

Information and Communication Technology

Grade 10

2007

Teachers' Instruction Manual



Department of Information Communication Technology

National Institute of Education

Sri Lanka

Message of the Director General

The first curriculum revision for the new millennium is based on the elimination of the several problems obtaining in the present education system. The present curriculum reforms have been planned having identified the problems that youth face consequent to the weakening of their thinking abilities, social abilities as well as personal abilities and step by step exploration of factors leading to this situation, to overcome which, the necessary background was prepared.

Compared to the other countries in the Asian region, our country took the lead in education in earlier years. But most countries in this region have superceded Sri Lanka in education today. Some factors that influenced this deterioration are the action taken by educational institutions to continue to take action to confirm the known, learn that which had been decided on earlier, and reconstruct that which was, in the same form itself.

All these matters have been taken into consideration and the officers of the National Institute of Education have endeavoured to prepare the new curriculum on the basis of a distinct philosophy. The primary objective here is to change that which is known, explore that which is new and develop that which is necessary for tomorrow and build up a generation of students who can display their readiness for a successful future. But there is no need to reiterate, the need for a visible change in the teacher's role for the realization of this objective. In place of the obvious transactional teacher role presenting in our classrooms so far, the Sri Lankan school teacher will have to understand and conform to a student-centered, competency based and activity focused transformational role.

It is our firm belief that this Teacher Instruction Manual will serve you as an aid to become an effective teacher through the provision of numerous instructions that will help you adapt to the new situation. Through the study of these instructions you will be provided the opportunity of making your daily teaching as well as the evaluation task easy. There is no doubt that instructions for student exploration and other quality inputs will help facilitate the teacher's task. Similarly, the Teacher Instruction Manual will help convey to school principals valuable information they can use in time-tabling, sharing of limited resources and internal supervision.

My sincere thanks go to Dr. Mrs. I. L. Ginige, Assistant Director General (Curriculum Development) Science & Technology Faculty of National Institute of Education for her direct involvement in the preparation of this Teacher Instruction Manual that will serve an immense purpose in the task performed at school level by the section above and also teacher educationist involved in beginning or continuous teacher educational matters, in-service advisors as well as officers at various levels, involved in external supervision plus monitoring programmes.

Professor J. W. Wickramasinghe
Director General
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Preface

The first curriculum reform for the millennium implemented with the aim of preparing a powerful basis for a new Sri Lanka anticipates a visible transformation of the teacher's role. The three main sections below are included in the Teachers Instruction Manual prepared with the objective of providing the teacher with the necessary support in this regard.

- Detailed Syllabus
- Activity Continuum that helps in the implementation of the syllabus
- Instruments for the extension of the learning teaching process.

Teachers have been provided the opportunity of understanding several basic matters that have been taken into consideration in the preparation of the curriculum for the detailed syllabus extending beyond subject topics and sub-topics. Competency levels that correspond to subject competency have been included in this section that commences with an introduction to the factors and subject aims that formed the basis of the new syllabus. One special features of this section is that, while the knowledge-base determined under competency level each student needs to develop has been introduced as the subject content the multiple learning and teaching methods employed in transmitting this section to the student has also been taken into consideration in determining the time frame with respect to each competency level.

The final part of the detailed syllabus presented under the heading "School Policy and Programs" needs to be studied very carefully and understood by every instructional leader. This section provides school managers a range of valuable instructions to assist them in the allocation for teaching, subject-teaching assigning functions to teachers, implementing co-curricular activities as well as supervision of the teacher's task. The second section of the Teacher Instruction Manual has been prepared with the objective of providing teachers with clear understanding of the proposed learning- teaching methodology. This section commences with the introduction of the methods of planning activities under competency-based education as well as the change in the teacher's role. Although the activity continuum necessary for the implementation of the curriculum has been introduced next, the implementation of the proposed activity in the very same manner is not expected of teachers. The teacher should endeavor to make use of his / her creative, as well as critical thinking abilities and adapt these activities in a manner that suits ones class, best. Although instructions have been provided on the constitution of groups in keeping with the facets of the problems subject to exploration, the teacher is expected to take an intelligent decision on the number of groups based on number of students in the class.

Time has been allocated for activities to ensure achievement of the relevant competency levels. Therefore, teachers may have to exceed the 40-minute period. While each activity has been provided adequate time for the actualization of each competency level, the teacher is expected to make use of single or double periods in the time table and breakdown these activities, as suitable in implementing them. For the success of the procedure it is essential that every time an activity commenced the previous day is carried over to the following day, that a brief summary of the part of the activity completed the previous day is presented to the class. Similarly, this decision will provide the school community with the opportunity of involving students in effective learning where teachers obtain leave of absence. The final item in this section is a list of quality inputs necessary for the maintenance of the quality of subject learning and teaching, when taken as a whole. As such, the teacher has a choice of ordering out the necessary learning-teaching materials in time and having them on hand.

Included in the third part of the teacher Instruction Manual under the title " Assessment and evaluation" are a number of important hints to ensure that the expected results of the exercise are realized.

This section has been so structured as to introduce matters related to the assessment and evaluation that should take place under each activity, extension of the learning and teaching that takes place based on activity groups and the nature of the questions that might be expected in general examinations. It must be pointed out that the primary responsibility of the teachers is to identify instances where assessment and evaluation can be implemented in the course of each activity and to carry out this task successfully on the basis of common criteria. The set of instruments prepared with a range of activities as the objective for the purpose of extending learning and teaching provide students with the opportunity of involvement in continuous learning outside the recommended classroom sessions. While it is the task of the teacher to regularly examine the learning students receive, based on these instruments, and encourage them, arriving at a correct decision regarding the final results of the activities and communicating that decision to the relevant parties is expected of the teacher. It is essential that a visible change takes place in general examinations for the success of the learning-teaching process. The National Institute of Education, with the assistance of the Sri-Lanka Department of Examinations, has introduced several prototype questions for educational levels that terminate with these examinations. Since this change in examination question papers has been suggested in order to direct students to learn through practice and experience, instead of resorting to mechanical approaches like memorizing or answering model question papers, the education of school students and parents about this change should commence at the beginning itself.

All teachers should realize that various activities can be developed for the achievement of any particular competency level. Accordingly, they should be prepared for more successful teaching through the use of better approaches, exploration, as well as instruments for the extension of learning and teaching.

The present Teacher Instruction Manual will give teachers right throughout the country the courage to effect a visible change in the teacher's role and prevent their becoming inactive in the presence of new approaches. Similarly, we expect to award certificates and provide numerous development opportunities to teachers who go beyond the activities to involve themselves in the innovation of novel creations. What teachers have to do in order to become eligible to the awards is to improve these activities, using their creative thinking, and present them. Learning-teaching plans prepared in this manner outside the basic activity plan, should be forwarded to Assistant Director General (Curriculum Development), Science and Technology faculty, National Institute of Education, Sri Lanka. Selection of those entitled to awards will be made subsequent to the study of these activities by the relevant subject committees.

We have endeavoured in this manner, to bring learning-teaching assessment and evaluation on to the same platform through new methodologies. According to this, teachers will be provided substantial latitude to meaningfully handle the learning-teaching process, school-based assessment, as well as assignment of home-work. It is our firm conviction that the school system of Sri Lanka will, make maximum use of this aid and depart from orthodox learning-teaching approaches to enhance the thinking abilities, social abilities as well as the individual abilities of the sons and daughters of the country.

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Part 1

Syllabus

Information And Communication Technology

RATIONALE

The Information and Communication Technology sector is acknowledged worldwide as a tool that could be used to increase the productivity, efficiency and effectiveness of work. This technology has enabled dramatic changes in the job market and the way workers communicate with each other and perform job related activities. Every sector of the economy is forced to use this technology to make their work effective and efficient and thereby maintain a competitive edge. Therefore, those who enter the job market should acquire proper IT skills to find employment in the modern business world without much difficulty. However, in Sri Lanka, the level of IT skills of the majority of the students is not adequate to meet the current requirements of business and industry. This is mainly due to lack of opportunities for students to study IT related subjects in the school curriculum. Therefore, it is very important to bridge the gap between requirements of the industry and quality of education standards through the curriculum, providing transferable skills and competencies related to the world of work. Especially, the ICT and entrepreneurial skills of students should be developed. The student should learn at school a wide variety of competencies for different needs of life in the changing world. They should have various views and different ways to continue studies and proceed to employment.

Since Sri Lanka is in the early stages of introducing ICT to the lower grades, the present syllabus does not demand any ICT knowledge as an entry requirement. Therefore, this syllabus is intended to introduce ICT as a technical subject to be offered at the G.C.E (O/L). Examination. The main objective of this syllabus is to develop the competencies to use ICT tools and to build a basic theoretical base for students to pursue higher studies in ICT.

Course Objectives:

Such a surge in the growth, development and the application of Information Communication Technology as today has never been experienced before. The importance and relevance of ICT to almost all walks of life today has made it all the more important that knowledge and expertise, both practical and theoretical, of its application, should begin at the very grass roots level of education.

It with the objective of accommodating this perception that there is the need for ICT to be firmly and pervasively established in the schools system, that the present initiative for the introduction of the ICT–G.C.E. (O / L) syllabus on a competency based format, was taken in keep with curriculum reforms of 2007.

Objectives to be achieved by the course are as follows:

- Inculcate basic computer literacy and develop a base for further pursuit of Information Technology and Communication Technology studies.
- Develop understanding of use and resultant outcomes of use of different types of ICT applications.
- Develop concepts and principles related to ICT.
- Improve skills required for the development of ICT based solutions for real world problems.
- Provide awareness of benefits and problems of ICT use to participants.

Subject Content and Time Duration by Competencies and Competency Levels,

Competency and competency levels	Content	Time minutes
1. Investigates the place of the computer in the world of information.		
1.1 Investigates the contribution of ICT towards national development.	<ul style="list-style-type: none"> ▪ Definition of ICT ▪ Uses of ICT in society ▪ Importance of ICT 	120
1.2 Investigates the computer as a system for converting data into information.	<ul style="list-style-type: none"> ▪ Parts of a system ▪ Difference between Data and Information ▪ Data and Information as input and output ▪ Processing as the method for converting data into information 	90
1.3 Explores the evolution of computers to identify its major developments.	<ul style="list-style-type: none"> ▪ Computer Generations ▪ Hardware changes <ul style="list-style-type: none"> ○ Vacuum Tubes ○ Transistors ○ Integrated Circuits ○ LSIC ○ VLSIC ▪ Related changes in characteristics <ul style="list-style-type: none"> ○ Size ○ Capacity ○ Speed ○ Accuracy ○ Efficiency 	90

Competency and competency levels	Content	Time minutes
2. Selects and uses computer hardware		
2.1 Classifies computers using a variety of methods.	<ul style="list-style-type: none"> ▪ Computer classifications <ul style="list-style-type: none"> ○ Mainframe/Mini/Micro/Super ○ Digital/Analog/Hybrid ○ General purpose/special purpose 	90
2.2 Classifies computer peripherals by function.	<ul style="list-style-type: none"> ▪ Functions of computer peripherals <ul style="list-style-type: none"> ○ Input ○ Processing ○ Output ○ Storage ○ Dissemination 	120
2.3 Identifies and connects basic peripherals to the computer.	<ul style="list-style-type: none"> ▪ Basic computer components Keyboard, mouse, system unit, monitor ▪ Ports <ul style="list-style-type: none"> ○ PS/2 ports ○ Serial port ○ Parallel ports ○ USB port ○ RJ 45 	90
2.4 Uses the basic block diagram to demonstrate the computer system.	<ul style="list-style-type: none"> ▪ Flow path <ul style="list-style-type: none"> ○ Data/instruction signals ○ Control Signals 	80
2.5 Investigates benefits and concerns of computer networks for optimal communication.	<ul style="list-style-type: none"> ▪ Purpose of computer networks <ul style="list-style-type: none"> ○ Data communication ○ Resource sharing ▪ Components of a network <ul style="list-style-type: none"> ○ Network Interface Cards ○ Internal/External ○ Transmission Media ○ Network cable ○ Twisted Pair, Co-axial, Fiber optics, ○ Microwaves ○ Client/Server ○ Computers ○ Modems ○ Hub/Switches ▪ Network Operating Systems ▪ Types of computer Networks <ul style="list-style-type: none"> ○ LAN ○ MAN ○ WAN ▪ Disadvantages of Networks 	80

Competency and competency levels	Content	Time minutes
3 Investigates the methods used for data representation in computer systems		
3.1. Uses the Binary number system to represent data in computer systems	<ul style="list-style-type: none"> ▪ Methods for data representation <ul style="list-style-type: none"> ○ One and zero to represent two states ▪ Binary number system to represent the two states 	60
3.2. Converts decimal numbers to Binary, Octal and Hexadecimal	<ul style="list-style-type: none"> ▪ Number systems <ul style="list-style-type: none"> ○ Decimal ○ Binary ○ Octal ○ Hexadecimal ▪ Methods for related conversions 	90
3.3 Converts Binary numbers to Decimal, Octal, Hexadecimal numbers and vice versa	<ul style="list-style-type: none"> ▪ Methods for relevant conversions <ul style="list-style-type: none"> ○ Binary to Decimal ○ Binary to Octal ▪ Binary to Hexadecimal and vice versa 	90
3.4 Determines the capacity of computers in terms of data storage	<ul style="list-style-type: none"> ▪ Bit ▪ Byte ▪ Kilobyte ▪ Megabyte ▪ Gigabyte ▪ Terabyte 	90
3.5 Uses coding systems in computers	<ul style="list-style-type: none"> ▪ BCD ▪ EBCDIC ▪ ASCII ▪ Unicode 	80

Competency and competency levels	Content	Time minutes
4. Uses Boolean Algebra to work effectively with logic gates		
4.1 Identifies basic logic operators and draws truth tables to illustrate their functions.	<ul style="list-style-type: none"> ▪ Operators <ul style="list-style-type: none"> ○ AND ○ OR ○ NOT ▪ Introduction to Truth Table (more than two inputs) 	80
4.2 Assesses the suitability of basic logic gates to illustrate logic operations.	<ul style="list-style-type: none"> ▪ Identify Basic Logical Gates <ul style="list-style-type: none"> ○ AND ○ OR ○ NOT 	80
4.3 Uses basic laws of Boolean algebra to handle logic gates	<ul style="list-style-type: none"> ▪ Introduction to Boolean Algebra ▪ Introduction to Basic Laws of Boolean Algebra 	80
4.4 Integrates basic gates to develop simple circuits	<ul style="list-style-type: none"> ▪ Uses Boolean algebra to simplify problems in designing simple circuits. 	80
5.Works effectively with operating systems		
5.1 Explores operating system by type functions benefits and concerns	<ul style="list-style-type: none"> ▪ Manual system and the OS ▪ Functions of the OS ▪ Benefits of the OS 	60
5.2 Adopts the graphical user interface to meet ones own need	<ul style="list-style-type: none"> ▪ GUI ▪ Benefits of GUI ▪ GUI components & its features 	120
5.3 Handles files and folders in the Windows operating system.	<ul style="list-style-type: none"> ▪ Windows Explorer/ My computer <ul style="list-style-type: none"> ○ Drives ○ Folders ○ Files and extensions ▪ Manipulating files and folders. ▪ Recycle bin 	60

Competency and competency levels	Content	Time minutes
6. Uses Word Processing Software To Solve Day-To-Day Problems.		
6.1 Explores the concept and features of Word Processing	<ul style="list-style-type: none"> ▪ Introduction to Word processing ▪ Components of Word processing Application Window. 	120
6.2: Performs basic tasks in Word Processing	<ul style="list-style-type: none"> ▪ Creating a new document ▪ Opening an existing document ▪ Saving and closing 	120
6.3 Uses different types of formatting in Word Processing	<ul style="list-style-type: none"> ▪ Formatting text ▪ Drawing, Formatting and Inserting 	120
6.4 Inserts tables into documents and acquires the ability of customizing them.	<ul style="list-style-type: none"> ▪ Inserting table ▪ Column width and row height ▪ Deleting, inserting, splitting and merging 	60
6.5 Creates documents and obtains printouts.	<ul style="list-style-type: none"> ▪ Spelling and Grammar checking ▪ Find and replace ▪ Page setup (paper size, margins, orientation and selecting printer) ▪ Print options (copies and page range) 	90
6.6 Uses the mail merge facility.	<ul style="list-style-type: none"> ▪ Document types ▪ Common document ▪ Source data 	120

7. Uses Spreadsheet to solve simple statistical problems.		
7.1 Explores a Spreadsheet to identify its basic features and functions.	<ul style="list-style-type: none"> ▪ Introduction to Spreadsheets ▪ Components of Spreadsheets Application Window. 	90
7.2 Moves around the worksheet to gain hands on experience of data entry	<ul style="list-style-type: none"> ▪ Worksheet, columns, rows and cells ▪ Moving around worksheet. ▪ Data entries (label, number, formulae) 	60
7.3 Performs basic mathematical operations	<ul style="list-style-type: none"> ▪ Simple calculations using values and operators (+, -, *, /) ▪ Simple calculations using cell names and operators (+, -, *, /) 	60
7.4 Uses inbuilt functions for calculations	<ul style="list-style-type: none"> ▪ Simple calculations using values and operators (+, -, *, /) ▪ Simple calculations using cell names and operators (+, -, *, /) 	60
7.5 Formats a worksheet	<ul style="list-style-type: none"> ▪ Font, Font size, Bold, Italic etc. ▪ Alignment (centre, left, right) ▪ Decimal places (increase and decrease) 	90
7.6 Recognizes relative versus absolute cell references.	<ul style="list-style-type: none"> ▪ Absolute and Relative cell references. 	90
7.7 Creates charts Using Spreadsheet	<ul style="list-style-type: none"> ▪ Charts, chart type, chart options 	90

Competency and competency levels	Content	Time minutes
8. Uses Presentation software to design electronic presentations.		
8.1. Makes attractive presentations using basic features of presentation software	<ul style="list-style-type: none"> ▪ Introduction to presentation ▪ Changing Background, Slide layout, Slide designs. ▪ Inserting Suitable pictures ▪ Customizing animation 	120
9. Develops simple databases to elicit information.		
9.1 Explores the Concept of Database	<ul style="list-style-type: none"> ▪ Introduction to database ▪ Tables, Fields, Records, Key field 	120
9.2 Creates a simple database with a single table, manually	<ul style="list-style-type: none"> ▪ Field name, unique field, data types, field size 	90
9.3 Converts a manual database into electronic media	<ul style="list-style-type: none"> ▪ Field name, data types, field size, Primary key, Field properties 	90
9.4: Creates a relational Database manually	<ul style="list-style-type: none"> ▪ Relational DBMS ▪ Primary key, Foreign key, Relationship 	60
9.5 Uses DBMS software to convert manually developed relational database into electronic media	<ul style="list-style-type: none"> ▪ Relational DBMS ▪ Primary key, Foreign key, Relationship 	120
9.6 Creates Queries to extract information	<ul style="list-style-type: none"> ▪ New query design ▪ Using criteria ▪ Sorting 	60
9.7 Uses Forms to append data and view information	<ul style="list-style-type: none"> ▪ New form design ▪ Controls and properties ▪ Header & footer (Form & Page) 	60

School Policies and Programmes

The schools attempting to implement the new technical subject ICT at the GCE (OL) are likely to face a number of challenges. First and foremost, the non-availability of a computer laboratory or an adequate number of computers for the task will not allow all schools with GCE (OL) classes to initiate the course in year 2007 itself. The technical nature of ICT will further limit the number of teachers opting to teach the subject thereby preventing the school authorities from selecting the most suitable teacher to be trained for the purpose. Moreover, lack of senior teachers both within and in the vicinity of the school will not allow adequate assistance and guidance to be offered to those teachers who undertake teaching of the new subject.

Curricula proposed under the first curriculum reform of the new millennium require all subject teachers to introduce the philosophy of learning by doing. The teachers attempting to meet this requirement have to link theory with practice in every activity they plan for their students. The learning thus acquired through activities has to be supplemented with a number of additional practice sessions. All this requires every school offering the subject to be equipped with a computer laboratory with multimedia facilities. Although the ideal situation in this respect is to provide a computer to each student, the many limitations resulting through resource constraints would necessitate two students to share one computer.

It is also important that each school has a technician or at least a competent teacher to attend to minor repairs and breakdowns and troubleshoot software. The school authorities, however, are encouraged to get the major repairs attended to by the Computer Resource Centre (CRC) in the region or by the computer vendor itself in the availability of a valid warranty. Maintenance and repairs to computer items thus will ensure the availability of a running computer laboratory for continuous use by students throughout the course period.

All teachers selected for teaching of ICT must have skills over and above mere computer users. Such teachers should be able to understand the logic of programming. They should further have the capacity and willingness to update the competencies they acquire originally to be in line with the new developments of the industry. In view of facilitating this, the teachers selected should be exposed to both initial and continuing teacher education programmes organized for them by the IT Department of the Science and Technology Faculty of the National Institute of Education.

Even though all students should have equal opportunity to select ICT as their technical subject, resource limitations, particularly in the areas of computer laboratories and capable teachers, may not allow all those who are interested to be selected for the course. Considering the resources available to the schools, the authorities, therefore, will have to find a reasonable basis to select an appropriate number of students to follow the course.

As with any other optional subject included in the technical or any other subject group, ICT has to be allocated with three periods a week. The teachers will have to study the activities given in the Teacher Instructional Manual (TIM) in dividing the time assigned between activity and practice sessions. Since the computer laboratory available to each school is shared for Computer Assisted Learning (CAL), General Information Technology (GIT), and various other programmes on computer awareness, it is advisable to maintain a time allocation chart in the computer laboratory itself to prevent any possible clashes.

The group project to be undertaken in the second year of the course will have to be carried out beyond the normal classroom sessions. Thirteen periods, however, will be devoted for teacher led discussions at different stages of the project. For the success of this activity which enables a score comprising both individual and group marks, arrangements will have to be made for the students to use the computer laboratory outside the timetabled sessions.

The tools developed to extend learning and teaching can be used for assessment and evaluation as well. The resulting marks can be submitted to the Sri Lanka Department of Examinations for certification purposes.

Until the full cadre of In-Service Advisors (ISAs) are appointed to support teachers at school level, the schools are expected to maintain a close relationship with the closest CRC and the Provincial Centre for IT for purposes of monitoring the progress of the subject and provision of necessary feedback to the teachers. The relevant sectional head and the senior teachers of the school also may assist the ICT teacher on pedagogical matters to enable joyful learning for the students. All parties responsible for ICT also will be updated from time to time on such matters.

For successful implementation of ICT at school level, the schools should demonstrate a culture conducive to ICT. School administrative and instructional processes embracing IT for day-to-day activities are two features of such a culture. It is also important for the majority of students of the school to have some exposure to IT and the school community to value ICT education as a tool for future employability. To accomplish the first task here, the schools are encouraged to form ICT clubs, conduct ICT exhibitions, and make visits to ICT organizations. Links with relevant industries in the locality will pave the way for the latter. Support extended by such institutions in developing the ICT sections of the schools and in supplying employment to school leavers will enable the schools to make ICT popular among their school communities.

Part 2

Learning – Teaching Methodology

Introduction

In deciding upon the learning teaching methodology relevant to the course, attention has been paid to the planning of learning-teaching activities so as to facilitate building up of student competencies based on exploration. In preparing for competency-based education, in this manner, an obvious change in the role of the teacher is expected.

The transmission role practiced in our classroom from way back and the more recently introduced transaction role is evident in the classroom even in the present day. When taking the deterioration of the thinking skills, personal skills and social skills of school leavers into consideration, it needs no effort to understand that there is a need for the development of the learning-teaching methodology and how it should be effected.

In the transmission role while the teacher is considered an individual who knows everything, his task has become that of considering the student as one who does not know anything and of transmitting knowledge to him. This learning-teaching process that takes the guise of lectures is restricted only to the flow of knowledge from the teacher to the student, does not make an adequate contribution either to the stimulation of student thinking or to the development of his personal and social skills.

The dialogue initiated by the teachers within the class is the initial stage of the transaction role apart from the ideas that flow from the teacher to the class and from the class to the teacher. These dialogues get gradually transformed into discussions as a result of the student-student interaction that takes place subsequently. The teacher is continuously involved in the task of questioning in order to take the student from the known to the unknown, from the simple to the complex and from the concrete to the abstract.

While, in competency-based education, student tasks occupy a powerful position, the teacher occupies the position of a resource person who mediates in order to provide every student in the class with at least the competency proximate to each relevant competency. For this purpose the basic functions the teacher is expected to perform include planning of a learning environment consisting of the materials and other facilities necessary for learning, close observation of how students learn, identification of student abilities and inabilities and the promotion of student learning through feed back and provision of feed forward as well as the preparation of instruments of assessment for the extension of learning beyond the classroom. The teacher's role based eventually upon the tasks above is called the transformation role.

The series of activities that can be used in the implementation of the descriptive curriculum introduced in the first part of this course guide, has been included in its second part. Each of these activities has been developed so as to contain a minimum of three steps. It is expected to get the student involved in the learning process through the first step of the activities. As such, this step is called the "Engagement" step. As an introduction to this step, the teacher assumes the Transaction role and engages in a dialogue with the students. Later, along with the transformation of this dialogue to a discussion the students engage in exploration and are provided the opportunity to recall the pre-knowledge related to the basic competency they should develop and to acquire a hint regarding the future of the activity. The teacher possesses a host of strategies that can be used in these exchanges of ideas. Some of the devices at the disposal of the teacher for the exchange of these ideas are questioning/stimulants like pictures, newspaper advertisements and flash cards/use of puzzles or case studies/dialogues, role play, poems, songs and demonstrations, video tapes or audio tapes. In summary, the first step of the activities is implemented with the objective of actualizing the three objectives below.

- Winning over of the attention of the class.
- Providing the students with the opportunity for students' recall of the necessary pre-knowledge.

- Introducing the elements of the explanation the students are expected to be directed to under the second step of the activity.

It is with the objective of providing the students with the opportunity of Exploration that the second step of the activity has been planned. Students base their exploration on a special leaflet prepared for the purpose. The teacher has to plan this explanation to enable the students to engage in co-operative learning through the exploration of various aspects of the problem, in groups. Some of the most important qualities of this step are involvement in the conscious group discussions and the use of the resource materials provided. As a result of involvement in group activities through a long period of time, student will acquire the ability to develop a number of skills like self-discipline, listening to others, working co-operatively with others, helping them, management of time, obtain creations of high quality, honesty etc. In directing students to exploration, while the teacher should avoid taking decisions regarding leadership, he should build up the background necessary to surface. Accordingly, the students will have the privilege of taking on leadership when opportune, based on hidden abilities.

During the 3rd step of the activity, every group will get the opportunity of presenting the results of its exploration for the enlightenment of the others. What the teacher has to do here is to encourage students to group presentations. It would be effective if students are directed so as to ensure that every member is given responsibility in the planning of the presentation. An important quality of this step, related to the explanation of student findings, is the creation of the opportunity for the voice of students to be heard in the classroom where, commonly the voice of the teacher had dominated.

After the explanation of the findings in the third step of the activities, students should be directed to elaboration. Each group is given the opportunity to provide constructive suggestions on its findings first, and subsequently, members of other groups are given this opportunity. Anyway the final review is the responsibility of the teacher. The teacher is expected to touch on all the important points relevant to the students' exploration.

The main responsibility of the teacher in this learning teaching process is to monitor continuously, whether the classroom learning-teaching process is implemented successfully, as expected. While assessment and evaluation should be made use of for this purpose, the teacher is provided the opportunity, through planned activities, in the learning teaching process itself. The teacher is given the opportunity for assessment while the students are involved in exploration during the second stage of the activity and for evaluation when the students are involved in explanation and expansion during the third stage. A detailed inquiry into assessment and evaluation will be provided later on in this document.

The teacher is provided direction on the transformation role by the learning –teaching methodology described so far. While priority is given to group exploration here, the teacher is also afforded the opportunity for transaction, discussion and short lectures. While there is room for transaction and discussion, the teacher may also give a short lecture, under review, in the final stage. In the development of the learning-teaching methodology related to this curriculum, the first to be introduced under the curriculum reforms for the new millennium, the attention paid to the important features relevant to the transmission as well as the transaction roles of the teacher, apart from the transformation role, is a special feature of this methodology.

The learning-teaching process can be broadened through the improvement of the evaluation program. For this purpose the teacher has the opportunity of creating several evaluation situations through an activity continuum. The program of assessment can be made meaningful by dividing the activity continuum to several activity clusters to facilitate identification of evaluation points. It is necessary that the evaluation instrument being used with respect to each activity is introduced to the students at the beginning of every activity cluster. It is also necessary in the selection of learning varieties, those activities where student motivation to learn are helped to blossom forth, is selected. Below is a list of the relevant activities.

Concept maps
Wall newspapers
Quizzes
Question and answer books
Portfolios
Exhibitions
Debates
Panel discussions
Seminars
Impromptu speeches
Role-play
Presentation of literature reviews
Field books/ nature diaries
Practical tests

Quality Inputs

A classroom environment replete with quality inputs is necessary for active education. The inputs referred to here can be utilized for purposes of Information and communication technology.

Some of these equipment may be obtained from the various sections of the school. It is important that this equipment is introduced to the students. In the course of the lesson it becomes necessary for students to be introduced, physically, to certain peripherals. It is true that certain schools do have such equipment but there are others that don't. The lesson can be, all the more enriched, if students are afforded the opportunity of viewing such material. It is left to the ingenuity of the teacher to find the necessary equipment, possibly on loan basis.

- | | |
|--|---|
| <ul style="list-style-type: none"> • Fully equipped computer lab with multimedia projector. | A simple circuit built on a circuit board. |
| <ul style="list-style-type: none"> • Demy sheets | <ul style="list-style-type: none"> • Scanners, digital cameras, printers, speakers and other peripherals available in the lab. |
| <ul style="list-style-type: none"> • Markers | |
| <ul style="list-style-type: none"> • Half sheets | |
| <ul style="list-style-type: none"> • A4 sheets | <ul style="list-style-type: none"> • Different types of machines. (Manually operated machine like coconut scraper, Grinder, Grater.) |
| <ul style="list-style-type: none"> • Felt pens | |
| <ul style="list-style-type: none"> • Diskettes | |
| <ul style="list-style-type: none"> • Counter frames | |

Drawings or Diagrams

- Picture, illustrating the use of ICT in society.
- Picture on the evolution of the human being
- Pictures with descriptions of computer peripherals
- Labeled diagram of starting Window of Word Processing application
- Labeled diagram of Keyboard layout.
- Labeled diagram of Starting Window of Spreadsheet
- Labeled diagram of formatting tool bar
- Printouts of Home Page layouts
- A poster on hobbies

Activity Continuum

Competency 1: Investigates the place of the computer in the world of information.

Competency Level 1.1: Investigates the contribution of ICT towards national development

Activity 1.1 : Let's investigate the role of ICT in society.

Time : 120 minutes.

Quality Inputs :

- The picture illustrating the use of ICT in society in Annexe 1.1.1.
- Seven copies of the group exploration instructions in Annexe 1.1.2
- Seven copies of reading material in Annexe 1.1.3
- Demy sheets and markers.

Learning – Teaching Process:

Step 1.1.1 :

- Display picture to class.
- Lead a discussion to highlight the following.

- Computers are used to meet a variety of human needs.
- The many functions facilitated by the computer makes it a multi - purpose tool.
- Society, however, has to be cautious of its advantages and disadvantages.

(15 minutes)

Step 1.1.2 :

- Divide the class into seven groups.
- Distribute copies of the group exploration instructions and reading material to each group with a demy sheet and marker.
- Involve the groups in the exploration.
- Prepare them for a presentation at the plenary session.

(45 minutes)

- Step 1.1.3** :
- Get the groups to present their findings.
 - Request the presenters themselves to fill in any gaps they have left.
 - Invite constructive comments of the other groups.
 - Conclude the session by highlighting the following.

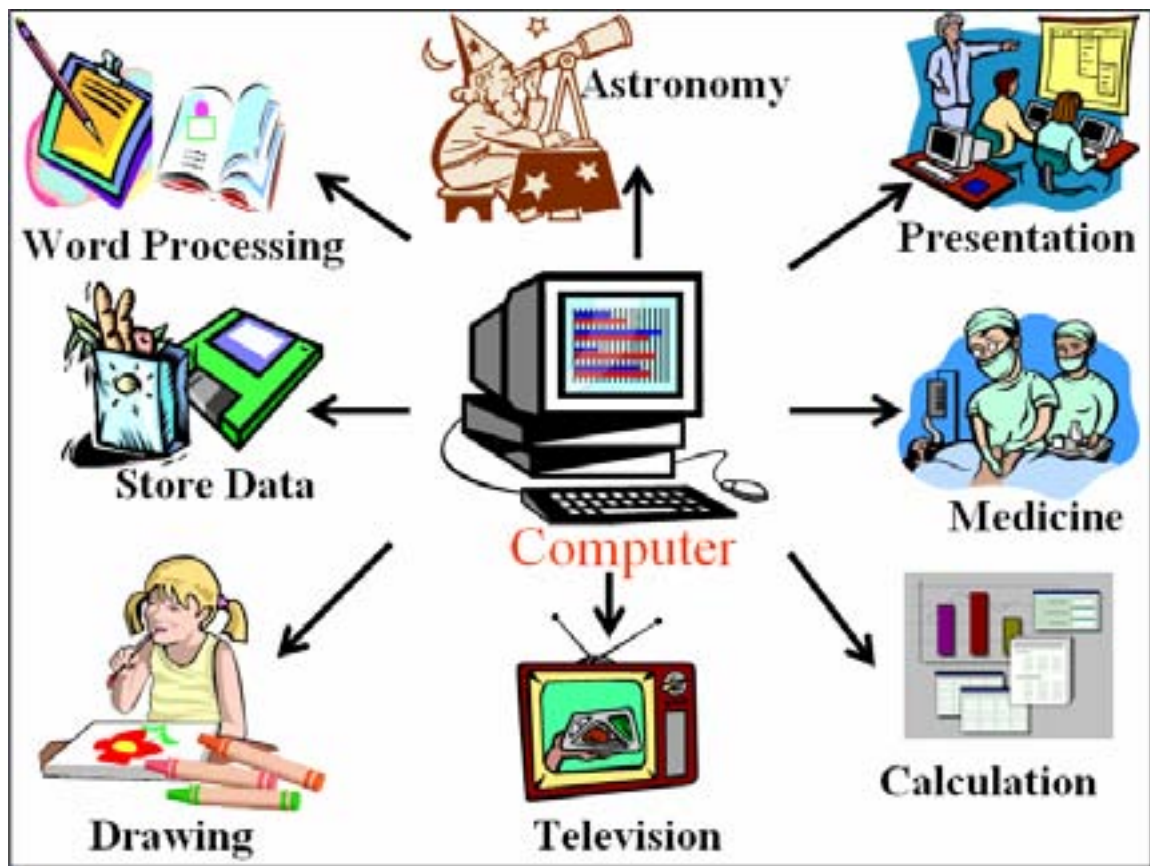
- A common definition for ICT is “Processing of data using the technologies of computing, electronics, and telecommunications to disseminate information to clients in digital and other forms”.
- A common use of ICT in education is e-learning.
- In banking ICT is used for immediate transactions.
- ICT facilitates customer service in transportation.
- Scanning is one main use of ICT in medicine.
- Thus ICT provides us with numerous opportunities to make our day-to-day life easy.
- Society, however, has to be prepared to give due credit to its founders.

(60 minutes)

Criteria for assessment and evaluation

- Names the main fields where computers are commonly used.
- Accepts the value of the computer as a multi-purpose tool.
- Analyses the contribution of the computer in making day-to-day work efficient and effective.
- Reflects on previous experiences to arrive at suitable answers.
- Acknowledges the learning derived from other sources.

Annexe 1.1.1



Annexe 1.1.2**Instructions for the Group Exploration**

Today, ICT has become an important part of day-to-day life. Most human activities now take place with the aid of ICT solutions. The reason behind this is that, ICT gives more effective and speedy solutions to real life problems. In fact, a characteristic feature of this era is that people lead such complex lifestyles with greater requirements that need rapid and suitable solutions. ICT satisfies these requirements in a comprehensive manner. Hence today has become the ICT age.

A few instances where ICT is used currently are:

- Education
 - Banking & Accounting
 - Transportation
 - Medicine
 - Engineering
 - Security & Defense
 - Entertainment
- You will be working in seven groups with the seven fields above randomly distribute among the groups.
 - Go through the relevant section of the reading material.
 - Develop a definition for ICT on the basis of your reading experience.
 - List how the computer is used in the particular field assigned to your group.
 - Suggest other uses to be added to the list.
- (Use a different marker to highlight the additions)
- Identify the relevance of ICT in your own field of work.
 - Be prepared to present your findings at the plenary session.

Annexe 1.1.3

Reading Material

Uses of ICT in society

Education

- Learning
- Teaching
- Educational administration

Computer Assisted School Administration+

This involves the use of IT to automate activities in school administration such as keeping records of students, examination results, normal office work and communication with other schools via e-mail etc.



Accounting and Banking

[ATM, Transactions, Tele banking, Credit card payments]

IT is used to automate manual accounting systems such as general ledger, sales and purchases, stock control (with point of sales terminal connected to stock data base) In banking the use of Automatic Teller Machine is a useful application of IT.



Transportation

IT is used in transportation by railways and airlines for reservation of seats, control of traffic and maintaining time-tables of vehicles and duties of the crew. It is used in all fields of air traffic. Every aircraft has a small computer fitted to help pilots in various ways.



Medicine

[Chemical analysis, CT, MRI, US Scanning, ECG, EEG, Surgery]

In hospitals special computers are built inside different equipment. For example CAT scanners (Computer Axial Tomography) Further maintenance of patients records in electronic databases enhances services provided to them.

In hospitals special computers are built inside different equipment. For example CAT scanners (Computer Axial Tomography) Further, maintenance of patients records in electronic databases enhances service provided to them.



Defense & Security

[Signal operations, Missile guidance, and nuclear plant operations]

IT is very useful in tracking down criminals through the maintenance of their databases. In warfare computers are used to guide missiles.



Engineering

Engineers use IT to prepare drawings of machines, tools, bridges, buildings etc.

(Computer Assisted Drawing- CAD). Also computers are used to control manufacture of items. (Computer Assisted Manufacture). The use of Robots in industries is another example.



Entertainment

This basically covers video games, music and movies played back by computers with multimedia facilities.



Importance of ICT

ICT provides many opportunities for the users

- Makes learning more interesting especially of hard-to-understand topics
- Bridge distances – e.g. using e-mail, phone, video conferencing etc.
- Breaks literacy barriers in communication – e.g. use of video and radio.
- Helps research and information sharing – e.g. use of Internet
- Helps access information on jobs/internships
- Creates new employment opportunities (via ICTs/with ICTs)
- Enhances interaction with peers over long distances.
- Creates entertainment opportunities (games, music, video)
- Provides more realistic information on life elsewhere.
- Provides educational information (distance learning)
- Provides health information, including information on sensitive issues.

Competency 1: Investigates the place of the computer in the world of information.
Competency Level 1.2: Investigates the computer as a system for converting data into information

Activity 1.2 : Let's differentiate between data and information.

Time : 90 minutes.

Quality Inputs :

- Three copies of the group exploration instructions in Annexe 1.2.1
- Three copies of reading material in Annexe 1.2.2
- Demy sheets and markers.

Learning – Teaching process:

Step 1.2.1 :

- Draw the following table on the board.
- Get a volunteer to question the others and complete it.

How do we make a cake?		
Ingredients	Process	Output

- Conduct a discussion to highlight the following.

- Ingredients are needed to make a cake.
- Proper instructions are needed to guide the process.
- Ingredients and instructions are the inputs of this process.
- The cake is the output.
- Similarly, data need to be processed through a set of instructions to obtain information.

(15 minutes)

Step 1.2.2 :

- Divide the class into three groups.
- Provide each group with copies of the group exploration instructions and reading material.

- Assign each group to study Data, Data processing and information separately.
- Prepare each group to present its findings.

(45 minutes)

Step 1.2.3

- :
- Get each group to present its findings.
 - Request the other groups to present constructive comments.
 - Conduct a discussion to highlight the following.

- Data are the basic facts about things.
- Data can exist in the following two basic forms.
 - Data that cannot be expressed numerically.
 - Data that can be expressed numerically.
- Data can be processed in many ways as follows.
 - Arithmetical processes.
 - Organizing – Storing, Indexing.
 - Statistical processes.
- Information is obtained by processing data in a meaningful way.
- Information has nine characteristics.
- There are six factors that improve the quality of information.
- Information is used in day – to – day routine work, increasing our knowledge and planning, forecasting.

(30 minutes)

Criteria for assessment and evaluation

- Differentiates between data and information.
- Accepts that any result comes through a guided process
- Gives proper instructions to obtain better results.
- Collects data and processes them into information in real life situations.
- Expresses verbally the facts obtained from a document.

Annexe 1.2.1

Instructions for the Group Exploration

- You will be working in three groups on the following three topics randomly assigned to the groups
 - Data
 - Data processing
 - Information
- Go through the handout to identify the nature of the data type given to your group.
- Discuss with members and identify examples of the data types.
- Explain how you would process the data given.
- Describe the type of information you expect after processing.
- What differences do you see between data and information?
- Write down your answers on the demy sheet given and be prepared for a presentation.

Annexe 1.2.2

Reading Material

Data

Data are the basic facts about aspects such as things, persons, places, business activities, and events that exist in unprocessed form and have little meaning. They are treated as raw material.

E.g. Data concerning. An employee

Employee number
Name
Data of employment
Department
Job title
Salary

Data exists in the following forms.

1. Text (read & write)
 - Digits (numerical) [0...9]
 - Letters (Alphabetical) [a..z, A..Z]
 - Punctuation marks [., : : etc.]
 - Special tokens [\$ # @ ^ * ! Space etc]
 - Control characters.
2. Audio
 - Tones and other sounds, voice
3. Imaging
 - Dots, Lines, Circles, rectangles, diagrams, images, pictures.

Classification of data

Data can be categorized into two basic forms:

1. Data that cannot be expressed numerically
e.g. Colour, shape, sound, degree of health.
2. Quantitative Data
Data that can be expressed numerically are either discrete or continuous.

Nature of Data.

Data can be

1. Collected and stored.
2. Retrieved from a storage medium.
3. Communicated.
4. Processed.

Data Processing

A set of numerical data can be processed in many ways. Some of these are:

1. Arithmetical Process.
2. Organizing – Storing, Indexing.
3. Statistical Processes.

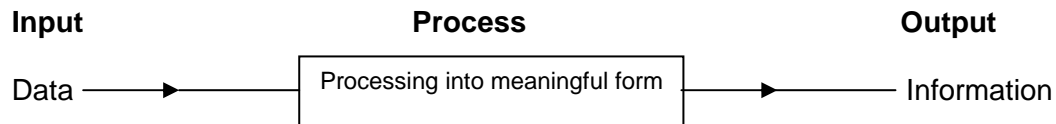
Manual Process and Technological Process

Basically, Data Processing can be done in two ways: Manual and Technological.

When compared to manual processing, technological processing is extremely fast, accurate and more reliable. Technology thus allows the highest value for information by giving rise to the field of Information technology.

Information

The term information refers to the result obtained by processing data in a meaningful way.



Relevance of Information

Information must have a purpose and so, it must be available to someone who can use it. The relevance of information varies from person to person. For an average person, the fifth root of 100 may mean nothing, but it may be very useful to a scientist or a technologist.

Characteristics of Information.

Information

1. is meaningful
2. is a surprise element
3. is an action
4. is an action motivator
5. confirms and refreshes previous knowledge
6. is considered an economic resource, somewhat on par with other resources such as labor, material, and capital.
7. is an economic commodity which helps to stimulate the worldwide growth of a new segment of national economics – the information service sector.
8. can only be shared in transactions and not exchanged.
9. is relative.

Factors that improve the quality of information

1. Relevance
2. Completeness
3. Accuracy
4. Clarity
5. Timeliness
6. Make of Communication

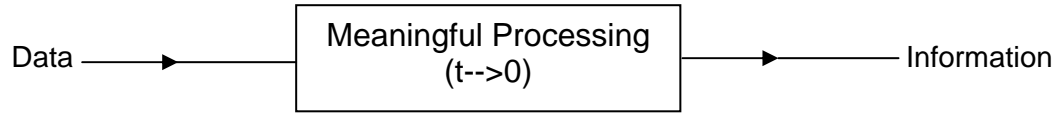
Uses of information

Information facilitates

- Day – to – day routine work
- Knowledge
- Planning
- Forecasting

Value of information

The value of information is determined on the basis of its relevance. The moment you create or receive information, it has a great value but this drops rapidly with time. This leads to a very important rule called the 'Golden Rule' of information. It states that the highest value of information occurs at time zero.

**Data and Information**

The two terms data and information are often used as meaning the same thing. An important distinction, however, exists between them.

Competency 1: Investigates the place of the computer in the world of information.
Competency Level 1.3: Explores the evolution of the computer to identify its major developments.

Activity 1.3 : Let's trace the development of computers to their present status.

Time : 90 minutes.

Quality Inputs :

- The picture illustrating the evolution of the human being in Annexe 1.3.1.
- Four copies of the group exploration instructions in Annexe 1.3.2
- Four copies of the reading material in Annexe 1.3.3
- Demy sheets and markers.

Learning – Teaching Process

Step 1.3.1 :

- Expose the picture to the class.
- Lead a discussion to highlight the following.

- The human beings have evolved from the apes.
- Over the generations, they have retained their basic structure while losing certain features and adding new features.
- Now human beings rule the world.
- Computers also have followed a similar pattern.
- They have developed over a number of generations.

(15 minutes)

Step 1.3.2 :

- Divide the class into four groups.
- Provide each group with copies of group exploration instructions, reading material, demy sheets and markers.
- Assign four generations to the four groups and involve them in the exploration.
- Prepare the groups for an innovative presentations at plenary session.

(40 minutes)

- Step 1.3.3** :
- Request each group to present its findings.
 - Conduct a discussion to highlight the following.

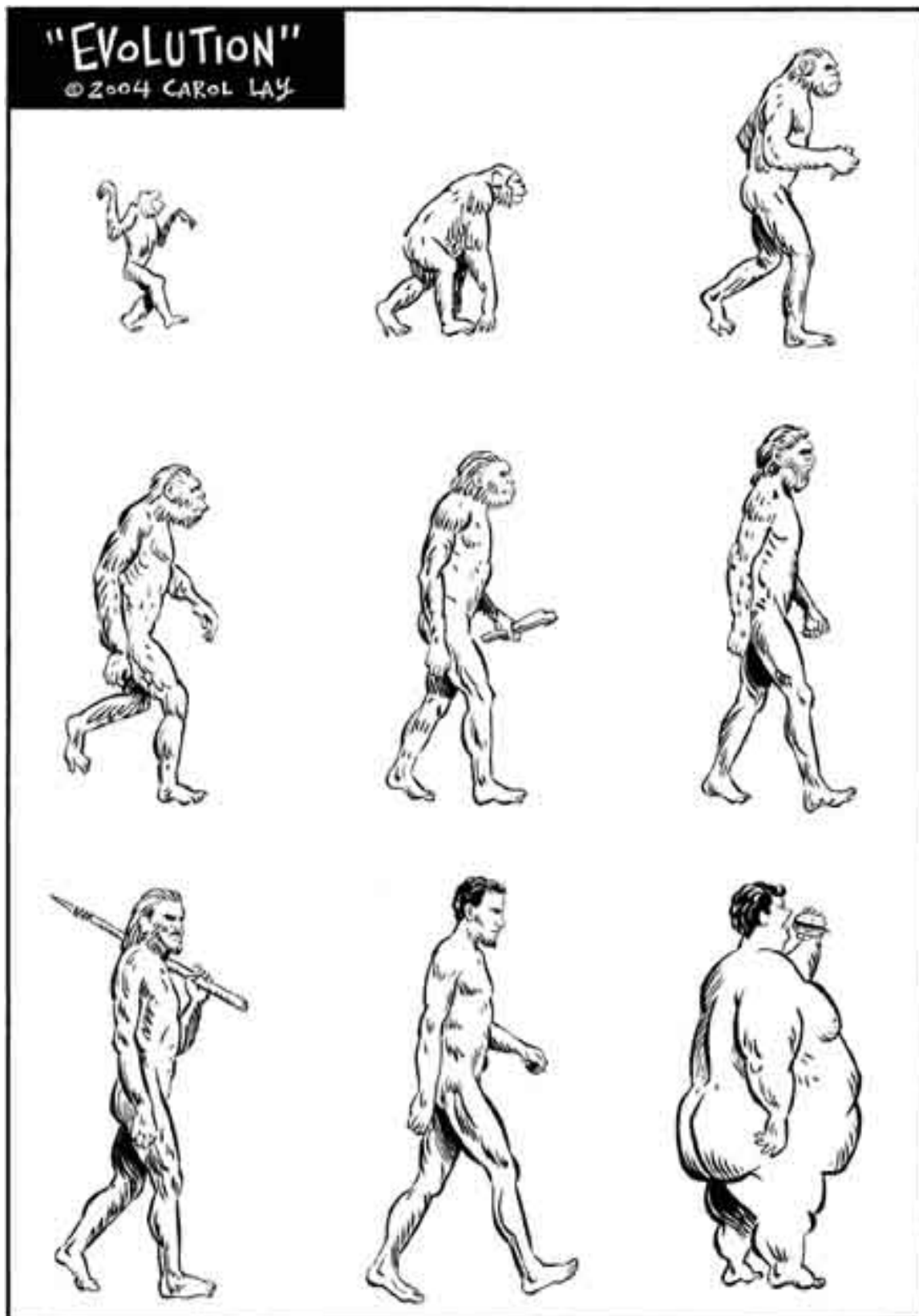
- The first computer was developed in 1939.
- The evolution of the computer rests basically on the development of its electronic component as follows.
 - Vacuum tube
 - Transistor
 - Integrated Circuit (IC)
 - Micro chip
 - The size, power consumption and heat generation are few computer aspects that have decreased over the generations.
 - The speed of processing and the performance are the features that have increased over the years.

(35 minutes)

Criteria for assessment and evaluation

- Names the electronic components pertaining to the computer generations.
- Accepts the need to study the past and the present to be prepared for the future.
- Traces the evolution of the computer in terms of its major generations.
- Picks relevant information from reading materials.
- Works cooperatively with peers.

Annexe 1.3.1



Annexe 1.3.3**Reading Material****The Evolution of the Computer****1. First Generation (1939-1954) - Vacuum Tube**

- 1937 - John V. Atanasoff designed the first digital electronic computer
- 1939 - Atanasoff and Clifford Berry demonstrate in Nov. the ABC prototype
- 1941 - Konrad Zuse in Germany developed in secret the Z3
- 1943 - In Britain, the Colossus was designed in secret at Bletchley Park to decode German messages
- 1944 - Howard Aiken developed the Harvard Mark I mechanical computer for the Navy
- 1945 - John W. Mauchly and J. Presper Eckert built ENIAC at U of PA for the U.S. Army
- 1946 - Mauchly and Eckert start Electronic Control Co., received grant from National Bureau of Standards to build a ENIAC-type computer with magnetic tape input/output, renamed UNIVAC in 1947 but run out of money, formed in Dec. 1947 the new company Eckert-Mauchly Computer Corporation (EMCC).
- 1948 - Howard Aiken developed the Harvard Mark III electronic computer with 5000 tubes
- 1948 - U of Manchester in Britain developed the SSEM Baby electronic computer with CRT memory
- 1949 - Mauchly and Eckert in March successfully tested the BINAC stored-program computer for Northrop Aircraft, with mercury delay line memory and a primitive magnetic tape drive; Remington Rand bought EMCC Feb. 1950 and provided funds to finish UNIVAC
- 1950- Commander William C. Norris led Engineering Research Associates to develop the Atlas, based on the secret code-breaking computers used by the Navy in WWII; the Atlas was 38 feet long, 20 feet wide, and used 2700 vacuum tubes
- 1951 - S. A. Lebedev developed the MESM computer in Russia
- 1951 - Remington Rand successfully tested UNIVAC March 30, 1951, and announced to the public its sale to the Census Bureau June 14, 1951, the first commercial computer to feature a magnetic tape storage system, the eight UNISERVO tape drives that stood separate from the CPU and control console on the other side of a garage-size room. Each tape drive was six feet high and three feet wide, used 1/2-inch metal tape of nickel-plated bronze 1200 feet long, recorded data on eight channels at 100 inches per second with a transfer rate of 7,200 characters per second. The complete UNIVAC system weighed 29,000 pounds, included 5200 vacuum tubes, and an offline typewriter-printer UNIPRINTER with an attached metal tape drive. Later, a punched card-to-tape machine was added to read IBM 80-column and Remington Rand 90-column cards.
- 1952 - Remington Rand bought the ERA in Dec. 1951 and combined the UNIVAC product line in 1952: the ERA 1101 computer became the UNIVAC 1101. The UNIVAC I was used in November to calculate the presidential election returns and successfully predict the winner, although it was not trusted by the TV networks who refused to use the prediction.
- 1954 - The SAGE aircraft-warning system was the largest vacuum tube computer system ever built. It began in 1954 at MIT's Lincoln Lab with funding from the Air

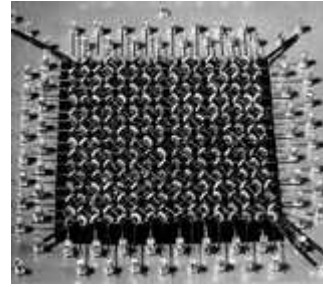
Force. The first of 23 Direction Centers went online in Nov. 1956, and the last in 1962. Each Center had two 55,000-tube computers built by IBM, MIT, AND Bell Labs. The 275-ton computers known as "Clyde" were based on Jay Forrester's Whirlwind I and had magnetic core memory, magnetic drum and magnetic tape storage. The Centers were connected by an early network, and pioneered development of the modem and graphics display.



Atanasoff-Berry Computer
1939, from IEEE



magnetic drum
memory of the
Atanasoff-Berry
Computer 1939,
from Smithsonian
NMAH



Whirlwind core
memory 1951,
from IEEE



UNIVAC 1951, from
Smithsonian NMAH



UNIVAC I ca. 1955, from
Smithsonian

UNIVAC I of 1951 was the first business computer made in the U.S. "Many people saw a computer for the first time on television when UNIVAC I predicted the outcome of the 1952 presidential elections."



Bendix G-15 of 1956, inexpensive at \$60,000, for science and industry but could also be used by a single user; several hundred were built - used magnetic tape drive and key punch terminal



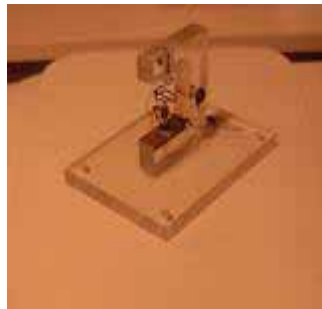
IBM 650 that "became the most popular medium-sized computer in America in the 1950's" - rental cost was \$5000 per month - 1500 were installed - able to read punched cards or magnetic tape - used rotating magnetic drum main memory unit that could store 4000 words, from Smithsonian NMAH

2. Second Generation Computers (1954 -1959) - Transistor

- 1950 - National Bureau of Standards (NBS) introduced its Standards Eastern Automatic Computer (SEAC) with 10,000 newly developed germanium diodes in its logic circuits, and the first magnetic disk drive designed by Jacob Rabinow
- 1953 - Tom Watson, Jr., led IBM to introduce the model 604 computer, its first with transistors that became the basis of the model 608 of 1957, the first solid-state computer for the commercial market. Transistors were expensive at first, cost \$8 vs. \$.75 for a vacuum tube. But Watson was impressed with the new transistor radios and gave them to his engineers to study. IBM also developed the 650 Magnetic Drum Calculator, the first by IBM to use magnetic drum memory rather punched cards, and began shipment of the 701 scientific "Defense Calculator" that was the first of the Model 700 line that dominated main frame computers for the next decade
- 1955 - IBM introduced the 702 business computer; Watson on the cover of *Time* magazine March 28
- 1956 - Bendix G-15A small business computer sold for only \$45,000, designed by Harry Huskey of NBS
- 1959 - General Electric Corporation delivered its Electronic Recording Machine Accounting (ERMA) computing system to the Bank of America in California; based on a design by SRI, the ERMA system employed Magnetic Ink Character Recognition (MICR) as the means to capture data from the checks and introduced automation in banking that continued with ATM machines in 1974



transistor, from
Smithsonian NMAH



"First transistor (model),
December 1947.
Constructed by John
Bardeen, Walter
Brattain and William
Shockley at Bell
Laboratories," from
Smithsonian NMAH



Regency transistor radio
1954 (TL), Zenith
transistor hearing aid
1952, from Smithsonian
NMAH



Regency transistor radio
1954, from Smithsonian
NMAH



Philco and Emerson
transistor radios, from
Smithsonian NMAH



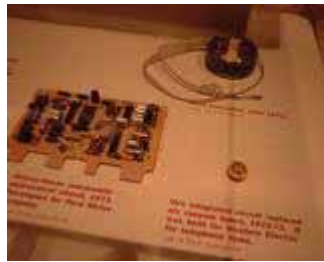
transistor radios, from
Smithsonian NMAH



transistor radios, from
Smithsonian NMAH

3. Third Generation Computers (1959 -1971) - IC

- 1959 - Jack Kilby of Texas Instruments patented the first integrated circuit in Feb. 1959; Kilby had made his first germanium IC in Oct. 1958; Robert Noyce at Fairchild used planar process to make connections of components within a silicon IC in early 1959; the first commercial product using IC was the hearing aid in Dec. 1963; General Instrument made LSI chip (100+ components) for Hammond organs 1968
- 1964 - IBM produced SABRE, the first airline reservation tracking system for American Airlines; IBM announced the System/360 all-purpose computer, using 8-bit character word length (a "byte") that was pioneered in the 7030 of April 1961 that grew out of the AF contract of Oct. 1958 following Sputnik to develop transistor computers for BMEWS
- 1968 - DEC introduced the first "mini-computer", the PDP-8, named after the mini-skirt; DEC was founded in 1957 by Kenneth H. Olsen who came for the SAGE project at MIT and began sales of the PDP-1 in 1960
- 1969 - Development began on ARPAnet, funded by the DOD
- 1971 - Intel produced large scale integrated (LSI) circuits that were used in the digital delay line, the first digital audio device



IC, from Smithsonian NMAH



Polaroid IC 1961, from Smithsonian NMAH



DEC PDP-1 of 1960, from CHM



DEC PDP8/E minicomputer 1973 from SDCM



Anderson Jacobson ADC 260 acoustic coupler 1963, from SDCM



early transistor calculators - Casio "Mini" used chips from TI (left); TI SR-10 calculator showing circuit in transparent case, used a single chip 1972, from Smithsonian NMAH



early transistor calculators - Casio "Mini" used chips from TI (left); TI SR-10 calculator showing circuit in transparent case, used a single chip 1972, from Smithsonian NMAH



IC, from Smithsonian NMAH



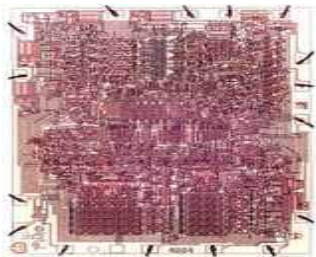
IC, from Smithsonian NMAH

4. Fourth Generation (1971-Present) - microprocessor

- 1971 - Gilbert Hyatt at Micro Computer Co. patented the microprocessor; Ted Hoff at Intel in February introduced the 4-bit 4004, a VSLI of 2300 components, for the Japanese company Busicom to create a single chip for a calculator; IBM introduced the first 8-inch "memory disk", as it was called then, or the "floppy disk" later; Hoffmann-La Roche patented the passive LCD display for calculators and watches; in November Intel announced the first microcomputer, the MCS-4; Nolan Bushnell designed the first commercial arcade video game "Computer Space"
- 1972 - Intel made the 8-bit 8008 and 8080 microprocessors; Gary Kildall wrote his Control Program/Microprocessor (CP/M) disk operating system to provide instructions for floppy disk drives to work with the 8080 processor. He offered it to

Intel, but was turned down, so he sold it on his own, and soon CP/M was the standard operating system for 8-bit microcomputers; Bushnell created Atari and introduced the successful "Pong" game

- 1973 - IBM developed the first true sealed hard disk drive, called the "Winchester" after the rifle company, using two 30 Mb platters; Robert Metcalfe at Xerox PARC created Ethernet as the basis for a local area network, and later founded 3COM
- 1974 - Xerox developed the Alto workstation at PARC, with a monitor, a graphical user interface, a mouse, and an ethernet card for networking
- 1975 - the Altair personal computer is sold in kit form, and influenced Steve Jobs and Steve Wozniak
- 1976 - Jobs and Wozniak developed the Apple personal computer; Alan Shugart introduced the 5.25-inch floppy disk
- 1977 - Nintendo in Japan began to make computer games that stored the data on chips inside a game cartridge that sold for around \$40 but only cost a few dollars to manufacture. It introduced its most popular game "Donkey Kong" in 1981, Super Mario Bros in 1985
- 1978 - Visicalc spreadsheet software was written by Daniel Bricklin and Bob Frankston
- 1979 - Micropro released Wordstar that set the standard for word processing software
- 1980 - IBM signed a contract with the Microsoft Co. of Bill Gates and Paul Allen and Steve Ballmer to supply an operating system for IBM's new PC model. Microsoft paid \$25,000 to Seattle Computer for the rights to QDOS that became Microsoft DOS, and Microsoft began its climb to become the dominant computer company in the world.
- 1984 - Apple Computer introduced the Macintosh personal computer January 24.
- 1987 - Bill Atkinson of Apple Computers created a software program called HyperCard that was bundled free with all Macintosh computers. This program for the first time made hypertext popular and useable to a wide number of people. Ted Nelson coined the terms "hypertext" and "hypermedia" in 1965 based on the pre-computer ideas of Vannevar Bush published in his "As We May Think" article in the July 1945 issue of The Atlantic Monthly.



Intel 4004
microprocessor in 1971,
from Intel Museum



Apple I of 1976, from
Smithsonian NMAH



Wozniak and Jobs
introduced Apple II in
1977, from History of
Apple



MITS Altair 8800A 1975 from

SDCM



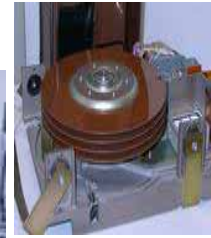
Apple II personal computer 1978 with 5.25-inch Disk drives, from SDCM



IBM 5151 personal computer 1981, from SDCM



Seagate ST-251 5-inch 40 MB hard drive 1978, from SDCM



Memorex Model 101 hard drive, 10 MB, 1983, from SDCM

5. Fifth Generation (Present and Beyond)

Scientists are now at work with the fifth generation of computers. The world is moving towards the development of what one can call 'Super Large Scale Integration' – which in turn will compliment and improve speed, miniaturization and cost reduction. Development of ARTIFICIAL INTELLIGENCE to make the computer function and take decisions almost like human beings, implementation of expert systems, robots, intelligent programs, speech synthesizers as well as the use of video disks and tapes for external storage media, are included in the fifth generation of computer innovation

- 1991 - World-Wide Web (WWW) was developed by Tim Berners-Lee and released by CERN.
- 1993 - The first Web browser called Mosaic was created by student Marc Andreessen and programmer Eric Bina at NCSA in the first 3 months of 1993. The beta version 0.5 of X Mosaic for UNIX was released Jan. 23 1993 and was instant success. The PC and Mac versions of Mosaic followed quickly in 1993. Mosaic was the first software to interpret a new IMG tag, and to display graphics along with text. Berners-Lee objected to the IMG tag, considered it frivolous, but image display became one of the most used features of the Web. The Web grew fast because the infrastructure was already in place: the Internet, desktop PC, home modems connected to online services such as AOL and Compuserve
- 1994 - Netscape Navigator 1.0 was released Dec. 1994, and was given away free, soon gaining 75% of world browser market.
- 1996 - Microsoft failed to recognized the importance of the Web, but finally released the much improved browser Explorer 3.0 in the summer.



Nokia 9210 Communicator is part of the latest wave of web cell phones



The raveMP player sells for \$269 and can store more than an hour of MP3 music



world's first production microchips made of silicon-on-insulator (SOI) transistors and copper wiring by IBM (AP 5/22/00)



body scans to buy clothes



Microsoft Reader



Wearable computers



Apple G4



Linux

Annexe 1.3.3**Instructions for the Group Exploration**

- You will be working in four groups with one of the following four generations of computer assigned to each group.

Group	Generation	Significant Feature
1	First generation	
2	Second generation	
3	Third generation	
4	Forth generation	

- Write the significant feature of each generation in the appropriate cage of the table.
- List any other features you have noticed.
 - Identify the changes according to the generations.
 - What are the features you notice about the present progress of the computer?
 - Be prepared to present your findings at the plenary session.

Competency 2 : Selects and uses computer hardware.

Competency 2.1 : Classifies computers using a variety of methods.

Activity 2.1. : Let's explore the different classification methods used in computers.

Time : 90 minutes.

Quality Inputs :

- Eight copies of the group exploration instructions in Annexe 2.1.1.
- Eight copies of the reading material in Annexe 2.1.2.
- Demy sheets and markers.

Learning – Teaching Process:

Step 2.1.1 :

- Ask a volunteer to write a few names of vehicles on the blackboard.
- Ask another student to classify the vehicles.
- Conduct a discussion to highlight the following.

- Main features are taken into account in classification.
- The working capacity of a computer increasing when more features are available.
- Classification of computers also taken into account the above aspects

(10 minutes)

Step 2.1.2 :

- Divide the class into eight groups.
- Distribute copies of the group exploration instructions to each group with a demy sheet and marker.
- Involve the groups in the exploration.
- Prepare groups for a presentation at plenary session.

(40 minutes)

Step 2.1.3 :

- Get each group to present its findings.
- Request the presenters themselves to fill gaps, if any.
- Seek for constructive comments of other groups.
- Conclude the session by highlighting the following.

- Computers can be classified as follows.
 - Type
 - Size and Capability
 - Purpose
- According to logic, computers can be classified as follows
 - Digital computers
 - Analog computers
 - Hybrid computers
- According to size and capability, computers can be classified as follows.
 - Super computers
 - Mainframe computers
 - Mini computers
 - Micro computers
- According to purpose, computers can be classified as follows.
 - General purpose computers
 - Special purpose computers

(40 minutes)

Criteria for Assessment and Evaluation

- Names different methods used to classify computer systems and describes them.
- Accepts the need to use a variety of methods to classify computers.
- Classifies computers on the basis of number of methods.
- Expresses ones own ideas in different forms.
- Classifies things to facilitate learning.

Annexe 2.1.1

Instructions for the Group Exploration

- You will be working in eight groups with the following eight topics randomly distributed among the groups.
 - Digital computers
 - Analog computers
 - Hybrid computers
 - Classification according to purpose
 - Super computer
 - Mainframe computer
 - Mini computer
 - Micro computer
- On the basis of the document provided, carry out the part assigned to you.
- Write down the important points relevant to your topic.
- Be prepared to present your findings at the plenary session

Annexe 2.1.2**Reading Material****Classification of computers**

A computer can be classified as follows:

1. Computational method (Type)
2. Size and Capability.
3. Purpose

Classification based on Computational method

Based on the way a system performs computations, a computer can be classified as follows:

- Digital
- Analog
- Hybrid

Digital Computer

A digital computer can count and accept numbers and letters through various input devices. The input devices convert data into electronic pulses, and perform arithmetical operations on numbers in discrete form. In addition to performing arithmetical operations, they are also capable of:

1. Storing data for processing
2. Performing logical operations
3. Editing or deleting the input data

One of the main advantages of the use of digital computers is that any desired level of accuracy can be achieved by considering as many decimal places as are necessary and hence are most suitable for business applications. The main disadvantage is their high cost, even after regular reductions in price and the complexity in programming.

Example

To calculate the distance traveled by a car in a particular time interval, you might take the diameter of the tyre to calculate the periphery, take into consideration the number of revolutions of the wheel per minute, take the time in minutes and multiply them all to get the distance moved. This is called digital calculation. A computer using this principle of digital calculations will be called a digital computer.

Analog Computer

Analog computers process data input in a continuous form. Data such as voltage, resistance or temperature are represented in the computer as a continuous, unbroken flow of information, as in engineering and scientific applications, where quantities to be processed exist as waveforms of continually rising and falling voltages, pressure and so on. As the measurements in analog computer are carried out by a few single purpose devices, the analog computer offers low cost and ease of programming.

The main disadvantage of an analog computer is the accuracy factor, and the limited storage capacity. Hence it is not suitable for processing business data.

Example

If you see the principle of the milometer in a car it does not work on the same principle as explained in digital calculation. The rotation of the car wheels move some gears, the movement is transmitted to the meter by a flexible shaft. The meter itself contains some gears/ wheels marked with numbers and is calibrated to give the exact distance traveled in meter/kilometers. There is no calculation involved by numbers and the result is obtained by physical phenomenon. This method of calculation is called the Analog method. A computer using the analog method of calculation will be termed an analog computer.

Hybrid Computer

A computer can also be built using some parts employing digital computations and some parts based on Analog principles. Such computers are called **Hybrid Computers**.

Example

In Process Control Computer Systems, the input comes from devices likes pressure, gauze, thermometers, meters etc. The pressure control uses analog methods in the relevant areas. The inputs from analog devices are sent to a digital computation unit that runs the mathematical model for controlling the process. These types of computers are called Hybrid because they use analog methodology in some parts and digital methodology in some others.

Classification according to purpose

General purpose computers

The computers, which can be theoretically used for any type of application, are called general-purpose computers.

Special purpose computers

The computers, which are made and used for specific jobs like air traffic control systems. Controlling fuel in automobiles are called special purpose computers

Classification based on Size and Capability

On the basis of size and capability, the digital computer can be classified as:

- Super Computer
- Mainframe computer
- Mini Computer
- Micro Computer

Super Computer

These are the largest and fastest computers available but are typically not used for commercial data processing. Instead they are used in specialized areas as in Defense, Aircraft design, computer generated movies, weather research etc. The first super computer was the ILLIAC IV made by Burroughs. Other suppliers of supercomputer are CRAY, CDC, FUGITSU, NEC etc. A supercomputer CRAY-1 is considered the most powerful computer today. The supercomputers CRAY-2 and CRAY-3 developed by Seymore Cray are wonderful. Supercomputers can process 64 bits or more at a time. Their processing speed ranges from 10,000 million instructions per sec (MIPS) to 1.2 billion instructions per sec. They can support 10,000 terminals at a time. They have huge numbers of storage and other devises connected to them.

Mainframe

Mainframes are less powerful and cheaper than Super computers. However, they are big general purpose computers capable of handling all kinds of scientific and business applications. Mainframes can process several million instructions per second. More than 1000 remote terminals can be supported by a Mainframe. Mainframes have large on-line secondary storage capacity. A number of different types of peripheral devices like magnetic tape drivers, hard disk drive, visual display units, plotters, printers and telecommunication terminals can be attached to Mainframe computers. Mainframes, such as ES/9000 family of computers of the International Business Machines Corp. (IBM) are used for such applications as payroll computations, accounting, business transactions, information retrieval and airline seat reservations.

Mini Computers

This type of computer performs data processing activities in the same way as the Mainframe but on a smaller scale. The cost of minis is lower. As the name implies, a minicomputer is small compared to a Mainframe and may be called a scaled down Mainframe as the processor and the number of peripherals are physically smaller. A mini computer can typically support 10 to 12 terminals. The most popular Minicomputers or minis are Nova, Dec, PDP_II and IBM series.

Micro Computers

This is the smallest category of computers, consisting of a microprocessor and associated storage and input/output devices. These are also called Personal Computer systems. Microcomputers were first available for widespread use in the 1970's, when it became possible to put the entire circuitry of computers (CPU) in to a small silicon chip.

Example

Personnel Computers (PC)

A Personnel Computer is so named because it is designed for personal use. IBM, the foremost computer-manufacturing firm in the world, introduced the first PC named as IBM-PC. Personal computers are classified on the basis of size and portability. Personal computers that can be placed on top of a desk but are not very portable are called desktop computers. Portable computers are those personal computers that are light enough to be easily transported. Portable personal computers that are small enough to be set up on the lap of a user are called laptop computers; notebook computers are approximately the size of a book. Portable personal computers that can be put in a pocket are called pocket or palm-sized computers.

Competency 2 : Selects and uses computer hardware

Competency Level 2.2 : Classifies computer peripherals by function.

Activity 2.2 : Let's simulate the function of computer peripherals.

Time : 120 minutes

Quality Inputs :

- Seven copies of the group exploration instructions in Annexe 2.2.1
- Seven copies of the reading material in Annexe 2.2.2
- Scanners, digital cameras, printers, speakers and other peripherals available in the lab.

Learning – Teaching Process:

Step 2.2.1 :

- Get the students to look around the computer laboratory to identify different peripherals there.
- Conduct a discussion to highlight the following.

- Peripherals are devices that can be attached to the computer system.
- They can be classified as input devices and output devices

(15 minutes)

Step 2.2.2 :

- Divide the class into Seven groups.
- Provide each group with the copies of group exploration instructions.
- Request the groups to study the peripheral given to simulate its functions.

(60 minutes)

Step 2.2.3 :

- Allocate three corners of the classroom for input, output, devices and storage devices.
- Get each group to simulate the peripheral given.
- Encourage the other groups to question about the simulation.
- Fill any gaps indicated.
- Get the groups completing the simulation .
- Conduct a discussion to highlight the following.

- All input devices are used to input data to the system.
- All output devices are used to get outputs from the system.
- Some other devices are used to store data.

(45 minutes)

Criteria for assessment and evaluation

- Names computer peripherals and describes their functions.
- Accepts that peripherals serve a specific purpose.
- Classifies peripherals as input, output, and storage devices
- Illustrates one's own learning through simulations.
- Justifies one's own answers.

Annexe 2.2.1

Instructions for the Group Exploration

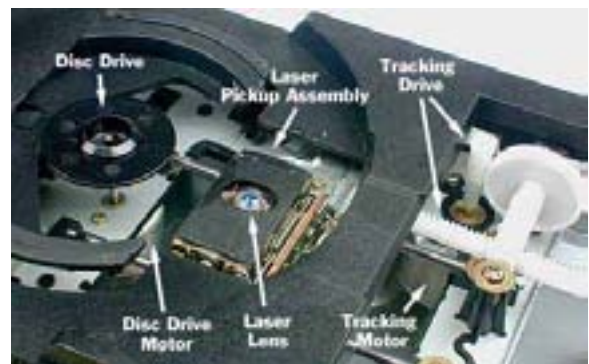
- You will be working in seven groups with the following seven topics distributed randomly across the groups.
 - CD-Rom
 - Digital Camera
 - Hard Drive
 - Floppy Disk
 - Computer Keyboard
 - Computer Monitors
 - Removable Storage
- On the basis of the document provided, carry out the part assigned to you.
- Study the peripherals selected and simulate their functions.
- Be prepared to present your findings at the plenary session

Annexe 2.2.1**Reading Material****CD-ROM**

You can choose between internal and external CD-ROM. Internal is the most common and for most purposes the most practical. The advantage of an external station is that it can be moved from one PC to another, although the majority of PCs nowadays have CD-ROM. Also, external CD-ROM stations tend to be slower.

***External CD player******Internal CD player*****CD Player (CD Rom) Components**

The CD player has the job of finding and reading the data stored as bumps on the CD. Considering how small the bumps are, the CD player is an exceptionally precise piece of equipment. The drive consists of three fundamental components:

***Inside a CD player***

CDs and DVDs are everywhere these days. Whether they are used to hold music, data or computer software, they have become the standard medium for distributing large quantities of information in a reliable package. Compact discs are so easy and cheap to produce that America Online sends out millions of them every year to entice new users. And if you have a computer and CD-R drive, you can create your own CDs, including any information you want.

Digital Camera

There are a variety of different digital cameras that vary significantly in price and quality.

Resolution

The resolution is the most important aspect, as it gives the image-quality as well as stating its overall pixel capacity.

Some digital cameras can record short film sequences it's normally only possible to record. Digital camcorders are able to record long film sequences of high quality.

Some digital cameras have a small monitor on the back that shows you how the pictures are going to look like. This monitor is called an LCD monitor, and it gives you a preview of your photos. You can go back and look at all the pictures you've taken, and erase those you don't want to keep. This will free the space on your memory chip, enabling you to take more pictures.

How to transfer your pictures from the camera to the PC.

It's common to use a USB cable. It's also a good solution. Some cameras use a disc or a card.



Digital camera

Hard Drive

Today all PCs use a hard drive for storage of GBs. The data the computer needs to remember after it's switched off are stored on the hard drive. Software, images, audio and video take up a lot of the storage capacity.



Hard Drive

Removable hard drive

It's possible to install your hard drive so that it can be removed quite easily and inserted into another computer.

When you're upgrading you might want to consider getting a removable hard drive. The way this works, is that the hard drive is placed together with the disk drive and the CD-ROM station, making it easy to remove the hard drive at any given time. This is particularly useful if you're working at two locations, e.g. at home and at work. But it's also useful in other respects. For instance, it makes upgrading it an easy task.

Removable hard drive



The Floppy Disk

A floppy disk is a lot like a cassette tape:

- Both use a thin plastic base material coated with iron oxide. This oxide is a **ferromagnetic** material, meaning that if you expose it to a magnetic field it is permanently magnetized by the field.
- Both can record information instantly.
- Both can be erased and reused many times.
- Both are very inexpensive and easy to use.

A floppy disk, like a cassette tape, is made from a thin piece of plastic coated with a magnetic material on both sides. However, it is shaped like a disk rather than a long thin ribbon. The tracks are arranged in **concentric rings** so that the software can jump from "file 1" to "file 19" without having to fast forward through files 2-18. The diskette spins like a record and the heads move to the correct track, providing what is known as **direct access storage**.

The Floppy Disk Drive

The major parts of a FDD include:

- **Read/Write Heads:** Located on both sides of a diskette, they move together on the same assembly. The heads are not directly opposite each other in an effort to prevent interaction between write operations on each of the two media surfaces. The same head is used for reading and writing, while a second, wider head is used for erasing a track just prior to it being written. This allows the data to be written on a wider "clean slate," without interfering with the analog data on an adjacent track.
- **Drive Motor:** A very small spindle motor engages the metal hub at the center of the diskette, spinning it at either 300 or 360 rotations per minute (RPM).
- **Stepper Motor:** This motor makes a precise number of stepped revolutions to move the read/write head assembly to the proper track position. The read/write head assembly is fastened to the stepper motor shaft.
- **Mechanical Frame:** A system of levers that opens the little protective window on the diskette to allow the read/write heads to touch the dual-sided diskette media. An external button allows the diskette to be ejected, at which point the spring-loaded protective window on the diskette closes.
- **Circuit Board:** Contains all of the electronics to handle the data read from or written to the diskette. It also controls the stepper-motor control circuits used to move the read/write heads to each track, as well as the movement of the read/write heads toward the diskette surface.

Computer Keyboards

The part of the computer that we come into contact with most is probably the piece that we think about the least. But the **keyboard** is an amazing piece of technology. For instance, did you know that the keyboard on a typical computer system is actually a computer itself?



Your basic Windows keyboard

At its essence, a keyboard is a series of switches connected to a microprocessor that monitors the state of each switch and initiates a specific response to a change in that state.

Keyboards have changed very little in layout since their introduction. In fact, the most common change has simply been the natural evolution of adding more keys that provide additional functionality.

The most common keyboards are:

- 101-key Enhanced keyboard
- 104-key Windows keyboard
- 82-key Apple standard keyboard
- 108-key Apple Extended keyboard

Portable computers such as laptops quite often have custom keyboards that have slightly different key arrangements than a standard keyboard. Also, many system manufacturers add specialty buttons to the standard layout. A typical keyboard has four basic types of keys:

- Typing keys
- Numeric keypad
- Function keys
- Control keys

The typing keys are the section of the keyboard that contains the letter keys, generally laid out in the same style that was common for typewriters. This layout, known as **QWERTY** for the first six letters in the layout, was originally designed to **slow down** fast typists by making the arrangement of the keys somewhat awkward! The reason that typewriter manufacturers did this was because the mechanical arms that imprinted each character on the paper could jam together if the keys were pressed too rapidly. Because it has been long established as a standard, and people have become accustomed to the QWERTY configuration, manufacturers developed keyboards for computers using the same layout, even though jamming is no longer an issue. Critics of the QWERTY layout have adopted another layout, **Dvorak** that places the most commonly used letters in the most convenient arrangement.

The **numeric keypad** is a part of the natural evolution mentioned previously. As the use of computers in business environments increased, so did the need for speedy data entry. Since a large part of the data was numbers, a set of 17 keys was added to the keyboard. These keys are laid out in the same configuration used by most adding machines and calculators, to facilitate the transition to computer for clerks accustomed to these other machines.

In 1986, IBM extended the basic keyboard with the addition of **function** and **control** keys. The function keys, arranged in a line across the top of the keyboard, could be assigned specific commands by the current application or the operating system. Control keys provided cursor and screen control. Four keys arranged in an inverted *T* formation between the typing keys and numeric keypad allows the user to move the cursor on the display in small increments. The control keys allow the user to make large jumps in most applications. Common control keys include:

- Home
- End
- Insert

- Delete
- Page Up
- Page Down
- Control (Ctrl)
- Alternate (Alt)
- Escape (Esc)

The Windows keyboard adds some extra control keys: two **Windows** or **Start** keys, and an **Application** key. The Apple keyboards are specific to Apple Mac systems.

Computer Mice



Mice first broke onto the public stage with the introduction of the Apple Macintosh in 1984, and since then they have helped to completely redefine the way we use computers.

Every day of your computing life, you reach out for your **mouse** whenever you want to move your cursor or activate something. Your mouse senses your motion and your clicks and sends them to the computer so it can respond appropriately.

The Optical Mouse

With advances in mouse technology, it appears that the venerable wheeled mouse is in danger of extinction. The now-preferred device for pointing and clicking is the **optical mouse**.



The Optical Mouse

This Microsoft Intellimouse uses optical technology.

Able to work on almost any surface, the mouse has a small, red **light-emitting diode (LED)** that bounces light off that surface onto a complimentary metal-oxide semiconductor (CMOS) sensor. The CMOS sensor sends each image to a **digital signal processor (DSP)** for analysis. The DSP, operating at 18 MIPS (million instructions per second), is able to detect patterns in the images and see how these patterns have moved since the previous image. Based on the change in patterns over a sequence of images, the DSP determines how far the mouse has moved and sends the corresponding coordinates to the computer. The

computer moves the cursor on the screen based on the coordinates received from the mouse. This happens hundreds of times each second,

Computer Monitors

A computer display is a marvelous thing. An unassuming dark gray surface can suddenly transform into an artist's canvas, an engineer's gauge, a writer's page or your very own window to both the real world and a huge range of artificial worlds.



Computer Monitor

The Basics

Often referred to as a **monitor** but the display is the most - used output device on a computer. It shows you text and graphic images as you work or play. Most desktop displays use a cathode ray tube (CRT), while portable computing devices such as laptops incorporate liquid crystal display (LCD), light-emitting diode (LED), gas plasma or other image projection technology. Because of their slimmer design and smaller energy consumption, monitors using LCD technologies are beginning to replace the venerable CRT on many desktops.

When purchasing a display, you have a number of decisions to make. These decisions affect how well your display will perform for you, how much it will cost and how much information you will be able to view with it. Your decisions include:

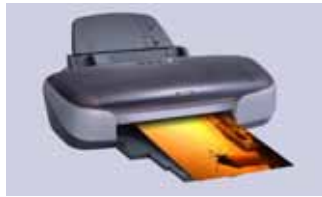
- **Display technology** - Currently, the choices are mainly between CRT and LCD technologies.
- **Cable technology** - VGA and DVI are the two most common.
- **Viewable area** (usually measured diagonally)
- **Aspect ratio** and **orientation** (landscape or portrait)
- **Maximum resolution**
- **Dot pitch**
- **Refresh rate**
- **Color depth**
- **Amount of power consumption**

Purchasing and Operating

Printers come in all sizes and price ranges. It's important that you know what you need and what the market has to offer. It's also important to be aware that a printer has two prices; a purchase price and an operating price. A low purchase price will usually mean high operating costs. If a company is looking for a high-performance printer, the printer's operating costs will be decisive in their choice.

Ink or Laser?

These are terms you should familiarize yourself with. Inkjet printers are the cheapest. But that's their only advantage. A laser printer provides you with better and faster printouts, as well as having lower operating costs. This is because it's cheaper to buy laser toner than printer ink. In addition, inkjet printers may require more expensive paper. Inkjet printers need special paper to achieve the best possible printouts and as a result you incur additional costs.



Printer

Removable Storage

Portable Memory

There are several reasons why removable storage is useful:

- Commercial software
- Making back-up copies of important information
- Transporting data between two computers
- Storing software and information that you don't need to be accessed constantly
- Copying information to be given to someone else
- Securing information that you don't want anyone else to access



Portable Memory

A tiny hard drive powers this removable storage device.

Modern removable storage devices offer an incredible number of options, with storage capacities ranging from the 1.44 megabytes (MB) of a standard floppy to upwards of 20-gigabyte (GB) capacity of some portable drives. All these devices fall into one of three categories:

- Magnetic storage
- Optical storage
- Solid-state storage

USB Storage Unit



You plug it into the USB port, use it to store information and bring it with you to another PC. Simple and practical.

USB Storage Unit

The unit is often called a USB drive. There are no disks inside the storage unit. It's a memory module (or, if you like, a memory chip) with a larger storage capacity than a floppy disk. This kind of unit is mainly used for transporting data from one PC to another. It's small and light and fits into your pocket and transferring data to and from the unit is done in no time.

You can use it for backup, since transferring data to and from it is done relatively fast. If you're working on a document that you're constantly updating, it might be easier to use the USB unit for backup, instead of floppy disks or CDs.

Scanners

Scanners have become an important part of the home office over the last few years. Scanner technology is everywhere and used in many ways:

- **Flatbed scanners**, also called desktop scanners, are the most versatile and commonly used scanners. In fact, this article will focus on the technology as it relates to flatbed scanners.
- **Sheet-fed scanners** are similar to flatbed scanners except that the document is moved and the scan head is immobile. A sheet-fed scanner looks a lot like a small portable printer.
- **Handheld scanners** use the same basic technology as a flatbed scanner, but rely on the user to move them instead of a motorized belt. This type of scanner typically does not provide good image quality. However, it can be useful for quickly capturing text.

- **Drum scanners** are used by the publishing industry to capture incredibly detailed images. They use a technology called a **photomultiplier tube** (PMT). In PMT, the document to be scanned is mounted on a glass cylinder. At the center of the cylinder is a sensor that splits light bounced from the document into three beams. Each beam is sent through a color filter into a photomultiplier tube where the light is changed into an electrical signal.



Microtel's Scan maker flatbed scanner

PC Speakers

It's difficult deciding which speakers are the best buy without listening to the different speakers to judge the sound quality. However, people don't do this very often when they buy speakers for their computer.



PC Speakers

Competency 2 : Selects and uses computer hardware

Competency Level 2.3: Identifies and connects basic peripherals to the computer.

Activity 2.3 : Let's connect peripherals to the computer.

Time : 90 minutes.

Quality Inputs :

- Five copies of the group exploration instructions in Annexe 2.3.1.
- Five computers with peripherals detached.
- Demy sheets and markers.

Learning – Teaching Process:

Step 2.3.1 :

- Display the back panel of the system units to the whole group.
- Ask a volunteer to describe what he sees.
- Conduct a discussion to highlight the following.

- A System unit has jack points.
- Some jack points have symbols.
- Some jack points have pins and some have holes.

(15 minutes)

Step 2.3.2 :

- Divide the class into five groups.
- Distribute copies of the group exploration instructions to each group with demy sheets and markers.
- Involve the groups in the exploration.
- Prepare them for presentation at the plenary session.

(45 minutes)

Step 2.3.3 :

- Get each group to present its findings.
- Request the presenters themselves to fill in any gaps they have left.
- Seek for constructive comments of the other groups.
- Conclude the session by highlighting the following.

- Jack points are called ports.
- Ports are used to connect peripherals to the computer.
- There are many types of ports
- Symbols help to identify the relevant peripheral.
- Male ports have pins.
- Female ports have holes.
- PS/2 ports are used to connect the mouse and keyboard.
- A VGA port is used to connect the monitor.
- Parallel ports are used to connect external devices such as scanners and printers.
- A USB port can be used to connect all kinds of external devices, such as external hard drives, printers, mice and scanners.
- The Ethernet (Network) port is used to connect the computer to a network or to Internet.

(30 minutes)

Criteria for Assessment and evaluation

- Describes the ports used in a computer system.
- Accepts the need to use different types of ports.
- Uses correct ports to connect peripherals.
- Expresses ones own ideas in different forms.
- Uses electronic devises accurately.

Annexe 2.3.1

Instructions for Group Exploration

- You will be working in five groups.
- On the basis of the document provided, carry out the task assigned to you.
- Identify the various ports used in computers.
- Relate the relevant peripherals to relevant port.
- Connect relevant peripherals to relevant port.
- Write down the important points.
- Be prepared to present your findings at the plenary session.

Power Supply

The regulated power supply inside the computer transforms mains electricity into DC current used in the computer. It has an internal fan to cool the unit.

Peripheral Devices

Peripheral devices are the components of the computer situated outside the main casing of the computer. Peripheral devices are typically connected to the computer, using **ports**.

Different Types of Ports

A typical computer may provide a number of different types of ports to connect external devices to it. Some of these different port types and their typical usages are explained in the following sections.

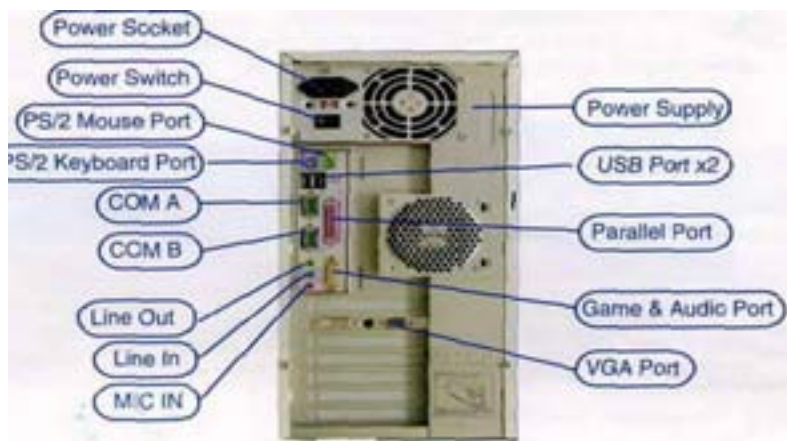


Figure 1.12 –System Unit, Ports Layouts

Serial Port

A serial port is used to connect external modems or an older computer mouse to the

computer. There are two serial port versions: 9-pin version, or 25-pin version. The serial port is a male port and the typical data transfer rate over a serial port is 115 kilobits per second.



Video Card Port

This connector is used to connect a computer display monitor to a computer's video card. The port is a female port and has 15 holes



Parallel Port

A Parallel port has 25 holes and is commonly known as the printer port. They are used to connect external devices such as scanners and printers.



PS/2 Port

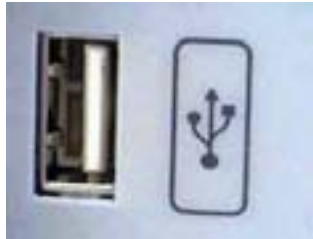
A PS/2 port, also referred to as a mouse port, is used to connect a mouse or keyboard with the computer. Most computers come with two PS/2 ports, one for the keyboard and the other for the mouse.



USB Port

A universal serial bus (USB) port is a fairly new port - introduced around 1997. This port can be used to connect all kinds of external devices, such as external hard drives, printers and

mice, scanners. USB-compliant devices can draw power from a USB port. USB 2.0 connectors were introduced in 2003 and are capable of transferring data at 480 Mbps.



Ethernet (Network) Port

This port is used to connect the computer to a network or to Internet. Data travel through this port at speeds of either 10 Megabits or 100 Megabits depending on the speed of the network card in the computer. Little monitor lights on these devices flicker when the port is in use.



Competency 2: Selects and uses computer hardware

Competency Level 2.4: Uses basic block diagram to demonstrate the computer system.

Activity 2.4. : Let's learn the Architecture of computers.

Time : 90 minutes.

Quality inputs :

- Five copies of the group exploration instructions in Annexe 2.4.1
- Demy sheets and markers.

Learning – Teaching Process:

Step 2.4.1 :

- Pose the following question to the whole class and conduct a brainstorming discussion.

How do people respond to their environment?

- Conduct a discussion to highlight the following.

- People get data and information from their environment through the five senses.
- Data and information are processed in their brains.
- The brain controls all parts of the human system
- It also has some output methods.
- Computers also show the same behavior.

(20 minutes)

Step .2.4.2 :

- Divide class into five groups.
- Distribute copies of the instruction sheet to each group with a demy sheet and marker.
- Involve the groups in the exploration.
- Prepare them for a presentation at the plenary session.

(40 minutes)

- Step 2.4.3 :**
- Get the groups to present their findings.
 - Request the presenters themselves to fill in any gaps they have left.
 - Seek for constructive comments of the other groups.
 - Conclude the session by highlighting the following

- Input devices are used to input data to the computer.
- Output devices are used to output information.
- The programs and data must be in the main memory to be used by the CPU.
- Secondary or auxiliary storage devices are used to store large volumes of information more permanently.
- The central processing unit performs the majority of calculations and controls the operation of a computer.
- The CPU consists of two parts - ALU and CU

(30 minutes)

Criteria for Assessment and evaluation

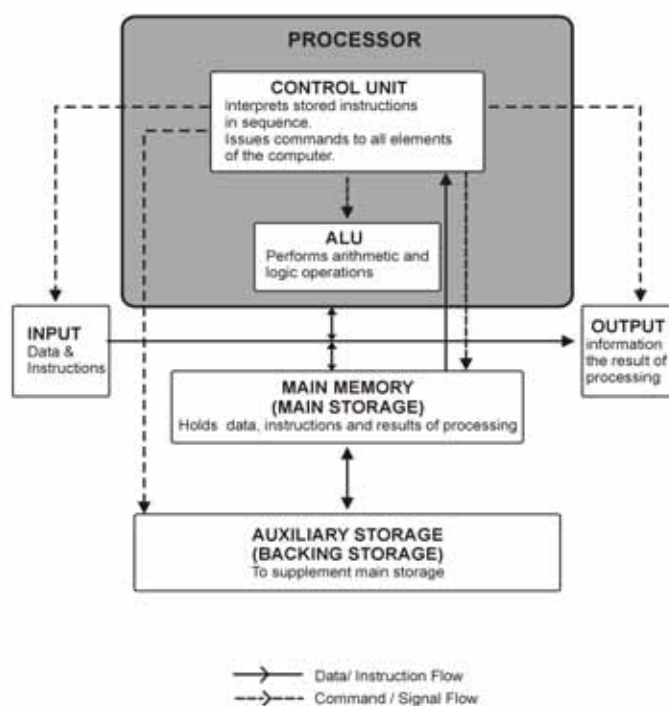
- Describes the basic block diagram of the computer system
- Accepts that each part the block diagram performs a specific task.
- Draws block diagrams with flow path.
- Expresses ones own ideas in different forms.
- Expresses one's own learning through simulations.

Annexe 2.4.1

Instructions for the group investigations

By considering the functions performed by the various components, a computer can be represented as a collection of logical components as in the following figure. The main hardware components of a modern computer system are the central processing unit (CPU), the main memory, the secondary storage and the input output devices.

* The elements of a computer system showing its "Logical structure" (Block Diagram)



Block Diagram of a Computer System

- Computer Block Diagram consist of the following parts
 - Control unit
 - ALU
 - Main Memory
 - Auxiliary/Secondary Storage
 - Input and Output
- You will be working in five groups with the fields above randomly distributed among the groups.
 - On the basis of the document type assigned to your group engage in the following task.
 - Go through the specimen document given.

- Write down the important points.
- Identify how your part associates with other parts
- Be prepared to present your findings at the plenary session.

Central Processing Unit (CPU)

The central processing unit performs the majority of calculations and controls the operation of a computer. CPUs are rated by the speed at which they can execute instructions. The speed of a CPU is measured in Megahertz (MHz), and is also known as the clock speed.



Different manufactures make CPUs today. Some of these popular CPUs available today are the Intel, AMD, Cyrix and Motorola. The CPU consists of two parts: the control unit (CU) and the arithmetic and logic unit (ALU).

Control Unit (CU)

The control unit controls and directs the operation of the entire computer system. Although it does not perform any actual processing on the data, the control unit acts as the central nervous system for the other components of the computer by generating clock pulses.

Arithmetic and Logic Unit (ALU)

The Arithmetic-Logic unit performs arithmetic operations such as addition, subtraction, multiplication and division on data. It also performs logical operations, which involve comparison of data.

Main Memory (Random Access Memory - RAM)

The programs and data must be in the main memory to be used by the CPU. The main memory is the only large storage area that the CPU can access directly. The memory of a computer is measured in Megabytes.



RAM or the main memory is the computer's short-term memory that temporarily holds data and instructions, which will be needed shortly by the CPU. Data and instructions can be stored and retrieved from anywhere in the RAM, and the time taken for such operations is approximately the same irrespective of the locations they are stored in the RAM. RAM is volatile, which means that it loses its data when the computer is turned off. RAM is supplied in modules; small circuit boards which can be plugged into the motherboard in special sockets.

Auxiliary Storage

Secondary or auxiliary storage devices are used to store large volumes of information more permanently. There are many types of secondary storage devices.

Hard Disks

A hard disk drive is a device housed inside the computer on which data is stored for later retrieval. Most computers have at least one hard disk. Hard disks are considered the most reliable method of storage. Hard disk storage capacities range from a few hundred megabytes to many gigabytes. The speed of a hard drive is measured in terms of average access time, the speed at which the hard drive finds data. The average access time is measured in milliseconds (1/1000 of a second).

The other Secondary Storage devices are floppy disk, CD /DVD etc.

Input Devices

Input devices enable data to be fed into the computer in a form that the computer can use. Input devices are categorized into two types: keyboard entry devices and direct entry devices. A device through which data can be entered in the computer by pressing keys is called a keyboard entry device whereas all the other types of input devices are called direct entry devices.

Output Devices

Output devices translate information processed by the computer into a form that either humans or other machines can understand.

Competency 2: Selects and uses computer hardware

Competency Level 2.5: Investigates benefits and concerns of computer networks for optimal communication

Activity 2.5 : Let's find the advantages and disadvantages of networking

Time : 90 minutes.

Quality inputs :

- Three copies of the reading material in Annexe 2.5.1
- Three copies of the group exploration instructions in Annexe 2.5.2
- Demy sheets and markers

Learning – Teaching Process:

Step 2.5.1 :

- Get a volunteer to explain the process of withdrawing money from an ATM.
- Ask another student to explain the advantages of the above system and a third student to explain its disadvantages.
- Conduct a discussion to highlight the following.

- A network consists of two or more objects communicating with each other.
- Some advantages of ATM system are
 - Many can be withdrawn money without visiting the bank.
 - The risk of carrying money is reduced.
 - Saves time.

(15 minutes)

Step 2.5.2 :

- Divide the class into three groups.
- Distribute copies of the group exploration instructions and reading material among the groups.
- Involve the groups in the exploration.
- Prepare them for a presentation at the plenary session.

(45 minutes)

- Step 2.5.3** :
- Get groups to present their findings.
 - Request others to submit constructive comments.
 - Conclude the activity by highlighting the following.

- Exchange of information is known as communication.
- Data Communication involves the use of communication equipment to transfer coded data.
- A network is a group of computers connected to each other.
- The three components in a Computer Network are
 - Transmission Media
 - Network Stations and Interface adapters
 - Network Operating Systems
- The three types of Computer Networks are
 - Local Area Networks (LAN)
 - Metropolitan Area Networks (MAN)
 - Wide Area Networks (WAN)
- Some advantages of computer networks are
 - Connectivity and Communication
 - Data Sharing
 - Hardware Sharing
 - Data Security and Management
- Disadvantages in computer networks are:
 - Server faults stop applications being available.
 - Network faults can cause loss of data.
 - Network faults could lead to loss of resources
 - User work dependent upon network.
 - System open to hackers

(30 minutes)

Criteria for Assessment and evaluation

- Names the advantages of computer networks.
- Accepts the need for computer networks.
- Uses Computer networks for communication purposes
- Gives reasons to justify own ideas.
- Enriches discussions through constructive comments.

Annexe 2.5.1

Reading material

DATA COMMUNICATION AND NETWORKS

What is communication? → Exchange of information between two or more parties is known as communication.

Speech, written materials, signals and symbols are the day-to-day normal methods of communication.

Basic requirements for a successful communication session:

1. There should be two or more parties.
2. There should be a common medium, which connects the parties involved.
3. The use of common grounds

These requirements are applicable to communication equipment (data communication) also.

Data Communication

The use of communication equipment to transfer coded data by telephone, telegraphs, or radio communication circuits etc.

Introduction to Network

A network is a group of computers and associated peripheral devices connected by communication channels capable of sharing files and other resources between several users.

Components of a Computer Network

1. Transmission Media
2. Network Stations and Interface adapters
3. Network Operating Systems
4. Other Equipments

1. Transmission Media

The transmission of an electrical signal between two pieces of equipment requires the use of a transmission line.

Twisted pair is the same type of cables as used by the telephone systems.

- Inexpensive
- Flexible
- Immune to noise

Coaxial Cables are a high-capacity cable used in networking. It contains an inner copper conductor surrounded by plastic insulation, and an outer braided copper or foil shield.

- Free of external interference
- High transmission rates

Optical Fiber carries data in the form of a fluctuating beam of light in glass fiber.

- High bit rates
- High level of security
- Very costly

Micro Wave data is transferred by microwave beams. This medium has a very high bandwidth.

- For satellite communication
- Locations where it is impracticable to lay physical lines (hills etc.)

The range of frequencies, that can be handled by equipment or a transmission link, is known as its Band Width

2. Network Stations and Interface adapters

- Workstation - In communication, any device attached to the network, other than the server.
- File Server - Network computer used to store files for access by other client computers on the network.
- Network interface card - The interface card is connected to the network cabling which in turn connects all the network interface cards in the network.

Client/ Server

A computer system or process that requests a service of another computer system or process (a "server") using some kind of protocol and accepts the server's responses. A client is part of a client-server software architecture.

For example, a workstation requesting the contents of a file from a file server is a client of the file server.

3. Network Operating Systems

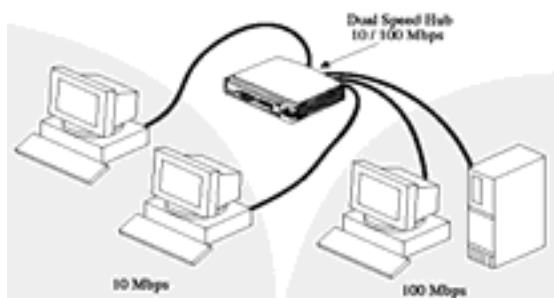
NOS consist of two parts - The System software running on the file server & Running on each of the networked PCs.

eg: Novell Netware, Windows NT

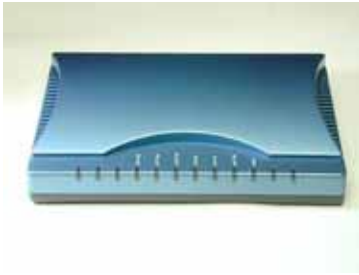
4. Other Equipments

Hub

A device connected to several other devices



Modem



External Modem



Internal Modem

(Modulator/demodulator) An electronic device for converting between serial data from a computer and an audio signal suitable for transmission over a telephone line connected to another modem.

Types of computer Networks

1. LAN
2. MAN
3. WAN

1. LAN (Local Area Networks)

A LAN is two or more computers directly linked within a small well defined area such as a room, office building or university. A LAN can be made up of only microcomputers or any combination of microcomputers and large systems

Intranet

An intranet is a private network that is contained within an enterprise. It may consist of many interlinked local area networks and also uses leased lines in the wide area network

2. MAN (Metropolitan Area Network)

MAN connects users across large distances. This is ideal for any company or firm to link together their branches within a city.

3. WAN (Wide Area Network)

A network that connects users across large distances, and often crosses the geographical boundaries of cities or states. Ex: - To link computers in Colombo +and London

Internet

An internet is a group of networks connected together. The Internet refers to the global connection of networks around the world

The Advantages (Benefits) of Networking

Here are some of the specific advantages generally associated with networking:

- **Connectivity and Communication:** Networks connect computers and the users of those computers. Individuals within a building or work group can be connected into **local area networks (LANs)**; LANs in distant locations can be interconnected into larger **wide area networks (WANs)**. Once connected, it is possible for network users to communicate with each other.
- **Data Sharing:** One of the most important uses of networking is to allow the sharing of data.
- **Hardware Sharing:** Instead of giving each of 10 employees in a department an expensive color printer, one printer can be placed on the network for everyone to share.
- **Internet Access:** whenever you access the Internet, you are using a network.
- **Internet Access Sharing:** Small computer networks allow multiple users to share a single Internet connection. Special hardware devices allow the bandwidth of the connection to be easily allocated to various individuals as they need it, and permit an organization to purchase one high-speed connection instead of many slower ones.
- **Data Security and Management:** Data can be centralized on shared servers. This makes it easy for everyone to find the data, makes it possible for the administrators to ensure that the data is regularly backed up, and also allows for the implementation of security measures to control who can read or change various pieces of critical information.
- **Entertainment:** The Internet itself offers many sources of entertainment, of course. In addition, many multi-player games exist that operate over a local area network. Many home networks are set up for this reason, and gaming across wide area networks (including the Internet) has also become quite popular. Of course, if you are running a business and have easily-amused employees, you might insist that this is really a **disadvantage** of networking and not an advantage!
- **Disadvantages of Networks**
 1. Server faults stop applications being available.
 2. Network faults can cause loss of data.
 3. Network fault could lead to loss of resources.
 4. User work dependent upon network.
 5. System open to hackers.
 6. Decisions tend to become centralized.
 7. Could become inefficient.
 8. Could degrade in performances.
 9. Resources could be located too far from users.
 10. Network management can become difficult.

Annexe 2.5.2**Instructions for the group exploration**

- Discuss with your group and define a network.
- On the basis of the items assigned to you, find answers to the following

Group	Components of a network	Types of networks
1	Transmission Media	Local Area Networks (LAN)
2	Network Stations and interface adaptors	Metropolitan Area Network (MAN)
3	Network Operating Systems	Wide Area Network (WAN)

- Identify the main characteristics of the component to your group.
- Name its major functions.
- Try to define the network types assigned to your group.
- Check to see whether it is Internet or Intranet.
- Go through the reading material and compare the advantages and disadvantages of the networks.
- Be prepared to present your findings at the plenary session.

Competency 3 : Investigates the methods used for data representation in computer systems.
Competency Level 3.1: Uses the Binary number system to represent data in computer systems.

Activity 3.1 : Let's investigate how the computer memory functions and how computers handle data.

Time : 60 Minutes

Quality Input :

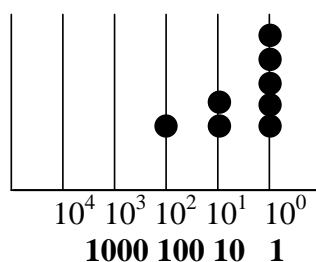
- Four flash cards developed from the material in Annexe 3.1.1
- Three copies of Reading Material in Annexe 3.1.2
- A counting frame to denote the decimal number 125.

Learning – teaching process:

Step 3.1.1 :

- Display the flash cards, one at a time, to the class.
- Get students to name the items that they have seen.
- Let students arrange the beads on a counter frame to denote the decimal number 125.
- Lead a discussion to highlight the following.

- Flash cards carry the same information in different forms.
- Human memory does not retain all types of information equally well.
- Symbols, which are short and simple, are remembered easily when compared to other forms.
- The computer uses the symbols 1 and 0 to represent current Flow and absence of Current Flow.
- The number system used by the computer is made up of 1 and 0.
- The decimal number system is the most familiar number system.
- The number 125 is a decimal number consisting of 1×100 , 2×10 , and 5×1 .



125

- This number has three place values.
- The base value of this number system is 10 and it consists of ten digits ranging from 0 through 9.
- Counting frame can be used to denote number 125.

(10 minutes)

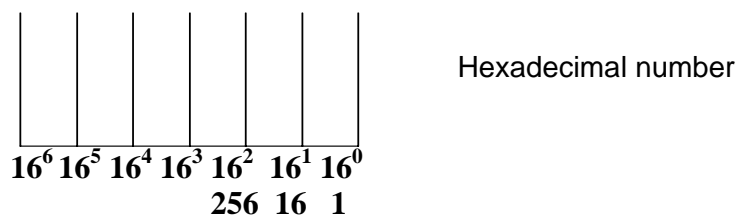
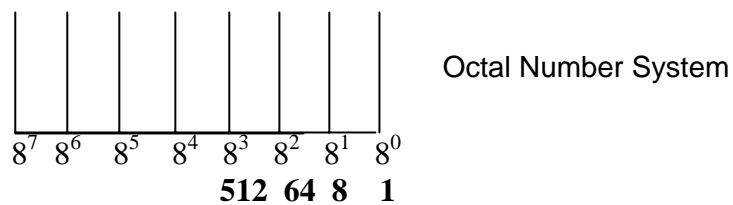
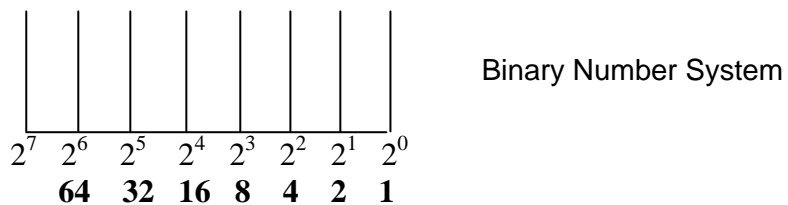
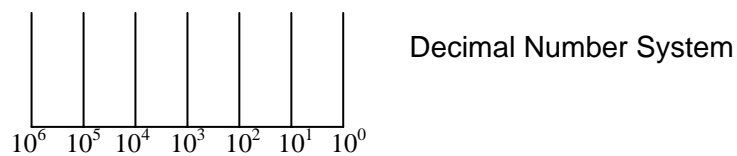
- Step 3.1.2** :
- Divide the class into three groups.
 - Distribute copies of the reading materials and group exploration instruction sheets to the groups.
 - Assign the three topics randomly among groups.
 - Provide groups with demy sheet and makers.
 - Involve the groups in the exploration.
 - Prepare them for a presentation.

(30 minutes)

- Step 3.1.3** :
- Get the groups to present their findings.
 - Request constructive comments from other groups.
 - Conclude the session by highlight the following.

- Binary Number System
 - Base (B) is two.
 - The binary number system consists of two digits.
 - The formula to find the last digit is B-1
 - Each string of the counting frame can contain only one bead.
 - Each string has its own place value
 - The string from the rightmost string in the diagram.
- Octal Number System
 - Base (B) is eight.
 - The number of the digits is eight.
 - Formula to find the last digit is B-1
 - Each string of the counting frame can contain only seven beads.
 - Each string has its own place value
 - The string from the rightmost string in the diagram.

- Hexadecimal Number System
 - Base (B) is sixteen.
 - Number of digits is sixteen.
 - Formula to find the last digits is B-1.
 - Each string of the counting frame can contain only fifteen beads.
 - Each string has its own place value.
 - String from the rightmost string in the diagram.



- The Hexadecimal number System has six digits exceeding 9
These are represented by A,B,C,D,E,F

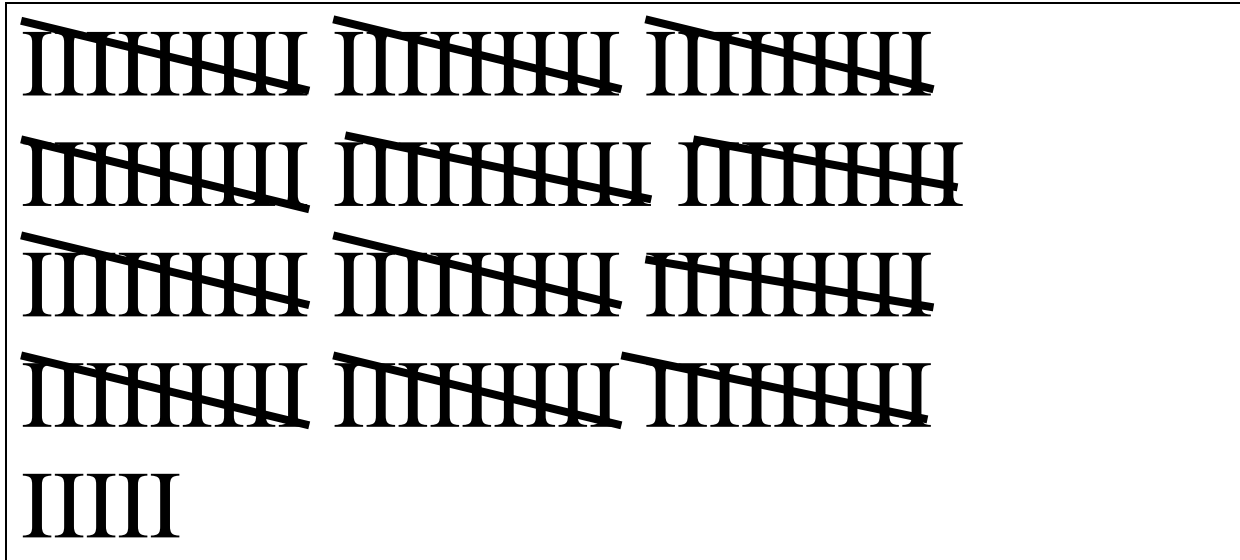
(20 minutes)

Criteria for Assessment and evaluation

- Names the number system and describes them.
- Accepts the value of number systems in representing the same data in various ways.
- Denotes given numbers on the counting frame.
- Demonstrates ability to think logically in different situations.
- Draws diagrams to clarify an idea.

Annexe 3.1.1

Material for developing flash cards



One hundred and twenty five



$100+25$

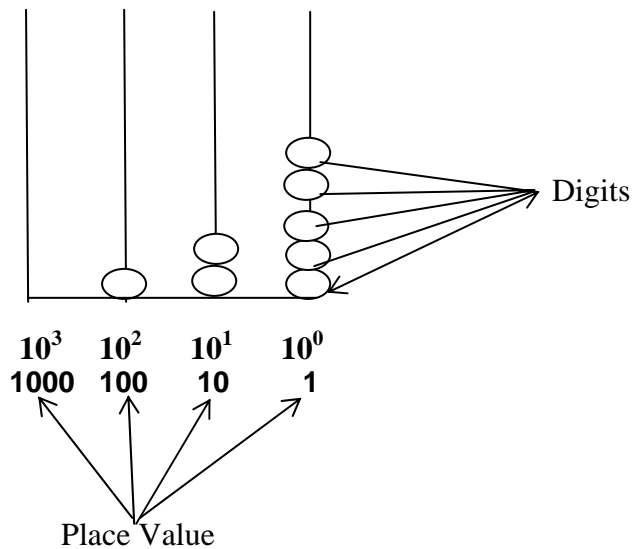


125

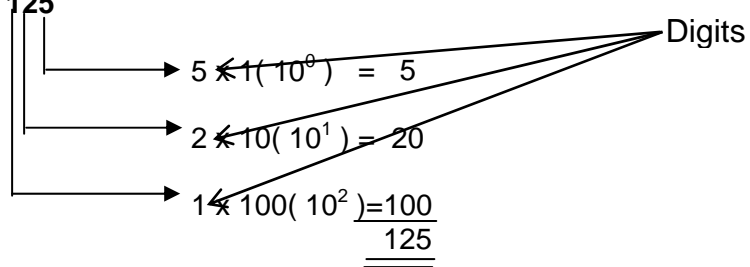
Annexe 3.1.2

Reading material I

Use the counting frame to denote the number 125.



Decimal Number 125



All decimal numbers can be represented as above.

Base Value of the decimal number system is 10.

Digits of the decimal number are 0,1,2,3,4,5,6,7,8,9

Place Values are 10^3 , 10^2 , 10^1 , 10^0 or 1000, 100, 10, 1

Instructions for the Group Exploration

- You will be working in three groups on the following three topics.
 - Binary Number System
 - Octal Number System
 - Hexadecimal Number System
- Go through the reading materials to become familiar with the decimal number system given.
- Use the knowledge gained to find the answer to the following question on the basis of the number system assigned to your group.
- What is the base of the Number System?
- How many digits are there in the Number System?
- What are they?
- Develop the formula using the base to find out the last digits of the number system.
- Set up the counting frame to denote number 25.

Reading material- 2

1. 25
2. 45
3. 12
4. 65
5. 37

- Use the counting frame and denote the above numbers
- Fill in the following table (Fill in the column header)

Binary Number System

2^4	2^3	2^2	2^1	2^0

Decimal number								Binary Number System

Octal Number System

8^4	8^3	8^2	8^1	8^0

Decimal number							Octal Number System

Hexadecimal Number System

16^4	16^3	16^2	16^1	16^0

Decimal number							Hexadecimal Number System

Competency 3 : Investigates the methods used for data representation in computer systems.
Competency Level 3.2: Converts Decimal numbers into Binary, Octal and Hxadecimal

Activity 3.2 : Let's have fun with number conversion.

Time : 90 Minutes.

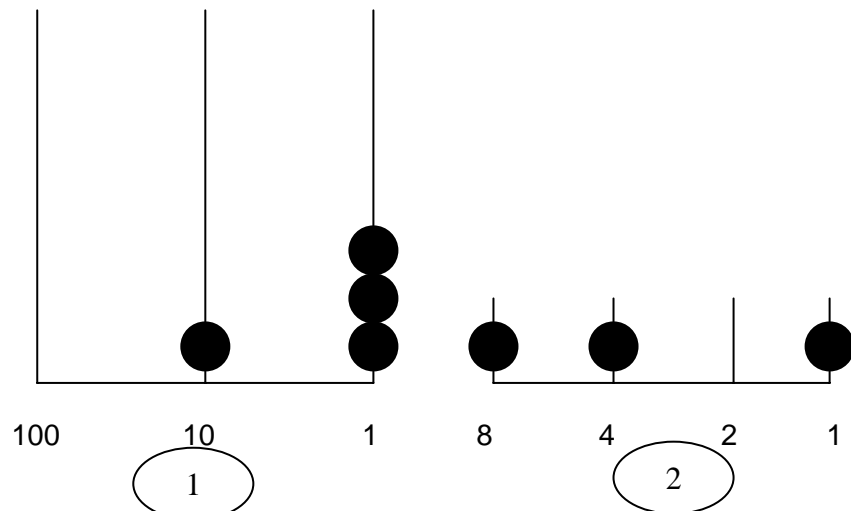
Quality inputs :

- Graded directions on number conversion in Annexe 3.2.1
- Three copies of the group exploration instructions in Annexe 3.2.2

Learning – Teaching Process:

Step 3.2.1 :

- Display to the class the following two counting frames that denote number 13.



- Get the class to identify the number denoted and explain same.
- Conduct a discussion to highlight the following.

- Counting frame 1 denotes the decimal number 13.
- Counting frame 2 denotes 13 in binary numbers.
- The same number can be represented in both number systems.
- Base values of binary and decimal number systems are 2 and 10, respectively.
- The maximum number of balls possible on one bar of counting frame1 is 9 while this is 1 on counting frame 2.

- Step 4.2.2** :
- Divide the class into three groups.
 - Distribute copies of group exploration instructions and Graded Directions to the groups.
 - Involve the groups in the assignment.
 - Prepare them for presentations at the plenary session.

(40 minutes)

- Step 4.2.3** :
- Get groups to present their completed grids.
 - Request others to submit constructive comments.
 - Conclude activity highlighting the following.

- Conversion facilitates human action in terms of representation.
- A set of rules have to be followed in converting a number from one system to another.
- A standard procedure is available to present the digits of the converted number.
- The topmost column headings of the grid denote place values while the second column denotes the same in a different form.
- A grid enables a number conversion to be accomplished without division.

(30 minutes)

Criteria for Assessment and evaluation

- Describes the methods used in converting numbers from one number system to another.
- Accepts the need to convert numbers in the decimal number system to other number systems, in computing.
- Converts decimal numbers to binary, octal and hexadecimal.
- Presents ideas with confidence.
- Demonstrates ability to represent information in different forms.

Annexe 3.2.1**Graded Directions for Number Conversion****Decimal to Binary**

Mainly there are two methods for converting decimal numbers to binary. These are repeated division by 2, and repeated subtraction by the weighted position value.

Repeated Division By 2

In this method we divide the decimal number by 2. If the remainder is 0, on the side we write down 0. If the remainder is 1, we write down 1. This process is continued by dividing the quotient by 2 and dropping the previous remainder until the quotient is 0. The table below indicates how a binary number is derived for 2671. Note the start and the sequence of the 12 digits 1010 0110 1111. The Leftmost digit is called the Most Significant Digit (MSD) and the rightmost digit is called the Least Significant Digit (LSD).

Division	Quotient	Remainder	Binary Number
2671 / 2	1335	1	1
1335 / 2	667	1	11
667 / 2	333	1	111
333 / 2	166	1	1111
166 / 2	83	0	0 1111
83 / 2	41	1	10 1111
41 / 2	20	1	110 1111
20 / 2	10	0	0110 1111
10 / 2	5	0	00110 1111
5 / 2	2	1	10 0110 1111
2 / 2	1	0	010 0110 1111
1 / 2	0	1	1010 0110 1111

Decimal to Octal

Converting decimal numbers to octal is slightly more difficult. The typical method for this is repeated division by 8. Although repeated subtraction by the weighted position value provides another method, this is difficult for large decimal numbers.

Repeated Division By 8

In this method we first divide the decimal number by 8, and write the remainder on the side. This becomes the least significant digit in the octal number finally obtained. The process is continued by dividing the quotient by 8 and writing the remainder until the quotient is 0.

When performing the division, the remainders which represent the octal equivalent of the decimal number are written from the right to left beginning with the least significant digit and moving gradually to reach the most significant digit. The table below shows how the decimal number 44978 is converted to octal.

Division	Quotient	Remainder	Octal Number
44978 / 8	5622	2	2
5622 / 8	702	6	62
702 / 8	87	6	662
87 / 8	10	7	7662
10 / 8	1	2	27662
1 / 8	0	1	127662

Decimal to Hexadecimal

Converting decimal numbers to hexadecimal is even more difficult. The typical method used for this is repeated division by 16. While we may also use repeated subtraction by the weighted position value, it is more difficult with large decimal numbers.

Repeated Division By 16

In this method, we begin by dividing the decimal number by 16. We write the remainder on the side as the least significant digit. The quotient is divided by 16 and the process is continued until the quotient is 0. When performing the division, the remainders that represent the hexadecimal equivalent of the decimal number are written beginning at the least significant digit (right) and each new digit is written to the next more significant digit (the left) of the previous digit. Consider the number 44978.

Division	Quotient	Remainder	Hex Number
44978 / 16	2811	2	2
2811 / 16	175	11	B2
175 / 16	10	15	FB2
10 / 16	0	10	0AFB2

Annexe 3.2.2**Instructions for the group exploration**

- You will be working in three groups with the following three conversions assigned to the three groups.
 - Decimal to binary
 - Decimal to octal
 - Decimal to hexadecimal
- Go through the reading material to identify the methods available for the conversion assigned to your group.
- Identify the grid relevant to your conversion and note with the column headings.
- Try to complete the grid following the division method.
- Identify the advantages of using the grid for the purpose.
- Be prepared to explain the process that you adopted, to the whole class, at the plenary session.

1.

Powers of 2	2 ⁷	2 ⁶	2 ⁵	2 ⁴	2 ³	2 ²	2 ¹	2 ⁰	TOTAL
Decimal	128	64	32	16	8	4	2	1	
Binary number									1
									3
									14
									177
									180
									255
									128
									129

2.

Powers of 8	8^4	8^3	8^2	8^1	8^0	TOTAL
Decimal	4096	512	64	8	1	
Octal number						1
						3
						14
						177
						180
						255
						579
						4617

3.

Powers of 16	16^3	16^2	16^1	16^0	TOTAL
Decimal	4096	256	16	1	
Hexadecimal number					1
					3
					14
					177
					180
					256
					1000
					4617

Competency 3 : Investigates the methods used for data representation in computer systems.

Competency Level 3.3 : Converts Binary numbers into Decimal, Octal and Hexadecimal numbers and vice versa

Activity 3.3 : Let's have fun with number conversion.

Time : 90 Minutes.

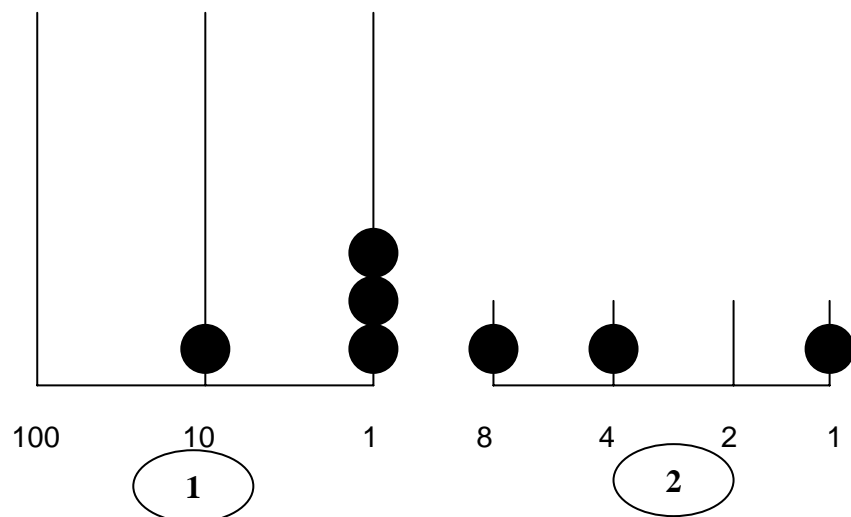
Quality inputs :

- Graded directions on number conversion in Annexe 3.3.1
- Three copies of the group exploration instructions in Annexe 3.3.2

Learning – Teaching Process:

Step 3.3.1 :

- Display to the class the following two counting frames that denote number 13.



- Get the class to identify the number denoted and explain.
- Conduct a discussion to highlight the following.

- Counting frame 1 denotes the decimal number 13.
- Counting frame 2 denotes 13 in binary numbers.
- The same number can be represented in both number systems.
- Base values of binary and decimal number systems are 2 and 10, respectively.
- The maximum number of balls possible on one bar of counting frame1 is 9 while this is 1 on counting frame 2.

(20 minutes)

- Step 3.3.2** :
- Divide the class into three groups.
 - Distribute copies of group exploration instruction and Graded Directions to the groups.
 - Involve the groups in the exploration.
 - Prepare them for presentations at the plenary session.

(40 minutes)

- Step 3.3.3** :
- Get groups to present their completed grids.
 - Request others to submit constructive comments.
 - Conclude activity highlighting the following.

- Conversion facilitates human action in terms of representation.
- A set of rules have to be followed in converting a number from one system to another.
- A standard procedure is available to present the digits of the converted number.
- The topmost column headings of the grid denote place values while the second column denotes the same in a different form.
- A grid enables a number conversion to be accomplished without division.

(30 minutes)

Criteria for Assessment and evaluation

- Describes the methods used in converting numbers from one number system to another.
- Accepts the need to convert numbers in the decimal number system to other number systems, in computing.
- Converts decimal numbers to binary, octal and hexadecimal.
- Presents ideas with confidence.
- Demonstrates ability to represent information in different forms.

Annexe 3.3.1**Graded Directions for Number Conversion****Decimal to Binary**

Mainly there are two methods for converting decimal numbers to binary. These are repeated division by 2, and repeated subtraction by the weighted position value.

Repeated Division By 2

In this method we divide the decimal number by 2. If the remainder is 0, on the side we write down 0. If the remainder is 1, we write down 1. This process is continued by dividing the quotient by 2 and dropping the previous remainder until the quotient is 0. The table below indicates how a binary number is derived for 2671. Note the start and the sequence of the 12 digits 1010 0110 1111. The Leftmost digit is called the Most Significant Digit (MSD) and the rightmost digit is called the Least Significant Digit (LSD).

Division	Quotient	Remainder	Binary Number
2671 / 2	1335	1	1
1335 / 2	667	1	11
667 / 2	333	1	111
333 / 2	166	1	1111
166 / 2	83	0	0 1111
83 / 2	41	1	10 1111
41 / 2	20	1	110 1111
20 / 2	10	0	0110 1111
10 / 2	5	0	00110 1111
5 / 2	2	1	10 0110 1111
2 / 2	1	0	010 0110 1111
1 / 2	0	1	1010 0110 1111

Decimal to Octal

Converting decimal numbers to octal is slightly more difficult. The typical method for this is repeated division by 8. Although repeated subtraction by the weighted position value provides another method, this is difficult for large decimal numbers.

Repeated Division By 8

In this method we first divide the decimal number by 8, and write the remainder on the side. This becomes the least significant digit in the octal number finally obtained. The process is continued by dividing the quotient by 8 and writing the remainder until the quotient is 0.

When performing the division, the remainders which represent the octal equivalent of the decimal number are written from the right to left beginning with the least significant digit and moving gradually to reach the most significant digit. The table below shows how the decimal number 44978 is converted to octal.

Division	Quotient	Remainder	Octal Number
44978 / 8	5622	2	2
5622 / 8	702	6	62
702 / 8	87	6	662
87 / 8	10	7	7662
10 / 8	1	2	27662
1 / 8	0	1	127662

Decimal to Hexadecimal

Converting decimal numbers to hexadecimal is even more difficult. The typical method used for this is repeated division by 16. While we may also use repeated subtraction by the weighted position value, it is more difficult for large decimal numbers.

Repeated Division By 16

In this method, we begin by dividing the decimal number by 16. We write the remainder on the side as the least significant digit. The quotient is divided by 16 and the process is continued until the quotient is 0. When performing the division, the remainders that represent the hexadecimal equivalent of the decimal number are written beginning at the least significant digit (right) and each new digit is written to the next more significant digit (the left) of the previous digit. Consider the number 44978.

Division	Quotient	Remainder	Hex Number
44978 / 16	2811	2	2
2811 / 16	175	11	B2
175 / 16	10	15	FB2
10 / 16	0	10	0AFB2

Annexe 3.3.2

Instructions for the Group Exploration

- You will be working in three groups with the following three conversions assigned to the three groups.
 - Decimal to binary
 - Decimal to octal
 - Decimal to hexadecimal
- Go through the reading material to identify the methods available for the conversion assigned to your group.
- Identify the grid relevant to your conversion and become familiar with the column headings.
- Try to complete the grid following the division method.
- Identify the advantages of using the grid for the purpose.
- Be prepared to explain the process that you adopted, to the whole class, at the plenary session.

1.

Powers of 2	2 ⁷	2 ⁶	2 ⁵	2 ⁴	2 ³	2 ²	2 ¹	2 ⁰	TOTAL
Decimal	128	64	32	16	8	4	2	1	
Binary number									1
									3
									14
									177
									180
									255
									128
									129

2

Powers of 8	8^4	8^3	8^2	8^1	8^0	TOTAL
Decimal	4096	512	64	8	1	
Octal number						1
						3
						14
						177
						180
						255
						579
						4617

3.

Powers of 16	16^3	16^2	16^1	16^0	TOTAL
Decimal	4096	256	16	1	
Hexadecimal number					1
					3
					14
					177
					180
					256
					1000
					4617

Competency 3 : Investigates the methods used for data representation in computer systems.

Competency Level 3.4 : Determines the capacity of computers in terms of data storage

Activity 3.4 : Let's measure data storage

Time : 90 Minutes

Quality Input :

- Reading materials on measuring units in Annexe 3.4.1
- Four copies of group exploration instruction in Annexe 3.4.2

Learning – Teaching Process:

Step 3.4.1 :

- Display the two diagrams in Annexe 3.4.1 to the class
- Get students to match the two sets in Annexe 3.4.1
- Ask students how and why they match
- What is the measuring unit of the capacity of a digital device?
- What is a byte?
- Conduct a discussion to highlight the following.

- Most things have measurable features
- Measuring units are used to measure them.
- Measuring units have multiples and sub-divisions.
- The measuring unit “byte” is used to measure the storage capacity of digital devices.
- A byte consists of eight places in binary digits (bits)
- The combination of two bytes is called a “word”.
- Half a byte (4 bits) is called a “bin”

(20 minutes)

- Step 3.4.2** :
- Divide the whole class into four groups
 - Distribute graded directions and group exploration instruction to each group
 - Lead them to read the graded directions and identify byte, sub division of byte and multiples of byte.
 - Ask students to go through the graded directions and trace the specifications in the assignment using the computer that he/she is working with.
 - Ask the students to list out how performance increases as the capacity increases in digital devices
 - Ask each group to complete the assignment.

(40 minutes)

- Step 3.4.3** :
- Let each group present its experiences.
 - Conduct discussion to highlight the following

- Byte is the measuring unit of the capacity of digital devices.
- A byte consists of 8 bits. A word consists of 2 bytes
 8 bits = 1 byte
 2 bytes = 1 word
- Multiples of byte as follows
 1,024 bytes = 1 kilobyte
 1,024 kilobytes = 1 megabyte
 1,024 megabytes = 1 gigabyte
 1,024 gigabytes = 1 terabyte
- We can check the Capacity of Some devices on the computer
 Capacity of RAM
 Capacity of VGA
 Capacity of hard disk
 Capacity of removable disks
- There are digital devices with a variety of capacities in the market.

(30 minutes)

Criteria for Assessment and evaluation

- Describes the multiples of bytes and their decimal representations.
- Accepts the existence of different storage devices of different sizes.
- Distinguishes between the performance of digital devices according to their storage capacity.
- Chooses a suitable device of appropriate size for activities in day to day life
- Works co-operatively in-group.

Annexe 3.4.1

Reading Material

- Byte is the measuring unit of the capacity of digital devices.
- A byte consists of 8 binary digits (bit). A word consists of 2 bytes
 8 bits = 1 byte
 2 bytes = 1 word
- Multiples of byte:
 - 1,024 bytes = 1 kilobyte
 - 1,024 kilobytes = 1 megabyte
 - 1,024 megabytes = 1 gigabyte
 - 1,024 gigabytes = 1 terabyte

Two Different Systems of Measurement

Name	Abbreviation	Binary Power	Binary Value (represented in Decimal)	Decimal Power	Decimal (Equivalent)
kilobyte	Kbyte	2^{10}	1,024	10^3	1,000
megabyte	Mbyte	2^{20}	1,048,576	10^6	1,000,000
gigabyte	Gbyte	2^{30}	1,073,741,824	10^9	1,000,000,000
terabyte	Tbyte	2^{40}	1,099,511,627,776	10^{12}	1,000,000,000,000

Name	Abbr.	Size
Kilo	K	$2^{10} = 1,024$
Mega	M	$2^{20} = 1,048,576$
Giga	G	$2^{30} = 1,073,741,824$
Tera	T	$2^{40} = 1,099,511,627,776$
Peta	P	$2^{50} = 1,125,899,906,842,624$
Exa	E	$2^{60} = 1,152,921,504,606,846,976$
Zetta	Z	$2^{70} = 1,180,591,620,717,411,303,424$
Yotta	Y	$2^{80} = 1,208,925,819,614,629,174,706,176$

- We can find the Capacity of RAM on a computer by going through the following steps.

Capacity of RAM

- C:\ windows \ system32 \direct x
- Control panel system general

- We can find the Capacity of VGA on a computer by going through the following steps.

Capacity of VGA

- Display properties settings advanced adapter
- C windows system32 direct x

- We can find the Capacity of the hard disk on a computer by going through the following steps.

Capacity of hard disk

- My computer select drive click file properties
- C:\ windows \ system32 \direct x

- We can find the Capacity of removable disks on a computer by going through the following steps.

Capacity of removable disks

Insert disk in to drive

- My computer - select drive - click file - properties
- C windows - system32 - direct x

Annexe 3.4.2**Assignment 1**

1. Match the features in A with the units in B

A	B
Weight	Degrees of Celsius
Volume	gram
Distance	Meter
Time	Byte
Temperature	Second
Storage capacity of electronic device	Liter
	Celsius

Assignment 2

1. Find the storage capacity of the hard disk on your computer.
2. List the storage capacity of hard disks available.
3. Write two advantages of high hard disk capacity. (provided other hardware specifications are of high standard, only)

Assignment 3

1. Find the RAM size of your computer.
2. List RAM sizes available.
3. Write two advantages of high RAM size. (Provided other hardware specifications are of high standard, only)

Assignment 4

1. Find the VGA size of your computer.
2. List VGA sizes available.
3. Write two advantages of high VGA size. (Provided other hardware specifications are of high standard, only)

Assignment 5

1. Find the storage capacity of removable devices of your computer.
2. List the storage capacities of removable devices (floppy disks, CD, Flash drive) available.
3. Write two advantages, when the hard disk capacity is high. (if other hardware specifications are of high standard only)

Competency 3 : Investigates the methods used for data representation in computer systems.
Competency Level 3.5: Uses coding systems in Computers

Activity 3.5 : Let's learn the different codes used in computer systems.

Time : 90 minutes.

Quality inputs :

- Three copies Reading materials in Annexe 3.5.1
- Three copies of the group exploration instructions in Annexe 3.5.2

Learning – Teaching Process:

Step 3.5.1 :

- Displayed below is, the code for “Codes used in computer” in numeric when the letters of the alphabet are numbered in order.

3 15 4 5 19 21 19 5 4 9 14 3 15 13 16 21 20 5 18

- Get the class to identify the text relevant to the above codes.
- Conduct a discussion to highlight the following.

- Information can be represented in codes
- To represent data the computer uses only two symbols.

(15 minutes)

Step 3.5.2 :

- Divide the class into three groups.
- Distribute copies of group exploration instructions and reading material among the groups.
- Involve the groups in the exploration.
- Prepare them for presentation at the plenary session.

(40 minutes)

Step 3.5.3 :

- Get groups to present their findings.
- Request others to submit constructive comments.
- Conclude the activity by highlighting the following.

- The most common coding system is ASCII
(Pronounced *ass-key*)
- ASCII stands for American National Standard Code for Information Interchange
- In ASCII
 - Each character is coded as a byte
 - 7-bit code
 - 8th bit is unused
 - $2^7 = 128$ codes
- EBCDIC stands for Extended BCD Interchange Code
(pronounced *ebb'-se-dick*)
- EBCDIC is
 - 8-bit code
 - Developed by IBM
 - Used for IBM mainframes only
- BCD stands for Binary-Coded Decimal.
- BCD is a system for storing decimal numbers in binary form.
- To convert a decimal number to BCD each digit of the decimal number is converted to a 4 bit binary number.

(35 minutes)

Criteria for Assessment and evaluation

- Describes the methods used for converting characters to ASCII, EBCDIC and decimal numbers to BCD.
- Accepts the need for coding systems employed in computers.
- Converts characters to ASCII, EBCDIC and decimal numbers to BCD.
- Expresses one's own ideas in different forms.
- Uses simple ways to perform complicated task.

Anexe 3.5.1

Reading Material

Coding systems are employed by computers in order to represent various characters, numbers, and control keys that the computer user selects on the keyboard. Three of the more popular coding systems are:

1. ASCII (American Standard Code for Information Interchange)
2. EBCDIC (Extended Binary Coded Decimal Interchange Code)
3. BCD (Binary Coded Decimal)

They differ in how many digits or bits they use to represent a character.

In each system the character or number is represented by a sequence of binary digits which can only have the values 0 or 1. The ASCII system uses seven 0 or 1 digits or bits to represent the letters of the alphabet, while EBCDIC uses eight bits. BCD uses four bits to represent the numbers 0 to 9.

ASCII (American Standard Code for Information Interchange)

ASCII (pronounced "askee") is the short form for American Standard Code for Information Interchange. ASCII is a standard developed by the American National Standards Institute (ANSI) to define computer intelligible values for characters used in text.

The ASCII set of 128 characters includes upper and lower case letters of the English alphabet, numbers, punctuation marks, and 33 control codes (such as tab, bell, carriage return.) ASCII uses 7 bits to represent each character. You may see ASCII characters identified by a decimal number from 0 to 127. 65, for example, identifies uppercase A; 122 is lowercase z. Alternatively, you may see hexadecimal numbers used. In this system A is 41, z is 7A. The ASCII coded set is the one used by most operating systems.

ASCII 7 bit
1000001 = A
1000010 = B
1000011 = C
1000100 = D
1000101 = E
etc.

ASCII	Hex	Symbol	ASCII	Hex	Symbol	ASCII	Hex	Symbol	ASCII	Hex	Symbol
0	0	NUL	16	10	DLE	32	20	(space)	48	30	0
1	1	SOH	17	11	DC1	33	21	!	49	31	1
2	2	STX	18	12	DC2	34	22	"	50	32	2
3	3	ETX	19	13	DC3	35	23	#	51	33	3
4	4	EOT	20	14	DC4	36	24	\$	52	34	4
5	5	ENQ	21	15	NAK	37	25	%	53	35	5
6	6	ACK	22	16	SYN	38	26	&	54	36	6
7	7	BEL	23	17	ETB	39	27	'	55	37	7
8	8	BS	24	18	CAN	40	28	(	56	38	8
9	9	TAB	25	19	EM	41	29	)	57	39	9
10	A	LF	26	1A	SUB	42	2A	*	58	3A	:
11	B	VT	27	1B	ESC	43	2B	+	59	3B	;
12	C	FF	28	1C	FS	44	2C	,	60	3C	<
13	D	CR	29	1D	GS	45	2D	-	61	3D	=
14	E	SO	30	1E	RS	46	2E	.	62	3E	>
15	F	SI	31	1F	US	47	2F	/	63	3F	?

ASCII	Hex	Symbol	ASCII	Hex	Symbol	ASCII	Hex	Symbol	ASCII	Hex	Symbol
64	40	@	80	50	P	96	60	`	112	70	p
65	41	A	81	51	Q	97	61	a	113	71	q
66	42	B	82	52	R	98	62	b	114	72	r
67	43	C	83	53	S	99	63	c	115	73	s
68	44	D	84	54	T	100	64	d	116	74	t
69	45	E	85	55	U	101	65	e	117	75	u
70	46	F	86	56	V	102	66	f	118	76	v
71	47	G	87	57	W	103	67	g	119	77	w
72	48	H	88	58	X	104	68	h	120	78	x
73	49	I	89	59	Y	105	69	i	121	79	y
74	4A	J	90	5A	Z	106	6A	j	122	7A	z
75	4B	K	91	5B	[	107	6B	k	123	7B	{
76	4C	L	92	5C	\	108	6C	l	124	7C	|
77	4D	M	93	5D	]	109	6D	m	125	7D	}
78	4E	N	94	5E	^	110	6E	n	126	7E	~
79	4F	O	95	5F	_	111	6F	o	127	7F	

EBCDIC (Extended Binary Coded Decimal Interchange Code)

EBCDIC (generally pronounced "Ebb see Dick") is the character encoding scheme used by IBM mainframe systems since the 1960s. In that decade it lost to ASCII a competition to become the official national standard. EBCDIC uses an 8-bit character set whose code values are entirely different from those of ASCII.

EBCDIC 8 bit
11000001 = A
11000010 = B
11000011 = C
11000100 = D
11000101 = E
etc.

Dec	Hex	Code	Dec	Hex	Code	Dec	Hex	Code	Dec	Hex	Code
0	00	NUL	32	20		64	40	space	96	60	-
1	01	SOH	33	21		65	41		97	61	/
2	02	STX	34	22		66	42		98	62	
3	03	ETX	35	23		67	43		99	63	
4	04		36	24		68	44		100	64	
5	05	HT	37	25	LF	69	45		101	65	
6	06		38	26	ETB	70	46		102	66	
7	07	DEL	39	27	ESC	71	47		103	67	
8	08		40	28		72	48		104	68	
9	09		41	29		73	49		105	69	
10	0A		42	2A		74	4A	[	106	6A	|
11	0B	VT	43	2B		75	4B	.	107	6B	,
12	0C	FF	44	2C		76	4C	<	108	6C	%
13	0D	CR	45	2D	ENQ	77	4D	(	109	6D	_
14	0E	SO	46	2E	ACK	78	4E	+	110	6E	>
15	0F	SI	47	2F	BEL	79	4F	!|	111	6F	?
16	10	DLE	48	30		80	50	&	112	70	
17	11		49	31		81	51		113	71	
18	12		50	32	SYN	82	52		114	72	
19	13		51	33		83	53		115	73	
20	14		52	34		84	54		116	74	
21	15		53	35		85	55		117	75	
22	16	BS	54	36		86	56		118	76	
23	17		55	37	EOT	87	57		119	77	
24	18	CAN	56	38		88	58		120	78	
25	19	EM	57	39		89	59		121	79	'
26	1A		58	3A		90	5A	!]]	122	7A	:
27	1B		59	3B		91	5B	\$	123	7B	#
28	1C	IFS	60	3C		92	5C	*	124	7C	@
29	1D	IGS	61	3D	NAK	93	5D	)	125	7D	'
30	1E	IRS	62	3E		94	5E	;	126	7E	=
31	1F	IUS	63	3F	SUB	95	5F	^	127	7F	"

Dec	Hex	Code	Dec	Hex	Code	Dec	Hex	Code	Dec	Hex	Code
128	80		160	A0		192	C0	{	224	E0	\
129	81	a	161	A1	~	193	C1	A	225	E1	
130	82	b	162	A2	s	194	C2	B	226	E2	S
131	83	c	163	A3	t	195	C3	C	227	E3	T
132	84	d	164	A4	u	196	C4	D	228	E4	U
133	85	e	165	A5	v	197	C5	E	229	E5	V
134	86	f	166	A6	w	198	C6	F	230	E6	W
135	87	g	167	A7	x	199	C7	G	231	E7	X
136	88	h	168	A8	y	200	C8	H	232	E8	Y
137	89	i	169	A9	z	201	C9	I	233	E9	Z
138	8A		170	AA		202	CA		234	EA	
139	8B		171	AB		203	CB		235	EB	
140	8C		172	AC		204	CC		236	EC	
141	8D		173	AD		205	CD		237	ED	
142	8E		174	AE		206	CE		238	EE	
143	8F		175	AF		207	CF		239	EF	
144	90		176	B0		208	D0	}	240	F0	0
145	91	j	177	B1		209	D1	J	241	F1	1
146	92	k	178	B2		210	D2	K	242	F2	2
147	93	l	179	B3		211	D3	L	243	F3	3
148	94	m	180	B4		212	D4	M	244	F4	4
149	95	n	181	B5		213	D5	N	245	F5	5
150	96	o	182	B6		214	D6	O	246	F6	6
151	97	p	183	B7		215	D7	P	247	F7	7
152	98	q	184	B8		216	D8	Q	248	F8	8
153	99	r	185	B9		217	D9	R	249	F9	9
154	9A		186	BA		218	DA		250	FA	
155	9B		187	BB		219	DB		251	FB	
156	9C		188	BC		220	DC		252	FC	
157	9D		189	BD		221	DD		253	FD	
158	9E		190	BE		222	DE		254	FE	
159	9F		191	BF		223	DF		255	FF	

BCD (Binary Coded Decimal)

BCD is a system for storing decimal numbers in binary form. Each digit of the decimal number is converted to a 4 bit binary number:

Decimal	0	1	2	3	4	5	6	7	8	9
BCD	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001

All numbers in decimal can be represented in BCD with four bits that can easily represent numbers from 0 to 9.

For example: To represent the decimal number 312 in BCD form:

Decimal	3	1	2
BCD	0011	0001	0010

Note: Each digit of the decimal number (3,1,2) is separately converted to a binary number instead of converting the number 312 as a whole to the binary number 100111000. You can see that the pure binary number takes up 9 bits while the three BCD numbers take up 12 bits, requiring more computer memory space.

Annexe 3.5.2

Instructions for the group exploration

- You will be working in three groups with the three group exploration instruction related to the following coding systems employed in computers.
 - ASCII
 - EBCDIC
 - BCD
 - Go through the reading material to identify the methods available for the group exploration instruction assigned to your group.
 - Be prepared to explain the process that you adapted, to the whole class, at the plenary session.
-
1. Write the ASCII code to represent text strings “Hello, world”.
 2. How do you represent text string “Hello, world” in EBCDIC code?
 3. a. What are the bit patterns not used in the 4 bit BCD coding system?
b. Convert the following decimal numbers to BCD.
 - 1) 321
 - 2) 564
 - 3) 9082
 - 4) 7093
 - 5) 2857

Competency 4 : Uses Boolean Algebra to work effectively with logic gates

Competency Level 4.1: Identifies basic logic operators and draws truth tables to illustrate their functions

Activity 4.1 : Let's draw truth tables for basic logic operators.

Time : 90 minutes

Quality inputs :

- A demy sheet containing the two circuits in Annexe 4.1.1
- Four copies of reading material in Annexe 4.1.2
- Four copies of group exploration instructions in Annexe 4.1.3.

Learning – Teaching Process:

Step 4.1.1 :

- Expose the two circuits on demy sheet to the class.
- Get students to discuss how the bulb lights up in relation to the on / off positions of the switches.
- Conduct discussion to highlight the following.

- The two diagrams represent the two types of circuits -parallel and series
- In series circuits the bulb lights only if switches A and B are in “on” position
- In parallel circuits the bulb lights when either switch A or B or both A and B are in the “on” position:
- These two circuits illustrate the two logical operations in computers

(15minutes)

Step 4.1.2 :

- Divide class into four groups.
- Distribute the group exploration instructions and reading material among the four groups
- Involve groups in the exploration.
- Prepare groups for a presentation at the plenary.

(50 minutes)

- Step 4.1.3** :
- Get each group to present its findings.
 - Request the presenters themselves to fill gaps, if any.
 - Seek for constructive comments of other groups
 - Conclude the session by highlighting the following.

- The AND operations gives an output 1 only if all the inputs are 1. The output will be 0 if any one of the inputs is 0.
- The OR operation gives the output 1 if any input is one.
- In an OR operation, If all the inputs are 0 then the output will be 0.
- The NOT operation gives the inverse of the input, that is, if the input is 0, the output is 1 and *vice versa*.
- A Truth table is a graphical representation, which shows how a logic circuit responds to various combinations of inputs using 1 for *true* and 0 for *false*.
- In a truth table if there are two inputs there will be four combinations and if there are three inputs there will be eight combinations.

(25 Minutes)

Criteria for assessment and evaluation

- Names and describes the basic logical operations
- Accepts the need to combine different operations appropriately in designing simple circuits to meet user needs
- Develops truth tables using different input combinations to arrive at the desired output.
- Uses reading as a tool for self-learning.
- Demonstrates ability to think logically.

Annexe 4.1.1

Figure 1

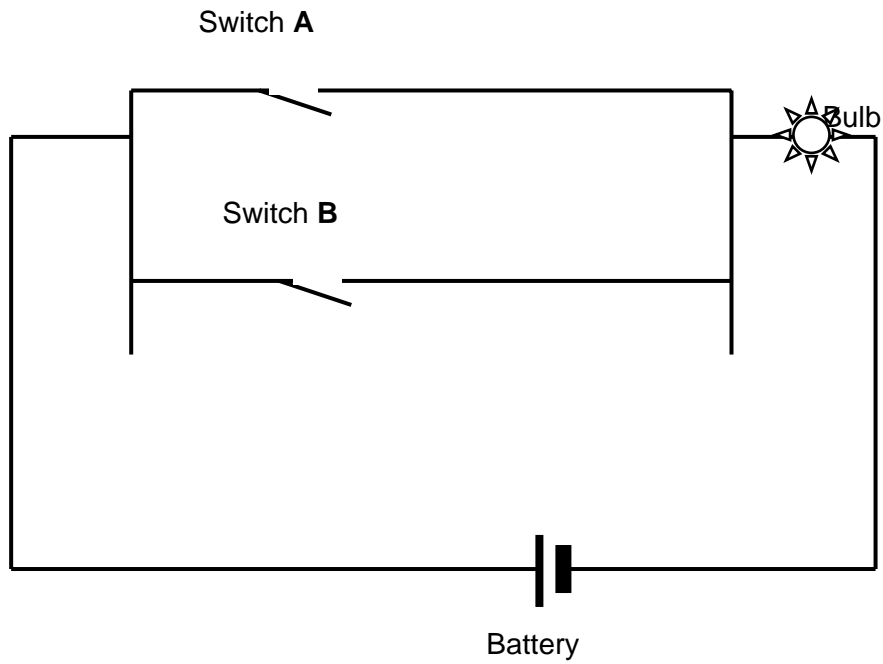
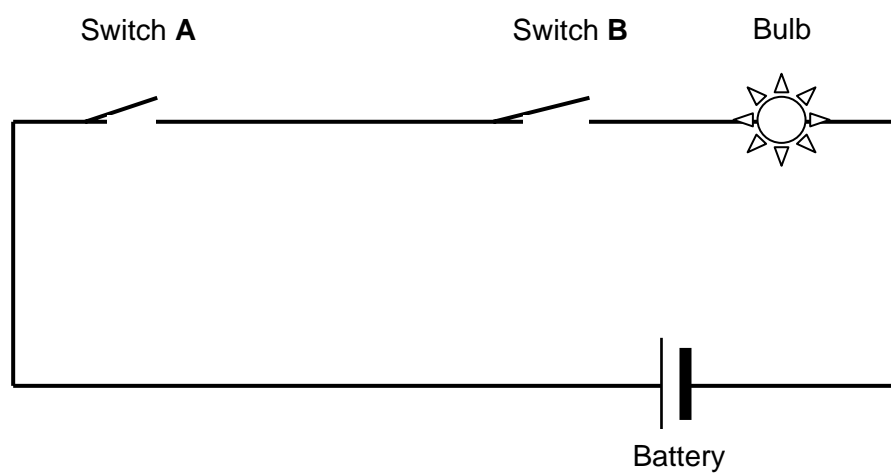


Figure 2



Annexe 4.1.2

Everything in the digital world is based on the binary number system. Numerically, this involves only two symbols: 0 and 1. Logically, we can use these symbols or we can equate them with others according to the needs of the moment. Thus, when dealing with digital logic, we can specify that:

0 = false = no
1 = true = yes

Using this two-valued logic system, every statement or condition must be either "true" or "false;" it cannot be partly true and partly false.

One essential reason for basing logical operations on the binary number system is that it is easy to design simple, stable electronic circuits that can switch back and forth between two clearly-defined states.

Some common representations of 0 and 1 are shown in the following diagram.

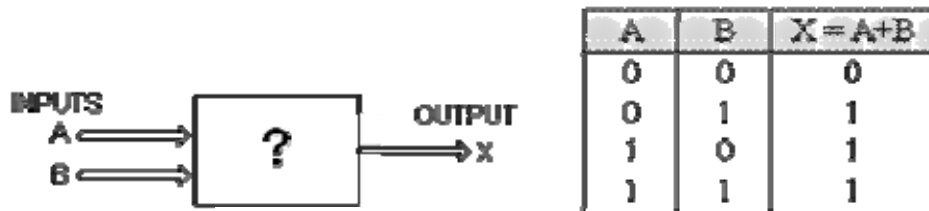
Logic 0	Logic 1
False	True
Off	On
Low	High
No	Yes
Open Switch	Close Switch

Truth Tables

In algebra, it is rarely possible to guess the numerical solution to a problem, and because there are an infinite number of numbers it is obvious that one cannot try all possible solutions in order to find one that solves the problem. But in logic, we only have two "numbers": True and False. Therefore, any logical statement which contains a finite number of logical variables (which of course covers any problem we have to deal with) can be analyzed using a table which lists all possible values of the variables: a "**truth table**". Since each variable can take only two values, a statement with "n" variables requires a table with 2^n rows. Using the letters "p", "q", "r", etc., to represent logical variables, we can construct truth tables for statements involving any number of variables (although we will usually limit ourselves to at most three variables per statement to simplify the matter):

OR Operation

In the following two-inputs logic circuit, the table lists all possible combinations of logic levels present at inputs A and B along with the corresponding output level X.



When either input A OR B is 1, the output X is 1.

The expression $X = A + B$ is read "X equals A **OR** B".

The + sign stands for the OR operation, not for ordinary addition.

The OR operation produces a result of 1 when **any** of the input variable is 1.

The OR operation produces a result of 0 only when **all** the input variables are 0.

Truth table for 3 input logic circuit (OR operation)

A	B	C	X = A+B+C
0	0	0	0
0	0	1	1
0	1	0	1
0	1	1	1
1	0	0	1
1	0	1	1
1	1	0	1
1	1	1	1

AND Operation

The expression $X = A * B$ is read "X equals A **AND** B".

The multiplication sign stands for the AND operation, the same as for ordinary multiplication of 1s and 0s.

The AND operation produces the result 1 only for the single case where **all** the input variables are 1.

The output is 0 for any case where one or more inputs are 0

A	B	X = A*B
0	0	0
0	1	0
1	0	0
1	1	1

Truth table for three input logic circuit

A	B	C	$X = A * B * C$
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	0
1	0	0	0
1	0	1	0
1	1	0	0
1	1	1	1

NOT Operation

The NOT operation is unlike the OR and AND operations in that it can be performed on a **single** input variable. For example, if the variable A is subjected to the NOT operation, the result x can be expressed as

$$x = A'$$

where the prime (') represents the NOT operation. This expression is read as:
x equals NOT A
x equals the inverse of A
x equals the complement of A

Each of these is in common usage and all indicate that the logic value of x = A' is opposite to the logic value of A.

The truth table of the NOT operation is as follows:

A	$X = A'$
0	1
1	0

$1' = 0$ because NOT 1 is 0
 $0' = 1$ because NOT 0 is 1

The NOT operation is also referred to as the inversion or complementation, and these terms are used interchangeably.

Annexe 4.1.3**Instructions for the Group Exploration**

- Each group will be assigned one of the following sets containing four truth tables.
- Focus on the truth tables assigned to your group.
- Identify the number of variables in table one and two.
- Identify and name the number of possible combinations that can be formed from the above variables.
- Discuss the relation between the combinations
- Study table 3 and state how it is related to the second table
- Identify and describe the meaning of A' and B' (bar)
- Understand the different variables correctly and complete all the tables

First set of tables

A	B	A.B	B.A
0	0	0	
0	1		0
1	0	0	
1	1		1

A	B	C	A.B	(A.B).C
0	0	0		
0	0	1	0	0
0	1	0		
0	1	1		
1	0	0		
1	0	1		0
1	1	0		
1	1	1		

A	B	C	B.C	(B.C).A
0	0	0		
0	0	1	0	0
0	1	0		
0	1	1		
1	0	0		
1	0	1	0	
1	1	0		
1	1	1		

NOT operation

		—	—	— —		—
--	--	---	---	-----	--	---

A	B	A	B	A.B	A.B	A.B
0	0	1		1	0	
0	1					
1	0		1			1
1	1					

Second set of tables

A	B	A+B	B+A
0	0	0	
0	1		1
1	0	1	
1	1		1

A	B	C	A+B	(A+B)+C
0	0	0		0
0	0	1	1	
0	1	0		
0	1	1		
1	0	0		
1	0	1		1
1	1	0	1	
1	1	1		

A	B	C	B+C	(B+C)+A
0	0	0		
0	0	1	1	
0	1	0		
0	1	1		1
1	0	0		
1	0	1	1	
1	1	0		
1	1	1		1

A	B	\bar{A}	\bar{B}	$\overline{A+B}$	A+B	$\overline{A+B}$
0	0	1		1	0	
0	1					
1	0		1			0
1	1					

Competency 4 : Uses Boolean Algebra to work effectively with logic gates

Competency 4.2: Assesses the suitability of basic logic gates to illustrate logic Operations

Activity 4.2 : Let's find out the functions of basic logic gates

Time : 90 Minutes

Quality inputs :

- A demy sheet containing the situations in Annexe 4.2.1
- Five copies of the reading material in Annexe 4.2.2
- Five copies of the group exploration instruction sheet in Annexe 4.2.3

Learning – Teaching Process:

Step 4.2.1 :

- Draw the attention of the class to the situations shown on the demy sheet.
- Ask students to state the conditions that need to be satisfied to obtain the necessary outcome.
- Conduct a discussion to highlight the following.

- When both the key and the door are open the buzzer in the car sounds. The condition is AND and the output is sound.
- The fire alarm sounds when it senses either heat or smoke. The condition is OR.
- People in our country are allowed to vote at the elections if they are Sri Lankans who are 18 or above. The condition is AND.
- To complete the assignment the students must do a presentation or write an essay. The condition is OR.
- To follow the course at the University the student must have A passes in Math, English and Science or ICT. The combined conditions are AND & OR.
- If the door is not locked you can enter the building. If the door is locked you cannot enter. The condition is NOT.

(15 minutes)

Step 4.2.2 : • Divide the class into five groups.

- Provide each group with a copy of the reading material and group exploration instruction
- Distribute five logic gates among the five groups
- Involve the groups in the exploration.
- Prepare groups for a presentation at the plenary.

(45 Minutes)

Step 4.2.3

- :
- Get each group to present its findings.
 - Request the presents themselves to fill gaps, if any.
 - Seek for constructive comments of other groups
 - Conclude the session by highlighting the following.

- Gates in a circuit are represented by specific delta-shaped standard symbols prescribed by the ASA – American Standard Association.
- A Logic Gate in an electronic device is a logic circuit, which makes basic logical decisions such as AND, OR, NOT operations.
- Logic gates in digital systems are AND, OR, NOT, NAND, NOR
- The high output in a circuit, that is current flow, is denoted by 1 and the low output where there is no current flow, is denoted by 0.
- The AND gate is an electronic circuit that gives a high output -1 only if all its inputs are high-1. A dot (.) is used to show the AND operation.
- The OR gate is an electronic circuit that gives a high output-1 if one or more of its inputs are high. A plus (+) is used to show OR operation.
- The NOT gate is an electronic circuit that produces an inverted version of the input as its output. It is also known as inverter.

- If the input variable is A, the inverted output is known as Not A. This is shown as A' or \bar{A} - a bar over the top.
- NAND – Not AND gate is equal to an AND gate followed by a NOT gate. The symbol is an AND gate with a small circle on the output side.
- The outputs of all NAND gates are high (1) if any of the

(30 minutes)

Criteria for assessment and evaluation

- Names the basic logic gates and describes their functions.
- Accepts the value of gates in decision-making.
- Uses appropriate gates in circuits to meet user needs.
- Uses symbols and graphical representations.
- Demonstrates logical thinking ability.

Annexe 4.2.1

Logic operations and Gates

Situations:

1. You have a buzzer in your car that sounds when your keys are in the ignition and the door is open.
2. You have a fire alarm installed in your house. This alarm will sound if it senses heat or smoke.
3. There is General election coming up. People are allowed to vote if they are a Sri Lankan citizen and they are 18.
4. Mr. Sydney is giving his students an assignment. To complete the assignment the students must do a presentation or write an essay.
5. Ranjani is applying to a university course on Mathematics in Australia. She must have A passes in Math, English and Science or ICT.
6. You have reached the main entrance of the building and the door is not locked. So you can enter the building.

Annexe 4.2.2

Logic gates and circuits

Logic Gates

A logic gate is an arrangement of switches used to calculate operations in Boolean algebra. It is an elementary building block in a digital circuit. Most logic gates have two inputs and one output. At any given moment, every terminal is in one of the two binary conditions low (0) or high (1), represented by different voltage levels. The logic state of a terminal can, and generally does, change often, as the circuit processes data.

In most logic gates, the low state is approximately zero volts (0 V), while the high state is approximately five volts positive (+5 V).

Computers operate on the principle of logic and use the **TRUE** and **FALSE** logic conditions of a logical statement to make a programmed decision. The conditions of a statement can be represented by symbols or variables.

In computers, electronic circuits operating in two LOGIC STATES represent these two conditions. These logic states are 0 (zero) and 1 (one). 0 and 1 represent the FALSE and TRUE conditions of a statement, respectively.

There are five basic logic gates: AND, OR, NOT, NAND and NOR.

The AND gate

The AND gate has two or more inputs. The output from the AND gate is 1 if and only if all of the inputs are 1, otherwise the output from the gate is 0. The AND gate is drawn as follows



The output from the AND gate is written $A \cdot B$.

Truth table

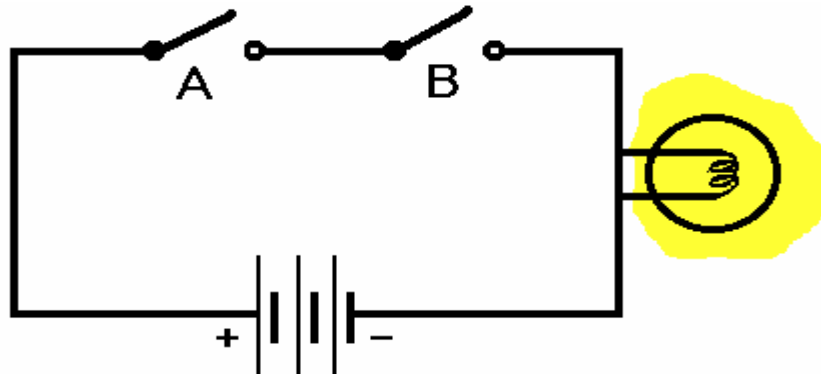
A table that defines a logic circuit by listing all combinations of input values, and indicating the true output values for each combination.

The truth table for a two-input AND gate looks like

A	B	$A \cdot B$
0	0	0
0	1	0
1	0	0

1	1	1
---	---	---

It is also possible to represent an AND gate with a simple analogue circuit, where a bulb is lit when A and B are closed.



The lamp lights only when both A and B are closed

The OR gate

The OR gate has two or more inputs. The output from the OR gate is 1 if any of the inputs is 1. The gate output is 0 if and only if all inputs are 0. The OR gate is drawn as follows

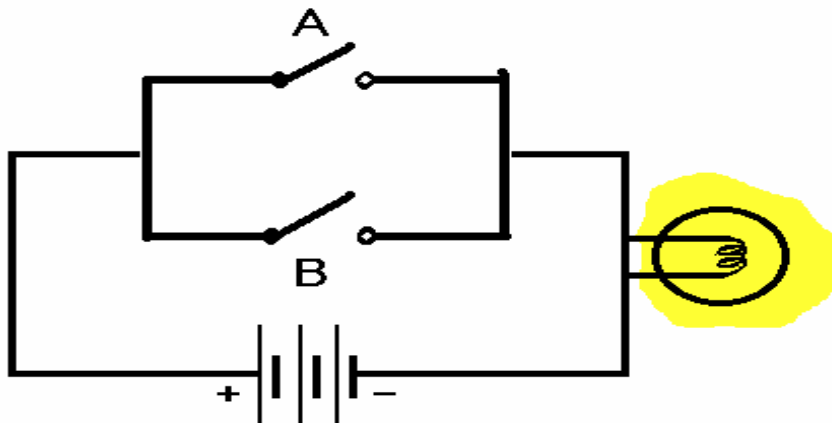


The output from the OR gate is written **$A+B$** .

The truth table for a two-input OR gate looks like

A	B	$A+B$
0	0	0
0	1	1
1	0	1
1	1	1

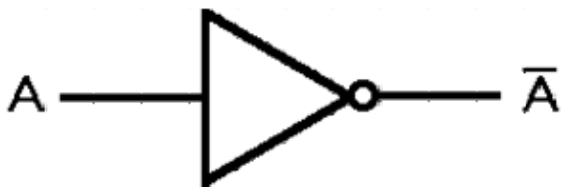
The following diagram represents a OR gate with a simple analogue circuit, where a bulb is lit when A or B is closed.



The lamp lights only when A or B closed

The NOT gate

The NOT gate is unique in that it has only has one input. This is how it looks



The input to the NOT gate **A** is inverted i.e the binary input state of 0 gives an output of 1 and the binary input state of 1 gives an output of 0.

A-bar is known as "NOT A" or alternately, the complement of **A**.

The truth table for the NOT gate appears as below

A	A-bar
0	1
1	0

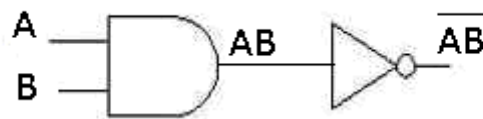
COMBINATION OF GATES

These three gates are adequate to accomplish all possible logical functions and operations in the microprocessor.

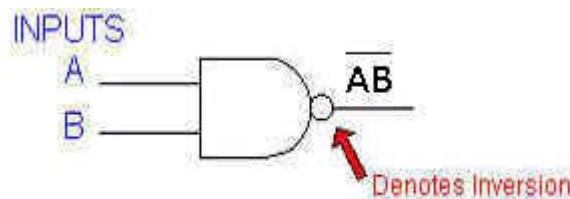
Some combinations of the three basic AND, OR and NOT gates are used so commonly that they have been given names and logic symbols of their own. i.e. NAND, NOR, these gates are constructed using basic AND, OR and NOT gates.

The NAND (NOT AND) Gate

A simple circuit consisting of an AND gate in series with an inverter is illustrated below.



This simple circuit is referred to as a NAND gate because the output is a NOT AND output. The circuit has its own symbol as illustrated below.



A NAND gate is cheaper to manufacture as a single circuit on a chip compared to the cost of manufacturing an AND gate and a NOT gate using separate circuits on separate chips. In fact microprocessors mostly use NAND gates because of their relatively low cost.

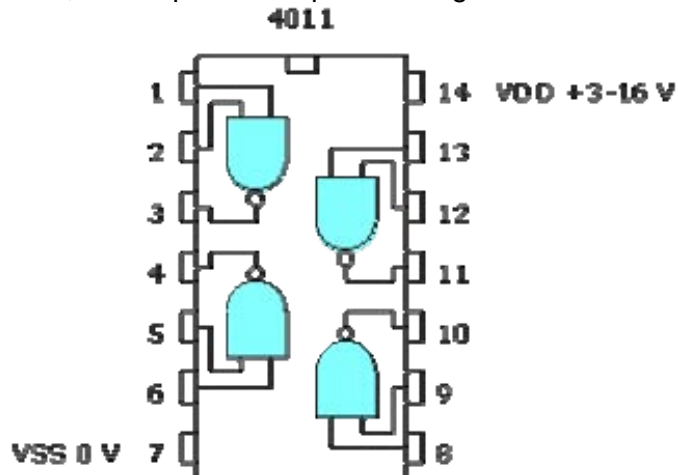
Truth Table for a NAND Gate

A	B	\overline{AB}
0	0	1
0	1	1
1	0	1
1	1	0

The NAND gate can be considered to have the NOT AND function. The outputs for a NAND gate are the complements or inversions of the corresponding outputs for an AND gate.

As with an AND gate, there is no limit to the number of inputs that may be applied to a NAND function, as such, there is no functional limit to the number of inputs a NAND gate

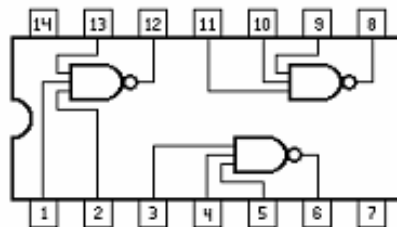
may have. However, for practical reasons, commercial NAND gates are most commonly manufactured with 2, 3, or 4 inputs, to fit in a 14-pin or 16-pin package. In the diagram below, four separate 2 input NAND gates are wired in a chip containing 14 pins.



Note that there is no separate symbol for NAND in Boolean logic. Using symbols, the AND function is designated with a multiplication sign (\cdot), or usually no sign, with an overbar over the entire expression to indicate the NAND function.

For example, using symbols, \overline{AB} can be read as NAND AB, although this is usually read as NOT AB or NOT A AND B.

Here is a 14 pin integrated circuit chip containing three input NAND gates. The truth table for a 3-input NAND gate is also listed below.



14-pin IC chip

A	B	C	ABC	\overline{ABC}
0	0	0	0	1
0	0	1	0	1
0	1	0	0	1
0	1	1	0	1
1	0	0	0	1
1	0	1	0	1
1	1	0	0	1
1	1	1	1	0

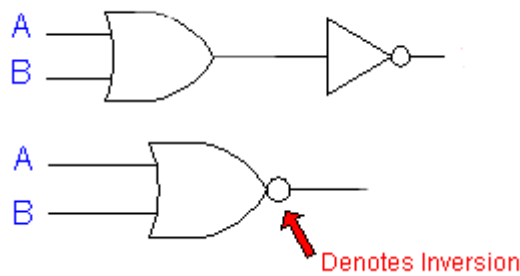
The truth table for a 3-input NAND gate for the circuit above.

The NOR (NOT OR) Gate

We saw above that an AND gate in series with an inverter [NOT gate] is referred to as a NAND gate.

Similarly, an OR gate in series with an inverter [NOT gate] is referred to as a NOT OR or simply, NOR gate.

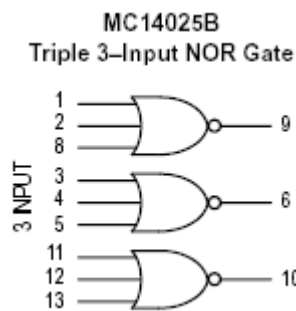
An OR gate in series with an inverter: is called a NOR gate which has its own special symbol:



The NOR gate is an OR gate where the output is inverted. There is no separate Boolean symbol for NOR.

In symbols, the NOR function is designated by a plus sign (+), with an overbar over the entire expression to indicate the inversion. In logical diagrams, the symbol $\overline{A + B}$ read as NOT A OR B or simply A NOR B which represents the output of a 2-input NOR gate.

A NOR gate can have any number of inputs, but practical commercial NOR gates are mostly limited to 2, 3, and 4 inputs, as with other gates at this level, to fit into standard IC packages. The Motorola MC14025B 14 pin chip is shown below. This chip contains three 3-input NOR gates. The truth table for each gate has also been completed as shown below.

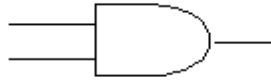


A	B	C	$A + B + C$	$\overline{A + B + C}$
0	0	0	0	1
0	0	1	1	0
0	1	0	1	0
0	1	1	1	0
1	0	0	1	0
1	0	1	1	0
1	1	0	1	0
1	1	1	1	0

These gates, as with the other derived logic gates, can be formed from a combination of the three basic gates: AND, OR and NOT. However, because of their functional importance, these gates again are treated as basic gates along with their own unique symbols.

Summary of Logic Gates

AND



A	B	$A \bullet B$
0	0	0
0	1	0
1	0	0
1	1	1

OR



A	B	$A + B$
0	0	0
0	1	1
1	0	1
1	1	1

NOT



A	\bar{A}
0	1
1	0

NAND



A	B	$\overline{(A \bullet B)}$
0	0	1
0	1	1
1	0	1
1	1	0

NOR



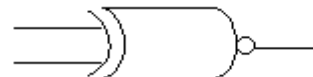
A	B	$\overline{(A + B)}$
0	0	1
0	1	0
1	0	0
1	1	0

XOR



A	B	$A \oplus B$
0	0	0
0	1	1
1	0	1
1	1	0

XNOR



A	B	$\overline{(A \oplus B)}$
0	0	1
0	1	0
1	0	0
1	1	1

Annexe 4.2.3

Instruction for the Group Exploration

- You will be working in five groups with the following five gates distributed randomly across the groups.

Group	Gate and the operation
1	AND
2	OR
3	NOT
4	NAND
5	NOR

- Identify the function of the gate along with the symbol.
- Draw a three input truth table.
- Identify the logic operation manipulated by the gate.
- Assess the suitability of the gate for the logic operation identified.
- Be prepared to present your findings at the plenary session.

Competency 4 : Uses Boolean Algebra to work effectively with logic gates
Competency 4.3: Uses basic laws of Boolean Algebra to handle logic gates

Activity 4.3 : Let's identify the basic laws of Boolean algebra.

Time : 90 Minutes

Quality inputs :

- Four copies of reading material in Annexe 4.3.1
- Four copies of group exploration instructions in Annexe 4.3.2

Learning – Teaching Process:

Step 4.3.1 :

- Display the following equation to the whole class
 $2\{4+3(6- 4/2)\}$
- Ask the students to explain how they would solve the above equation
- Conduct a discussion to highlight the following.

- We follow rules and use operators when solving equations
- The result depends on the operators
- Boolean algebra, that has certain rules and operators, is used in Computing

(10 minutes)

Step 4.3.2 :

- Divide the class into four groups.
- Distribute group exploration instruction and reading material between the four groups
- Involve the groups in the exploration.
- Prepare groups for a presentation at the plenary

(50 Minutes)

Step 4.3.3 :

- Get each group to present its findings.
- Request the presents themselves to fill gaps, if any.
- Seek for constructive comments of other groups
- Conclude the session by highlighting the following.

- There are basic laws and axioms in Boolean Algebra.
- The basic operators used in Boolean Algebra are
 - AND
 - OR
 - NOT.
- Here we use $+$ to denote OR, $.$ to denote AND, $'$ or $\bar{}$ (Bar) to denote NOT.
- The laws used in Boolean Algebra are
 - Commutative law
 - Associative law
 - Distributive law
 - Identity law
 - Redundancy law.
- In conjunction with Boolean algebra a formalized set of logical operations have been formed. They are called De Morgan's theorem.
- In general algebra a variable can have any value. In Boolean the variable, however has two states either 0 or 1.
- Truth tables can be used to check the outcome of the Boolean expression

(30 minutes)

Criteria for Assessment and evaluation

- Names the basic laws associated with Boolean algebra.
- Accepts that the rules are to be adhered to when solving the mathematical equations.
- Uses basic laws of Boolean algebra to simplify logical expressions.
- Follows rules in solving problems.
- Builds mathematical models for logical thinking

Annex 4.3.1

Boolean Algebra

Boolean algebra is the algebra of logic. One of the earliest investigators of symbolic logic was George Boole (1815 –1864) who invented a systematic way of manipulating logic symbols, which came to be known as Boolean algebra. Till 1939, there was no practical application for Boolean algebra. In 1938, Shanon's work gave an idea that Boolean algebra could be applied to digital electronics. Indeed, it has now become an indispensable tool for computer scientists because of its direct applicability to switching theory and the logical design of digital computers

In ordinary algebra, operators like +, -, x, \div are used to perform mathematical operations on any number on the number line.

But Boolean algebra differs radically from ordinary algebra in that Boolean constants and variables are allowed to have only two possible values, **0 or 1**. These variables are referred to as logical (binary) variables. Like other mathematical variables English letters can also represent these variables.

Boolean 0 and 1 do not represent actual numbers but instead, represent the state of a voltage variable, or what is called its logic level.

Some common representations of 0 and 1 are shown in the following diagram.

Logic 0	Logic 1
False	True
Off	On
Low	High
No	Yes
Open Switch	Close Switch

Logical operations & Truth Tables

One of the primary requirements when dealing with digital circuits is to find ways to make them as simple as possible. This constantly requires that complex logical expressions are reduced to simpler expressions that nevertheless produce the same results under all possible conditions. The simpler expression can then be implemented with a smaller, simpler circuit, which in turn saves the price of unnecessary gates, reduces the number of gates needed, and reduces the power and the amount of space required by these gates.

The rules of Boolean Algebra

The rules of Boolean Algebra are simple and straight-forward, and can be applied to any logical expression. The resulting reduced expression can then be readily tested with a Truth Table, to verify that the reduction was valid.

In Boolean algebra, there are three basic logic operations:
OR, AND and NOT.

The (axioms) rules of Boolean Algebra are:.

AND Operations (.)

$$\begin{aligned} 0 \cdot 0 &= 0 & A \cdot 0 &= 0 \\ 1 \cdot 0 &= 0 & A \cdot 1 &= A \\ 0 \cdot 1 &= 0 & A \cdot A &= A \\ 1 \cdot 1 &= 1 & A \cdot A' &= 0 \end{aligned}$$

OR Operations (+)

$$\begin{aligned} 0+0 &= 0 & A+0 &= A \\ 1+0 &= 1 & A+1 &= 1 \\ 0+1 &= 1 & A+A &= A \\ 1+1 &= 1 & A+A' &= 1 \end{aligned}$$

NOT Operations (')

$$\begin{aligned} 0' &= 1 & A'' &= A \\ 1' &= 0 \end{aligned}$$

Laws of Boolean Algebra

Note that every law has two expressions, (a) and (b). This is known as duality. These are obtained by changing every AND(.) to OR(+), every OR(+) to AND(.) and all 1's to 0's and vice-versa.

It has become conventional to drop the . (AND symbol) i.e. A.B is written as AB.

Investigating the various Boolean theorems (rules) can help us to simplify logic expressions

Commutative Law

$$\begin{aligned} A \cdot B &= B \cdot A \\ A + B &= B + A \end{aligned}$$

Associative Law

$$\begin{aligned} (A \cdot B) \cdot C &= A \cdot (B \cdot C) = A \cdot B \cdot C \\ (A + B) + C &= A + (B + C) = A + B + C \end{aligned}$$

Distributive Law

$$\begin{aligned} A \cdot (B + C) &= (A \cdot B) + (A \cdot C) \\ A + (B \cdot C) &= (A + B) \cdot (A + C) \end{aligned}$$

Idempotent Laws

$$\begin{aligned} A \cdot A &= A \\ A + A &= A \end{aligned}$$

DeMorgan's Theorem

$$\begin{aligned} (A \cdot B)' &= A' + B' \quad (\text{NAND}) \\ \text{Not A and B is a combined operator which is called NAND} \\ (A + B)' &= A' \cdot B' \quad (\text{NOR}) \\ \text{Not A or B is a combined operator which is called NOR} \end{aligned}$$

Annexe 4.3.2**Instruction for the Group Exploration**

- You will be working in three groups with one of the following three equations distributed among the three groups.

Group	Equations
1	$\overline{A + B} \cdot \overline{C} = \overline{A \cdot (B + C)}$
2	$\overline{A \cdot (B \cdot C)} = \overline{A} + (\overline{B} \cdot \overline{C})$
3	$\overline{A \cdot (B + C)} = \overline{A} \cdot \overline{B} \cdot \overline{C}$

- Develop two truth tables to indicate each side of the equation
- Compare the outcome of the truth tables to prove that they are equal.
- Now study the equation to familiarize yourselves with variables, operators and symbols
- Follow the procedure adopted for the theorems to compare the two sides of the equations
- Be prepared to present your findings at the plenary session.

Competency 4 : Uses Boolean Algebra to work effectively with logic gates
Competency Level 4.4: Integrates basic gates to develop simple circuits

Activity 4.4 : Let's design simple circuits

Time : 90 minutes.

Quality inputs :

- Four copies of Reading material in Annexe 4.4.1
- Four copies of instructions for the group exploration in Annexe 4.4.2

Learning – Teaching Process:

Step 4.4.1 :

- Expose the class to the circuit developed along with the underlined situation
- Discuss with the students how the circuit works
- Conduct discussion to highlight the following.

- The given circuit has three inputs
- The two basic gates in the given circuit are
 - AND gate
 - OR gate
- The output depends on the selection of the current input

(15 minutes)

Step 4.4.2 :

- Divide the class into four groups.
- Distribute the group exploration instruction and reading material between the four groups
- Involve the groups in the exploration.
- Prepare groups for a presentation at the plenary

(45 minutes)

Step 4.4.3 :

- Get each group to present its findings.
- Request the presents themselves to fill gaps, if any.
- Seek for constructive comments of other groups
- Conclude the session by highlighting the following.

- Circuits are combinations of gates
- The NAND gate is a combination of AND and NOT gates.
- The NOR gate is a combination of OR and NOT gates
- A truth table can be used to show the output of the circuit
- A logical expression of the circuit can be built using the truth table or circuit diagram
- Each circuit is used for a specific purpose on which a situation can be developed.

(30 Minutes)

Criteria for assessment and evaluation

- Names and explains different types of gates found in a circuit
- Accepts the value of Boolean algebra in developing logical circuits for digital devices.
- Explores day-to-day situations through simple circuits.
- Uses diagrams to simplify understanding of day to day problems
- Thinks logically.

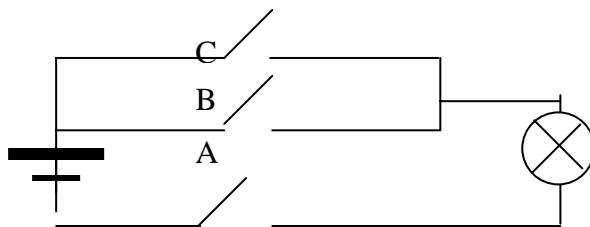
Annex 4.4.1**Reading Material****Instructions on how to develop the circuit.**

Situation identified to develop the circuit

Assume that there are three umpires in the cricket field; the chief umpire and two assistant umpires. This is how they take a decision.

1. Any decision approved by a minimum of two umpires is accepted.
2. Two assistant umpires cannot take any decision
3. The chief umpire alone cannot take a decision.
4. A decision to be accepted must necessarily be taken jointly by the chief umpire and at least one assistant umpire.

The Circuit diagram for the above situation

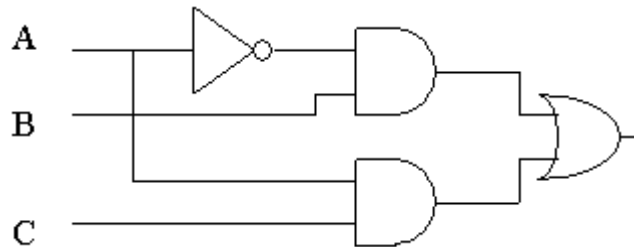


Annex 4.4.2

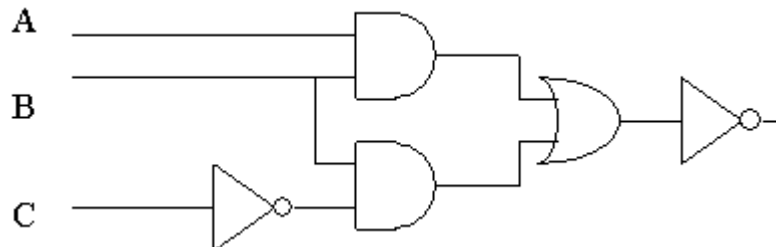
Instruction for the Group Exploration

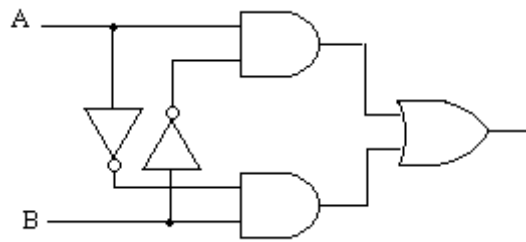
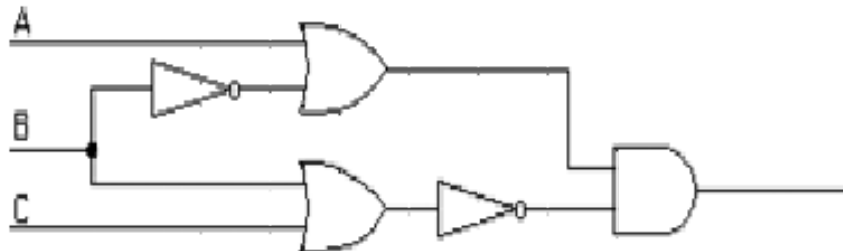
- You will be working in four groups with the following four circuit diagrams assigned to the four groups.
- Study the diagram and complete the following tasks.
 - Write Boolean expression
 - Draw the truth table
 - Identify the possibilities of receiving the same output
 - Create a situation that could represent the diagram given
- Be prepared to present your findings at the plenary session.

Circuit diagram 1



Circuit diagram 2



Circuit diagram 3**Circuit diagram 4**

Competency 5 : Works effectively with operating systems

Competency Level 5.1: Explores operating systems by type, functions, benefits and concerns

- Activity** : Lets explore different types of operating systems.
- Time** : 60 minutes
- Quality inputs** :
- Five copies of group exploration instructions in Annexe 5.1.1
 - Five copies of the reading material in Annexe 5.1.2

Learning – Teaching Process:

- Step 5.1.1** :
- Draw the attention of the class to a variety of machines like scrapers, graters, grinders, cassette recorders, washing machines and computers.
 - Let students describe how these machines work.
 - Conduct a discussion to highlight the following.

- Machines are operated either manually or automatically.
- Both operations above require some kind of a system.
- Different types of operating systems are available to run computers.
- These are called operating system.

(10 minutes)

- Step 5.1.2** :
- Divide the class into five groups.
 - Distribute group exploration instructions, demy sheets and markers across the groups.
 - Assign tasks randomly and involve the groups in the exploration.
 - Prepare groups for a whole class presentation.

(30 minutes)

- Step 5.1.3** :
- Get each group to present its findings.
 - Get the presenters themselves to elaborate on their findings.
 - Request other groups to submit their constructive comments.
 - Conduct a discussion to develop the following chart on the board.

Types of operating system	Functions	Benefits	Disadvantages

Criteria for assessment and evaluation

- Names the five types of operating systems and describes them.
- Accepts the value of selecting operating systems on the basis of processing needs.
- Analyzes different types of operating systems by their functions, benefits and concerns.
- Investigates needs as prerequisites for selection of digital devices.
- Investigates parts to visualize the whole.

Annexe 5.1.1

Instructions for the Group Exploration

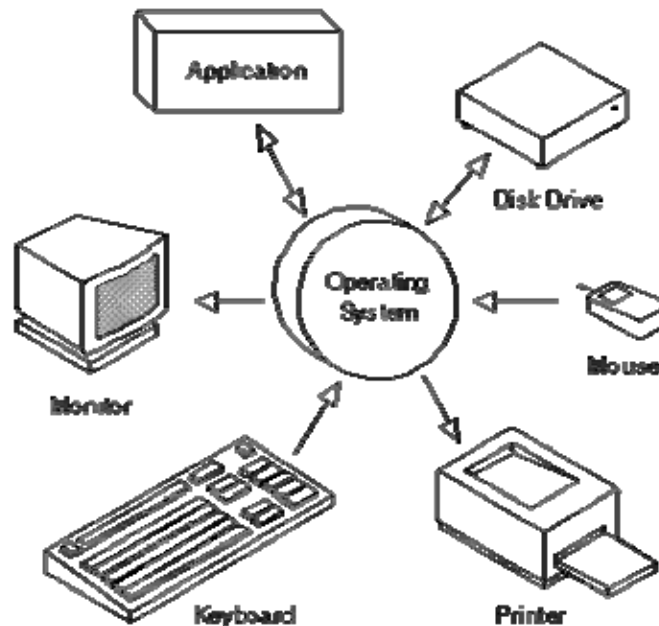
- You will be working in five groups with one of the following types of operating systems assigned randomly to each group.
 - Multi-user
 - Multiprocessing
 - Multitasking
 - Multithreading
 - Real time
- Discuss the main features and functions of the type of operating system assigned to your group.
- Identify its benefits and concerns.
- Be prepared for a whole class presentation.

Annexe 5.1.2

Reading material

For All Groups

Operating system



The most important program that runs on a computer. Every general-purpose computer must have an operating system to run other programs. Operating systems perform basic tasks, such as recognizing input from the keyboard, sending output to the display screen, keeping track of files and directories on the disk, and controlling peripheral devices such as disk drives and printers.

Operating systems can be classified as follows:

- multi-user** : Allows two or more users to run programs at the same time. Some operating systems permit hundreds or even thousands of concurrent users.
- multiprocessing** : Supports running a program on more than one CPU.
- multitasking** : Allows more than one program to run concurrently.
- multithreading** : Allows different parts of a single program to run concurrently.
- real time** : Responds to input instantly. General-purpose operating systems, such as DOS and UNIX, are not real-time.

Multi-user

Refers to computer systems that support two or more simultaneous users. All mainframes and minicomputers are multi-user systems, but most personal computers and workstations are not. Another term for *multi-user* is *time-sharing*.

Multiprocessing

Refers to a computer system's ability to support more than one process (program) at the same time. Multiprocessing operating systems enable several programs to run concurrently. UNIX is one of the most widely used multiprocessing systems, but there are many others, including OS/2 for high-end PCs. Multiprocessing systems are much more complicated than single-process systems because the operating system must allocate resources to competing processes in a reasonable manner.

Multitasking

The ability to execute more than one *task* at the same time, a task being a program. The terms *multitasking* and *multiprocessing* are often used interchangeably, although multiprocessing implies that more than one CPU is involved.

In multitasking, only one CPU is involved, but it switches from one program to another so quickly that it gives the appearance of executing all of the programs at the same time.

There are two basic types of multitasking: *preemptive* and *cooperative*. In preemptive multitasking, the operating system parcels out CPU *time slices* to each program. In cooperative multitasking, each program can control the CPU for as long as it needs it. If a program is not using the CPU, however, it can allow another program to use it temporarily. OS/2, Windows 95, Windows NT, the Amiga operating system and UNIX use preemptive multitasking, whereas Microsoft Windows 3.x and the MultiFinder (for Macintosh computers) use cooperative multitasking.

Multithreading

The ability of an operating system to execute different parts of a program, called *threads*, simultaneously. The programmer must carefully design the program in such a way that all the threads can run at the same time without interfering with each other.

Real time

Occurring immediately. The term is used to describe a number of different computer features. For example, real-time operating systems are systems that respond to input

immediately. They are used for such tasks as navigation, in which the computer must react to a steady flow of new information without interruption. Most general-purpose operating systems are not real-time because they can take a few seconds, or even minutes, to react.

DOS (Command Line Interface “CLI”)

DOS stands for Disk Operating System. In the early 1980s, Microsoft got the right to QDOS (Quick and Dirty Operating System) developed by a small company, Seattle Computer, and then has been sold it under the name MS-DOS. Microsoft licenses a version called PC-DOS to IBM (International Business Machines) for its IBM personal computers, and its version, MS-DOS, to many other PC manufacturers.

Advantages:

- The advantages will be the reasons for learning DOS. DOS is the most *popular* microcomputer operating system for IBM computers and compatibles ever sold worldwide.
- It runs thousands of *applications*, and is easy to use. DOS is easy for novices to use, and many publications and books are available for the operating system.
- DOS runs on low- priced IBM computers and compatibles. DOS does not require an expensive computer system while some others still do.
- DOS needs small space of the memories.

Disadvantages

- It will then slowly be replaced as the dominant operating system. The hardware has evolved in significant ways. New microcomputers have more capacity and faster electronics than the old IBM PC and compatibles. This makes DOS an old operating system.
- DOS use more commands. So, it is more difficult to memories about command.
- DOS has direct access to only 640 kilobytes of primary storage, although new microcomputers have much more primary storage. This restriction is an inherent limitation of DOS. Today's new software for word processing, graphics, spreadsheets, and database management requires more primary storage. In addition, DOS is a single tasking operating system. It can support only one user and one program at a time.

Another disadvantage is that DOS has a **character-based interface**. A graphical user interface is easier to the users than the character-based interface.

Windows 3.x

This is a graphics-based operating environment from Microsoft. This operating system runs under DOS. Thus, it is usually called "DOS with *windows*." Windows 3.x allows multiple tasking, allowing users to open several applications simultaneously and shift between them. Windows operating system is very similar to the Macintosh desktop environment.

Advantages:

- Windows allows *multitasking* capability and more primary memory. Windows provides a memory manager to allow users to access more than 640KB of conventional memory.
- Another benefit of it is that it has a *dynamic data exchange* function. Dynamic data exchange allows one program (e.g., a word processing program) to request data or information from other programs (e.g., a spreadsheet program or a database program etc.) currently running and use those information.
- A *graphical user interface (GUI)* against character- based approach is another advantage. This allows users to use Windows environment such as mouse,

Disadvantages:

- Windows 3.x can handle multitasking, but it is really switching between tasks.
- Windows 3.x is not a multithreaded operating system. This works well for many applications, but for some information and data can be lost if Windows does not get back to a task soon enough.
- Windows 3.x was not originally intended for networks and is not very efficient in that environment

Windows 95

Windows 95 upgrades its earlier versions (Windows 3.x) in many ways. It has a new 3-D interface. It is mostly a 32- bit system although it has 16-bit components included for compatibility with Windows 3.x. Windows 95 does not need to have a separate DOS. It integrates all DOS services. A Windows 95 system runs in protected mode. This means that it speeds up the processors and provides more safety.

Windows 95 serves two purposes: It will move developers to the *Win32 API* and will ease the transition for users whose hardware is not yet ready to handle the demands of *Windows*

NT.

Windows 95 offers better *preemptive multitasking*. Although for most things, *cooperative multitasking* is good. However, if users want to do several things simultaneously, they are going to find that preemptive multitasking provides smoother operation and better speed. Because Windows 95 is based on Win32 and has borrowed some of NT's features, some people are confused over which Windows to use. Windows 95 is for anyone who has a lower capability computer that does not enable to use Windows NT. Windows 95 is likely to perform better than NT as a desktop system, especially when running older 16-bit Windows applications.

Advantages:

- This operating system provides compatibility with existing Windows and DOS programs. It also offers compatibility with existing Windows and DOS device drivers. It works as in standalone computer and in networked environment for both desktop and mobile users.
- It is easier to learn and use, gives users better performance, has more capacity, integrates applications better, connects better, and crashes less than its predecessor, Windows 3.x.

Disadvantages:

- Windows 95 still has limits from 16-bit components retained for backward compatibility with 16-bit application. It does not give much benefit to the 16-bit applications. To get benefits from Windows 95, users must upgrade their applications to 32-bit versions that support OLE and can interact directly with Windows 95's shell. It will cost users significantly.

Windows NT (New Technology)

Window NT is a platform for 32-bit Windows applications. This is a powerful and one of the most advanced operating systems available today.

Windows NT was originally designed with big-system features. Beginning with version 3.5, Microsoft began repositioning Windows NT as a workstation and server operating system. It also has a sophisticated multiuser security system, so Windows NT performs excellently as a disk server. NT has support for network services useful to applications like client/server database engines. Still, all the features of Windows NT are suitable for use in demanding applications of desktop users.

OS/2

OS/2 stands for *Operating System 2*. This is another operating systems for powerful microcomputers and networking. OS/2 was designed to avoid some of the most serious limitations of DOS. OS/2 runs in 4MB of memory, although it runs well in an 8MB system. It requires about 30MB of hard disk space. OS/2 WARP, the window version of OS/2, performs reasonably well in 4MB system and requires less disk space.

Users do not need to abandon DOS and Windows to try out OS/2. OS/2 provides a dual boot feature that allows users to boot up in either DOS or OS/2. OS/2 uses folders much like those on the Macintosh and on some UNIX GUIs.

Advantages:

- It is not affected by requirements of DOS and Windows that certain device drivers live in the first 640KB of memory. Instead, OS/2 can load network adapter drivers, multimedia interfaces, CD-ROM software or video drivers into memory as required. While OS/2 works very nicely with the same FAT file system used by DOS, its HPFS has a number of benefits. It is significantly faster, it allows a long file name, and it supports disk drivers as large as 256 gigabytes.
- This operating system allows multitasking and dynamic data interchange. It also provides common graphical user interface with mainframes, minicomputers, and microcomputers by OS/2 WARP. OS/2 was developed to assist in the sharing of data and programs among several microcomputers. OS/2 solidly supports Novell Netware and TCP/IP. Most network interface cards are supported.

Disadvantages:

- OS/2 Shell or WARP is similar to Windows, but is not identical. It may take users a while to adjust to some of the differences. The application programs developed specifically for OS/2 are not as many as those for Windows, although more and more application developers are going to converting and developing programs for OS/2 these days.

UNIX

This is a multi-user, multitasking operating system that runs on many different computer systems from microcomputer to mainframe, because UNIX is written in C programming language, which is a language designed for system-level programming. UNIX is consisted of a kernel, the file system, and the user interface. The kernel is the heart of the operating system. The file system has a hierarchical directory method for organizing files on the disk and the shell.

Advantages:

- UNIX is the portable operating system that can be used with many different computers from mainframe to microcomputer. The other operating systems such as DOS, Windows, Mac operating system, and OS/2 cannot be used for other systems. One of many strong features of UNIX is multitasking. UNIX allows users to run multiple programs simultaneously.
- UNIX also shares it among multiple users. UNIX is not restrained by the computer systems such as conventional memory as the DOS and OS/2 systems are. It can accomplish many operations that were formerly performed on minicomputers or mainframes. It is important, because industry can achieve the performance and benefits of large computers from microcomputers by using UNIX.
- Networking is another strong feature of a UNIX operating system. UNIX can be connected through several different kinds of equipment. It can share files among them.

Disadvantages:

- UNIX was a minicomputer operating system used by programmers and computer science professionals some time before the rise of the microcomputer. This means that it has certain qualities making it useful to programmers - many supporting utility programs and documentation, for instance. Some of its features make it difficult for end users.
- Limited application programs are another disadvantage for UNIX. UNIX off-the-shelf programs for microcomputers are limited. However, this situation is going to change, because many software vendors are rewriting DOS and Windows applications for UNIX.

- There is not a standard for UNIX. This may be the biggest problem for the popularity of UNIX. An application program written for one version of UNIX may not run on other versions.
- There is also not a standard GUI for many UNIXs. There were several attempts to combine the Sun, AT& T, and U.C. Berkeley versions of UNIX to produce a standard graphical user interface.

Macintosh Operating Systems

It uses a graphics screen that places familiar office objects on a display screen. Icons represent files, folders, programs, and disks. It has a hierarchical file system that lets users drag document icons into and out of folder icons. Folders can also contain other folders and so on.

The Macintosh user interface style has been adapted to many other operating systems. For example, OS/2 Presentation Manager and WARP, New Wave, most UNIX systems, and Windows look very similar to the Macintosh graphics user interface.

The Macintosh operating system has two major files. They are the System file and the Finder. The system file manages the user interface. Both files work together to achieve the operating system procedures such as formatting disks, copying files, erasing files, and running application programs.

Advantages:

- The ease of use is the primary charm of the Macintosh. The graphics interface such as menus, screen display, and dialog boxes are quite more consistent across applications than they are in Windows. It also offers easy plug and play. When install a board in a Mac, users need to plug it into a slot, drag its driver icon into the System Folder, and reboot the computer.
- It provides long filenames, integrated program and file management, desktop icons, and shortcuts. It provides a high quality graphics processing that makes Macintosh popular for desktop publishing (Mac is the standard computer in the publishing industry).
- It has a great video architecture that allows users to add multiple monitors to a computer by adding another video board and hook up another monitor. The later versions of Macintosh operating system (System 7.x series) enable users to do multitasking. That is, multiple programs can run simultaneously, each sharing the CPU (cooperative multitasking like Windows 3.x). System

7.x allows applications programs to exchange and share data and commands with other application programs.

- It even provides built-in sound, SCSI, and Ethernet that allow users to work easily with multimedia. It has much better multimedia toolkit than Windows has. The IBM and compatible computers, PC, cannot match the Macintosh's toolkits for multimedia, and Windows multimedia applications do not work together as smoothly as their Macintosh counterparts.

Disadvantages:

- The first disadvantage of the Macintosh platform is the incompatibility with DOS and Windows (PC) applications. This has been made Macintoshes less attractive to corporate users that want to have compatibility and connectivity within company and between companies.
- Software (e.g., Insignia's SoftWindows) are now available for the Mac to allow it to run Windows on PowerMac although it runs slowly. This is a great utility for a Mac user who needs to run DOS or Windows applications occasionally.

Real-Time Operating System

A **real-time operating system (RTOS)** is a class of operating system intended for real-time applications. Such applications include embedded (programmable thermostats, household appliance controllers, mobile telephones), industrial robots, spacecraft, industrial control (see SCADA), and scientific research equipment.

An RTOS facilitates the creation of a real-time system, but does not guarantee the final result will be real-time; this requires correct development of the software. An RTOS does not necessarily have high throughput; rather, an RTOS provides facilities which, if used properly, guarantee deadlines can be met generally (soft real-time) or deterministically (hard real-time). An RTOS will typically use specialized scheduling algorithms in order to provide the real-time developer with the tools necessary to produce deterministic behavior in the final system. An RTOS is valued more for how quickly and/or predictably it can respond to a particular event than for the given amount of work it can perform over time. Key factors in an RTOS are therefore a minimal interrupt latency and a minimal thread switching latency.

An early example of a large-scale real-time operating system was the so-called "control program" developed by American Airlines and IBM for the Sabre Airline Reservations System.

Competency 5 : Works effectively with operating systems

Competency Level 5.2 : Adopts Graphical User Interface to meet ones own needs.

Activity 5.2 : Let's explore the operating system.

Time : 120 minutes.

Quality Inputs :

- Four copies of instructions for group exploration in Annexe 5.2.1
- Four copies of the reading material in Annexe 5.2.2

Learning-Teaching Process:

Step 5.2.1 :

- Get three volunteers to explain how they operate the following.
 - A Radio
 - A TV
 - A computer
 - An ATM
- Conduct a discussion to highlight the following.

- To use a system there should be an operating system.
- An Operating system creates the user interface required to communicate with a system.
- The user communicates with a computer through a graphical user interface (GUI).
- The computer operating system links the user with computer hardware and software.

(15 minutes)

Step 5.2.2 :

- Divide the class into four groups.
- Provide each group with the screen layout of GUI desktop and instructions for exploration.
- Involve the groups in the exploration.
- Prepare them for a presentation.

(45 minutes)

Step 5.2.3

- :
- Get each group to present its findings.
 - Invite the presenters themselves to conduct the first elaboration.
 - Request other groups to submit their constructive comments.
 - Conduct a discussion to highlight the following

- Desktop contains the following items.
 - Wallpaper
 - Icons
 - Task bar
 - Start button
- Icons represent files or programs, which can be arranged to meet user needs.
- Icons related to programs can be opened by double clicking same.
- Any program opens as a window.
- Basically any window contains
 - Title bar, Menu bar, Tool bars and Scroll bars
 - Minimize, Maximize / Restore, Close buttons
- Windows can be minimized, maximized, restored, moved, closed and resized.
- A number of programs can be handled simultaneously.
- Opened programs and files appear as buttons on the task bar.
- Some windows cannot be maximized or resized.
- Start button in the task bar is used to launch programs.
- The control panel window provides several tools to customize the system settings and to elicit information about the following:
 - System date and time.
 - Operating System, Processor type, Processor speed and Memory capacity (RAM)
 - Wallpaper, screen saver, appearance and other settings.
- Properties of any storage device contain its capacity, used space, free space, file system and volume label.
- Windows explorer displays drives, folder structure and files.

(60 minutes)

Criteria for assessment and evaluation

- Names the main features of a GUI and explains them.
- Accepts that a GUI can be adjusted according to user needs.
- Makes maximum use of computer operating system efficiently.
- Customizes ones working environment.
- Develops self-learning skills.

Annexe 5.2.1

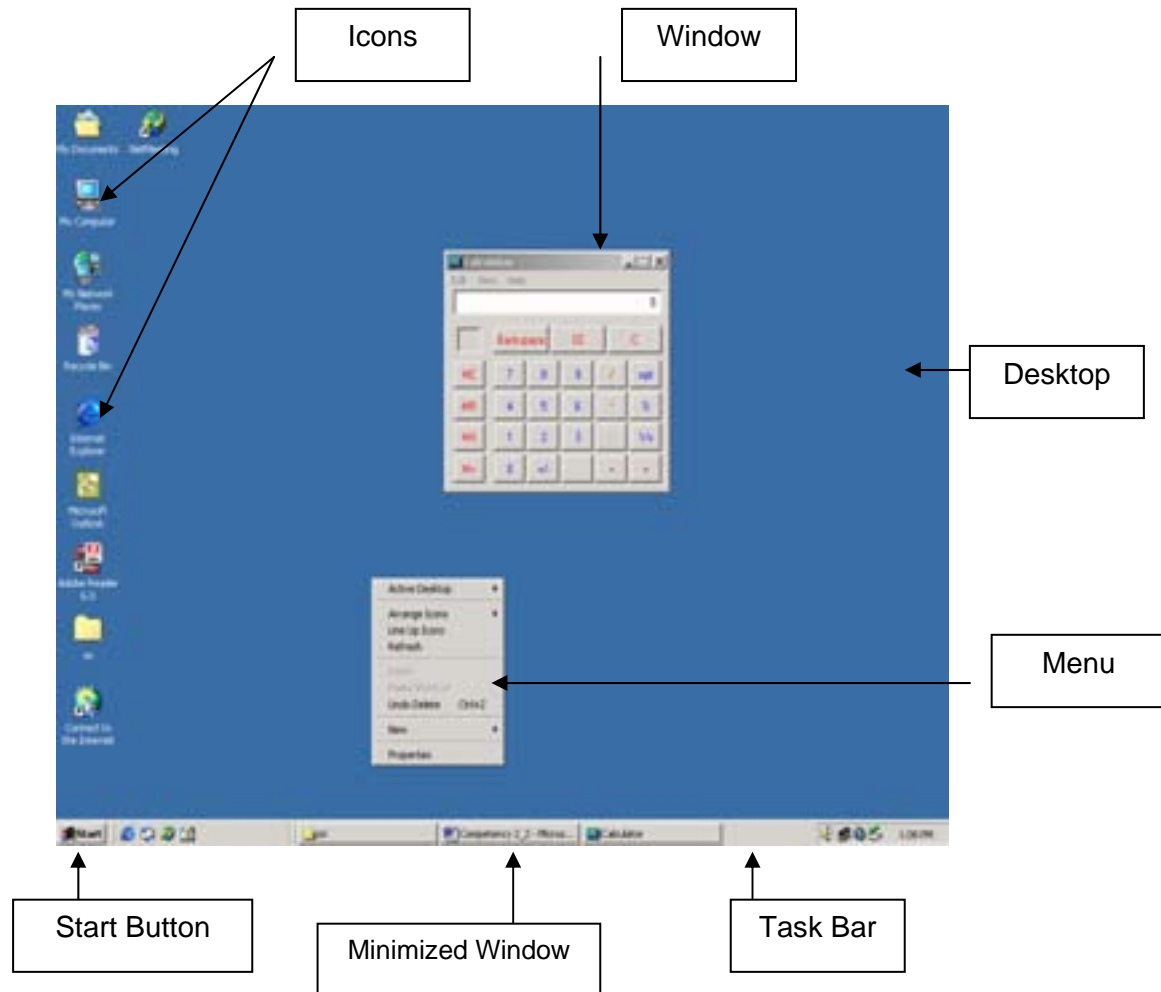
Instructions for the Group Exploration

- You will be working in four groups with the following four topics distributed randomly across the groups.
 - Graphical User Interface and its components (for all groups)
 - Manipulating windows, changing the desktop properties
 - Changing the appearance of windows
 - Changing screen resolution & system date & Time, Regional Settings.
 - Customize the Start Menu and My Computer.
- Go through the reading material and get a good idea of the assigned area.
- Move to the computer lab, boot the computer and explore the components of GUI.
- Carry out the practicals on the computer following the graded directions and view how changes take place.
- Be prepared to share your experiences and findings with the class at the plenary session

Annexe 5.2.2

Reading Material

Graphical User Interface

**What is a User Interface?**

The user interface is the **junction between a user and a computer program**. An interface is a set of **commands or menus** through which a user **communicates** with a program. The interface is how you interact with the computer.

What is a graphical user interface (GUI)

A user interface based on graphics (icons and pictures and menus) instead of text; uses a mouse as well as a keyboard as an input device

Pointer

A symbol that appears on the display screen which you move to select objects and commands. Usually, the pointer appears as a small angled arrow. Text -processing applications, however, use an *I-beam pointer* that is shaped like a capital *I*.

Pointing device

A device, such as a mouse or trackball enables you to select objects on the display screen.

Icons

Icons are the small pictures that represent commands, files, or, windows. By moving the pointer to the icon and pressing a mouse button, you can execute a command or convert the icon into a window. You can also move the icons around the display screen as if they were real objects on your desk.

Desktop

The area on the display screen where icons are grouped is often referred to as the desktop because the icons are intended to represent real objects on a real desktop.

Windows

You can open several windows in different areas of the screen. In each window, you can run a different program or display a different file. You can move windows around the display screen, and change their shape and size at will.

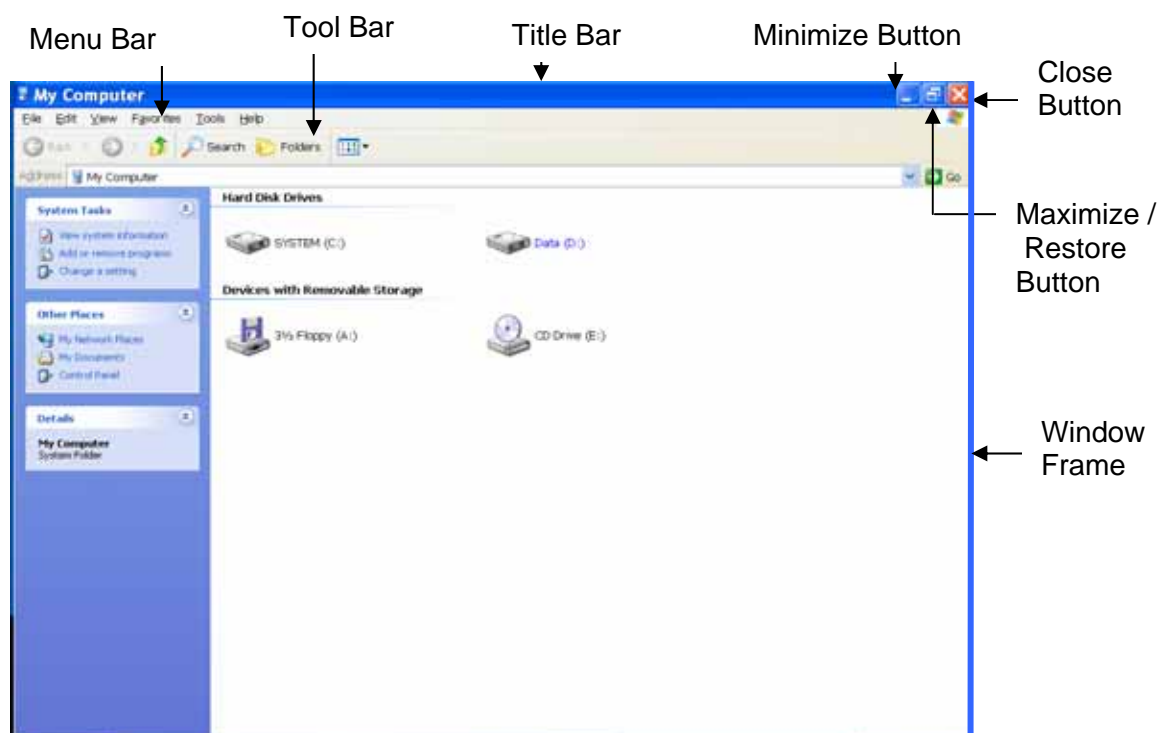
Menus

Most graphical user interfaces let you execute commands by selecting an item of your choice from a menu.

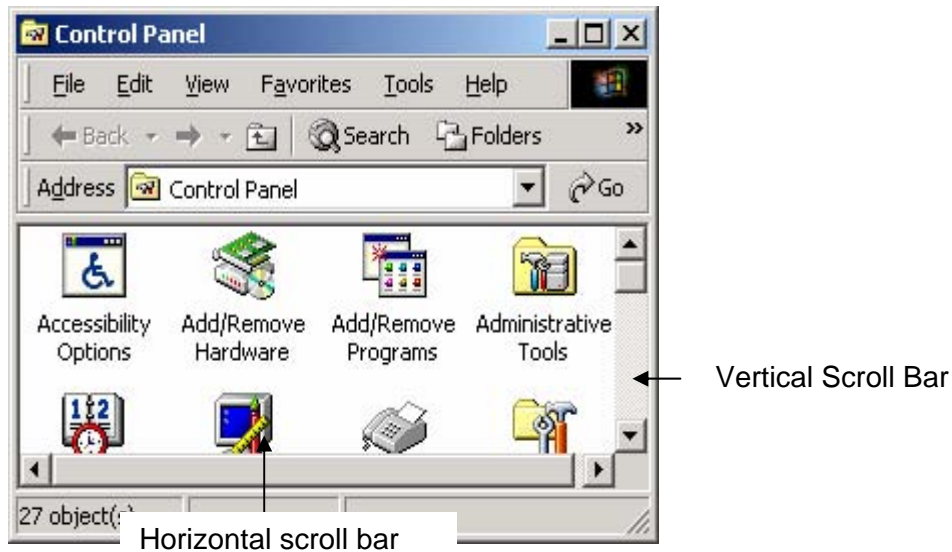
Manipulating Windows

Let's identify the components of a window

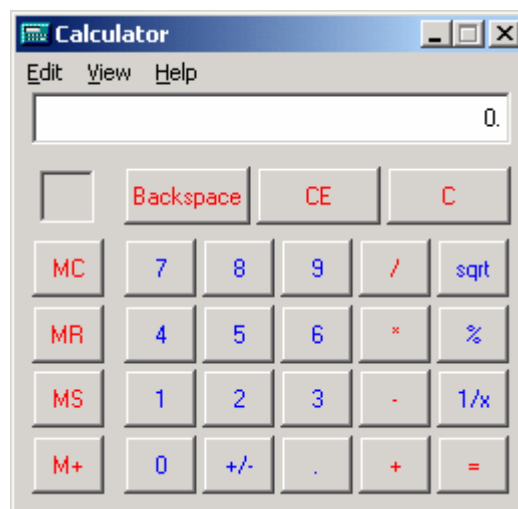
Open my computer icon on the desktop. You will see the following window



Some windows contain scroll bars when the entire contents of the window cannot be shown at the same time. By scrolling you will be able to see the contents that are hidden.



Note: Some windows cannot be maximized or resized. (E.g. Calculator)
 Start → All programs → Accessories → Calculator



Moving a Window

Click and hold the left mouse button on the title bar and drag the mouse pointer to any location on the desktop and release mouse button.

Closing a window

Click on the close button at the right hand end of the title bar.

Minimizing a window

Click on the minimize button, the first button on the right hand corner of the title bar
 (When a window is minimized it can be seen in the task bar as an icon.)

Maximizing a window

Click on the maximize button, the second button at the right hand end of the title bar
 Or
 Double click on the title bar.

(When a window is maximized it covers the entire desktop. Clicking the same button or double clicking on the title bar can restore a maximized window.).

Resizing a window

Move the mouse pointer to the frame of the window. Now the mouse pointer changes its shape to a double-headed arrow. (↔) Click and hold the left mouse button and drag the mouse in any direction (up, down, left, right).

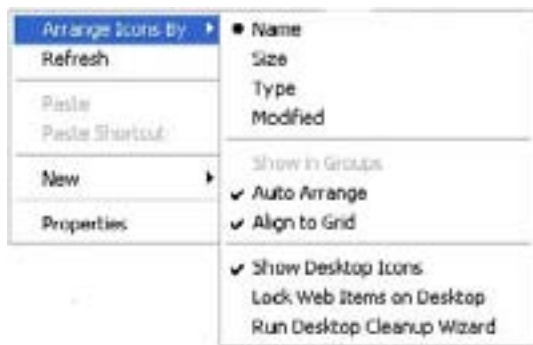
You can change the width and height of the window at the same time by clicking and dragging at the corner of the window.

Changing the desktop and its properties

Moving the icons on the desktop

- Move the mouse pointer on to an icon,
- Press and hold the left mouse button on the icon and drag the icon to a new location

How to arrange the icons on the desktop



- Right click on the desktop
- Move the mouse pointer over **Arrange Icons By** and a submenu will appear; here you can sort your desktop icons by name, size, type and the last modified date.
- Selecting the **Auto Arrange** option will automatically align your desktop icons every time you add one to the desktop.

- **The Desktop Cleanup Wizard** will remove any desktop shortcuts that have never been used to a new folder on your desktop called Unused Desktop Shortcuts.

How to change the desktop

Start → Control Panel → Display

Or

Right click on the desktop and click on properties in the shortcut menu

Click on the **Desktop** tab, do one or more of the following:

- Click a picture in the **Background** list. In **Position**, click **Center**, **Tile**, or **Stretch**.
- Select a color from **Desktop color**. (The color fills the space not used by a picture.)
- Click Apply → Ok



How to change the screen saver

Start → Control Panel → Display

Or

Right click on the desktop and click on properties in the shortcut menu

Click on the **Screen Saver** tab,

- Select a screen saver from the screen saver list
- Click Apply → Ok

How to change the screen resolution

Start → Control Panel → Display

Or

Right click on the desktop and click on properties in the shortcut menu

Click on the **Settings** tab,

- Under **Screen resolution**, drag the slider, and then click **Apply**.
When prompted to apply the settings, click **OK**. Your screen will turn black for a moment. Once your screen resolution changes, you have 15 seconds to confirm the change.
- Click **Yes** to confirm the change; click **No** or do nothing to revert to your previous setting.

How to change the appearance of windows

Start → Control Panel → Display

Or

Right click on the desktop and click on properties in the shortcut menu

Click on the **Appearance** tab,

- Under windows and buttons, select **Windows classic** or **Windows XP** style
- Select a color scheme
- Select a suitable color scheme
- Click Apply, Click Ok.

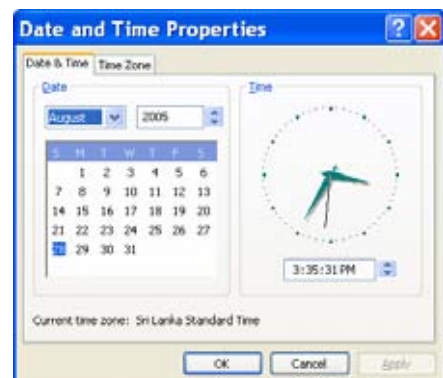
Changing System Date

Start → Control Panel → Date and Time

Or

Double click in the far right hand corner of the task bar where the time is shown

Click on the **Date and Time** tab,



- To change the month, click the arrow in the month list, and then click the correct month.
- To change the year, click the arrows in the year list.
- To change the day, click the correct day on the calendar.
- Click Apply, Click Ok.

To change time

- Click on the area where the hours are shown, click **up** arrow, to increase hours, click **down** arrow, to decrease hours



- Click on the area where the minutes are shown, click **up** arrow, to increase minutes; click **down** arrow, to decrease minutes.
- Click on the area where the seconds are shown, click **up** arrow, to increase minutes; click **down** arrow, to decrease minutes.
- Click on the area where AM is shown, click the arrows to switch between AM or PM.

The Start Menu

Click on the start button at the left end of the task bar

Now you will see the following menu

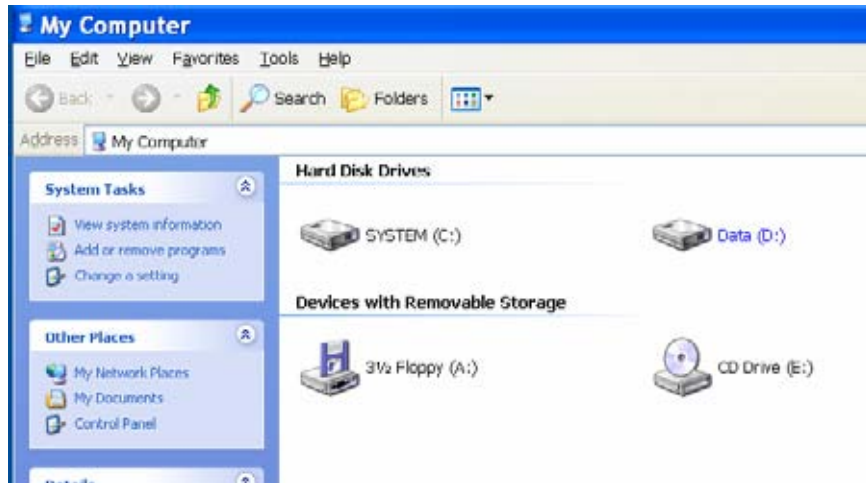


Log off -	Log off the current user.
Turn Off Computer -	shutdown, restart and standby.
All Programs -	Access to installed programs.
Run -	Used to manually start executable files (programs).
Search -	Search your PC for pictures, music, documents, files and folders.
Help and Support -	Opens the built-in Windows help including various help topics
Printers and Faxes -	Access to your printers and faxes folder, allows you to add and configure printers/faxes.
Control Panel -	The control panel is used to configure various Windows XP settings,
My Computer -	Gives you access to your computer's disk drives and files
My Music -	Links to a folder created by Windows XP which is used (by default) to store any music files on your hard drive.
My Pictures -	Links to a folder (again created by Windows XP) used (by default) to store any pictures/images on your hard drive.
My Recent Documents -	This folder contains any recently viewed documents.
My Documents -	Gives access to a folder created by Windows XP used (by default) to store any documents on your hard drive.
Tour Windows XP -	Starts the built-in tour of Windows XP's features.
Windows Movie Maker -	Opens Windows XP's movie editing software.

My Computer

Gives you access to disk drives and files of your computer.

(Double click on the **my computer** icon to open **my computer** window)



Let's see the capacity of the hard disk (C)



Right click on the icon (C) and click on properties

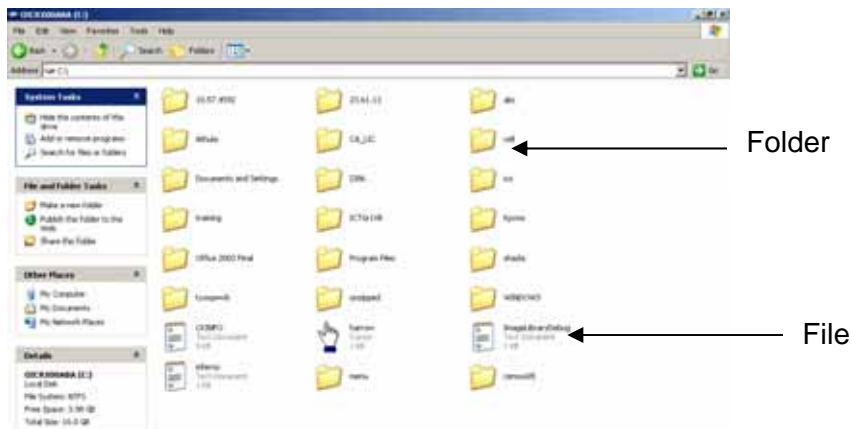
You will see a window similar to this.

In this window (General tab) you can see the following things

- Capacity of the hard disk
- Used space
- Free space
- File system
- Label of hard disk drive
- (if label box is empty you can type a name for your hard drive, Click Apply → Ok)

Let's see what's in drive C

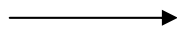
Double click on the icon, with label (C)



Changing the regional settings

Changing the currency symbol

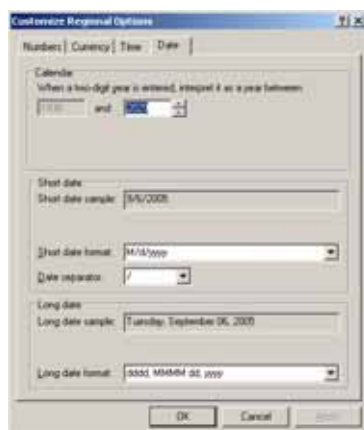
- Start → Control Panel → Regional and language Options
- Click on customize button in the Regional options tab
- Click on Currency tab
- Type or select the required currency symbol
- Click Apply → Ok.



Changing the

date

format



- Start → Control Panel → Regional and Language Options
- Click on customize button in the Regional options tab
- Click on date tab
- Select a suitable date separator (/ or – or .)
- Click Apply → Ok.

How to view system properties

Start → Control Panel → System



In this window you can see the following:

- Name of Operating System
- Processor type
- Processor speed
- Memory capacity of computer (RAM)

Competency 5 : Works effectively with operating systems

Competency 5.3 : Handles files and folders in the Windows Operating System

Activity 5.3 : Let's use files and folders to keep track of information.

Time : 60 minutes.

Quality Inputs :

- Two copies of the dialogue in Annexe 5.3.1
- Four copies of group exploration instructions in Annexe 5.3.2
- Graded Directions on file and folder management in Annexe 5.3.3.
- Four computers containing a set of teacher created folders and files.

Learning – Teaching Process:

Step 5.3.1 :

- Get two volunteers to present the dialogue to the class
- Conduct a discussion to highlight the following.

- In normal life we prepare documents to keep track of information for future reference.
- Files help handle documents manually.
- Different files containing different documents are maintained for different purposes.
- Files are stored safely in the file cabinet.
- Different shelves of a file cabinet are used to arrange files in some order.

(10 minutes)

Step 5.3.2 :

- Divide the class into four groups.
- Let the four groups to sit at the four computers.
- Distribute group exploration instructions and graded directions across the groups.
- Assign tasks and involve groups in the exploration.
- Prepare groups for a whole class presentation.

(30 minutes)

Step 5.3.3

- Get each group to present its findings.
- Conduct a discussion to highlight the following.

- Files and Folders arranged in Windows Explorer are used to organize information.
- Files store data or information in a computer
- Each file is given a filename.
- A Document is a file created in a Word Processor.
- A folder can contain a number of files.
- Stored files can be seen in different views and can be arranged to suit ones convenience.
- A Folder or file can be
 - created
 - renamed
 - deleted
 - copied / moved from one location to another
- Deleted files and folders are temporarily stored in the Recycle Bin.
- Accidentally erased files or folders can be sent to their original location.
- Files and folders can be permanently deleted or removed from the Recycle Bin.

(20 minutes)

Criteria for assessment and evaluation

- Describes folders and files used in preparing documents.
- Accepts the importance of files and folders in organizing and ensuring security.
- Uses explorer and shortcut methods in handling files and folders
- Selects suitable methods in organizing tasks and activities.
- Asks questions to facilitate learning.

Annexe 5.3.1

Dialogue

Principal : Mr. Wasantha! (Principal, summons clerk)

Wasantha : (Clerk enters the office) Yes sir,

Principal : Bring me the School Development Society file.

Wasantha : Here it is sir.

Principal : Let me have the letter summoning members to the last SDS meeting
(Clerk opens the file and produces the letter.)

Wasantha : Here it is sir.

Principal : Prepare a letter for this year's meeting. Just make the necessary
alterations in this letter.

Wasantha : What are the adjustments to be made in this letter?

Principal : Follow the standard system and left align the document.

Wasantha : What about the date Sir?

Principal : Make it 22 January, 2007.
Underline the subject SDS Meeting.

Wasantha : What next, Sir?

Principal : Print and file it.
Make sure it is in the post, tomorrow.

Wasantha : Very well, Sir.

Annexe 5.3.2**Instructions for the Group Exploration**

- You will be working in four groups with the following topics assigned randomly to four groups. (except first one)

For all groups

- Go through the graded directions to be familiar on opening the Windows Explorer and arranging of files, documents and folders
 - File management
 - Folder management
 - Document Handling
- Use the Windows Explorer and become thorough with the following areas
 - Different views of Files & Folders
 - Arrange files & folders
 - Expand folder
 - Collapse folder
- Carry out the following tasks
 - Create new folder
 - Rename folder
 - Move folder
 - Delete folder
- Carry out the following tasks
 - Select file / Multiple files
 - Copy file / files
 - Move file / files
 - Delete file / files
- Study the use of 'Recycle Bin'.
 - Open Recycle Bin and look for the deleted files.
 - Send a file or folder deleted accidentally to the original location.
 - Delete the files permanently in the Recycle Bin.

Annexe 5.3.3

Graded Directions

For all groups

It is essential for a computer user to manage files and folders in his/her computer. **Windows Explorer** has been around since Windows 95 and is a very handy tool for managing your files and folders.

To Open Windows Explorer**Method 1**

START → All Programs → Accessories → Windows Explorer.

Method 2

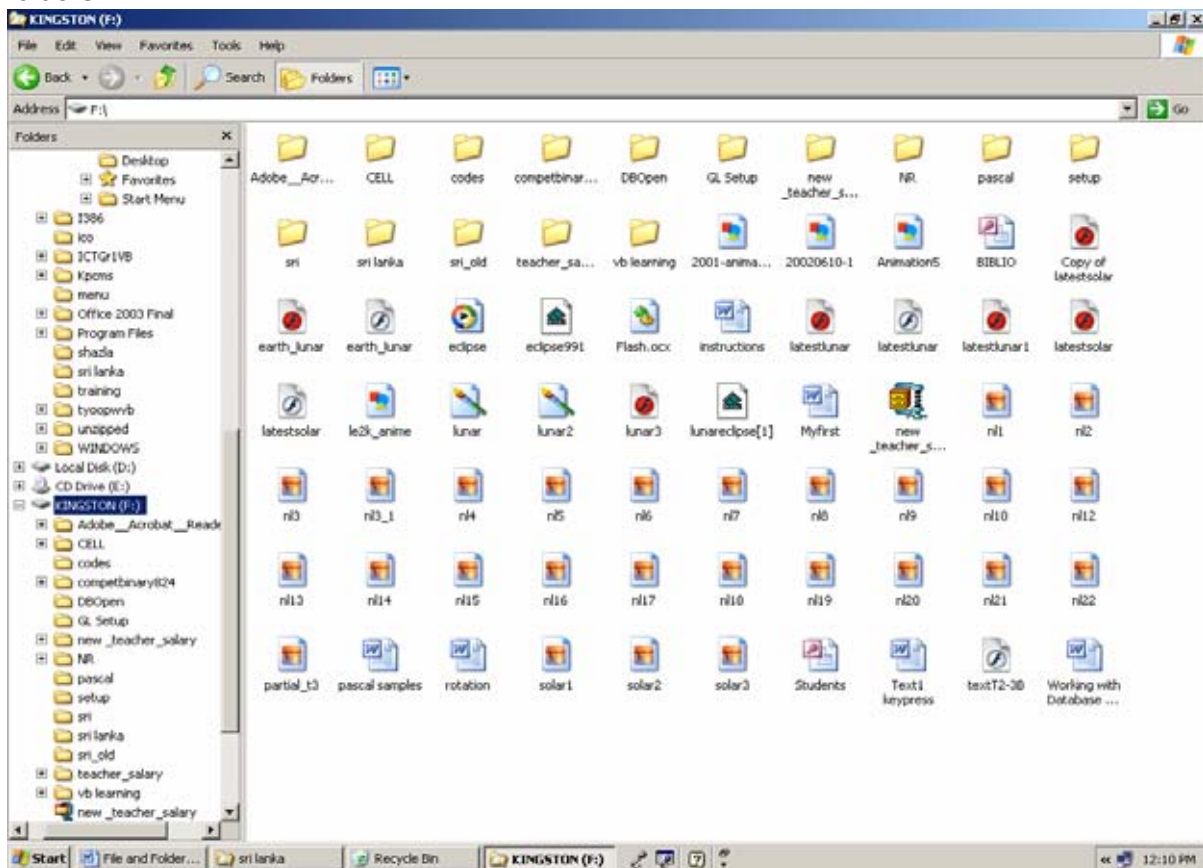
START → run type `explorer` into the box and press enter.

Method 3

Right click on the **start** button → Click on Explore command in the shortcut menu that appears.

Now you will have a window similar to this

You can see that Windows Explorer is split into two parts, the left hand side, which is called the folders list, and the right hand side, which is where you will be managing your files and folders.

**File**

A collection of data or information that has a name, called the *filename*. Almost all information stored in a computer must be in a file. There are many different types of files.

Document

In computing, the term was originally used for a file created with a word processor. In addition to text, documents can contain graphics, charts, and other objects.

Folder

In graphical user interfaces such as Windows and the Macintosh, a folder is an object that can contain files. Folders are used to organize information. In the DOS and UNIX worlds, folders are called directories.

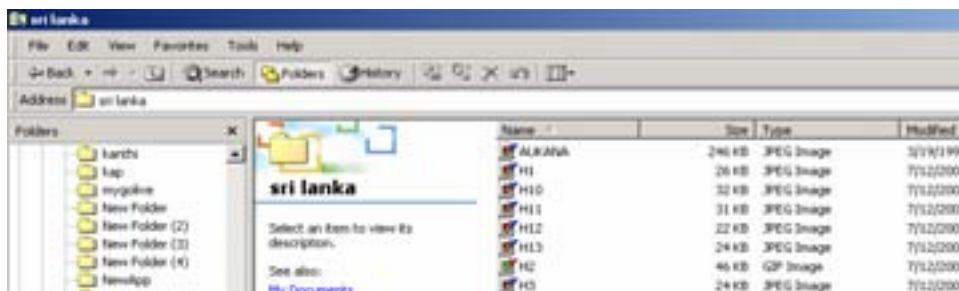
How to change the view of files and folders in right pane

Click **View** and select one of the following

Large Icons, Small Icons, List, details or thumbnails.



Thumbnails



Details



Large Icons

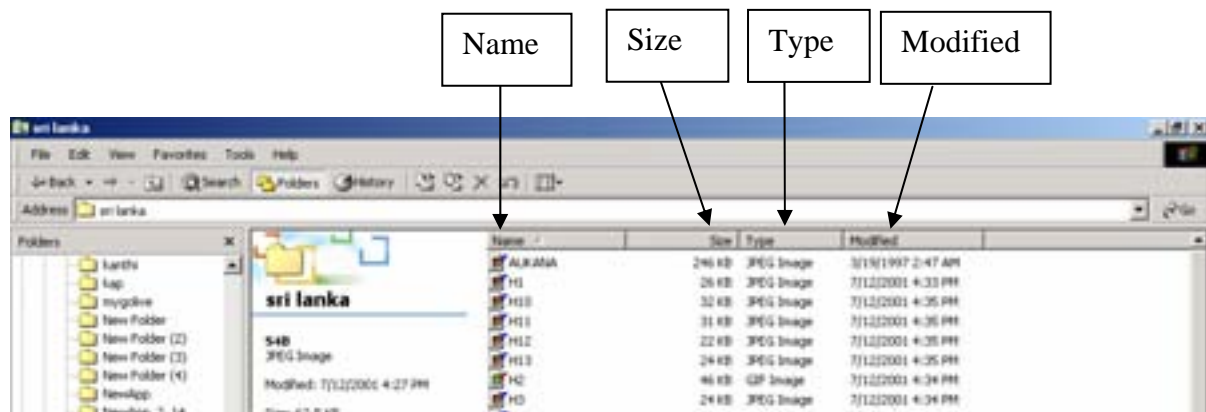
Selecting a file or folder

- Click on the file or folder

How to arrange files or folders in the left pane

In the details view

- Click on **Name** button to arrange the files in ascending order of the file name. Clicking the **name** button again will arrange the files in descending order of the file name
- Click on **Type** button to arrange the files in ascending order of the file type. Clicking the **Type** button again will arrange the files in descending order of the file type
- Click on **Size** button to arrange the files in ascending order of the file size. Clicking the **Size** button again will arrange the files in descending order of the file size
- Click on **Modified** button to arrange the files in ascending order of the file modification date. Clicking the **Modified** button again will arrange the files in descending order of the file modification date

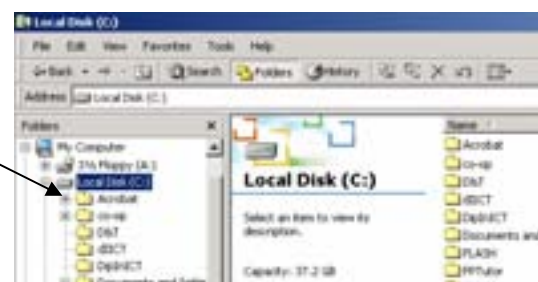
**Expanding a folder**

In front of some folder icons in the left pane, you may have noticed the small plus sign (+). This indicates that the drive/folder has more folders inside it.

To see the folders inside, click on the plus sign. This is called expanding a folder.

Collapsing a folder.

If a folder is expanded the plus sign changes to a (-) sign. Clicking on this minus sign hides all the folders inside this folder.

**Creating a new folder**

Select the folder or drive in the left pane of the explorer window by clicking on it.

- Select File → New → Folder

- Now you will have a icon in the right hand pane named new folder
- Type a suitable name for the folder
- Press enter

Renaming a folder

- Right click on the folder you want to rename
- Click on Rename command in the shortcut menu
- Type a new name
- Press enter.

Deleting a folder

(Note: When you delete a folder all the files and sub folders inside it will also be deleted.)

- Select the folder to be deleted
- Press Delete Key.
- Click Yes

Moving a folder

- Select the folder to be moved
- Edit → Cut
- Select the drive or folder under which you want to place the folder
- Edit → Paste

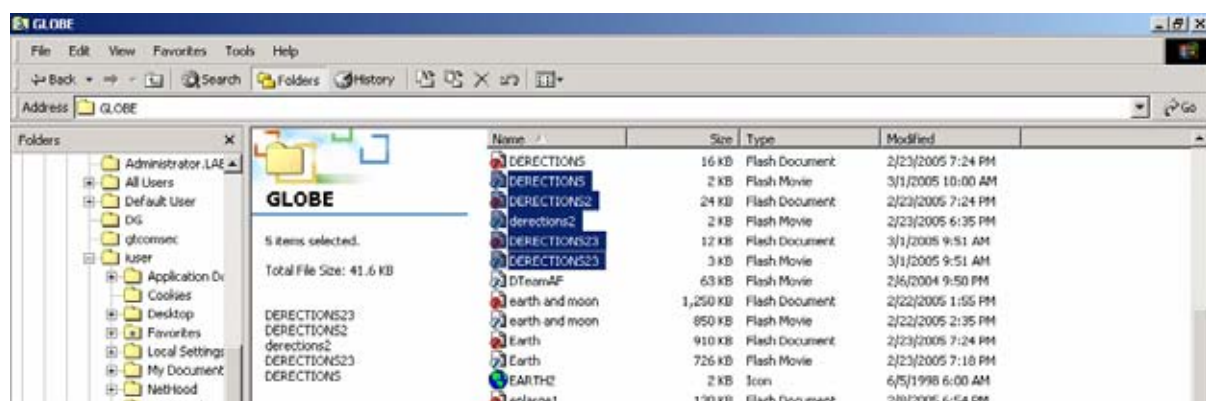
Renaming a file

- Right click on the file you want to rename in the right pane of the explorer window
- Click on Rename command in the shortcut menu
- Type a new name
- Press enter.

Selecting multiple files

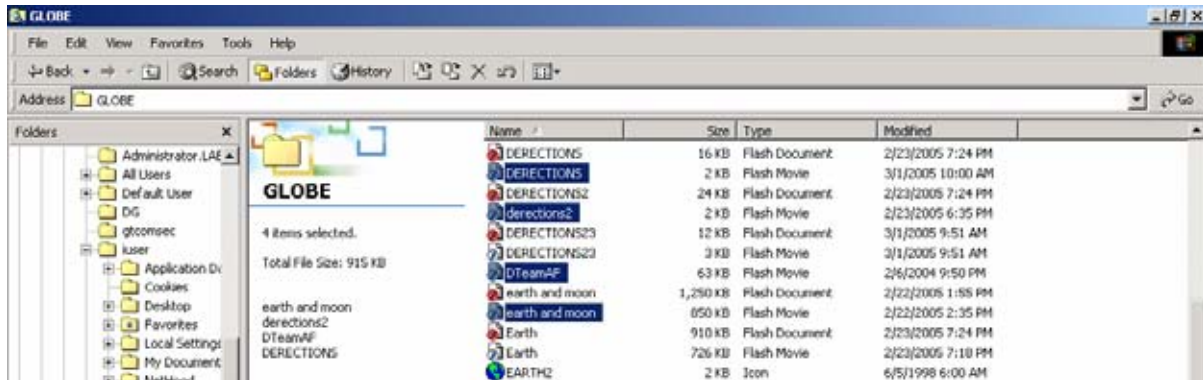
To select adjacent files

- Click on the upper file name of the file range you want to select
- Holding down the shift key, click on the lower file name of the file name you want to select



To select non –adjacent files

- Click on each file name while holding down CTRL key.

**Deleting a file or files**

- Select the file or files to be deleted
- Press Delete Key.
- Click Yes

Copying a file or files

- Select the file or files to be copied
- Edit → Copy
- Select the drive or folder under which you want to place the files
- Edit → Paste

**Moving a file or files**

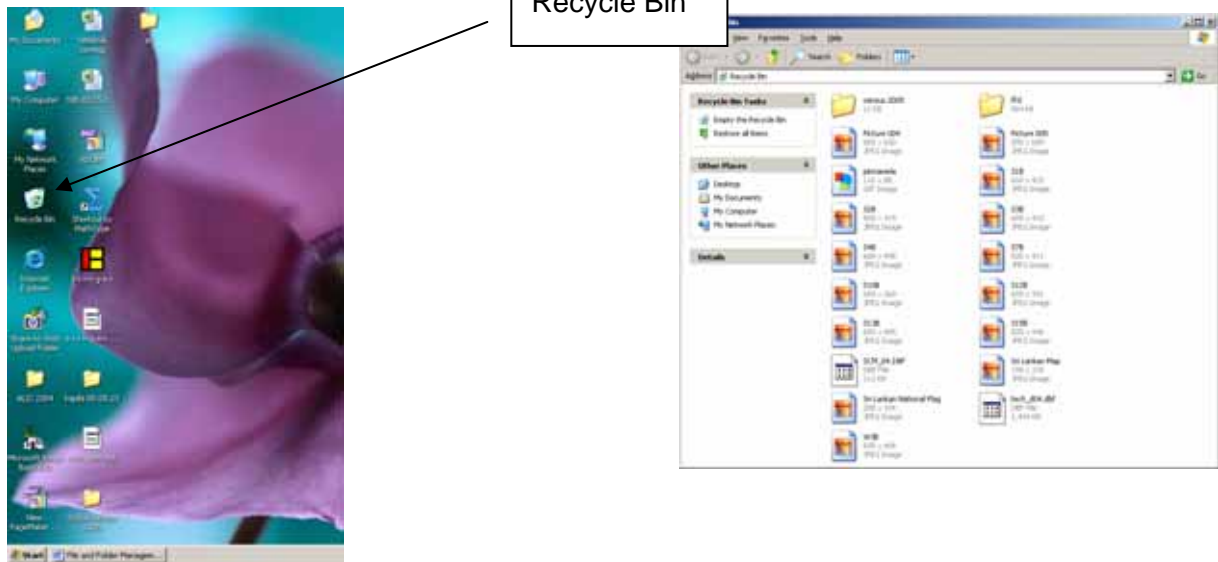
- Select the file or files to be moved.
- Edit → Cut
- Select the drive or folder under which you want to place the files
- Edit → Paste

To display file or folder properties.

- Right click on the file or folder.
- Click on Properties command in the shortcut command.
- Now you will see a window similar to this.

Recycle Bin

An icon on the desktop that represents a directory where deleted files are temporarily stored. This enables you to retrieve files that you may have accidentally deleted.



Double click on the recycle bin icon in the desktop to view deleted files

If you accidentally delete a file

- Locate the file icon in the recycle bin
- Right click on the icon and click on **restore** command in the shortcut menu.

By clicking **restore all** button in the recycle bin window you can restore all the deleted files to their original locations.

Deleting a file permanently

- Select the file in the recycle bin
- Press Delete Key.
- Click Yes

To remove all the files in the recycle bin

- Click on Empty Recycle Bin button in the recycle bin window.
- Click Yes.

Competency 6 : Uses Word Processing Software To Solve Day-To-Day Problems.

Competency Level 6.1 : Explores the concept and features of Word Processing Activity 6.1 : Let's explore word processor.

Time : 120 minutes.

Quality Inputs :

- Four copies group exploration instruction in Annexe 6.1.1
- Four copies of labeled diagram of starting window of word processing application in Annexe 6.1.2
- Four copies of labeled diagram of Keyboard layout and list of symbols in Annexe 6.1.3
- Demy sheets and markers.

Learning – Teaching process:

Step 6.1.1 :

- Initiate discussion of an invitation to a recent function/event e.g. Year-end party.
- Ask students to prepare an invitation for the weekly fair to be held at 10a.m. the following day.
- Lead a discussion to highlight the following.

- There are different handwriting styles, letter sizes and colours, in each invitation.
- Each format varies from the other.
- Pictures drawn for the invitation by unskilled persons look unattractive.
- This manually prepared invitation is difficult to edit or modify.
- Depending on the number of invitations, each copy needs to be duplicated manually.
- Therefore this is time consuming.
- The computer can help eliminate the difficulties above.

(20 minutes)

Step 6.1.2 :

- Divide the class into four groups.
- Distribute the copies of labeled diagram to the groups.
- Assign the 16 features equally to the groups.
- Get groups to study the features.

- Help groups to start the word processing package and study the features on the screen as well.
- Prepare groups for a whole class presentation.

(20 minutes)

Step 6.1.3

- :
- Get each group to present its findings.
 - Lead a discussion to highlight following.

- Word Processing application can be used to create documents electronically.
- Title bar displays the title of the document
- There are a number of menus in the menu bar.
- Many tools are available in a word processor.
 - The Standard Tool bar and Formatting tool bar are very important in creating documents.
 - The tools in the tool bars are available in the menus also.
- The margins of the documents are displayed on the rulers.
- There are a number of buttons in the document window.
 - Minimize button is used to minimize the document.
 - Maximize/Restore button is used to Maximize and Restore the document.
 - Close button is used to close the application.
 - Close button below the title bar is used to close the document.
- Scroll bars are used to scroll the document.
- Drawing tools are available in the drawing tool bar.
- Status bar displays the status of the document.
- Editing (working) area is used to type and edit documents.
- The small blinking vertical bar in the editing area is called cursor or insertion point which appears like an I , in the editing area when the mouse pointer is moved.

(40 minutes)

Step 6.1.4.

- :
- Provide copies of labeled diagram of keyboard.
 - Let the students do the activity.

(20 minutes)

- Step 6.1.5** :
- Request each group to present its findings.
 - Lead a discussion to highlight following.

- Enter key (or Return key) is used to move to the next line.
- Caps Lock key is used to type Uppercase letters.
- Shift is used with another key to capitalize a letter and print the characters on the top of the key.
- Space bar is used to provide space.
- Backspace is used to erase characters or reduce space to the left of the cursor.
- Delete is used to erase the character or reduce space next to the cursor.
- Tab key is used to move the cursor to a pre-determined position.
- Arrow keys/Cursor keys move the cursor in the direction of the arrow, without deleting any characters or spaces.
- Numeric keypad is easy to use when typing numbers continuously.
- Insert key has two modes – insert mode and replace mode.
- Function keys perform special functions according to application.

(20 minutes)

Criteria for assessment and evaluation

- Names the components of the screen layout.
- Accepts the need to produce documents electronically rather than manually.
- Uses keyboard in word processing.
- Expresses one's own ideas freely, clearly and pleasantly.
- Plans tasks for improved efficiency and effectiveness.

Annexe 6.1.1

Instructions for the Group Exploration

- You will be working in four groups with the following four sets of topics distributed randomly across the groups.
 - Title Bar
 - Menu Bar
 - Standard Toolbar
 - Formatting Toolbar

 - Vertical Ruler
 - Horizontal Ruler
 - Working Area
 - Margins

 - Minimize Button
 - Maximize/Restore Button
 - Word Close Button
 - Document Close Button

 - Vertical Scroll Bar
 - Horizontal Scroll Bar
 - Drawing Tool Bar
 - Status Bar
- Move to the computer lab, explore the keyboard, compare same with diagram provided and identify keys.
- Boot computer and load word processor.
- Go through the reading material and get a good idea of the assigned area.
- Practice typing your own words and symbols on the word processing application using all the keys.
- Be prepared to share your experiences and findings with the class at plenary session.

Annexe 6.1.2

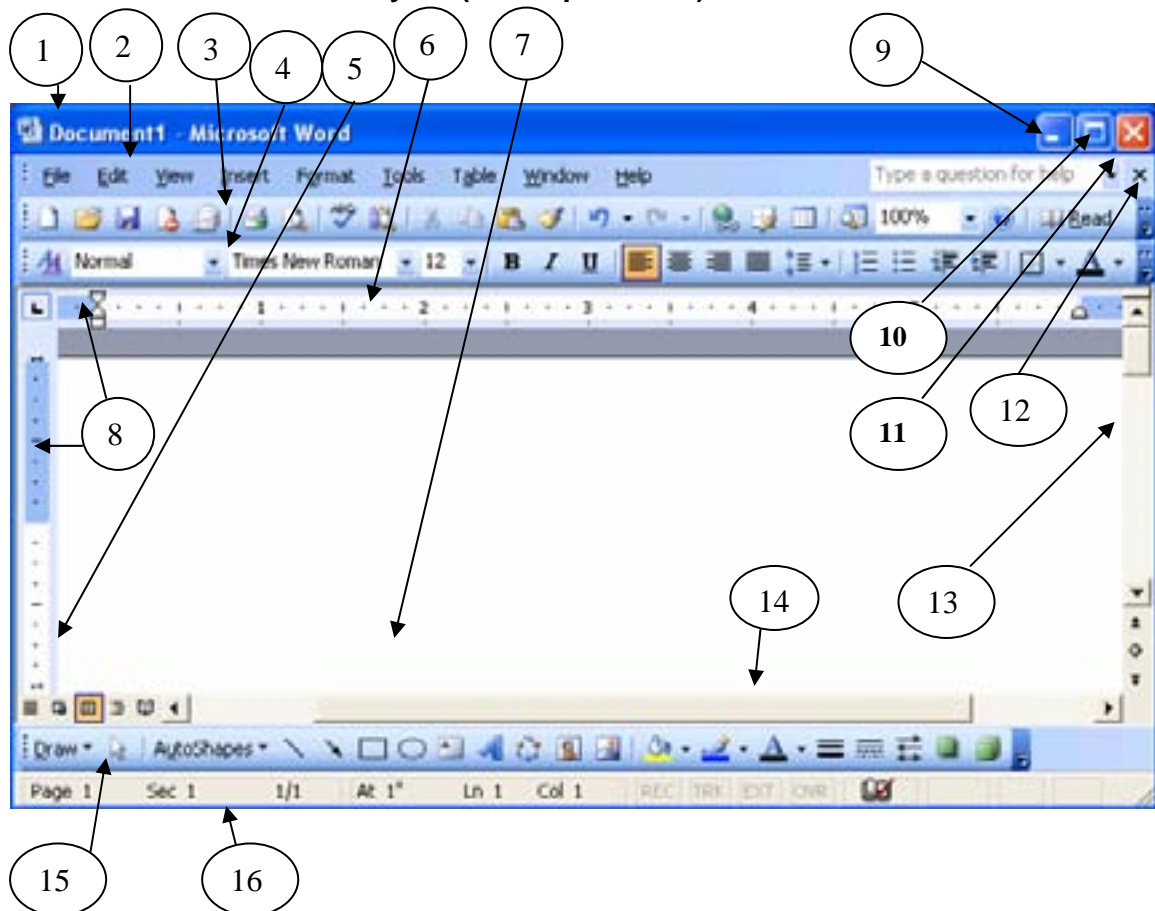
Starting a word processing package (MS Word)

Click **START** button from the task bar

Move to programs → Microsoft Office → Microsoft Word(Click)

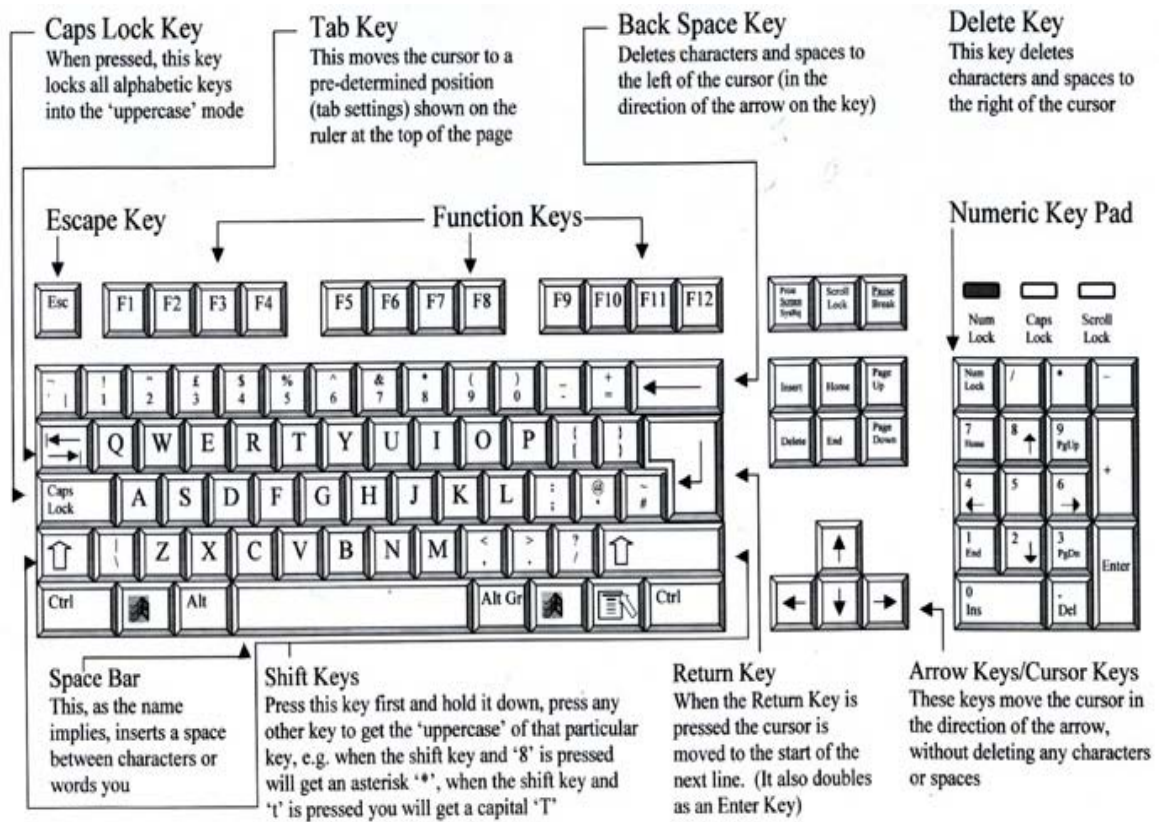


Screen layout (Start up window) of Microsoft Word



1. Title Bar
2. Menu Bar
3. Standard Toolbar
4. Formatting Toolbar
5. Vertical Ruler
6. Horizontal Ruler
7. Working Area
8. Margins
9. Minimize Button
10. Maximize/Restore Button
11. Word Close Button
12. Document Close Button
13. Vertical Scroll Bar
14. Horizontal Scroll Bar
15. Drawing Tool Bar
16. Status Bar

Annexe 6.1.3

Labeled diagram of Keyboard layout

Keyboard symbols

~ Tilde	{ Open or Left Curly Brace
! Exclamation Point	} Close or Right Curly Brace
@ At	[Open or Left Square Bracket
Number or Hash	] Close or Right Square Bracket
\$ Dollar	: Colon
% Percent	" Quote
^ Caret or Hat	| Or or Vertical Bar
& Ampersand	; Semi Colon
* Asterisk	' Apostrophe or Single Quote
(Open or Left Parenthesis	\ Backslash
) Close or Right Parenthesis	< Less Than
_ Underscore or Horizontal Bar	> Greater Than
+ Plus	? Question Mark
` Acute	, Comma
- Dash or Hyphen	. Dot, Period or Full Stop
= Equals	/ Forward Slash

Competency Level 6.2 : Performs basic tasks in Word Processing.

Activity 6.2 : Let's acquaint ourselves with word processing.

Time : 120 minutes.

Quality Inputs :

- Two copies of the dialogue in Annexe 6.2.1.
- Three copies group exploration instructions in Annexe 6.2.2
- Three copies of the Graded Directions in Annexe 6. 2. 3.
- Three computers with three floppy disks each containing a self prepared multiple page document named Text1.doc.
- Demy sheets and pastel.

Learning –Teaching Process:

Step 6.2.1 :

- Get two volunteers to present the dialogue to the class.
- Conduct a discussion to highlight the following.

- A new file is opened to store information on each student admitted to the school.
- Documents in this file could be referred or retrieved at any time.
- Systematic filing on the basis of aspects such as admission number and year of admission provides easy access to files.
- File cover sizes vary to suit standard paper sizes used in documents.
- Word Processing enables the above manual tasks to be performed both efficiently and effectively.

(15 minutes)

Step 6.2.2 :

- Divide the class into three groups.
- Provide each group with copies of group exploration instructions, graded directions, demy sheets and markers.
- Direct the groups and involve them in the exploration.
- Prepare them for a whole-class presentation.

(75 minutes)

Step 6.2.3

- : • Get each group to present its findings.
- Provide opportunity for the presenters themselves to elaborate on their findings.
- Invite constructive comments from the other groups.
- Conduct a discussion to highlight the following.

- There are a number of ways to open, close or save a document in word processing
- A new blank document can be opened by
 - Using file menu.
 - Clicking on the 'New Blank Document' icon in the standard tool bar
 - Using Key strokes
- A document that already exists in storage media can be opened by
 - Using file menu.
 - Clicking on the 'Open' icon in the standard tool bar.
 - Using Keystrokes.
- Usually documents are saved for future reference.
- A document can be saved by
 - Using file menu
 - Clicking on the icon in the standard tool bar
 - Using Key strokes
- When we save a new document for the first time we must go through the menu 'File --> Save as'.
- A document can be closed by
 - Using file menu
 - Clicking on the 'Close window' button, at the right end of the menu bar.
 - Using Key strokes 'Ctrl+F4'

- Word Processing application can be closed by
 - Using file menu
 - Clicking on the 'Close' control button at the right end of the title bar.
 - Using Key strokes 'Alt+F4'
- Margin and the paper size can be changed using Page Setup in the File menu
- Margins can be adjusted using Ruler in the print layout view or print preview.
- Standard paper sizes can be selected or customized in the page setup.
- An entered text can be edited by deleting, copying or moving.
- Copying or moving is done using
 - edit menu
 - standard toolbar
 - drag and drop method
 - key strokes
 - context menu (short cut menu)

(30 minutes)

Criteria for Assessment and Evaluation

- Names basic tasks of Word Processing and describes them.
- Accepts the importance of attending to basic tasks in producing a quality document.
- Uses basic features available in word processing to create and store files.
- Engages in tasks fully aware of the options available to perform them.
- Takes precautions to avoid wastage of time, energy and other resources.

Annexe 6. 2. 1

Dialogue

- Office Assistant : What can I do for you?
- Student : I came to fetch my school leaving certificate.
- Office Assistant : Do you remember your Admission Number and the Year you left school?
- Student : Yes of course. My admission number is 26589 and I left school in 2003.
- Office Assistant : Hold on a little. I will look for your file.
(Rifles in the cabinet and pulls out the file)
- Student : Why are the files in the cabinet of different sizes?
- Office Assistant : Papers are of standard size. A3 papers are larger than A4 papers. Documents in A3 papers, therefore, need larger files.
- Student : Now I understand why birth certificates need larger files.
- Office Assistant : Here is your file, but your birth certificate is missing. You may have taken it earlier.
- Student : Yes, now I remember. I took it for the circuit sports meet two years ago.
- Office Assistant : OK, then I will submit your file to the principal.

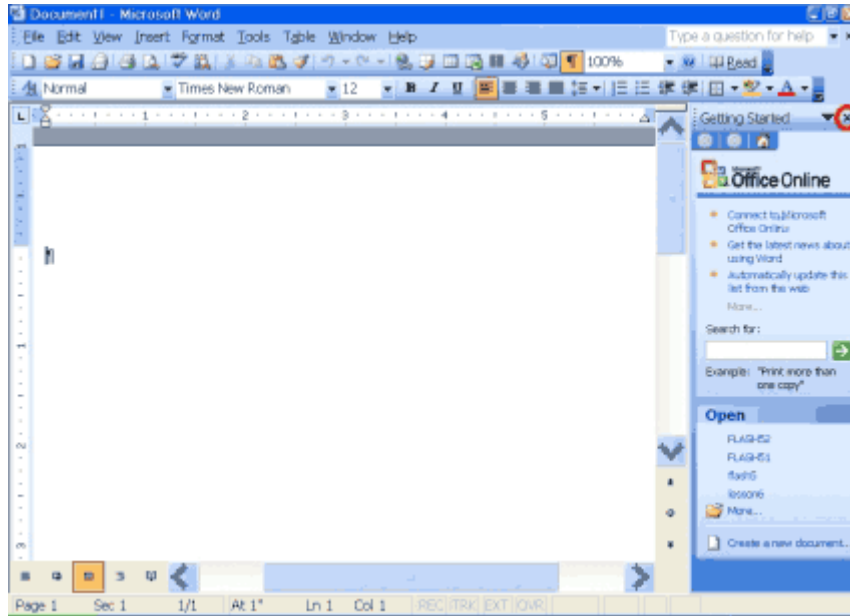
Annexe 6.2.2

Instructions for the Group Exploration

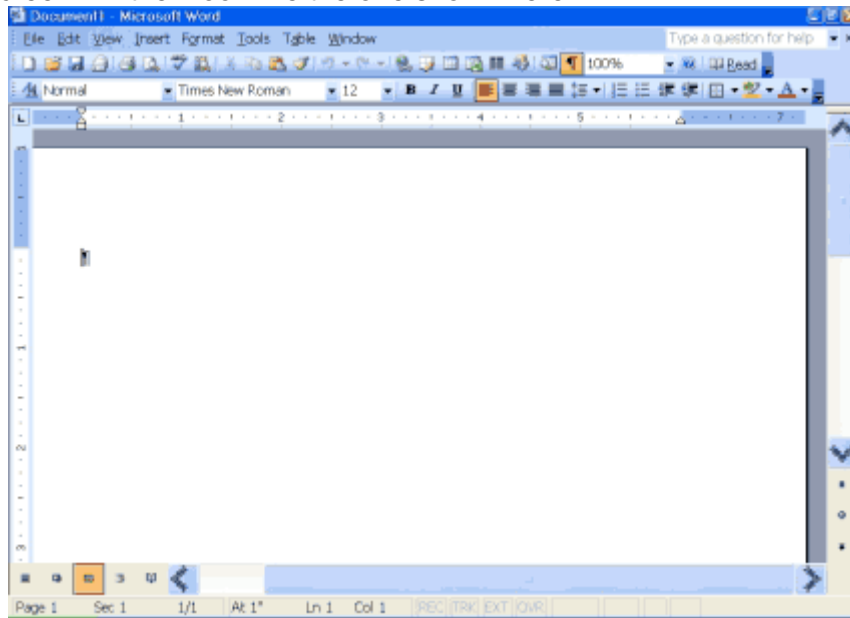
- You will be working in three groups with the following three topics assigned randomly to the groups.
 - Identifying paper size and setting margins
 - Print previewing and adjusting margins
 - Entering and Editing text
- Go to the computer assigned to your group.
- Open the soft copy of Text1.doc stored in your computer.
- Go to the end of the page and type the names of your group members along with the name of your school.
- Close Text1.doc and create a new document.
- Discuss the task assigned to your group with the others in the group.
- Follow the graded directions and complete the task to the best of your ability.
- Write down the steps you followed, on the demy sheet given.
- Also write down the problems encountered and what you did to overcome them.
- Save the new document as Text2.doc. on the Desktop and in the given floppy disk.
- Be prepared to present your findings at the plenary session.

Annexe 6.2.3**Graded Direction****Word Processing using Microsoft Word 2003/2002 for Windows**

This tutorial teaches Microsoft Word basics. Although knowledge of how to navigate in a Windows environment is helpful, this tutorial was created for the computer novice. To begin, open Microsoft Word. Your screen will look like the one shown here.



Click the X in the upper right corner of the New Document pane to close the New Document pane. Your screen will then look like the one shown here.

**The Ruler**

The ruler is generally found below the main toolbars. The ruler is used to change the format of your document quickly. To display the ruler:

1. Click View on the Menu bar.
2. The option Ruler should have a check mark next to it. If it has a check mark next to it, press Esc to close the menu. If it does *not* have a check mark next to it, continue to the next step.
3. Click Ruler. The ruler now appears below the toolbars.

Document View

In Word, you can display your document in one of five views: Normal, Web Layout, Print Layout, Reading Layout, or Online Layout.

Normal View

Normal view is the most often used and shows formatting such as line spacing, font, point size, and italics. Word displays multiple-column text in one continuous column.

Web Layout

Web layout view enables you to view your document as it would appear in a browser such as Internet Explorer.

Print Layout

The Print Layout view shows the document as it will look when it is printed.

Reading Layout

Reading Layout view formats your screen to make reading your document more comfortable.

Outline view

Outline view displays the document in outline form. Headings can be displayed without the text. If you move a heading, the accompanying text moves with it.

Word 2002

In Word 2002, you can display your document in one of four views: Normal, Outline, Page Layout, or Online Layout.

Normal view

Normal view is the most often used and shows formatting such as line spacing, font, point size, and italics. Word displays multiple-column text in one continuous column.

Outline view

Outline view displays the document in outline form. Headings can be displayed without the text. If you move a heading, the accompanying text moves with it.

Print Layout view

The Print Layout view shows the document as it will look when it is printed.

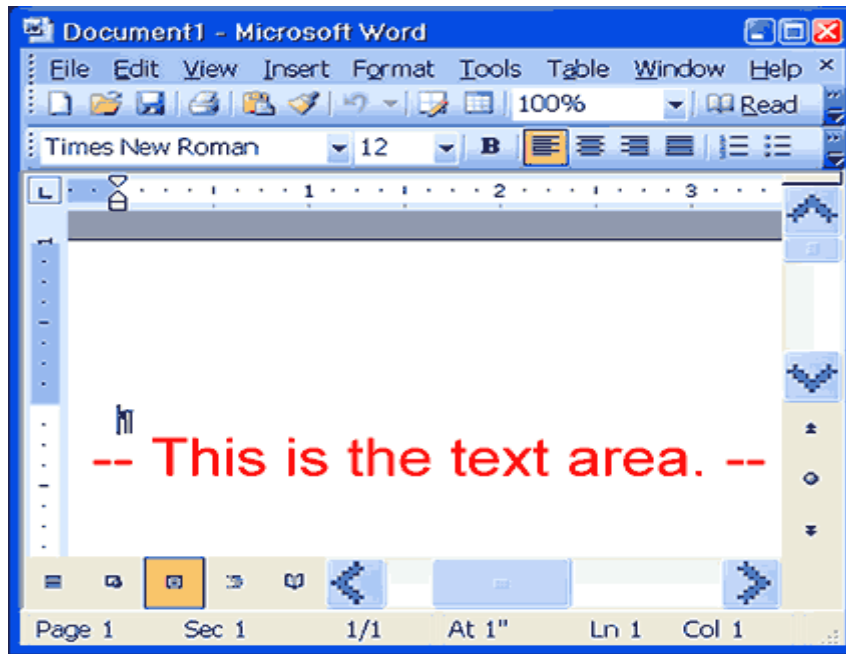
Online Layout view

The Online Layout view optimizes the document for online viewing (viewing the document in a browser such as Internet Explorer).

Before moving ahead, check to make sure you are in Normal view:

1. Click View on the Menu bar.
2. The icon next to Normal should have a box around it. If the icon next to normal has a box around it, press Esc to close the menu. If the icon next to Normal does not have a box around it, continue on to the next step.
3. Click Normal. You are now in Normal view.

Text Area



Just below the ruler is a large area called the "text area." You type your document in the text area. The blinking vertical line in the upper left corner of the text area is the cursor. It marks the insertion point. As you type, your work shows at the cursor location. The horizontal line next to the cursor marks the end of the document.

Exiting Word

You have completed Lesson One. Typically, you would save your work before exiting. This lesson does not require you to enter any text, so you might have nothing to save. To exit Word:

1. Click File.
2. Click Exit, which can be found at the bottom of the drop-down menu.
3. If you have entered text, you will be prompted: "Do you want to save changes to Document1?" To save your changes, click Yes. Otherwise, click No.
4. Specify the correct folder in the Save In box.
5. Name your file by typing **lesson1.doc** in the File Name field.
6. Click Save.

Things You Need to Know

This lesson instructs you on how to set up your computer so that you can complete the lessons that follow successfully and it provides you with background information on Microsoft Word. To begin the lesson, open Microsoft Word.

Click

During the lessons that follow, you will be asked to "click" items. When asked to click:

1. Point to the item.
2. Press your left mouse button once.

If you are asked to double-click an item:

1. Point to the item.
2. Quickly press your left mouse button twice.

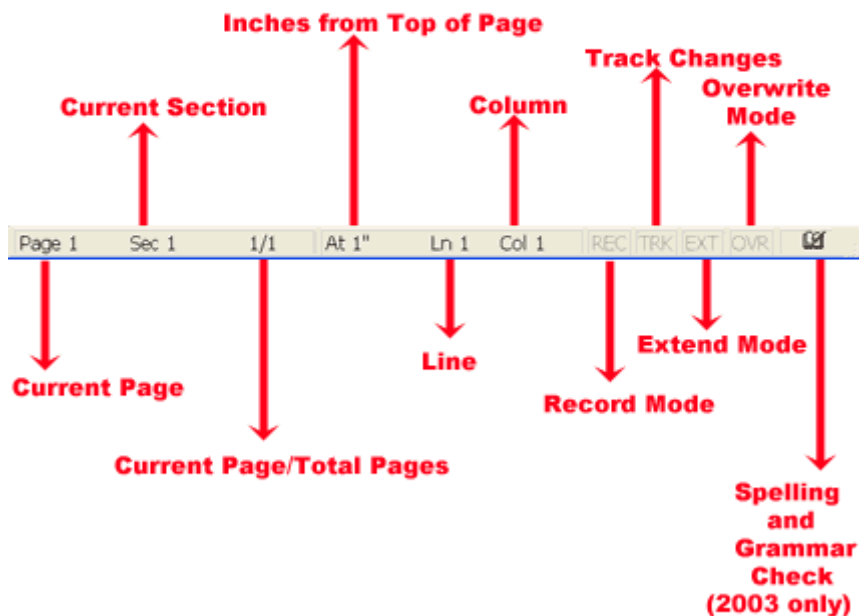
If you are asked to right-click:

1. Point to the item.
2. Press your right mouse button.

Options

The following is an introduction to various features of the Microsoft Word screen.

Status Bar

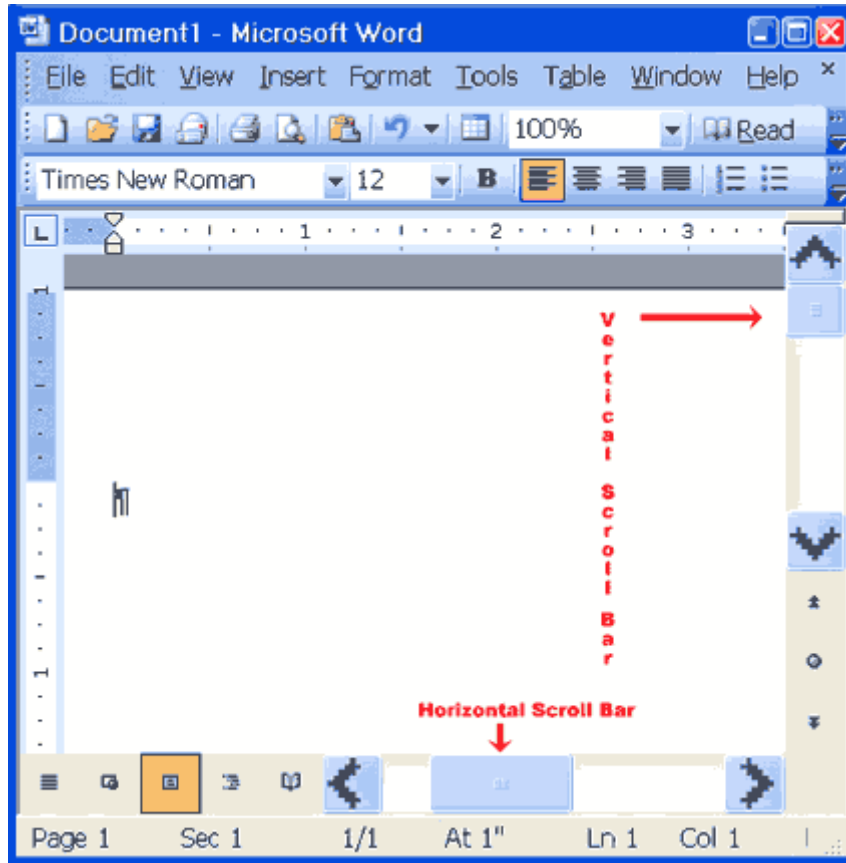


The Status bar appears at the very bottom of the screen and provides such information as the current page, current section, total number of pages, inches from the top of the page, current line number, and current column number. The Status bar also provides options that enable you to track changes or turn on the Record mode, the Extension mode, the Overtyping mode, and the Spelling and Grammar check.

Word 2002

The Status bar for the 2002 version of Word includes *WordPerfect* help, but does not include Spelling and Grammar check.

Horizontal and Vertical Scroll Bars



The Horizontal and Vertical scroll bars, if turned on, enable you to move up and down or across the window simply by pressing the icons located on the scroll bars. The Horizontal scroll bar is located above the Status bar. The Vertical scroll bar is located along the right side of the screen. To move up and down your document, click and drag the Vertical scroll bar up and down. To move back and forth across your document, click and drag the Horizontal scroll bar.

Nonprinting Characters

Certain characters do not print but do affect the document layout. You can elect to see these characters on the screen as you type or have them remain invisible. For these lessons, you should opt to see them onscreen. Here are most of them:

Denotes a tab

..

Denotes a space

¶

Denotes the end of a paragraph

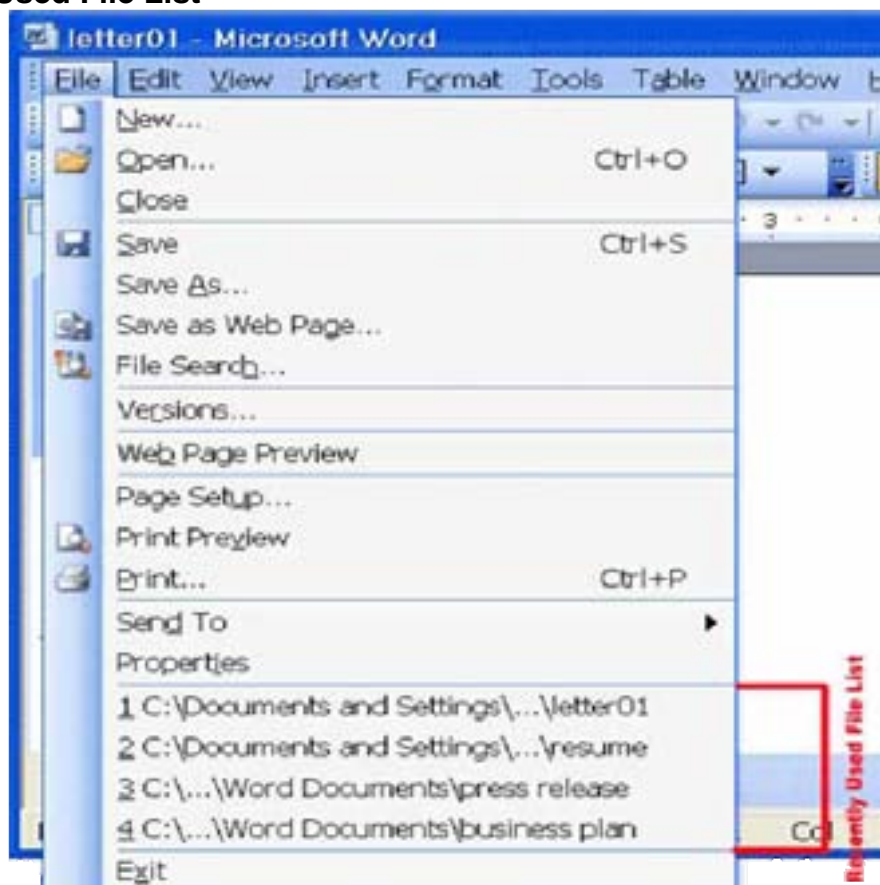
....

Denotes hidden text

To show non-printing characters:

1. Click Home
2. Click the Show/Hide button. The button is orange.

Recently Used File List



If you enable the recently used file list, clicking File displays the most recently opened files near the bottom of the drop-down menu. You can click the file name to open the file quickly.

Setting Options

Before proceeding, turn on the Status bar, Horizontal scroll bar, Vertical scroll bar, nonprinting characters, and the recently used file list. Follow the procedure outlined here:

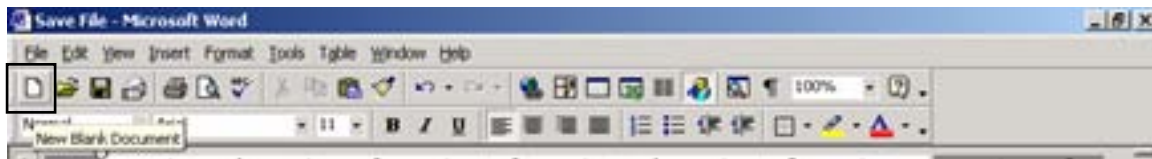
1. Click Tools on the Menu bar.
2. Click Options.
3. Click View to choose the View tab.
4. In the Show frame, check to see if there are checks next to Status Bar, Horizontal Scroll Bar, and Vertical Scroll Bar.
5. If all these items do not have check marks, go to the box next to the unchecked item(s) and click the left mouse button.
Note: You toggle the check mark on and off by clicking the left mouse button.
6. In the Formatting Marks frame, check to see if there is a check mark next to All.
7. If there is no check mark next to All, go to the box next to All and click the left mouse button. A check mark will now appear.
8. Click General to choose the General tab.

9. Check to see if there is a check mark next to the Recently Used File List. If there is no check mark, go to the box next to Recently Used File List and click the left mouse button. Check to see if the number in the Entries box is at least four. If it is not, type **4** in the box.
10. Check to see if Inches is selected in the Measurement Units box (this sets the unit of measurement for the ruler). If it is not, click the pull-down menu and then click Inches.
11. Click OK to close the dialog box.

New blank document

To open a new blank document

Click on the **New** icon from the standard tool bar.



Or select **File > New** from the menu

Or Use Keystrokes '**Ctrl+N**'

Highlighting Text

Throughout these lessons, you will be asked to highlight text. You can use either of the following methods:

Highlighting by Using the F8 and Arrow Keys

1. Place the cursor before or after the text you wish to highlight and click the left mouse button.
2. Press the F8 key, which will serve as an "anchor" showing where text you wish to highlight begins or ends.
3. Press the appropriate arrow key (left arrow to move to the left or right arrow to move to the right) until the text is highlighted. You can use the up or down arrow key to highlight one line at a time. Press Esc to remove the anchor.

Highlighting by Using the Mouse

1. Place the cursor before or after the text you wish to highlight.
2. Hold down the left mouse button.
3. Move the mouse left, right, up, or down until the text is highlighted.

Highlighting Menu Items

Menu Bar

To select a Menu bar item:

1. Click the Menu bar item. A drop-down menu will appear.

2. To change the Menu bar option selected, move the mouse pointer across the Menu bar.

Note: After you highlight an item on the Menu bar, you can also use the left and right arrow keys to move across the Menu bar.

Drop-Down Menu Items

When you click any option on the Menu bar, a drop-down menu appears. To choose a drop-down menu item:

- Click the drop-down menu item.

Or

1. Use the arrow keys to move up or down the drop-down menu.
2. Press Enter to select a drop-down menu item.

Placing the Cursor

During the lessons, you will often be asked to place the cursor at a specific location on the screen. You place the cursor by moving the cursor to the specified location and pressing the left mouse button or by using the arrow keys to move to the specified location.

Choosing Menu Commands by Using the Alt Key

There are many methods to accomplish tasks when you are using Microsoft Word. Generally, when selecting items from the menu, we will ask you to click or highlight the menu item. However, you can also select a menu option by:

1. Pressing the Alt key while typing the underlined letter on the Menu bar.
2. Typing the letter underlined on a drop-down menu. If a dialog box appears, you can move around the dialog box by pressing the Alt key and any underlined option.

Shortcut Key Demonstration

1. Hold down the Alt key and press "o" to select Format from the menu.
2. Press "p" to select Paragraph from the drop-down menu.
3. Hold down the Alt key and press "i" to select the Indents and Spacing tab.
4. Hold down the Alt key and press "b" to select Before from the Spacing frame.
5. Press Enter to close the dialog box.

Shortcut Notations

A key name followed by a dash and a letter means to hold down the key while pressing the letter. For example, Alt-o means you should hold down the Alt key while pressing "o." A shorthand notation of the above demonstration would read as follows:

1. Press Alt-o, p.
2. Press Alt-i.
3. Press Alt-b.
4. Press Enter.

Typists who are slowed down by using a mouse usually prefer using keys.

Typing and Using the Backspace Key

The exercises that follow will teach you how to enter and delete text. To enter text, simply type just as you would if you were using a typewriter. To capitalize, hold down the Shift key while typing the letter. Use the Backspace key to delete text. You do not need to press Enter to start a new line -- Microsoft Word automatically wraps at the end of the line. Press Enter to start a new paragraph.

Exercise 1

1. Type the following sentence:
Joe has a very large house.
2. Now delete the word "house." Using either the arrow keys or the mouse, place the cursor between the period and the "e" in "house."
3. Press the Backspace key until the word "house" is deleted.
4. Type **boat**. The sentence should now read:
"Joe has a very large boat."

The Delete Key

You can also delete text by using the Delete key. First, highlight the text you wish to delete; then press the Delete key.

Exercise 2

Delete the word "very" from the sentence you just typed.

1. Highlight the word "very." Place the cursor before the "v" in the word "very" and press the F8 key. Then press the right arrow key until the word "very" is highlighted.
2. Press the Delete key. The sentence should now read:
"Joe has a large boat."

Inserting Text

You can insert text. To insert text, you must be in the Insert mode. To check to see whether you are in the Insert mode, look at the Status bar, located at the very bottom of the screen. Look at the right side of the Status bar. If the letters "OVR" are gray, you are in the Insert mode. If the letters "OVR" are black, you are in the Overtyping mode.



Insert Mode



Overtyping Mode

To change to the Insert mode:

1. Double-click the letters "OVR."
2. The letters "OVR" are now gray.

Alternate Method -- Setting Options by Using the Menu

You can also use the menu to change to the Overtyping mode.

1. Choose *Tools > Options* from the menu. The Options dialog box opens.
2. Click the Edit tab to choose the Edit tab.
3. The Overtyping Mode box should be blank. If the box is blank, click OK.
4. If the Overtyping Mode box is not blank, click the box to remove the check mark. Then click OK.

Alternate Method -- Setting Options by Using Key

You can use the keyboard to change to the Overtyping mode.

1. Press Alt-t, o.
2. Click Edit.
3. Press Alt-v (toggles between overtype and insert).
4. Press Enter.

Exercise 3

Make sure the letters "OVR" are gray before proceeding. You are going to insert the word "blue" between the words "large" and "boat."

1. Place the cursor after the dot between the words "large" and "boat."
2. Type the word **blue**.
3. Press the spacebar to add a space.
4. The sentence should now read:
"Joe has a large blue boat."

Overtyping

You can type over the current text (replace the current text with new text). However, you must be in the Overtyping mode. Do the following to change to the Overtyping mode.

1. Double-Click "OVR" on the Status bar.
2. The letters "OVR" should now be black.

Make sure the letters "OVR" are black before proceeding to the following exercise.

Exercise 4

Change the word "blue" to "gray."

1. Place the cursor before the letter "b" in "blue."
2. Type the word **gray**.

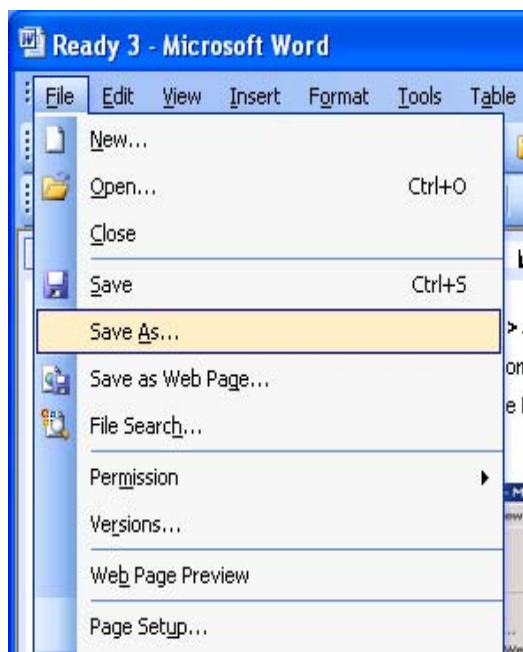
The sentence should now read:

"Joe has a large gray boat."

Saving a File

You must save your files if you wish to recall them later. Before you can save, you must give your file a name. To save your file and close Word, follow the instructions given here:

1. Choose **File > Save As** from the menu.
2. Specify the correct folder in the Look In box.
3. Name your file by typing in the File Name box.
4. Click **Save**.



Or



Select **save** icon from the standard tool bar and click it.



Or

Press Key strokes **Ctrl+S**



Or Click **close** button on the title bar.



Microsoft Word Basic Features

This lesson covers typing, the Backspace key, the Delete key, inserting text, bolding, underlining, and italicizing. To begin this lesson, open Microsoft Word.

Typing and Using the Backspace Key

The exercises that follow will teach you how to enter and delete text. To enter text, simply type just as you would if you were using a typewriter. To capitalize, hold down the Shift key while typing the letter. Use the Backspace key to delete text. You do not need to press Enter to start a new line -- Microsoft Word automatically wraps at the end of the line. Press Enter to start a new paragraph.

More Basic Features

This lesson covers cut, copy, paste, AutoText, spell check, find, replace, and fonts. To begin this lesson, open Microsoft Word.

Open File

To continue working on a file you previously saved, you must open the file. To open the file you used in Lesson 3:

1. Choose *File > Open* from the menu.
2. Make sure the folder you noted during the previous lesson displays in the Look In field.
3. Select the file or type the file name in the File Name field.
4. Click Open. The file you created during the previous lesson appears.

Alternate Method -- Opening a File by Using the Drop-Down Menu

1. Click File.
2. Look for the file name near the bottom of the drop-down menu.
3. Click the file you created during the previous lesson opens.

Cut and Paste

In Microsoft Word, you can cut (delete) text from one area of a document and save that text so it can be pasted elsewhere in the document. When you cut text, it is stored on the Clipboard. You can also copy text. When you copy text, it is also stored on the Clipboard. Information stored on the Clipboard stays there until new information is either cut or copied. Each time you execute Cut or Copy, you replace the old information on the Clipboard with whatever you just cut or copied. You can paste Clipboard information as often as you like.

Exercise 1


Cut - Using the Menu

1. Type the following:
I want to move. I am content where I am.
2. Highlight "I want to move."
3. Choose *Edit > Cut* from the menu.
4. Your text should now read:
"I am content where I am."


Paste - Using the Menu

1. Place the cursor after the period in the sentence "I am content where I am."
2. Press the spacebar to leave a space.
3. Choose *Edit > Paste* from the menu.
4. Your text should now read
"I am content where I am. I want to move."

Alternate Method -- Cut by Using the Icon

1. Type the following:
I want to move. I am content where I am.
2. Highlight "I want to move."
3. Click the Cut icon .
4. Your text should now read:
" I am content where I am."

Alternate Method -- Paste by Using the Icon

1. Place the cursor after the period in the sentence
"I am content where I am."
2. Press the spacebar to leave a space.
3. Click the Paste icon .
4. Your text should now read:
"I am content where I am. I want to move."

Alternate Method -- Cut by Using Keys

1. Type the following:
I want to move. I am content where I am.
2. Highlight "I want to move."
3. Press Ctrl-x.
4. Your text should now read:
" I am content where I am."

Alternate Method -- Paste by Using Keys

1. Place the cursor after the period in the sentence: "I am content where I am."
2. Press the spacebar to leave a space.
3. Press Ctrl-v.
4. Your text should now read:
"I am content where I am. I want to move."

Copy and Paste

In Microsoft Word, you can copy text from one area of the document and place that text elsewhere in the document. As with cut data, copied data is stored on the Clipboard.

Exercise 2


Copy - Using the Menu

1. Type the following:
You will want to copy me. One of me is all you need.
2. Highlight "You will want to copy me."
3. Choose *Edit > Copy* from the menu.


Paste - Using the Menu

1. Place the cursor after the period in the sentence: "One of me is all you need."
2. Press the spacebar to leave a space.
3. Choose *Edit > Paste* from the menu.
4. Your text should now read:
"You will want to copy me. One of me is all you need. You will want to copy me."

Alternate Method -- Copy by Using the Icon

1. Type the following:
You will want to copy me. One of me is all you need.
2. Highlight "You will want to copy me."
3. Click the Copy icon .

Alternate Method -- Paste by Using the Icon

1. Place the cursor after the period in the sentence: "One of me is all you need."
2. Press the spacebar to leave a space.
3. Click the Paste icon .
4. Your text should now read:
"You will want to copy me. One of me is all you need. You will want to copy me."

Alternate Method -- Copy by Using Keys

1. Type the following:
You will want to copy me. One of me is all you need.
2. Highlight "You will want to copy me."
3. Press Ctrl-c.

Alternate Method -- Paste by Using Keys

1. Place the cursor after the period in the sentence "One of me is all you need."
2. Press the spacebar to leave a space.
3. Press Ctrl-v.
4. Your text should now read:
"You will want to copy me. One of me is all you need. You will want to copy me."

AutoText


Cut and Copy both store information on the Clipboard. Each time you store new information on the Clipboard, the old information is lost. If you wish to store text permanently so you can use it repeatedly, use AutoText.

Exercise 3

1. Type the following:
AutoText information is stored permanently.
2. Highlight "AutoText information is stored permanently."
3. Choose *Insert > AutoText > New* from the menu.
4. Microsoft Word suggests a name. The suggestion displays in the dialog box. Change the name by typing **AT** in the Please Name Your AutoText Entry field.
5. Click OK.
6. Click anywhere in the text area to remove the highlighting.
7. Place the cursor between the period in the sentence you just typed and the paragraph marker (¶).
8. Press the spacebar twice to leave two blank spaces.
9. Type **AT**.
10. Press F3.
11. Your text should now read:
"AutoText information is stored permanently. AutoText information is stored permanently."
Note: Whenever you need the text, simply type the name and press F3.

Spell Check


Word checks your spelling and grammar as you type. Spelling errors display with a red wavy line under the word. Grammar errors display with a green wavy line under the error. If you

want to spell check your entire document, press F7 and click the spelling icon , or choose *Tools > Spelling and Grammar* from the menu. If you want to spell check part of your document, highlight the area you want to spell check. Then press F7 and click the spelling

icon , or choose *Tools > Spelling and Grammar* from the menu.

Exercise 4

1. Type the following exactly as shown. Include all errors.
Open thr door for Mayrala. She is a teacher from the town of Ridgemont.
2. Highlight: "Open thr door for Mayrala. She is a teacher from the town of Ridgemont."

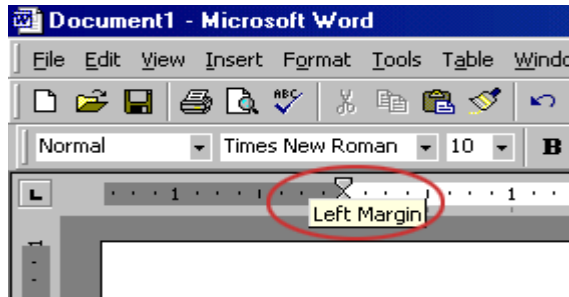
3. Press F7 or click the Spelling icon  on the Standard toolbar.
4. "The" is misspelled, so it is highlighted on the screen and noted in the Not in Dictionary box.
5. Word suggests correct spellings. These suggestions are found in the Suggestions box.
6. To change the word to the correct spelling, make sure "the" is highlighted in the Suggestions box. Click Change.
Note: If the word is misspelled in several places in the document, click Change All to correct all misspellings.
7. The name "Mayrala" is not in the dictionary, but it is correct. Click Ignore Once to leave "Mayrala" in the document with its current spelling.
Note: If a word appears in several places in the document, click Ignore All so you are not prompted to correct the spelling for each occurrence.
8. "Ridgemont" is not found in the dictionary. If you frequently use a word not found in the dictionary, you should add that word to the dictionary by pressing the Add to Dictionary button. Word will then recognize the word the next time it encounters it. Click Add to Dictionary.
9. The following should appear on your screen: "Word finished checking the selection. Do you want to continue checking the remainder of the document?"

Click No. If you wanted Word to spell-check the entire document, you would have clicked on Yes.

Page Margins

The page margins of the document can be changed using the rulers on the page and the Page Setup window. The ruler method is discussed first:

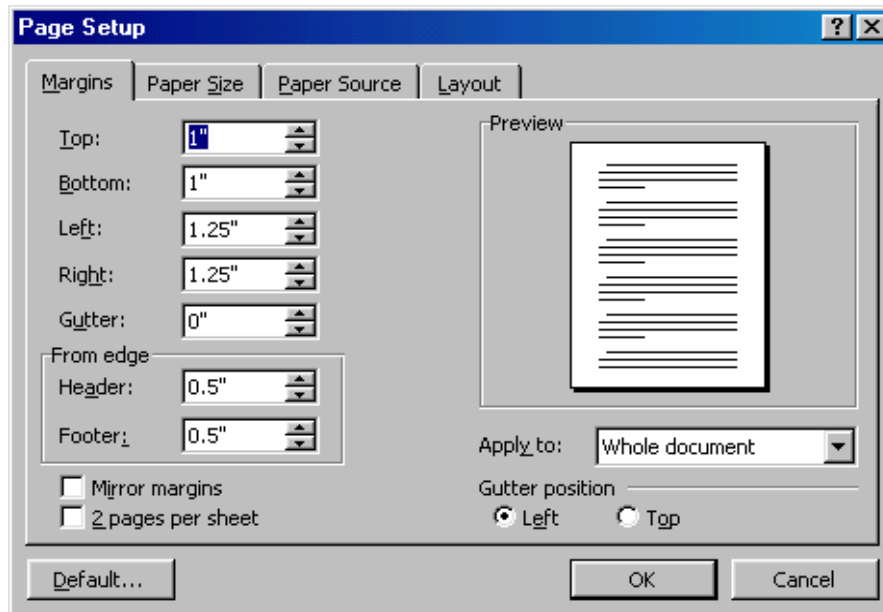
- Move the mouse over the area where the white ruler changes to gray.



- When the cursor becomes a double-ended arrow, click with the mouse and drag the margin indicator to the desired location.
- Release the mouse when the margin is set.

The margins can also be changed using the Page Setup dialog box:

- Select File|Page Setup and choose the Margins tab in the dialog box.

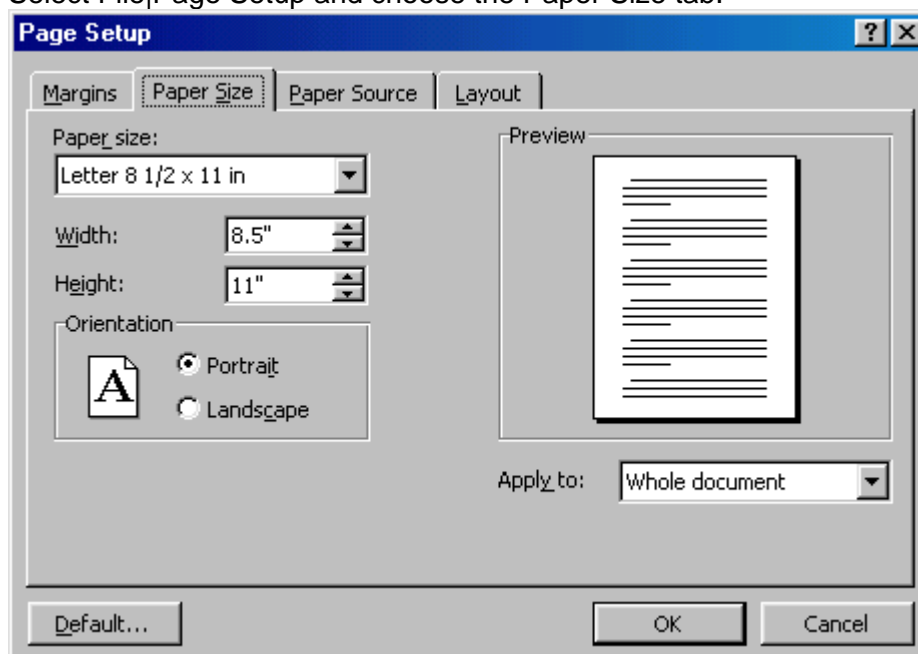


- Enter margin values in the Top, Bottom, Left, and Right boxes. The Preview window will reflect the changes.
- If the document has Headers and/or Footers, the distance this text appears from the edge of the page can be changed.
- Click OK when finished.

Page Size and Orientation

Change the orientation page within the Page Setup dialog box.

- Select File|Page Setup and choose the Paper Size tab.



- Select the proper paper size from the drop-down menu.
- Change the orientation from Portrait or Landscape by checking the corresponding radio button

Print Preview and Printing

Preview your document by clicking the Print Preview button on the standard toolbar or by selecting File|Print Preview. When the document is ready to print, click the Print button from the Print Preview screen or select File|Print.

Exiting Microsoft Word

You have completed this lesson. Typically, you would save your work before exiting. This lesson does not require you to enter any text, so you might have nothing to save. To exit Microsoft Word:

1. Click File on the Menu bar.
2. Click Exit, which can be found at the bottom of the drop-down menu.
3. If you have entered text, you will be prompted: "Do you want to save changes to Document1?" To save your changes, click Yes. Otherwise, click No.
4. Specify the correct directory in the Save In box.
5. Name your file by typing in the File Name field.
6. Click Save.

Competency 6 : Uses Word Processing Software To Solve Day-To-Day Problems.

Competency Level 6.3 : Uses different types of formatting in Word Processing

Activity 6.3 : Let's prepare different types of documents in MS Word

Time : 120 minutes.

Quality Inputs :

- A copy of the sample document in Annexe 6.3.1 to be enlarged.
- Four copies of graded directions for the user on formatting in Annexe 6.3.2
- Four copies group exploration instruction in Annexe 6.3.3

Learning - Teaching Process:

Step 6.3.1 :

- Initiate a discussion on formats used in Newspapers, Invitation cards that the students have viewed.
- Get students to reflect on the format they have observed in news papers and invitation cards.
- Conduct a discussion to highlight the following.

- Word processing features available in MS Word are used for formatting
- Bold, italic and bullet are formatting features.
- Inserting pictures using Clip Art, Word Art are the facilities available.

(15 minutes)

Step 6.3.2 :

- Divide the class into four groups.
- Provide each group with the copies of group exploration instructions and the labeled diagram on toolbars.
- Get the groups involved in the group exploration.
- Prepare them for a whole class presentation.

(60 minutes)

Step 6.3.3 :

- Get each group to present its findings.
- Initiate a game where one group names a format and the other group identifies it on the document prepared.
- Lead a discussion to highlight the following.

- To change the format of a typed text highlight the text and click on the format button from the formatting toolbar.
- To change the font and the size of a highlighted text, the font or font size drop down button is clicked and the required font or font size is selected.
- Aligning text could be done using the align buttons; *Left, Center, Right, Justify*.
- Numbering and bullets buttons are used to list items.
- Drawing tool bar can be used to draw auto shapes, lines, circles and other shapes.
- Text and the contents within the text box can be moved easily anywhere on the page.
- Different types of Word Art are available in word processing.
- The document can be made impressive by inserting clip art and pictures.

(45 minutes)

Criteria for Assessment and Evaluation

- Names different formats used in word processing and describes them.
- Accepts the need to follow standard formats to develop documents.
- Prepares professional documents.
- Works cooperatively with peers..
- Justifies one's own answer.

Annexe 6.3.1

Computer System**Basic Components of a computer**

1. Input Devices
2. Central Processing Unit
3. Out put Devices
4. Auxiliary/Secondary Storage

Input Devices

- Keyboard
- Mouse
- Light Pen
- Joy Stick
- Scanner
- Etc...

Personal Data

Name with Initials:.....

Address :.....

Sex: Male-1 Female-2 ☐Date of Birth: / /
Date Month Year

Date:..... Signature

Computer System

Hardware

Software

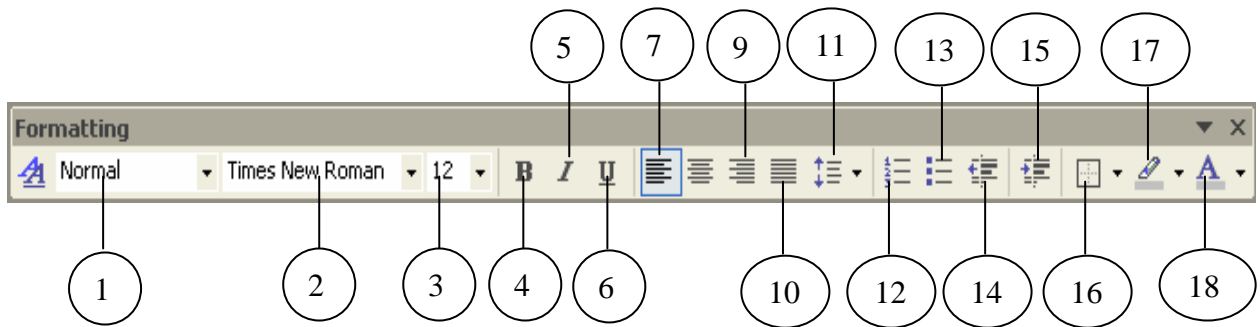
Liveware



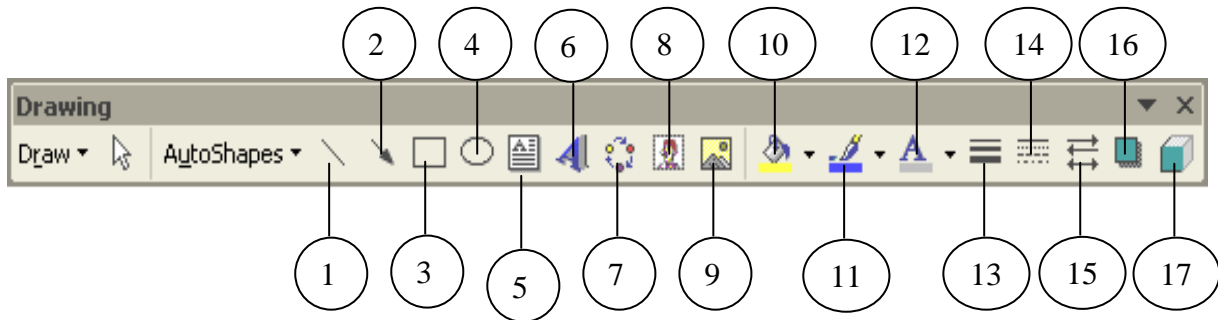
Annexe 6.3.2

A Labeled Diagram on Toolbars

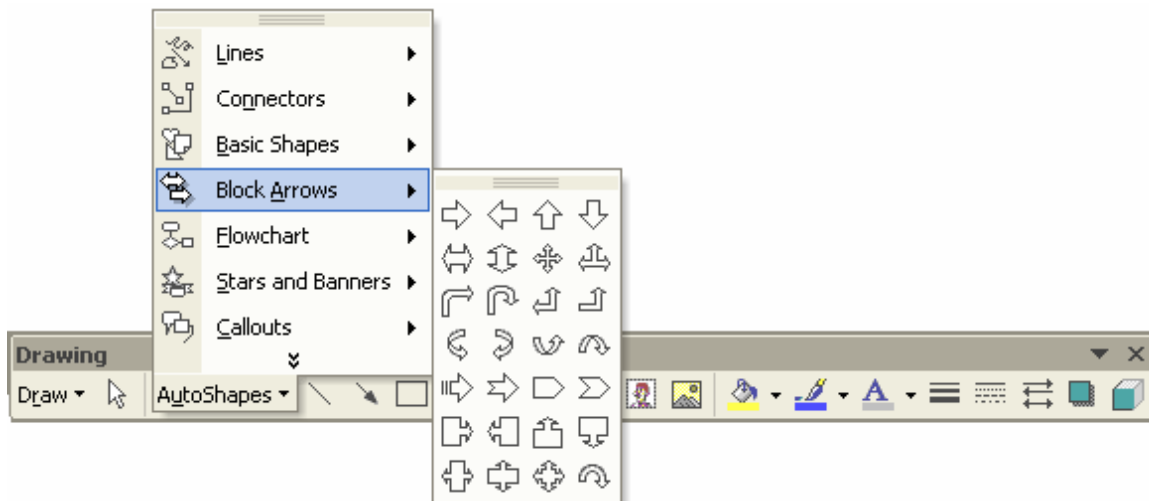
Formatting Toolbar



Drawing Toolbar



AutoShapes using Drawing Toolbar



Formatting Toolbar

1. Style
2. Font
3. Font Size
4. Bold
5. Italic
6. Underline
7. Align Left
8. Center
9. Align Right
10. Justify
11. Line Spacing
12. Numbering
13. Bullets
14. Decrease Indent
15. Increase Indent
16. Outside Border
17. Highlight
18. Font Color

Drawing Toolbar

1. Line
2. Arrow
3. Rectangle
4. Oval
5. Text Box
6. Insert Word Art
7. Insert Diagram and Organization Chart
8. Insert Clip Art
9. Insert Picture
10. Fill Color
11. Line Color
12. Font Color
13. Line Style
14. Dash Style
15. Arrow Style
16. Shadow style
17. 3-D style

Annexe 6.3.3

Instructions for the Group Exploration

- You will be working in four groups with the following four topics assigned to the four groups randomly.
 - Prepare an Invitation card for a birthday party using Clip Art and drawing features.
 - Prepare an application form similar to the one shown in the Annexe 3.3.1
 - Prepare an application for a job: use all possible formats.
 - Prepare a Bio Data using bullets and other formats appropriately
- Prepare the document given using all the formats.
- Get ready for a whole class presentation.

Competency 6 : Uses Word Processing Software To Solve Day-To-Day Problems.

Competency Level 6.4 : Inserts tables into documents and acquires the ability of customizing them.

Activity 6.4 : Let's insert tables and learn how to customize tables and documents.

Time : 60 minutes.

Quality Inputs:

- The timetable in Annexe 6.4.1
- Three copies of group exploration instructions in Annexe 6.4.2
- Three copies of Tables for group activity in Annexe 6.4.3
- Graded Directions in Annexe 6.4.4 for creating and customizing tables.

Learning -Teaching Process:

Step 6.4.1 : • Expose the timetable to the class.
• Conduct a discussion to highlight the following.

- A table consists of columns and rows
- Table facilities in word processing enable data within a table to be organized in a meaningful manner
- A table can be customized according to user needs to give meaningful information.

(10 minutes)

Step 6.4.2 : • Divide the class into three groups.
• Provide each group with copies of group exploration instructions
• Involve the groups in the exploration.
• Prepare groups to present their findings

(30 minutes)

Step 6.4.3 : • Get each group to present its findings
• Request other groups to submit their constructive comments.
• Conduct a discussion to highlight the following.

- In creating tables the number of columns and rows have to be specified.
- Column width and row height can be adjusted.
- New columns and rows can be inserted and unwanted columns and rows can be deleted
- Adjacent cells can be merged while cells also can be divided.

(20 minutes)

Criteria for Assessment and Evaluation

- Describes the facilities made available by the word processor in working with tables.
- Accepts the value of tables in handling information.
- Creates tables to arrange data in an organized manner
- Demonstrates ability to organize according to situation.
- Works cooperatively with peers.

Annexe 6.4.1

Time Table

Time	Monday	Tuesday	Wednesday	Thursday	Friday
08.00 - 08.40	Sinhala	Maths	Social studies	Religion	Health & Phy. Ed.
08.40 – 09.20	Health & Phy. Ed.	Maths	Sinhala	Science	Maths
09.20 – 10.00	Maths	Social studies	English	Science	Maths
10.00 – 10.40	Maths	English	Religion	Sinhala	Sinhala
10.40 – 11.00	Science	Religion	Health & Phy. Ed.	Maths	Social studies
11.30 – 12.10	Aesthetic	Health & Phy. Ed.	Science	Maths	English
12.10 – 12.50	Social studies	Sinhala	Aesthetic	Social studies	Religion
12.50 – 13.20	English	Science	Maths	English	Science
13.20 – 13.00	Religion	Science	Maths	Health & Phy. Ed.	Aesthetic

Annexe 6.4.2

Instructions for the Group Exploration

- You will be working in three groups with one of the tables annexed
- Study the table given to your group.
- Use the word processor to create the table.
- Identify instances wherein you have done the following.
 - Defining columns and rows
 - Merging cells
 - Aligning cell entries
 - Applying Text direction
 - Formatting
- Be prepared for an innovative whole-class presentation

Annexe 6.4.3

Tables for group activity

Table 1

Time	Monday		Tuesday		Wednesday		Thursday		Friday	
	La	Le	La	Le	La	Le	La	Le	La	Le
8.00am - 8.40	A	B	C	D	A	B	C	D	A	B
8.40 – 9.20	C	D	E	F	C	D	E	F	C	D
9.20 – 10.00	E	F	A	B	E	F	B	A	F	E
10.00 – 10.40	G	H	G	H	G	H	G	H	G	H
10.40 – 11.00	I	N	T	E	R	V	A	L		
11.30 – 12.10	A	B	C	D	A	B	C	D	A	B
12.10 – 12.50	C	D	E	F	C	D	E	F	C	D
12.50 – 1.20	E	F	A	B	E	F	B	A	F	E
1.20 – 2.00	G	H	G	H	G	H	G	H	G	H

Table 2

PALITHA		WIMAL		KAMAL		SUNIL		NIMAL	
Sales Computer Items				Sales Software CDs					
Hard Disks		Floppy Disks		Processors		Motherboards		<div>Autocad 14</div> <div>Visual Basic .Net</div> <div>Photoshop cs 9</div> <div>Corel<div>Ver 11</div><div>Ver 12</div></div> <div>Macromedia</div> <div>Flash</div> <div>MS Offices</div>	

Table 3

Package1		Package2		Package3		Package4	
Monthly Rent 100/-		Monthly Rent 200/-		Monthly Rent 300/-		Monthly Rent 500/-	
	Rs		Rs		Rs		Rs
Peek Hour	13	Peek Hour	10	Peek Hour	8	Peek Hour	5
Off Peek Hour	10	Off Peek Hour	8	Off Peek Hour	6	Off Peek Hour	2
CLI	50	CLI	50	CLI	50	CLI	50
SMS	25	SMS	25	SMS	25	SMS	25
GPRS	25	GPRS	25	GPRS	25	GPRS	25
MMX	25	MMX	25	MMX	25	MMX	25
Call waiting	30	Call waiting	30	Call waiting	30	Call waiting	30
Call forwarding	15	Call forwarding	15	Call forwarding	15	Call forwarding	15

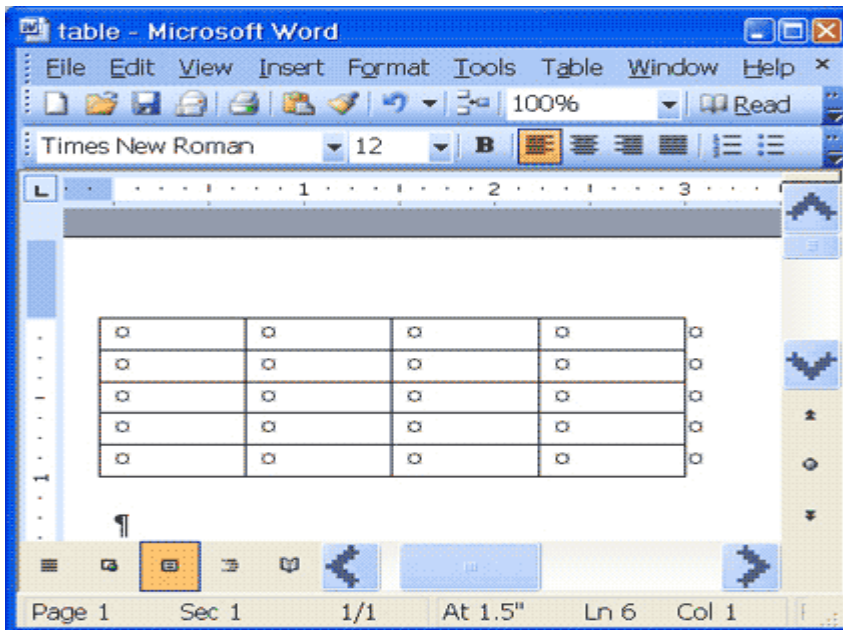
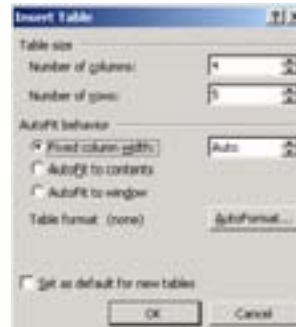
Annexe 6.4.4

Graded Directions

Creating Tables

To create a table with four-columns and five-rows:

1. Choose **Table > Insert > Table** from the menu. The Insert Table dialog box opens. →
2. Type **4** in the Number of Columns field.
3. Type **5** in the Number of Rows field.
4. Select Auto in the Column Width field. you can adjust the column width later.
5. Click OK. Your table should look like the one shown here, with four columns and five rows.

***Moving Around a Table***

Each block in a table is called a cell. Use the Tab key to move from cell to cell from left to right. Use Shift-Tab to move from cell to cell from right to left. The following exercise demonstrates.

1. Click in any of the cell in the table.

Or

2. Press the Tab key to moves forward cell and Shift + Tab to moves backward

Or

3. You can also move to a cell by clicking in the cell. In addition, you can move around the table by using the left, right, up, and down arrow keys **Note:**.

Entering Text into a Table

To enter text into a table, simply type as you normally would. Press Tab to move to the next cell. Enter the text shown below into your table.

Salesperson	Dolls	Trucks	Puzzles
Kennedy, Sally	1327	1423	1193
White, Pete	1421	3863	2934
York, George	2190	1278	1928

Adding a New Row to the End of the Table

1. Move to the last column of the last row of your table.
2. Press the Tab key.
3. Type the text shown here.

--	--	--	--

Inserting a Row Within the Table

You can add a new row anywhere in the table. The exercise that follows demonstrates. To add a row just above York, George:

1. Place the cursor where you want to insert Rows.
2. Choose *Table > Insert > Rows Above* from the menu to insert a row above to the current row.. *Rows Below* from the menu to insert a row below to the current row
3. Add the information shown here to the new row.

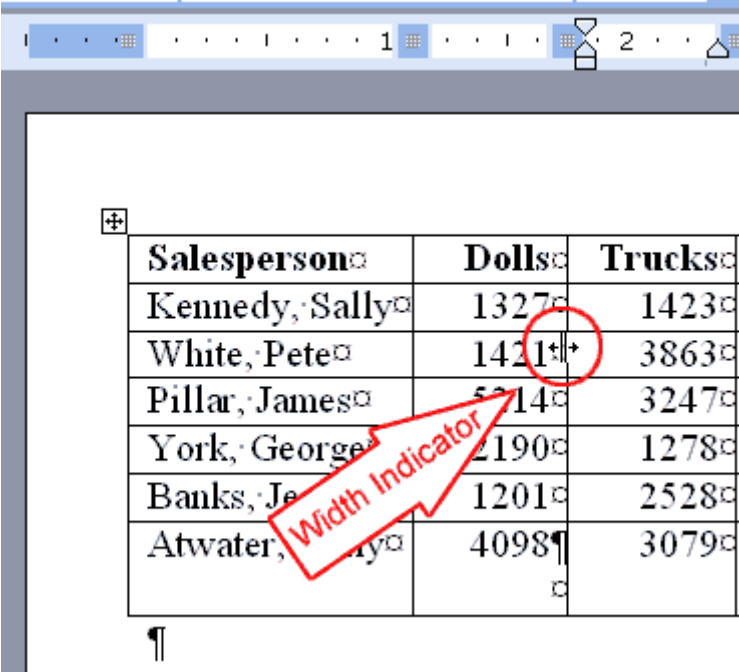
Resizing the Columns

To widen the first column:

1. Place the cursor anywhere in the first column.
2. Choose *Table > Select > Column* from the menu.
3. Choose *Table > Table Properties* from the menu.
4. Choose the Column tab.
5. Type **1.5** in the Preferred Width field.
6. Click OK.

Alternate Method -- Resizing Your Column Widths by Using the Width Indicator

By placing the cursor on the line that separates two columns. When width indicator appears click and drag towards left or right with the mouse to adjust the column width.



Salesperson	Dolls	Trucks
Kennedy, Sally	1327	1423
White, Pete	1421	3863
Pillar, James	5214	3247
York, George	2190	1278
Banks, Je	1201	2528
Atwater, ay	4098	3079

Adding a New Column to a Table

You can add new columns to your table. To add a new column between the Salesperson and Dolls columns:

1. Place the cursor anywhere in the column.
2. Choose *Table > Insert > Columns to the Left* or columns to the right from the menu.
3. Label the new column **to your requirement**.

. Deleting a Column

You can delete columns from your table. To delete the Trucks column:

1. Place your cursor anywhere in the Trucks column.
2. Choose *Table > Delete > Columns* from the menu.

Deleting a Row

You can delete rows from your table. To delete the York, George row:

1. Place your cursor anywhere in the York, George row.
2. Choose *Table > Delete > Rows* from the menu.

Note: The context menu is a useful tool. When you right-click, Microsoft Word supplies you with a list of menu choices. You can execute a command by selecting an option from the context menu.

Merge Cell

Using Microsoft Word, you can merge cells -- turn two or more cells into one cell. In this exercise, you are going to create a new row at the top of your table, merge the cells, and add a title to the table.

1. Move to the cell located on the first row of the first column of your table (the Salesperson cell).
2. Choose *Table > Insert > Rows Above* from the menu.

3. Choose *Table > Merge Cells* from the menu.
4. Type **Toy Sales** in the new cell.
5. Press Ctrl-e to center the title.

Splitting a Table

With Microsoft Word, splitting a single table into two tables is easy. To separate the table you just created into two tables:

1. Place your cursor anywhere on the row that reads "Name, Age, Sex."
2. Choose *Table > Split Table* from the menu.

Splitting Cells

Any cell can be splitted into one or more columns and rows

Competency 6 : Uses Word Processing Software To Solve Day-To-Day Problems.
Competency Level 6.6: Uses mail merge facility.

Activity 6.6 : Let's use mail merge facility.

Time : 120 minutes

Quality inputs :

- Standard letter in Annexe 6.6.1
- Three copies of address list in Annexe 6.6.2
- Three copies of group exploration instructions on mailing letters, envelopes, labels in Annexe 6.6.3
- Three copies of Graded directions in Annexe 6.6.4
- Soft copy of standard letter and address list

Step 6.6.1 :

- Distribute Annexe 6.6.1 & 6.6.2 to the class.
- Conduct a discussion about their experiences in sending copies of a letter to a number of recipients
- Conduct a discussion to highlight the following

- The original message repeated.
- Writing multiple copies of a letter manually is very laborious.
- Recipients of printed copies feel that they do matter.

(20 minutes)

Step 6.6.2 :

- Divide the class into three groups.
- Distribute copies of the soft copy of standard letter, address list and reading material to the groups.
- Involve the groups in the exploration as described in the reading material.
- Prepare them for a presentation at the plenary.

(60 minutes)

Step 6.6.3 :

- Get groups to present their findings.
- Request others to submit constructive comments.
- Conclude the activity by highlighting the following

- Merge Wizard in Microsoft Word XP is a six-step process.
- There are five document types.
 - Letters
 - Envelopes
 - Labels
 - Email messages
 - Directory
- Document type letters can be used to create multiple copies of letters.
- In letters, original message is repeated.
- Recipient's information is unique.
- Envelope size can be selected.
- Paper size and label size can be selected with respect to labels.

Criteria for assessment & evaluation:

- Describes the steps used to create letters, envelopes, labels, using mail merge.
- Accepts the need to use mail merge facility.
- Creates letters, envelopes, labels, using mail merge.
- Uses simple method to perform complicated task.
- Learns from experience.

Annexe 6.6.1

Director (Personal)
Board of investment of Sri Lanka
9th floor, West tower
World trade centre
Echelon square
Colombo 01

.....
.....
.....
.....

Dear

Interview for the post of Management Trainee

I am pleased to inform you that you have been short-listed for the above post. We intend to hold interviews on the morning of Saturday, 26 April 2005.

Your actual interview before the panel is scheduled for a.m. Please attend the interview.

Yours sincerely,

Director-Personnel

Annexe 6.6.2

Title	FirstName	LastName	Address1	Address2	City	Time
Mr	A.B.	Samanadasa	65/3, Samanala palama	Samanabedda	Sathutukele	9.00
Miss	Filishiya	Fernando	4th lane	Erambuma	Akarawita	9.30
Mr	Joseph	Gowder	No. 65/12	Longdon place	Greenwood	10.00
Miss	Thilini	Kodikara	Pleasant avenue	Gilferd crescent	Colombo	10.30
Mr	Malaka	Ranbanda	No 14A	2nd cross road	Colombo	11.15

Address List**Annexe 6.6.3****Instructions for the Group Exploration**

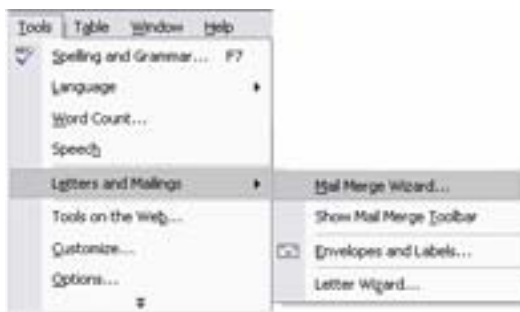
- You will be in three groups with the following three topics randomly assigned to the groups
- mailing letters,
- envelopes,
- labels
- On the basis of the document provided carry out the part assigned to you.
- Write down the important points relevant to your topic.
- Be prepared to present your findings at the plenary session.

Annexe 6.6.4

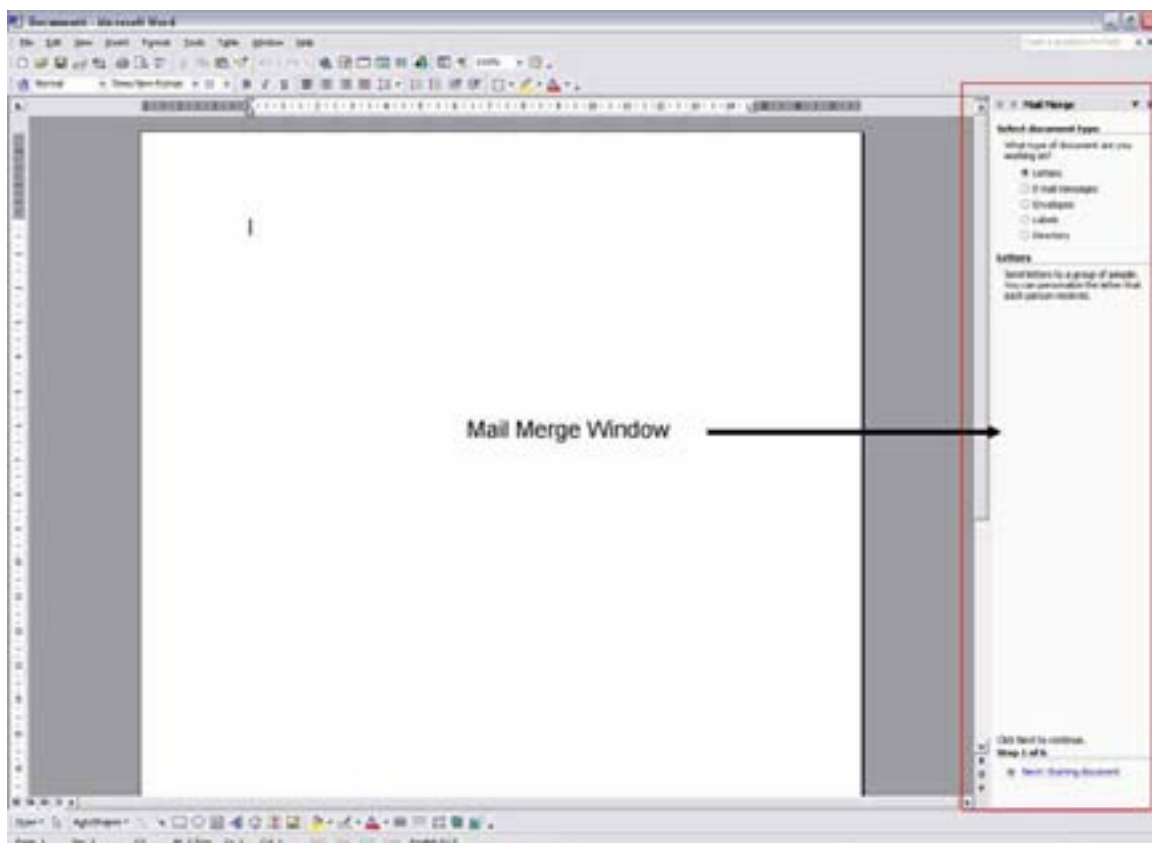
Graded direction 1- Mailing letters

The following steps illustrate how to complete a Mail Merge in your new XP environment.

- Open Microsoft Word
- Select **Letters & Mailing**
- Choose **Mail Merge Wizard**



A new window will appear on the right hand side of the document. (View Diagram Below)



How to Use the Mail Merge Wizard

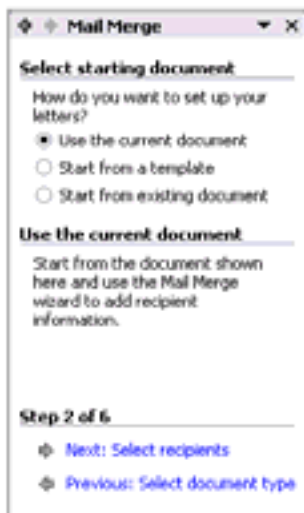
Using the Mail Merge Wizard in Microsoft Word XP is a six-step process.

Step 1 – Select Document Type

- Select **Letters**
- Click **Next: Starting Documents**

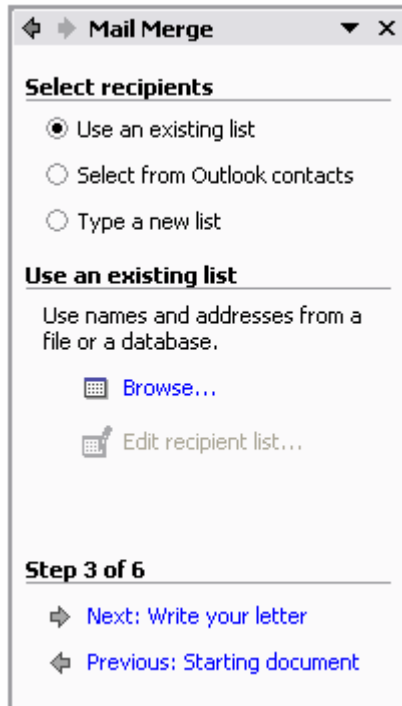


Step 2 – Selecting Starting Document



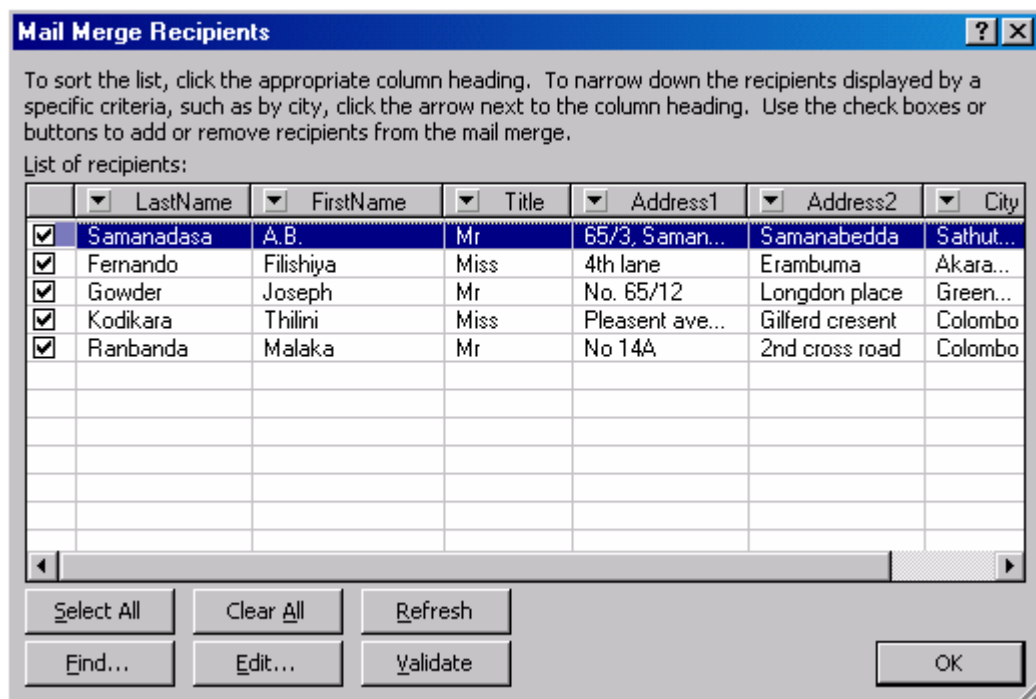
- Select **Start from existing document**
 - Click **open** and open the relevant file
- Click **Next: Select Recipients**

Step 3 – Selecting Recipients

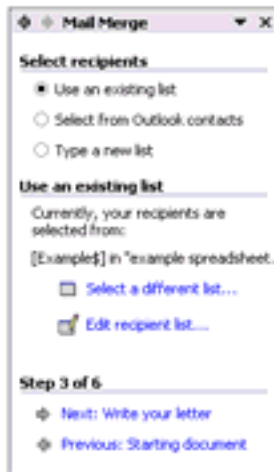


- Select **Use an Existing List**.
- Choose **Browse** and locate the relevant file.

The following window will display.

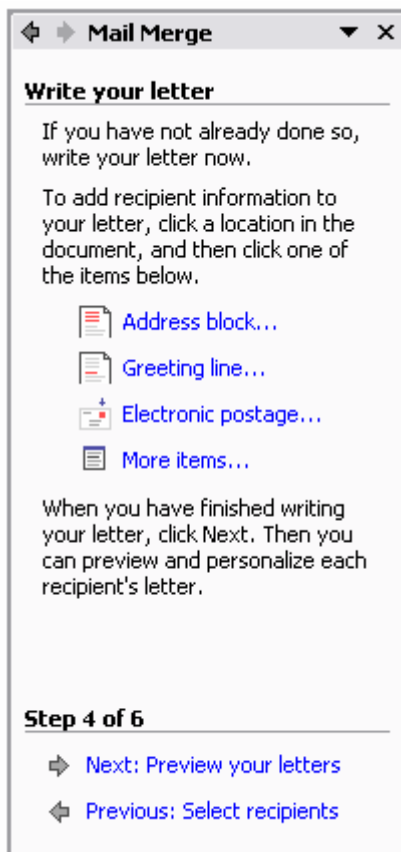


- Choose **Select All**
- Click **ok**



- Choose **Next Write Your Letter**

Step 4 - Insert your Address Data



- Place your cursor in your letter on the screen at the point where you want to place your address
- Click on **Address Block**

The Following Window will pop-up.



Select the address type

- Click **OK**

The following line will appear in your letter:

<< << Address Block >> >>

- Place your cursor in your letter on the screen at the point where you want to place your greeting
- Click on **Greeting Line**

The Following Window will pop-up



The following line should appear in your letter:

<< << Greeting Line >> >>

- Now choose **Preview your letter**.

Step 5 – Preview Your Letters

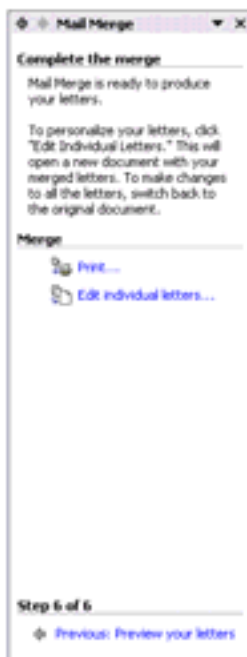
- Preview the merged pages by clicking on arrows (View Diagram below)

See your letters individually in preview mode.



Step 6 – Complete the Merge

- Click on **Next: Complete the Merge**.



To see the individual letters

- Click on **Edit individual letters**

Merge to New Document dialog box appears.

- Click **OK**

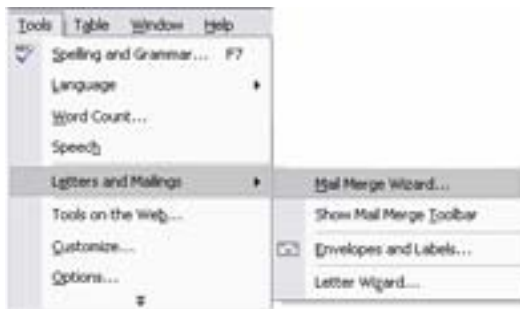


You can save all the envelopes or a range to a new document. This allows you to save the document and print at another time.

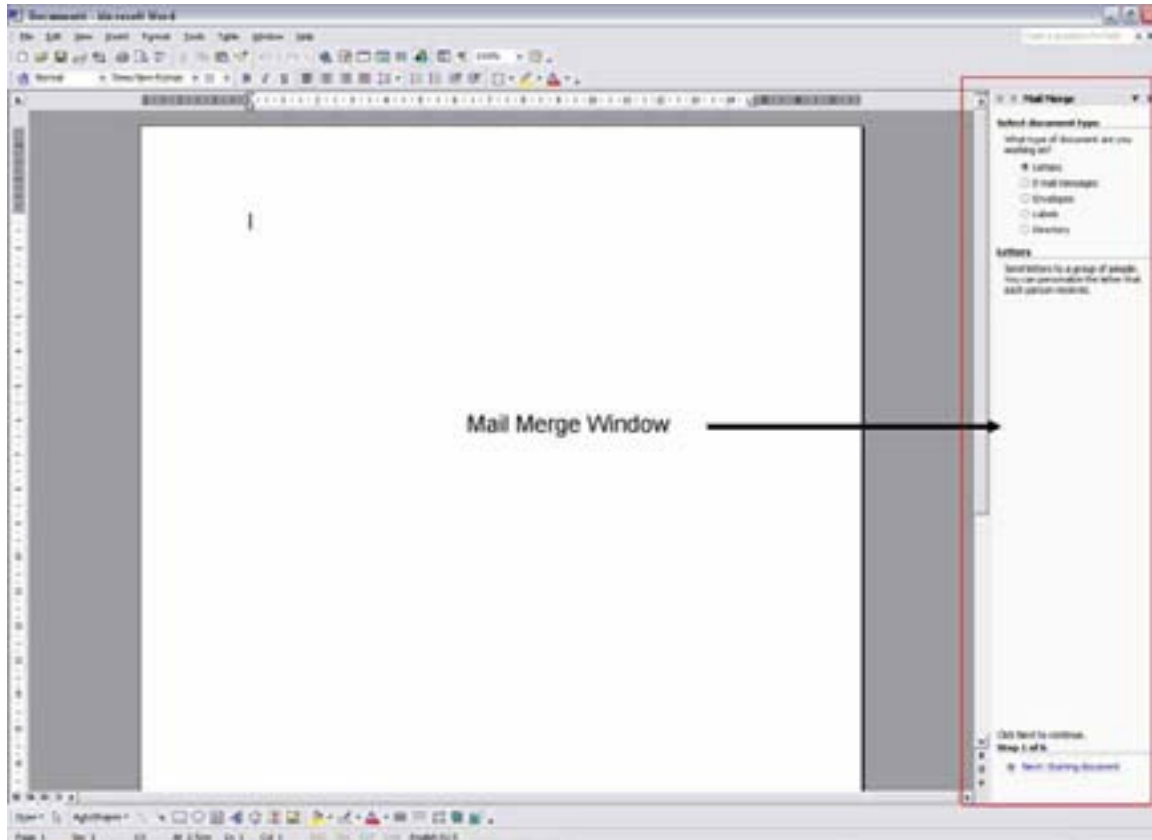
Guided direction 2- Envelopes

The following steps illustrate how to complete a Mail Merge in your new XP environment.

- Open Microsoft Word
- Select **Letters & Mailing**
- Choose **Mail Merge Wizard**



A new window will appear on the right hand side of the document. (View Diagram Below)



How to Use the Mail Merge Wizard

Using the Mail Merge Wizard in Microsoft Word XP is a six-step process.

Step 1 – Select Document Type

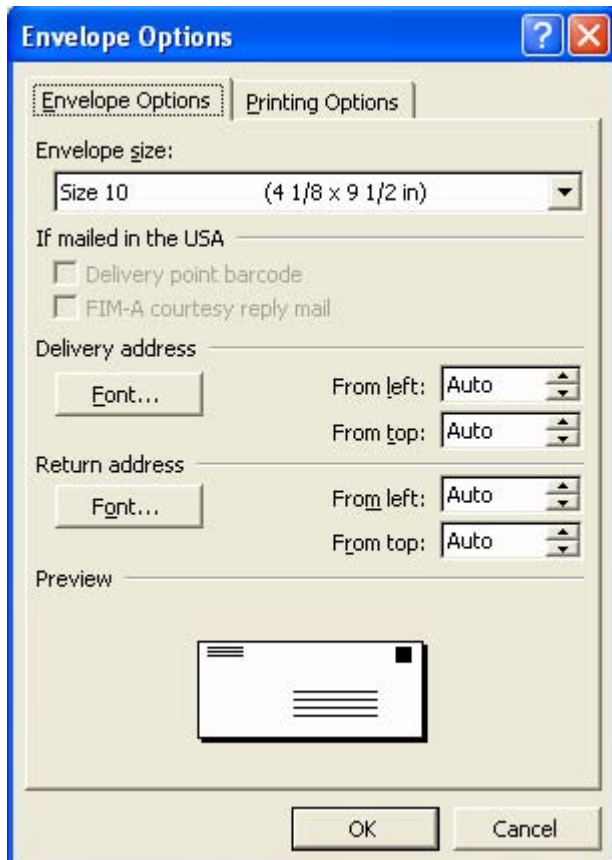
- Select **Envelopes**
- Click **Next: Starting Documents**



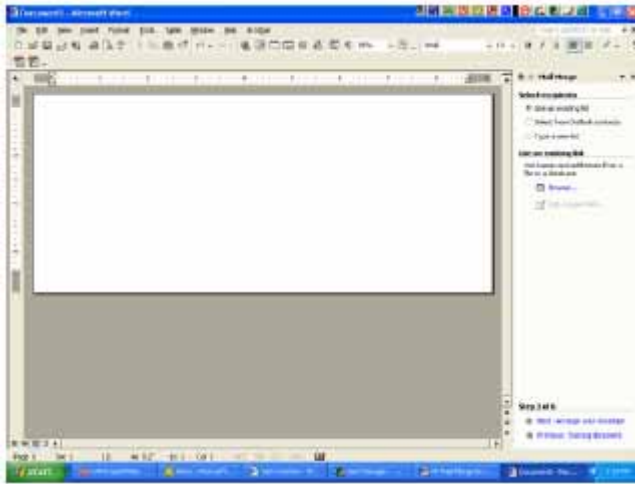
Step 2 – Selecting Starting Document

Step 2 of 6 – Starting document

- Under **Change document layout** click on *Envelope Options*
- Click in the down arrow and select the type of envelope you are using.
- Click on the Printing options tab, your default printer is listed. Select the correct feed method.
- Click **OK**.

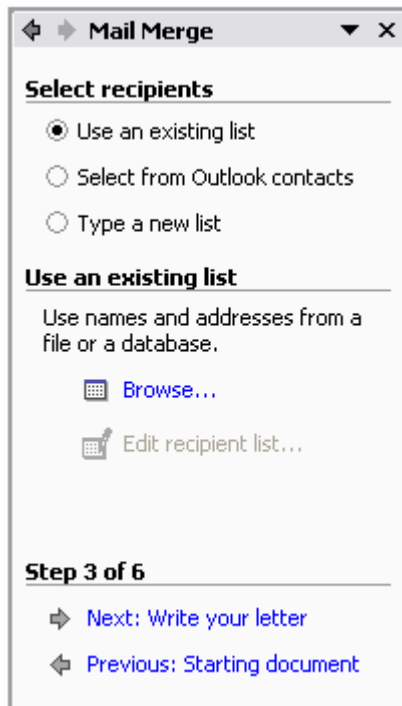


An Envelope is displayed.



- Click **Next: Select Recipients**

Step 3 – Selecting Recipients



- Select **Use an Existing List**.
- Choose **Browse** and locate the relevant file.

The following window will display.

Mail Merge Recipients

To sort the list, click the appropriate column heading. To narrow down the recipients displayed by a specific criteria, such as by city, click the arrow next to the column heading. Use the check boxes or buttons to add or remove recipients from the mail merge.

List of recipients:

	▼ LastName	▼ FirstName	▼ Title	▼ Address1	▼ Address2	▼ City
<input checked="" type="checkbox"/>	Samanadasa	A.B.	Mr	65/3, Saman...	Samanabedda	Sathut...
<input checked="" type="checkbox"/>	Fernando	Filishiya	Miss	4th lane	Erambuma	Akara...
<input checked="" type="checkbox"/>	Gowder	Joseph	Mr	No. 65/12	Longdon place	Green...
<input checked="" type="checkbox"/>	Kodikara	Thilini	Miss	Pleasant ave...	Gilferd crescent	Colombo
<input checked="" type="checkbox"/>	Ranbanda	Malaka	Mr	No 14A	2nd cross road	Colombo

- Choose **Select All**
- Click **ok**
- Click **Next: Arrange your envelope**

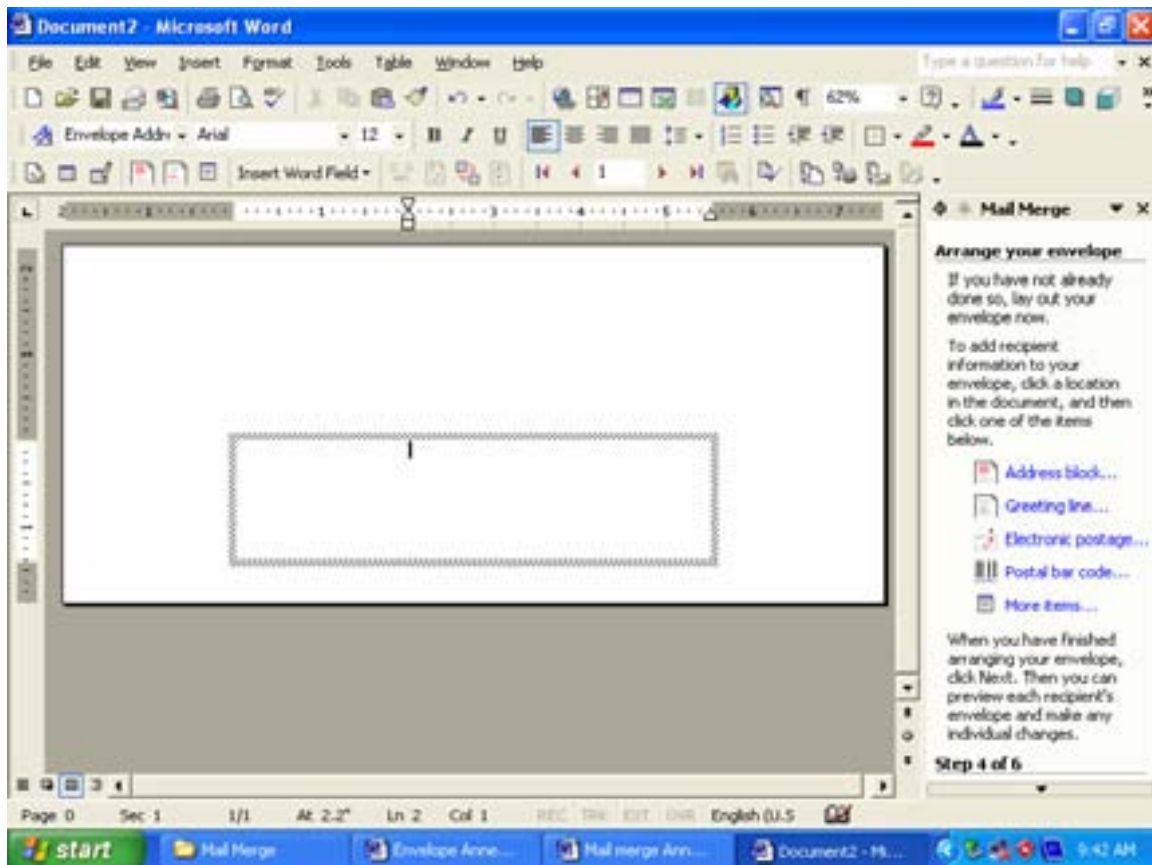
Step 4 of 6 Arrange your envelope

An envelope is displayed. If you want a return address, click in the bottom left corner of the envelope and type the address. It will appear on each envelope. If you don't want a return address, leave it blank.

- Click in the center of the envelope and a box appears

Under **Arrange your envelope** is a list of 5 items.

- Click **address block**



The Following Window will pop-up.



- Select the address type
- click **OK**

The following line will appear.

<< << Address Block >> >>



- Click **Next: Preview envelopes**

Step 5 of 6 Preview envelopes

Under **Preview your envelopes** are arrows that will take you forward and back through the envelopes.

If all looks well Click *Next: complete the merge*.

If it's not right, click *Previous: Arrange your envelope* and make corrections.

- Click **Next: Complete the merge**

Step 6 of 6 - Complete the merge

- Select **Edit individual envelopes**

Merge to New Document dialog box appears.



- Click **OK**

You can save all the envelopes or a range to a new document. This allows you to save the document and print at another time.

Guided direction 3 - Creating mailing labels

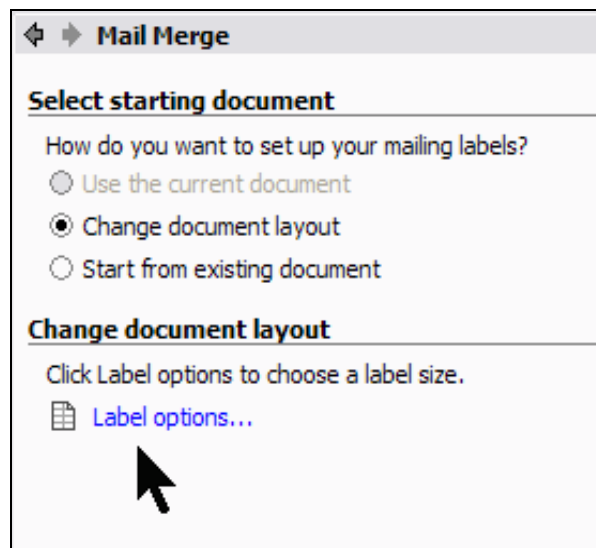
Open Microsoft Word and start a new document.

- Click **Tools / Letters and Mailings / Mail Merge Wizard**.
- The Mail Merge Wizard will open in the task pane on the right hand side of your screen. To use this wizard you will need to complete each step and then click on the next step at the bottom.



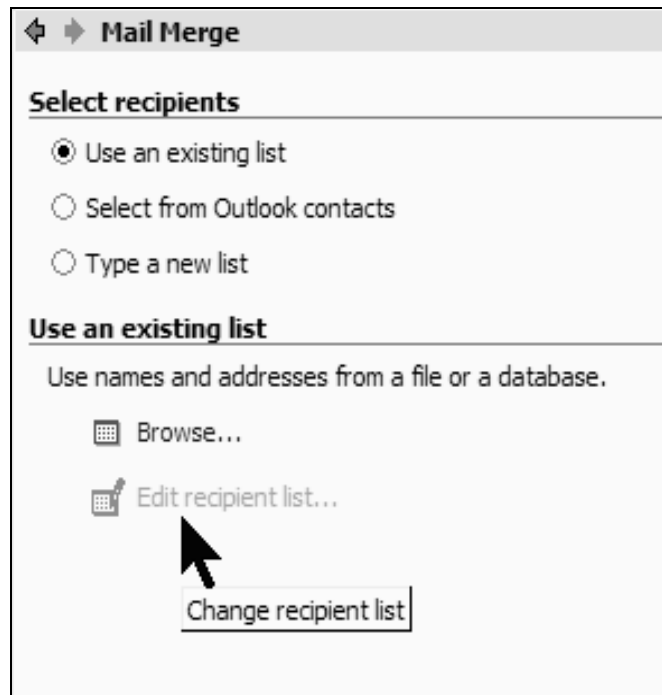
The screenshot shows the 'Mail Merge' task pane. Under the heading 'Select document type', it asks 'What type of document are you working on?'. There are five radio button options: 'Letters', 'E-mail messages', 'Envelopes', 'Labels' (which is selected), and 'Directory'. Below this, under the heading 'Labels', it says 'Print address labels for a group mailing.'

- First choose **Labels** as your document type.
- Click on **Next: Starting document**.
- Choose **Change document layout** and then click on **Label options**.



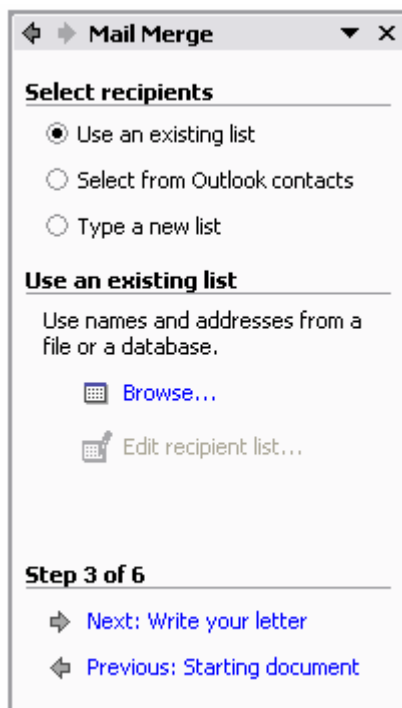
The screenshot shows the 'Mail Merge' task pane at the 'Select starting document' step. It asks 'How do you want to set up your mailing labels?'. There are three radio button options: 'Use the current document', 'Change document layout' (which is selected), and 'Start from existing document'. Below this, under the heading 'Change document layout', it says 'Click Label options to choose a label size.' and there is a button labeled 'Label options...' with a mouse cursor pointing at it.

- A **Label Options** dialog box is displayed. Under **Label products** choose the **Avery A4 and A5 size**
- **Click OK**
- Click on **Next: Select recipients**.

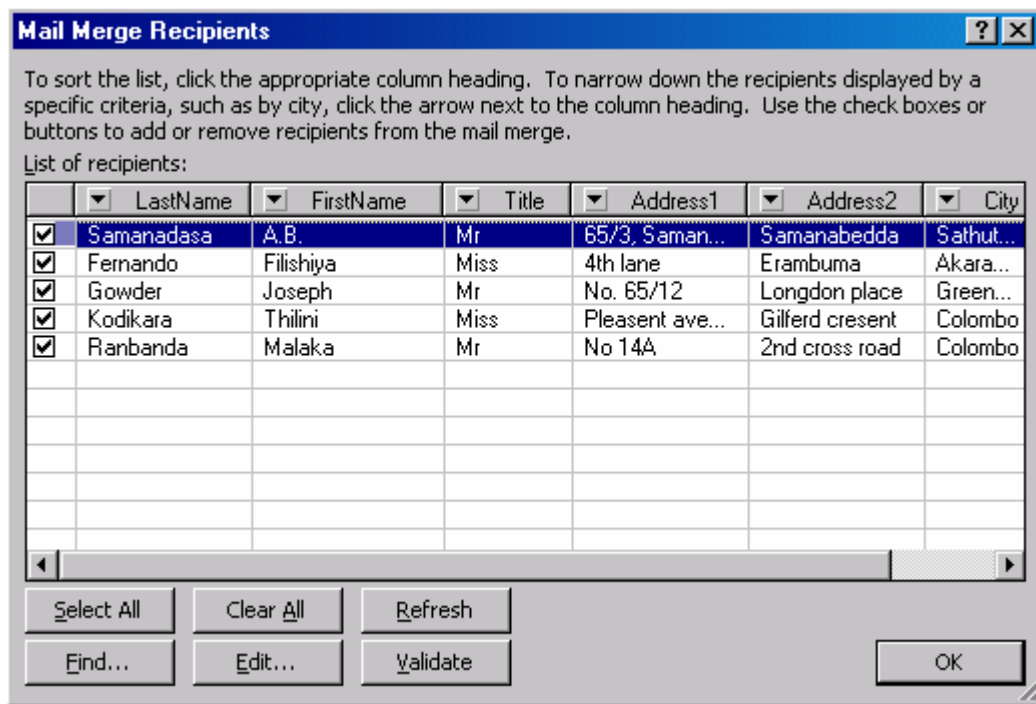


For this task choose to **Use an existing list**.

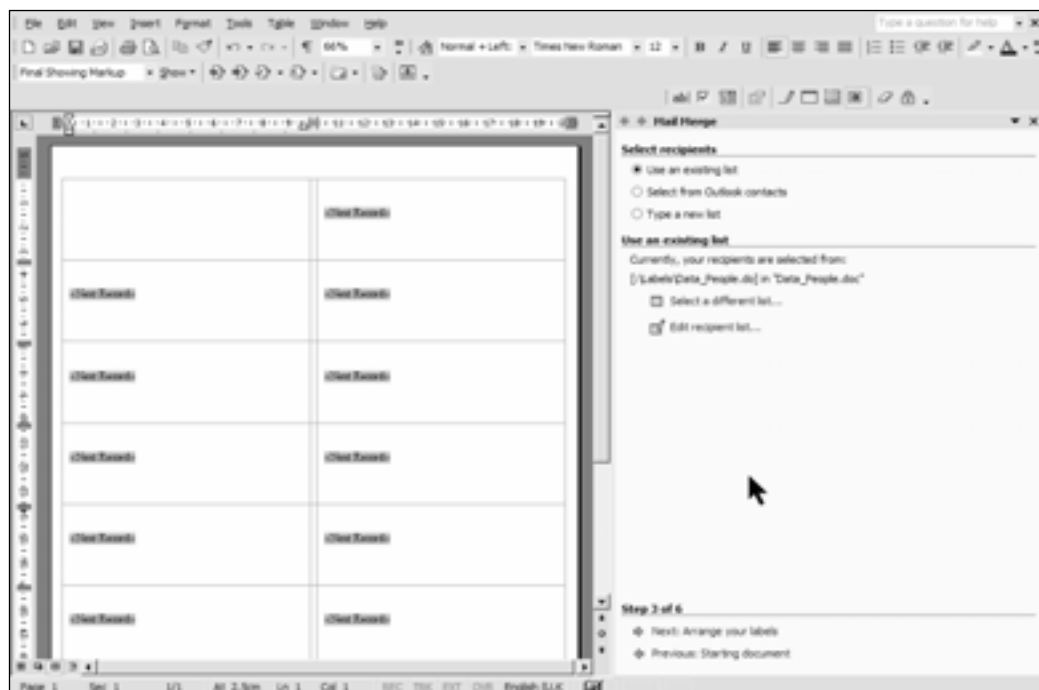
- Choose **Browse** and locate the relevant file :



The following window will display.

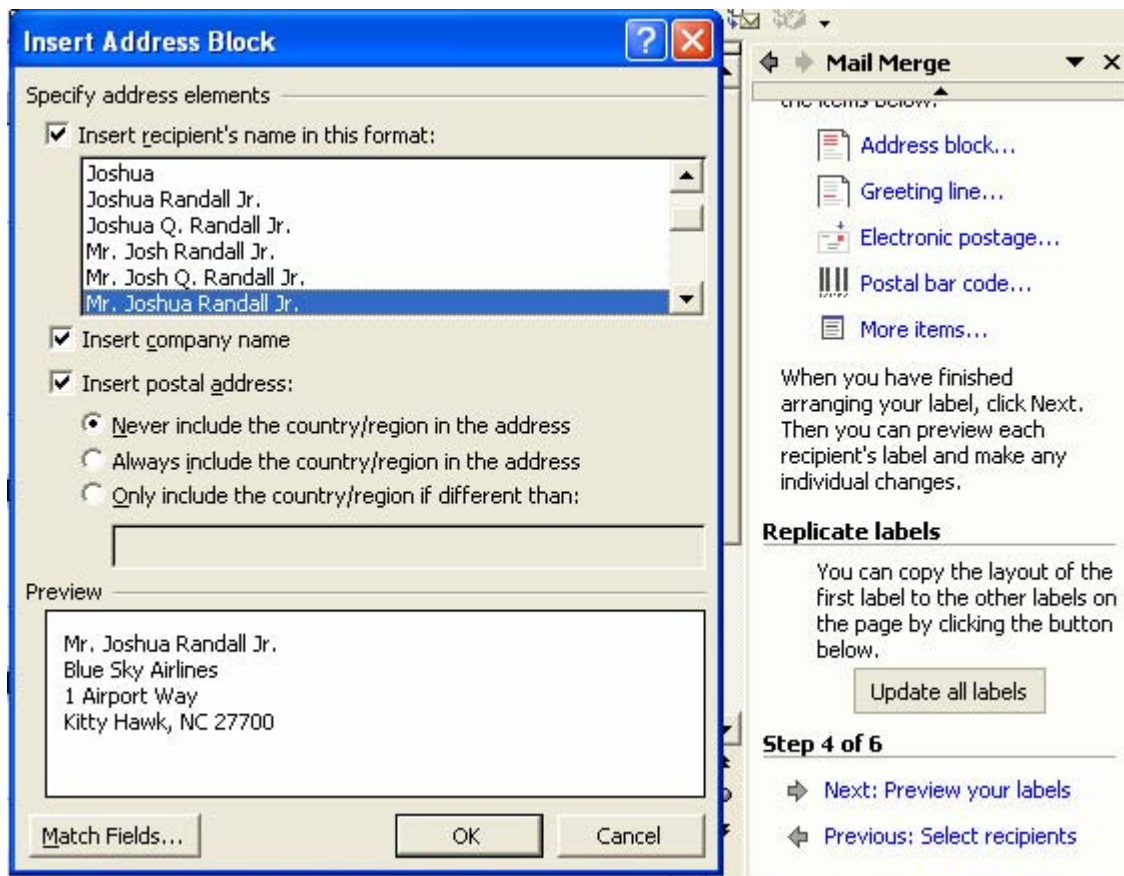


- Choose **Select All**
- Click **ok**



- Click on **Next: Arrange your labels.**

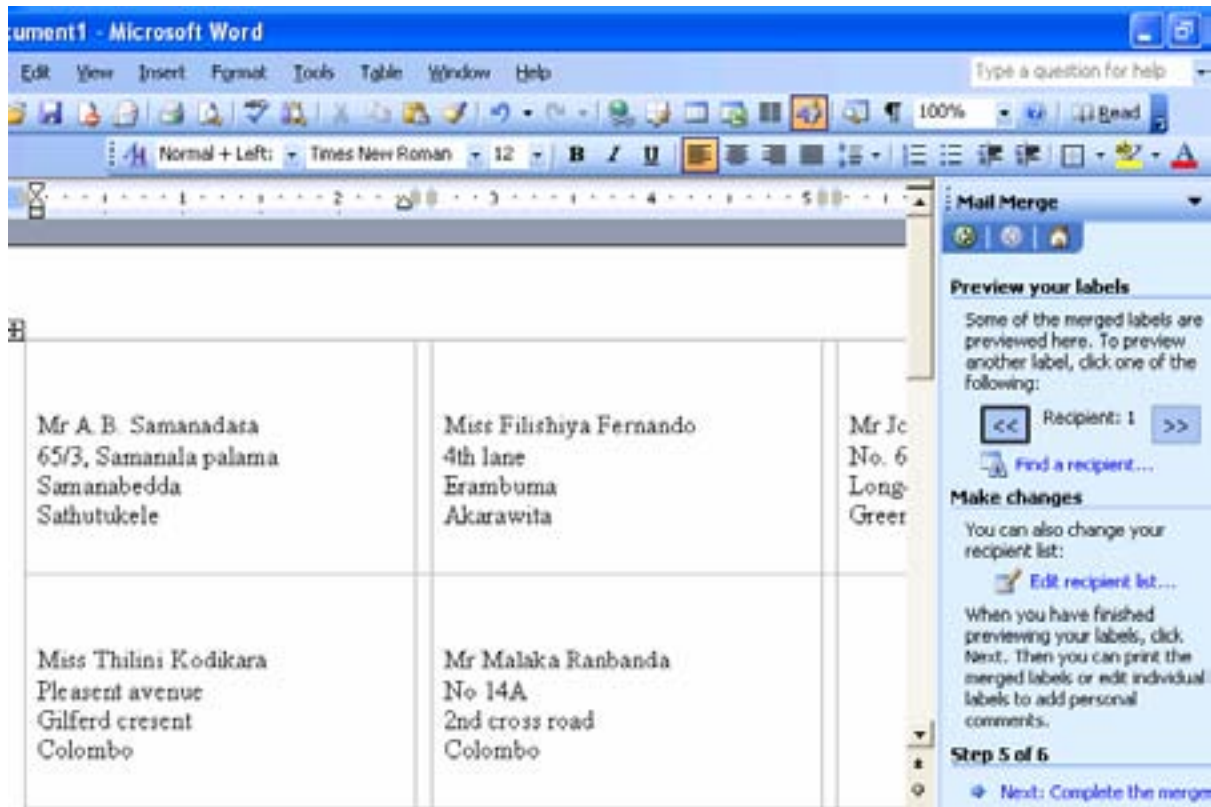
To add recipient information to your label, click a location in the first label, and click the address block.



- Select the address type and click **OK**

You can copy the layout of the first label to the other labels on the page by clicking the button **Update all labels**

- Click Update all labels
- Click on **Next: Preview your labels**.
- You can now see your merged labels as below:



- Click on **Next: Complete the merge.**



- Edit individual labels** will allow you to choose some or all of your labels to create a new document where you can edit individual labels if you need to. This new document is no longer a mail merge document. It contains only the labels and the address text and can be edited like a normal Word document.

Competency 7 : Uses Spreadsheet to solve simple statistical problems.

Competency 7.1: Explores a Spreadsheet to identify its basic features and functions.

Activity 7.1 : Let's explore a spreadsheet application package.

Time : 90 minutes.

Quality inputs :

- Six copies of labeled diagram of starting window of spreadsheet in Annexe 7.1.1.
- A poster containing the definition of a “spreadsheet” in Annexe 7.1.2.

Learning-Teaching process:

Step 7.1.1 :

- Get the class to denote their expenses of a particular week on a table.
- Conduct a discussion to highlight the following.

- A table with rows and columns provides a suitable means for presenting data.
- The two variables – days of the week and expenses – of the exercise given can be represented on rows and columns.
- Cells resulting from the intersection of rows and columns provide places for data entry.
- Incorporation of data pertaining to variables separately in a table facilitates understanding of data when compared to a paragraph.
- It is also easier to manipulate data presented in a table.

(30 minutes)

Step 7.1.2 :

- Divide the class into six groups.
- Distribute copies of the labeled diagram to the groups.
- Assign the 18 features equally to the groups.
- Get groups study the features.
- Help groups to start the spreadsheet package and study the features on the screen as well.
- Prepare groups for a presentation.

(30 minutes)

- Step 7.1.3** :
- Get each group to present its findings.
 - Expose them to the poster containing the definition of spreadsheet
 - Lead a discussion to highlight the following.

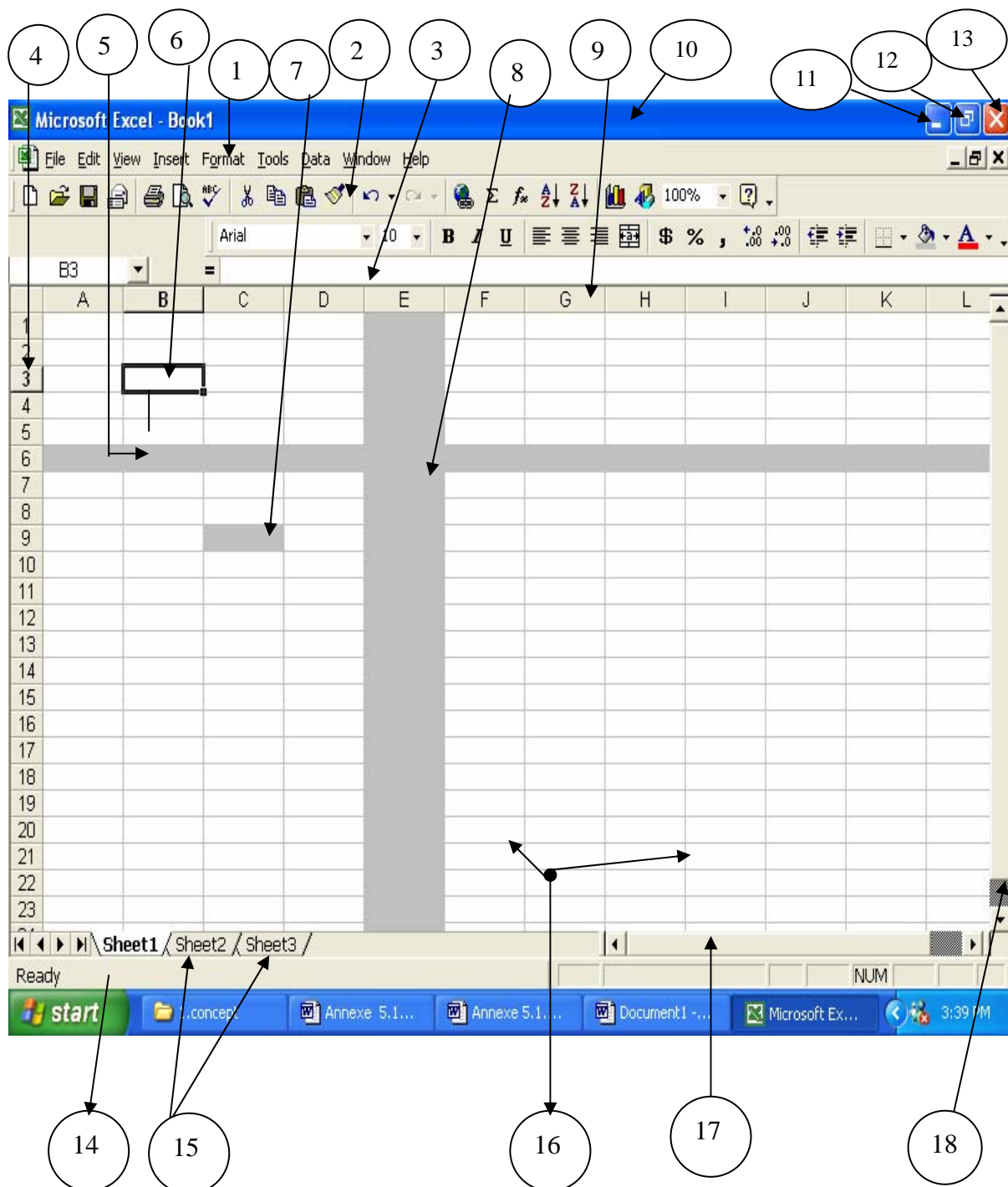
- A spreadsheet package is opened through a standard procedure.
- The 18 items studied represent the basics features of the starting window of the application.
- Familiarity with these features helps users to access the package to meet their needs.

(30 minutes)

Criteria for assessment and evaluation

- Describes the basic features of a spreadsheet.
- Accepts the value of being familiar with the starting window of a spreadsheet application to be a successful user.
- Adopts the standard procedure to gain access to an application package.
- Uses observations to confirm learning experiences gained through reading.
- Learns from peers.

Annexe 7.1.1



1. Menu
2. Toolbars
3. Formula bar
4. Row Number
5. Row
6. Active Cell
7. Cell
8. Column
9. Column Letter
10. Title Bar
11. Minimize
Button
12. Maximize
Button
13. Close Button
14. Status Bar
15. Work Sheet
Tabs
16. Grid Lines
17. Horizontal
Scroll bar
18. Vertical Scroll
Bar

Poster**What is a spreadsheet?**

In the realm of accounting jargon a "spread sheet" or spreadsheet was and is a large sheet of paper with columns and rows that organizes data about transactions for a businessperson to examine. It spreads or shows all of the costs, income, taxes, and other related data on a single sheet of paper for a manager to examine when making a decision.

An electronic spreadsheet organizes information into software-defined columns and rows. The data can then be "added up" by a formula to give a total or sum. The spreadsheet program summarizes information from many paper sources in one place and presents the information in a format to help a decision maker see the financial "big picture" of the company.

Competency 7 : Uses Spreadsheet to solve simple statistical problems.

Competency Level 7.2: Moves around the worksheet to gain hands on experience of data entry.

Activity 7.2 : Let's manipulate the worksheet.

Time : 60 Minutes

Quality inputs :

- The table displayed on computer screens in Annexe 7.2.1.
- Three copies of Graded directions to guide the user in Annexe 7.2.2.

Learning – Teaching Process:

Step 7.2.1 :

- Expose the table to the class.
- Get students to state the difficulties of following these instructions manually.
- Conduct a discussion to highlight the following.

- A spreadsheet provides the following editing facilities on the original itself.
 - Inserting and deleting of rows and columns.
 - Cutting and pasting data in the cells.
- When compared to manual methods of doing these, the spreadsheet saves time and effort, and removes the need for rechecking.

(15 minutes)

Step 7.2.2 :

- Divide the class into three groups.
- Distribute copies of graded directions to students.
- Ask students to go through the directions and change the table given according to instructions.
- Prepare them for a presentation on the experiences.

(30 minutes)

Step 7.2.3 :

- Get groups to present their experiences.
- Lead a discussion to highlight the following.

- A worksheet consists of 65536 rows and 256 columns.
- A cell constitutes the smallest element of a spreadsheet.
- Each cell has a unique address that refers to columns and rows.
- The cells are the data containers of the worksheet.
- Placing the cell pointer where manipulation is needed helps track changes made to data.

(15 minutes)

Criteria for assessment and evaluation

- Describes editing facilities made available by spreadsheet package.
- Accepts the value of spreadsheet as a time saving device, application and user types.
- Manipulates a worksheet according to instructions.
- Learns through hands on experiences.
- Learns from the experiences of others.

Manipulate worksheet.

Make following table.

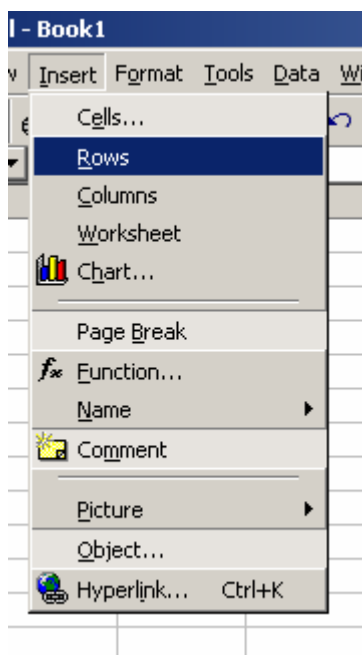
	Name	English	Mathamatics	science
	Saman Perera	55	85	62
	Nimal Rathnayake	48	55	25
	kamala Perea.	56	84	31
	Nimali Pieris	55	71	60

- Insert two rows above Saman Perera and add two names and give the marks.
- Insert a column between English and Mathamatics for Religion and give marks.
- Cut all data of Saman Perera and paste them below Nimali Pieris.
- Delete the empty row.
- Adjust cells according to the length of student names and the subject names.

Graded directions

1. Insert Columns and Rows

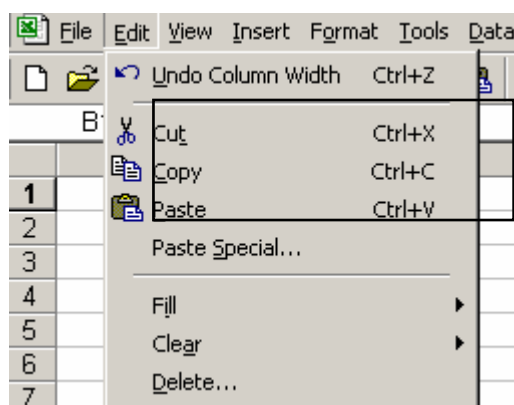
- Place the cell pointer where you need to insert a column.



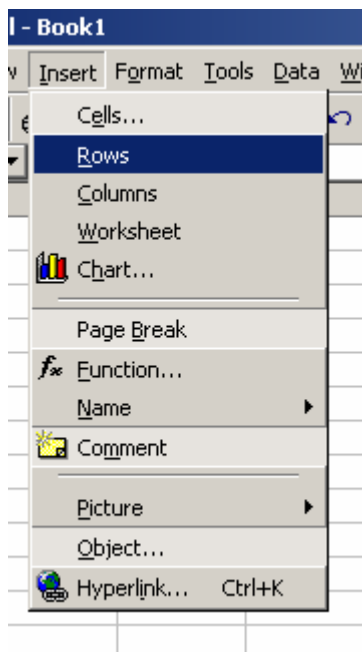
2. Cut, Copy and paste

Columns and rows.

The row or the column
Must be selected.



- Place the cell pointer where you need to insert a row.



Competency 7 : Uses Spreadsheet to solve simple statistical problems.

Competency Level 7.3: Performs basic mathematical operations

Activity 7.3 : Let's do some mathematical operations on worksheet.

Time : 60 Minutes

Quality Inputs :

- A document containing numbers, texts and basic mathematical operations in Annexe 7.3.1.
- Four copies of graded directions and exercises in Annexe 7.3.2.

Learning-Teaching Process:

Step 7.3.1 :

- Distribute document containing numbers, texts and basic mathematical operations
- Request participants to enter numbers and texts in worksheet.
- Ask them to press enter key after each entry.
- Lead a discussion to highlight the following.

- The enter key should be pressed after typing in the cell.
- Spreadsheet accepts data of three types.
- Generally numbers are right aligned in a cell.
- Generally texts are left aligned in a cell.
- Calculations can be done using mathematical expressions called formulae.

(15 minutes)

Step 7.3.2 :

- Divide the class into four groups.
- Distribute copies of graded directions and exercises.
- Ask each group to carry out one of four exercises.
- Ask them to check the formula bar.
- Prepare them to present their ideas about their new experience

(30 minutes)

- Step 7.3.3** :
- Get each group to present its findings.
 - Lead a discussion to emphasize the following.

- A formula should begin with the equals sign.
- The result will be displayed in the same cell in which the formulae entered.
- The formula of the selected result will be displayed on the formula bar.
- The spreadsheet application follows the hierarchy of order of mathematical operations.

(15 minutes)

Criteria for assessment and evaluation

- Names three data types in a cell.
- Accepts that basic mathematical operation can be performed in an electronic spreadsheet.
- Demonstrate skills in the use of mathematical calculations in a spreadsheet.
- Works cooperatively with group.
- Learns from the experiences of others.

Annexe 7.3.1

Numbers, texts and basic mathematical operations.

Numbers are aligned rightwards in a cell.

C	D	E
	NUMBERS	
	1	
	12	
	123	
	1234	
	12345	
	123456	
	1234567	
	12345678	
	1234567890	

1. Go to highlighted cells and observe the status of each cell on the formula bar.
2. Note important features about information in the cell

Texts are aligned leftwards in a cell.

C	D	E
	TEXTS	
	a	
	ab	
	abc	
	abcd	
	abcde	
	abcdef	
	abcdefg	
	abcdefgh	
	abcgeefghi	

Formulas

Formulas calculate values in a specific order. A formula in Microsoft Excel always begins with an equal sign (=). The equal sign tells Excel that the succeeding characters constitute a formula. Following the equal sign are the elements to be calculated (the operands), which are separated by calculation operators. Excel calculates the formula from left to right, according to a specific order for each operator in the formula. You can change the order of operations by using parentheses.

Calculation operators in formulas

Operators specify the type of calculation that you want to perform on the elements of a formula. Microsoft Excel includes four different types of calculation operators: arithmetic, comparison, text, and reference.

Arithmetic operators

To perform basic mathematical operations such as addition, subtraction, or multiplication; combine numbers; and produce numeric results, use the following arithmetic operators.

Arithmetic operator	Meaning	Example
+ (Plus sign)	Addition	3+3
– (Minus sign)	Subtraction Negation	3–1 –1
* (Asterisk)	Multiplication	3*3
/ (Forward slash)	Division	3/3

Graded Directions

Click the cell pointer where you want to get the answer and do following exercises.
Observe the formula bar when you do them.

Exercise 1

- a) $=5 + 4$
- b) $=3 + (5 - 2) * 2$
- c) $=(4 - 2) / 2 + 3$
- d)

Exercise 2

- a) $=2 + 6$
- b) $=3 + 5 - 2 * 2$
- c) $=4 - 2 / 2 + 3$

Exercise 3

- a) $=2 + 3 * (2(4 - 3))$
- b) $=4 * 3 * (5 - 2)$
- c) $=1 + 2 * (6 - 2) / 2$

Exercise 4

- a) $=2 + 3 * 4 - 3$
- b) $=4 * 3 * 5 - 2$
- c) $=12 * 6 - 2 / 2$

Competency 7 : Uses Spreadsheet to solve simple statistical problems.

Competency Level 7.4: Uses inbuilt functions for calculations

Activity 7.4 : Let's do some mathematical operations.

Time : 60 Minutes

Quality inputs :

- Four copies of work sheet in Annexe 7.4.1.
- Four copies of graded directions to guide user in Annexe 7.4.2.

Learning-Teaching process:

Step 7.4.1 :

- Distribute copies of Work sheet.
- Ask students to do as many activities as possible.
- Conduct a discussion to highlight the following.

- Some mathematical operations on worksheet are more effective than human manual calculations.
- Therefore there must be predefined functions or formulas.
- Some mathematical operations can be defend according to the purpose

(30 minutes)

Step 7.4.2 :

- Divide the class into four groups.
- Distribute copies of Graded directions.
- Assign the tasks and involve groups in the work.
- Prepare groups for a whole class presentations.

(15 minutes)

Step 7.4.3. :

- Ask the students to present their findings to the class.
- Lead a discussion to highlight the following.

- There are predefined formulas in spreadsheet application.
- It is very easy to perform mathematical operations using predefined formulas.

(15 minutes)

Criteria for assessment and evaluation.

- Uses predefined functions to do mathematical operations.
- Accepts the need of formulas to do mathematical operations.
- Demonstrate skill of selecting formulas to suit application.
- Makes concise presentations
- Justifies one's own answers.

Worksheet

Give solutions for the following.

Group 1

1. Find the total sum.

10
250
9999
481
1966
20
50856
456
250368
5698

Total

Group 2

2. Find the average number of above.

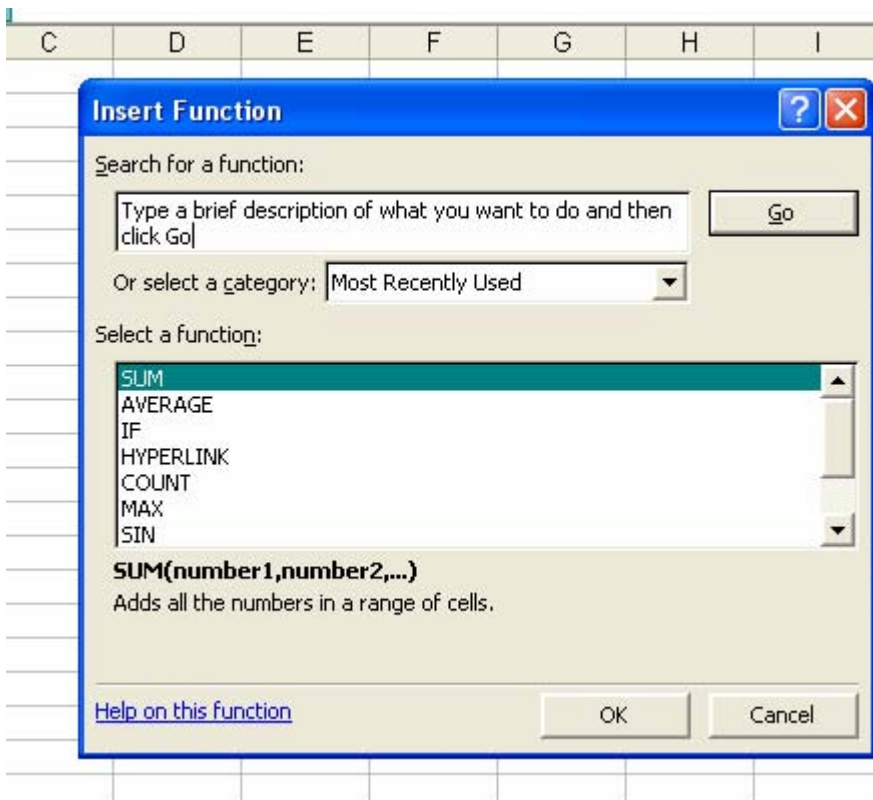
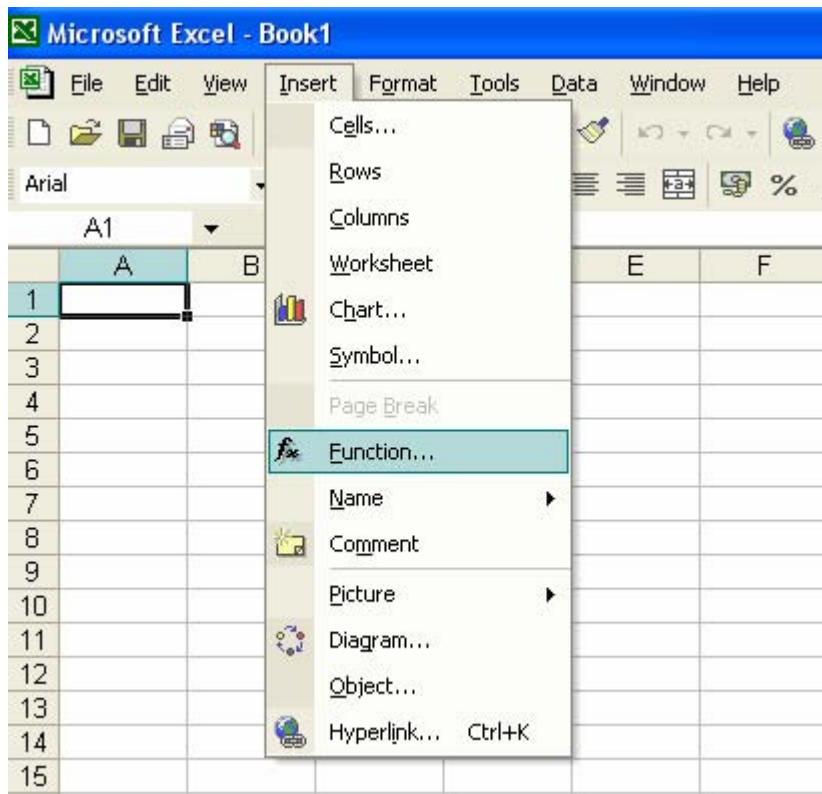
Group 3

3. Find the minimum number.

Group 4

4. Find the maximum number.

Predefined functions.



Competency 7 : Uses Spreadsheet to solve simple statistical problems.

Competency Level 7.5: Formats a worksheet

Activity 7.5 : Let's format the worksheet using formatting toolbar.

Time : 90 minutes

Quality inputs :

- Four copies of completed table in Annexe 7.5.1.
- Four copies of labeled diagram of formatting tool bar and directions in Annexe 7.5.2.

Learning – Teaching process:

Step 7.5.1. :

- Request the class to note their expenses for a particular week on a table
- Ask them to draw it attractively using colours and different sizes of letters.
- Lead discussion to highlight the following.

- It is important to make a table attractive to the reader.
- The table can be made attractive by formatting same.

(30 minutes)

Step 7.5.2 :

- Divide the whole class into four groups.
- Provide each group with copies of Labeled diagram and completed table.
- Get students to familiarize themselves with the formatting bar and the directions.
- Ask them to create a table as the completed table.

(30 minutes)

Step 7.5.3 :

- Request each group to present ideas about their new experiences.
- Conduct discussion to highlight the following.

- Font styles can be changed in spreadsheet application.
- Font size can be changed in spreadsheet application.
- Justifications are possible.
- Numbers can be formatted.
- Decimal and indent can be increased or decreased.
- Table border can be applied.

(30 minutes)

Criteria for assessment and evaluation

- Makes a complete table according to requirements.
- Accepts need to format worksheet to match the nature and requirements of the user.
- Demonstrate skills of formatting worksheets
- Makes concise presentations.
- Learns from peers.

Formatting

Examine the following table.

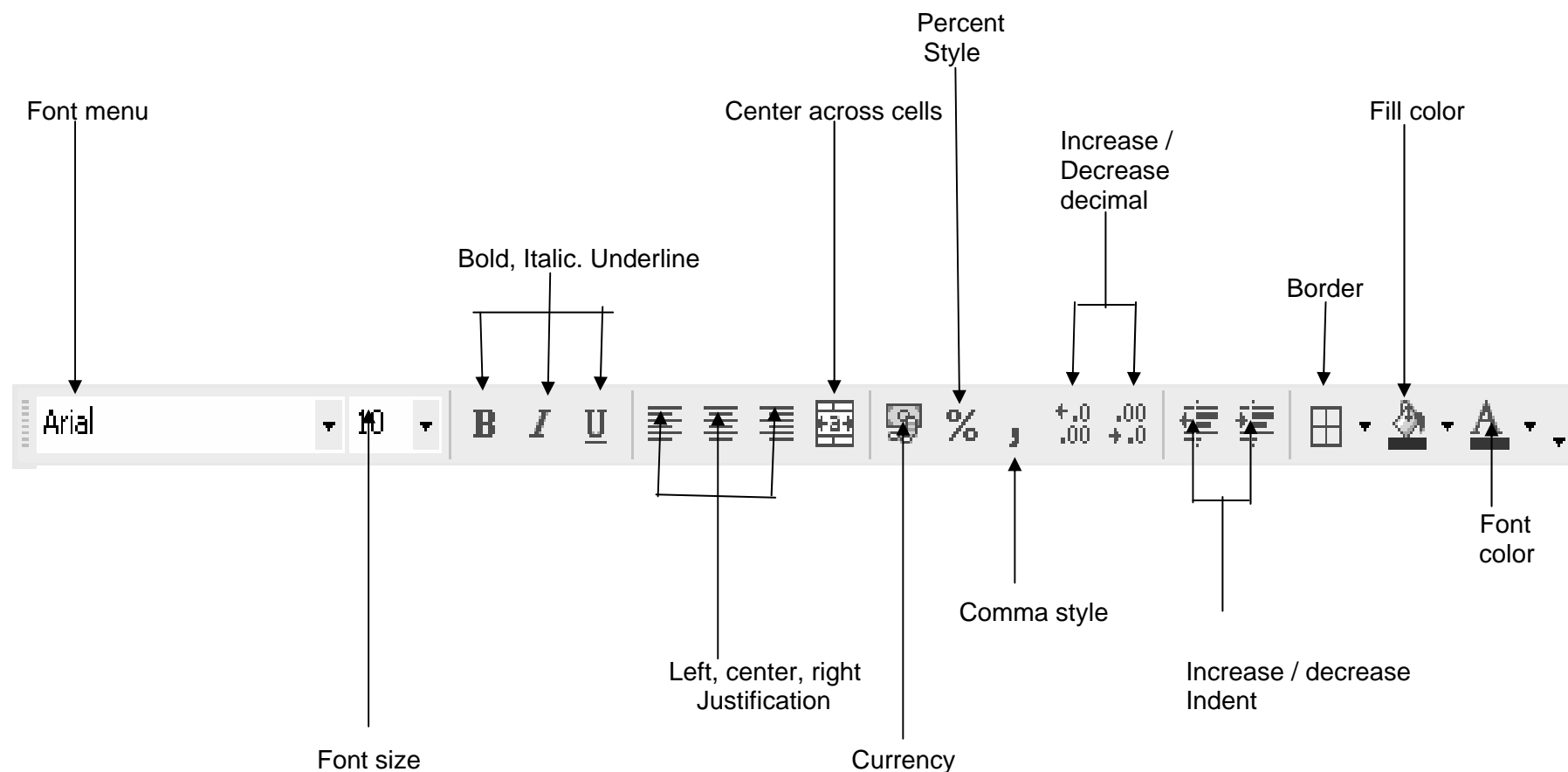
	A	B	C	D	E
1	Unit Number.	Vishaka Company Ltd.			
2		<i>Stock File</i>			
3					
4		<i>Item</i>	<i>Unit</i>	<i>Cost Price</i>	<i>Profit Margin</i>
5		222 Rice	Kg	Rs: 45.50	20.00%
6	333	Sugar	Kg	Rs: 42.23	23.20%
7	894	Salt	Kg	Rs: 10.50	10.00%
8	456	Coconut Oil	Li	Rs: 50.20	25.36%
9	745	Fish	Kg	Rs: 250.60	25.00%
10					

Then create this table according to the guidance in the Annexure 2.

Formatting cells.

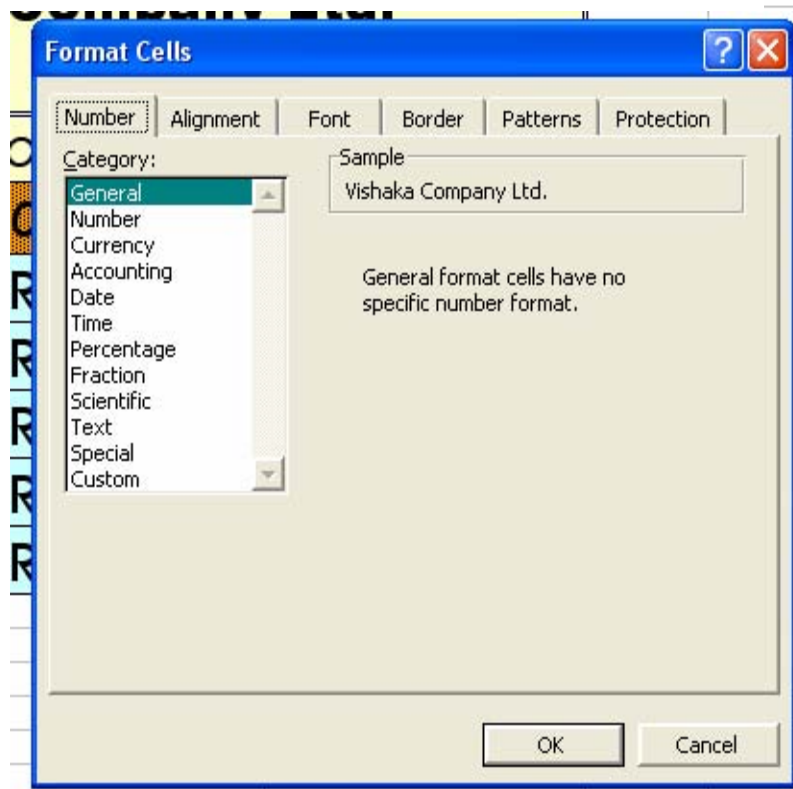
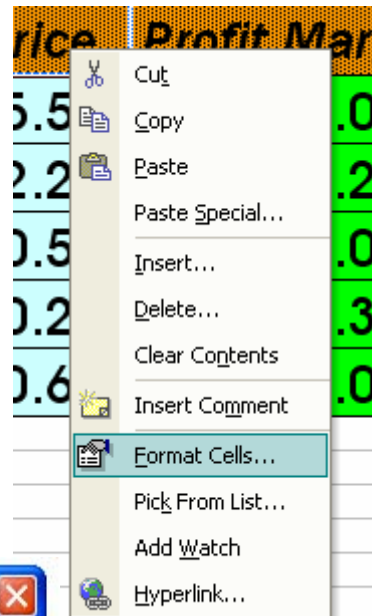
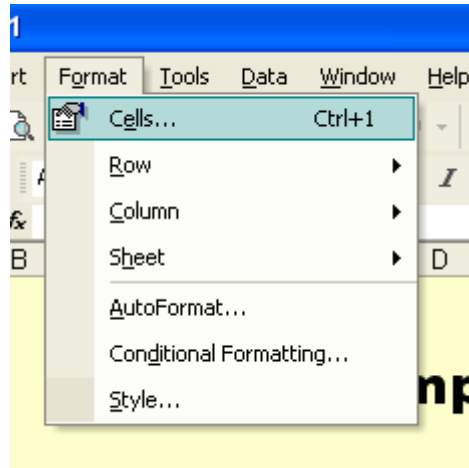
Formatting Toolbar

The content of a highlighted cell can be formatted in many ways. Font and cell attributes can be added from shortcut buttons on the formatting bar. If this tool bar is not already visible on the screen, select View → **Toolbar** → **Formatting** from the menu bar.



Format Cells dialogue box

Right click on the highlighted cells and choose **Format Cells** from the short cut menu or select **Format** → **Cells** from the menu bar.



- Number tab** : The data type can be selected from the options on this tab.
- Alignment tab** : These options allow you to change the position and alignment of the data with the cell.
- Font tab** : All the font attributes are displayed in this tab including font face, size, style, and effects.
- Border and pattern tabs:** These tabs allow you to add borders, shading a background colors to a cell.

Competency 7 : Uses Spreadsheet to solve simple statistical problems.

Competency Level 7.6: Recognizes relative versus absolute cell references.

Activity 7.6 : Let's do some calculations using relative cell reference and absolute cell reference.

Time : 90 Minutes

Quality inputs :

- Four copies of worksheet containing exercises in Annexe 7.6.1.
- A work sheet with graded directions in Annexe 7.6.2.

Learning – Teaching process:

Step 7.6.1 :

- Distribute copies of worksheet containing exercises.
- Ask students to do exercises manually.
- Conduct a discussion to highlight the following.

- Manual calculation takes much time.
- Manual calculation is sometimes difficult.

(30 minutes)

Step 7.6.2 :

- Divide the whole class into four groups.
- Distribute copies of the work sheet.
- Ask the students to do the activities described.
- Request students to check the formula bar after each calculation.

(30 minutes)

Step 7.6.3. :

- Let each group present its findings to the class.
- Conduct discussion to highlight the following.

- Formulae can be copied using relative cell references.
- When we want to retain a permanent cell in a formula, the Absolute call reference is used.

(30 minutes)

Criteria for assessment and evaluation.

- Identifies difference between Relative and Absolute cell reference.
- Accepts the value of Relative and Absolute cell reference to suit the application and user types.
- Demonstrate ability to use Relative and Absolute cell reference
- Justifies one's answers.
- Learns from peers.

Annexe 7.6.1

Do following activities.

1. Find the total marks of the following students.

Name	English	Science	Maths	IT	Religion	Total
A	45	56	85	66	89	
B	12	46	49	36	95	
C	85	96	74	16	52	
D	52	63	41	74	85	
E	14	25	36	69	58	
F	47	58	69	74	85	
G	12	23	45	56	78	
H	15	48	26	95	84	
I	75	53	95	51	48	
J	46	79	13	64	46	
K	87	98	65	54	32	
L	32	21	65	54	98	
M	78	46	13	13	46	
N	46	54	64	95	84	
O	13	16	18	19	16	
P	59	56	59	64	64	
Q	73	46	46	80	92	
R	20	45	80	94	97	
S	45	90	80	61	23	

2. Now give 25 bonus marks to each student and give them total marks.

Name	English	Science	Maths	IT	Religion	Bonus Marks	Total
A	45	56	85	66	89		
B	12	46	49	36	95		
C	85	96	74	16	52		
D	52	63	41	74	85		
E	14	25	36	69	58		
F	47	58	69	74	85		
G	12	23	45	56	78		
H	15	48	26	95	84		
I	75	53	95	51	48		
J	46	79	13	64	46		
K	87	98	65	54	32		
L	32	21	65	54	98		
M	78	46	13	13	46		
N	46	54	64	95	84		
O	13	16	18	19	16		
P	59	56	59	64	64		
Q	73	46	46	80	92		
R	20	45	80	94	97		
S	45	90	80	61	23		

Relative cell reference and absolute cell reference.**Work Sheet.**

Create following table and locate Palitha's total marks as follows.

	A	B	C	D	E	F	G
1	Name	English	Science	IT	Sinhla	Total	
2	Palitha	20	50	20	40	=B2+C2+D2+E2	
3	Dammi	50	60	50	50		
4	Muditha	56	40	60	20		
5	Dimuthu	77	30	30	30		
6	Nimal	30	70	40	40		
7	Sugath	90	60	90	88		
8	Kamal	80	50	40	45		
9							

Then drag using fill handle. The result is given below.

	A	B	C	D	E	F	G
1	Name	English	Science	IT	Sinhla	Total	
2	Palitha	20	50	20	40	130	
3	Dammi	50	60	50	50	210	
4	Muditha	56	40	60	20	176	
5	Dimuthu	77	30	30	30	167	
6	Nimal	30	70	40	40	180	
7	Sugath	90	60	90	88	328	
8	Kamal	80	50	40	45	215	
9							
10							

Then go on to each cell in column F and check the formula bar and observe that the cell references change. **This is Relative cell reference.**

Now insert another column "Bonus marks" and type **50** in **F2** as follows. Then find the total marks as given in the example.

Note that 2F is typed as **\$F\$2** to keep it permanent.

	A	B	C	D	E	F	G	H	I
1	Name	English	Science	IT	Sinhla	Bonus Marks	Total		
2	Palitha	20	50	20	40	50	=B2+C2+D2+E2+\$F\$2		
3	Dammi	50	60	50	50				
4	Muditha	56	40	60	20				
5	Dimuthu	77	30	30	30				
6	Nimal	30	70	40	40				
7	Sugath	90	60	90	88				
8	Kamal	80	50	40	45				
9									

Then drag and find the total marks of the rest of the students. Then go on to each cell in column **G** and check the formula bar and observe the **absolute cell reference**.

G2		=B2+C2+D2+E2+\$F\$2						
	A	B	C	D	E	F	G	H
1	Name	English	Science	IT	Sinhla	Bonus Marks	Total	
2	Palitha	20	50	20	40	50	180	
3	Dammi	50	60	50	50		260	
4	Muditha	56	40	60	20		226	
5	Dimuthu	77	30	30	30		217	
6	Nimal	30	70	40	40		230	
7	Sugath	90	60	90	88		378	
8	Kamal	80	50	40	45		265	
9								

Competency 7 : Uses Spreadsheet to solve simple statistical problems.

Competency Level 7.7: Creates charts Using Spreadsheet

Activity 7.7 : Let's create charts.

Time : 90 minutes

Quality inputs :

- Five copies of an exercise about charts in Annexe 7.7.1.
- Five copies of Graded directions in Annexe 7.7.2
- Five copies of Work sheet in Annexe 7.7.3.

Learning – Teaching process:

Step 7.7.1 :

- Distribute copies of exercise.
- Let the students to do the activity.
- Conduct a discussion to highlight the following.

- It is very important to create graphical representations of data.
- There are different types of charts used for different forms of presentation.

(30 minutes)

Step 7.7.2 :

- Divide the class into five groups.
- Distribute copies of graded directions and Work sheet.
- Tell them that each group should create a chart type different from others.
- Request students to follow the steps when doing the activity.

(30 minutes)

Step 7.7.3 :

- Let each group present its findings to the class.
- Lead a discussion to highlight the following.

- A chart is a graphical representation of data.
- A chart can be understood easily.

(30 minutes)

Criteria for assessment and evaluation.

- Names different types of charts
- Accepts the need to select charts to match the nature and the requirement of the user.
- Analyses the qualities of a good charts should have..
- Creates complete charts.
- Learns from peers.

Annexe 7.7.1

Create a chart according to data in the following table. Create a complete chart. You can draw any type of chart

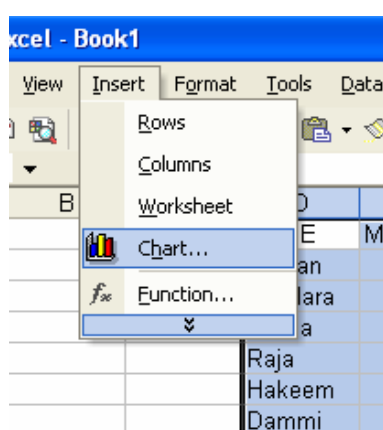
	A	B	C	D	E
1	Super Company Ltd.				
2	Sales from April to July				
3	Item	April	May	June	July
4	Televisions	20	10	60	30
5	Radios	10	50	40	5
6	Washing Machine	20	30	5	10
7	Refrigerators	5	10	20	5
8	VCRs	50	20	40	60
9					

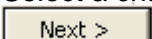
Creating a Chart.

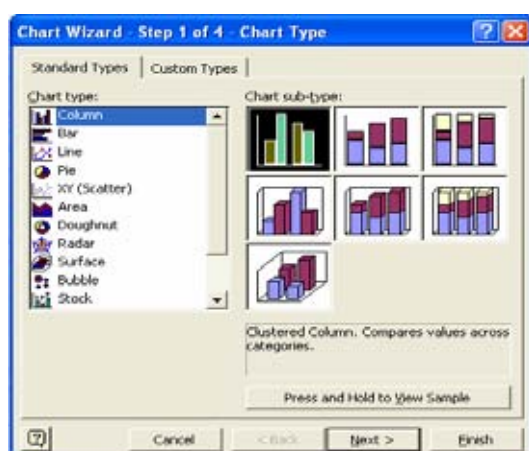
1. Select the cells that contain the data you want to appear in the chart.

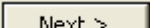
NAME			
C	D	E	F
	NAME	MARKS	
	Saman	56	
	Bandara	78	
	Dulika	20	
	Raja	40	
	Hakeem	55	
	Dammi	30	

- 2 Click Chart Wizard.

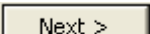


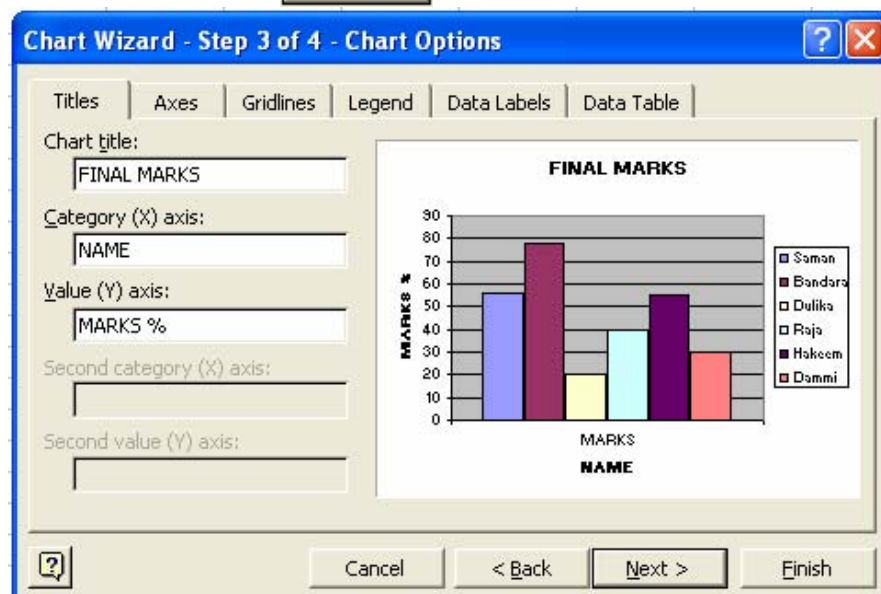
3. Select a chart type and click  button to the second step.



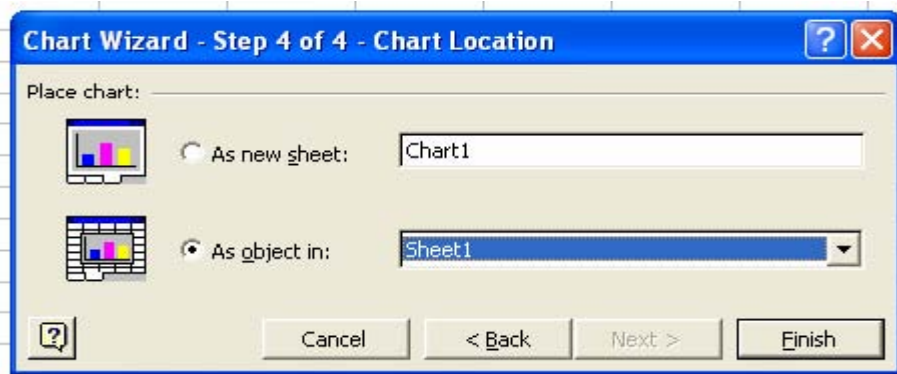
4. Select the data range you want to include in the chart. Then select Series in rows or Series in columns to determine which data range to be displayed also with X axis and click button 



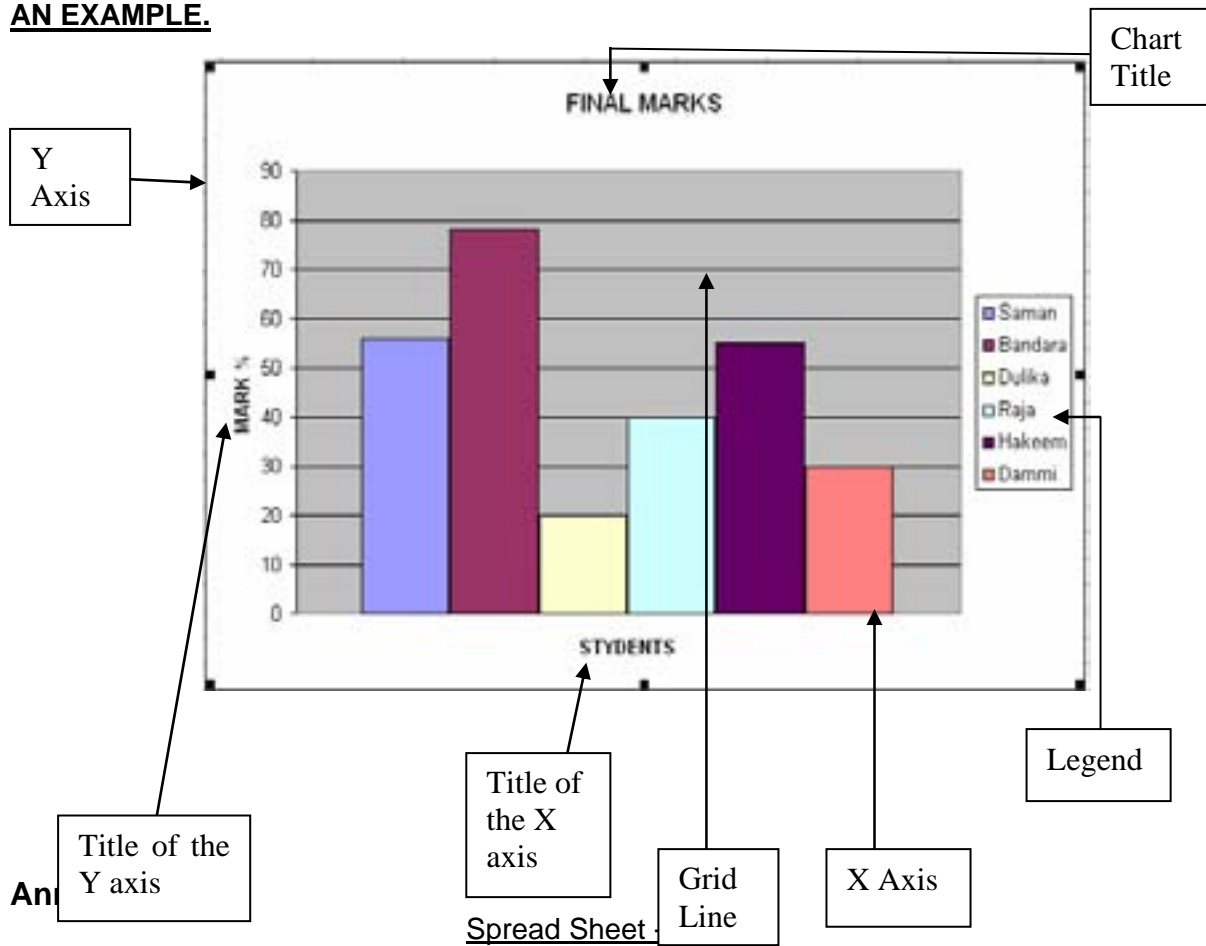
5. Under chart option see chart titles, gridlines, legends, data labels and other options. Then click 



5. Select the location where you want to place the chart. Select **As new sheet** to place the chart in a chart sheet and select **As an object** in to place the chart in a particular sheet as an object. Then click FINISH button and place the chart in the particular location.



AN EXAMPLE.



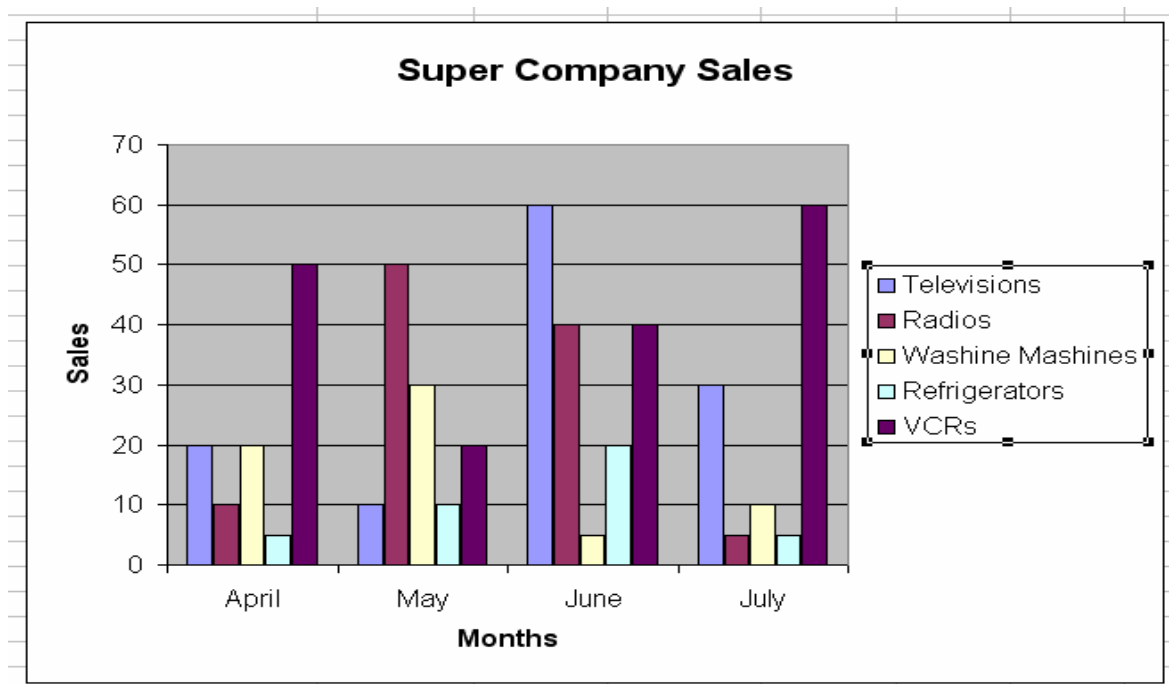
An

Work sheet

Enter the following data to the work sheet and create a chart.

	A	B	C	D	E
1	Super Company Ltd.				
2	Sales from April to July				
3	Item	April	May	June	July
4	Televisions	20	10	60	30
5	Radios	10	50	40	5
6	Washing Machine	20	30	5	10
7	Refrigerators	5	10	20	5
8	VCRs	50	20	40	60
9					

The chart will be as follows.



Competency 8 : Uses Presentation software to design electronic presentations.

Competency 8.1: Makes attractive presentations using basic features of presentation software.

Activity 8.1 : Let's make our presentations attractive by using different layouts, designs, colours and objects.

Time : 120 minutes

Quality inputs :

- Teacher developed slide show on a CD.
- Three copies of group exploration instructions in Annexe 8.1.1
- Three copies of graded direction in Annexe 8.1.2
- Three hard copies of a previously developed presentation in Annexe 8.1.3
- Three computer stations with software

Learning – Teaching Process:

Step 8.1.1 :

- Expose the class to the slide show given.
- Get students to comment on the presentation comparing with their own manual presentation.
- Conduct a discussion to highlight the following.

- Use of multimedia including text, sound, pictures, animation and video helps highlight important aspects of the presentation.
- Easy access to a variety of layouts enables those to be selected to suit the content covered.
- Variety of backgrounds facilitated through appropriate designs and suitable colours enhance the attractiveness of the presentation.
- The ability to manipulate text enables short, simple and easy to understand presentations.
- The high initial cost, however, does not allow all interested parties to access the needed software and hardware.

(15 minutes)

- Step 8.1.2** :
- Divide class into three groups.
 - Distribute group exploration instructions, graded directions, pre-prepared presentation, dummy sheets and markers across the groups.
 - Involve groups in the exploration.
 - Prepare groups for a presentation at the plenary.
- (30minutes)

- Step 8.1.3** :
- Get each group to present its findings.
 - Request the presenters themselves to fill gaps, if any.
 - Seek for constructive comments of other groups
 - Conclude the session by highlighting the following.

- The text of the pre-prepared presentation has to be studied carefully as a first step in improving the presentation
- The layout as well as the background designs and colours have to be carefully selected to make them relevant and attractive.
- Clip art, Word art, charts, tables, photographs and videos are some objects that can be inserted to improve the quality of the presentations.
- There are three modes to view the presentation.
- The normal view allows only one slide to be viewed at a time, with editing facilities made possible simultaneously.
- The sorter view presents all slides developed on one screen allowing the users to select any file that they wish to edit.
- The outline view presents an overview of all slides already developed and yet to be developed with the content providing an opportunity for the user to enter or edit text as required.
- The slide show enables the total output to be viewed on the full screen one at a time.

(20 minutes)

Criteria for Assessment and Evaluation

- Names the basic features in a presentation software and describes each of them.
- Accepts the value of electronic presentations as against traditional method.
- Makes good presentation using basic features of software.
- Presents ideas simply and precisely.
- Demonstrates sensitivity to needs and feeling of others.

Instructions for the Group Exploration

- You will be working in three groups with the following three basic features of presentation software randomly distributed among the three groups.
 - Changing the slide layout
 - Introducing new slide designs with different background colours
 - Inserting objects.
- Go to the computer assigned to your group.
- Use any method that you are familiar with to open the presentation software package.
 - Identify the menu that helps you accomplish the task given.
 - Familiarize yourself with each option made available by the menu.
- Tryout the options and be creative to develop a slide show on the task assigned to your group.
- Use a variety of methods to view the presentation developed.
 - Identify the problems that you encountered while engaged in the task and note them down on the demy sheet given, with the action you have taken to solve them.
 - Be prepared to make a whole-class presentation.

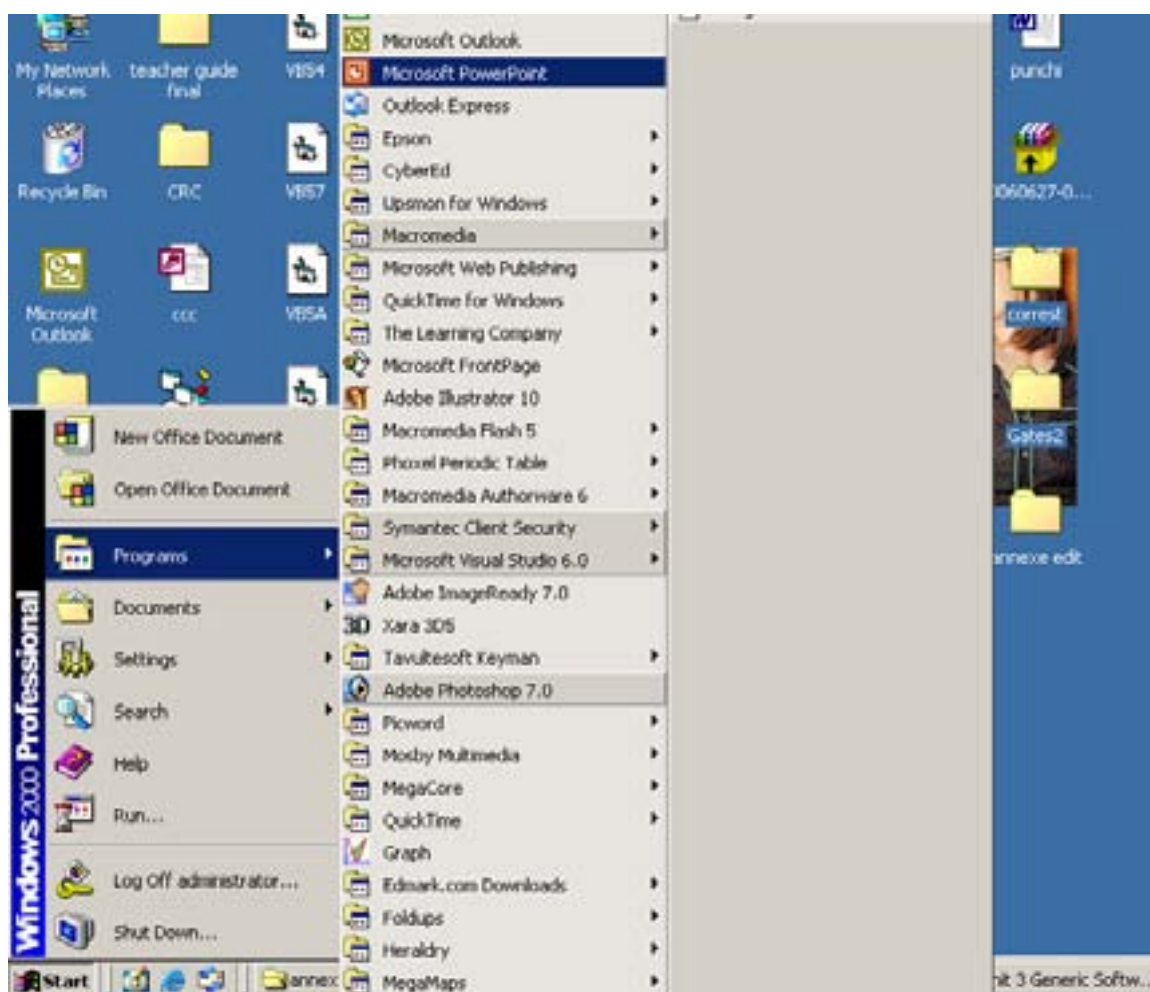
Graded Directions Starting a Microsoft PowerPoint package

Click **START** button from the task bar

Move to programs → Microsoft Office → Microsoft PowerPoint(Click)

Or

Move to programs → Microsoft PowerPoint(Click)

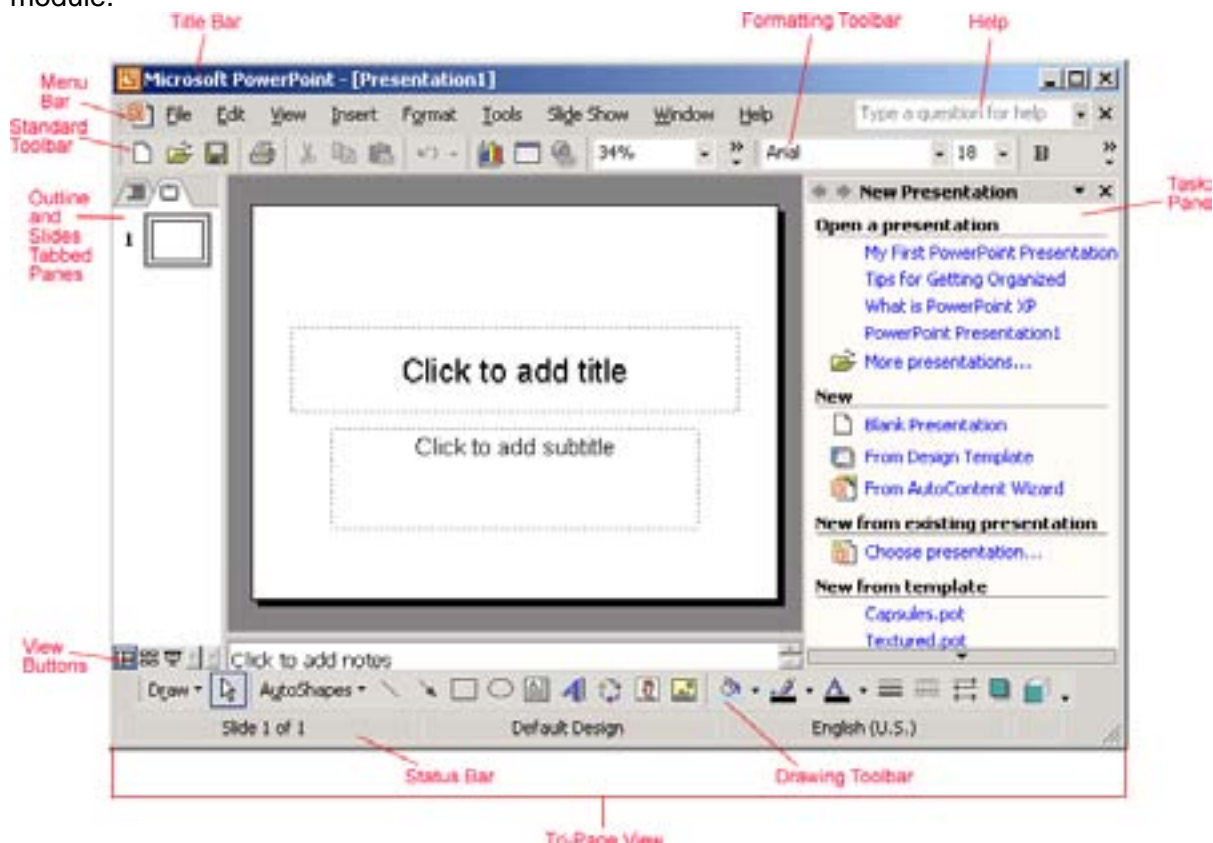


The Parts of the PowerPoint Window

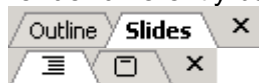
The **PowerPoint Window** has toolbars and panes to help you quickly create presentations. Most of the toolbars are common in Office applications but may feature options unique to PowerPoint.

- **Title Bar** - displays the document name followed by a program name.
- **Menu Bar** - contains a list of options to manage and customize documents.
- **Standard Toolbar** - contains shortcut buttons for the most popular commands.
- **Formatting Toolbar** - contains buttons used for formatting.
- **Status Bar** - displays slide position and the type of design in PowerPoint.
- **Drawing Toolbar** - contains tools for drawing lines, shapes and objects.
- **Help** - provides quick access to Help topics.

PowerPoint XP has a new default Normal view - the **Tri-Pane View**. This view, which opens when you launch PowerPoint, allows you to see multiple parts of a presentation at once. One of the other noticeable changes between **PowerPoint 2000** and **PowerPoint 2002** is the **Task Pane**. Located on the right side of the computer screen, this pane allows you to select tasks in different categories and allows you to quickly enhance your slides in a few steps. You'll learn more about the Task Pane later in this module.



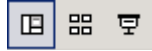
Also new in PowerPoint 2002 are the **Outline and Slides Tabbed Panes**. Click on the tabs on the left side of the screen to view an outline or a slide of your presentation. The tabs render differently based on the size of the pane.




✓ You can show or hide PowerPoint's toolbars. Click on the View menu and choose Toolbar. Decide which ones you want to show or hide.

View Buttons and Slide Views

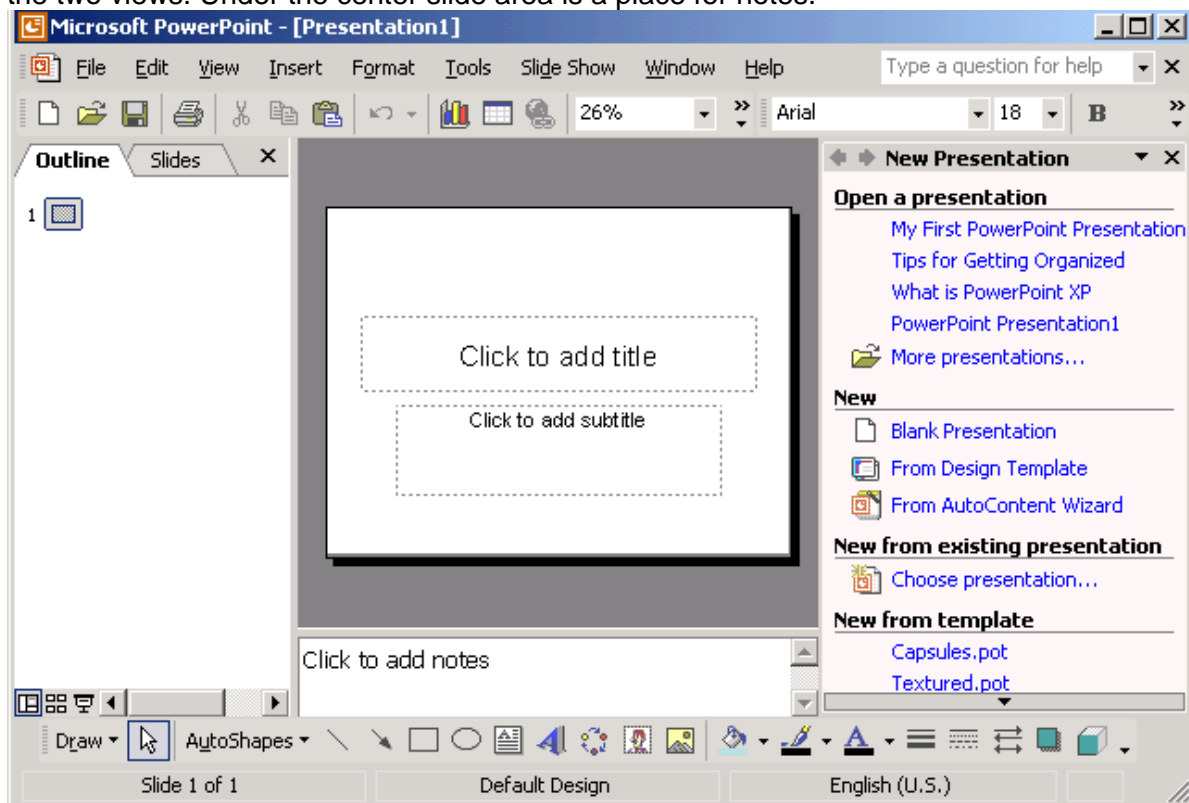
The **view buttons** at the left bottom corner of the screen allow three slide views: **Normal View**, **Slide Sorter View** and **Slide Show**.



The view buttons can be useful as you prepare your presentation. They control the way slides are displayed on the screen. Click a view button to see a different view.

Normal View  contains the **Outline and Slides Tabbed Panes** on the left, the **Slide pane** in the center and the **Task Pane** on the right.


The **Outline View** shows the text of your presentation for easy editing while **Slides View** shows text and graphics of the slide you're working on. Click on the tabs to switch between the two views. Under the center slide area is a place for notes.




✓ You can hide or show the different panes in **Normal View**. To hide the Task Pane, click on the View menu and choose Task Pane. (The View menu also allows you to choose other views). To hide the Outline View and Slide Tabbed Panes, click on the X to the left of the Slides Tab.

More Views

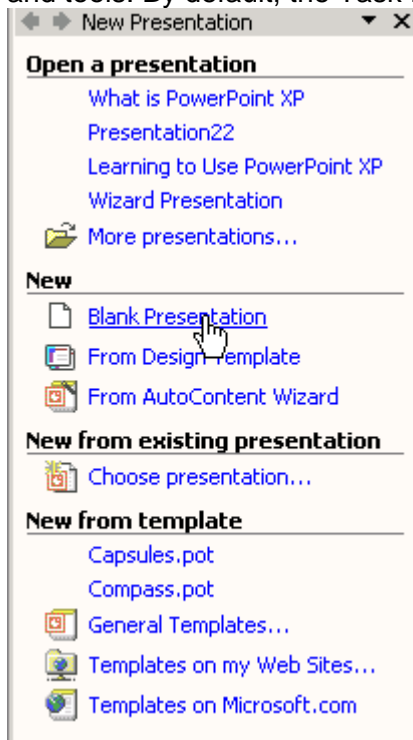
Here are some other views that may be useful as you create your presentations:

Slide Sorter View  lets you see small versions of all the slides you have created. You can delete, copy, and move slides in this view.

Slide Show  lets you see your presentation electronically as it will appear to an audience.

The Task Pane

The PowerPoint XP **Task Pane** replaces the dialog boxes used in PowerPoint 2000. The down-pointing arrow in the top, right corner of the pane allows you to select different menus and tools. By default, the Task Pane appears when PowerPoint XP is launched.

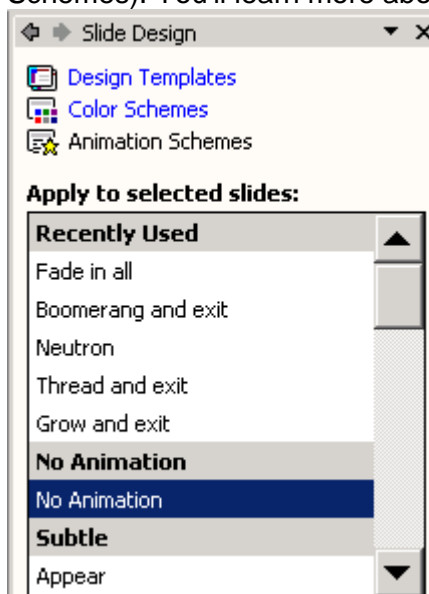


The **Slide Layout** and **Slide Design** panes within the Task Pane help organize layouts, design templates, and color schemes. When you select a design option, your slides are quickly updated with the new look.

You can view the Slide Layout and Slide Design panes by clicking on the **down-pointing arrow** next to **New Presentation** in the Task Pane.



Select Slide Layout or Slide Design (Design Templates, Color Schemes, Animation Schemes). You'll learn more about using these panes later in this course.

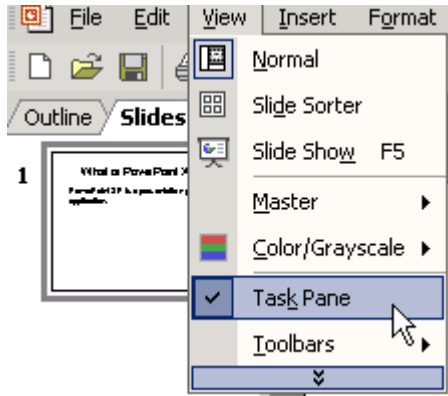


Using the Task Pane

If you do not see the Task Pane on the right side of the PowerPoint window, you can easily access it.

To Open the Task Pane:

- Click **View → Task Pane**



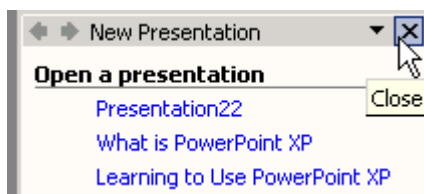
To View Different Panes:

- Click on the **down-pointing arrow** next to **New Presentation** and select different panes.
- Once you open different panes, you can move through them by clicking on the backward and forward arrow buttons on the left.



To Close the Task Pane:

- Click the **X** on the right corner of the bar.



✓ You can hide or view the Task Pane by clicking on **View → Task Pane**.

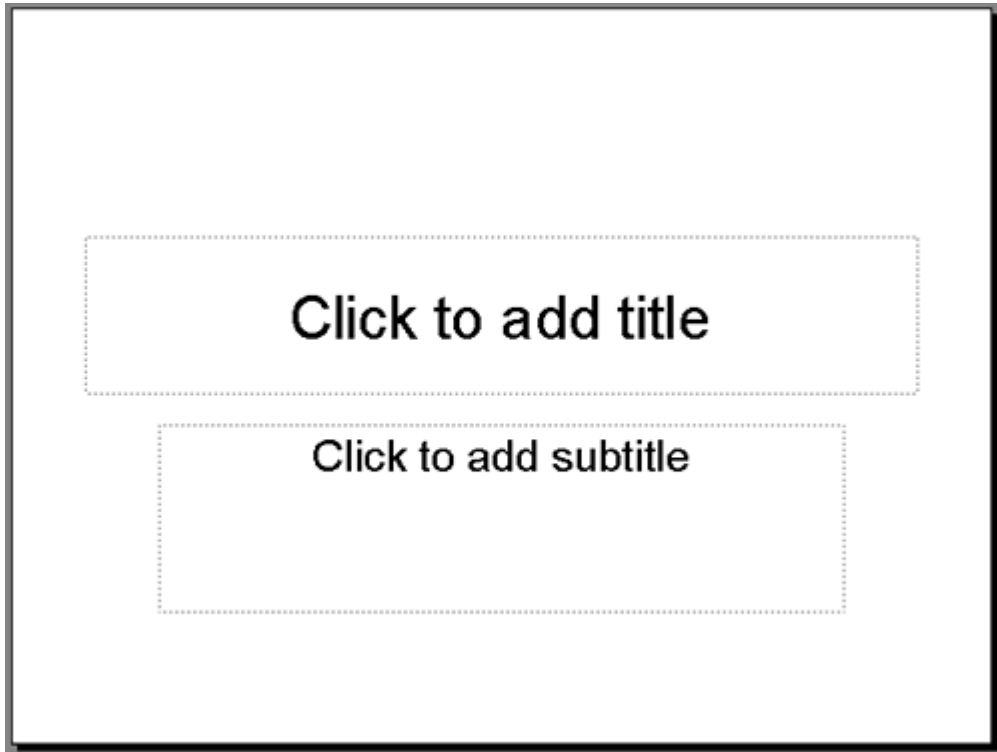
Creating a Blank Presentation

PowerPoint offers three ways to create a presentation: **Blank presentation**, **From Design Template** or **From AutoContent Wizard**.

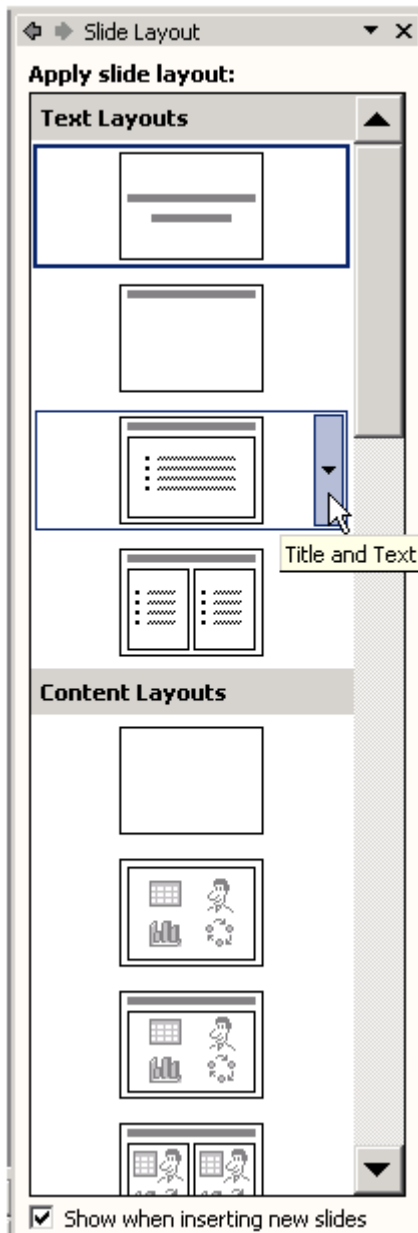
The Blank presentation option is one of the more commonly used methods. It offers several blank slides with layouts for text and graphics.

To Create a Blank Presentation:

- Open PowerPoint.
- A slide featuring a place for a title and subtitle appears by default. You may begin your presentation with this slide or choose a different slide layout.



- The **New Presentation Pane** appears on the right side of the screen.
- Under **New**, click **Blank Presentation**.
- A list appears.

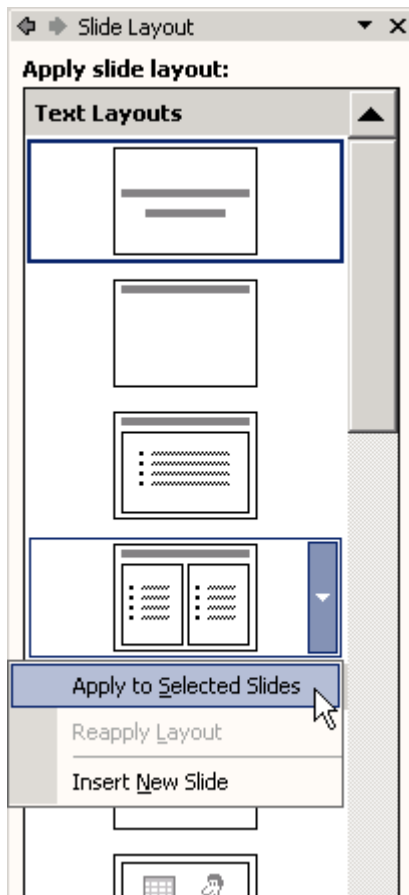


Choosing a Slide Layout

As you work on your presentation, think about the type of layout you want. Do you want a slide with text and lots of clip art or one with text and a chart? PowerPoint offers many layout options.

To Choose a Slide Layout:

- Move your arrow pointer over the layouts or use the scroll bar in the **Slide Layout Pane**.
- A gray bar appears on the right of each layout.
- When you find a layout that you like, click the down-pointing arrow and choose Apply to Selected Slide.



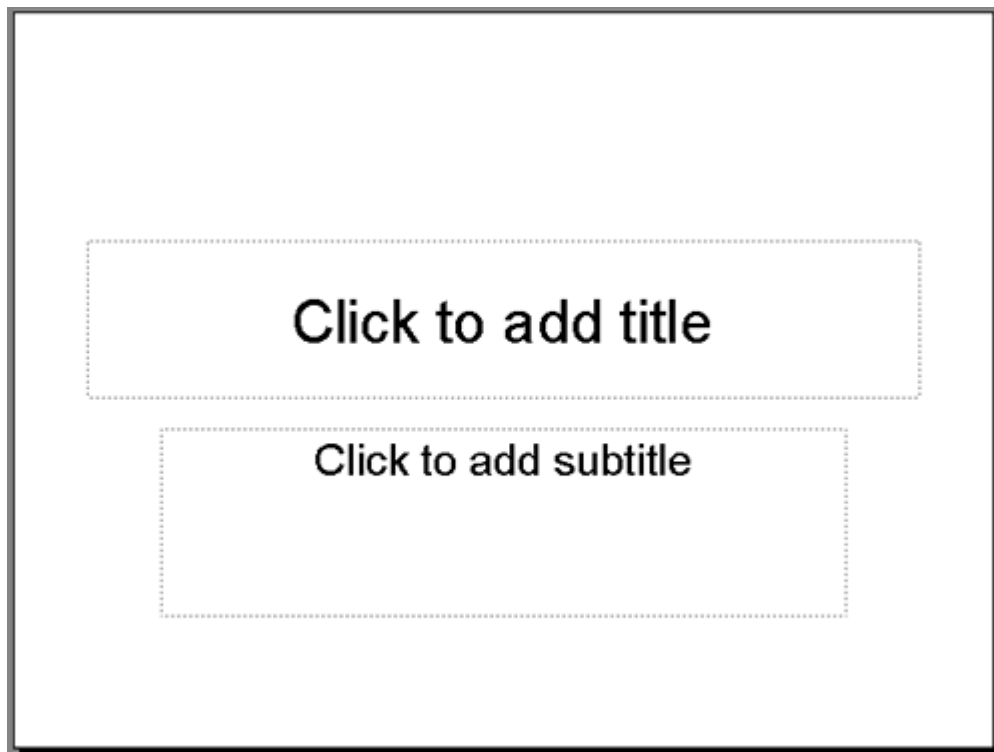
✓ You can also click on the slide layout to apply it. Notice that the slide you are currently working on has a dark border in the Outline Pane.

Placeholders

Once you choose a layout for your slides, you can begin adding text, graphics or other items. You do this with **placeholders** - special places within a slide where you can add content.

To Add Text to a Placeholder:

- Click on the placeholder.
- Start typing.



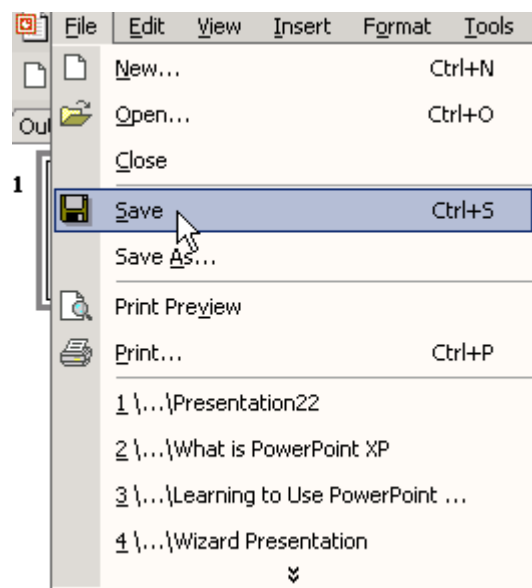
(You'll learn about inserting clip art and other graphics into placeholders later in this course)

Saving a Presentation

You can save, close, and exit presentations in PowerPoint just as you would while using other Microsoft applications.

To Save a Presentation:

- Click on **File** → **Save**. (Ctrl + S)



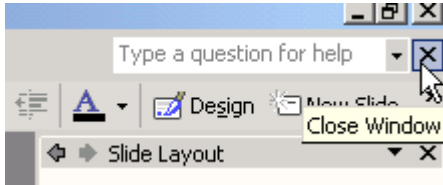
- Choose the location where you want to save your presentation. (My Documents is a good place).
- Type a name in the **File Name** box or keep the one that PowerPoint has provided.

Closing a Presentation and Exiting PowerPoint

Once you've finishing working on your presentation, you can quickly close it.

To Close a Presentation:

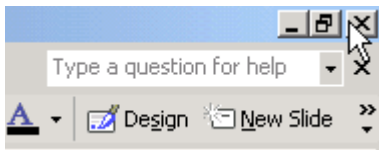
- Click the **X** in the PowerPoint presentation window (Ctrl + W).



- The PowerPoint application remains open and you can start a new presentation. (See next page for details).

To Exit PowerPoint:

- Click the **X** in the far right top corner.



OR

- Choose **File → Exit**. (Alt + F4)

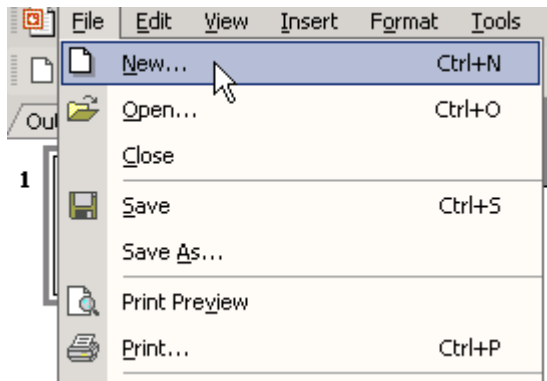
✓ Before you exit PowerPoint, make sure that you save any work that you want to keep.

Creating a New Presentation Using the Traditional Method

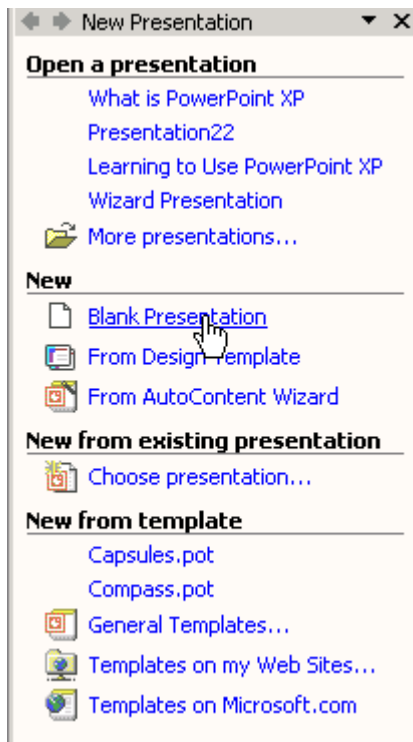
Remember, after you have closed one presentation, you can easily start a new one while PowerPoint is still open by using the traditional new file creation method.

To Start a New Presentation:

- Click on **File → New**. (Ctrl + N)



- In the **New Presentation Pane**, under **New** choose **Blank Presentation**.



- Choose the design layout that you want.

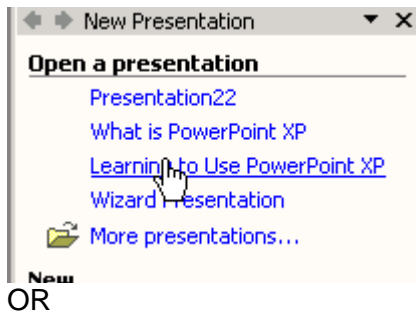
✓ Remember, if your Task Pane disappears from the right side of the screen, click on **View** → **Task Pane**

Opening a Presentation

You can quickly open a presentation that you've previously saved by using the Task Pane.

To Open a Presentation

- Start PowerPoint.
- In the **Task Pane** under **Open a Presentation**, click on the presentation that you want to open.



- Choose **File → Open**.
- Navigate the file you want to open.

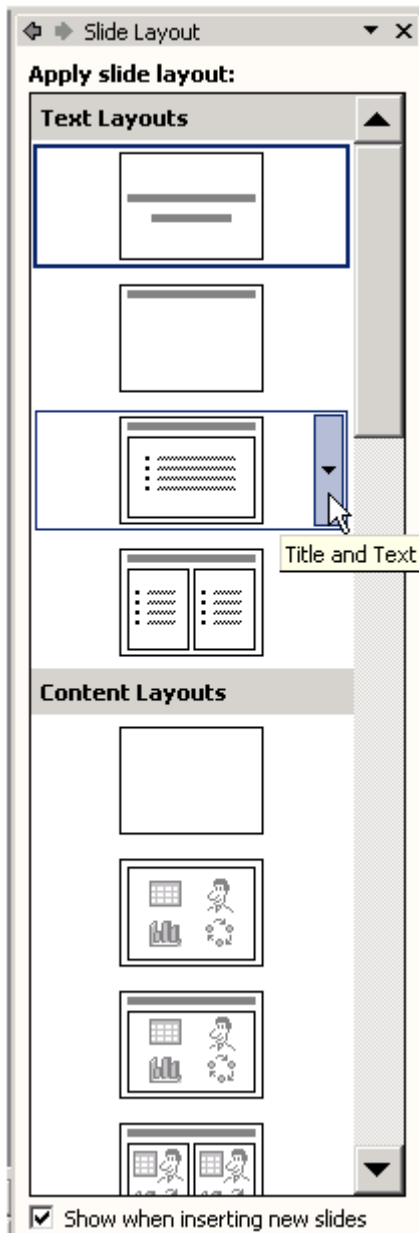
Group A

Inserting a New Slide

Once you've created your opening slide, you'll want to add more slides to your presentation.

To Insert a New Slide:

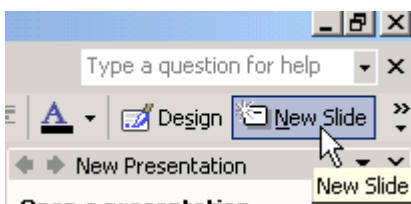
- Click on **Insert → New Slide**. (Ctrl + M)
- Move your arrow pointer over layouts or use the scroll bar and choose a slide layout.



- A gray bar appears on the right
- Click the down-pointing arrow and choose **Insert New Slide**.

OR

- Click the **New Slide** button at the top of the screen



- Move your arrow pointer over layouts or use the scroll bar and choose a design layout.
- A gray bar appears on the right
- Click the down-pointing arrow and choose **Insert New Slide**.

Copying a Slide

Copying is another technique that you may use as you work on your slide presentation. For example, you may want to repeat a slide later in the presentation or copy a slide and make slight changes to it to make a different point.

To Copy a Slide:

- Click the slide you want to copy in the pane on the left.
- Click on the **Copy Button** on the Standard Toolbar. (Ctrl + C)
- Move the arrow pointer to where you want the copied slide to appear.

OR

- Right click the slide you want to copy in the pane on the left.
- Move the arrow pointer to where you want the copied slide to appear.
- A horizontal cursor appears.
- Click the **Paste Button** on the Standard Toolbar or right click → **Paste**. (Ctrl + V)

Deleting a Slide

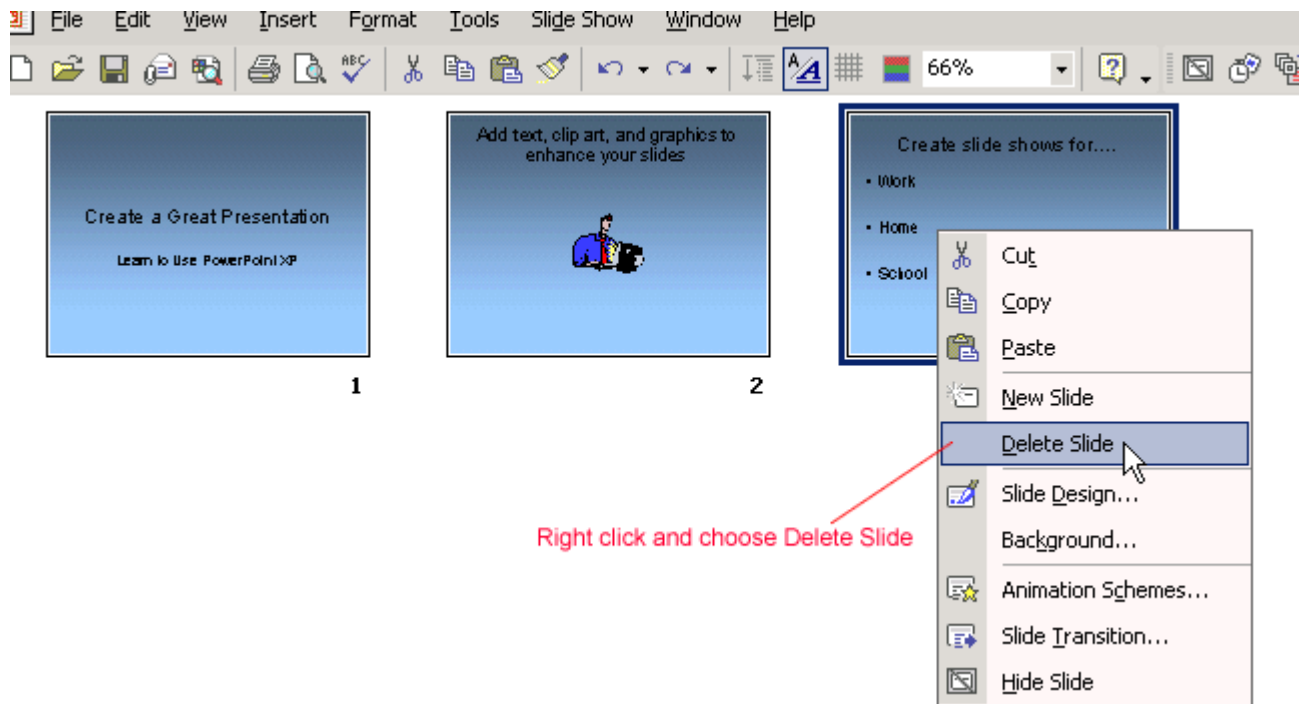
Sometimes you may want to take one or more slides out of your presentation.

To Delete a Slide:

- Click the slide.
- Press **Delete** on your keyboard.

OR


- Right click the slide you want to delete in the pane to the left → **Delete Slide**.

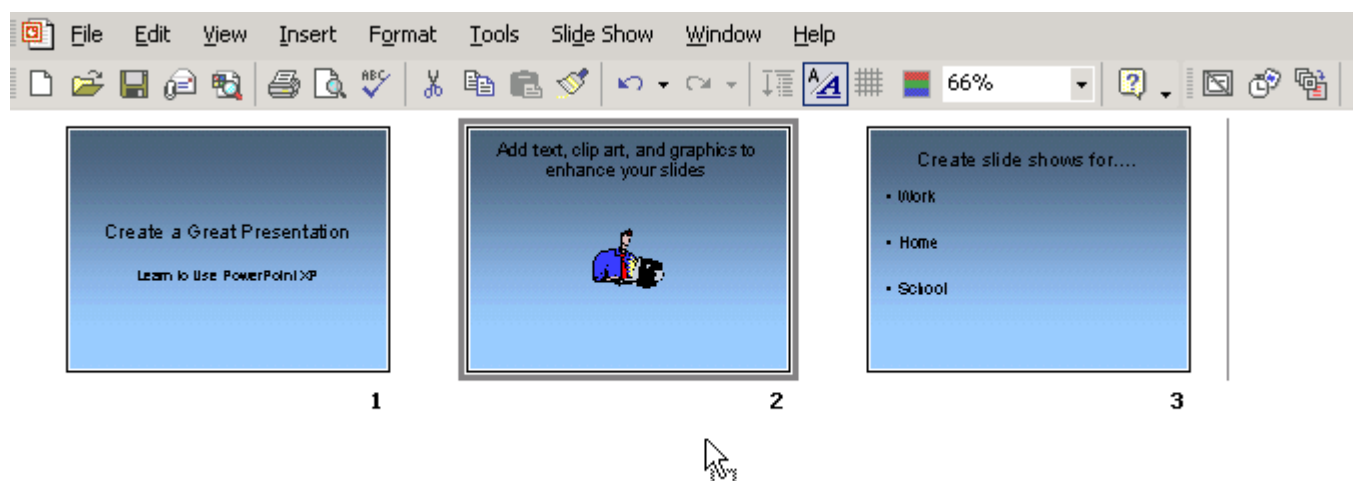


Slide Sorter View

As you are working on your presentation, you may want to change the order of your slides. You can rearrange slides in **Slide Sorter View**. It allows you to view miniature slides that you can drag and drop.

To Manipulate Slides in Slide Sorter View:

- Click on the **Slide Sorter View** button  in the left bottom corner of the page.
- Click the slide you want to move.
- Hold down the left mouse button and drag the slide to its new location. A pointer with a box appears as you drag the slide.




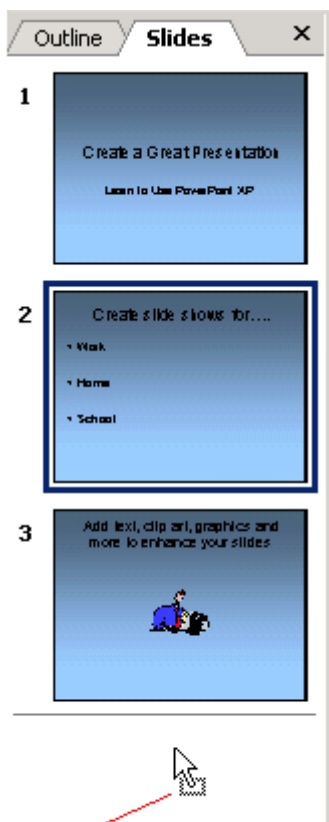
- Click on the **Normal View button**  to return to Normal View.

Working with Slides in Normal View

You can also easily move slides in **Normal View**. Remember, this is the Tri-Pane View that shows small slides on the left, a slide in the center and the Task Pane on the right.

To Move Slides in Normal View:

- Click on the Normal View button .
- Click a slide in the left pane and drag and drop it to its new location.
- Hold down the left mouse button and drag the slide to its new location. A pointer with a box appears as you drag the slide.



An arrow with a box attached appears as you drag the slide

✓ To toggle between the different views in PowerPoint XP, click on the **View buttons** or click on **View → Slide Sorter, Normal or Slide Show**.

Changing and viewing Slides in Outline View

Outline View also allows you to make changes to slides. While you can drag and drop slides in this view, it's also useful for making changes to the text of your slides or for viewing multiple slides.

To View or Make Changes to Text in Outline View:

- Click the Outline View tab in the left pane.



- An outline view of your slides appears with text.
- Click on the small gray slide you want to make changes to.
- Scroll through the slides in outline view.
- Select the slide in the outline and then type changes directly onto the center slide.
- You can view the text of all of your slides in this view.
- Return to **Normal View** by clicking the **Slides tab** in the left pane.

Viewing Slides in Slide Show View

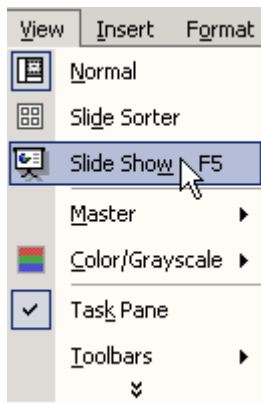
After you have made some changes to your PowerPoint presentation, you can get an idea of how it will look as a slide show.

To View Slides in Slide Show View:

- Click on the **Slide Show button**  at the bottom left corner of the screen.

OR

- Click on **View → Slide Show**.



- Click on each slide until you reach the end of the slide show. (black screen)
- Click to exit and return to **Normal View**

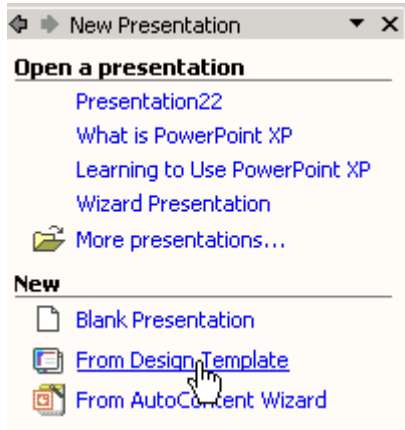
Group B

Applying a Design Template

PowerPoint offers Design Templates to make it easy to create an attractive presentation. These templates come in a variety of colors and styles. You can apply a design to existing slides or begin a new presentation with a template.

To Begin a New Presentation with a Design Template:

- Open PowerPoint.
- In the **Task Pane** under **New**, click on **From Design Template**.



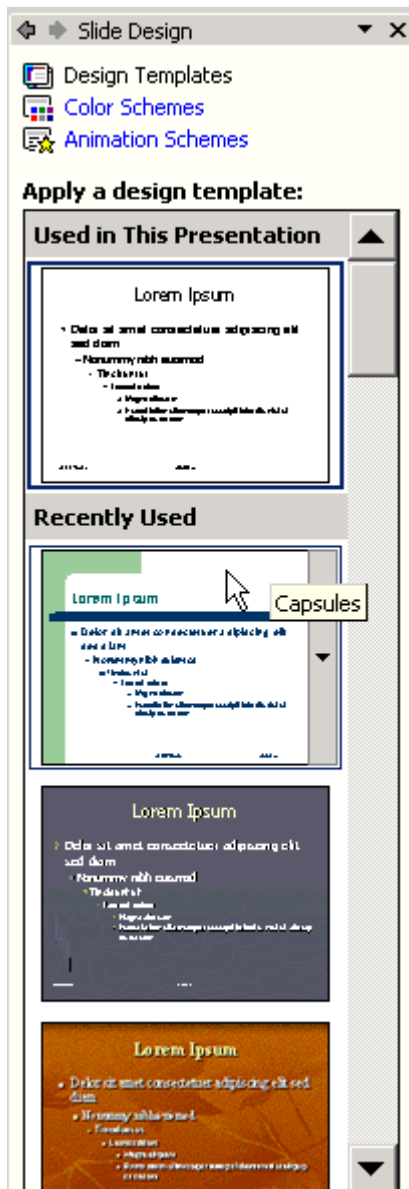
- A list of templates appears.
- Move your mouse pointer through the different designs or use the scroll bar.
- Click on the down-pointing arrow in the gray box next to the template that you like.
- Choose **Apply to All Slides**.

Adding a Design to an Existing Presentation

Do you have an existing presentation that you want to add a design to? PowerPoint makes it easy to enhance existing slides with a design template.

To Apply a Design to an Existing Presentation:

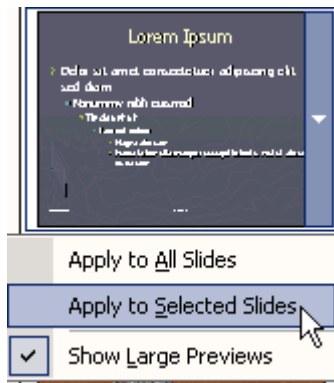
- Open PowerPoint.
- In the **Task Pane**, under **Open a presentation**, click on the presentation you want.
- Click on the down-pointing arrow in the **New Presentation pane** and choose **Slide Design - Design Templates**.
- A list of templates appears.



- Move your mouse pointer through the different designs or use the scroll bar.
- Click on the down-pointing arrow in the gray box next to the template that you like.
- Choose **Apply to All Slides**.

Applying a Design Template to Selected Slides

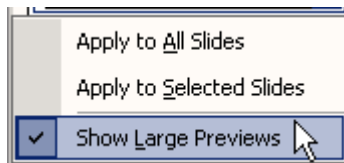
As you are working on your presentation, you can choose **Apply to Selected Slides** if you want one or more slides to have a different look.



A Closer View of Design Templates

If you want a closer look at the Design Templates, follow these steps:

- With a presentation open, click on a template.
- Click on the down-pointing arrow in the gray bar to the left.
- Choose **Show Large Previews**. (It is now checked).



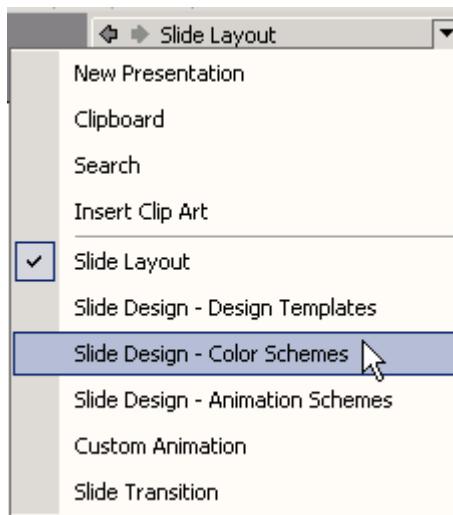
- To return to the smaller views of the slides, click in the gray bar of any template and **uncheck Show Large Previews**

Choosing a Color Scheme

PowerPoint's Design Templates have pre-selected colors but you can choose your own **color scheme**. A color scheme is a combination of colors for the text and background of your slides.

To Choose a Different Color Scheme:

- In the **Task Pane**, click on the down-pointing arrow in the gray bar next to **New Presentation**.
- Choose **Slide Design - Color Schemes**.



- A list of color schemes appears.
- Move your arrow pointer through the different color scheme options or use the scroll bar.
- When you find a color scheme that you like, click on the down-pointing arrow in the gray box and choose **Apply to All Slides**.

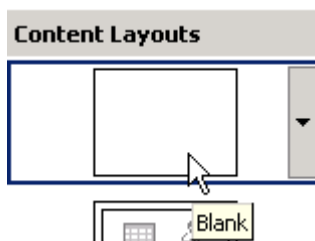
Group C

Adding Text to an Original Slide

Many of PowerPoint's slides have text boxes already included and ready for you to add information. However, if you create an original slide you'll need to add a text box or two.

To Add Text to an Original Slide:

- Insert a **blank New Slide**.



- Click on the **Text Box** button in the **Drawing Toolbar**.

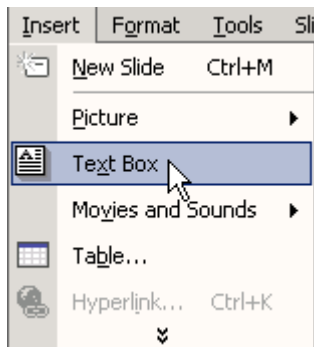


- Click and drag your mouse pointer to create a text box on the slide.

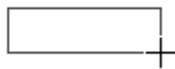


OR

- Click on **Insert** → **Text Box**.



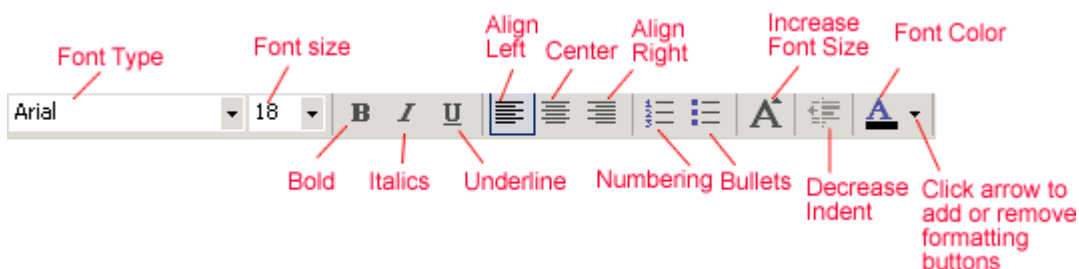
- Click and drag your mouse pointer to create a text box.



The Formatting Toolbar

PowerPoint's default font or text type is Arial. However, you may want to change the font type, font size and more. Use the **Formatting Toolbar** to set the color, size, and overall look of your text. It doesn't matter whether the text is an original slide or is in a preset layout. Here are some of the formatting options:

- Font type
- Font size
- Bold, Italics, and Underline
- Center, Align Left, and Align Right
- Bullets and Numbering
- Font color
- Increase Font Size
- Decrease Indent



✓ For more formatting buttons, click on the down-pointing arrow at the end of the toolbar. Choose **Add or Remove Buttons - Formatting**. Choose any additional options you want on the Formatting Toolbar. You can also choose **Show Buttons on Two Rows**.

Formatting Text

The Formatting Toolbar allows you to make many changes to your text to give it the look you want for your presentation.

To Format Text

- In the Formatting Toolbar, click on the down-pointing arrow OR button for the item you want to format.
- For example, to set the font size for text you haven't typed yet, click on the down-pointing arrow next to the number and choose the font size. To change the font color, click on the down-pointing arrow next to the "underlined" A.



Choose a font by clicking on the down-pointing arrow

Choose a font color by clicking on the down-pointing arrow

- To make formatting changes to existing text, highlight the text and click on the down-pointing arrow OR button for the formatting change.



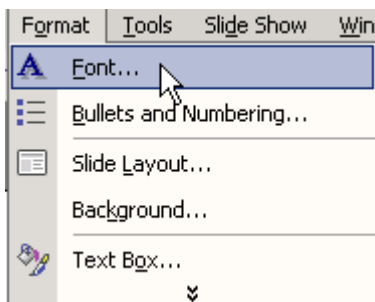
Take some time to experiment with the different formatting options to decide what's best for your presentation.

The Format Menu

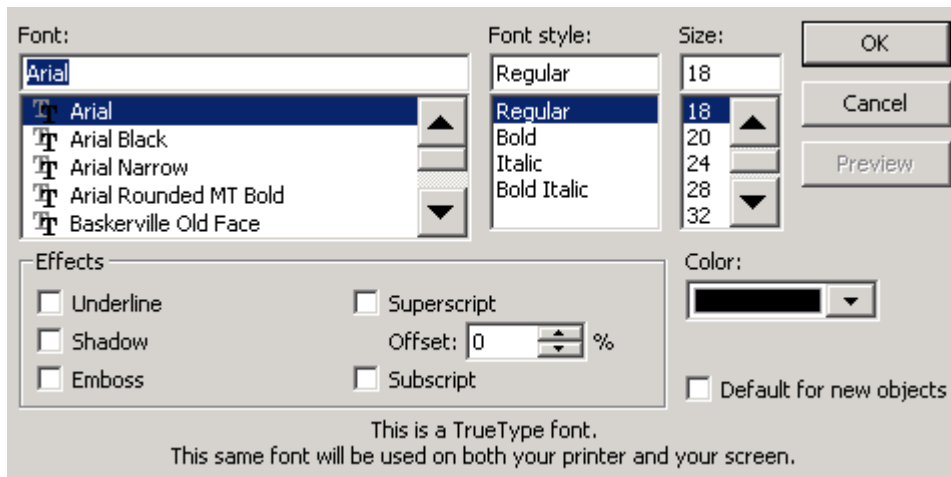
You can also use the **Format** menu to make formatting changes to the text in your presentation.

To Use the Format Menu:

- Click on **Format** → **Font**.



- A dialog box opens.



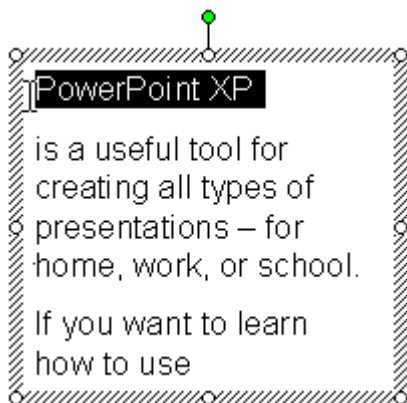
- Choose the **font**, **font style**, and/or **size**.
- Click **OK**

Cut, Copy, and Paste

Once you've determined how your text will appear in your slides, you may need to cut copy or paste some information.

To Copy and Paste:

- Select the text you want to copy.



- Click the **copy button** on the **Standard Toolbar**. (Ctrl + C)



- Move your mouse pointer to the location on the slide where you want the text to appear.
- Click the **paste button** on the **Standard Toolbar**. (Ctrl + V)



To Cut and Paste:

- Select the text you want to cut.
- Click the **cut button** on the **Standard Toolbar**. (Ctrl + X)



- Move your mouse pointer to the location on the slide where you want the text to appear.
- Click the **paste button** on the **Standard Toolbar**. (Ctrl +V)

✓ The keyboard shortcuts - **Ctrl + C**, **Ctrl + X**, and **Ctrl + V** - can help make cutting, copying and pasting faster. If you don't already know them, learn these shortcuts.

Inserting Clip Art into a Slide

Clip art is a collection of graphical images. You can easily enhance your presentation with clip art in a few easy steps.

To Insert Clip Art into a Slide:

- In the **Outline view** in the left pane, select the slide in which you want the clip art to appear.
- Click the **Clip Art button** on the **Drawing Toolbar**.



OR

- Select the slide you want to work on.
- Click on the down-pointing arrow in the **Task Pane** → **Insert Clip Art**.

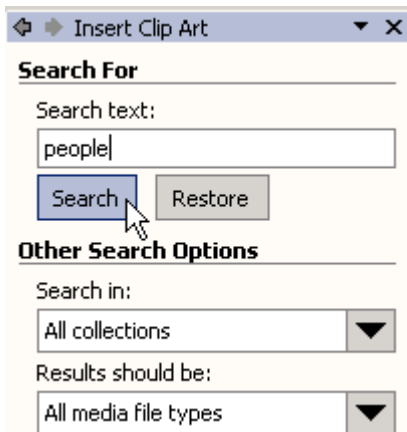
✓ If you are working with a slide that has an icon for clip art, click on the icon. You'll learn more about this later in this module.

Searching for Clip Art

Once you activate the **Insert Clip Art** option, a list of clip art appears on the screen. If you don't see the clip art that you want for your presentation, you can browse for it using the **Search feature**.

To Search for Clip Art

- With the **Search dialog box** open, type the name of the image that you are looking for. For example, people, buildings, winter.
- Click on **Search**.



- Click on the clip art that you want to insert



- Click **OK**.
- The clip art appears in your slide.

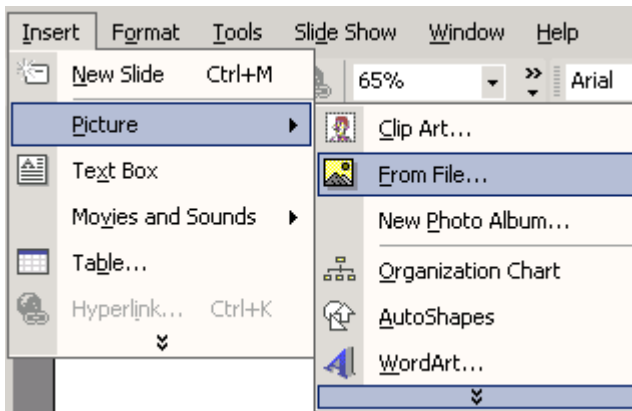
✓ You can move or resize clip art and other content once it has been inserted into a slide. You'll learn more about this later in this module.

Inserting Pictures from File

Adding **pictures** to your presentation may also help engage the audience's attention. You can insert pictures that you have on file on your computer.

To Insert a Picture from File:

- Click on **Insert** → **Picture** → **From File**.



- Navigate to the folder where you've saved your picture.
- Click on the picture you want to insert into the slide.

OR

- Click the **Insert Picture** button on the **Drawing Toolbar**.



- Navigate to the picture that you want to use.
- Select the picture and click **Insert**.

Inserting Pictures or Clip Art Using a Slide Design Layout

Some slide layouts already have icons for clip art and pictures. PowerPoint allows you to insert pictures through these **slide design layouts**.

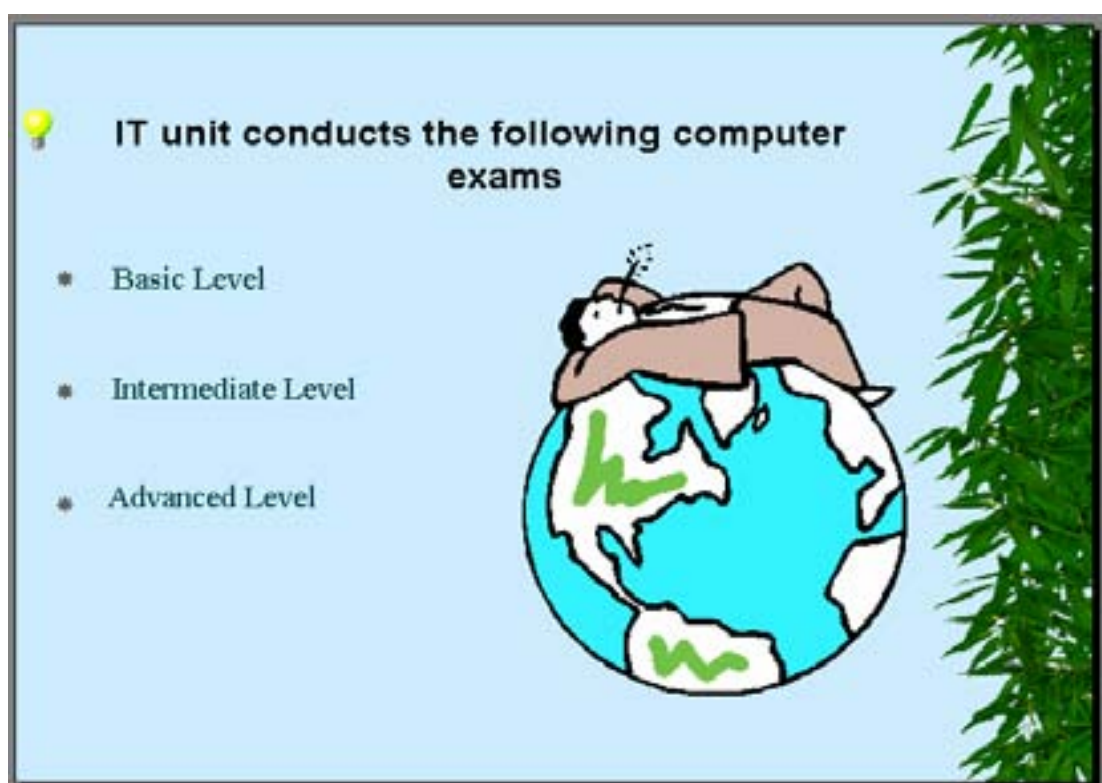
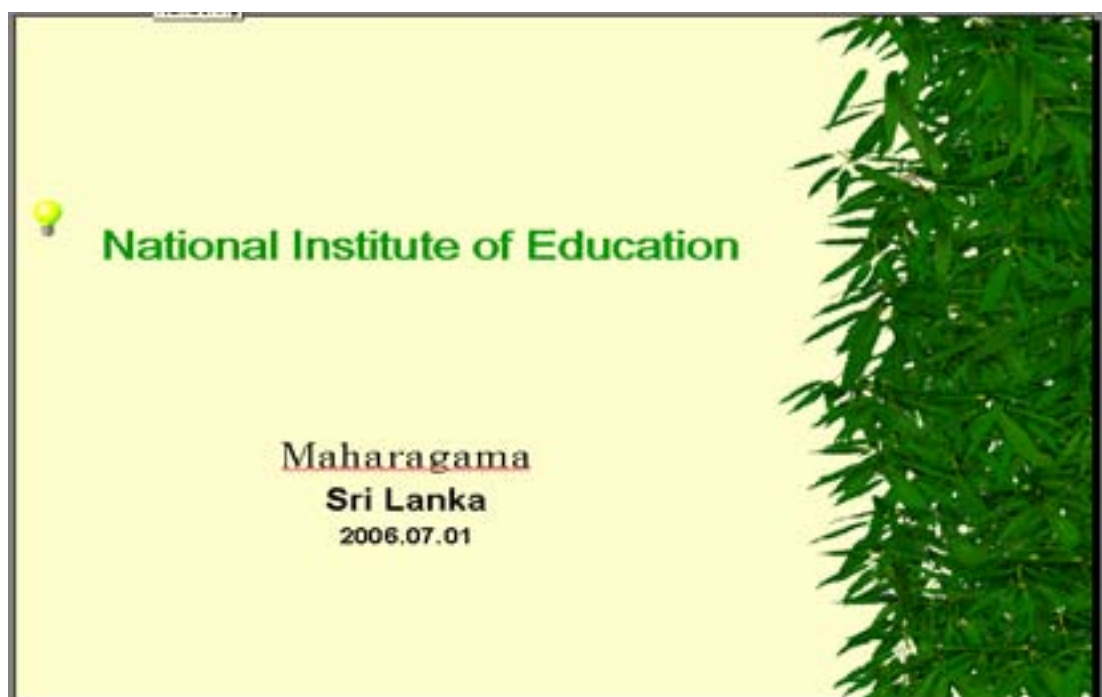
To Insert Pictures Using a Slide Design Layout:


- Browse the slide design layouts to find one with an icon for a picture.
- Click on the picture icon.



- Navigate to the picture you want to insert.
- Select the picture and click **Insert**.


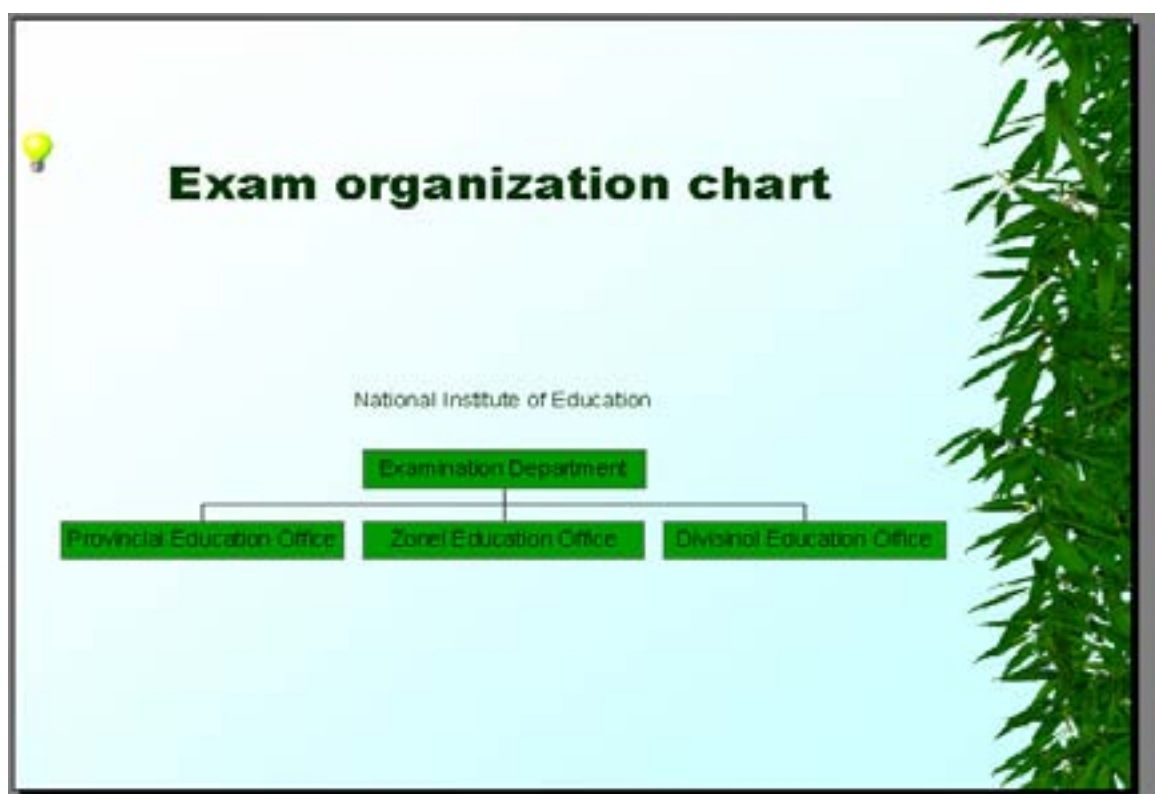
Sample Presentation





Results Summary

BASIC LEVEL	No. of students sat Exam	No. of students passed Exam
	1200	900
INTERMEDIATE LEVEL	750	500
ADVANCED LEVEL	420	250

Competency 9 : Develops simple databases to elicit information.

Competency Level 9.1: Explores the Concept of Database

Activity 9.1 : Let's explore the concept of Database

Time : 120 minutes

Quality Inputs :

- Four copies of in Reading Material 9.1.1
- Student Registration Table in Annexe 9.1.2
- Four copies of group exploration instructions in Annexe 9.1.3
- Demy sheets and Markers

Learning – Teaching Process:

Step 9.1.1 :

- Tell students that they are going to develop a database of students.
- Get them to suggest some important data items and a framework for presenting the data items.
- Conduct a discussion to highlight the following:

- Data can be presented through a table.
- A table can be prepared to illustrate fields & records.
- Serial No, Name, Address, and Age are some fields. of a student database

Serial No	Name	Address	Age

- Data presented in rows are records.
- Serial No is the unique field that helps differentiate between similar records.
- A database can consist of one or more tables.
- A key field helps link a number of tables together.

(15 minutes)

- Step 9.1.2** :
 - Divide the class into four groups.
 - Provide each group with the Reading Material and a copies of the student registration table and the assignment.
 - Involve groups in the exploration.
 - Prepare groups for a presentation at the plenary..

(60 minutes)

- Step 9.1.3** :
 - Get each group to present its findings.
 - Request the presenters themselves to fill gaps, if any.
 - Seek for constructive comments of other groups
 - Conclude the session by highlighting the following.

- A database is a collection of related data organized in one or more tables.
- Student Registration Table on its own is a simple database.
- This can be converted to a complex database by combining it with other Tables on Courses, Teachers and Examinations.
- The five fields of the student registration database are Registration No, Name, Address, Group and Payments.
- Data on a particular student pertaining to these fields form a record.
- The Student Registration Table given has five fields and eight records.
- Each data item of a record is called an attribute.
- Each field represents one attribute of a record.
- A table can have two or more similar records.
- In such situations a key field helps identify these records separately.
- The Student Registration No. That serves this purpose is the key field of the record.

(45 minutes)

Criteria for Assessment and Evaluation

- Names basic components of a Table and defines them.
- Accepts the table as a useful tool for systematic organization of data.
- Interprets a table in terms of the basic components of a DBMS.
- Develops a complex concept in terms of its basic components.
- Derives meaning from text.

Reading Material**What is a database?**

A collection of data can be defined simply as a database. A database is organized in lists of related information. For example, a database for a school can have about details of Teachers, Students, subjects, Equipments and so on.

A Relational database is a collection of tables, which are related to each other and stored in one place. A relational database in which more than one table can share information.

What is a table?

Table is a primary object of a database. In a database, it may contain several topics that represent tables. For example, a database for a school can have tables of Teachers, Students, subjects, Equipments and so on.

In a table, there are two components named as Record and Fields.

What is a Record?

A record shows information about a single item or a single person in the table. All the details relating to one person or item can be put on that record. Information in a record can be broken down into several fields. Therefore record can be defined as a collection of fields.

What is a field?

A field is a piece of data within a record. In a teacher record, things like NAME, ADDRESS, BIRTH DATE, JOB TITLE, GRADE, SALARY etc. can be identified as Fields of the record. Each field has a name that identifies it.

Table of Student Registration

Register No	Name Of Student	Address	Group	Payment (Rs.)
001	Kamal	Polonnaruwa	A	1000
002	Nimal	Kandy	A	1200
003	Ravi	Galle	B	800
004	Wimal	Colombo	C	1200
005	Lal	Negambo	B	1000
006	Nayana	Jaffna	C	1200
007	Dinithi	Matale	A	1000
008	Sandini	Ratnapura	C	750

Instructions for the group exploration

- You will be working in four groups with the following four topics assigned to the four groups
 - Database
 - Table
 - Field
 - Record
- Go through the relevant definition in the handout to be familiar with the topic given.
- Study the table to identify the place of topic in it
- Be prepared to introduce the topic to the whole class in relation to the table

Competency 9 : Develops simple databases to elicit information.

Competency Level 9.2 : Creates a simple database with a single table, manually

Activity 9.2 : Let's design a simple database

Time : 90 minutes

Quality Inputs :

- Five copies of datasheet in Annexe 9.2.1
- Demy sheets and markers.

Learning – Teaching Process:

Step 9.2.1 :

- Expose the data sheet to the class, prepared for developing a database Annexe 9.2.1
- Ask them to write down the appropriate field names from given table.
- Conduct a discussion to highlight the following.

- Data in the sheet can be categorized under the following eight headings referred to as field names
 - Registration number
 - Name
 - Address
 - Telephone Number
 - Date of Birth
 - Sex
 - School
 - Fees
- Data in a field is associated with type and size
- Some examples of data types are:
 - Text (e.g. Name of a student)
 - Number (Marks)
 - Date/Time (Date of birth)
 - Currency (Registration Fees)
- A collection of fields makes a record
- Each record is identified through a unique field

(20 minutes)

- Step 9.2.2** :
- Divide the class into five groups
 - Get each group to identify a different set of data
 - Provide each group with a copy of the data sheet
 - Get them to use the data to develop a manual database
 - Identify every field of records & complete the table
 - Add a identification field as the key field to identify each record

(40 minutes)

- Step 9.2.3** :
- Get each group to present its completed tables.
 - Conduct a discussion to highlight the following.

- In developing a database it is very important to identify a unique field.
- Student registration number is the unique field in the student database.
- In designing a table, one has to identify relevant field names and data types.
- Field size has to be decided in terms of the maximum number of characters to be incorporated

(30 Minutes)

Criteria for Assessment & Evaluation

- Describes the main characteristics of a database.
- Accepts that each record of a database needs to have a unique identification
- Uses given information to develop a database.
- Organizes information systematically to facilitate decision-making.
- Selects relevant items for a task at hand.

Annexe 9.2.1

Personal Data of Ten Students

Ajith Rajapaksha
15, Circular Rd,
Polonnaruwa
Royal Central College
1967.05.27
Male
0777-851517
1200/=

Polonnaruwa
Nagara M.V
1967.04.09
Female
077-9023771
1200/=

Amali Silva
15, "Vasana"
1st Cross Street,
Hingurakgoda.
Ananda B.V
1988.06.01

Rohini Amarasinghe
12, Jayagath Mawatha,
Aluthwewa.
Seevali M.V
1978.03.21
Female
078-5187701
1200/=

Dinithi Thilanga
487, Govt Housing Scheme,
New Town,
Polonnaruwa
Thopawewa M.V
1988.06.06
Female
Tharaka Amarasena
Lake View Garden,
Polonnaruwa

Sandini Amasha,
100, School Lane,
New Town
Minneriya C.C
1990.05.24
Female
027-2221212
1200/=

Instructions for the group exploration

- You will be assigned with the task of developing one of the following databases.
- Inventory of a school Computer Learning Center (CLC).
- Salary particulars of schoolteachers.
- Daily sales of the school canteen.
- Identify at least five fields for the database given.
- Select data at least for five records.
- Develop your database incorporating fields and records.
- Use the data in the data sheet to develop a separate database.
- Identify the unique field of this database.
- Check to see whether the database assigned to your group is also associated with a key field.

Competency 9 : Develops simple databases to elicit information.

Competency Level 9.3 : Creates relational database manually

Activity 9.3 : Let's simplify our tasks by manipulating relational databases.

Time : 120 minutes

Quality inputs :

- An enlarged version of the diagram in Annexe 9.3.1.
- Three copies of the Group Exploration Instructions in Annexe 9.3.3.
- Three copies of the graded directions 9.3.2
- Three computers with DBMS installed.
- Demy sheets and markers

Learning –Teaching process:

Step 9.3.1 :

- Expose the diagram to the class.
- Get students to match the companies with their products.
- Also request students to name three attributes each for the companies and their products.
- Ask them to identify the difficulties that they would encounter when combining the two sets of attributes.
- Conduct a discussion to highlight the following.

- Some attributes of the company are company number, name and address.
- Some attributes of a product are Item number, name, volume and colour.
- The two unique attributes in the two groups are company number and item number
- These are unique because no number can be duplicated and no record can exist without a number.
- When developing a single table including all the attributes time and storage space are normally wasted due to duplication.
- Relational databases enable users to prevent these difficulties.

(15 minutes)

- Step 9.3.2** :
 - Divide the class into three groups.
 - Provide each group with copies of exploration instructions, graded directions, demy sheets and markers.
 - Send the three groups to the three computers.
 - Assign tasks and involve the groups in developing the databases
 - Prepare groups for a whole-class presentation.

(45 minutes)

- Step 9.3.3** :
 - Get groups to present their findings.
 - Conduct a discussion to highlight the following.

- A relational database consists of a collection of tables that store particular sets of data.
- Repeating groups are identified and placed in two tables to reduce redundancy of data.
- A Primary Key is one or more columns whose values uniquely identify a row in a table
- A unique attribute which does not allow duplication in a table is called a primary key.
- If the primary key is not assigned, there can be duplication of records in a table.
- Unique key field helps to create a relationship between two tables.
- The relationship in a Relational DBMS are of three types.
 - One-to-one
 - One-to-many
 - Many-to-Many

Criteria for assessment and evaluation

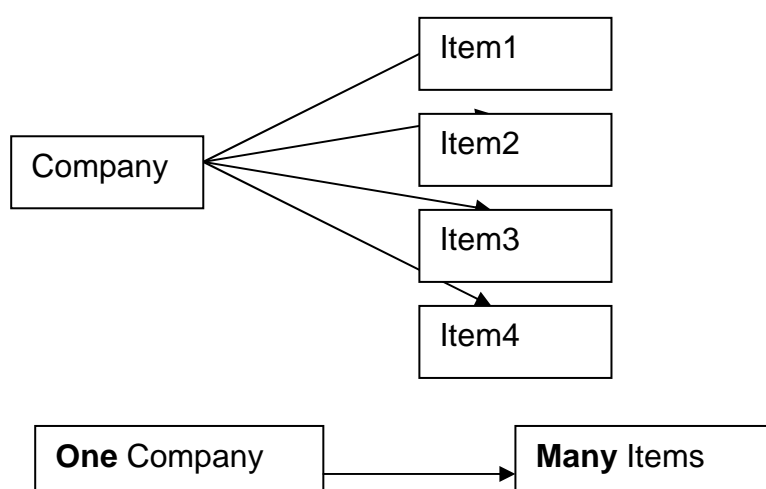
- Explains the concept of relational database in one's own words.
- Accepts the value of using relational databases to save time and energy of users and storage space of computers.
- Designs tables to manage data, needs of users and converts same into electronic media.
- Develops models to facilitate complex tasks.
- Avoids duplication to make the maximum of available limited resources.

Annexe 9.3.1

Diagram to simplify the concept of relational database

Company No	Company Name	Company Address	Item No	Item Name	Item Volume	Item Colour
01	ABC	Colombo	A001	Soda	300ml	no
01	ABC	Colombo	A002	Orange	200ml	Orange
01	ABC	Colombo	A003	Ginger	300ml	Brown
01	ABC	Colombo	A004	Lime	300ml	Green
02	XYZ	Galle	A005	Soda	300ml	no
02	XYZ	Galle	A006	Orange	200ml	Orange
02	XYZ	Galle	A007	Ginger	300ml	Brown
03	PQR	Kandy	A008	Cola	300ml	Red
03	PQR	Kandy	A009	B&W	300ml	White
03	PQR	Kandy	A010	Choco	300ml	Brown

Annexe 9.3.2



-

Annexe 9.3.3

Instructions for the Group Exploration

- You will be working in three groups developing the following three databases assigned randomly to the groups.
 - Database of students by courses offered.
 - Database of teachers by schools
 - Database of divisions by province
- Go to the computer assigned to your group.
- Read the task assigned to your group to familiarize yourself on the two databases to be combined.
- List attributes separately for the two databases.
- Open the DBMS package loaded in the computer.
- Start by assigning a name to the newly created database.
- Develop two tables including the attributes identified.
- Identify one attribute unique to each group of attributes and assign it as the primary key.
- Identify the relationship among the tables as one to one, one to many or many to many.
- Combine the two tables by placing one of the primary keys as appropriate.
- Discuss with others in your group to identify the foreign key.
- Write down, on the demy sheet given the steps you followed.
- Also write down the problems encountered and what you did to overcome them.
- Be prepared for a whole-class presentation.

Competency 9 : Develops simple databases to elicit information.

Competency Level 9.4 : Creates a Relational Database manually

Activity 9.4 : Let's design a database containing several tables.

Time : 60 minutes

Quality Inputs :

- Table containing details of Education divisions and schools in Annexe 9.4.1
- List of Definitions in Annexe 9.4.2
- Five copies of group exploration instructions in Annexe 9.4.3

Learning – Teaching Process:

Step 9.4.1 :

- Divide the class into 5 groups.
- Provide each group with a copy of Annexure 9.4.1
- Let them study the table & list out some of its drawbacks.
- Conduct a discussion about the previous database and highlight the following.

- A Database is a collection of tables.
- Tables can be used to enter different types of data.
- To identify each record, there should be a unique field known as Primary Key.
- Storing same data repeatedly (data duplication) limits the storage capacity and wastes the time.

(15 Minutes)

- Step 9.4.2** : • Divide the group into five groups.
- Provide each group with a copy of Annexure 9.4.2 and ask them to study it.
 - Provide each group with group exploration instruction
(25 Minutes)

- Step 9.4.3** : • Get each group to present their findings
- Let them give their comments
 - Conduct a discussion and highlight the following.

- Relational database can contain one or more tables, which are related to each other.
- Each table should consist of a unique field known as Primary key.
- Such a system is called A Relational Database Management System (RDBMS).
- When we place the primary key of the table in another table as one of its fields to create a relationship, this key is known as Foreign key
- A relationship is an association between two or more tables. Relationships are expressed in the data values of the primary and foreign key.
- A foreign key is a field whose values are the same as the primary key of another table.
- Related tables are useful to make any queries only with required data.

(25 Minutes)

Criteria for Evaluation & assessment

- Explains the Relational Database Management system
- Identifies primary & foreign keys to make relationships
- Design a database with multiple tables
- Builds up good relationships.
- Simplifies complex databases.

Details of Education divisions & schools in Polonnaruwa.

Div_Name	Div_Address	Div_ContactNo	School_Name	Sch_Address	Sch_ContactNo	No_Teachers
Polonnaruwa	New Town, Polnnaruwa	027-2228967	Royal Central College	New Town, Polnnaruwa	027-2222401	141
Polonnaruwa	New Town, Polnnaruwa	027-2228967	Thopawewa M.V	Sacred City, Polonnruwa	027-2221234	98
Polonnaruwa	New Town, Polnnaruwa	027-2228967	Muslim Central College	Kaduruwela, Polonnaruwa	027-2222471	89
Polonnaruwa	New Town, Polnnaruwa	027-2228967	Vigitha Central College	Pulasthigama, Polonnruwa	027-2228321	75
Polonnaruwa	New Town, Polnnaruwa	027-2228967	Nagara M.V	Kaduruwela, Polonnruwa	027-2225055	64
Hingurakgoda	Main Street, Hingurakgoda	027-2247513	Ananda Balika M.V	Hathmuna Rd, Hingurakgoda	027-2224111	132
Hingurakgoda	Main Street, Hingurakgoda	027-2247513	Minneriya Central College	Minneriya Rd, Hingurakgoda	027-2224518	114

Hingurakgoda	Main Street, Hingurakgoda	027-2247513	Medirigiriya Central College	Minneriya, Hingurakgoda	027-2224110	134
Hingurakgoda	Main Street, Hingurakgoda	027-2247513	Giritale M.V	Polonnruwa Rd, Giritale	027-2228857	84
Hingurakgoda	Main Street, Hingurakgoda	027-2247513	Bakamoona Central College	Matale Rd, Bakamoona	027-2226363	102
Dimbulagala	Manampitiya, Polonnruwa	027-2222471	Manampitiya M.V	Manampitiya, Polonnruwa	027-2225151	69
Dimbulagala	Manampitiya, Polonnruwa	027-2222471	Vilayaya Central College	New Town, Aralaganvila	027-2227788	105
Dimbulagala	Manampitiya, Polonnruwa	027-2222471	Valikanda M.V	Main Street, Valikanda	027-2220707	66
Dimbulagala	Manampitiya, Polonnruwa	027-2222471	Dimbulagala M.V	Dimbulagala, Polonnruwa	027-2223333	44

Relational Database

A database system in which the database is organized and accessed according to the relationships between data items. Relationships between data items are expressed by means of tables.

Relational Database Management System.

A database management system with the ability to access data organized in tabular files that can be related to each other by a common field (item). An RDBMS has the capability to recombine the data items from different files, providing powerful tools for data usage

Relationships and Keys

A **relationship** is an association between two or more tables. Relationships are expressed in the data values of the primary and foreign keys.

A **primary key** is a column or columns in a table whose values **uniquely identify** each row in a table. A **foreign key** is a column or columns whose values are the same as the primary key of another table. You can think of a foreign key as a copy of primary key from another relational table. The relationship is made between two relational tables by matching the values of the foreign key in one table with the values of the primary key in another.

Keys are fundamental to the concept of relational databases because they enable tables in the database to be related with each other.

Annexe 9.4.3

Instruction for the group exploration

Engage on the following assignment in groups and prepare to make a team representation at the end.

1. Division_No, Division_Name, Division_Address, School_No, School_name, School_Address
2. Doctor_id, Doctor_Name, Doctor_Addres, Patient_no patient_Name, Patient Address, Patient_Phone

Competency 9 : Develops simple databases to elicit information.

Competency Level 9.5 : Uses DBMS software to convert a manually developed relational database into electronic media

Activity 9.5 : Let's design a Relational database using a DBMS application.

Time : 120 minutes

Quality Inputs :

- Copy of two tables in Annexe 9.5.1
- Ten copies of Reading material containing steps for the creation of Relational tables in Annexe 9.5.2
- Tables created by the students in previous activity in Annexe 9.5.3

Learning – Teaching Process:

Step 9.5.1 :

- Expose two tables to the class and ask them to study the tables and find whether the tables contains related records.
- Conduct a discussion to highlight the following

- Both tables contains data of same students
- The field Reg No appears in both tables.
- Therefore, there is a relationship between these two tables.

Step 9.5.2 :

- Divide the class into 10 groups
- Provide each group with a copy of Annexure 9.5.1
- Ask them to study the previous manually database with two tables
 - Divisions
 - School

- Load the database software
- Ask them to create the database with two tables with relevant data types & formats.
- Save the tables and enter the data given.
- Move around the computer lab, monitor progress & help.
- Conduct a discussion & highlight the following

- DBMS software provide facilities dealing with multiple tables
- These tables can be related with one and other. Data stored in related tables can be Manipulated and utilized.

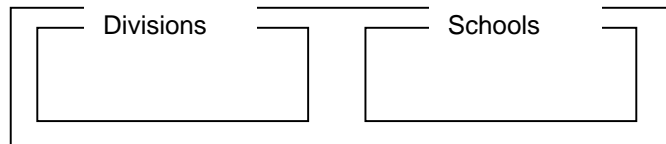
- Step 9.5.3** :
 - Ask the participants to go through the Annexe 9.5.1.
 - Open created database and & follow the grade directions to make a make relationship between the tables.
 - Define primary keys and foreign keys.

(50 minutes)

- Step 9.5.4** :
 - Move around the computer lab, monitor progress & help. The following is highlighted.

- RDBMS is a collection of related tables.

Education database



- Tables can be related to each other in a variety of ways.
- The simplest relationship is the one-to-one relationship, in which one record in a table is related to another record in a separate table. A one-to-many relationship is one in which one record in a table is related to multiple records in another table.
- Tables can contain a primary key, which differentiates records from one another. Foreign keys relate tables in the database to one another. A foreign key in one table is a primary key in another.
- RDBMS software facilitates to create other important objects from the related tables. They are
 - Queries
 - Forms
 - Reports

Criteria for Assessment & Evaluation

- Explains technology of relational databases.
- Designs a relational database using database software.
- Accepts value of relational database
- Selects appropriate primary & foreign keys, data types, formats and field sizes.
- Manipulates information to suit different purposes

Annexe 9.5.1

Students' registration table

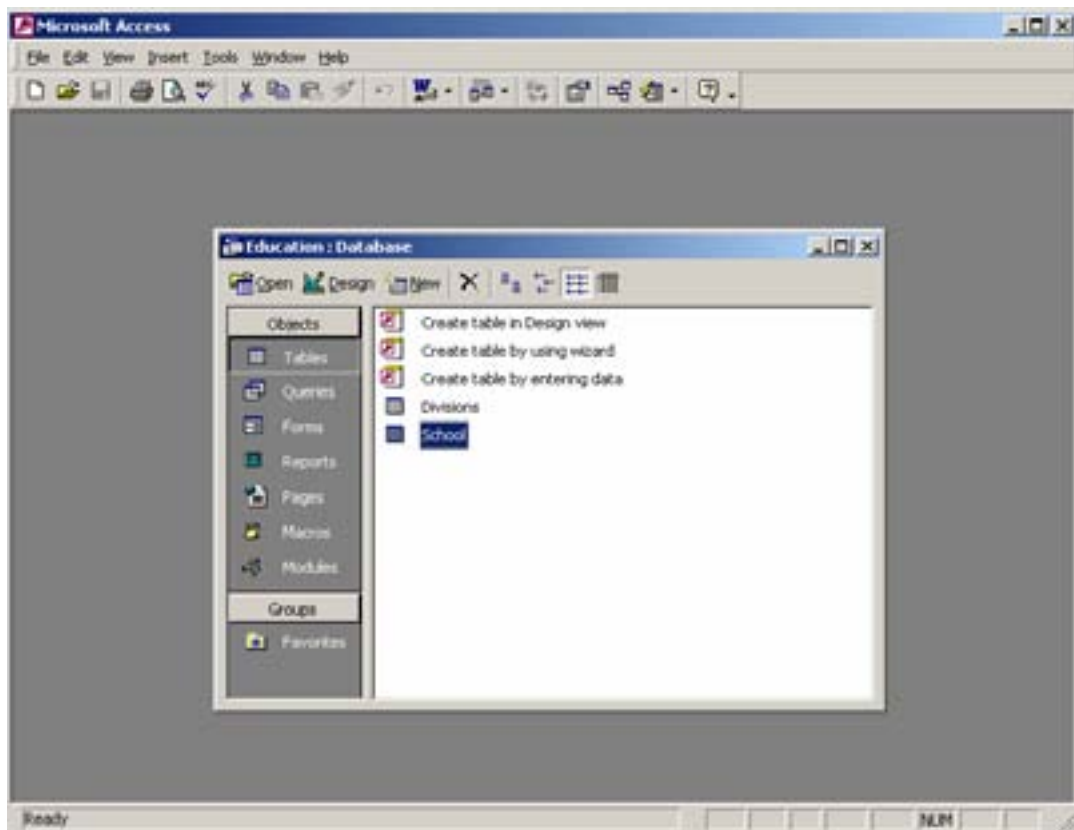
REG NO	NAME	ADDRESS	BIRTH DATE
001	Dinithi Thilanga	Galle	06/06/1996
002	Saman Perera	Colombo	01/02/1995
003	W.Vazeer	Polonnaruwa	01/18/1996
004	Kavindi Amarasekara	Kandy	12/12/1995
005	Nuwan Bandara	Kegalle	02/23/1996

Students' marks table

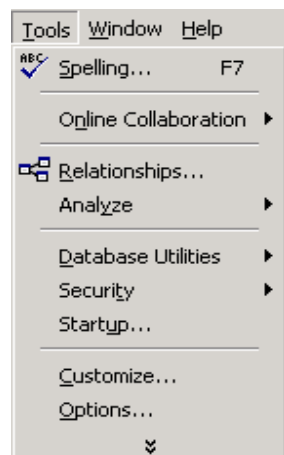
INDEX NO	REG NO	WORD MARKS	EXCEL MARKS	ACCESS MARKS
E1	001	32	56	58
E2	002	98	87	76
E3	003	69	67	81
E4	004	36	45	44
E5	005	31	28	55

Creating a Relationship using Ms Access 2000

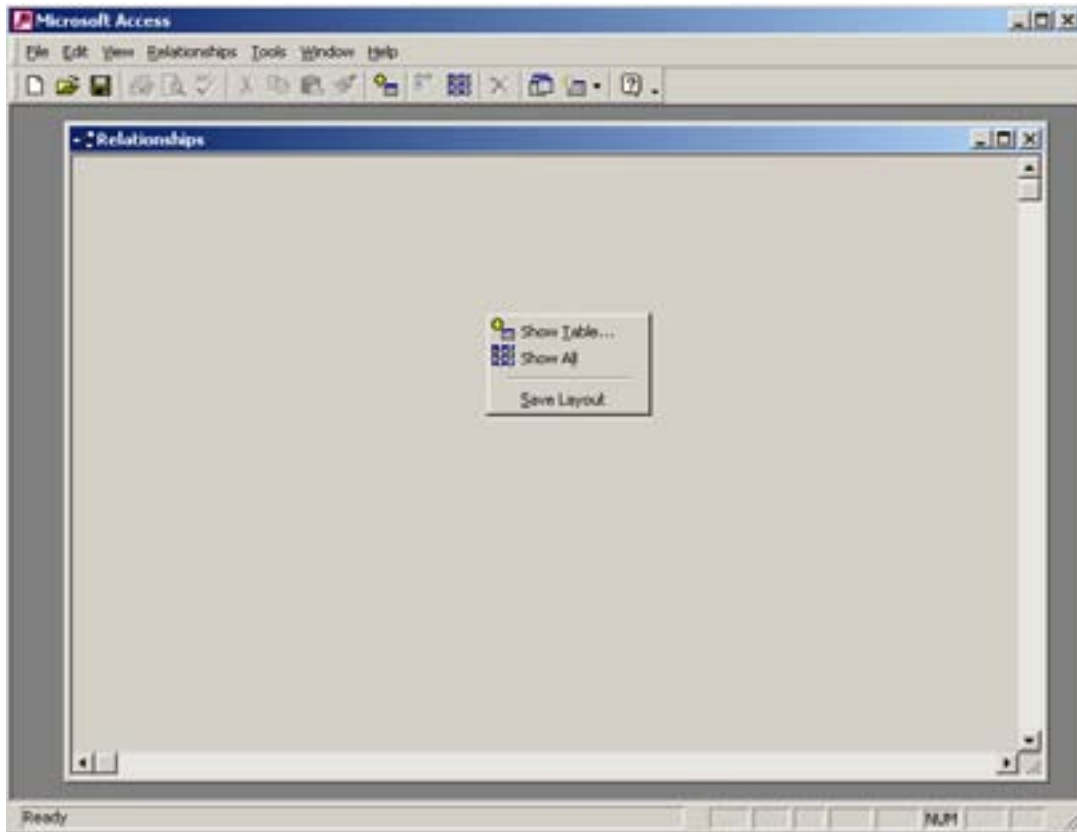
Step1: Open the database & show the tables



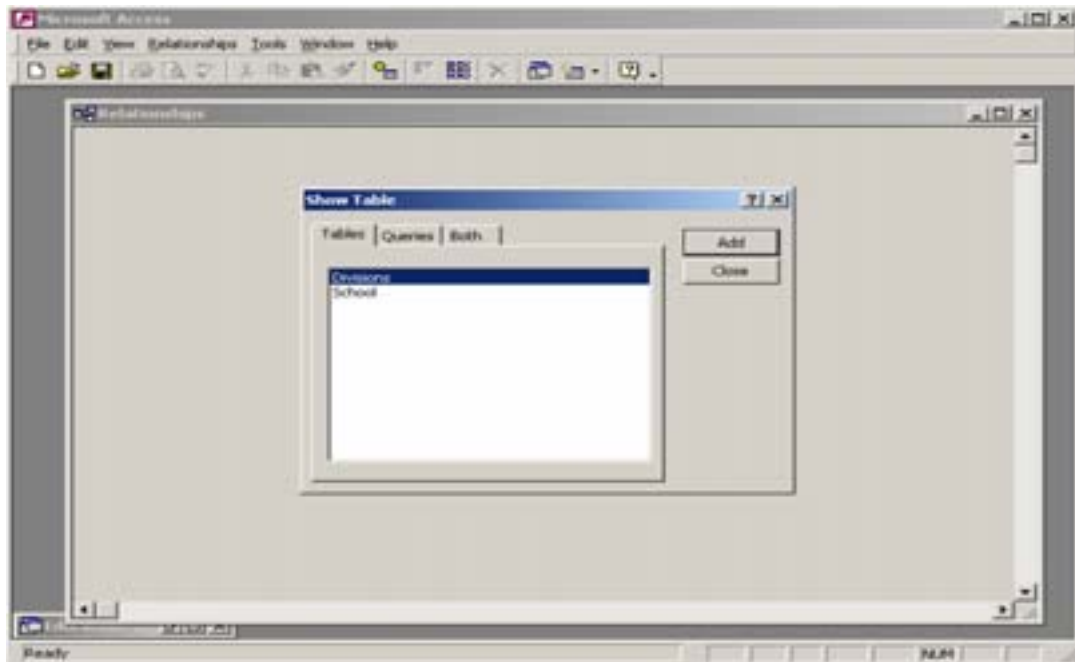
Step2: Tool —————> Relationships



Step 3: From the Relationship window, right click and select the Show Table



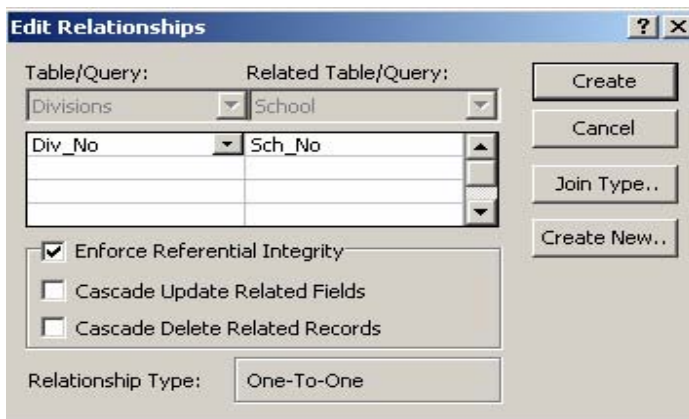
Step 4: From the Show Table click Add button to add the tables onto the Relationships window.



Step5: Click close on the Show table dialog box

Step6: From the Relationship window Drag the field name from one table and drop it onto the related field in the other table

Step 5: From the Edit Relationship dialog box, select **Enforce Referential Integrity** check box and click **Create**. Relationship type is shown below dialog box.



Step 6: Save the Relationship and Close the Relationships window.

Annexe 9.5.3

Engage participants on the assignment in groups and prepare them to make a team representation at the end.

Create tables using following fields and make relationship between both tables.

(make relationship using MS Access facilities)

Fields:

1. Division_No, Division_Name, Division_Address, School_No, School_name, School_Address
2. Doctor_id, Doctor_Name, Doctor_Addres, Patient_no patient_Name, Patient Address, Patient_Phone

Exercise 1. Creating database with two tables.

1. Create a database named as "**My second table**" on the D: drive.
2. Create first table in design view and add the following fields.
 - Product Id
 - Product Code
 - Description
 - Producer Id
 - Price
3. Set the data type and field size
4. Set the Product Id as the primary key
5. Save the table design as Product & close.
6. Open the table & enter the data.
7. Create the second table in design view with the following fields.
 - Producer Id
 - Producer name
 - Address
 - Telephone Number
 - Web site
8. Set the appropriate data types & field size.
9. Set the Producer Id as the primary key.
10. Close the and save the table as Producer.
11. Open the Producer table & enter the data.

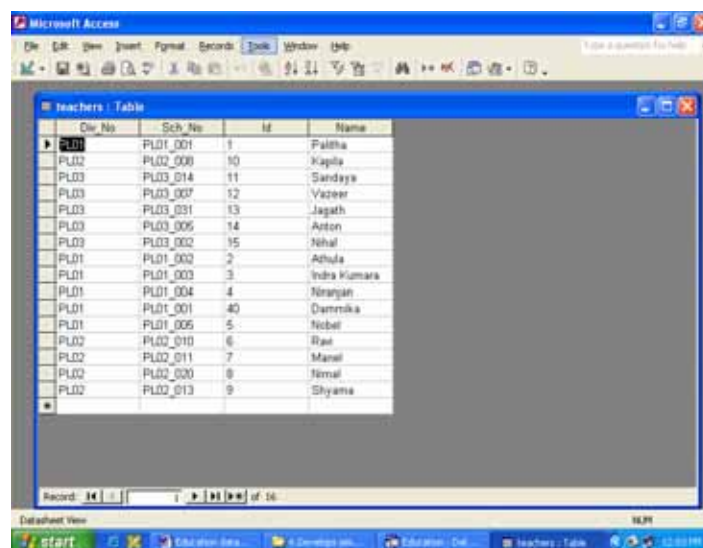
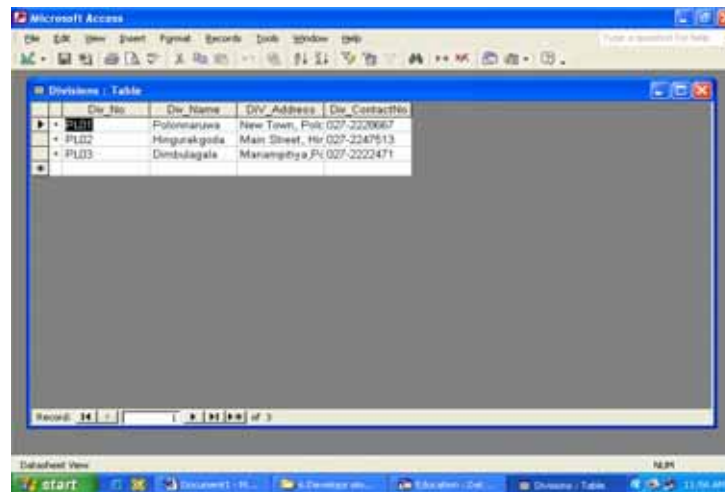
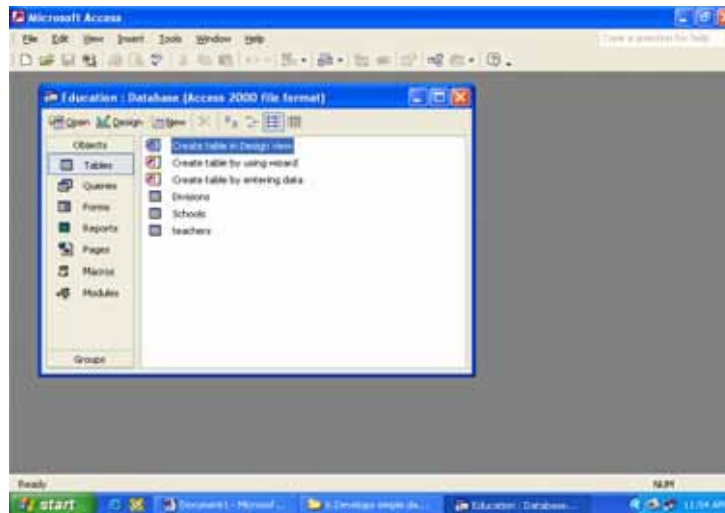
Exercise 2. Creating Relationships

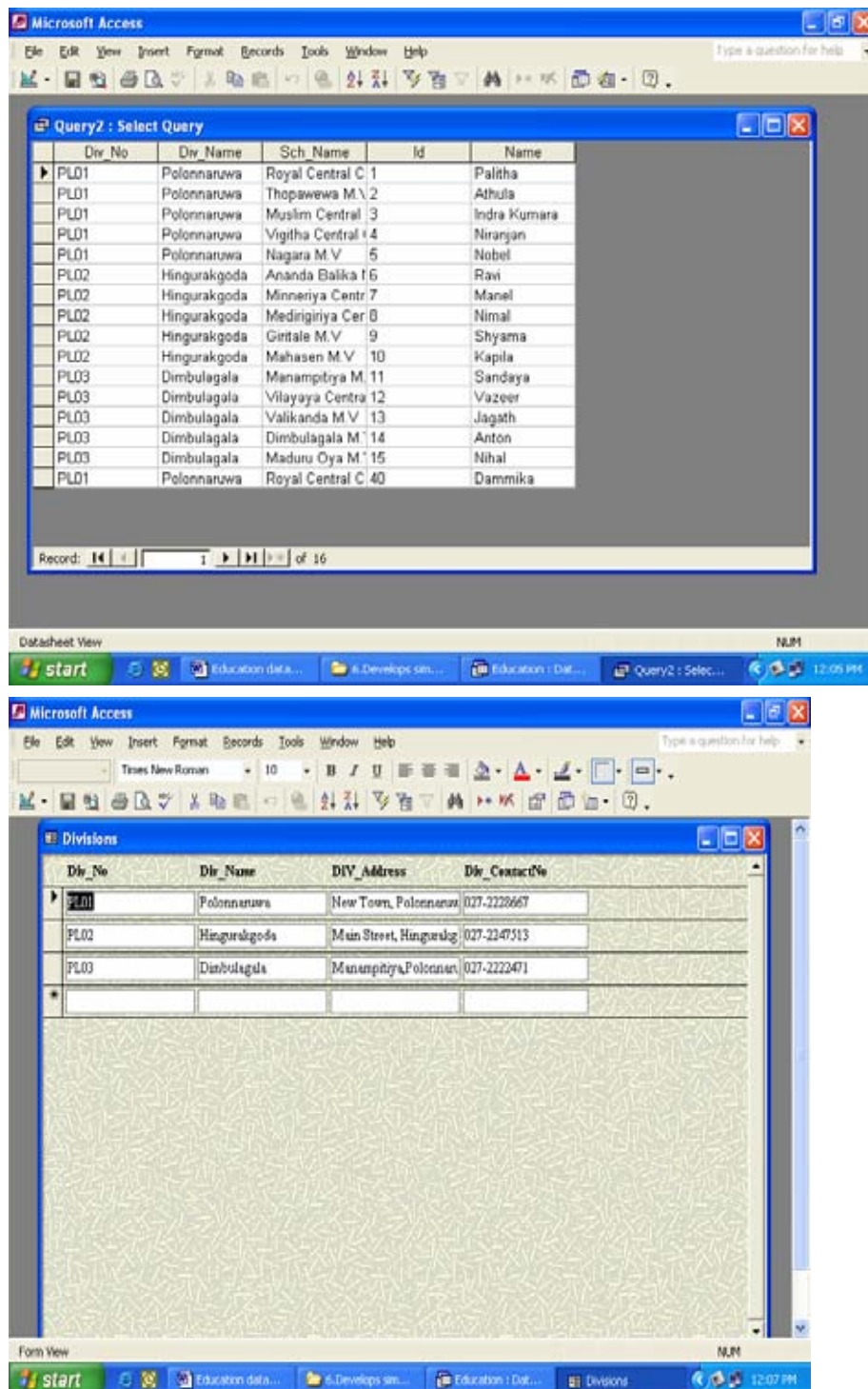
1. Open the Relationship window and add all the tables.
2. Set up a “proper” relationship between the Producer Id & the Product Id.

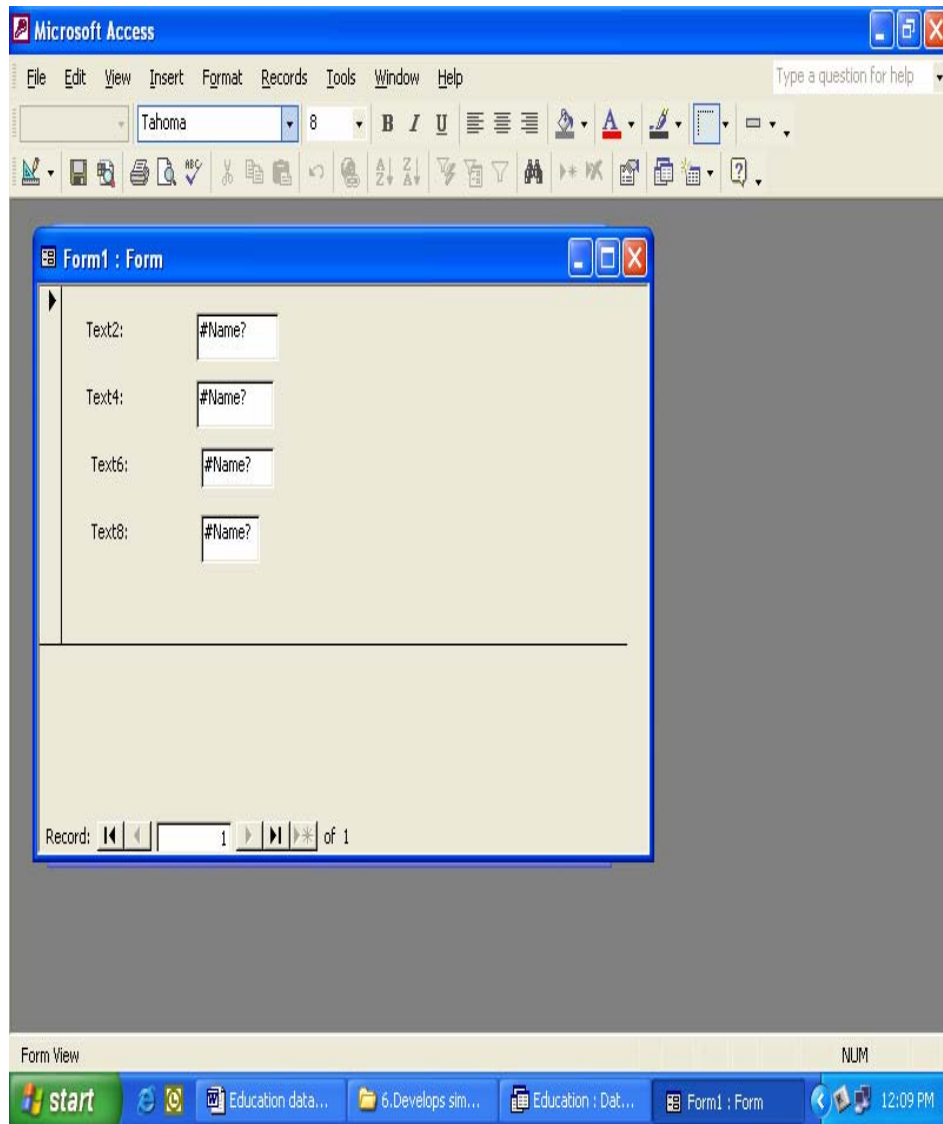
Exercise 3. Creating a simple query.

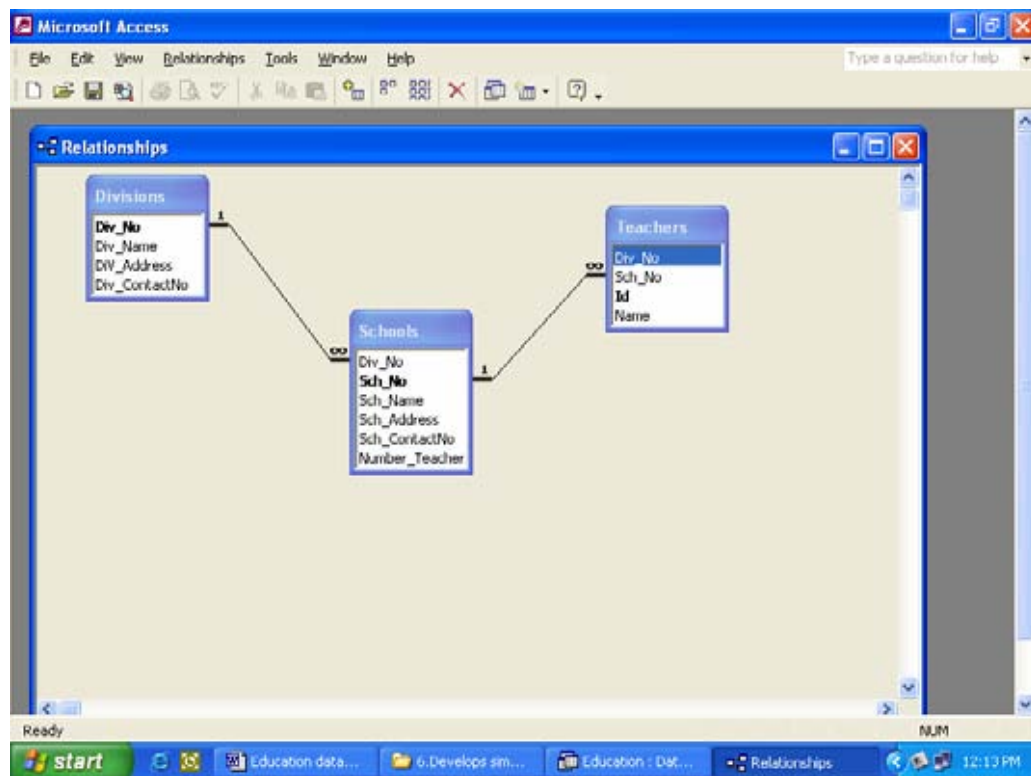
1. Open the "**My second database**".
2. Select **Queries** object & select design view.
3. Add the tables named Product and Producer.
4. Add Product Id, Description, and Price from Product table and add Producer name and telephone number from Maker table.
5. Close & save the Query as **My first Query**.

Education database









Competency 9 : Develops simple databases to elicit information.

Competency Level 9.6 : Creates queries to extract information

Activity 9.6 : Lets design a query

Time : 60 minutes

Quality input :

- Student database on a bristol board in Annexe 9.6.1
- Four copies of soft copy in Annexe 9.6.2
- Four copies of Graded directions in Annexe 9.6.3

Teaching Learning process:

Step 9.6.1 :

- Teacher displays the manually prepared database (Name , Address, DOB, Gender)
- Ask the following questions
 - Name two students who are under 25 years of age
 - Find 3 girls who come from Bandarawela
- Conduct the discussion to highlight the following.

- Data can be extracted for requirements.
- DOB column should be referred and calculated to find the names of the students who are below 25 years of age..
- Gender column and Address column should be referred to find the names of the girls whose addresses are in Bandarawela
- Referring to more columns for a requirement is a difficult task.
- These tasks can be easily done by using computers.

(15 minutes)

- Step 9.6.2:
- Divide the class into four groups.
 - Provide each group with a copy of Annexe 9.7.2 and Annexe 9.7.3
 - Assign each group a different set of conditions for data extraction.
 - Prepare each group to present its findings

(30 minutes)

- Step 3:
- Get each group to present its findings.
 - Conduct a discussion to highlight the following

- Query is used for extracting data from table
- Data can be extracted using conditions on one or more fields.
- Conditions should be written according to the valid syntax
- Data from one or more table can be retrieved (When they are relational)
- Sorting and show are some facilities that can be used when extracting data
- The extracted data can be saved or printed

(15 minutes)

Criteria for assessment and Evaluation

- Describes the usefulness of a query.
- Accepts that data duplication can be avoided by using query.
- Uses queries to obtain information.
- Reflects on previous experiences to arrive at suitable answers.
- Expresses verbally the facts obtained from an experience.

Competency 9 : Develops simple databases to elicit information.

Competency Level 9.7 : Uses forms to append data and view information.

Activity : Lets design a form

Time : 60 minutes

Quality Input:

- A printed list of records on a single sheet. Annexe 9.7.1
- A set of printed cards each containing the same records in annexe 1 with record number in Annexe 9.7.2
- Graded directions to create a form in Annexe 9.7.2
- Soft copy of School database

Learning teaching process:

Step 9.7.1:

- Get two volunteers and ask one to display Annexe 9.7.1 and the Other to display Annexe 9.7.2
- Ask both volunteers to show the fifth record to the class
- Ask both volunteers to tell the address of the ninth record to the class
- Conduct a discussion to highlight the following

- Displaying one record at a time gives clear view of the record.
- Form gives attractive view.
- Forms can be designed electronically in computers as an interface to the records in the table.

(15 minutes)

Step 9.7.2:

- Divide the class into three groups.
- Provide each group with a copy of Annexe 9.7.1 , Annexe 9.7.2 and School database.
- Assign each group to design a form for the given table.
- Assign each group the following task
 - Adding new records

- Editing records
- Deleting records

(30 minutes)

- Step 9.7. 3:**
- Get each group to present its findings.
 - Conduct a discussion to highlight the following.

- A database with source table is essential to create forms
- The form gives an attractive graphical user interface to handle records
- Properties are useful to make forms attractive..
- Adding, Deleting and Editing records is quick and simple in form view.

(15 minutes)

Criteria for assessment and evaluation.

- Describes the advantages in the use of forms.
- Accepts that attractively design form is easy to understand.
- Handles records using forms
- Works with peers cooperatively.
- Understands a document.

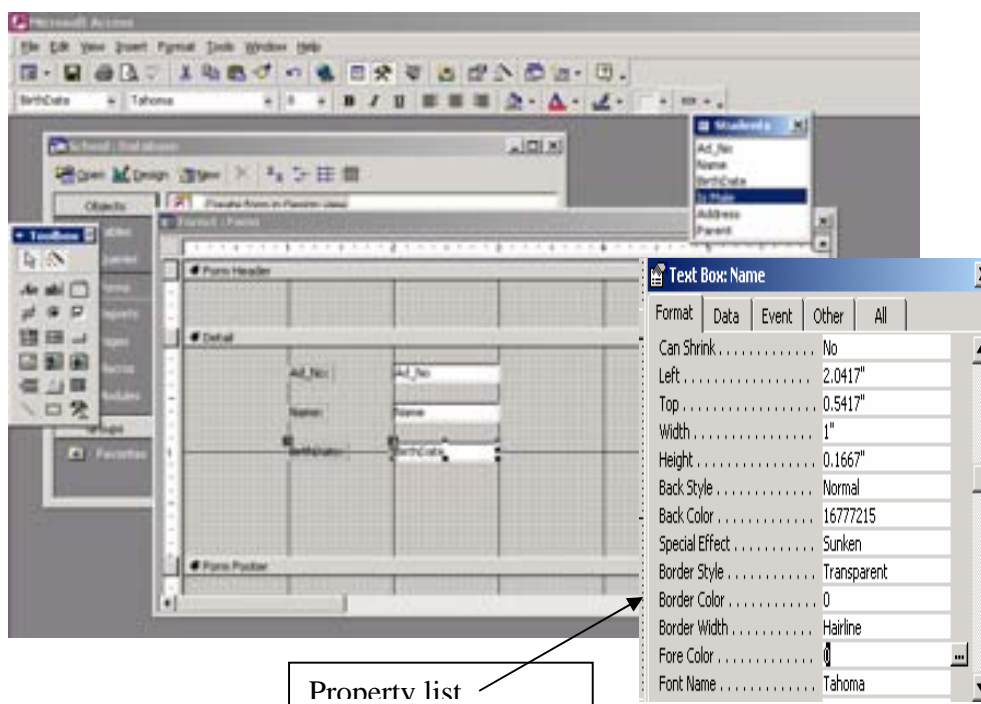
Data Sheet View

No	Student Name	Age	Sex	Address1
01	Nimal Fernando	23	Male	Negombo
02	Sriyantha Perera	22	Male	Matara
03	Nilmini Dissanayaka	24	Female	Colombo
04	Kanthi Samaranayaka	23	Female	Matale
05	Susantha Perera	20	Male	Maharagama

Creating Form in Design View

To create a form, follow these steps:

- Click **Forms** object on the database window
- Click the **New** button on the window.
- Select "Design View" and choose the **table or query** associated with the form from the drop-down menu.
- Select **View** → **Toolbox** from the menu bar to view the floating toolbar with additional options.
- Add controls by clicking and dragging the field names from the Field List to the floating window.
 - To add controls for all of the fields in the Field List, double-click the Field List window's title bar and drag all of the highlighted fields to the form
 - Text box is used for value controls
 - Label is used to display any text messages.
- Arrange the field name controls as you wish.
- Right click on any control and click **properties** and in the list change **Back color** / **Fore color** / **Special Effects** etc. to make it attractive



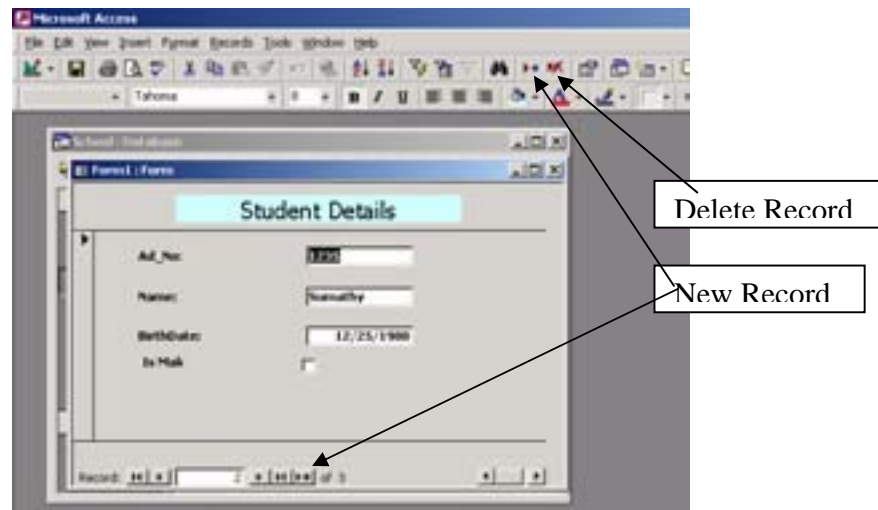
(Screen capture of a form Design)

To add controls for header/footer to display a form heading.

- Click **View** —→ **Form Header/ Footer** to have a form heading
- Draw a text box in the form header part using the toolbox.
- Type heading text in it.
- Once designing part is over save the form.

Adding Records Using A Form

- Open the form you saved
- click the **New Record** button at the bottom or **Insert** —→ **New Record**
- Fill out the fields of the form. Press the **Tab** key to move from field to field or click the mouse on the field .
- Click next / previous / First / Last buttons to display records.



Deleting Records using a form

- Open the form
- Click **next / previous / First / Last** buttons to display any specific record
- Then click Delete record button or **Edit** —→ **Delete Record**

Editing Records using a form

- Open the form
- Click **next / previous / First / Last** buttons to display any specific record
- Then click edit the data you want

Note: Any changes made in the form is applied to the source data (table /query)

Part 3

Assessment and Evaluation

Introduction

Assessment and Evaluation can be identified as two interconnected programs that can be conveniently implemented in the classroom in order to identify the levels of competence achieved by students so as to establish that the students have actualized the expected learning outcomes through the learning-teaching process. If the assessment is implemented properly, it is not difficult for all the students studying in the class to acquire a competency at least proximate to the relevant skill. On the other hand, what evaluation expects is to identify what the levels of competency the students have achieved are.

Teachers involved in assessment can provide their students with guidance of two types. This guidance is commonly called “feedback” and “feed forward”. When the weaknesses and inabilities of students are discovered, it is the task of the teacher to provide feedback in order to overcome their learning difficulties and to provide feed forward to improve their skills when their abilities and strengths are discovered.

It is necessary that students find out as to which competencies in the course they have been able to actualize and the relevant levels for the success of the learning-teaching process. Accordingly, determination of the levels of competency students have achieved through the program of evaluation and the communication of student progress to parents as well as other relevant sections, is expected of the teacher.

This curriculum comprises a student centered, competency-based, activity oriented approach. The transformation role of the teacher and learning through action becomes the core for the purpose of making life meaningful.

An attempt has been made to integrate assessment and evaluation with the learning and teaching of the curriculum implemented through a series of activities developed in the past. When students are involved in exploration under the second step of each activity, the teacher will be able to subject them to assessment and to evaluation when students present their findings and subject same to elaboration.

The teacher is expected to move among the students engaged in exploration, observe the tasks they are involved in, help them to solve in the classroom itself any problems they happen to encounter and provide them facilities and guidance.

Five common criteria are suggested to facilitate the task of assessment and evaluation. Out of these criteria, the first three criteria are based on knowledge, skills and attitudes that combine to develop each competency. The two final criteria support students in the inculcation of two attitudes important in their life. The teacher should make an effort to identify these criteria and the five behavioral changes within the classroom itself while the students are active and strengthen them under assessment and quantify these behaviors under evaluation.

The third part of the course guide has been planned in order to introduce the suggested evaluation points and instruments of evaluation selected for this purpose. In this manner, students will be able to involve themselves in learning with interest and motivation while the learning teaching process is further broadened as a result of the evaluation process being implemented between as well as in the course of activities.

Instruments to Extend the Learning-Teaching Process

1. **Extension Stage** : Term 1, Instrument 1
2. **Objectives** :
 - To develop a booklet on the theoretical knowledge gained
 - To demonstrate relevant skills at a practical test
3. **Competency levels covered:** 1.5, 2.2, 2.3, 5.1 and 5.2
4. **Subject content covered** :
Computer peripherals.
Types of ports.
Connections.
Execution of menu driven packages.
Work ethics pertaining to basic computer operations
5. **Nature of Instrument** : Practical test based on completed assignment.

6. Instructions for implementation:

❖ For teachers:

- At the commencement of activity 1.5, tell students that they have to develop a booklet covering the following
 - Pictures/Drawings of computer peripherals with descriptions in own words.
 - Diagrams of connectors with relevant ports and descriptions.
 - Justification for selecting ports.
 - Sources of information collected
- Tell them that they are expected to demonstrate one of the following skills at the end of activity 5.2 assigned at random.
 - Selects ports to connect power and commonly used input and output devices.
 - Boot up the computer
 - Loads menu driven programs using given methods.
- Also tell them that their performance on the above skills will be evaluated taking into consideration their work ethics as well.
- Schedule the practical test and inform the date well in advance, to the students.
- Assign topics randomly and get students to demonstrate their practical skills.
- Get students to justify their actions, identify errors and report these to the class with what they have done to overcome the errors.

- Use the criteria suggested to give feedback on both theoretical and practical abilities developed.

❖ **For students:**

- Collect pictures/drawings of computer peripherals.
- Draw diagrams of connectors with relevant ports.
- Write brief descriptions to explain the items you have collected and the diagrams you have drawn.
- Indicate your information sources.
- Get the list of skills for the practical test from your teacher.
- Practice skills daily to improve your performance.
- Prepare and present yourself for the practical test.
- Perform the task assigned to you at random.
- Justify your actions and present the problems you have encountered with methods for solving them.
- Discuss the proficiency level you have reached with your teacher and take action to develop it further.

7. Format for assessment and evaluation :

Student Names	Criteria				
	Descriptive information in terms of sources tapped	Relevance of pictures and diagrams	Practical skills acquired	Verbal presentation	Work ethics

- **Proficiency Levels**
 - A – Excellent**
 - B - Good**
 - C - Average**
 - D - Should Improve**

Instruments to Extend the Learning-Teaching Process

1. **Extension Stage** : Term 1, Instrument 2
2. **Objectives** : To study a variety of documents to identify as many features as possible of the Word Processing application.
- To practise related skills.
 - To demonstrate skills acquired in a practical test.
1. **Competency levels covered:** 6.1, 6.2, 6.3 and 6.4
2. **Subject content covered** : ▪ The following facilities are made available in Word Processing.
- Page setup
 - Entering text
 - Text Editing and formatting
 - Inserting objects and tables
 - Saving and printing
 - Closing and opening
3. **Nature of Instrument** : Practical test based on completed assignment.
4. **Instructions for implementation:**

❖ **For teachers:**

- At the commencement of activity 6.1, tell students that they have to collect various types of documents to study formats used.
- Request them to paste the documents on bristol board with a brief description of the formats identified.
- Prepare students to practice Word Processing skills for a practical test to be conducted at the end of activity 6.4.
- At the test, pick one format from a document collected and request students to illustrate it.
- Use the criteria suggested to give feedback to students.

❖ **For students:**

- Involve yourself in this extension task as you begin working on activity 6.1.
- Collect various types of documents and study their formats.
- Paste all your document on bristol board and write a few statements to describe the formats.

- Practice Word Processing skills on the basis of the documents collected to prepare for a practical test at the end of activity 6.4.
- At the test, be prepared to replicate one of the documents you have collected.
- Discuss the proficiency level you have reached with your teacher and take action to develop skills further.
-

5. Format for assessment and evaluation :

Name of the Student	Criteria				
	Adequacy of documents collected	Accuracy of descriptions provided	Keyboard skills	Use of correct tools for WP functions	Creativity

- **Proficiency Levels**
 - A – Excellent**
 - B - Good**
 - C - Average**
 - D - Should Improve**

Sample Questions

1. Bill Gates: 1981 has said, “640 KB of primary memory is enough for any PC”.
 - a. What does KB stand for? [1 mark]
 - b. Express 640 KB in bytes? [2 marks]
 - c. Give two differences between Primary Memory and Secondary Memory? [3 marks]
 - d. The Personal Computer developed during 1980's is said to be belong to the 4th generation. Which generation does ENIAC belong to? [1 mark]
 - e. Do you think that the statement above is still valid today? Justify your answer. [5 marks]
2. Ravi wanted to buy a computer system. He asked Athula to help him in this matter. Athula is an expert in the use of computers. He had been a student at CRC. He took Ravi to the “Computer Shop”. There they were given a leaflet about computers and their specifications.

This leaflet reads as follows:

Processor:	Intel® Pentium®4 CPU 3.2GHz.
Motherboard:	Intel® P4
Memory:	512 MB
Mouse:	Wireless Optical Scroll mouse
VGA memory:	64 MB
Monitor:	17” Flat screen
Keyboard:	104 Standard
Sound:	Inbuilt 32 Bit
Speakers:	800 W
CD Rom:	52x
CD Writer:	16x
Software:	Linux (Open Source)

Athula explains that this computer has a processor with a higher speed than his and that his is a Pentium III.

- a. List 3 other different processors.
 - i.
 - ii.
 - iii.

[3 marks]

- b. The latest mouse in the market is the Wireless Optical Scroll mouse. List two other mice used with computers.
- i.
 - ii. [2 marks]
- c. In the 32 bit inbuilt sound card above,
- i. What is a Bit?
 - ii. Express 32 Bits in Bytes [2 marks]
- d. In the Linux open source software above,
- i. What is meant by software? [1 mark]
 - ii. What kind of software do you need to operate a computer? [1 mark]
 - iii. If you need to type a letter asking for quotations for a computer what software will you use? [1 mark]
 - iv. Suppose you are left-handed and you need to change your mouse buttons, how would you do this? [2 marks]

Please forward your suggestions and comments to the following e-mail address: nie.lk@hotmail.com