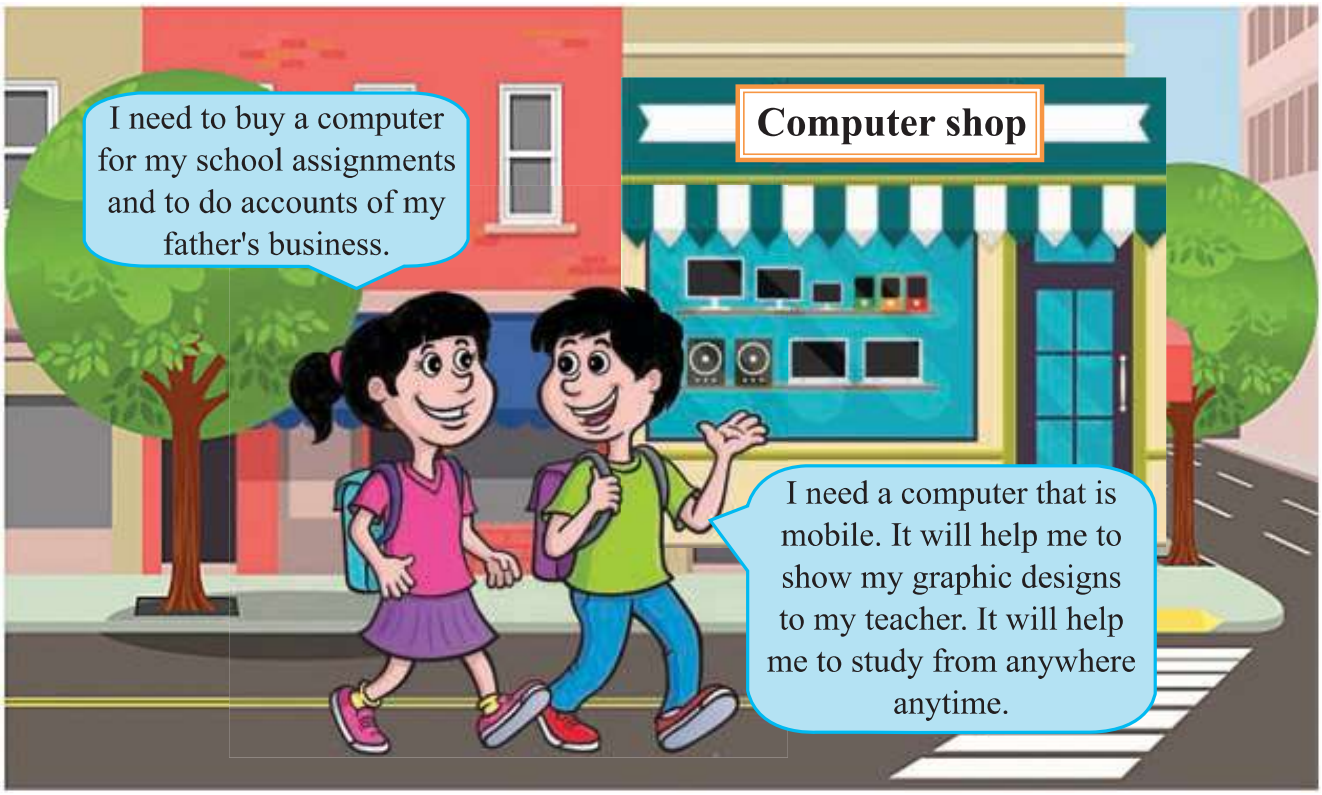
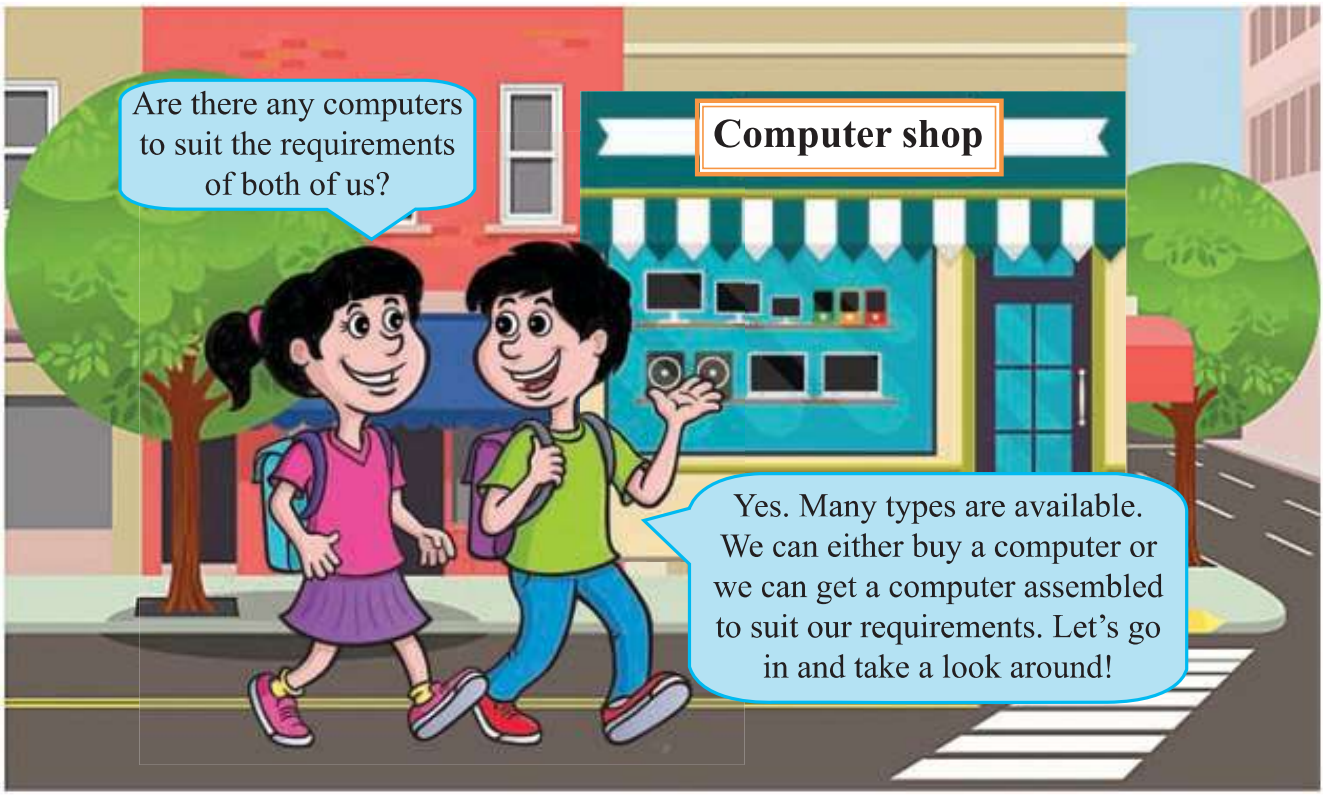
1 Preparation of Computer Specifications

This chapter will cover the following:

- Computers and peripheral devices
- Selection of devices for the user requirement
- Creating computer specifications
- Non-technical factors to be considered in purchasing a computer





1.1 Identifying the user

The one who uses a computer is generally referred to as a *user*. Different users working in different areas in Information and Communication Technologies have different designations. The following table shows a few such examples;

Table 1.1 : Types of users and their work

User name	Task
Programmer	Develops computer programs
Network Administrator	Manages and maintains computer networks
System Analyst	Designs information systems
Software Engineer	Develops software
Computer Application Assistant	Uses office application packages for office related tasks
Web Developer	Develops and maintains websites

The sixth chapter presents you a further study on the user.

Note - Users can be classified into mainly two categories: *system users* and *end users*. *End user* uses the software maintained by the *Systems User.*

1.2 Selection of a computer to suit user requirements

User requirements relate to tasks that are carried out by using a computer. The following Figure 1.1 provides examples for user requirements.

Figure 1.1 : Some examples for user requirements

A computer to suit user requirements can be selected from those available in the market (Figure 1.2), or a computer can be assembled to suit user requirements. Computers can be classified according to their nature and use as follows;

- **Non - portable computers**

Server computers, workstations, desktop computers and all-in-one computers, are all operated using the main electricity power supply. These computers are large in size and relatively heavy. Therefore, they are installed and used in places like houses, schools or offices.

- **Computers for mobile use**

Laptops, notebooks, tablet computers and a smart phones can be considered for mobile use. They operated with re-chargeable batteries. Therefore, they can be used when traveling in buses, trains, aeroplanes or from any convenient place.

Figure 1.2 : Examples for types of computers that are available in the market

Refer to workbook for Activity 1.1.

Important - The following are useful in learning more about computers.

- Printed or electronic commercial advertisements on computers
- Magazines and newspapers about computers
- Websites providing information on computers
- Obtaining information from an expert in computers
- Visiting the computer shops and gathering information

1.3 Computer peripheral devices

What are peripheral devices?

Input devices are used to feed data and instructions into a computer. *Storage devices* are used to store data. *Output devices* are used to provide the information processed with the input data. Accordingly, input, storage and output devices are called *peripheral devices*.

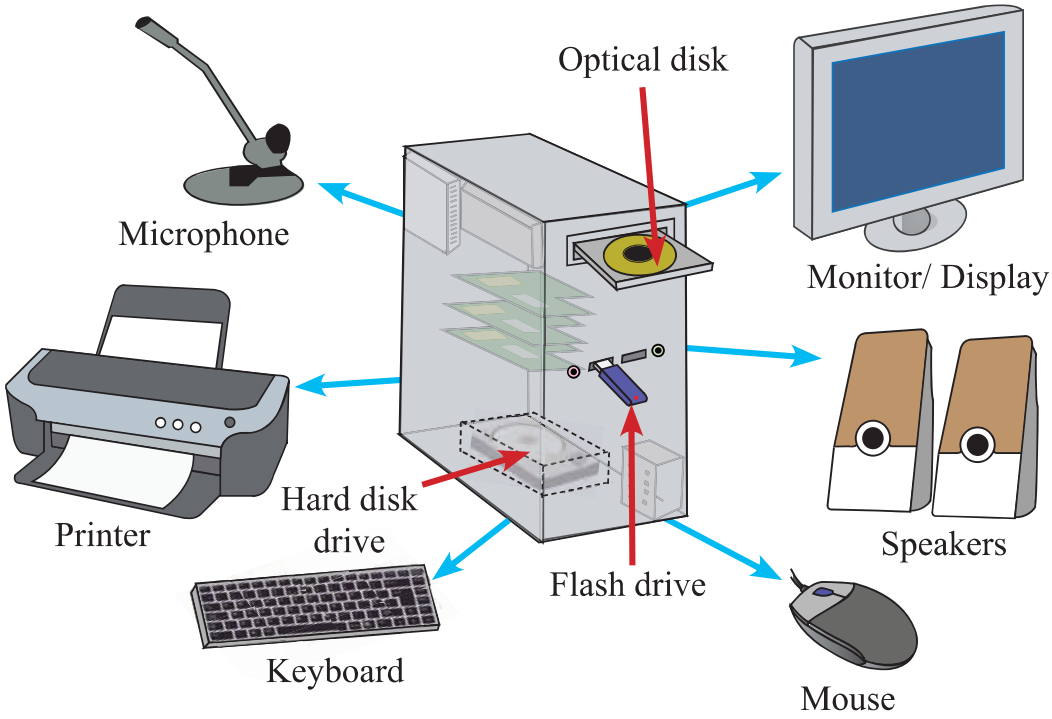
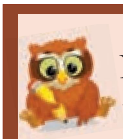


Figure 1.3 : Computer peripheral devices

The peripheral devices shown in Figure 1.3 above are classified in Table 1.2 as *input, output* and *storage*.

Table 1.2 : Peripheral devices

Input	Output	Storage
Keyboard	Monitor	Hard disk drive
Mouse	Printer	Optical disk drive
Microphone	Speaker	Flash drive
Touch screen		Magnetic tape drive



Note - The touch screen can be used to input data as well as to display information. Hence, it can be used as an input an output device.

Refer to workbook for Activity 1.2.

1.4 Computer specifications

What are computer specifications?

Before purchasing an item, it is important to be aware of the value and the quality of the item. Specifications are generally about the common features of an item.

For example, length, width and paper thickness, etc. determine quality of an exercise book. Basic specifications for an exercise book are as shown.

Basic specifications for an exercise book

Length	: 210 mm
Width	: 148 mm
Number of pages	: 40
Thickness of paper	: 60 GSM
Type	: Single ruled

Similar to the specification of a book, a computer also has its specification.

Specifications to suit different user requirements

Consider a situation where two students use two types of books for different purposes. For example, a square ruled exercise book for *mathematics* and a large size drawing book for *art*. Specifications for the two types mentioned above are as follows:

Specifications for an exercise book	
Length	: 210 mm
Width	: 148 mm
Number of pages	: 200
Thickness of paper	: 60 GSM
Type	: Square ruled

Specifications for a drawing book	
Length	: 300 mm
Width	: 210 mm
Number of pages	: 20
Thickness of paper	: 70 GSM
Type	: Blank

Different specifications for different purposes may result in price differences as well.

The specifications change according to user requirements in the above example. Similarly depending on the use of a computer its specifications also differs.

1.5 Specifications of computers and peripheral devices

The following shows some important factors of computer specifications;

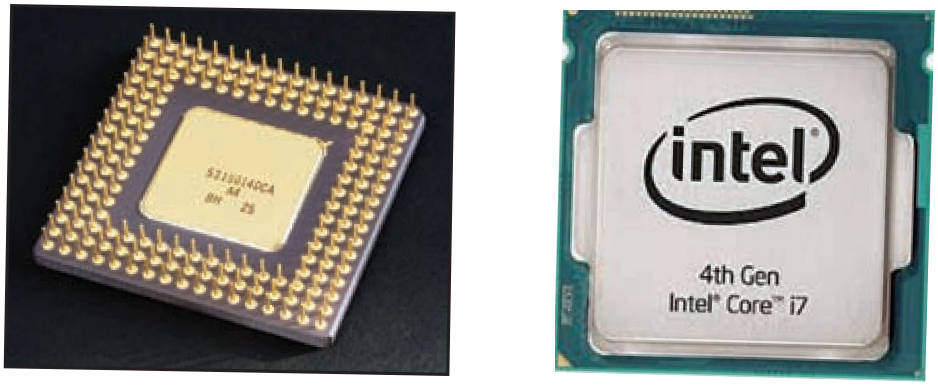
Important - One can generally assure the quality of an item through its specifications.

1.5.1 The processor

Humans are considered the most intelligent among all living beings. The brain (Figure 1.4) helps man to make decisions for actions taken. The brain also has the ability to swiftly respond to all sensations.

Figure 1.4 : the human brain

Much as the brain is most important for humans, the processor (Central Processing Unit) (Figure 1.5) is the most important part of a computer. The processor processes data swiftly. As such, the processor is considered the "Brain" of the computer.



The side that connects to the mother board

View from above

Figure. 1.5 : Central Processing Unit

Speed of the processor

A machine functions at a slower speed takes a longer time to complete a task while a machine functions at a higher speed takes a shorter or a lesser time to complete a task. Therefore, the amounts of work that could be carried out using these machines during a unit time differs.

Blender working at slower speed

Blender working at higher speed

Figure 1.6 : Preparation of fruit juice using blenders with different speeds

Figure 1.6 shows two blenders working simultaneously. The blender working at higher speed processes a larger quantity of fruit juice per unit time. A machine working at a higher speed provides better results.

The performance of a computer depends on the speed of the processor. A processor running at high speed is able to process more data during a unit time. That is, the performance of the computer is increases. Then the software can be run faster. Therefore, when selecting a processor, it is advisable to select one with a greater speed.

The speed of the processor is measured by the number of instructions executed per second.

Important - The speed of a computer is determined by the number of instructions execute per second.

The speed is measured in Hertz (units such as MHz or GHz).

1000 MHz = 1 GHz

Processor manufacturers

Several processor manufacturing companies, Apple, Intel and AMD (Advanced Micro Devices) exists.

Figure 1.7 : Different processors

Types of processors

Generally, the number of processors in a central processing unit is used to classify the Central Processing Unit. The following table shows examples of some Intel Central Processing Units with multiple processor units.

Table 1.3 : Types of processors

No. of CPUs	Type
1	Single Core
2	Dual Core
4	Quad Core

When the number of processors in a central processing unit increases its capacity also increases. Table 1.4 shows examples for Intel processors.

Table 1.4 : Different processors and their names

Type	Name	Examples
Single Core	*Pentium I, II, III, IV*	
Dual Core	*Dual Core/Core 2 Duo*	
Quad Core	*Core i3, i5, i7, i9*	

Refer to workbook for Activity 1.3.

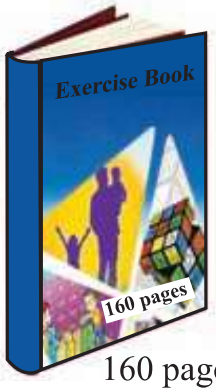
1.5.2 Hard disk

The hard disk provides permanent storage space for storing data and to installing all software. The hard disk is the main secondary storage device in a computer.

For example, an exercise book with 160 pages provide more writing space than a book with 40 pages. Similarly, more data can be stored in a hard disk with a greater storage capacity. (see figure 1.8).

40 page exercise book

1 TB hard disk



160 page exercise book

4 TB hard disk

Figure 1.8 : An analogy for hard disk capacities

Refer to workbook for Activity 1.4.

1.5.3 The monitor display

The main output device of a computer is its monitor display. Most often, a user interacts with a computer via its monitor/ display.

Monitor size

For examples, a wall clock is larger than a wrist watch. Time is easily seen on a wall clock because of its size. Similarly, larger monitors have better visibility.

A larger monitor size is useful in viewing a larger picture. The monitor size is measured in terms of its diagonal length in inches. (Figure 1.9).

Figure. 1.9 : Monitor Size

Monitor technology

Monitors can be classified into the following types according to the technology used by them:

- CRT (Cathode Ray Tube) Monitor
- LCD (Liquid Crystal Display) Monitor
- LED (Light Emitting Diode) Monitor

CRT monitor

LCD /LED monitor

Fig.1.10 : CRT and LCD /LED monitor

CRT monitors consume more electricity than the other two types. Further they are heavier and occupy more space due to its size. Hence, light weight LED and LCD monitors which consume less electricity are commonly used today. (See figure 1.10).

1.5.4 Main memory

Let us consider a shelf which is used to keep books and bags when entering a library (See figure 1.11). Students who enter the library keep their school bags in compartments. They takes their bags as they leave the library.

In a similar manners data and instructions are stored temporarily in the main memory (See figure 1.12) when the computer functions. A bigger rack for storage in a library can hold more school bags. Similarly, a higher capacity in the main memory stores more data and instructions. Therefore, a computer with a higher main memory capacity is better.

Figure 1.11 : Rack for school bags

Figure 1.12 : Random Access Memory (RAM) card act as the main memory

Important - The capacity of the main memory is measured in units of bits. (Mega Bite (MB) or Giga Bite (GB) etc).

1024 MB = 1 GB

Refer to workbook for activity 1.5.

1.5.5 Video Graphic Adapter (VGA)

Figure 1.13 : VGA card

The Monitor is the main output device of a computer. The output is fed to the monitor via the Video Graphic Adapter (VGA). There are two types of Video Graphic Adapter (VGAs). On board VGA is fixed to the mother board and Separate VGAs card can be fixed to mother board manually. The separate VGA card has a separate video memory and a processor. Separate VGA cards are useful for playing computer games.

Modern computers use DV1 or HDMI ports instead of VGA port (See Figure 1.14).

Figure 1.14 : Types of video ports

When HDMI cables are connected to a computer, a television screen or multi media projector, both sound and video signals are transmitted. When a VGA is used for the same purpose, only images are transmitted and a separate cable is required for sound.

1.5.6 Sound cards

Many computer are widely used for entertainment today. A sound card is required for listening to music and recording audio. A microphone connected to the sound card can be used to record (input) sounds while a speaker connected to the sound card can be used to play (output) sounds.

Most computers have the sound card built into the motherboard (See figure 1.15). A user can also connect external sound card to the computer if necessary.

Figure 1.15 : Built in sound card on mother board

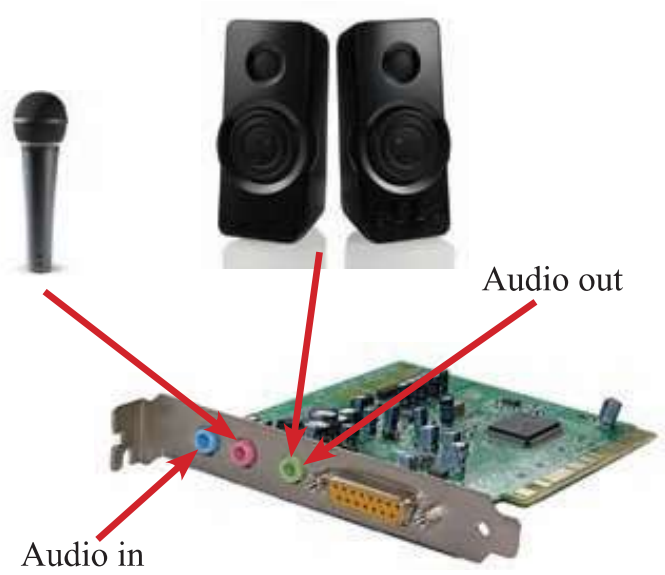


Figure 1.16 : External sound card

The ports of a sound cards use standard colour scheme for identification purpose.

Light green - Audio out (to connect speaker or headphone)
Light pink - Mic in (to connect microphone)
Light blue - Line in (to feed sound with external devices)

1.5.7 Pre-Installed software

An operating system provides the interface between the user and the hardware. The operating system is essential to run application software. Once the operating system is installed in a computer, the necessary application software can be installed.

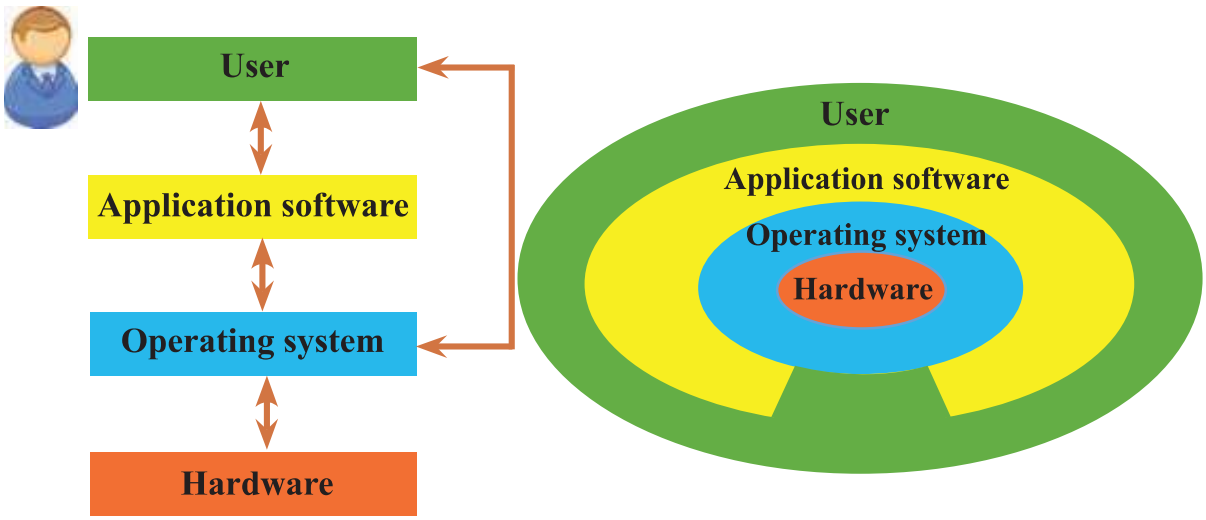


Figure 1.17 : Hardware, software and user

Free and open source operating systems such as Linux, Ubuntu can be obtained free of charge. Licensed operating systems such as Windows 8, Windows 10 to purchase. A trial version of an operating systems such as trail version of Windows 10 can be used only for a limited period. Required application software depends on the requirement of the user.

In buying a desktop computer or a laptop computer it is important to check whether an operating system has been pre-installed. Most often only DOS or LINUX computer systems are pre-installed. A computer with licensed software installed is more expensive than a computer with a free and open source operating system.

1.6 Non-technical features to be considered in purchasing a computer

Non-technical specifications such as manufacturer, type of book and price are considered in purchasing an exercise book. This applies to the purchase of a computer as well. Therefore, in purchasing a computer, non-technical specification must also be considered.

1.6.1 Warranty

Warranty is an important factor to be considered when purchasing a computer. Warranty given by the vendor and the manufacturer assurers to cover the defects for a certain period. Customer can get this warranty in many different ways.

a. Manufacturer warranty

The warranty which is given by the manufacturing company is known as the manufacturer warranty. If the device malfunctions during the warranty period, it is either repaired or replaced with a new one.

b. Extended warranty

Extended warranty is a prolonged warranty given to customers in addition to the standard warranty. Customer needs bearing additional cost for extended warranty.

c. On-site warranty

If a customer obtains an on-site warranty, technicians from the respective company visit the place of work to repair the product. They generally maintain, replace faulty parts and examine the operations of the machine.

There is a standard warranty when purchasing a computer. but, the warranty for the parts of the computer may differ from the standard.

For instance, a laptop computer with standard warranty for 3 years, may have only one year warranty for the battery.

1.6.2 Price

The price of a computer can vary according to the customer requirements.

e.g.

1. The price of a computer is rather high with a high speed processor.
2. A computer with a large monitor is comparatively high in price.
3. Price is low of a computer with a lesser memory capacity.
4. A computer inclusive high capacity hard disk drive is high in price.

It is advisable to compare prices to suit one's requirements from different places and select the computer with the lowest price.

Refer to workbook for Activities 1.6 and 1.7

Important - It is not advisable to purchase a computer considering only its price.

1.6.3 Services after-sale

Computer sales centers provide the following after-sales services to customers;

1. Technical advice
2. Technical assistance
3. Telephone, e-mail and website information (i.e. contact information) of the vendor

It is advisable for a user to consider the given information in purchasing a computer. Customer needs preparing specifications first. Then, a computer must be bought from a vendor with a reputed name and must be from a recognized manufacturer.

Refer to workbook for Activity 1.8

1.6.4 Ports and network connections

Ports are used to connect the peripheral devices to a computer. A user may select peripheral devices to suit one's requirements. However, the computer should have the necessary ports to connect them. A few such ports are given below;

a. Universal Serial Bus (USB)

The USB is the most widely used port to connect peripheral devices to the computer. Therefore, it is essential to have several USB ports.

Some peripheral devices that can be connected via USB Port;

Printer
Keyboard
Mouse
Scanner
External hard disk
External DVD drive
Digital camera
Web camera
Bar code reader
Memory card
Pen drive

Refer to workbook for Activity 1.9

b. Network ports/RJ45 connector

The computer uses RJ45 connector to connect to a network. (See Figure 1.18)

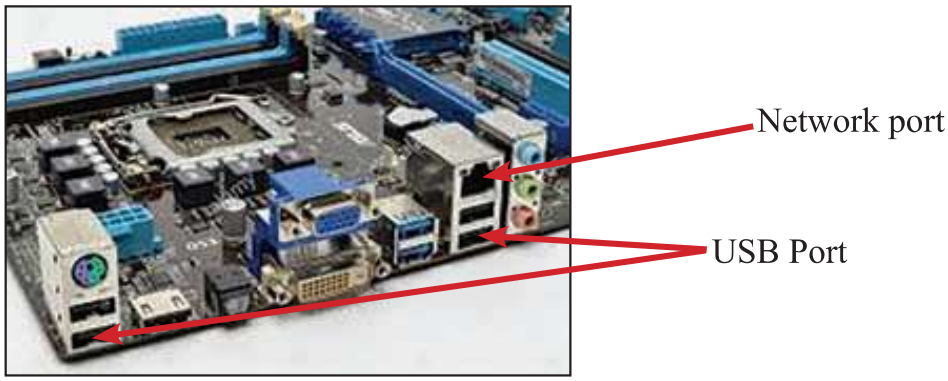


Figure 1.18

c. Bluetooth and Wi-Fi facilities

Bluetooth and Wi-Fi facilities provide cable free (i.e. wireless) network connections to computers. (See Figure 1.19)

Given below are a few basic specifications in purchasing a computer;

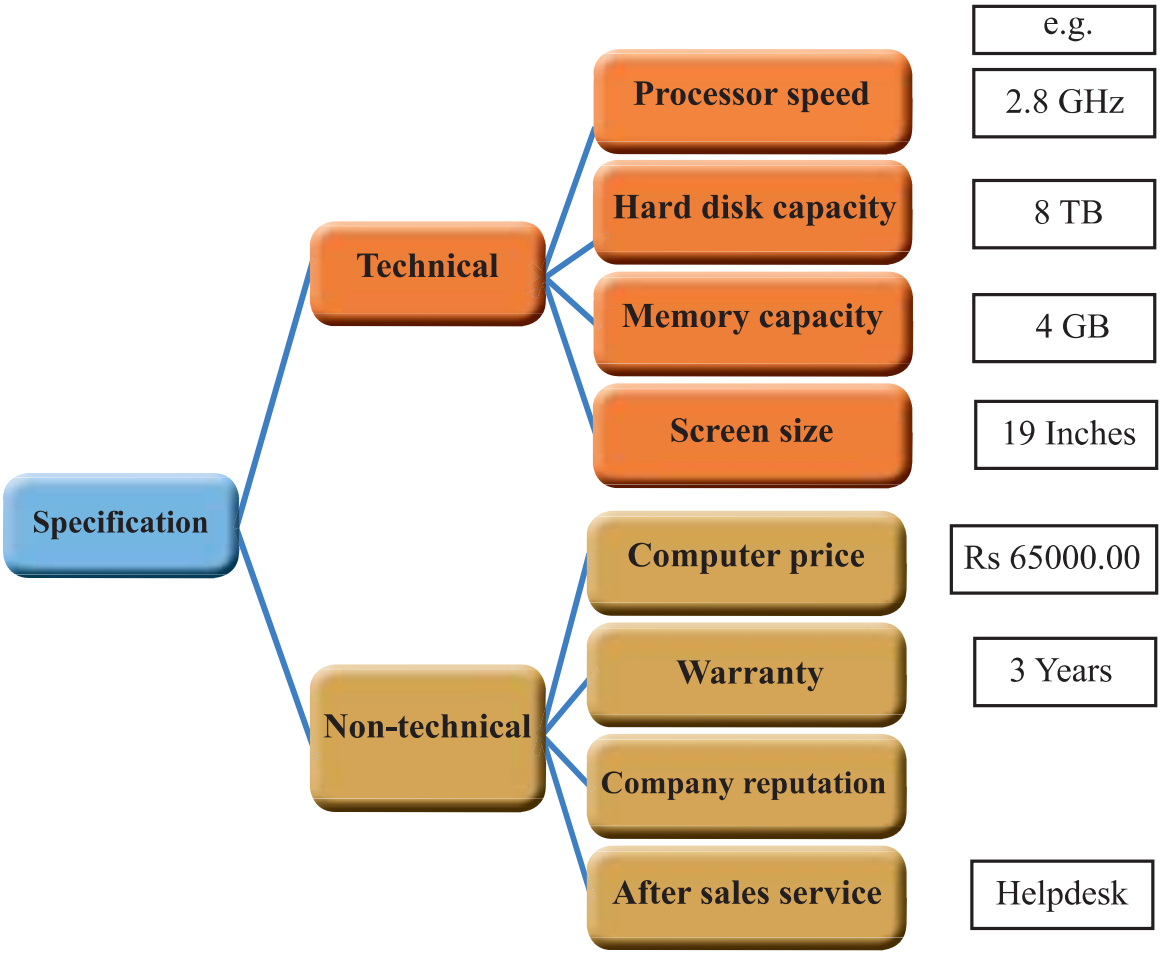


Figure 1.19 : Technical and non-technical specifications to be considered in purchasing a computer

Refer to workbook for Activity 1.10

Important factors of technical specifications

Central processing Unit	Type	Single Core/ Dual Core/ Quad Core
	Speed	2.8/ 3.0/ 3.2/ 3.4 GHz
Main memory	Capacity	512 MB/ 1GB/ 2GB/ 4GB/ 8GB
	Generation	1st, 2nd, 3rd, 4th etc.
Hard disk	Capacity	500 GB, 750 GB, 1 TB, 2 TB, 4 TB
Monitor	Size	17", 19", 21"
	Type	CRT/ LCD/ LED
Video Graphic Adapter	Type	VGA/ DVI/ HDMI
Sound card	Type	Onboard, Separate

Refer to workbook for Activity 1.11

Summary

- Several types of computers are available to suit user requirements;
  - Server
  - Workstation
  - Desktop
  - All-in-one
  - Laptop
  - Notebook
  - Tablet
  - Smart phone
- Computer peripheral devices are input, output and storage devices.
- Specification is a detailed description of a material with respect to its quality or quantity.

- Basic specifications for a computer and peripheral devices are:
    - Processor type and speed
    - Random Access Memory (RAM) capacity
    - Hard disk capacity
    - Monitor size and technology
    - Video Graphic Adapter and sound
- Other non-technical factors to be considered in purchasing a computer;
    - Warranty
    - Pre-installed software
    - After-sales services