



5

Algorithm and Flow Charts

5.1 / Process of Solving Practical Problems

Imagine that a group of relatives have arrived when you were alone in the house. You need to serve them some tea. Here, you should prepare a cup of tea by following different steps.

On another occasion, you will have to make a fruit salad for a dessert or make a birthday cake. On all these occasions, you need to solve problems. Compare it with calculating the area of a rectangle during your mathematics lesson.

When we have a certain aim, we do certain activities to achieve it. In our day to day life, we often solve problems.

5.1.1 / Problem Solving

The problem needs to be analyzed well before solving it. Then you can get a good understanding of how to solve the problem. The process of problem solving has an input, an outcome and a process.

Input	- Things to be included to solve the problem.
Process	- Guidelines to be followed to solve the problem.
Output	- The result you get after solving the problem.

Thus, you will understand that processing content according to a recipe is known as solving problems.

Example: 1

The input, process and output of preparing a fruit salad is as follows.

Input - a variety of fruits

Process - washing fruits, cutting fruit, mixing

Output - Fruit salad

Example: 2

The input, process and output of finding the area of a rectangle are as follows.

Input - the length and the width of the rectangle

Process - length x width

Output - area of the rectangle

Activity 01 - See 5.1 in the Workbook.



5.2 / Algorithm

If you are able to prepare a cup of tea, tie the shoe lace correctly, or put on the school uniform correctly, then you know how to use an algorithm.



Figure 5.1 - Some instances in daily life where we use algorithms

5.2.1 / What is an algorithm?

Algorithm

A method that includes all the steps of solving a problem in order is known as an algorithm.

Example 1

Steps to create a fruits salad are as follows.

Step 01



Finding various kinds of fruits

Step 02



Washing all the fruits well

Step 03



Cutting fruits into small pieces

Step 04



Putting the pieces of fruit into a bowl

Step 05



Add sugar and mix

Step 06



Serve the fruit salad in bowls

It's important to write the steps sequentially in an algorithm. Think about what will happen if the sixth step is done as the second step. All the fruits mixed with sugar should be washed again.

Therefore, it is important to write the steps of an algorithm sequentially.

5.2.2 // Writing Algorithm

When writing an algorithm in a standard way, every algorithm must have a start and an end. Therefore, it is compulsory to include an initial step and a final step in writing an algorithm in addition to the normal steps.

Example 1

The algorithm for making a chocolate cake

Step 01	Start
Step 02	Clean and wash the baking tray and other bowls
Step 03	Dissolve chocolate
Step 04	Mix wheat flour and baking powder
Step 05	Beat butter until it gets creamy. While beating, add sugar little by little
Step 06	Add the eggs one by one to the sugar and butter mixture and beat it. Then add the flour mixture little by little.
Step 07	Add the dissolved chocolate
Step 08	Add milk
Step 09	Put the mixture into the baking tray and bake it
Step 10	Let it cool after baking
Step 11	Decorate as you wish and serve it
Step 12	End

Example 2

Algorithm to find the area of a rectangle.

Steps 01	Start
Steps 02	Get the length of the rectangle
Steps 03	Get the width of the rectangle
Steps 04	Area = length x width
Steps 05	Get the area of the rectangle
Steps 06	End



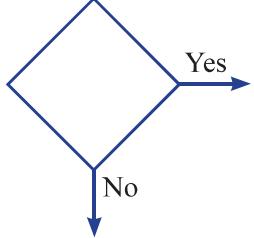
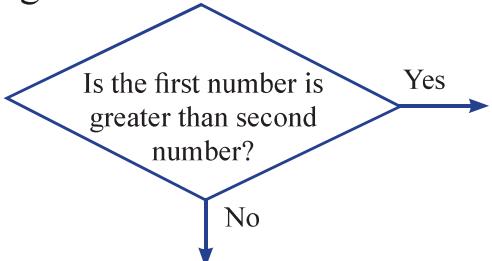
Activity 02 - See 5.2 in the Workbook.

5.3 / Flow Chart

A flow chart is a graphical representation of the algorithmic steps.

Here, standard symbols are used to show each action.

Symbol	Usage
	Used to indicate the start and the end. Eg:
	Used to indicate the input and the output. Eg:

	<p>Used to show an action/a process</p> <p>Eg: Adding eggs one by one to the mixture of sugar and butter and beating it.</p> <p>Area = length x width</p>
	<p>Used to indicate an instance of decision making.</p> 
	<p>It is used to indicate the direction of data flow.</p>

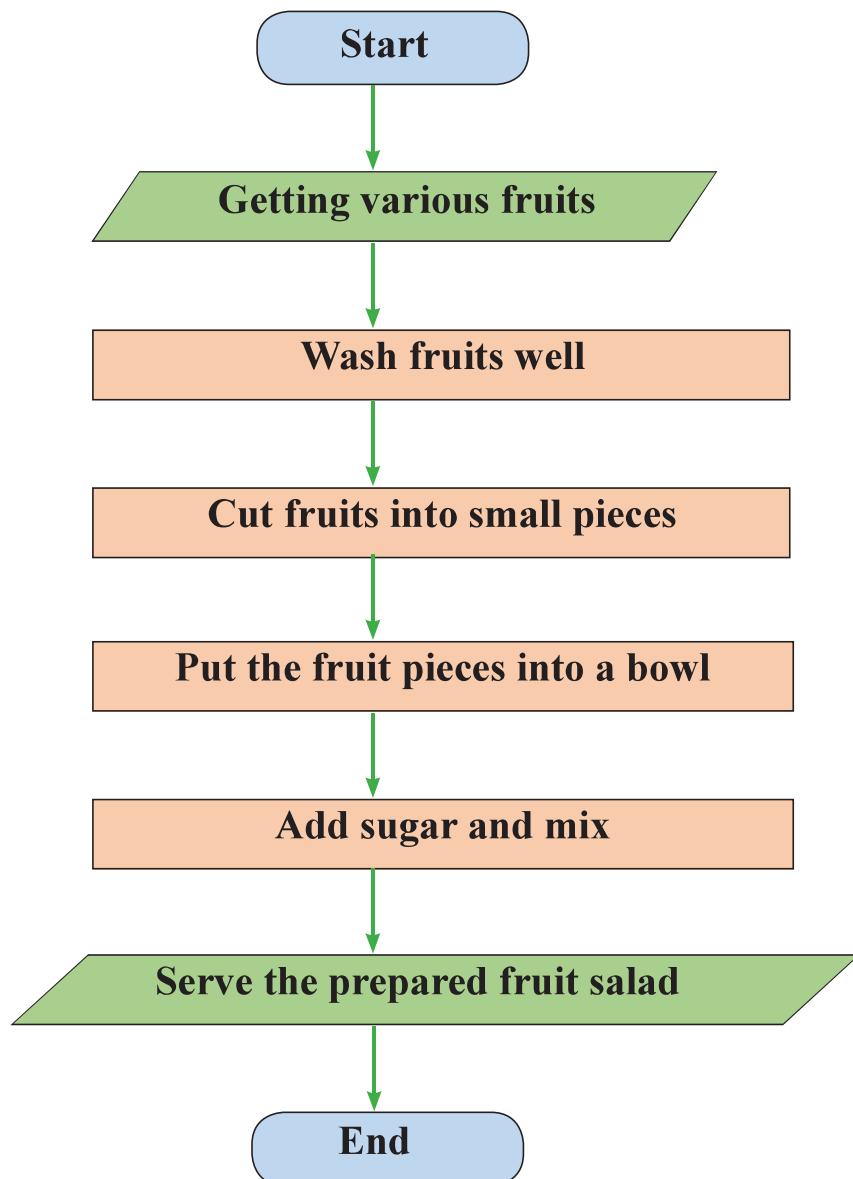
Activity 03 - See 5.3 in the Workbook.



Example 01

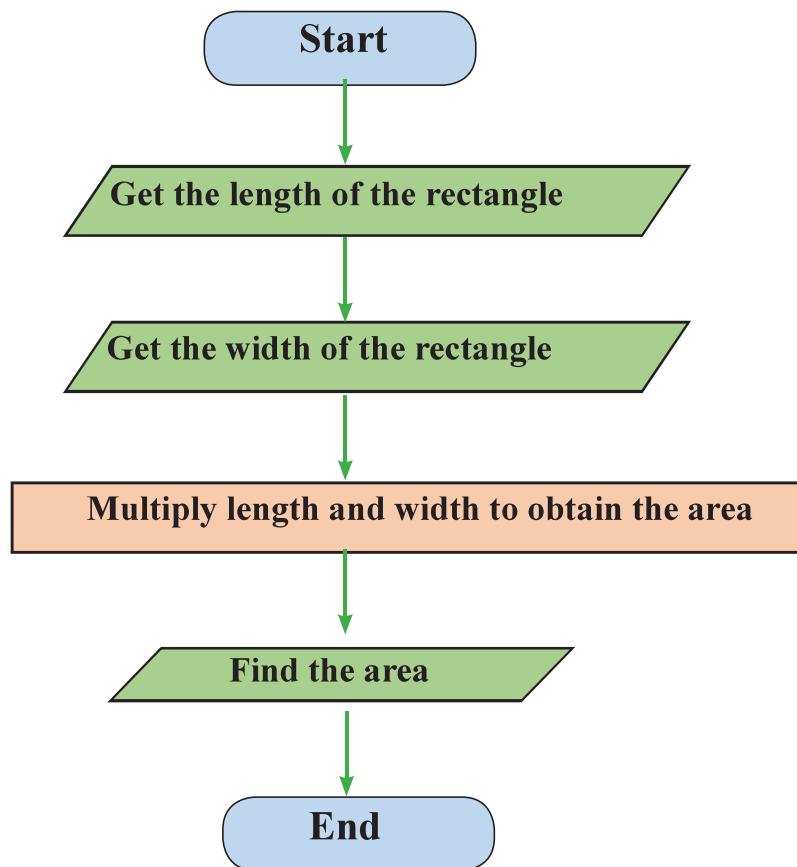
Drawing the flow chart for making a fruit salad using the above symbols is given below.

Here the symbols related to start, end input out and process are used.



Example 02

The flow chart for finding the area of a rectangle is given below.



Activity 04 - See 5.4 in the Workbook.

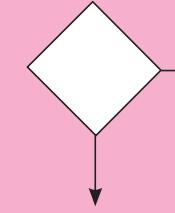




Summary

- ★ Before the problem is resolved, it needs to be analyzed well.
- ★ There is an input, output and a process when solving a problem.
- ★ Things we feed to solve the problem are identified as the 'input', the steps to be followed when solving a problem are identified as the 'process', and the result we get after solving the problem is named as the 'output'.
- ★ A method set out in order including all the steps needed to solve any problem is identified as an algorithm.
- ★ A standard algorithm must have a start and an end.
- ★ A flow chart is a graphical representation of the algorithmic steps. Specific symbols are used to indicate each action.

- ★  shape is used to indicate the start and the end.
- ★  shape is used to indicate the input and the output.
- ★  shape is used to indicate the process.

- ★  shape is used to indicate the decision taken.