

# Atomic Energy Education Society, Mumbai

Class XI

Computer Science

**BASICS OF COMPUTATIONAL THINKING**

**Module 02/02**

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## Data Abstraction

Abstraction means displaying only essential information and hiding the implementation details. Data abstraction refers to providing only essential information about the data to the outside world, hiding the background details or implementation.

Consider a real life example of a man driving a car. The man only knows that pressing the accelerators will increase the speed of car or applying brakes will stop the car but he does not know about how on pressing accelerator the speed is actually increasing, he does not know about the inner mechanism of the car or the implementation of accelerator, brakes etc in the car.

We can have another example here,

When you visit an ATM machine you insert debit card and then enter PIN thereafter you are presented a welcome screen where you have different options e.g. Deposit money, Withdraw money, Mini statement, PIN change etc.

If you choose to withdraw some amount from your bank account then you collect cash and leave the ATM. You neither bother nor know, how the transaction is updated in your account whereas there are millions of account holders with the bank like you. In fact the procedure to update the account is hidden from you.

In other words, we can say that we were just presented the essential interface by the ATM machine while hiding the implementation details.

## Algorithm

Algorithm is a step-by-step process of solving a well-defined computational problem. In practice, in order to solve any complex real life problem, first we have to define the problem and then, design algorithm to solve it. Writing and executing a simple program may be easy; however, for executing a bigger one, each part of the program must be well organized. In short, algorithms are used to simplify the program implementation.

We can use algorithm to solve any kind of problem. However, before writing a program, we need to write the steps to solve the problem in simple English

language. This step-by-step procedure to solve the problem is called algorithm.

### **Example 1**

Let us take one simple day-to-day example by writing algorithm for making “Maggi Noodles” as a food.

Step 1: Start

Step 2: Take pan with water

Step 3: Put pan on the burner

Step 4: Switch on the gas/burner

Step 5: Put maggi and masala

Step 6: Give two minutes to boil

Step 7: Take off the pan

Step 8: Take out the maggi with the help of fork/spoon

Step 9: Put the maggi on the plate and serve it

Step 10: Stop.

### **Example 2**

Write an algorithm to find area of a rectangle.

Step 1: Start

Step 2: Take length and breadth and store them as L and B.

Step 3: Multiply L and B and store it in variable Area

Step 4: Print Area

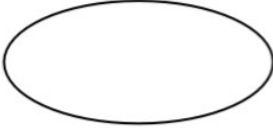


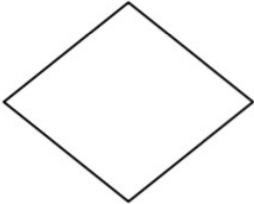

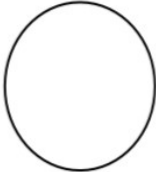
Step 5: Stop

### **Flowchart**

We can also show these steps in graphical form by using some symbols. This is called flowcharting.

### **Flowchart Symbols**

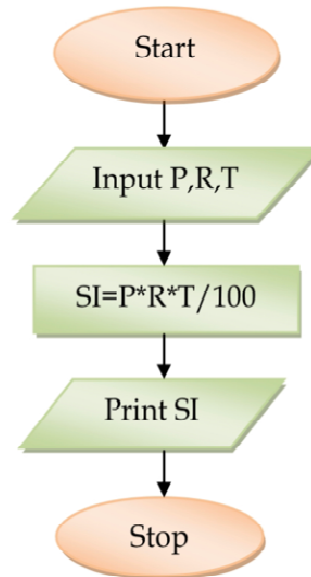
Some of the standard symbols along with respective function(s) that are used for making flowchart are as follows:

Symbols	Functions
1. 	Start/stop
2. 	Input/output
3. 	Processing
4. 	Decision Box
5. 	Flow of control
6. 	Connector

### Example 1

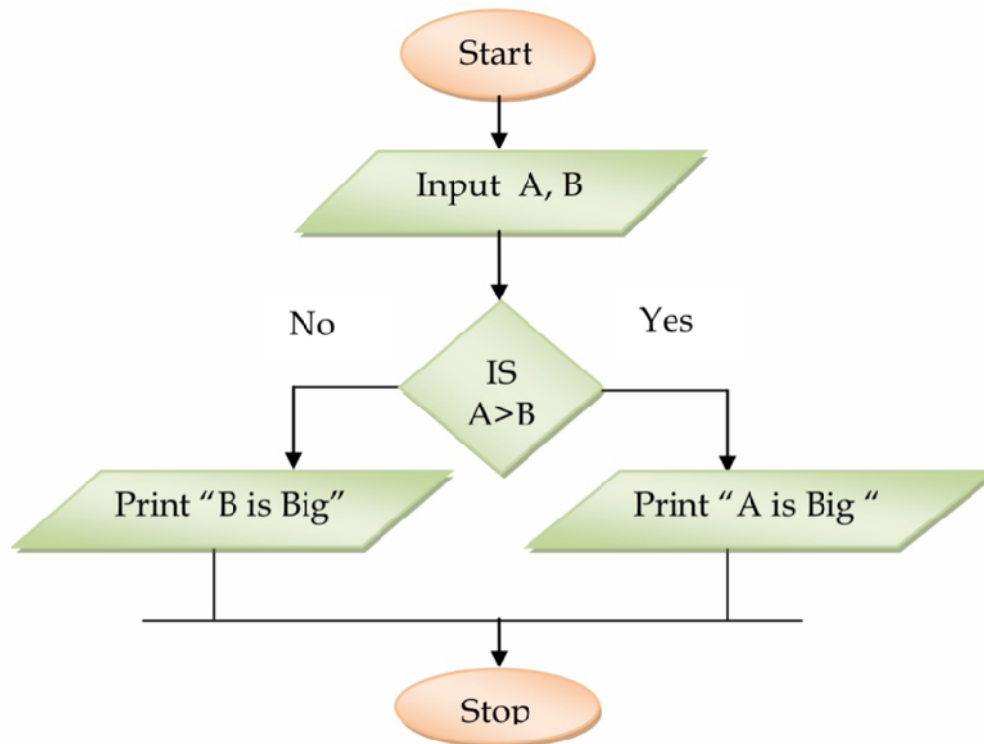
Draw a flowchart to find the simple interest.

Solution:



### Example 2

Draw a flowchart to find bigger number among two numbers



**Jai Hind**