SLIIT ACADEMY

FCIT – Semester 1

PROGRAMMING SKILLS - I

PROGRAM DESIGN

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Learning Outcomes

End of this lecture you will be able to learn ,

LO1 : Discuss the stages in the programming process.

LO2 : Discuss the methods of Program Design.

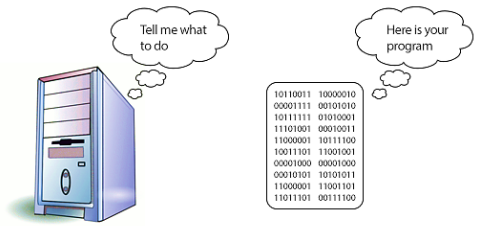
What is a Computer Program?

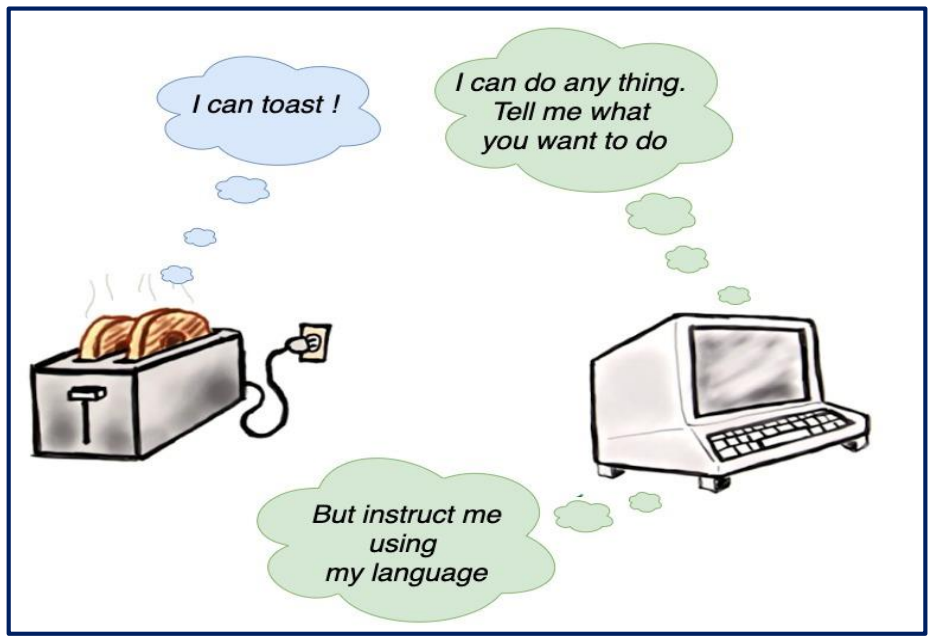
Discuss with your friend and come up with an answer!

What is a Computer Program?

- Computers, although quite sophisticated electronically, are, nevertheless, unintelligent.
- In order for them to carry out a task, they must be instructed how to complete the task.
- Instructions must be given in a language that the computer understands.

What is a Computer Program?





What does a Programmer do?

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Steps in Program Development

1. Step 1 : Define the problem
2. Step 2 : Outline the solution
3. Step 3 : Develop the outline into an algorithm
4. Step 4 : Test the algorithm for correctness
5. Step 5 : Code the algorithm into a specific programming language
6. Step 6 : Run the program on the computer
7. Step 7 : Document and maintain the program

Step One : Define the problem

- Carefully reading and rereading the problem until you understand completely what is required.
- The problem should be divided into three separate components:
  - ❑
  - ❑
  - ❑
- A is recommended in this analysis phase, as it helps to separate and define the three components.

Step Two : Outline Solution(Design/Plan Solution)

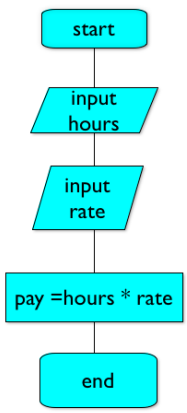
- Once the problem has been defined, you may decide to break it down into smaller tasks or steps, and establish a solution outline.
- This initial outline is usually a rough draft of the solution and may include:
  - ❑
  - ❑
  - ❑
  - ❑
  - ❑
- The solution outline may also include a **hierarchy or structure chart**.

Step Three : Develop the outline into an algorithm

- The solution outline is then expanded into an algorithm:
- A set of precise steps that describe exactly the tasks to be performed and the order in which they are to be carried out.
  - **(a form of structured English) is one method of representing the solution algorithm.**
  - **is more pictorial method of algorithm representation.**

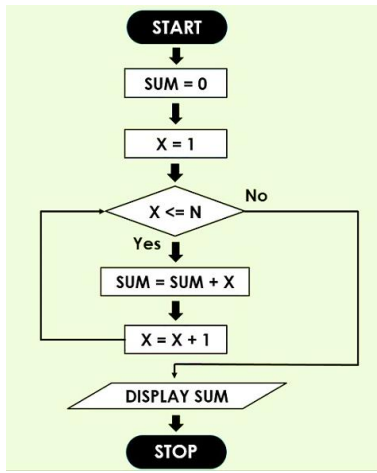
Flow Chart and Pseudocode Example:

Flowchart



Pseudocode

```
BEGIN
   input hours
   input rate
   pay = hours * rate
   print pay
END
```



Step Four : Test Algorithm for correctness

- Test data needs to be walked through each step in the algorithm to check that the instructions described in the algorithm will actually do what they are supposed to.
- The programmer 'walks' through the logic of the algorithm, exactly as a computer would, keeping track of all major variables on a sheet of paper

Step Five : Code the algorithm into a specific programming language

- Express the algorithms (flowcharts/ pseudo codes) in a programming language .
- Software Engineer is responsible for this.

Step Six : Run the program on the computer

- This step uses a program compiler and programmer-designed test data to machine test the code for syntax errors and logical error.
- This is usually the **most rewarding step** in the program development process.
- This step may need to be performed several times until you are satisfied that the program is running as required.

Step Seven : Document and maintain the program

- Includes both **external documentation** (such as hierarchy charts, the solution algorithm and test data results) and **internal documentation** that may have been coded in the program.
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- If the program has been well designed using structured programming techniques, the code will be seen as self documenting, resulting in easier maintenance.

What is an algorithm ?

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What is a pseudo code?

- Pseudocode is structured English.
  - ❑
  - ❑
  - ❑
  - ❑ **Each set of instructions is written from top to bottom, with only one entry and one exit.**
  - ❑ **Groups of statements may be formed into modules, and that module given a name.**

Write a Summary on what you learnt

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Thank you!