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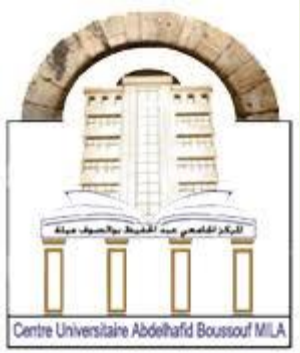

Structure of Computers and Applications

1st year ST – ENG & LMD

Part 2: The basics of Algorithm and Program

Courses 4: The approtch and analysis of a problem in computer

Concept of an Algorithm/Program

By

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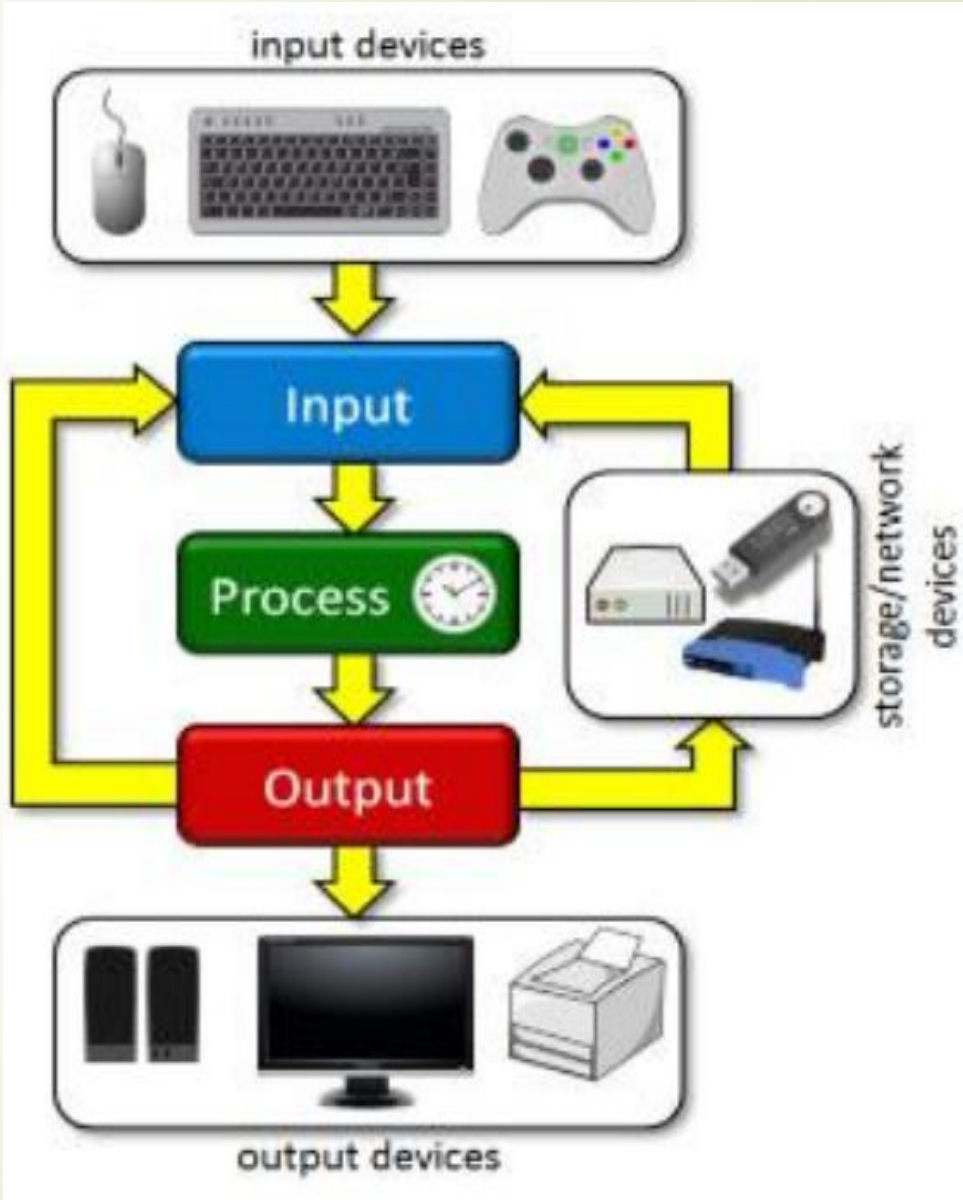
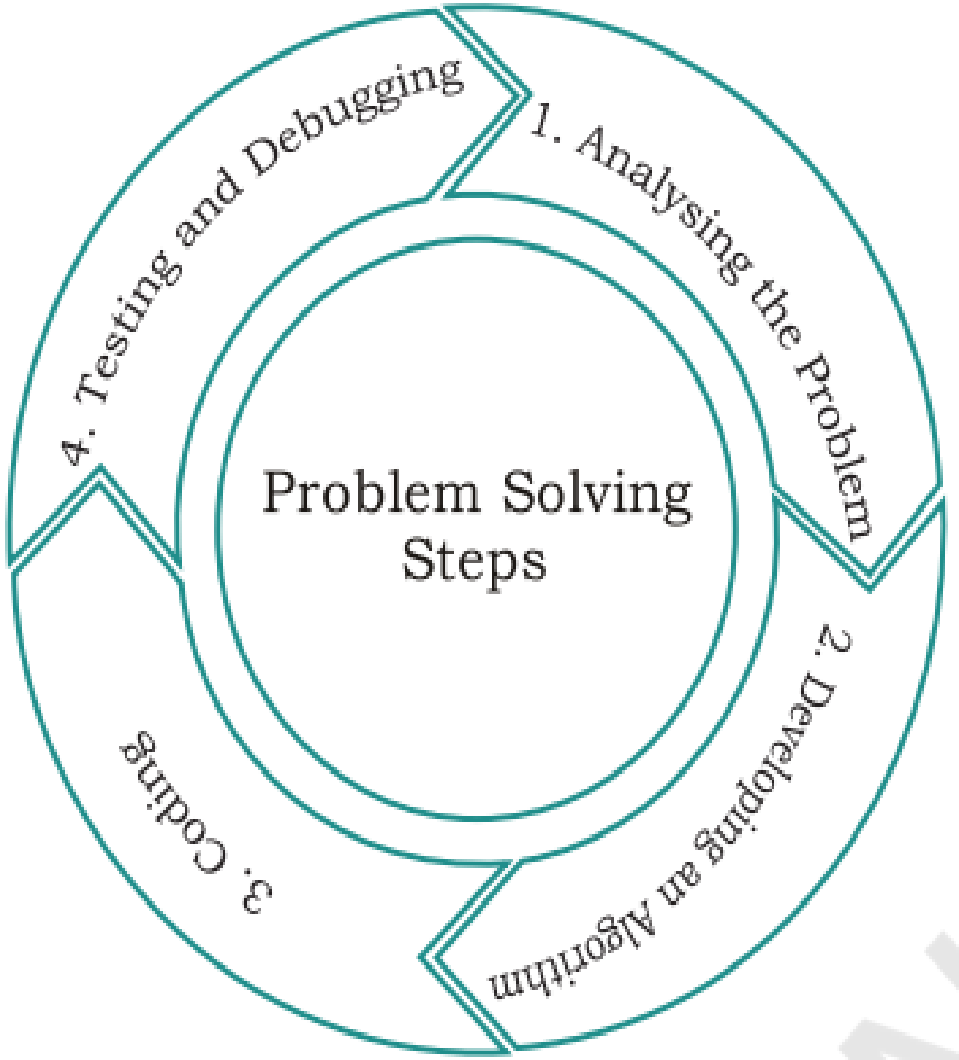
5- The approatch and analysis of a problem in computer

- Computer science is all about **solving problems** with computers.
- The problems that we want to solve *can come from any **real-world** problem* or *perhaps even from the **abstract world***.
- We need to have a **standard systematic approach** to solving problems.
- Since we will be using computers to solve problems, it is important to first **understand** the computer's information processing model.



5- The approtch and analysis of a problem in computer

- **Problem Solving:** ***is the sequential process of analyzing information related to a given situation and generating appropriate response options.***
- There are ***six steps*** that you should follow in order to solve a problem:
  - ***Understand the Problem***
  - ***Formulate a Model***
  - ***Develop an Algorithm***
  - ***Write the Program***
  - ***Test the Program***
  - ***Evaluate the Solution***



6- Concept of an Algorithm/Program

The central concept underlying computation is that of the algorithm, a step-by-step sequence of instructions for carrying out some task.

- When we speak to people, we can assume that they understand certain basic facts of everyday life. For example, if we ask a person to buy a loaf of bread, we assume he/she knows how to do it.
- But computers are not people. If we were instructing a robot to buy a loaf of bread, we might have to be much more specific.
- When we instruct the computer to solve a problem, we must specify in detail all the steps in achieving the goal – an algorithm.
- Without the algorithm, the computer will not work.

6- Concept of an Algorithm/Program

6.1_ Algorithm

The word “algorithm” relates to the name of the mathematician **Al-khowarizmi**, which means a procedure or a technique.

- Software Engineer commonly uses an algorithm for **planning** and **solving** the problems. To write an algorithm, one must **know** how to **solve the problem**.
- An algorithm is a **sequence** of **steps** to **solve** a **particular problem** or algorithm is an ordered set of unambiguous steps that produces a **result** and terminates in a **finite time**.
- Algorithms need to be written **clearly** without **ambiguity**.
- Algorithms can be expressed in **many kinds** of notation, including **natural languages**, **pseudocode**, **flowcharts**, and **programming languages.**
- For each give problem, there may be **more** than one algorithm to solve the problem
- Some algorithms may be **faster than** others; some algorithms may require **different resources** (memory, special hardware, etc).

6- Concept of an Algorithm/Program

6.1_ Algorithm

What are the different characteristics of an algorithm?