SLIIT

Discover Your Future

IT1010 – Introduction to Programming

Lecture 1 – Part 1

Algorithms and Flowcharts

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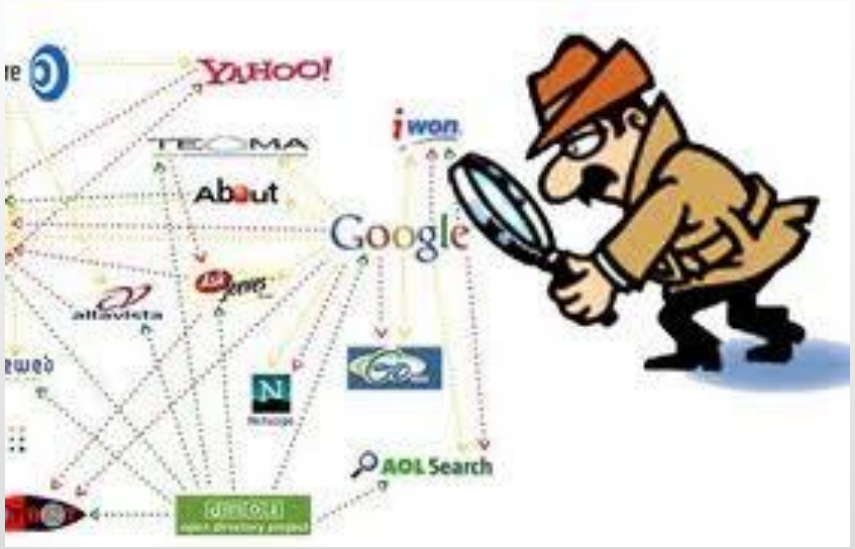
FACULTY OF COMPUTING

What is a computer ?

- A computer is a machine for processing data to produce information.

What can it do ?

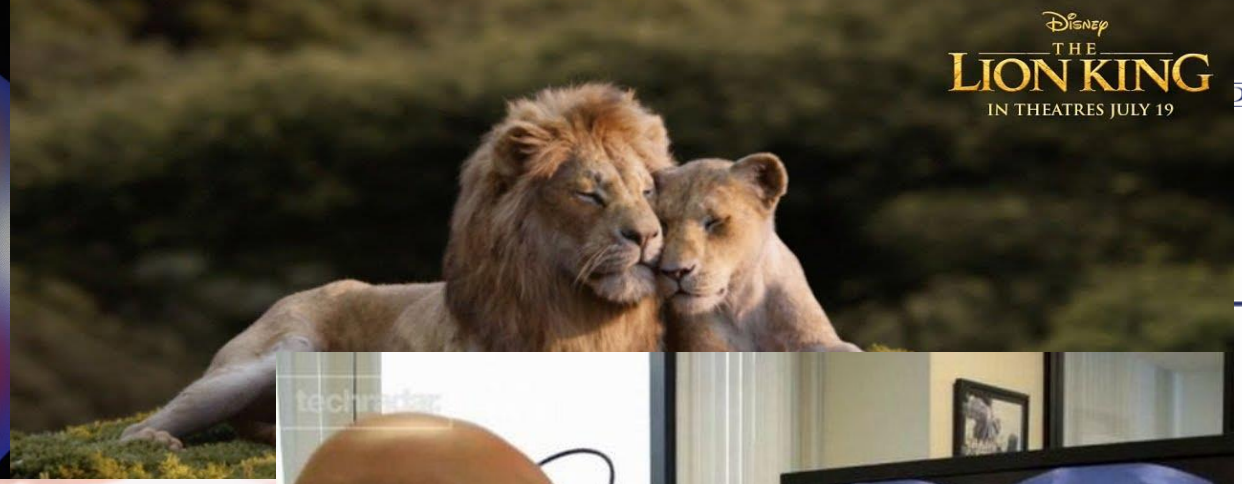
- Store large amounts of data.
- Process large amount of data quickly.
- Fast access to information and records
- Increase productivity



What can it do ?

- What else……
  - Calculate
  - Process (word, numbers, pictures, sound)
  - Store and retrieve
  - Match / compare / sort
  - Merge
  - And some more…..


Social Media
Snapchat
Facebook
99
Instagram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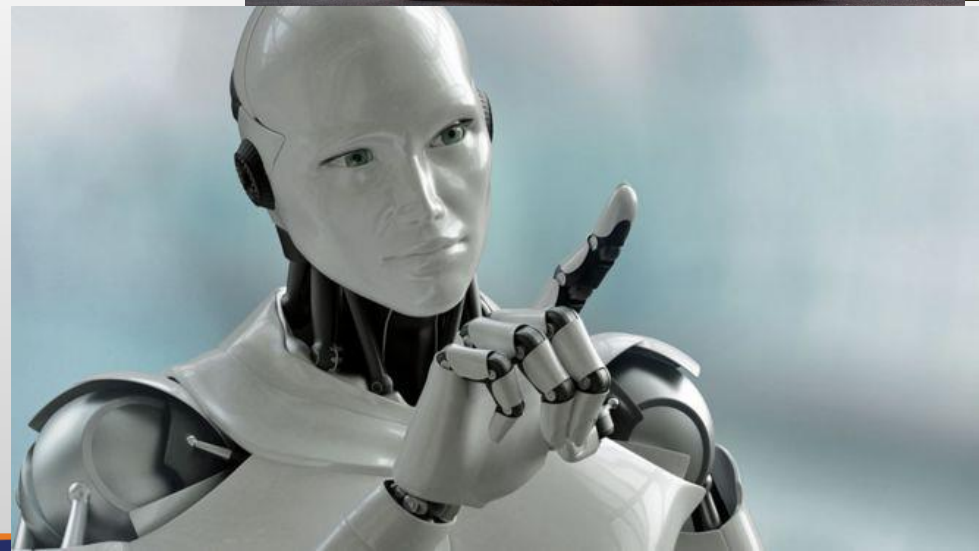


How do computers do all these

How do you instruct a computer to do tasks?

- Write a program???
- Program
  - is a set of step-by-step instructions

  written to perform a specific task…
  - Program consist of a set of instructions

  that are executed by the computer

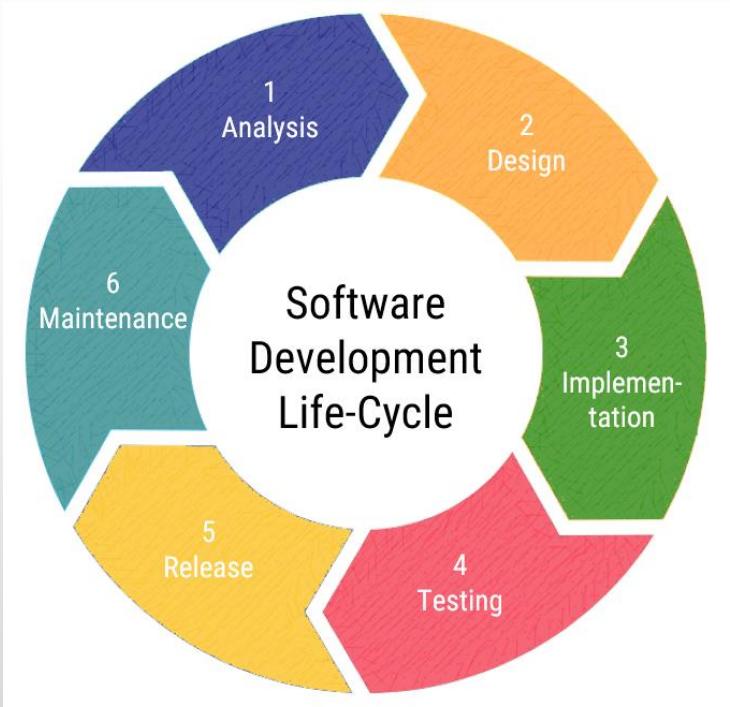
How do computers do all these…?

- This process of writing programs is called ***programming***
- These programs are written by a ***programmer***
- A set of rules that tell a computer what operations to perform are called ***programming language***
- In other words, we can call this program ***Software***

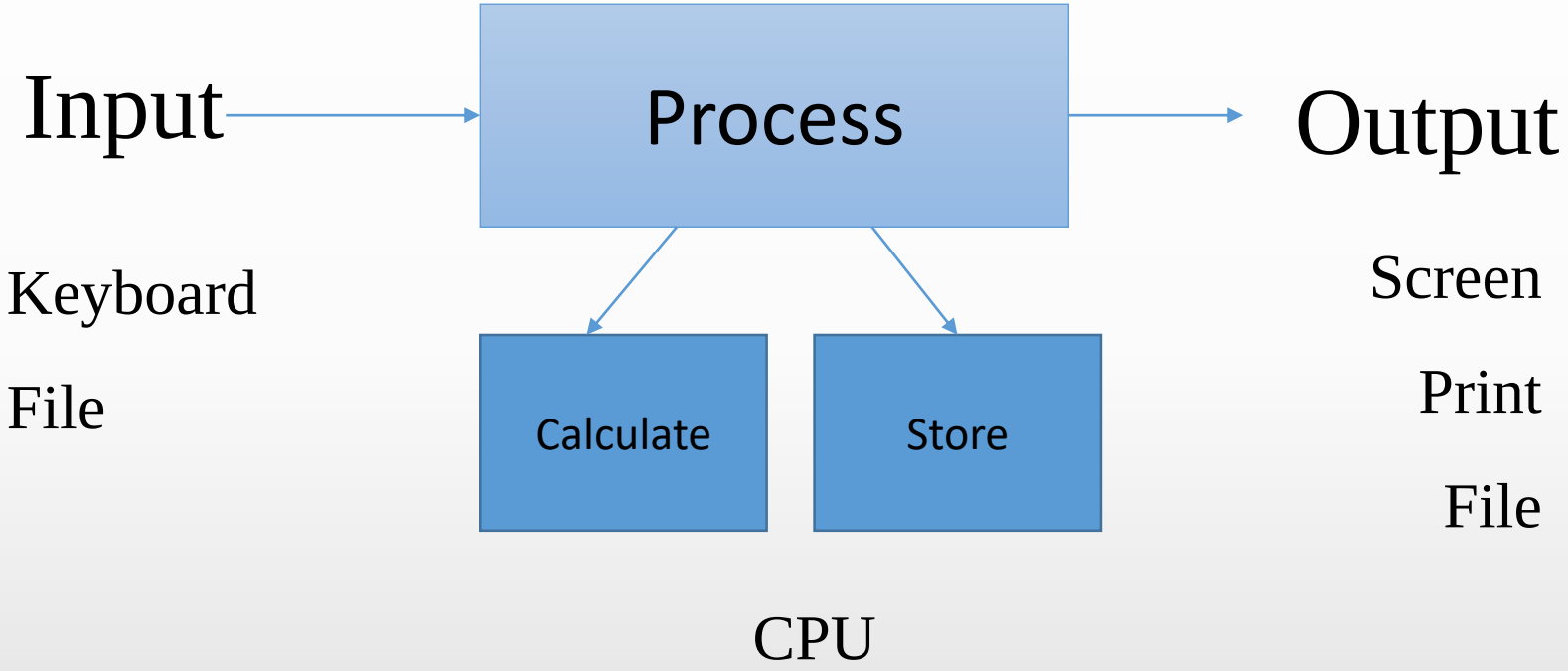
How do you write programs

In developing a computer program the programmer must:

- Analysis - Understand/Define the problem
- Design – plan the solution
- Implement - Write/Code the program
- Test - Compile, Debug & Test
- Release - Implement the program
- Maintain - Document the program



What can the computer do ?



Analyze / Understand the problem

Problem : Given 2 numbers (say a and b) where a < (is less than) b , I want to find the sum of numbers between a and b

- Input : Integers a & b (where a<b)
- Task : Find the sum of numbers between a & b
- Output : The sum

Planning the solution

- It is important to spend considerable time in planning your solution (program) in order to ensure it is properly structured
- If properly planned and presented, the time and effort in 'coding' the solution, will be minimal
- Use algorithms to prepare a solution

Algorithms

- An algorithm is a complete step-by-step set of instruction of how to solve a problem.
- Consist of
  - The instructions
  - The order of the instructions

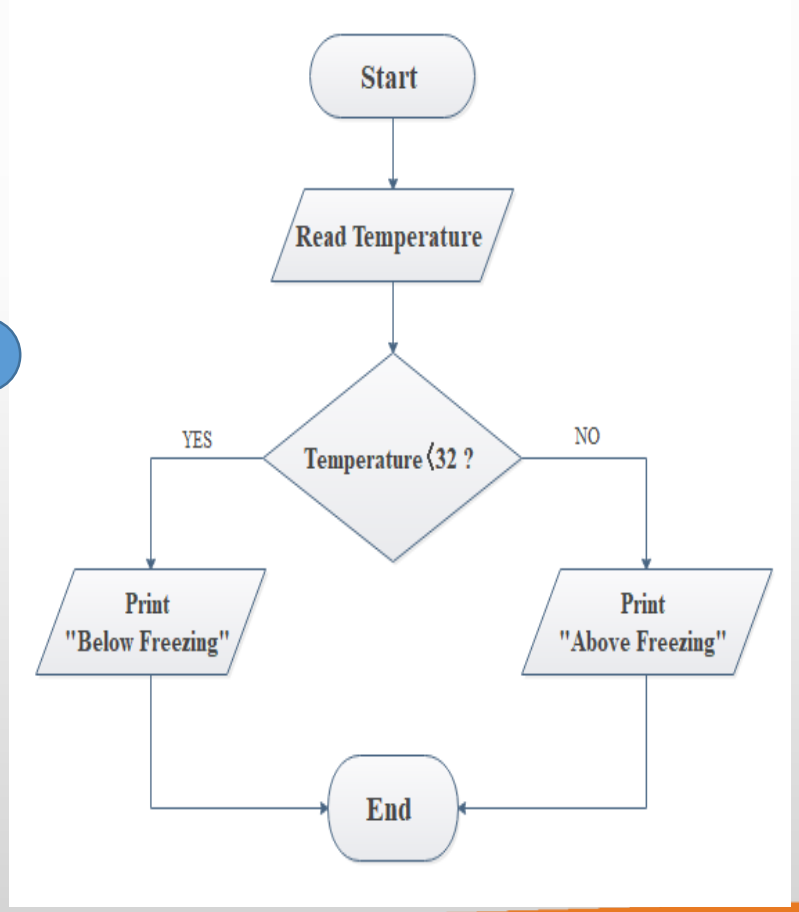
How to make a cup of Tea ?

- Fill electric tea kettle
- Bring it to a boil
- Pour hot water in cup
- Put teabag in cup
- Steep for 4 minutes
- Remove teabag

Algorithms

- Algorithms is Programming are represented by
  - Flowcharts
  - Pseudo codes

```
Start
    Input Temperature
    If Temperature < 32
      Then Print "Below freezing"
    Else
      Print " Above Freezing
End
```



Flow charts

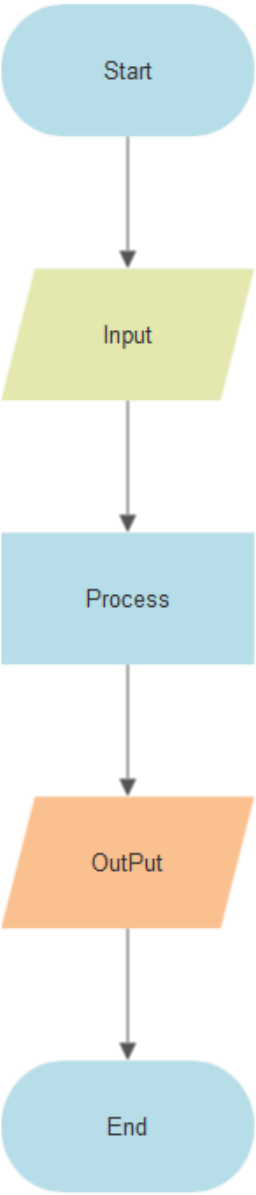
- It is a step by step diagrammatic representation of the program
- Each instruction is represented by a Symbol.
- Arrow shows the order in which the instructions are executed.

Flow chart symbols

Symbol	Name	Function
	Start/end	An oval represents a start or end point.
	Arrows	A line is a connector that shows relationships between the representative shapes.
	Input/Output	A parallelogram represents input or ouptut.
	Process	A rectangle represents a process.
	Decision	A diamond indicates a decision.

Flow charts

- Most simple algorithms that you will develop will involve inputting some data, performing some calculation and finally displaying the output.



The Logical Constructs / Control structures

- Three basic constructs that controls the flow of an algorithm;
  - Sequence
  - Selection
  - Iteration

Sequence

- **SEQUENCE** is a linear progression where one task is performed sequentially after another…
- solution steps must follow each other in a logical sequence
- Statements are executed in the same order as they are written.

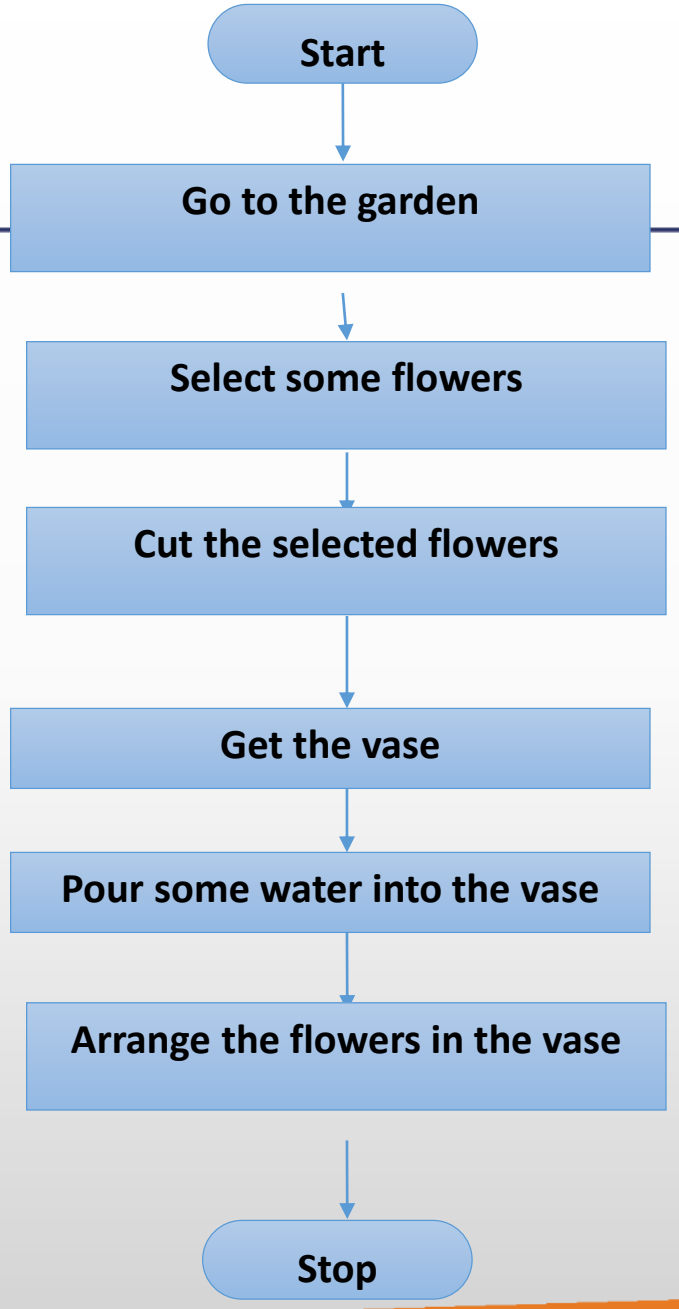
Example 01

- Put the following steps in correct order and draw a flowchart to show

“ How to arrange a flower vase”.

1. Cut the selected flower
2. Go to the garden
3. Arrange the flowers in the vase
4. Get the vase
5. Select some flowers
6. Pour some water into the vase

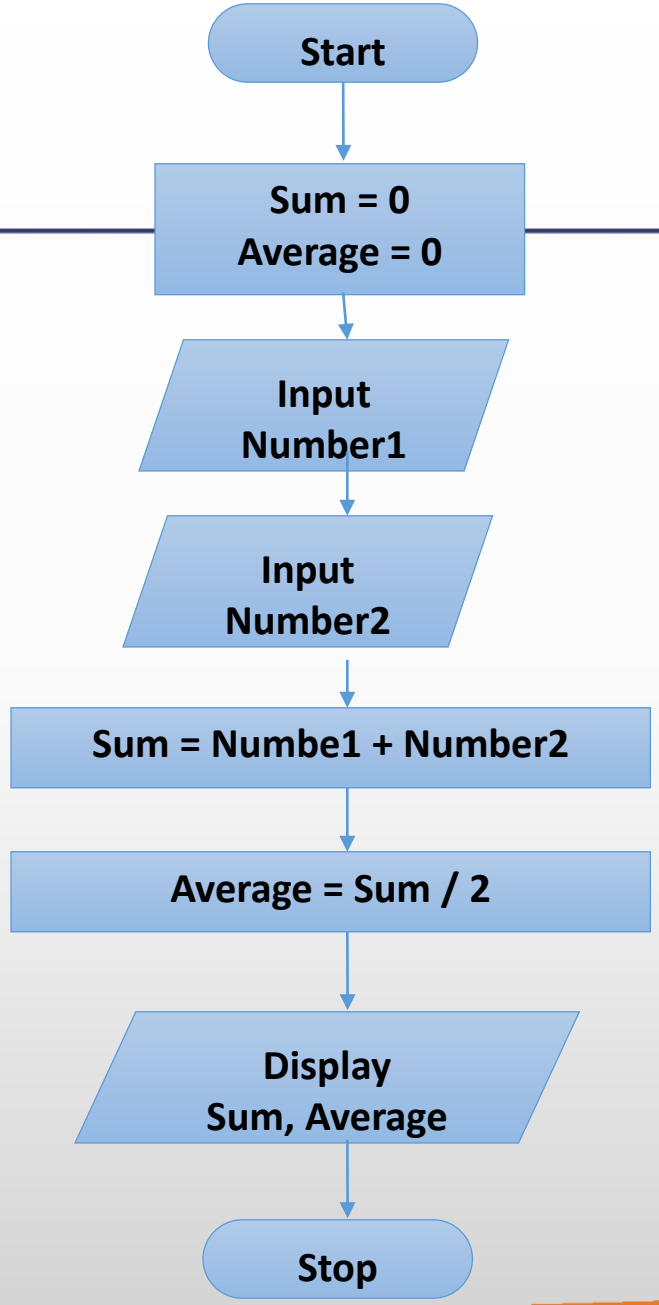
Example 01 - Solution



Example 02

- Draw a flowchart to input two numbers and find the sum and average.

Example 02 - Solution



Exercise

- Draw a flowchart to input the radius of a circle and calculate and display the area.