Session 2

Programming Tools

Objectives

❑Explain data storage in computers

❑Describe the evolution of computer languages

❑Identify aspects of programming

❑List the different modeling tools for program designing

Introduction 1-2

❑Computers can perform different functions and calculations, but a computer cannot take a decision as a human being.

❑Computers have to be instructed or programmed to perform certain task.

❑For this purpose, several programming languages have been developed to help programmers write code to meet user's requirement.

Introduction 2-2

❏ The basic approach to write the programming code is almost similar for all programming tools.

```
C    #include <stdio.h>

     void main()
     {
     char name[15];
     printf("Enter Name: ");
     scanf("%s", &name);
     printf("Hello %s ", name);

     }
```
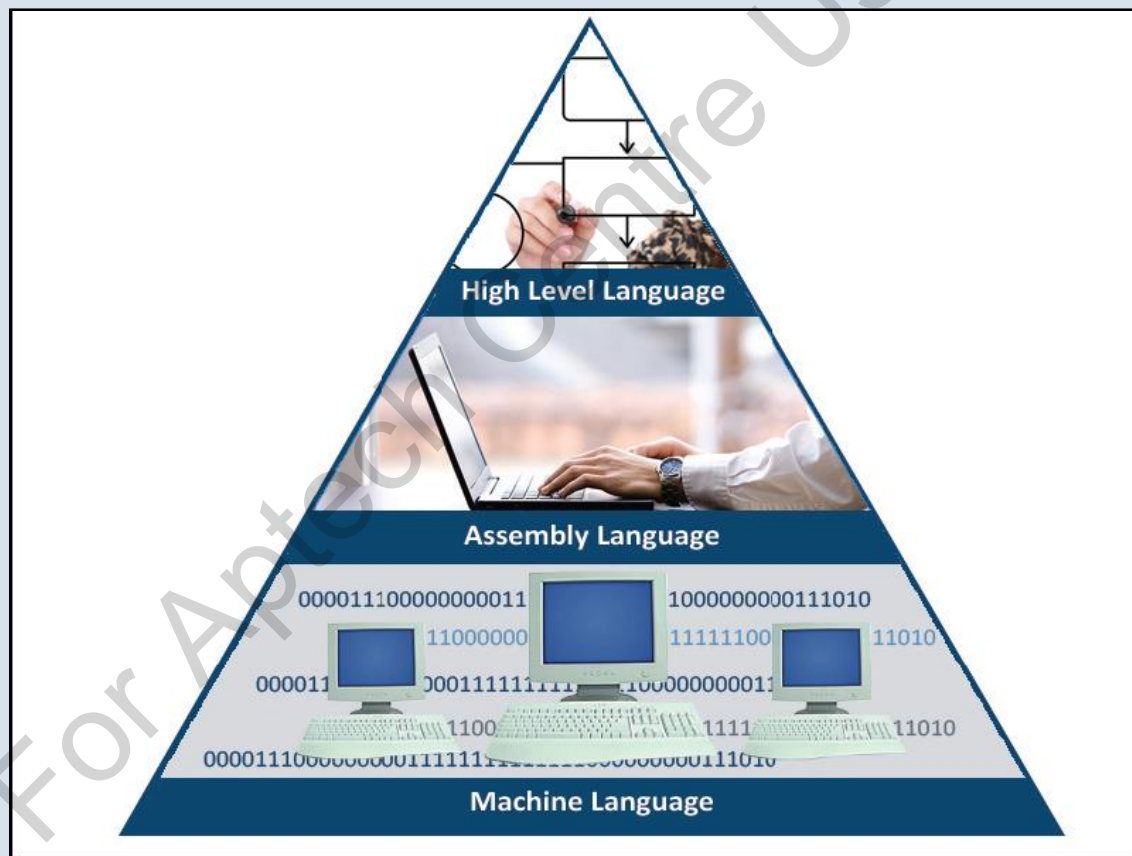
```
BASIC   10 Input name$
        20 Print "Hello "; name$
        30 END
```

```
JAVA   Class Hello
       {
       public static void main(String args[])
         {
         String name;
         System.in.readln(name);
         System.out.println("Hello " + name);
         }
       }
```

Computer Languages 1-2

❑ Developed for the purpose of communication between the different components and programs of a computer.

Computer Languages 2-2

❑Machine Language

❑Assembly Language

❑High Level Language

➢Third Generation Languages

➢Fourth Generation Languages

➢Fifth Generation Languages

Data Storage

❑The data for processing is stored in the memory or primary storage.

❑Memory is classified into two types, namely, primary storage and secondary storage.

Primary Storage 1-3

❑ Primary storage is a temporary storage. Random Access Memory (RAM) is known as the primary storage or the main memory.

❑ It is a volatile memory as the data stored in it is lost when the power is switched off.

❑ Memory is measured in terms of bytes. A byte consists of 8 bits (Binary Digits).

Primary Storage 2-3

❏ A byte can normally store one character.

❏ The characters can be any one of the following:

➢ Any number from 0 to 9

➢ Capital letters from A to Z

➢ Small letters from a to z

➢ Special characters such as . , + - % ' " ! and so on

Primary Storage 3-3

❑Memory is divided into four parts.

| Input area (Buffer) |
| Data area |
| Program area |
| Output area (Buffer) |
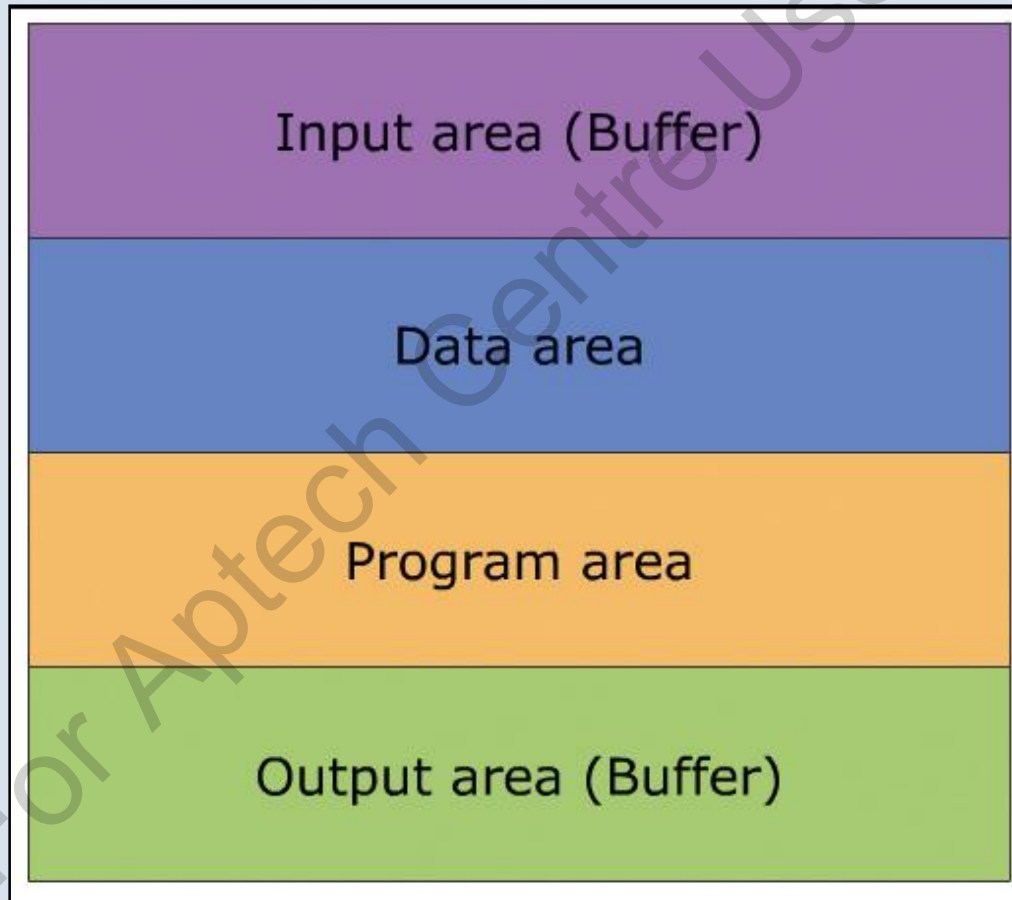
Secondary Storage

❑ A non-volatile memory

❑ Not directly accessible by the CPU

❑ Secondary storage devices used in a computer are as follows:

  ➢ Hard disk drives
  ➢ Optical disk drives
  ➢ Flash memory
  ➢ Other storage

# Working of Computer Systems

❑ Data is represented as raw, unorganized facts that need to be processed.

❑ When this data is processed into organized collection of useful and meaningful data it is known as information.

❑ Computers are used to process the raw data and provide meaningful information after processing the data.

Input-Process-Output

❑A computer can only complete its task by going through the following three stages.
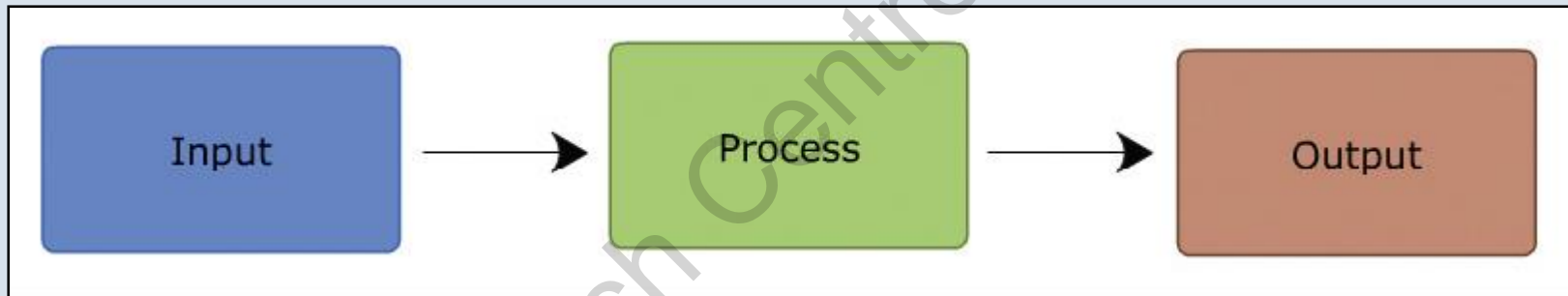
Hardware Components

❑A general purpose computer system consists of the following hardware components:

➢Input/Output Device

➢Control Unit

➢Memory

Input Devices

❑ A hardware device that is used to receive data from the computer user.

❑ Different types of data such as audio, video, text, and so on can be provided by the user.

❑ The commonly used input devices are as follows:
 ➢ Keyboard
  ➢ Mouse
  ➢ Microphone
  ➢ Scanner
  ➢ Webcam

Output Devices

❑ A hardware device that is used to display the processed data to the computer user.

❑ The output can be in both tangible and non-tangible format.

❑ The commonly used output devices are as follows:
  ➢ Monitor
  ➢ Printer
  ➢ Plotter
  ➢ Speakers
  ➢ Projectors

Aspects of Programming

❑ To write a program, two important aspects need to be considered at the start.

❑ These two aspects of programming are shown in the figure.

Understanding the Program Specification

Designing the Local Solution
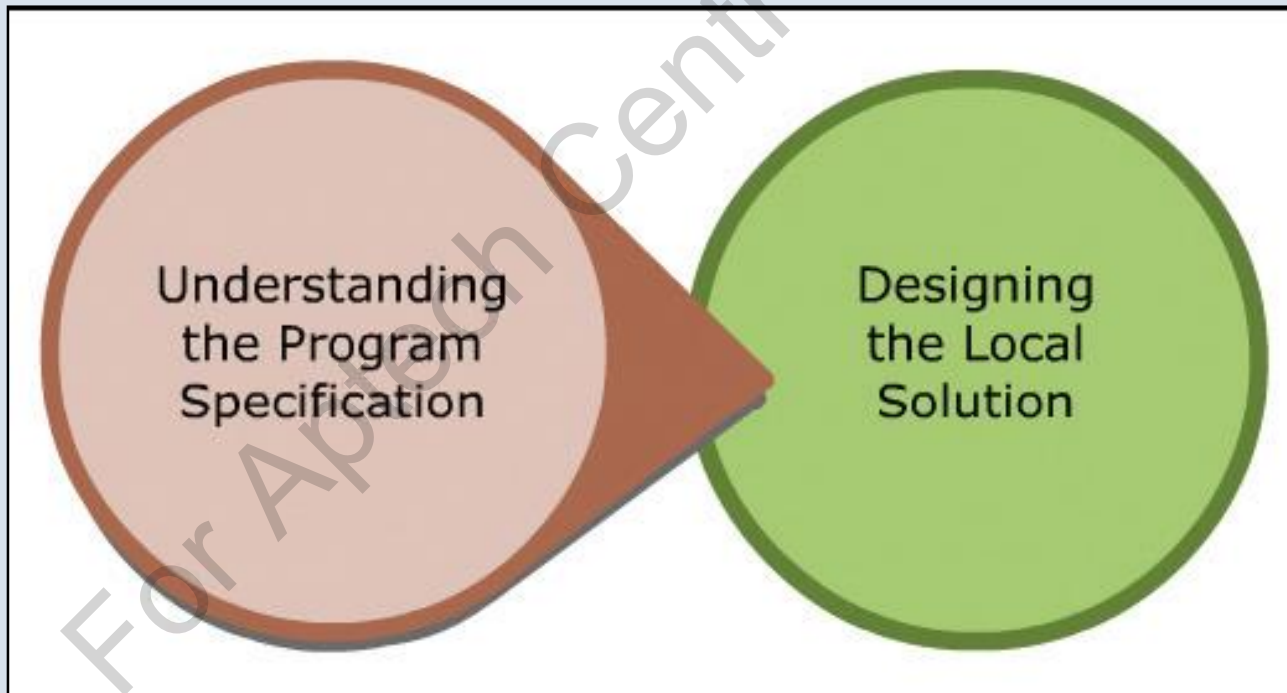
Modeling Tools

❑ To design the logical solution, two modeling tools are used.

1. **Flowchart** – A diagrammatic representation of an algorithm.

2. **Pseudocodes** – A representation of an algorithm in a form that can easily be translated into programming statements.

Summary 1-2

❑ Languages are broadly categorized into three types namely, machine language, assembly language, and high level language.

❑ Machine language uses strings of 0s and 1s to represent instructions.

❑ Assembly language uses cryptic English like phrases for writing codes that represent strings of numbers. High level languages use English words.

❑ There are different types of codes for storing characters in memory such as American Standard Code for Information Interchange (ASCII), Binary Coded Decimal (BCD), and Extended Binary Coded Decimal Interchange Code (EBCDIC).

❑ The data for processing is stored in the memory or primary storage. Memory is measured in Kilobytes or Megabytes.

Summary 2-2

❑ A computer is an electronic device that accepts the raw data, processes the data according to the instruction provided, and generates the output.

❑ The two aspects of programming are understanding the program specifications and designing the logical solution.

❑ A flowchart is a diagrammatic representation of an algorithm.

❑ A pseudocode is a representation of an algorithm in a form that can easily be translated into programming statements.