Al-Mustaqbal University
College of Engineering & Technology
Biomedical Engineering Department

Computer

Lecture 1
Introduction

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Lectures, Labs, and Units

- 1 hour per a week: Introductory course to the computer system (Hardware & software) and its specification and programming. Focusing on studying flowcharts , mainly programming with C++ language.

- 2 hour per a week as Lab.

- Formative assessment :
  - 2 Quizzes 10% / 1 Assignments 10% / Projects - Lab. 10% / Report 10% / Attendance 40%

- Summative assessment :
  - Midterm Exam 2 hours / week 7 10 %
  - Final Exam 4 hours / week 15 50%

Learning and Teaching Resources

- C++ How to Program, 6th Edition 2007 By P. J. Deitel - Deitel & Associates, Inc., H. M. Deitel - Deitel & Associates, Inc

- Starting Out with Programming Logic and Design (What's New in Computer Science), 5th Edition 2018 By Tony Gaddis

- https://www.geeksforgeeks.org/c-plus-plus

- https://www.w3schools.com/cpp/default.asp

Syllabus

- **Introduction to computer components (hardware) and computer programming (software).**
- **Algorithms' development**
  - ✓Flowchart and Pseudo-code
- **Programming with C ++**
  - ✓Syntax and program structure
  - ✓Variables
  - ✓Data types and declarations
  - ✓Flow-control in programming with C (if and switch) for decision making
  - ✓Loop statement (for, while, do while)
  - ✓Functions
  - ✓Arrays (1D, 2D, 3D)
  - ✓Pointers, Files, Structure

What's a Computer?

- A computer is an electronic device that can be programmed to carry out a set of arithmetic (+, -,*,/) and logical (AND , OR , NOT, XOR) operations automatically.
- Computers can perform calculations and make logical decisions faster than human beings can.
- Computer works as a higher performance than human being. However, computer has not ability to think as smart as human being.

What's a Computer?

- Computers process data under the control of sequences of instructions called computer programs.
- These software programs guide the computer through ordered actions specified by computer programmers (people who write the program code).
- So, a computer program is the set of instructions you write to command computers to perform actions and make decisions.

➢ Why is software programming important?

A. Software programming has been important because it affects nearly every aspect of our lives and has become prevalent in our commerce (buying and selling), our culture, and our everyday activities.

B. Nowadays, software algorithms have become embedded in systems of all kinds: transportation, medical, telecommunications, military, industrial, entertainment, office machines, and many other fields and applications.

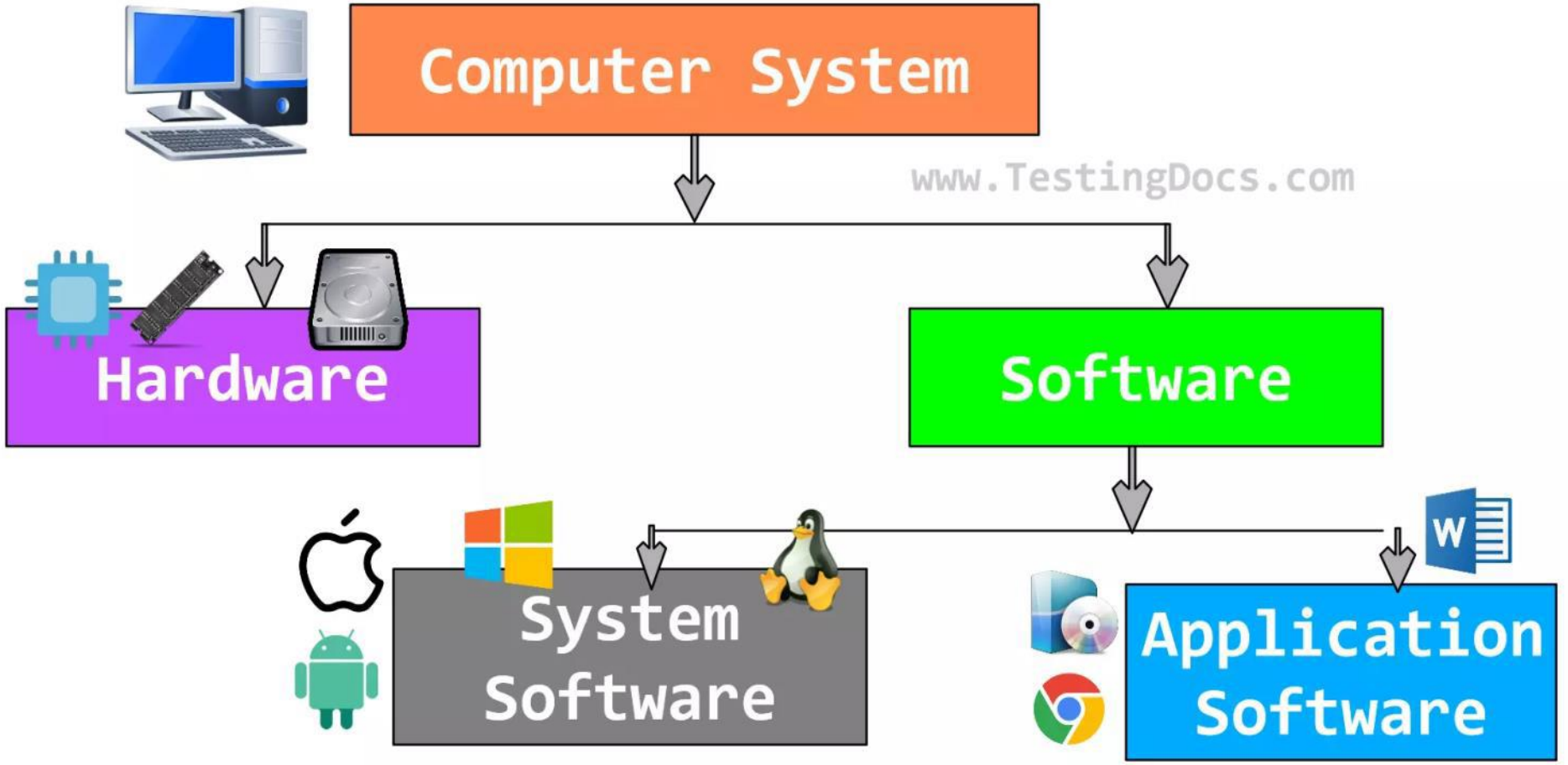
Computer Services

- Essential Benefits of a Computer:

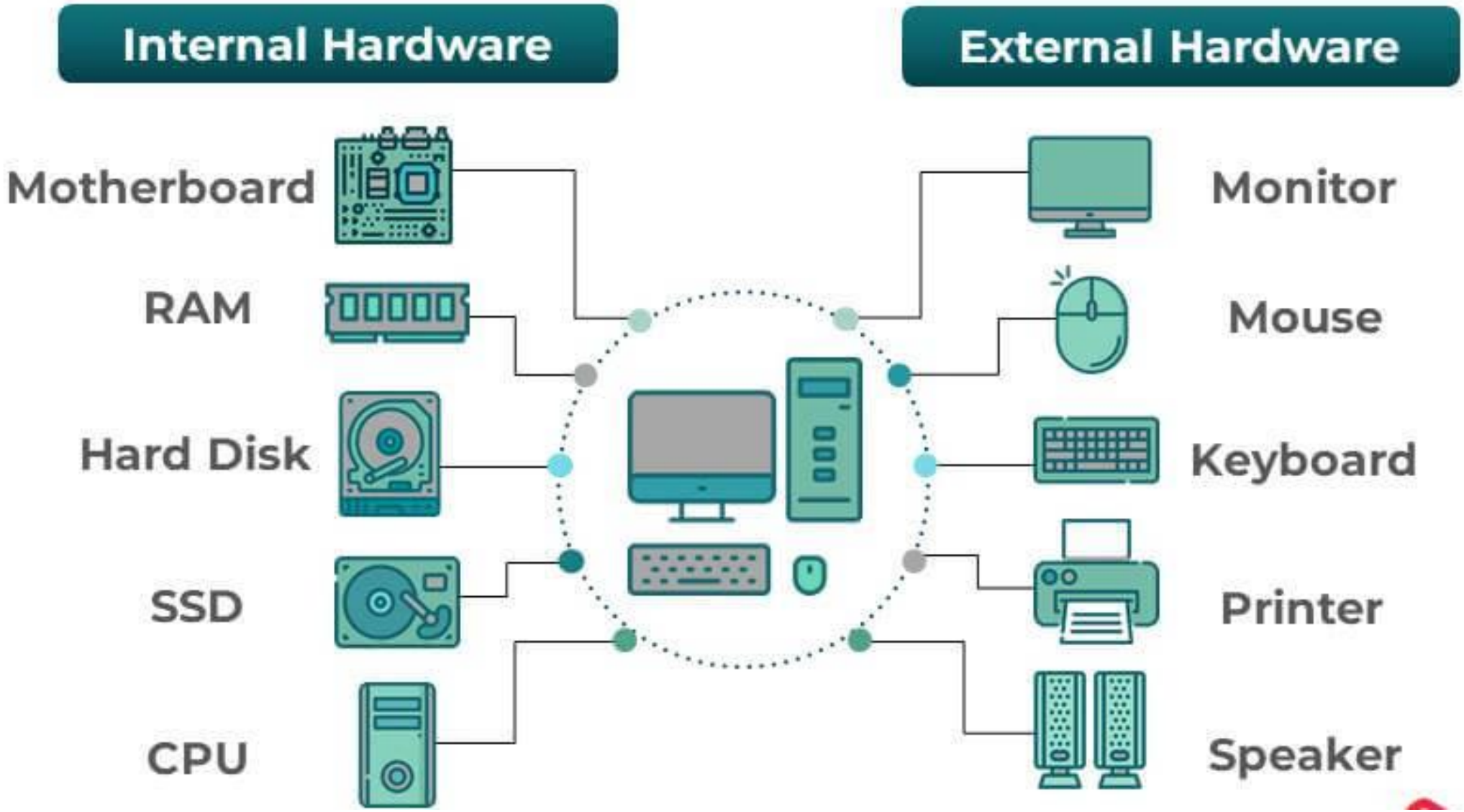
1. Speed up : performing tasks very fast.
2. Accuracy : perform tasks correctly.
3. Effortless : reduce the effort to do tasks.
4. High-capacity storage : the ability to store billions of data information

What's a Computer?

- Computer system : Hardware & Software



Types of Computer Hardware



Computer Hardware

❑The main hardware components of a computer include:

1. **Central Processing Unit (CPU):**

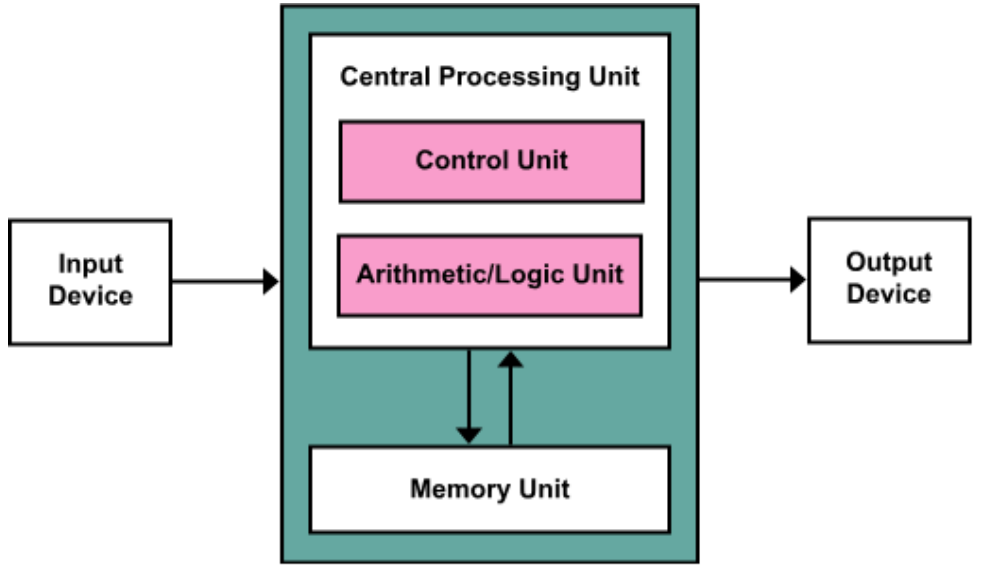
   For running Arithmetic & logical operations.

2. **Main Memory:**

   To store information for processing.

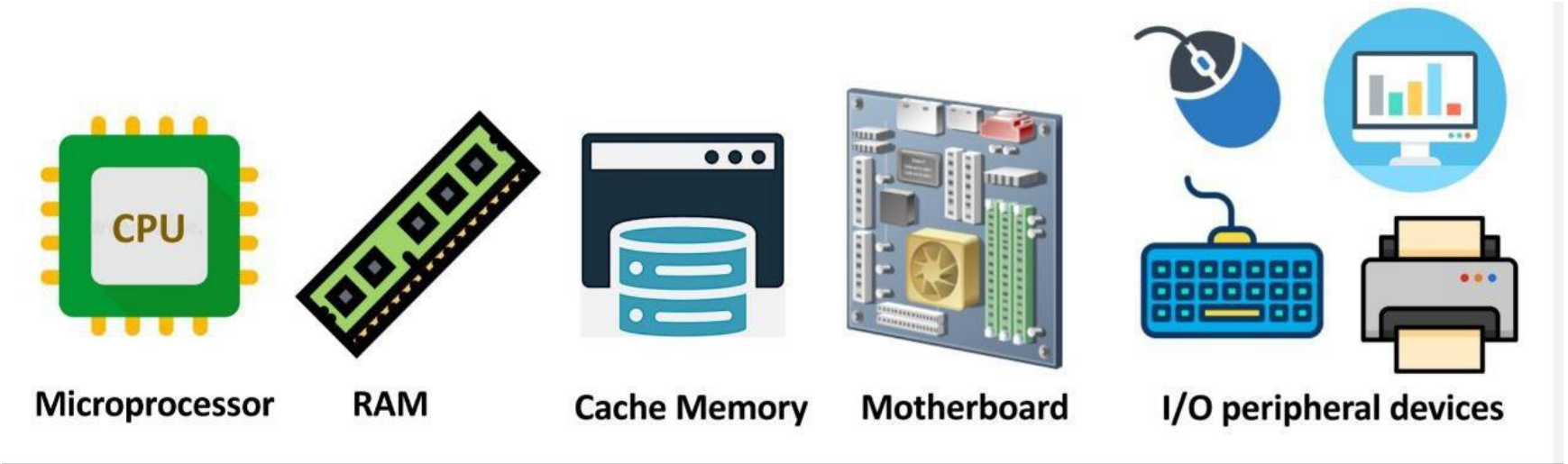
3. **Peripheral Devices (Input/Output devices):**

   To input information to a computer or output information outside the computer.



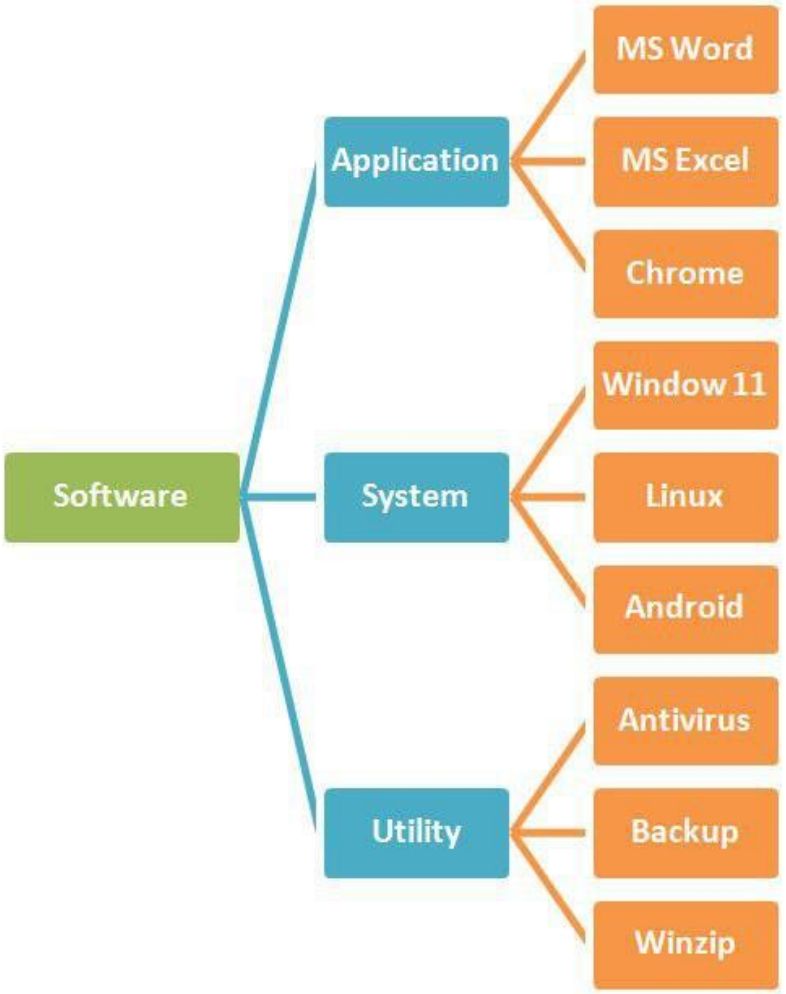
Computer components

- **Microprocessor (CPU)** — performs all computations
- **Cache** — fast memory which holds current data and program
- **Primary (Main) memory** —contains data and instructions, they can accessed directly by the CPU. For example: RAM, ROM , Cache, etc._
- **Secondary storage** — permanently store data such as OS, and user's files. For example: Hard Disk, floppy Disk. etc.
- **Chipset** — controls communication between components
- **Motherboard** — circuit board which holds all the above components



Computer Software

- Computer Software: Application & System & Utility



Programming languages

What is the programming?

- Programming is the process of creating a set of instructions that tell a computer how to perform a task.
- We can program using a variety of computer programming languages. For example: C, C++, Java, Python, etc.

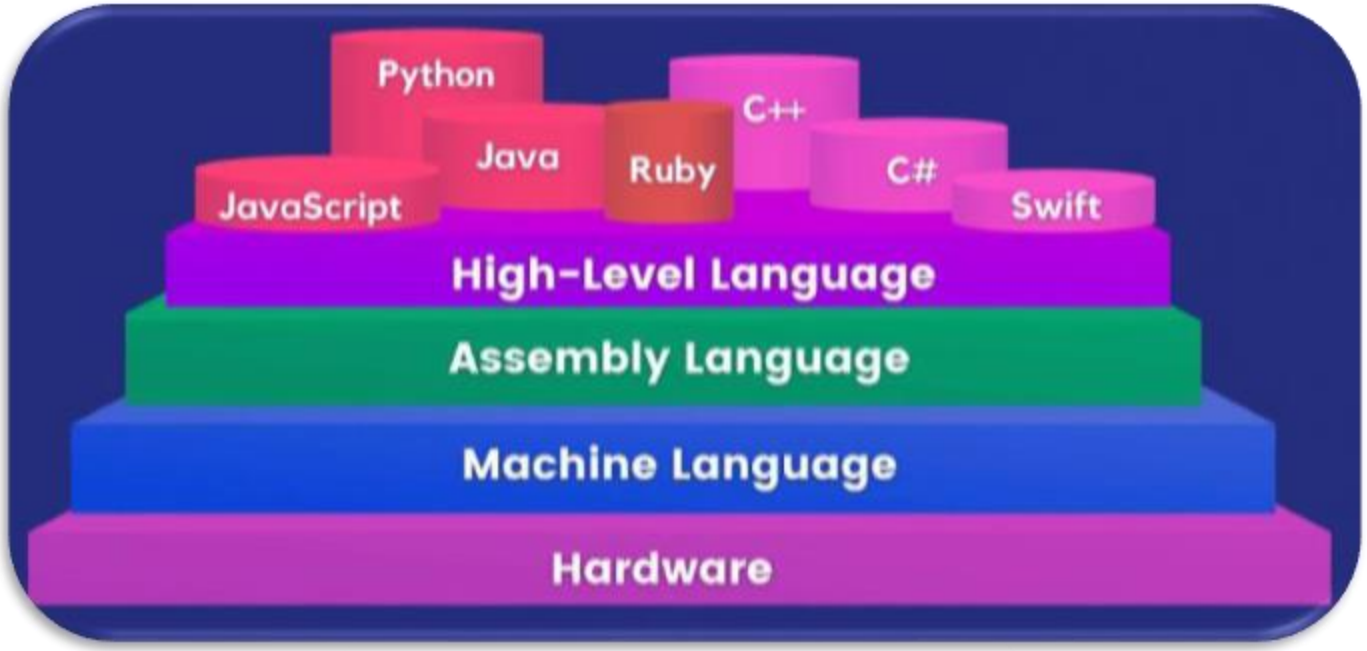
Why is it important?

- Nowadays, software algorithms have become embedded in systems of all kinds: transportation, medical, telecommunications, military, industrial, entertainment, office machines, and many other fields and applications.

Programming languages:

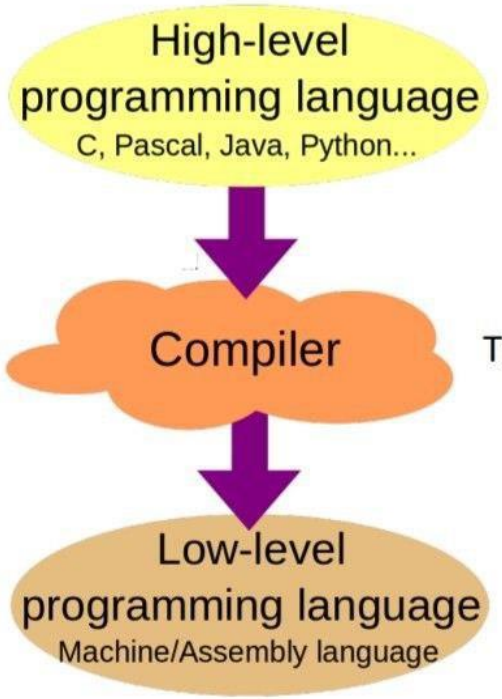
- Programmers write instructions in various programming languages, some directly understandable by computers and others requiring intermediate translation steps.
- Hundreds of computer languages are in use today. These may be divided into three general types:

  - Machine languages
  - Assembly languages
  - High-level languages



Compilation –> Translation

- To speed the programming process, high-level languages were developed in which single statements could be written to accomplish substantial tasks.
- Translator programs called compilers convert high-level language programs into machine language.
- High-level languages allow programmers to write instructions that contain commonly used mathematical notations.



Complier
Translates high-level into low-level languages and viceversa

Big Data – Byte Measurement

- The smallest capacity of computer unit is measured by what called bit. A bit is either ‘0’ or ‘1’.
  - 1 = there is a volt
  - 0 = there is no volt.

Name	Equal to:	Size in Bytes
Bit	1 bit	1/8
Nibble	4 bits	1/2 (rare)
Byte	8 bits	1
Kilobyte	1,024 bytes	1,024
Megabyte	1,024 kilobytes	1,048,576
Gigabyte	1,024 megabytes	1,073,741,824
Terrabyte	1,024 gigabytes	1,099,511,627,776
Petabyte	1,024 terrabytes	1,125,899,906,842,624
Exabyte	1,024 petabytes	1,152,921,504,606,846,976
Zettabyte	1,024 exabytes	1,180,591,620,717,411,303,424
Yottabyte	1,024 zettabytes	1,208,925,819,614,629,174,706,176

THANK YOU