Computers

- A **computer** is a machine capable of following the instructions of a **program.**

- A **program** is a set of instructions.

- **Computer Organization: Hardware** (von Neumann architecture)
  - The Central Processing Unit: (CPU)
    1. Carries out the instructions of the programs.
    2. Moves data from one part of machine to another part of the machine.
    3. Manipulates data (e.g., adds, compares, etc.).

  - Memory:
    1. Internal Memory: memory internal to the system printed circuit boards. Used to store programs and data that are currently being processed by the CPU.
       a) RAM - Random Access Memory
       b) ROM - Read Only Memory
    2. External Memory: memory external to the system printed circuit boards. Used for long term and mass storage of programs and data.
       a) Floppy Disks
       b) Hard Disks
       c) Flash Drives
       d) CD ROM
       e) DVD ROM

  - Input/Output Devices:
    1. Input Devices: used to input programs and data into the computer.
       a) Keyboard
       b) Mouse or Trackball
       c) Microphone
    2. Output Devices: used to receive output information from the computer.
       a) Screen
       b) Printer
       c) Speaker

- **Computer Organization: Software**

  - Program:
    A set of instructions that determines a computer's action.

  - Software:
    A program or a collection of programs that are not 'built-in' to the hardware.

  - The Operating System: (Windows, Unix, Linux, ...)
    The software that manages the entire computer system.

  - Application Program:
    Software designed to carry out tasks in a particular application area (word processing, Web access, spreadsheets,...).

  - Programming Language:
    A language with which programs are written.

  - C, C++, Java, JavaScript, Fortran, Pascal, Visual Basic, ...:
    High-level programming languages.

  - Assembly Language:
    A low-level programming language.

  - Machine Language
    The "language" that the computer actually understands. (strings of 1s and 0s)

  - Compiler:
    Software that translates programs written in high-level languages into machine language. (e.g., Java Compiler)

  - Interpreter:
    Software that translates and executes programs written in high-level languages into machine language one command at a time. (e.g., JavaScript Interpreter)