WEEK 3 – Computer Hardware

I. The System Unit and Its Main Components
Definition of System Unit
- A system unit is the part of a computer that houses the primary devices that perform operations and produce results for complex calculations.
- The primary function of the computer system unit is to hold all the other components together and protect the sensitive electronic parts from the outside elements.

Major Components of the System Unit:
1. Power Supply
- is an electrical device that supplies electric power to an electrical load. The main purpose of a power supply is to convert electric current from a source to the correct voltage, current, and frequency to power the load.
- Also called 'electric power converter'. Power supplies are designed from the output back to the input.

2. CD/DVD drive
- It is a device used with a computer to read or write a compact disc (CD).

3. Hard drive
- It is a hardware component that stores / saves all of your digital content. Your documents, pictures, music, videos, programs, application preferences, and operating system represent digital content that is stored on a hard drive.

4. Memory Chip
- It is the most often referred to as the primary storage on a computer.
- A device that is used to store data or programs on a temporary or short-term basis.
- It is a **volatile** data storage device.

5. Motherboard
- It is a printed circuit board and foundation of a computer that is the biggest board in a computer system unit.
- It is the backbone that ties the computer's components together at one spot and allows them to talk to each other.

6. Sound Card
- Also referred to as an audio card, is a peripheral device that attaches to the Peripheral Component Interconnect (PCI) slot on a motherboard to enable the computer to input, process and deliver sound.

7. Video Card
- Also called as 'Graphics Card' is an integrated circuit that generates and controls output to a display screen.
- It connects to the motherboard and generates output images to display. Video cards include a processing unit, memory, a cooling mechanism and connections to a display device.

8. Ribbon cable
- A thin, flat, multi conductor cable that is widely used for internal peripheral connections inside the system unit such as hard drive, CD Drives etc.

9. Fan
- A computer fan is any fan inside, or attached to, a computer case used for active cooling. Fans are used to draw cooler air into the case from the outside

10. Central Processing Unit (CPU)
- Is an internal component of the computer.
- Also known as the "Brain of Computer" and carries out the instructions of a computer program, to perform the basic arithmetical, logical and input/output operations.

   Components of CPU:
   - Arithmetic Logic Unit (ALU): Performs arithmetic operations (addition, subtraction) and logical comparisons (>, <, =).
   - Control Unit (CU): Directs the flow of data and instructions between the CPU, memory, and peripherals.
   - Registers: Small, high-speed storage locations inside the CPU for temporary data during processing.

CPU Features:
- **Clock Speed:** Speed at which the CPU executes instructions, measured in GHz.
- **Cores:** Modern CPUs have multiple cores for simultaneous processing of tasks.
- **Cache Memory:** High-speed memory storing frequently used data close to the CPU for faster access.

   Memory
   - **Registers**: Small, high-speed storage locations inside the CPU for temporary data during processing.
   - **Cache**: A smaller, faster memory located closer to a processor core, storing copies of frequently used data from main memory for faster access.
   - **RAM (Random Access Memory)**: Also called read-write memory or main memory; stores programs and data that the CPU requires during execution. Volatile memory.
         - **SRAM (Static RAM)**: On-chip memory with small access time; faster than DRAM.
         - **DRAM (Dynamic RAM)**: Off-chip memory with larger access time; larger capacity than SRAM.
   - **ROM (Read-Only Memory)**: Non-volatile memory storing instructions essential for booting and operating the system.
         - **PROM (Programmable ROM)**: Can be programmed once by the manufacturer.
         - **EPROM (Erasable PROM)**: Can be erased with UV light and reprogrammed.
         - **EEPROM (Electrically Erasable PROM)**: Can be erased electrically, partially or fully.

   II. Ports, buses, and expansion cards
   Expansion Cards - An expansion slot is a socket on the motherboard that is used to insert an expansion card (or circuit board), which provides additional features to a computer such as video, sound, advanced graphics, Ethernet or memory.

Ports – *Physical connectors on a computer used to connect external devices (USB, HDMI, Ethernet, audio jacks, etc.).*

Buses – *Communication pathways that transfer data between components inside the computer (e.g., data bus, address bus, control bus).*