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Introduction to Operating Systems

Main Functions of a Computer

There are four main functions of a computer that make user interaction possible:

- Input
- Processing
- Memory
- Output

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- Input is data we give to our computers
through interactions
- Processing is comprised of the
translation of input and the instructions
given for output
- Memory is used to store either temporary
or permanent information
- Output is the information that gets
returned by the computer
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Control Unit (CU)

The Control Unit (CU) on a CPU receives information from the software; then, it distributes and directs the data to the relevant hardware components.

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Some functions of the CU:
  - Determine what/where the next
    instruction must go for processing
  - Send clock signals to all hardware to
    force synchronous operations
  - Send memory taskings if appropriate
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Arithmetic and Logic Unit (ALU)

An Arithmetic Logic Unit (ALU) is a digital circuit used to perform arithmetic and logic operations. It is the fundamental building block of the CPU.

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Some ALU functions:
  - Addition & subtraction
  - Determining equality
  - AND/OR/XOR/NOR/NOT/NAND logic
    gates and more!
```

Registers

A register is a volatile memory system that provides the CPU with rapid access to information it is immediately using.

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Functions of a register:
  - Store temporary data for immediate
    processing by the ALU
  - Hold "flag" information if an
operation
    results in overflow or triggers other
flags
  - Hold the location of the next
instruction
    to be processed by the CPU
```

The CPU

A Central Processing Unit (CPU) is the electronic circuitry that executes instructions based on an input of binary data (0's and 1's). The CPU consists of the Control Unit (CU), the Arithmetic and Logic Unit (ALU), and registers (Immediate Access Store).

Random Access Memory (RAM)

Random Access Memory, or RAM, is additional high-speed memory that a computer uses to store and access information on a short-term basis.

Hard Disks

Hard disks, or hard drives, are responsible for the long-term, or secondary storage of data and programs.

The Mainboard

The mainboard, or motherboard, is a printed circuit board that houses important hardware components via ports.

Ports

A port is a physical outlet used to connect devices to a computer. A computer typically contains multiple ports. This connection allows for communication between the IO device and the computer.

The Operating System

The operating system (OS) is system software that manages the basic functionalities of a computer and is responsible for tasks such as process management, memory management, file system management, IO management, networking, security, and providing a user interface.