Information Technology

Computer Architecture

Dr. Radwa Rady



Continue Chapter 1

Basic Concepts and Computer Evolution

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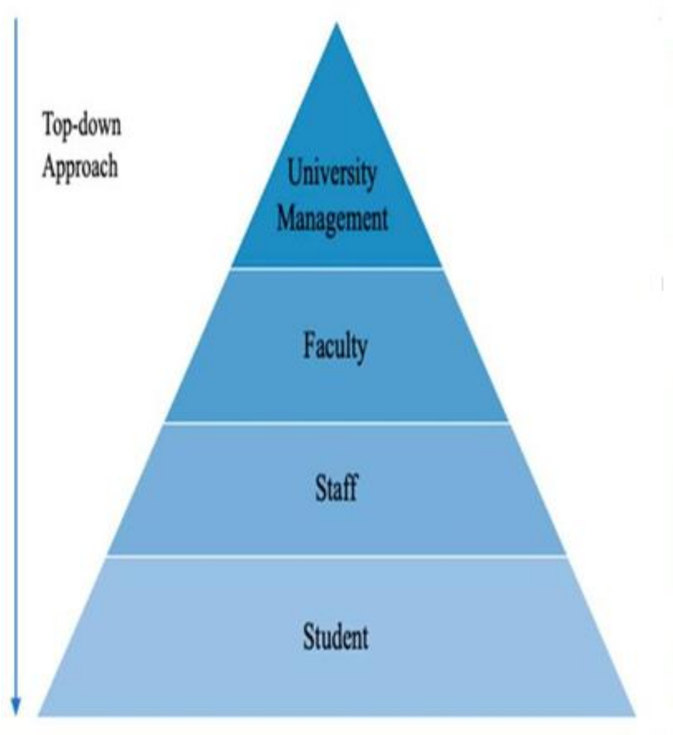
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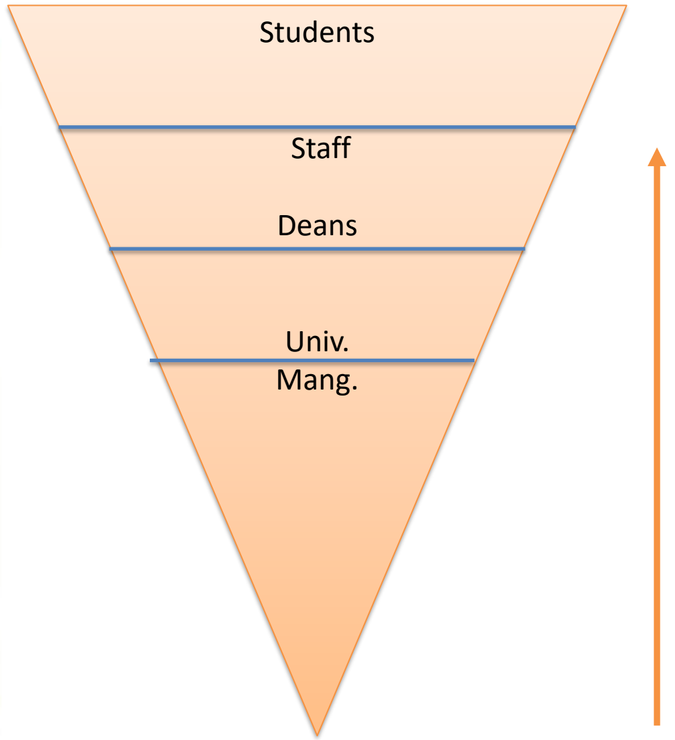
After this lecture, we will be able to;

- Explain the structure hierarchy of computers.
- Aware of the main structural components of the computer
- Know the CPU and control unit structure.

Computer Architecture

Hierarchical categories





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Structure

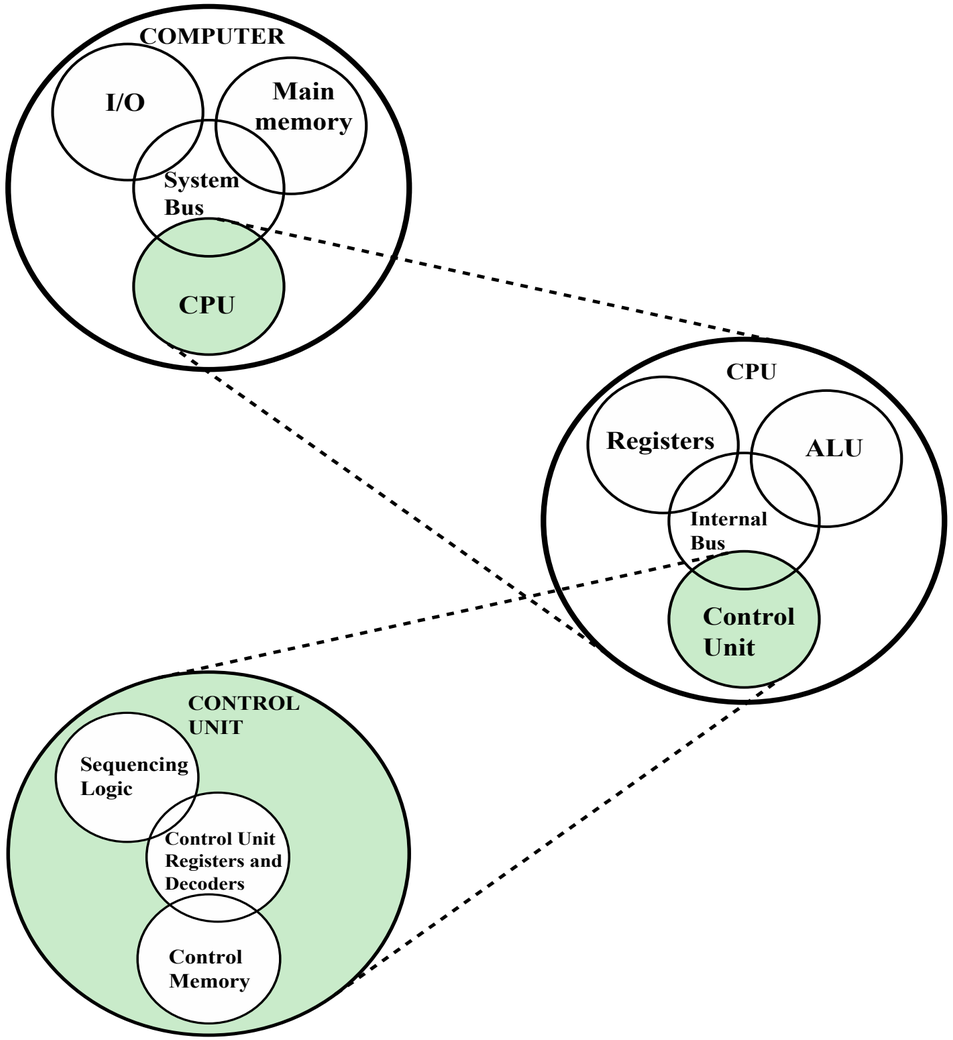
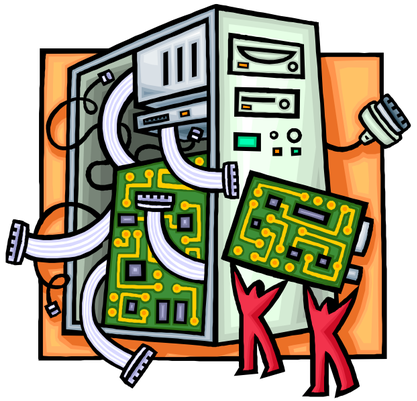


Figure 1.1 A Top-Down View of a Computer

Computer Architecture

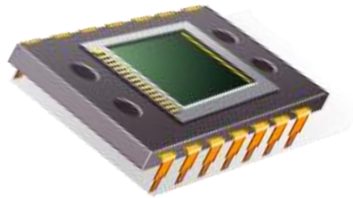
There are four main structural components of the computer:

- CPU – controls the operation of the computer and performs its data processing functions (ALU)
- Main Memory – stores data
- I/O – moves data between the computer and its external environment
- System Interconnection – some mechanism that provides for communication among CPU, main memory, and I/O

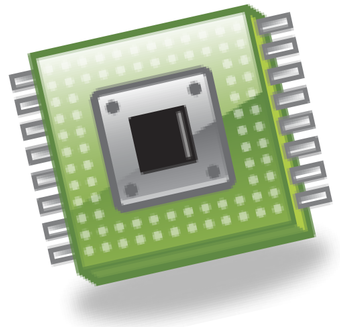


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CPU major structural components:



- Control Unit
  - Controls the operation of the CPU and hence the computer

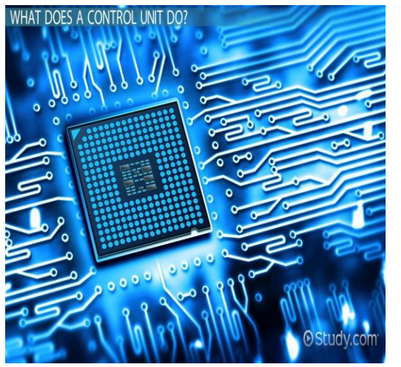


- Arithmetic and Logic Unit (ALU)
  - Performs the computer's data processing function
- Registers
  - Provide storage internal to the CPU
- CPU Interconnection
  - Some mechanism that provides for communication among the control unit, ALU, and registers
  - Sum:

    keyboard>RAM>Reg>ALU>Reg>RAM>Monitor [control unit]

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Control unit major structural components:



- Instruction register:
  - Holds the current instruction fetched.
- Instruction decoder:
  - Decodes the opcode of the instruction to generate control signals.
- Timing and control signal generator:
  - Produces timing signals and control signals for the execution process.
- Sequencing circuitry or microprogram memory (for microprogrammed control units):
  - Stores microinstructions or controls the sequence of operations.
- Interface logic:
  - Sends control signals to various CPU components like ALU, registers, memory, and I/O devices. Controls the operation of the CPU and hence the computer

Thank You

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