Al-Mustaqbal University

College of Engineering and Technology

Department of Computer Techniques Engineering

Class: Second Class

Subject: Computer Architecture

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Lecture Address: Computer System Architecture

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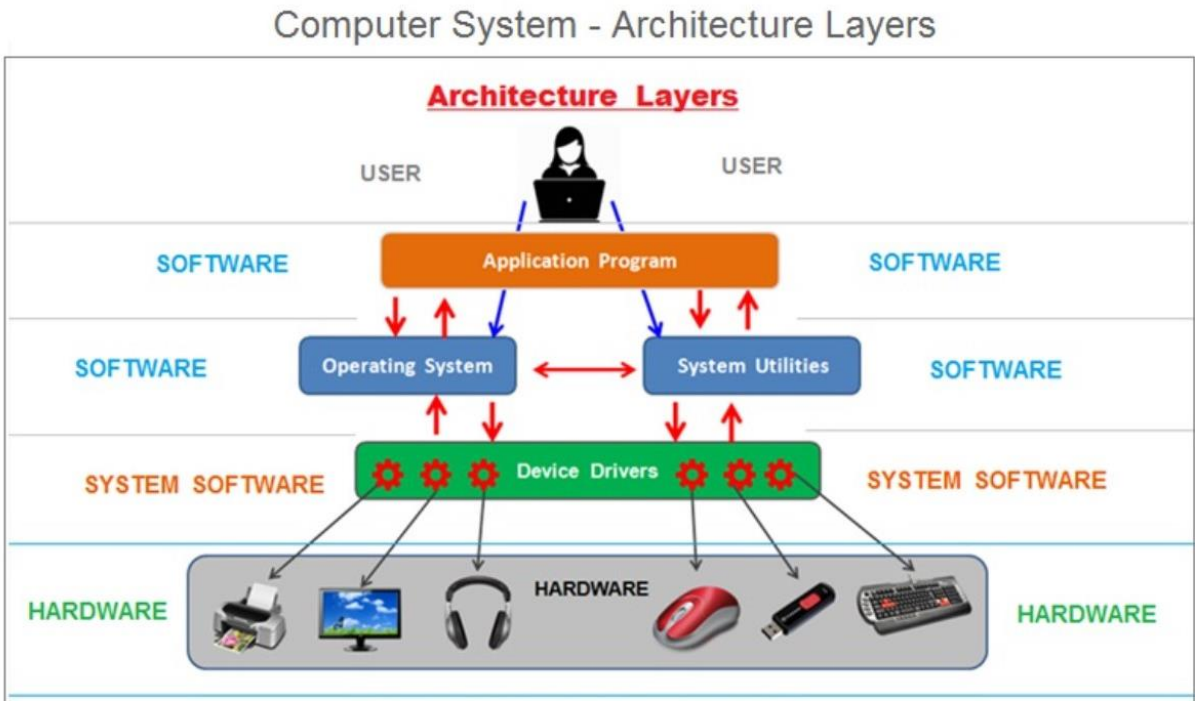
Computer System Architecture

What is Computer System Architecture

In computer engineering , the computer system architecture is the conceptual design and fundamental operational structure of a computer system.

It is the technical drawings and functional description of all design components and requirements. The system architecture defines the system performance parameters such as speed and interconnections.



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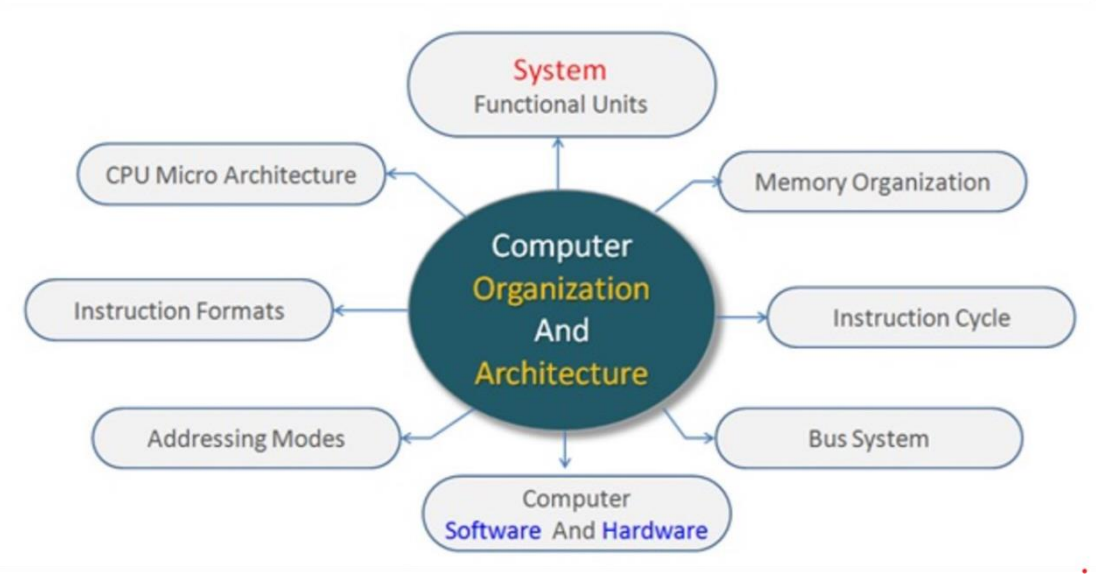
The system architecture can also be defined as the science and art of selecting and interconnecting hardware components to create computer system that meet functional performance and cost goals.

And therefor , better system architecture will produce a better design and system performance.



Computer Organization and Architecture (COA) is a field of study that delves into the fundamental principles underlying the design, performance, and operation of ,computer systems

It encompasses both the physical components of computers (organization) and the conceptual framework guiding their design and functionality (architecture). COA plays a crucial role in shaping the efficiency, performance, and capabilities of modern computing systems.

The COA important topics include all the fundamental concepts such as computer system, functional units , processor micro architecture , program instructions, instruction formats , addressing modes , instruction pipelining, memory ,organization , instruction cycle, interrupts

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instruction set architecture (ISA) and other important related topics

Computer Organization And Architecture

COA Table Of Contents

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What Is Computer Architecture?

In order to understand the term computer architecture , let us first discuss what is an architecture. The term architecture can be defined as an art and science of designing an object.

We generally relate the term architecture with the building because the building is one of the most common object in the human world. The architecture helps us to define the functional , physical and the performance standards for any object

Every object in the real world is based on some architecture. For example an architect will define the building in terms of building drawings and specifications for various building components.

Similarly , the system architecture defines various functional units of the computer system and how these units are interconnected and performance standards. It defines the system

performance specifications and what system should achieve in terms of performance

In simple words , the computer architecture is all about computer system design details expressed in terms of functional units and interconnection between these units

The computer architecture helps us define the functional capabilities and the requirements for the computer system. The system architecture is a high level design specification that does not specify any specify details of the hardware components.

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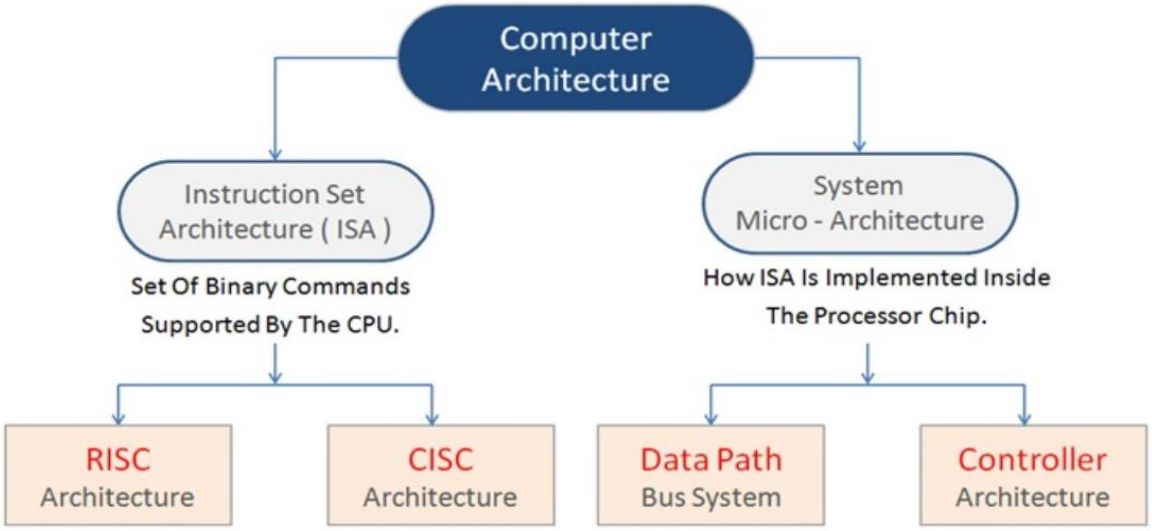

What Is Computer Organization ?

Let us first understand the meaning of term organization in the context of computers, The term organization is defined as arranging , classifying things together logically to .maximize the functional convenience

The computer organization is based on the computer architecture. The computer .organization implements the system architecture

In simple words , the computer organization is all about organizing various system hardware components and how these components are interconnected .

Difference Between Computer Architecture And Computer Organization

In general the terms " computer organization " and " computer architecture" are often used interchangeably . However , they can be distinguished by the following characteristic.

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Computer Architecture	Computer Organization
Computer architecture is concerned with the way hardware components are connected together to form a computer system.	Computer organization is concerned with the way architecture is implemented in terms of structure and behaviour of a computer system as seen by the user.
It acts as an interface between computer hardware and software.	Organization deals with the components and connections between various hardware components.
Computer architecture help us to understand the functionalities of a system.	Computer organization provide the details of the how exactly all the functional units in the system are arranged and interconnected.
A programmer can view system architecture in terms of instruction set architecture (ISA), instruction format, addressing modes and registers.	Computer organization is the actual implementation of the system architecture to achieve specified system performance.
Computer architecture is the first step necessary while designing and building a computer.	An organization is defined and done based on the system architecture.
Computer architecture deals with the high level design issues and specifications.	Computer organization basically deals with the low level system design issues.
Architecture involves logic (ISA instruction sets , addressing modes, data types , cache memory optimization).	Organization involves physical hardware components such as circuit design, adders, signals, and peripherals.

Computer Architecture

Computer architecture can be classified into different types . for example, von Neumann

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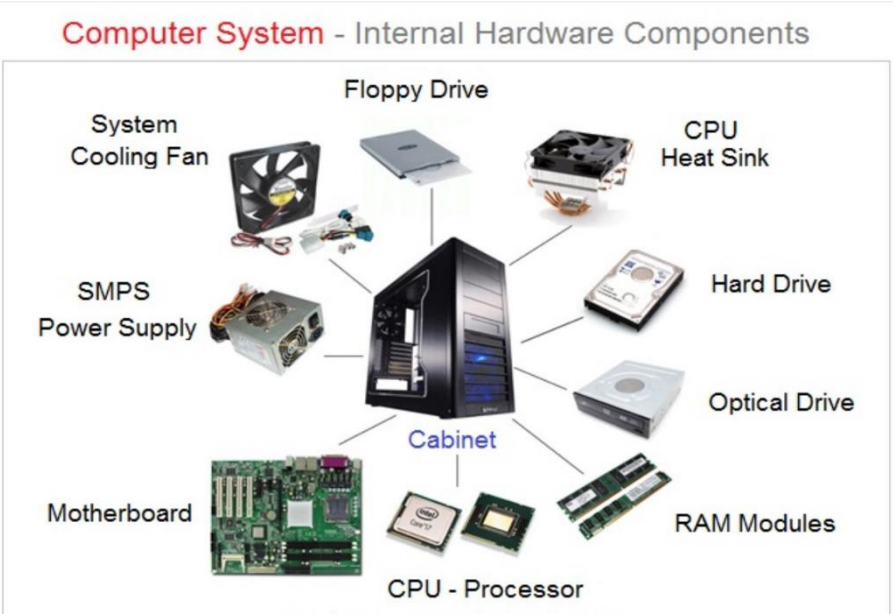
Architecture, which is based on the concept of a stored – program computer , and more specialized architecture like Reduced Instruction Set Computer (RISC) or Complex Instruction Set Computing (CISC).

Computer Hardware



What Is Computer Hardware?

The computer hardware components are the physical parts of the computer system, the computer hardware includes the electronic, electrical and mechanical components connected to the computer system.

The computer hardware components can be of two types . some components are placed inside the computer system case (cabinet) , and the peripheral hardware devices are connected externally to the system.

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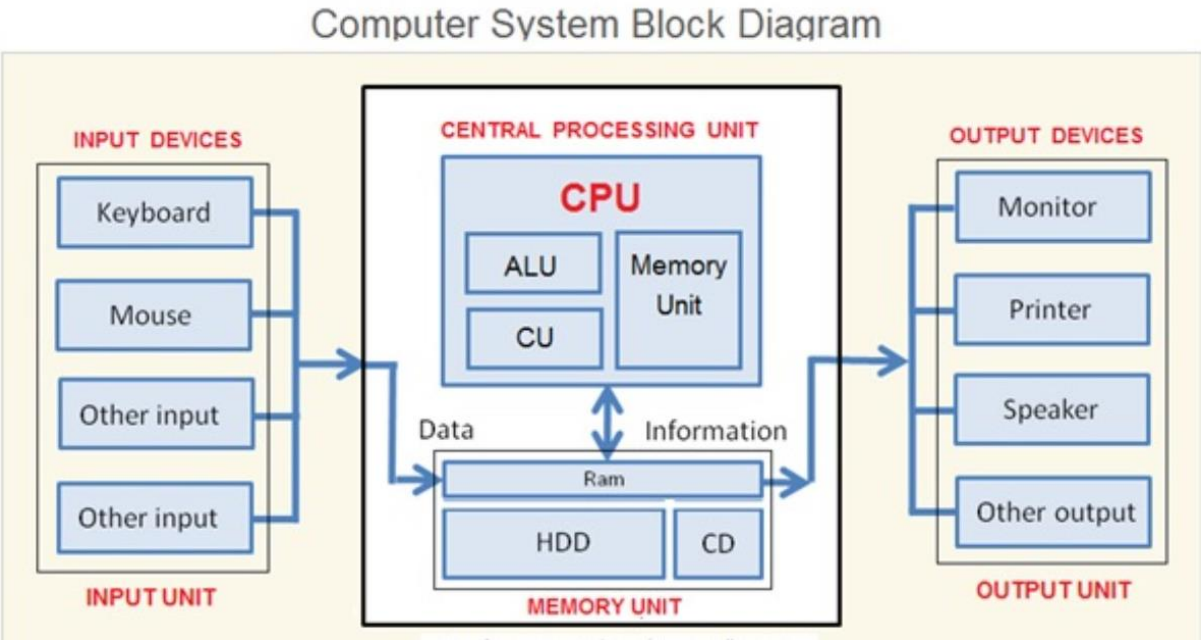

Types of computer hardware

1. Internal Hardware components
2. External Hardware components

Internal Hardware components

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- System Case (Cabinet).
- Motherboard.
- Microprocessor (CPU).
- Processor Heat Sink.
- Power Supply Unit (SMPS) .
- RAM Modules.
- System Ventilation Fan.
- Graphics Card .
- Sound Card.
- Internal Hard Disk.
- Solid State Drive (SSD).
- CD DVD Drive.
- Optical Drive.
- Connection Cables (Buses).

External Hardware components

- Display Monitor.
- Keyboard.
- Mouse.
- Printer.
- Projector.
- Mike.
- Camera .
- Scanner.
- External Hard Disk.
- Speakers.
- Joystick.
- Headphone.

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