Al-Mustaqbal University

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Department of Medical Instrumentation Techniques Engineering

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Lecturer: M.Sc Ali Kareem

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Microprocessor architecture .

BY M.SC. ALI KAREEM AL-JUHAISHI

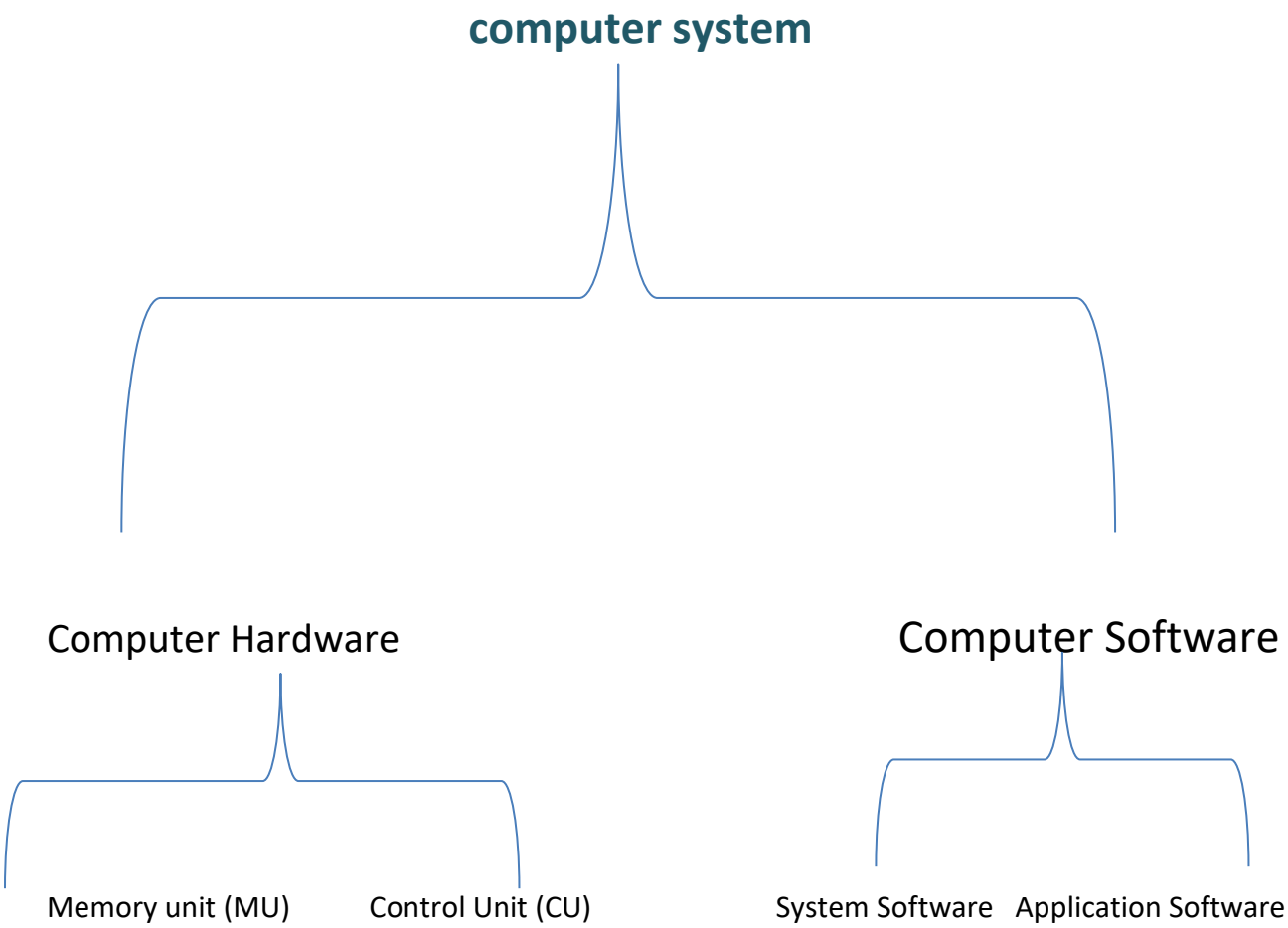
ali.kareem.obaid@uomus.edu.iq

Introduction of Microprocessor:

- A Microprocessor is an important part of a computer architecture without which you will not be able to perform anything on your computer.
- It is a programmable device that takes in input performs some arithmetic and logical operations over it and produces the desired output.
- In simple words, a Microprocessor is a digital device on a chip that can fetch instructions from memory, decode and execute them and give results.

General architecture of digital computer

At present there are many types and sizes of computers available. These computers are designed and constructed based on digital and integrated circuit (IC) fabrication technology. A digital computer is a machine that can be used to solve problems for people and carrying out the tasks by following the instructions given to it. A sequence of instructions describing how to perform a certain task or job is called a program. There are two basic components of computer system architecture



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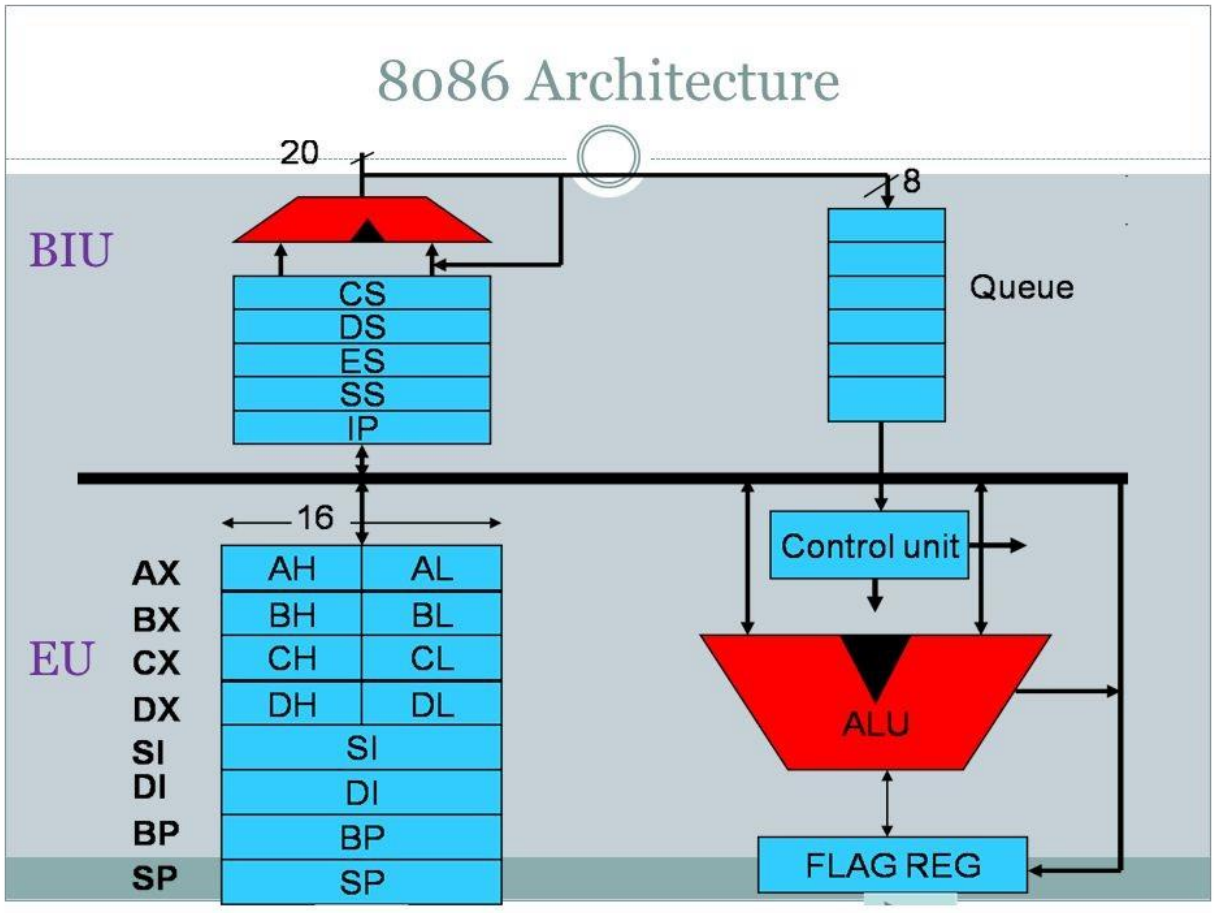
8086 Microprocessor Architecture

The microprocessor has become more essential part of many gadgets. The evolution of microprocessors was divided into five generations such as first, second, third, fourth and fifth generation



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The 8086 microprocessor has a segmented memory architecture, which means that memory is divided into segments that are addressed using both a segment register and an offset. The segment register points to the start of a segment, while the offset specifies the location of a specific byte within the segment. This allows the 8086 microprocessor to access large amounts of memory, while still using a 16-bit data bus

the data registers of the 8086

1. AX (Accumulator Register)

- **Function**: Used for arithmetic operations and serves as an input/output for operations

2. BX (Base Register)

- **Function**: Used as a base address when accessing memory.

3. CX (Count Register)

- **Function**: Used as a counter in loops or iterative operations.

4. DX (Data Register)

- **Function**: Used to store data and works with AX in operations requiring higher precision

5. SI (Source Index)

- **Function**: Used in operations that require accessing data in memory

6. DI (Destination Index)

- **Function**: Used as the destination for data being transferred from the source.

7. BP (Base Pointer)

- **Function**: Used to point to the location of data in the stack

8. SP (Stack Pointer)

- **Function**: Used to track the top address of the stack

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some basic instructions (operations) used in the 8086 microprocessor

1. Arithmetic Instructions

- **ADD**: Adds two values.
- **SUB**: Subtracts one value from another.
- **MUL**: Multiplies two values (16-bit result, using AX and DX).
- **DIV**: Divides one value by another (uses DX and AX).

2. Logical Instructions

- **AND**: Performs a logical AND operation between two values.
- **OR**: Performs a logical OR operation between two values.
- **XOR**: Performs a logical XOR operation between two values.
- **NOT**: Inverts a given value.

3. Data Transfer Instructions

- **MOV**: Transfers data from one register to another or from memory to a register.
- **PUSH**: Pushes a value onto the stack.
- **POP**: Pops a value off the stack.
- **XCHG**: Exchanges values between registers

4. Control Instructions

- **JMP**: Jumps to a specified address (unconditional).
- **CALL**: Calls a procedure (function).
- **RET**: Returns from a procedure.
- **CMP**: Compares two values