Introduction of 8086

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Introduction to 8086

- The 8086 microprocessor is an 8-bit/16-bit microprocessor designed by Intel in the late 1970s. It is the first member of the x86 family of microprocessors, which includes many popular CPUs used in personal computers.

- The architecture of the 8086 microprocessor is based on a complex instruction set computer (CISC) architecture, which means that it supports a wide range of instructions, many of which can perform multiple operations in a single instruction. The 8086 microprocessor has a 20-bit address bus, which can address up to 1 MB of memory, and a 16-bit data bus, which can transfer data between the microprocessor and memory or I/O devices.

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▶ The 8086 microprocessor has two main execution units: **the execution unit (EU)** and *the bus interface unit (BIU)*. The **BIU** is responsible for fetching instructions from memory and decoding them, while the **EU** executes the instructions. The BIU also manages data transfer between the microprocessor and memory or I/O devices.

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▶ The 8086 microprocessor has **a rich set of registers**, including **general-purpose registers**, **segment registers**, and **special registers**. The general-purpose registers can be used to store data and perform arithmetic and logical operations, while the segment registers are used to address memory segments. The special registers include the flags register, which stores status information about the result of the previous operation, and **the instruction pointer (IP**), which points to the next instruction to be executed.

Block Diagram of 8086 Microprocessor
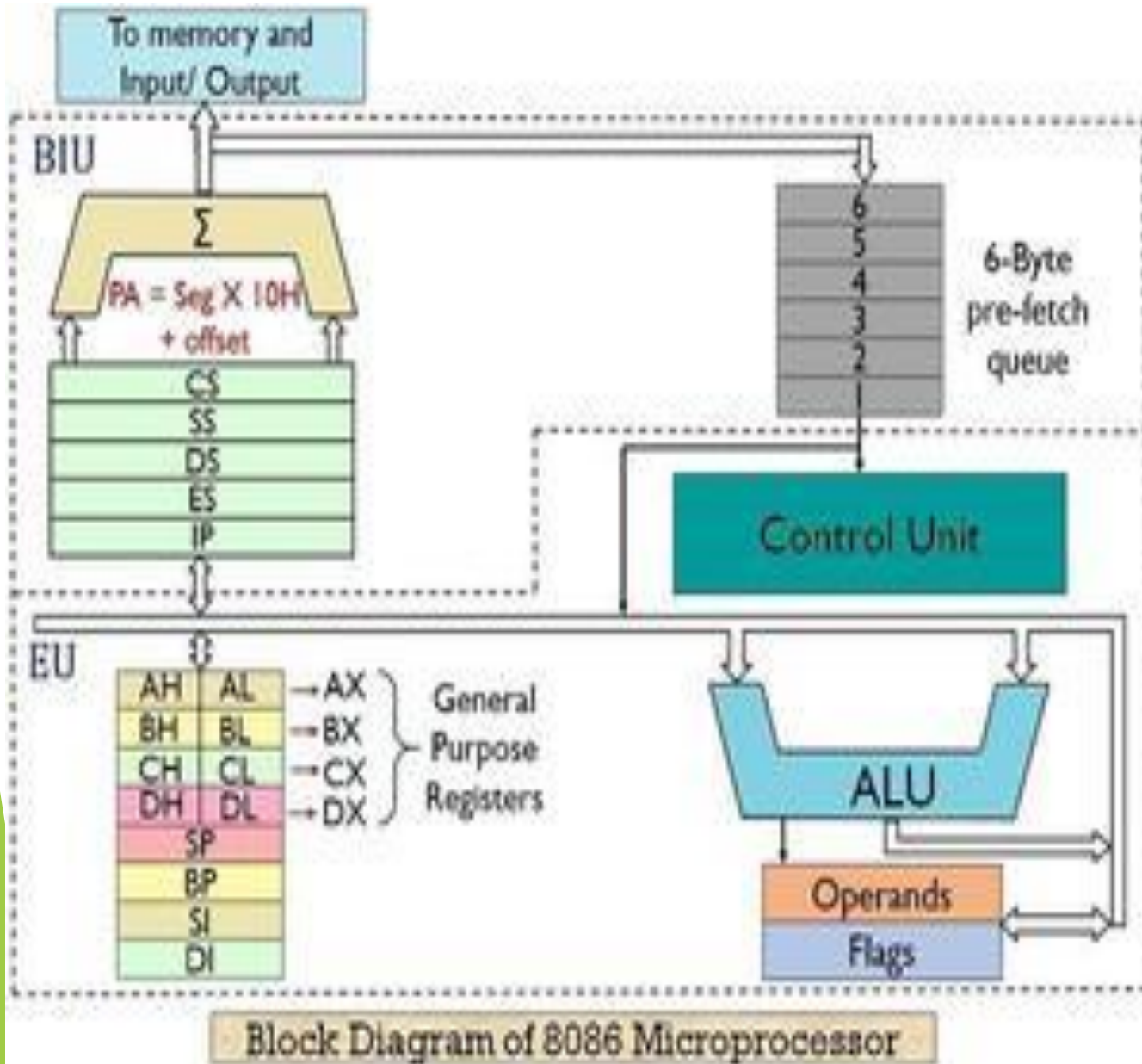
1. The Bus Interface Unit (BIU)
2. prefetch unit
3. The Execution Unit (EU)
4. Decode unit
5. control unit

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Advantages of Architecture of 8086:

▶ The architecture of the 8086 microprocessor provides several advantages, including:

▶ Wide range of instructions: The 8086 microprocessor supports a wide range of instructions, allowing programmers to write complex programs that can perform many different operations.

▶ Segmented memory architecture: The segmented memory architecture allows the 8086 microprocessor to address large amounts of memory, up to 1 MB, while still using a 16-bit data bus.

▶ Powerful instruction set: The instruction set of the 8086 microprocessor includes many powerful instructions that can perform multiple operations in a single instruction, reducing the number of instructions needed to perform a given task

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▶ Multiple execution units: The 8086 microprocessor has two main execution units, the execution unit and the bus interface unit, which work together to efficiently execute instructions and manage data transfer.

▶ Rich set of registers: The 8086 microprocessor has a rich set of registers, including general-purpose registers, segment registers, and special registers, allowing programmers to efficiently manipulate data and control program flow.

▶ Backward compatibility: The architecture of the 8086 microprocessor is backward compatible with earlier 8-bit microprocessors, allowing programs written for these earlier microprocessors to be easily ported to the 8086 microprocessor.

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Dis-advantages of Architecture of 8086:

▶ The architecture of the 8086 microprocessor has some disadvantages, including:

▶ Complex programming: The architecture of the 8086 microprocessor is complex and can be difficult to program, especially for novice programmers who may not be familiar with the assembly language programming required for the 8086 microprocessor.

▶ Segmented memory architecture: While the segmented memory architecture allows the 8086 microprocessor to address a large amount of memory, it can be difficult to program and manage, as it requires programmers to use both segment registers and offsets to address memory.

▶ Limited performance: The 8086 microprocessor has a limited performance compared to modern microprocessors, as it has a slower clock speed and a limited number of execution units.

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▶ Limited instruction set: While the 8086 microprocessor has a wide range of instructions, it has a limited instruction set compared to modern microprocessors, which can limit its functionality and performance in certain applications.

▶ Limited memory addressing: The 8086 microprocessor can only address up to 1 MB of memory, which can be limiting in applications that require large amounts of memory.

▶ Lack of built-in features: The 8086 microprocessor lacks some built-in features that are commonly found in modern microprocessors, such as hardware floating-point support and virtual memory management.