

أسئلة واجوبة لمادة الاسبلي

- A **Microprocessor** is an Integrated Circuit with all the functions of a CPU however, it cannot be used stand-alone because it has no memory or peripherals.
- 8086 does not have a **RAM or ROM inside it**.
- 8086 has internal registers for storing intermediate and final results and interfaces with memory located outside it through the System Bus.
- In case of 8086, it is a **16-bit Integer processor in a 40 pin**, Dual Inline Packaged IC.
- The size of the internal registers (present within the chip) indicates how much information the processor can operate on at a time (in this case 16- bit registers) and how it moves data around internally within the chip.
- sometimes also referred to as the **internal data bus**.
- The microprocessors functions as the CPU in the stored program model of the digital computer.
- The microprocessors job is to generate all system timing signals and synchronize the transfer of data between memory, I/O, and itself.
- The microprocessors accomplishes this task via the three-bus system architecture (Address bus, Data bus, and Control bus).
- The 8086 CPU is organized as two separate processors (or units), called **the Bus Interface Unit (BIU) and the Execution Unit (EU)**.
- The BIU provides H/W functions, including generation of the memory and I/O addresses for the transfer of data between the outside world - outside the CPU, that is- and the EU.

- The EU **receives** program instruction codes and data from **the BIU**, executes these instructions, and **store the results in the general registers**.
- the EU has no connection to the system buses.
- The main components of the EU are:
 - Control Circuit
 - Instruction Register and Instruction Decoder
 - ALU
 - General Purpose Registers
 - Special Purpose Registers
 - Flag/Status Register.
- The Control Circuit controls all the operations & flow the data inside the Microprocessor.
- The Instruction Decoder works to translate or decode the instructions which are fetched from the memory (pre-fetch Stack).
- EU unit performs the following functions:
 - It Fetches instructions from the Stack in BIU, and decodes it.
 - It performs the logic & arithmetic operation on memory or register, using the ALU.
 - It stores the information temporary in the register array.
 - Sends request signals to the BIU to access the external module.
- General Purpose Registers are a type of computer memory used to quickly accept, store, and transfer data and instructions that are being used immediately by the CPU.
- The General Purpose registers used by the CPU are often termed as Processor registers.
- The computer needs processor registers (why) for processing data and a register for holding a memory address.

-The General Purpose register holding the memory location is used to calculate the address of the next instruction after the execution of the current instruction is completed.

-some of the most common registers used in a basic computer

: A .Data Registers

B. Pointer Registers

C .Index Register

-Data Registers include:

1-Accumulator Register (AX)

2- Base Register (BX)

3-Counter Register (CX)

4- Data Register (DX)

-Accumulator Register (AX): Consists of **two 8-bit registers** AL and AH, which can be combined together and used as a **16-bit register AX**.

- Accumulator Register holds operands and results during multiplication, division operations and logical (AND, OR, NOT, compare, etc.) functions.

- AL register is also called accumulator because it has some characteristics different from other general-purpose registers.

- Base Register (BX): Consists of two 8-bit registers BL and BH, which can be combined together and used as a 16-bit register BX.

- BL in this case contains the low-order byte of the word, and BH contains the high-order byte.

-Base Register (BX): the only general purpose register whose contents can be used for addressing the 8086 memory.

- Counter Register (CX): Consists of two 8-bit registers CL and CH, which can be combined together and used as a 16-bit register CX.

- CL register contains the low order byte of the word, and CH contains the high-order byte.

- Data Register (DX): Consists of two 8-bit registers DL and DH, which can be combined together and used as a 16-bit register DX.
- Data Register Used to hold the high 16-bit result (data) in 16 X 16 multiplication or the high 16-bit dividend (data) before a $32 \div 16$ division and the 16-bit remainder after division.
- The 8086 has **four other general-purpose registers** , two-pointer registers **SP and BP**, and two index registers **DI and SI**.
- the pointer and index registers are only accessed as words (16 bits)
- SP (Stack Pointer): Points to Stack top. Stack is in Stack Segment, used during instructions like PUSH, POP, CALL, RET etc.
- BP (Base Pointer): This is base pointer register pointing to data in Stack Segment.
- . BP can hold offset address of any location in the stack segment. It is used to access random locations of the stack.
- Index Registers include: These types of registers useful for doing vector/array operations.
- SI (Source Index): This is source index register which is used to point to memory locations in the Data Segment addressed by DS.
- DI (Destination Index): This is destination index register performs the same function as SI but in Extra Segment ES not in Data Segment DS.
- DI holds offset address in Data Segment during string operations.
- A special purpose register: Some registers serve specific functions within the CPU.
- A special purpose register Several of the more important of these registers are Instruction Register and Program Counter:

Instruction Register

Program Counter

- The instruction register (IR) or current instruction register (CIR) is used to store the current instruction to be executed or decoded.
- IR or CIR is the part of a CPU's control circuit.
- Decoding the op-code in the instruction register includes: determining the instruction, determining where its operands are in memory, retrieving the operands from memory, allocating the processor to execute the command (in superscalar processors), etc.
- Program Counter The program counter also called the instruction pointer (IP), which holds the address of the following instruction to be executed.
- the program counter is responsible for the following process, for the purpose of saving time.

اعداد الطالب: احمد سفيان غانم

