

1.What is a Microprocessor?

Microprocessor is a CPU fabricated on a single chip, program-controlled device, which fetches the instructions from memory, decodes and executes the instructions.

2. What is Instruction Set?

It is the set of the instructions that the Microprocessor can execute.

3. What is Bandwidth?

The number of bits processed by the processor in a single instruction.

4. What is Clock Speed ?

Clock speed is measured in the MHz and it determines that how many instructions a processor can processed. The speed of the microprocessor is measured in the MHz or GHz.

5. What is the purpose of a register in a CPU?

- Registers are small, fast storage locations in the CPU used to hold data, instructions, or addresses temporarily during processing.

6. What is Logical Address:?

A memory address on the 8086 consists of two numbers, usually written in hexadecimal and separated by a colon, representing the segment and the offset. This combination of segment and offset is referred to as a logical address.

7. What is The Effective Address:

`Mov ax, [baseReg + indexReg + constant]`

This example copies a word sized value into the register AX.

8. What is Physical Address?

Physical memory address pointed by SEGMENT:OFFSET pair is calculated as:

$\text{Physical address} = (\text{<Segment Addr>} * 10) + \text{<Offset Addr>}$

9.What are the flags in 8086 ?

In 8086 Carry flag, Parity flag, Auxiliary carry flag, Zero flag, Overflow flag, Trace flag, Interrupt flag, Direction flag, and Sign flag.

10.Why crystal is a preferred clock source?

Because of high stability, large Q (Quality Factor) & the frequency that doesn't drift with aging. Crystal is used as a clock source most of the times.

11. What is Program counter?

Program counter holds the address of either the first byte of the next instruction to be fetched for execution or the address of the next byte of a multi byte instruction, which has not been completely fetched. In both the cases it gets incremented automatically one by one as the instruction bytes get fetched. Also Program register keeps the address of the next instruction.

12.What are the various segment registers in 8086?

Code, Data, Stack, Extra Segment registers in 8086.

13.What are the flags in 8086?

In 8086 Carry flag, Parity flag, Auxiliary carry flag, Zero flag, Overflow flag, Trace flag, Interrupt flag, Direction flag, and Sign flag.

14. What is SIM and RIM instructions?

SIM is Set Interrupt Mask. Used to mask the hardware interrupts.

RIM is Read Interrupt Mask. Used to check whether the interrupt is Masked or not.

15. What is an Interrupt?

Def:- Interrupt is an external signal that causes a microprocessor to jump to a specific subroutine.

An interrupt operation suspends execution of a program so that the system can take special action. The interrupt routine executes and normally returns control to the interrupted procedure, which then resumes execution. BIOS handles Int 00H-1FH, whereas DOS handles INT 20H-3FH.

16. What is an Opcode?

The part of the instruction that specifies the operation to be performed is called the Operation code or Op code.

17. What is an Operand?

The data on which the operation is to be performed is called as an Operand.

18. Explain the difference between a JMP and CALL instruction?

A JMP instruction permanently changes the program counter.

A CALL instruction leaves information on the stack so that the original program execution sequence can be resumed.

19. What is the role of a memory management unit (MMU)?

The MMU handles memory access by translating virtual addresses to physical addresses.

20. What is meant by Polling?

Polling or device Polling is a process which identifies the device that has interrupted the microprocessor.

21. What is an Instruction?

An instruction is a binary pattern entered through an input device to command the microprocessor to perform that specific function.

22. What is Assembler?

The assembler translates the assembly language program text which is given as input to the assembler to their binary equivalents known as object code. The time required to translate the assembly code to object code is called access time. The assembler checks for syntax errors & displays them before giving the object code.

23. Define Pipelining?

In 8086, to speed up the execution program, the instructions fetching and execution of instructions are overlapped each other. This is known as Pipelining.

24. What is the use of HLDA?

HLDA is the acknowledgment signal for HOLD. It indicates whether the HOLD signal is received or not. HOLD and HLDA are used as the control signals for DMA operations.

25. What is cache memory, and why is it important?

Cache memory is a small, high-speed memory close to the CPU that stores frequently used data. It reduces the time to access data from the main memory.

26. What is the difference between SRAM and DRAM?

- **SRAM:** Static RAM is faster and does not need refreshing but is expensive.
- **DRAM:** Dynamic RAM is slower, requires periodic refreshing, but is cheaper.

27. What is virtual memory?

- Virtual memory extends RAM by using a portion of the hard drive to store data temporarily, enabling the execution of larger programs.

28. What is an instruction cycle?

- The instruction cycle is the process by which a CPU fetches, decodes, and executes an instruction.

29. What are addressing modes?

Immediate: Operand is specified in the instruction.

Register: Operand is in a register.

Direct: Operand is at a specific memory address.

Indirect: Address of the operand is stored in a register.

30. What is DMA (Direct Memory Access)?

- DMA allows devices to transfer data directly to/from memory without CPU involvement, improving I/O efficiency.

31. Explain the concept of I/O mapped I/O.

- In I/O-mapped I/O, specific I/O instructions are used to access devices, with each device having a unique I/O address.

32. What is the role of buses in computer systems?

- Buses transfer data, addresses, and control signals between the CPU, memory, and I/O devices.

33. What is the difference between hardwired and microprogrammed control units?

- **Hardwired Control Unit:** Fixed logic circuits directly control operations. It's fast but less flexible.
- **Microprogrammed Control Unit:** Uses a sequence of microinstructions stored in memory, allowing flexibility.

34. What is the difference between CISC and RISC architectures?

- **CISC (Complex Instruction Set Computing):** Large, complex instruction set; fewer instructions per program.
- **RISC (Reduced Instruction Set Computing):** Simplified instructions; more instructions per program but optimized performance.

35. Explain stack-based and register-based instruction sets.

- **Stack-based:** Instructions operate on data stored in a stack.
- **Register-based:** Instructions operate on data stored in registers.

36. Define throughput in a computer system.

- Throughput is the amount of work a system can process in a given time, usually measured in instructions per second.

37. What is memory latency?

- Memory latency refers to the delay between a memory request and the delivery of data.

38. What are page faults?

- A **page fault** occurs when a program tries to access data not currently in main memory (RAM), requiring it to be fetched from secondary storage.

39. What is memory interleaving?

- Memory interleaving divides memory into multiple modules to allow simultaneous access, improving speed.

40. What is the difference between synchronous and asynchronous data transfer?

- **Synchronous:** Data transfer is synchronized with a clock signal.
- **Asynchronous:** Data transfer occurs without a clock, using handshaking signals.

41. What is programmed I/O?

- In **programmed I/O**, the CPU is responsible for managing data transfer between devices and memory.

42. Explain the difference between polling and interrupt-driven I/O.

- **Polling:** CPU continuously checks the status of an I/O device.
- **Interrupt-driven I/O:** Device notifies the CPU only when it's ready, saving CPU cycles.

43. What are the functions of the control unit?

- Fetching instructions.

- Decoding instructions.
- Sending control signals to execute instructions.

44. What is microprogramming?

- Microprogramming uses a set of microinstructions stored in control memory to generate control signals.

45. What are control signals?

- Control signals are binary signals used to direct the operation of the CPU and other components.

46. What is clock speed, and how does it affect performance?

- **Clock speed** is the number of cycles a CPU executes per second, measured in GHz. Higher clock speed generally means faster performance.

47. How do you troubleshoot a computer that won't boot?

- Check power supply and connections.
- Verify RAM and storage device functionality.
- Inspect the motherboard for faults.

48. What is a RAID system?

- **RAID (Redundant Array of Independent Disks)** is a data storage technology that combines multiple drives for redundancy or performance.

49. What happens during the POST (Power-On Self-Test)?

- The system checks hardware components (RAM, CPU, storage) for errors before booting the OS.

50. What is a firmware?

- Firmware is software embedded in hardware devices, providing low-level control for the device.