



Microprocessor viva questions and answers

Media studies (The University of Lahore)

Gathered by
Ashraf Al- Khaliq (EEE_RUET_1801171)

MICROPROCESSOR VIVA QUESTIONS AND ANSWERS

1) How many bit 8086 processor is?

ANSWER: 16-bit processor

2) What is the size of data bus?

ANSWER: 16-bit

3) What is the size of address bus?

ANSWER: 20-bit

4) What is the maximum addressing capacity of 8086?

ANSWER: The maximum memory capability of 8086 is 1MB

5) What are the functional units of 8086?

ANSWER: 8086 has two independent functional units because of that the processor speed is more. The Bus interface unit and Execution unit are the two functional units.

6) What is the function of BIU?

ANSWER: Bus interface unit is responsible for transferring the data addresses on the buses necessary for execution unit.

7) What is the function of EU?

ANSWER: Execution Unit receives program instruction codes and data from BIU, executes these instructions and store the result in general registers.

8) Which microprocessor accepts the program written for 8086 without any changes? -

ANSWER: 8088 is that processor.

9) What is the function of AX?

ANSWER: It is accumulator register and used for I/O, arithmetic and logical operations by default. $AX (16\text{-bit}) = AL (8\text{-bit}) + AH (8\text{bit})$

10) What is the function of BX?

ANSWER: It is base register. It is used to store base address and is the only register used as offset address pointer. $BX (16\text{-bit}) = BL (8\text{-bit}) + BH (8\text{bit})$

11) What is the function of CX?

ANSWER: It is counter register. CX register is used as default counter.

$CX (16\text{-bit}) = CL (8\text{-bit}) + CH (8\text{bit})$

12) What is the function of DX?

ANSWER: It is data register. It is where the data is stored. Whenever an interrupt is called to print the data, it prints the data stored in data register.

$DX (16\text{-bit}) = DL (8\text{-bit}) + DH (8\text{bit})$

13) How much data is read at once and where it is stored?

ANSWER: 1 byte of data is read at once and is stored in AL register.

14) How physical address is generated?

ANSWER: Physical address is generated using Memory paging Unit.

15) Which are the pointers used in 8086?

ANSWER:

IP (Instruction pointer): 16-bit register that stores the offset address of next instructions to be executed.

BP (Base pointer): 16-bit register that stores the offset address of the data or parameters within the stack.

SP (Stack pointer): 16-bit register that stores the offset address of the top most element of the stack.

16) Which is the default pointer for CS/ES?

ANSWER: DI register (Destination index register)

17) Which is the default pointer for DS?

ANSWER: SI register (source index register)

18) Use of CS register?

ANSWER: It contains upper 4 nibbles of starting address of code segment. Used for normal programming purpose. It is not directly referenced

19) Use of DS register?

ANSWER: It contains upper 4 nibbles of starting address of data segment. Used while computing 20-bit physical address of data.

20) Use of SS register?

ANSWER: It contains upper 4 nibbles of starting address of stack segment. This register permits the implementation of stack in memory. It is not directly referenced.

21) Use of ES register?

ANSWER: It contains upper 4 nibbles of starting address of extra segment. Used only during string manipulation.

22) What is the size of instruction queue in 8086?

ANSWER: 6 byte

23) Which are the registers present in 8086?

ANSWER:

General purpose registers (AX, BX, CX, and DX)

Index registers (SI and DI)

Segment registers (CS, DS, SS and ES)

Pointer registers (IP, BP and SP)

Flag register

24) How many segments are there?

ANSWER: there are 4 segments

Code segment

Data segment

Stack segment

Extra segment

25) When is extra segment used?

ANSWER: Extra segment is used when data segment is not sufficient enough for the program.

26) What is the size of each segment?

ANSWER: 64 k bytes

27) What do you mean by .model?

ANSWER: Selects the programming model

28) Difference between tiny, small, medium, and huge.

29) What do you mean by directives?

ANSWER: Directives (Also called pseudo- operations) indicate how an operand or section of program is to be processed by the assembler.

E.g.: DB, DW, BYTE, .CODE, .MODEL etc...

30) What is DD, DW, DB?

ANSWER: DD- data double word

DW- data word

DB-data byte

These are the directives used to declare a variable of type double word, word and byte respectively.

31) What is the function of 01h of int 21h?

ANSWER: read the data character by character.

32) What is the function of 02h of int 21h?

ANSWER: Print the data character by character.

33) What is the function of 09h of int 21h?

ANSWER: print the data as a string.

34) What is the function of 08h of int 21h?

ANSWER: read the data as a string.

35) What is the function of 4ch of int 21h?

ANSWER: Signifies the End of the DOS program.

36) What does int 21h signify?

ANSWER: Execute the interrupt

37) What is the size of flag register? Explain all

ANSWER: size of the flag register is 16-bit

STATUS FLAGS

Carry flag: set when carry occurs after an operation, otherwise reset.

Parity flag: set if the result of an operation contains even number of 1 bits, otherwise reset.

Auxiliary carry flag: set if there is carry from lower nibble, otherwise reset.

Zero flag: set if the result of an arithmetic or logical operation is zero, otherwise reset.

Sign flag: If the MSB of the result is 1 then the flag is set, otherwise reset.

Overflow flag: set when carry out of MSB and carry into MSB is different, otherwise reset.

CONTROL FLAGS

Trap flag: To execute the program in a single step, this flag should be set.

Interrupt flag: If this flag is set, then interrupts are enabled else the interrupts are disabled.

Direction flag: This is used during string manipulation.

- 38) Which is faster- reading word size data whose starting address is even or at odd address of memory in 8086?

ANSWER: reading word size data whose starting address is even (why? I don't know)

- 39) What is procedure?

ANSWER: procedure is also called functions or sub routines. A procedure is a collection of instructions that perform some specific activity when executed in a sequence.

- 40) What is segment override prefix?

ANSWER: segment override prefix allows the programmer to deviate from using the default segments. By default, the data is obtained from data segment memory. But by using segment override prefix in an instruction, it is possible to access the data in code segment memory or extra segment memory or stack segment memory.

- 41) Does macro reduce the memory requirement?

ANSWER: macro does not reduce the memory requirement (please verify this answer with sir, I am not sure, but I think this is correct coz macro increases the size of the executable file)

- 42) What do you mean by assembler?

ANSWER: assembler is used to translate the high level language program to machine code.

Example: MASM

- 43) What do you mean by linker?

ANSWER: The linker is a program that allows the user to combine different objects into a single executable file.

- 44) What do you mean by loader?

ANSWER: It is a program that is used to assign specific addresses of each object code during loading.

- 45) What do you mean by emulator?

ANSWER: Emulators are used to test and debug the hardware and software of an external system.

- 46) What do you mean by debugger?

ANSWER: debugger is a program that allows the user to load the object program into the memory, execute the program in single step.

47) What do you mean by editor?

ANSWER: editor is a program that allows the user to create/edit a file containing the text, program or data.

48) What do you mean by compiler?

ANSWER: Compiler is used to translate the high-level language program into machine code at a time. It doesn't require special instruction to store in a memory, it stores automatically. The Execution time is less compared to Interpreter.

49) List some stack related instructions

ANSWER: PUSH, POP

50) What do you mean by 20 dup (0)?

ANSWER: 20 memory locations are reserved and initialized to 0. Dup stands for duplicate.

51) Which flags of 8086 is not present in 8085?

52) Can you perform 32-bit operation with 8086?

ANSWER: Yes

53) Whether 8086 is compatible with Pentium processor?

ANSWER: Yes

54) While accepting the number from user why you need to subtract 30 from that?

55) While displaying the number why you need to add 30 to that?

56) What type of Queue in 8086?

ANSWER: FIFO

57) In string pointer which is the default source pointer?

ANSWER: SI

58) In string pointer which is the default destination pointer?

ANSWER: DI

59) Where is queue present?

ANSWER: Bus Interface Unit

60) What is MUL BX? Where is the result stored?

ANSWER: the value of BX is multiplied with the value of AL and stored in AL.

61) What is the maximum size of an instruction in 8086?

ANSWER: maximum size of each instruction is 1 byte. (cross check once again)

62) What is the number representation system you have used?

ANSWER: Hexadecimal

63) What is LEA?

ANSWER: Load Effective Address, load the address of the data that is to be printed to dx.

64) What is the difference between MUL and IMUL?

ANSWER: MUL instructions is used when we deal with unsigned numbers.

IMUL instruction is used when we deal with signed numbers.

65) What is difference between DIV and IDIV?

ANSWER: DIV instructions is used when we deal with unsigned numbers.

IDIV instruction is used when we deal with signed numbers.

66) What is difference between shift and rotate?

ANSWER:

Shift: move numbers to left of right within a register or memory location.

Rotate: position binary data by rotating the information in a register or memory location, either from one end to another or through the carry flag.

67) List some of the string related instructions?

ANSWER: MOVS, LODS, STOS, INS, OUTS, SCAS, CMPS

68) What do you mean by pipelining?

ANSWER: the feature of fetching the next instruction by BIU when the current instruction is executing BY EU is called pipelining.

69) What is the speed of execution in 8086 processor?

ANSWER: 400ns or 2.5 MIPS

70) What is a Microprocessor?

ANSWER: Microprocessor is a program-controlled device, which fetches the instructions from memory, decodes and executes the instructions. Most Micro Processors are single- chip devices.

71) What is the difference between 8086 and 8088?

ANSWER: The BIU in 8088 is 8-bit data bus & 16- bit in 8086. Instruction queue is 4 byte long in 8088 and 6 byte in 8086.

72) What are the flags in 8086?

ANSWER: carry flag, Parity flag, Auxiliary carry flag, Zero flag, Overflow flag, Trace flag, Interrupt flag, Direction flag, and Sign flag.

73) What is the Maximum clock frequency in 8086?

ANSWER: 5 MHz is the Maximum clock frequency in 8086

74) What are the various segment registers in 8086?

ANSWER: Code, Data, Stack, Extra Segment registers in 8086

75) Logic calculations are done in which type of registers?

ANSWER: Accumulator is the register in which Arithmetic and Logic calculations are done.

76) How 8086 is faster than 8085?

ANSWER: Because of pipelining concept. 8086 BIU fetches the next instruction when EU busy in executing another instruction.

77) Which Segment is used to store interrupt and subroutine return address registers?

ANSWER: Stack Segment in segment register is used to store interrupt and subroutine return address registers.

78) What does microprocessor speed depend on?

ANSWER: The processing speed depends on DATA BUS WIDTH.

79) What is flag?

ANSWER: Flag is a flip-flop used to store the information about the status of a processor and the status of the instruction executed most recently.

80) Which Flags can be set or reset by the programmer and also used to control the operation of the processor?

ANSWER: Trace Flag, Interrupt Flag, Direction Flag.

81) In how many modes 8086 can be operated and how?

ANSWER: 8086 can be operated in 2 modes. They are Minimum mode if MN/MX pin is active high and maximum mode if MN/MX pin is ground.

82) What is the difference between min mode and max mode of 8086?

ANSWER: Minimum mode operation is the least expensive way to operate the 8086 microprocessor because all the control signals for the memory and I/O are generated by the microprocessor. In Maximum mode some of the control signals must be externally generated. This requires the addition of an external bus controller. It is used only when the system contains external coprocessors such as 8087 arithmetic coprocessor.

83) Which bus controller is used in maximum mode of 8086?

ANSWER: 8288 bus controller is used to provide the signals eliminated from the 8086 by the maximum mode operation.

84) What is stack?

ANSWER: Stack is a portion of RAM used for saving the content of Program Counter and general purpose registers.

85) Which Stack is used in 8086?

ANSWER: FIFO (First In First Out) stack is used in 8086. In this type of Stack the first stored information is retrieved first.

86) What is the position of the Stack Pointer after the PUSH instruction?

ANSWER: The address line is 02 less than the earlier value.

87) What is the position of the Stack Pointer after the POP instruction?

ANSWER: The address line is 02 greater than the earlier value.

88) What is interrupt?

ANSWER: Interrupt is a signal sent by external device to the processor so as to request the processor to perform a particular work.

89) What are the various interrupts in 8086?

ANSWER: Maskable interrupts, Non-Maskable interrupts.

90) What is meant by Maskable interrupts?

ANSWER: An interrupt that can be turned off by the programmer is known as Maskable interrupt.

91) What is Non-Maskable interrupts?

ANSWER: An interrupt which can be never be turned off (i.e. disabled) is known as Non-Maskable interrupt.

92) Which interrupts are generally used for critical events?

ANSWER: Non-Maskable interrupts are used in critical events. Such as Power failure, Emergency shut off etc.

93) What is a SIM and RIM instruction?

ANSWER: 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.

94) What is macro?

ANSWER: Macro is a set of instructions that perform a task and all the instructions defined in it is inserted in the program at the point of usage.

95) What is the difference between Macro and Procedure?

ANSWER: A procedure is accessed via a CALL instruction and a macro will inserted in the program at the point of execution.

96) What is meant by LATCH?

ANSWER: Latch is a D- type flip-flop used as a temporary storage device controlled by a timing signal, which can store 0 or 1. The primary function of a Latch is data storage. It is used in output devices such as LED, to hold the data for display

97) What is the disadvantage of microprocessor?

ANSWER: It has limitations on the size of data. Most Microprocessor does not support floating-point operations.

98) What is the 82C55A device?

ANSWER: The 8255A/82C55A interfaces peripheral I/O devices to the microcomputer system bus. It is programmable by the system software. It has a 3-state bi-directional 8-bit buffer which interfaces the 8255A/82C55A to the system data bus.

99) What kind of input/output interface dose a PPI implement?

ANSWER: It provides a parallel interface, which includes features such as single-bit, 4-bit, and byte-wide input and output ports; level-sensitive inputs; latched outputs; strobed inputs or outputs and strobed bidirectional input/outputs.

100) How many I/O lines are available on the 82C55A?

ANSWER: 82C55A has a total of 24 I/O lines.

101) Describes the mode 0, mode 1, and mode 2 operations of the 82C55A?

ANSWER:

MODE 0: Simple I/O mode. In this mode, any of the ports A, B, and C can be programmed as input or output. In this mode, all the bits are out or in.

MODE 1: Ports A and B can be used as input or output ports with handshaking capabilities. Handshaking signals are provided by the bits of port C.

MODE 2: Port A can be used as a bidirectional I/O port with handshaking capabilities whose signals are provided by port C. Port B can be used either in simple I/O mode or handshaking mode 1.

102) What is the mode and I/O configuration for ports A, B, and C of an 82C55A after its control register is loaded with 82H?

ANSWER: If control register is loaded with 82H, then the port B is configured as an input port, port A and port C are configured as output ports and in mode 0.