COA VIVA QUESTIONS

UNIT-1

1. **What is Computer?**

Answer:- A computer is a programmable electronic device that accepts raw data as input and processes it with a set of instructions (a program) to produce the result as output.

2. **What are the basic functional unit of computers?**

Answer:- Input Unit, Memory unit, Arithmetic Logic Unit, Control Unit, Output Unit

3. **What is hardware?**

Answer:- Computer hardware includes the physical parts of a computer, such as the case, central processing unit, monitor, mouse, keyboard, computer data storage, graphics card, sound card, speakers and motherboard

4. **What is software?**

Answer:- Software is a collection of instructions that tell a computer how to work

5. **What is input?**

Answer:- Input refers to any information, or data, that is sent to a computer for processing

6. **What is output?**

Answer:- Output consist of processing results produced by a computer.

7. **What is data?**

Answer:- Data refers to the symbols that represent facts, objects and ideas.

8. **What is input unit?**

Answer:- an input device is a piece of equipment used to provide data and control signals to an information processing system, such as a computer or information appliance

9. **What are the various input devices?**

Answer:- Mouse, keyboard, joystick, etc

10. **What is output unit?**

Answer:- It is the unit through which we can get output from the entered input from the computer.

11. **What are various output devices?**

Answer:- Printer, speaker, monitors, etc

12. What is CPU?

Answer:- CPU is also known as brain of computer which performs the various tasks to process the data.

OR

A central processing unit (CPU), also called a central processor, main processor or just processor, is the electronic circuitry that executes instructions comprising a computer program.

13. What are the major components of CPU?

Answer:- ALU, CU, Register

14. What is ALU?

Answer:- An arithmetic logic unit (ALU) is a combinational digital circuit that performs arithmetic and logical operations.

15. What is CU?

Answer:- The control unit is a component of a computer's central processing unit that directs the operation of the processor

16. What is register?

Answer:- 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.

17. What is Bus?

Answer:- In computer architecture, a bus is a communication system that transfers data between components inside a computer, or between computers.

18. What are the types of bus?

Answer:- Data bus, Control Bus, Address Bus

19. What is Data Bus?

Answer:- Data bus is the type of bus which stores the data.

20. What is Control Bus?

Answer:- It is used for controlling of operations. Like it will tell whether any task should be given to the ALU or register.

21. What is address bus?

Answer:- It is the type of bus which stores the address of the data.

22. What is memory unit?

Answer:- Memory is basically a large array of bytes. The main function of memory unit is to store the information needed by the system.

23. What are the types of memory?

Answer:- Primary memory, secondary memory, cache

24. What is primary memory?

Answer:- It is also known as main memory which operates at electronic speed. Primary memory is a segment of computer memory that can be accessed directly by the processor.

25. What is secondary memory?

Answer:- It is the external storage which is much slower than the main memory which is used to store the large data files which is not regularly used by the CPU.

26. What is Volatile memory?

Answer:- Memory that loses its content when the power is turned off is known as volatile memory.

27. What is non-volatile memory?

Answer:- Memory that retains its content even after the power is turned off is known as non-volatile memory.

28. Why we have 1GB, 2GB, 4GB, 8GB, etc of RAM and not 3GB, 5GB, 6GB,etc ?

Answer:- Because computer understand binary code only which has 2 digits only. So the space available can be of order of 2^n only.

29. What is an Instruction?

Answer:- Whatever we give to the computer to perform the particular task is called instructions.

30. What are the two parts of instruction?

Answer:- Opcode and operands

31. What is opcode?

Answer:- An opcode is the portion of a machine language instruction that specifies the operation to be performed.

32. What is operands?

Answer:- an operand is the part of a computer instruction which specifies what data is to be manipulated or operated on, while at the same time representing the data itself.

33. What is program counter?

Answer:- It is a register which holds the memory address of next instructions to be fetched and executed.

34. What is instruction Register?

Answer:- It is a register which holds the instruction which is being currently executed.

35. What is MDR?

Answer:- A memory buffer register (MBR) (also known as memory data register (MDR)) is the register in a computer's processor, or central processing unit, CPU, that stores the data being transferred to and from the immediate access storage.

36. What is MAR?

Answer:- In a computer, the memory address register (MAR) is the CPU register that either stores the memory address from which data will be fetched to the CPU, or the address to which data will be sent and stored.

37. What are the types of instruction?

Answer:- Following are the 4 types of instruction:-

i.) Zero address
ii.) One address
iii.) Two address
iv.) Three address

38. How many addressing modes are there?

Answer:- 12 (ALL GIVEN BELOW IN NEXT 12 QUESTION)

39. What is Implied/Implicit Adressing Mode?

Answer:- In this the operand is specified implicitely.

40. What is Stack Adressing Mode?

Answer:- In this the operand is contained at the top of the stack.

41. What is Immediate Adressing Mode?

Answer:- In this the operand is specified explicitily.

42. What is Direct Adressing Mode?

Answer:- The address field of instruction contains the effective address of the operand.

43. What is Indirect Adressing Mode?

Answer:- The address field of instruction specifies the address of memory location that contains the effective address of operand.

44. What is Register Direct Adressing Mode?

Answer:- The operand is contained in the register set. The address field of instruction refers to the CPU register that contains the operand.

45. What is Register indirect Adressing Mode?

Answer:- The address field of instruction will refers to the CPU register that contains the effective address of operand.

46. What is Relative Adressing Mode?

Answer:- In this the effective address is sum of Content of PC and Address part of instruction.

47. What is Indexed Adressing Mode?

Answer:- In this the effective address is sum of content of indexed register and address part of instruction.

48. What is Base register Adressing Mode?

Answer:- In this the effective address is the sum of content of base register and address part of instruction.

49. What is Auto-increment Adressing Mode?

Answer:- Effective address of the operand is the contents of a register specified in the instruction. After accessing the operand, the contents of this register are automatically incremented to point to the next consecutive memory location.

50. What is Auto-decrement Adressing Mode?

Answer:- Effective address of the operand is the contents of a register specified in the instruction. Before accessing the operand, the contents of this register are automatically decremented to point to the previous consecutive memory location.

51. What is ARM processor?

Answer:- An ARM processor is one of a family of CPUs based on the RISC (reduced instruction set computer) architecture developed by Advanced RISC Machines (ARM).

52. What is an assembly language?

Answer:- An assembly language is a type of low-level programming language that is intended to communicate directly with a computer's hardware.

53. What is microprocessor?

Answer:- A microprocessor is a computer processor where the data processing logic and control is included on a single integrated circuit, or a small number of integrated circuits

54. **What are the type of notation used to represent instructions?**

Answer:- 1. Register transfer Notation (RTN) 2. Assembly Language Notation

UNIT-2

1. What is adder?

Answer:- An adder is a digital circuit that performs addition of numbers.

2. What is difference between adder and subtractor?

Answer:- Binary Adder is used for ADDITION (SUM & COUT) whereas the binary subtractor produces a DIFFERENCE, D by using a BORROW bit, B from the previous column.

3. What are the types of adder?

Answer:- 1. Half adder 2. Full adder

4. What is Half adder?

Answer:- A half adder is an adder which adds two binary digits together, resulting in a sum and a carry.

5. What is full adder?

Answer:- Full Adder is the adder which adds three inputs(A,B,C-IN) and produces two outputs(SUM,C-OUT).

6. What is the major difference between Half adder and full adder?

Answer:- The major difference between Half Adder and Full Adder is that Half Adder adds two 1-bit numbers given as input but **do not add the carry** obtained from previous addition while the Full Adder, along with two 1-bit numbers can **also add the carry** obtained from previous addition.

7. What is the name of gates used in Half adder?

Answer:- 1 XOR GATE and 1 AND GATE

8. Why we are using AND gate in half adder?

Answer:- because in carry we have output as multiplication of 2 input values and AND gate is the only gate which is giving us multiplication.

9. How we are getting SUM and Carry in half adder?

Answer:- XOR GATE for SUM AND GATE for CARRY

10. Which GATES we are using to get SUM and carry in full adder?

Answer:- CARRY-OUT = A AND B OR Cin(A XOR B) SUM = (A XOR B) XOR Cin

CARRY-OUT -> 2 AND, 1 XOR , 1 OR SUM -> 2 XOR

11. What is ripple carry adder?

Answer:- A ripple carry adder also known as “n-bit parallel adder” is a combinational logic circuit used for the purpose of adding two n-bit binary numbers and requires ‘n’ full adders in the circuit.

12. Why Ripple Carry Adder is called so?

Answer:- In Ripple Carry Adder, the carry out produced by each full adder as output serves as the carry in input for its next most significant full adder. Since in ripple carry adder, each carry bit ripples or waves into the next stage, that’s why it is called by the name “Ripple Carry Adder”.

13. What is the limitation of ripple carry adder?

Answer:- Limitation of Ripple Carry Adder-

Ripple Carry Adder does not allow all full adders to be used simultaneously and each full adder has to necessarily wait till the carry bit becomes available from its adjacent less significant full adder. This increases the propagation time and due to this reason, ripple carry adder becomes extremely slow which is considered to be the biggest disadvantage of using ripple carry adder.

14. What is carry-look ahead adder?

Answer:- Carry Look Ahead Adder is an improved version of the ripple carry adder which generates the carry-in of each full adder simultaneously without causing any delay.

15. What is the advantage of carry look ahead adder?

Answer:- The advantage of carry look ahead adder is that it reduces propagation delay.

16. What is the disadvantage of carry look ahead adder?

Answer:- The disadvantage of carry look ahead adder is that it involves complex hardware.

UNIT-3

1. What is Memory Function Completed?

Answer:- Memory function completed is a special control signal which is used to tell the CPU that data is available.

2. What is Single Bus structure?

Answer:- Single Bus Structure is the bus structure in which one common bus is used for communication between peripherals and processor. Instruction and data both are transferred in same bus.

3. What is double bus structure?

Answer;- In this two buses are used, one for communication from peripherals and other for processor. Instruction and data both are transferred in different buses.

4. What is Hardwired Control Unit.

Answer:- It is the unit which generates the control needed for the processor using logic circuits.

5. What is microprogrammed control unit?

Answer:- It generates control signals with the help of micro instructions stored in control memory.

6. What is Pipelining?

Answer:- Pipelining is the process of accumulating instruction from the processor through a pipeline. It is a technique where multiple instruction are overlapped during execution.

7. What are the two types of pipeline?

Answer:- 1. Arithmetic Pipeline 2. Instruction Pipeline

8. What is Arithmetic Pipeline?

Answer:- Arithmetic pipeline are usually found in most of computers. They are used for floating point operations, multiplication of fixed point numbers, etc.

9. What is instruction pipeline?

Answer:- In this a stream of instruction can be executed by overlapping fetch, decode and execute phases of an instruction cycle. This technique is used to increase the throughput of the computer system.

10. What are the various factor that cause the pipeline to deviate its normal performance?

Answer:- 1. Timing Variations 2. Data hazards 3. Branching 4. Interrupts 5. Data dependency

11. What is hazard?

Answer:- Hazard is the situation that prevent the next instruction in the instruction stream from executing during its designated clock cycle.

12. What is the advantages of pipelining?

Answer:- The cycle time of the processor is reduced.

It increases the throughput of the system

It makes the system reliable.

13. What are the main disadvantage of pipelining?

Answer:- The design of pipelined processor is complex and costly to manufacture.

14. What is Speed up?

Answer:- It gives an idea of "how much faster" the pipelined execution is as compared to non-pipelined execution.

15. What is Efficiency?

Answer:- Efficiency of pipelined execution is defined as speed up divided by number of stages.

16. What is Throughput?

Answer:- Throughput is defined as number of instructions executed per unit time.

17. What are the different type of hazard?

Answer:- 1. Structural hazard 2. Data Hazard 3. Control Hazard

18. What is structural hazards?

Answer:- It arise from resource conflicts when the hardware cannot support all possible combinations of instructions in simultaneous overlapped execution

19. What is data hazards?

Answer:- It arise when an instruction depends on the result of a previous instruction in a way that is exposed by the overlapping of instructions in the pipeline

20. What is control hazards?

Answer:- It arise from the pipelining of branches and other instructions that change the PC

UNIT-4

1. **What is Parallelism?**

Answer:- Executing two or more operations at the same time is known as parallelism.

2. **What is a parallel Computer?**

Answer:- A parallel computer is a set of processors that are able to work cooperatively to solve a computational problem

3. **What are the goals of parallelism?**

Answer:- Following are some of the goals of parallelism:-

- To increase the computational speed (ie) to reduce the amount of time that you need to wait for a problem to be solved
- To increase throughput (ie) the number of processes completed on unit time
- To improve the performance of the computer for a given clock speed
- To solve bigger problems that might not fit in the limited memory of a single CPU

4. **What is Hardware Parallelism?**

Answer:- It is based on the processor multiplicity and machine architecture.

5. **What is Instruction level parallelism?**

Answer:- Instruction-level parallelism means the simultaneous execution of multiple instructions from a program. Instruction level Parallelism (ILP) is a measure of how many operations (instructions) can be performed in parallel at the same time in a computer program.

6. **What is Task parallelism?**

Answer:- Task Parallelism means concurrent execution of the different task on multiple computing cores.

7. **What is bit-level parallelism?**

Answer:- Bit-level parallelism is a form of parallel computing which is based on increasing processor word size. In this type of parallelism, with increasing the word size reduces the number of instructions the processor must execute in order to perform an operation on variables whose sizes are greater than the length of the word.

8. **What is data parallelism?**

Answer:- Data Parallelism means concurrent execution of the same task on each multiple computing core.

9. **What is Flynn's classification?**

Answer:- M.J. Flynn proposed a classification for the organization of a computer system by the number of instructions and data items that are manipulated simultaneously. This classification is known as Flynn's classification.

10. What are the various group of flynn's classification?

Answer:- Flynn's classification divides computers into four major groups that are:

i.) Single instruction stream, single data stream (SISD)
ii.) Single instruction stream, multiple data stream (SIMD)
iii.) Multiple instruction stream, single data stream (MISD)
iv.) Multiple instruction stream, multiple data stream (MIMD)

11. What is instruction stream?

Answer:- An instruction stream is sequence of instructions executed by machine.

12. What is data stream?

Answer:- A data stream is a sequence of data including input, partial or temporary results used by instruction stream.

13. What is hardware multithreading?

Answer:- In computer architecture, multithreading is the ability of a central processing unit to provide multiple threads of execution concurrently, supported by the operating system.

14. What are the types of multithreading?

Answer:- 1. Fine Grained 2. Course Grained 3. Simultaneous

15. What is fine grained multithreading?

Answer:- Fine-grained multithreading switches between threads on each instruction, resulting in interleaved execution of multiple threads. **OR in simple words,**

In fine grained multithreading, the threads are executed in a round-robin fashion in consecutive cycles.

16. What is course grained multithreading?

Answer:- In coarse grained multithreading, a thread issues instructions until thread issuing stops. The process is also called stalling. When a stall occurs, the next thread starts issuing instructions.

17. What is the basic difference between fine-grained and course grained multithreading?

Answer:- The main difference between fine grained and coarse grained multithreading is that, in fine grained multithreading, the threads issue instructions in round-robin manner while in coarse grained multithreading, the threads issue instructions until a stall occurs.

18. What is multicore system?

Answer:- A processor that has more than one core is called multicore processor. Basically it is A single CPU or processor with two or more independent processing units called cores that are capable of reading and executing program instructions.

19. What is multiprocessor System?

Answer:- A system with two or more CPU's that allows simultaneous processing of programs.

20. What is cache coherence?

Answer:- Cache coherence is the discipline that ensures that changes in the values of shared operands are propagated throughout the system in a timely fashion.

21. What are the various cache coherence protocols in multiprocessor system?

Answer:- There are various Cache Coherence Protocols in multiprocessor system. These are :-

i.) MSI protocol (Modified, Shared, Invalid)
ii.) MOSI protocol (Modified, Owned, Shared, Invalid)
iii.) MESI protocol (Modified, Exclusive, Shared, Invalid)
iv.) MOESI protocol (Modified, Owned, Exclusive, Shared, Invalid)

22. What is the cause of Cache coherence problem?

Answer:- This occurs mainly due to these causes:-

- Sharing of writable data.
- Process migration.
- Inconsistency due to I/O.

UNIT-5

1. How many levels are there in memory hierarchy?

Answer:- 6

2. Write various level of memory hierarchy from top to bottom.

Answer;-

- Level 0:- Register
- Level 1:- Cache memory
- Level 2:- Main memory
- Level 3:- USB/FLASH Memory
- Level 4:- Magnetic Disk/Hard disk
- Level 5:- Magnetic tapes/Tape drives

3. What is the various types of Semiconductor memories?

Answer:- Following are the types of memories:-

1. ROM (READ ONLY MEMORY)
2. RAM (RANDOM ACCESS MEMORY)
3. CAM (CONTENT ADDRESSABLE MEMORY)
4. Sequential Memory

5. What are the various type of RAM?

Answer:- 1. Static RAM (SRAM) 2. Dynamic RAM (DRAM)

6. What is DRAM?

Answer:- It is a type of random-access semiconductor memory that stores each bit of data in a memory cell, usually consisting of a tiny capacitor and a transistor, both typically based on metal-oxide-semiconductor (MOS) technology.

7. What is SRAM?

Answer:- It is a type of random-access memory (RAM) that uses flip-flop to store each bit.

8. What are the types of ROM?

Answer:- Following are the various types of ROM:-

1.) PROM (Programmable Read Only Memory)
2.) EPROM (Erasable Programmable Read Only Memory)
3.) EEPROM (Electrically Erasable Programmable Read Only Memory)
4.) Flash memory
5.) Masked ROM

9. What is PROM?

Answer:- It can be programmed by the user. Once programmed, the data and instructions in it cannot be changed.

10. What is EPROM?

Answer:- It can be reprogrammed. To erase data from it, expose it to ultraviolet light. To reprogram it, erase all the previous data.

11. What is EEPROM?

Answer:- The data can be erased by applying an electric field, with no need for ultraviolet light. We can erase only portions of the chip.

12. What is Masked ROM?

Answer:- Mask ROM is a kind of read-only memory, that is masked off at the time of production. Like other types of ROM, mask ROM cannot enable the user to change the data stored in it.

13. What is flash memory?

Answer:- In this the speed of erase is faster than that of EEPROM. And data erase is done block by block.

14. What is interrupts?

Answer:- The interrupt is a signal emitted by hardware or software when a process or an event needs immediate attention.

15. What are the types of interrupts?

Answer:- Interrupts are of 2 types:-

1. Hardware interrupt:- The hardware interrupt occurrs by the interrupt request signal from peripheral circuits.
2. Software Interrupt:- the software interrupt occurrs by executing a dedicated instruction.

16. How to handle multiple interrupts?

Answer:- 1. By disable Multiple interrupts. 2. By giving priority to the interrupt.

17. What is virtual memory?

Answer:- Virtual memory is a section of volatile memory created temporarily on the storage drive. It is created when a computer is running many processes at once and RAM is running low.

Virtual memory in computer organization architecture is a technique and not actually a memory in physical form present in computer system. This is the reason it is known as virtual memory.

18. What are the advantages of virtual memory?

Answer:- Following are some advantages of virtual memory:-

1. Virtual memory technique helps in efficient utilization of main memory.
2. Virtual memory helps in efficient CPU utilization
3. Virtual memory helps to improve overall throughput.

19. Name 2 technique to configure virtual memory.

Answer:- 1. Paging Technique 2. Segmentation Technique

20. What is Paging?

Answer:- This type of virtual memory works by separating memory into sections called paging files. When a computer reaches its RAM limits, it transfers any currently unused pages into the part of its hard drive used for virtual memory.

21. What is Segmentation?

Answer:- Segmentation is another method of managing virtual memory. A segmentation system divides virtual memory into segments of varying lengths and moves any segments not in use from the computer's virtual memory space to its hard drive.