

# CS501

## Advance Computer Architecture

### Important mcqs

#### Lec 23 - I/O Subsystems

1. **What is the main purpose of an I/O subsystem in a computer system?**

- A) To manage the processing of data within the CPU
- B) To provide communication between the computer and external devices
- C) To handle memory allocation and management
- D) To execute system calls from user programs

**Solution: B**

**Which component of the I/O subsystem is responsible for interfacing with external devices?**

- A) Device drivers
- B) Buses
- C) Controllers
- D) Buffers

**Solution: C**

**What is the role of a device driver in the I/O subsystem?**

- A) To manage the transfer of data between devices and memory
- B) To control the flow of data between devices and the CPU
- C) To interface between the operating system and the device
- D) To store data temporarily during I/O operations

**Solution: C**

**Which of the following is not a common type of I/O device?**

- A) Keyboard
- B) Printer
- C) Processor
- D) Mouse

**Solution: C**

**Which type of I/O operation is characterized by data being transferred from a device to memory?**

- A) Input operation
- B) Output operation
- C) Interrupt operation
- D) DMA operation

**Solution: A**

**What is the primary purpose of a buffer in the I/O subsystem?**

- A) To hold data temporarily during I/O operations

- B) To control the flow of data between devices and memory
- C) To interface between the CPU and the device driver
- D) To allocate and manage system memory

**Solution: A**

**Which type of I/O device is capable of both input and output operations?**

- A) Monitor
- B) Printer
- C) Keyboard
- D) Disk Drive

**Solution: D**

**Which of the following is not a commonly used interface standard for I/O devices?**

- A) USB
- B) Ethernet
- C) PCI
- D) ISA

**Solution: B**

**Which of the following is not a function of the I/O controller?**

- A) To manage device-specific operations
- B) To control the flow of data between devices and memory
- C) To provide buffering and error detection
- D) To interface between the device and the CPU

**Solution: B**

**Which type of I/O operation is characterized by a device notifying the CPU of an event that requires attention?**

- A) Input operation
- B) Output operation
- C) Interrupt operation
- D) DMA operation

**Solution: C**

## Lec 24 - Designing Parallel Input and Output Ports

1. Which of the following is NOT a factor to consider when designing parallel input and output ports?

- A) Data transfer rates
- B) Hardware compatibility
- C) Operating system compatibility
- D) Bandwidth

Answer: C) Operating system compatibility

Which component is essential for parallel input and output ports?

- A) Processor
- B) Operating system
- C) Data cable
- D) None of the above

Answer: C) Data cable

What is the purpose of designing parallel input and output ports?

- A) To increase data transfer rates
- B) To improve efficiency
- C) To streamline communication between devices
- D) All of the above

Answer: D) All of the above

Which of the following is NOT a security concern when designing parallel input and output ports?

- A) Preventing unauthorized access
- B) Ensuring data privacy
- C) Ensuring hardware compatibility
- D) Preventing data theft

Answer: C) Ensuring hardware compatibility

Which of the following is NOT a hardware component required for designing parallel input and output ports?

- A) Data cable
- B) Input/output controller
- C) Processor
- D) None of the above

Answer: C) Processor

Which of the following is NOT a benefit of designing parallel input and output ports?

- A) Improved efficiency
- B) Increased data transfer rates
- C) Reduced hardware costs
- D) Increased hardware compatibility

Answer: C) Reduced hardware costs

Which of the following is a software component required for designing parallel input and output ports?

- A) Data cable

- B) Input/output controller
- C) Device driver
- D) None of the above

**Answer: C) Device driver**

**Which of the following factors should be considered when selecting appropriate hardware components for parallel input and output ports?**

- A) Bandwidth
- B) Data transfer rates
- C) Hardware compatibility
- D) All of the above

**Answer: D) All of the above**

**Which of the following is a type of parallel port?**

- A) USB
- B) Ethernet
- C) Serial
- D) None of the above

**Answer: D) None of the above**

**Which of the following is NOT a step in the design process for parallel input and output ports?**

- A) Selecting appropriate hardware components
- B) Testing the system
- C) Creating an operating system
- D) Configuring input and output ports

**Answer: C) Creating an operating system**

## Lec 25 - Input Output Interface

### 1. What is an input-output interface?

- A. A communication channel between a computer and its peripherals
- B. A program that manages data transfer between devices
- C. A type of keyboard for data input

Answer: A

### Which of the following devices is an example of an input-output interface?

- A. Printer
- B. Hard drive
- C. Keyboard

Answer: A

### Which type of input-output interface allows for the transfer of data one bit at a time?

- A. Serial
- B. Parallel
- C. USB

Answer: A

### Which of the following is a disadvantage of a parallel input-output interface?

- A. Higher data transfer rates
- B. Requires fewer cables
- C. Limited cable length

Answer: C

### Which of the following is not a factor to consider when designing an input-output interface?

- A. Data transfer rates
- B. Security concerns
- C. Processor speed

Answer: C

### Which type of input-output interface uses multiple wires to transfer data simultaneously?

- A. Serial
- B. Parallel
- C. USB

Answer: B

### Which of the following is an example of a wireless input-output interface?

- A. Bluetooth
- B. USB
- C. Ethernet

Answer: A

### Which type of input-output interface is commonly used for high-speed data transfer in external storage devices?

- A. USB
- B. SCSI
- C. FireWire

Answer: B

### Which of the following is an advantage of a serial input-output interface?

- B. Simpler wiring
- C. Longer cable length

**Answer: C**

**Which type of input-output interface is commonly used in industrial automation applications?**

- A. USB
- B. Ethernet
- C. Profibus

**Answer: C**

## Lec 26 - Programmed I/O

### 1. What is Programmed I/O?

- a) A method of data transfer between CPU and memory
- b) A method of data transfer between peripheral devices
- c) A method of data transfer using specialized hardware

Answer: a

### What is the main advantage of Programmed I/O?

- a) It is faster than other input/output methods
- b) It is more reliable than other input/output methods
- c) It does not require specialized hardware

Answer: c

### In Programmed I/O, who controls the data transfer?

- a) The peripheral device
- b) The CPU
- c) The specialized hardware

Answer: b

### Which method of input/output transfer is faster than Programmed I/O?

- a) Direct Memory Access (DMA)
- b) Interrupt-driven I/O
- c) Both of the above

Answer: a

### What type of data transfer is Programmed I/O commonly used for?

- a) Large data transfers
- b) Real-time data transfers
- c) Small data transfers

Answer: c

### Which component is responsible for controlling the data transfer in Programmed I/O?

- a) The DMA controller
- b) The CPU
- c) The interrupt controller

Answer: b

### Which of the following is a disadvantage of Programmed I/O?

- a) It requires specialized hardware
- b) It is slower than other input/output methods
- c) It cannot handle real-time data transfers

Answer: b

### What is the main benefit of using Programmed I/O?

- a) It is more efficient than other input/output methods
- b) It is less expensive than other input/output methods
- c) It can be used with simple devices that do not require specialized hardware

Answer: c

### Which type of device is commonly used with Programmed I/O?

- a) External storage devices

- b) Printers
- c) Network devices

Answer: b

**Which of the following is an example of an input/output method that uses specialized hardware?**

- a) Interrupt-driven I/O
- b) Direct Memory Access (DMA)
- c) Programmed I/O

Answer: b



## Lec 27 - Interrupt Driven I/O

### 1. What is Interrupt Driven I/O?

- A) A technique to prevent I/O operations from interfering with CPU
- B) A technique to improve system performance by allowing CPU to perform other tasks while waiting for I/O operations
- C) A technique to speed up I/O operations by reducing the overhead of context switching
- D) A technique to eliminate the need for interrupt signals

Answer: B

### What happens when a device generates an interrupt signal in Interrupt Driven I/O?

- A) The device stops working
- B) The CPU stops its current task and starts executing the interrupt service routine
- C) The CPU continues its current task and ignores the interrupt signal
- D) The device's data is lost

Answer: B

### What is the purpose of the interrupt service routine in Interrupt Driven I/O?

- A) To communicate with the device and transfer data between the device and CPU's memory
- B) To stop the CPU's current task and start executing the interrupt signal
- C) To ignore the interrupt signal and continue the CPU's current task
- D) To prevent I/O operations from interfering with CPU

Answer: A

### Which of the following statements is true about Interrupt Driven I/O?

- A) It eliminates the overhead of context switching
- B) It reduces the need for interrupt signals
- C) It can improve system performance
- D) It slows down I/O operations

Answer: C

### What is the disadvantage of Interrupt Driven I/O?

- A) It introduces overhead due to context switching and interrupt handling
- B) It cannot improve system performance
- C) It cannot prevent I/O operations from interfering with CPU
- D) It can only be used with certain types of devices

Answer: A

### In Interrupt Driven I/O, what does the CPU do when it receives an interrupt signal?

- A) It stops its current task and starts executing the interrupt service routine
- B) It continues its current task and ignores the interrupt signal
- C) It stops working
- D) It sends an interrupt signal to the device

Answer: A

### What is the role of the device in Interrupt Driven I/O?

- A) To generate an interrupt signal when it is ready to send or receive data
- B) To execute the interrupt service routine
- C) To prevent I/O operations from interfering with CPU
- D) To eliminate the overhead of context switching

Answer: A

### Which of the following can Interrupt Driven I/O improve?

- A) Memory access time

- B) Disk latency
- C) Network bandwidth
- D) CPU clock speed

**Answer: B**

**How does Interrupt Driven I/O improve system performance?**

- A) By preventing I/O operations from interfering with CPU
- B) By reducing the need for interrupt signals
- C) By eliminating the overhead of context switching
- D) By allowing CPU to perform other tasks while waiting for I/O operations

**Answer: D**

**What is the benefit of using Interrupt Driven I/O?**

- A) It reduces the need for interrupt signals
- B) It can prevent I/O operations from interfering with CPU
- C) It eliminates the overhead of context switching
- D) It improves system performance by allowing CPU to perform other tasks while waiting for I/O operations

**Answer: D**

## Lec 28 - Interrupt Hardware and Software

1. Which of the following is an example of a hardware interrupt?

- a) System call
- b) Division by zero
- c) Keyboard press
- d) Memory access violation

Answer: c) Keyboard press

Which of the following is an example of a software interrupt?

- a) Disk read error
- b) Mouse click
- c) System call
- d) Power outage

Answer: c) System call

Which type of interrupt is triggered by a device?

- a) Hardware interrupt
- b) Software interrupt
- c) Both
- d) None

Answer: a) Hardware interrupt

Which type of interrupt is triggered by a program instruction?

- a) Hardware interrupt
- b) Software interrupt
- c) Both
- d) None

Answer: b) Software interrupt

Which of the following is an example of a hardware interrupt controller?

- a) BIOS
- b) DMA controller
- c) CPU
- d) Memory

Answer: b) DMA controller

Which of the following is an example of a software interrupt handler?

- a) Device driver
- b) Interrupt service routine (ISR)
- c) Interrupt vector table
- d) Interrupt request (IRQ)

Answer: b) Interrupt service routine (ISR)

Which type of interrupt has higher priority?

- a) Hardware interrupt
- b) Software interrupt
- c) Both have equal priority
- d) It depends on the system design

Answer: a) Hardware interrupt

Which of the following is responsible for managing the interrupt requests in a system?

- a) Interrupt service routine

- b) Interrupt handler
- c) Interrupt controller
- d) Interrupt vector table

**Answer: c) Interrupt controller**

**Which type of interrupt can be masked or disabled?**

- a) Hardware interrupt
- b) Software interrupt
- c) Both
- d) None

**Answer: a) Hardware interrupt**

**Which type of interrupt can be triggered by a user-level program?**

- a) Hardware interrupt
- b) Software interrupt
- c) Both
- d) None

**Answer: b) Software interrupt**

## Lec 29 - FALSIM

### 1. What is FALSIM?

- a) A programming language
- b) A software tool for simulating finite automata models
- c) A hardware device
- d) A database management system

Answer: b) A software tool for simulating finite automata models

### What is the purpose of FALSIM?

- a) To design database systems
- b) To test computer networks
- c) To simulate and test the behavior of finite automata models
- d) To create web applications

Answer: c) To simulate and test the behavior of finite automata models

### Which of the following is a feature of FALSIM?

- a) It provides a graphical user interface
- b) It is used for creating video games
- c) It is a high-level programming language
- d) It is used for data analysis

Answer: a) It provides a graphical user interface

### Which of the following is not a type of finite automata?

- a) Deterministic finite automata (DFA)
- b) Nondeterministic finite automata (NFA)
- c) Pushdown automata (PDA)
- d) Recursive automata (RA)

Answer: d) Recursive automata (RA)

### What is the input to a finite automata model?

- a) Regular expressions
- b) Programming code
- c) Finite sequences of symbols
- d) Natural language sentences

Answer: c) Finite sequences of symbols

### Which of the following is not a component of a finite automata model?

- a) Input alphabet
- b) Transition function
- c) Output function
- d) States

Answer: c) Output function

### Which of the following is true about a deterministic finite automata (DFA)?

- a) It can recognize context-free languages
- b) It can recognize regular languages
- c) It can recognize context-sensitive languages
- d) It can recognize recursive languages

Answer: b) It can recognize regular languages

### Which of the following is true about a nondeterministic finite automata (NFA)?

- a) It can recognize context-free languages

- b) It can recognize regular languages
- c) It can recognize context-sensitive languages
- d) It can recognize recursive languages

**Answer: a) It can recognize context-free languages**

**Which of the following is not a step in simulating a finite automata model using FALSIM?**

- a) Design the model using a graphical user interface
- b) Define the input alphabet and states of the model
- c) Specify the output function of the model
- d) Test the model with input sequences

**Answer: c) Specify the output function of the model**

**Which of the following is an advantage of using FALSIM for simulating finite automata models?**

- a) It requires extensive programming knowledge
- b) It provides a visual representation of the model
- c) It is limited to deterministic finite automata
- d) It is not compatible with other programming languages

**Answer: b) It provides a visual representation of the model**

## Lec 30 - Interrupt Priority and Nested Interrupts

### 1. What is interrupt priority?

- a) The order in which interrupts are received
- b) The order in which interrupts are serviced
- c) The time it takes to service an interrupt
- d) The number of interrupts that can be handled at once

Answer: b) The order in which interrupts are serviced

### What is the purpose of interrupt priority?

- a) To ensure that all interrupts are handled equally
- b) To reduce the number of interrupts
- c) To determine the order in which interrupts are serviced
- d) To prevent nested interrupts

Answer: c) To determine the order in which interrupts are serviced

### What is a nested interrupt?

- a) An interrupt that occurs before the previous interrupt is serviced
- b) An interrupt that occurs after the previous interrupt is serviced
- c) An interrupt that occurs during the servicing of another interrupt
- d) An interrupt that occurs when no other interrupts are pending

Answer: c) An interrupt that occurs during the servicing of another interrupt

### What happens when a nested interrupt occurs?

- a) The processor ignores the nested interrupt
- b) The processor services the nested interrupt immediately
- c) The processor completes the current interrupt before servicing the nested interrupt
- d) The processor reboots the system

Answer: c) The processor completes the current interrupt before servicing the nested interrupt

### What is interrupt masking?

- a) Disabling interrupts temporarily
- b) Enabling interrupts temporarily
- c) Assigning priorities to interrupts
- d) Suspending the current interrupt

Answer: a) Disabling interrupts temporarily

### Which of the following is true regarding interrupt priorities?

- a) Higher priority interrupts are always serviced first
- b) Lower priority interrupts are always serviced first
- c) Interrupts are serviced in a random order
- d) Interrupts are serviced in the order they are received

Answer: a) Higher priority interrupts are always serviced first

### Which of the following is a disadvantage of nested interrupts?

- a) They can cause delays in the servicing of lower priority interrupts
- b) They can cause system crashes
- c) They can increase the processing time of interrupts
- d) They can decrease the system performance

Answer: a) They can cause delays in the servicing of lower priority interrupts

### Which of the following is a technique used to handle interrupt priorities?

- a) Interrupt masking

- b) Interrupt chaining
- c) Interrupt queuing
- d) Interrupt reordering

**Answer: b) Interrupt chaining**

**What is the maximum number of interrupt levels supported by most processors?**

- a) 8
- b) 16
- c) 32
- d) 64

**Answer: c) 32**

**What is the purpose of an interrupt vector table?**

- a) To store the priority levels of interrupts
- b) To store the addresses of interrupt service routines
- c) To store the names of interrupts
- d) To store the number of interrupts

**Answer: b) To store the addresses of interrupt service routines**



## Lec 31 - Direct Memory Access (DMA)

### 1. What is DMA?

- a) A technique that allows data to be transferred between peripheral devices and memory without the intervention of the processor.
- b) A method to transfer data using the processor as an intermediary.
- c) A technique to improve the processing speed of the processor.
- d) None of the above.

Answer: a

### What is the primary function of DMA?

- a) To reduce the load on the processor by allowing data transfers without its intervention.
- b) To increase the processing speed of the processor.
- c) To control the flow of data between the processor and peripherals.
- d) None of the above.

Answer: a

### Which of the following devices can benefit from DMA?

- a) Keyboard
- b) Mouse
- c) Hard disk
- d) All of the above

Answer: d

### Which of the following is not a benefit of using DMA?

- a) Reducing the load on the processor
- b) Faster data transfer rates
- c) Better control of data flow between peripherals and the processor
- d) None of the above

Answer: c

### Which component is used to manage the transfer of data using DMA?

- a) Peripheral devices
- b) Memory
- c) DMA controller
- d) Processor

Answer: c

### Which of the following is a disadvantage of using DMA?

- a) It can result in memory fragmentation.
- b) It can result in data corruption.
- c) It can result in slower data transfer rates.
- d) None of the above.

Answer: b

### Which of the following is not a type of DMA transfer?

- a) Single
- b) Burst
- c) Cycle-stealing
- d) Multitasking

Answer: d

### Which of the following is an example of a peripheral device that can initiate DMA

**transfers?**

- a) Hard disk
- b) Graphics card
- c) Sound card
- d) All of the above

**Answer: d**

**Which of the following is a limitation of DMA?**

- a) It can only transfer data in one direction.
- b) It can only transfer small amounts of data.
- c) It requires a lot of processor resources to function.
- d) None of the above.

**Answer: a**

**Which of the following is an advantage of DMA over programmed I/O?**

- a) It reduces the load on the processor.
- b) It allows for faster data transfer rates.
- c) It improves the control of data flow between peripherals and the processor.
- d) All of the above.

**Answer: d**

## Lec 32 - Magnetic Disk Drives

1. What is the capacity of a standard 3.5-inch floppy disk?

- a) 1.44 MB
- b) 2.88 MB
- c) 720 KB
- d) 1.2 MB

Answer: a) 1.44 MB

Which type of magnetic disk is used in laptops and portable devices?

- a) Hard disk drive
- b) Floppy disk drive
- c) Zip disk drive
- d) Solid-state drive

Answer: d) Solid-state drive

What is the rotational speed of a standard desktop hard disk drive?

- a) 5400 RPM
- b) 7200 RPM
- c) 10,000 RPM
- d) 15,000 RPM

Answer: b) 7200 RPM

Which of the following is not a component of a magnetic disk drive?

- a) Disk platters
- b) Actuator arm
- c) CPU
- d) Read/write heads

Answer: c) CPU

What is the average seek time for a standard desktop hard disk drive?

- a) 5 ms
- b) 10 ms
- c) 15 ms
- d) 20 ms

Answer: b) 10 ms

Which type of magnetic disk drive has the highest storage capacity?

- a) Floppy disk drive
- b) Zip disk drive
- c) Hard disk drive
- d) Solid-state drive

Answer: c) Hard disk drive

Which of the following is not a disadvantage of magnetic disk drives?

- a) Prone to mechanical failure
- b) Sensitive to external factors like magnetic fields
- c) Slow access times
- d) High cost per GB of storage

Answer: d) High cost per GB of storage

Which technology is used to increase the storage capacity of magnetic disk drives?

- a) Disk compression

- b) RAID
- c) Disk partitioning
- d) Disk spanning

**Answer: b) RAID**

**What is the maximum transfer rate for a standard SATA hard disk drive?**

- a) 3 Gb/s
- b) 6 Gb/s
- c) 12 Gb/s
- d) 24 Gb/s

**Answer: b) 6 Gb/s**

**What is the main advantage of solid-state drives over magnetic disk drives?**

- a) Higher storage capacity
- b) Lower cost
- c) Faster access times
- d) More durable

**Answer: c) Faster access times**

## Lec 33 - Error Control

1. Which of the following is a technique used for error detection?

- A) Hamming codes
- B) Huffman codes
- C) Lempel-Ziv coding
- D) None of the above

Answer: A) Hamming codes

Which of the following is a technique used for error correction?

- A) Checksums
- B) CRC
- C) Reed-Solomon codes
- D) Both A and B

Answer: C) Reed-Solomon codes

Which of the following is not a type of error control technique?

- A) Data encryption
- B) Error detection codes
- C) Error correction codes
- D) None of the above

Answer: A) Data encryption

Which of the following is a commonly used error detection code?

- A) CRC
- B) RSA
- C) AES
- D) SHA

Answer: A) CRC

Which of the following is a commonly used error correction code?

- A) Parity bits
- B) Vigenere cipher
- C) RSA
- D) None of the above

Answer: A) Parity bits

Which error control technique is based on adding extra bits to a message to detect errors?

- A) Checksums
- B) Hamming codes
- C) Reed-Solomon codes
- D) None of the above

Answer: A) Checksums

Which error control technique is based on adding redundant bits to a message to correct errors?

- A) Parity bits
- B) CRC
- C) Hamming codes

D) None of the above

**Answer: C) Hamming codes**

**Which error control technique is commonly used in wireless communication systems?**

A) Reed-Solomon codes

B) Parity bits

C) Checksums

D) None of the above

**Answer: A) Reed-Solomon codes**

**Which of the following is a disadvantage of error control techniques?**

A) Increased complexity

B) Reduced data throughput

C) Increased delay

D) All of the above

**Answer: D) All of the above**

**Which error control technique is most commonly used for error detection in computer networking?**

A) Parity bits

B) CRC

C) Hamming codes

D) Reed-Solomon codes

**Answer: B) CRC**

## Lec 34 - Number Systems and Radix Conversion

1. What is the base of the binary number system?

- A. 8
- B. 10
- C. 2
- D. 16

Answer: C

What is the base of the octal number system?

- A. 2
- B. 8
- C. 10
- D. 16

Answer: B

What is the base of the hexadecimal number system?

- A. 2
- B. 8
- C. 10
- D. 16

Answer: D

What is the decimal equivalent of the binary number 1010?

- A. 8
- B. 10
- C. 12
- D. 16

Answer: C

What is the decimal equivalent of the octal number 63?

- A. 51
- B. 54
- C. 57
- D. 60

Answer: D

What is the binary equivalent of the decimal number 29?

- A. 11101
- B. 10111
- C. 10011
- D. 11001

Answer: A

What is the octal equivalent of the decimal number 95?

- A. 137
- B. 147
- C. 157
- D. 167

Answer: B

What is the hexadecimal equivalent of the binary number 1110101?

- A. 4D

- B. 5D
- C. 6D
- D. 7D

**Answer: A**

**What is the decimal equivalent of the hexadecimal number 2A?**

- A. 38
- B. 40
- C. 42
- D. 44

**Answer: C**

**What is the binary equivalent of the octal number 53?**

- A. 100101
- B. 101010
- C. 110001
- D. 111000

**Answer: C**



## Lec 35 - Multiplication and Division of Integers

1. What is the result of multiplying -4 and 6?

- a) -24
- b) 24
- c) -10
- d) 10

Answer: a) -24

What is the result of dividing 24 by -3?

- a) -8
- b) 8
- c) -6
- d) 6

Answer: a) -8

What is the product of -5 and -8?

- a) -40
- b) 40
- c) -13
- d) 13

Answer: b) 40

What is the quotient of 15 divided by -5?

- a) -3
- b) 3
- c) -2
- d) 2

Answer: a) -3

What is the product of -7 and 0?

- a) 7
- b) 0
- c) -7
- d) Undefined

Answer: b) 0

What is the quotient of 0 divided by 6?

- a) 0
- b) 1
- c) Undefined
- d) Infinity

Answer: a) 0

What is the result of multiplying -3 and -4 and then dividing the result by -6?

- a) 2
- b) -2
- c) 4
- d) -4

Answer: a) 2

What is the quotient of 25 divided by 4, rounded to the nearest whole number?

- a) 6

b) 7

c) 5

d) 8

Answer: b) 7

What is the product of -2 and the sum of 3 and 5?

a) -16

b) -6

c) -8

d) 16

Answer: c) -8

What is the quotient of -12 divided by -4?

a) -3

b) 3

c) -4

d) 4

Answer: b) 3

## Lec 36 - Floating-Point Arithmetic

1. What is the range of the exponent in single-precision floating-point format?

- a. -126 to 127
- b. -127 to 127
- c. -128 to 127
- d. -129 to 128

Answer: a

What is the formula for converting a decimal number to single-precision floating-point format?

- a. Multiply the decimal number by  $2^{32}$
- b. Divide the decimal number by  $2^{32}$
- c. Multiply the decimal number by  $2^{-32}$
- d. Divide the decimal number by  $2^{-32}$

Answer: c

Which of the following is not a component of the IEEE 754 standard for floating-point arithmetic?

- a. Sign bit
- b. Exponent
- c. Mantissa
- d. Byte order

Answer: d

What is the smallest positive number that can be represented in single-precision floating-point format?

- a.  $2^{-127}$
- b.  $2^{-126}$
- c.  $2^{-149}$
- d.  $2^{-148}$

Answer: b

What is the largest number that can be represented in single-precision floating-point format?

- a.  $3.4028235 \times 10^{38}$
- b.  $1.7976931348623157 \times 10^{308}$
- c.  $9.999999 \times 10^{999}$
- d.  $2^{127}$

Answer: a

What is the difference between normalized and denormalized floating-point numbers?

- a. Normalized numbers have a non-zero mantissa, while denormalized numbers have a zero mantissa
- b. Normalized numbers have a zero exponent, while denormalized numbers have a non-zero exponent
- c. Normalized numbers have a non-zero exponent, while denormalized numbers have a zero exponent
- d. Normalized numbers have a larger range of representable values than denormalized numbers

Answer: a

Which of the following operations is not commutative in floating-point arithmetic?

- b. Multiplication
- c. Division
- d. Subtraction

Answer: d

**Which of the following is a common method for handling floating-point exceptions?**

- a. Rounding
- b. Truncation
- c. Exception handling routines
- d. None of the above

Answer: c

**What is the main disadvantage of using floating-point arithmetic compared to integer arithmetic?**

- a. It is slower
- b. It is less accurate
- c. It requires more memory
- d. It is more difficult to implement

Answer: a

**Which of the following is an example of a floating-point representation system that does not use the IEEE 754 standard?**

- a. IBM floating-point format
- b. VAX floating-point format
- c. ARM floating-point format
- d. All of the above use the IEEE 754 standard

Answer: b

## Lec 37 - Components of Memory Systems

1. Which of the following is a type of primary memory?

- a) Hard disk drive
- b) Solid-state drive
- c) RAM
- d) DVD-ROM

Answer: c) RAM

Which of the following is an example of secondary memory?

- a) Cache memory
- b) RAM
- c) ROM
- d) Hard disk drive

Answer: d) Hard disk drive

What is the purpose of cache memory?

- a) To store data permanently
- b) To store frequently accessed data for faster retrieval
- c) To provide additional storage capacity
- d) To provide backup in case of system failure

Answer: b) To store frequently accessed data for faster retrieval

Which component is responsible for managing data transfer between the CPU and memory?

- a) Memory controller
- b) Cache memory
- c) Secondary memory
- d) I/O device

Answer: a) Memory controller

What is the function of virtual memory?

- a) To store data permanently
- b) To store frequently accessed data for faster retrieval
- c) To provide additional storage capacity
- d) To extend the available memory beyond the physical memory of the system

Answer: d) To extend the available memory beyond the physical memory of the system

Which type of memory is non-volatile and retains data even when the power is off?

- a) RAM
- b) Cache memory
- c) ROM
- d) Virtual memory

Answer: c) ROM

Which component is responsible for controlling the flow of data between the CPU and the memory?

- a) Memory controller
- b) Cache memory
- c) Secondary memory

d) I/O device

**Answer: a) Memory controller**

**Which type of memory is typically the fastest but also the most expensive?**

a) Secondary memory

b) Cache memory

c) Virtual memory

d) ROM

**Answer: b) Cache memory**

**What is the function of an I/O device in a memory system?**

a) To control data transfer between the CPU and memory

b) To provide backup in case of system failure

c) To store data permanently

d) To enable communication between the system and external devices

**Answer: d) To enable communication between the system and external devices**

**Which component is responsible for managing the organization and allocation of memory in a system?**

a) Memory controller

b) Cache memory

c) Secondary memory

d) Operating system

**Answer: d) Operating system**

## Lec 38 - Memory Modules

1. Which of the following is a type of memory module commonly used in laptops?

- A) DIMM
- B) SODIMM
- C) RIMM
- D) SIMM

Answer: B

What is the full form of RIMM?

- A) Random In-line Memory Module
- B) Rambus In-line Memory Module
- C) Read-only In-line Memory Module
- D) Random-access In-line Memory Module

Answer: B

Which of the following memory modules is primarily used in older computers?

- A) DIMM
- B) SODIMM
- C) RIMM
- D) SIMM

Answer: D

Which type of memory module is commonly used in high-end gaming computers for better performance?

- A) DDR2
- B) DDR3
- C) DDR4
- D) DDR5

Answer: C

Which of the following is an advantage of using memory modules in a computer system?

- A) They are cheap
- B) They take up very little space
- C) They are easy to install and remove
- D) They provide faster processing speeds

Answer: C

Which type of memory module has a higher memory bandwidth?

- A) DIMM
- B) SODIMM
- C) RIMM
- D) None of the above

Answer: D

What is the maximum memory capacity of a single DDR4 DIMM module?

- A) 8GB
- B) 16GB
- C) 32GB
- D) 64GB

Answer: B

Which type of memory module uses a serial interface to transfer data?

- B) DDR3
- C) DDR4
- D) DDR5

Answer: D

**What is the main disadvantage of using RIMM memory modules?**

- A) They are expensive
- B) They are slower than other types of memory modules
- C) They are not compatible with all motherboards
- D) They have a higher power consumption

Answer: C

**What is the maximum clock speed supported by DDR4 memory modules?**

- A) 1600MHz
- B) 2133MHz
- C) 3200MHz
- D) 4000MHz

Answer: D



## Lec 39 - The Cache

### 1. What is the purpose of a cache in a computer system?

- A) To store infrequently accessed data
- B) To provide additional storage for the main memory
- C) To act as a buffer between the processor and main memory
- D) To speed up the processing of instructions

Answer: C

### What principle does the cache operate on?

- A) Temporal and spatial locality
- B) Random access
- C) Sequential access
- D) LRU (Least Recently Used) replacement

Answer: A

### Which of the following is a characteristic of a good cache design?

- A) Large capacity
- B) High access time
- C) High hit rate
- D) Low associativity

Answer: C

### What is the purpose of a cache hit?

- A) To retrieve data from the main memory
- B) To store data in the main memory
- C) To retrieve data from the cache
- D) To store data in the cache

Answer: C

### Which of the following is a disadvantage of a direct-mapped cache?

- A) Low hit rate
- B) High associativity
- C) High complexity
- D) Large size

Answer: A

### What is the difference between a write-through and write-back cache?

- A) Write-through caches are slower than write-back caches
- B) Write-back caches are slower than write-through caches
- C) Write-through caches write data to both the cache and main memory, while write-back caches only write to the cache until it is full
- D) Write-back caches write data to both the cache and main memory, while write-through caches only write to the cache until it is full

Answer: C

### Which cache replacement algorithm evicts the least recently used cache line?

- A) First-In-First-Out (FIFO)
- B) Least Frequently Used (LFU)
- C) Least Recently Used (LRU)

D) Random

**Answer: C**

**What is cache coherence?**

- A) The process of updating the cache when the main memory is modified
- B) The process of updating the main memory when the cache is modified
- C) The process of ensuring that all caches have the same view of shared memory
- D) The process of ensuring that all processors have the same view of shared memory

**Answer: C**

**Which of the following is an example of a cache miss?**

- A) When data is successfully retrieved from the cache
- B) When data is not found in the cache and must be retrieved from main memory
- C) When data is overwritten in the cache
- D) When data is stored in the cache

**Answer: B**

**What is the difference between a fully associative and set-associative cache?**

- A) Fully associative caches have a higher hit rate than set-associative caches
- B) Set-associative caches have a higher hit rate than fully associative caches
- C) Fully associative caches are larger than set-associative caches
- D) Set-associative caches are larger than fully associative caches

**Answer: B**

## Lec 40 - Virtual Memory

### 1. What is virtual memory?

- a) Memory that is stored on virtual machines
- b) A technique used to increase the apparent size of a computer's main memory
- c) A type of memory that can only be accessed by virtual machines
- d) A type of memory that is used for temporary storage

Answer: b

### What is the purpose of virtual memory?

- a) To increase the amount of physical memory available to the operating system
- b) To speed up the execution of programs
- c) To create a virtual machine environment
- d) To store data temporarily

Answer: a

### Which of the following is not a benefit of virtual memory?

- a) Programs can execute even when there is insufficient physical memory available
- b) It improves overall system performance
- c) It allows for faster access to data
- d) It provides a larger memory space for programs

Answer: c

### What is a page fault?

- a) A type of error that occurs when a program tries to access memory that is not available
- b) A technique used by virtual memory to transfer pages of data between physical memory and disk storage
- c) A type of virtual memory that is stored on a hard disk
- d) A type of memory that is only used for temporary storage

Answer: a

### What is the role of the page table in virtual memory?

- a) To map virtual addresses to physical addresses
- b) To store data temporarily
- c) To manage the transfer of pages of data between physical memory and disk storage
- d) To create a virtual machine environment

Answer: a

### What is thrashing?

- a) A situation in which the operating system spends too much time managing virtual memory
- b) A type of error that occurs when a program tries to access memory that is not available
- c) A situation in which the system spends too much time transferring pages between physical memory and disk storage
- d) A type of virtual memory that is stored on a hard disk

Answer: c

### What is the size of a page in virtual memory typically?

- a) 2 KB
- b) 4 KB
- c) 8 KB

d) 16 KB

**Answer: b**

**What is the purpose of a TLB in virtual memory?**

- a) To speed up the mapping of virtual addresses to physical addresses
- b) To store data temporarily
- c) To manage the transfer of pages of data between physical memory and disk storage
- d) To create a virtual machine environment

**Answer: a**

**What is the difference between demand paging and pre-paging?**

- a) Demand paging loads pages into physical memory only when they are needed, while pre-paging loads pages into physical memory before they are needed
- b) Pre-paging loads pages into physical memory only when they are needed, while demand paging loads pages into physical memory before they are needed
- c) Demand paging and pre-paging are the same thing
- d) Neither demand paging nor pre-paging are used in virtual memory

**Answer: a**

**Which of the following is an example of a virtual memory implementation?**

- a) RAID
- b) SSD
- c) Pagefile
- d) BIOS

**Answer: c**

## Lec 41 - Numerical Examples of DRAM and Cache

1. What is the hit rate of a cache with 2000 cache lines, where 1500 references were made and 300 misses occurred?

- a. 85%
- b. 80%
- c. 75%
- d. 70%

Answer: a

What is the miss rate of a cache with 512 cache lines, where 1000 references were made and 50 misses occurred?

- a. 5%
- b. 10%
- c. 15%
- d. 20%

Answer: a

If a cache access takes 5 ns and a DRAM access takes 50 ns, and the hit rate of the cache is 90%, what is the average memory access time?

- a. 5.5 ns
- b. 6.5 ns
- c. 7.5 ns
- d. 8.5 ns

Answer: b

A program has a total of 10,000 memory references, of which 1000 are cache misses. What is the hit rate of the cache?

- a. 90%
- b. 85%
- c. 80%
- d. 75%

Answer: a

A cache has 512 lines, each of which can hold 32 bytes. How many bits are required to address a byte in this cache?

- a. 7 bits
- b. 8 bits
- c. 9 bits
- d. 10 bits

Answer: c

If a cache has a hit rate of 95%, what is the miss rate?

- a. 5%
- b. 10%
- c. 15%
- d. 20%

Answer: a

If a cache has a hit rate of 80% and an access time of 5 ns, and a DRAM has an access

time of 50 ns, what is the average memory access time?

- a. 9 ns
- b. 10 ns
- c. 11 ns
- d. 12 ns

Answer: c

A cache has a hit rate of 90% and an access time of 5 ns. What is the effective access time if the cache is split into two levels, where the L1 cache has a hit rate of 95% and an access time of 2 ns, and the L2 cache has a hit rate of 80% and an access time of 10 ns?

- a. 4.1 ns
- b. 4.5 ns
- c. 5.0 ns
- d. 5.5 ns

Answer: b

A cache has 256 lines, each of which can hold 64 bytes. What is the total capacity of the cache in bytes?

- a. 16384 bytes
- b. 32768 bytes
- c. 65536 bytes
- d. 131072 bytes

Answer: b

If a cache has a hit rate of 80% and an access time of 5 ns, and a DRAM has an access time of 50 ns, what is the speedup achieved by the cache?

- a. 4x
- b. 5x
- c. 6x
- d. 7x

Answer: c

## Lec 42 - Performance of I/O Subsystems

1. Which of the following is NOT a factor that affects the performance of I/O subsystems?

- a) Speed and capacity of devices
- b) Efficiency of the operating system's I/O handling mechanisms
- c) Workload characteristics of the applications
- d) Type of processor used

**Solution: d) Type of processor used**

Which of the following is a technique used to improve I/O performance?

- a) Virtual memory
- b) RAID
- c) Multi-core processing
- d) Pipelining

**Solution: b) RAID**

Which of the following is NOT an example of a peripheral device?

- a) Hard disk
- b) Keyboard
- c) Memory
- d) Printer

**Solution: c) Memory**

Which of the following is a metric used to measure I/O performance?

- a) Bandwidth
- b) Clock speed
- c) Cache size
- d) Instruction set

**Solution: a) Bandwidth**

Which of the following can improve I/O performance by reducing the number of I/O operations required?

- a) Virtual memory
- b) DMA
- c) Interrupts
- d) Polling

**Solution: b) DMA**

Which of the following is an I/O handling mechanism used by operating systems?

- a) Interrupts
- b) Bit manipulation
- c) Vectorization
- d) Load balancing

**Solution: a) Interrupts**

Which of the following is a technique used to reduce I/O latency?

- a) Caching
- b) Compression
- c) Encryption
- d) Hashing

**Solution: a) Caching**

Which of the following is NOT a type of RAID configuration?

- a) Mirroring

- b) Striping
- c) Parity
- d) Compression

**Solution: d) Compression**

**Which of the following is an I/O workload characteristic?**

- a) Memory usage
- b) Processor utilization
- c) Read/write ratio
- d) Network bandwidth

**Solution: c) Read/write ratio**

**Which of the following is an advantage of solid-state drives (SSDs) over hard disk drives (HDDs)?**

- a) Larger capacity
- b) Higher latency
- c) Lower power consumption
- d) Lower cost per gigabyte

**Solution: c) Lower power consumption**



## Lec 43 - Networks

1. Which of the following is not a type of network topology?

- a) Bus
- b) Star
- c) Mesh
- d) Program

Answer: d) Program

Which of the following protocols is used for sending email?

- a) FTP
- b) SMTP
- c) SNMP
- d) SSH

Answer: b) SMTP

Which of the following is not a type of wireless network?

- a) Wi-Fi
- b) Bluetooth
- c) Infrared
- d) Ethernet

Answer: d) Ethernet

Which of the following is not a layer of the OSI model?

- a) Application
- b) Physical
- c) Data
- d) Transport

Answer: c) Data

Which of the following devices is used to connect multiple network segments together?

- a) Router
- b) Switch
- c) Hub
- d) Modem

Answer: a) Router

Which of the following topologies has a central hub or switch to which all devices are connected?

- a) Ring
- b) Star
- c) Mesh
- d) Bus

Answer: b) Star

Which of the following is a unique identifier assigned to a network interface card (NIC)?

- a) IP address
- b) MAC address
- c) URL
- d) Domain name

Answer: b) MAC address

Which of the following protocols is used for secure remote access to a network?

- a) FTP

- b) Telnet
- c) SSH
- d) POP

**Answer: c) SSH**

**Which of the following devices is used to convert digital signals to analog signals for transmission over telephone lines?**

- a) Router
- b) Switch
- c) Modem
- d) Hub

**Answer: c) Modem**

**Which of the following is not a type of network cable?**

- a) Coaxial
- b) Fiber optic
- c) Twisted pair
- d) Infrared

**Answer: d) Infrared**

## Lec 44 - Communication Medium and Network Topologies

1. Which of the following is not a communication medium?

- a) Copper wires
- b) Fiber optics
- c) Wireless signals
- d) LAN

Answer: d) LAN

Which communication medium provides the highest transmission speeds?

- a) Copper wires
- b) Fiber optics
- c) Wireless signals
- d) Bluetooth

Answer: b) Fiber optics

Which network topology is most commonly used in home networks?

- a) Star
- b) Bus
- c) Ring
- d) Mesh

Answer: a) Star

In which network topology, each device is connected to a central hub or switch?

- a) Star
- b) Bus
- c) Ring
- d) Mesh

Answer: a) Star

In which network topology, a single break in the communication channel can bring down the entire network?

- a) Star
- b) Bus
- c) Ring
- d) Mesh

Answer: c) Ring

Which network topology is best suited for large networks with heavy traffic?

- a) Star
- b) Bus
- c) Ring
- d) Mesh

Answer: d) Mesh

Which communication medium is most immune to interference and noise?

- a) Copper wires
- b) Fiber optics
- c) Wireless signals
- d) Bluetooth

Answer: b) Fiber optics

In which network topology, data travels in a single direction only?

- a) Star

- b) Bus
- c) Ring
- d) Mesh

**Answer: b) Bus**

**Which network topology is most fault-tolerant?**

- a) Star
- b) Bus
- c) Ring
- d) Mesh

**Answer: d) Mesh**

**Which communication medium is most commonly used for wireless networks?**

- a) Copper wires
- b) Fiber optics
- c) Wireless signals
- d) Bluetooth

**Answer: c) Wireless signals**

## Lec 45 - Review

### 1. What is a review?

- a. A type of assessment tool used in education
- b. A type of essay that analyzes a literary work
- c. An evaluation of a product or service
- d. A type of scientific study

Answer: c

### What is the purpose of a review?

- a. To promote a product or service
- b. To provide feedback to the creator or provider
- c. To manipulate public opinion
- d. To create controversy

Answer: b

### Where are reviews commonly found?

- a. In textbooks and academic journals
- b. In political speeches and debates
- c. In e-commerce sites and online marketplaces
- d. In scientific research articles

Answer: c

### Who conducts reviews?

- a. Only professional critics
- b. Only consumers
- c. Both professionals and consumers
- d. Only the creators or providers of the product or service

Answer: c

### What is the role of reviews in shaping public opinion?

- a. They have no impact on public opinion
- b. They can positively or negatively influence public opinion
- c. They only influence the opinions of experts
- d. They are only important for marketing purposes

Answer: b

### What is a rating in a review?

- a. A written evaluation of a product or service
- b. A numerical or symbolic representation of the overall evaluation
- c. A type of video review
- d. A summary of the pros and cons of a product or service

Answer: b

### What is the difference between a positive and negative review?

are longer than negative reviews

a. Positive reviews

- b. Positive reviews focus on the product's benefits, while negative reviews focus on its drawbacks
- c. Positive reviews are more reliable than negative reviews
- d. Negative reviews are more common than positive reviews

Answer: b

### What is a fake review?

- a. A review that is intentionally false or misleading

- b. A review written by a professional critic
- c. A review that focuses only on positive aspects of a product or service
- d. A review that is too short or vague to be helpful

**Answer: a**

**How can reviews benefit businesses?**

- a. By providing free advertising
- b. By helping to identify areas for improvement
- c. By improving customer satisfaction and loyalty
- d. By generating revenue

**Answer: c**

**What is the best way to evaluate the credibility of a review?**

- a. By only reading positive reviews
- b. By looking at the reviewer's profile and history
- c. By ignoring reviews altogether
- d. By only reading reviews from professional critics

**Answer: b**

