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

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 p

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 x 10^38
- b. 1.7976931348623157 x 10³08
- c. 9.999999 x 10^999
- d. 2¹²⁷

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

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 prepaging 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

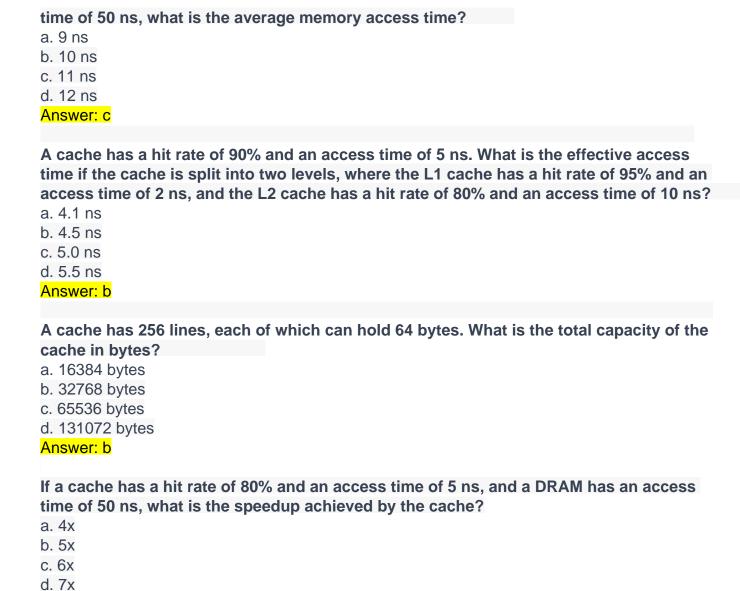
Answer: c

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%

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

d. 20% Answer: a



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?

a. Positive reviews

are longer than negative 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