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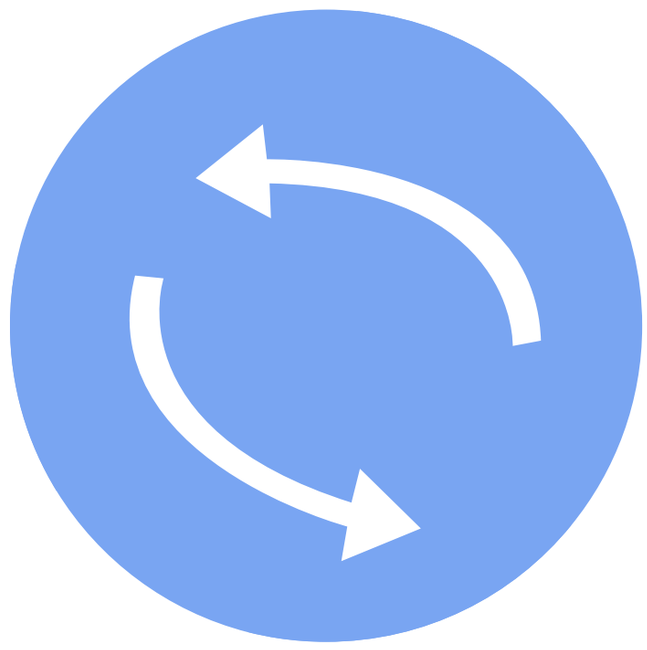
MCS-218

30 MOST REPEATED QUESTIONS



Curated List of 30 Questions that are seen to be repeated frequently in the examinations.

By **FarLearner.com**

MCS-218 Most Repeated Questions

1 . Differentiate between congestion control and flow control.

Found in Dec 2021 (1 d) , Dec 2022 (4 c)

Answer : Flow control and congestion control are mechanisms used in computer networks to regulate the transmission of data and maintain efficient communication.

Flow control ensures that the sender does not transmit data faster than the receiver can process it. It manages the rate of data transfer between sender and receiver to prevent buffer overflow.

Techniques such as Stop-and-Wait protocol and Sliding Window protocol are commonly used for flow control.

Congestion control, on the other hand, deals with the problem of excessive traffic in the network. Congestion occurs when the number of packets in the network exceeds the network's capacity, causing delays, packet loss, and reduced performance.

The main difference is that flow control operates between sender and receiver, while congestion control manages traffic across the entire network.

In packet switched networks, congestion control is achieved through several techniques. One method is traffic shaping, where the transmission rate is regulated to avoid sudden bursts of data. Another technique is queue management, where routers control packet queues to avoid overflow.

Protocols such as TCP implement congestion control algorithms, including slow start, congestion avoidance, and fast recovery.

2 . Explain the key generation algorithm for RSA.

Found in Dec 2021 (1 f) , June 2022 (1 f) , June 2023 (1 d)

Answer : Public key cryptography is a security technique that uses two different keys for encryption and decryption. One key is public and can be shared with everyone, while the other key is private and kept secret by the owner. Data encrypted with the public key can only be decrypted with the corresponding private key.

One widely used public key algorithm is RSA (Rivest–Shamir–Adleman).

RSA Key Generation Steps

- Choose two prime numbers :

$p = 3, q = 11$

- Compute

$n = p \times q = 33$

- Calculate Euler's Totient

$\varphi(n) = (p-1)(q-1) = 2 \times 10 = 20$

- Choose public key e such that

$1 < e < \varphi(n)$ and $\gcd(e,20)=1$

- Example: e = 3
- Compute private key d such that
- (d × e) mod φ(n) = 1
- So d = 7

Thus : Public key = (3, 33)

Private key = (7, 33)

RSA ensures secure communication, digital signatures, and data confidentiality over networks.

MCS-218 Most Repeated Questions

3 . Draw the IPv4 header structure and explain the significance of its fields (such as flags or fragment offset).
Found in Dec 2021 (1 h) , June 2022 (1 h)

Answer : The IPv4 header contains important control information required for routing and delivering packets across networks. The header is typically 20 bytes long and includes several fields.

IPv4 Header Fields

- Version
- Header Length
- Type of Service
- Total Length
- Identification
- Flags
- Fragment Offset
- Time to Live (TTL)
- Protocol
- Header Checksum
- Source Address
- Destination Address

Signifi

The Flags [illegible] is used for packet fragmentation control.

4 . Explain the concept of circuit and packet switching.
Found in Dec 2021 (2 c) , June 2023 (2 c) ,June 2024 (2 b)

Answer : Circuit switching and packet switching are two fundamental communication techniques used in computer networks to transfer data between devices.

Circuit Switching : Circuit switching establishes a dedicated communication path between the sender and receiver before data transmission begins. The connection remains active for the entire duration of communication. All data travels through the same path until the session ends. This method involves three stages: 1. Connection establishment 2. Data transmission 3. Connection termination An example of circuit switching is the traditional telephone network where a dedicated line is reserved between two callers during the entire conversation. The advantage is reliable and continuous communication, but the disadvantage is inefficient use of network resources.

Packet Switching : In packet switching, data is divided into small p contains the d ndently through paths and are reassembled at the destination.

The Internet is the best example of packet switching. When sending an email or browsing a website, the data is broken into packets that travel through multiple routers before reaching the receiver. Packet switching improves network efficiency and reliability compared to circuit switching.

5 . Compare star topology with other network topologies (such as tree, ring, or bus).

Found in Dec 2021 (2 d) , Dec 2022 (2 d) , Dec 2023 (1 a) , Dec 2024 (1 c)

Answer : Network topology refers to the physical or logical arrangement of devices in a network. Two common topologies are Star topology and Tree topology.

Star Topology : In a star topology, all network devices are connected to a central hub or switch. Each device communicates with others through this central node.

Characteristics

- Easy to install and manage
- Fail[illegible] of the net[illegible]
- Cent[illegible]
- Easy to add or remove devices

Thus, star topology is suitable for small networks, while tree topology is used for larger hierarchical networks.

6 . What is a Hamming Code and how are redundant bits calculated/inserted?

Found in Dec 2021 (3 a) , Dec 2023 (1 b)

Answer : Hamming Code is an error-detection and error-correction technique used in digital communication systems. It was developed by Richard Hamming to detect and correct single-bit errors during data transmission. In this method, extra bits called redundant bits or parity bits are added to the original data bits so that errors can be detected and corrected at the receiver side.

The number of redundant bits required is determined using the formula: $2^r >= m + r + 1$

Where

r = number of redundant bits

m = number of data bits

Given da

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MCS-218 Most Repeated Questions

7 . Calculate the throughput of the slotted ALOHA protocol.

Found in Dec 2021 (3 b) , Dec 2022 (3 c) , June 2023 (3 c)

Answer : ALOHA is a random access protocol used in computer networks to allow multiple devices to share a communication channel. It was developed for wireless communication systems. There are two main types: Pure ALOHA and Slotted ALOHA.

Pure ALOHA : In Pure ALOHA, stations transmit data whenever they have data to send. There is no synchroni218ation between stations. Because of this, collisions may occur if two devices transmit at the same time. When a collision happens, the stations wait for a random period and retransmit the data.

The vulnerable period in Pure ALOHA is twice the frame transmission time, which leads to a high probability of collisions. The maximum throughput of Pure ALOHA is : S = 1/2e ~ 0.184

This m s about 18.4%.

8 . Discuss the IEEE 802.11 protocol/stack.

Found in Dec 2021 (3 c) , Dec 2022 (3 d)

Answer : IEEE 802.11 is a standard developed by the Institute of Electrical and Electronics Engineers (IEEE) for wireless local area networks (WLANs). It defines the protocols for implementing wireless communication between devices such as laptops, smartphones, and wireless routers.

The IEEE 802.11 standard operates mainly in the 2.4 GH218 and 5 GH218 frequency bands. It uses radio waves to transmit data over short distances. The standard supports various data rates depending on the version, such as 802.11a, 802.11b, 802.11g, 802.11n, and 802.11ac.

Architecture of IEEE 802.11

The main components include:

- Station (STA) – A wireless device such as a laptop or smartphone.
- Access Point (AP) – A device that connects wireless devices to the wired network.
- Basi… stations com…
- Distri… e access points to extend the network.

MCS-218 Most Repeated Questions

9 . Find the shortest route between points using Dijkstra's algorithm.

Found in Dec 2021 (4 b) ,June 2022 (4 b) ,June 2024 (4 b)

Answer : Dijkstra’s algorithm is a widely used algorithm in computer networks and graph theory to find the shortest path between nodes in a network. It was developed by the computer scientist Edsger W. Dijkstra. The algorithm is used in routing protocols to determine the minimum cost path between a source node and other nodes in the network.

Steps of Dijkstra’s Algorithm

- Initiali218ation : Assign a distance value of 0 to the source node and infinity to all other nodes.
- Select the nearest node : Choose the unvisited node with the smallest distance value.
- Update distances : For the selected node, calculate the distance to its neighboring nodes. If the new distance is smaller than the current value, update it.
- Mark the node as visited : Once the shortest distance to a node is determined, mark it as visited.
- Repe[illegible] nearest unv[illegible]til the dest[illegible]

Application :
Dijkstra’s algorithm is used in network routing protocols, GPS navigation systems, and communication networks to determine the most efficient path for data transmission.

Thus, it helps networks deliver packets efficiently by minimi218ing transmission cost and delay.

10 . What is Multiplexing and what are its basic techniques?

Found in Dec 2021 (5 a) , June 2022 (2 c) , June 2023 (1 g) , June 2024 (3 c)

Answer : Multiplexing is a technique used in data communication that allows multiple signals to share a single communication channel simultaneously. It helps in improving the efficiency of bandwidth usage and reduces the cost of communication systems. In multiplexing, several input signals are combined at the sender side using a device called a multiplexer (MUX). At the receiver side, a demultiplexer (DEMUX) separates the combined signal b

Multiplex networks, satellite communication, and computer networks.