DSA Question

1. Difference between stack and queue.
2. How to find the datatype of a tuple?
3. Write a program to print the values from 0 to 5 using a static variable.
4. Why can you use recursion in a program for the above program?
5. Why do we use recursion? We can simply use a for loop alternatively which is better.
6. Binary search and explain its algorithms.
7. What is a linked list?
8. Advantages of an array over a linked list.
9. What is a doubly linked list?
10. What is the difference between a list and a tuple?
11. Write a program to remove duplicate elements.
12. Write a program to return repeated characters.
13. Depth-first search (DFS) algorithm explanation.
14. How do you find the second least salary in an employee table?
15. Explain the quicksort algorithm.
16. How to merge three data in three tables and calculate how many days employees were present? (SQL query)
17. Implement a stack using an array or linked list.
18. Find the complexity of a given algorithm.
19. Implement a binary search tree and perform various operations on it.
20. Explain the difference between a linked list and an array.
21. Solve problems involving sorting algorithms like quicksort or mergesort.
22. Implement a hash table and handle collision resolution.
23. What is the difference between an array and a linked list?
24. Explain the concept of time complexity in algorithms.
25. What is a stack, and what operations can be performed on it?
26. Define "recursion" in the context of algorithms.
27. What is a binary search tree (BST)?
28. Explain the difference between depth-first search (DFS) and breadth-first search (BFS).
29. What is the purpose of hashing in data structures?
30. Define the term "queue" and provide an example.
31. What is the significance of the "Big O" notation in algorithm analysis?
32. Explain the concept of dynamic programming.
33. What is an algorithm's space complexity?
34. Define a linked list and its types.
35. What is the difference between a binary tree and a binary search tree?
36. What is an adjacency matrix in graph representation?
37. Explain the concept of divide and conquer.

38. What is the purpose of a priority queue?
39. Define the term "hash table" and its collision resolution techniques.
40. What is an AVL tree, and why is it balanced?
41. Explain the concept of greedy algorithms.
42. What is an algorithm's worst-case time complexity?
43. Define the term "stack overflow."
44. What is the difference between an algorithm and a data structure?
45. Explain the concept of a linked list cycle.
46. What is a heap data structure?
47. Define "asymptotic analysis" in algorithm complexity.
48. What is the purpose of the "quick sort" algorithm?
49. Explain the concept of a circular queue.
50. What is memoization in dynamic programming?
51. Define the term "graph traversal."
52. What is a doubly linked list, and how is it different from a singly linked list?
53. Explain the concept of backtracking in algorithms.
54. What is a hash function?
55. What is the purpose of the "merge sort" algorithm?
56. Define the term "amortized analysis" in algorithms.
57. What is the significance of the "Dijkstra's algorithm" in graph theory?
58. Explain the concept of a binary heap.
59. What is the purpose of the "breadth-first search (BFS)" algorithm?
60. Define the term "algorithmic complexity."
61. What is a trie data structure used for?

Operating Systems

1. Explain the concept of multithreading.
2. Difference between static binding and dynamic binding.
3. Difference between static and dynamic memory allocation.
4. Explain the concept of memory segmentation.
5. What are the different levels of memory hierarchy in a computer system?
6. What are the main functions of an operating system?
7. Explain the purpose and working of the Page Table in virtual memory management.
8. Explain the concept of process scheduling in an operating system.
9. What are the different types of scheduling algorithms in OS?
10. Explain the concept of deadlock in operating systems.
11. What is a system call?
12. Explain the concept of file systems in operating systems.
13. What is a process and a thread? Explain the differences.

14. How does virtual memory work?
15. Explain the purpose of an operating system's kernel.
16. Discuss different process scheduling algorithms.
17. What is deadlock, and how can it be prevented?
18. Describe the role of the file system in an operating system.
19. How does a context switch work?
20. What is an operating system?
21. What is the purpose of a kernel in an OS?
22. Explain the difference between multitasking and multiprogramming.
23. What is a file system, and what does it do?
24. Define a process in the context of an OS.
25. What is virtual memory?
26. What is a device driver?
27. Explain the role of an interrupt in OS operations.
28. What is a shell in an OS?
29. What does the term "GUI" stand for?
30. What is a system call?
31. What is the purpose of the Task Manager in Windows OS?
32. What is a deadlock in OS terminology?
33. Describe the difference between a thread and a process.
34. What is the role of a scheduler in an OS?
35. What is a page fault?
36. Explain the concept of process synchronization.
37. What is a semaphore?
38. Define a zombie process.
39. What is the purpose of a bootloader in OS boot-up?
40. Explain the concept of a page table.
41. What is a race condition?
42. What does "RAID" stand for in disk management?
43. What is a shell prompt?
44. Describe the concept of a context switch.
45. What is a real-time operating system (RTOS)?
46. What is the purpose of a cache in computer systems?
47. What is a fork system call?
48. What is a file descriptor?
49. Explain the concept of a process control block (PCB).
50. What is thrashing in virtual memory systems?
51. What is a time-sharing system?
52. What does "DMA" stand for in computer systems?
53. Explain the purpose of the "init" process in Unix-like systems.
54. What is the difference between a mutex and a semaphore?
55. What is a shell script?

56. Define the term "spooling."
57. What is the role of the "inode" in Unix file systems?
58. Explain the concept of a shell pipeline.
59. What is a system resource in an OS context?

Software testing

1. What is software testing, and why is it important?
2. Explain the difference between white box testing and black box testing.
3. How will you ensure the quality of a product?
4. How will you test a particular device like headphones or a mobile phone?
5. How will you test Amazon software?
6. Explain different types of testing.
7. How do you test a new fan or a Gmail login system?

General Questions

1. Explain the Agile process.
2. Explain the Scrum process.
3. What is IoT (Internet of Things), and how does it work?
4. Why use wireless networks over wired networks?
5. Explain the LAN cable vs. wireless network efficiency.
6. How to test a software?
7. Explain the concept of RAID in DBMS.
8. What is a deep copy and shallow copy in Python?
9. Explain the concept of abstraction with real-time examples.
10. Explain the concept of interfaces in multi-threading.
11. Explain the concept of ACID properties in databases.
12. Design a URL shortening service like Bitly.
13. Explain the architecture of a distributed system.
14. Design a scalable chat application.
15. How would you design a social media platform?
16. Discuss load balancing strategies.
17. Design a parking lot management system.
18. Explain microservices architecture.

Networking

1. What is the purpose of an IP address?
2. Explain the difference between TCP and UDP.

3. What is a subnet mask used for?
4. Define the term "router" in networking.
5. What is DNS and its role in networking?
6. What is a MAC address, and how is it unique?
7. Explain the concept of a firewall.
8. What is NAT (Network Address Translation)?
9. Define "bandwidth" in network terminology.
10. What is a VLAN (Virtual LAN)?
11. Explain the purpose of ARP (Address Resolution Protocol).
12. What is the OSI model, and how many layers does it have?
13. Define the term "switch" in networking.
14. What is the purpose of ICMP (Internet Control Message Protocol)?
15. Explain the concept of a proxy server.
16. What is a DHCP server, and what does it do?
17. Define "packet loss" in network communication.
18. What is the difference between a hub and a switch?
19. Explain the purpose of SSL/TLS in network security.
20. What is a subnet in IP addressing?
21. Define the term "gateway" in networking.
22. What is the significance of a DNS resolver?
23. Explain the concept of a DMZ (Demilitarized Zone).
24. What is a MAC flooding attack?
25. Define "latency" in network performance.
26. What is the purpose of a load balancer?
27. Explain the concept of a 403 Forbidden error.
28. What is a VPN (Virtual Private Network), and why is it used?
29. Define the term "IP spoofing."
30. What is the purpose of a traceroute command?
31. Explain the concept of a subnetting mask.
32. What is QoS (Quality of Service) in networking?
33. Define the term "DNS cache poisoning."
34. What is the difference between half-duplex and full-duplex communication?
35. Explain the purpose of BGP (Border Gateway Protocol)

Database Management System

1. What is a DBMS, and what is its purpose?
2. Explain the difference between a database and a DBMS.
3. What is SQL, and why is it essential in DBMS?
4. Define the term "table" in a relational database.
5. What is a primary key, and why is it important?
6. Explain the concept of normalization in DBMS.

7. What is an index, and how does it improve database performance?
8. Define the term "foreign key" in a relational database.
9. What is ACID in the context of database transactions?
10. Explain the differences between SQL and NoSQL databases.
11. What is a database schema?
12. Define the term "data dictionary."
13. What is a stored procedure, and why is it used?
14. Explain the concept of a database trigger.
15. What is a view in DBMS?
16. Define the term "data redundancy" in databases.
17. What is the purpose of the SELECT statement in SQL?
18. Explain the differences between INNER JOIN and OUTER JOIN.
19. What is a composite key in DBMS?
20. Define the term "data integrity" in databases.
21. What is the role of the COMMIT statement in transactions?
22. Explain the concept of data modeling.
23. What is a NoSQL database, and when is it used?
24. Define the term "concurrency control" in DBMS.
25. What is a database index, and how does it work?
26. Explain the purpose of the GROUP BY clause in SQL.
27. What is a subquery, and why is it used in SQL?
28. Define the term "OLAP" in databases.
29. What is the difference between a clustered and a non-clustered index?
30. Explain the concept of data warehousing.
31. What is a foreign key constraint?
32. Define the term "data mining" in the context of DBMS.
33. What is the purpose of the ORDER BY clause in SQL?
34. What is a database transaction, and why is it important?
35. Explain the differences between a heap file and a clustered file.
36. What is the role of the ROLLBACK statement in transactions?
37. Define the term "data mart" in data warehousing.
38. What is the purpose of the HAVING clause in SQL?
39. What is a database management system (DBMS) architecture?
40. Explain the concept of referential integrity in DBMS.