Technical Interview Questions

Data Structures and Algorithms

- Write the code of heap sort and complexity in different cases.
- Implement Kadane's Algorithm.
- Kahn's algorithm for topological sorting.
- Which DS is used to manage files and folders in your mobile?
- Write code for Dijkstra Algorithm.
- Find the kth minimum element into binary search.
- What is memory leak? How to avoid it?
- Write a program to create circular queue?
- Detect and remove loop in linked list.
- Design LRU data structure.
- WAP for finding nth node from the end in the linked list.
- Explain KMP Algorithm.
- Zigzag traversal between two singly linked lists.

- There is a N*M matrix where each row is sorted. Find the kth largest element in matrix?

- Print sum of all prime numbers within a given range.

- Find the largest and second largest element in array. Give 4 different approaches.

- Given two polynomials as linked lists, return a linked list which represents the product of two polynomials.

- What is the difference between dynamic programming and divide and conquer?

- Given two polynomials represented by two arrays, write a function that multiplies given two polynomials.

- What are the disadvantages of stack.

- Write a program to find when we get stack overflow if we are using recursive functions.

- How is cycle detection different in directed and undirected graphs?

- Write a program to append a C-style string to the end of another C-style string. You were supposed to write a function like void concat(char* a , char* b) such that after calling this function a becomes a+b(concatenation of a and b). Assume that the size of a is greater than length of a+length of b.No library functions were to be used. Not even strlen.

- Why do we need trie data structure?Tell one another technique which does the same job as trie with same time complexity? Then why is trie preferred over that one?(The other technique which I told was hashing).

- Given a binary tree remove nodes to make it 'Perfect'. Print all removed nodes.

DBMS

- What is the view in DBMS?
- What is Indexing?
- You have a student table having 3 attributes: student_name, subject and marks. Find the subject-wise maximum mark of students. Arrange the subjects in ascending order and marks in descending order
- Primary indexing vs Secondary indexing vs cluster indexing, multilevel indexing.
- Sparse indexing vs dense indexing.
- Lossless decomposition vs Lossy decomposition.
- Describe join operation w.r.t databases.

Operating System

- What is page fault and why it occurs?
- What is virtual memory?
- What is Demand Paging?
- Explain Semaphore.
- While context switching takes place what is stored on stack and heap.
- Write code for Producer-Consumer Problem.
- What is Swap In and Swap Out?

- Differentiate between Starvation and Aging.
- Explain the page replacement Algorithm LRU.
- What is Inter process communication ,types and which one is fast and why?
- What is fragmentation? Define external fragmentation.
- Calculate the number of processes generated using N fork() statements?
- Due to priority of process, what type of problem occurs in priority scheduling?
- What is real time OS?
- Difference between preemptive and non- preemptive algorithms.
- If time slice is greater than the execution time of the largest execution time process than round robin acts as...?
- There is a file and 5 processes. How can you grant access so that only 2 processes can write to file and 1 can read file at a time .
- Stack pointer vs Frame pointer.
- Explain spooling.
- You are given a process A. The scheduler is using Priority Based Round Robin Technique for scheduling various processes. Suppose at some instant A was being run and it entered its critical section. And there it acquired a resource X. Meanwhile another process B comes to the ready queue. B has more priority than A. Now the preemption occurs and the scheduler decides to run B and it also wants to own resource X to complete some task. Now B won't be able to take the resource as A is already having it but since it has higher priority it must run before A. So is this condition a deadlock? Explain with reasons.
- What is starvation? Out of priority based round robin scheduling and priority based scheduling , which one is more likely to suffer from the problem of starvation? How to recover from starvation?
- Static and dynamic memory allocation and followup questions on stack and heap.

Miscellaneous

- Explain and give an example of a function pointer. Write function pointer for a function that takes an integer as a parameter and returns character.
- Implement your own strcat() function. Don't use string header.
- Difference between TCP and UDP.
- What is Inline function?
- Make a utility function in C to detect memory leaks in any program given its source code,you are allowed to modify input programs minimally for this purpose.
- Balloon burst problem.
- Write a program to allocate a 3D-array dynamically.
- Write your own typedef operator.
- What is meant by Early binding and late binding.
- State various protocols in various layers of TCP/IP.
- Create a pointer that can point to an array of integers.
- Explain client server architecture.
- What is L-value and R-value reference?
- State various principles of OOPS.
- Define MFC COM and DCOM.
- Difference between NULL and NIL.
- What is meant by Big and Small Endian? How would you know that Machine code is Big or Small Endian?
- What is friend class and function in C++?
- What is Virtual Function in C++?
- Explain VTABLE and VPTR?
- Difference between sizeOf(void) and sizeOf(void*).
- Full form of conio.
- Describe Java's garbage collection.
- Explain Abstract and pure Virtual function in detail.
- What is the difference between a static and const variable?

- Do namespaces interact? if yes, how? if no, why not?
- Define Scheduling. Which data structure is used in scheduling?
- Where are the local, global, static, auto, register, extern, const, volatile variables stored?
- What is a virtual destructor? Explain the use of it - C++.
- What is a void pointer, a smart pointer, a wild pointer, a null pointer, and a dangling pointer? In what cases are they used?
- What is the difference between a deep copy and a shallow copy?
- Explain Diamond problem in C++.
- What is segmentation fault?
- Implement 3 stacks using 1 array.
- Explain MultiLevel inheritance.
- Memory layout of C program.
- What is structure padding ?
- What are memset and memcpy?
- What is function pointer?
- There are some exceptions that cannot be caught by try catch. How to catch such exceptions? Can we prevent our program from crashing if we are not able to catch such exceptions.
- What is name mangling, and how does it work?
- What does malloc(0) return?
- There are 25 horses and 1 racing track. You can conduct a race of at most 5 horses on that track. You need to find the fastest 3 horses. What is the minimum number of races do you require?
- You are given 8 batteries and 1 torch. 4 batteries are working and 4 are dead. The torch accommodates 2 batteries. If both the batteries are working then the torch will glow otherwise not. What is the minimum number of times you need to switch the torch to find out 2 working batteries?
- How to prevent multiple object instantiations of a class ?
- Explain the math behind gradient descent ?