

Q.front() aur Q.back() :P

Questions

1. Level order traversal of BST.
2. Sorted Array to BST.
3. Sort array according to a Given string of Is and Ds.
like for 1 2 3 4 5
and IDID
will output : 1 3 2 5 4
4. Sort alternate increasing decreasing order.
5. Mirror BST
6. Predecessor of a node in BST.
7. Lower Bound
- 8 . Maze Solver
9. Kth Largest/Smallest element in a BST
- *10. LRU cache
11. PostOrder with stack (boo yeah... just read .. no code..)
- *12. Word break Word break II on leetcode

1. Wiggle sort
 2. Binary search on array (lower bound)
 3. Implement stack with O(1) getMin() method
 4. How would you design a system to deploy a binary across a cluster of computers? (15 minutes)
 - 5. How do you produce high quality software in C++? (14 minutes)**
 - 6. How would you design a URL shortener service like tinyurl.com? (11 minutes)**
(The previous interviewer indicated that he had strong coding skills, so I should focus on design and SW engineering. Thus, I didn't ask any coding questions.)
 7. Partial products. (in an array return multiplication of all numbers except ith term...(one way is to do by multiplying all numbers and diving it by ith term...tell another way)).
 8. Next Node in the in-order traversal (given parent pointer also)
 - 9. validate an UTF8 string**
 10. find the deepest leaf and the path from the root to that leaf inside a binary tree.
 11. Write a maze solver (in a maze find if you can reach from a to b).
 - 12.1 Write a function to copy a file (external merge sort)
 - 12.2 How many bytes should we copy at a time?
 - 12.3 What if we copy from one disk to another disk?
- Conversion Interviews :-
13. Number of ways you can draw n chords in a circle with 2n points such that no 2 chords intersect.
 14. Given an array and a permutation array, tell min steps in which array becomes itself again.
 15. Given a 2-d matrix with characters. Find number of occurrences of a given string (This can be tricky, few edge cases to handle like 180 degree rotation).
 16. One design question - boring they're :-/

- 1) Write a function to increment number stored as an array.

E.g., [2,7,8,9] -> [2,7,9,0]

Starting prototype (CAN BE CHANGED AS DESIRED):

```
int* inc (int* array, int len);
```

- - Discuss briefly a recent project. What role did you play on it, and what was the purpose? (HDL lab work)
- Serialize a tree with a variable number of children per node for transmission over a very low bandwidth link.
- Design a system to parse a large (tens or hundreds of GB) text file with lines like:

```
foo = 7
```

```
bar = 3
```

```
foo + 8
```

```
bar - 1
```

```
baz = 16
```

```
bar = 9
```

and produce summary results:

```
foo = 15
```

```
bar = 9
```

```
baz = 16
```

- 1) Write a breadth first graph traversal.
- 2) In a monastery there are several monks, amongst whom atleast one attains enlightenment everyday. Enlightenment manifests itself as a red mark on the forehead of a monk. The monks have no way to see their own reflection and they are forbidden from talking or gesturing to each other. All the monks meet once every morning in a single room. A monk leaves the monastery after realising that he has been enlightened. What is the algorithm that the monks use to decide that they have been enlightened.

Q1. Return the 5th largest node in a BST

Q2. Given ReadBlocks(start_block, block_count, buffer), implement ReadData(start_addr, size, data)

- Compute the local KxK averages of an input NxN matrix into a target matrix (image smoothing). Algorithm + Coding.

- Given a sorted array, construct a balanced BST

Extras (asked during a conversion interview)

1. find the node with the closest value of the given node in BST (absolute difference minimum) - very easy to miss a case ! :-D

2. friends standing at integral coordinates on a grid. every intersection points in grid is hotel. All have to meet somewhere where should they meet such that the sum of distance from all other hotels is minimum?

3. Rod cutting problem - given the position of cuts you have to give order of cuts such that the cost is minimum, cost for each cut is length of rod at that time.

1. Two players are playing the following game in turns . There are m white balls and n black balls on a table. A player can either remove

- a) any number of white balls
- b) any number of black balls
- c) equal number of white and black balls.

The player who clears the table first wins.

Given any scenario that there are x white balls and y black balls on the table and its player Z's turn.

Determine his winning strategy.

2. Reverse all the words in a strings

My name is Himanshu. -> Himanshu is name My.

3. Given two numbers stored in linked lists, perform their addition.

1234 is represented as $1 \rightarrow 2 \rightarrow 3 \rightarrow 4$

Given some stack of coins, the 2 player game is:

each player can take all/any(>0) coins from leftmost stack

Each player plays optimally, last to pick wins.

Find Winner

Given sorted then rotated series of numbers find max/min

Given ropes of size multiples of k (unlimited in no), min pieces required to form n ropes of length m , only cut operation permitted

Sorted Array -> BST

Implement find in Integer array with difference(adj elements) = constant,

Given a 2d height map of buildings on a mountain, find the water accumulated after heavy rains

1. Given 2 words. Verify if they are anagrams .

2. Given a binary tree, convert it into a traversable DLL such a way that prev node points to parent and next node points to right child .

3. Describe GlusterFS project(resume related). Explain hashing technique used.

4. Spiral traversal in a matrix using $O(1)$ extra space.

5. Given a long string $S(|S| \leq 10^6)$. You will be given m queries ($m \leq 100$). You need to tell if this is a subset string of S or not .

Subset string is defined as string containing characters from previous string in same order but need not be continuous . let query string be Q . $1 \leq |Q| \leq |S|$.

Ex. $S = \text{abcd}; \text{sbba}$

$Q = \text{acaba} \rightarrow \text{"YES"}$

$Q = \text{acaab} \rightarrow \text{"NO"}$

6. Given some time intervals and it's weight. Find the longest continuous subset (need not be disjoint) which has largest weight .
7. Given a rod , its length and points where it should be cut. Cost of cutting a rod = length of the current segment. Give a sequence of cuts which would minimize the cutting cost.
Eg: L= 10.Cut Sequences = 2,4,7
if order = 2,4,7 cost = 10+8+6.
8. Given a parking lot. 0 numbers empty slot and rest of the numbers represent the car numbers to be at that index. Eg. 1 should be in position 1 and so on. Write a code to bring them back to original places.
Input = n(number of cars) , array.
Eg. 5 , 2 1 0 4 3 5. Write a code to reshuffle them as 0 1 2 3 4 5. time limit = O(n)
9. Given the starting and ending points of the building and it's heights. Eg: 1 4 5
1 is the starting point, 4 is the ending point and 5 is its height. Given such several buildings output the starting point, ending point and maximum height there.
Eg:
4
1 4 5
2 3 7
2 6 4
5 7 3
output
1 2 5
2 3 7
3 6 4
6 7 3
10. Design bit.ly . Starting from function to be used to redirecting the page, designing buckets to distribute load. Storage etc etc. (45 mins question) :P
11. Explain intern project
12. Explain livelock (No code needed)
13. Given a stock market and structure for a single day. i.e Stock name , price, timestamp in a huge database (some TBs) .There might be 2 requests GET stockname -> get the price at the time, store all time high and low too, SHOW stockname -> highest and lowest price during the day. What data structures would you use if get requests are more frequent than show requests or vice versa. What cache structures will you use.
14. Given a number and a string sequence which consists of D or I . Form a permutation which respects sequence.
Eg: n= 5 , sequence = DIDD (sequence length = n-1) .
permutation should contain numbers from 1 to n. D means next number is smaller and I means next number is greater
answer = 51432
15. Given a doubly linked list of M nodes. and N pointers to that DLL(random order) . Join those N nodes to form another linked list. Do it in O(M).

