Tech Interview Preparation 102

Slides - bit.ly/tip-102

What’s the Agenda

Contents

- Warm up
- Interview Process
- How to approach a problem
- Diving into topics
- More Topics
- STL

Warm Up

- Discussions till now - `bit.ly/tip-101`
- Resume talks
- Resume Demoes
- Projects

Interview Process

How to approach the problem

- Listen the problem
- Understand the problem
- Clarify the doubts
- Write function prototype
- Think of test cases
- Think an approach
- Take the approach through the interviewer
- Satisfy the interviewer
- Start coding - coding style, naming scheme, clean code
- Test your solution - edge cases
- Submit your solution

Questions?

Diving into Topics

Bit Manipulation - Basics

- L191 - Hamming Weight of a number `n` (count no of set bits)
- L461 - Hamming Distance (bit distance from `a` to `b`)
- L231 - Is `n` a power of 2
- L136 - Single number - Each number exists twice except one, find it
- L268 - In an array from 1 to `n`. A number is missing, find the number
- Single number ii - Each number exists thrice except one, find it

Bit Manipulation - Level Up

- L338 - Hamming Weight of numbers from `1` to `n`
- L137 - Each number exists thrice except one, find it (Discussion)

L137 - Each number exists thrice except one, find it

- The Brute Force Logic
- The trick shot -

```
int one = 0, two = 0, mask = 0;
    for(int& ele: nums){
        two |= (one & ele);
        one ^= ele;
        mask = ~(one & two);
        one &= mask;
        two &= mask;
    }
    return one;
```

L137 - Each number exists thrice except one, find it

- The good solution

```
int n = 8*sizeof(int); int result = 0;
for(int i=0; i<n; ++i){
    int sum = 0;
    int mask = (1 << i);
    for(int ele : nums){ if(ele & mask){  sum++;   } }
    if(sum%3 != 0){
        result |= mask;
    }
}
return result;
```

Linked Lists - Basics

- L707 - Design a Linked List
- L141 - Detect if Linked List is cycle
- L142 - Find head of cycle in linked list, if exists
- L82 - In sorted list, delete duplicates so that each element appear only once.
- L19 - Remove nth node from end of list
- L24 - Swap nodes in pairs
- L206 - Reverse Linked List
- L445 - Add two numbers
- as - 123 + 456 = 579 - solution
- Sort a linked list of with number from 1 to 9

Linked Lists - Level Up

- L83 - Delete duplicate as well as original elements in sorted list (Discussion)
- L114 - Flatten Binary Tree to Linked List
- L138 - Copy a list with random pointer
- L25 - Reverse nodes in K group
- L430 - Flatten a multilevel doubly linked list

L83 - Delete duplicate as well as original elements in sorted list

- The non solver - one who can’t solve it
- The non compiling solution - not well enough to compile in first time
- The messy solution - the code works in first time but isn’t clean enough
- The required solution - the clean solution which works in first time
- sample solution

Trees - Basics

- L100 - Same Tree
- L101 - Symmetric Tree (Mirror Tree)
- Tree Traversals - L - 94, 102, 103, 103, 144, 145, 589, 590
- Path problems - L - 112, 124, 257, 1022
- L236 - Lowest Common Ancestor
- Q671 - Second minimum node in binary tree

Trees - Level Up

- L116 - Populating next right pointers
- L543 - Diameter of Tree (Discussion)
- Q652 - Find duplicate subtrees
- Morris Traversal

BST - Basics

- L108 - Sorted array to BST
- L230 - Kth smallest element in BST
- L653 - 2 sum in a BST
- L98 - Validate BST
- L235 - LCA in BST

Trie - Basics

- L208 - Implement Trie
- L212 - Word Search ii

Two pointer method

- N sum problem - L1, L15, L16, L167
- L283 - Move zeroes
- L75 - sort colors (Dutch national flag) (Discussion)
- L88 - Merge sorted arrays
- L881 - Boats to save people
- Sliding window method
- L3 - longest substring without repeating characters

Backtracking

- Recursion, tree structure, BFS, DFS
- Template formation
- BFS / DFS - L200 - No of islands (Discussion)
- BFS / DFS - L79 - Word search
- L46, 47 - Permutations
- L39, 40, 216 - Combination sum
- L78, 90 - subsets (Discussion)
- Sudoko - L36 , L37
- 8 queens - L51
- Tic Tac Toe - L794

DP

- DP is an art
- Fibonacci numbers
- Kadane algo (to be or not to be)
- min path sum - (optimisation - i am my parent)
- falling path sum
- L62, 63 - unique paths
- Pascal triangle
- Coin change
- Buy and sell stocks
- Edit distance
- Catalan numbers
- Longest Increasing Subsequence

More Topics

- Graphs - topological sort, graph coloring
- Matrix based questions - spiral matrix L54, 59 - solution, search sorted matrix
- Arrays - Majority problem
- Strings
- Stacks, Queues
- HashMaps, HashSets
- Design questions - LRU Cache (Discussion)
- Database questions - nth highest salary, other queries

C++ STL - slides

That’s all for today.

About me

Profile - `jatinrohilla.me`

Github - @ `jatin69`

Twitter - @ `jatinrohilla69`

LinkedIn - @ `jatinrohilla`