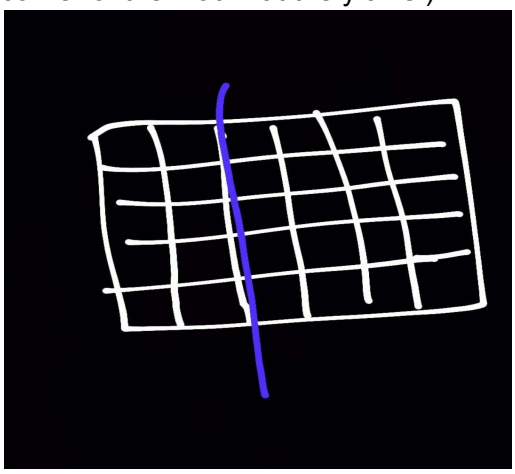
Name	Round Number	Question
Himanshu, Dolesh	1	Number of ways to reach [n-1][0] from [0][0] in a matrix with n rows and m columns. Allowed moves are :- down, diagonal left, diagonal right. Follow up :- Now there is a line drawn parallel to columns at x=k (assuming the matrix is drawn in coordinate plane with the left corner of the matrix at the y axis).  What will be the number of ways to reach [n-1][0] after crossing the given line at least 't' number of times. Solution :- For the first problem, define dp[i][j] = number of ways to reach [i,j]. Then dp[i][j] = dp[i-1][j] + dp[i-1][j-1] + dp[i-1][j+1] For the follow up question, define dp[i][j][cross] accordingly.
Himanshu	2	A grid is given, some cells are land(1) and others are water(0), you have to tell the size of the largest connected land component where adjacent horizontal and vertical lands are connected. Solution: just find the connected components using dfs or bfs. Follow Up: Now assume that if some water is trapped within a connected land continent(component) then you can take it as included in that component and it will also let you connect to other lands horizontally and vertically now you have to tell the size of the largest continent. Solution: find all the waters that are not trapped within any land continent by doing dfs/bfs from the boundary waters. then you can just consider the remaining waters as land. :) and again compute the connected components.
Gul	1	Q1

		Given connections, like A-B, B-C,implement two functions isAssociated(A,B) and isAllied(A, B),
		
		eg > 1 -3 , 1-4, 5-6. 4-7
		
		isAllied(1,3) = true, isAllies(1, 7) = false, isAllies(1,5) = false
		isAssociated(1, 3) = false, isAssociated(1,7) = true,
		isAssociated(1, 5) = false;
		
		isAllied(A, B)) -> return true if and only if they are directly connected, else false
		
		isAssociated(A,B) return true if they are connected but should not be connected directly, if directly connected or not connected return false.
		
		Answer - DSU or DFS , hashmap for isAllied is also acceptable but she wanted more on DSU only. Brief discussion over complexities of time and space and dry run of examples
		
		Interviewer asked me to do queries in O(1) -> we need to compromise both time and space in that case, we can use 2d matrix (assuming input is small, as confirmed by interviewer) for both isAllied and isAssociated. First do dfs and make components and mark them true in isAssociated matrix, and form other 2d matrix of isAllied , time - O(n^2) and space = O(n^2) however queries is O(1).
		
		The major difference between DFS and DSU she wanted was to talk about updates, updates that merge 2 components were possible in DSU but updates that revolve around breaking some connection or update would not be supported, in such case we need to use DFS.
		
		Q2
		`Imagine that cute cat videos are being spread from email address to email address, and it is charming the entire world. The video has special tracking technology built into it. Each time the video is shared, a message is sent over the internet with IDs of the sending and receiving address. We are listening in on these messages. How can we figure out who first shared the video?`

		Since the time parameter is given, we can just return the person with minimum time. Her next condition was to remove the time parameter, in this I needed to ask her about cycles which she said are not there, in this we need to think about directed graph and return node with 0 indegree. This was a quick discussion and done in last 5 mins of interview, she just wanted the thinking approach
Touheed	1	There are N processes with some processes having dependencies on other processes (meaning if a process P1 is dependent on process P2, then P1 can only be started after P2 is complete). Assume that there won't be a cyclic dependency in the inputs. Each process has a time duration (in sec) given by a duration map. Processes can be run in parallel. Write a solution to find the time taken such that all processes are completed.
Yash Sharma	1	Given n, k, d. Find the number of ways to write n as the sum of positive integers such that at least one element >= d and every element <= k. Different permutations are counted different. For example: n = 10, k = 3, d = 2 Some ways are: 1 + 1 + 2 + 3 + 3 1 + 2 + 3 + 1 + 3 1 + 3 + 3 + 3 Exact same question: https://codeforces.com/problemset/problem/431/C
Srajan (Interviewer: Sandeep A.)	1	Given n, k, d. Find number of ways to write n as the sum of positive integers such that at least one element >= d and every element <= k. TT1 : 3 3 2 Output : ans=3 // 3, 1+2, 2+1
Saurabh Singh	1	We were given many log requests. Each of these consisted of a TIMESTAMP(time at which it started), STATUS CODE, and

		DURATION(time which it will take to process the request). The problem had two parts:- For first part, we just had to count the number of occurrences of each status code. For second part, for each request, we had to tell at its timestamp(when it started), how many requests are going on, i.e. for each timestamp, we had to tell how many requests will be in process at this time.
Shubham(Interviewer- Aditya Singh)	1	Minimum Number of lines required to fill a page of width w, with text consisting of words and special characters words can't be broken . He then included different small cases e.g. if we introduce (! or .) special characters . He then followed it up with if he has 2 strings and we need to divide the whole page with width w into 2 parts then the minimum number of lines required of the page(he was happy with brute also for follow up).
Muhammed Sinan C K	1	The first qn was you are given a directed graph with no cycle and we have to print all its ancestors… and the second qn didn't understand properly… there is list of vectors.. And each vector is mapped to another vector what is the data structure for representing this
Shubham(Interviewer Mradul)	2	I was given an array of size n with index ing from 0 and from a[i] i can move to a[i]-1 and a[i]+1,and all j where a[i]==a[j] I had to reach n-1 in minimum number of steps and in follow up was asked to give the required path. The interviewer was deep into complexity things in solution.
Jenish Monpara (interviewer Shashank)	1	1. Given a list of numbers, return a shuffled list containing every original element as well as the doubled values of every original element. F.ex. [1,2,4] --> [1,2,4,2,4,8] --> [4,4,2,1,2,8] (or any other permutation) 2. Given a list of numbers, find a possible input to the previous function that could have yielded this output, if any exists. That is, write an inverse function
Kavya Goyal (Interviewer: Premdeep Sharma)	1	

Deepika	1	There are N check-up rooms labeled from 0 to N-1. You are given appointment times and durations for a set of patients. Each patient is assigned to the check-up room with the lowest index. A room can only have one patient at a time. Find the rooms which had the most appointments booked after all patients have gone through their appointments. Test case: Arrival time : [1, 4, 6, 7, 9] Duration : [4, 4, 4, 4, 4] Room = infinite Test case : Arrival time : [1, 2] Duration : [200, 1] Number of rooms = 1; Data structure: Priority Queues
Tanishq	1	Given a number **N**, count the number of times, a digit ***k*** appears in all the non-negative numbers less than or equal to N. n<=1e18 0<=k<=9 (use digit dp to solve)
Ishita Singh	1	1) Imagine that there is a cute cat video being spread from email address to email address, and it is charming the entire world. The video has special tracking technology built into it. Each time the video is shared, a message is sent over the internet with IDs of the sending and receiving address. We are listening in on these messages. How can we figure out who first shared the video? ->first person wouldn't be on anyone's 'sent to' list 2) In android each app is stored as an APK, a bit like .exe file. Inside each app there is a manifest, which says which devices will run on it, eg, it says if it needs a GPS. We are only going to look at two parts of the manifest, minSDK and maxSDK. These say which version of the android the app will run on. They are both optical and inclusive.

		APK minSDK maxSDK A 4 - B - 16 C 7 10 So if an APK has in its manifest minSDK=4, then it runs on Android versions 4,5,6...And if it is maxSDK then it runs on 1,2,3,...15,16 or an app could have both. So C would run on Android versions 7-10 Now on google play, you can have more than one APK per app, and we need to decide which one to deliver. So you could have A, B and C. As part of this process we need to split up the space of all phones to which APKs they match. (1-3) (4-6) (7-10) (11-16) (17+)
Abhishek	2	Given inequations in the form of (**var < var**) -> [(x < y), (y < z), (z < x)] return true/false if this inequation is valid for any real values of variables. Only **less than** operator is used. I/P: [(x < y), (y < z), (z < x)] O/P: false I/P: [(x < y), (y < z), (x < z)] O/P: true (x = 1, y = 2, z = 3) can be a possible answer Soln : Find if back edge exists.
Gul	2	Q1 Given a list of numbers, return a shuffled list containing every original element as well as the doubled values of every original element. F.ex. [1,2,4] --> [1,2,4,2,4,8] --> [4,4,2,1,2,8] (or any other permutation) Sol - Create a vec of 2n size and then use rand function in range (0, 2n - 1) and output the random array, I gave time complexity as O(n) and told ti that time complexity of rand function depends on how it is implemented. Q2 Given a list of numbers, find a possible input to the previous function that could have yielded this output, if any exists. That is, write an inverse function (if it does not exit, return empty vector) Ex - given [4,4,2,1,2,8], output [1,2,4] 1 (1) - > 2(2)- > 4(2) - > 8(1) [in brackets we write the

		frequence] Sol - initially thought of directed tree (no cycle is possible and no node can have 2 parents) and then we proceed from end (leaves) and proceed slowly to root node, there may be multiple such trees and array can have negative numbers too . He wanted me to think simple -> multiset start with largest and go to lower values (similarity for neg, staart with most neg values and gradually move towards 0, observation -> neg and positive values can be treated as 2 different array all together] Edge cases -> array is empty, if number of elements is odd or some elements are not used, or some required elements does not exit . Dry run on code, Space - O(n) [O(1) possible too via 2 pointer] Time complexity (O(nlogn)) If array was given as sorted we could have done in O(n) time and O(1) space using 2 pointer.
Abhishek	1	You are given a country consisting of **N** cities (numbered from 1 to N), where **city 1** is the capital. Any pair of cities in this country have **exactly 1 path** (can be made up of a single road or multiple roads) between them. Each road's condition can be either **good or bad**. Your aim is to repair **all the bad roads**. In a single project, you can choose a **city X**, and repair **all** bad roads **which fall in the path** between **city 1 to city X** (i.e bad road becomes good road). **Sample Input:** 5 1 2 **2,** 2 3 **2,** 3 4 **2,** 4 5 **2,** **Sample Output:** 1 (start project from **5**) Soln: Use DSU. Manjul - I was also given the same question, I used dp on trees. Define dp(i) -> minimum number of projects needed to repair bad roads in a subtree whose root is i, now find relation between subtree and its children's He also asked a follow up, to find which nodes should I build my project with. One solution I came up with is to go to every subtree such that dp(subtree)!=0 and for every node in subtree, dp(node) = 0.

		Now for that subtree, calculate bad roads going to its child and push that child in your answer vector. Final vector is your answer.
Dolesh	2	You are given a complete binary tree of ‘n’ nodes with nodes numbered from left to right. You need to write a function which will return True if a node at a given index is present. Eg. 1 / \ 2 3 / \ / 4 5 6 Answer :- Use the fact that for any node, Left_node = 2*node and right_node = 2*node + 1 Now, find the reversed path using the index and travel that path and see if that node exists or not.
Varsha	1	Go from location A to location B in the least time possible given a list of connected locations, all times are 1 from one loc to another. Ans: Use basic bfs Addition: If fuel stations were mentioned, like which locations had fuel stations and max capacity of your vehicle, give the least time possible to reach the destination. Return -1 if reaching the destination is not possible. Many people are participating in a marathon. You are given an array such that Ai completes the race right before i. Find the ranking of all the participants.
Varsha	2	Given a 2D matrix, find the largest submatrix that has a zero sum. Return its dimensions. Reduced the problem to a 1D array for simplicity, then tried building upon that, but got stuck in between.
Tanushree	1	Given n coins. The values of all the n coins are given in an array. You have to choose k coins and maximise the total value of chosen coins. You can either choose from the left of the array or from the right of the array. Oi Choose i coins from the left and k-i coins from the right. create a prefix and suffix array for the same and calculate the maximum value of collected coins.
Akshat	1	Define a data structure ‘cord’ that breaks a string into non-overlapping substrings that are to be stored in a tree.The leaf nodes contain two values:length of the substring and the substring.The internal nodes contain the pointer:left and right to its children nodes and store the sum of length of its children. eg: “ABCDEFGHIJKLMNOPQRSTUVWXYZ”

		root node: len=26 => left: len=5,s=”ABCDE” =>right: Internal node: len=21 =>left: len=10,s=”FGHIJKLMNO” =>right: len=11,s=”PQRSTUVWXYZ” (i) Implement the data structure by defining structs. (ii) Given a cord(basically a pointer to the root node of the cord) and an index N, find the N’th character of the string. eg: N=12 for above example O/P=’L’
Siddharth	1	Question was related to my project 'Type Speed Tester' Given a list of words, find the minimum time to type each word present in the list. The word may be the prefix of another word. Assume you have a time library which has a function now() that gives the current time. Example Input: batsman likes bat and bats //bat is present in batsman,bat,bats so mp[bat]=min(time taken to type bat while typing bat or bats or batsman) Output: map<string,int>//word and minimum time to type it {"Batsman":4,"like":2,"bat":1,"and":1,"bats":2} Solution: Use trie
Siddharth	2	Given a file structure having entities as files or directories, find the size of a given entity(file/directory). Size of every file is given and for a directory, size= sum of sizes of its subdirectories/subfiles Follow up: if multiple queries, how to improve? Input given in the form of map<entityId,entity_details> entity_details is a structure containing the following- type:file/directory, size,list of children entities Solution: dfs and then use hashmap with entityId as key and size as value
Manjul	2	You are given an N*M matrix, in which every cell has two characters, either * or L. Call the cells containing L as special cells. Now you have to go from (0,0) to (n-1,m-1) such that the minimum of all the distance from every cell in the path to every special cell is maximised. Return that particular maximum distance. You can move up, down, left and right. Answer - Multisource BFS and Binary Search

Anish	1	1. There are N processes with some processes having dependencies on other processes (meaning if a process P1 is dependent on process P2, then P1 can only be started after P2 is complete). Assume that there won't be a cyclic dependency in the inputs.Each process has a time duration (in sec) given by a duration map.Processes can be run in parallel. Write a solution to find the time taken such that all processes are completed. 2. Given a list of n cities and their populations and k booths, Distribute some no of booths in each city with equal population distribution for all booths in the city such that the maximum population at any booth is minimised and each booth is present in one and only one booth.
Anish	2	Given a nxn matrix, for each wxw submatrix, find the minimum in each such submatrix.
Mayank	1	Sinbad is out on the high seas, and he wants to maximize the distance he will travel. Sinbad has access to Google's weather API, so he knows how fast the winds will blow in the next N days, which he writes down as A. If Sinbad works on day i, his ship will move forwards A[i] kilometres. However, Sinbad is very lazy, and doesn't like to work too hard for too long. Sinbad starts the trip at his energy capacity, K. A single day of work reduces it by 1. A single day of rest increases it by 1. With zero energy, Sinbad cannot work, and resting at full energy is possible but does nothing. Example values: N = 7 A = [10, 20, 0, 30, 5, 0, 10] K = 3 1,2,4,5,7 => 75 kilometers We would like to write an algorithm that tells Sinbad on which days he should work, so as to maximize his distance traveled by the end of the trip. Approach : dp[day][capacity]

Mayank	2	1. a. Basically given and undirected unweighted graph find shortest path between A and B. b. Extension of (a) now our car has a fuel tank of fixed max capacity and few towns have fuel stations which can replenish the tank to full capacity. Travelling a road decreases the fuel by 1 unit. U cant travel if u have 0 fuel left. Given these additional constraints, solve (a). Approach: Tweak the BFS
Aditya	1	1) Given an array nums, and some queries, we need to perform the queries on the array. Each query is given in the form [l, r], and we need to increment the range [l, r] in nums by k. a) k = 1 b) k can be any number 2) Consider the same kind of queries on a NxN matrix, where we need to increment a submatrix by 1. Each query is of the form [x1, y1, x2, y2] where (x1, y1) is the top left corner and (x2, y2) is the bottom right corner of the submatrix. Extend the solution of the first problem to solve this. 3) Now, assume we have a data structure that can perform prefix increments and prefix sum queries on an array. (BIT) How would you use this data structure to solve the problem (2)?

Aditya	2	1) There are some types of gems, each one has a price, and a stock (no of gems available of that type). Each gem has a weight of 1. We are mining those gems, hence we want to collect the maximum price of gems that we can, but our bag has a limited capacity and can only carry W weight. Give the maximum price of gems that we can mine. Approaches : a) greedily picking highest priced O(nlogn) b) quickselect algorithm O(n)