

## Arrays

- subarray/substring ka question is either of Sliding Window or HashMap+prefix sum

~~The Problem~~

- ~~2020~~

Maximum product subarray. (subuition) sort 0, 1, 2, count inversion

## Bingy Search

- Array  $\rightarrow$  if  $\text{array}[x] = \text{array}[y]$  then  $x$  and  $y$  are sorted else not to end is sorted. (see page taped on next page)

↗ max of min mai min search space hoga  
 & usme ans milhe ps → jabse size mai  
 change. Predicate funkt<sup>n</sup> mai  
 Book Allocation (map of min) reverse eng. kr  
 find peak

String

- Palindrome → longest palindromic substring (O(N<sup>2</sup>) - naive method)
- Integer to Roman

## Linked List

Important Problems  $\Rightarrow$  Reverse LL in grp of  $k$ , Rotate list (easy)



Remove k digits  $\Rightarrow$  remove k digits to make smallest number. Remove from start, then left side, then kth kth & stack mai dalke jao elements. Suppose 135 hai now next element 2 aaga, 132 & 135 ye dekho last digit ko remove krte current daalno pr chota hoga to delete krke else no. 135, 132 toh chota hoga toh 5 ko hata ke 2 daalo. (Bk. Abhi 2 aaga hi ahi 2 ko process krke 1, remaining stack = 13, toh sabko 13 or 12 aur is 12 toh 2 ko remove krke. Ab stack mai 1 hoga, toh 1 or 2. 1 toh is bag 1 ko delete krke 2 ko stack mai daalo 2 is processed.

(E) Recursion  $\rightarrow$  functional, parametrised (country, ans)  $\rightarrow$  subsequences (take, not take)  $\rightarrow$  combinations (all take, but which one first)

Important Questions  $\Rightarrow$  Palindromic Partition, word search (DFS), Expression Add operators, All Permutations Of Strings

$\rightarrow$  To recall concepts read  $\Rightarrow$  basics, combinatorial sum, subset sum

(F) Count valid questions mai positive logic  $\rightarrow$  info.md, kth & baki base case mai 0, normal call mai sum of all calls return krke (Jaha 1 index to change krke pr  $(i-1)$  & previous index mai changes ho, use stack)

$\rightarrow$  NGE questions = Sum of subarray minimum, Sum of subarray ranges

Important questions  $\Rightarrow$  Trapping Rainwater, Largest rectangle in Histogram, Maximal Rectangles, Remove k Digits

even if you don't know how to solve trapping rainwater, largest rectangle in histogram. You still should know that NGE technique is used to solve this, toh agar aa bhi gaya toh khud dimaag laga lena. Jisme pillars ki width hai us trapping rainwater mai NGE lagega, 0 width vale mai 2 pointer tha

(G) Sliding Window  $\Rightarrow$  max/min subarray/substring vale questions mai

$\rightarrow$  fixed = Count Number Of Anagrams, first Negative In Every Window, Maximum Number In Every Window (comparing hashmap at every window) (queue) (list working as queue)  
 $\rightarrow$  variable = Minimum Window Substring, Longest Subarray With Sum (comparing hashmap at every window) (solved problem of variable code) (Longest Repeating Character Replacement)  
 $\rightarrow$  Count  $\Rightarrow$  Binary Subarrays With Sum, Subarrays With K Distinct Digits

Solved using  $f(x) - f(x-1)$

(H) Heaps  
 $\rightarrow$  internal working of heap [see how notes in this copy itself]

$\rightarrow$  kth smallest / largest / frequent

Important questions  $\Rightarrow$  Kth Smallest Element In A Sorted Array, Sort k Sorted Array

(I) Greedy  
 $\rightarrow$  Interval Problems (see next to next page)

$\rightarrow$  Important Question  $\Rightarrow$  Valid Parentheses Checker

(J) Binary Trees

$\rightarrow$  BFS (level order with different levels in different list), DFS, bounded, balanced, vertical order traversal

$\rightarrow$  height  $\Rightarrow$  height, diameter, path sum

$\rightarrow$  View  $\Rightarrow$  Top, Right [use hashing, horizontal tree  $\rightarrow$  node val or vertical level  $\rightarrow$  node val & then traverse map]

$\rightarrow$  Parent Pointers  $\Rightarrow$  all nodes at distance k, time to burn tree



- Construction of tree from inorder, preorder
- Important Questions → LCA, Root to node path, maximum width of BT

(K) Binary Search Trees (Inorder is sorted)  
→ Deletion, Insertion, check if tree is BST or BT (range based), Recover BST, largest BST in BST

(L) Graphs  
→ BFS, DFS (BFS in queue m dalte se hi visited mark kro, DFS mai call krne pr nhi; call krne pr visited mark kro & then goto unvisited neighbours.)

- Problems on BFS, DFS → first read format.md jo ki batayega ki esi problem ko solve krne ke liye changing parameters ko class m include krte h. Rotten oranges, Number of Enclaves, 01 matrix,

Important question → Cycle detection in Directed, Undirected graph, 01 matrix, Number of Distinct Islands, Bipartite

- no visited array, dist array instead  
Dijkstra, read concept.md  
Important question → Path with min effort, Cheapest flight within k stops, Network Delay Time, NO of ways to arrive at destination.  
Others → Bellman ford, Floyd warshall

Recursion vs Dijkstra

tricky question

Concept ki dist array store min dist from source to every other node

→ Dijkstra gives shortest path, but if we need in how many ways we can reach in shortest path, we need modified Dijkstra.

- Prims, Kruskal (visited when u reach the node, not when u put it in PQ), Kruskal (Disjoint set), Minimum Spanning Tree, Disjoint set → Accounts merge, MST = Most stones removed

- TopoSort (DFS) [when all neighbours are visited, then add the node in stack]  
→ Course schedule II



(M)

DP (read format.md)

1D  $\Rightarrow$  ~~House Robber~~ Climbing Stairs (count problem), Frog jump

2D  $\Rightarrow$  Ninja Training, Unique Path 2, Ninja & His friends

Subsequences  $\Rightarrow$  Partition Set into 2 subset with min Abs. difference, Rod cutting

Strings  $\Rightarrow$  LCS (length + Point), Longest Common Substring, Min insertion to make string palindrome, Min insertion/deletion to convert  $s_1$  to  $s_2$ , Edit Distance, Longest Palindromic Subsequence, Shortest Common Supersequence

LIS  $\Rightarrow$  LIS,