

## **GREEDY**

1. Activity Selection Problem
2. Job Sequencing Problem
3. Huffman Coding
4. Water Connection Problem
5. Fractional Knapsack Problem
6. Greedy Algorithm to find Minimum number of Coins
7. Maximum trains for which stoppage can be provided
8. Minimum Platforms Problem
9. Buy Maximum Stocks if i stocks can be bought on i-th day
10. Find the minimum and maximum amount to buy all N candies
11. Minimize Cash Flow among a given set of friends who have borrowed money from each other
12. Minimum Cost to cut a board into squares
13. Check if it is possible to survive on Island
14. Find maximum meetings in one room
15. Maximum product subset of an array
16. Maximize array sum after K negations
17. Maximize the sum of  $arr[i]*i$
18. Maximum sum of absolute difference of an array
19. Maximize sum of consecutive differences in a circular array
20. Minimum sum of absolute difference of pairs of two arrays
21. Program for Shortest Job First (or SJF) CPU Scheduling

22. Program for Least Recently Used (LRU) Page Replacement algorithm
23. Smallest subset with sum greater than all other elements
24. Chocolate Distribution Problem
25. DEFKIN -Defense of a Kingdom
26. DIEHARD -DIE HARD
27. GERGOVIA -Wine trading in Gergovia
28. Picking Up Chicks
29. CHOCOLA -Chocolate
30. ARRANGE -Arranging Amplifiers
31. K Centers Problem
32. Minimum Cost of ropes
33. Find smallest number with given number of digits and sum of digits
34. Rearrange characters in a string such that no two adjacent are same

## **BACK TRACKING**

1. Rat in a maze Problem
2. Printing all solutions in N-Queen Problem
3. Word Break Problem using Backtracking
4. Remove Invalid Parentheses
5. Sudoku Solver
6. m Coloring Problem
7. Print all palindromic partitions of a string
8. Subset Sum Problem
9. The Knight's tour problem
10. Tug of War
11. Find shortest safe route in a path with landmines
12. Combinational Sum
13. Find Maximum number possible by doing at-most K swaps
14. Print all permutations of a string
15. Find if there is a path of more than k length from a source
16. Longest Possible Route in a Matrix with Hurdles
17. Print all possible paths from top left to bottom right of a  $m \times n$  matrix
18. Partition of a set into K subsets with equal sum

## **STACK AND QUEUE**

1. Implement Stack from Scratch
2. Implement Queue from Scratch
3. Implement 2 stack in an array
4. find the middle element of a stack
5. Implement "N" stacks in an Array
6. Check the expression has valid or Balanced parenthesis or not.
7. Reverse a String using Stack
8. Design a Stack that supports getMin() in  $O(1)$  time and  $O(1)$  extra space.
9. Find the next Greater element
10. The celebrity Problem
11. Arithmetic Expression evaluation
12. Evaluation of Postfix expression
13. Implement a method to insert an element at its bottom without using any other d structure.
14. Reverse a stack using recursion
15. Sort a Stack using recursion
16. Merge Overlapping Intervals
17. Largest rectangular Area in Histogram
18. Length of the Longest Valid Substring
19. Expression contains redundant bracket or not
20. Implement Stack using Queue
21. Implement Stack using Deque

22. Stack Permutations (Check if an array is stack permutation of other)
23. Implement Queue using Stack
24. Implement "n" queue in an array
25. Implement a Circular queue
26. LRU Cache Implementation
27. Reverse a Queue using recursion
28. Reverse the first "K" elements of a queue
29. Interleave the first half of the queue with second half
30. Find the first circular tour that visits all Petrol Pumps
31. Minimum time required to rot all oranges
32. Distance of nearest cell having 1 in a binary matrix
33. First negative integer in every window of size "k"
34. Check if all levels of two trees are anagrams or not.
35. Sum of minimum and maximum elements of all subarrays of size "k".
36. Minimum sum of squares of character counts in a given string after removing "k" characters.
37. Queue based approach or first non-repeating character in a stream.

## **HEAP**

1. Implement a Maxheap/MinHeap using arrays and recursion.
2. Sort an Array using heap. (HeapSort)
3. Maximum of all subarrays of size k.
4. "k" largest element in an array
5. Kth smallest and largest element in an unsorted array
6. Merge "K" sorted arrays. [ IMP ]
7. Merge 2 Binary Max Heaps
8. Kth largest sum continuous subarrays
9. Leetcode- reorganize strings
10. Merge "K" Sorted Linked Lists [V.IMP]
11. Smallest range in "K" Lists
12. Median in a stream of Integers
13. Check if a Binary Tree is Heap
14. Connect "n" ropes with minimum cost
15. Convert BST to Min Heap
16. Convert min heap to max heap

## **TRIE**

1. Construct a trie from scratch
2. Find shortest unique prefix for every word in a given list
3. Word Break Problem | (Trie solution)
4. Given a sequence of words, print all anagrams together
5. Implement a Phone Directory

## **DYNAMIC PROGRAMMING**

1. Coin Change Problem
2. Knapsack Problem
3. Binomial Coefficient Problem
4. Permutation Coefficient Problem
5. Program for nth Catalan Number
6. Matrix Chain Multiplication
7. Edit Distance
8. Subset Sum Problem
9. Friends Pairing Problem
10. Gold Mine Problem
11. Assembly Line Scheduling Problem
12. Painting the Fence problem
13. Maximize The Cut Segments
14. Longest Common Subsequence
15. Longest Repeated Subsequence
16. Longest Increasing Subsequence
17. Space Optimized Solution of LCS
18. LCS (Longest Common Subsequence) of three strings
19. Maximum Sum Increasing Subsequence
20. Count all subsequences having product less than K
21. Longest subsequence such that difference between adjacent is one



22. Maximum subsequence sum such that no three are consecutive
23. Egg Dropping Problem
24. Maximum Length Chain of Pairs
25. Maximum size square sub-matrix with all 1s
26. Maximum sum of pairs with specific difference
27. Min Cost Path Problem
28. Maximum difference of zeros and ones in binary string
29. Minimum number of jumps to reach end
30. Minimum cost to fill given weight in a bag
31. Minimum removals from array to make  $\max - \min \leq K$
32. Longest Common Substring
33. Count number of ways to reach a given score in a game
34. Count Balanced Binary Trees of Height  $h$
35. Largest Sum Contiguous Subarray [V>V>V>V IMP ]
36. Smallest sum contiguous subarray
37. Unbounded Knapsack (Repetition of items allowed)
38. Word Break Problem
39. Largest Independent Set Problem
40. Partition problem
41. Longest Palindromic Subsequence
42. Count All Palindromic Subsequence in a given String
43. Longest Palindromic Substring

44. Longest alternating subsequence
45. Weighted Job Scheduling
46. Coin game winner where every player has three choices
47. Count Derangements (Permutation such that no element appears in its original position) [ IMPORTANT ].
48. Maximum profit by buying and selling a share at most twice [ IMP ]
49. Optimal Strategy for a Game
50. Optimal Binary Search Tree
51. Palindrome Partitioning Problem
52. Word Wrap Problem
53. Mobile Numeric Keypad Problem [ IMP ]
54. Boolean Parenthesization Problem
55. Largest rectangular sub-matrix whose sum is 0
56. Largest area rectangular sub-matrix with equal number of 1's and 0's [ IMP ]
57. Maximum sum rectangle in a 2D matrix
58. Maximum profit by buying and selling a share at most k times
59. Find if a string is interleaved of two other strings
60. Maximum Length of Pair Chain

## **BIT MANIPULATION**

1. Count set bits in an integer
2. Find the two non-repeating elements in an array of repeating elements
3. Count number of bits to be flipped to convert A to B
4. Count total set bits in all numbers from 1 to n
5. Program to find whether a no is power of two
6. Find position of the only set bit
7. Copy set bits in a range
8. Divide two integers without using multiplication, division and mod operator
9. Calculate square of a number without using  $*$ ,  $/$  and `pow()`
10. Power Set