

## ARRAY

Reverse the array

Find the maximum and minimum element in an array

Find the "Kth" max and min element of an array

Given an array which consists of only 0, 1 and 2. Sort the array without using any sorting algo

Move all the negative elements to one side of the array

Find the Union and Intersection of the two sorted arrays.

Write a program to cyclically rotate an array by one.

find Largest sum contiguous Subarray [V. IMP]

Minimise the maximum difference between heights [V.IMP]

Minimum no. of Jumps to reach end of an array

find duplicate in an array of N+1 Integers

Merge 2 sorted arrays without using Extra space.

Kadane's Algo [V.V.V.V.V IMP]

Merge Intervals

Next Permutation

Count Inversion

Best time to buy and Sell stock

find all pairs on integer array whose sum is equal to given number

find common elements In 3 sorted arrays

Rearrange the array in alternating positive and negative items with O(1) extra space

Find if there is any subarray with sum equal to 0

Find factorial of a large number

find maximum product subarray

Find longest consecutive subsequence

Given an array of size  $n$  and a number  $k$ , find all elements that appear more than  $\frac{n}{k}$  times.

Maximum profit by buying and selling a share at most twice

Find whether an array is a subset of another array

Find the triplet that sum to a given value

Trapping Rain water problem

Chocolate Distribution problem

Smallest Subarray with sum greater than a given value

Three way partitioning of an array around a given value

Minimum swaps required bring elements less equal  $K$  together

Minimum no. of operations required to make an array palindrome

Median of 2 sorted arrays of equal size

Median of 2 sorted arrays of different size

## **MATRIX**

Spiral traversal on a Matrix

Search an element in a matrix

Find median in a row wise sorted matrix

Find row with maximum no. of 1's

Print elements in sorted order using row-column wise sorted matrix

Maximum size rectangle

Find a specific pair in matrix

Rotate matrix by 90 degrees

$K$ th smallest element in a row-column wise sorted matrix

Common elements in all rows of a given matrix

## **STRING**

Reverse a String

Check whether a String is Palindrome or not

Find Duplicate characters in a string

Why strings are immutable in Java?

Write a Code to check whether one string is a rotation of another

Write a Program to check whether a string is a valid shuffle of two strings or not

Count and Say problem

Write a program to find the longest Palindrome in a string.[ Longest palindromic Substring]

Find Longest Recurring Subsequence in String

Print all Subsequences of a string.

Print all the permutations of the given string

Split the Binary string into two substring with equal 0's and 1's

Word Wrap Problem [VERY IMP].

EDIT Distance [Very Imp]

Find next greater number with same set of digits. [Very Very IMP]

Balanced Parenthesis problem.[Imp]

Word break Problem[ Very Imp]

Rabin Karp Algo

KMP Algo

Convert a Sentence into its equivalent mobile numeric keypad sequence.

Minimum number of bracket reversals needed to make an expression balanced.

Count All Palindromic Subsequence in a given String.

Count of number of given string in 2D character array

Search a Word in a 2D Grid of characters.

Boyer Moore Algorithm for Pattern Searching.

Converting Roman Numerals to Decimal

Longest Common Prefix

Number of flips to make binary string alternate

Find the first repeated word in string.

Minimum number of swaps for bracket balancing.

Find the longest common subsequence between two strings.

Program to generate all possible valid IP addresses from given string.

Write a program to find the smallest window that contains all characters of string itself.

Rearrange characters in a string such that no two adjacent are same

Minimum characters to be added at front to make string palindrome

Given a sequence of words, print all anagrams together

Find the smallest window in a string containing all characters of another string

Recursively remove all adjacent duplicates

String matching where one string contains wildcard characters

Function to find Number of customers who could not get a computer

Transform One String to Another using Minimum Number of Given Operation

Check if two given strings are isomorphic to each other

Recursively print all sentences that can be formed from list of word lists

## **SEARCHING & SORTING**

Find first and last positions of an element in a sorted array

Find a Fixed Point (Value equal to index) in a given array

Search in a rotated sorted array

square root of an integer

Maximum and minimum of an array using minimum number of comparisons

Optimum location of point to minimize total distance

Find the repeating and the missing

find majority element

Searching in an array where adjacent differ by at most k

find a pair with a given difference

find four elements that sum to a given value

maximum sum such that no 2 elements are adjacent

Count triplet with sum smaller than a given value

merge 2 sorted arrays

print all subarrays with 0 sum

Product array Puzzle

Sort array according to count of set bits

minimum no. of swaps required to sort the array

Bishu and Soldiers

Rasta and Kheshtak

Kth smallest number again

Find pivot element in a sorted array

K-th Element of Two Sorted Arrays

Aggressive cows

Book Allocation Problem

EKOSPOJ:

Job Scheduling Algo

Missing Number in AP

Smallest number with atleastn trailing zeroes infactorial

Painters Partition Problem:

ROTI-Prata SPOJ

DoubleHelix SPOJ

Subset Sums

Findthe inversion count

Implement Merge-sort in-place

Partitioning and Sorting Arrays with Many Repeated Entries

## **LINKEDLIST**

Write a Program to reverse the Linked List. (Both Iterative and recursive)

Reverse a Linked List in group of Given Size. [Very Imp]

Write a program to Detect loop in a linked list.

Write a program to Delete loop in a linked list.

Find the starting point of the loop.

Remove Duplicates in a sorted Linked List.

Remove Duplicates in a Un-sorted Linked List.

Write a Program to Move the last element to Front in a Linked List.

Add “1” to a number represented as a Linked List.

Add two numbers represented by linked lists.

Intersection of two Sorted Linked List.

Intersection Point of two Linked Lists.

Merge Sort For Linked lists.[Very Important]

Quicksort for Linked Lists.[Very Important]

Find the middle Element of a linked list.

Check if a linked list is a circular linked list.

Split a Circular linked list into two halves.

Write a Program to check whether the Singly Linked list is a palindrome or not.

Deletion from a Circular Linked List.

Reverse a Doubly Linked list.

Find pairs with a given sum in a DLL.

Count triplets in a sorted DLL whose sum is equal to given value “X”.

Sort a “k”sorted Doubly Linked list.[Very IMP]

Rotate DoublyLinked list by N nodes.

Rotate a Doubly Linked list in group of Given Size.[Very IMP]

Can we reverse a linked list in less than  $O(n)$  ?

Why Quicksort is preferred for. Arrays and Merge Sort for LinkedLists ?

Flatten a Linked List

Sort a LL of 0's, 1's and 2's

Clone a linked list with next and random pointer

Merge K sorted Linked list

Multiply 2 no. represented by LL

Delete nodes which have a greater value on right side

Segregate even and odd nodes in a Linked List

Program for n'th node from the end of a Linked List

Find the first non-repeating character from a stream of characters

## **BINARY TREES**

level order traversal

Reverse Level Order traversal

Height of a tree

Diameter of a tree

Mirror of a tree

Inorder Traversal of a tree both using recursion and Iteration

Preorder Traversal of a tree both using recursion and Iteration

Postorder Traversal of a tree both using recursion and Iteration

Left View of a tree

Right View of Tree

Top View of a tree

Bottom View of a tree

Zig-Zag traversal of a binary tree

Check if a tree is balanced or not

Diagonal Traversal of a Binary tree

Boundary traversal of a Binary tree

Construct Binary Tree from String with Bracket Representation

Convert Binary tree into Doubly Linked List

Convert Binary tree into Sum tree

Construct Binary tree from Inorder and preorder traversal

Find minimum swaps required to convert a Binary tree into BST

Check if Binary tree is Sum tree or not

Check if all leaf nodes are at same level or not

Check if a Binary Tree contains duplicate subtrees of size 2 or more [ IMP ]

Check if 2 trees are mirror or not

Sum of Nodes on the Longest path from root to leaf node

Check if given graph is tree or not. [ IMP ]

Find Largest subtree sum in a tree

Maximum Sum of nodes in Binary tree such that no two are adjacent

Print all "K" Sum paths in a Binary tree  
Find LCA in a Binary tree  
Find distance between 2 nodes in a Binary tree  
Kth Ancestor of node in a Binary tree  
Find all Duplicate subtrees in a Binary tree [ IMP ]  
Tree Isomorphism Problem

## **BINARY SEARCH TREES**

Find a value in a BST  
Deletion of a node in a BST  
Find min and max value in a BST  
Find inorder successor and inorder predecessor in a BST  
Check if a tree is a BST or not  
Populate Inorder successor of all nodes  
Find LCA of 2 nodes in a BST  
Construct BST from preorder traversal  
Convert Binary tree into BST  
Convert a normal BST into a Balanced BST  
Merge two BST [ V.V.V>IMP ]  
Find Kth largest element in a BST  
Find Kth smallest element in a BST  
Count pairs from 2 BST whose sum is equal to given value "X"  
Find the median of BST in O(n) time and O(1) space  
Count BST nodes that lie in a given range  
Replace every element with the least greater element on its right  
Given "n" appointments, find the conflicting appointments  
Check preorder is valid or not  
Check whether BST contains Dead end  
Largest BST in a Binary Tree [ V.V.V.V.V IMP ]  
Flatten BST to sorted list



## **GREEDY**

Activity Selection Problem

Job Sequencing Problem

Huffman Coding

Water Connection Problem

Fractional Knapsack Problem

Greedy Algorithm to find Minimum number of Coins

Maximum trains for which stoppage can be provided

Minimum Platforms Problem

Buy Maximum Stocks if i stocks can be bought on i-th day

Find the minimum and maximum amount to buy all N candies

Minimize Cash Flow among a given set of friends who have borrowed money from each other

Minimum Cost to cut a board into squares

Check if it is possible to survive on Island

Find maximum meetings in one room

Maximum product subset of an array

Maximize array sum after K negations

Maximize the sum of  $arr[i] * i$

Maximum sum of absolute difference of an array

Maximize sum of consecutive differences in a circular array

Minimum sum of absolute difference of pairs of two arrays

Program for Shortest Job First (or SJF) CPU Scheduling

Program for Least Recently Used (LRU) Page Replacement algorithm

Smallest subset with sum greater than all other elements

Chocolate Distribution Problem

DEFKIN -Defense of a Kingdom

DIEHARD -DIE HARD

GERGOVIA -Wine trading in Gergovia

Picking Up Chicks

CHOCOLA –Chocolate

ARRANGE -Arranging Amplifiers

K Centers Problem

Minimum Cost of ropes

Find smallest number with given number of digits and sum of digits

Rearrange characters in a string such that no two adjacent are same

Find maximum sum possible equal sum of three stacks

## **BACKTRACKING**

Rat in a maze Problem

Printing all solutions in N-Queen Problem

Word Break Problem using Backtracking

Remove Invalid Parentheses

Sudoku Solver

m Coloring Problem

Print all palindromic partitions of a string

Subset Sum Problem

The Knight's tour problem

Tug of War

Find shortest safe route in a path with landmines

Combinational Sum

Find Maximum number possible by doing at-most K swaps

Print all permutations of a string

Find if there is a path of more than k length from a source

Longest Possible Route in a Matrix with Hurdles

Print all possible paths from top left to bottom right of a  $m \times n$  matrix

Partition of a set into K subsets with equal sum

Find the K-th Permutation Sequence of first N natural numbers

## STACKS & QUEUES

Implement Stack from Scratch

Implement Queue from Scratch

Implement 2 stack in an array

find the middle element of a stack

Implement "N" stacks in an Array

Check the expression has valid or Balanced parenthesis or not.

Reverse a String using Stack

Design a Stack that supports getMin() in  $O(1)$  time and  $O(1)$  extra space.

Find the next Greater element

The celebrity Problem

Arithmetic Expression evaluation

Evaluation of Postfix expression

Implement a method to insert an element at its bottom without using any other data structure.

Reverse a stack using recursion

Sort a Stack using recursion

Merge Overlapping Intervals

Largest rectangular Area in Histogram

Length of the Longest Valid Substring

Expression contains redundant bracket or not

Implement Stack using Queue

Implement Stack using Deque

Stack Permutations (Check if an array is stack permutation of other)

Implement Queue using Stack

Implement "n" queue in an array

Implement a Circular queue

LRU Cache Implementation

Reverse a Queue using recursion

Reverse the first "K" elements of a queue

Interleave the first half of the queue with second half

Find the first circular tour that visits all Petrol Pumps

Minimum time required to rot all oranges

Distance of nearest cell having 1 in a binary matrix

First negative integer in every window of size “k”

Check if all levels of two trees are anagrams or not.

Sum of minimum and maximum elements of all subarrays of size “k”.

Minimum sum of squares of character counts in a given string after removing “k” characters.

Queue based approach or first non-repeating character in a stream.

Next Smaller Element

## HEAP

Implement a Maxheap/MinHeap using arrays and recursion.

Sort an Array using heap. (HeapSort)

Maximum of all subarrays of size k.

“k” largest element in an array

Kth smallest and largest element in an unsorted array

Merge “K” sorted arrays. [ IMP ]

Merge 2 Binary Max Heaps

Kth largest sum continuous subarrays

Leetcode- reorganize strings

Merge “K” Sorted Linked Lists [V.IMP]

Smallest range in “K” Lists

Median in a stream of Integers

Check if a Binary Tree is Heap

Connect “n” ropes with minimum cost

Convert BST to Min Heap

Convert min heap to max heap

Rearrange characters in a string such that no two adjacent are same.

Minimum sum of two numbers formed from digits of an array

## **GRAPH**

Create a Graph, print it

Implement BFS algorithm

Implement DFS Algo

Detect Cycle in Directed Graph using BFS/DFS Algo

Detect Cycle in UnDirected Graph using BFS/DFS Algo

Search in a Maze

Minimum Step by Knight

flood fill algo

Clone a graph

Making wired Connections

word Ladder

Dijkstra algo

Implement Topological Sort

Minimum time taken by each job to be completed given by a Directed Acyclic Graph

Find whether it is possible to finish all tasks or not from given dependencies

Find the no. of Islands

Given a sorted Dictionary of an Alien Language, find order of characters

Implement Kruskal's Algorithm

Implement Prim's Algorithm

Total no. of Spanning tree in a graph

Implement Bellman Ford Algorithm

Implement Floyd warshall Algorithm

Travelling Salesman Problem

Graph Colouring Problem

Snake and Ladders Problem

Find bridge in a graph

Count Strongly connected Components(Kosaraju Algo)

Check whether a graph is Bipartite or Not

Detect Negative cycle in a graph

Longest path in a Directed Acyclic Graph

Journey to the Moon

Cheapest Flights Within K Stops

Oliver and the Game

Water Jug problem using BFS

Water Jug problem using BFS

Find if there is a path of more than length from a source

M-Colouring Problem

Minimum edges to reverse to make path from source to destination

Paths to travel each node using each edge(Seven Bridges)

Vertex Cover Problem

Chinese Postman or Route Inspection

Number of Triangles in a Directed and Undirected Graph

Minimise the cashflow among a given set of friends who have borrowed money from each other

Two Clique Problem

## **TRIE**

Construct a trie from scratch

Find shortest unique prefix for every word in a given list

Word Break Problem | (Trie solution)

Given a sequence of words, print all anagrams together

Implement a Phone Directory

Print unique rows in a given boolean matrix

## **DYNAMIC PROGRAMMING**

Coin Change Problem

Knapsack Problem

Binomial Coefficient Problem

Permutation Coefficient Problem

Program for nth Catalan Number

Matrix Chain Multiplication

Edit Distance

Subset Sum Problem

Friends Pairing Problem

Gold Mine Problem

Assembly Line Scheduling Problem

Painting the Fence problem

Maximize The Cut Segments

Longest Common Subsequence

Longest Repeated Subsequence

Longest Increasing Subsequence

Space Optimized Solution of LCS

LCS (Longest Common Subsequence) of three strings

Maximum Sum Increasing Subsequence

Count all subsequences having product less than K

Longest subsequence such that difference between adjacent is one

Maximum subsequence sum such that no three are consecutive

Egg Dropping Problem

Maximum Length Chain of Pairs

Maximum size square sub-matrix with all 1s

Maximum sum of pairs with specific difference

Min Cost Path Problem

Maximum difference of zeros and ones in binary string

Minimum number of jumps to reach end

Minimum cost to fill given weight in a bag

Minimum removals from array to make  $\max - \min \leq K$

Longest Common Substring

Count number of ways to reach a given score in a game

Count Balanced Binary Trees of Height  $h$

Largest Sum Contiguous Subarray [V>V>V>V IMP ]

Smallest sum contiguous subarray

Unbounded Knapsack (Repetition of items allowed)

Word Break Problem

Largest Independent Set Problem

Partition problem

Longest Palindromic Subsequence

Count All Palindromic Subsequence in a given String

Longest Palindromic Substring

Longest alternating subsequence

Weighted Job Scheduling

Coin game winner where every player has three choices

Count Derangements (Permutation such that no element appears in its original position) [ IMPORTANT ]

Maximum profit by buying and selling a share at most twice [ IMP ]

Optimal Strategy for a Game

Optimal Binary Search Tree

Palindrome Partitioning Problem

Word Wrap Problem

Mobile Numeric Keypad Problem [ IMP ]

Boolean Parenthesization Problem

Largest rectangular sub-matrix whose sum is 0

Largest area rectangular sub-matrix with equal number of 1's and 0's [ IMP ]

Maximum sum rectangle in a 2D matrix

Maximum profit by buying and selling a share at most  $k$  times

Find if a string is interleaved of two other strings

Maximum Length of Pair Chain



## **BIT MANIPULATION**

Count set bits in an integer

Find the two non-repeating elements in an array of repeating elements

Count number of bits to be flipped to convert A to B

Count total set bits in all numbers from 1 to n

Program to find whether a no is power of two

Find position of the only set bit

Copy set bits in a range

Divide two integers without using multiplication, division and mod operator

Calculate square of a number without using \*, / and pow()

Power Set