# Coding Problems-MS IIT Interviews

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## Arrays

Find the repeating and the missing (IIT Ropar)
find majority element(IIT Delhi)
Searching in an array where adjacent differ by at most k
find a pair with a given difference (NIT K)
find four elements that sum to a given value (IIT Kanpur)
maximum sum such that no 2 elements are adjacent
merge 2 sorted arrays
print all subarrays with 0 sum(IIT Ropar)
Kth smallest number again
Find pivot element in a sorted array
K-th Element of Two Sorted Arrays (NIT K)
Job Scheduling Algo(IIT Ropar)
Missing Number in AP
Subset Sums
Find the inversion count
Implement Merge-sort in-place(IIT Ropar)
Kadanes Algorithm (IITB,D,K)
Merge Intervals
Find Maximum Product SubArray
Median of 2 sorted Arrays of Equal Size/non equal size (IIT Ropar)
Shortest Job First
LRU Page Replacement Algorithm

## LinkedList

Sort a LL of 0's, 1's and 2's
Multiply 2 no. represented by LL (IIT BHU)
Delete nodes which have a greater value on right side
Segregate even and odd nodes in a Linked List (NIT K)
Program for n'th node from the end of a Linked List (IISC bangalore)
Find the first non-repeating character from a stream of characters
Deletion from a Circular Linked List. (IISC bangalore)
Reverse a Doubly Linked list.
Sort a "k"sorted Doubly Linked list
Rotate DoublyLinked list by N nodes. (IISC bangalore)
Rotate a Doubly Linked list in group of Given Size. (IIT Ropar)
Reverse a Linked List in group of Given Size.
Write a program to Detect loop in a linked list. (NIT K)
Remove Duplicates in a sorted Linked List.
Merge K sorted Linked list (IISC bangalore)
Maximum size rectangle (IIT Kanpur Coding Test)
Find a specific pair in matrix
Rotate matrix by 90 degrees

## Graphs

Find if there is a path of more thank length from a source (IIT D)
Paths to travel each nodes using each edge(Seven Bridges)

Vertex Cover Problem (NIT K)
Number of Triangles in a Directed and Undirected Graph (IIT BHU)
Implement Floyd warshallAlgorithm
Travelling Salesman Problem
Graph Colouring Problem (IIT Ropar)
flood fill algo (IIT Bombay)
Find bridge in a graph (IIT D)
Count Strongly connected Components(Kosaraju Algo) (IIT D)
Check whether a graph is Bipartite or Not
Detect Negative cycle in a graph
Longest path in a Directed Acyclic Graph
Detect Cycle in Graph (IIT Ropar)

## Binary Search Trees

Replace every element with the least great element on its right
Given "n" appointments, find the conflicting appointments (IIT Kanpur)
Check preorder is valid or not (IIT BHU)
Largest BST in a Binary Tree
Construct BST from preorder traversal
Convert Binary tree into BST (IIT Ropar)
Convert a normal BST into a Balanced BST
Merge two BST (IIT Bombay)
Find Kth largest element in a BST (IIT Bombay)
Count pairs from 2 BST whose sum is equal to given value "X"
Find the median of BST (IIT Bombay)
Height, LeftView, Top view, Bottom View, Boundary view,Diameter, Mirror,
Zigzag traversal of Binary tree (IIT H,D,K)

## String Manipulation (Coding Tests favourite)

Check whether a String is Palindrome or not (IIT BHU)
Write a Program to check whether a string is a valid shuffle of two strings or n
Split the Binary string into two substrings with equal 0's and 1's
Find next greater number with same set of digits. (IIT D)
KMP Algo
Convert a Sentence into its equivalent mobile numeric keypad sequence.
Count All Palindromic Subsequence in a given String. (IIT Bombay)
Longest Common Prefix (IIT Kanpur)
Find the longest common subsequence between two strings. (IIT Kanpur)
Write a program to find the smallest window that contains all characters of str
Rearrange characters in a string such that no two adjacent are same (IIT D)
Minimum characters to be added at front to make string palindrome (IIT Kanp
Given a sequence of words, print all anagrams together (IIT Bombay)
Find the smallest window in a string containing all characters of another string
String matching where one string contains wildcard characters
Function to find Number of customers who could not get a computer (IIT Kanp
Transform One String to Another using Minimum Number of Given Operation
Check if two given strings are isomorphic to each other (IIT Bombay)

## Backtracking (Rare)

Printing all solutions in N-Queen Problem (IIT BHU)
Word Break Problem using Backtracking

## Heap (Rare)

Implement a Maxheap/MinHeap.
Sort an Array using heap. (HeapSort)
Maximum of all subarrays of size k. (IIT Bombay)
“k” largest element in an array

## Dynamic Programming (Very rare)

0/1 Knapsack (IIT BHU)
Travelling Salesman Problem (IIT H)
Multilevel Graph Shortest Path
Matrix Chain Multiplication Problem
Fractional Knapsack (Greedy) (IIT H)
Huffman Coding (Greedy)
Largest area rectangular sub-matrix with equal number of 1’s and 0’s
Count Derangements (Topic in Discrete Maths)