Road map for the java with data structure and algorithm

We have a variety of Data Structures which are as follows:

1. Arrays
2. Strings
3. Linked List
4. Stack
5. Queue
6. Heap and Priority Queue
7. Hashmap
8. Binary Tree
9. Binary Search Tree
10. AVL Tree
11. Red Black Tree
12. Trie
13. Suffix Tree
14. Graph
15. Segment Tree
16. Fenwick Tree
17. Sparse Table
18. Set

Arrays

1. Single Number
2. Sliding Window
3. Find the Number Occurring Odd Number of Times
4. Next Permutation
5. Searching and Sorting in Rotated Sorted Array
6. Radix Sort
7. Bucket Sort
8. Counting Sort
9. Heap Sort
10. Smallest Index with Equal Value
11. Aggressive Cows
12. Book Allocation Problem
13. Binary Search Vs Ternary Search
14. Ternary Search
15. Square Root using binary search
16. Divide the Chocolate
17. Find the minimum element in a sorted and Rotated Array
18. Minimum coverage by heaters
19. Plates Between Candles
20. To Find the Nth Number in the Merged and Sorted Lists of Given Ranges
21. Find the Maximum Sum of i*arr[i] Among all Possible Rotations of an Array
22. Multiple left rotations of an array with O(1)

23. Reversal algorithm for right rotation of an array
24. Reversal Algorithm for Array Rotation
25. Rotation Count
26. Program for Array rotation in Java
27. Sort a Rotated Sorted Array
28. Sort a Rotated Sorted Array
29. Moore's Voting Algorithm
30. Next Greater and Smaller Element for Every Element in an Array

String

1. Count Valleys
2. Compare Version Numbers
3. Count and Say
4. Longest word in dictionary
5. Check If a String is a Palindrome
6. Car Fleet
7. String matching naive
8. KMP String Matching Algorithm
9. Rabin Karp

Linked List

1. Why is Quick Sort preferred for Arrays and Merge Sort for Linked Lists?
2. Application of Linked List Data Structure
3. Linked List remove() Method in Java
4. How to Convert all LinkedHashMap Values to a List in Java
5. Difference between a singly linked list and a doubly linked list
6. Create Linked List From A Given Array
7. Binary search on Linked List
8. Insert a node at a specific position in a linked list
9. Deletion of a linked list
10. Unrolled linked list
11. Implementing a Linked List in Java Using Class
12. LinkedList descendingIterator in Java
13. Construct a Linked List from a 2D Matrix
14. Advantages and Disadvantages of LinkedList
15. LinkedList implementation in JavaScript
16. Is it possible to reverse a linked list in less than O(n)?
17. How to write the functions that modify the head pointer of a Linked List in C?
18. Generic Linked List in C
19. LinkedList listIterator() method in Java
20. Java.util.LinkedList.offer(), offerFirst(), offerLast() in Java
21. Retrieving Value from a LinkedHashMap by Index in Java
22. LinkedList removeFirst method in Java
23. LinkedList add() method in Java
24. LinkedList addAll() method in Java
25. Singly Linked List To Circular Linked List
26. Check If A Linked List Is Circular Linked List
27. Circular Linked List Traversal

28. Convert a given Binary Tree to Doubly Linked List
29. Reverse a Doubly-Linked List in Given Size
30. Memory-efficient doubly linked list

Stack

1. Stack in C++ (STL)
2. Stack Class in Java Collection Framework
3. Stack in Python (LIFO Queue)
4. Python Stack Using Doubly Linked List
5. Difference Between Stack and Tree
6. Difference between Array, Queue and Stack
7. Implement stack using a singly linked list
8. Implement stack using a doubly-linked list
9. Next greater/smaller element using a monotonic queue
10. Iterative Tower of Hanoi
11. Remove Adjacent Duplicates
12. Design A Minimum Stack
13. Trapping Rainwater
14. Delete Middle Element Of The Stack
15. Count array elements having at least one smaller element on its left and right side
16. Minimize the length of a given string by removing subsequences forming valid parenthesis
17. Add two numbers represented by Stacks
18. Diagonal Traverse ii
19. Minimize a binary string by repeatedly removing even-length substrings of the same characters
20. Minimize A String By Removing All Occurrences Of Another String
21. Maximum Equal Sum in Three Stacks
22. Print Stack Elements from Top to Bottom
23. Smallest String Obtained By Removing All Occurrences of 01 and 11 from the Binary String
24. Count of days remaining for the next day with higher temperature
25. Count of strings that do not contain Arc intersection
26. Minimize Length of a String by Removing Pairs of Consecutive Increasing or Decreasing Digits
27. Largest rectangle in histogram
28. Reverse a linked list using Stack
29. Count subarrays for every array element in which they are the minimum
30. Check if a string is a subsequence of another string using stack

Queue

1. Difference between Queue and Deque in C++
2. Advantages of circular queue over linear queue
3. Queue of Pairs in C++ STL
4. Implementation Of Queue in Java using Array and Generics
5. How to remove a specific element from queue
6. Queue Remove Method in Java
7. Dumping Queue Into List or Array in Python

8. Find the index of the array elements after performing given operations k times
9. Find Nth positive number whose absolute difference of adjacent digits is at most 1
10. Circular queue implementation and operations
11. Implement dynamic Deque using templates class and a circular array
12. Design Front Middle Back Queue using STL
13. Implementation of Deque Using Doubly Linked List
14. Generate a permutation of first N natural numbers having count of unique adjacent differences equal to K
15. Array obtained by repeatedly reversing array after every insertion from the given array
16. First non-repeating character in a stream
17. How to efficiently implement k Queues in a single array?
18. Sorting of Queue
19. Queue Reconstruction by Height

Heap and Priority Queue

1. Applications of Heap - Data Structure
2. Binary Heap
3. Tournament Trees and Binary Heaps
4. Implementation of Heap
5. Binomial Heap
6. Fibonacci Heap
7. Leftist Heap
8. N-ary Heap
9. Priority Queue using Java
10. Priority Queue Implementation using Linked List
11. Priority Queue Using Doubly Linked List
12. Priority Queue Using a Linked List
13. Priority Queue using array in C++
14. Priority Queue using C++
15. Applications of Priority Queue
16. Double Ended Priority Queue
17. Priority Queue of Pairs In C++ with Ordering
18. Converting a BST to Min Heap
19. Kth smallest element in a row-wise and column-wise sorted 2D array
20. N Max Pair Combinations
21. Connect N Ropes
22. Median of Stream of Integers Problem
23. Connect N ropes with minimum cost
24. Sum and product of K smallest and largest Fibonacci numbers in the array
25. K-th Smallest Pair Sum in The Given Array
26. Maximum product of an Array after subtracting 1 from any element N times
27. Find the K closest points to origin using Priority Queue
28. Length of longest subsequence such that prefix sum at every element remains greater than zero
29. The maximum sum of two non-overlapping intervals in a list of Intervals | Interval Scheduling Problem

30. Minimum difference between maximum and minimum value of Array with given Operations

HashMap

1. Implementation of HashMap
2. Index Mapping
3. Double hashing
4. Load Factor and Rehashing
5. Hash Table vs STL Map
6. Difference between HashMap and Hash Table in Java
7. Separate Chaining and Open Addressing for Collision Handling
8. Binary Subarrays with sum
9. LRU Cache Implementation
10. Asteroid Collision
11. Count Number of Subarrays with Sum K
12. Reduce Array Size to The Half
13. Minimum operations to choose Array elements with sum as K by choosing an element from the front, or rear or both
14. Length Of All Prefixes That Are Also The Suffixes Of The Given String
15. Online Election
16. Find the highest frequency of non-negative powers that are the same as indices of elements in the given array
17. Longest Substring Without Repeating Characters
18. The K Weakest Rows in a Matrix
19. Count the Triplets
20. Kth Distinct String in an Array
21. Stone Game VI
22. Permutation in String
23. Find All Duplicates in an Array
24. Longest Consecutive Sequence
25. N Repeated Elements in Size 2N
26. Custom Sort String
27. Winner of Tic-Tac-Toe

Binary Tree

1. Binary Tree using dstructure library in Python
2. Types of Binary trees
3. Create a Balanced Binary Tree using leaf Nodes of a Binary Tree without using Extra Space
4. N-Ary Trees
5. Construct a Binary Tree from a given Preorder and Inorder traversal
6. The Binary Lifting Technique
7. Construct a Complete Binary Tree from its Linked List Representation
8. Convert a generic tree (n-ary tree) to binary tree
9. Double Order Traversal of a Binary Tree
10. Specific Level Order Traversal of Binary Tree
11. Iterative Postorder Traversal of Binary tree
12. Iterative Postorder Traversal of a binary tree | Part-2

13. Iterative Preorder Traversal of Binary tree
14. Clockwise Triangular Traversal of a Binary Tree
15. Level Order Traversal Of A Binary Tree
16. ZigZag Traversal of Binary Tree
17. Boundary Traversal Of Binary Tree (Recursive and Iterative)
18. Iterative Inorder Traversal of Binary tree
19. Morris Traversal for Inorder
20. Print all Prime Levels of a Binary Tree
21. Bottom-left to upward-right Traversal in a Binary Tree
22. Check if given inorder and preorder traversals are valid for any Binary Tree without building the tree
23. Construct A Perfect Binary Tree From A Preorder Traversal
24. Inorder Successor in Binary Tree
25. Right View of a Binary Tree
26. Left View of a Binary Tree in Java
27. Top view of a binary tree | Part-1
28. Diameter of Binary Tree
29. Convert a given Binary Tree to a Doubly Linked List
30. Symmetric Binary Tree

Binary Search Tree

1. Introduction to Binary Search tree
2. Difference between binary tree and binary search tree
3. Inbuilt Binary Search in Different Languages
4. Binary Search Tree | Iterative Delete
5. Implementing Backward Iterator in BST
6. Implementing Forward Iterator in BST
7. Insertion in Binary Search Tree
8. Insert a node in Binary Search Tree Iteratively
9. Construct BST from the given pre-order traversal
10. Construct a BST from given postorder traversal using Stack
11. Lowest Common Ancestor in a Binary Search Tree
12. Finding inorder predecessor of a node in a Binary Search Tree
13. Finding Inorder Successor of a node in a Binary Search Tree
14. Number of Binary Search Trees of height H consisting of H+1 nodes
15. Range Sum of BST
16. Flatten a Binary Search Tree to Convert the Tree into a Wave List in Place Only
17. Flattening BST in Sorted List
18. Row with the maximum number of 1’s
19. Create a wave array from the given Binary Search Tree
20. Sum of all nodes with smaller values at a distance ‘K’ from the given node in BST
21. Median of All Nodes from a Given Range in a BST
22. Print All Odd Nodes Of Binary Search Tree
23. Print all the even nodes of a Binary Search Tree
24. Node with the maximum value in a Binary Search Tree
25. Sum and the Product of minimum and maximum elements of a Binary Search Tree
26. Find Closest Smaller Value For Every Element In Array

27. Find Closest Value For Every Element In Array
28. Find the median of BST in O(N) time and O(1) space.
29. Kth Largest Element BST
30. Largest BST subtree in the given Binary Tree

AVL Search Tree

1. Self Balancing Binary Search Trees
2. Introduction To AVL Trees
3. How to Insert Strings into an AVL Tree
4. Optimal Sequence for AVL Tree Insertion
5. Deletion in AVL Tree
6. Insertion, Searching, and Deletion in AVL trees containing a parent node pointer

Red Black Tree

1. Introduction To Red-Black Trees
2. Red Black Tree Insertion
3. Red-Black Trees Top-Down Insertion
4. Deletion in Red-Black Trees
5. Red-Black Tree (Delete)
6. Insertion in Left-Leaning Red-Black Tree
7. Check if a given Binary Search Tree is height-balanced like a Red-Black Tree
8. Find the largest K for every Array element such that at least K prefixes are ≥ K

Trie

1. Introduction and implementation of Trie
2. Dictionaries using Tries
3. Delete nodes from trie
4. Advantages of Trie Data Structure
5. Pattern Searching using Trie
6. Longest word in dictionary
7. Implement Forward DNS Look Up Cache
8. Implement Reverse DNS Look Up Cache

Suffix Tree

1. Suffix Array Construction (Brute Force N ^ 2 LogN)
2. Suffix Trees (Implementation - Brute Force)
3. Find the indices of all the occurrences of a pattern in a string
4. Longest Palindromic Substring using a suffix tree

Graph

1. Introduction to Graphs
2. Graph Representation
3. Implementation of Graph in Java
4. Implementation of Graph in Python
5. Graph Theory
6. Graph Types and Applications
7. Construct a Graph from the size of components of each node
8. Graph And Tree
9. Pendant Vertices, Non-Pendant vertices, Pendant Edges, and Non-Pendant Edges of the Graph.

10. Properties of Graph
11. Breadth-First Search
12. Minimum length paths between 1 to N including each node
13. Check if the given permutation is a valid BFS of a given tree
14. Find integral points with minimum distance from given set of integers using BFS
15. Implement Water Supply System
16. 0-1 BFS
17. 01 Matrix
18. DFS Traversal of a Graph - Iteratively
19. Check if there are at least T continuous blocks of 0s or not in a Binary Matrix
20. Find Regions with Most Common Region Size in a Given Boolean Matrix
21. Clone of an undirected graph
22. Course Schedule
23. Topological sort without Kahn's algorithm
24. Clone a Directed Acyclic Graph
25. Word Ladder
26. Minimum Cost Path in a directed graph via a given set of necessary nodes
27. Stepping Numbers
28. Print all paths from a given source to a destination
29. Accounts Merge
30. Euler and Hamiltonian Paths

Segment Tree

1. Introduction to Segment Trees
2. Segment Tree
3. Merge Sort Tree For Range Order Statistics
4. Length of Longest Increasing Subsequences (LIS) using Segment Tree
5. Count of Xs in the Array for a given range of indices after array updates for Q queries
6. Longest Subarray with GCD Greater than 1
7. Count Substrings having Frequency of a Character Exceeding that of Another Character in a String
8. Queries to Calculate the Sum of the Array Elements Consisting of an Odd Number of Divisors
9. Queries to Calculate Sum of Squares of ASCII Values of Characters of a Substring with updates
10. Queries to calculate sum of squares of array elements over range of indices [L, R] with updates
11. Range Update in a Segment Tree without using Lazy Propagation and Point Query
12. Queries to Count Array Elements from a Given Range having a Single Set Bit
13. Queries to Find The First Array Element Exceeding K with Updates
14. Maximize value of a pair from two given arrays based on given conditions
15. Range minimum query
16. Queries to find the min index in a range [L, R] having at least value ele with updates
17. Queries to calculate sum with alternating signs of array elements in a given range
18. Query to find the length of the longest subarray consisting of only 1s

19. Maximize the length of longest subarray consisting of same elements by at most X decrements
20. Maximum length of same indexed subarrays from two given arrays satisfying the given condition
21. Queries to Count Array Elements Greater Than or Equal to a given Number with Updates
22. Maximize sum of array by reducing array elements to contain no triplets (i, j, k) where a[i] < a[j] and a[i] < a[k] and j <i < k
23. Queries to Evaluate the given Expression in a range [L, R]

Fenwick Tree

1. Find Value After N Operations to Remove N Characters of String S with Given Constraints
2. Sum of previous numbers that are greater than current number for given array
3. Finding XOR of the Array Elements in a Given Range with Updates using Fenwick Tree
4. Queries for the Number of Nodes having Values Less than V in the Subtree of a Node
5. Count smaller elements on right side and greater elements on left side using Binary Index Tree
6. Find the Number of Pair of Ideal Nodes in a Given Tree
7. Range Sum Queries and Update with Square Root
8. Number of elements greater than K in the range L to R using Fenwick Tree (Offline queries)
9. Count of Inversion of size K in a given array
10. XOR of Numbers that Appeared Even Number of Times in Given Range
11. Sum of Interval and Update with Number of Divisors
12. Maximum Sum of Increasing Subsequence using Fenwick Tree
13. Queries for Number of Distinct Elements in the Subarray
14. Number of Elements less than or equal to a given number in a given subarray
15. Count Inversions using Fenwick Tree
16. Two Dimensional Fenwick Tree
17. Binary Indexed Tree or Fenwick Tree
18. Range Update and Range Queries in Binary Indexed Tree
19. Binary Indexed Tree: Range Update and Range Queries
20. Querying the Number of Distinct Colors in a Subtree of a Colored Tree using BIT
21. Minimum Possible Integer After at Most K Adjacent Swaps On Digits
22. The Skyline Problem

Sparse Table

1. Matchstick Problem
2. Find the S-value of the Given Subarrays Using Mo’s Algorithm

Set

1. Implementing Sets Without C++ STL Containers
2. Fair Candy Swap
3. Count the total numbers with no repeated digits in a range
4. Count of Isogram Strings in a Given Array of Strings with Length at Least K
5. Maximize count of distinct elements in a subsequence of size K in given array

6. Find numbers in the range [L, R] that are coprime with all given Array elements
7. Count Of Pairs In Given Array Whose GCD Is Not Prime

Data Structures and Algorithms

We have already discussed data structures and now it is time to have a look at Algorithms and put the terms together as Data Structures and Algorithms to see why is it trending all over in the computer science community.

Algorithms

In mathematics and computer science, an algorithm is defined as the set of instructions/commands given to solve a problem. For example, giving instructions to a computer to sum 2 or more numbers, finding prime numbers from a bunch of given numbers, etc.

We have a variety of algorithms which are as follows:

1. Algorithm Analysis
2. Recursion
3. Backtracking
4. Dynamic Programming
5. Greedy Algorithms
6. String Processing
7. Divide and Conquer
8. Graph Algorithms
9. Searching Techniques
10. Sorting Techniques
11. Branch and Bound Algorithms
12. Bit Manipulation
13. SQRT Decomposition

Algorithm Analysis

1. Introduction of Time Complexity
2. Introduction to Space Complexity
3. Asymptotic Notations
4. Time & Space Complexity for loops
5. Trick questions from Time & Space Complexity
6. Iteration Method
7. Recursion Tree Method
8. Interesting Questions from (Substitution, Iteration, Recursion Tree, Master)
9. Time & Space Complexity of Searching Algorithms
10. Time & Space Complexity of Sorting Algorithms (Quadratic time algorithms)
11. Time & Space Complexity of Sorting Algorithms - 2 (N*logN)
12. Time & Space Complexity of Graph Algo - 1
13. Time & Space Complexity of Graph Algo - 2
14. Time & Space Complexities of Graph Algo-3
15. Time and Space Complexity of Linear Data Structures
16. Time and Space Complexity of Non-Linear Data Structures
17. Recursion & Backtracking Time Complexity

Recursion

1. Types Of Recursion

2. Tail Recursion
3. Different ways to add parentheses
4. Josephus Problem
5. Sum of the combination of numbers | Part-1
6. Sum of the combination of numbers | Part-2
7. How to find all the palindromic partitions of a string
8. Rat In A Maze
9. Word Search

Backtracking

1. Backtracking and Recursion
2. Min-Max Algorithm
3. N-Queen
4. Generate Parentheses
5. Stone Game
6. Sudoku Solver
7. Word Break Problem using Backtracking
8. Tug Of War
9. Permutations
10. Implement Hamiltonian Cycle
11. Additive Number
12. The K-th Lexicographical String of All Happy Strings of Length ‘N’
13. Subsets
14. Subsets (ii)

Dynamic Programming

1. How to solve a dynamic programming problem?
2. Memoization vs Tabulation
3. Overlapping substructure vs overlapping sub problems
4. Subsets
5. 0-1 Knapsack
6. Count Number of subsets with given Sum
7. Subset Sum Problem
8. Coin Change: Minimum Number Of Coins
9. Unbounded Knapsack
10. Target Sum
11. Longest Common Subsequence
12. Longest common substring
13. Longest Palindromic Subsequence
14. Minimum insertion to convert the string to a palindrome
15. Longest Repeating Subsequence
16. LCS of 3 strings
17. Shortest Common Supersequence
18. Distinct subsequences
19. Regular Expression Matching
20. Wildcard Matching
21. Best time to buy and sell stock
22. Best time to buy and sell stock II

23. Best Time to Buy and Sell Stock III
24. Best Time to Buy and Sell Stock with at most K Transactions
25. Best time to buy and sell the stock with cooldown
26. Edit Distance
27. Wine Selling
28. Maximum Product Subarray
29. Maximum Area of the Square Submatrix
30. Maximal Square

Greedy Algorithms

1. Activity Selection problem and Greedy Algorithm-
2. Job scheduling algorithm
3. Huffman Encoding
4. Gas Station
5. Minimum Number of Platforms Required for a Railway/Bus Station
6. Merge Intervals
7. Maximum Disjoint Intervals
8. Maximum number of overlapping intervals
9. Shortest Unsorted Continuous Subarray
10. Queue Reconstruction by Height
11. Find maximum meetings in one room
12. Reduce array to a single element by repeatedly removing an element from any increasing pair
13. Next Permutation
14. Minimize Cash Flow among a given set of friends who have borrowed money from each other
15. Divide 1 to n into two groups with a minimum sum difference
16. Fractional Knapsack Problem
17. Minimum initial vertices to traverse the whole matrix with given conditions
18. K Centers Problem
19. Shortest Superstring
20. Minimum Number of Arrows to Burst Balloons
21. Find Minimum Number of Arrows Needed to Burst all Balloons
22. Equilibrium Point
23. Product of array except self
24. Jump Game
25. Jump Game II
26. Boats to Save People
27. Get Equal Substrings Within Budget
28. Number of wonderful substrings

String Processing

1. String Hashing
2. Find All Occurrences of the Pattern in the String
3. Minimum Repetitions of String A, to Generate String B as its Substring
4. Shortest Palindrome
5. Find the longest proper prefix that is also a suffix
6. Repeated Substring Pattern

Divide and Conquer

1. Introduction to the Divide and Conquer Algorithm
2. Fast Fourier Transform for polynomial multiplication
3. Fibonacci numbers
4. Tiling Problem using Divide and Conquer algorithm
5. Check if a number is a palindrome or not without using any extra space
6. Count the number of inversions in an array using merge sort
7. Reduce array to longest sorted array possible by removing either half of given array in each operation
8. Merge two sorted arrays in O(1) extra space using QuickSort partition
9. Koko Eating Bananas
10. Count Negative Numbers in a Sorted Matrix
11. How to find the minimum capacity of the ship to ship packages within d days.
12. Sum of middle elements of two sorted arrays
13. Longest Substring with At Least K Repeating Characters
14. Median of Two Sorted Arrays
15. Longest Common Prefix using Divide and Conquer Algorithm

Graph Algorithms

1. Breadth First Search(BFS)
2. Depth First Search(DFS)
3. Properties of a Minimum Spanning Tree(MST)
4. Kruskal's Algorithm
5. Minimum Cut on a Graph Using a Maximum Flow Algorithm
6. Bellman Ford Algorithm
7. Floyd Warshall Algorithm
8. Kahn's Algorithms
9. DSatur Algorithm for Graph Coloring
10. Bipartite Algorithm
11. Print all Hamiltonian Cycles in an Undirected Graph

Searching Techniques

1. Linear Search
2. Binary Search
3. Ternary Search
4. Binary Search Vs Ternary Search

Sorting Techniques

1. Bubble Sort
2. Bubble Sort For Linked List By Swapping Nodes
3. Merge Sort
4. Quick Sort
5. Radix Sort
6. Bucket Sort
7. Counting Sort
8. Heap Sort

Branch and Bound Algorithms

1. 0-1 Knapsack

2. N-Queen Problem
3. Travelling Salesman Problem | Part 1
4. Travelling Salesman Problem | Part 2

Bit Manipulation

1. Hamming Distance
2. Total Hamming Distance
3. Ugly Numbers 2
4. Find Elements
5. Bitwise AND of Numbers Range
6. Longest Consecutive Sequence of 1's in the Binary Representation of a Number
7. Minimum X (xor) A
8. Lucky Alive Person in a Circle
9. Count Number of Set Bits in an Integer
10. Gray Code
11. Number of Steps to Reduce a Number in Binary Representation to One
12. Divide Two Integers
13. Bitwise Operators in C++
14. Binary Numbers of N digits
15. Generate All Binary Numbers in the Range [L, R]
16. Find a Number X Such that XOR of Given Array after Adding X to Each Element is 0
17. Convert given binary to its equivalent ASCII character string
18. Count Set Bits in Index Range [L, R] in Given Array for Q Queries
19. Count total set bits in an array
20. Form a Number Using Bit Rotations of N having the Same Frequency of each Digit
21. Maximize Bitwise AND of the array by replacing at most one element
22. Bit Stuffing and Bit Destuffing
23. Find the maximum product of Bitwise AND and Bitwise OR of K-size subarray
24. Find the size of the largest subset with bitwise AND greater than their bitwise XOR
25. Find the total number of subsequences having odd Bitwise AND values in the array
26. Find the total number of subsequences having odd Bitwise OR values in the array
27. Maximize sum of LSBs of Bitwise OR of all possible N/2 pairs from given Array
28. Find the next greater number formed with exactly two unique digits for each array element

SQRT Decomposition

1. Ninja's Messenger
2. Sqrt (Square Root) Decomposition
3. Frequency Range Count