Topics:

- Linked List
- Stack
- Queue
- Binary Tree
- Binary Search Tree
- Heap
- Hashing
- Graph
- Advanced Data Structure
- Array
- Matrix
- Misc

Linked List:

Singly Linked List:

- Introduction to Linked List
- Linked List vs Array
- Linked List Insertion
- Linked List Deletion (Deleting a given key)
- Linked List Deletion (Deleting a key at given position)
- A Programmer's approach of looking at Array vs. Linked List
- Find Length of a Linked List (Iterative and Recursive)
- How to write C functions that modify head pointer of a Linked List?
- Swap nodes in a linked list without swapping data
- Reverse a linked list
- Merge two sorted linked lists
- Merge Sort for Linked Lists
- Reverse a Linked List in groups of given size
- Detect and Remove Loop in a Linked List
- Add two numbers represented by linked lists | Set 1
- Rotate a Linked List
- Generic Linked List in C

Circular Linked List:

- Circular Linked List Introduction and Applications,
- Circular Linked List Traversal
- Split a Circular Linked List into two halves
- Sorted insert for circular linked list

Doubly Linked List:

- Doubly Linked List Introduction and Insertion
- Delete a node in a Doubly Linked List
- Reverse a Doubly Linked List
- The Great Tree-List Recursion Problem.
- QuickSort on Doubly Linked List
- Merge Sort for Doubly Linked List

All Articles of Linked List

Quiz on Linked List

Stack:

- Introduction to Stack
- Infix to Postfix Conversion using Stack
- Evaluation of Postfix Expression
- Reverse a String using Stack
- Implement two stacks in an array
- Check for balanced parentheses in an expression
- Next Greater Element
- Reverse a stack using recursion
- Sort a stack using recursion
- The Stock Span Problem
- Design and Implement Special Stack Data Structure
- Implement Stack using Queues
- Design a stack with operations on middle element
- How to efficiently implement k stacks in a single array?
- Sort a stack using recursion

Quiz on Stack

All Articles on Stack

Queue:

- Queue Introduction and Array Implementation
- Linked List Implementation of Queue
- Applications of Queue Data Structure
- Priority Queue Introduction
- Deque (Introduction and Applications)
- Implement Queue using Stacks
- Find the first circular tour that visits all petrol pumps

- Maximum of all subarrays of size k
- An Interesting Method to Generate Binary Numbers from 1 to n
- How to efficiently implement k Queues in a single array?

Quiz on Queue

All Articles on Queue

Binary Tree:

- Binary Tree Introduction
- Handshaking Lemma and Interesting Tree Properties
- Binary Tree Properties
- Types of Binary Tree
- Enumeration of Binary Tree
- Applications of tree data structure
- Tree Traversals
- Level Order Tree Traversal
- Diameter of a Binary Tree
- Inorder Tree Traversal without Recursion
- Inorder Tree Traversal without recursion and without stack!
- Threaded Binary Tree
- Maximum Depth or Height of a Tree
- If you are given two traversal sequences, can you construct the binary tree?
- Clone a Binary Tree with Random Pointers
- Construct Tree from given Inorder and Preorder traversals
- Maximum width of a binary tree
- Print nodes at k distance from root
- Print Ancestors of a given node in Binary Tree
- Check if a binary tree is subtree of another binary tree
- Connect nodes at same level

Quiz on Binary Tree

Quiz on Binary Tree Traversals

All articles on Binary Tree

Binary Search Tree:

- Search and Insert in BST
- Deletion from BST
- Minimum value in a Binary Search Tree
- Inorder predecessor and successor for a given key in BST
- Check if a binary tree is BST or not
- Lowest Common Ancestor in a Binary Search Tree.
- Inorder Successor in Binary Search Tree
- Find k-th smallest element in BST (Order Statistics in BST)
- Merge two BSTs with limited extra space
- Two nodes of a BST are swapped, correct the BST
- Floor and Ceil from a BST

- In-place conversion of Sorted DLL to Balanced BST
- Find a pair with given sum in a Balanced BST
- Total number of possible Binary Search Trees with n keys
- Merge Two Balanced Binary Search Trees
- Binary Tree to Binary Search Tree Conversion

Quiz on Binary Search Trees
Quiz on Balanced Binary Search Trees
All Articles on Binary Search Tree

Heap:

- Binary Heap
- Why is Binary Heap Preferred over BST for Priority Queue?
- Binomial Heap
- Fibonacci Heap
- Heap Sort
- K'th Largest Element in an array
- Sort an almost sorted array/
- Tournament Tree (Winner Tree) and Binary Heap

All Articles on Heap
Quiz on Heap

Hashing:

- Hashing Introduction
- Separate Chaining for Collision Handling
- Open Addressing for Collision Handling
- Print a Binary Tree in Vertical Order
- Find whether an array is subset of another array
- Union and Intersection of two Linked Lists
- Find a pair with given sum
- Check if a given array contains duplicate elements within k distance from each other
- Find Itinerary from a given list of tickets
- Find number of Employees Under every Employee

Quiz on Hashing
All Articles on Hashing

Graph:

Introduction, DFS and BFS:

- Graph and its representations
- Breadth First Traversal for a Graph
- Depth First Traversal for a Graph
- Applications of Depth First Search

- Applications of Breadth First Traversal
- Detect Cycle in a Directed Graph
- Detect Cycle in a an Undirected Graph
- Detect cycle in an undirected graph
- Longest Path in a Directed Acyclic Graph
- Topological Sorting
- Check whether a given graph is Bipartite or not
- Snake and Ladder Problem
- Minimize Cash Flow among a given set of friends who have borrowed money from each other
- Boggle (Find all possible words in a board of characters)
- Assign directions to edges so that the directed graph remains acyclic

Minimum Spanning Tree:

- Prim's Minimum Spanning Tree (MST))
- Applications of Minimum Spanning Tree Problem
- Prim's MST for Adjacency List Representation
- Kruskal's Minimum Spanning Tree Algorithm
- Boruvka's algorithm for Minimum Spanning Tree

Shortest Paths:

- Dijkstra's shortest path algorithm
- Dijkstra's Algorithm for Adjacency List Representation
- Bellman–Ford Algorithm
- Floyd Warshall Algorithm
- Johnson's algorithm for All-pairs shortest paths
- Shortest Path in Directed Acyclic Graph
- Some interesting shortest path questions,
- Shortest path with exactly k edges in a directed and weighted graph

Connectivity:

- Find if there is a path between two vertices in a directed graph
- Connectivity in a directed graph
- Articulation Points (or Cut Vertices) in a Graph
- Biconnected graph
- Bridges in a graph
- Eulerian path and circuit
- Fleury's Algorithm for printing Eulerian Path or Circuit
- Strongly Connected Components
- Transitive closure of a graph
- Find the number of islands
- Count all possible walks from a source to a destination with exactly k edges
- Euler Circuit in a Directed Graph
- Biconnected Components
- Check if a given graph is tree or not

- Karger's algorithm for Minimum Cut

Hard Problems:

- Graph Coloring (Introduction and Applications)
- Greedy Algorithm for Graph Coloring
- Travelling Salesman Problem (Naive and Dynamic Programming)
- Travelling Salesman Problem (Approximate using MST)
- Hamiltonian Cycle
- Vertex Cover Problem | Set 1 (Introduction and Approximate Algorithm)
- K Centers Problem | Set 1 (Greedy Approximate Algorithm)

Maximum Flow:

- Ford-Fulkerson Algorithm for Maximum Flow Problem
- Find maximum number of edge disjoint paths between two vertices
- Find minimum s-t cut in a flow network
- Maximum Bipartite Matching
- Channel Assignment Problem

Quiz on Graph

Quiz on Graph Traversals

Quiz on Graph Shortest Paths

Quiz on Graph Minimum Spanning Tree

Advanced Data Structure:

Advanced Lists:

- Memory efficient doubly linked list
- XOR Linked List – A Memory Efficient Doubly Linked List | Set 1
- XOR Linked List – A Memory Efficient Doubly Linked List | Set 2
- Skip List | Set 1 (Introduction)
- Self Organizing List | Set 1 (Introduction)

Trie:

- Trie | (Insert and Search)
- Trie | (Delete)
- Longest prefix matching – A Trie based solution in Java
- Print unique rows in a given boolean matrix
- How to Implement Reverse DNS Look Up Cache?
- How to Implement Forward DNS Look Up Cache?

Suffix Array and Suffix Tree:

- Suffix Array Introduction
- Suffix Array nLogn Algorithm

- Suffix Tree Introduction
- Ukkonen's Suffix Tree Construction – Part 1
- Ukkonen's Suffix Tree Construction – Part 2
- Ukkonen's Suffix Tree Construction – Part 3
- Ukkonen's Suffix Tree Construction – Part 4,
- Ukkonen's Suffix Tree Construction – Part 5
- Ukkonen's Suffix Tree Construction – Part 6
- Generalized Suffix Tree
- Build Linear Time Suffix Array using Suffix Tree
- Substring Check
- Searching All Patterns
- Longest Repeated Substring,
- Longest Common Substring, Longest Palindromic Substring

AVL Tree:

- AVL Tree | Set 1 (Insertion)
- AVL Tree | Set 2 (Deletion)
- AVL with duplicate keys

Splay Tree:

- Splay Tree | Set 1 (Search)
- Splay Tree | Set 2 (Insert)

B Tree:

- B-Tree | Set 1 (Introduction)
- B-Tree | Set 2 (Insert)
- B-Tree | Set 3 (Delete)

Segment Tree:

- Segment Tree | Set 1 (Sum of given range)
- Segment Tree | Set 2 (Range Minimum Query)
- Lazy Propagation in Segment Tree

Red-Black Tree:

- Red-Black Tree Introduction
- Red Black Tree Insertion.
- Red-Black Tree Deletion
- Program for Red Black Tree Insertion

K Dimensional Tree:

- KD Tree (Search and Insert)
- K D Tree (Find Minimum)

- K D Tree (Delete)

Others:

- Treap (A Randomized Binary Search Tree)
- Ternary Search Tree
- Interval Tree
- Implement LRU Cache
- Sort numbers stored on different machines
- Find the k most frequent words from a file
- Given a sequence of words, print all anagrams together
- Tournament Tree (Winner Tree) and Binary Heap
- Decision Trees – Fake (Counterfeit) Coin Puzzle (12 Coin Puzzle)
- Spaghetti Stack
- Data Structure for Dictionary and Spell Checker?
- Binary Indexed Tree

Array:

- Given an array A[] and a number x, check for pair in A[] with sum as x
- Majority Element
- Find the Number Occurring Odd Number of Times
- Largest Sum Contiguous Subarray
- Find the Missing Number
- Search an element in a sorted and pivoted array
- Merge an array of size n into another array of size m+n
- Median of two sorted arrays
- Write a program to reverse an array
- Program for array rotation
- Reversal algorithm for array rotation
- Block swap algorithm for array rotation
- Maximum sum such that no two elements are adjacent
- Leaders in an array
- Sort elements by frequency | Set 1
- Count Inversions in an array
- Two elements whose sum is closest to zero
- Find the smallest and second smallest element in an array
- Check for Majority Element in a sorted array
- Maximum and minimum of an array using minimum number of comparisons
- Segregate 0s and 1s in an array
- k largest(or smallest) elements in an array | added Min Heap method
- Maximum difference between two elements
- Union and Intersection of two sorted arrays
- Floor and Ceiling in a sorted array
- A Product Array Puzzle
- Segregate Even and Odd numbers
- Find the two repeating elements in a given array

- Sort an array of 0s, 1s and 2s
- Find the Minimum length Unsorted Subarray, sorting which makes the complete array sorted
- Find duplicates in O(n) time and O(1) extra space
- Equilibrium index of an array
- Linked List vs Array
- Which sorting algorithm makes minimum number of memory writes?
- Turn an image by 90 degree
- Next Greater Element
- Check if array elements are consecutive | Added Method 3
- Find the smallest missing number
- Count the number of occurrences in a sorted array
- Interpolation search vs Binary search
- Given an array arr[], find the maximum j – i such that arr[j] > arr[i]
- Maximum of all subarrays of size k (Added a O(n) method)
- Find whether an array is subset of another array | Added Method 3
- Find the minimum distance between two numbers
- Find the repeating and the missing | Added 3 new methods
- Median in a stream of integers (running integers)
- Find a Fixed Point in a given array
- Maximum Length Bitonic Subarray
- Find the maximum element in an array which is first increasing and then decreasing
- Count smaller elements on right side
- Minimum number of jumps to reach end
- Implement two stacks in an array
- Find subarray with given sum
- Dynamic Programming | Set 14 (Maximum Sum Increasing Subsequence)
- Longest Monotonically Increasing Subsequence Size (N log N)
- Find a triplet that sum to a given value
- Find the smallest positive number missing from an unsorted array
- Find the two numbers with odd occurrences in an unsorted array
- The Celebrity Problem
- Dynamic Programming | Set 15 (Longest Bitonic Subsequence)
- Find a sorted subsequence of size 3 in linear time
- Largest subarray with equal number of 0s and 1s
- Dynamic Programming | Set 18 (Partition problem)
- Maximum Product Subarray
- Find a pair with the given difference
- Replace every element with the next greatest
- Dynamic Programming | Set 20 (Maximum Length Chain of Pairs)
- Find four elements that sum to a given value | Set 1 (n^3 solution)
- Find four elements that sum to a given value | Set 2 (O(n^2Logn) Solution)
- Sort a nearly sorted (or K sorted) array
- Maximum circular subarray sum
- Find the row with maximum number of 1s
- Median of two sorted arrays of different sizes
- Shuffle a given array

- Count the number of possible triangles
- Iterative Quick Sort
- Find the number of islands
- Construction of Longest Monotonically Increasing Subsequence (N log N)
- Find the first circular tour that visits all petrol pumps
- Arrange given numbers to form the biggest number
- Pancake sorting
- A Pancake Sorting Problem
- Tug of War
- Divide and Conquer | Set 3 (Maximum Subarray Sum)
- Counting Sort
- Merge Overlapping Intervals
- Find the maximum repeating number in O(n) time and O(1) extra space
- Stock Buy Sell to Maximize Profit
- Rearrange positive and negative numbers in O(n) time and O(1) extra space
- Sort elements by frequency | Set 2
- Find a peak element
- Print all possible combinations of r elements in a given array of size n
- Given an array of of size n and a number k, find all elements that appear more than n/k times
- Find the point where a monotonically increasing function becomes positive first time
- Find the Increasing subsequence of length three with maximum product
- Find the minimum element in a sorted and rotated array
- Stable Marriage Problem
- Merge k sorted arrays | Set 1
- Radix Sort
- Move all zeroes to end of array
- Find number of pairs such that x^y > y^x
- Count all distinct pairs with difference equal to k
- Find if there is a subarray with 0 sum
- Smallest subarray with sum greater than a given value
- Sort an array according to the order defined by another array
- Maximum Sum Path in Two Arrays
- Check if a given array contains duplicate elements within k distance from each other
- Sort an array in wave form
- K’th Smallest/Largest Element in Unsorted Array
- K’th Smallest/Largest Element in Unsorted Array in Expected Linear Time
- K’th Smallest/Largest Element in Unsorted Array in Worst Case Linear Time
- Find Index of 0 to be replaced with 1 to get longest continuous sequence of 1s in a binary array
- Find the closest pair from two sorted arrays
- Given a sorted array and a number x, find the pair in array whose sum is closest to x
- Count 1’s in a sorted binary array
- Print All Distinct Elements of a given integer array
- Construct an array from its pair-sum array
- Find common elements in three sorted arrays
- Find the first repeating element in an array of integers
- Find the smallest positive integer value that cannot be represented as sum of any subset of a given array

- Rearrange an array such that ‘arr[j]’ becomes ‘i’ if ‘arr[i]’ is ‘j’
- Find position of an element in a sorted array of infinite numbers
- Can QuickSort be implemented in O(nLogn) worst case time complexity?
- Check if a given array contains duplicate elements within k distance from each other
- Find the element that appears once
- Replace every array element by multiplication of previous and next
- Check if any two intervals overlap among a given set of intervals
- Delete an element from array (Using two traversals and one traversal)
- Given a sorted array and a number x, find the pair in array whose sum is closest to x
- Find the largest pair sum in an unsorted array
- Online algorithm for checking palindrome in a stream
- Find Union and Intersection of two unsorted arrays
- Pythagorean Triplet in an array
- Maximum profit by buying and selling a share at most twice

Quiz on Array

Matrix:

- Search in a row wise and column wise sorted matrix
- Print a given matrix in spiral form
- A Boolean Matrix Question
- Print unique rows in a given boolean matrix
- Maximum size square sub-matrix with all 1s
- Print unique rows in a given boolean matrix
- Inplace M x N size matrix transpose | Updated
- Print Matrix Diagonally
- Dynamic Programming | Set 27 (Maximum sum rectangle in a 2D matrix)
- Strassen’s Matrix Multiplication
- Create a matrix with alternating rectangles of O and X
- Find the row with maximum number of 1s
- Print all elements in sorted order from row and column wise sorted matrix
- Given an n x n square matrix, find sum of all sub-squares of size k x k
- Count number of islands where every island is row-wise and column-wise separated
- Find a common element in all rows of a given row-wise sorted matrix
- Given a matrix of ‘O’ and ‘X’, replace ‘O’ with ‘X’ if surrounded by ‘X’
- Find the longest path in a matrix with given constraints
- Given a Boolean Matrix, find k such that all elements in k’th row are 0 and k’th column are 1.
- Find the largest rectangle of 1’s with swapping of columns allowed
- Validity of a given Tic-Tac-Toe board configuration
- Minimum Initial Points to Reach Destination
- Find length of the longest consecutive path from a given starting character
- Collect maximum points in a grid using two traversals
- Rotate Matrix Elements
- Find sum of all elements in a matrix except the elements in row and/or column of given cell?
- Find a common element in all rows of a given row-wise sorted matrix

Misc:

- Commonly Asked Data Structure Interview Questions | Set 1
- A data structure for n elements and O(1) operations
- Expression Tree

You can create a new Data Structure topic and discuss it with other geeks using **Geeksforgeeks Q&A** page. See already discussed **Data Structure questions on forum**.

204 Comments GeeksforGeeks 1 Login

Recommend 24 Share Sort by Newest

Join the discussion…

jimmy • 6 days ago
i am a web developer. On this site there is nothing about that. i feel miserable here.
1 • Reply • Share ›

Gopal Singh Meena jimmy • 3 days ago
This is only for data structure and algorithm.
For web development go to www.w3school.com
• Reply • Share ›

dungeon_master • 11 days ago
@GeeksforGeeks
Add the feature that done questions appear in some different color....According to current feature the color changes as soon as we click on that question, done question should be given different color too..
2 • Reply • Share ›

Jitendra Singh • 24 days ago
any one has Dynamic perfect hashing c code.
• Reply • Share ›

acodebreaker • 25 days ago
why are most of the links in linked list section missing , linked list in DS section used to contain a lot of links
2 • Reply • Share ›

Vishwas S. Chouhan • 2 months ago
A suggestion, instead of bullets points please number them. It gets easier to identify/remember them and also easy when referring the link to someone else.
8 • Reply • Share ›

Ajcoo • 2 months ago
there should be some indicator that tells that you have already voted your rating for a problem
• Reply • Share ›

Jex • 2 months ago
Here is animation of all data structures
animatedarena.com
1 • Reply • Share ›