

# Stack, Queue and Heap

## *Intermediate Level Questions:*

### Stack:

- **Implement Stack using Queues**

[Practice here: <https://practice.geeksforgeeks.org/problems/stack-using-two-queues/1> ]

- How to efficiently implement “k” stacks in an array ?

[Follow here: <https://www.geeksforgeeks.org/efficiently-implement-k-stacks-single-array/> ]

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

[Follow here: <https://www.geeksforgeeks.org/design-a-stack-that-supports-getmin-in-o1-time-and-o1-extra-space/> ]

- Implement stack and Queue using deque

[Follow here: <https://www.geeksforgeeks.org/implement-stack-queue-using-deque/> ]

- Implement methods for Infix to Postfix, Prefix to Infix, Prefix to Postfix, Postfix to Infix and Postfix to prefix Conversion using stack.

[Follow here: <https://www.geeksforgeeks.org/stack-set-2-infix-to-postfix/> ]

[Follow here: <https://www.geeksforgeeks.org/prefix-infix-conversion/> ]

[Follow here: <https://www.geeksforgeeks.org/prefix-postfix-conversion/> ]

[Follow here: <https://www.geeksforgeeks.org/postfix-prefix-conversion/> ]

[Follow here: <https://www.geeksforgeeks.org/postfix-to-infix/> ]

- **Find the next Greater element**

[Practice here: <https://practice.geeksforgeeks.org/problems/next-larger-element/0> ]

- **The celebrity Problem**

[Practice here: <https://practice.geeksforgeeks.org/problems/the-celebrity-problem/1> ]

- Arithmetic Expression evaluation

[Practice here: <https://www.geeksforgeeks.org/arithmetic-expression-evaluation/> ]

- Evaluation of Postfix expression

[Practice here: <https://practice.geeksforgeeks.org/problems/evaluation-of-postfix-expression/0> ]

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

- Reverse a stack using recursion

[Follow here: <https://www.geeksforgeeks.org/reverse-a-stack-using-recursion/> ]

- Sort a Stack using recursion

[Practice here: <https://practice.geeksforgeeks.org/problems/sort-a-stack/1> ]

- Merge Overlapping Intervals

[Practice here: <https://practice.geeksforgeeks.org/problems/overlapping-intervals/0> ]

- Largest rectangular Area in Histogram

[Practice here: <https://practice.geeksforgeeks.org/problems/maximum-rectangular-area-in-a-histogram/0> ]

- Length of the Longest Valid Substring

[Practice here: <https://practice.geeksforgeeks.org/problems/valid-substring/0> ]

- Expression contains redundant bracket or not

[Follow here: <https://www.geeksforgeeks.org/expression-contains-redundant-bracket-not/> ]

- Find the maximum difference between nearest left and right smaller elements

[Practice here: <https://practice.geeksforgeeks.org/problems/maximum-difference/1> ]

- Remove brackets from an algebraic string containing + and – operators

[Follow here: <https://www.geeksforgeeks.org/remove-brackets-algebraic-string-containing-operators/> ]

- Implement a Simple text Editor using Stack

[Follow here: <http://algorithmsforgeeks.blogspot.com/2017/03/implement-text-editor-using-stack.html> ]

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

[Practice here: <https://practice.geeksforgeeks.org/problems/count-the-reversals/0> ]

## Queue:

- Implement Queue using Stack

[Practice here: <https://practice.geeksforgeeks.org/problems/queue-using-two-stacks/1> ]

- LRU Cache Implementation

[Practice here: <https://practice.geeksforgeeks.org/problems/lru-cache/1> ]

- How to efficiently implement “k” queues in an array ?

[Follow here: <https://www.geeksforgeeks.org/efficiently-implement-k-queues-single-array/> ]

- Check if a queue can be sorted into another queue using a stack

[Practice here: <https://www.geeksforgeeks.org/check-queue-can-sorted-another-queue-using-stack/> ]

- Level Order Tree traversal

[Practice here: <https://practice.geeksforgeeks.org/problems/level-order-traversal/1> ]

- Reverse a Queue using recursion

[Practice here: <https://practice.geeksforgeeks.org/problems/queue-reversal/1> ]

- Reverse the first “K” elements of a queue

[Practice here: <https://practice.geeksforgeeks.org/problems/reverse-first-k-elements-of-queue/1> ]

- Interleave the first half of the queue with second half

[Practice here: <https://www.geeksforgeeks.org/interleave-first-half-queue-second-half/> ]

- Sorting a queue without extra space

[Practice here: <https://www.geeksforgeeks.org/sorting-queue-without-extra-space/> ]

- Find the first circular tour that visits all Petrol Pumps

[Practice here: <https://practice.geeksforgeeks.org/problems/circular-tour/1> ]

- Minimum time required to rot all oranges

[Practice here: <https://practice.geeksforgeeks.org/problems/rotten-oranges/0> ]

- Find maximum level sum in Binary tree

[Practice here: <https://practice.geeksforgeeks.org/problems/max-level-sum-in-binary-tree/1> ]

- Distance of nearest cell having 1 in a binary matrix

[Practice here: <https://practice.geeksforgeeks.org/problems/distance-of-nearest-cell-having-1/0> ]

- First negative integer in every window of size “k”

[Practice here: <https://practice.geeksforgeeks.org/problems/first-negative-integer-in-every-window-of-size-k/0> ]

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

[Practice here: <https://www.geeksforgeeks.org/check-if-all-levels-of-two-trees-are-anagrams-or-not/> ]

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

[Practice here: <https://www.geeksforgeeks.org/sum-minimum-maximum-elements-subarrays-size-k/> ]

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

[Practice here: <https://practice.geeksforgeeks.org/problems/game-with-string/0> ]

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

[Practice here: <https://practice.geeksforgeeks.org/problems/first-non-repeating-character-in-a-stream/0> ]

## Heap:

- Heap Sort

[Follow here: <https://www.geeksforgeeks.org/heap-sort/> ]

- “k” largest element in an array

[Practice here: <https://practice.geeksforgeeks.org/problems/k-largest-elements/0> ]

- K<sup>th</sup> smallest and largest element in an unsorted array

[Practice here: <https://practice.geeksforgeeks.org/problems/kth-smallest-element/0> ]

- Check if a Binary Tree is Heap

[Practice here: <https://practice.geeksforgeeks.org/problems/is-binary-tree-heap/1> ]

- Connect “n” ropes with minimum cost

[Practice here: <https://practice.geeksforgeeks.org/problems/minimum-cost-of-ropes/0> ]

- Merge “K” sorted arrays.

[Practice here: <https://practice.geeksforgeeks.org/problems/merge-k-sorted-arrays/1> ]

- Largest Derangement of a Sequence

[Practice here: <https://www.geeksforgeeks.org/largest-derangement-sequence/> ]

- Maximum distinct elements after removing “k” elements

[Practice here: <https://practice.geeksforgeeks.org/problems/maximum-distinct-elements-after-removing-k-elements/0> ]

- Median in a stream of Running Integers

[Practice here: <https://practice.geeksforgeeks.org/problems/find-median-in-a-stream/0> ]

- Largest Triplet Product in a stream

[Practice here: <https://www.geeksforgeeks.org/largest-triplet-product-stream/> ]

- Convert BST to Min Heap

[Practice here: <https://www.geeksforgeeks.org/convert-bst-min-heap/> ]

- Merge 2 Binary Max Heaps

[Practice here: <https://practice.geeksforgeeks.org/problems/merge-two-binary-max-heap/0> ]

- K<sup>th</sup> largest sum continuous subarrays

[Practice here: <https://www.geeksforgeeks.org/k-th-largest-sum-contiguous-subarray/> ]

- Convert min heap to max heap

[Practice here: <https://www.geeksforgeeks.org/convert-min-heap-to-max-heap/> ]

- Why is Binary Heap is preferred over BST for Priority Queue ?

[Answer: <https://www.geeksforgeeks.org/why-is-binary-heap-preferred-over-bst-for-priority-queue/> ]

- Given Level order traversal of a Binary Tree, check if the tree is Min heap.

[Follow here: <https://www.geeksforgeeks.org/given-level-order-traversal-binary-tree-check-tree-min-heap/> ]

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

[Practice here: <https://practice.geeksforgeeks.org/problems/rearrange-characters/0> ]

- Minimum sum of two numbers formed from digits of an array

[Practice here: <https://practice.geeksforgeeks.org/problems/min-sum-formed-by-digits/0> ]

- Leetcode- reorganize strings

[Practice here: <https://leetcode.com/problems/reorganize-string/> ]

- Merge “K” Sorted Linked Lists

[Practice here: <https://practice.geeksforgeeks.org/problems/merge-k-sorted-linked-lists/1> ]

- Smallest range in “K” Lists

[Practice here: <https://practice.geeksforgeeks.org/problems/find-smallest-range-containing-elements-from-k-lists/1> ]