DATA STRUCTURE ALGORITHM

TOPIC:

STACK AND QUEUE

Just simplified my experience here…

Hope it goona help you all…

Save this pdf and thanks me later

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Stack

A stack is a linear data structure in which elements can be inserted and deleted only from one side of the list, called the **top**.

A stack follows the **LIFO** (Last In First Out) principle, i.e., the element inserted at the last is the first element to come out.

The insertion of an element into the stack is called **push** operation, and the deletion of an element from the stack is called **pop** operation.

In stack, we always keep track of the last element present in the list with a pointer called **top**.

The diagrammatic representation of the stack is given below:

Standard Problems based on Stack :

- Infix to Postfix Conversion using Stack
- Prefix to Infix Conversion
- Prefix to Postfix Conversion
- Postfix to Prefix Conversion
- Postfix to Infix
- Convert Infix To Prefix Notation
- The Stock Span Problem
- Check for balanced parentheses in an expression
- Next Greater Element

- Next Greater Frequency Element
- Number of NGEs to the right
- Maximum product of indexes of next greater on left and right
- The Celebrity Problem
- Expression Evaluation
- Arithmetic Expression Evalution
- Evaluation of Postfix Expression
- Iterative Tower of Hanoi
- Print next greater number of Q queries
- Print ancestors of a given binary tree node without recursion
- Reverse a string using stack
- Program for Tower of Hanoi
- Find maximum depth of nested parenthesis in a string
- Find maximum of minimum for every window size in a given array
- Length of the longest valid substring
- Iterative Depth First Traversal of Graph
- Minimum number of bracket reversals needed to make an expression balanced
- Expression contains redundant bracket or not

Queue

Queue is a linear data structure in which elements can be inserted only from one side of the list called **rear**, and the elements can be deleted only from the other side called the **front**.

The queue data structure follows the **FIFO** (First In First Out) principle, i.e. the element inserted at first in the list, is the first element to be removed from the list.

The insertion of an element in a queue is called an **enqueue** operation and the deletion of an element is called a **dequeue** operation.

In queue, we always maintain two pointers, one pointing to the element which was inserted at the first and still present in the list with the **front** pointer and the second pointer pointing to the element inserted at the last with the **rear** pointer.

Standard Problems :

- Check if a queue can be sorted into another queue using a stack
- Breadth First Traversal or BFS for a Graph
- Level Order Tree Traversal
- Reverse a path in BST using queue
- Construct Complete Binary Tree from its Linked List Representation
- Program for Page Replacement Algorithms | Set 2 (FIFO)
- Check whether a given Binary Tree is Complete or not | Set 1 (Iterative Solution)
- Number of siblings of a given Node in n-ary Tree
- ZigZag Tree Traversal
- FIFO (First-In-First-Out) approach in Programming
- FIFO vs LIFO approach in Programming

- LIFO (Last-In-First-Out) approach in Programming
- Reversing a Queue
- Reversing a queue using recursion
- Reversing the first K elements of a Queue
- Interleave the first half of the queue with second half
- Sorting a Queue without extra space

Feel Free to connect with me –

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