DATA STRUCTURES

OVERVIEW OF DATA STRUCTURES

DATA STRUCTURE

- A data structure is a particular way of organizing , processing, retrieving and storing data in a computer.

  For ex) We can store a list of data items having the same data type using the ARRAY data structure

CLASSIFICATION OF DATA STRUCTURE

- LINEAR DATA STRUCTURE

  All the elements are arranged in a sequential manner.

  ex)ARRAY ,LINKED LIST ,STACK ,QUEUE

- NON-LINEAR DATA STRUCTURE

  All the elements are arranged in a hierarchical manner.

  ex)TREES ,GRAPH

ARRAYS

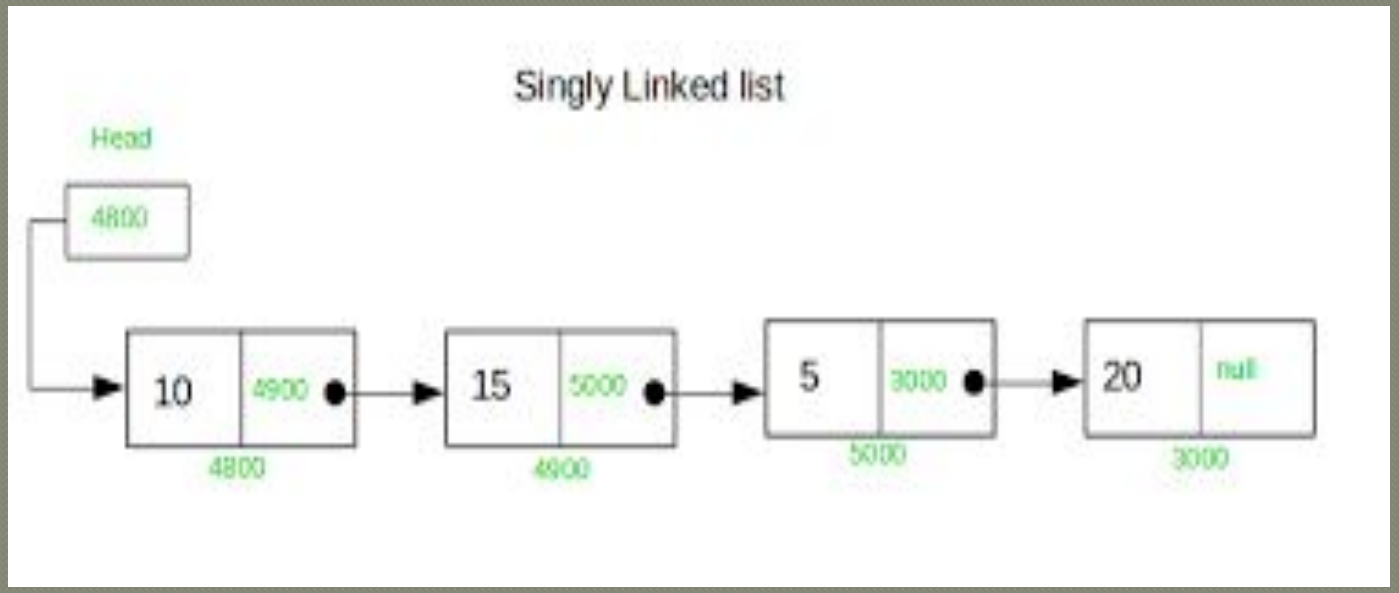
- Array is a kind of data structure that can store a fixed size sequential collection of elements of the same data type

- For ex) int a[10];

  an array a have 10 elements of the integer data type

LINKED LIST

- Linked list is a linear data structure
- A linked list consist of nodes where each node contains a data field and a link to the next node in the list.

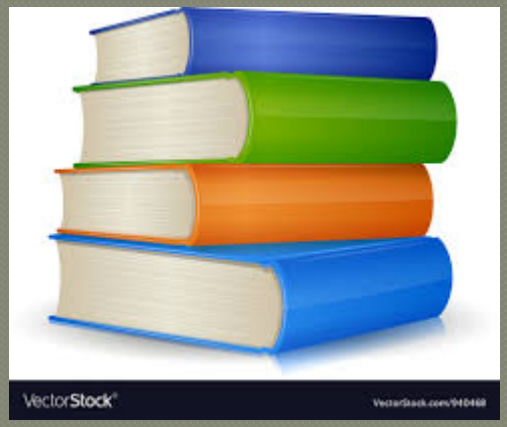

Singly Linked list
Head
4800
10
4900
4800
15
5000
4900
5
3000
5000
20
null
3000

STACK

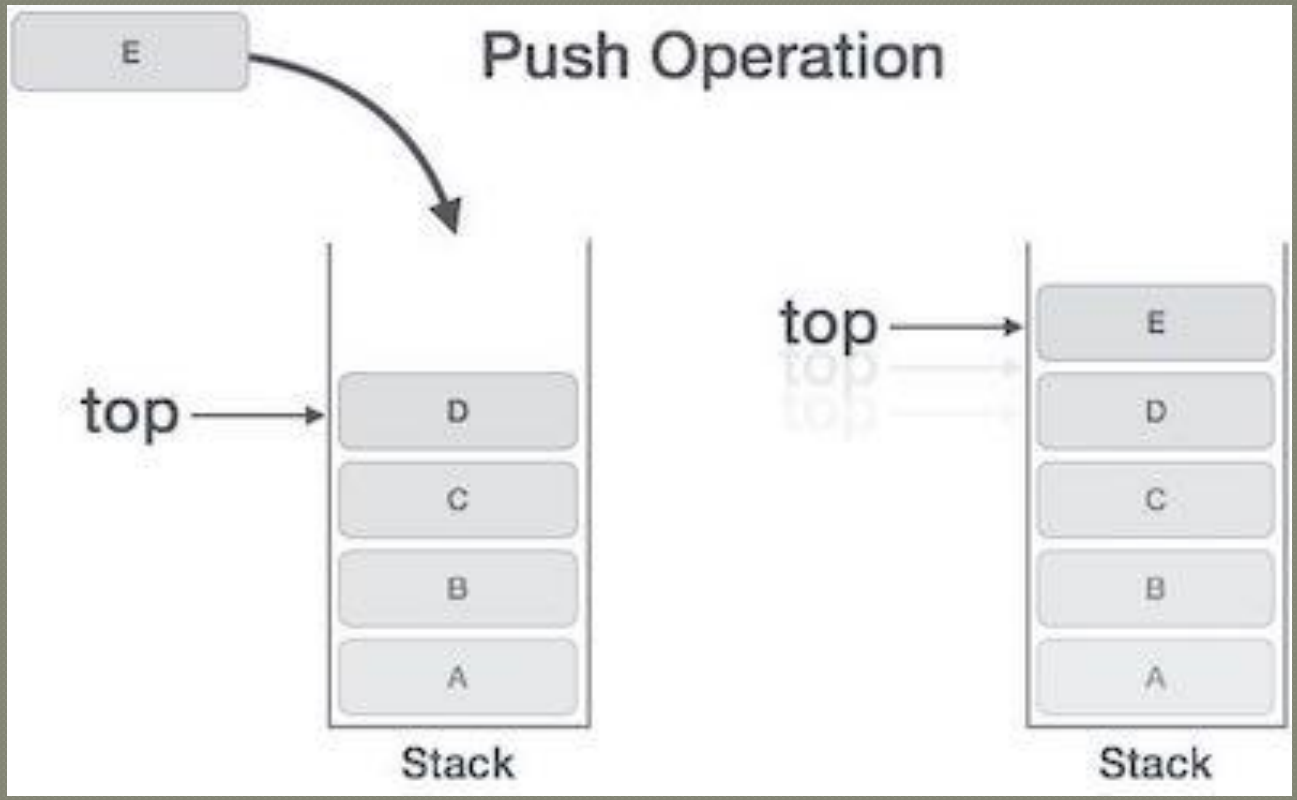
- Stack is a linear data structure
- Follows **Last In First Out (LIFO)** principle
- Insertion and deletion happen in one end is called TOP

STACK OPERATIONS

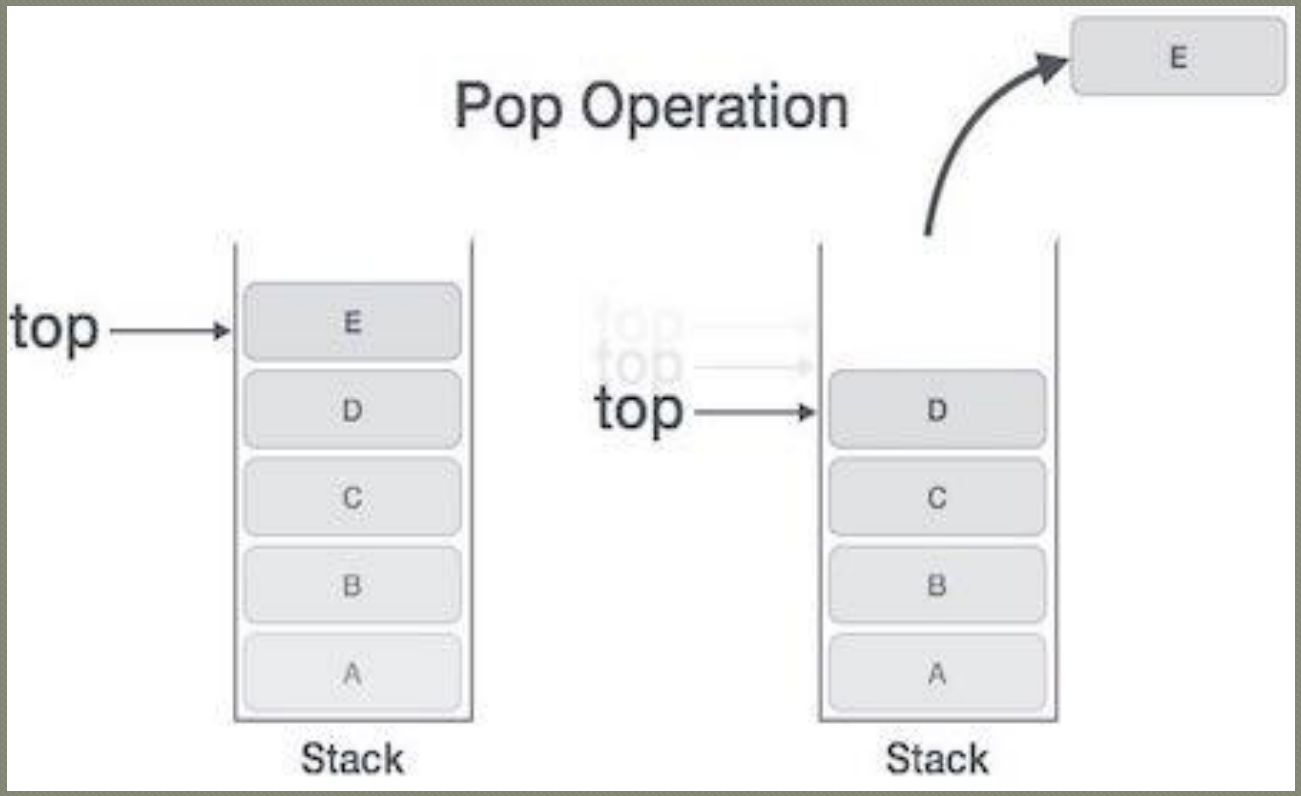
- PUSH
  - Insert the items into a stack
- POP
  - Remove the items from the stack



PUSH



POP



QUEUE

- Queue is a linear datastructure
- First element is inserted from one end called **REAR**
- Deleted from the other end called as **FRONT**

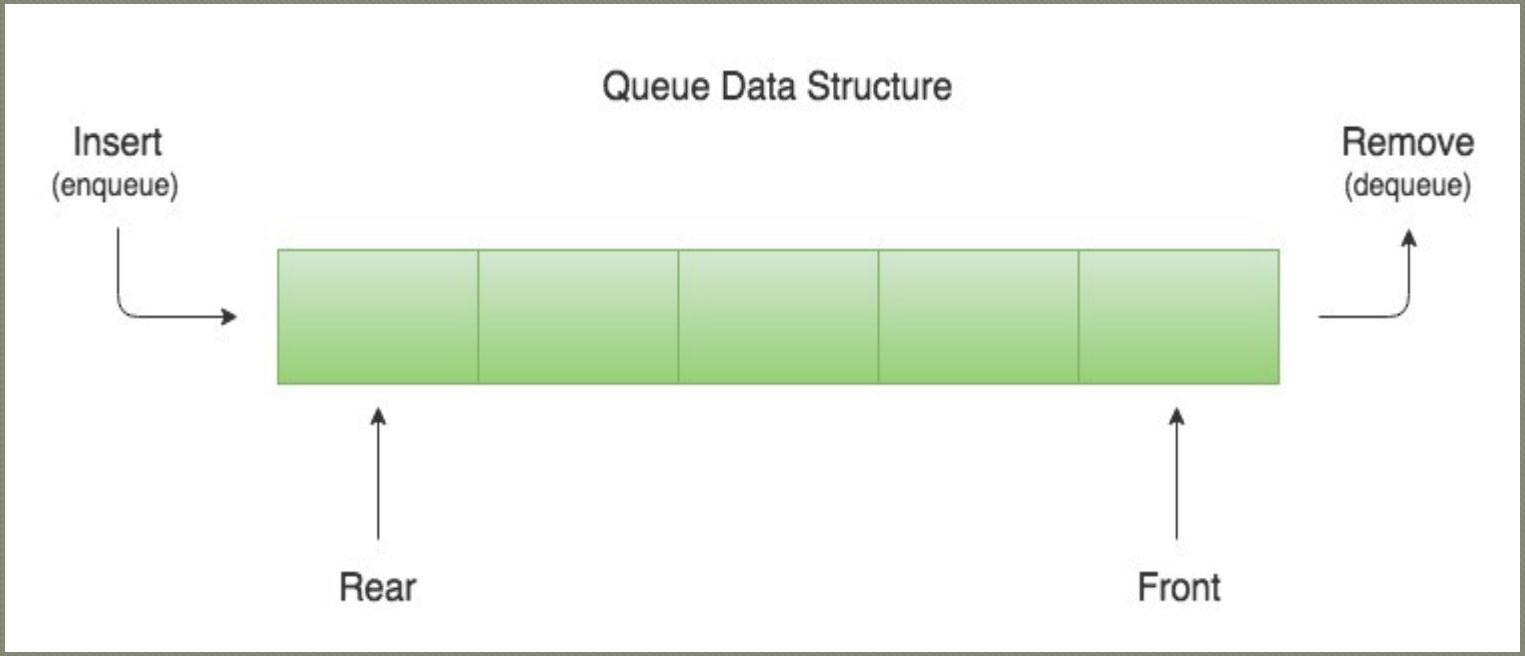
- Follows **First In First Out** (FIFO) principle.
  - Element which is inserted first, will be removed first

QUEUE OPERATIONS

- Enqueue
  - Adding an element into the queue
- Dequeue
  - Removing an element from the queue

For ex) In a TICKET COUNTER, the first person to enter the queue , gets the ticket first & the last person to enter the queue , gets the ticket last.

ENQUEUE & DEQUEUE

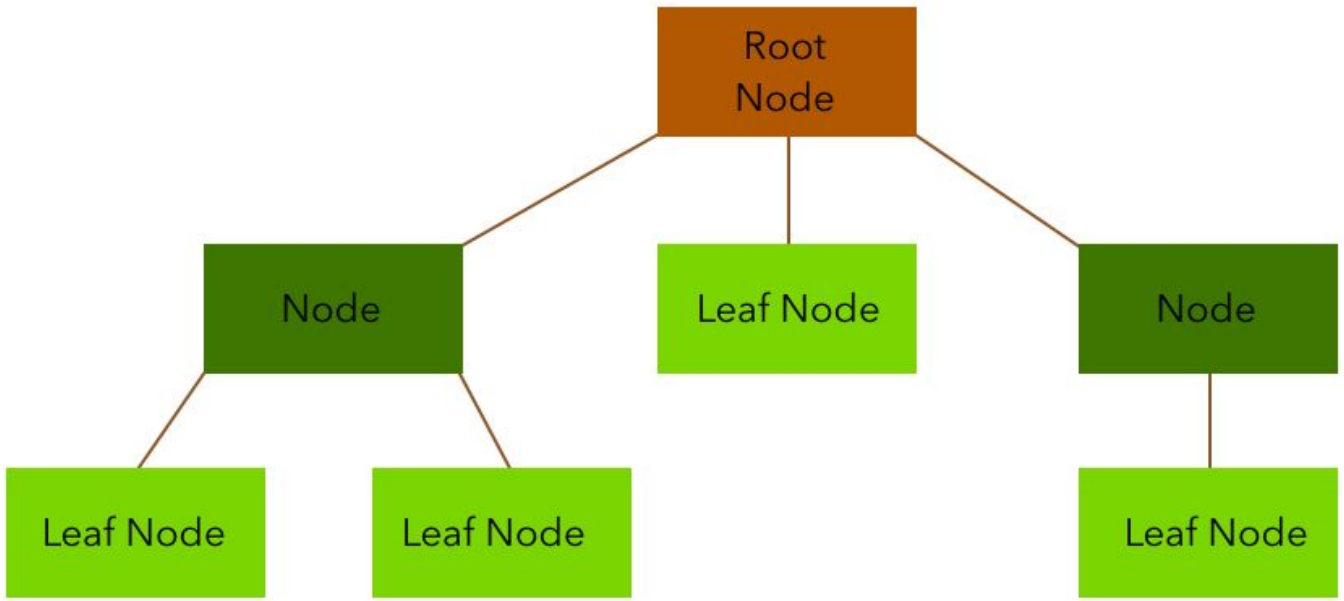


TREES

- Tree is a non-linear data structure
- A tree is a finite set of nodes connected to each other by means of “edges” which are either directed or undirected

BASIC TREE TERMS

- ROOT NODE - top most node
- LEAF NODE - bottom most node , node that do not have any child node
- LEVEL – represents the generation of a node
- DEGREE – represents the number of children that a node has


Root
Node
Node
Leaf Node
Node
Leaf Node
Leaf Node
Leaf Node

GRAPH

- Graph is a non-linear data structure
- A Graph consists of a finite set of vertices and set of edges which connect a pair of nodes
- Graphs are used to represent networks

- Graphs are also used in social networks like facebook
  - For ex) in facebook , each person is represented with a vertex(node). Each node is a structure and contains information like person id, name, location etc.