

Linear or Non-Linear data Structure

* Linear Data Structure:-

In this data structure, elements are stored in linear fashion.

• Types of linear data structure:-

1. Array
2. Link list
3. Stack
4. Queue.

1. Array:- An array is collection of homogeneous data elements. Array elements will always store under contiguous memory locations.

Types of Array:-

(i) Linear Array or One dimensional Array.

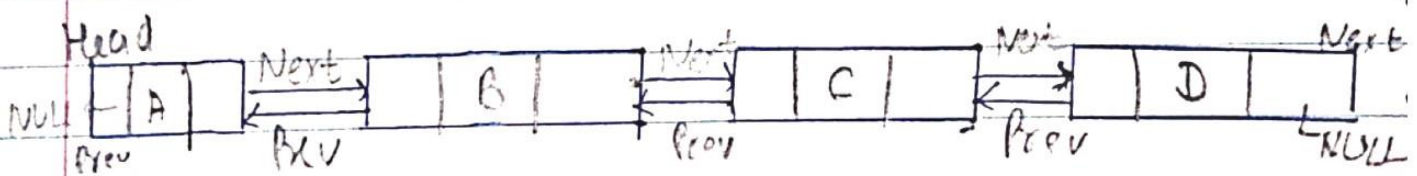
(ii) Non-Linear Array or Two Dimensional Array.

2. Linked List:-

- A linked list is a dynamic data structure.
- It is linear collection of data elements called nodes.
- Each node consists of two fields, one containing the item and the other containing the address of the next item.



Singly Link List



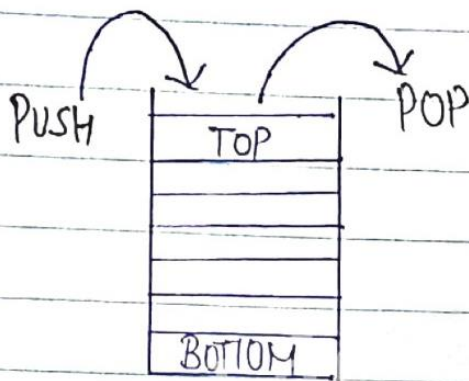
Doubly Linked List

3. Stack:-

- Stack is a linear data structure, i.e. based on the principle of LIFO known as Last In First Out.

There are two main operations applicable to stack:-

- (i) Push :- An item is put into the Top.
- (ii) Pop :- An item is deleted from the top of the stack.



4. Queue:- An queue is special type of data structure which is based on FIFO i.e. First In first Out.

- In a FIFO data structure, the first element added to the queue will be the first one to be removed.

Examples:-

- (i) Ticket Window
- (ii) Cars in line at gas station.

* Non Linear data Structure:-

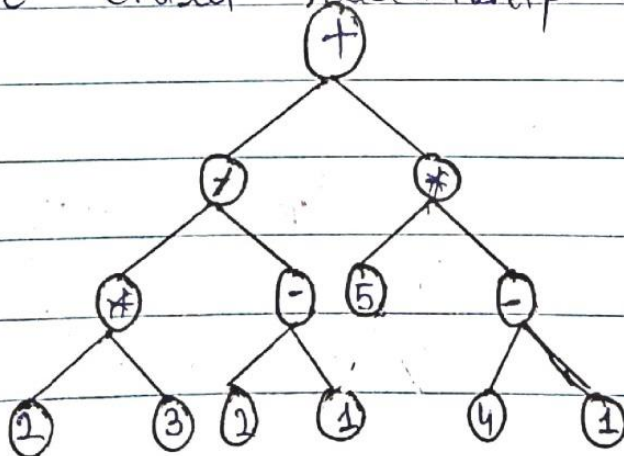
- Non-linear data structure is a type of data structure in which elements are not necessary to store in linear fashion.
- A data structure whose elements do not form a sequence.

Examples (TYPES)

- (i) Tree
- (ii) Graph.

1. Trees:- It is a hierarchical structure of data.

- It is a graph without a cycle. It associates a Parent child relationship b/w various pieces of data.



2. Graph: - It is an important non-linear data structure.

In this, there is a cyclic relationship.

A Graph data structure consists mainly of finite set of ordered pairs, called edges or arcs of certain entities called nodes.

