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Data Structures

Theory Assignment-1

1. Differentiate between linear and non-linear data structure

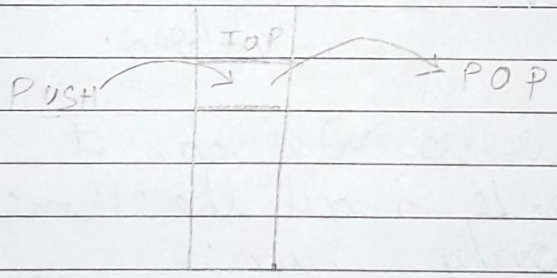
Ans:-

Linear data structure	Non-linear data structure
• Data structures where data elements are arranged sequentially or linearly	Data structures where data elements are not arranged sequentially or linearly.
• In linear data structure single level is involved	In non-linear data structure single level is not involved.
• We can traverse all the elements in single run only	We can't traverse all the elements in single run.
• Easy to implement	Not easy to implement.
• Inefficient memory allocation	Efficient memory allocation
• Ex- Array, stack, queue & linked list, etc.	Ex- trees and graphs

2. Explain ADT of stack

Ans: Stack is a linear data structure in which the inserting & deletion operations are performed at only one end. In a stack, adding & removing of elements are performed at a single position which is known as "top".

In stack, the insertion & deletion operations are performed based on LIFO (Last in First Out) principle. This insertion operation is performed using a function called "push" & deletion operation is performed using a function called "pop".

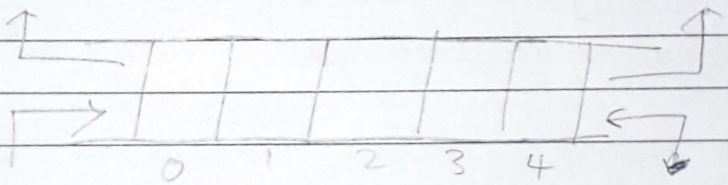


The common operations on a stack are
1. PUSH (To insert an element in the stack)
2. POP (To delete an element from stack)
3. PEEK (To display the element on top)
4. DISPLAY (To display element of the stack

Stack can be implemented using Array or linked list.

4. Write a short ~~not~~ note on double ended queue.

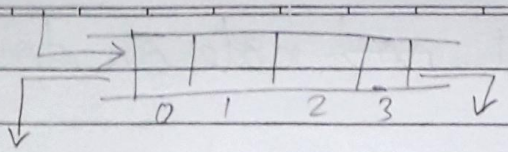
Ans: The double ended queue is also known as dequeue. In a queue, the insertion takes place from one end while the deletion takes place from another end. Dequeue is a linear data structure in which the insertion & deletion operations are performed from both ends.



Dequeue can be used both as stack and queue as it allows the insertion & deletion operation on both sides.

There are two types ~~of queues~~ queues, Input restricted queue & output restricted queue.

1. Input restricted queue: ~~The input~~ This means that some restrictions are applied to the insertion. In input restricted queue, the insertions is applied to one end ~~but~~ while the deletion is appled from both the ends.



2. Output restricted queue - The output restricted queue means that some restrictions are ~~applied~~ applied to the deletion operation. In an output-restricted queue, the deletion can be applied only from one end, whereas the insertion is possible from both the ends.