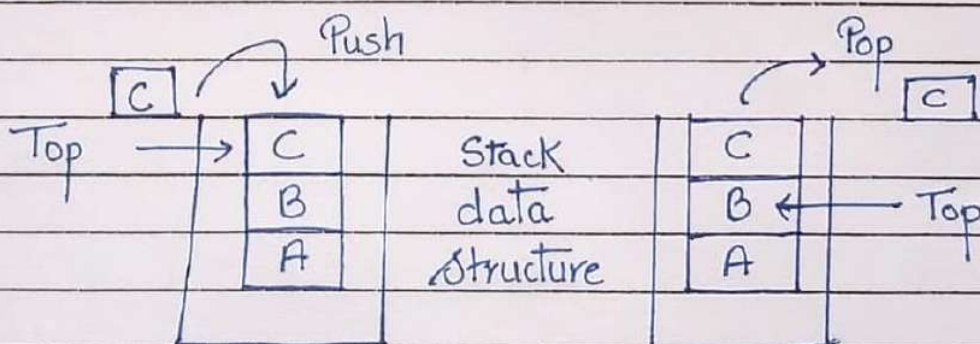


STACK AND QUEUE

BY: @Curious_.programmer

* What is Stack?

Stack is a linear data structure that follows a particular order in which the operations are performed. The Order may be LIFO (Last In first Out) or FILO (first In last Out). LIFO implies that the element that is inserted last, Comes out first and FILO implies that the element that is inserted first, Comes out last.



Example :-

There are many real-life examples of a stack. Consider an example of plates stacked over one another in the canteen. The plate which is at the top is the first one to be removed, i.e. the plate which has been placed at the bottommost position remains in the stack for the longest period of time. So, it can be simply seen to follow LIFO (Last In first Out) / FILO (first In last Out) Order.

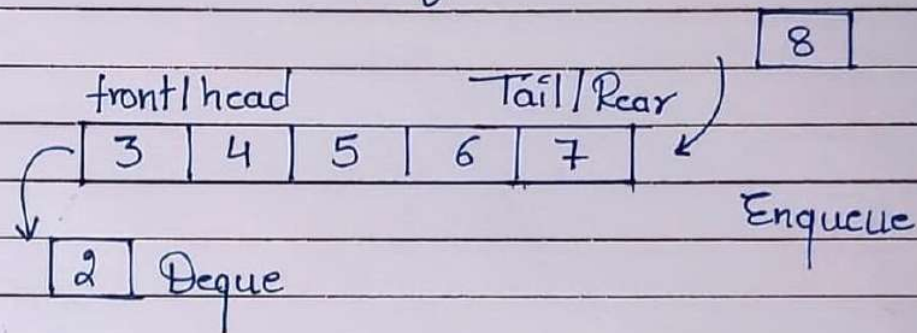
* Application of Stack : Curious... programmer

1. Some CPU have their entire assembly language based on the concept of performing operation on registers that are stored in a stack.
2. Stack structure is used in the C++ run-time system.

* What is Queue data structure ?

A queue is defined as a linear data structure that is open at both ends and the operations are performed in first In first Out (FIFO) Order.

We define a queue to be a list in which all additions to the list are made at one end, and all deletion from the list are made at the other end. The element which is first pushed into the queue, the operation is first performed on that.



Queue data Structure

Example :-

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1. A queue is like a line waiting to purchase tickets, where the first person in line is the first person served. (i.e. first come first serve).
2. Position of the entry in a queue ready to be served, that is, the first entry that will be removed from the queue is called the front of the queue. Similarly, the position of the last entry in the queue that is the one most recently added, is called the tail of the queue.

* Application of queue:

1. Queue data structure is implemented in the hardware microinstructions inside a CPU.
2. Queue structure is used in most Operating System.

* Difference between stack and queue.

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STACK

1. A stack is a data structure that stores a collection of elements, with operation to push (add) and pop (remove) elements from the top of the stack.
2. Stack are based on the LIFO principle. i.e., the element inserted at the last, is the first element to come out of the list.
3. Stack are often used for tasks that require back-tracking. Such as parsing expression or implementing undo functionality.
4. Insertion and deletion in stack take place only from one end of the list called the top.

5. Stack is used in solving problems work on recursion.
6. Stack does not have any types.
7. Examples of stack based language include postscript and forth.

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Queues.

1. A queue is a data structure that stores a collection of elements, with operation to enqueue (add) elements at the back of the queue and dequeue (remove) elements from the front of the queue.
2. Queue are based on the FIFO principle i.e the element inserted at the first, is the first element to come out of the list.
3. Queue are often used for tasks that involve processing elements in a specific order, such as handling requests or scheduling tasks.
4. Queue is used in solving problems having sequential processing.

5. Queue is of three types :

1. Circular

2. Priority

3. Double-ended

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6. Can be considered as a horizontal collection Visual.

7. Examples of queue based algorithms include Breadth-first Search (BFS) and printing a binary tree level-by-level.

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