

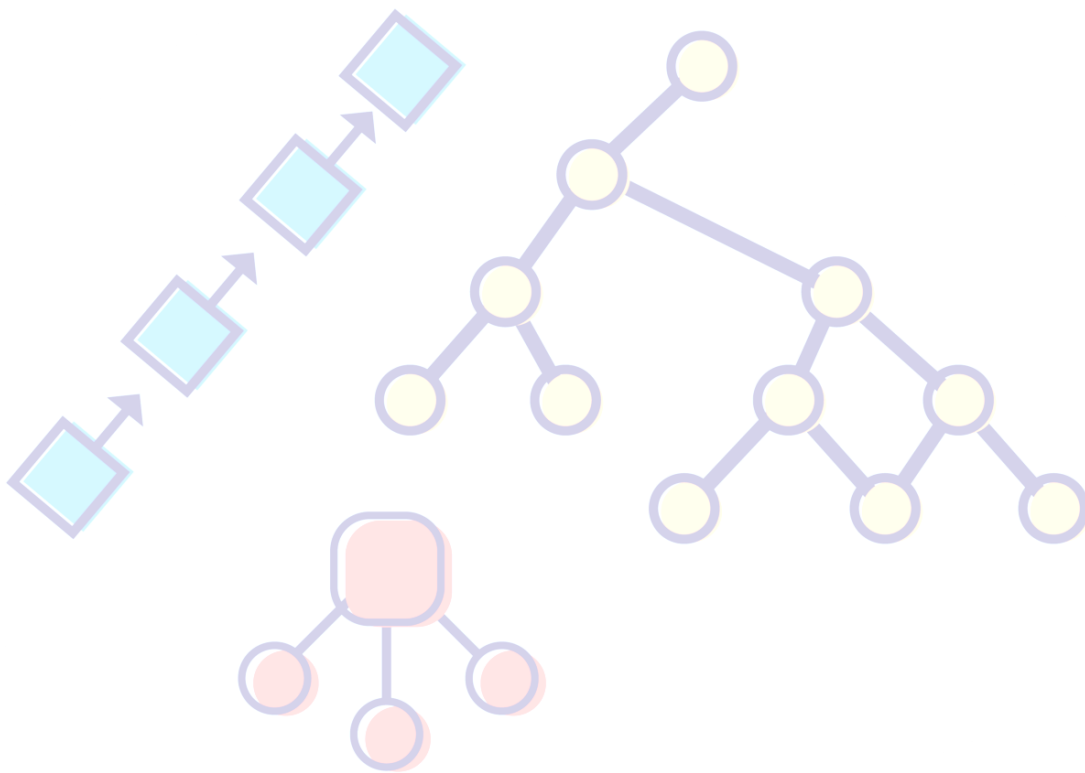
Data Structures and Algorithm

Chapter-06

Queue

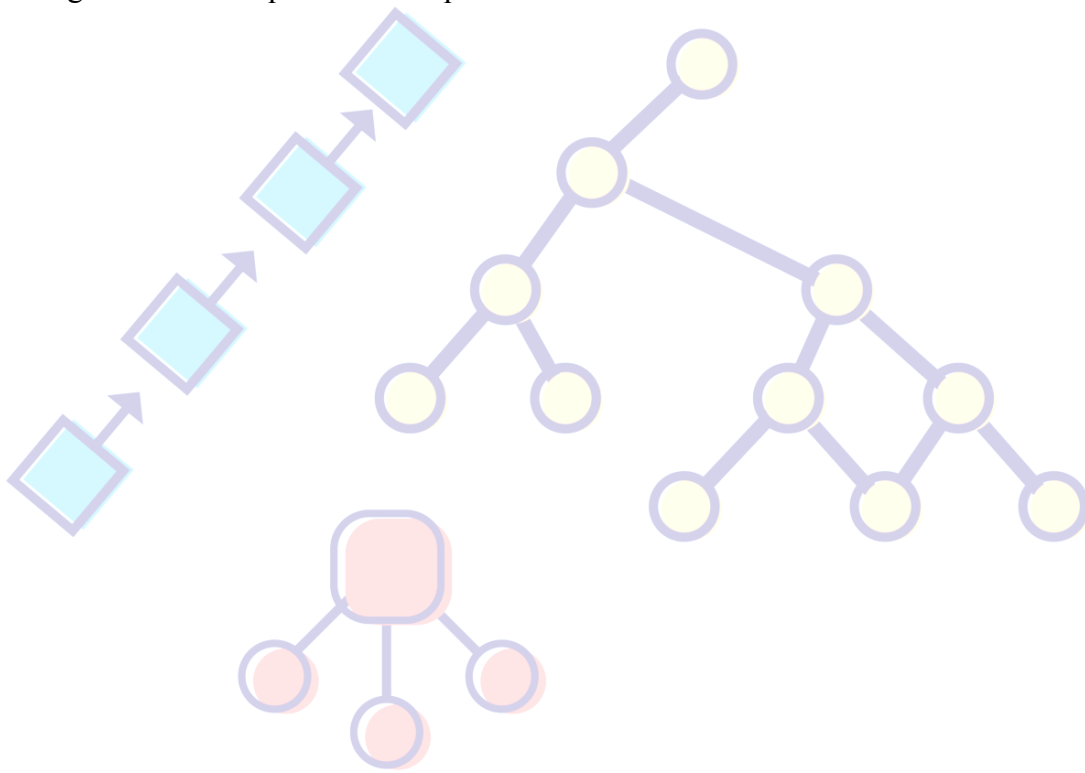
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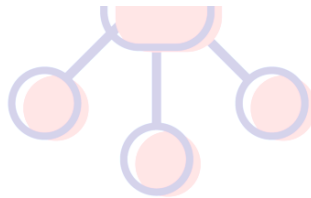
What is Queue?

A line or sequence of people or vehicles awaiting their turn to be attended to or to proceed. This means that a queue is an ordered group of homogeneous items or elements. Queues have two ends: Elements are added at one end, and Elements are removed from the other.



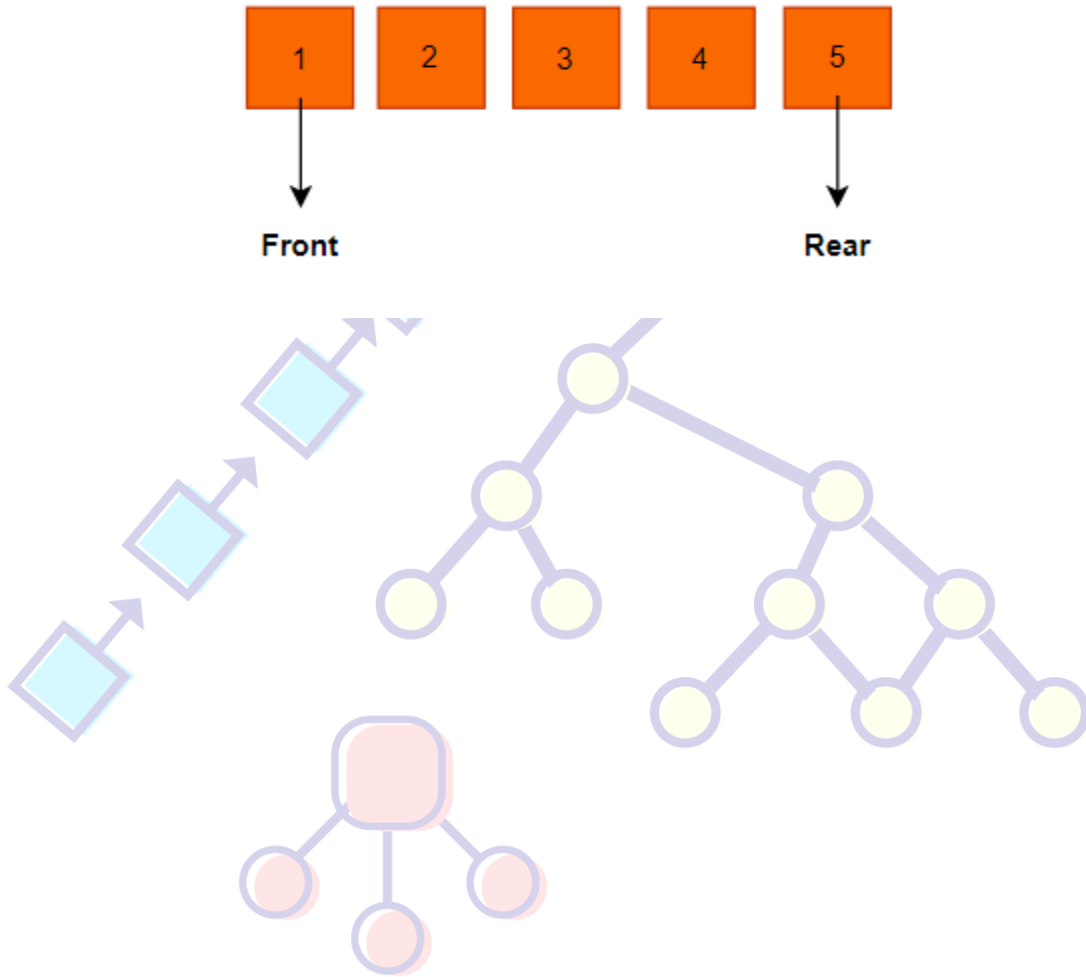
A Queue of persons

In Data Structure, a Queue is a linear data structure that contains data elements that open on both ends. Queue operations are done using the First In First Out ([FIFO](#)) method.



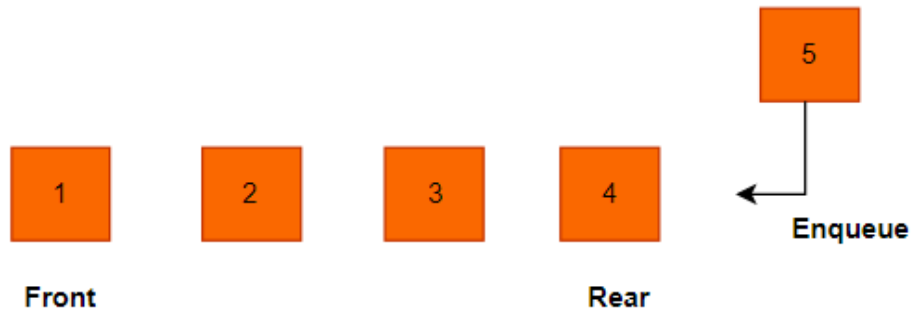
Representation of Queue

By using a linear array we can represent queues very easily. In a queue, we access both the front part and the ending part of a queue. In-front deletion and rear part insertion were performed.

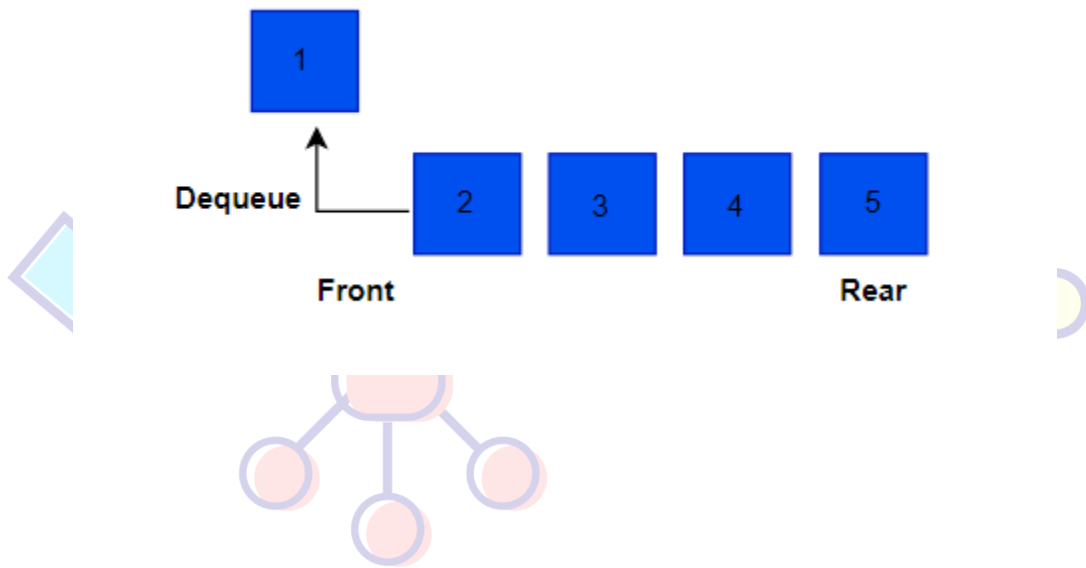


Enqueue and Dequeue

Enqueue is the term by which it means to insert or store a new item at the tail of a queue.

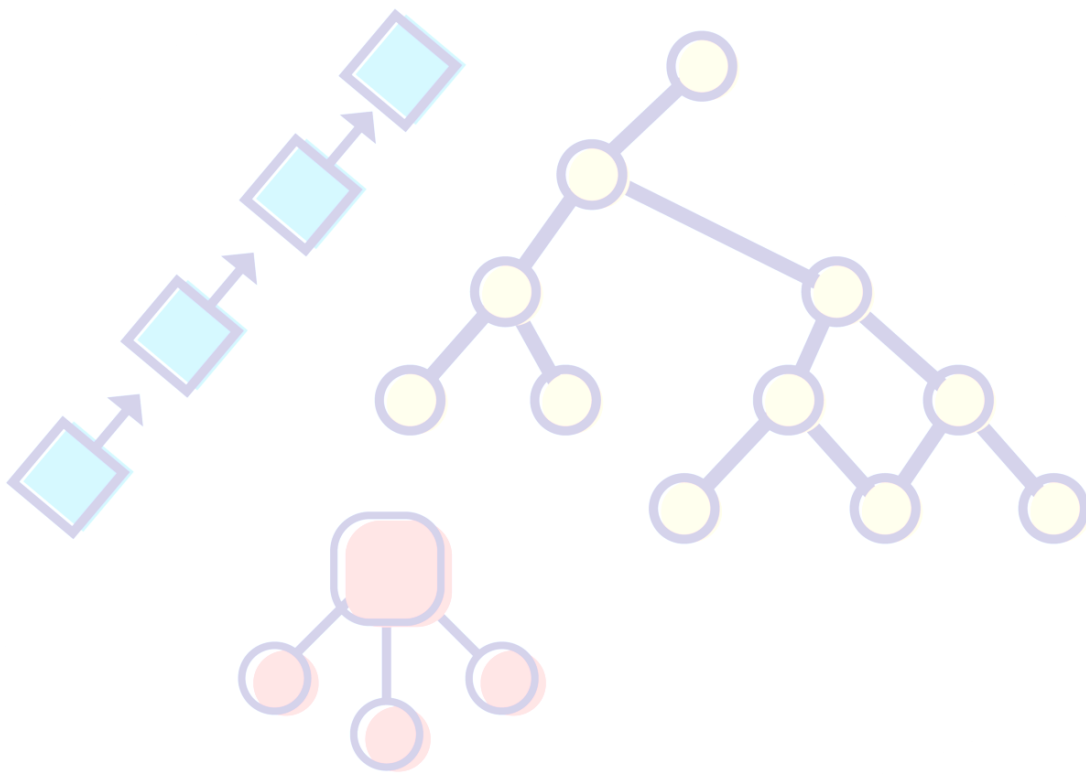


Dequeue is the term by which it means to remove or delete an item from the front of a queue.



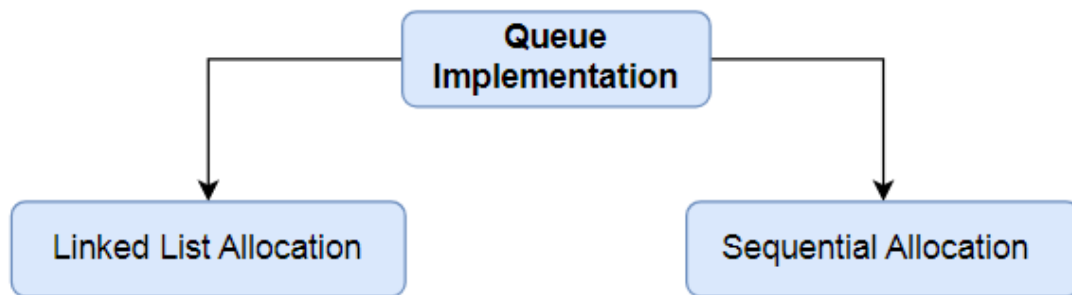
Applications of Queue

For a problem where the First In First Out methodology can be used, we can implement a Queue data structure. For example, CPU and Disk scheduling. Router and Switches in the network and maintain the playlist in the media player.



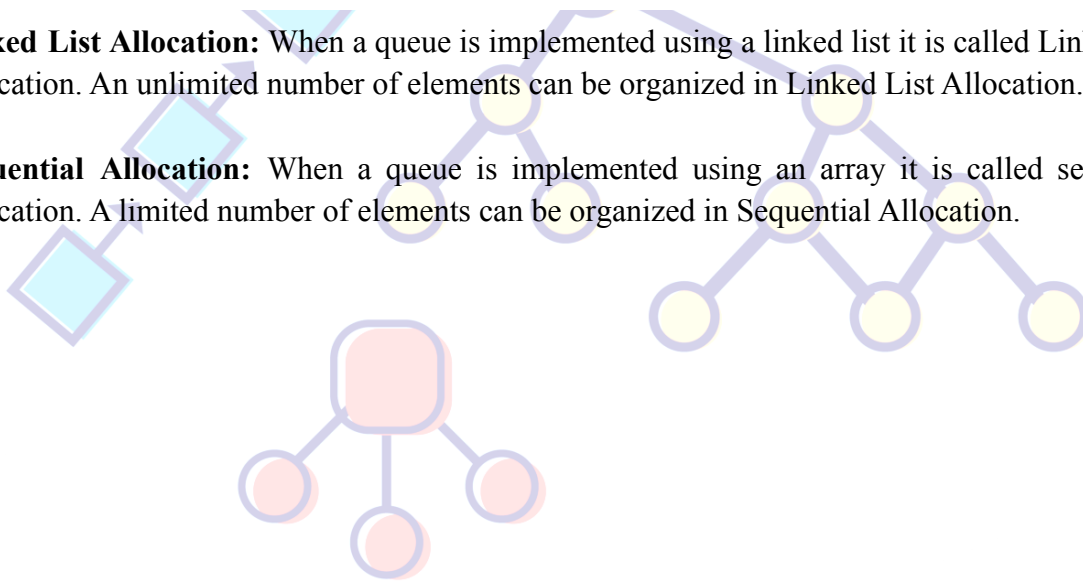
Implementation Queue

The queue can be implemented in two ways. (i) Linked List Allocation and (ii) Sequential Allocation



Linked List Allocation: When a queue is implemented using a linked list it is called Linked List Allocation. An unlimited number of elements can be organized in Linked List Allocation.

Sequential Allocation: When a queue is implemented using an array it is called sequential Allocation. A limited number of elements can be organized in Sequential Allocation.



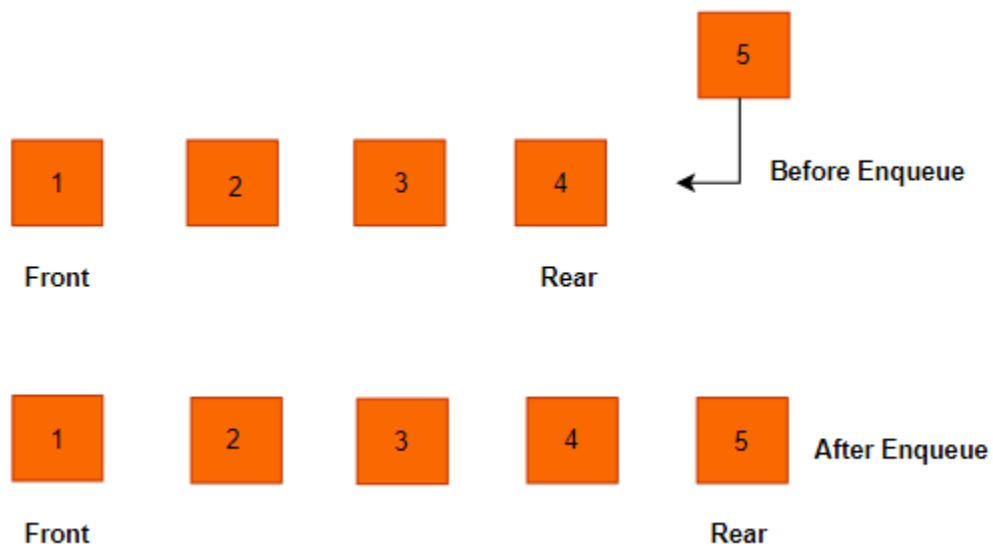
Algorithms of Enqueue and Dequeue

Enqueue:

Enqueue means adding a new data element in the queue. This addition will happen at the Rear part of the queue.

Steps:

1. Check if the queue is full or not.
2. If the queue is full then the element cannot be added because it is overflowing. So exit.
3. If the queue is not full and if this is the first element then make the front 0.
4. Increase the Rear index by 1.
5. Finally, add the new element in the position pointed by Rear.



Dequeue:

Dequeue means deleting a data element from the queue. This deletion will happen at the Front part of the queue.

Steps:

1. Check if the queue is empty or not.
2. If the queue is empty, the element cannot be removed as there are no elements present. So exit.
3. If the queue is not empty then return the value which is pointing to Front.
4. Increment the Front.

