



Sunbeam Institute of Information Technology Pune and Karad

Module – Data Structures and Algorithms

Email – devendra.dhande@sunbeaminfo.com



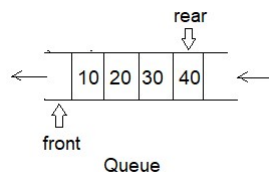
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Queue

Queue

- Queue is First-In-First-Out structure.
- Queue Operations:
 - enqueue()
 - dequeue()
 - peek()
 - is_empty()
 - is_full()



- Types of queue:
 - Linear Queue
 - Circular Queue
 - Deque
 - Priority Queue

Queue

- Jobs submitted to printer
- In Network setups – file access of file server machine is given to First come First serve basis
- Calls are placed on a queue when all operators are busy
- Used in advanced data structures to give efficiency.
- Process waiting queues in OS

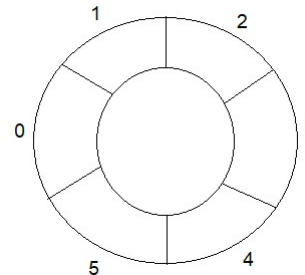
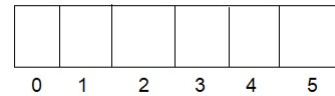


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Circular Queue

- In linear queue (using array) when *rear* reaches last index, further elements cannot be added, even if space is available due to deletion of elements from *front*. Thus space utilization is poor.
- Circular queue allows adding elements at the start of array if *rear* reaches last index and space is free at the start of the array.
- Thus *rear* and *front* can be incremented in circular fashion i.e. 0, 1, 2, 3, ..., $n-1$, 0, 1, ..., $n-1$. So they are said to be circular queue.
- However queue full and empty conditions become tricky.



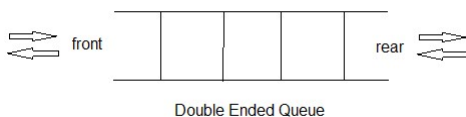
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Deque and Priority Queue

Deque

- Double Ended Queue
- Insert and remove operations are possible from both end of queue.
- Operations can be performed as
 - Push front
 - Pop front
 - Push rear
 - Pop rear



Priority Queue

- Each element is associated with priority.
- Elements are added by their priority.
- This queue is not FIFO
- Element with highest priority comes out first.



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Thank you!

Devendra Dhande

<devendra.dhande@sunbeaminfo.com>



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