Assignment Number: 10

Simulation of pizza parlor: Pizza parlor accepting maximum M orders. Orders are served on a first come first served basis. Order once placed cannot be canceled. Write C++ program to simulate the system using simple queue or circular queue

Objectives:

To know the use of circular queue

Theory:

Circular Queue is a linear data structure in which the operations are performed based on FIFO (First In First Out) principle and the last position is connected back to the first position to make a circle. It is also called **'Ring Buffer'**.

In a normal Queue, we can insert elements until queue becomes full. But once queue becomes full, we cannot insert the next element even if there is a space in front of queue this problem can be overcome by circular queue.

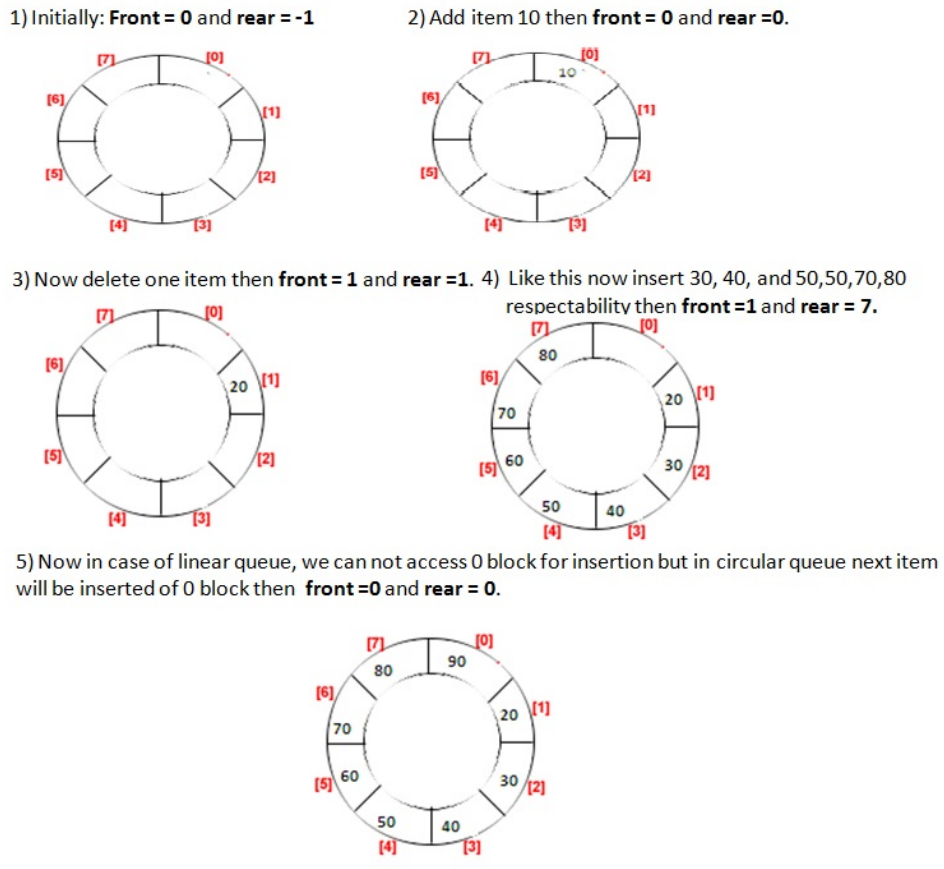

fig. Circular queue implementataion

Operations on Circular Queue:

- **Front:** Get the front item from queue.
- **Rear:** Get the last item from queue.
- **insert():** This function is used to insert an element into the circular queue. In a circular queue, the new element is always inserted at Rear position.
- **delete():** This function is used to delete an element from the circular queue. In a circular queue, the element is always deleted from front position.

Drawback of Circular Queue

- The drawback of circular queue is , difficult to distinguished the full and empty cases. It is also known as boundary case problem.

Applications:

1. **Memory Management:** The unused memory locations in the case of ordinary queues can be utilized in circular queues.
2. **Traffic system:** In computer controlled traffic system, circular queues are used to switch on the traffic lights one by one repeatedly as per the time set.
3. **CPU Scheduling:** Operating systems often maintain a queue of processes that are ready to execute or that are waiting for a particular event to occur.

Time Complexity of operations on circular queue:

Insert:

Delete:

Getfront:

Test cases:

Consider the circular queue of size 5 and perform following operations in sequence

1. delete()
2. Insert (10)
3. Insert(20)
4. Delete()
5. Getfront()
6. Insert (30)
7. Insert (40)
8. Insert (50)
9. Insert(60)
10. Delete()
11. Delete()

12. Delete()
13. Getfront()
14. Insert(70)

Conclusion: Thus we have successfully implemented the pizza parlour orders by the circular queue

Practice problem:

Write a code to implement circular queue using link list.