Assignment - 13

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Problem Statement -
Doubly ended queue (dequeue) is a linear list in which addition and deletion may be made at either end. obtain a data representation mapping a dequeue into 1D array with a function to add or delete element from either end of dequeue.

Objectives:-
- To understant concept and impliment-ation of doubly ended queue.
- To understand addition and deletion operation for queue.

Outcome:-
Student will be able to do
① impliment dequeue data structure using 1D array.
② Write menu driven program in C++

S/W and H/W requirements:-
Eclipse IDE, Windows 10 OS
64 bit system, Intel is processor.

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(2)

Theory:-

Doubly ended queue:-

Dequeue or doubly ended queue is a generalized version of queue data structure that allows insertion & deletion at both ends.

- Insertion in front:-
  add an item to front of dequeue
- insert in last:-
  add an item to rear of dequeue
- Delete front.
  Delete first item of dequeue.
- Delete rear.
  Delete rear element of dequeue.

Algorithm:-

```
struct dq {
    int data[30];
    int rear, front;
};
class queue {
public:
    dq q;
    queue();
    int empty()
    int full()
    void enqr(int x);
    void enqf(int x);
    int dqf();
    int dqr();
```

```
Void print();
};
```

Algorithm:-

Void enqF(int key)

1 if deque is full then print("queue is full")
2 if front = -1 then q.front=0 q.rear=0.
3 else if q.front=0 then set q.front = size-1
4. else front - -1
5 arr[front] = key

Void enqR(int key)

① if dequeue is full then print("queue is full")
② if front = -1 then initialize front & rear to 0.
③ else if rear = size-1 set rear=0 too
④ arr[rear] = key.

Complexity:-

insertion front	O(1)
insertion rear	O(1)
deletion front	O(1)
deletion rear	O(1)

Test cases.

NO	steps.	exp O/P	act O/P	result.
①	insertFront =10	successfully inserted	successfully inserted	pass.
②	Delete front	deleted successfully	deleted successfully	pass

(8) print. queue is queue is pass
empty empty

Conclusion!-:

Successfully emplimented double ended queue in C++ with menu driven program.