Data Structures and its Applications

Dinesh Singh
Department of Computer Science & Engineering

DATA STRUCTURES AND ITS APPLICATIONS

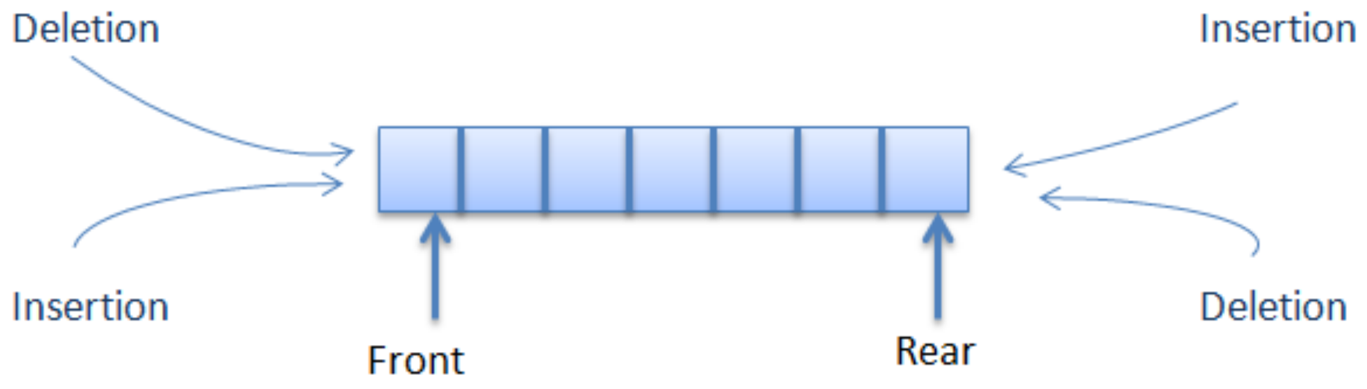
Dequeue - Implementation

Dinesh Singh

Department of Computer Science & Engineering

Dequeue(Double ended Queue) - definition

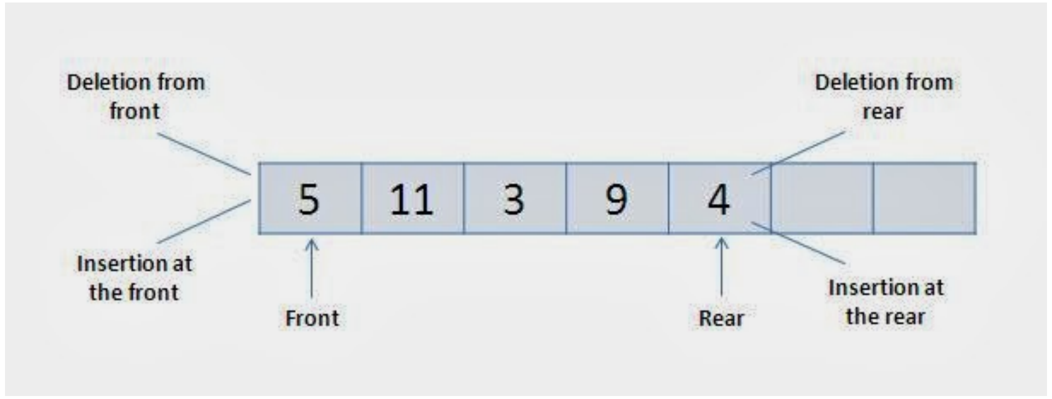
Double ended queue is a queue that allows insertion and deletion at both ends.



Dequeue(Double ended Queue) - definition

The following four basic operations are performed on dequeue:

- *insertFront()*: Adds an item at the front of Deque.
- *insertRear()*: Adds an item at the rear of Deque.
- *deleteFront()*: Deletes an item from front of Deque.
- *deleteRear()*: Deletes an item from rear of Deque.



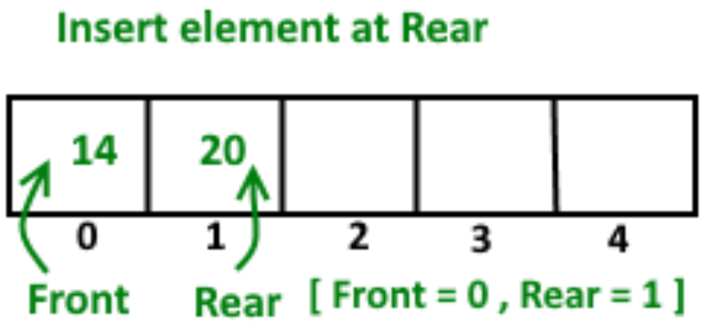
Dequeue(Double ended Queue) - Array Implementation

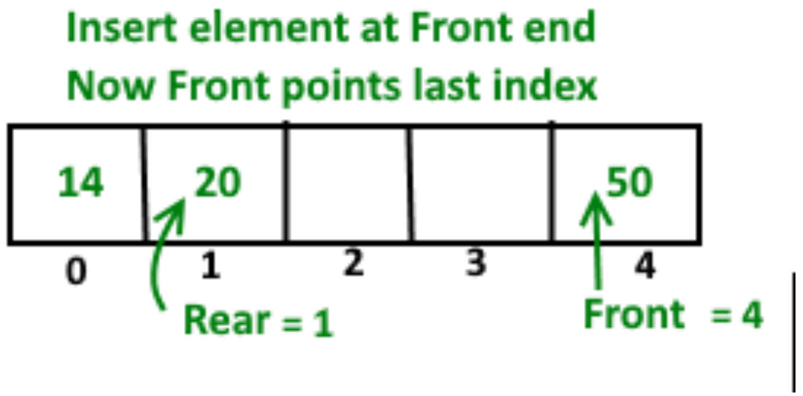
Insert Elements at Rear end :

```
Check whether the queue is full
If rear = size-1
  initialise rear to 0.
else
   increment rear by 1
 insert element at location rear
```

Insert eleement front end

```
Check if the queue is full
If Front =0
  move front to last location (sirxe -1)
else
  decrement front by 1 a
  insert at location front
```





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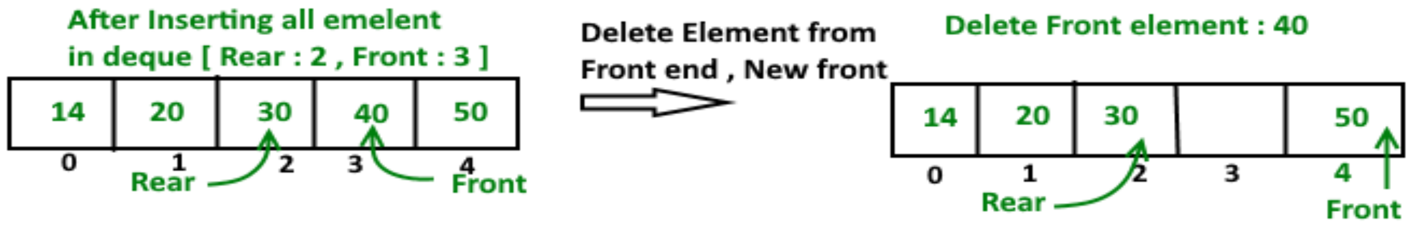
Dequeue(Double ended Queue) - Array Implementation

Delete element at Rear end

```
check if the queue is empty
delete the element pointed by rear
If dequeue has one element
   front=-1 rear=-1;
If rear is at first index
  make rear = size-1
else
   decrease rear by 1
```

Delete element at front end

```
check if the queue is empty
delete the element pointed by front
If dequeue has one element
   front=-1 rear=-1;
If front is at last index
  make front = 0
else
   increase front by 1
```



Dequeue(Double ended Queue) - Doubly Linked list Implementation

Structure of Dequeue

```
struct dequeue
{
   struct node * front;
   struct node * rear;
};
struct node
{
    int data;
    struct node * prev, *next;
};
struct   dequeue dq;

dq.front=dq.rear = NULL
```

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Dequeue(Double ended Queue) - - Doubly Linked list Implementation

```
//insert in front of the queue
void qinsert_head(int x,struct dequeue *dq)
  {
    struct node *temp;

    temp=(struct node*)malloc(sizeof(struct node));
    temp->data=x;
    temp->prev=temp->next=NULL;

    if(dq->front==NULL) // first element
      dq->front=dq->rear=temp;
     else
      {
        temp->next=dq->front;  // insert in front
        dq->front->prev=temp;
        temp->prev=NULL;
        dq->front=temp;
      }
  }
```

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Dequeue(Double ended Queue) - - Doubly Linked list Implementation

```
//insert at the rear of the queue
void qinsert_tail(int x,struct dequeue* dq)
 {
   struct node *temp;

    temp=(struct node*)malloc(sizeof(struct node));
    temp->data=x;
    temp->prev=temp->next=NULL;

    if(dq->front==NULL)
       dq->front=dq->rear=temp;
     else
       {
         dq->rear->next=temp;
         temp->prev=dq->rear;
         dq->rear=temp;
       }
  }
```

Dequeue(Double ended Queue) - - Doubly Linked list Implementation

```
//delete at the front of the queue
int qdelete_head(struct dequeue* dq)
 {
    struct node *q;
    int x;
    if(dq->front==NULL)
      return -1;

   q=dq->front;
    x=q->data;
   if(dq->front==dq->rear)//only one node
     dq->front=dq->rear=NULL;
   else
     {
       dq->front=dq->front->next;
       dq->front->prev=NULL;
     }
     free(q);
    return x;
  }
```

Data Structures and its Applications

Dequeue(Double ended Queue) - - Doubly Linked list Implementation

```
//delete at the rear of the queue
int  qdelete_tail(struct dequeue* dq)
 {
   struct node *q;
    int x;
    if(dq->front==NULL)
      return -1;
    q=dq->rear;
    x=q->data;
   if(dq->front==dq->rear)//only one node
     dq->front=dq->rear=NULL;
   else
    {
       dq->rear=dq->rear->prev;
       dq->rear->next=NULL;
     }
    free(q);
     return x;
  }
```

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THANK YOU

Dinesh Singh

Department of Computer Science & Engineering

dineshs@pes.edu

+91 8088654402