**Practical No:-12**

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Title:-

/\*\*

A double-ended queue (deque) is a linear list in which additions and deletions may be made at either end. Obtain a data representation mapping a deque into a one-dimensional array. Write

C++ program to simulate deque with functions to add and delete elements from either end of the deque.

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INPUT:-

#include<iostream>

#include<stdlib.h>

using namespace std;

#define SIZE 5

class dequeue

{

int a[10],front,rear,count;

public:

dequeue();

void add\_at\_beg(int);

void add\_at\_end(int);

void delete\_fr\_front();

void delete\_fr\_rear();

void display();

};

dequeue::dequeue()

{

front=-1;

rear=-1;

count=0;

}

void dequeue::add\_at\_beg(int item)

{

int i;

if(front==-1)

{

front++;

rear++;

a[rear]=item;

count++;

}

else if(rear>=SIZE-1)

{

cout<<"\nInsertion is not possible,overflow!!!!";

}

else

{

for(i=count;i>=0;i--)

{

a[i]=a[i-1];

}

a[i]=item;

count++;

rear++;

}

}

void dequeue::add\_at\_end(int item)

{

if(front==-1)

{

front++;

rear++;

a[rear]=item;

count++;

}

else if(rear>=SIZE-1)

{

cout<<"\nInsertion is not possible,overflow!!!";

return;

}

else

{

a[++rear]=item;

}

}

void dequeue::display()

{

for(int i=front;i<=rear;i++)

{

cout<<a[i]<<" "; }

}

void dequeue::delete\_fr\_front()

{

if(front==-1)

{

cout<<"Deletion is not possible:: Dequeue is empty";

return;

}

else

{

if(front==rear)

{

front=rear=-1;

return;

}

cout<<"The deleted element is "<<a[front];

front=front+1;

}

}

void dequeue::delete\_fr\_rear()

{

if(front==-1)

{

cout<<"Deletion is not possible:Dequeue is empty";

return;

}

else

{

if(front==rear)

{

front=rear=-1;

}

cout<<"The deleted element is "<< a[rear];

rear=rear-1;

}

}

int main()

{

int c,item;

dequeue d1;

do

{

cout<<"\n\n\*\*\*\*DEQUEUE OPERATION\*\*\*\*\n";

cout<<"\n1-Insert at beginning";

cout<<"\n2-Insert at end";

cout<<"\n3\_Display";

cout<<"\n4\_Deletion from front";

cout<<"\n5-Deletion from rear";

cout<<"\n6\_Exit";

cout<<"\nEnter your choice<1-4>:";

cin>>c;

switch(c)

{

case 1:

cout<<"Enter the element to be inserted:";

cin>>item;

d1.add\_at\_beg(item);

break;

case 2:

cout<<"Enter the element to be inserted:";

cin>>item;

d1.add\_at\_end(item);

break;

case 3:

d1.display();

break;

case 4:

d1.delete\_fr\_front();

break;

case 5:

d1.delete\_fr\_rear();

break;

case 6:

exit(1);

break;

default:

cout<<"Invalid choice";

break;

}

}while(c!=7);

return 0;

}

OUTPUT:-

jaihind@jaihind-ThinkCentre-M60e:~$ g++ yash12.cpp

jaihind@jaihind-ThinkCentre-M60e:~$ ./a.out

\*\*\*\*DEQUEUE OPERATION\*\*\*\*

1-Insert at beginning

2-Insert at end

3\_Display

4\_Deletion from front

5-Deletion from rear

6\_Exit

Enter your choice<1-4>:1

Enter the element to be inserted:23

\*\*\*\*DEQUEUE OPERATION\*\*\*\*

1-Insert at beginning

2-Insert at end

3\_Display

4\_Deletion from front

5-Deletion from rear

6\_Exit

Enter your choice<1-4>:2

Enter the element to be inserted:34

\*\*\*\*DEQUEUE OPERATION\*\*\*\*

1-Insert at beginning

2-Insert at end

3\_Display

4\_Deletion from front

5-Deletion from rear

6\_Exit

Enter your choice<1-4>:3

23 34

\*\*\*\*DEQUEUE OPERATION\*\*\*\*

1-Insert at beginning

2-Insert at end

3\_Display

4\_Deletion from front

5-Deletion from rear

6\_Exit

Enter your choice<1-4>:4

The deleted element is 23

\*\*\*\*DEQUEUE OPERATION\*\*\*\*

1-Insert at beginning

2-Insert at end

3\_Display

4\_Deletion from front

5-Deletion from rear

6\_Exit

Enter your choice<1-4>:5

The deleted element is 34

\*\*\*\*DEQUEUE OPERATION\*\*\*\*

1-Insert at beginning

2-Insert at end

3\_Display

4\_Deletion from front

5-Deletion from rear

6\_Exit

Enter your choice<1-4>:6