**PUNE INSTITUTE OF COMPUTER TECHNOLOGY DHANKAWADI, PUNE**

**Data Structures And Algorithms(DSA)**

**Assignment No. 03**

**Title : Circular Queue**

**SE-IT-10**  **ACADEMIC YEAR :- 2020-2021**

**Name :- Diptesh Ravindra Varule Roll No :- 23277**

//============================================================================

// Name : CircularQueue.cpp

// Author : Diptesh Ravindra Varule

// Version :Updating…

// Copyright : ……………………………………..

// Description : Hello World in C++, Ansi-style

//============================================================================

**Source Code :**

#include <iostream>

using namespace std;

class Student{

private:

string name;

int roll\_no;

int marks;

public:

friend class CircularQueue;

//Consrtuctor to initialize the values

Student(){

name="Null";

roll\_no=0;

marks=0;

}

//method to input data from the user

void input(){

cout<<"Enter name : ";

cin.ignore();

getline(cin,name);

cout<<"Enter your roll no. : ";

cin>>roll\_no;

cout<<"Enter your marks : ";

cin>>marks;

}

//method to display the details of the student

void display(){

cout<<"Name : "<<name<<endl;

cout<<"Roll No. : "<<roll\_no<<endl;

cout<<"Marks : "<<marks<<endl;

cout<<endl;

}

};

class CircularQueue{

private:

Student arr[5];

Student data;

int front,rear,itemCount;

public:

friend class Student;

//Initialisation using constructor

CircularQueue(){

itemCount=0;

front=-1;

rear=-1;

for(int i=0;i<5;i++){

arr[i].name="Null";

arr[i].roll\_no=0;

arr[i].marks=0;

}

}

//method to check whether the queue is Empty

bool isEmpty(){

if(front==-1 && rear==-1){

return true;

}

else{

return false;

}

}

//Method to check whether the queue is full

bool isFull(){

if((rear+1)%5==front){

return true;

}

else{

return false;

}

}

//method to enqueue a student

void enqueue(){

if(isFull()){

cout<<"Queue is full";

return;

}

else if(isEmpty()){

front=0;

rear=0;

}

else{

rear=(rear+1)%5;

}

data.input();

arr[rear]=data;

itemCount++;

}

//method to dequeue a student

Student dequeue(){

Student x;

Student y;

if(isEmpty()){

cout<<"Queue is empty";

return x;

}

else if(front==rear){

x=arr[front];

front=-1;

rear=-1;

arr[front]=y;

itemCount--;

return x;

}

else{

x=arr[front];

arr[front]=y;

front=(front+1)%5;

itemCount--;

return x;

}

}

//method to return the no of stuudents in queue

int count(){

return itemCount;

}

//method to display the queue

void displayAll(){

cout<<"The Students in the queue are as follows........."<<endl;

for (int i=0;i<=4;i++){

arr[i].display();

cout<<endl;

}

cout<<endl;

}

};

int main() {

CircularQueue obj;

Student z;

int option,value;

do{

cout<<"Select the Operation you want to perform...."<<endl;

cout<<"1.Enqueue()"<<endl;

cout<<"2.Dequeue()"<<endl;

cout<<"3.isEmpty()"<<endl;

cout<<"4.isFull()"<<endl;

cout<<"5.count()"<<endl;

cout<<"6.display()"<<endl;

cout<<"7.clearscreen()"<<endl;

cin>>option;

switch(option){

case 0:

break;

case 1:

cout<<"Enter the STUDENT to enqueue .........."<<endl;

obj.enqueue();

break;

case 2:

z=obj.dequeue();

cout<<"Dequeued STUDENT is ........"<<endl;

z.display();

break;

case 3:

if(obj.isEmpty()){

cout<<"Queue is Empty"<<endl;

}

else{

cout<<"Queue is not Empty"<<endl;

}

break;

case 4:

if(obj.isFull()){

cout<<"Queue is full"<<endl;

}

else{

cout<<"Queue is not full"<<endl;

}

break;

case 5:

cout<<"The size of the queue is "<<obj.count()<<endl;

break;

case 6:

obj.displayAll();

break;

case 7:

system("cls");

break;

default:

cout<<"Enter the correct option"<<endl;

}

}while(option!=0);

return 0;

}

**OUTPUT :**

Select the Operation you want to perform....

1.Enqueue()

2.Dequeue()

3.isEmpty()

4.isFull()

5.count()

6.display()

7.clearscreen()

3

Queue is Empty

Select the Operation you want to perform....

1.Enqueue()

2.Dequeue()

3.isEmpty()

4.isFull()

5.count()

6.display()

7.clearscreen()

5

The size of the queue is 0

Select the Operation you want to perform....

1.Enqueue()

2.Dequeue()

3.isEmpty()

4.isFull()

5.count()

6.display()

7.clearscreen()

1

Enter the STUDENT to enqueue ..........

Enter name : Diptesh Varule

Enter your roll no. : 23277

Enter your marks : 85

Select the Operation you want to perform....

1.Enqueue()

2.Dequeue()

3.isEmpty()

4.isFull()

5.count()

6.display()

7.clearscreen()

1

Enter the STUDENT to enqueue ..........

Enter name : Manoj Sirvi

Enter your roll no. : 23272

Enter your marks : 96

Select the Operation you want to perform....

1.Enqueue()

2.Dequeue()

3.isEmpty()

4.isFull()

5.count()

6.display()

7.clearscreen()

1

Enter the STUDENT to enqueue ..........

Enter name : Shweth Shetty

Enter your roll no. : 23270

Enter your marks : 82

Select the Operation you want to perform....

1.Enqueue()

2.Dequeue()

3.isEmpty()

4.isFull()

5.count()

6.display()

7.clearscreen()

1

Enter the STUDENT to enqueue ..........

Enter name : Shubham Sandanshiv

Enter your roll no. : 2326

Enter your marks : 76

Select the Operation you want to perform....

1.Enqueue()

2.Dequeue()

3.isEmpty()

4.isFull()

5.count()

6.display()

7.clearscreen()

1

Enter the STUDENT to enqueue ..........

Enter name : Abhijeet Mahajan

Enter your roll no. : 23219

Enter your marks : 89

Select the Operation you want to perform....

1.Enqueue()

2.Dequeue()

3.isEmpty()

4.isFull()

5.count()

6.display()

7.clearscreen()

5

The size of the queue is 5

Select the Operation you want to perform....

1.Enqueue()

2.Dequeue()

3.isEmpty()

4.isFull()

5.count()

6.display()

7.clearscreen()

4

Queue is full

Select the Operation you want to perform....

1.Enqueue()

2.Dequeue()

3.isEmpty()

4.isFull()

5.count()

6.display()

7.clearscreen()

1

Enter the STUDENT to enqueue ..........

Queue is fullSelect the Operation you want to perform....

1.Enqueue()

2.Dequeue()

3.isEmpty()

4.isFull()

5.count()

6.display()

7.clearscreen()

16

Enter the correct option

Select the Operation you want to perform....

1.Enqueue()

2.Dequeue()

3.isEmpty()

4.isFull()

5.count()

6.display()

7.clearscreen()

6

The Students in the queue are as follows.........

Name : Diptesh Varule

Roll No. : 23277

Marks : 85

Name : Manoj Sirvi

Roll No. : 23272

Marks : 96

Name : Shweth Shetty

Roll No. : 23270

Marks : 82

Name : Shubham Sandanshiv

Roll No. : 2326

Marks : 76

Name : Abhijeet Mahajan

Roll No. : 23219

Marks : 89

Select the Operation you want to perform....

1.Enqueue()

2.Dequeue()

3.isEmpty()

4.isFull()

5.count()

6.display()

7.clearscreen()

2

Dequeued STUDENT is ........

Name : Diptesh Varule

Roll No. : 23277

Marks : 85

Select the Operation you want to perform....

1.Enqueue()

2.Dequeue()

3.isEmpty()

4.isFull()

5.count()

6.display()

7.clearscreen()

6

The Students in the queue are as follows.........

Name : Null

Roll No. : 0

Marks : 0

Name : Manoj Sirvi

Roll No. : 23272

Marks : 96

Name : Shweth Shetty

Roll No. : 23270

Marks : 82

Name : Shubham Sandanshiv

Roll No. : 2326

Marks : 76

Name : Abhijeet Mahajan

Roll No. : 23219

Marks : 89

Select the Operation you want to perform....

1.Enqueue()

2.Dequeue()

3.isEmpty()

4.isFull()

5.count()

6.display()

7.clearscreen()

2

Dequeued STUDENT is ........

Name : Manoj Sirvi

Roll No. : 23272

Marks : 96

Select the Operation you want to perform....

1.Enqueue()

2.Dequeue()

3.isEmpty()

4.isFull()

5.count()

6.display()

7.clearscreen()

6

The Students in the queue are as follows.........

Name : Null

Roll No. : 0

Marks : 0

Name : Null

Roll No. : 0

Marks : 0

Name : Shweth Shetty

Roll No. : 23270

Marks : 82

Name : Shubham Sandanshiv

Roll No. : 2326

Marks : 76

Name : Abhijeet Mahajan

Roll No. : 23219

Marks : 89

Select the Operation you want to perform....

1.Enqueue()

2.Dequeue()

3.isEmpty()

4.isFull()

5.count()

6.display()

7.clearscreen()

2

Dequeued STUDENT is ........

Name : Shweth Shetty

Roll No. : 23270

Marks : 82

Select the Operation you want to perform....

1.Enqueue()

2.Dequeue()

3.isEmpty()

4.isFull()

5.count()

6.display()

7.clearscreen()

6

The Students in the queue are as follows.........

Name : Null

Roll No. : 0

Marks : 0

Name : Null

Roll No. : 0

Marks : 0

Name : Null

Roll No. : 0

Marks : 0

Name : Shubham Sandanshiv

Roll No. : 2326

Marks : 76

Name : Abhijeet Mahajan

Roll No. : 23219

Marks : 89

Select the Operation you want to perform....

1.Enqueue()

2.Dequeue()

3.isEmpty()

4.isFull()

5.count()

6.display()

7.clearscreen()

1

Enter the STUDENT to enqueue ..........

Enter name : Utkarsh Magar

Enter your roll no. : 23243

Enter your marks : 87

Select the Operation you want to perform....

1.Enqueue()

2.Dequeue()

3.isEmpty()

4.isFull()

5.count()

6.display()

7.clearscreen()

6

The Students in the queue are as follows.........

Name : Utkarsh Magar

Roll No. : 23243

Marks : 87

Name : Null

Roll No. : 0

Marks : 0

Name : Null

Roll No. : 0

Marks : 0

Name : Shubham Sandanshiv

Roll No. : 2326

Marks : 76

Name : Abhijeet Mahajan

Roll No. : 23219

Marks : 89

Select the Operation you want to perform....

1.Enqueue()

2.Dequeue()

3.isEmpty()

4.isFull()

5.count()

6.display()

7.clearscreen()

2

Dequeued STUDENT is ........

Name : Shubham Sandanshiv

Roll No. : 2326

Marks : 76

Select the Operation you want to perform....

1.Enqueue()

2.Dequeue()

3.isEmpty()

4.isFull()

5.count()

6.display()

7.clearscreen()

6

The Students in the queue are as follows.........

Name : Utkarsh Magar

Roll No. : 23243

Marks : 87

Name : Null

Roll No. : 0

Marks : 0

Name : Null

Roll No. : 0

Marks : 0

Name : Null

Roll No. : 0

Marks : 0

Name : Abhijeet Mahajan

Roll No. : 23219

Marks : 89

Select the Operation you want to perform....

1.Enqueue()

2.Dequeue()

3.isEmpty()

4.isFull()

5.count()

6.display()

7.clearscreen()

2

Dequeued STUDENT is ........

Name : Abhijeet Mahajan

Roll No. : 23219

Marks : 89

Select the Operation you want to perform....

1.Enqueue()

2.Dequeue()

3.isEmpty()

4.isFull()

5.count()

6.display()

7.clearscreen()

6

The Students in the queue are as follows.........

Name : Utkarsh Magar

Roll No. : 23243

Marks : 87

Name : Null

Roll No. : 0

Marks : 0

Name : Null

Roll No. : 0

Marks : 0

Name : Null

Roll No. : 0

Marks : 0

Name : Null

Roll No. : 0

Marks : 0

Select the Operation you want to perform....

1.Enqueue()

2.Dequeue()

3.isEmpty()

4.isFull()

5.count()

6.display()

7.clearscreen()

2