



RIPHAH
INTERNATIONAL UNIVERSITY

Name: Muhammad Fahad

SAP ID: 29006

Course: BSCS

Section: BSCS-3

Subject: DSA

Submitted To: Ma'am Zarmina

Submission Date: 06/07/2022

Priority queues using Stacks

```
#include<iostream>

using namespace std;

class Stacks
{
    int *arr;
    int capacity;
    int pos;
public:
    Stacks()
    {
        capacity = 10;
        arr = new int[capacity];
        pos = -1;
        for (int i = 0; i < capacity; i++)
        {
            arr[i] = 0;
        }
    }
    Stacks(int c)
    {
        capacity = c;
        arr = new int[capacity];
        pos = -1;
```

```
for (int i = 0; i < capacity; i++)
```

```
{
```

```
arr[i] = 0;
```

```
}
```

```
}
```

```
bool isEmpty()
```

```
{
```

```
if (pos<0)
```

```
{
```

```
return true;
```

```
}
```

```
return false;
```

```
}
```

```
void push(int data)
```

```
{
```

```
if (pos >= capacity - 1)
```

```
cout << "Stack Full" << endl;
```

```
else
```

```
{
```

```
pos++;
```

```
arr[pos] = data;
```

```
}
```

```
}
```

```
int pop()
```

```
{
```

```
int x = 0, y = 0;
```

```
if (pos <= -1)
```

```
{
```

```

return -1;
}
else
{
x = arr[pos];
arr[pos] = 0;
pos--;
}
return x;
}
void display()
{
for (int i = 0; i < capacity; i++)
{
cout << endl << arr[i];
}
}
~Stacks();

};

```

```

class PQueue
{
private:
Stacks* s;
Stacks* pro;
int capacity;
int priority;
int rare, front;

```

```
public:
PQueue()
{
capacity = 10;
rare = 0;
front = 0;
}
PQueue(int c)
{
capacity = c;
s = new Stacks(c);
pro = new Stacks(c);
rare = 0;
front = 0;
}
bool isFull()
{
if (rare == capacity)
return true;
return false;
}
bool isEmpty()
{
if (front == capacity)
return true;
return false;
}
void Enqueue(int a,int p)
{
```

```

if (!isFull())
{
if (rare == 0)
{
s->push(a);
pro->push(p);
}
else
{
Stacks* ss = new Stacks(capacity);
Stacks* proo = new Stacks(capacity);
int x = pro->pop();
proo->push(x);
ss->push(s->pop());
if (x>=p)
{
pro->push(proo->pop());
s->push(ss->pop());
s->push(a);
pro->push(p);
}
else
{
while (!(x>= p))
{
x = pro->pop();
if (x == -1)
{
break;

```

```
}  
if (x >= p)  
{  
    pro->push(x);  
    break;  
}  
proo->push(x);  
ss->push(s->pop());  
}  
pro->push(p);  
s->push(a);  
int y = proo->pop();  
pro->push(y);  
s->push(ss->pop());  
while (!(y<0))  
{  
    y = proo->pop();  
    if (y == -1)  
    {  
        break;  
    }  
    pro->push(y);  
    s->push(ss->pop());  
}  
}  
}  
rare++;  
}  
else
```

```
{  
cout << "The queue is already full." << endl;  
}  
}  
int Dequeue()  
{  
int x;  
  
if (!isEmpty())  
{  
if (front == 0)  
{  
front++;  
x = s->pop();  
}  
else  
{  
x = s->pop();  
front++;  
}  
return x;  
}  
else  
{  
cout << "The queue is empty." << endl;  
}  
}  
void display()  
{
```



```
int x;
for (int i = 0; i < capacity; i++)
{
    x = Dequeue();
    cout << "Data: " << x << " Priority: " << pro->pop() << endl;
    rare--;
}
```

```
}
```

```
};
```

```
int main()
```

```
{
```

```
int x;
```

```
int y;
```

```
int q;
```

```
cout << "Please enter the capacity of the queue: ";
```

```
cin >> q;
```

```
PQueue* q1= new PQueue(q);
```

```
for (int i = 0; i < q; i++)
```

```
{
```

```
cout << "Please enter " << i+1 << " value in queue: ";
```

```
cin >> x;
```

```
cout << "Please enter it's priority: ";
```

```
cin >> y;
```

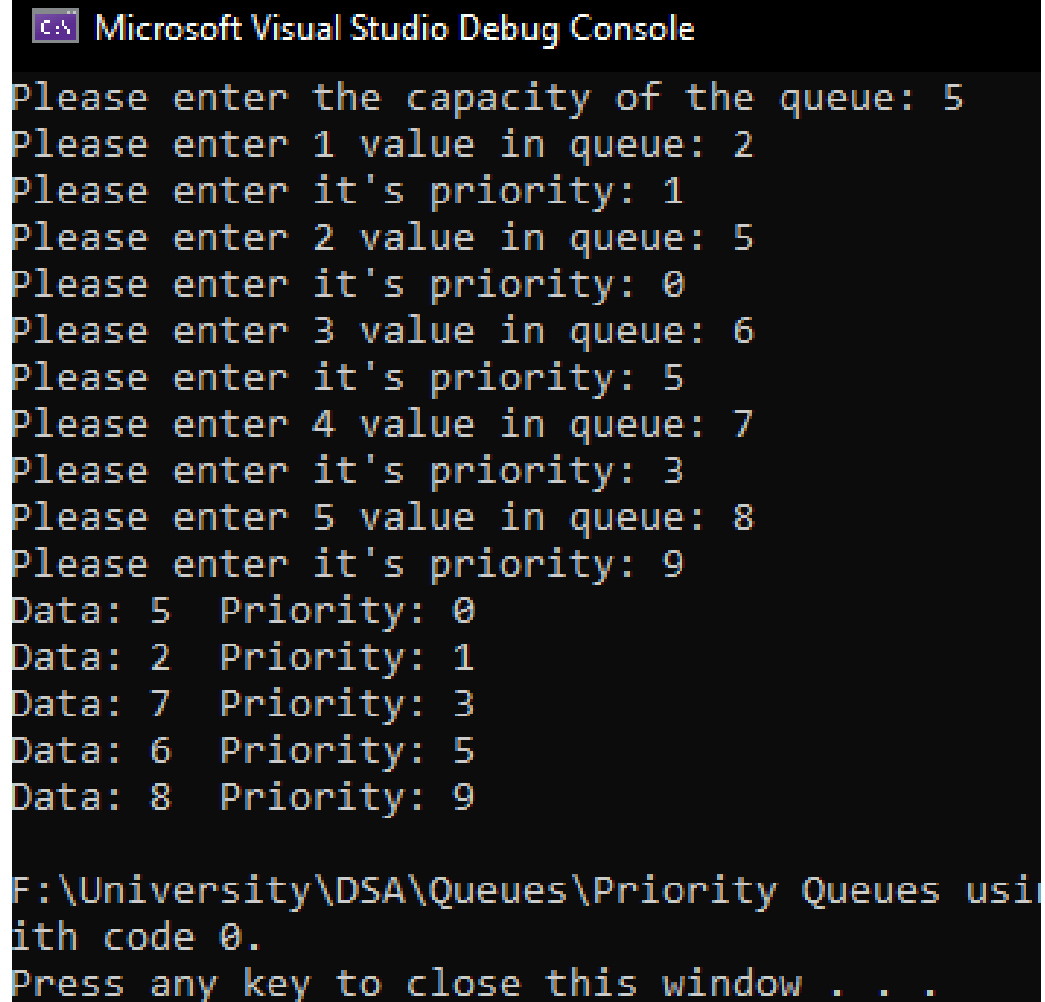
```
q1->Enqueue(x,y);
```

```
}
```

```
q1->display();
```

```
}
```

Program Execution



The screenshot shows the Microsoft Visual Studio Debug Console with the following text:

```
C:\> Microsoft Visual Studio Debug Console  
Please enter the capacity of the queue: 5  
Please enter 1 value in queue: 2  
Please enter it's priority: 1  
Please enter 2 value in queue: 5  
Please enter it's priority: 0  
Please enter 3 value in queue: 6  
Please enter it's priority: 5  
Please enter 4 value in queue: 7  
Please enter it's priority: 3  
Please enter 5 value in queue: 8  
Please enter it's priority: 9  
Data: 5  Priority: 0  
Data: 2  Priority: 1  
Data: 7  Priority: 3  
Data: 6  Priority: 5  
Data: 8  Priority: 9  
  
F:\University\DSA\Queues\Priority Queues using  
ith code 0.  
Press any key to close this window . . .
```