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Name	Shubham Sarang
Roll No	1345
Topic	Queues
Title of Program	Priority Queue

CODE:

```
/*

        Name: Shubham Sarang

        Roll no: 1345

        Unit 4: Queues

        Program: Priority Queue

*/


#include<iostream>

#include<conio.h>


using namespace std;


//1. Node template

class PNode

{

        public:

                int data;

                int priority;
```

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```cpp
        PNode *next;

};


//2. Queue template


class PQueue
{
      PNode *front;
      public:
              PQueue()
              {
                      front = NULL;
              }
              void Enqueue(int x, int p);
              void Dqueue();
              void PeekFront();
              void PeekRear();
              void Display();
};

//3. Functions
```

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```
void PQueue::Enqueue(int x, int p)

{

        PNode *t = new PNode();

        t->data = x;

        t->priority = p;

        t->next = NULL;


        //first node

        if(front == NULL)

        {

                front = t;

                return;

        }

        //Traverse in order

        PNode *tmp = front;

        PNode *prev = NULL;


        while(tmp != NULL && tmp->priority < t->priority)

        {

                prev = tmp;

                tmp = tmp->next;

        }
```

```
//Insert t at the correct position in the queue


if(tmp == front) //Front node Insertion
{
        t->next = front;

        front = t;
}
else if(tmp == NULL) //Last node insertion
{
        prev->next = t;
}
}


void PQueue::Dqueue()
{
    PNode *tmp = front;

    if(front->next == NULL)
    {
        front == NULL;
    }
    else
```

```cpp
    {
        front = front->next;
    }
    cout<<"Element "<<tmp->data<<" dequeued with priority "<<tmp->priority;
    delete tmp;
}


void PQueue::PeekFront()
{
    PNode *tmp = front;
    cout<<"Element at the front is "<<tmp->data<<" with priority "<<tmp->priority;
}


void PQueue::PeekRear()
{
    PNode *tmp = front;
    while(tmp->next != NULL)
    {
        tmp = tmp->next;
    }
    cout<<"Element at the front is "<<tmp->data<<" with priority "<<tmp->priority;
}
```

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```cpp
void PQueue::Display()
{
    if(front == NULL)
    {
        cout<<"Empty Queue";
        return;
    }
    PNode *tmp = front;
    cout<<"Data | Priority \n";

    while(tmp != NULL)
    {
        cout<<tmp->data<<" | "<<tmp->priority<<"\n";
        tmp = tmp->next;
    }
}

//4. Menu

int main()
{
```

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```cpp
int ch, num, pri;

PQueue p;


while(1)

{

        system("cls");

        cout<<"***Priority Queue*** \n\n";


        cout<<"1. Enqueue \n";

        cout<<"2. Dequeue \n";

        cout<<"3. Peek front \n";

        cout<<"4. Peek rear \n";

        cout<<"5. Display queue \n";

        cout<<"6. Exit \n";


        cout<<"Enter your choice: ";

        cin>>ch;


        switch(ch)

        {

                case 1:

                        cout<<"Enqueue element: ";
```

```cpp
            cin>>num;

            cout<<"Enter priority: ";

            cin>>pri;

            p.Enqueue(num,pri);

            getch();

            break;

        case 2:

            cout<<"Dequeue element: ";

            p.Dqueue();

            getch();

            break;

        case 3:

            cout<<"Peek front: ";

            p.PeekFront();

            getch();

            break;

        case 4:

            cout<<"Peek rear: ";

            p.PeekRear();

            getch();

            break;

        case 5:
```
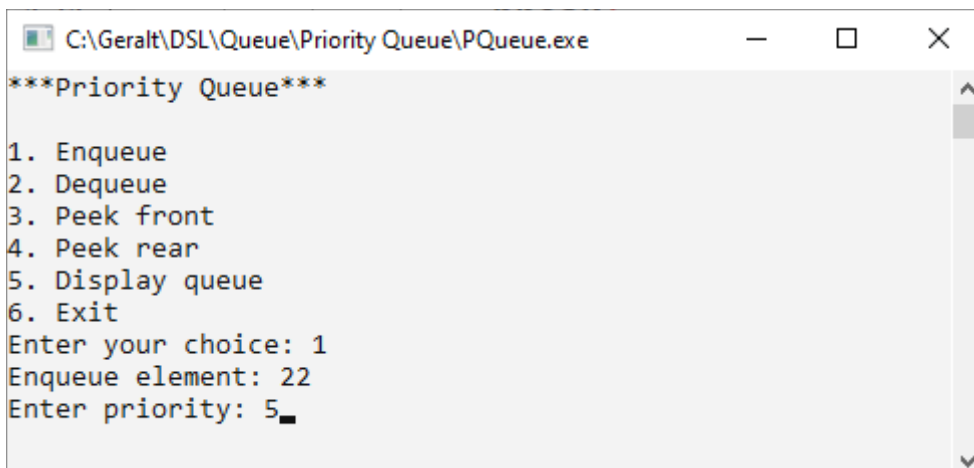
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```
            cout<<"Display queue: \n";

            p.Display();

            getch();

            break;

        case 6:

            exit(1);

            break;

        default:

            cout<<"Wrong opt bruv";

            getch();

            break;

    }//end switch

  }//end while

}//end main
```

OUTPUT: ADD ELEMENT:

Display:

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```
C:\Geralt\DSL\Queue\Priority Queue\PQueue.exe

***Priority Queue***

1. Enqueue
2. Dequeue
3. Peek front
4. Peek rear
5. Display queue
6. Exit
Enter your choice: 5
Display queue:
Data | Priority
24 | 2
22 | 5
26 | 10
28 | 15
```

PeekFront:


```
C:\Geralt\DSL\Queue\Priority Queue\PQueue.exe

***Priority Queue***

1. Enqueue
2. Dequeue
3. Peek front
4. Peek rear
5. Display queue
6. Exit
Enter your choice: 3
Peek front: Element at the front is 24 with priority 2
```

PeekRear:

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```
C:\Geralt\DSL\Queue\Priority Queue\PQueue.exe        —    □    ×
***Priority Queue***

1. Enqueue
2. Dequeue
3. Peek front
4. Peek rear
5. Display queue
6. Exit
Enter your choice: 4
Peek rear: Element at the front is 28 with priority 15
```

Dequeue:

```
C:\Geralt\DSL\Queue\Priority Queue\PQueue.exe        —    □    ×
***Priority Queue***

1. Enqueue
2. Dequeue
3. Peek front
4. Peek rear
5. Display queue
6. Exit
Enter your choice: 2
Dequeue element: Element 24 dequeued with priority 2
```