Lab Report 08

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List of Tasks

1. Class PNode
2. Class PQueue
3. Enqueue
4. Dqueue
5. isEmpty
6. rearValue
7. front Value
8. Delete all in one Go

Source Code PNode.h

#include <iostream>

#include "E:\BSCS 3rd Semester\DSA\lab code\L3P3 Singular link List\node.h"

using namespace std;

template <class t>

class PNode : public Node<t>

{

private:

    int prio;

public:

    PNode(int prio, t data, Node<t> \*next) : Node<t>(data,next)

    {

        this->prio = prio;

    }

    void setprio(int prio);

    int getprio();

    void displayPNode();

}; // End of PNode class

template <class t>

void PNode<t>::setprio(int prio)

{

    this->prio = prio;

} // End

template <class t>

int PNode<t>::getprio()

{

    return this->prio;

} // end

template <class t>

void PNode<t>::displayPNode()

{

    cout << this->data << "\t";

    cout << this->next << "\t";

    cout << this->prio;

}

Description of PNode

* The code defines a class **PNode** that is derived from the **Node** class.
* **PNode** is a template class that takes a generic data type **t**.
* The class has a private member variable **prio** of type **int** to store the priority value.
* The constructor of **PNode** takes three parameters: **prio**, **data**, and **next**. It calls the base class (**Node**) constructor to initialize the data and next pointers.
* The **setprio()** function is a member function that sets the priority value of the **PNode** object.
* The **getprio()** function is a member function that returns the priority value of the **PNode** object.
* The **displayPNode()** function is a member function that displays the data, next pointer, and priority value of the **PNode** object.

Source Code PQueue.h

#include <iostream>

#include "PNode.h"

using namespace std;

template <class t>

class PQueue

{

private:

    PNode<t> \*front; // head

    PNode<t> \*rear;  // tail

public:

    PQueue()

    {

        rear = 0;

        front = 0;

    }

    void Enqueue(int prio, t element);

    t Dqueue();

    bool isEmpty();

    t rearvalue();

    t frontValue();

    t allDelete();

}; // End of Class

template <class t>

void PQueue<t>::Enqueue(int prio, t element)

{

    PNode<t> \*n = new PNode<t>(prio, element, 0);

    if (rear == 0 && front == 0)

    {

        rear = front = n;

    }

    else if (n->getprio() < rear->getprio()) // rear/tail modify or rear has greater priority than n

    {

        rear->setNext(n);

        rear = n;

    }

    else if (n->getprio() > front->getprio()) // front/head modify or front has less priority than n

    {

        rear->setNext(n);

        rear = n;

    }

    else // in between case

    {

        PNode<t> \*ptr = front;

        while (((PNode<t> \*)ptr->getNext())->getprio() >= n->getprio())

        {

            ptr = (PNode<t> \*)ptr->getNext();

        }

        ptr->setNext(n);

        n->setNext(ptr->getNext());

    }

} // End

template <class t>

t PQueue<t>::Dqueue()

{

     t element;

    if (rear == 0 && front == 0)

    {

        cerr << "Queue is empty \n";

    }

    else if (rear == front)

    {

        element = front->getInfo();

        delete front;

        front = rear = 0;

    }

    else

    {

        PNode<t> \*temp = front;

         element =front->getInfo();

        front = (PNode<t> \*)front->getNext();

        delete temp;

    }

  return element;

} // end Dequeue

template<class t>

bool PQueue<t>::isEmpty()

{

    if(rear==0 && front==0)

    return true;

    else

    return false;

}

template<class t>

t PQueue<t>::rearvalue()

{

    if(rear==0 && front==0)

{

        cerr<<"Queue is empty \n";

}

    else

    {

        t element = rear->getInfo();

    return element;

    }

}

template<class t>

t PQueue<t>::frontValue()

{

    if(rear==0 && front==0)

    {

    cerr<<"Queue is empty \n";

}

    else

    {

        t element = front->getInfo();

     return element;

    }

}

template<class t>

t PQueue<t>::allDelete()

{

    if(rear==0 && front==0)

    {

    cerr<<"Queue is empty \n";

  }

    PNode<t> \*ptr=front;

    t element;

    while(ptr!=NULL)

    {

        element+=Dqueue();

        ptr=(PNode<t>\*)ptr->getNext();

    }

    return element;

}

Description of PQueue.h

* The code defines a class **PQueue** which represents a priority queue.
* The class uses a linked list implementation using **PNode** objects.
* The **PQueue** class is a template class that takes a generic data type **t**.
* The class has two private member variables: **front** and **rear**, which represent the head and tail of the priority queue, respectively.
* The constructor initializes **front** and **rear** to 0, indicating an empty priority queue.
* The **Enqueue()** function adds an element with a given priority to the priority queue.
* The **Dequeue()** function removes and returns the element with the highest priority from the priority queue.
* The **isEmpty()** function checks if the priority queue is empty and returns a boolean value indicating its status.
* The **rearvalue()** function returns the value of the element with the highest priority without removing it from the priority queue.
* The **frontValue()** function returns the value of the element with the lowest priority without removing it from the priority queue.
* The **allDelete()** function removes all elements from the priority queue and returns their sum.

Source Code main class

#include <iostream>

#include "PQueue.h"

using namespace std;

/\* run this program using the console pauser or add your own getch, system("pause") or input loop \*/

int main(int argc, char \*\*argv)

{

    PQueue<string> pq1;

    pq1.Enqueue(2, "p1");

    pq1.Enqueue(0, "p2");

    pq1.Enqueue(4, "p3");

    pq1.Enqueue(5, "p4");

    pq1.Enqueue(3, "p5");

    cout << "\n";

    cout << "Front value is : " << pq1.frontValue() << endl;

    cout << "Rear value is : " << pq1.rearvalue() << endl;

    //cout <<"Delete all in one Go : "<< pq1.allDelete();

    while (!pq1.isEmpty())

    {

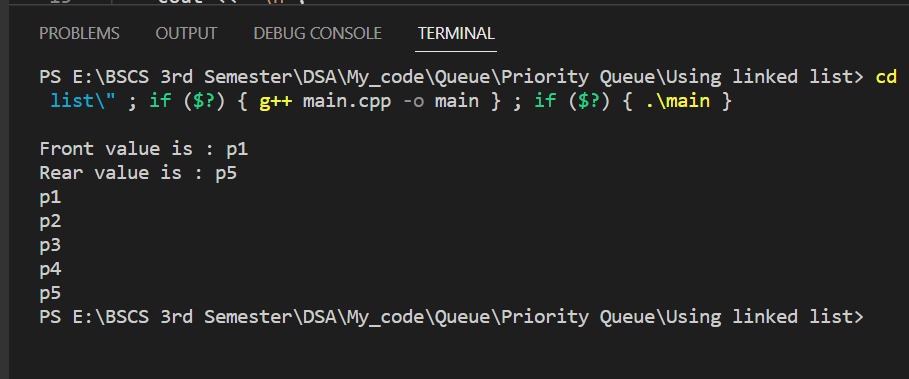
        cout << pq1.Dqueue() << endl;

    }

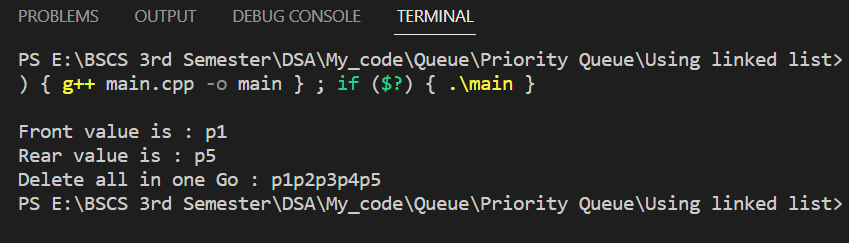
    return 0;

}

Output



If Call allDelete();



End of Lab 08