PRN: 2020BTEIT00041

Queue Implementation Using LinkedList

```cpp
/*
    PRN: 2020BTEIT00041
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*/

/*
    Queue using Linked List implementation
*/

#include <bits/stdc++.h>
using namespace std;

// Node class
class Node{
public:
    int data;
    Node *next;

    Node(){
        this->data = 0;
        this->next = NULL;
    }

    Node(int data){
        this->data = data;
        this->next = NULL;
    }
};

// Queue class
class Queue{
public:
    Node* front;
    Node* rear;

    Queue(){
        this->front = NULL;
        this->rear = NULL;
    }

    void enqueue(int data);
    int dequeue();
    void display();
};

// Function to enqueue an element in the queue using LL implementation of Queue
void Queue::enqueue(int data){
    // Create a new node
    Node* new_node = new Node(data);
```
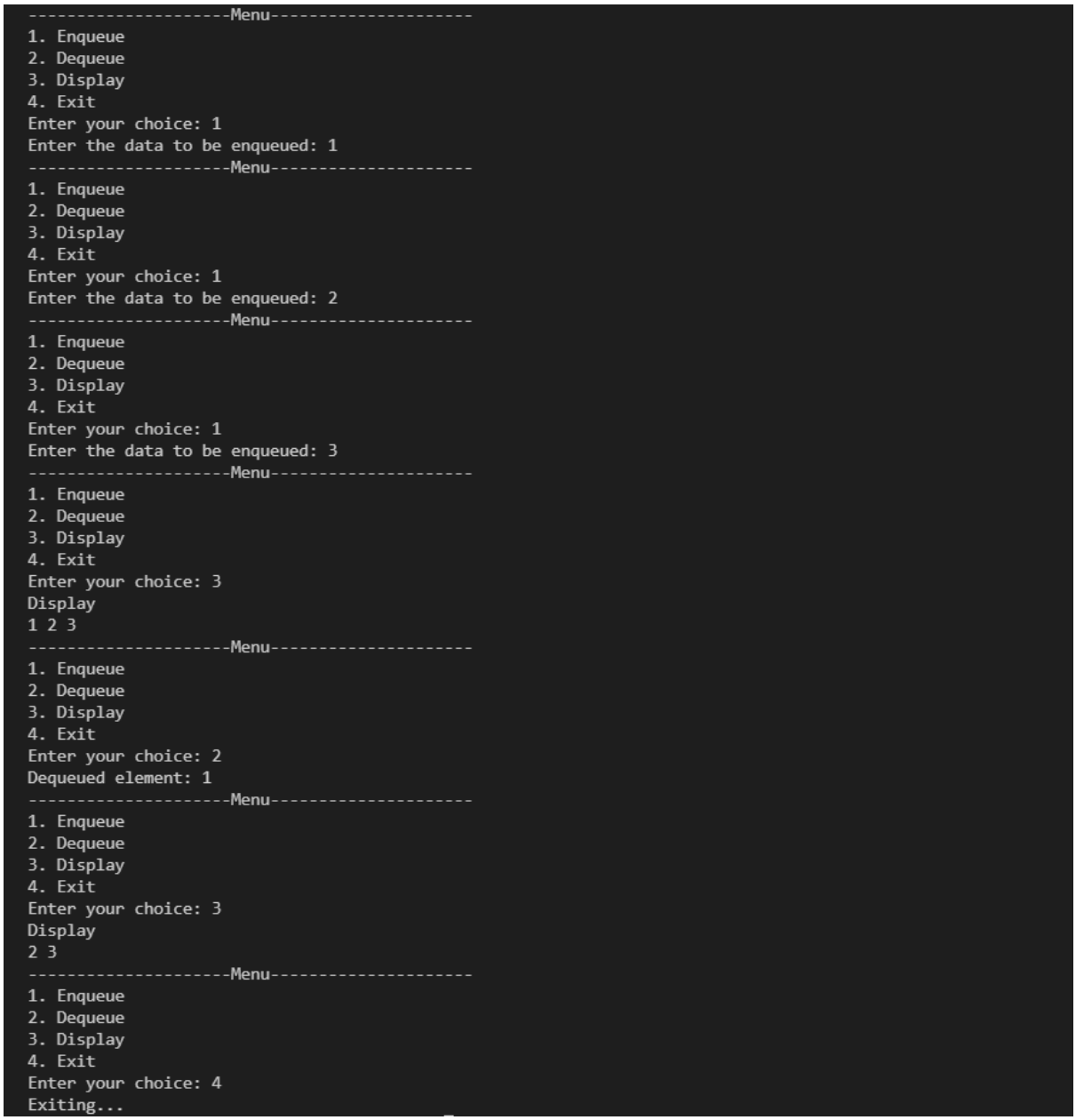

```
50
51      // If queue is empty
52      if(this->front == NULL){
53          // Make the new node as the front and rear
54          this->front = new_node;
55          this->rear = new_node;
56      }
57      else{
58          // Make the new node as the rear
59          this->rear->next = new_node;
60          this->rear = new_node;
61      }
62  }
63
64  // Function to dequeue an element from the queue using LL implementation of Queue
65  int Queue::dequeue(){
66      // if queue is empty
67      if(this->front == NULL){
68          cout<<"Queue is empty"<<endl;
69          return -1;
70      }
71      else{
72          // Store the data of the front node
73          int data = this->front->data;
74
75          // Make the next node as the front
76          this->front = this->front->next;
77
78          // If queue is empty
79          if(this->front == NULL){
80              this->rear = NULL;
81          }
82
83          return data;
84      }
85  }
86
87  // Display the Queue
88  void Queue::display(){
89      // If queue is empty
90      if(this->front == NULL){
91          cout<<"Queue is empty"<<endl;
92          return;
93      }
94
95      // Create a temporary node
96      Node* temp = this->front;
```

```
97
98      // Traverse the queue
99      while(temp != NULL){
100         cout<<temp->data<<" ";
101         temp = temp->next;
102     }
103     cout<<endl;
104 }
105
106 int main(){
107     Queue q;
108
109     // Menu driven program to perform operations on the queue using LL implementation of Q
110     int choice;
111     do{
112         cout<<"--------------------Menu--------------------\n";
113         cout<<"1. Enqueue"<<endl;
114         cout<<"2. Dequeue"<<endl;
115         cout<<"3. Display"<<endl;
116         cout<<"4. Exit"<<endl;
117
118
119         cout<<"Enter your choice: ";
120         cin>>choice;
121
122         switch(choice){
123             case 1:
124                 int data;
125                 cout<<"Enter the data to be enqueued: ";
126                 cin>>data;
127                 q.enqueue(data);
128                 break;
129             case 2:
130                 cout<<"Dequeued element: "<<q.dequeue()<<endl;
131                 break;
132             case 3:
133                 cout<<"Display"<<endl;
134                 q.display();
135                 break;
136             case 4:
137                 cout<<"Exiting..."<<endl;
138                 break;
139             default:
140                 cout<<"Invalid choice"<<endl;
141         }
142     }while(choice != 4);
143
144     return 0;
145 }
```

OUTPUT:


----------Menu----------
1. Enqueue
2. Dequeue
3. Display
4. Exit
Enter your choice: 1
Enter the data to be enqueued: 1
----------Menu----------
1. Enqueue
2. Dequeue
3. Display
4. Exit
Enter your choice: 1
Enter the data to be enqueued: 2
----------Menu----------
1. Enqueue
2. Dequeue
3. Display
4. Exit
Enter your choice: 1
Enter the data to be enqueued: 3
----------Menu----------
1. Enqueue
2. Dequeue
3. Display
4. Exit
Enter your choice: 3
Display
1 2 3
----------Menu----------
1. Enqueue
2. Dequeue
3. Display
4. Exit
Enter your choice: 2
Dequeued element: 1
----------Menu----------
1. Enqueue
2. Dequeue
3. Display
4. Exit
Enter your choice: 3
Display
2 3
----------Menu----------
1. Enqueue
2. Dequeue
3. Display
4. Exit
Enter your choice: 4
Exiting...