COMSATS University Islamabad, Vehari Campus

Department of Computer Science

Class: BSCS-SP22-4B **Date: 23 Oct 2023**

Subject: Data Structure & Algorithm Lab **Instructor: Yasmeen Jana**

Max Marks: 25 **Reg. No: Sp22-BCS-126**

Max Time: 90 Minutes **Name: Zain Saleem**

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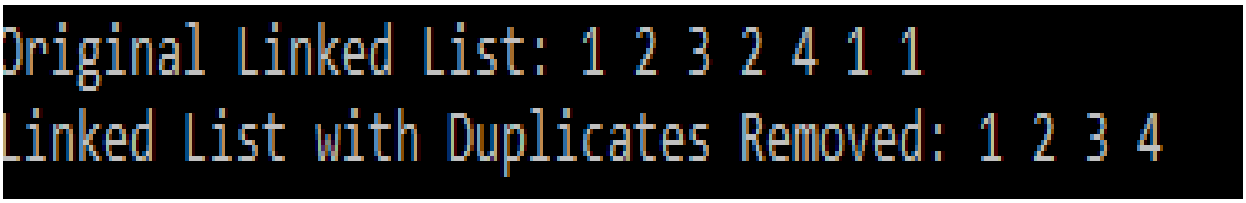
Activity 1:

Write a C++ code to create a singly linked list using "SLL()" function and Remove duplicates from an unsorted linked list as RemoveDup() function and display linked list with unique values. (15)

For Example:

Input: linked list = 12->11->12->21->41->43->21

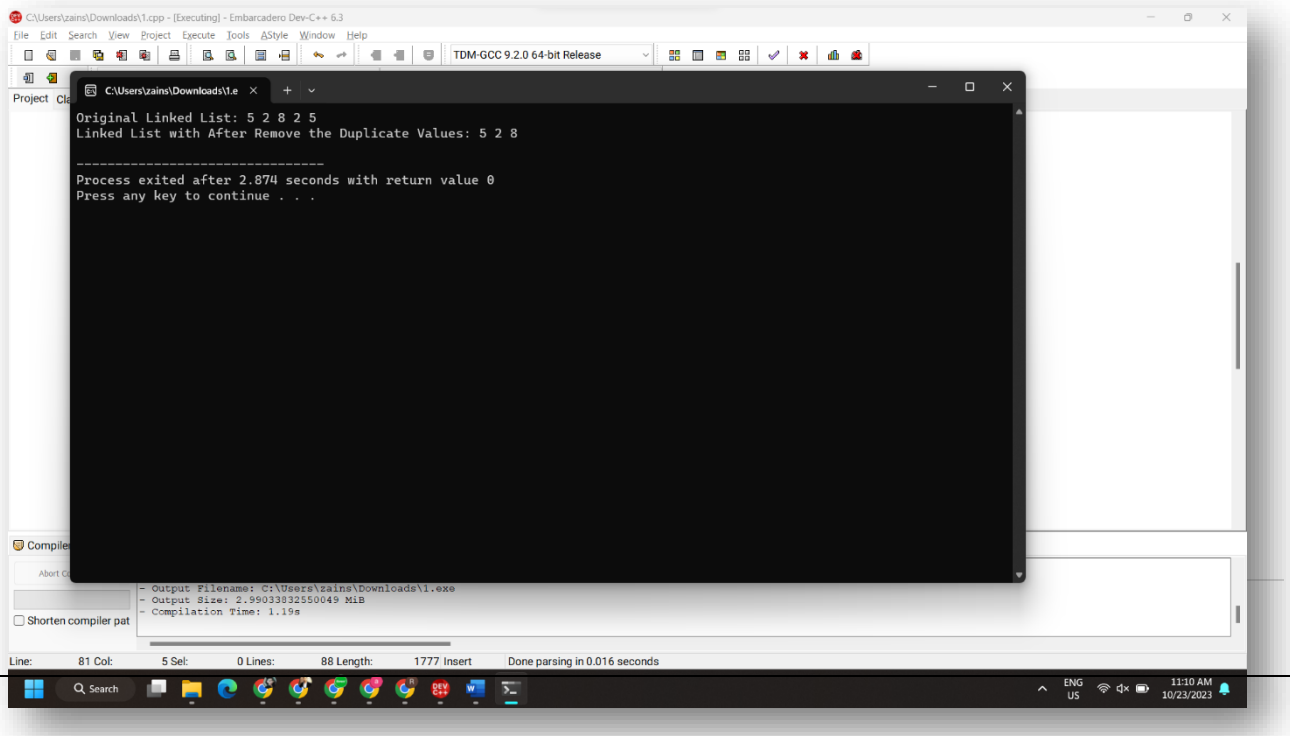
Output: 12->11->21->41->43.




```
#include <iostream>
using namespace std;
class Node
{
public:
    int data;
    Node* next;
    Node(int value) : data(value), next(NULL) {}
};
```

```
class LinkedList {
public:
   Node* head;
   LinkedList() : head(NULL) {}

   void SLLO(int value)
         {
      Node* newNode = new Node(value);
      if (!head)
                  {
         head = newNode;
      }
                  else
                  {
         Node* temp = head;
         while (temp->next)
                        {
            temp = temp->next;
         }
         temp->next = newNode;
      }
   }

   void RemoveDup()
         {
      Node* current = head;
      while (current)
                  {
         Node* runner = current;
         while (runner->next)
                        {
            if (runner->next->data == current->data)
                              {
               Node* temp = runner->next;
               runner->next = runner->next->next;
               delete temp;
            }
                              else
                              {
               runner = runner->next;
            }
         }
         current = current->next;
      }
   }
```

```
    void display()
        {
        Node* temp = head;
        while (temp)
            {
            cout << temp->data << " ";
            temp = temp->next;
        }
        cout << endl;
    }
};

int main()
{
    LinkedList myList;

    // First I Create the singly linked list using SLLO function //
    myList.SLLO(5);
    myList.SLLO(2);
    myList.SLLO(8);
    myList.SLLO(2);
    myList.SLLO(5);
    cout << "Original Linked List: ";
    myList.display();

    // Now I Remove duplicate Values //
    myList.RemoveDup();
    cout << "Linked List with After Remove the Duplicate Values: ";
    myList.display();
    return 0;
}
```

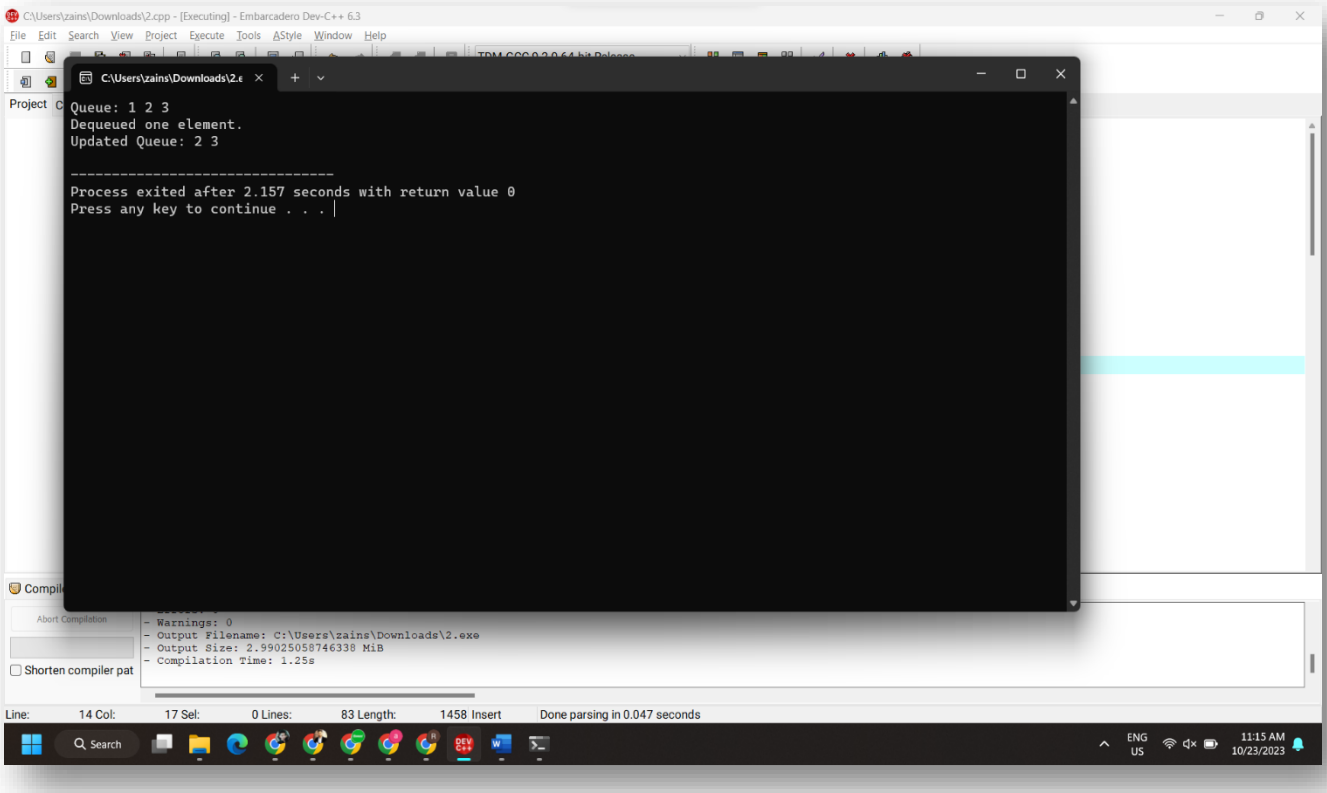


Activity 2:

Write a C++ code to create a Queue using a linked list. The code should contain functions for Enqueue(), Dequeue(), and Display(). **(10)**

```
#include <iostream>
using namespace std;
class Node {
public:
    int data;
    Node* next;

    Node(int value) : data(value), next(NULL) {}
};

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

    Queue() : front(NULL), rear(NULL) {}

    void Enqueue(int value)
            {
        Node* newNode = new Node(value);
        if (rear == NULL)
                    {
            front = rear = newNode;
            return;
        }
        rear->next = newNode;
        rear = newNode;
    }

    void Dequeue()
            {
        if (front == NULL)
                    {
            cout << "Queue is empty. Cannot dequeue." << endl;
            return;
        }
        Node* temp = front;
        front = front->next;
        delete temp;
        if (front == NULL)
```

```
                {
            rear = NULL;
        }
    }

    void Display()
            {
        if (front == NULL)
                {
            cout << "Queue is empty." << endl;
            return;
        }
        Node* temp = front;
        while (temp != NULL)
                {
            cout << temp->data << " ";
            temp = temp->next;
        }
        cout << endl;
    }
};

int main()
{
    Queue myQueue;

    myQueue.Enqueue(1);
    myQueue.Enqueue(2);
    myQueue.Enqueue(3);

    cout << "Queue: ";
    myQueue.Display();

    myQueue.Dequeue();
    cout << "Dequeued one element." << endl;

    cout << "Updated Queue: ";
    myQueue.Display();

    return 0;
}
```


C:\Users\zains\Downloads\2.cpp - [Executing] - Embarcadero Dev-C++ 6.3
File Edit Search View Project Execute Tools AStyle Window Help
C:\Users\zains\Downloads\2.e
Queue: 1 2 3
Dequeued one element.
Updated Queue: 2 3

Process exited after 2.157 seconds with return value 0
Press any key to continue . . .
Project
Abort Compilation
Shorten compiler pat
- Warnings: 0
- Output Filename: C:\Users\zains\Downloads\2.exe
- Output Size: 2.99025058746338 MiB
- Compilation Time: 1.25s
Line: 14 Col: 17 Sel: 0 Lines: 83 Length: 1458 Insert
Done parsing in 0.047 seconds
Search
ENG
US
11:15 AM
10/23/2023