LAB MID

NAME : SAQIB LATIF

ROLL NO : SP22-BCS-054

DATE : 25-10-2023

SECTION : A

INSTRUCTOR : MAM YASMEEN JANA

QUESTION NO 2: IMPLEMENT STACK USING ARRAY

```
#include <iostream>
using namespace std;

const int MAX_SIZE = 100;

class Stack{
private:
```

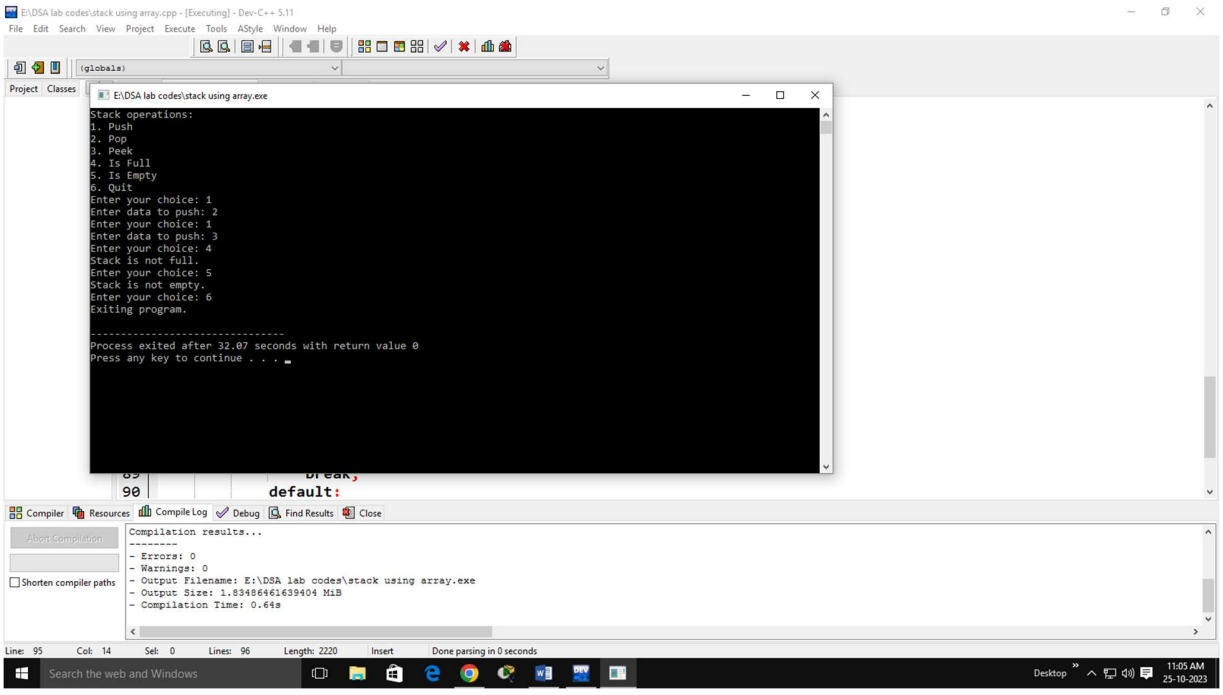
```
    int top;
    int arr[MAX_SIZE];

public:
    Stack() {
        top = -1;
    }
    bool isEmpty() {
        return top == -1;
    }
    bool isFull() {
        return top == MAX_SIZE - 1;
    }
    void push(int data) {
        if (isFull()) {
            cout << "Stack is full. Cannot push." << endl;
            return;
        }
        arr[++top] = data;
    }
```

```
    void pop() {
        if (isEmpty()) {
            cout << "Stack is empty. Cannot pop." << endl;
            return;
        }
        --top;
    }
    int peek() {
        if (isEmpty()) {
            cout << "Stack is empty. Cannot peek." << endl;
            return -1;
        }
        return arr[top];
    }
};

int main() {
    Stack stack;

    cout << "Stack operations:" << endl;
```

```
cout << "1. Push" << endl;
cout << "2. Pop" << endl;
cout << "3. Peek" << endl;
cout << "4. Is Full" << endl;
cout << "5. Is Empty" << endl;
cout << "6. Quit" << endl;

int choice, data;

do {
    cout << "Enter your choice: ";
    cin >> choice;

    switch (choice) {
        case 1:
            cout << "Enter data to push: ";
            cin >> data;
            stack.push(data);
            break;
        case 2:
```

```
    stack.pop();
    break;
case 3:
    cout << "Top element: " << stack.peek() << endl;
    break;
case 4:
    if (stack.isFull()) {
        cout << "Stack is full." << endl;
    } else {
        cout << "Stack is not full." << endl;
    }
    break;
case 5:
    if (stack.isEmpty()) {
        cout << "Stack is empty." << endl;
    } else {
        cout << "Stack is not empty." << endl;
    }
    break;
case 6:
```

```
            cout << "Exiting program." << endl;
            break;
        default:
            cout << "Invalid choice. Please try again." << endl;
    }
} while (choice != 6);

return 0;
}
```



QUESTION NO 2:

TO CREATE A SINGLE LINKED LIST USING SLL FUNCTION TO CHECK THAT SINGLY LINKED LIST IS PALINDRONE OR NOT.

FOR EXAMPLE 1->2->2->1

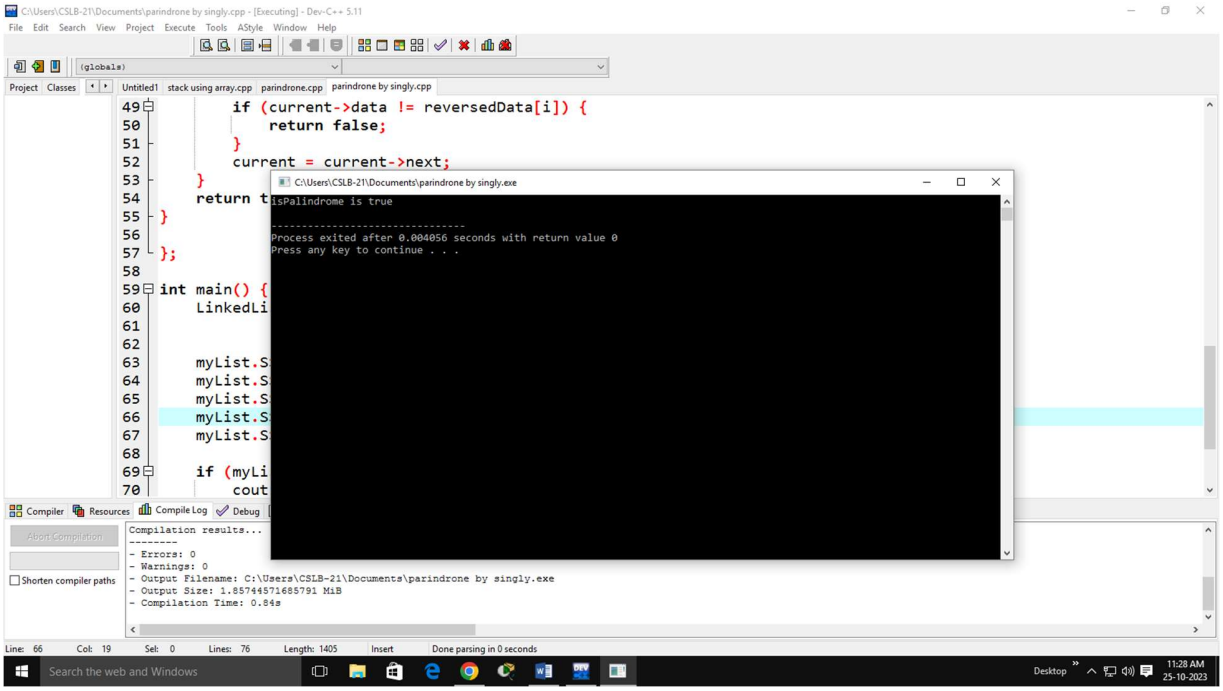
HINT: CHECK USING STACK

```
#include <iostream>
#include <vector>
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 SSL(int value) {
      Node* newNode = new Node(value);
      if (!head) {
         head = newNode;
      } else {
         Node* current = head;
         while (current->next) {
            current = current->next;
         }
         current->next = newNode;
      }
   }
```

```
    bool Palindrome() {
    vector<int> reversedData;
    Node* current = head;

    while (current) {
        reversedData.insert(reversedData.begin(), current->data);
        current = current->next;
    }

    current = head;
    for (int i = 0; i < reversedData.size(); ++i) {
        if (current->data != reversedData[i]) {
            return false;
        }
        current = current->next;
    }
    return true;
}
```

```
};

int main() {
    LinkedList myList;



    myList.SSL(1);
    myList.SSL(2);
    myList.SSL(3);
    myList.SSL(2);
    myList.SSL(1);

    if (myList.Palindrome()) {
        cout << "The linked list is a palindrome." << std::endl;
    } else {
        cout << "The linked list is not a palindrome." << std::endl;
    }

    return 0;
}
```


C:\Users\CSLB-21\Documents\parindrone by singly.cpp - [Executing] - Dev-C++ 5.11
File Edit Search View Project Execute Tools AStyle Window Help
Project Classes
Untitled1 stack using array.cpp parindrone.cpp parindrone by singly.cpp
if (current->data != reversedData[i]) {
return false;
}
current = current->next;
}
return t
};
int main() {
LinkedLi
myList.S
myList.S
myList.S
myList.S
myList.S
if (myLi
cout
C:\Users\CSLB-21\Documents\parindrone by singly.exe
IsPalindrome is true
Process exited after 0.004056 seconds with return value 0
Press any key to continue . . .
Compiler Resources Compile Log Debug
Abort Compilation
Shorten compiler paths
Compilation results...
- Errors: 0
- Warnings: 0
- Output Filename: C:\Users\CSLB-21\Documents\parindrone by singly.exe
- Output Size: 1.85744571685791 MiB
- Compilation Time: 0.84s
Line: 66 Col: 19 Sel: 0 Lines: 76 Length: 1405 Insert Done parsing in 0 seconds
Search the web and Windows
Desktop
11:28 AM
25-10-2023