NATIONAL UNIVERSITY OF COMPUTER AND EMERGING SCIENCES

PROGRAM: SOFTWARE ENGINEERING

DATA STRUCTURES LAB

LAB TASK-06

SUBMITTED BY:

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Q1 CODE:

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

class stack
{
	private:
		int size;
		int *arr;
		int top;
	public:
		stack(int size)
		{
			this->size=size;
			arr=(int*)calloc(size,sizeof(int));
			top=-1;
		}

		bool is_full()
		{
			if(top==size-1)
			{
				cout<<"stack is full"<<endl;
				return true;
			}
			else
			{
```

```
                cout<<"stack is not full"<<endl;
                return false;
        }
}

bool is_empty()
{
        if(top==-1)
        {
                cout<<"stack is empty"<<endl;
                return true;
        }
        else
        {
                cout<<"stack is not empty"<<endl;
                return false;
        }
}

void push(int data)
{
        if(top==size-1)
        {
                cout<<"stack is full value is not stored..."<<endl;
        }
        else
        {
                top++;
                arr[top]=data;
```

```
        }
}

int pop()
{
        if(top==-1)
        {
                cout<<"stack is empty"<<endl;
                return -1;
        }
        else
        {
                return arr[top--];
        }
}

//peak only shows the last element
//pop shows and delete the last element

int peek()
{
        if(top==-1)
        {
                cout<<"stack is empty"<<endl;
                return -1;
        }
        else
        {
                return arr[top];
```

```
                }
        }


};

int main()
{
        int size;
        cout<<"enter size"<<endl;
        cin>>size;

        stack x(size);
        int ch;
        int val;

        do
        {
                cout<<endl<<"Menu:"<<endl;
                cout<<"1) Push"<<endl;
                cout<<"2) Pop"<<endl;
                cout<<"3) Peek"<<endl;
                cout<<"4) Check if Empty"<<endl;
                cout<<"5) Check if Full"<<endl;
                cout<<"6) Exit"<<endl;
                cout<<"Enter your choice: ";
                cin>>ch;

                switch(ch)
```

```
{
        case 1:
                {
                        cout<<"Enter value to be pushed: "<<endl;
                        cin>>val;
                        x.push(val);
                        break;
                }

        case 2:
                {
                        val=x.pop();
                        if(val!=-1)
                        {
                                cout<<"popped value is: "<<val<<endl;
                        }
                        break;
                }

        case 3:
                {
                        val=x.peek();
                        if(val!=-1)
                        {
                                cout<<"value at top: "<<val<<endl;
                        }
                        break;
                }
```

```
                case 4:
                        {
                                x.is_empty();
                                break;
                        }

                case 5:
                        {
                                x.is_full();
                                break;
                        }

                case 6:
                        cout<<"byeeeee......."<<endl;
                        break;

                default:
                        cout<<"entered incorrect choice, please try again"<<endl;
                }
        }
        while(ch!=6);

        return 0;
}
```

Output-01:

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```
enter size
3

Menu:
1) Push
2) Pop
3) Peek
4) Check if Empty
5) Check if Full
6) Exit
Enter your choice: 1
Enter value to be pushed:
1

Menu:
1) Push
2) Pop
3) Peek
4) Check if Empty
5) Check if Full
6) Exit
Enter your choice: 1
Enter value to be pushed:
5

Menu:
1) Push
2) Pop
3) Peek
4) Check if Empty
5) Check if Full
6) Exit
Enter your choice: 1
Enter value to be pushed:
3

Menu:
1) Push
2) Pop
3) Peek
4) Check if Empty
5) Check if Full
6) Exit
Enter your choice: 1
Enter value to be pushed:
0
stack is full value is not stored...
```

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```
Menu:
1) Push
2) Pop
3) Peek
4) Check if Empty
5) Check if Full
6) Exit
Enter your choice: 2
popped value is: 3

Menu:
1) Push
2) Pop
3) Peek
4) Check if Empty
5) Check if Full
6) Exit
Enter your choice: 2
popped value is: 5

Menu:
1) Push
2) Pop
3) Peek
4) Check if Empty
5) Check if Full
6) Exit
Enter your choice: 3
value at top: 1

Menu:
1) Push
2) Pop
3) Peek
4) Check if Empty
5) Check if Full
6) Exit
Enter your choice: 4
stack is not empty

Menu:
1) Push
2) Pop
3) Peek
4) Check if Empty
5) Check if Full
6) Exit
Enter your choice: 5
stack is not full
```

Q2 CODE:

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

class node
{
	public:
		string text;
		node *next;
		node(string text)
		{
			this->text=text;
			next=nullptr;
		}
};

class stack
{
	private:
		node *top;

	public:
		stack()
		{
			top=nullptr;
		}

		void push(string text)
```

```
        {
            node *newnode=new node(text);
            newnode->next=top;
            top=newnode;
        }

        string pop()
        {
            if(top==nullptr)
            {
                return 0;
            }

            node *temp=top;
            top=top->next;
            string text=temp->text;
            delete temp;
            return text;
        }

    bool is_empty()
        {
       return top==nullptr;
    }
};

class text_editor
{
    private:
```

```
        string current_text;
        stack prev_text;

    public:
        void type(string text)
        {
            prev_text.push(current_text);
            current_text=current_text+text;
        }

        string undo()
        {
            if(prev_text.is_empty())
            {
                return "nothing to undo";
            }

            current_text=prev_text.pop();
            return current_text;
        }

        string get_text()
        {
            return current_text;
        }
};

void display()
{
```

```
	cout<<"1) Type text"<<endl;
	cout<<"2) Undo"<<endl;
	cout<<"3) Display current text"<<endl;
	cout<<"4) Exit"<<endl;
	cout<<"....................................." << endl;
	cout<<"Enter your choice: ";
}

int main()
{
	text_editor editor;

	int ch;
	string text;

	do
	{
		display();
		cin>>ch;

		switch(ch)
		{
		case 1:
			cout<<"Enter text to type: "<<endl;
			cin>>text;
			editor.type(text);
			break;

		case 2:
```

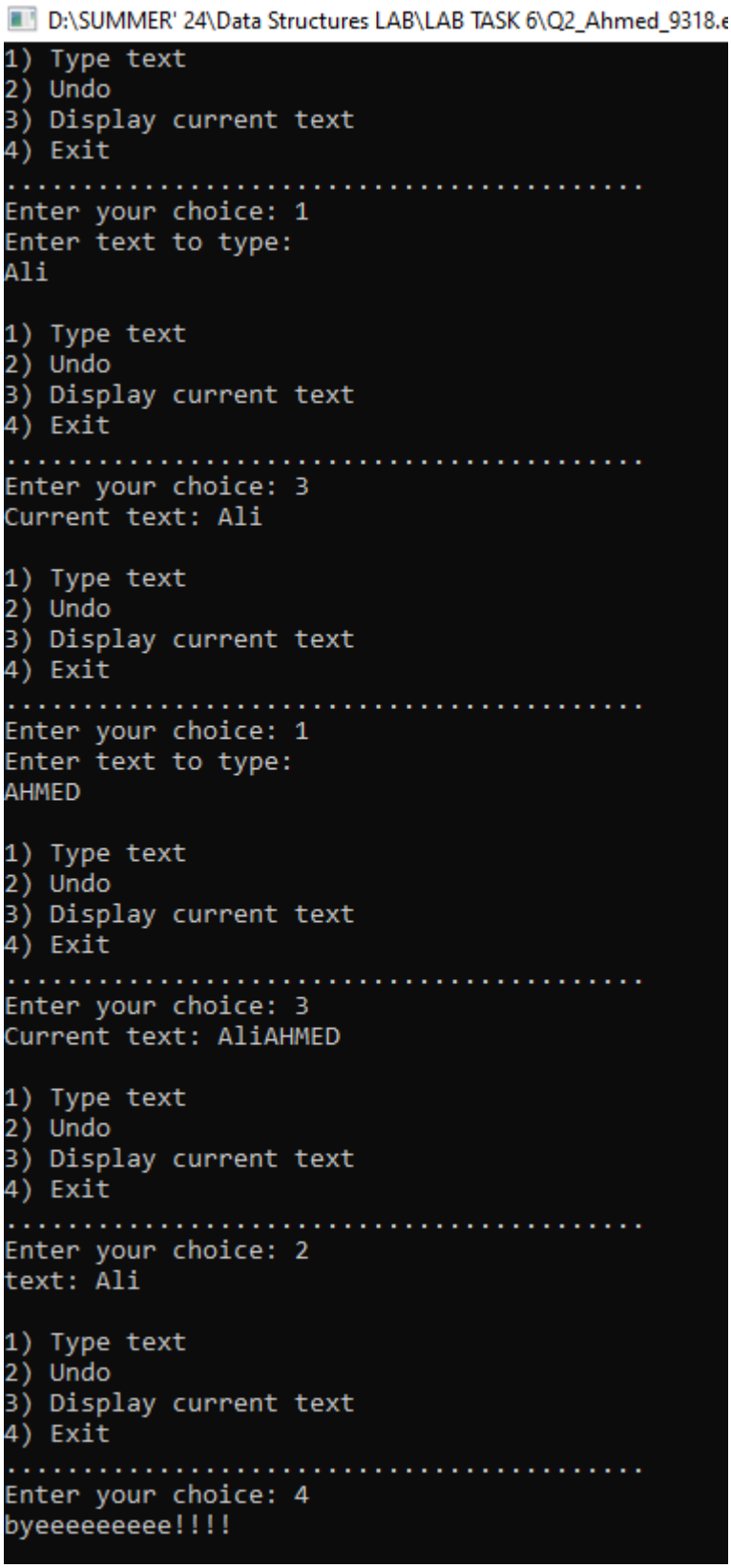
```
                cout<<"text: "<<editor.undo()<<endl;
                break;

            case 3:
                cout<<"Current text: "<<editor.get_text()<<endl;
                break;

            case 4:
                cout<<"byeeeeeeeee!!!!"<<endl;
                break;
            default:
                cout<<"incorrect choice, please enter correct option"<<endl;
            }
            cout<<endl;
        }
        while(ch!=4);
        return 0;
}
```

SEE BELOW FOR OUTPUT 2

Output-02:


D:\SUMMER' 24\Data Structures LAB\LAB TASK 6\Q2_Ahmed_9318.e
1) Type text
2) Undo
3) Display current text
4) Exit
.....
Enter your choice: 1
Enter text to type:
Ali
1) Type text
2) Undo
3) Display current text
4) Exit
.....
Enter your choice: 3
Current text: Ali
1) Type text
2) Undo
3) Display current text
4) Exit
.....
Enter your choice: 1
Enter text to type:
AHMED
1) Type text
2) Undo
3) Display current text
4) Exit
.....
Enter your choice: 3
Current text: AliAHMED
1) Type text
2) Undo
3) Display current text
4) Exit
.....
Enter your choice: 2
text: Ali
1) Type text
2) Undo
3) Display current text
4) Exit
.....
Enter your choice: 4
byeeeeeeeee!!!!