Instructions: Please read carefully

- Please rename this file as only your ID number **(e.g. 18-*****-1.doc or 18-*****-1.pdf).**
- Submit the file before **11:59pm on 4/11/2020** in the Portal Lab Performance section labeled **Lab task 4. If you cannot complete the full task, do not worry. Just upload what you have completed.**

1. Write a code to implement an array (static) based stack and its operations (Push and Pop). Get options from the user to push, pop and display the stack. If the stack is full and you want to push another value show message “Stack overflowed!!!”. If empty show “Stack is empty”

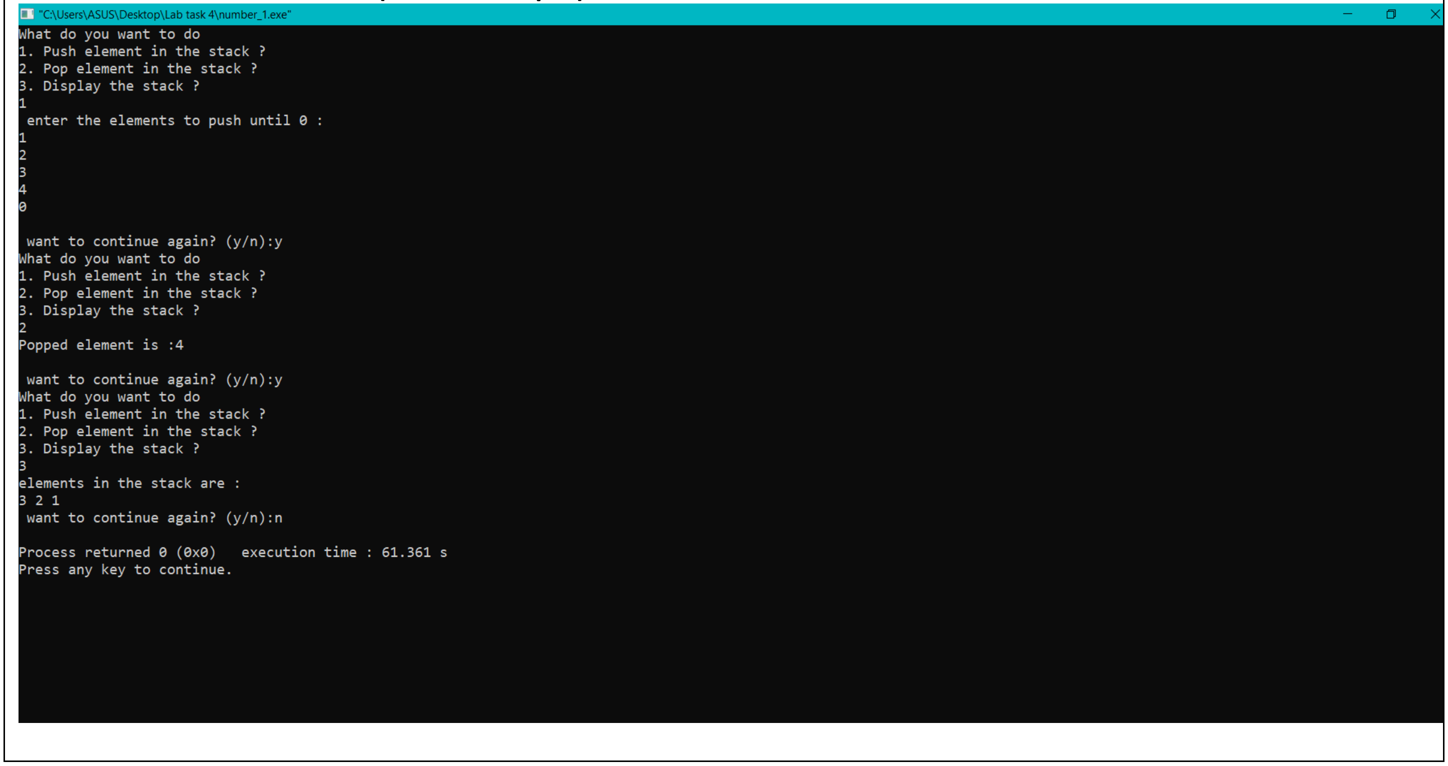
Example:
What you want to do?
1. Push element in the stack
2. Pop element in the stack
3. Display the stack

Your code here:

```
#include<iostream>
using namespace std;
#define MAX 10

int stack[MAX],top=-1,n;

void push(int n)
{
   if(top==MAX-1)
      cout<< "Stack overflow"<<endl;

   else
   {
      top++;
      stack[top]=n;
   }
}


void pop()

{
   if(top==-1)
      cout<< "Stack is empty"<<endl;
      else
      {
         n=stack[top];
         top--;
         cout<< "Popped element is :"<<n<<endl;
      }
}

void display()
{
   if(top==-1)
      cout<< "Stack is empty"<<endl;

   else
   {
      cout<< "elements in the stack are :"<<endl;
      for(int i=top;i>=0;i--)
         cout<<stack[i]<<" ";
   }
}



int main()
{
   int a;
   char ch;

   do
   {
      cout<< "What do you want to do \n"
      << "1. Push element in the stack ?"<<endl
      << "2. Pop element in the stack ? "<<endl
      << "3. Display the stack ? "<<endl;
      cin>>a;

      switch(a)
      {
         case 1: cout<< " enter the elements to push until 0 :\n";

         do
         {
            cin>>n;
            if (n!=0)
               push(n);
         }
         while(n!=0);
         break;


         case 2:pop();
         break;
         case 3:display();
         break;

         default: cout<< "\n input is wrong";
      }

      cout<< "\n want to continue again? (y/n):";
      cin>>ch;
   }

   while(ch=='y' ||ch=='Y');
```

}

Your whole Screenshot here: (Console Output):



```
What do you want to do
1. Push element in the stack ?
2. Pop element in the stack ?
3. Display the stack ?
1
 enter the elements to push until 0 :
1
2
3
4
0


 want to continue again? (y/n):y
What do you want to do
1. Push element in the stack ?
2. Pop element in the stack ?
3. Display the stack ?
2
Popped element is :4

 want to continue again? (y/n):y
What do you want to do
1. Push element in the stack ?
2. Pop element in the stack ?
3. Display the stack ?
3
elements in the stack are :
3 2 1
 want to continue again? (y/n):n

Process returned 0 (0x0)   execution time : 61.361 s
Press any key to continue.
```

2. Write a code to implement an array (static) queue and its operations (Enqueue and Dequeue). Get options from the user to Enqueue, Dequeue and display the queue. If the Queue is full and you want to enqueue another value show message “Queue overflowed!!!”. If empty show “Queue is empty”

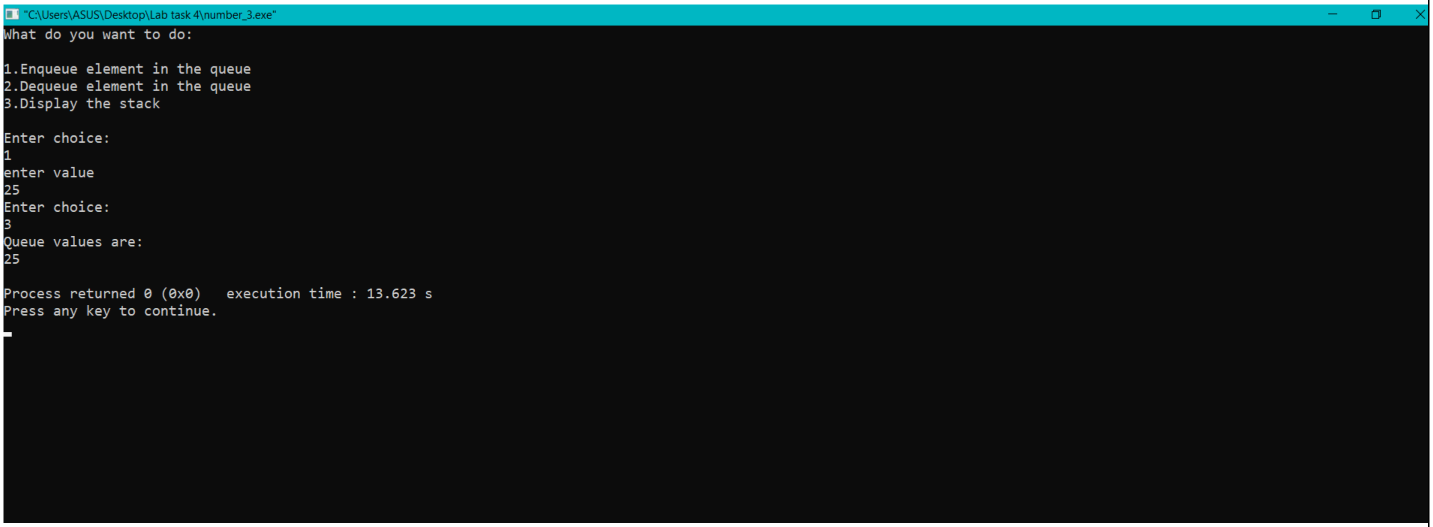
Example:
What you want to do?
1. Enqueue element in the queue
2. Dequeue element in the queue
3. Display the stack

Your code here:

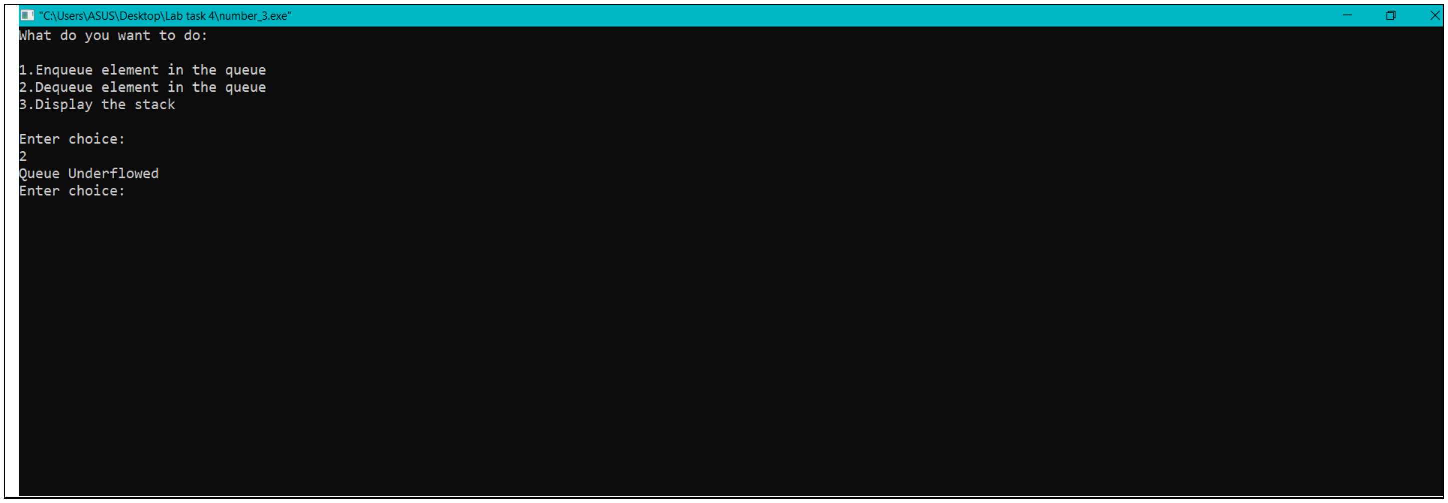
```
#include <iostream>
using namespace std;

int arr[10], rear=-1,front=-1;



void enqueue(){
int n;
cout<<"enter value"<<endl;
   cin>>n;

if(rear==10-1)
   {
   cout<<"Queue overflowed"<<endl;
   }
```

```
else if
    (front==-1 && rear==-1)
    {
      front=rear=0;
      arr[rear]=n;
    }
  else{
    rear++;
    arr[rear]=n;
  }
 }


void dequeue(){

 if(front==-1 && rear==-1)
    {
      cout<<"Queue Underflowed"<<endl;
    }
else if(front==rear)
    {
     front=rear=-1;
    }
    else{
   cout<<"The value removed is : "<<arr[front]<<endl;
   front++;
    }
}



void display()
{
  int i;
 if(front==-1 && rear==-1)
    {
        cout<<"Queue is empty"<<endl;
    }
   else
    {
       cout<<"Queue values are:"<<endl;
    for(i=front;i<=rear;i++)
       {
        cout<<arr[i]<<endl;
       }
    }
}



int main() {
   int ch, n;
   cout<<"What do you want to do: "<<endl<<endl;
  cout<<"1.Enqueue element in the queue"<<endl;
  cout<<"2.Dequeue element in the queue"<<endl;
  cout<<"3.Display the stack"<<endl<<endl;
  do {
    cout<<"Enter choice: "<<endl;
    cin>>ch;
    switch(ch) {
      case 1: {
        enqueue();
        break;
      }
      case 2: {
        dequeue();
        break;
      }
      case 3: {
        display();
        break;
      }
    }
  }while(ch!=3);
}
```

Your whole Screenshot here: (Console Output):



```
What do you want to do:

1.Enqueue element in the queue
2.Dequeue element in the queue
3.Display the stack

Enter choice:
1
enter value
25
Enter choice:
3
Queue values are:
25

Process returned 0 (0x0)   execution time : 13.623 s
Press any key to continue.
```



```
What do you want to do:

1.Enqueue element in the queue
2.Dequeue element in the queue
3.Display the stack

Enter choice:
2
Queue Underflowed
Enter choice:
```

3. Write a code to implement a dynamic (memory) array based stack and its operations (Push and Pop). Get options from the user to push, pop and display the stack. If the stack is full and you want to push another value, it will allow you to increase the size of stack and push the data. If empty show “Stack is empty”

Example:

What you want to do?
1. Push element in the stack
2. Pop element in the stack
3. Display the stack

Your code here:

Your whole Screenshot here: (Console Output):