Heaven’s Light is Our Guide

Rajshahi University of Engineering and Technology

Department of Computer Science and Engineering

Course No: CSE.1204

Course Title: Sessional based on CSE.1203 (Object Oriented Programming)

Lab Report No: 03

Lab Report On: Operator Overloading,Stack & Queue with Class in C++

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Problem No: 01

Problem Statement: Implementation of Operator Overloading.

coord

int x;
int y;
int z;

coord ( );
coord (int,int,int);
void get (int &i, int &j,int &k);
coord operator + (coord obj);

Theory :

Operator overloading is a compile-time polymorphism in which the operator is overloaded to provide the special meaning to the user-defined data type. Operator overloading is used to overload or redefines most of the operators available in C++. It is used to perform the operation on the user-defined data type.

The advantage of Operators overloading is to perform different operations on the same operand.

Rules for Operator Overloading

- Existing operators can only be overloaded, but the new operators cannot be overloaded.
- The overloaded operator contains atleast one operand of the user-defined data type.
- We cannot use friend function to overload certain operators. However, the member function can be used to overload those operators.
- When unary operators are overloaded through a member function take no explicit arguments, but, if they are overloaded by a friend function, takes one argument.
- When binary operators are overloaded through a member function takes one explicit argument, and if they are overloaded through a friend function takes two explicit arguments.

Source Code :

1. main.h

```
#include <iostream>
#include "coord.h"
using namespace std;

int main()
{
    coord o1(3,4,5),o2(5,6,7),o3;
    int x,y,z;

    o3=o1+o2;

    o3.get(x,y,z);

    return 0;
}
```

2. coord.h

```
#ifndef COORD_H
#define COORD_H


class coord
{
    int x;
    int y;
    int z;
public:
    coord();
    coord(int,int,int);
    void get(int &i,int &j,int &k);
    coord operator+(coord ob);

};
#endif // COORD_H
```

3. coord.cpp

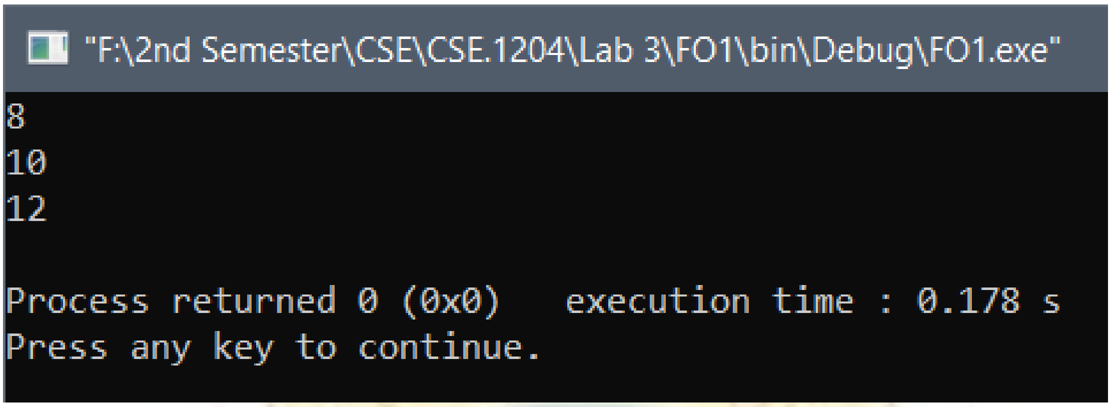
```
#include <iostream>
#include "coord.h"
using namespace std;

coord::coord()
{
   x=0;
   y=0;
   z=0;
}
coord::coord(int a,int b,int c)
{
   x=a;
   y=b;
   z=c;
}
void coord::get(int &i,int &j,int &k)
{
   i=x;
   cout<<i<<endl;
   j=y;
   cout<<j<<endl;
   k=z;
   cout<<k<<endl;
}
coord coord::operator+(coord ob)
{
   coord temp;

   temp.x=x+ob.x;
   temp.y=y+ob.y;
   temp.z=z+ob.z;

   return temp;
}
```

Output :



```
8
10
12

Process returned 0 (0x0)   execution time : 0.178 s
Press any key to continue.
```

Problem No: 02

Problem Statement: Implementation of Stack.

stack

int i;
int ax[100];

void push(int);
void pop();
void show();

Theory : Stacks are a type of container adaptors with LIFO(Last In First Out) type of working, where a new element is added at one end and (top) an element is removed from that end only.

We used three public functions in the class :

1. **push:** This function take data as input.
2. **pop:** This function delete the last inputted data.
3. **show:** this function shows all the remaining data.

Source Code :

1. main.h

```
#include <iostream>
#include "stack.h"
using namespace std;

void menu()
{
    cout<<"\n\t\t"<<"MENU"<<"\n"<<endl;
    cout<<" 1. PUSH"<<"\n"<<" 2. POP";
    cout<<"\n"<<" 0. Exit"<<endl;
}

int main()
{
    stack o;
    int a,i,j,k;

    menu();
    cin>>i;
    while(i!=0)
    {
        if(i==1)
        {
            cin>>a;
            o.push(a);
            o.show();
            menu();
            cin>>i;
        }
        else if(i==2)
        {
            o.pop();
            o.show();
            menu();
            cin>>i;
        }
        else if(i==0)
            break;
        else
        {
            cout<<"Wrong Input"<<"\n"<<endl;
            menu();
            cin>>i;
        }
    }



    return 0;
}
```

2. stack.h

```
#ifndef STACK_H
#define STACK_H


class stack
{
    int i=0;
    int ax[100]={-1};
    public:
        void push(int);
        void pop();
        void show();
};

#endif // STACK_H
```

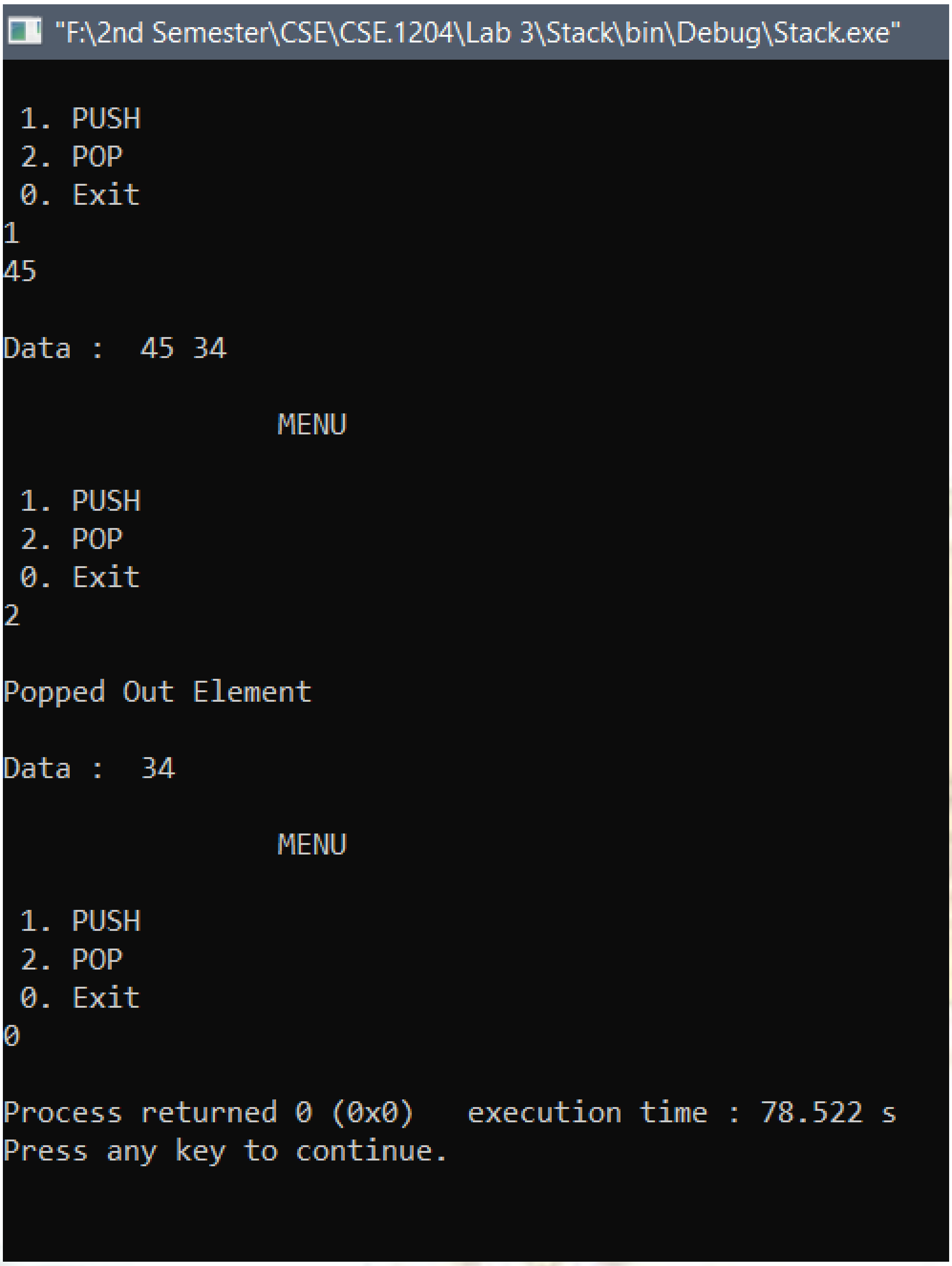
3. <u>stack.cpp</u>

```
#include <iostream>
#include "stack.h"
using namespace std;

void stack::push(int a)
{
    ax[i]=a;
    i=i+1;
    cout<<"\n\n"<<"Data :  ";
}
void stack::pop()
{
    if(i>0)
    {
        ax[i]=-1;
        i=i-1;
        cout<<"\n"<<"Popped Out Element"<<endl;
        if(i!=0)
           cout<<"\n"<<"Data :  ";
    }
    else
        cout<<"No Elements..."<<"\n"<<endl;
}
void stack::show()
{
    int j;

    for(j=i-1;j>=0;j--)
        cout<<ax[j]<<" ";
    cout<<endl;
}
```

Output:



"F:\2nd Semester\CSE\CSE.1204\Lab 3\Stack\bin\Debug\Stack.exe"

```

 1. PUSH
 2. POP
 0. Exit
1
45

Data :  45 34

                MENU

 1. PUSH
 2. POP
 0. Exit
2

Popped Out Element

Data :  34

                MENU

 1. PUSH
 2. POP
 0. Exit
0

Process returned 0 (0x0)   execution time : 78.522 s
Press any key to continue.
```

Problem No: 03

Problem Statement: Implementation of Queue.

queue

int i;
int ax[100];

void push(int);
void pop();
void show();

Theory : Queues are a type of container adaptors which operate in a first in first out (FIFO) type of arrangement. Elements are inserted at the back (end) and are deleted from the front.

We used three public functions in the class :

1. **push:** This function take data as input.
2. **pop:** This function delete the **first** inputted data.
3. **show:** this function shows all the remaining data.

Source Code :

1. main.h

```
#include <iostream>
#include "queue.h"
using namespace std;

void menu()
{
   cout<<"\n\t\t"<<"MENU"<<"\n"<<endl;
   cout<<" 1. PUSH"<<"\n"<<" 2. POP";
   cout<<"\n"<<" 0. Exit"<<"\n"<<endl;
}
```

```
int main()
{
    queue o;
    int a,i,j,k;

    menu();
    cin>>i;
    while(i!=0)
    {
        if(i==1)
        {
            cin>>a;
            o.push(a);
            o.show();
            menu();
            cin>>i;
        }
        else if(i==2)
        {
            o.pop();
            o.show();
            menu();
            cin>>i;
        }
        else if(i==0)
            break;
        else
        {
            cout<<"Wrong Input"<<"\n"<<endl;
            menu();
            cin>>i;
        }
    }

    return 0;
}
```

2. queue.h

```
#ifndef QUEUE_H
#define QUEUE_H


class queue
{
    int i=0,ax[100];
    public:
        void push(int);
        void pop();
        void show();

};

#endif // QUEUE_H
```

3. queue.cpp

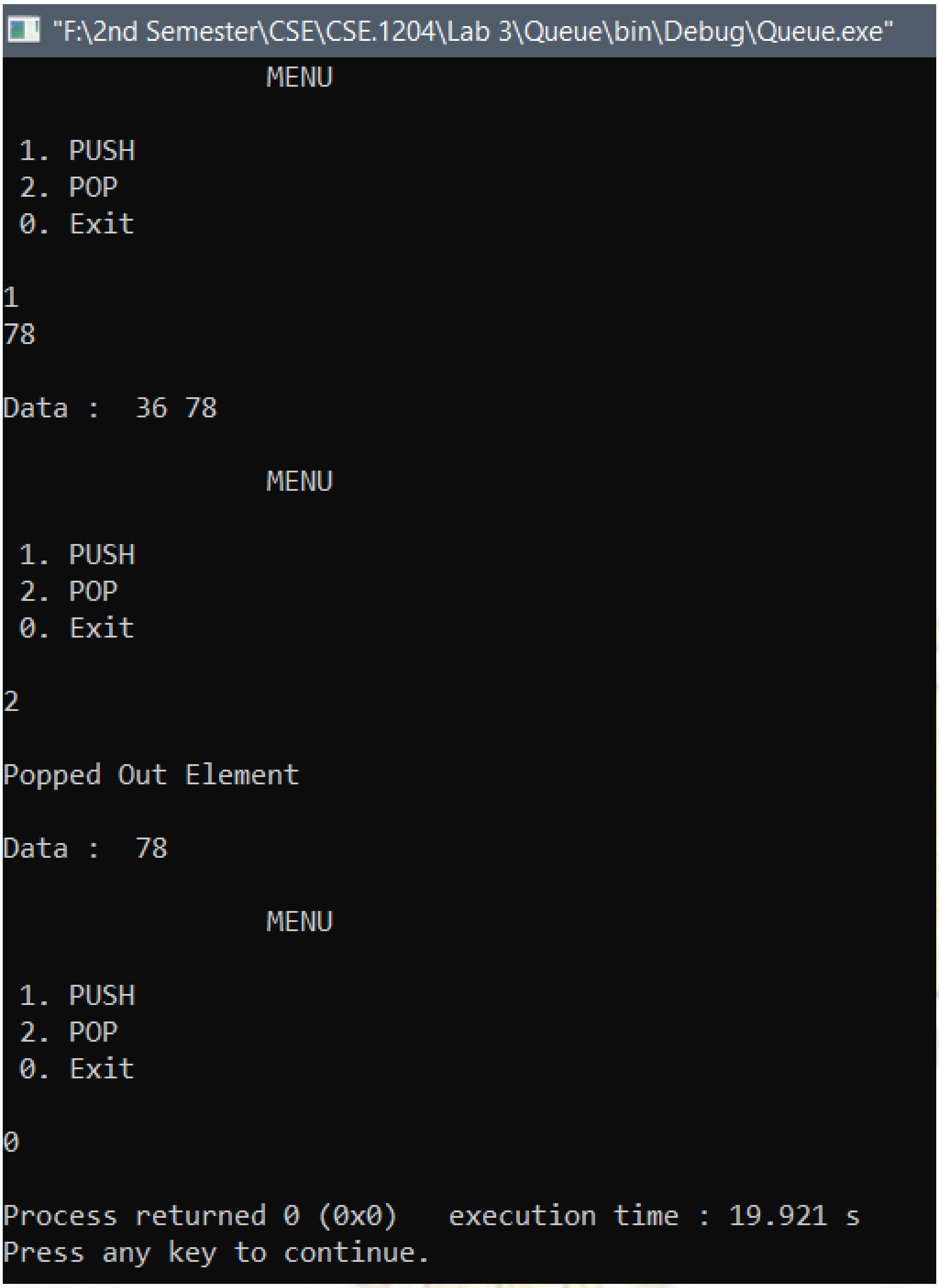
```
#include<iostream>
#include "queue.h"
using namespace std;

void queue::push(int a)
{
    ax[i]=a;
    i=i+1;
    cout<<"\n"<<"Data :  ";
}
void queue::pop()
{
    int j;
    if(i>1)
```

```
   {
      for(j=0;j<i-1;j++)
      {
         ax[j]=ax[j+1];
      }
      ax[i]=-1;
      i=i-1;
      cout<<"\n"<<"Popped Out Element"<<endl;
      if(i!=0)
        cout<<"\n"<<"Data :  ";
   }
   else if(i==1)
   {
      ax[0]=ax[i];
      ax[i]=-1;
      i=i-1;
      cout<<"\n"<<"Popped Out Element"<<endl;
      cout<<"No Elements..."<<"\n"<<endl;
   }
   else
      cout<<"\n"<<"No Elements..."<<"\n"<<endl;
}
void queue::show()
{
   int j;

   for(j=0;j<i;j++)
      cout<<ax[j]<<" ";
   cout<<endl;
}
```

Output:



"F:\2nd Semester\CSE\CSE.1204\Lab 3\Queue\bin\Debug\Queue.exe"

```
                MENU

 1. PUSH
 2. POP
 0. Exit

1
78

Data :  36 78

                MENU

 1. PUSH
 2. POP
 0. Exit

2

Popped Out Element

Data :  78

                MENU

 1. PUSH
 2. POP
 0. Exit

0

Process returned 0 (0x0)   execution time : 19.921 s
Press any key to continue.
```

Conclusion : In the lab I just completed the basic programs. I modified the programs in home.

The End