

Object Oriented Programming 1 in C++

Assignments

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Assignment #1 (lab)

Task #1: using bitwise operators.

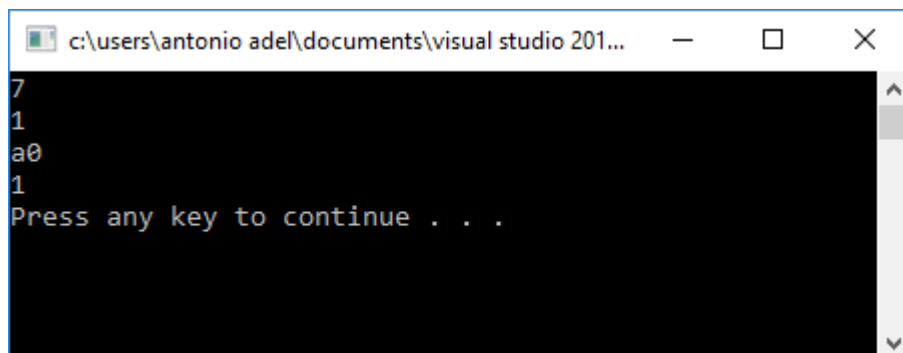
Code:

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

void main()
{
    unsigned x,y,z;
    x=0x000003;
    y=0x000005;
    z=x|y;
    cout<<hex<<z<<endl;
    z=x&y;
    cout<<hex<<z<<endl;
    z=y<<5;
    cout<<hex<<z<<endl;
    z=z>>7;
    cout<<hex<<z<<endl;
    z=~z;

    system("pause");
}
```

Console:



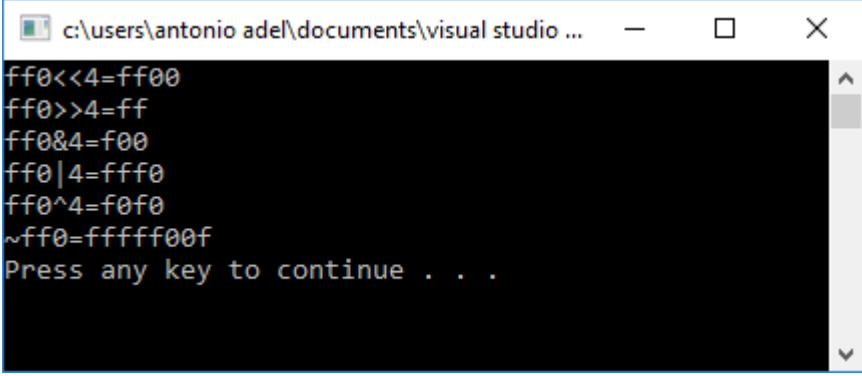
Task #2: A Program that illustrates bit level operations.

Code:

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

void main()
{
    unsigned a,b,c;
    a=0xff0;
    b=0xff0;
    c=a<<4;
    cout<<hex;
    cout<<a<<"<<"<<4<<"="<<c<<endl;
    c=a>>4;
    cout<<a<<">>"<<4<<"="<<c<<endl;
    c=a&b;
    cout<<a<<"&"<<4<<"="<<c<<endl;
    c=a|b;
    cout<<a<<"|"<<4<<"="<<c<<endl;
    c=a^b;
    cout<<a<<"^"<<4<<"="<<c<<endl;
    c=~a;
    cout<<"~"<<a<<"="<<c<<endl;
    system("pause");
}
```

Console:



```
c:\users\antonio adel\documents\visual studio ...
ff0<<4=ff00
ff0>>4=ff
ff0&4=f00
ff0|4=ffff0
ff0^4=f0f0
~ff0=ffffff00f
Press any key to continue . . .
```

Assignment #2 (lab)

Task #1: program that counts number of ones of bits in binary code.

Code:

```
#include <iostream>
using namespace std;
void main()
{
    unsigned int x,m,y;
    int count =0;
    x=0x5;
    m=0x1;

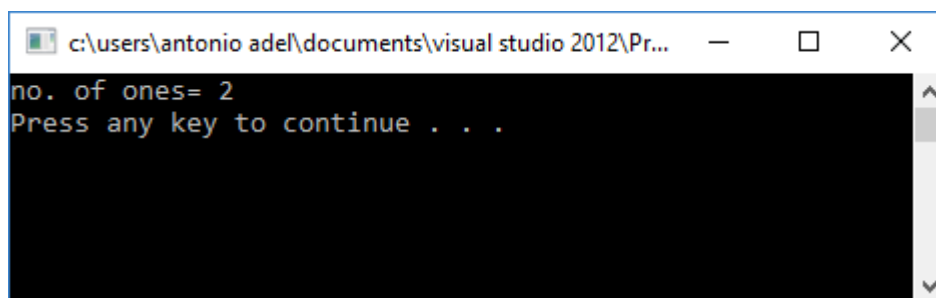
    while(x!=0)
    {
        y=x&m;

        if(y==1)
            count++;

        x=x>>1;
    }

    cout<<"no. of ones= "<<count<<endl;
    system("pause");
}
```

Console:

A screenshot of a Windows command prompt window. The title bar shows the path 'c:\users\antonio adel\documents\visual studio 2012\Pr...'. The window has standard minimize, maximize, and close buttons. The command prompt displays the output of the program: 'no. of ones= 2' followed by 'Press any key to continue . . .'. The text is white on a black background. There is a vertical scrollbar on the right side of the window.

```
c:\users\antonio adel\documents\visual studio 2012\Pr...
no. of ones= 2
Press any key to continue . . .
```

Task #2: program that counts number of zeros of bits in binary code.

Code:

```
#include <iostream>
using namespace std;
void main()
{
    unsigned int x,m,y;
    int count =0;
    x=0x5;
    m=0x1;

    while(x!=0)
    {
        y=x&m;

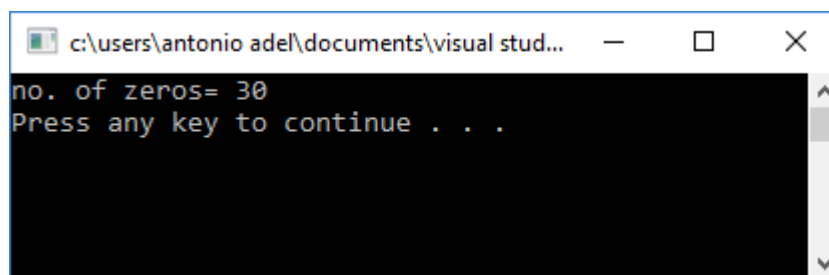
        if(y==1)
            count++;

        x=x>>1;
    }

    cout<<"no. of zeros= "<<32-count<<endl;

    system("pause");
}
```

Console:

A screenshot of a Windows console window. The title bar shows the file path 'c:\users\antonio adel\documents\visual stud...'. The console output displays 'no. of zeros= 30' on the first line and 'Press any key to continue . . .' on the second line. The console has a black background with white text and a vertical scrollbar on the right side.

Task #3: program that set the bits 4,5,7,20 and resets the bits 13,6,8,30 using mask.

Code:

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

void main()
{
    unsigned x,mask1,y;
    x=0xCD5F5B4E;
    mask1=0x00080058;
    y=x|mask1;

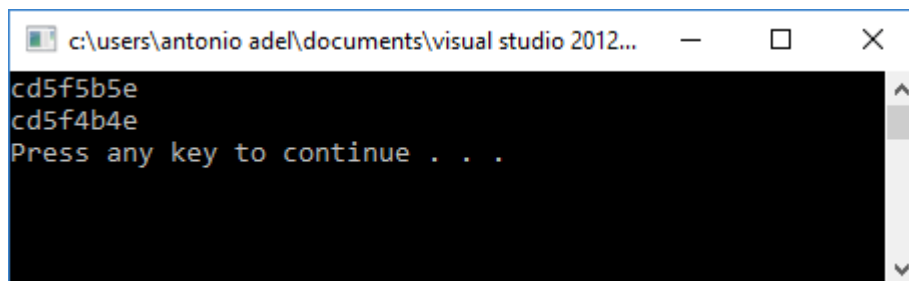
    cout<<hex<<y<<endl;

    unsigned z,mask2,l;
    z=0xCD5F5B4E;
    mask2=0xDFFFEF5F;
    l=x&mask2;

    cout<<hex<<l<<endl;

    system("pause");
}
```

Console:



```
c:\users\antonio adel\documents\visual studio 2012...
cd5f5b5e
cd5f4b4e
Press any key to continue . . .
```

Assignment #3

Task #1: Program that prints letters from A to Z and there corresponding decimal code.

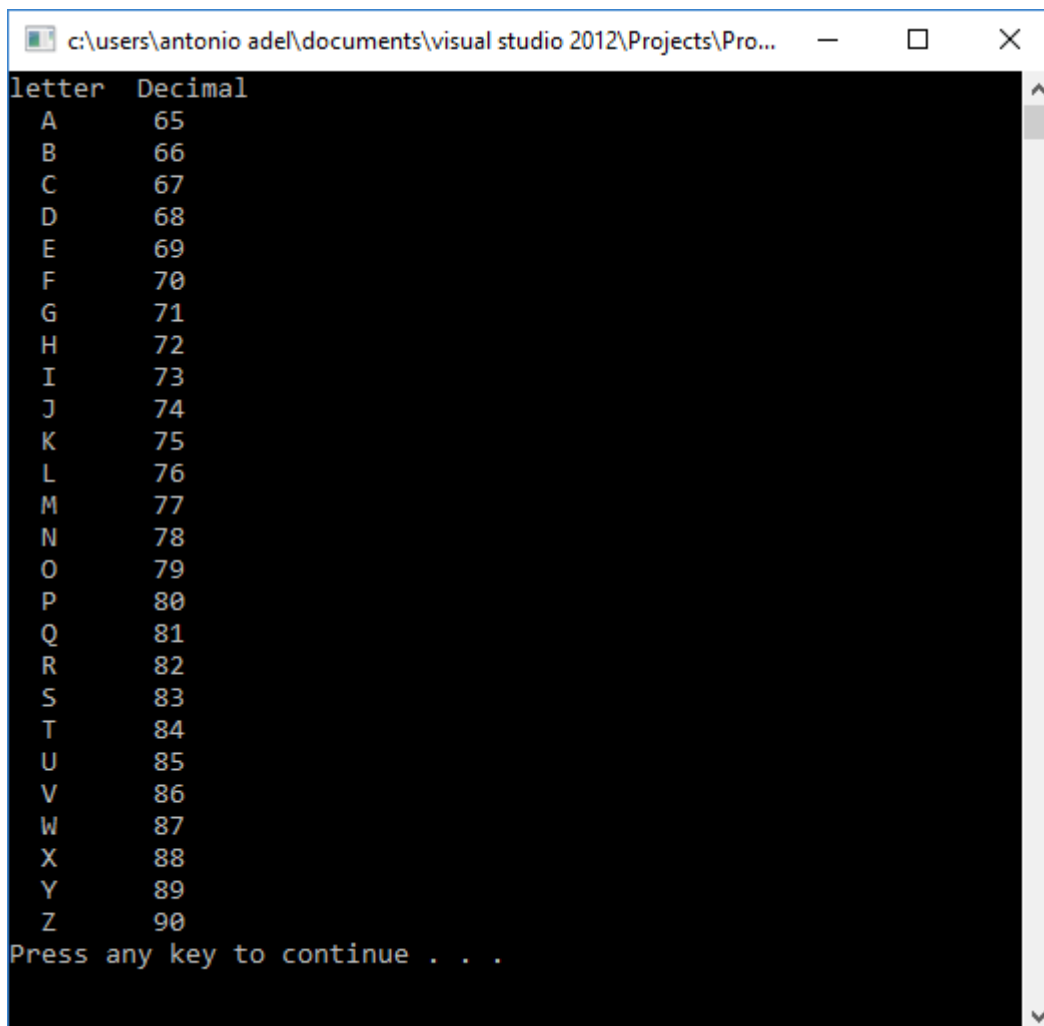
Code:

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

void main()
{
    char x='A';
    cout<<"letter"<<" "<<"Decimal"<<endl;
    for (int i = 0; i < 26; i++)
    {
        cout<<" "<<x<<" "<<(int)x<<endl;;
        x++;
    }

    system("pause");
}
```

Console:



```
letter  Decimal
A       65
B       66
C       67
D       68
E       69
F       70
G       71
H       72
I       73
J       74
K       75
L       76
M       77
N       78
O       79
P       80
Q       81
R       82
S       83
T       84
U       85
V       86
W       87
X       88
Y       89
Z       90
Press any key to continue . . .
```

Assignment #4 (lab)

Task #1: program that uses bitwise operators to pack a group of hexadecimal numbers each of one byte in an integer of 4 bytes.

Code:

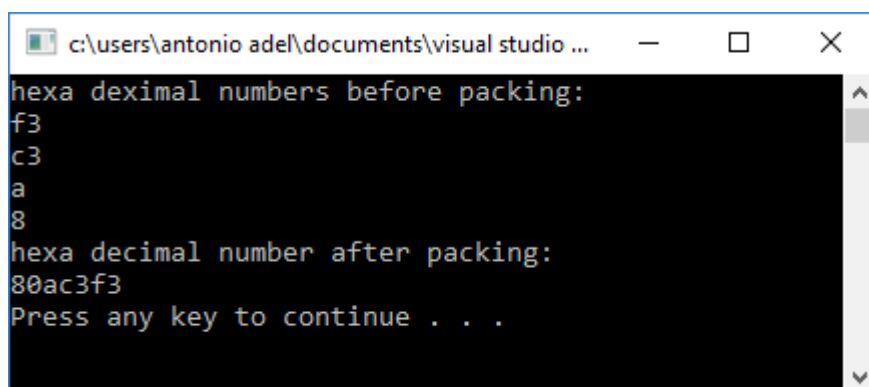
```
#include<iostream>
using namespace std;
void main()
{
    unsigned char a, b, c, d;
    unsigned y=0;
    a = 0xf3;
    b = 0xc3;
    c = 0xa;
    d = 0x8;

    cout<<"hexa deximal numbers before packing: "
    <<endl<<hex<<(int)a<<endl<<(int)b<<endl<<(int)c<<endl<<(int)d<<endl;
    y = y | d;
    y = y << 8;
    y = y | c;
    y = y << 8;
    y = y | b;
    y = y << 8;
    y = y | a;

    cout<<"hexa decimal number after packing: "<<endl;
    cout << hex << y << endl;

    system("pause");
}
```

Console:



```
c:\users\antonio adel\documents\visual studio ...
hexa deximal numbers before packing:
f3
c3
a
8
hexa decimal number after packing:
80ac3f3
Press any key to continue . . .
```


Task #2: program that uses bit wise operators to unpack a hexadecimal number of 4 bytes into 4 fragments each of 1 byte.

Code:

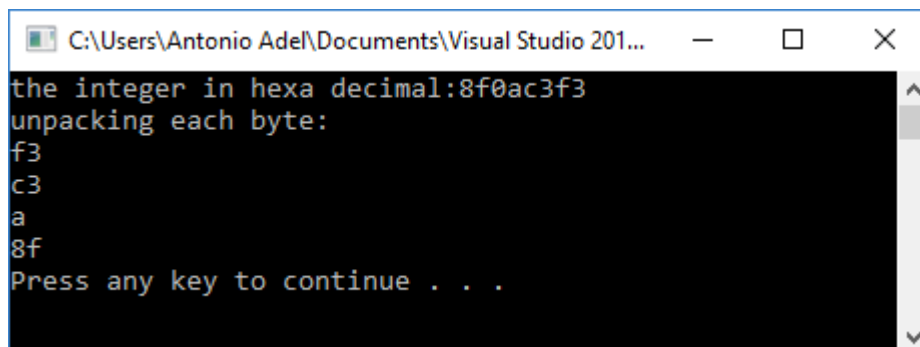
```
#include<iostream>
using namespace std;
void main()
{
    unsigned char a,b,c,d;
    unsigned int y=0x8f0ac3f3,m=0;
    cout<<"the integer in hexa decimal:"<<hex<<y<<endl;
    a=y|m;
    y=y>>8;
    b=y|m;
    y=y>>8;
    c=y|m;
    y=y>>8;
    d=y|m;

    cout<<"unpacking each byte: "<<endl;

    cout<<hex<<(int)a<<endl;
    cout<<hex<<(int)b<<endl;
    cout<<hex<<(int)c<<endl;
    cout<<hex<<(int)d<<endl;

    system("pause");
}
```

Console:



```
C:\Users\Antonio Adel\Documents\Visual Studio 201...
the integer in hexa decimal:8f0ac3f3
unpacking each byte:
f3
c3
a
8f
Press any key to continue . . .
```

Assignment #5 (lab)

Task #1: program having a function that swaps 2 numbers using call by value.

Code:

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

void swap(int x, int y);

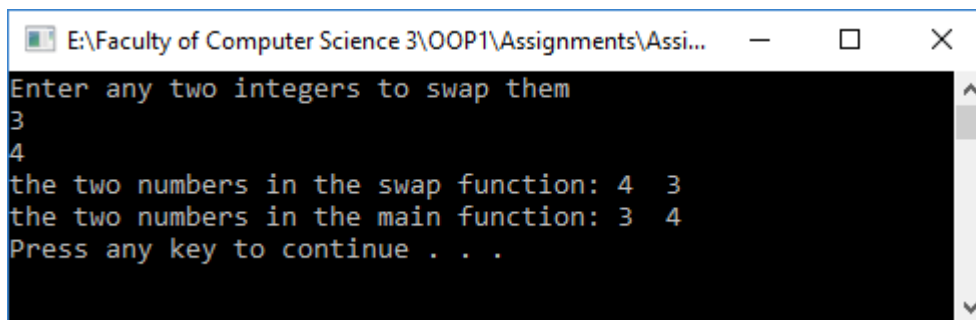
void main()
{
    int a,b;
    cout<<"Enter any two integers to swap them"<<endl;
    cin>>a>>b;

    swap(a,b);
    cout<<"the two numbers in the main function: "<<a<<" "<<b<<endl;
    system("pause");
}

void swap(int x,int y)
{
    int temp;

    temp=x;
    x=y;
    y=temp;
    cout<<"the two numbers in the swap function: "<<x<<" "<<y<<endl;
}
```

Console:



```
E:\Faculty of Computer Science 3\OOP1\Assignments\Assi...
Enter any two integers to swap them
3
4
the two numbers in the swap function: 4 3
the two numbers in the main function: 3 4
Press any key to continue . . .
```

Task #2: program having a function that swaps 2 numbers using call by reference.

Code:

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

void swap(int &x, int &y);

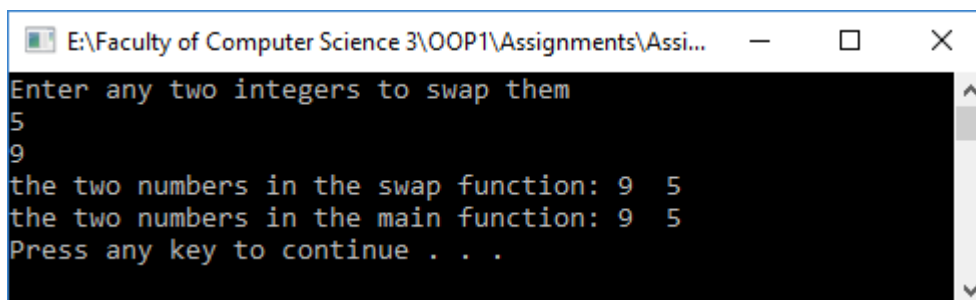
void main()
{
    int a,b;
    cout<<"Enter any two integers to swap them"<<endl;
    cin>>a>>b;

    swap(a,b);
    cout<<"the two numbers in the main function: "<<a<<" "<<b<<endl;
    system("pause");
}

void swap(int &x,int &y)
{
    int temp;

    temp=x;
    x=y;
    y=temp;
    cout<<"the two numbers in the swap function: "<<x<<" "<<y<<endl;
}
```

Console:



```
E:\Faculty of Computer Science 3\OOP1\Assignments\Assi...
Enter any two integers to swap them
5
9
the two numbers in the swap function: 9 5
the two numbers in the main function: 9 5
Press any key to continue . . .
```

Task #3: program having a function that swaps 2 numbers using call by address.

Code:

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

void swap(int *x, int *y);

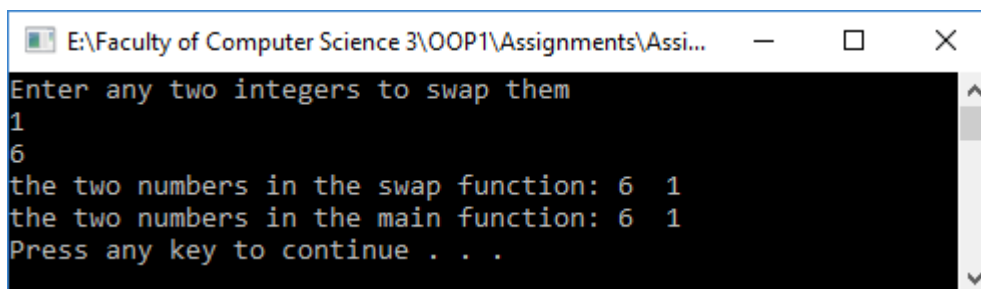
void main()
{
    int a,b;
    cout<<"Enter any two integers to swap them"<<endl;
    cin>>a>>b;

    swap(&a,&b);
    cout<<"the two numbers in the main function: "<<a<<" "<<b<<endl;
    system("pause");
}

void swap(int *x,int *y)
{
    int temp;

    temp=*x;
    *x=*y;
    *y=temp;
    cout<<"the two numbers in the swap function: "<<*x<<" "<<*y<<endl;
}
```

Console:



```
E:\Faculty of Computer Science 3\OOP1\Assignments\Assi...
Enter any two integers to swap them
1
6
the two numbers in the swap function: 6 1
the two numbers in the main function: 6 1
Press any key to continue . . .
```

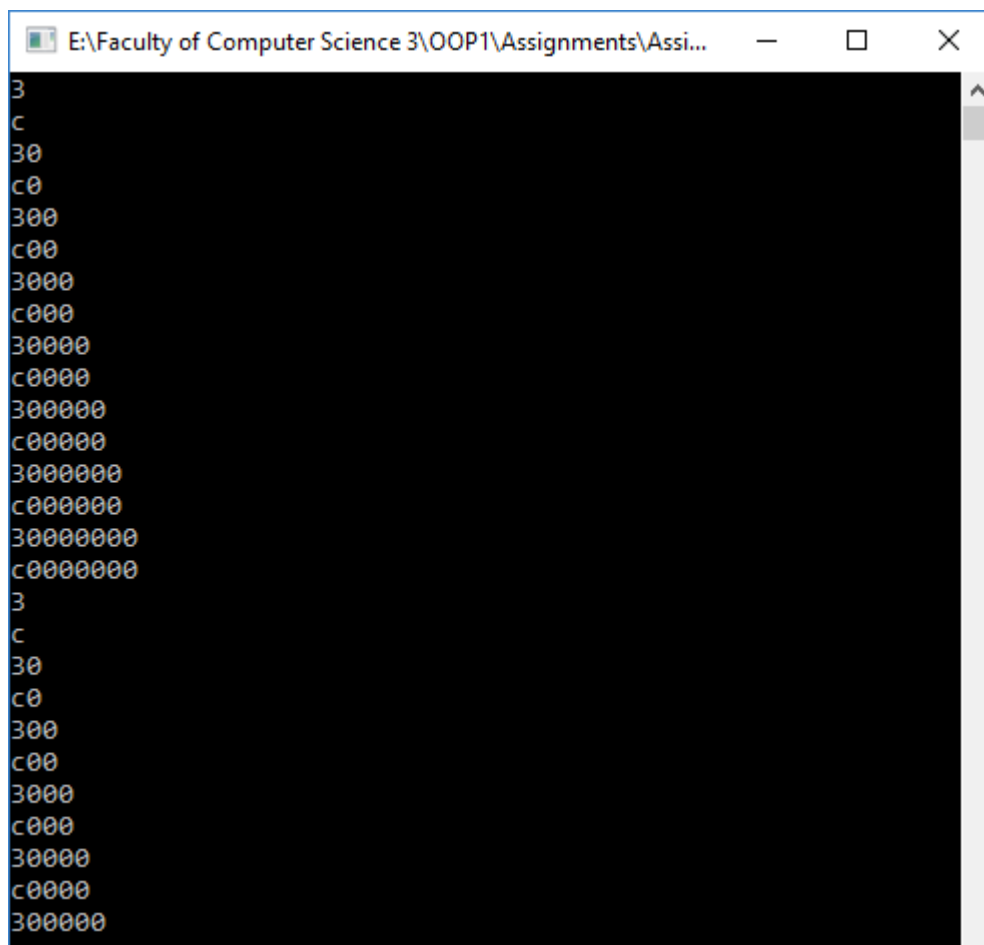
Task #4: program that turns ON the first 2 bits of 32 bits and turns OFF the rest of the bits then after 5 seconds turns ON the bits 3,4 of 32 bits and turns OFF the reset of the bits and continue till it passes all the 32 bits then delays 10 seconds and start over again .

Code:

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

void main()
{
    unsigned int y;
    while(true)
    {
        y=0x3;
        while(y!=0)
        {
            cout<<hex<<y<<endl;
            Sleep(5000);
            y=y<<2;
        }
        Sleep(10000);
    }
}
```

Console: note that the console prints an infinite loop.



Assignment #6

Task #1: program that checks if a word is palindrome or not using stack.

Code:

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

const int max_len=100;

struct stack
{
    char s[max_len];
    int top;
};

void reset (stack *stk)
{
    stk->top=0;
}

void push (char c,stack *stk)
{
    stk->top++;
    stk->s[stk->top]=c;
}

char pop (stack *stk)
{
    return(stk->s[stk->top--]);
}

bool empty (stack *stk)
{
    if (stk->top==0)
        return(true);
    else
        return (false);
}

bool full (stack *stk)
{
    if (stk->top==max_len-1)
        return(true);
    else
        return(false);
}
```

```

void main()
{
    stack s1,s2,s3;
    char str [40]={"Antonio"};

    cout<<"input data : "<<str<<endl<<endl; //to see the input data

    reset(&s1);
    //pushing chars into s1
    int i=0;
    while (str[i])
        if(full(&s1)==false)
        {
            push(str[i],&s1);
            i++;
        }

    s2=s1; //copying s1 to s2

    reset(&s3);
    //popping values from s2 and pushing them into s3
    while(empty(&s2)==false)
        push(pop(&s2),&s3);

    cout<<"value in s1: ";
    for (int i = 1; i<=s1.top; i++)
        cout<<(s1.s[i]); //printing chars from s1 without getting the stack empty

    cout<<endl;

    cout<<"value in s3: ";
    for (int i = 1;i<=s3.top; i++)
        cout<<(s3.s[i]); //printing chars from s3 getting the stack empty

    cout<<endl<<endl;

    string palindrome="the input word is palindrome";
    while (empty(&s1)==false)
    {
        if(pop(&s1)!=pop(&s3))
        {
            palindrome="the input word is not palindrome";
            break;
        }
    }

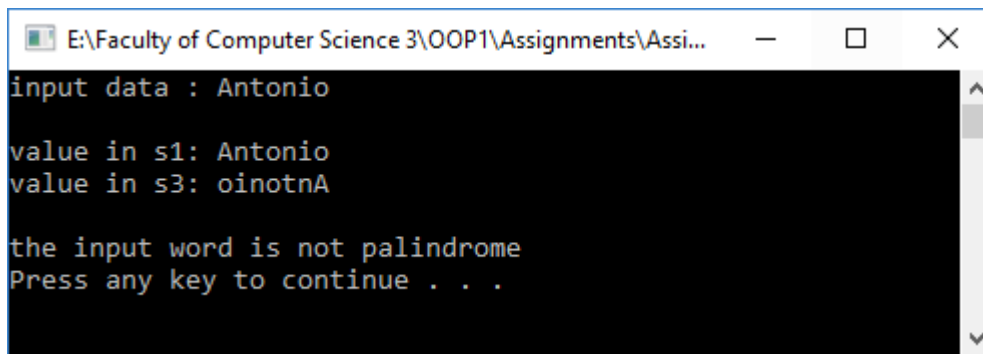
    cout<<palindrome<<endl;

    system("pause");
}

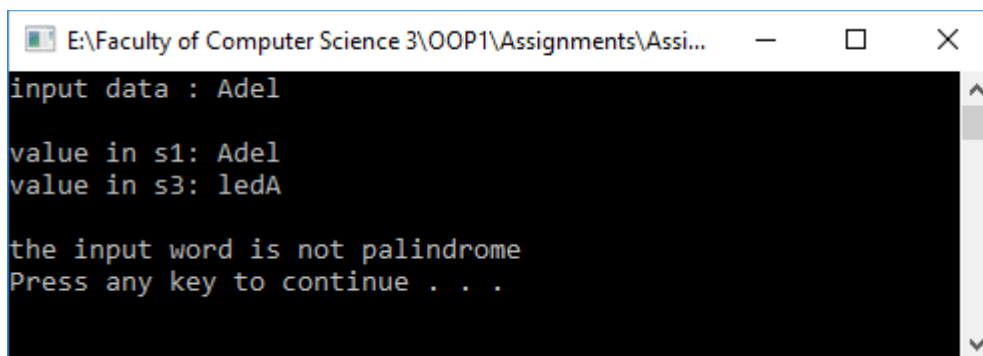
```

Consoles:

Case of not palindrome:

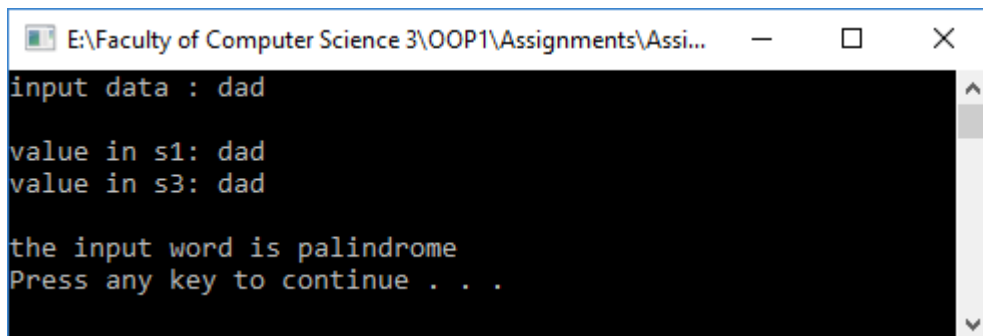


```
E:\Faculty of Computer Science 3\OOP1\Assignments\Assi...  
input data : Antonio  
value in s1: Antonio  
value in s3: oinohtA  
  
the input word is not palindrome  
Press any key to continue . . .
```

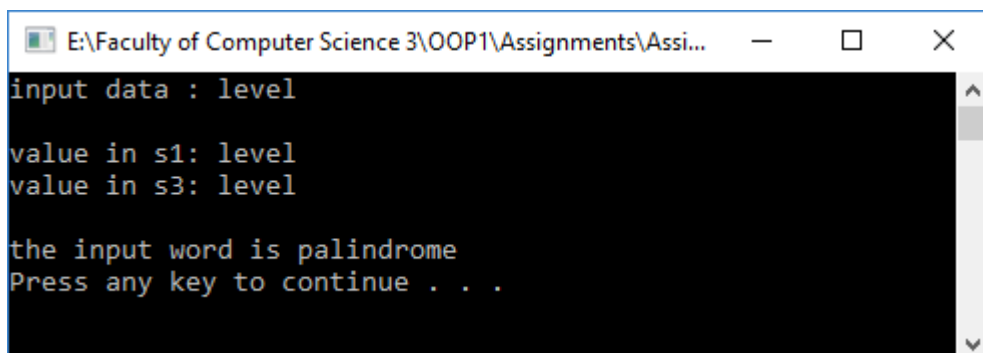


```
E:\Faculty of Computer Science 3\OOP1\Assignments\Assi...  
input data : Adel  
value in s1: Adel  
value in s3: ledA  
  
the input word is not palindrome  
Press any key to continue . . .
```

Case of palindrome:



```
E:\Faculty of Computer Science 3\OOP1\Assignments\Assi...  
input data : dad  
value in s1: dad  
value in s3: dad  
  
the input word is palindrome  
Press any key to continue . . .
```



```
E:\Faculty of Computer Science 3\OOP1\Assignments\Assi...  
input data : level  
value in s1: level  
value in s3: level  
  
the input word is palindrome  
Press any key to continue . . .
```


Assignment #7 (lab)

Task #1: program having a function that adds two points p1 & p2 to get p3 then insert those 3 points in a stack.

Code:

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

struct point
{
    int x,y;
};

point addpoint (point p1,point p2)
{
    point p3;
    p3.x=p1.x+p2.x;
    p3.y=p1.y+p2.y;

    return p3;
}

struct stack
{
    point s[4];
    int top;
};

void reset (stack *stk)
{
    stk->top=0;
}

void push (stack *stk,point c)
{
    stk->top++;
    stk->s[stk->top]=c;
}

point pop (stack *stk)
{
    return(stk->s[stk->top--]);
}

bool empty (stack *stk)
{
    if (stk->top==0)
        return(true);
    else
        return (false);
}

bool full (stack *stk)
{
    if (stk->top==3-1)
        return(true);
    else
        return(false);
}
```

```

void main()
{
    point p1,p2,p3;
    cout<<"Enter p1:"<<endl;
    cin>>p1.x>>p1.y;
    cout<<"Enter p2:"<<endl;
    cin>>p2.x>>p2.y;

    p3=addpoint(p1,p2);

    cout<<"p3= ("<<p3.x<<","<<p3.y<<")"<<endl;

    stack s;
    reset(&s);

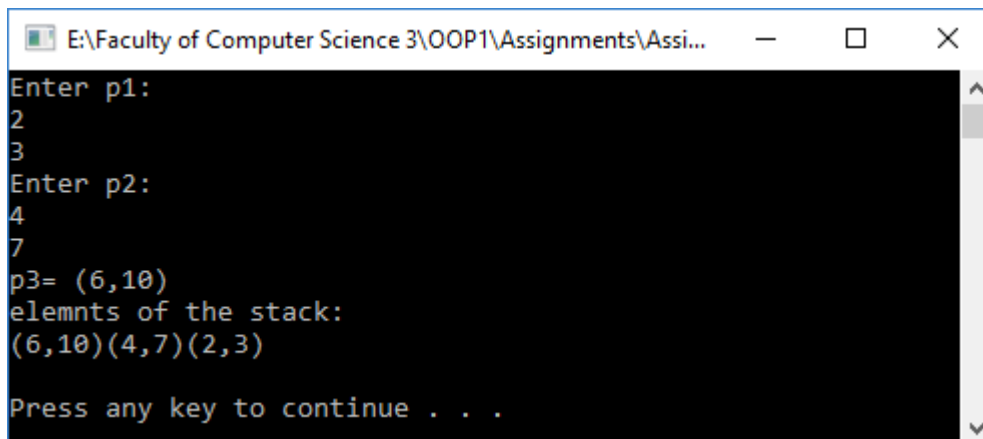
    push(&s,p1);
    push(&s,p2);
    push(&s,p3);

    cout<<"elemnts of the stack:"<<endl;
    while(empty(&s)==false)
    {
        point p_pop=pop(&s);
        cout<<"("<<p_pop.x<<","<<p_pop.y<<")";
    }
    cout<<endl<<endl;

    system("pause");
}

```

Console:



```

E:\Faculty of Computer Science 3\OOP1\Assignments\Assi...
Enter p1:
2
3
Enter p2:
4
7
p3= (6,10)
elemnts of the stack:
(6,10)(4,7)(2,3)
Press any key to continue . . .

```

Assignment #8

Task #1: you have a Department of an unknown number of employees and students.

Design a program that reads data of employees or students, then it is required to print this data and the actual number of employee and students.

Code:

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

struct Student
{
    int code;
    char name[80];
    float grade1;
    float grade2;
};

struct Employee
{
    int id;
    char name[80];
    float salary;
};

struct Department
{
    char flag;
    union
    {
        Student s;
        Employee e;
    }person;
};

struct node
{
    Department info;
    node *next;
};

void main()
{
    char c;
    node *list, *temp;

    cout<<"if you want to enter data type 'y': "<<endl;
    cin>>c;
    if(c!='y')
    {
        cout<<"thanks"<<endl;
        exit(0);
    }

    list=new node;
    list->next=NULL;

    cout<<"type 's' to enter student and 'e' to enter employee"<<endl;
    cin>>list->info.flag;
```

```

switch(list->info.flag)
{
    case 's':
        cout<<"please enter student code: ";
        cin>>list->info.person.s.code;
        cout<<"please enter student name: ";
        cin>>list->info.person.s.name;
        cout<<"please enter student first grade: ";
        cin>>list->info.person.s.grade1;
        cout<<"please enter student second grade: ";
        cin>>list->info.person.s.grade2;
        break;

    case 'e':
        cout<<"please enter Employee id: ";
        cin>>list->info.person.e.id;
        cout<<"please enter Employee name: ";
        cin>>list->info.person.e.name;
        cout<<"please enter Employee salary: ";
        cin>>list->info.person.e.salary;
        break;
}
cout<<endl;
cout<<"if you want to enter data again type'y': "<<endl;
cin>>c;

temp=list;

while(c=='y')
{
    temp->next=new node;
    temp=temp->next;
    cout<<"type 's' to enter student and 'e' to enter employee"<<endl;
    cin>>temp->info.flag;
    temp->next=NULL;

    switch(temp->info.flag)
    {
        case 's':
            cout<<"please enter student code: ";
            cin>>temp->info.person.s.code;
            cout<<"please enter student name: ";
            cin>>temp->info.person.s.name;
            cout<<"please enter student first grade: ";
            cin>>temp->info.person.s.grade1;
            cout<<"please enter student second grade: ";
            cin>>temp->info.person.s.grade2;
            break;

        case 'e':
            cout<<"please enter Employee id: ";
            cin>>temp->info.person.e.id;
            cout<<"please enter Employee name: ";
            cin>>temp->info.person.e.name;
            cout<<"please enter Employee salary: ";
            cin>>temp->info.person.e.salary;
            break;
    }
    cout<<endl;
    cout<<"if you want to enter data again type'y': "<<endl;
    cin>>c;
}

```

```

//to print the list
temp=list;
int stcount=0, empcount=0;
while(temp!=NULL)
{
    switch(temp->info.flag)
    {
        case 's':
            stcount++;
            cout<<"----- student`s records-----"<<endl;
            cout<<"student`s code: "<<temp->info.person.s.code<<endl;
            cout<<"student`s name: "<<temp->info.person.s.name<<endl;
            cout<<"student`s first grade: "<<temp->info.person.s.grade1<<endl;
            cout<<"student`s second grade: "<<temp->info.person.s.grade2<<endl;
            break;

        case 'e':
            empcount++;
            cout<<"----- Employee`s records-----"<<endl;
            cout<<"Employee`s id: "<<temp->info.person.e.id<<endl;
            cout<<"Employee`s name: "<<temp->info.person.e.name<<endl;
            cout<<"Employee`s salary: "<<temp->info.person.e.salary<<endl;
            break;
    }
    temp=temp->next;
}

cout<<endl;
cout<<"Number of Students = "<<stcount<<endl;
cout<<"Number of Employees = "<<empcount<<endl;

system("pause");
}

```

Console:

```
E:\Faculty of Computer Science 3\OOP1\Project6\Debug\Project6.exe
if you want to enter data type 'y':
y
type 's' to enter student and 'e' to enter employee
s
please enter student code: 56986
please enter student name: Antonio
please enter student first grade: 95
please enter student second grade: 93

if you want to enter data again type'y':
y
type 's' to enter student and 'e' to enter employee
e
please enter Employee id: 32145
please enter Employee name: Andrew
please enter Employee salary: 5000

if you want to enter data again type'y':
y
type 's' to enter student and 'e' to enter employee
s
please enter student code: 56952
please enter student name: Fady
please enter student first grade: 63
please enter student second grade: 85

if you want to enter data again type'y':
y
type 's' to enter student and 'e' to enter employee
s
please enter student code: 75423
please enter student name: Tamer
please enter student first grade: 85
please enter student second grade: 96

if you want to enter data again type'y':
y
type 's' to enter student and 'e' to enter employee
s
please enter student code: 45236
please enter student name: Amir
please enter student first grade: 45
please enter student second grade: 48

if you want to enter data again type'y':
y
type 's' to enter student and 'e' to enter employee
e
please enter Employee id: 47582
please enter Employee name: Atef
please enter Employee salary: 4000

if you want to enter data again type'y':
n
----- student's records-----
student's code: 56986
student's name: Antonio
student's first grade: 95
student's second grade: 93
----- Employee's records-----
Employee's id: 32145
Employee's name: Andrew
Employee's salary: 5000
----- student's records-----
student's code: 56952
student's name: Fady
student's first grade: 63
student's second grade: 85
----- student's records-----
student's code: 75423
student's name: Tamer
student's first grade: 85
student's second grade: 96
----- student's records-----
student's code: 45236
student's name: Amir
student's first grade: 45
student's second grade: 48
----- Employee's records-----
Employee's id: 47582
Employee's name: Atef
Employee's salary: 4000

Number of Students = 4
Number of Employees = 2
Press any key to continue . . .
```

Assignment #9 (lab)

Task #1: write a program of class vector where you define float xx as private class member and float yy as a public class member and use constructor and destructor.

Code:

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

class vector
{
public:
    float yy;

    vector()
    {
        xx=0;
        yy=0;
    }

    ~vector()
    {
        cout<<"object destroyed"<<endl;
    }

    void setxx(float a);
    float getxx();

private:
    float xx;
};

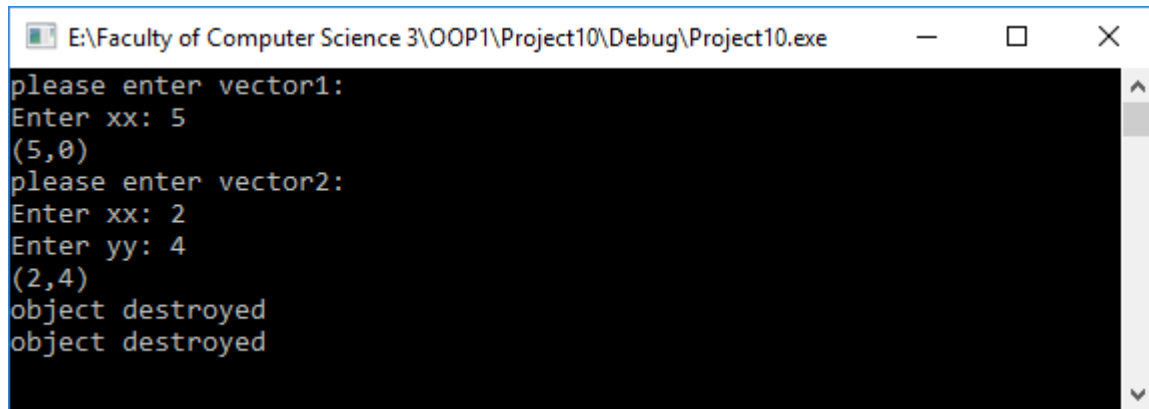
void main()
{
    vector v1,v2;
    float temp;
    cout<<"please enter vector1: "<<endl;
    cout<<"Enter xx: ";
    cin>>temp;
    v1.setxx(temp);
    cout<<"("<<v1.getxx()<<","<<v1.yy<<")"<<endl;
    // note that v1.yy will be set to 0 by the constructor

    cout<<"please enter vector2: "<<endl;
    cout<<"Enter xx: ";
    cin>>temp;
    v2.setxx(temp);
    cout<<"Enter yy: ";
    cin>>v2.yy;
    cout<<"("<<v2.getxx()<<","<<v2.yy<<")"<<endl;
}

void vector :: setxx(float a)
{
    xx=a;
}

float vector :: getxx()
{
    return xx;
}
```

Console:



```
E:\Faculty of Computer Science 3\OOP1\Project10\Debug\Project10.exe
please enter vector1:
Enter xx: 5
(5,0)
please enter vector2:
Enter xx: 2
Enter yy: 4
(2,4)
object destroyed
object destroyed
```


Assignment #10 (lab)

Task #1: write a program of class point where you define int x as private class member and int y as a public class member and use overloaded constructor, overloaded set function and overloaded operators (+ and -).

Code:

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

class point
{
private:
    int x;

public:
    int y;

    void setx(int a)
    {
        x=a;
    }

    int getx()
    {
        return x;
    }

    //constructor (we use that form instead of overloading the constructor)
    point (int a=0, int b=0)
    {
        x=a;
        y=b;
    }

    //overloaded set function
    void set()
    {
        x=1;
        y=1;
    }

    void set(int a)
    {
        x=a;
        y=0;
    }
    void set(int a, int b)
    {
        x=a;
        y=b;
    }
};

//overloaded operators
point operator +(point a,point b)
{
    return point (a.getx()+b.getx(),a.y+b.y);
}
point operator -(point a,point b)
{
    return point (a.getx()-b.getx(),a.y-b.y);
}
```

```

void main()
{
    point p1,p2(4),p3(2,7),p4,p5,p6,p7,p8,p9;

    p4.setx(5);
    p4.y=6;
    p5.set();
    p6.set(4);
    p7.set(3,9);

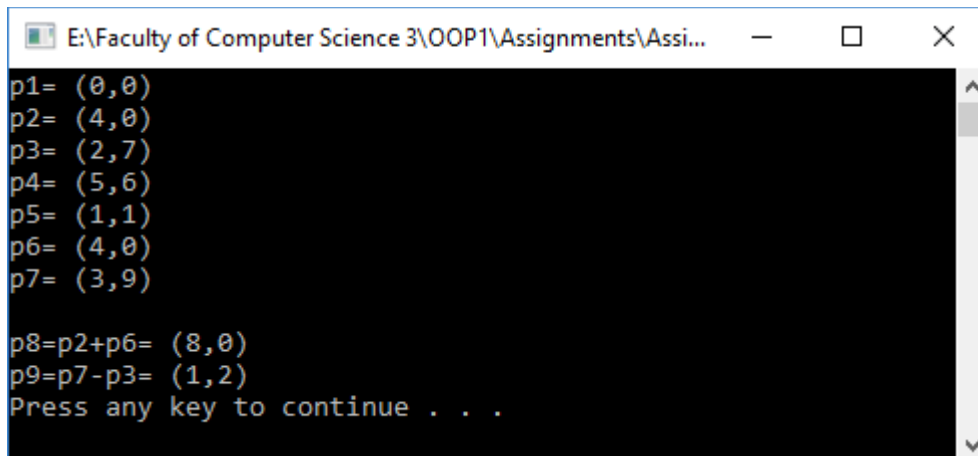
    p8=p2+p6; //adding points
    p9=p7-p3; //subtracting points

    cout<<"p1= "<<"("<<p1.getx()<<","<<p1.y<<")"<<endl;
    cout<<"p2= "<<"("<<p2.getx()<<","<<p2.y<<")"<<endl;
    cout<<"p3= "<<"("<<p3.getx()<<","<<p3.y<<")"<<endl;
    cout<<"p4= "<<"("<<p4.getx()<<","<<p4.y<<")"<<endl;
    cout<<"p5= "<<"("<<p5.getx()<<","<<p5.y<<")"<<endl;
    cout<<"p6= "<<"("<<p6.getx()<<","<<p6.y<<")"<<endl;
    cout<<"p7= "<<"("<<p7.getx()<<","<<p7.y<<")"<<endl;
    cout<<endl;
    cout<<"p8=p2+p6= "<<"("<<p8.getx()<<","<<p8.y<<")"<<endl;
    cout<<"p9=p7-p3= "<<"("<<p9.getx()<<","<<p9.y<<")"<<endl;

    system ("pause");
}

```

Console:



```

E:\Faculty of Computer Science 3\OOP1\Assignments\Assi...
p1= (0,0)
p2= (4,0)
p3= (2,7)
p4= (5,6)
p5= (1,1)
p6= (4,0)
p7= (3,9)

p8=p2+p6= (8,0)
p9=p7-p3= (1,2)
Press any key to continue . . .

```

Assignment #11 (lab)

Task #1: write a program of class point where you define int x, int y as private class member and int z as a public class member and use overloaded operator ++ and overloaded operator += as member function

Code:

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

class point
{
    int x;
    int y;
public:
    int z;

    void setx(int a)
    {
        x=a;
    }

    void sety(int a)
    {
        y=a;
    }
    int getx()
    {
        return x;
    }
    int gety()
    {
        return y;
    }

    point()
    {
        x=0;
        y=0;
        z=0;
    }

    point (int a, int b, int c)
    {
        x=a;
        y=b;
        z=c;
    }
}
```

```

//overloading operator ++ as member function
point operator ++ ()
{
    x++;
    y++;
    z++;

    return point(x,y,z);
}

//overloading operator += as member function
point operator += (int a)
{
    x=x+a;
    y=y+a;
    z=z+a;

    return point(x,y,z);
}

};

void main()
{
    point p1,p2(2,4,6),p3(5,7,9),p4(1,8,3);
    p1.setx(5); //using set function to set x of p1 to 5
    //y and z of p1 will be set to zero by the constructor

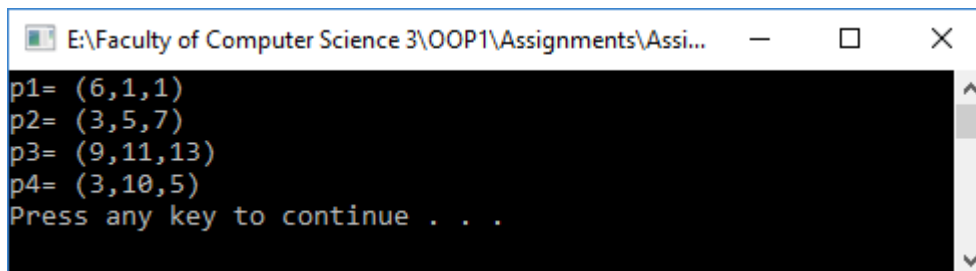
    ++p1;
    p2.operator++();
    p3+=4;
    p4.operator+=(2);

    cout<<"p1= ("<<p1.getx()<<","<<p1.gety()<<","<<p1.z<<)"<<endl;
    cout<<"p2= ("<<p2.getx()<<","<<p2.gety()<<","<<p2.z<<)"<<endl;
    cout<<"p3= ("<<p3.getx()<<","<<p3.gety()<<","<<p3.z<<)"<<endl;
    cout<<"p4= ("<<p4.getx()<<","<<p4.gety()<<","<<p4.z<<)"<<endl;

    system("pause");
}

```

Console:



```

E:\Faculty of Computer Science 3\OOP1\Assignments\Assi...
p1= (6,1,1)
p2= (3,5,7)
p3= (9,11,13)
p4= (3,10,5)
Press any key to continue . . .

```

Task #2: write a program of class point where you define int x, int y as private class member and int z as a public class member and use overloaded operator ++ and overloaded operator += as nonmember function

Code:

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

class point
{
    int x;
    int y;

public:
    int z;

    void setx(int a)
    {
        x=a;
    }

    void sety(int a)
    {
        y=a;
    }
    int getx()
    {
        return x;
    }
    int gety()
    {
        return y;
    }

    point()
    {
        x=0;
        y=0;
        z=0;
    }

    point (int a, int b, int c)
    {
        x=a;
        y=b;
        z=c;
    }

};
```

```

//overloading operator ++ as a non member function
point operator ++ (point &a)
{
    a.setx(a.getx()+1);
    a.sety(a.gety()+1);
    a.z++;
    return point(a.getx(),a.gety(),a.z);
}

//overloading operator += as a non member function
point operator += (point &a ,int c)
{
    a.setx(a.getx()+c);
    a.sety(a.gety()+c);
    a.z+=c;
    return point(a.getx(),a.gety(),a.z);
}

void main()
{
    point p1,p2(2,4,6),p3(5,7,9),p4(1,8,3);
    p1.setx(5); //using set function to set x of p1 to 5
    //y and z of p1 will be set to zero by the constructor

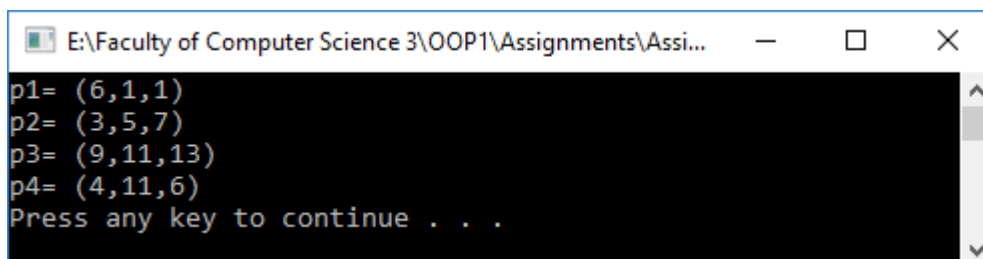
    ++p1;
    operator++(p2);
    p3+=4;
    operator+=(p4,3);

    cout<<"p1= ("<<p1.getx()<<","<<p1.gety()<<","<<p1.z<<")"<<endl;
    cout<<"p2= ("<<p2.getx()<<","<<p2.gety()<<","<<p2.z<<")"<<endl;
    cout<<"p3= ("<<p3.getx()<<","<<p3.gety()<<","<<p3.z<<")"<<endl;
    cout<<"p4= ("<<p4.getx()<<","<<p4.gety()<<","<<p4.z<<")"<<endl;

    system("pause");
}

```

Console:



```

E:\Faculty of Computer Science 3\OOP1\Assignments\Assi...
p1= (6,1,1)
p2= (3,5,7)
p3= (9,11,13)
p4= (4,11,6)
Press any key to continue . . .

```

Task #3: write a program of class point where you define int x, int y as private class member and int z as a public class member and use overloaded operator ++ and overloaded operator += as friend function

Code:

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

class point
{
    int x;
    int y;

public:
    int z;

    void setx(int a)
    {
        x=a;
    }

    void sety(int a)
    {
        y=a;
    }
    int getx()
    {
        return x;
    }
    int gety()
    {
        return y;
    }

    point()
    {
        x=0;
        y=0;
        z=0;
    }

    point (int a, int b, int c)
    {
        x=a;
        y=b;
        z=c;
    }
}
```

```

//overloading operator ++ as friend function
friend point operator ++ (point &a);

//overloading operator += as friend function
friend point operator += (point &a,int c);
};

point operator ++ (point &a)
{
    return point(a.x++,a.y++,a.z++);
}

point operator += (point &a,int c)
{
    return point(a.x+=c,a.y+=c,a.z+=c);
}

void main()
{
    point p1,p2(2,4,6),p3(5,7,9),p4(1,8,3);
    p1.setx(5); //using set function to set x of p1 to 5
    //y and z of p1 will be set to zero by the constructor

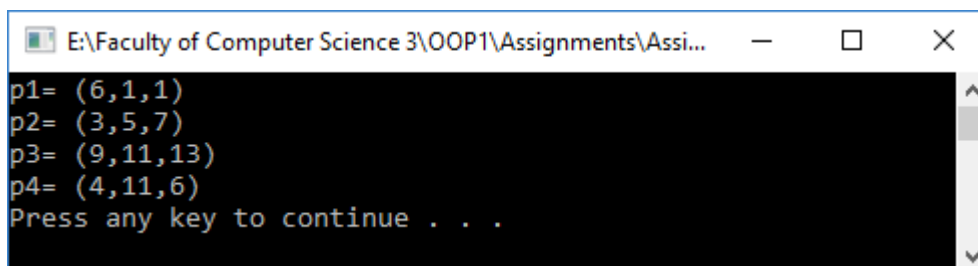
    ++p1;
    operator++(p2);
    p3+=4;
    operator+=(p4,3);

    cout<<"p1= ("<<p1.getx()<<","<<p1.gety()<<","<<p1.z<<)"<<endl;
    cout<<"p2= ("<<p2.getx()<<","<<p2.gety()<<","<<p2.z<<)"<<endl;
    cout<<"p3= ("<<p3.getx()<<","<<p3.gety()<<","<<p3.z<<)"<<endl;
    cout<<"p4= ("<<p4.getx()<<","<<p4.gety()<<","<<p4.z<<)"<<endl;

    system("pause");
}

```

Console:



```

E:\Faculty of Computer Science 3\OOP1\Assignments\Assi...
p1= (6,1,1)
p2= (3,5,7)
p3= (9,11,13)
p4= (4,11,6)
Press any key to continue . . .

```