

ST. JOSEPH UNIVERSITY IN TANZANIA

St. Joseph College of Engineering and Technology
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Object Oriented Programming Laboratory 055CS48
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List of Experiments

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/*Experiment 1A*/

/*Function call by value*/

#include<iostream.h>

#include<conio.h>

void swap(int a, int b);

void swap(int a, int b)

{

int temp;

temp=a;

a=b;

b=temp;

}

void main()

{

clrscr();

int x,y;

cout<<"Enter the values of x and y: ";

cin>>x>>y;

cout<<"Value of x and y before swap"<<endl;

cout<<"Value of x: "<<x<<endl<<"Value of y: "<<y<<endl;

swap(x,y);

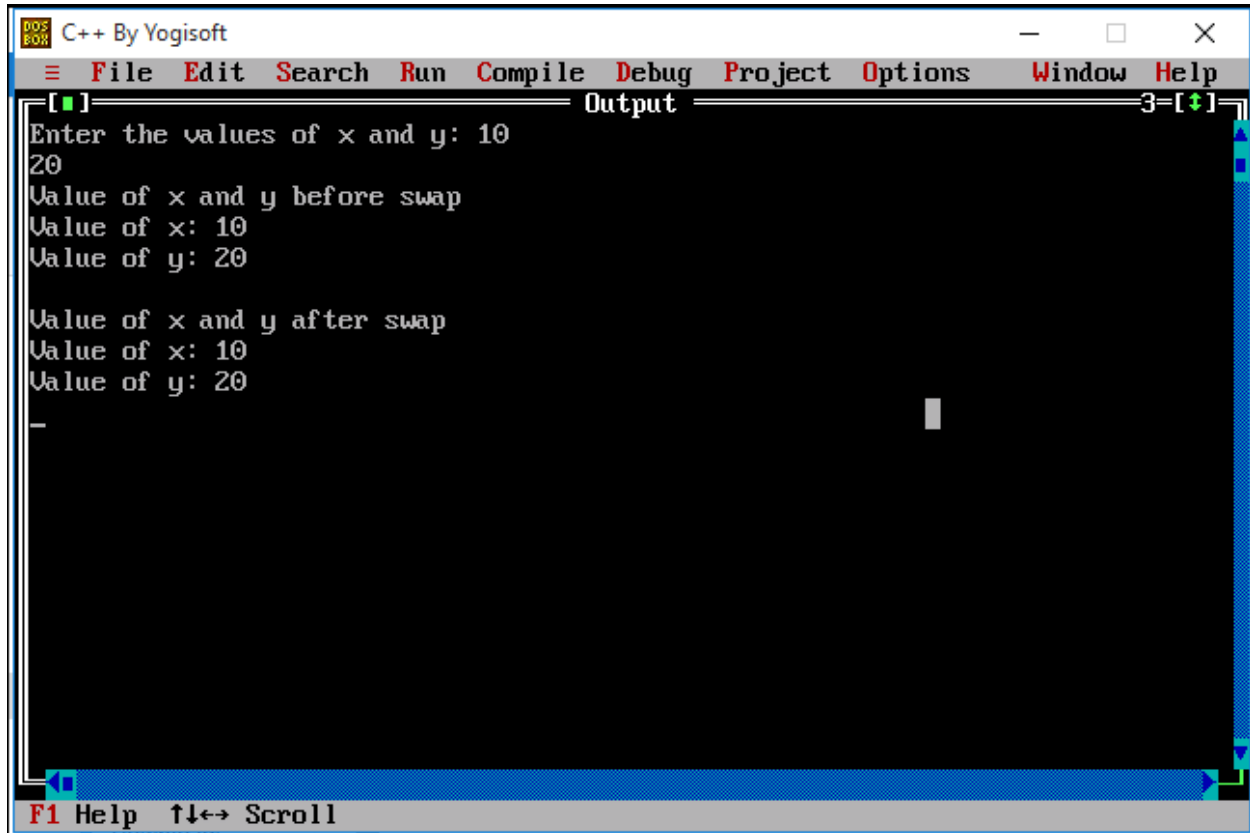
cout<<"\nValue of x and y after swap"<<endl;

cout<<"Value of x: "<<x<<endl<<"Value of y: "<<y<<endl;

getch();

}

Output



```
File Edit Search Run Compile Debug Project Options Window Help
[ ] Output 3=[+]
```

```
Enter the values of x and y: 10
20
Value of x and y before swap
Value of x: 10
Value of y: 20

Value of x and y after swap
Value of x: 10
Value of y: 20
-
```

F1 Help ↑↓↔ Scroll

When the above code is put together in a file, compiled and executed, it produces the result which shows that there is no change in the values though they had been changed inside the function. By default, C++ uses call by value to pass the arguments. Thus code within a function cannot alter the arguments used to call the function.

/*Experiment 1B*/

/*Function call by reference*/

#include<iostream.h>

#include<conio.h>

void swap(int &a, int &b);

void swap(int &a, int &b)

{

int temp;

temp=a;

a=b;

b=temp;

}

void main()

{

clrscr();

int x=10,y=20;

cout<<"Value of x and y before swap"<<endl;

cout<<"Value of x: "<<x<<endl<<"Value of y: "<<y<<endl;

swap(x,y);

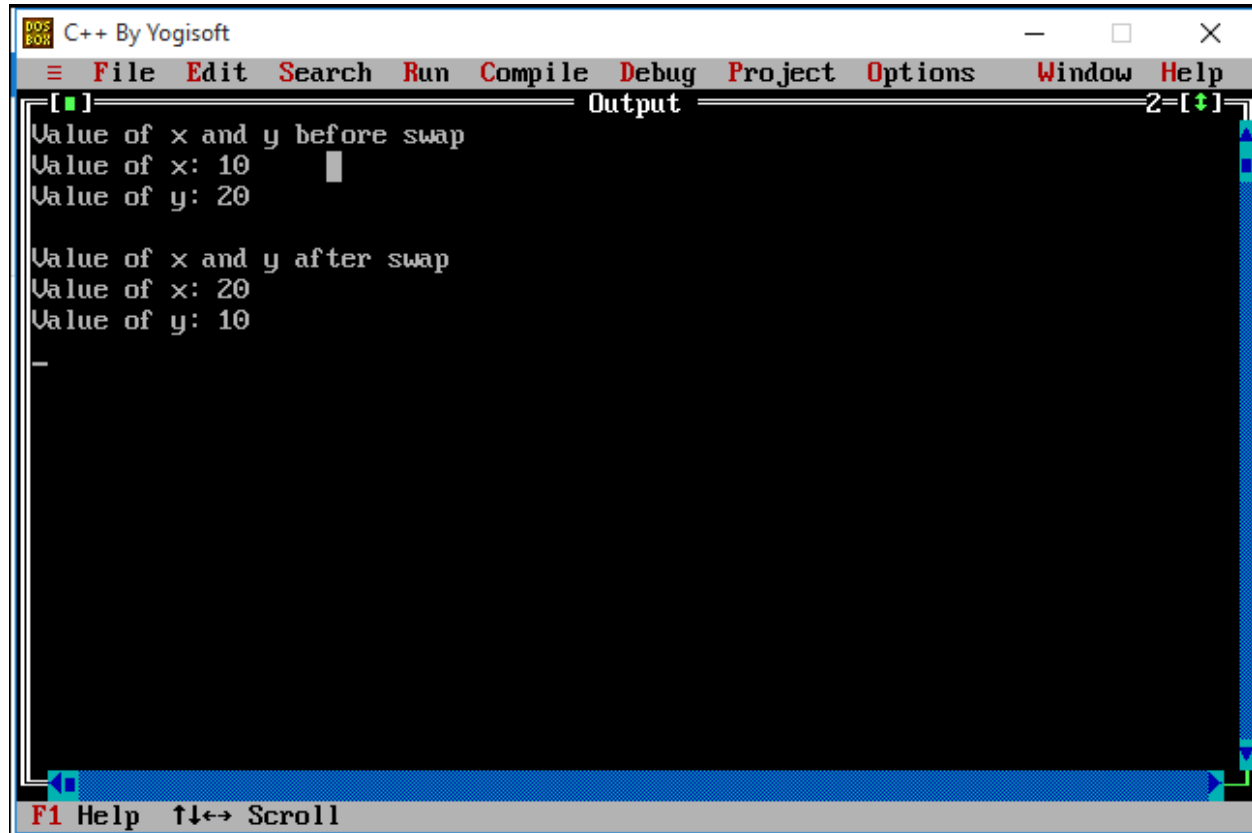
cout<<"\nValue of x and y after swap"<<endl;

cout<<"Value of x: "<<x<<endl<<"Value of y: "<<y<<endl;

getch();

}

Output



The screenshot shows a window titled "C++ By Yogisoft" with a menu bar containing File, Edit, Search, Run, Compile, Debug, Project, Options, Window, and Help. The main area is a black console window with white text. The text displays the output of a program that swaps the values of two variables, x and y. The output is as follows:

```
[ ] Output 2=[+]  
Value of x and y before swap  
Value of x: 10  
Value of y: 20  
  
Value of x and y after swap  
Value of x: 20  
Value of y: 10  
-  
F1 Help ↑↓↔ Scroll
```

/*Experiment 1C*/

/*Function call by address or pointer*/

#include<iostream.h>

#include<conio.h>

void swap(int *a, int *b);

void swap(int *a, int *b)

{

int temp;

temp=*a;

*a=*b;

*b=temp;

}

void main()

{

clrscr();

int x,y;

cout<<"Enter the values of x and y: ";

cin>>x>>y;

cout<<"Value of x and y before swap"<<endl;

cout<<"Value of x: "<<x<<endl<<"Value of y: "<<y<<endl;

swap(&x,&y);

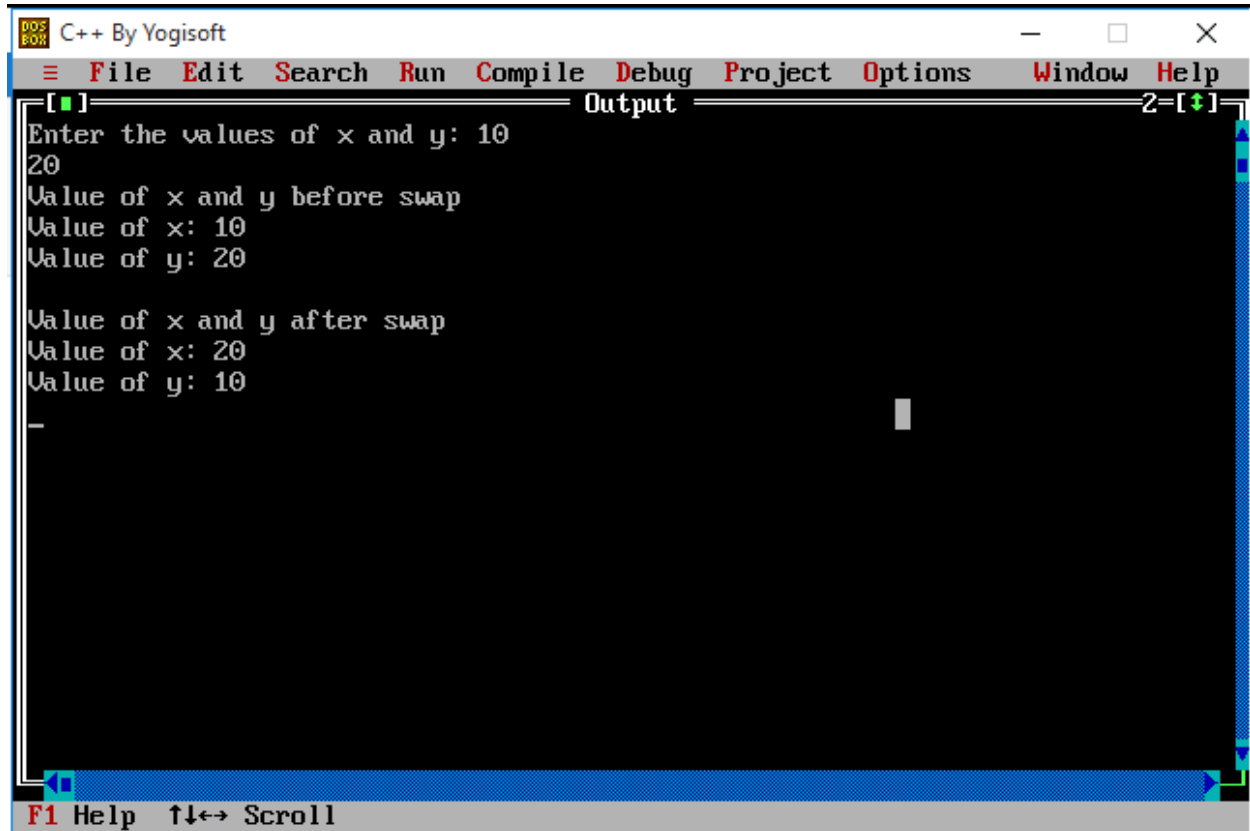
cout<<"\nValue of x and y after swap"<<endl;

cout<<"Value of x: "<<x<<endl<<"Value of y: "<<y<<endl;

getch();

}

Output



The screenshot shows a window titled "C++ By Yogisoft" with a menu bar containing File, Edit, Search, Run, Compile, Debug, Project, Options, Window, and Help. The main area is a black console window with white text. The text in the console is as follows:

```
[ ] Output 2=[+]  
Enter the values of x and y: 10  
20  
Value of x and y before swap  
Value of x: 10  
Value of y: 20  
  
Value of x and y after swap  
Value of x: 20  
Value of y: 10  
-  
F1 Help ↑↓↔ Scroll
```

A large, light gray watermark with the word "Robert" is oriented diagonally across the lower half of the image.

/*Experiment 2/

/* Function with default argument */

#include <iostream.h>

#include <conio.h>

void print(char ch= '*', int count= 10);

void print(char ch, int count)

{

int i;

for(i = 0; i <count; i++)

{

cout<<ch;

}

}

void main()

{

clrscr();

print();

cout<<"\n";

print('#',20);

cout<<"\n";

print('@',30);

getch();

}

Output



```
*****  
#####  
??????????????????????????????????_
```

5:43

/* Experiment 3*/

/*Class with primitive data member*/

#include<iostream.h>

#include<conio.h>

class student

{

public:

int reg,m1, m2, m3,total;

char name[20];

float avg;

void getdata()

{

cout<<"Enter the Student Name: ";

cin>>name;

cout<<"Enter the Registration No.: ";

cin>>reg;

cout<<"Enter the marks values: ";

cin>>m1>>m2>>m3;

}

void calculation()

{

total = m1+m2+m3;

avg = total/3;

}

void display()

{

cout<<"\nStudent Name: "<<name;

cout<<"\nRegistration No.: "<<reg;

cout<<"\nMark 1 : "<<m1;

cout<<"\nMark 2 : "<<m2;

cout<<"\nMark 3 : "<<m3;

cout <<"\nTotal = "<<total;

cout <<"\nAverage = "<<avg;

}

};

void main()

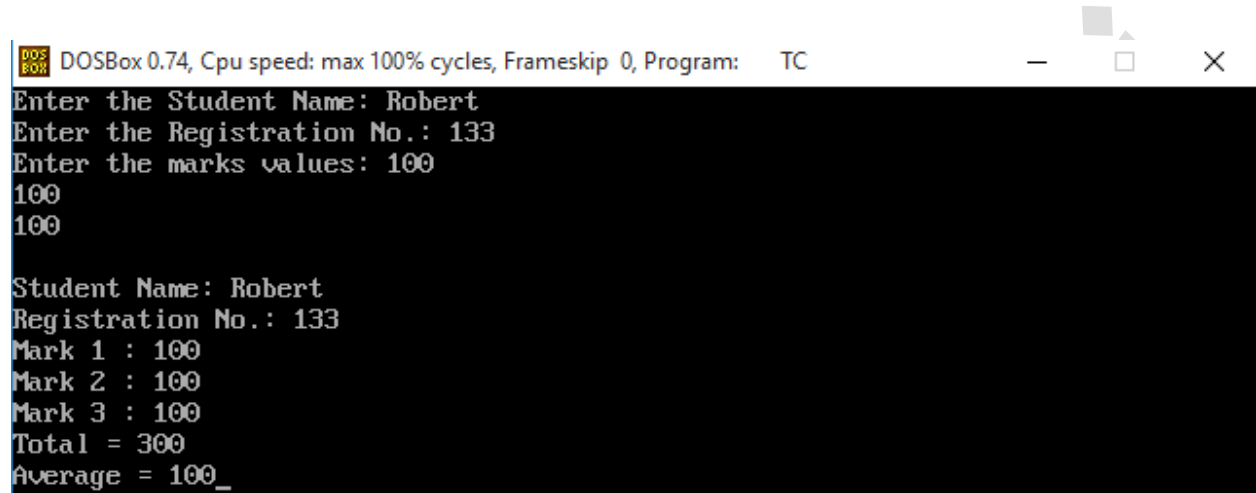
{

clrscr();

student s;

```
s.getdata();  
s.calculation();  
s.display();  
getch();  
}
```

Output

A screenshot of a DOSBox 0.74 window. The title bar reads "DOSBox 0.74, Cpu speed: max 100% cycles, Frameskip 0, Program: TC". The window contains a black terminal area with white text. The text shows the program prompting for student information and displaying the results. The output is as follows:

```
Enter the Student Name: Robert  
Enter the Registration No.: 133  
Enter the marks values: 100  
100  
100  
  
Student Name: Robert  
Registration No.: 133  
Mark 1 : 100  
Mark 2 : 100  
Mark 3 : 100  
Total = 300  
Average = 100_
```

/*Experiment 4*/

/*Classes with array as data member*/

#include<iostream.h>

#include<conio.h>

class shopping

{

int pno[10],i,n;

float pcost[10];

public:

void getproduct();

void displayproduct();

};

void shopping::getproduct()

{

cout<<"Enter no. of products:";

cin>>n;

for (i=1;i<=n;i++)

{

cout<<"\nEnter product number:";

cin >>pno[i];

cout<<"\nEnter product cost:";

cin>>pcost[i];

}

}

void shopping::displayproduct()

{

for (i=1;i<=n;i++)

{

cout<<"\nProduct number "<<i<<" is " <<pno[i];

cout<<"\nProduct cost of "<<i<<" is "<<pcost[i]<<endl;

}

}

void main()

{

clrscr();

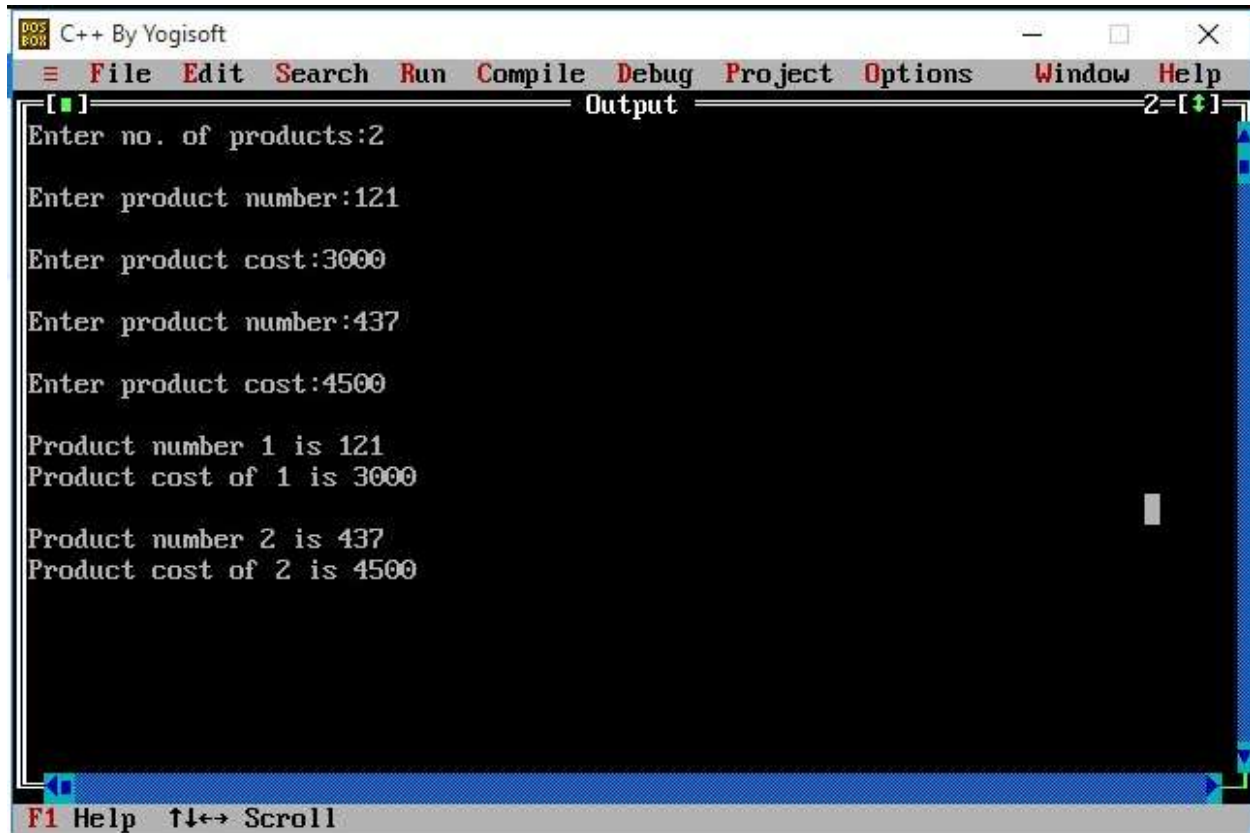
shopping a;

a.getproduct();

a.displayproduct();

```
    getch();  
}
```

Output



```
C++ By Yogisoft  
File Edit Search Run Compile Debug Project Options Window Help  
Output 2=[+]  
Enter no. of products:2  
Enter product number:121  
Enter product cost:3000  
Enter product number:437  
Enter product cost:4500  
Product number 1 is 121  
Product cost of 1 is 3000  
Product number 2 is 437  
Product cost of 2 is 4500  
F1 Help ↑↓↔ Scroll
```

/*Experiment 5*/

/*Classes with constant data member*/

#include<iostream.h>

#include<conio.h>

const int m=5;

int count = 0;

class employed

{

int empid[m],n;

float empsal[m];

public:

void input();

void output();

void manipulation();

};

void employed::input()

{

cout<<"\nEnter the Number of Employees: ";

cin>>n;

for(count=0;count<n;count++)

{

cout<<"\nEnter employee ID: ";

cin>>empid[count];

cout<<"\nEnter employee salary: ";

cin>>empsal[count];

}

}

void employed::output()

{

for(count=0;count<n;count++)

{

cout<<"\nEmployee ID: "<<empid[count];

cout<<"\nEmployee salary: "<<empsal[count]<<endl;

}

}

void employed::manipulation()

{

int sum=0;

```

        for(count=0;count<n;count++)
        {
            sum=sum+empsal[count];
        }
        cout<<"\nTotal salary is: "<<sum<<endl;
    }

```

```

int main()
{

```

```

    clrscr();
    employed t1;
    int x ;
    do
    {

```

```

        cout<<"\n1. Add Information";
        cout<<"\n2. Display the Information";
        cout<<"\n3. Total salary";
        cout<<"\n4. Quit";
        cout<<"\nEnter your choice: ";
        cin>> x;
        switch(x)
        {

```

```

            case 1:

```

```

                t1.input();
                break;

```

```

            case 2:

```

```

                t1.output();
                break;

```

```

            case 3:

```

```

                t1.manipulation();
                break;

```

```

            case 4:

```

```

                return 0;

```

```

            default:

```

```

                cout<<"\nPlease Enter the Right choice "<<endl;
                break;

```

```

        }

```

```

    }while(x!=4);
    return 0;

```

```

}

```

Output

```
C++ By Yogisoft

1. Add Information
2. Display the Information
3. Total salary
4. Quit
Enter your choice: 1

Enter the Number of Employees: 2

Enter employee ID: 200

Enter employee salary: 1000

Enter employee ID: 201

Enter employee salary: 1500

1. Add Information
2. Display the Information
3. Total salary
4. Quit
Enter your choice: 2

Employee ID: 200
Employee salary: 1000

Employee ID: 201
Employee salary: 1500

1. Add Information
2. Display the Information
3. Total salary
4. Quit
Enter your choice: 3

Total salary is: 2500

Enter your choice: 6

Please Enter the Right choice

1. Add Information
2. Display the Information
3. Total salary
4. Quit
Enter your choice: 4
```

/*Experiment 6*/

/*Classes with pointers as data members*/

#include<iostream.h>

#include<conio.h>

class library

```
{
    char *bookauthor, *bookname, *edition;
    int bookid, yrpublish;

    public:
        void information();
        void delivery();
};
```

void library::information()

```
{
    bookauthor = new char[10];
    bookname = new char[10];
    edition = new char [10];
    cout<<"\nEnter Book No.: ";
    cin>>bookid;
    cout<<"\nEnter Book Name: ";
    cin>>bookname;
    cout<<"\nEnter Book Edition: ";
    cin>>edition;
    cout<<"\nEnter Author Name: ";
    cin>>bookauthor;
    cout<<"\nEnter Year of Publication: ";
    cin>>yrpublish;
}
```

void library::delivery()

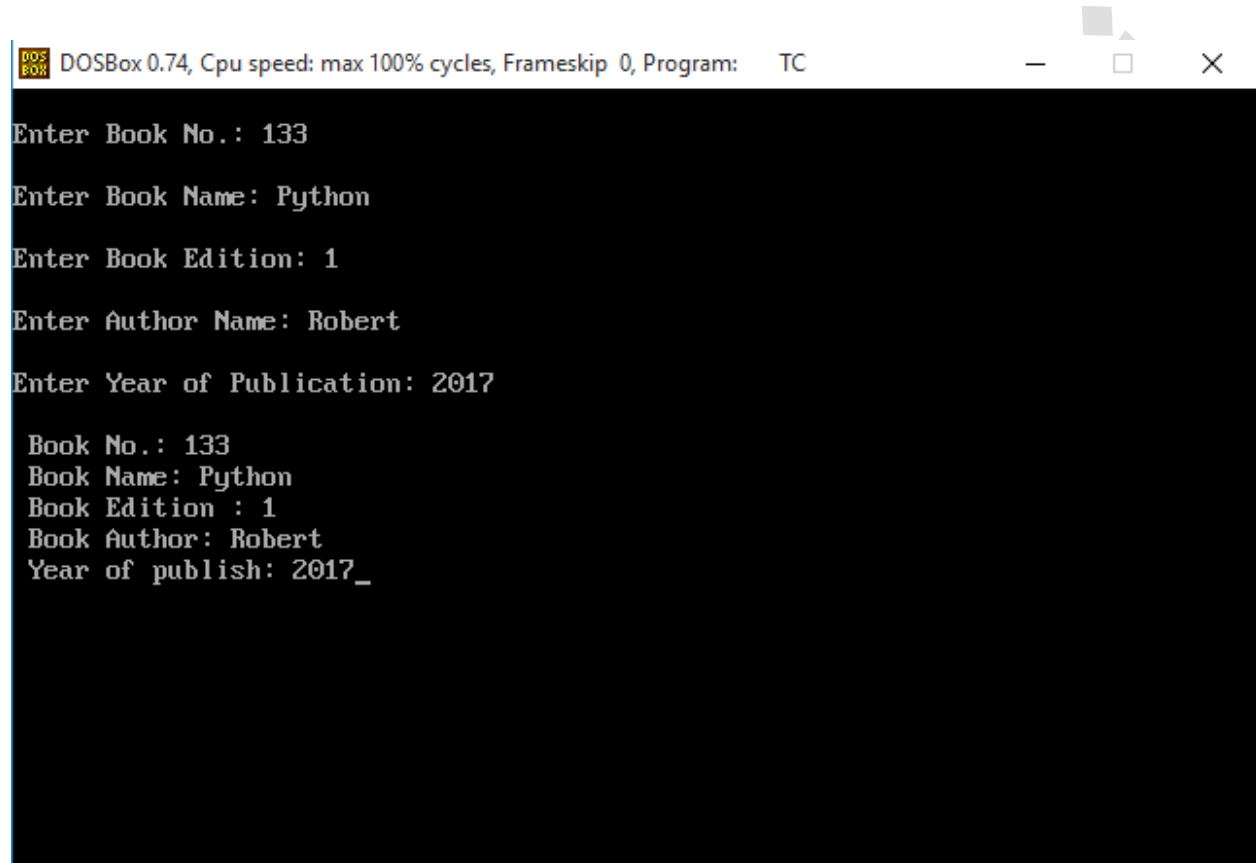
```
{
    cout<<"\n Book No.: "<<bookid;
    cout<<"\n Book Name: "<<bookname;
    cout<<"\n Book Edition : "<<edition;
    cout<<"\n Book Author: "<<bookauthor;
    cout<<"\n Year of publish: "<<yrpublish;
}
```

void main()

```
{
    clrscr();
```

```
library l;  
l.information();  
l.delivery();  
getch();  
}
```

Output

A screenshot of a DOSBox 0.74 window. The title bar shows 'DOSBox 0.74, Cpu speed: max 100% cycles, Frameskip 0, Program: TC'. The window contains a black terminal area with white text. The text shows a series of prompts and user inputs for a book management program. The prompts are 'Enter Book No.: ', 'Enter Book Name: ', 'Enter Book Edition: ', 'Enter Author Name: ', and 'Enter Year of Publication: '. The user inputs are '133', 'Python', '1', 'Robert', and '2017' respectively. At the bottom, the program displays the entered information: 'Book No.: 133', 'Book Name: Python', 'Book Edition : 1', 'Book Author: Robert', and 'Year of publish: 2017_'.

```
DOSBox 0.74, Cpu speed: max 100% cycles, Frameskip 0, Program: TC  
Enter Book No.: 133  
Enter Book Name: Python  
Enter Book Edition: 1  
Enter Author Name: Robert  
Enter Year of Publication: 2017  
  
Book No.: 133  
Book Name: Python  
Book Edition : 1  
Book Author: Robert  
Year of publish: 2017_
```

/*Experiment 7*/

/*Static Member Function*/

#include<iostream.h>

#include<conio.h>

class test

{

int code;

static int count;

public:

void sample(void)

{

code=++count;

}

void request(void)

{

cout<<"The value of code is "<<code<<endl;

}

static void respond(void)

{

cout<<"The value of count is "<<count<<endl;

}

};

int test::count;

void main()

{

clrscr();

test t1,t2;

t1.sample();

t2.sample();

test::respond(); //accessing static function

test t3;

t3.sample();

test::respond();

t1.request();

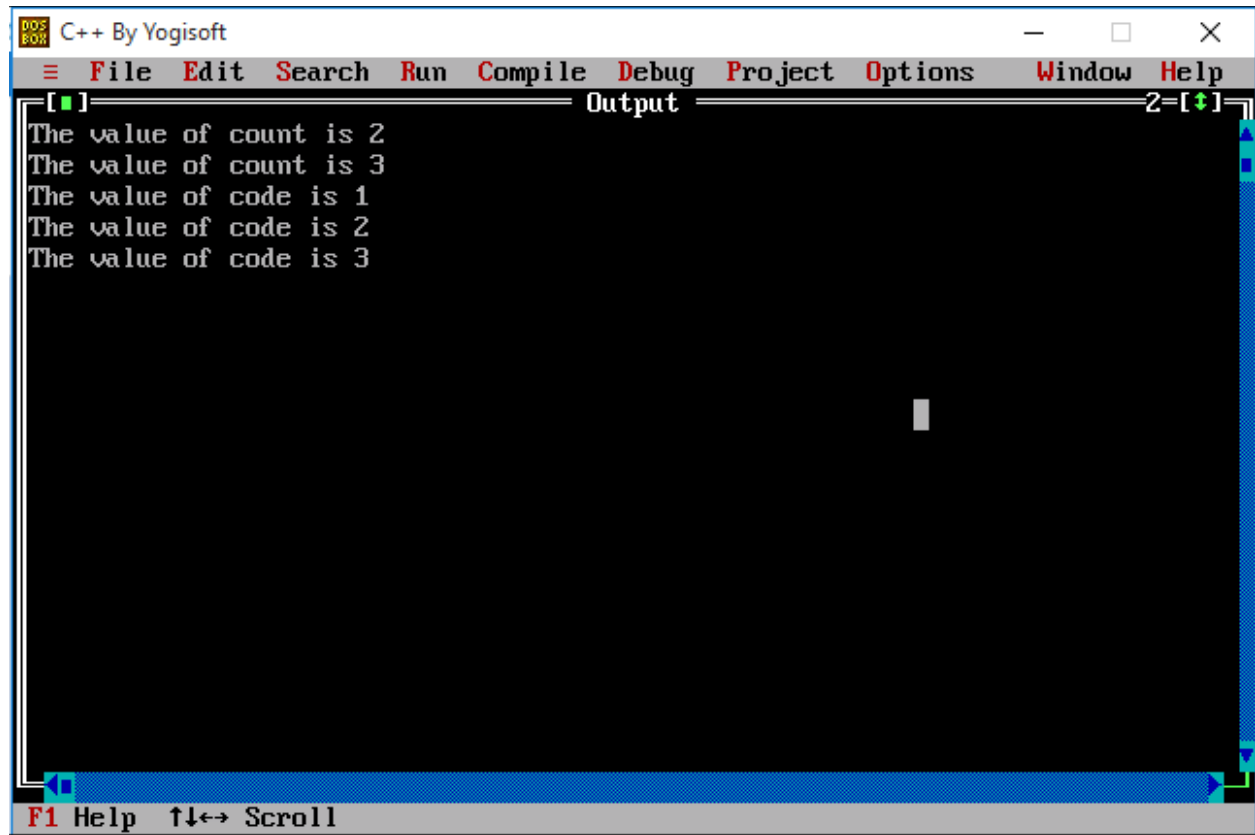
t2.request();

t3.request();

getch();

}

Output



```
C++ By Yogisoft
File Edit Search Run Compile Debug Project Options Window Help
[ ] Output 2=[+]
The value of count is 2
The value of count is 3
The value of code is 1
The value of code is 2
The value of code is 3
F1 Help ↑↓↔ Scroll
```

```
/*Experiment 8 */
```

```
/*Function overloading*/
```

```
#include<iostream.h>
```

```
#include<conio.h>
```

```
class over
```

```
{
```

```
    public:
```

```
        void area(double r);
```

```
        void area(int l, int b);
```

```
        void area();
```

```
};
```

```
void over::area()
```

```
{
```

```
    int a;
```

```
    cout<<"Enter side of square:"<<endl;
```

```
    cin>>a;
```

```
    cout<<"Area of square: "<<(a*a)<<endl;
```

```
}
```

```
void over::area(double r)
```

```
{
```

```
    cout<<"Area of circle: "<<(3.142*r*r)<<endl;
```

```
}
```

```
void over::area(int l, int b)
```

```
{
```

```
    cout<<"Area of rectangle: "<<(l*b)<<endl;
```

```
}
```

```
void main()
```

```
{
```

```
    clrscr();
```

```
    cout<<"Function Overloading"<<endl;
```

```
    over o;
```

```
    o.area();
```

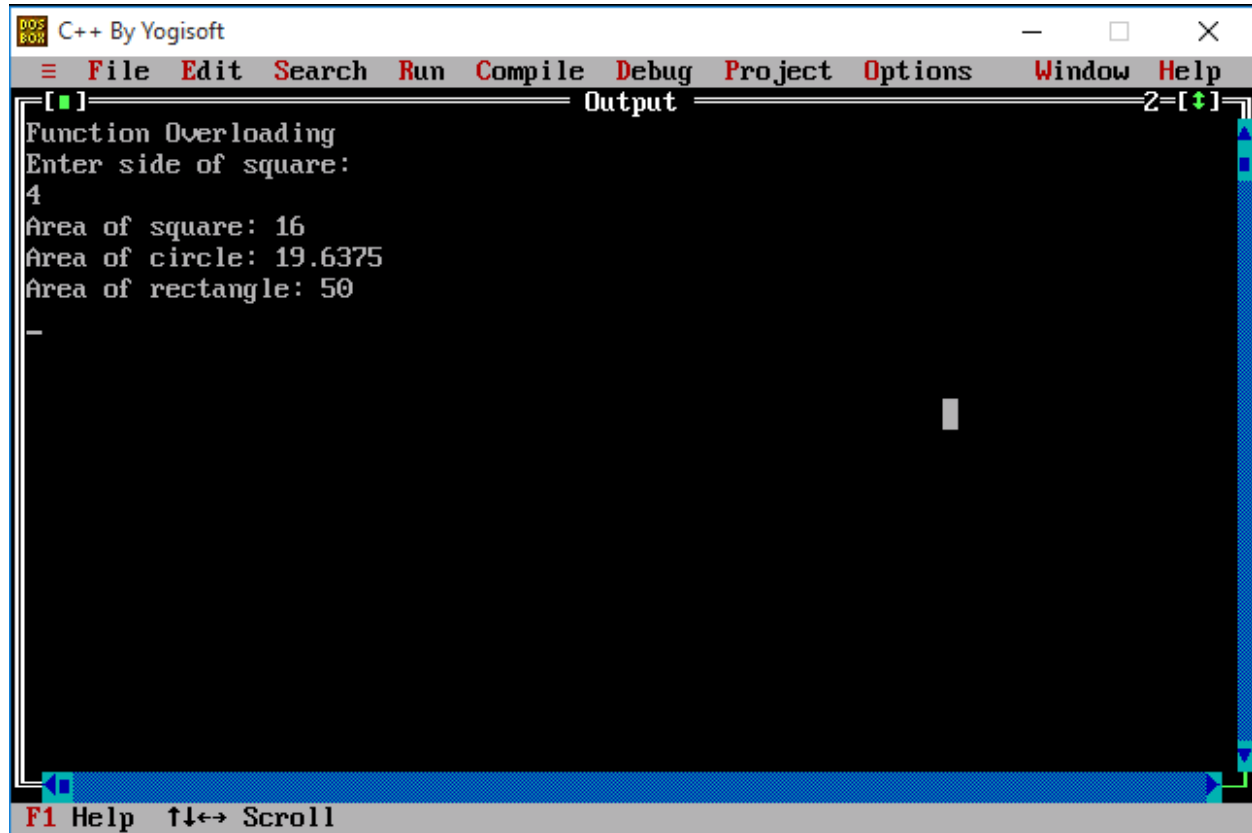
```
    o.area(2.5);
```

```
    o.area(5,10);
```

```
    getch();
```

```
}
```

Output



```
Function Overloading
Enter side of square:
4
Area of square: 16
Area of circle: 19.6375
Area of rectangle: 50
-
```

/*Experiment 9*/

/*Multilevel Inheritance*/

#include<iostream.h>

#include<conio.h>

class company

{

protected:

char ename [30],dname [20];

char gender;

int age, id;

float amount,income,allowance,total;

public:

void readdata()

{

cout<<"Enter employee Name: ";

cin>>ename;

cout<<"Enter Gender: ";

cin>>gender;

cout<<"Enter Age of the employee: ";

cin>>age;

}

void writedata()

{

cout<<"\n";

cout<<"Employee name: "<<ename<<endl;

cout<<"Gender: "<<gender<<endl;

cout<<"Age: "<<age<<endl;

}

};

class employee:public company

{

public:

void obtain();

void delivery();

};

void employee::obtain()

{

```

        readdata();
        cout<<"Enter employee ID: ";
        cin>>id;
        cout<<"Enter Income and Allowance: ";
        cin>>income>>allowance;
    }

void employee::delivery()
{
    writedata();
    cout<<"Employee ID: "<<id<<endl;
    cout<<"Income: "<<income<<endl;
    cout<<"Allowance: "<<allowance<<endl;
}

class dept:public employee
{
    public:

        void receive()
        {
            obtain();
            cout<<"Enter department name: ";
            cin>>dname;
            cout<<"Enter amount: ";
            cin>>amount;
        }

        void display()
        {
            delivery();
            cout<<"Department name: "<<dname<<endl;
            cout<<"Amount: "<<amount<<endl;
        }

        void salary();
};

void dept::salary()
{
    total=amount+income+allowance;
    cout<<"Total amount: "<<total;
}

void main()

```

```
{  
    clrscr();  
    dept D;  
    D.receive();  
    D.display();  
    D.salary();  
    getch();  
}
```

Output

DOSBox 0.74, Cpu speed: max 100% cycles, Frameskip 0, Program: TC

```
Enter employee Name: Robert  
Enter Gender: M  
Enter Age of the employee: 24  
Enter employee ID: 133  
Enter Income and Allowance: 1000  
500  
Enter department name: CSE  
Enter amount: 2000  
  
Employee name: Robert  
Gender: M  
Age: 24  
Employee ID: 133  
Income: 1000  
Allowance: 500  
Department name: CSE  
Amount: 2000  
Total amount: 3500_
```

```
/*Experiment 10*/  
/*Virtual Base Class*/
```

```
#include<iostream.h>  
#include<conio.h>
```

```
class bank  
{  
    protected:  
        char bname[20], acctname[10];  
        int acctno;  
  
    public:  
        void take();  
        void give();  
};
```

```
void bank::take()  
{  
    cout<<"Enter Bank Name: \n";  
    cin>>bname;  
    cout<<"Enter Account Name: \n";  
    cin>>acctname;  
    cout<<"Enter Account Number: \n";  
    cin>>acctno;  
}
```

```
void bank::give()  
{  
    cout<<"Bank Name: "<<bname<<endl;  
    cout<<"Account Name: "<<acctname<<endl;  
    cout<<"Account Number: "<<acctno<<endl;  
}
```

```
class deposit:virtual public bank  
{  
    protected:  
        float depamount;  
  
    public:  
        void insert();  
        void show();  
};
```

```
void deposit::insert()
```

```

{
    cout<<"Enter amount to deposit: \n";
    cin>>depamount;
}

void deposit::show()
{
    cout<<"Deposit amount: "<<depamount<<endl;
}

class withdraw:virtual public bank
{
    protected:
        float withamount;

    public:
        void collect()
        {
            cout<<"Enter amount to be withdrawn: \n";
            cin>>withamount;
        }

        void distribute()
        {
            cout<<"Withdrawal Amount: "<<withamount<<endl;
        }
};

class balance:public deposit,public withdraw
{
    float totalbal;
    public:
        void calculate();
        void result();
};

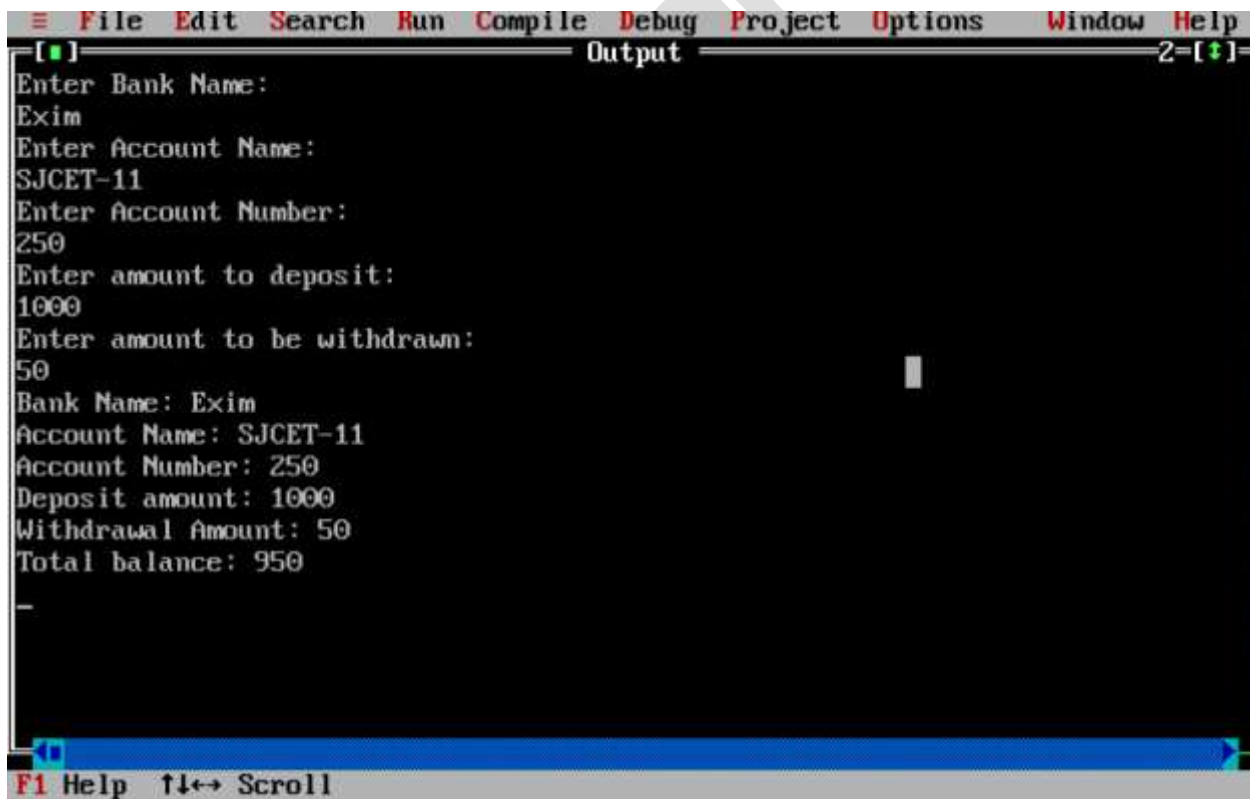
void balance::calculate()
{
    totalbal=depamount-withamount;
}

void balance::result()
{
    give();
    show();
}

```

```
        distribute();  
        cout<<"Total balance: "<<totalbal<<endl;  
    }  
  
void main()  
{  
    clrscr();  
    balance b;  
    b.take();  
    b.insert();  
    b.collect();  
    b.calculate();  
    b.result();  
    getch();  
}
```

Output



The screenshot shows a Windows-style application window titled "Output". The window has a menu bar with "File", "Edit", "Search", "Run", "Compile", "Debug", "Project", "Options", "Window", and "Help". The main area displays the output of a C++ program. The program prompts for bank details and performs operations. The output shows the following sequence of prompts and user inputs:

```
Enter Bank Name:  
Exim  
Enter Account Name:  
SJCET-11  
Enter Account Number:  
250  
Enter amount to deposit:  
1000  
Enter amount to be withdrawn:  
50  
Bank Name: Exim  
Account Name: SJCET-11  
Account Number: 250  
Deposit amount: 1000  
Withdrawal Amount: 50  
Total balance: 950  
-
```

The window also features a status bar at the bottom with "F1 Help" and "f4 Scroll".

/*Experiment 11*/

/*String Manipulations*/

#include<iostream.h>

#include<conio.h>

#include<stdio.h>

#include<string.h>

class string

{

protected:

char s1[25];

public:

void getstring();

void putstring(string&);

void display();

string operator+(string&);

int operator==(string&);

void operator=(string&);

void operator+=(string&);

};

void string::getstring()

{

cout<<"Enter string:";

gets(s1);

}

void string::putstring(string &s2)

{

int len=strlen(s2.s1);

cout<<len;

}

string string::operator+(string &s2)

{

string temp;

if((strlen(s1) + strlen(s2.s1)) <25)

{

strcpy(temp.s1, s2.s1);

strcat(temp.s1, s2.s1);

}

else

{

```

        cout<<endl<<"Concatenation not possible";
    }
    return temp;
}

```

```

int string::operator==(string &s2)
{
    return(strcmp(s1,s2.s1)==0?1:0);
}

```

```

void string::operator=(string &s2)
{
    strcpy(s1,s2.s1);
}

```

```

void string::operator+=(string &s2)
{
    strcat(s1,s2.s1);
}

```

```

void string::display()
{
    cout<<s1;
}

```

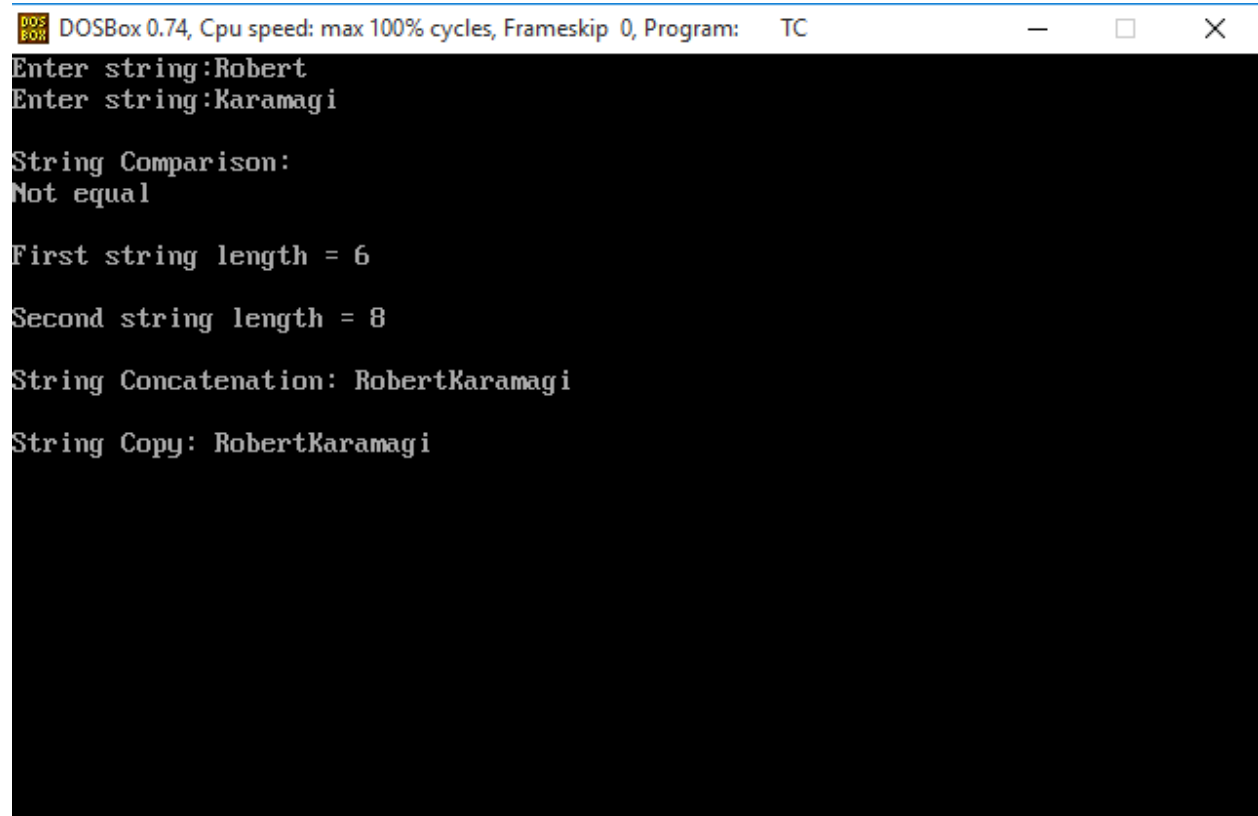
```

void main()
{
    string b1,b2,b3,b4;
    clrscr();
    b1.getstring();
    b2.getstring();
    cout<<"\nString Comparison:";
    if(b1==b2)
        cout<<endl<<"They are equal";
    else
        cout<<"\nNot equal";
    cout<<endl<<"\nFirst string length = ";
    b1.putstring(b1);
    cout<<endl<<"\nSecond string length = ";
    b2.putstring(b2);
    cout<<endl<<"\nString Concatenation: ";
    b1+=b2;
    b1.display();
    b4=b1;
    cout<<endl<<"\nString Copy: ";
}

```

```
    b4.display();  
    getch();  
}
```

Output

A screenshot of a DOSBox 0.74 window. The title bar shows 'DOS BOX' icon, 'DOSBox 0.74, Cpu speed: max 100% cycles, Frameskip 0, Program: TC', and standard window controls. The main area is black with white text. The text shows the program prompting for two strings, 'Robert' and 'Karamagi', then performing a comparison, calculating lengths (6 and 8), concatenating them to 'RobertKaramagi', and copying them to another 'RobertKaramagi' string.

```
DOS BOX DOSBox 0.74, Cpu speed: max 100% cycles, Frameskip 0, Program: TC  
Enter string:Robert  
Enter string:Karamagi  
  
String Comparison:  
Not equal  
  
First string length = 6  
Second string length = 8  
String Concatenation: RobertKaramagi  
String Copy: RobertKaramagi
```

/*Experiment 12A*/

/*Operator overloading using unary operator*/

#include <iostream.h>

#include <conio.h>

class unary

{

private:

int x,y;

public:

unary(int a,int b)

{

x=a;

y=b;

}

void display()

{

cout<<"Two numbers are: "<<x<<","<<y;

}

unary operator-()

{

x=-x;

y=-y;

return unary(x,y);

}

unary operator--()

{

x---x;

y--y;

return unary(x,y);

}

unary operator++()

{

x++x;

y++y;

return unary(x,y);

}

};

```

void main()
{
    clrscr();
    unary s(4,-8);
    s.display();
    -s;
    cout<<endl<<endl<<"The unary minus operator overloading"<<endl;
    s.display();
    --s;
    cout<<endl<<endl<<"The decrement operator overloading"<<endl;
    s.display();
    ++s;
    cout<<endl<<endl<<"The increment operator overloading"<<endl;
    s.display();
    getch();
}

```

Output

```

C++ By Yogisofit
File Edit Search Run Compile Debug Project Options Window Help
Output
Two numbers are: 4,-8
The unary minus operator overloading
Two numbers are: -4,8
The decrement operator overloading
Two numbers are: -5,7
The increment operator overloading
Two numbers are: -4,8_
F1 Help ↑↓↔ Scroll

```

/*Experiment 12B*/

/*Operator overloading*/

#include<iostream.h>

#include<conio.h>

#include<math.h>

class complex

{

float real;

float imag;

public:

complex()

{

}

complex(float x, float y)

{

real=x;

imag=y;

}

complex operator+ (complex);

complex operator- (complex);

complex operator* (complex);

complex operator/ (complex);

void display()

{

cout<<real<<" + i"<<imag<<endl;

}

};

complex complex::operator+ (complex c)

{

complex c2;

c2.real=real+c.real;

c2.imag=imag+c.imag;

return(c2);

}

complex complex::operator- (complex c)

{

complex c2;

```

        c2.real=real-c.real;
        c2.imag=imag-c.imag;
        return(c2);
    }

    complex complex::operator* (complex c)
    {
        complex c2;
        c2.real=((real*c.real) - (imag*c.imag));
        c2.imag=((real*c.imag) + (imag*c.real));
        return(c2);
    }

    complex complex::operator/ (complex c)
    {
        complex c2;
        c2.real=((real*c.real)+(imag*c.imag)) / (pow(c.real,2)+pow(c.imag,2));
        c2.imag=((imag*c.real)-(real*c.imag)) / (pow(c.real,2)+pow(c.imag,2));
        return(c2);
    }

    void main()
    {
        clrscr();
        complex c1(5.6,2.7), c2(3.5,5.6), c3;
        int op;
        char ch,y,Y;
        cout<<"Two complex numbers: "<<endl;
        c1.display();
        c2.display();
        do
        {
            cout<<endl<<"*****Menu*****"<<endl;
            cout<<"1.Addition\n2.Subtraction\n3.Multiplication\n4.Division"<<endl;
            cout<<"Enter your choice"<<endl;
            cin>>op;
            switch(op)
            {
                case 1:
                    c3=c1+c2;
                    cout<<"Addition of two complex numbers:"<<endl;
                    c3.display();
                    break;

                case 2:
                    c3=c1-c2;

```

```
        cout<<"Subtraction of two complex numbers:"<<endl;
        c3.display();
        break;

    case 3:
        c3=c1*c2;
        cout<<"Multiplication of two complex numbers:"<<endl;
        c3.display();
        break;

    case 4:
        c3=c1/c2;
        cout<<"Division of two complex numbers:"<<endl;
        c3.display();
        break;

    default:
        cout<<endl<<"Aborting!!! Invalid Choice."<<endl;
        break;
}

    cout<<"Do you want to continue? (y/n)"<<endl;
    cin>>ch;
}while(ch=='y'||ch=='Y');
getch();
}
```

Output

```
DOSBox 0.74, Cpu speed: max 100% cycles, Frameskip 0, Program: TC
Two complex numbers:
5.6 + i2.7
3.5 + i5.6

*****Menu*****
1.Addition
2.Subtraction
3.Multiplication
4.Division
Enter your choice
1
Addition of two complex numbers:
9.1 + i8.3
Do you want to continue? (y/n)
y

*****Menu*****
1.Addition
2.Subtraction
3.Multiplication
4.Division
Enter your choice
2
Subtraction of two complex numbers:
2.1 + i-2.9
Do you want to continue? (y/n)
y

*****Menu*****
1.Addition
2.Subtraction
3.Multiplication
4.Division
Enter your choice
3
Multiplication of two complex numbers:
4.48 + i40.809998
Do you want to continue? (y/n)
```

y

*****Menu*****

1.Addition

2.Subtraction

3.Multiplication

4.Division

Enter your choice

4

Division of two complex numbers:

0.796148 + i-0.502408

Do you want to continue? (y/n)

y

*****Menu*****

1.Addition

2.Subtraction

3.Multiplication

4.Division

Enter your choice

7

Aborting!!! Invalid Choice.

Do you want to continue? (y/n)

n

/*Experiment 13*/

/*Template Function*/

#include<iostream.h>

#include<conio.h>

template<class T>

void sort(T a[], int n)

{

int i, j;

for(i=0;i<n-1;i++)

{

for(j=i+1;j<n;j++)

{

if(a[i]>a[j])

{

T element;

element = a[i];

a[i] = a[j];

a[j] = element;

}

}

}

}

void main()

{

clrscr();

int x[5]={90,7,89,78,56};

float y[5]={56,78,8.5,11.5,3.2};

char z[5]={'y','f','t','r','o'};

sort(x,5);

cout<<"\n After Sorting Integers: ";

for(int i=0;i<5;i++)

cout<<x[i]<<"\t";

sort(y,5);

cout<<"\n After Sorting Float: ";

for(int j=0;j<5;j++)

cout<<y[j]<<"\t";

sort(z,5);

cout<<"\n After Sorting Characters: ";

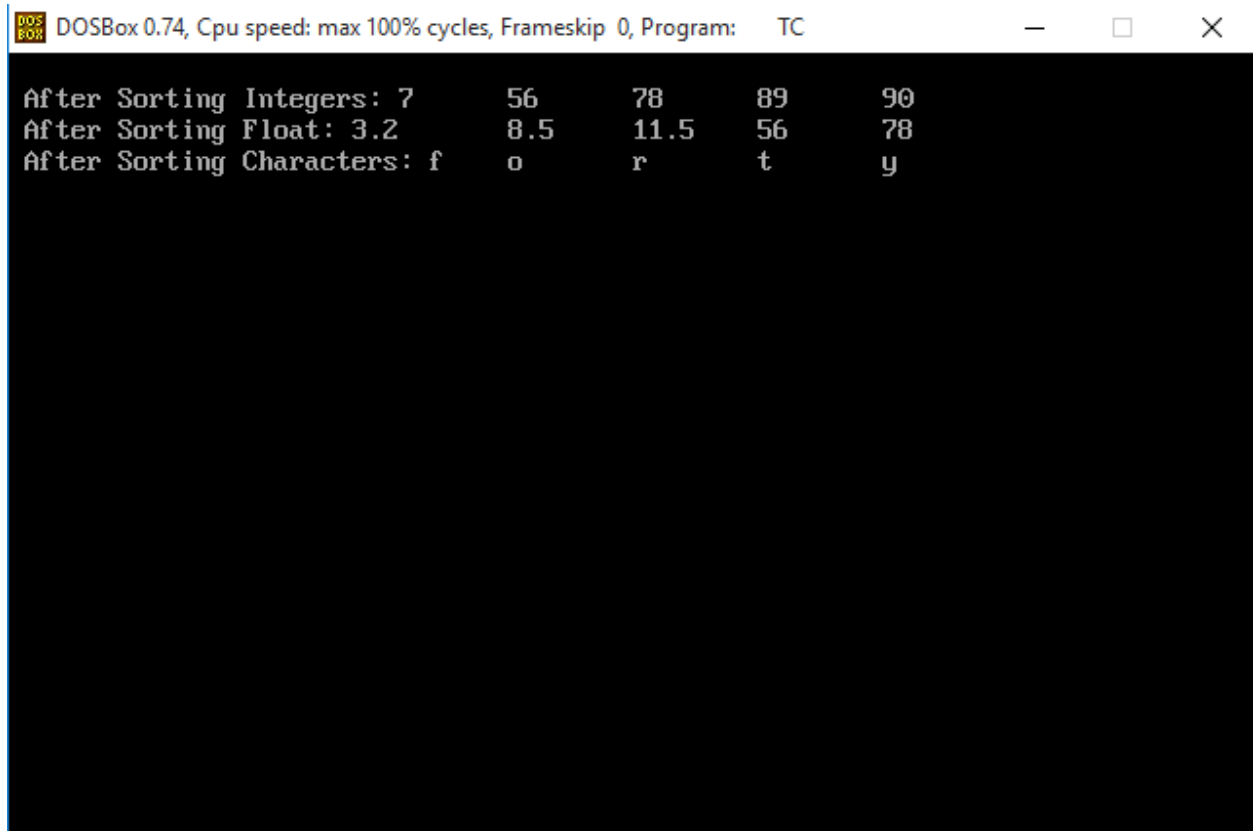
for(int k=0;k<5;k++)

cout<<z[k]<<"\t";

getch();

}

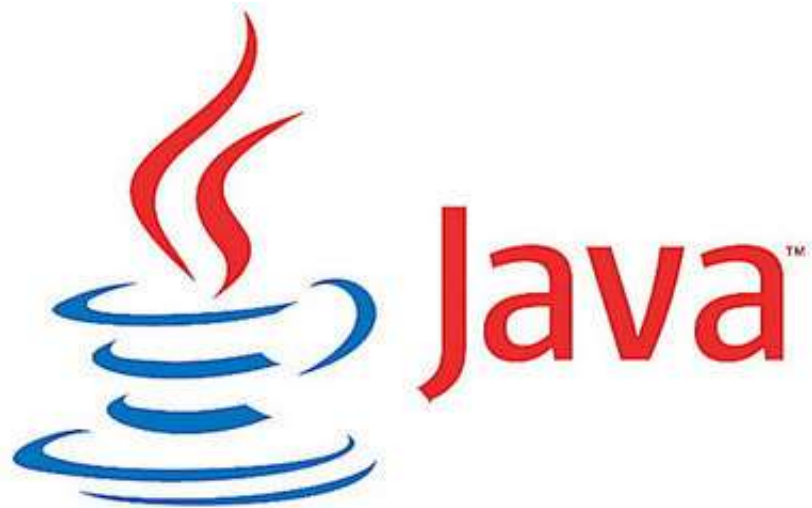
Output



DOSBox 0.74, Cpu speed: max 100% cycles, Frameskip 0, Program: TC

```
After Sorting Integers: 7      56      78      89      90
After Sorting Float: 3.2      8.5      11.5      56      78
After Sorting Characters: f    o        r        t        y
```

A screenshot of a DOSBox 0.74 window. The title bar shows 'DOSBox 0.74, Cpu speed: max 100% cycles, Frameskip 0, Program: TC'. The main window area is black with white text. The text displays the results of sorting three different data types: integers, floats, and characters. The integers are 7, 56, 78, 89, and 90. The floats are 3.2, 8.5, 11.5, 56, and 78. The characters are f, o, r, t, and y.



ORACLE

Rob

//Experiment 14A

//A simple Java program with control structure

```
import java.io.*;
import java.util.*;

class pyramid
{
    public static void main(String[] args)
    {
        int i,j;
        for(i=1;i<=5;i++)
        {
            for(j=1;j<=i;j++)
            {
                System.out.print(i);
            }
            System.out.print("\n");
        }
    }
}
```

Output



```
Command Prompt
Microsoft Windows [Version 10.0.10240]
(c) 2015 Microsoft Corporation. All rights reserved.

C:\Users\Robert Karamagi>cd..
C:\Users>cd..
C:\>cd java
C:\Java>javac pyramid.java
C:\Java>java pyramid
1
22
333
4444
55555
```

//Experiment 14B

//String handling in Java

```
import java.io.*;
import java.util.*;
class string
{
    public static void main(String args[])
    {
        StringBuffer str = new StringBuffer("Object programming");
        System.out.println("\nOriginal String : " + str);

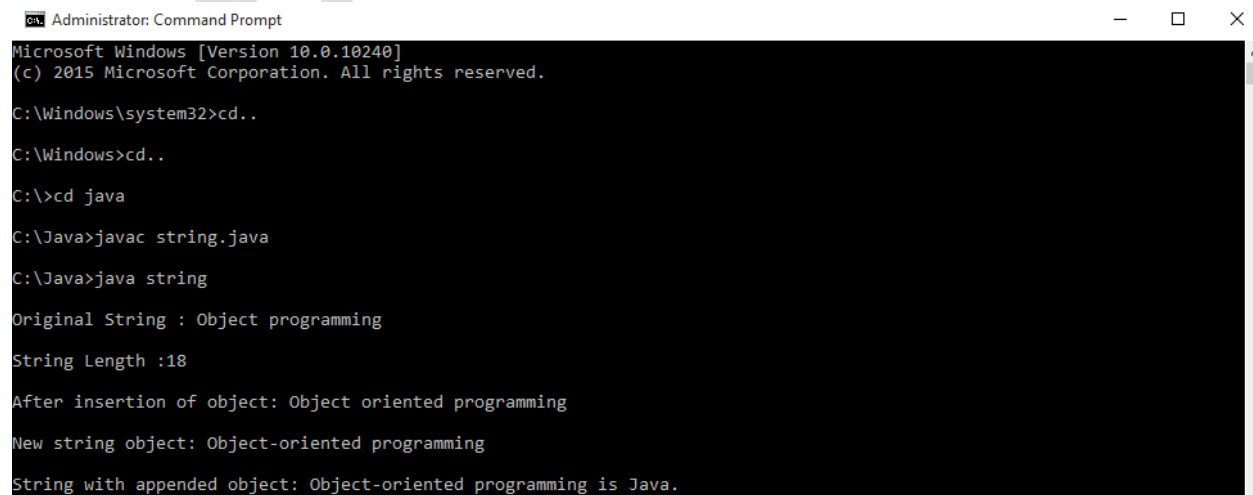
        //obtaining string length
        System.out.println("\nString Length : " + str.length());

        //Insertion of string into middle
        str.insert(7, "oriented ");
        System.out.println("\nAfter insertion of object: " +str);

        //Modifying Characters
        str.setCharAt(6, '-');
        System.out.println("\nNew string object: " +str);

        //Appending a string at the end
        str.append(" is Java.");
        System.out.println("\nString with appended object: " +str);
    }
}
```

Output



```
Administrator: Command Prompt
Microsoft Windows [Version 10.0.10240]
(c) 2015 Microsoft Corporation. All rights reserved.

C:\Windows\system32>cd..
C:\Windows>cd..
C:\>cd java
C:\Java>javac string.java
C:\Java>java string
Original String : Object programming
String Length :18
After insertion of object: Object oriented programming
New string object: Object-oriented programming
String with appended object: Object-oriented programming is Java.
```

//Experiment 15

//Multiple Inheritance through interface in Java

```
import java.io.*;
import java.lang.*;
import java.util.*;

interface Military
{
    int age;
    public void getage(int y)
    {
        age = y;
    }
    public void inspect()
    {
        if( (age>=18) && (age<=50) )
            System.out.println("\nJoin the academy");
        else
            System.out.println("\nYour rejected");
    }
}

interface Hospital
{
    int no_persons;
    public void getperson(int z)
    {
        no_persons = z;
    }
    public void show()
    {
        System.out.println("\nNumber of x-service men in this hospital: " +no_persons);
    }
}

interface Name extends Military, Hospital
{
    public void HM()
    {
        System.out.println("\nCountry information");
        String Hname = "Maweni";
        String Mlname = "Burombola JKT";
        System.out.println("\nHospital name: " +Hname);
    }
}
```

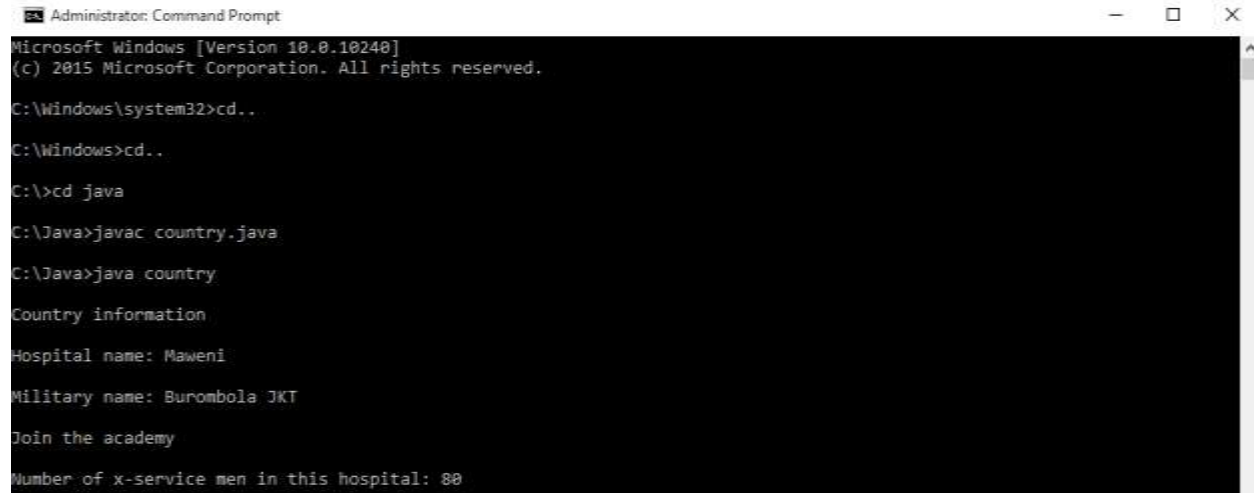
```

        System.out.println("\nMilitary name: " + MIname);
    }
    getage(int y);
    inspect();
    getperson(int z);
    show();
}

class country implements Name
{
    public static void main(String args[])
    {
        country c = new country();
        c.HM();
        c.getage(50);
        c.getperson(80);
        c.inspect();
        c.show();
    }
}

```

Output



```

Administrator: Command Prompt
Microsoft Windows [Version 10.0.10240]
(c) 2015 Microsoft Corporation. All rights reserved.

C:\Windows\system32>cd..

C:\Windows>cd..

C:\>cd java

C:\Java>javac country.java

C:\Java>java country

Country information
Hospital name: Maweni
Military name: Burombola JKT
Join the academy
Number of x-service men in this hospital: 80

```

//Experiment 16

//Creating user defined package in Java

```
package quality;
import java.io.*;

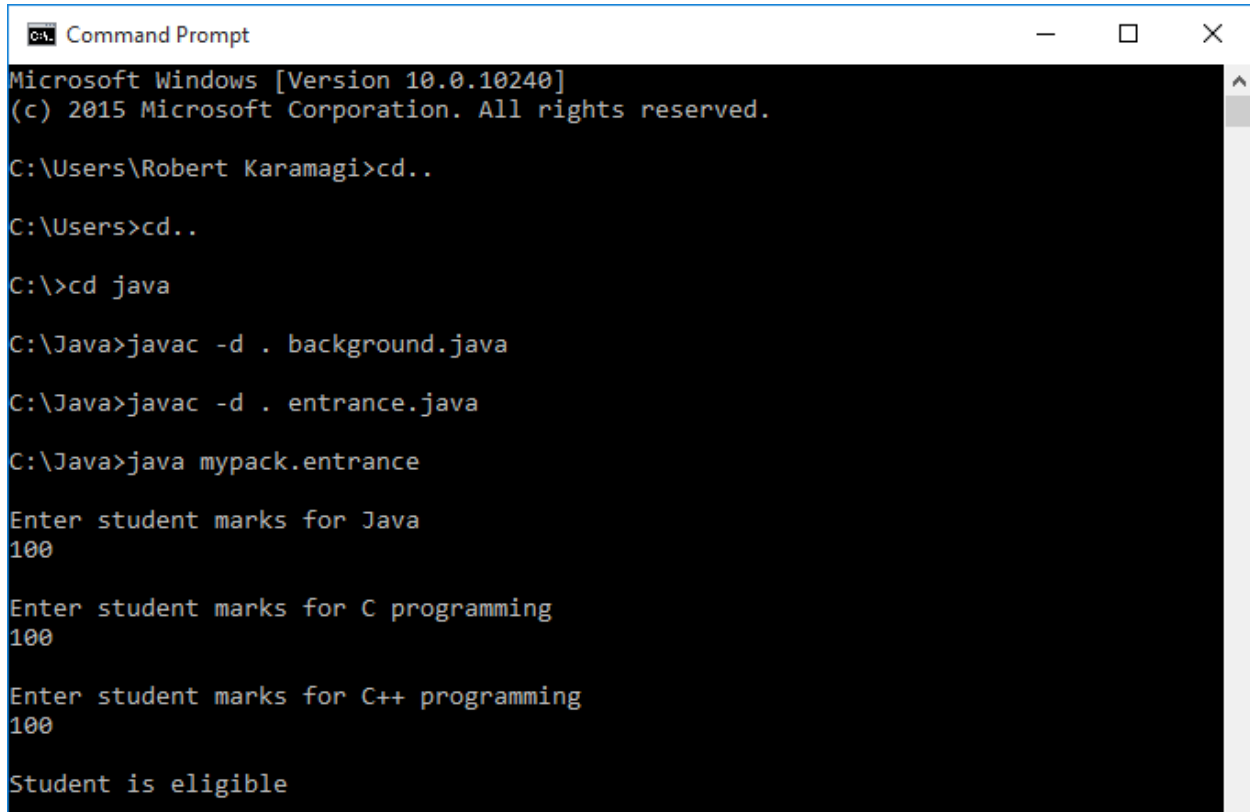
public class background
{
    int M1,M2,M3;
    public void testing()throws IOException
    {
        BufferedReader n = new BufferedReader(new InputStreamReader(System.in));
        System.out.println("\nEnter student marks for Java");
        String s1 = n.readLine();
        M1=Integer.parseInt(s1);
        System.out.println("\nEnter student marks for C programming");
        String s2 = n.readLine();
        M2=Integer.parseInt(s2);
        System.out.println("\nEnter student marks for C++ programming");
        String s3 = n.readLine();
        M3=Integer.parseInt(s3);
        if( (M1>=60) && (M2>=60) && (M3>=60) )
            System.out.println("\nStudent is eligible");
        else
            System.out.println("\nNot eligible");
    }
}

package mypack;
import java.io.*;

import quality.background;// or import quality.*;

class entrance
{
    public static void main(String args[])throws IOException
    {
        background b = new background();
        b.testing();
    }
}
```

Output



```
Command Prompt
Microsoft Windows [Version 10.0.10240]
(c) 2015 Microsoft Corporation. All rights reserved.

C:\Users\Robert Karamagi>cd..

C:\Users>cd..

C:\>cd java

C:\Java>javac -d . background.java

C:\Java>javac -d . entrance.java

C:\Java>java mypack.entrance

Enter student marks for Java
100

Enter student marks for C programming
100

Enter student marks for C++ programming
100

Student is eligible
```

The following package named quality with the class named background shall be exported to the class named entrance that is contained in the package named mypack. .i.e. The following class named entrance that is contained in the package named mypack imports the class named background from the package named quality.

//Experiment 17

//Multithreading in Java

```
import java.io.*;
import java.lang.*;
import java.util.*;
```

```
class CSE extends Thread
```

```
{
    public void run()
    {
        for(int i=1;i<=5;i++)
        {
            System.out.println("\nMultiplication table for [ "+3+" * "+i+" ] = "+(3*i));
        }
        System.out.println("End of CSE");
    }
}
```

```
class EEE extends Thread
```

```
{
    public void run()
    {
        for(int i=1;i<=5;i++)
        {
            System.out.println("\nMultiplication table for [ "+6+" * "+i+" ] = "+(6*i));
        }
        System.out.println("End of EEE");
    }
}
```

```
class ECE extends Thread
```

```
{
    public void run()
    {
        for(int i=1;i<=5;i++)
        {
            System.out.println("\nMultiplication table for [ "+5+" * "+i+" ] = "+(5*i));
        }
        System.out.println("End of ECE");
    }
}
```

```
class college
```

```
{
```

```
public static void main(String args[])  
{  
    new CSE().start();  
    new EEE().start();  
    new ECE().start();  
}  
}
```

Robert Karamagi

Output

Select Administrator: Command Prompt

```
C:\Windows\system32>cd..  
C:\Windows>cd..  
C:\>cd java  
C:\Java>javac college.java  
C:\Java>java college  
Multiplication table for [ 3 * 1 ] = 3  
Multiplication table for [ 3 * 2 ] = 6  
Multiplication table for [ 6 * 1 ] = 6  
Multiplication table for [ 6 * 2 ] = 12  
Multiplication table for [ 6 * 3 ] = 18  
Multiplication table for [ 6 * 4 ] = 24  
Multiplication table for [ 6 * 5 ] = 30  
End of EEE  
  
Multiplication table for [ 5 * 1 ] = 5  
Multiplication table for [ 5 * 2 ] = 10  
Multiplication table for [ 3 * 3 ] = 9  
Multiplication table for [ 5 * 3 ] = 15  
Multiplication table for [ 3 * 4 ] = 12  
Multiplication table for [ 5 * 4 ] = 20  
Multiplication table for [ 3 * 5 ] = 15  
Multiplication table for [ 5 * 5 ] = 25  
End of ECE  
End of CSE
```

//Experiment 18

//User defined exception with finally block

```
import java.io.*;
import java.lang.*;

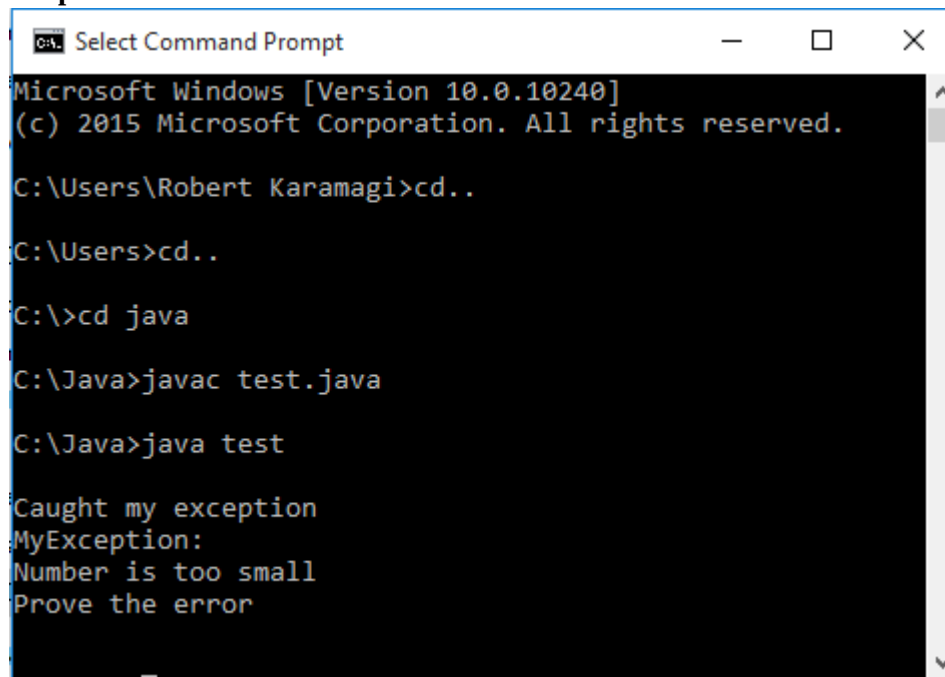
class MyException extends Exception
{
    MyException(String message)
    {
        super(message);
    }
}

class test
{
    public static void main(String args [])
    {
        int x=5,y=1000;
        try
        {
            float z = (x/y);
            if(z<0.01)
            {
                throw new MyException("\nNumber is too small");
            }
        }

        catch (MyException e)
        {
            System.out.println("\nCaught my exception");
            System.out.println(e);
        }

        finally
        {
            System.out.println("Prove the error");
        }
    }
}
```

Output



```
Microsoft Windows [Version 10.0.10240]
(c) 2015 Microsoft Corporation. All rights reserved.

C:\Users\Robert Karamagi>cd..

C:\Users>cd..

C:\>cd java

C:\Java>javac test.java

C:\Java>java test

Caught my exception
MyException:
Number is too small
Prove the error
```