FAZAIA BILQUIS POST GRADUATE COLLEGE FOR WOMEN

PAF NUR KHAN

OBJECT ORIENTED PROGRAMMING

PROGRAMMING LAB: 1

LAB MANUAL

SUBMITED TO: MAAM MEHWISH KANWAL

SUBMITTED BY:

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ROLL NUMBER:

37

CLASS:

BSCS

SEMESTER:

2ND

SECTION:

B

LAB TASK: 1

PROGRAMM IMPLIMANTATION

QUESTION: 1

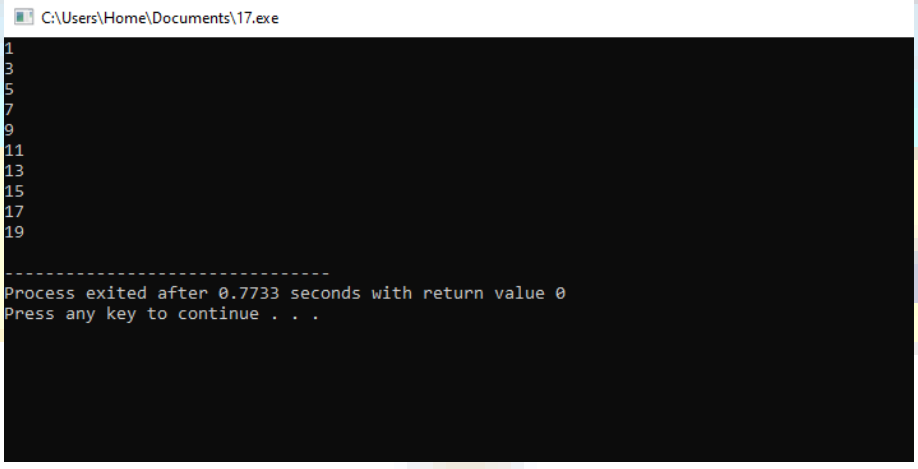
Write a program that print number from 1 to 20 with the gap of 2.

SOLUTION:

PROGRAM:

```
#include<iostream>

using namespace std;

int main()

{

        int a;

        for(a=1;a<=20;a+=2)

        cout<<a<<endl;

        return 0;

}
```

Output:



QUESTION: 2

Write a program that take following from the user like name, address, semester. Print on screen by concept of user defined function.

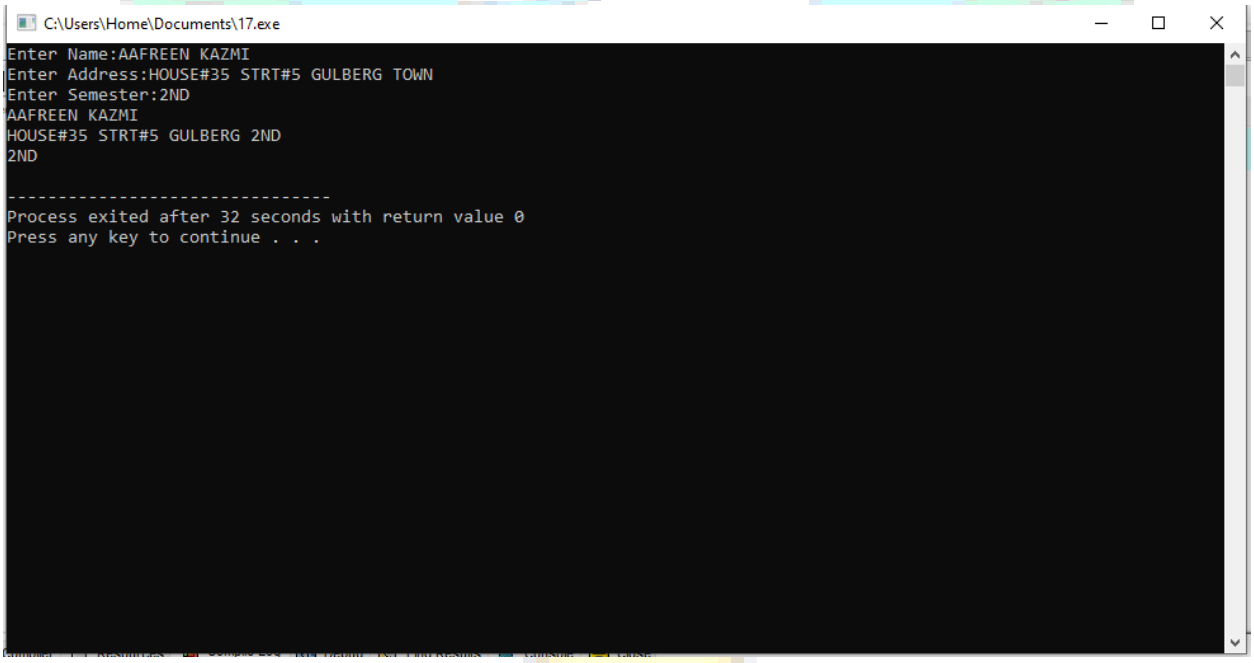
SOLUTION:

PROGRAM:

```
#include<iostream>
char name[14];
char address[20];
char semester[15];
void gets();
void print();
using namespace std;
int main()
{
	gets();
	print();
	return 0;
}
void gets()
{
	cout<<"Enter Name:";
	gets(name);
```

```
        cout<<"Enter Address:";
        gets(address);
        cout<<"Enter Semester:";
        cin>>semester;
}
void print()
{
        cout<<name<<endl;
        cout<<address<<endl;
        cout<<semester<<endl;
}
```

Output:



QUESTION: 3

Write a program to create a simple arithmetic calculator by using user defined function.

SOLUTION:

- ***CALL BY VALUE:***

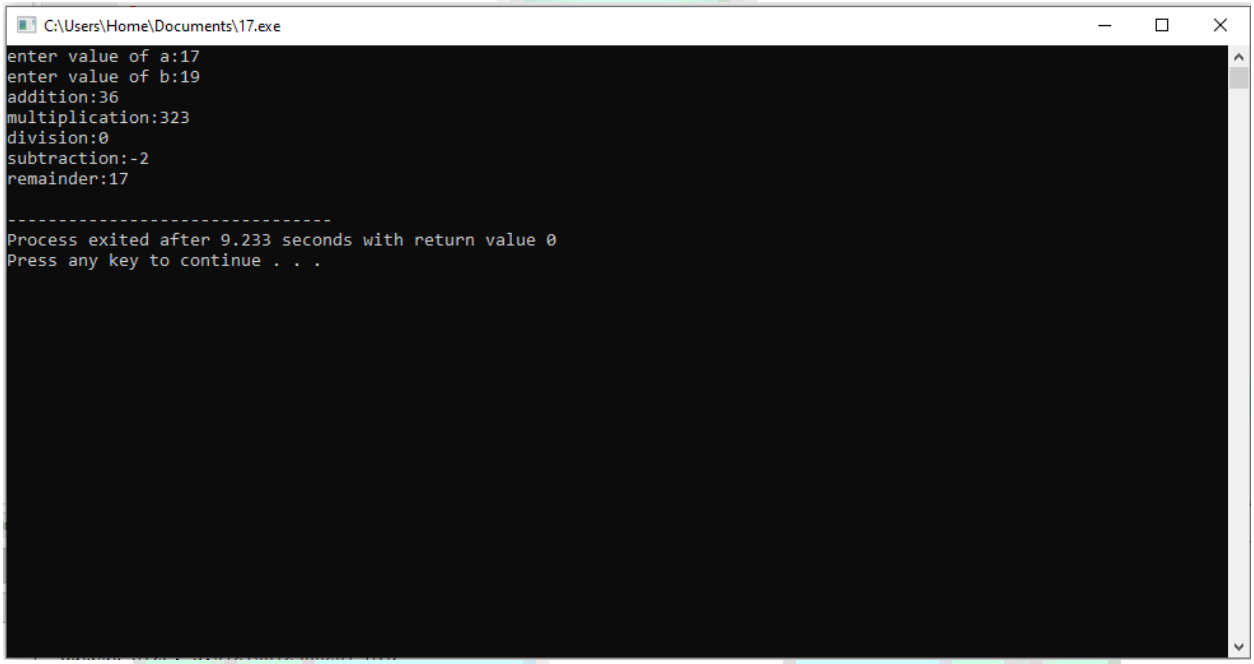
PROGRAM:

```
#include<iostream>
using namespace std;
void addition(int,int);
void multiplication(int,int);
void division(int,int);
void subtraction(int,int);
void remainder(int,int);
int a,b;
char op;
int main()
{
cout<<"enter value of a:";
cin>>a;
cout<<"enter value of b:";
cin>>b;
   addition(a,b);
```

```
   multiplication(a,b);
   division(a,b);
   subtraction(a,b);
   remainder(a,b);
   return 0;
}
void addition(int a,int b)
{
    cout<<"addition:"<<a+b<<endl;
}
void multiplication(int a,int b)
{
        cout<<"multiplication:"<<a*b<<endl;
}
void division(int a, int b)
{
        cout<<"division:"<<a/b<<endl;
}
void subtraction(int a,int b)
{
        cout<<"subtraction:"<<a-b<<endl;
}
void remainder(int a,int b)
```

```
{
        cout<<"remainder:"<<a%b<<endl;
}
```

Output:



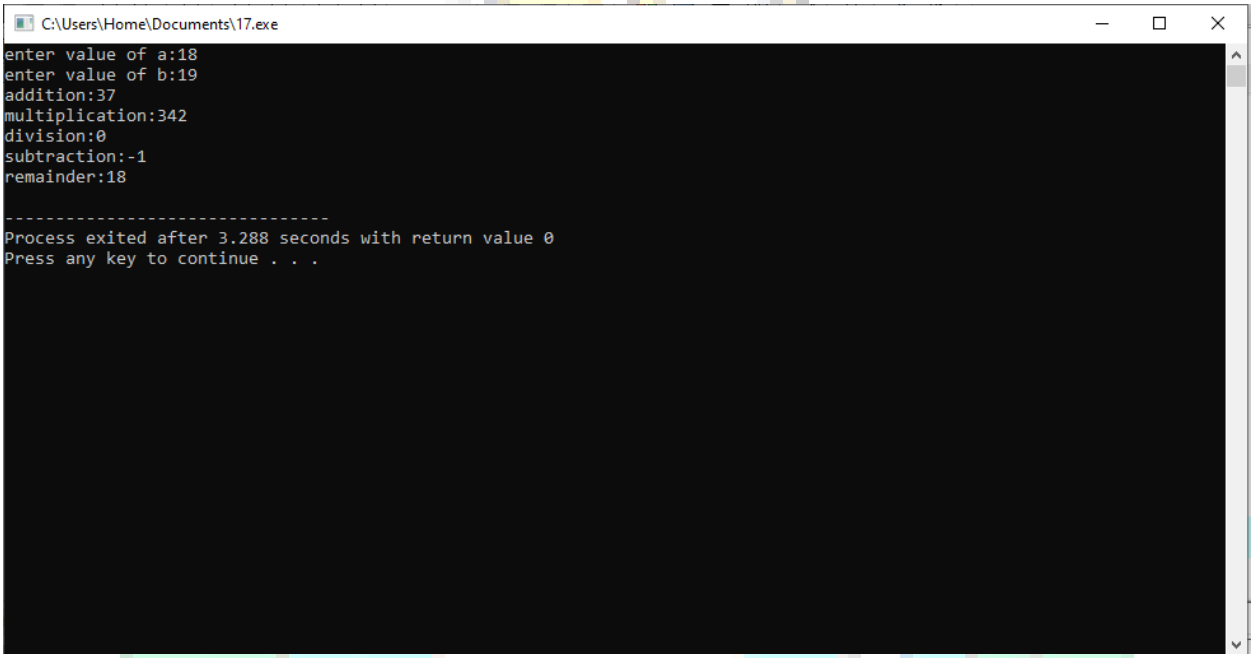
- ***CALL BY REFRENCE:***

PROGRAMM:

```
#include<iostream>
using namespace std;
void addition(int&a,int&b);
void multiplication(int&a,int&b);
void division(int&a,int&b);
void subtraction(int&a,int&b);
void remainder(int&a,int&b);
int a,b;
char op;
int main()
{
cout<<"enter value of a:";
cin>>a;
cout<<"enter value of b:";
cin>>b;
  addition(a,b);
  multiplication(a,b);
  division(a,b);
  subtraction(a,b);
  remainder(a,b);
```

```
  return 0;
}
void addition(int&a,int& b)
{
        cout<<"addition:"<<a+b<<endl;
}
void multiplication(int&a,int& b)
{
        cout<<"multiplication:"<<a*b<<endl;
}
void division(int& a, int& b)
{
        cout<<"division:"<<a/b<<endl;
}
void subtraction(int&a,int& b)
{
        cout<<"subtraction:"<<a-b<<endl;
}
void remainder(int&a,int&b)
{
        cout<<"remainder:"<<a%b<<endl;
}
```

Output:


C:\Users\Home\Documents\17.exe
enter value of a:18
enter value of b:19
addition:37
multiplication:342
division:0
subtraction:-1
remainder:18

Process exited after 3.288 seconds with return value 0
Press any key to continue . . .

QUESTION: 4

Write a program to do swapping between three variables.

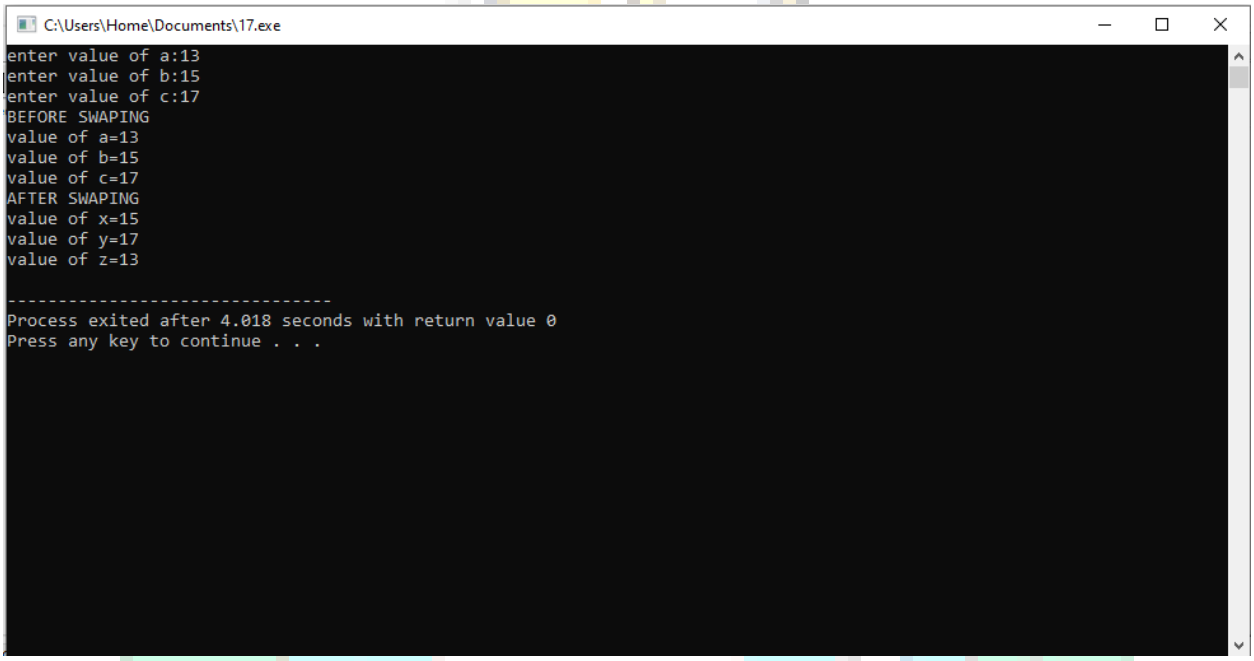
SOLUTION:

PROGRAM:

```
#include<iostream>
using namespace std;
void swap(int,int,int);
int a,b,c;
int main()
{
cout<<"enter value of a:";
cin>>a;
cout<<"enter value of b:";
cin>>b;
cout<<"enter value of c:";
cin>>c;
cout<<"BEFORE SWAPING"<<endl;
cout<<"value of a="<<a<<endl;
cout<<"value of b="<<b<<endl;
cout<<"value of c="<<c<<endl;
   swap(a,b,c);
   return 0;
```

```
}
void swap(int x, int y, int z)
{
int g;
g=x;
x=y;
y=z;
z=g;
cout<<"AFTER SWAPING"<<endl;
cout<<"value of x="<<x<<endl;
cout<<"value of y="<<y<<endl;
cout<<"value of z="<<z<<endl;
}
```

Output:


C:\Users\Home\Documents\17.exe
enter value of a:13
enter value of b:15
enter value of c:17
BEFORE SWAPING
value of a=13
value of b=15
value of c=17
AFTER SWAPING
value of x=15
value of y=17
value of z=13

Process exited after 4.018 seconds with return value 0
Press any key to continue . . .

LAB TASK: 2

QUESTION: 1

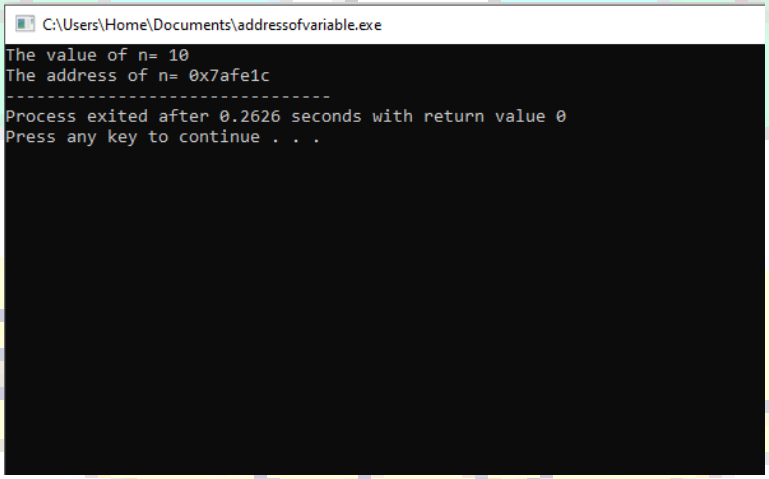
Write a program that will display the address of a variable.

SOLUTION:

PROGRAM:

```
#include<iostream>

using namespace std;

int main()

{

int n;

n=10;

cout<<"The value of n= "<<n<<endl;

cout<<"The address of n= "<<&n;

}
```

OUTPUT:



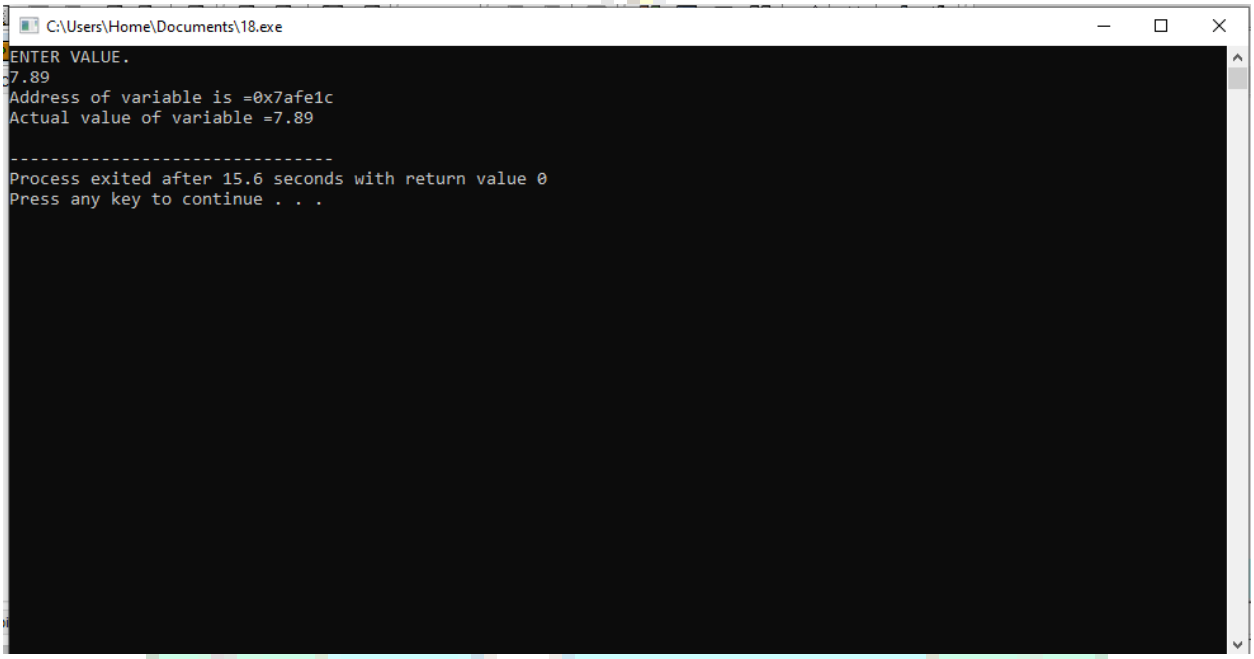
- **FLOAT:**

SOLUTION:

PROGRAM:

```
#include<iostream>
using namespace std;
int main()
{
	float a;
	cout<<"ENTER VALUE."<<endl;
	cin>>a;
	cout<<"Address of variable is ="<<&a<<endl;
	cout<<"Actual value of variable ="<<a<<endl;
	return 0;
}
```

Output:



- **CHARACTER:**

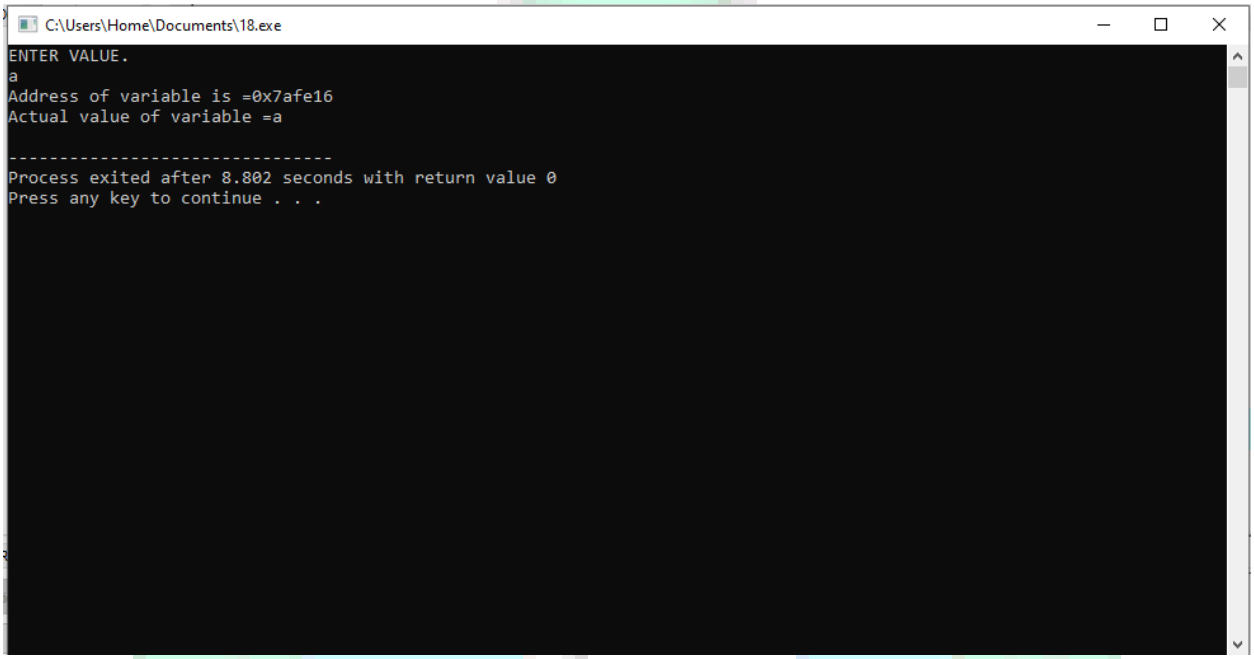
SOLUTION:

PROGRAM:

```
#include<iostream>
using namespace std;
int main()
{
    char a[10];
    cout<<"ENTER VALUE."<<endl;
    cin>>a;
    cout<<"Address of variable is ="<<&a<<endl;
```

```
    cout<<"Actual value of variable ="<<a<<endl;
    return 0;
}
```

Output:



QUESTION: 2

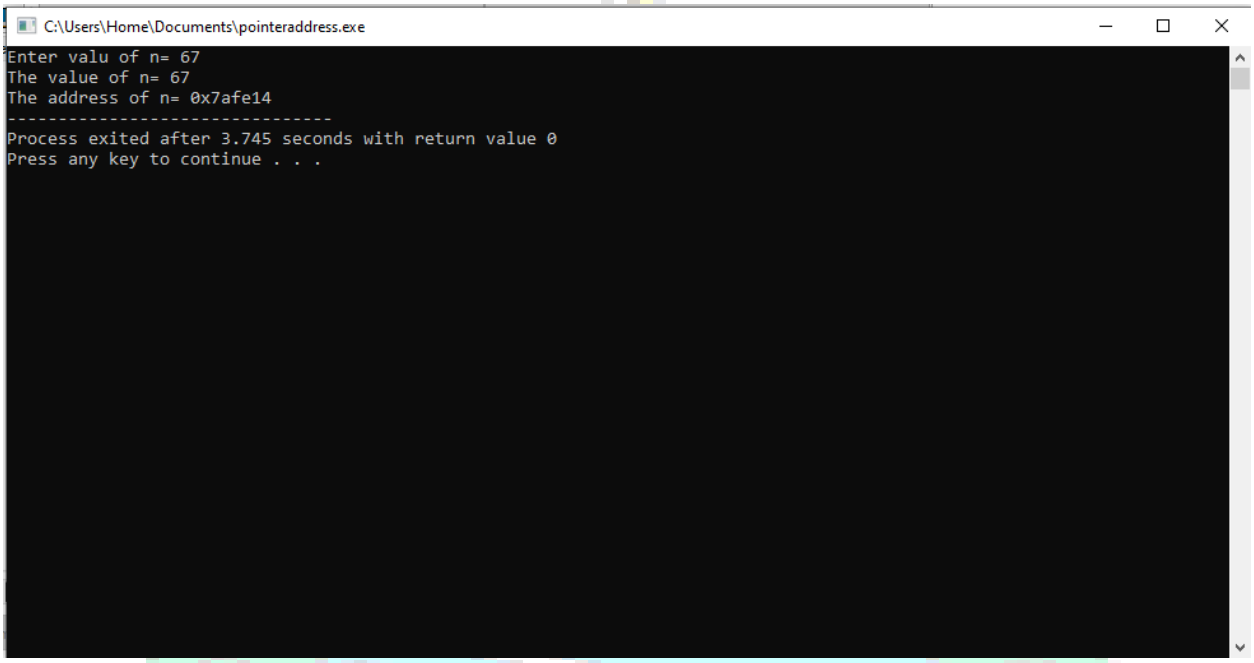
write a program that inputs a number in an integer variable. It stores the address of the variable in a pointer and then displays the value and address of the variable.

SOLUTION:

PROGRAM:

```
#include<iostream>

using namespace std;

int main()

{

int n;

int *ptr;

cout<<"Enter valu of n= ";

cin>>n;

ptr=&n;

cout<<"The value of n= "<<n<<endl;

cout<<"The address of n= "<<ptr;

}
```

Output:



- **FLOAT:**

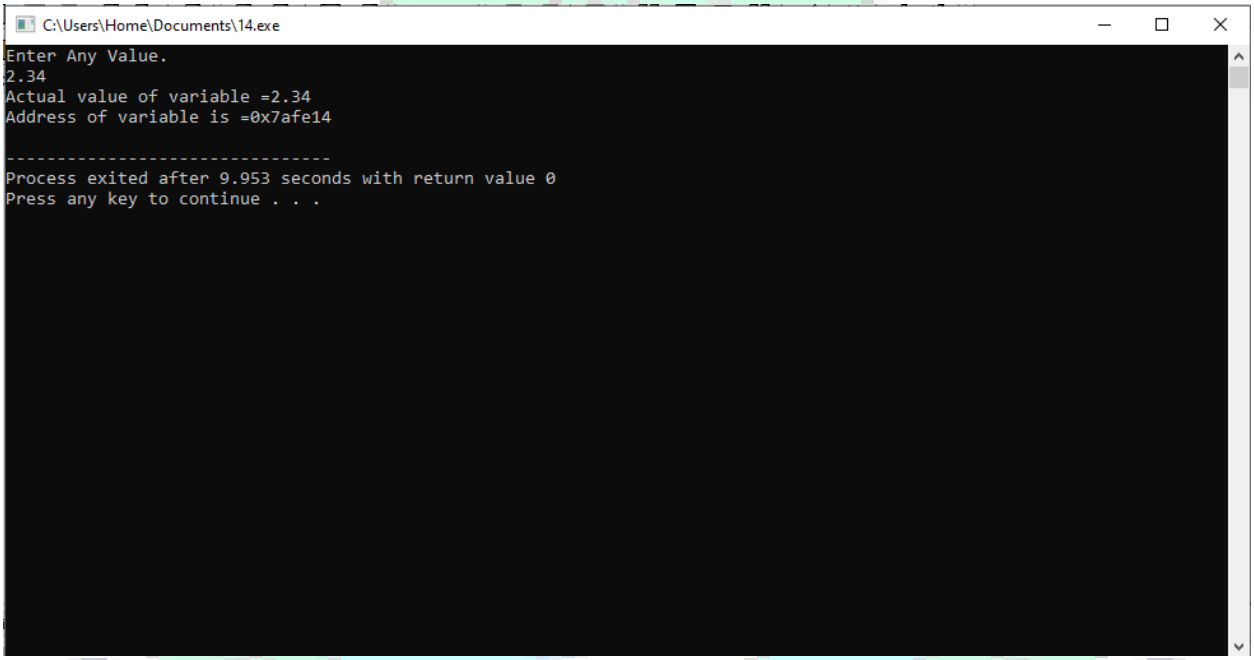
SOLUTION:

PROGRAM:

```
#include<iostream>
using namespace std;
 int main()
{
        float z;
        float *q;
        cout<<"Enter Any Value."<<endl;
        cin>>z;
```

```
        q=&z;
        cout<<"Actual value of variable ="<<z<<endl;
        cout<<"Address of variable is ="<<q<<endl;
        return 0;
}
```

Output:



- **CHAR:**

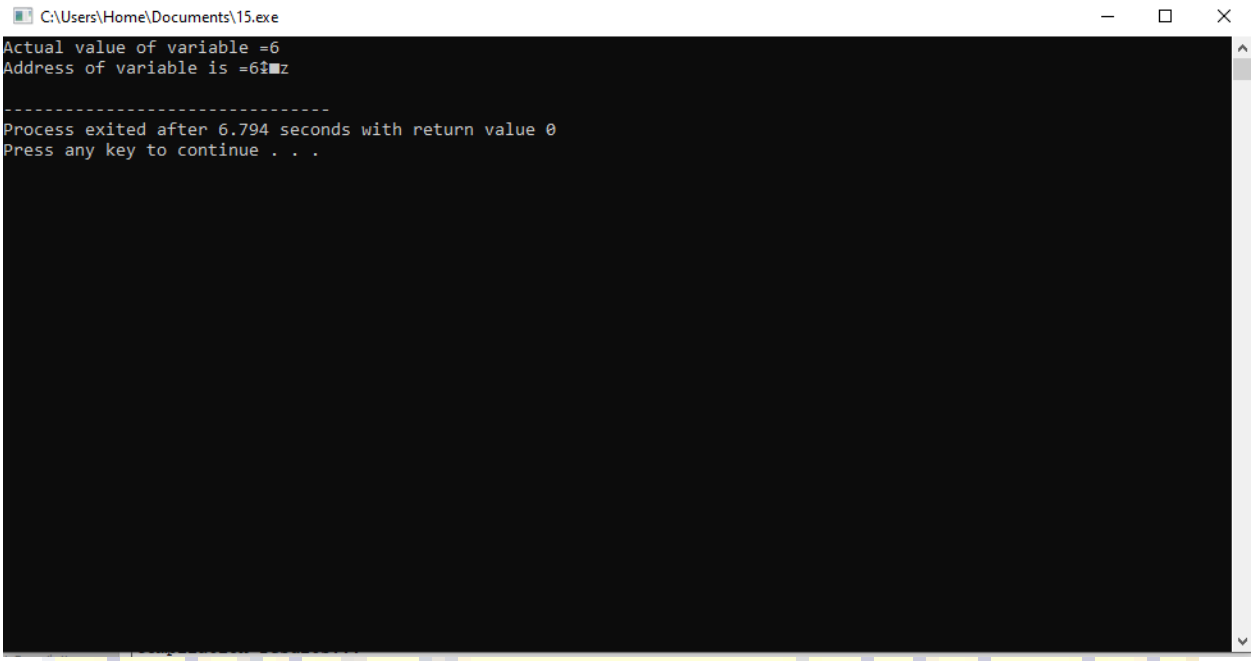
SOLUTION:

PROGRAM:

```
#include<iostream>
using namespace std;
 int main()
```

```
{
        char z='6';
        char *q;
        q=&z;
        cout<<"Actual value of variable ="<<z<<endl;
        cout<<"Address of variable is ="<<q<<endl;
        return 0;
}
```

Output:



QUESTION: 3

Write a program that initializes three different type of variables. use void pointer to assign address of these variables and then print the original value and address of the variables one by one.

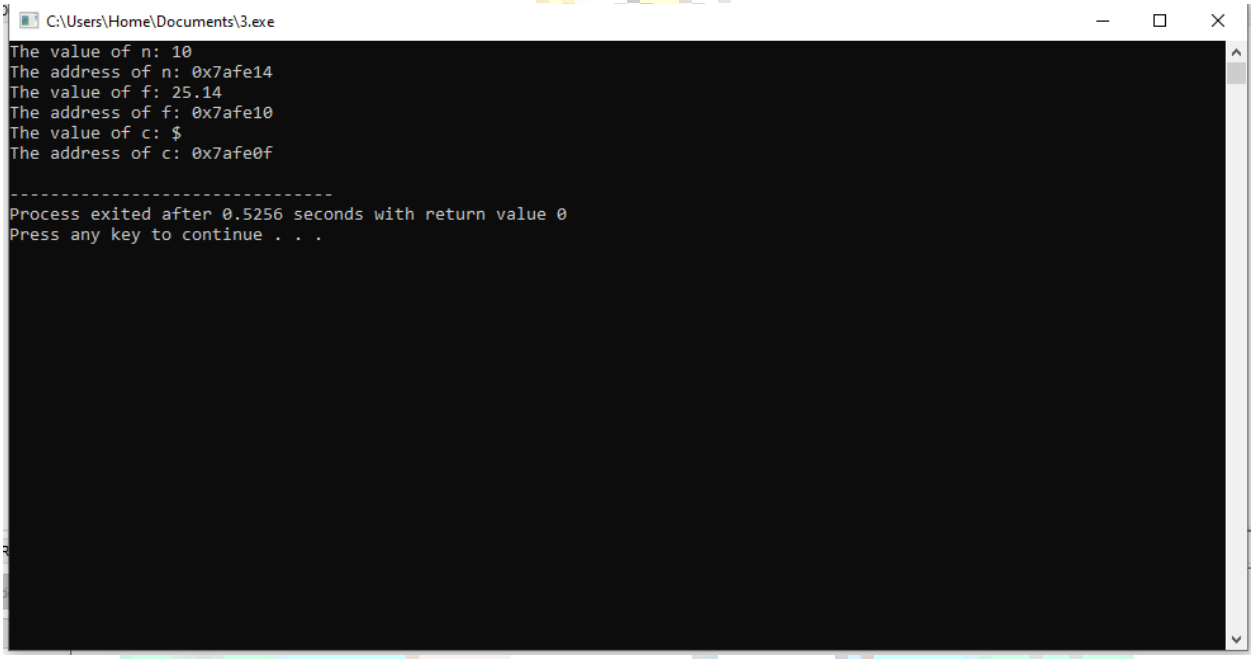
SOLUTION:

PROGRAM:

```
#include<iostream>
using namespace std;
int main()
{
int n=10;
float f=25.14;
char c='$';
void *ptr;
ptr=&n;
cout<<"The value of n: "<<n<<endl;
cout<<"The address of n: "<<ptr<<endl;
ptr=&f;
cout<<"The value of f: "<<f<<endl;
cout<<"The address of f: "<<ptr<<endl;
ptr=&c;
cout<<"The value of c: "<<c<<endl;
cout<<"The address of c: "<<ptr<<endl;
```

```
return 0;

}
```

Output:



QUESTION: 4

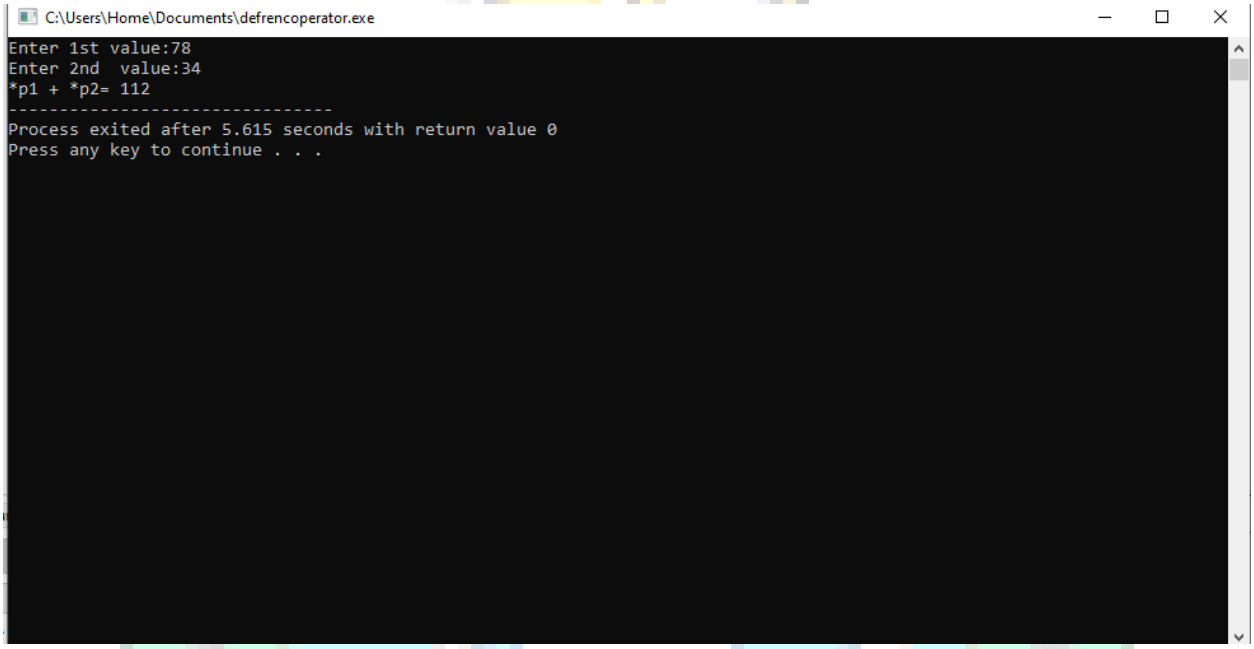
Write a program that will add the two integer values. Use deference operator.

SOLUTION:

PROGRAM:

```
#include<iostream>
using namespace std;
int main()
{
int a,b,s, *p1, *p2;
p1=&a;
p2=&b;
cout<<"Enter 1st value:";
cin>>*p1;
cout<<"Enter 2nd  value:";
cin>>*p2;
s=*p1+*p2;
cout<<"*p1 + *p2= "<<s;
return 0;
}
```

Output:


C:\Users\Home\Documents\defrencoperator.exe
Enter 1st value:78
Enter 2nd value:34
*p1 + *p2= 112

Process exited after 5.615 seconds with return value 0
Press any key to continue . . .

QUESTION: 5

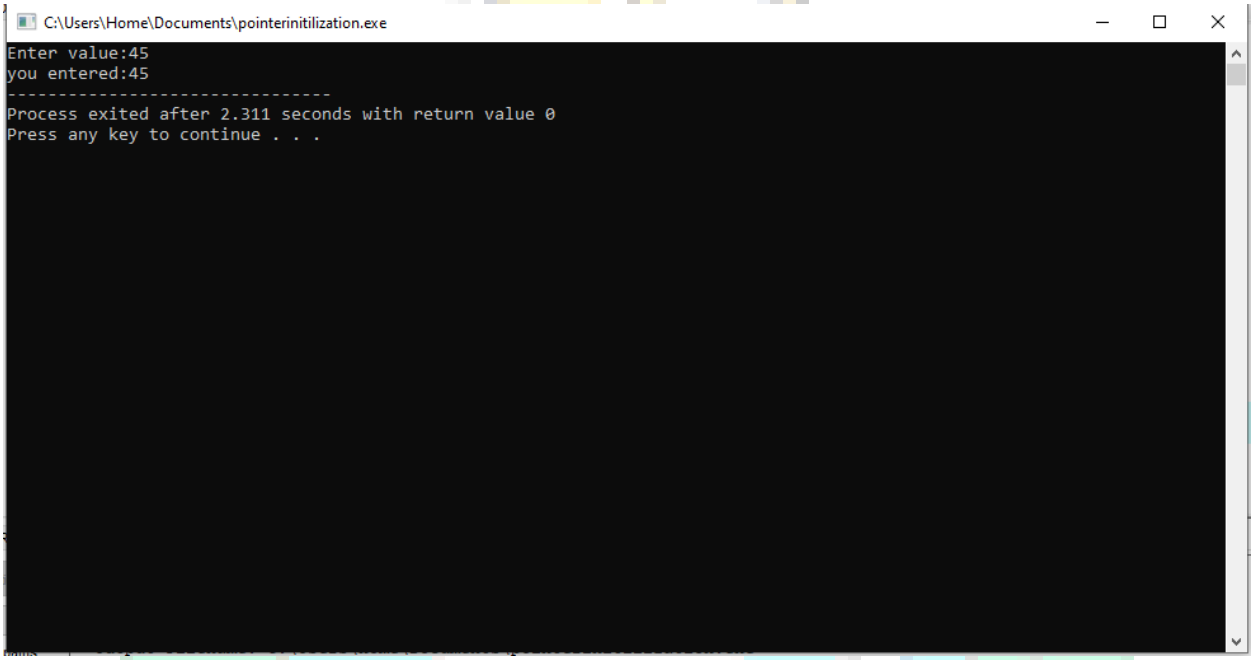
Write a program that will declare a variable a. Assign the address of the variable to pointer variable. Use the pointer variable to input the value and then display that value.

SOLUTION:

PROGRAM:

```
#include<iostream>

using namespace std;

int main()

{

int a;

int *ptr=&a;

cout<<"Enter value:";

cin>>*ptr;

cout<<"you entered:"<<*ptr;

return 0;

}
```

Output:


C:\Users\Home\Documents\pointerinitilization.exe
Enter value:45
you entered:45

Process exited after 2.311 seconds with return value 0
Press any key to continue . . .

QUESTION: 6

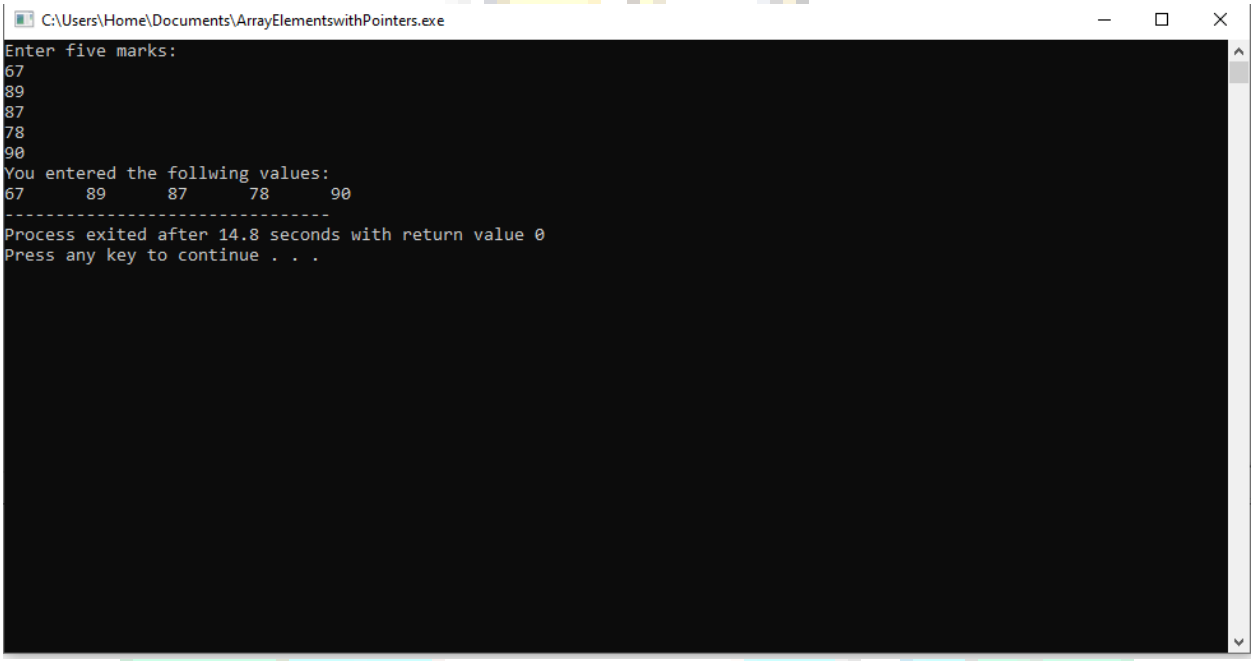
Write a program to input five integers in an array and than display them using a pointer.

SOLUTION:

PROGRAM:

```
#include<iostream>

using namespace std;

int main()

{

int marks[5],i;

int *ptr;

cout<<"Enter five marks: \n";

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

cin>>marks[i];

ptr=marks;

cout<<"You entered the follwing values:\n";

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

cout<<*ptr++<<"\t";

return 0;

}
```

Output:


C:\Users\Home\Documents\ArrayElementswithPointers.exe
Enter five marks:
67
89
87
78
90
You entered the follwing values:
67 89 87 78 90

Process exited after 14.8 seconds with return value 0
Press any key to continue . . .

QUESTION: 7

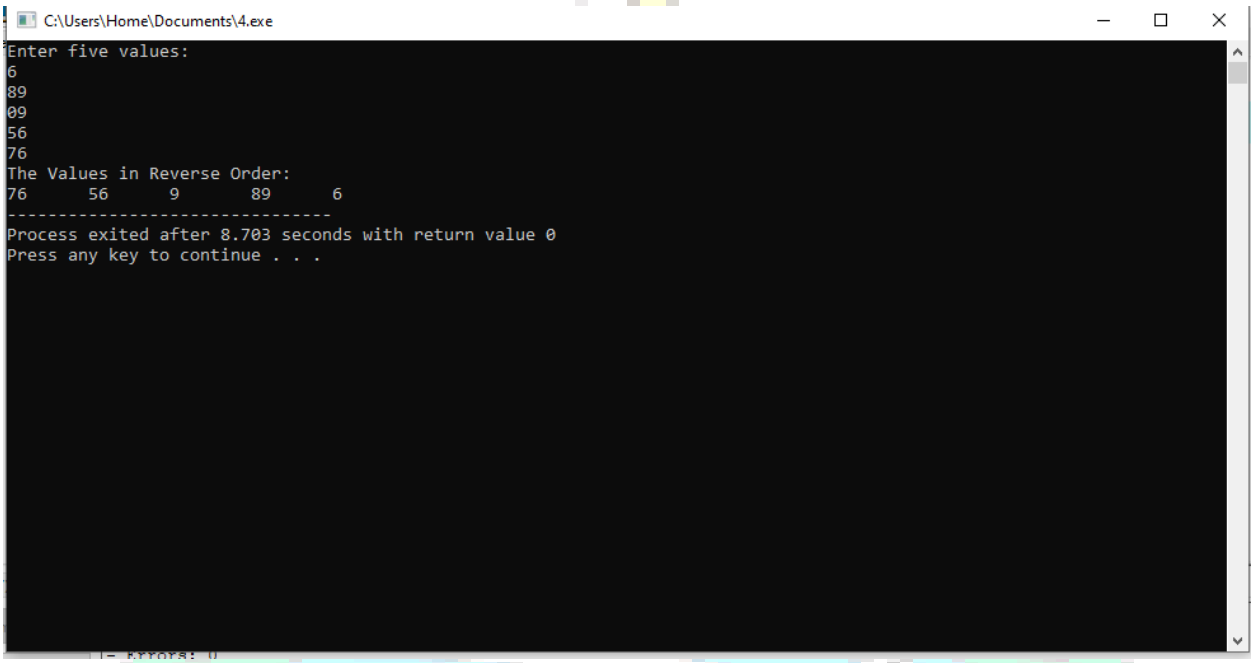
Write a program to input five floating point values in an array and then display in reverse order. Use pointers

SOLUTION:

PROGRAM:

```
#include<iostream>

using namespace std;

int main()

{

float arr[5],*ptr;

int i;

cout<<"Enter five values: \n";

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

cin>>arr[i];

ptr=&arr[4];

cout<<"The Values in Reverse Order:\n";

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

cout<<*ptr--<<"\t";

return 0;

}
```

Output:


C:\Users\Home\Documents\4.exe
Enter five values:
6
89
09
56
76
The Values in Reverse Order:
76 56 9 89 6
Process exited after 8.703 seconds with return value 0
Press any key to continue . . .

LAB TASK: 3

QUESTION: 1

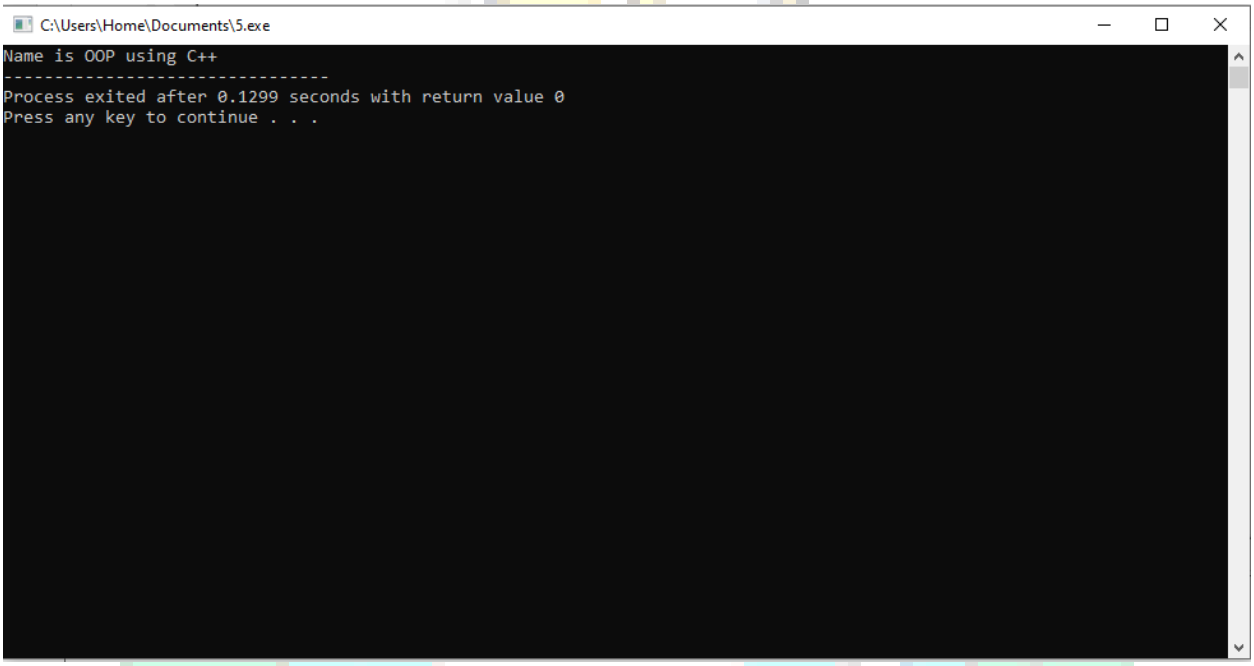
write a program that display the value stored in a string variable name.

SOLUTION:

PROGRAM:

```
#include<iostream>

using namespace std;

int main()

{

char name[40]="OOP using C++";

cout<<"Name is "<<name;

return 0;

}
```

OUTPUT:


C:\Users\Home\Documents\5.exe
Name is OOP using C++

Process exited after 0.1299 seconds with return value 0
Press any key to continue . . .

QUESTION: 2

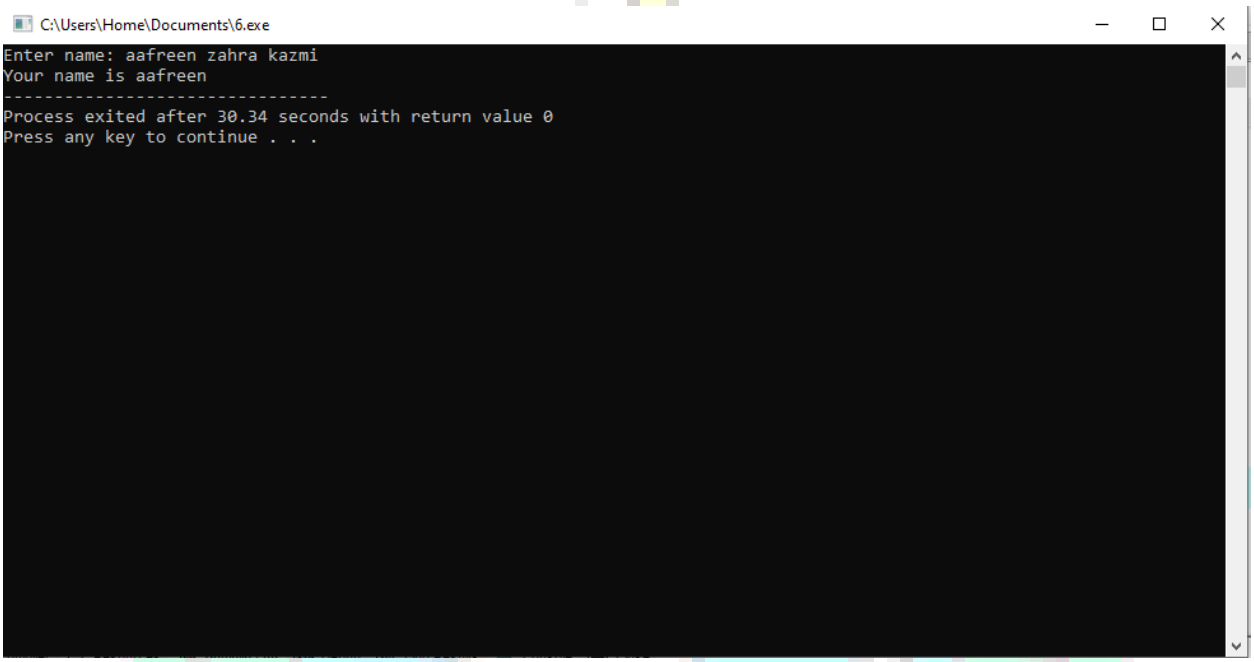
write a program that inputs the name of the user using cin object and display it.

SOLUTION:

PROGRAM:

```
#include<iostream>

using namespace std;

int main()

{

char name[50];

cout<<"Enter name: ";

cin>>name;

cout<<"Your name is "<<name;

return 0;

}
```

Output:


C:\Users\Home\Documents\6.exe
Enter name: aafreen zahra kazmi
Your name is aafreen

Process exited after 30.34 seconds with return value 0
Press any key to continue . . .

QUESTION: 3

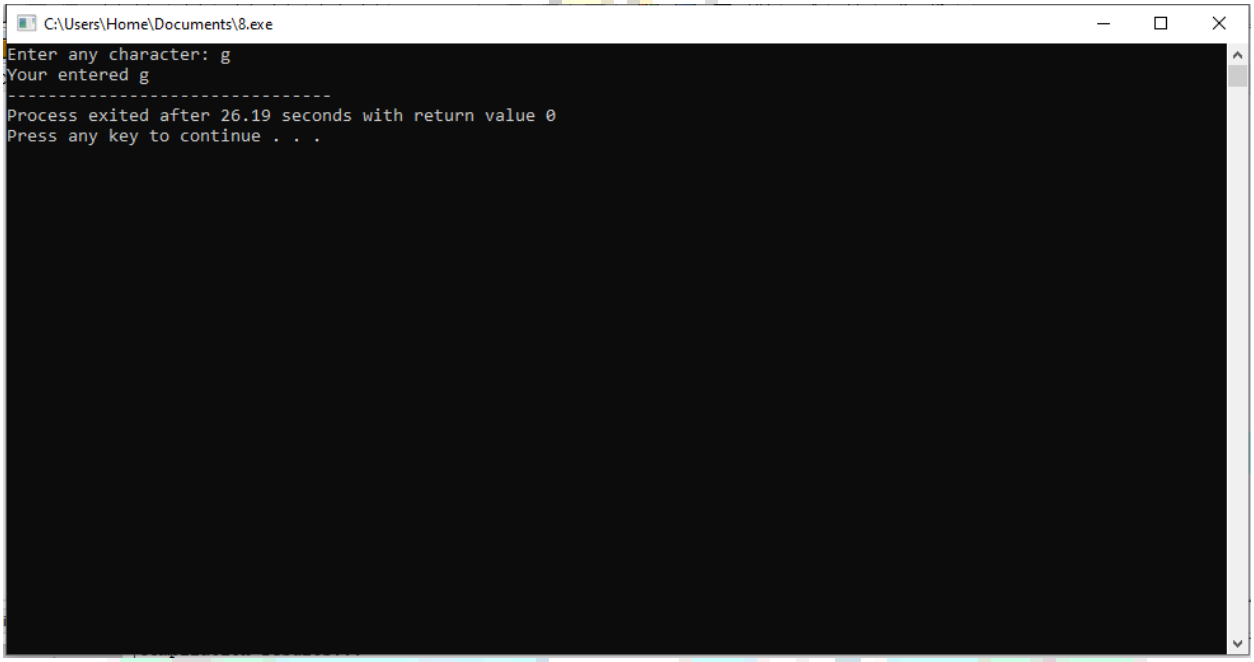
write a program that inputs the name of the user using cin.getline() function and display it on screen.

SOLUTION:

PROGRAM:

```
#include<iostream>

using namespace std;

int main()

{

char c;

cout<<"Enter any character: ";

cin.get(c);

cout<<"Your entered "<<c;

return 0;

}
```

Output:


C:\Users\Home\Documents\8.exe
Enter any character: g
Your entered g

Process exited after 26.19 seconds with return value 0
Press any key to continue . . .

QUESTION: 4

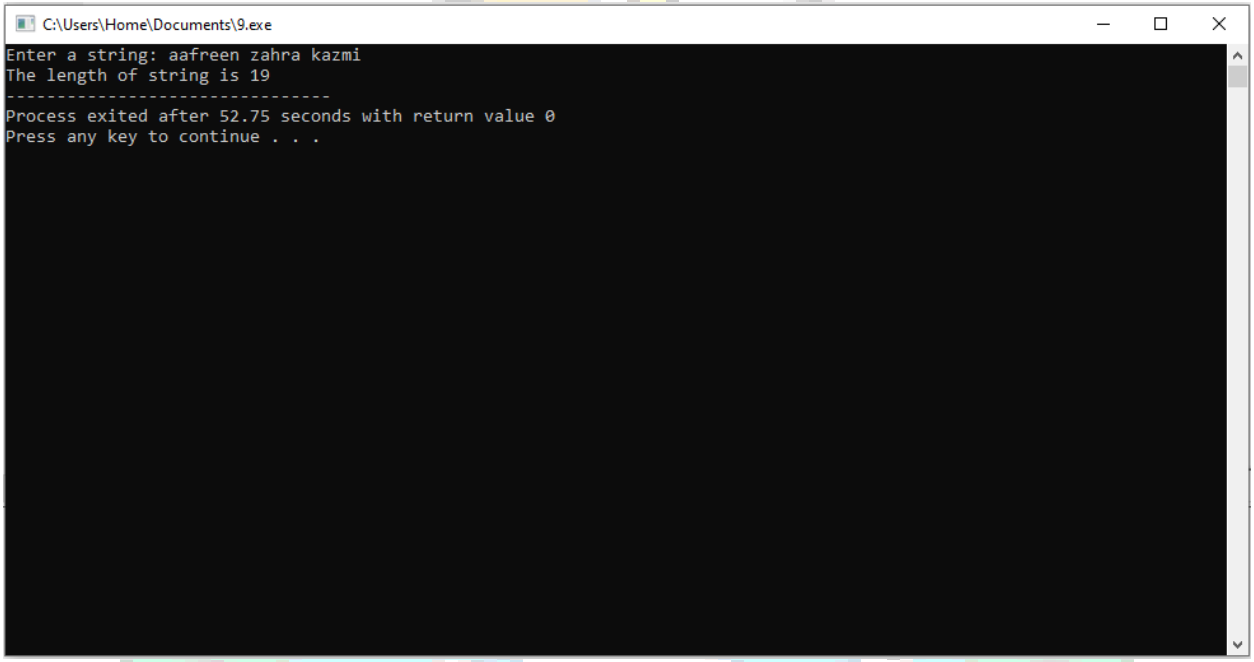
write a program that inputs a string from the user and displays its length.

SOLUTION:

PROGRAM:

```
#include<iostream>
using namespace std;
int main()
{
char str[50];
int i=0;
cout<<"Enter a string: ";
cin.getline(str,50);
while(str[i]!='\0')
i++;
cout<<"The length of string is "<<i;
return 0;
}
```

Output:


C:\Users\Home\Documents\9.exe
Enter a string: aafreen zahra kazmi
The length of string is 19

Process exited after 52.75 seconds with return value 0
Press any key to continue . . .

QUESTION: 5

write a program that inputs a string from the user and then copies it to another string

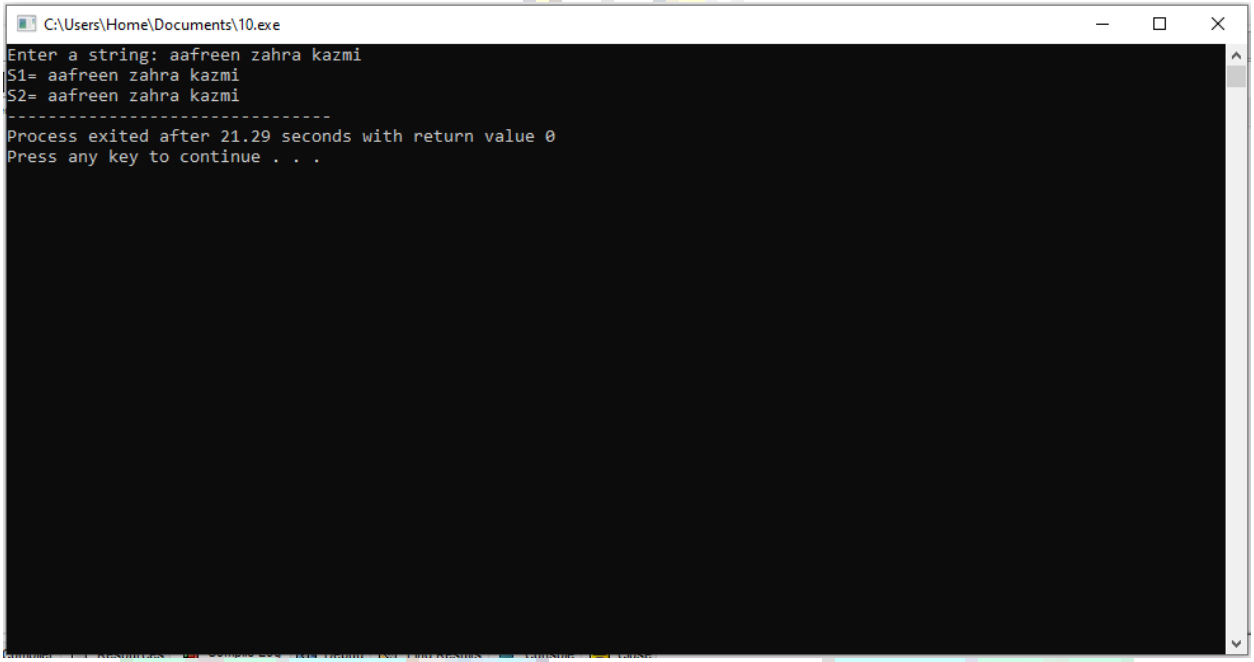
SOLUTION:

PROGRAM:

```
#include<iostream>
using namespace std;
int main()
{
char s1[50], s2[50];
int i=0;
cout<<"Enter a string: ";
cin.getline(s1,50);
while(s1[i]!='\0')
{
s2[i]=s1[i];
i++;
}
s2[i]='\0';
cout<<"S1= "<<s1<<endl;
cout<<"S2= "<<s2;
return 0;
```

}

Output:


C:\Users\Home\Documents\10.exe
Enter a string: aafreen zahra kazmi
S1= aafreen zahra kazmi
S2= aafreen zahra kazmi

Process exited after 21.29 seconds with return value 0
Press any key to continue . . .

QUESTION: 6

write a program that inputs a string from the user and then counts the number of vowels in the string

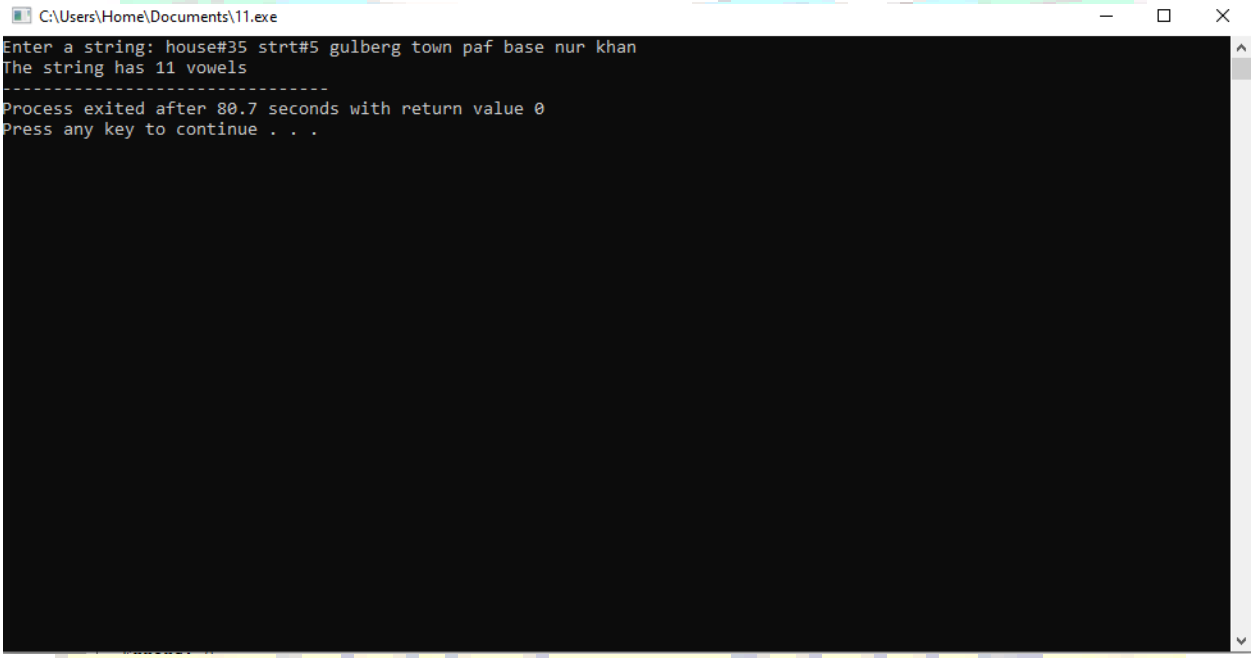
SOLUTION:

PROGRAM:

```
#include<iostream>

using namespace std;

int main()

{

char str[50];

int i,v;

i=v=0;

cout<<"Enter a string: ";

cin.getline(str,50);

while(str[i]!='\0')

{

switch(str[i])

{

case 'a':

case 'e':

case 'i':

case 'o':
```

```
case 'u':
v++;
}
i++;
}
cout<<"The string has "<<v<<" vowels";
return 0;
}
```

Output:



QUESTION: 7

write a program that inputs a string from the user and then counts the number of uppercase and lowercase constants, upercase and lowercase vowels in sentence.

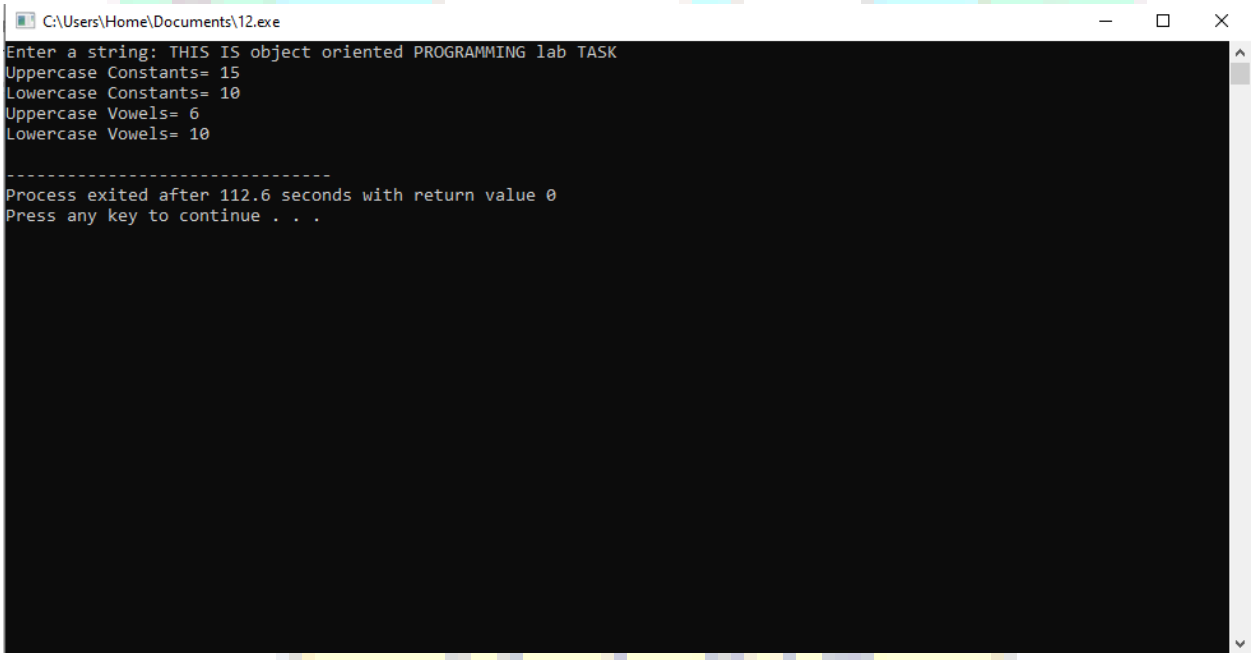
SOLUTION:

PROGRAM:

```
#include<iostream>

using namespace std;

int main()

{

char str[50];

int uc, lc, uv,lv;

uc=lc=uv=lv=0;

cout<<"Enter a string: ";

cin.getline(str,50);

for(int i=0;str[i]!='\0';i++)

{

if(str[i]=='A' || str[i]=='E' ||  str[i]=='I' || str[i]=='O' || str[i]=='U')

uv++;

else if(str[i]=='a' || str[i]=='e' ||  str[i]=='i' || str[i]=='o' || str[i]=='u')

lv++;

else if(str[i]>=65 && str[i]<=90)

uc++;
```

```
else if(str[i]>=97 && str[i]<=122)
lc++;
}
cout<<"Uppercase Constants= "<<uc<<endl;
cout<<"Lowercase Constants= "<<lc<<endl;
cout<<"Uppercase Vowels= "<<uv<<endl;
cout<<"Lowercase Vowels= "<<lc<<endl;
return 0;
}
```

Output:



QUESTION: 8

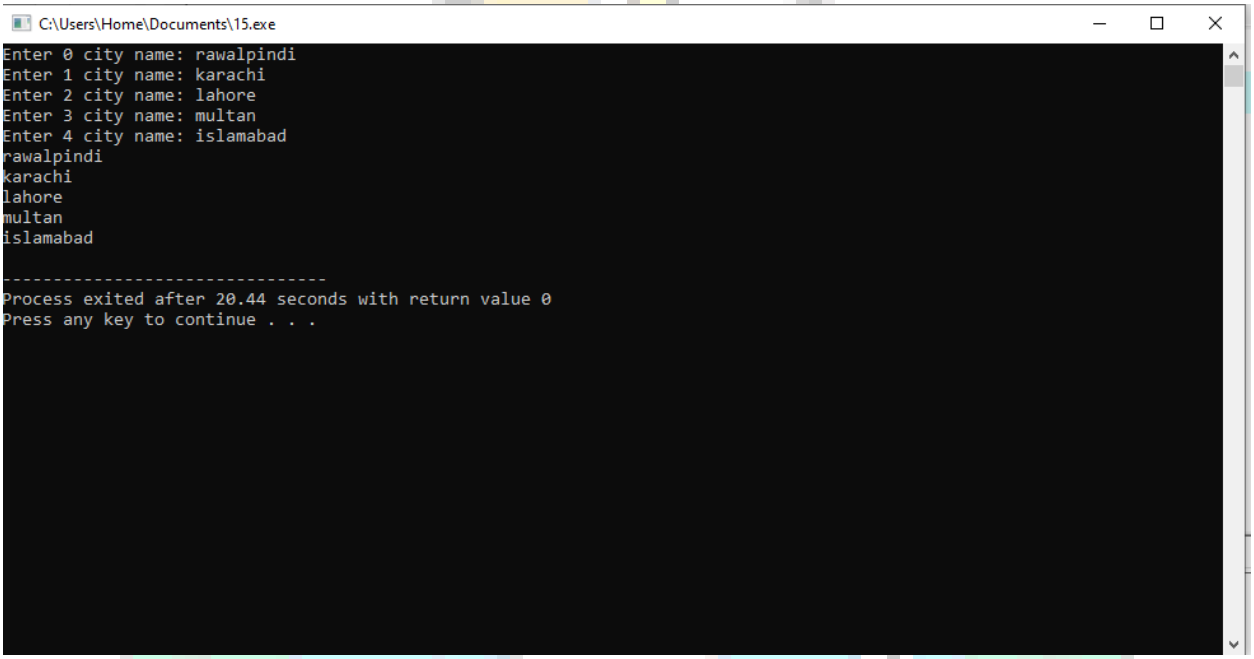
write a program that inputs the names of five cities and then display them

SOLUTION:

PROGRAM:

```
#include<iostream>
using namespace std;
int main()
{
char city[5][30];
int i;
for(i=0;i<5;i++)
{
cout<<"Enter "<<i<<" city name: ";
cin>>city[i];
}
for(i=0;i<5;i++)
cout<<city[i]<<endl;
return 0;
}
```

Output:


C:\Users\Home\Documents\15.exe
Enter 0 city name: rawalpindi
Enter 1 city name: karachi
Enter 2 city name: lahore
Enter 3 city name: multan
Enter 4 city name: islamabad
rawalpindi
karachi
lahore
multan
islamabad

Process exited after 20.44 seconds with return value 0
Press any key to continue . . .

QUESTION: 9

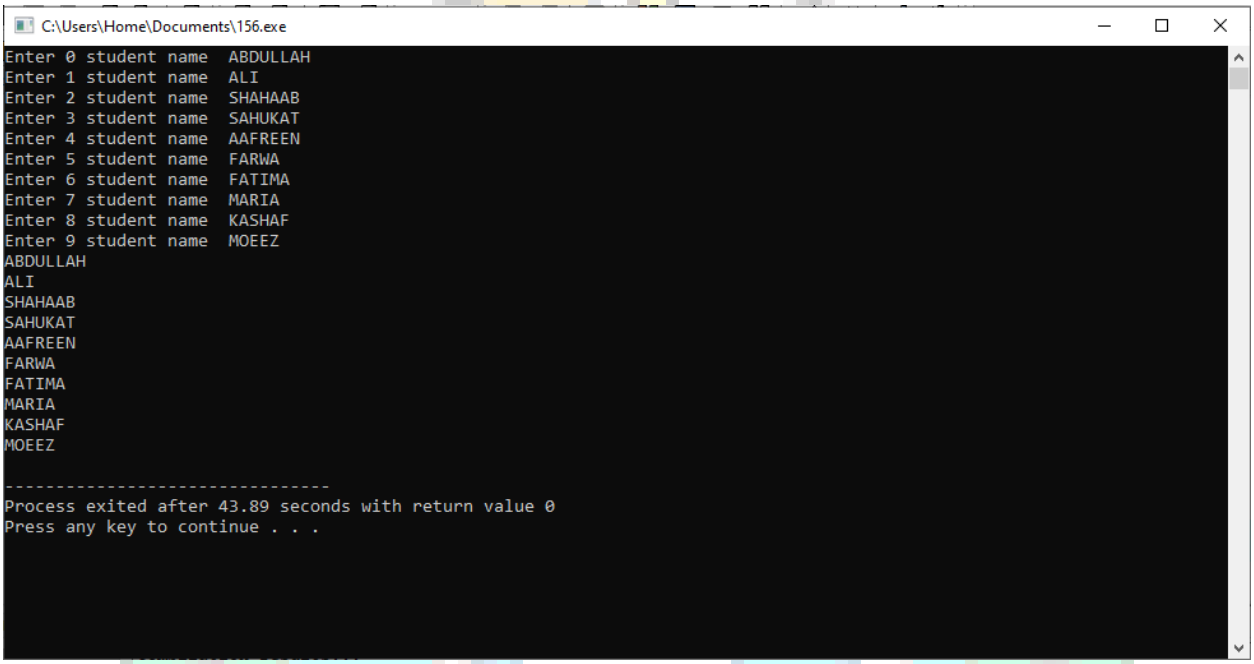
write a program that inputs the names of ten students and then display them

SOLUTION:

PROGRAM:

```
#include<iostream>
using namespace std;
int main()
{
char city[10][100];
int i;
for(i=0;i<10;i++)
{
cout<<"Enter "<<i<<" student name  ";
cin>>city[i];
}
for(i=0;i<10;i++)
cout<<city[i]<<endl;
return 0;
}
```

OUTPUT:


C:\Users\Home\Documents\156.exe
Enter 0 student name ABDULLAH
Enter 1 student name ALI
Enter 2 student name SHAHAAB
Enter 3 student name SAHUKAT
Enter 4 student name AAFREEN
Enter 5 student name FARWA
Enter 6 student name FATIMA
Enter 7 student name MARIA
Enter 8 student name KASHAF
Enter 9 student name MOEEZ
ABDULLAH
ALI
SHAHAAB
SAHUKAT
AAFREEN
FARWA
FATIMA
MARIA
KASHAF
MOEEZ

Process exited after 43.89 seconds with return value 0
Press any key to continue . . .

LAB TASK: 4

QUESTION: 1

Write a program that declares a class with one integer data member and two member functions in () and out () to input and output data in data member.

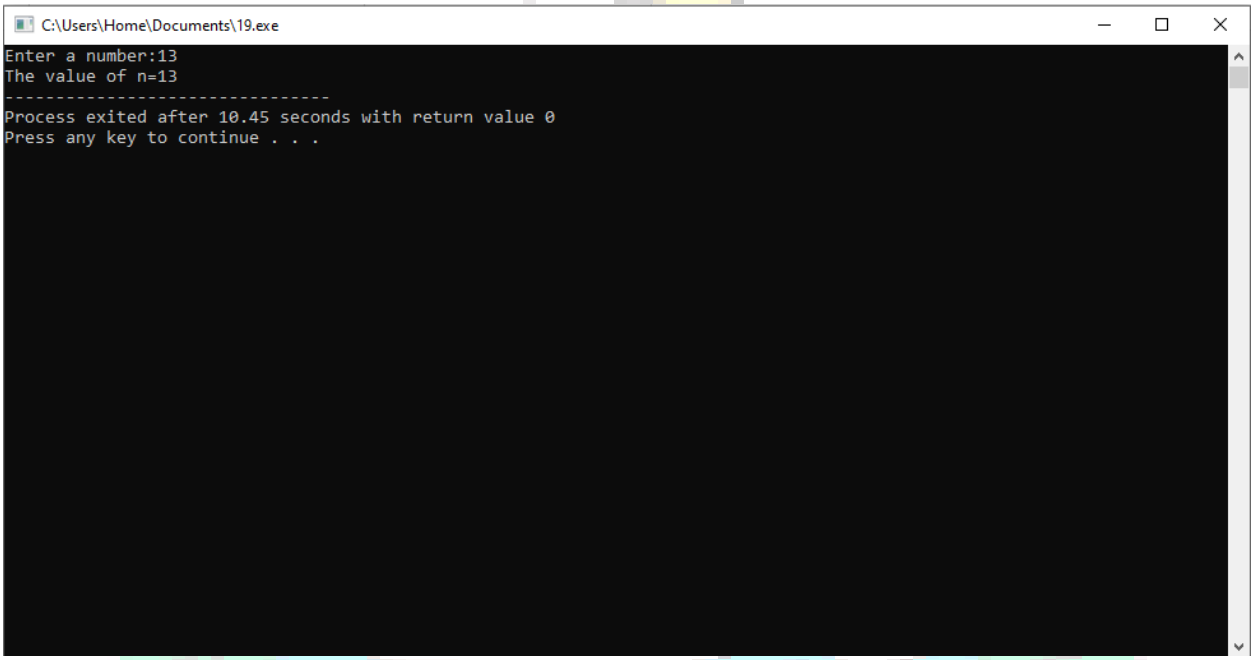
SOLUTION:

PROGRAM:

```
#include <iostream>
using namespace std;
class Test {
   int n;
  public:
   void in ()
   {    cout<<"Enter a number:";
        cin>>n;  }
    void out ()
   {    cout<<"The value of n="<<n;     }
   };
int main ()
{
 Test obj;
 obj.in();
 obj.out();
 return 0;
```

}

OUTPUT:


C:\Users\Home\Documents\19.exe
Enter a number:13
The value of n=13

Process exited after 10.45 seconds with return value 0
Press any key to continue . . .

QUESTION: 2

Write a class circle with one data members radius. Write three member functions

1) get_radius() to set radius value with parameter value,

2) area() to display radius and

3) circum() to calculate and display circumference of circle.

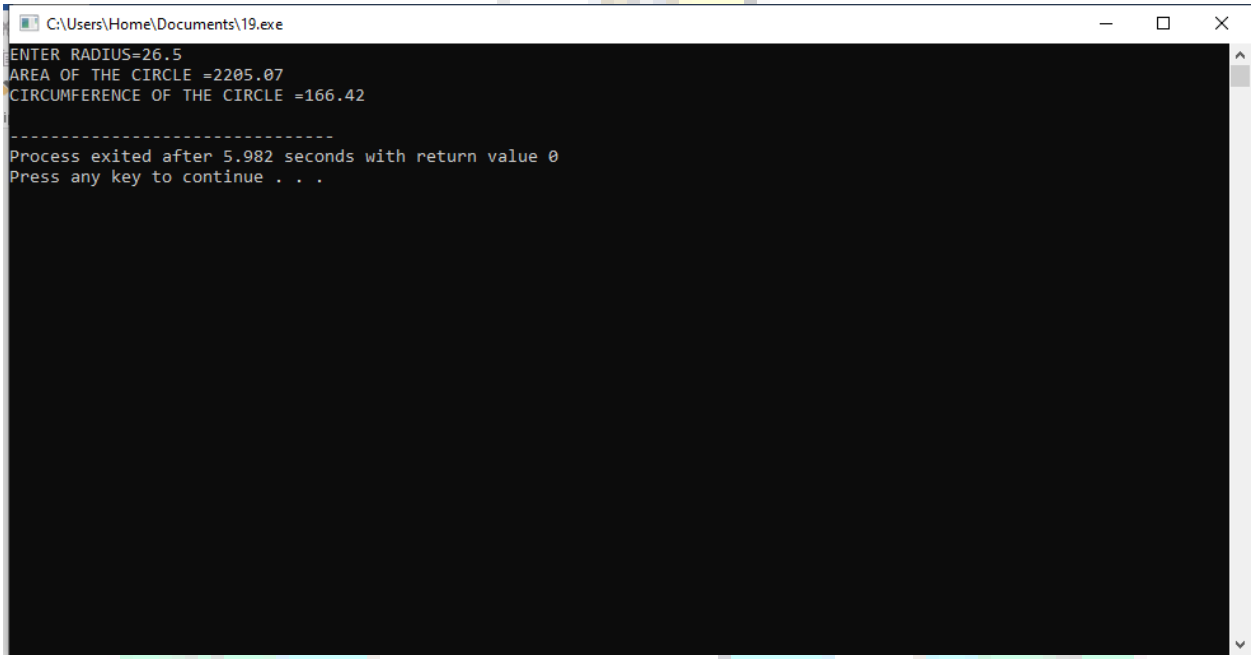
SOLUTION:

PROGRAM:

```
#include<iostream>
using namespace std;
class circle
{
        float radius;
        public:
        void get_radius(float r)
        {
                radius=r;
        }
        void area()
        {
                cout<<"AREA OF THE CIRCLE ="<<3.14*radius*radius<<endl;
        }
```

```
        void circum()
        {
                cout<<"CIRCUMFERENCE OF THE CIRCLE
="<<2*3.14*radius<<endl;
        }
};
int main()
{
        float r;
        cout<<"ENTER RADIUS=";
        cin>>r;
        circle c1;
        c1.get_radius(r);
        c1.area();
        c1.circum();
        return 0;
}
```

OUTPUT:


C:\Users\Home\Documents\19.exe
ENTER RADIUS=26.5
AREA OF THE CIRCLE =2205.07
CIRCUMFERENCE OF THE CIRCLE =166.42

Process exited after 5.982 seconds with return value 0
Press any key to continue . . .

QUESTION: 3

Write a program that make a student class and write data members and get these data members in the member function of in () and display them in the member function of display ().

SOLUTION:

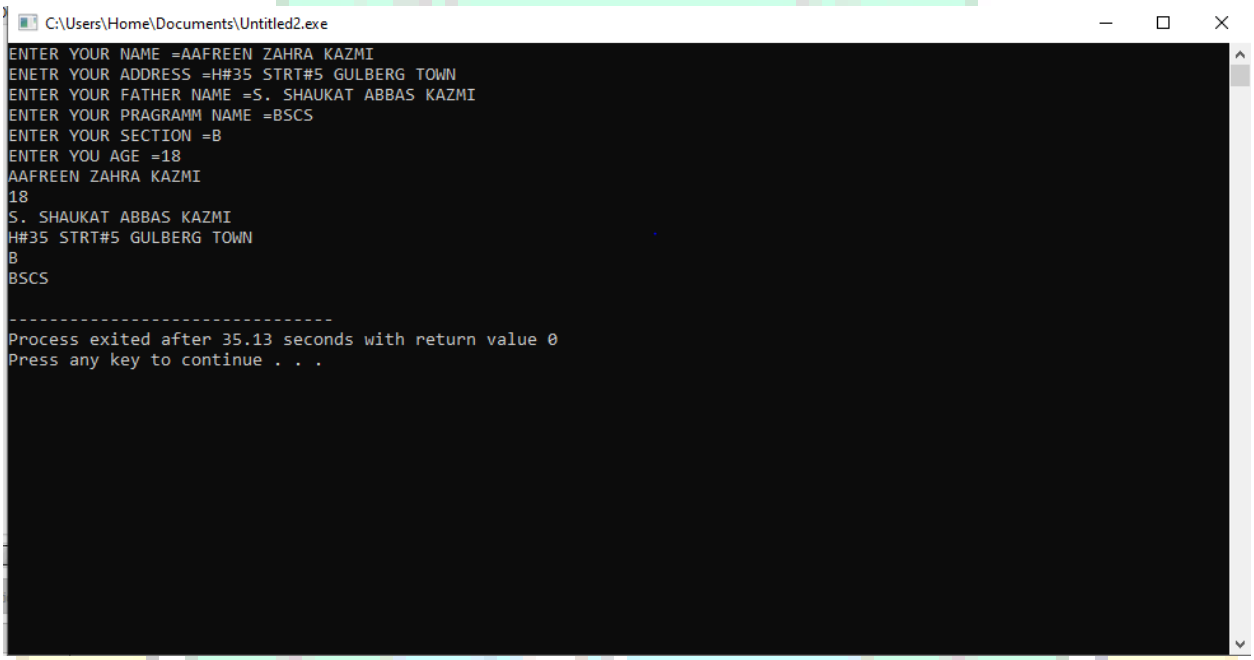
PROGRAM:

```
#include<iostream>
using namespace std;
class student
{
int age;
char name[100];
char fathername[100];
char program[100];
char address[100];
int rollno;
char section[30];
public:
void in()
{
        cout<<"ENTER YOUR NAME =";
        cin.getline(name,100) ;
        cout<<"ENETR YOUR ADDRESS =";
```

```
        cin.getline(address,100) ;
        cout<<"ENTER YOUR FATHER NAME =";
        cin.getline(fathername,100);
        cout<<"ENTER YOUR PRAGRAMM NAME =";
        cin>>program;
        cout<<"ENTER YOUR SECTION =";
        cin>>section;
        cout<<"ENTER YOU AGE =";
        cin>>age;

        }
void display()
{
        cout<<name<<endl;
        cout<<age<<endl;
        cout<<fathername<<endl;
        cout<<address<<endl;
        cout<<section<<endl;
        cout<<program<<endl;
}
};
int main()
{
```

```
    student s1;
    s1.in();
    s1.display();
    return 0;
}
```

Output:



QUESTION: 4

Create a class calculator that performs the following function;

a) **Addition**
b) **Subtraction**
c) **Multiplication**
d) **Division**

Use concept of passing parameters.

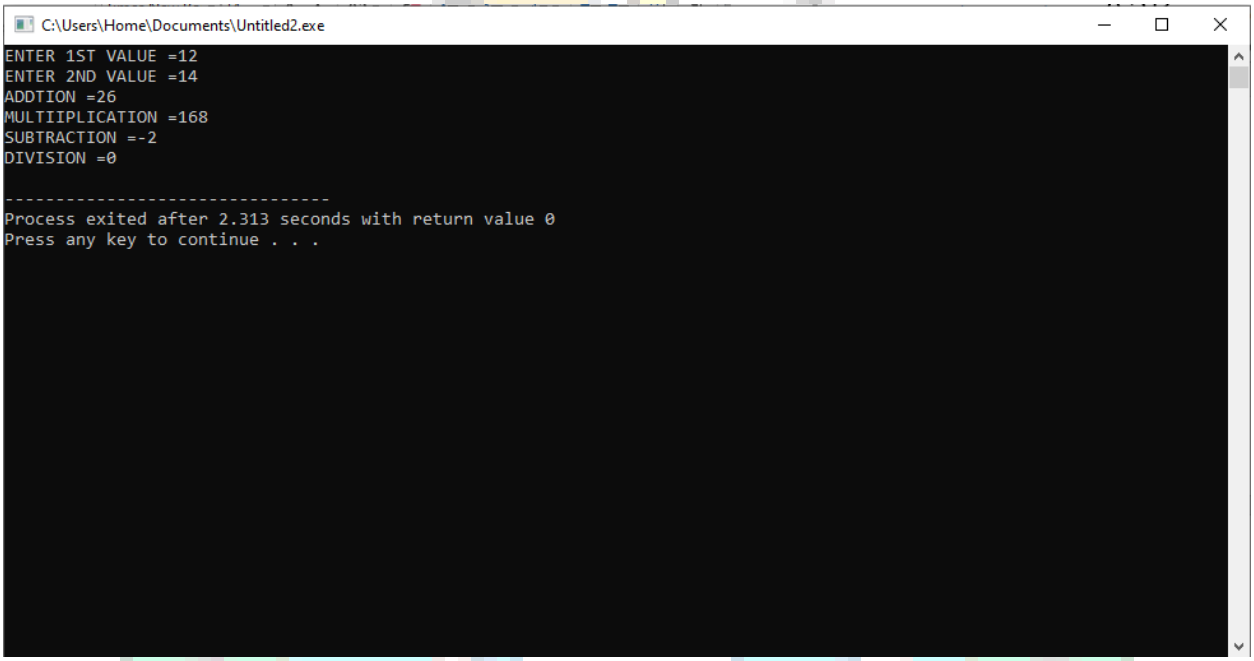
SOLUTION:

PROGRAM:

```
#include<iostream>

using namespace std;

class calculator

{

        public:

void addition(int a,int b)

{

        cout<<"ADDTION ="<<a+b<<endl;

}

void subtraction(int a,int b)

{

        cout<<"SUBTRACTION ="<<a-b<<endl;

}

void multiplication(int a,int b)
```

```
{
cout<<"MULTIIPLICATION ="<<a*b<<endl;
}
void division(int a,int b)
{
        cout<<"DIVISION ="<<a/b<<endl;
}
};
int main()
{
    int a,b;
    cout<<"ENTER 1ST VALUE =";
    cin>>a;
    cout<<"ENTER 2ND VALUE =";
    cin>>b;
    calculator c1;
    c1.addition(a,b);
    c1.multiplication(a,b);
    c1.subtraction(a,b);
    c1.division(a,b);
    return 0;
}
```

OUTPUT:


C:\Users\Home\Documents\Untitled2.exe
ENTER 1ST VALUE =12
ENTER 2ND VALUE =14
ADDTION =26
MULTIIPLICATION =168
SUBTRACTION =-2
DIVISION =0

Process exited after 2.313 seconds with return value 0
Press any key to continue . . .

QUESTION: 5

Write a program that has the class swipe_test that has two integer data members in one function and swap these data members in another function. Use the concept of classes and object in the main function .

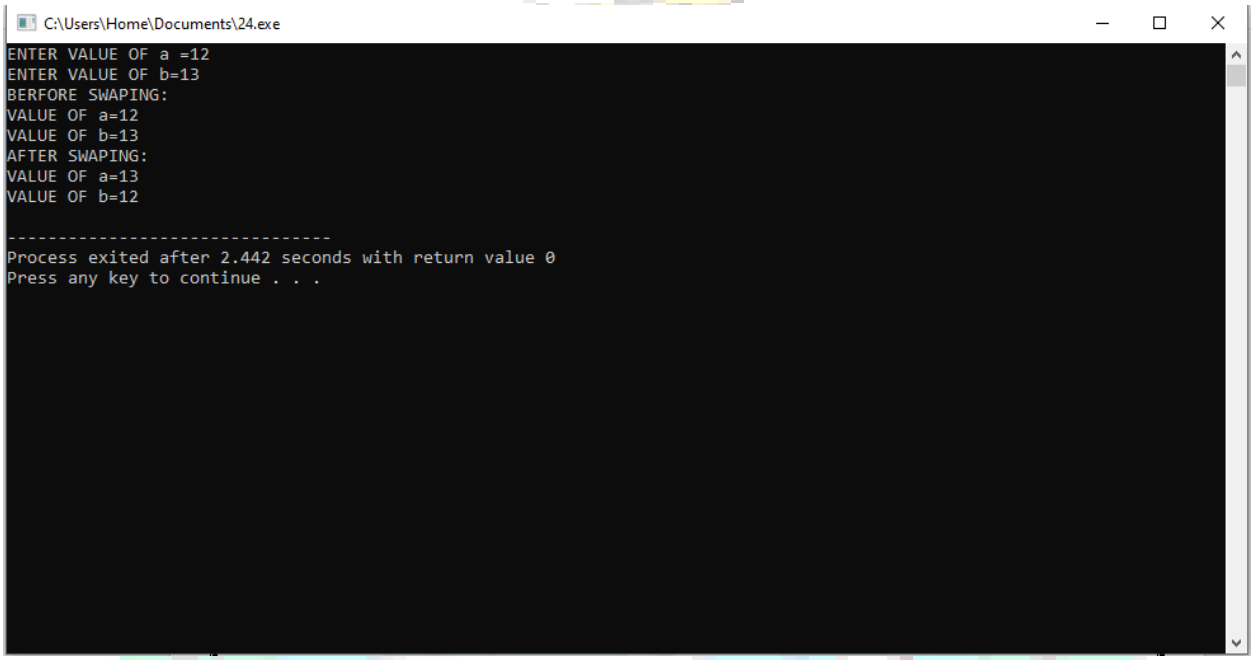
SOLUTION:

PROGRAM:

```
#include<iostream>

using namespace std;

class swipe_test

{

        int a,b;

        public:

        void in()

        {

        cout<<"ENTER VALUE OF a =";

        cin>>a;

        cout<<"ENTER VALUE OF b=";

        cin>>b;

        cout<<"BERFORE SWAPING:"<<endl;

        cout<<"VALUE OF a="<<a<<endl;

        cout<<"VALUE OF b="<<b<<endl;

        }

        void swipe()
```

```
        {
                int c;
        c=a;
        a=b;
        b=c;
                cout<<"AFTER SWAPING:"<<endl;
                cout<<"VALUE OF a="<<a<<endl;
                cout<<"VALUE OF b="<<b<<endl;
        }
};
int main()
{
        swipe_test st1;
        st1.in();
        st1.swipe();
        return 0;
}
```

Output:


C:\Users\Home\Documents\24.exe
ENTER VALUE OF a =12
ENTER VALUE OF b=13
BERFORE SWAPING:
VALUE OF a=12
VALUE OF b=13
AFTER SWAPING:
VALUE OF a=13
VALUE OF b=12

Process exited after 2.442 seconds with return value 0
Press any key to continue . . .

QUESTION: 6

Write a class Book with three data members BookID, Pages and Price. It also contains the following funtions:

1) **The get() function is used to input values**
2) **The show() function is used to display values**
3) **The set() function is used to set the values of data members using parameters.**
4) **The getPrice() function is used to return the value of Book.**

NOTE: The program should create two objects of the class and input values of object 1 and set values of object 2. The program will display the details of the most costly book.

```
#include <iostream>
using namespace std;
class Book {
   private:
   int BookID,Pages;
   float Price;
 public:
   void get ()
   {
        cout<<"Enter BookID:";
        cin>>BookID;
        cout<<"Enter Pages:";
```

```
        cin>>Pages;
        cout<<"Enter Price:";
        cin>>Price;
        }
     void show ()
    {
                cout<<"BookID= "<<BookID<<endl;
        cout<<"Pages= "<<Pages<<endl;
        cout<<"Price= "<<Price;
    }
     void set (int id, int pg, float pr)
    {
                BookID=id;
        Pages=pg;
        Price=pr;
    }
       float getPrice ()
    {
         return Price;
        }
        };
int main ()
 {
```

```
Book b1, b2;
b1.get();
b2.set(20, 320, 40.5);
cout<<"most costly book ="<<endl;
if(b1.getPrice()>b2.getPrice())
        b1.show();
else
        b2.show();
   return 0;
}
```

QUESTION: 7

Write a class Marks with three data members to store three marks. Write three member functions

1)in() to input marks,

2)sum() to calculate and return the sum and

3) avg() to calculate and return the average marks.

SOLUTION:

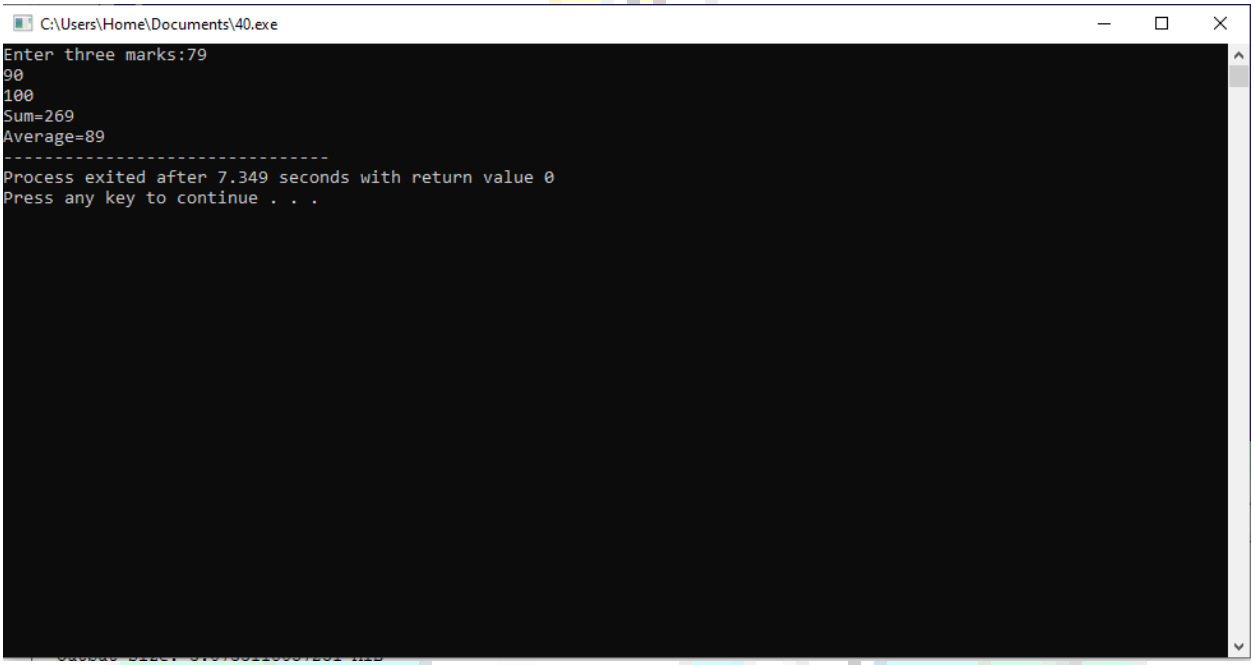
PROGRAM:

```
#include <iostream>
using namespace std;
class Marks
{
   private:
   int a,b,c;
 public:
   void in ()
   {
 cout<<"Enter three marks:";
 cin>>a>>b>>c;
       }
```

```
    int sum ()
   {
return(a+b+c);
}
    int avg ()
   {
      return(a+b+c)/3.0;
}
};
int main ()
{
 Marks m;
 int s;
 float a;
 m.in();
 s=m.sum();
 a=m.avg();
cout<<"Sum="<<s<<endl;
cout<<"Average="<<a;
```

```
  return 0;
}
```

Output:



QUESTION: 8

Write a class Result that contains rollno, name and marks of three subjects. The marks are stored in an array of integers. The class also contains the following member functions:

1.The input() function is used to input values in data members

2.The show() function is used to display values of data members

3.The total() function returns the total marks of a student.

4.The avg() function returns the average marks of a student.

NOTE: The program should create an object of the class and call the member functions.

SOLUTION:

PROGRAM:

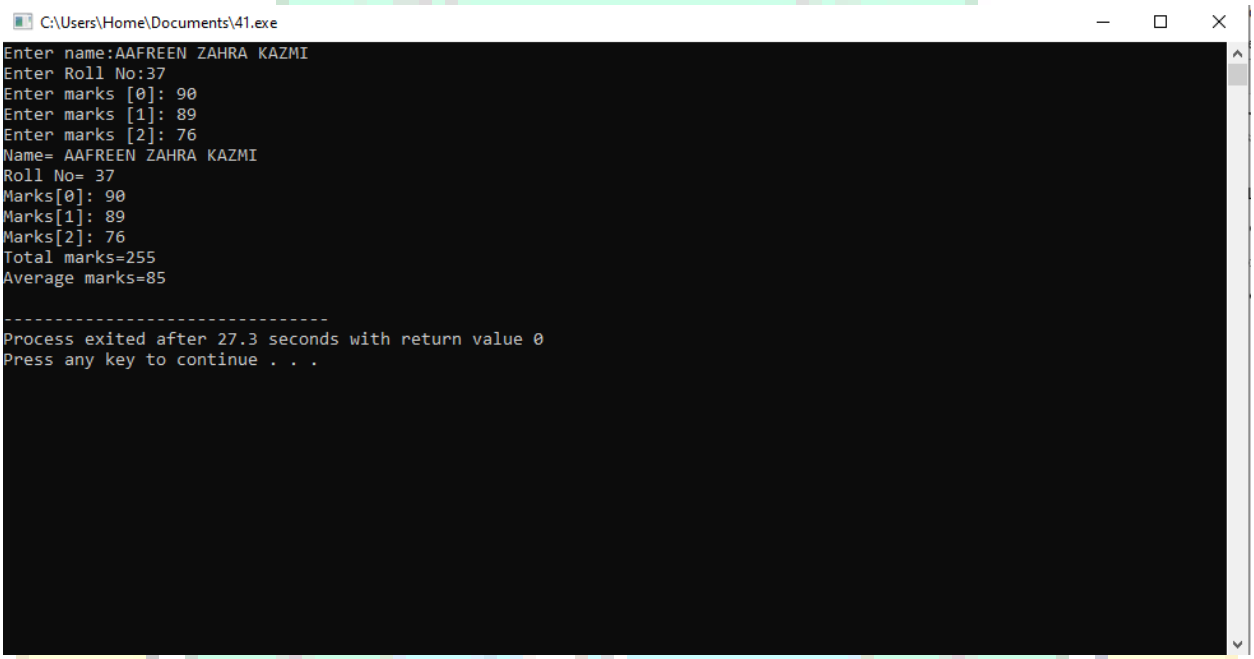
```
#include <iostream>
#include<string>
using namespace std;
class Result
 {
  private:
   int rno, marks[3];
   char name[50];
```

```
public:
  void input ()
  {         cout<<"Enter name:";
     gets(name);
     cout<<"Enter Roll No:";
     cin>>rno;
       for(int i=0; i<3; i++)
  {
       cout<<"Enter marks ["<<i<<"]: ";
     cin>>marks[i];
     }
  }
void show ()
  {
  cout<<"Name= "<<name<<endl;
   cout<<"Roll No= "<<rno<<endl;
  for(int i=0; i<3; i++)
  cout<<"Marks["<<i<<"]: "<<marks[i]<<endl;
  }
```

```
    int total ()
    {
        int t=0;
        for(int i=0; i<3; i++)
        t=t+marks[i];
        return t;
    }
        float avg ()
    {
        int t=0;
        for(int i=0; i<3; i++)
        t=t+marks[i];
        return t/3.0;
    }
};
int main ()
{
 Result r;
r.input();
```

```
r.show();
cout<<"Total marks="<<r.total()<<endl;
cout<<"Average marks="<<r.avg()<<endl;
return 0;
}
```

Output:



LAB TASK:5

QUESTION: 1

Write a program that declares a class with one integer data member and two member functions in () and out () to input and output data in data member by using scope resolution.

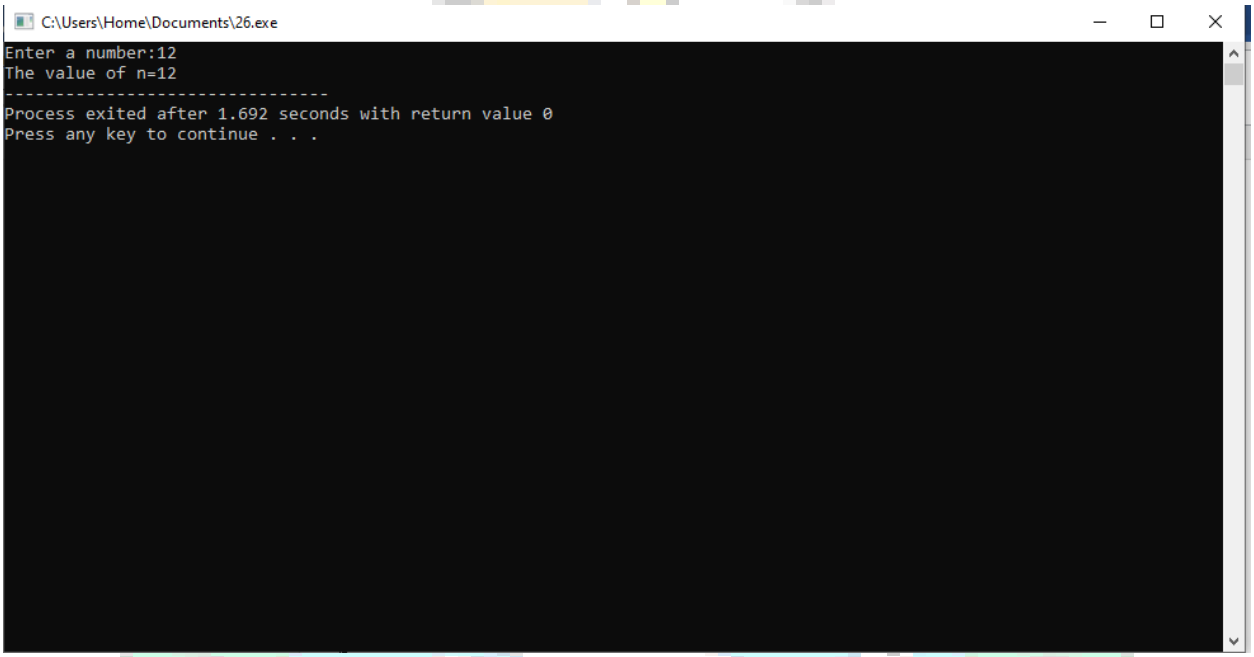
SOLUTION:

PROGRAM:

```
#include <iostream>
using namespace std;
class Test {
    int n;
  public:
    void in ();
    void out ();
    };
void Test ::in()
{
 cout<<"Enter a number:";
  cin>>n;
}
void Test ::out()
```

```
{
        cout<<"The value of n="<<n;
}

int main ()
{
Test obj;
 obj.in();
 obj.out();
  return 0;
}
```

Output:


C:\Users\Home\Documents\26.exe
Enter a number:12
The value of n=12

Process exited after 1.692 seconds with return value 0
Press any key to continue . . .

QUESTION: 2

Write a class circle with one data members radius. Write three member functions

1) get_radius() to set radius value with parameter value,

2) area() to display radius and

3) circum() to calculate and display circumference of circle.

SOLUTION:

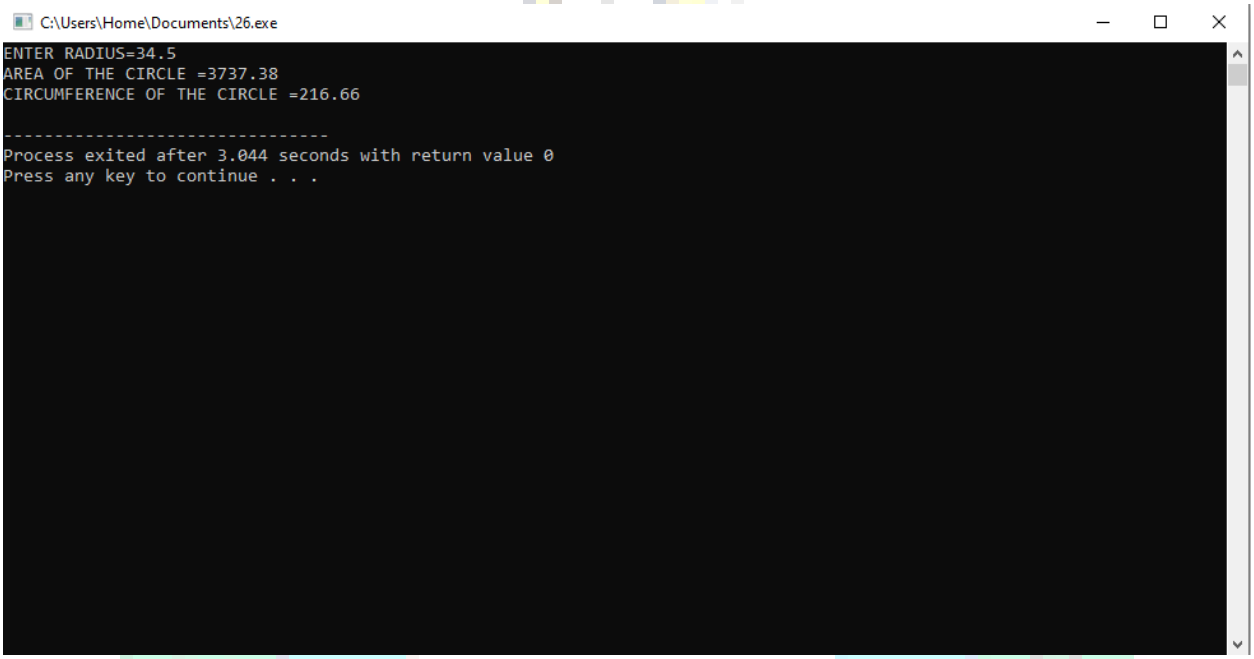
PROGRAM:

```
#include<iostream>
using namespace std;
class circle
{
    float radius;
    public:
    void get_radius(float r);
    void area();
    void circum();
};
void circle ::get_radius(float r)
{
```

```
        radius=r;
}
void circle ::area()
{
    cout<<"AREA OF THE CIRCLE ="<<3.14*radius*radius<<endl;
}
void circle ::circum()
{
    cout<<"CIRCUMFERENCE OF THE CIRCLE ="<<2*3.14*radius<<endl;
}
int main()
{
    float r;
    cout<<"ENTER RADIUS=";
    cin>>r;
    circle c1;
    c1.get_radius(r);
    c1.area();
```

```
    c1.circum();
    return 0;
}
```

Output:



QUESTION: 3

Write a program that make a student class and write data members and get these data members in the member function of in () and display them in the member function of display ().

SOLUTION:

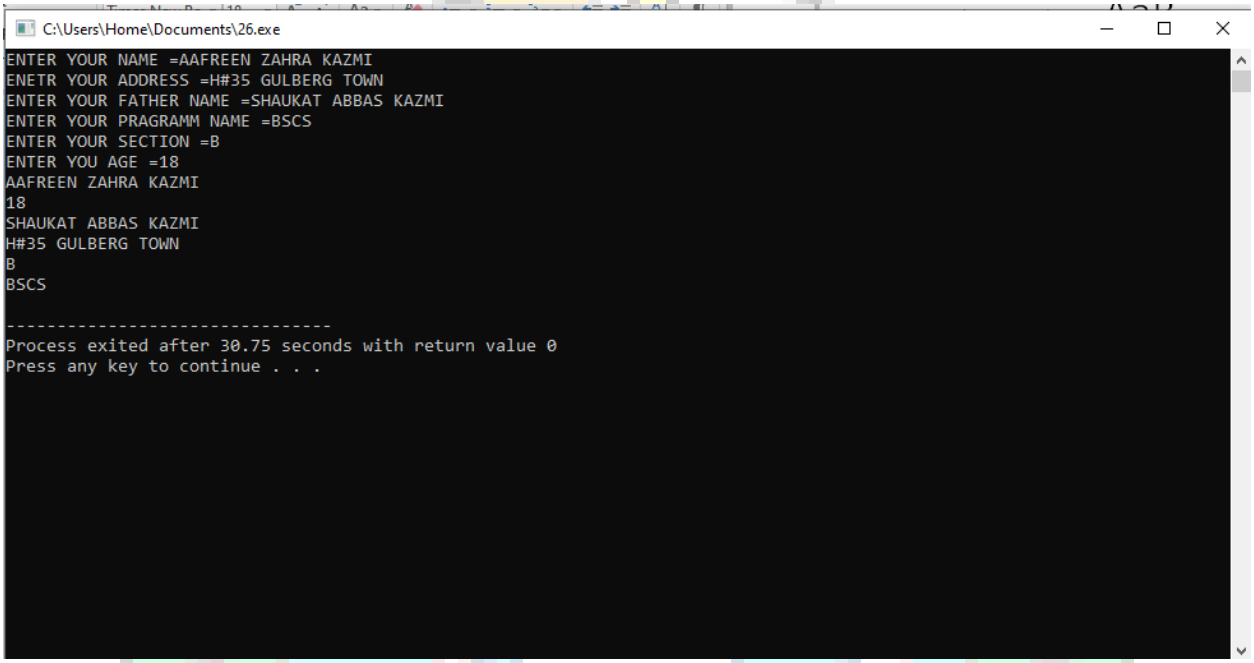
PROGRAM:

```
#include<iostream>
using namespace std;
class student
{
int age;
char name[100];
char fathername[100];
char program[100];
char address[100];
int rollno;
char section[30];
public:
void in();
void display();
```

```
};
void student :: in()
{
        cout<<"ENTER YOUR NAME =";
        cin.getline(name,100) ;
        cout<<"ENETR YOUR ADDRESS =";
        cin.getline(address,100) ;
        cout<<"ENTER YOUR FATHER NAME =";
        cin.getline(fathername,100);
        cout<<"ENTER YOUR PRAGRAMM NAME =";
        cin>>program;
        cout<<"ENTER YOUR SECTION =";
        cin>>section;
        cout<<"ENTER YOU AGE =";
        cin>>age;

    }
void student :: display()
{
```

```
        cout<<name<<endl;
        cout<<age<<endl;
        cout<<fathername<<endl;
        cout<<address<<endl;
        cout<<section<<endl;
        cout<<program<<endl;
}
int main()
{
        student s1;
        s1.in();
        s1.display();
        return 0;
}
```

OUTPUT:


C:\Users\Home\Documents\26.exe
ENTER YOUR NAME =AAFREEN ZAHRA KAZMI
ENETR YOUR ADDRESS =H#35 GULBERG TOWN
ENTER YOUR FATHER NAME =SHAUKAT ABBAS KAZMI
ENTER YOUR PRAGRAMM NAME =BSCS
ENTER YOUR SECTION =B
ENTER YOU AGE =18
AAFREEN ZAHRA KAZMI
18
SHAUKAT ABBAS KAZMI
H#35 GULBERG TOWN
B
BSCS

Process exited after 30.75 seconds with return value 0
Press any key to continue . . .

QUESTION: 4

Create a class calculator that performs the following function;

a) **Addition**
b) **Subtraction**
c) **Multiplication**
d) **Division**

Use concept of passing parameters.

SOLUTION:

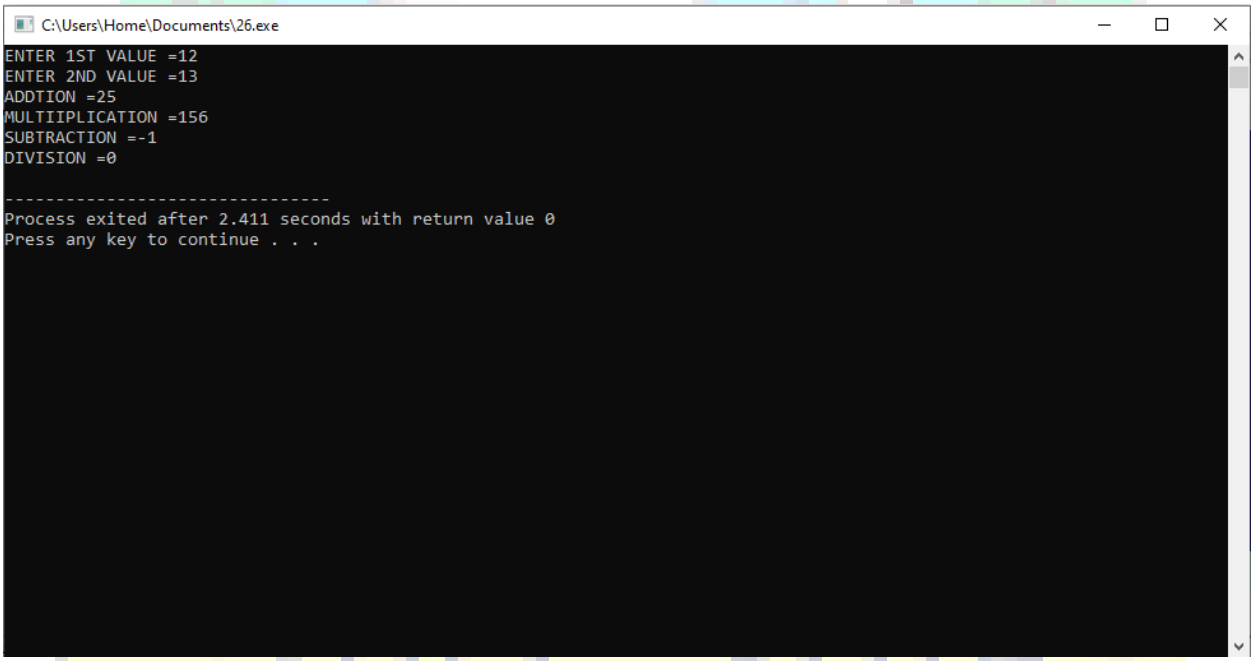
PROGRAM:

```
#include<iostream>
using namespace std;
class calculator
{
public:
void addition(int a,int b);
void subtraction(int a,int b);
void multiplication(int a,int b);
void division(int a,int b);
};
void calculator ::addition(int a,int b)
{
```

```
        cout<<"ADDTION ="<<a+b<<endl;
}
void calculator ::subtraction(int a,int b)
{
        cout<<"SUBTRACTION ="<<a-b<<endl;
}
void calculator ::multiplication(int a,int b)
{
cout<<"MULTIIPLICATION ="<<a*b<<endl;
}
void calculator ::division(int a,int b)
{
            cout<<"DIVISION ="<<a/b<<endl;
}
int main()
{
        int a,b;
        cout<<"ENTER 1ST VALUE =";
        cin>>a;
```

```
        cout<<"ENTER 2ND VALUE =";
        cin>>b;
        calculator c1;
        c1.addition(a,b);
        c1.multiplication(a,b);
        c1.subtraction(a,b);
        c1.division(a,b);
        return 0;
}
```

Output:



QUESTION: 5

Write a program that has the class swipe_test that has two integer data members in one function and swap these data members in another function. Use the concept of classes and object in the main function .

SOLUTION:

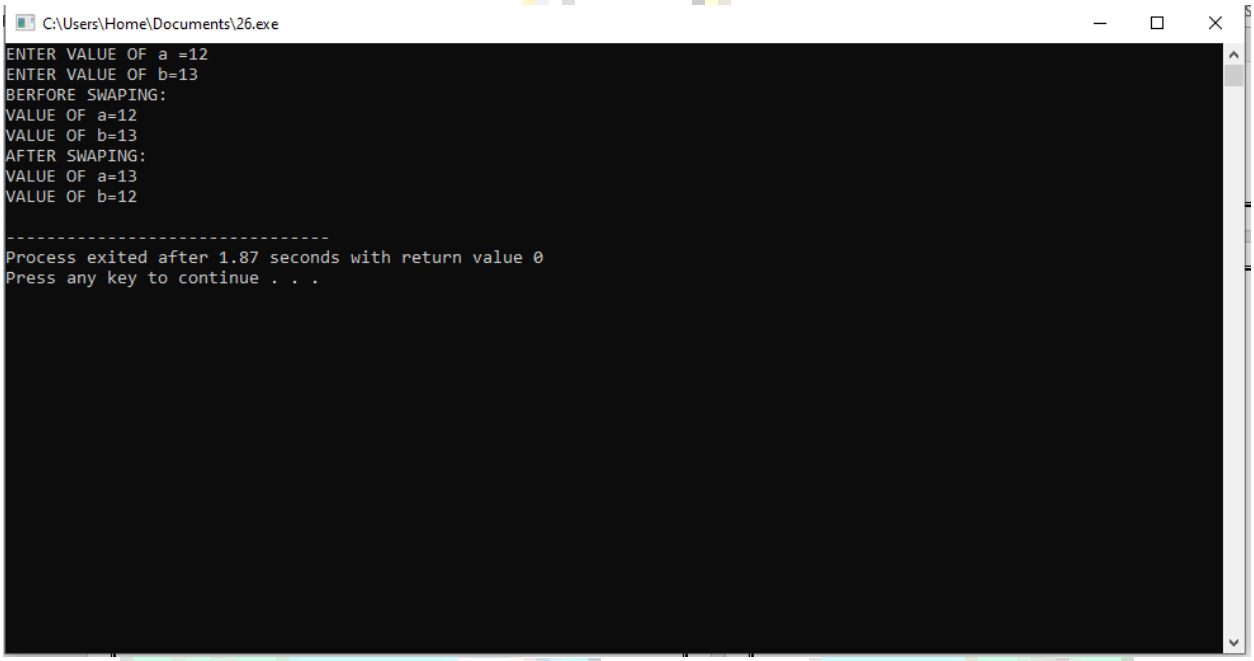
PROGRAM:

```
#include<iostream>
using namespace std;
class swipe_test
{
    int a,b;
    public:
    void in();
    void swipe();
};
void swipe_test ::in()
    {
    cout<<"ENTER VALUE OF a =";
    cin>>a;
    cout<<"ENTER VALUE OF b=";
```

```
        cin>>b;
        cout<<"BERFORE SWAPING:"<<endl;
        cout<<"VALUE OF a="<<a<<endl;
        cout<<"VALUE OF b="<<b<<endl;
        }
void swipe_test ::swipe()
        {
                int c;
        c=a;
        a=b;
        b=c;
                cout<<"AFTER SWAPING:"<<endl;
                cout<<"VALUE OF a="<<a<<endl;
                cout<<"VALUE OF b="<<b<<endl;
        }
int main()
{
        swipe_test st1;
        st1.in();
```

```
    st1.swipe();
    return 0;
}
```

Output:



QUESTION: 6

Write a class Book with three data members BookID, Pages and Price. It also contains the following funtions:

1) **The get() function is used to input values**
2) **The show() function is used to display values**
3) **The set() function is used to set the values of data members using parameters.**
4) **The getPrice() function is used to return the value of Book.**

NOTE: The program should create two objects of the class and input values of object 1 and set values of object 2. The program will display the details of the most costly book.

SOLUTION:

PROGRAM:

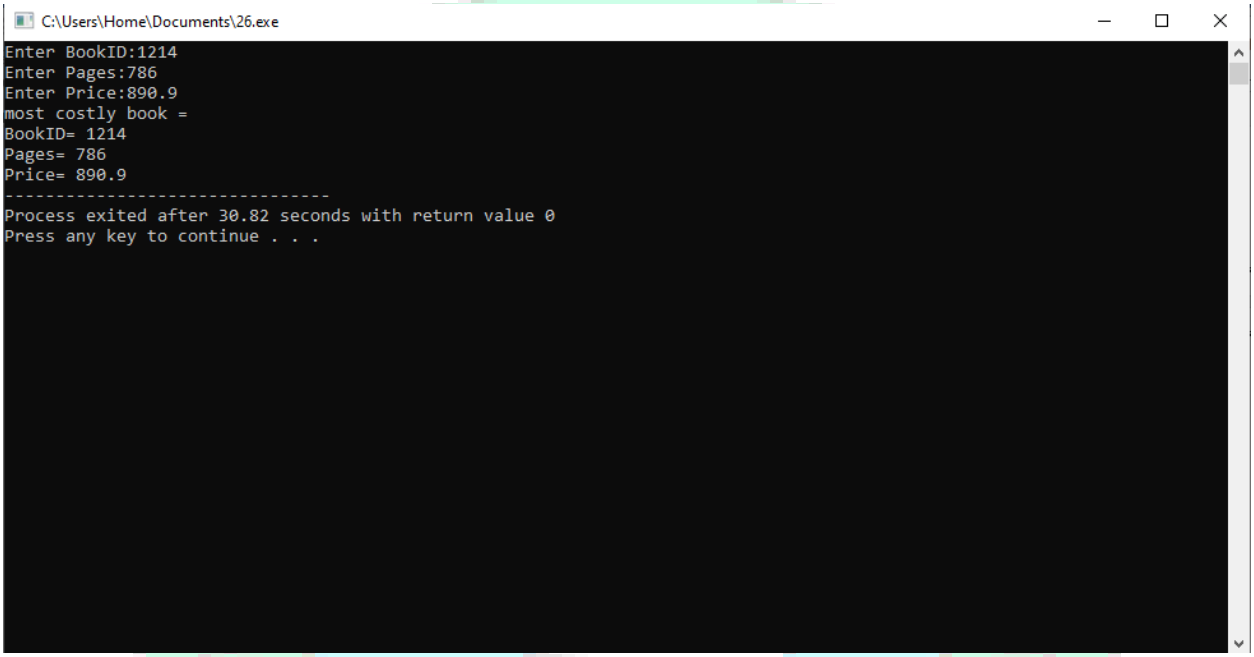
```
#include <iostream>
using namespace std;
class Book
{
   private:
   int BookID,Pages;
   float Price;
   public:
void get ();
```

```
void show ();
void set (int id, int pg, float pr);
float getPrice ();
};
void Book ::get()
{
      cout<<"Enter BookID:";
   cin>>BookID;
   cout<<"Enter Pages:";
   cin>>Pages;
   cout<<"Enter Price:";
   cin>>Price;
}
void Book ::show()
   {
      cout<<"BookID= "<<BookID<<endl;
   cout<<"Pages= "<<Pages<<endl;
   cout<<"Price= "<<Price;
   }
```

```
void Book :: set (int id, int pg, float pr)
 {
            BookID=id;
      Pages=pg;
      Price=pr;
}
float Book ::getPrice()
 {
      return Price;
}
int main ()
 {
 Book b1, b2;
 b1.get();
 b2.set(20, 320, 40.5);
 cout<<"most costly book ="<<endl;
 if(b1.getPrice()>b2.getPrice())
      b1.show();
 else
```

```
b2.show();

return 0;

}
```

Output:



QUESTION: 7

Write a class that has the displays a simple message on the screen whenever an object of that class is created.

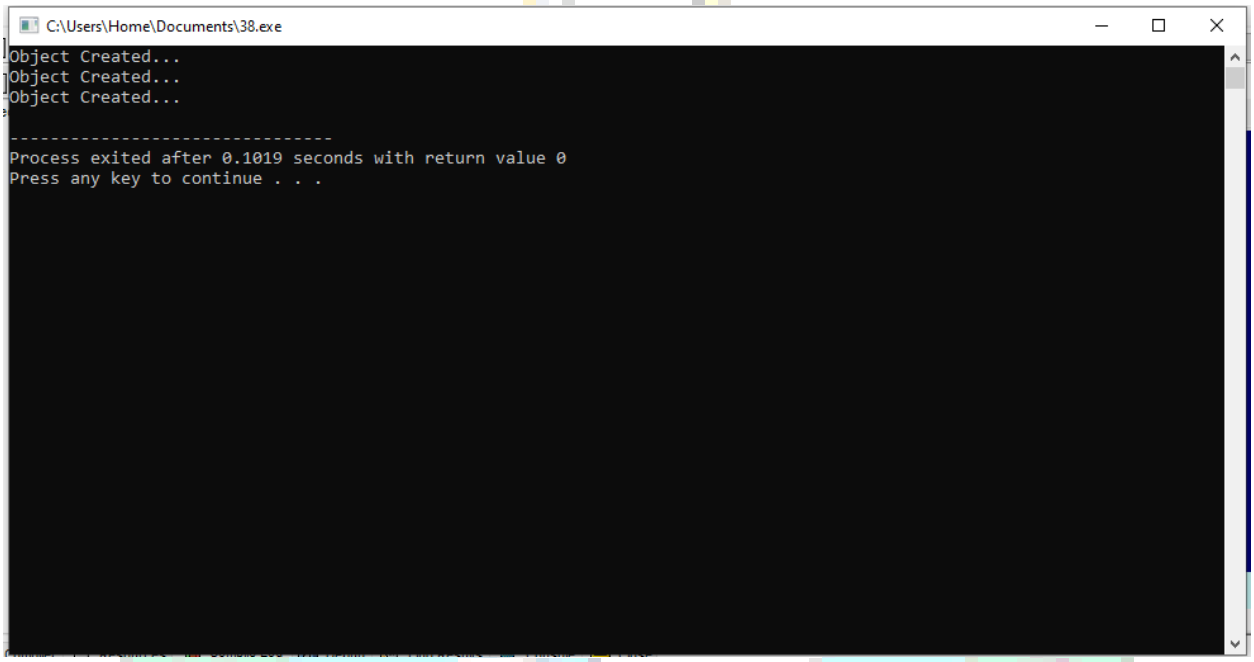
SOLUTION:

PROGRAM:

```
#include <iostream>
using namespace std;
class Hello
{
   private:
   int n;
   public:
   Hello()
   {
      cout<<"Object Created..."<<endl;
   }
};
int main ()
{
```

```
    Hello x, y,z;
    return 0;
}
```

Output:



QUESTION: 8

Write a Number class that contains two integer data members which are initialized to 100 when an object is created. It has a member function avg() that displays the average of data members.

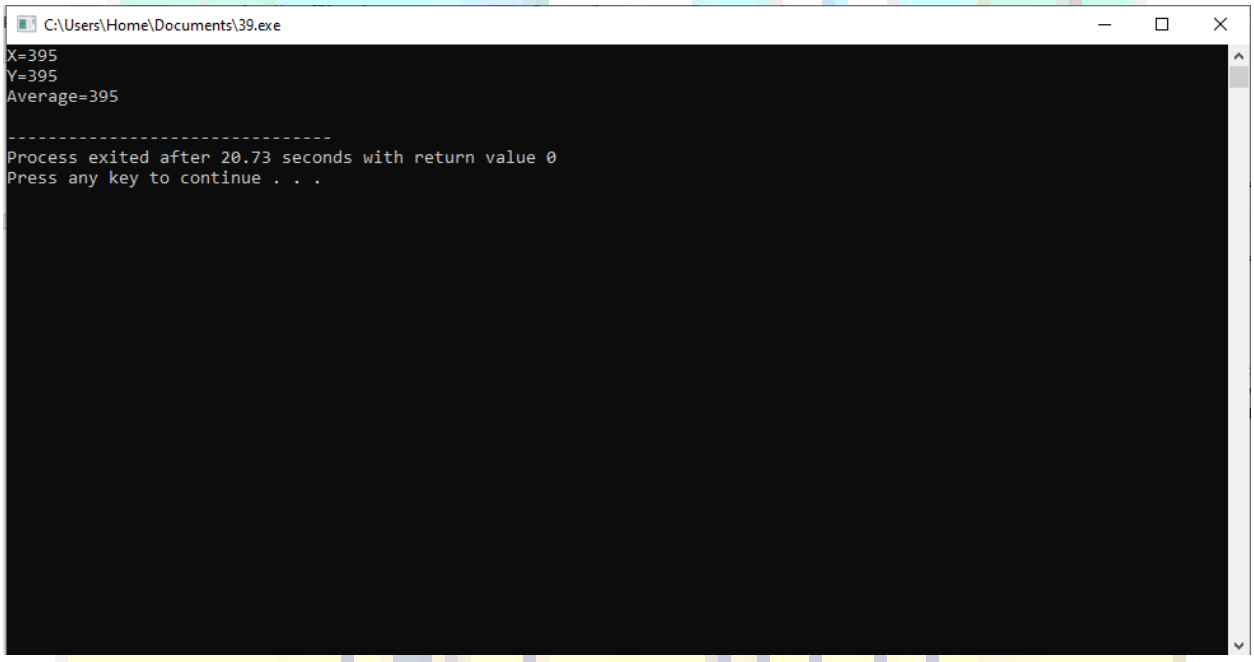
SOLUTION:

PROGRAM:

```
#include <iostream>
using namespace std;
class Number
{
      private:
   int x,y;
  public:
   Number()
   {
      x=y=395;
      }
   void avg()
   {   cout<<"X="<<x<<endl;
       cout<<"Y="<<y<<endl;
```

```
        cout<<"Average="<<(x+y)/2<<endl;
}
};
int main ()
{
    Number n;
    n.avg();
   return 0;
}
```

Output:



QUESTION: 9

Write a class Student that has marks and grade as data members. A constructor with two parameters initializes data members with the given values and member function show() displays the values of data members. Create two objects and display the values.

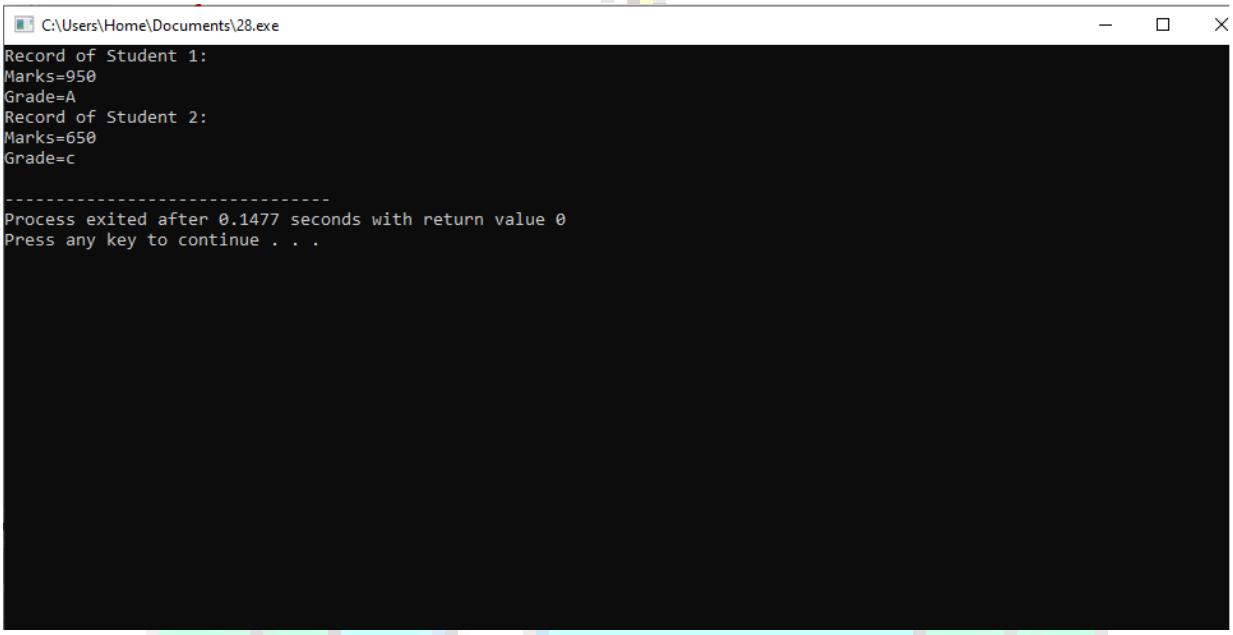
SOLUTION:

PROGRAM:

```
#include <iostream>
using namespace std;
class Student
{
   private:
   int marks;
   char grade;
   public:
   Student(int m, char g)
   {
      marks=m;
   grade=g;
   }
```

```
 void show()
    {
        cout<<"Marks="<<marks<<endl;
     cout<<"Grade="<<grade<<endl;
     }
};
int main ()
{
       Student s1(950, 'A'), s2(650, 'c');
       cout<<"Record of Student 1:"<<endl;
       s1.show();
       cout<<"Record of Student 2:"<<endl;
       s2.show();
       return 0;
}
```

Output:


C:\Users\Home\Documents\28.exe
Record of Student 1:
Marks=950
Grade=A
Record of Student 2:
Marks=650
Grade=c

Process exited after 0.1477 seconds with return value 0
Press any key to continue . . .

QUESTION: 10

Write a class Array that contains an array of integers to store five values. It also contains the following member functions:

1.The fill() function is used to fill the array with the values from the user.

2.The display() function is used to display values of array.

3.The max() function shows the maximum value in the array.

4.The min() function shows the minimum value in the array.

NOTE: All member function should be defined outside the class.

SOLUTION:

PROGRAM:

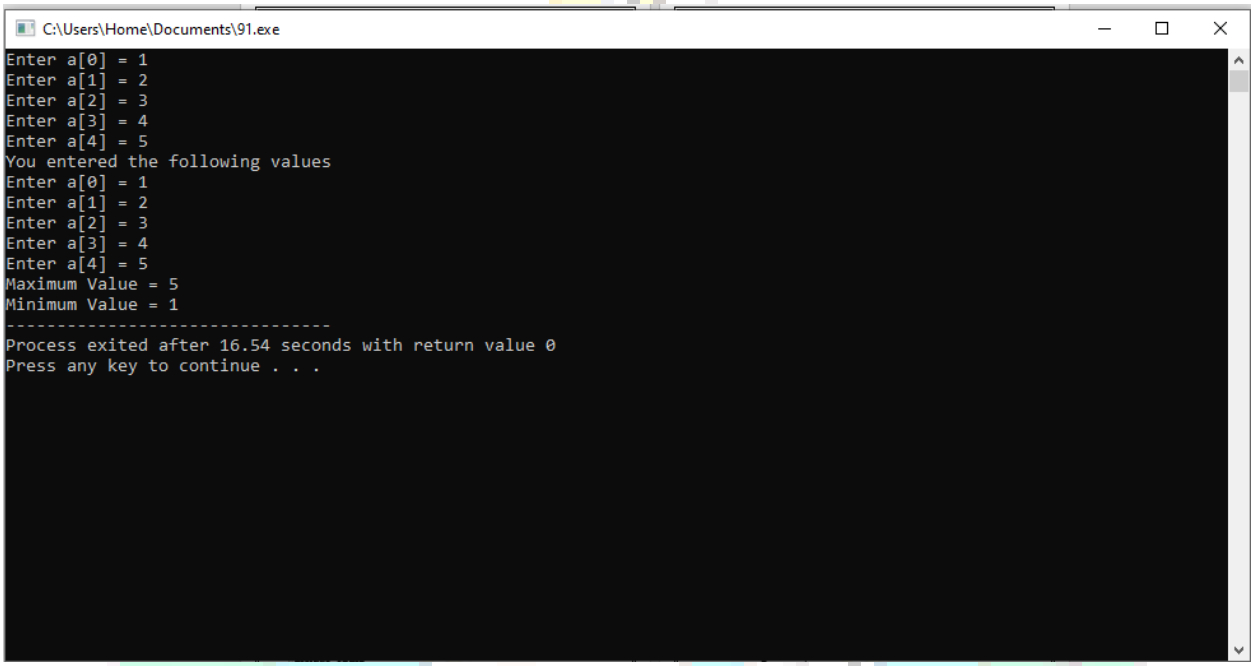
```
#include <iostream>
using namespace std;
class Array
{
    private:
    int a[5];
     public:
    void fill();
    void display();
    int max();
```

```
        int  min();
  };
  void Array::fill()
  {
       for(int i=0; i<5;i++)
       {
           cout<<"Enter a["<<i<<"] = ";
           cin>>a[i];
        }
  }
void Array::display()
{
     for(int i=0; i<5;i++)
     cout<<"Enter a["<<i<<"] = "<<a[i]<<endl;
}
int Array::max()
{
       int m=a[0];
       for(int i=0; i<5;i++)
```

```
        if(m<a[i])
        m=a[i];
        return m;
}
int Array::min()
{
        int m=a[0];
        for(int i=0; i<5;i++)
        if(m>a[i])
        m=a[i];
        return m;
}
int main () {
  Array arr;
  arr.fill();
  cout<<"You entered the following values"<<endl;
  arr.display();
  cout<<"Maximum Value = "<<arr.max()<<endl;
  cout<<"Minimum Value = "<<arr.min();
```

```
  return 0;
}
```

Output:



QUESTION: 11

Write a class Marks with three data members to store three marks. Write three member functions

1)in() to input marks,

2)sum() to calculate and return the sum and

3) avg() to calculate and return the average marks.

Using scope resolution.

SOLUTION:

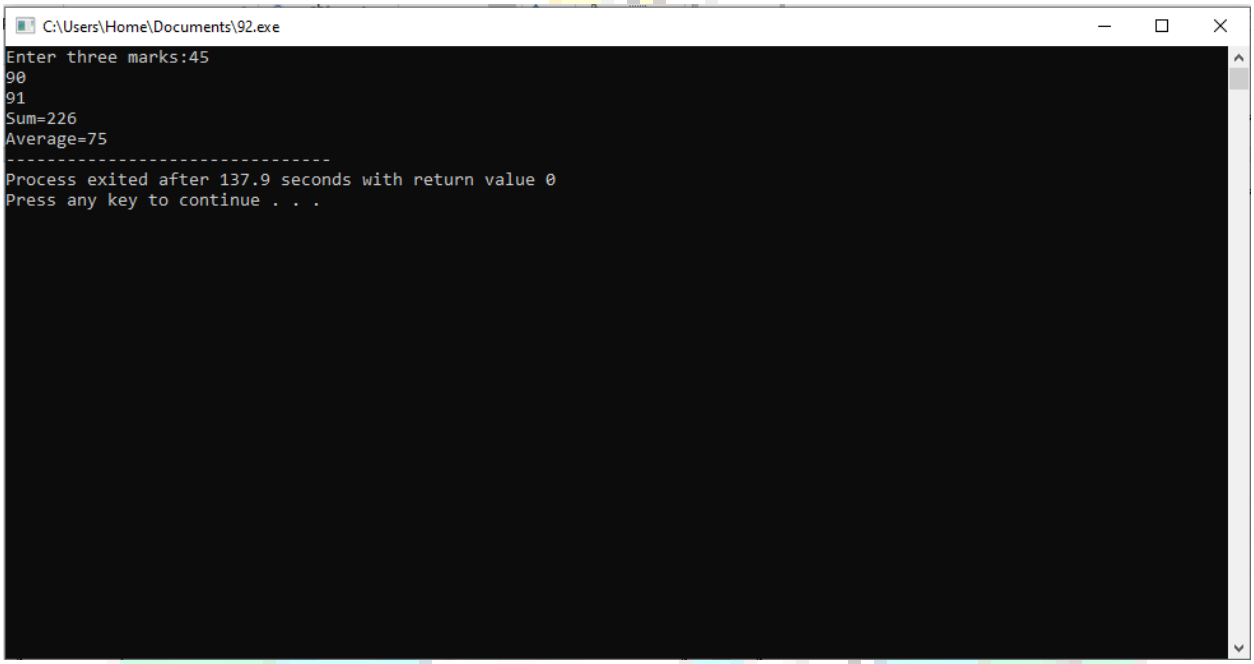
PROGRAM:

```
#include <iostream>
using namespace std;
class Marks
{
   private:
   int a,b,c;
   public:
   void in();
      int sum();
      int avg();
};
```

```
void Marks::in ()
{ cout<<"Enter three marks:";
    cin>>a>>b>>c;
    }
 int Marks::sum ()
{    return(a+b+c); }
 int Marks::avg ()
{  return(a+b+c)/3.0;
    }
int main ()
{
  Marks m;
  int s;
  float a;
  m.in();
  s=m.sum();
  a=m.avg();
 cout<<"Sum="<<s<<endl;
 cout<<"Average="<<a;
```

```
  return 0;
}
```

Output:



QUESTION #12

Write a class Result that contains rollno, name and marks of three subjects. The marks are stored in an array of integers. The class also contains the following member functions:

1.The input() function is used to input values in data members

2.The show() function is used to display values of data members

3.The total() function returns the total marks of a student.

4.The avg() function returns the average marks of a student.

NOTE: The program should create an object of the class and call the member functions.[using scope resolution]

SOLUTION:

PROGRAM:

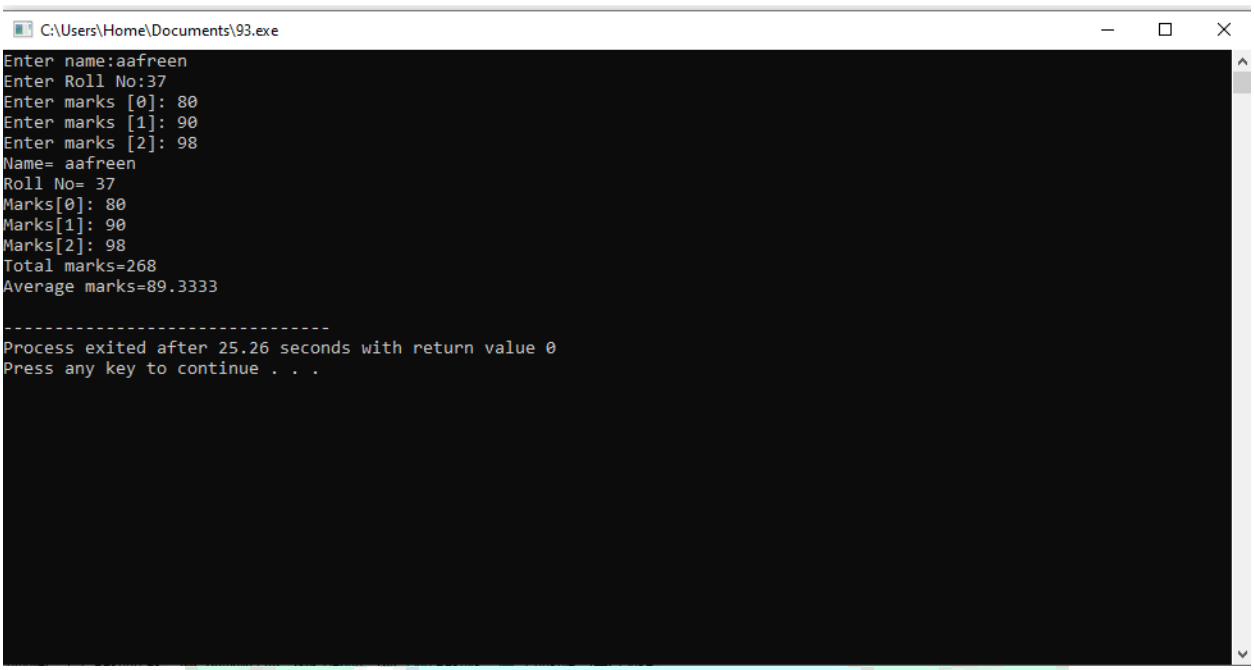
```
#include <iostream>
#include<string>
using namespace std;
class Result
 {
  private:
   int rno, marks[3];
   char name[50];
```

```
public:
    void input();
    void show();
    int total();
    float avg();
};
 void Result::input ()
 {       cout<<"Enter name:";
    gets(name);
    cout<<"Enter Roll No:";
    cin>>rno;
     for(int i=0; i<3; i++)
 {
     cout<<"Enter marks ["<<i<<"]: ";
    cin>>marks[i];
    }
 }
void Result::show ()
 {
```

```
cout<<"Name= "<<name<<endl;
 cout<<"Roll No= "<<rno<<endl;
for(int i=0; i<3; i++)
cout<<"Marks["<<i<<"]: "<<marks[i]<<endl;
}
 int Result::total ()
{
    int t=0;
    for(int i=0; i<3; i++)
    t=t+marks[i];
    return t;
}
    float Result::avg ()
{
    int t=0;
    for(int i=0; i<3; i++)
    t=t+marks[i];
    return t/3.0;
}
```

```
int main ()
{
 Result r;
r.input();
r.show();
cout<<"Total marks="<<r.total()<<endl;
cout<<"Average marks="<<r.avg()<<endl;
return 0;
}
```

Output:


C:\Users\Home\Documents\93.exe
Enter name:aafreen
Enter Roll No:37
Enter marks [0]: 80
Enter marks [1]: 90
Enter marks [2]: 98
Name= aafreen
Roll No= 37
Marks[0]: 80
Marks[1]: 90
Marks[2]: 98
Total marks=268
Average marks=89.3333

Process exited after 25.26 seconds with return value 0
Press any key to continue . . .

QUESTION #13

LAB TASKS

I. Create a class **Rectangle** keeping in mind that rectangle have **length** and **width**. One should be able to calculate the **perimeter ()** and the **area()** of the rectangle, can **set** a value to length and width and **retrieve** the value of Length & width. Where

0 < length < 21

0 < width < 21

Area of Rectangle=length*width;

Perimeter of Rectangle=(length+width)*2;

TEST PLANS

Commands	Output
Rectangle r;	
r.set(2);	
r.getLength();	
r.set(50);	
r.getLength();	
Rectangle f=r;	
f.set(-20);	
f.getLength();	

SOLUTION:

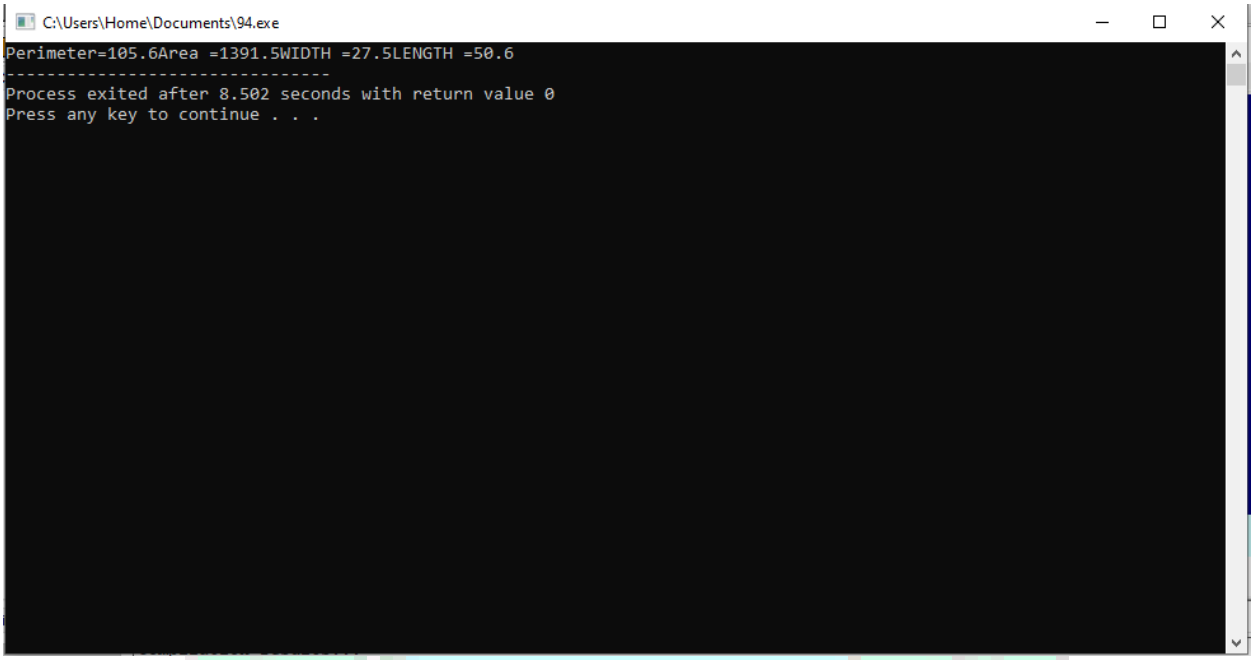
PROGRAM:

```
#include<iostream>
using namespace std;
class Rectangle
{
    float length,width;
```

```
        public:
        void set(float,float);
        void perimeter();
        void area();
        void retrive();
};
void Rectangle::set(float a,float b)
{
        width=a;
        length=b;
}
void Rectangle::perimeter()
{
        float p;
        p=length+width*2;
        cout<<"Perimeter="<<p;
}
void Rectangle::area()
{
```

```
        float A;
        A=length*width;
        cout<<"Area ="<<A;
}
void Rectangle::retrive()
{
        cout<<"WIDTH ="<<width;
        cout<<"LENGTH ="<<length;
}
main()
{
        Rectangle R1;
        R1.set(27.5,50.6);
        R1.perimeter();
        R1.area();
        R1.retrive();
        }
```

Output:


C:\Users\Home\Documents\94.exe
Perimeter=105.6Area =1391.5WIDTH =27.5LENGTH =50.6

Process exited after 8.502 seconds with return value 0
Press any key to continue . . .

LAB TASK :6

QUESTION: 1

Create a class with name Employee and take 4 data member of name, address, department, salary. A constructor with no parameters initializes string to '\0' and int to 0.A constructor with four parameters initializes data members with the given values and member function show () displays the values of data members.

SOLUTION:

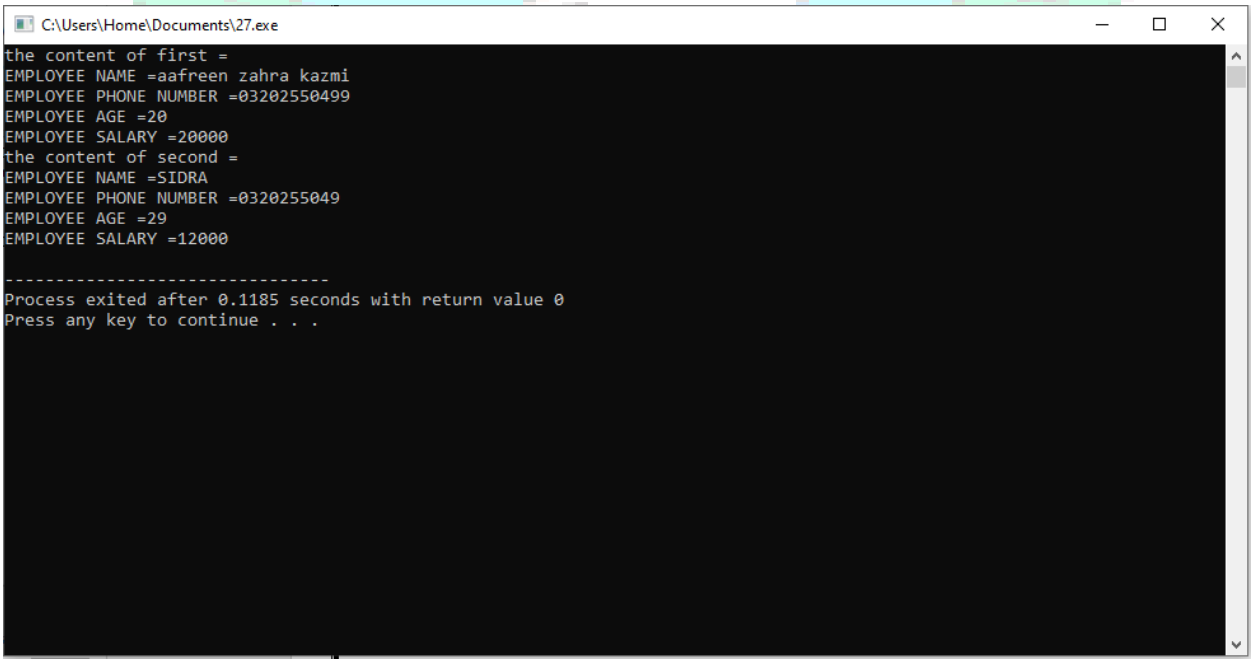
PROGRAM:

```
#include<iostream>
#include<string>
using namespace std;
class Employee
{
    private:
    int age;
    int  salary;
    char phone_number[15];
    char name[50];
    public:
    Employee()
    {
```

```
        age=20;
        salary=20000;
        strcpy(phone_number,"03202550499");
        strcpy(name,"aafreen zahra kazmi");
    }
    Employee(char N[50],char Ph[15],int slry,int AGE)
    {
        age=AGE;
        strcpy(name,N);
        strcpy(phone_number,Ph);
    salary=slry;
    }
    void display()
    {
        cout<<"EMPLOYEE NAME ="<<name<<endl;
        cout<<"EMPLOYEE PHONE NUMBER
="<<phone_number<<endl;
        cout<<"EMPLOYEE AGE ="<<age<<endl;
        cout<<"EMPLOYEE SALARY ="<<salary<<endl;
```

```
    }
};
int main()
{
    Employee first,second("SIDRA","0320255049",12000,29);
    cout<<"the content of first ="<<endl;
    first.display();
    cout<<"the content of second ="<<endl;
    second.display();
    return 0;
}
```

Output:



QUESTION: 2

Write a class TV that contains attributes of Brand, Name, Model and Retail Price. Write a method to display all attributes and a method to change the attributes. Also write a constructor to initialize all attributes.

SOLUTION:

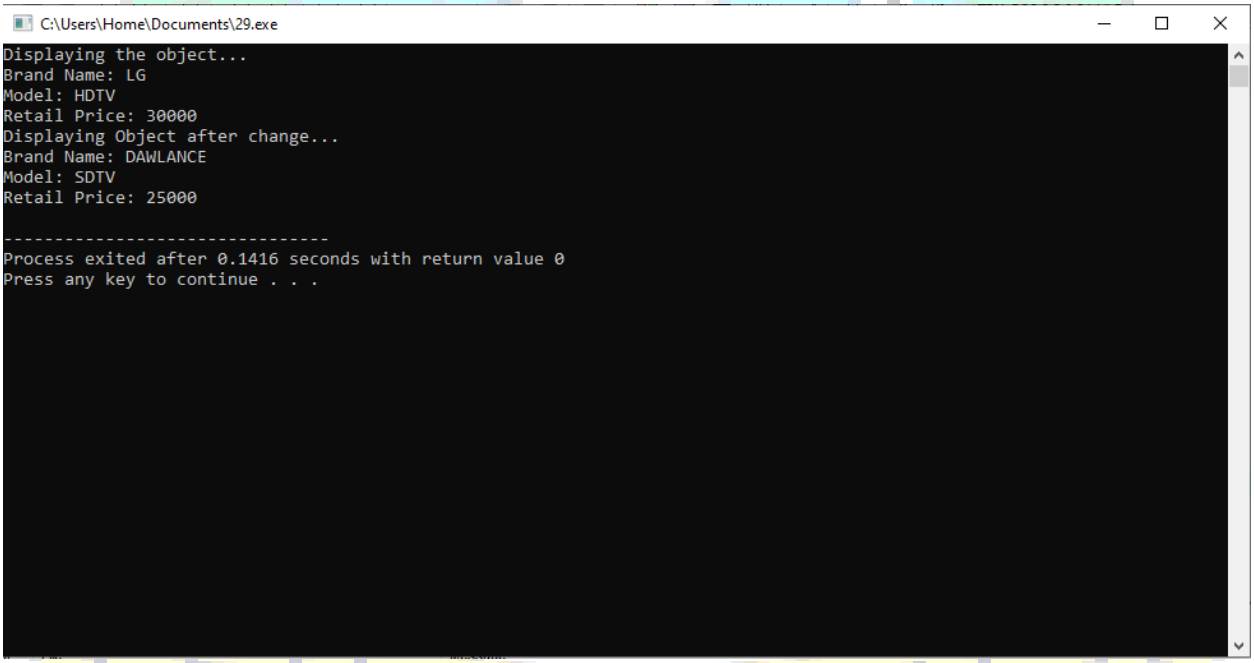
PROGRAM:

```
#include <iostream>
#include<string.h>
using namespace std;
class TV
{
   private:
   char BrandName[20];
   char Model[10];
   float RetailPrice;
   public:
   TV(char Brand[], char Mod[], float Price);
   void Change (char Brand[], char Mod[], float Price);
   void Display();
};
```

```
TV::TV(char Brand[], char Mod[], float Price)
    {
       strcpy(BrandName,Brand);
       strcpy(Model,Mod);
       RetailPrice=Price;
        }
  void TV:: Change (char Brand[], char Mod[], float Price)
   {
       strcpy(BrandName,Brand);
       strcpy(Model, Mod);
       RetailPrice=Price;
       }
   void TV:: Display()
   {
       cout<<"Brand Name: "<<BrandName<<endl;
       cout<<"Model: "<<Model<<endl;
       cout<<"Retail Price: "<<RetailPrice<<endl;
       }
int main ()
```

```
{      TV Test("LG", "HDTV", 30000);
   cout<<"Displaying the object..."<<endl;
   Test.Display();
   Test.Change("DAWLANCE", "SDTV", 25000);
   cout<<"Displaying Object after change..."<<endl;
   Test.Display();
      return 0;
}
```

Output:



QUESTION: 3

Write a class OVER that has num and ch as data members. A constructor with no parameters initializes num to 0 and ch to 'x'. A constructor with two parameters initializes data members with the given values and member function show() displays the values of data members.

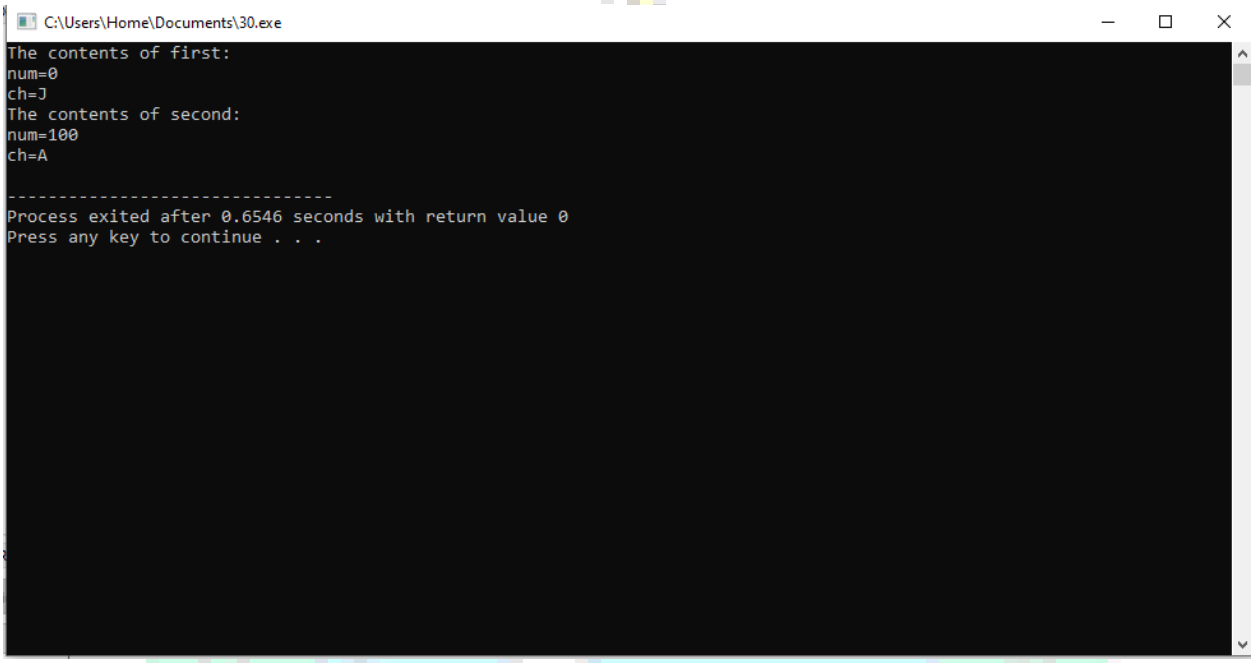
SOLUTION:

PROGRAM:

```
#include <iostream>
using namespace std;
class Over
{
   private:
   int num;
   char ch;
   public:
   Over()
   {
    num=0;
    ch='J';
    }
```

```
    Over(int n, char c)
    {
      num=n;
      ch=c;
}
        void show()
    {    cout<<"num="<<num<<endl;
         cout<<"ch="<<ch<<endl;
        }
};
int main ()
{
      Over first, second(100,'A');
      cout<<"The contents of first:"<<endl;
      first.show();
      cout<<"The contents of second:"<<endl;
      second.show();
      return 0;
}
```

Output:


C:\Users\Home\Documents\30.exe
The contents of first:
num=0
ch=J
The contents of second:
num=100
ch=A

Process exited after 0.6546 seconds with return value 0
Press any key to continue . . .

QUESTION: 4

Write a class Book that has attributes for pages, price and title. It has two functions to input the values and display the values. Create three objects (b1,b2 and b3) of the class and input values.

SOLUTION:

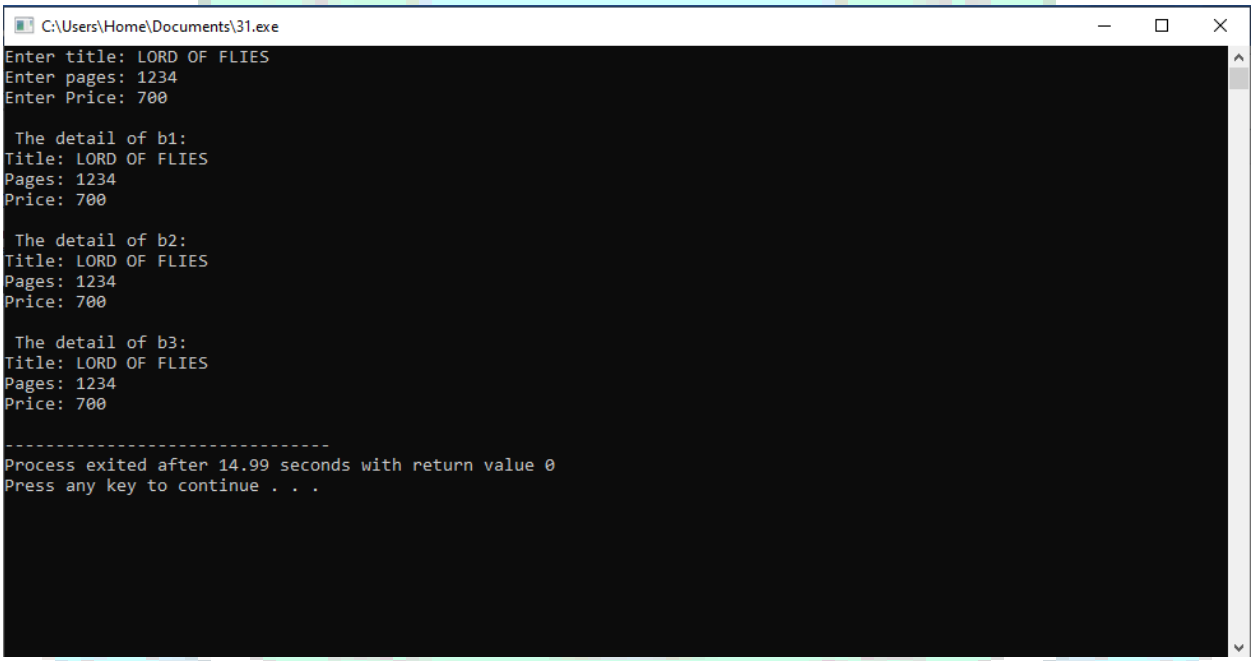
PROGRAM:

```
#include <iostream>
using namespace std;
class Book
{
      private:
   int pg, pr;
   char title[50];
   public:
      void get()
   {
       cout<<"Enter title: ";
       gets(title);
       cout<<"Enter pages: ";
       cin>>pg;
```

```
        cout<<"Enter Price: ";
        cin>>pr;
      }
       void show()
   {
        cout<<"Title: "<<title<<endl;
        cout<<"Pages: "<<pg<<endl;
        cout<<"Price: "<<pr<<endl;

      }
};
int main ()
{
     Book b1;
     b1.get();
     Book b2(b1);
     Book b3=b1;
     cout<<"\n The detail of b1:"<<endl;
     b1.show();
```

```
        cout<<"\n The detail of b2:"<<endl;
        b2.show();
        cout<<"\n The detail of b3:"<<endl;
        b3.show();
        return 0;
}
```

Output:



QUESTION: 5

Write a program that demonstrate the use of Destructor.

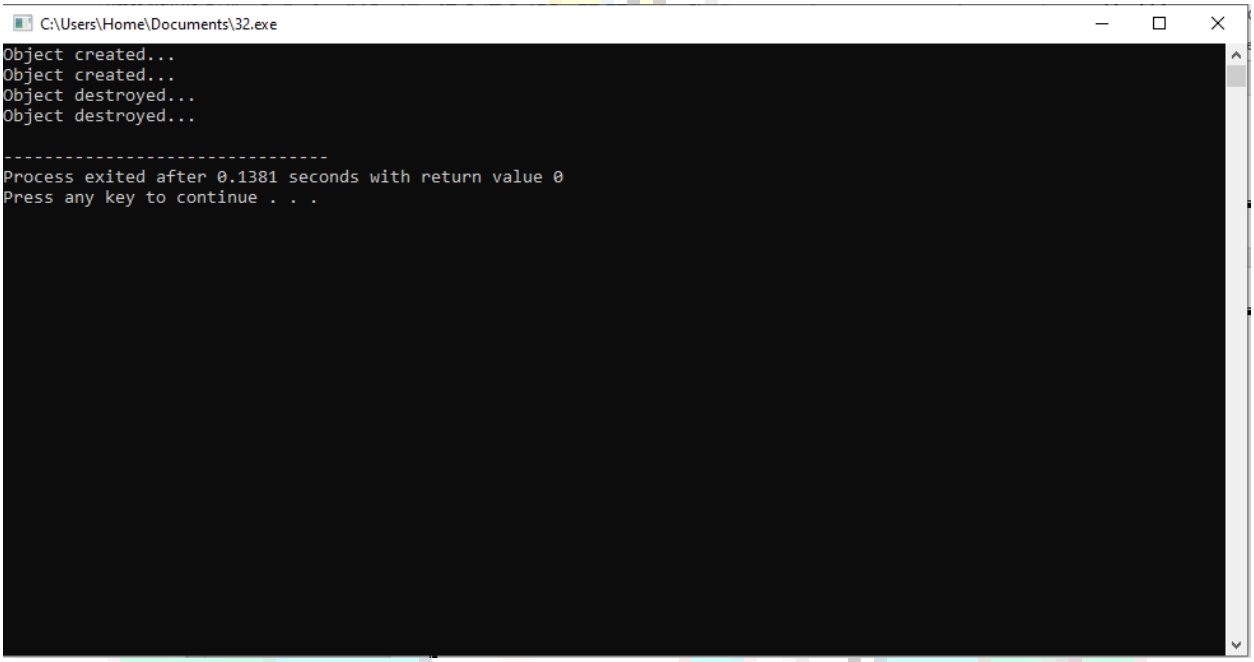
SOLUTION:

PROGRAM:

```
#include <iostream>
using namespace std;
class Test {
      private:
   int n;
   public:
   Test()
   {  cout<<"Object created..."<<endl; }
  ~Test()
   {  cout<<"Object destroyed..."<<endl; }  };

int main ()
{
   Test a, b;
      return 0;
```

}

Output:


C:\Users\Home\Documents\32.exe
Object created...
Object created...
Object destroyed...
Object destroyed...

Process exited after 0.1381 seconds with return value 0
Press any key to continue . . .

QUESTION :6

Write a class Travel that has the attributes of kilometers and hours. A constructor with no parameter initializes both data members to 0. a member function get() inputs the values and function show() display the values. It has the member function add() that takes an object of type Travel to add the kilometers and hours of calling object and the parameter.

SOLUTION:

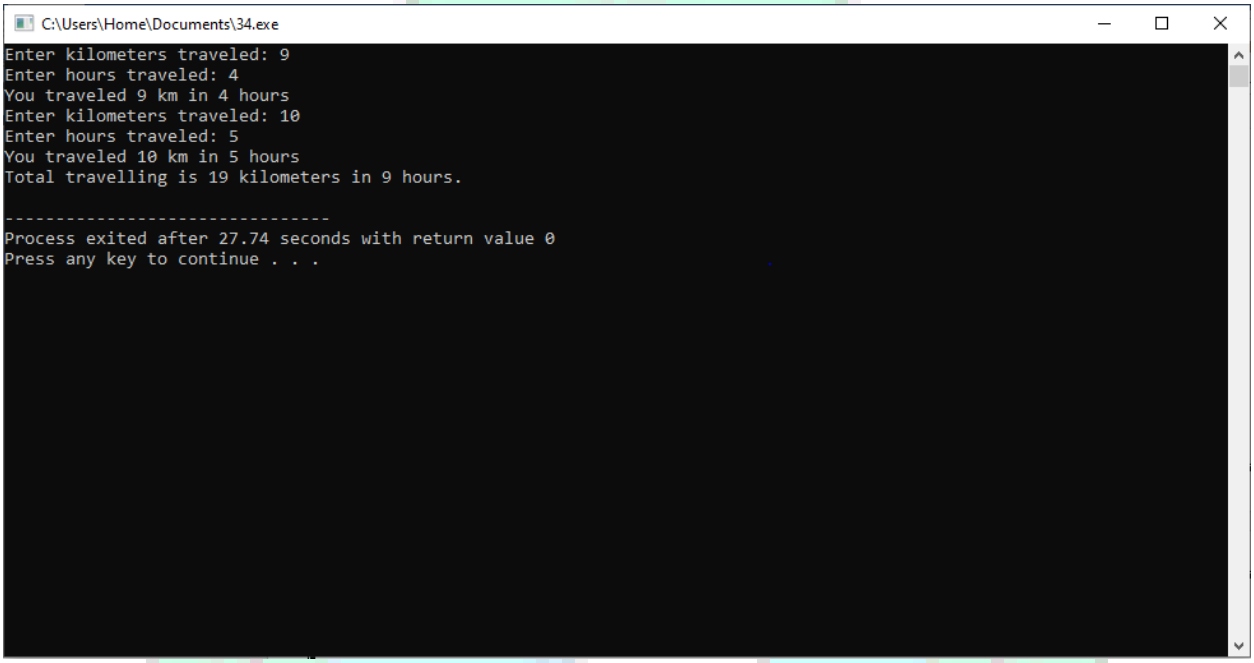
PROGRAM:

```
#include <iostream>
using namespace std;
class Travel {
      private:
   int km, hr;
   public:
      Travel()
{  km=hr=0; }
      void get()
{ cout<<"Enter kilometers traveled: ";
       cin>>km;
       cout<<"Enter hours traveled: ";
       cin>>hr;
```

```
        }
        void show()
    { cout<<"You traveled "<<km<<" km in "<<hr<<"
hours"<<endl;
     }
    void add(Travel p)
    {          Travel t;
         t.km=km+p.km;
         t.hr=hr+p.hr;
         cout<<"Total travelling is "<<t.km<<" kilometers in
"<<t.hr<<" hours."<<endl;
     }
 };
int main ()
{
    Travel my, your;
    my.get();
    my.show();
    your.get();
    your.show();
```

```
    my.add(your);
        return 0;
}
```

Output:



QUESTION :7

Write a class Travel that has the attributes of kilometers and hours. A constructor with no parameter initializes both data members to 0. a member function get() inputs the values and function show() display the values. It has the member function add() that takes an object of type Travel, add the kilometers and hours of calling object and the parameter(object parameter) and return an object with added values.

SOLUTION:

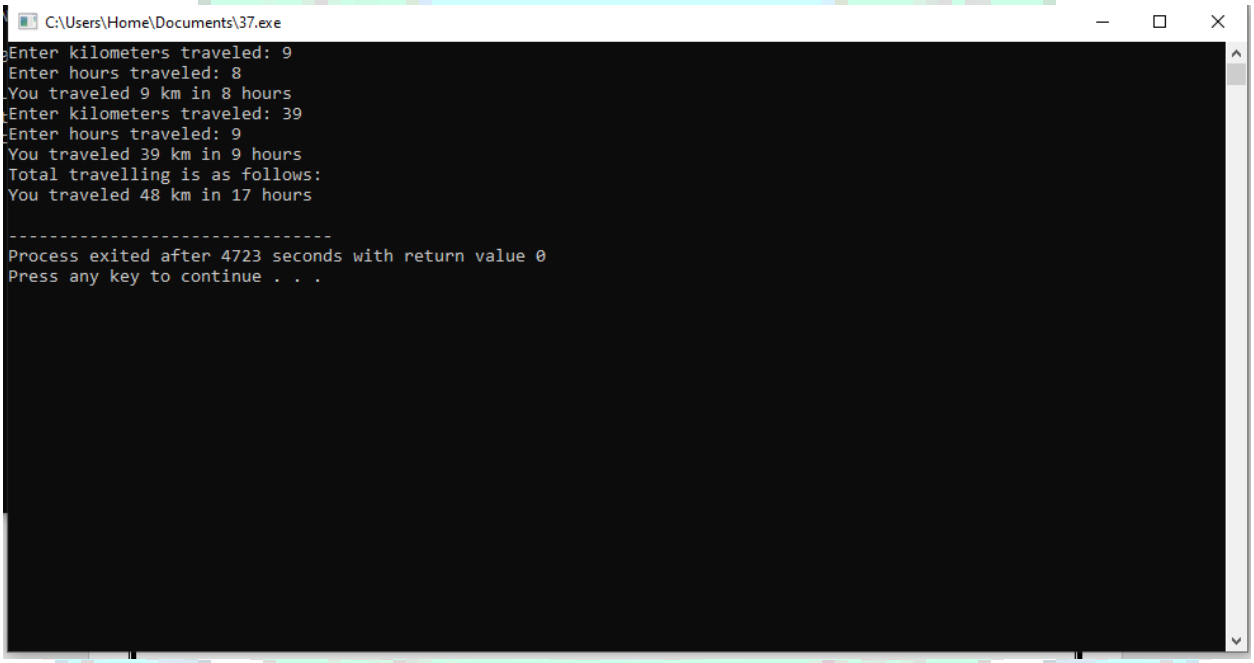
PROGRAM:

```
#include <iostream>
using namespace std;
class Travel {
      private:
   int km, hr;
   public:
      Travel()
  {  km=hr=0; }
      void get()
  { cout<<"Enter kilometers traveled: ";
       cin>>km;
       cout<<"Enter hours traveled: ";
```

```
        cin>>hr;
       }
      void show()
   { cout<<"You traveled "<<km<<" km in "<<hr<<" hours"<<endl;
    }
   Travel add(Travel p)
   { Travel t;
       t.km=km+p.km;
       t.hr=hr+p.hr;
       return t;
    }
};
int main ()
{
   Travel my, your, r;
   my.get();
   my.show();
   your.get();
```

```
    your.show();
    r=my.add(your);
    cout<<"Total travelling is as follows: "<<endl;
    r.show();
    return 0;
}
```

OUTPUT:



QUESTION :8

Create a class with a name swap test and make two data member and two member function one is for getting value and second for swap the value.[Using concept of constructor overloading]

SOLUTION:

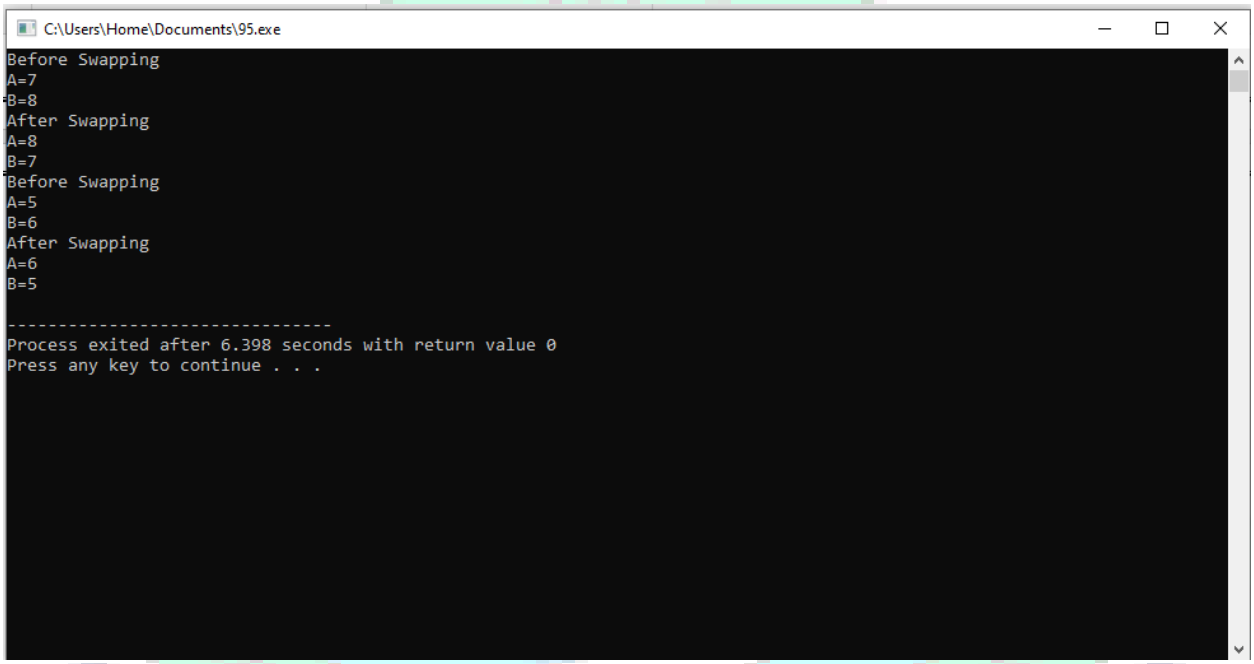
PROGRAM:

```
#include<iostream>
using namespace std;
class swap_test
{
    public:
    swap_test(float e,float f)
    {
     int z;
        cout<<"Before Swapping"<<endl;
        cout<<"E="<<e<<endl;
        cout<<"F="<<f<<endl;
        z=e;
        e=f;
        f=z;
```

```
        cout<<"After Swapping"<<endl;
        cout<<"E="<<e<<endl;
        cout<<"F="<<f<<endl;
    }
    swap_test(int a,int b)
    {
        int c;
        cout<<"Before Swapping"<<endl;
        cout<<"A="<<a<<endl;
        cout<<"B="<<b<<endl;
        c=a;
        a=b;
        b=c;
        cout<<"After Swapping"<<endl;
        cout<<"A="<<a<<endl;
        cout<<"B="<<b<<endl;
    }
};
main()
```

```
{
        swap_test s1(7,8);
    swap_test s2(5,6);
}
```

Output:



QUESTION :9

Write a class Marks with three data members to store three marks. Write three member functions

1)in() to input marks,

2)sum() to calculate and return the sum and

3) avg() to calculate and return the average marks.

SOLUTION:

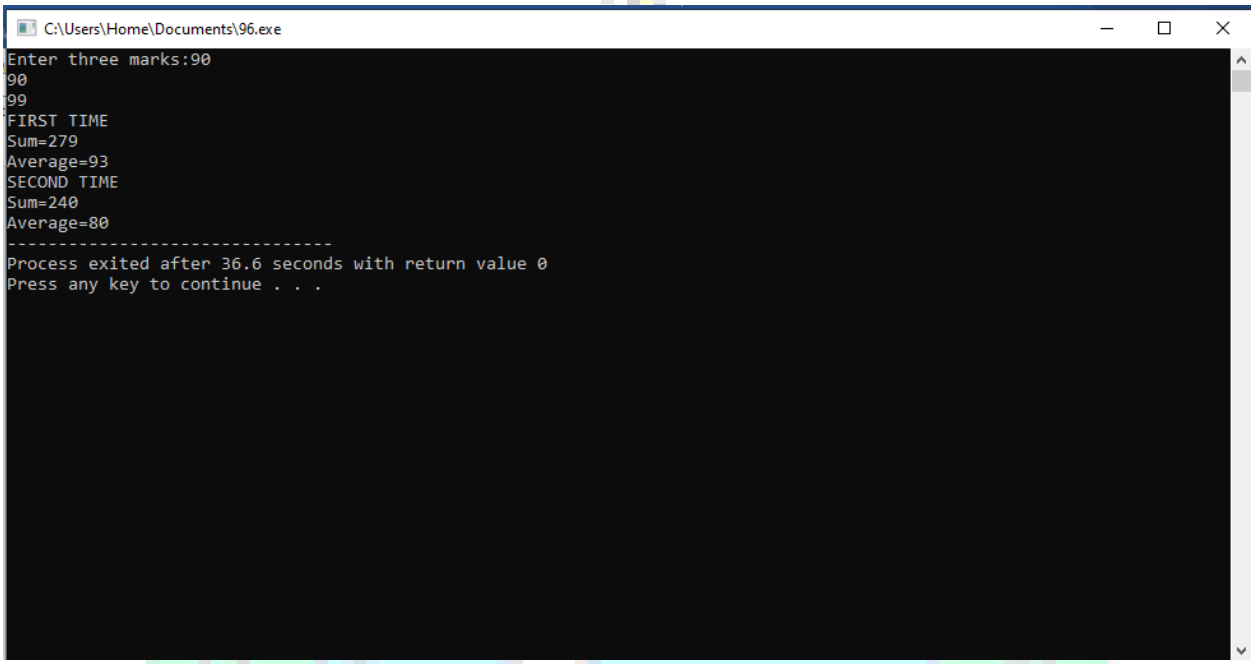
PROGRAM:

```
#include <iostream>
using namespace std;
class Marks
{
   private:
   int a,b,c;
   public:
   Marks()
   {
      cout<<"Enter three marks:";
    cin>>a>>b>>c;
      }
```

```
    Marks(int d,int e,int f)
    {
        a=d;
        b=e;
        c=f;
    }
  int sum ()
  {
     return(a+b+c);
    }
  int avg ()
  {
     return(a+b+c)/3.0;
    }
};
int main ()
{
  Marks m1;
  int s,add;
```

```
    float a,avg;
    s=m1.sum();
    a=m1.avg();
    cout<<"FIRST TIME"<<endl;
    cout<<"Sum="<<s<<endl;
    cout<<"Average="<<a<<endl;
    Marks m2(70,80,90);
    add=m2.sum();
    avg=m2.avg();
    cout<<"SECOND TIME"<<endl;
    cout<<"Sum="<<add<<endl;
    cout<<"Average="<<avg;
    return 0;
}
```

Output:


C:\Users\Home\Documents\96.exe
Enter three marks:90
90
99
FIRST TIME
Sum=279
Average=93
SECOND TIME
Sum=240
Average=80

Process exited after 36.6 seconds with return value 0
Press any key to continue . . .

LAB TASK :7

QUESTION :1

Write a program that counts the number of objects created of a particular class.

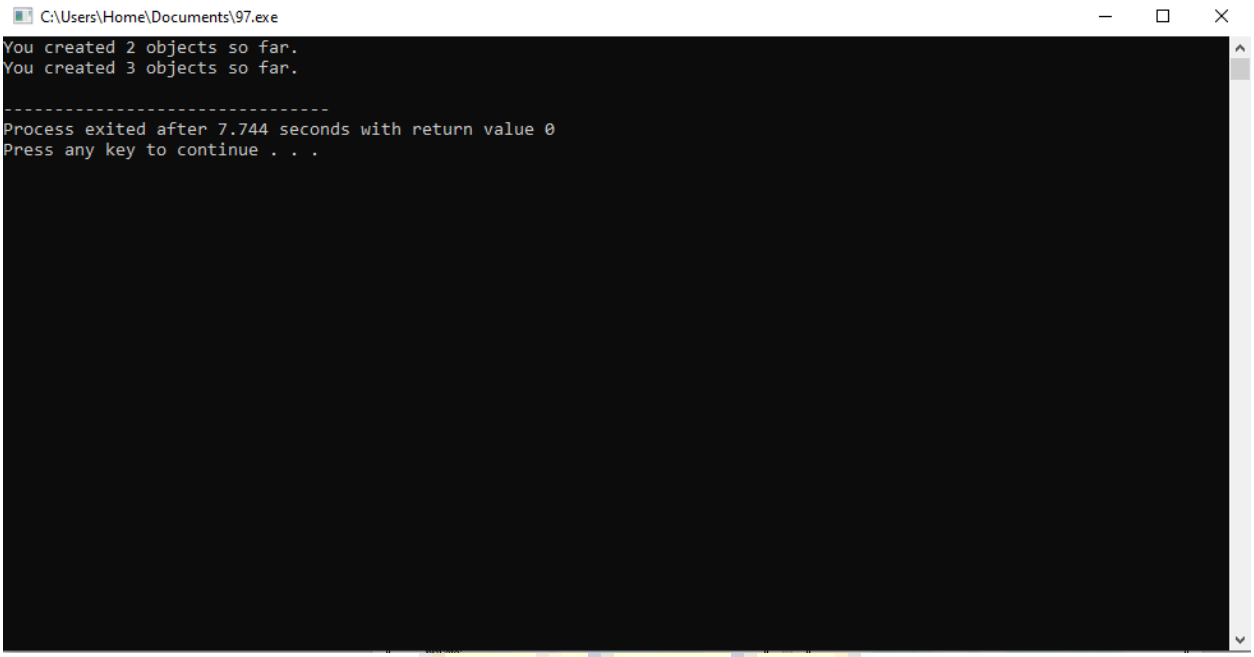
SOLUTION:

PROGRAM:

```
#include <iostream>
using namespace std;
class Yahoo
{
  private:
  static int a;
  public:
  Yahoo()
  {
   a++;
}
 void show ()
  {
      cout<<"You created "<<a<<" objects so far. "<<endl;
```

```
    }
  };
  int Yahoo::a=0;
  main ()
 {
  Yahoo x,y;
   x.show();
   Yahoo z;
   x.show();
}
```

OUTPUT:



QUESTION :2

Write a program that creates three objects of class Student. Each object of class must be assigned a unique roll number. (Hint: Use static data member for unique roll number)

SOLUTION:

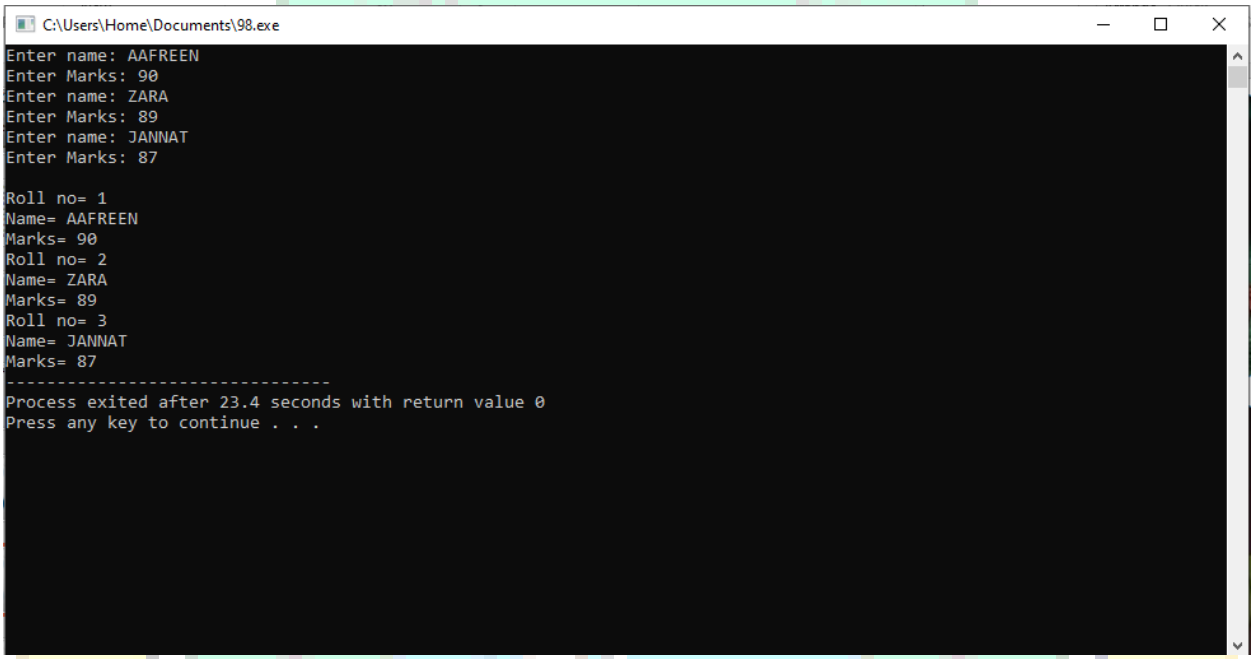
PROGRAM:

```
#include <iostream>
using namespace std;
class Student {
private:
static int r;
int rno, marks;
char name[50];
public:
Student()
{
r++;
rno=r;
 }
void in ()
```

```
{
cout<<"Enter name: ";
cin.getline(name,50);
cout<<"Enter Marks: ";
cin>>marks;
}
void show ()
{
cout<<endl;
cout<<"Roll no= "<<rno<<endl;
cout<<"Name= "<<name<<endl;
cout<<"Marks= "<<marks;
} };
int Student::r=0;
main ()
{
Student S1, S2, S3;
S1.in();
S2.in();
```

```
S3.in();
S1.show();
S2.show();
S3.show();
}
```

OUTPUT:



QUESTION :3

SOLUTION:

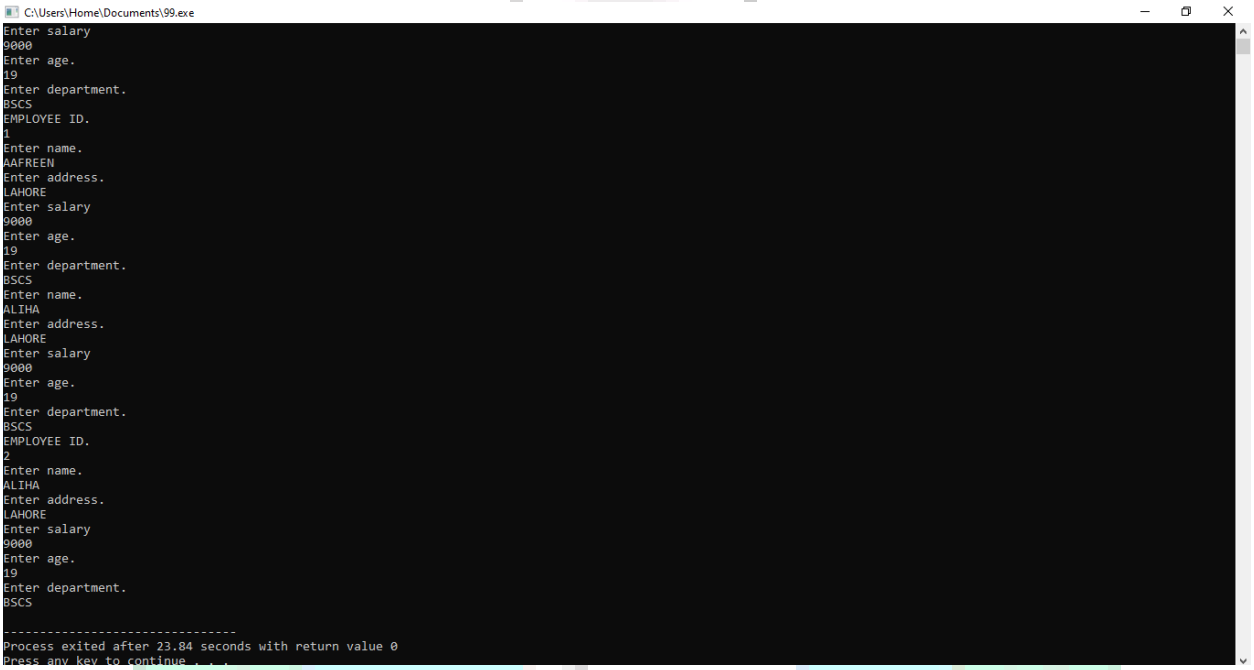
PROGRAM:

```
#include<iostream>
using namespace std;
class Employee
{
private:
static int a;
char name[50],dept[40],address[60];
int salary,age,emp_id;
public:
Employee()
{
a++;
emp_id=a;
}
void Get_info()
{
cout<<"Enter name."<<endl;
cin>>name;
cout<<"Enter address."<<endl;
```

```
cin>>address;
cout<<"Enter salary"<<endl;
cin>>salary;
cout<<"Enter age."<<endl;
cin>>age;
cout<<"Enter department."<<endl;
cin>>dept;
}
void display_details()
{
cout<<"EMPLOYEE ID."<<endl<<emp_id<<endl;
cout<<"Enter name."<<endl<<name<<endl;
cout<<"Enter address."<<endl<<address<<endl;
cout<<"Enter salary"<<endl<<salary<<endl;
cout<<"Enter age."<<endl<<age<<endl;
cout<<"Enter department."<<endl<<dept<<endl;

}};
int Employee::a=0;
main()
{
Employee e1,e2;
e1.Get_info();
```

```
e1.display_details();
e2.Get_info();
e2.display_details();
}
```

OUTPUT:



QUESTION :4

SOLUTION:

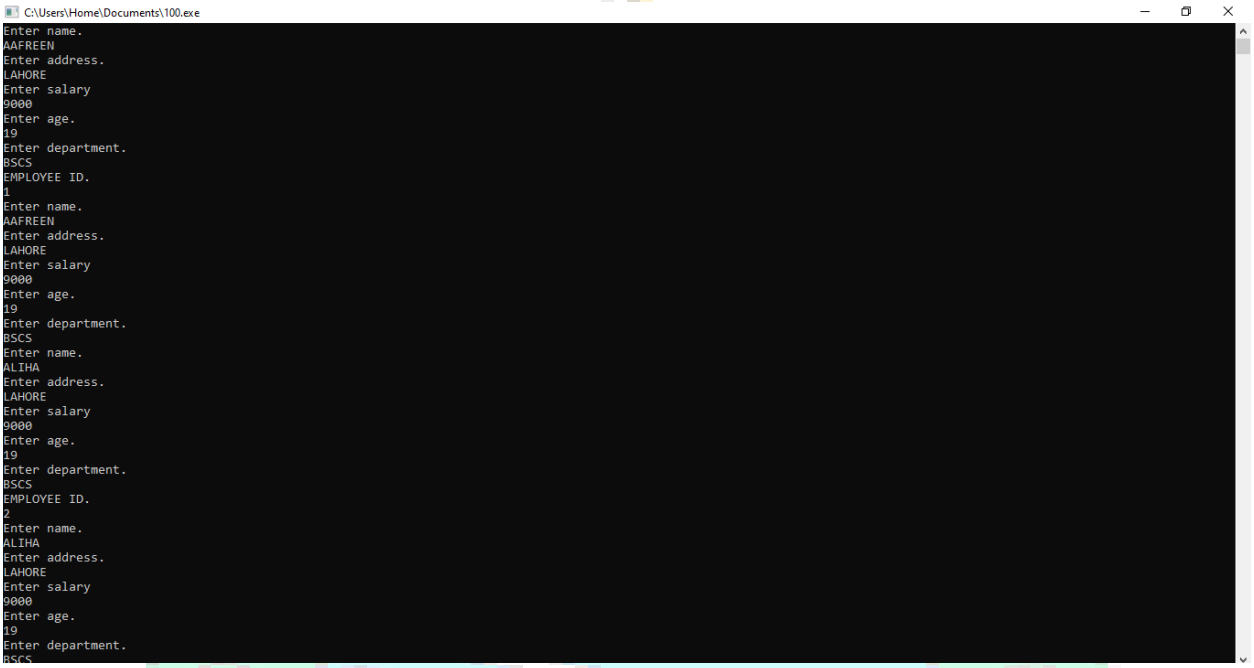
PROGRAM:

```
#include<iostream>
using namespace std;
class Employee
{
private:
static int a;
char name[50],dept[40],address[60];
int salary,age,emp_id;
public:
Employee()
{
a++;
emp_id=a;
}
void Get_info()
{
```

```
cout<<"Enter name."<<endl;
cin>>name;
cout<<"Enter address."<<endl;
cin>>address;
cout<<"Enter salary"<<endl;
cin>>salary;
cout<<"Enter age."<<endl;
cin>>age;
cout<<"Enter department."<<endl;
cin>>dept;
}
void display_details()
{
cout<<"EMPLOYEE ID."<<endl<<emp_id<<endl;
cout<<"Enter name."<<endl<<name<<endl;
cout<<"Enter address."<<endl<<address<<endl;
cout<<"Enter salary"<<endl<<salary<<endl;
cout<<"Enter age."<<endl<<age<<endl;
cout<<"Enter department."<<endl<<dept<<endl;
```

```
}};
int Employee::a=0;
main()
{
Employee e1,e2,e3,e4,e5;
e1.Get_info();
e1.display_details();
e2.Get_info();
e2.display_details();
e3.Get_info();
e3.display_details();
e4.Get_info();
e4.display_details();
e5.Get_info();
e5.display_details();
}
```

OUTPUT:


C:\Users\Home\Documents\100.exe
Enter name.
AAFREEN
Enter address.
LAHORE
Enter salary
9000
Enter age.
19
Enter department.
BSCS
EMPLOYEE ID.
1
Enter name.
AAFREEN
Enter address.
LAHORE
Enter salary
9000
Enter age.
19
Enter department.
BSCS
Enter name.
ALIHA
Enter address.
LAHORE
Enter salary
9000
Enter age.
19
Enter department.
BSCS
EMPLOYEE ID.
2
Enter name.
ALIHA
Enter address.
LAHORE
Enter salary
9000
Enter age.
19
Enter department.
BSCS

QUESTION :5

Write a program that demonstrate the use of Friend Function

SOLUTION:

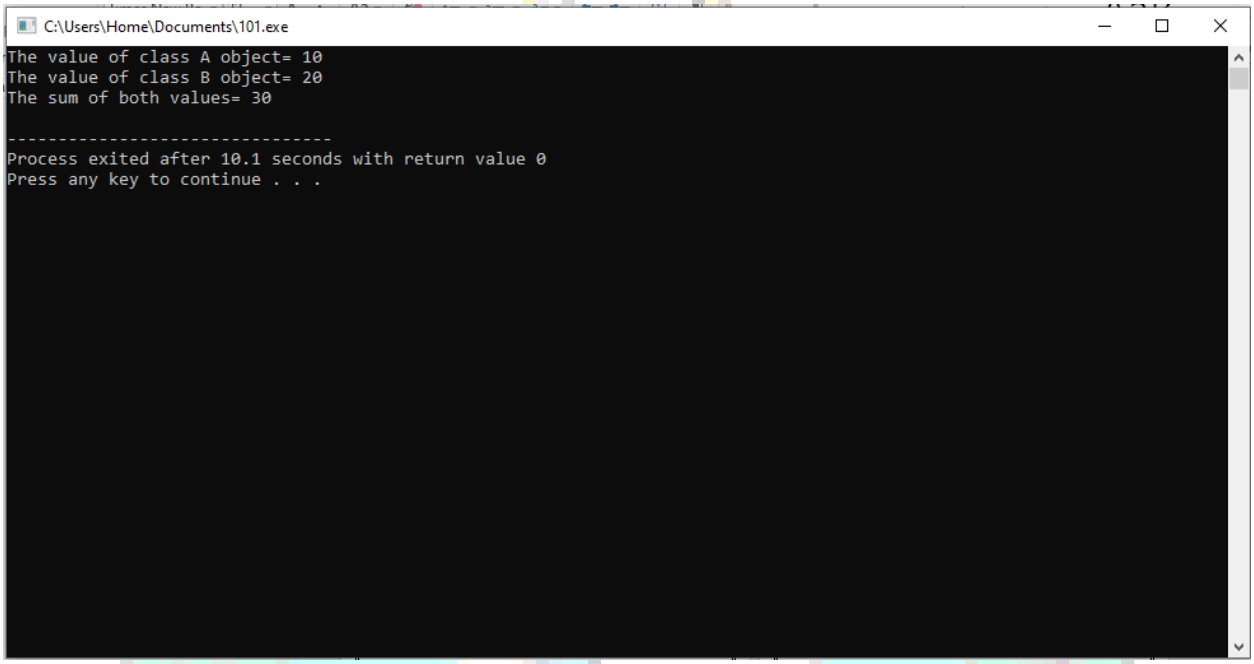
PROGRAM:

```
#include <iostream>
using namespace std;
class B;
class A {
   private:
    int a;
  public:
   A()
   {  a=10; }
    friend void show (A, B);
      };
class B {
   private:
    int b;
   public:
```

```
    B()
    {  b=20; }
     friend void show (A, B);
        };


void show (A x, B y)
{
    int r;
    r=x.a+y.b;
cout<<"The value of class A object= "<<x.a<<endl;
cout<<"The value of class B object= "<<y.b<<endl;
cout<<"The sum of both values= "<<r<<endl;

}

int main () {
  A obj1;
  B obj2;
```

```
  show(obj1, obj2);
  return 0;
}
```

OUTPUT:



QUESTION :6

Write a program that demonstrates the use of Friend Classes.

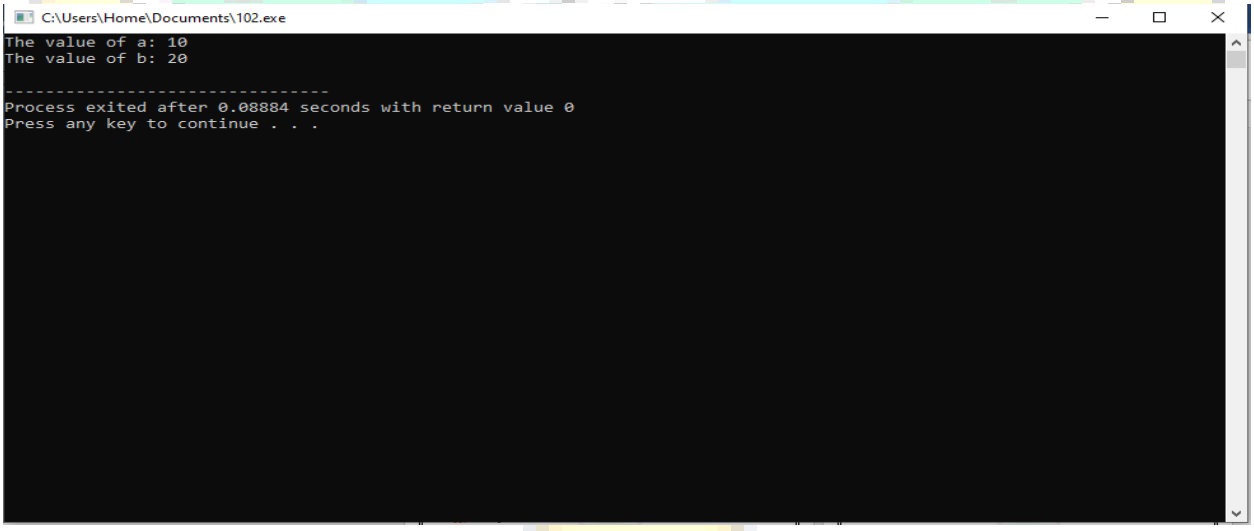
SOLUTION:

PROGRAM:

```
#include <iostream>
using namespace std;
class B;
class A {
    private:
    int a,b;
  public:
   A()
   {  a=10;
     b=20;  }
    friend class B;
   };
class B {
  public:
   void showA (A obj)
```

```
  {    cout<<"The value of a: "<<obj.a<<endl;  }
   void showB (A obj)
 { cout<<"The value of b: "<<obj.b<<endl; }
};
int main ()
{
  A x;
  B y;
  y.showA(x);
  y.showB(x);
  return 0;
}
```

OUTPUT:



QUESTION :7

Write a program that demonstrate the use of Static Functions.

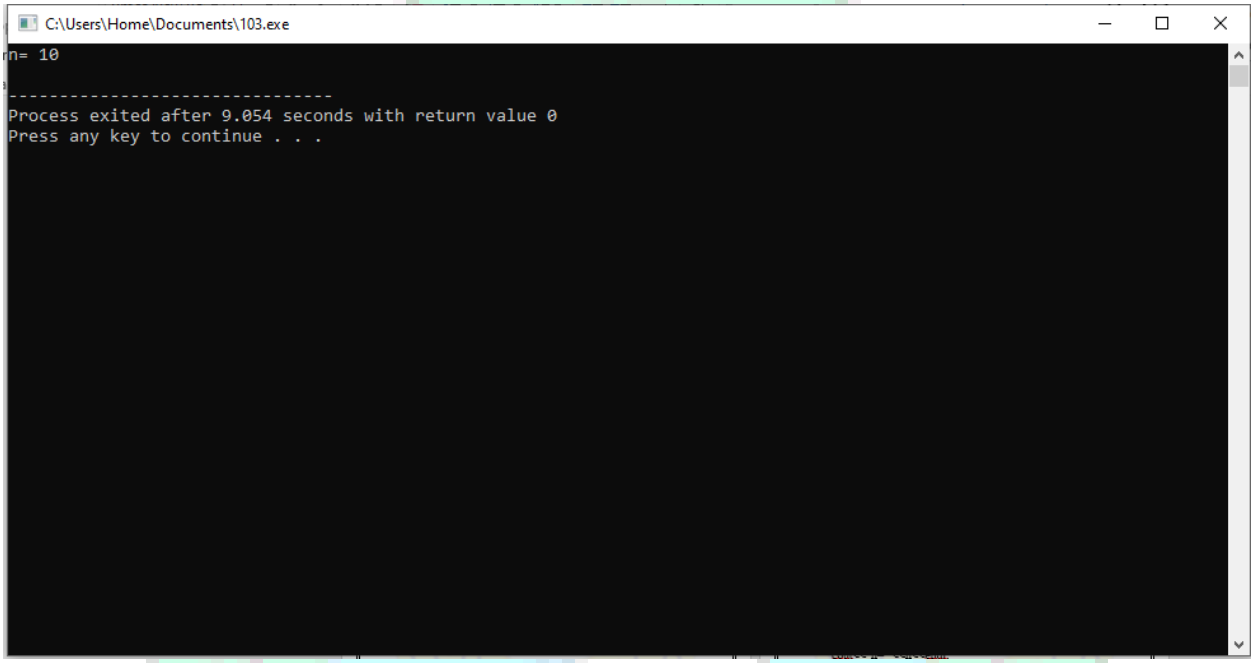
SOLUTION:

PROGRAM:

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

class Test {
      private:
    static int n;
   public:
       static void show ()
   {
      cout<<"n= "<<n<<endl;
   }
};
 int Test::n=10;
int main () {
```

```
  Test::show();
  return 0;
}
```

OUTPUT:



QUESTION :8

Write a program that counts the number of objects created for a particular class. The program must be able to display the results even if no object is created so far.

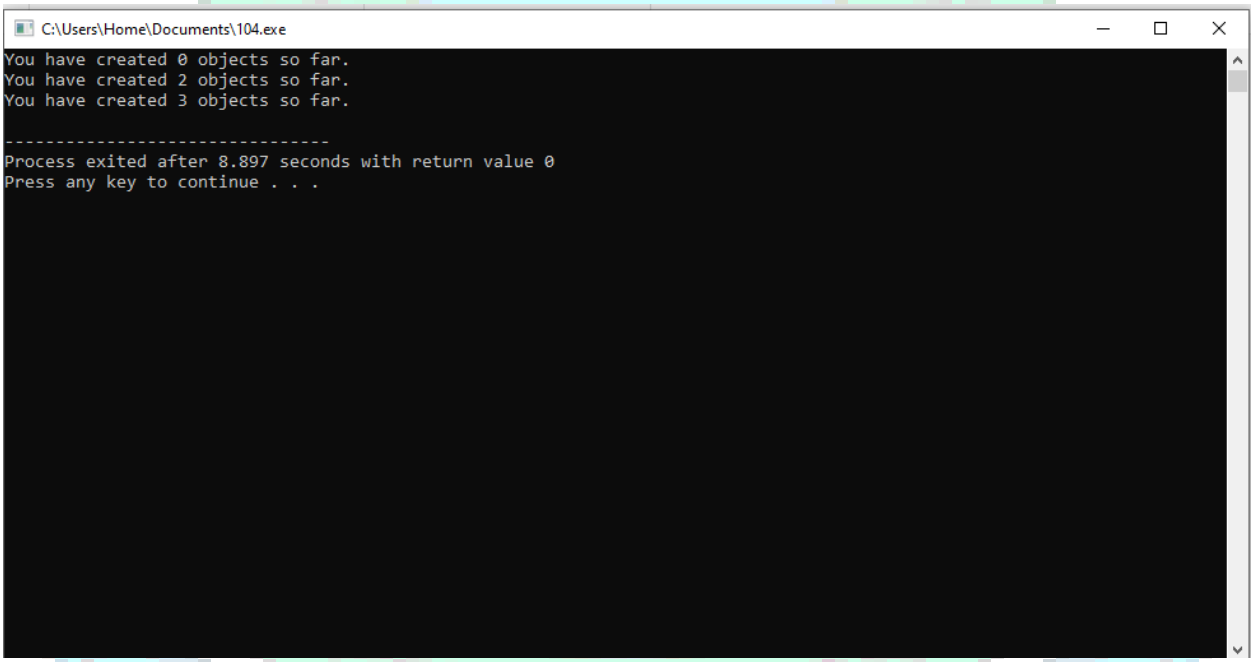
SOLUTION:

PROGRAM:

```
#include <iostream>
using namespace std;
class Yahoo {
      private:
    static int n;
   public:
      Yahoo()
      {     n++; }
       static void show ()
  {        cout<<"You have created "<<n<<" objects so far. "<<endl; }
 };
 int Yahoo::n=0;
int main () {
  Yahoo::show();
```

```
    Yahoo x,y;
    x.show();
    Yahoo z;
    x.show();
    return 0;
}
```

OUTPUT:



LAB TASK #8

QUESTION :1

Write a program that overloads increment operator to work with user-defined objects.

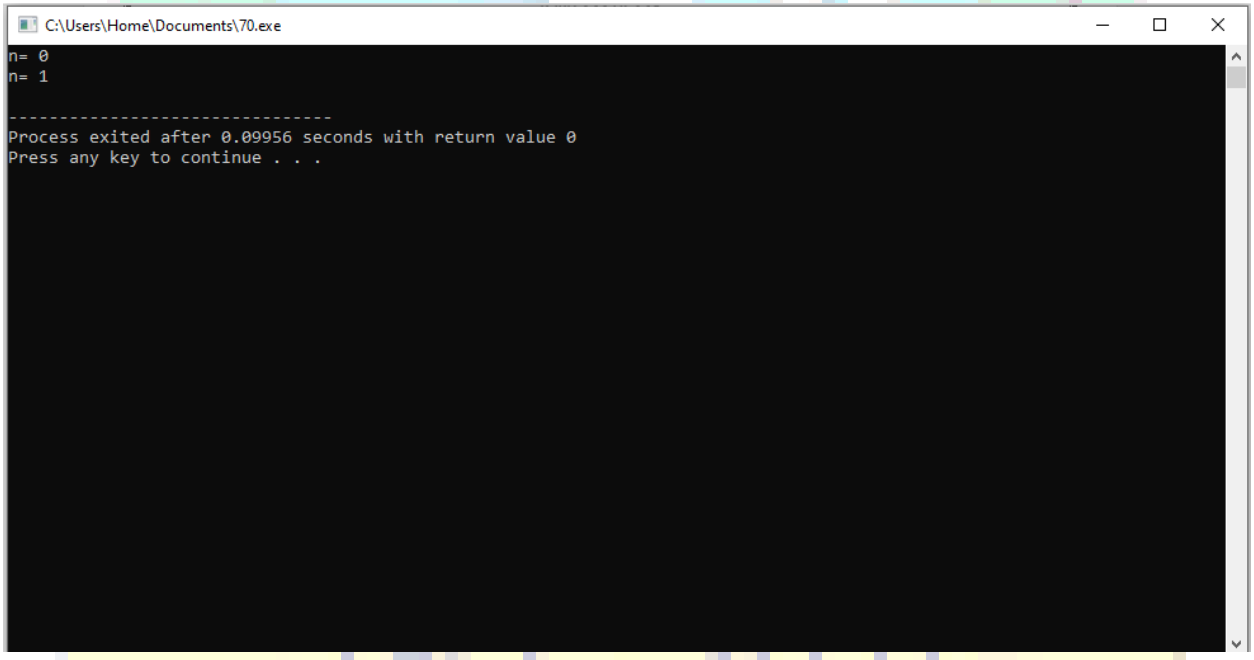
SOLUTION:

PROGRAM:

```
#include <iostream>
using namespace std;
class Count {
      private:
   int n;
 public:
   Count ()
   {
    n=0;
     }
   void show ()
   {
     cout<<"n= "<<n<<endl;
   }
```

```
    void operator ++()
    {  n=n+1;  } };
    int main () {
  Count obj;
  obj.show();
  ++obj;
  obj.show();
  return 0;
}
```

OUTPUT:



QUESTION :2

Write a program that overloads increment operator to work with the user-defined objects. The overloaded function should return an object after incrementing the data member

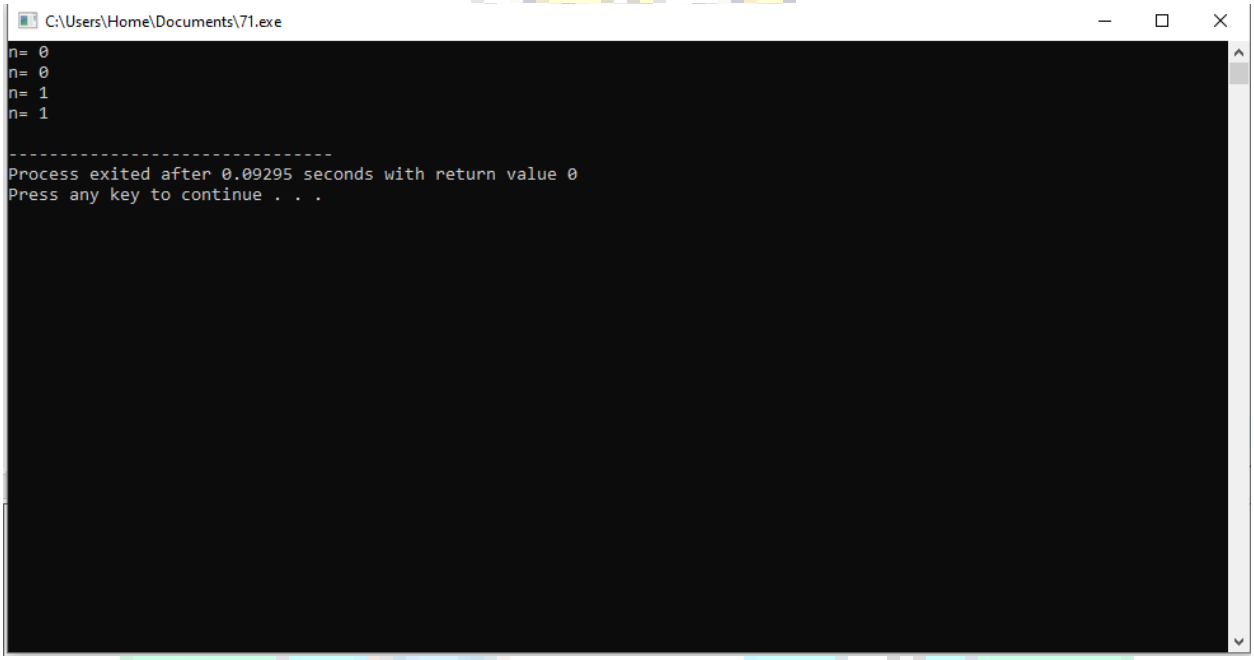
SOLUTION:

PROGRAM:

```
#include <iostream>
using namespace std;
class Count {
  private:
    int n;
  public:
    Count ()
    {
        n=0;
        }
   void show ()
  {
      cout<<"n= "<<n<<endl;
      }
```

```
    Count operator ++()
    {   Count temp;
        n=n+1;
        temp.n = n;
        return temp;
       }
 };
int main ()
{
  Count x,y;
  x.show();
  y.show();
  y= ++x;
  x.show();
  y.show();
  return 0;
}
```

OUTPUT:


C:\Users\Home\Documents\71.exe
n= 0
n= 0
n= 1
n= 1

Process exited after 0.09295 seconds with return value 0
Press any key to continue . . .

QUESTION :3

Write a program that overloads prefix and postfix increment operator to work with user-defined objects.

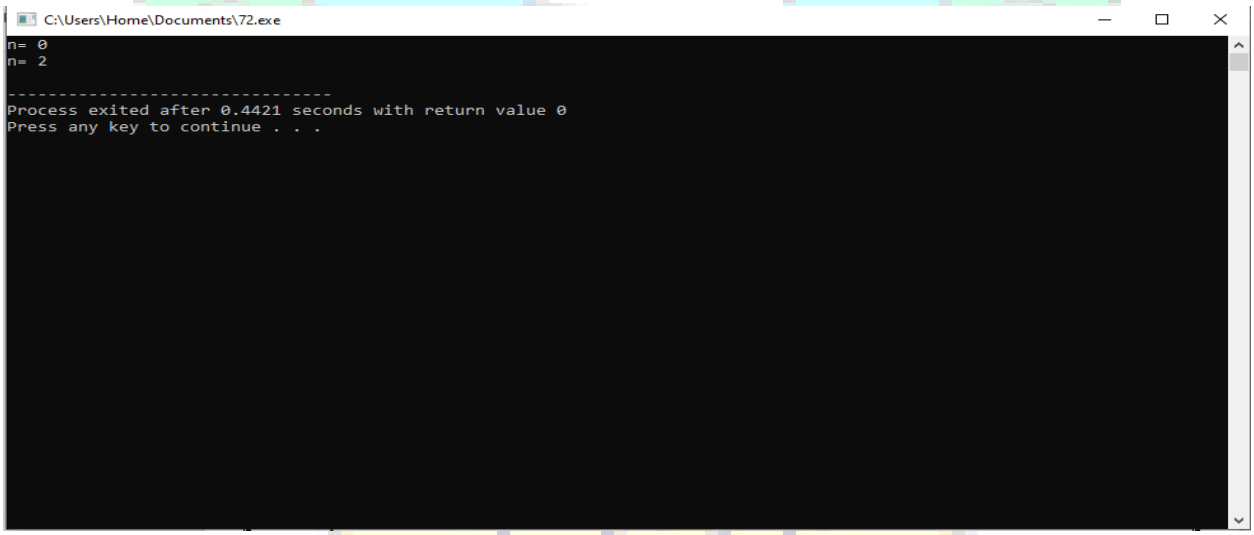
SOLUTION:

PROGRAM:

```
#include <iostream>
using namespace std;
class Count {
  private:
   int n;
 public:
   Count ()
   {  n=0; }
  void show ()
   { cout<<"n= "<<n<<endl; }
   void operator ++()
   {
    n=n+1;
   }
    void operator ++(int)
```

```
    {
        n=n+1; }
};
int main () {
  Count x,y;
  x.show();
  ++x;
  x++;
  x.show();
  return 0;
}
```

OUTPUT:



QUESTION :4

Write a program that overloads increment operator both for prefix and postfix to work with the user-defined objects. The overloaded function should return an object after incrementing the data member.

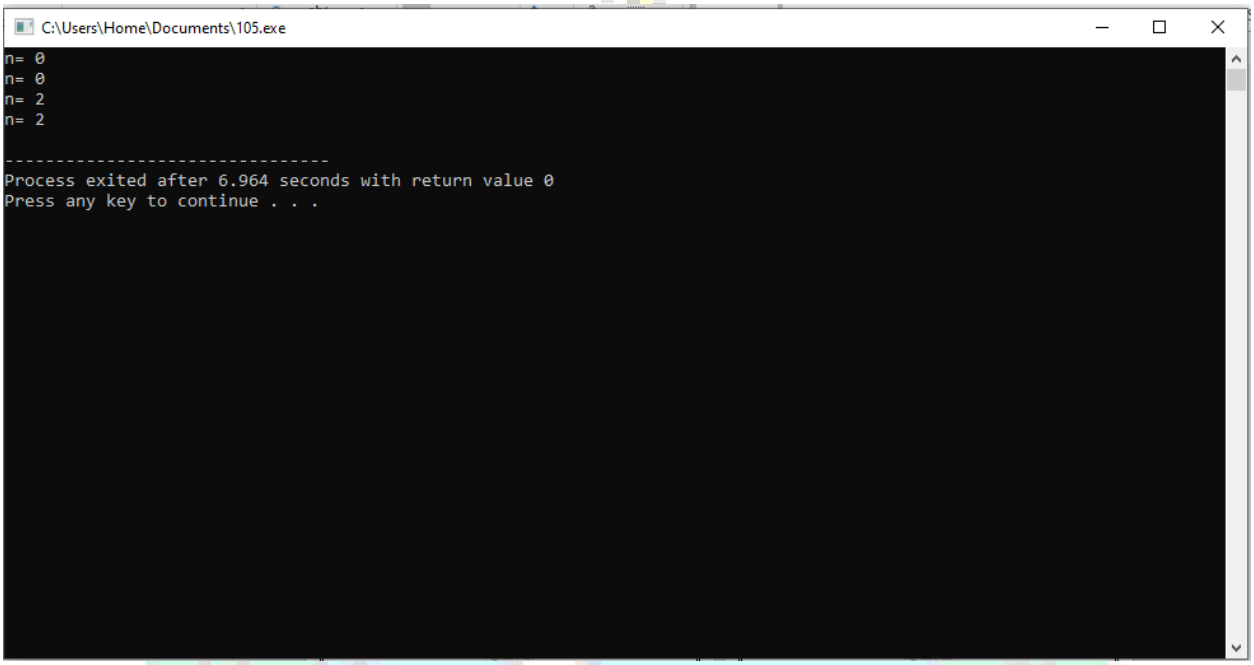
SOLUTION:

PROGRAM:

```
#include <iostream>
using namespace std;
class Count {
  private:
   int n;
 public:
   Count ()
   {  n=0; }
  void show ()
   { cout<<"n= "<<n<<endl; }
   Count operator ++()
   { Count temp;
     n=n+1;
     temp.n = n;
```

```
    return temp; }
    Count operator ++(int)
   { Count temp;
    n=n+1;
    temp.n = n;
    return temp;} };
int main () {
  Count x,y;
  x.show();
  y.show();
  y=++x;
  y=x++;
  x.show();
  y.show();
  return 0;
}
```

OUTPUT:


C:\Users\Home\Documents\105.exe
n= 0
n= 0
n= 2
n= 2

Process exited after 6.964 seconds with return value 0
Press any key to continue . . .

QUESTION :5

Write a program that overloads binary addition operator +.

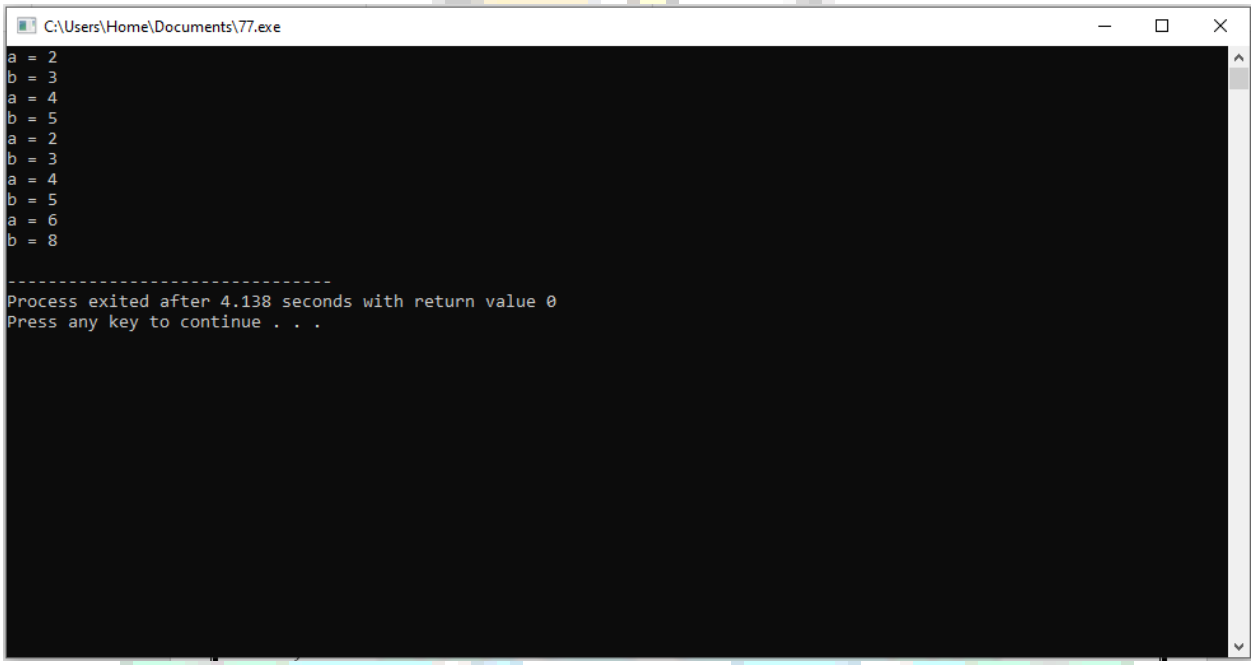
SOLUTION:

PROGRAM:

```
#include <iostream>
using namespace std;
class Add {
private:
   int a, b;
 public:
   Add ()
   {  a=b=0;    }
       void in()
   { cout<<"a = ";
    cin>>a;
    cout<<"b = ";
    cin>>b;
   }
   void show()
```

```
    { cout<<"a = "<<a<<endl;
      cout<<"b = "<<b<<endl;
    }
Add operator +(Add p)
    { Add temp;
      temp.a= p.a+a;
      temp.b= p.b+b;
      return temp;
        }
};

int main () {
  Add x, y, z;
  x.in();
  y.in();
  z=x+y;
  x.show();
  y.show();
  z.show();
```

```
  return 0;
}
```


C:\Users\Home\Documents\77.exe
a = 2
b = 3
a = 4
b = 5
a = 2
b = 3
a = 4
b = 5
a = 6
b = 8

Process exited after 4.138 seconds with return value 0
Press any key to continue . . .

QUESTION :6

Write a program that overloads arithmetic addition operator + for concatenating two string values.

SOLUTION:

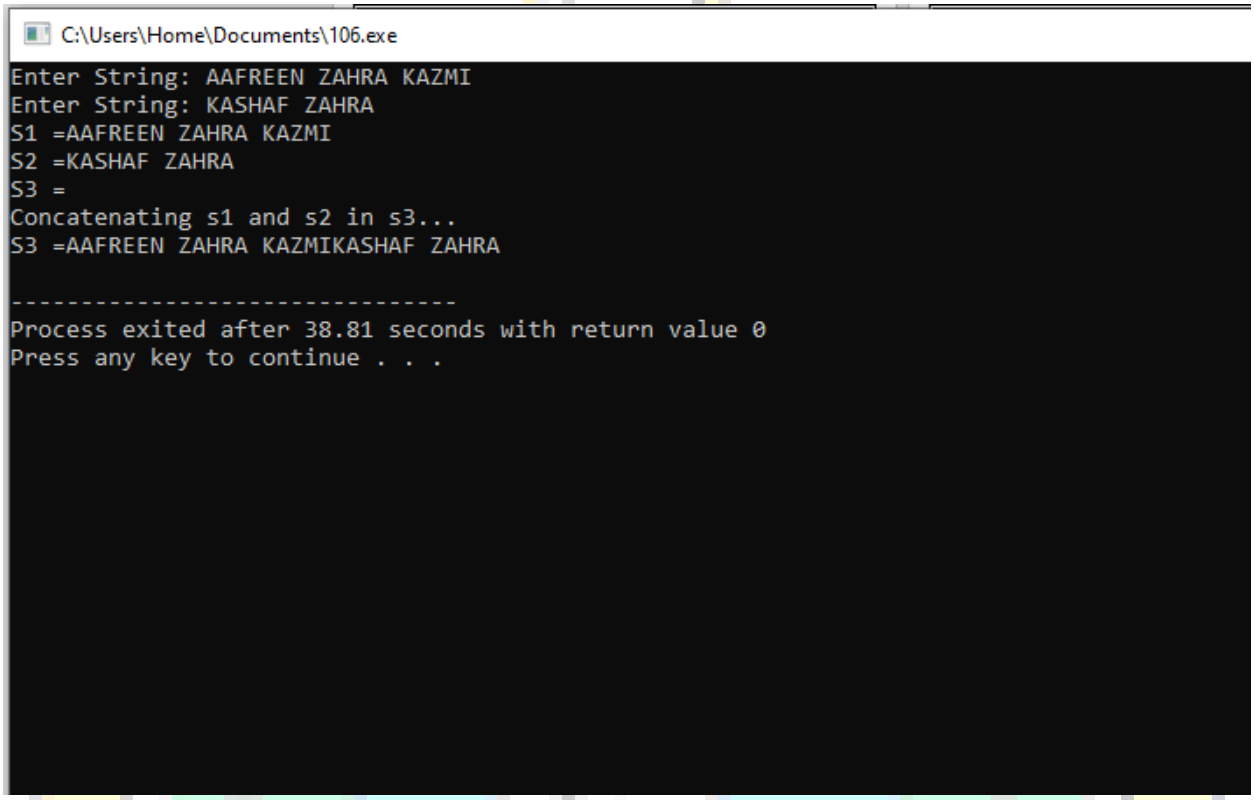
PROGRAM:

```
#include <iostream>
#include<string.h>
using namespace std;
class String {
  private:
    char str[50];
  public:
    String ()
    {  str[0]= '\0'; }
     void in()
    { cout<<"Enter String: ";
       gets(str);  }
    void show()
    { cout<<str<<endl;  }
```

```
    String operator +(String s)
    { String temp;
     strcpy(temp.str, str);
     strcat(temp.str, s.str);
      return temp;
       } };
int main () {
  String s1, s2, s3;
  s1.in();
  s2.in();
  cout<<"S1 =";
  s1.show();
   cout<<"S2 =";
  s2.show();
  cout<<"S3 =";
  s3.show();
  cout<<"Concatenating s1 and s2 in s3... "<<endl;
  s3=s1+s2;
  cout<<"S3 =";
```

```
  s3.show();
  return 0;
}
```

OUTPUT:



QUESTION :7

Write a program that overloads the comparison operators == to work with String class. The result of the comparison must be 1 if the two strings are of same length and 0 otherwise.

SOLUTION:

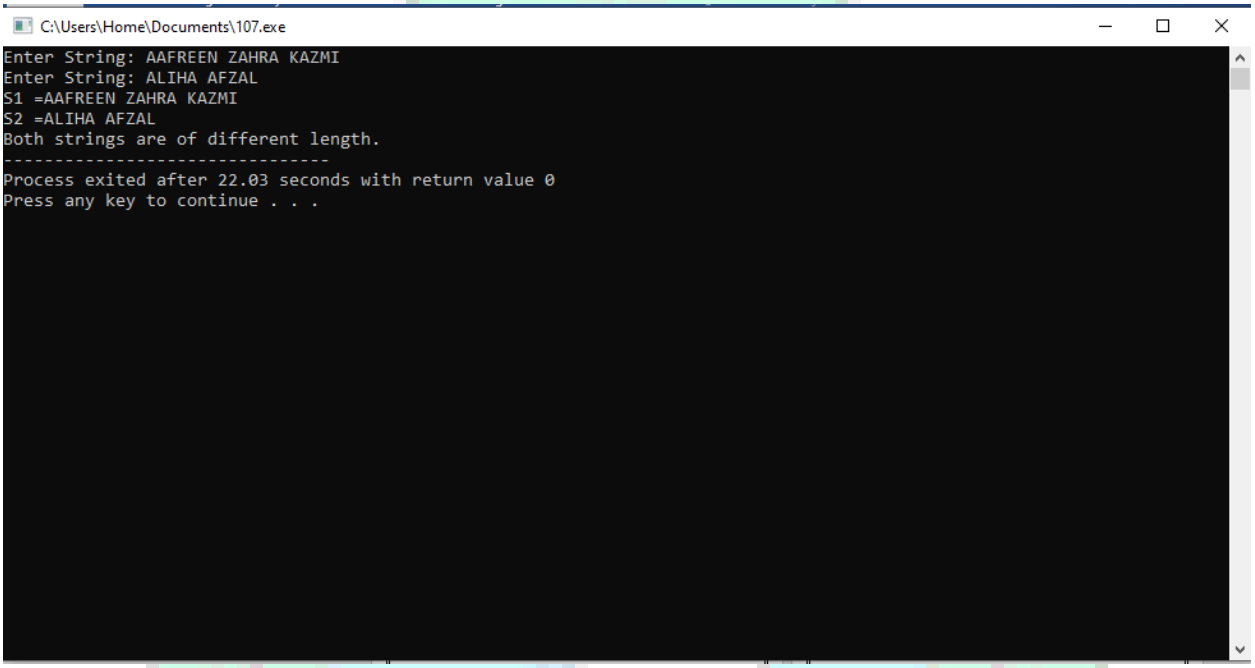
PROGRAM:

```
#include <iostream>
#include<string.h>
using namespace std;
class String {
   private:
   char str[50];
  public:
   String ()
   {  str[0]= '\0'; }
    void in()
   { cout<<"Enter String: ";
     gets(str);
   }
   void show()
```

```
    { cout<<str<<endl;
    }
    int operator ==(String s)
    { if(strlen(s.str)==strlen(str))
        return 1;
        else
        return 0;
       } };

int main () {
  String s1, s2;
  s1.in();
  s2.in();
  cout<<"S1 =";
  s1.show();
   cout<<"S2 =";
  s2.show();
 if(s1==s2)
  cout<<"Both strings are of equal length.";
```

```
else
 cout<<"Both strings are of different length.";
 return 0;
}
```

OUTPUT:



QUESTION :8

Write a program that overloads arithmetic assignment operator to work with user-defined objects.

SOLUTION:

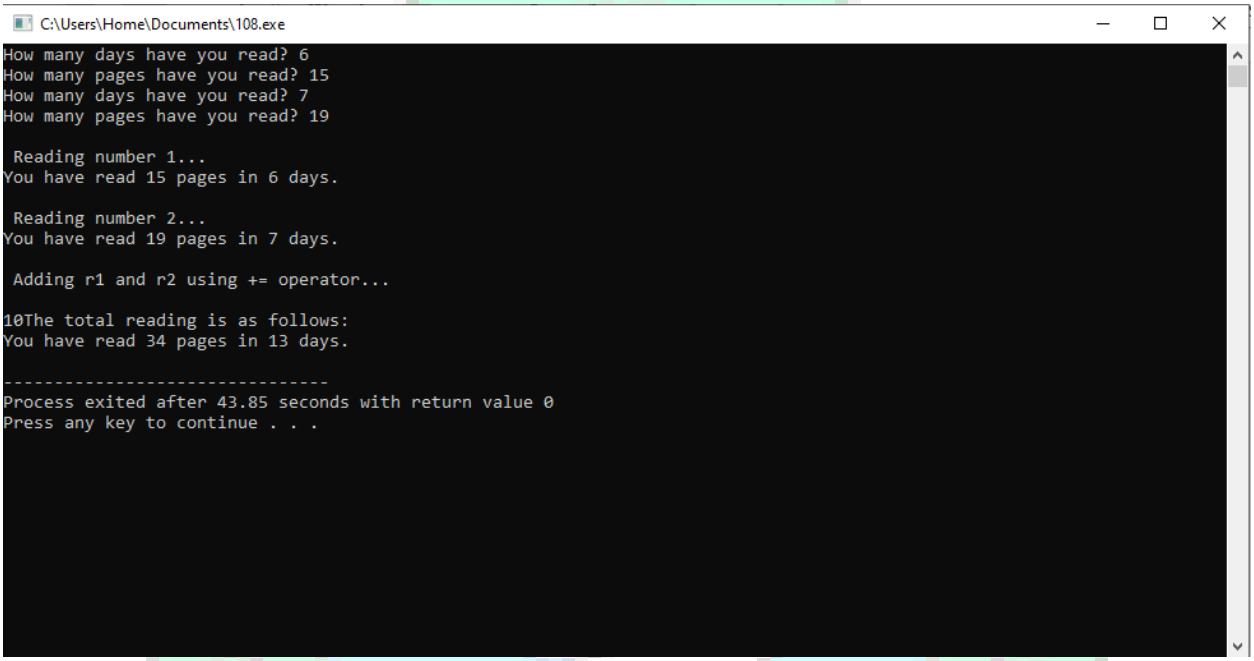
PROGRAM:

```
#include <iostream>
#include<string.h>
using namespace std;
class Read {
      private:
   int days, pages;
  public:
   Read ()
   {  days=pages=0; }
    void in()
   { cout<<"How many days have you read? ";
     cin>>days;
     cout<<"How many pages have you read? ";
     cin>>pages;
```

```
    }
    void show()
    { cout<<"You have read " <<pages<< " pages in "<<days<<" days."<<endl;
    }
    void operator +=(Read r)
    { days=days+r.days;
      pages=pages+r.pages;
    } };
int main () {
  Read r1, r2;
  r1.in();
  r2.in();
  cout<<"\n Reading number 1..."<<endl;
  r1.show();
  cout<<"\n Reading number 2..."<<endl;
  r2.show();
   cout<<"\n Adding r1 and r2 using += operator..."<<endl;
```

```
    r2+=r1;
    cout<<"\n10The total reading is as follows:"<<endl;
    r2.show();
}
```

OUTPUT:



QUESTION :9

Create a class name Spaces take three data members,Getdata(), Display() use overloaded decrement operator to decrement the value.

SOLUTION:

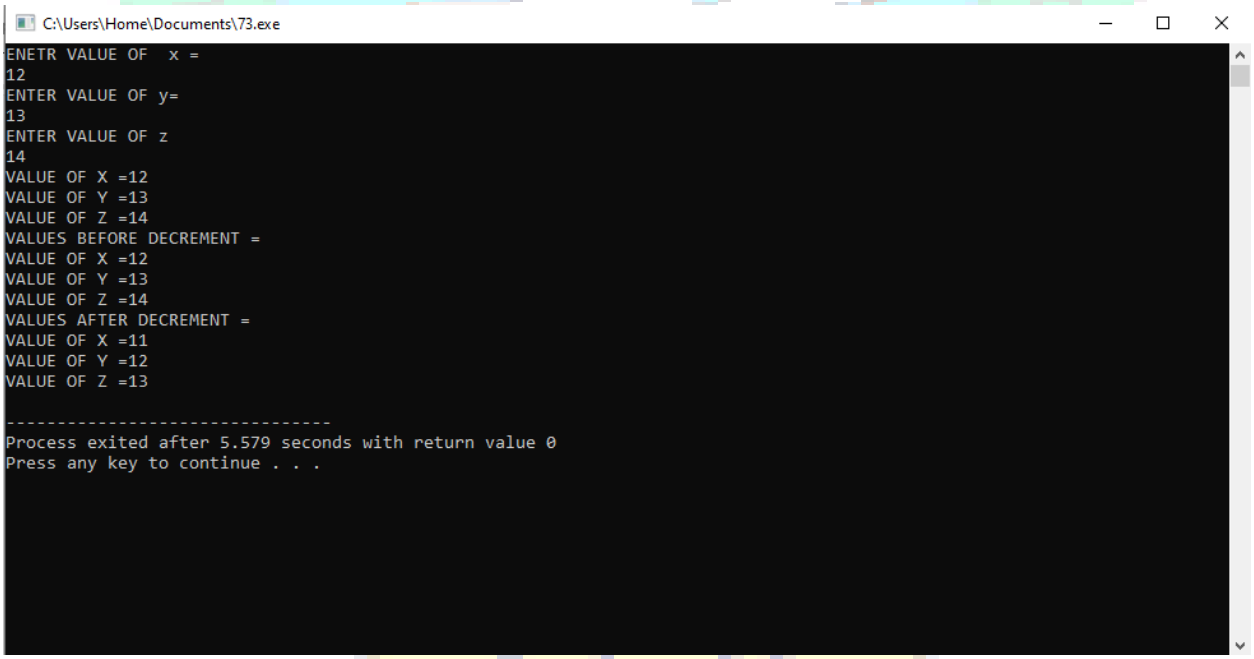
PROGRAM:

```
#include<iostream>
using namespace std;
class Space
{
    private:
    int x,y,z;
    public:
    Space()
    {
        x=y=z=0;
    }
void get_data()
{
    cout<<"ENETR VALUE OF  x ="<<endl;
    cin>>x;
```

```
        cout<<"ENTER VALUE OF y="<<endl;
        cin>>y;
        cout<<"ENTER VALUE OF z"<<endl;
        cin>>z;
        }
void display()
{
        cout<<"VALUE OF X ="<<x<<endl;
        cout<<"VALUE OF Y ="<<y<<endl;
        cout<<"VALUE OF Z ="<<z<<endl;
}
void operator --()
{
        x=x-1;
        y=y-1;
        z=z-1;
}
};
int main()
```

```
{
        Space a,b;
        a.get_data();
        a.display();
        cout<<"VALUES BEFORE DECREMENT ="<<endl;
        a.display();
        --a;
        cout<<"VALUES AFTER DECREMENT ="<<endl;
    a.display();
}
```

OUTPUT:



Task :2

QUESTION :10

Create a class pen with one datamember create one constructor without parameter,and one with paarmeter ,showcount() function create two overloaded increment operator for pre or post fix.

SOLUTION:

PROGRAM:

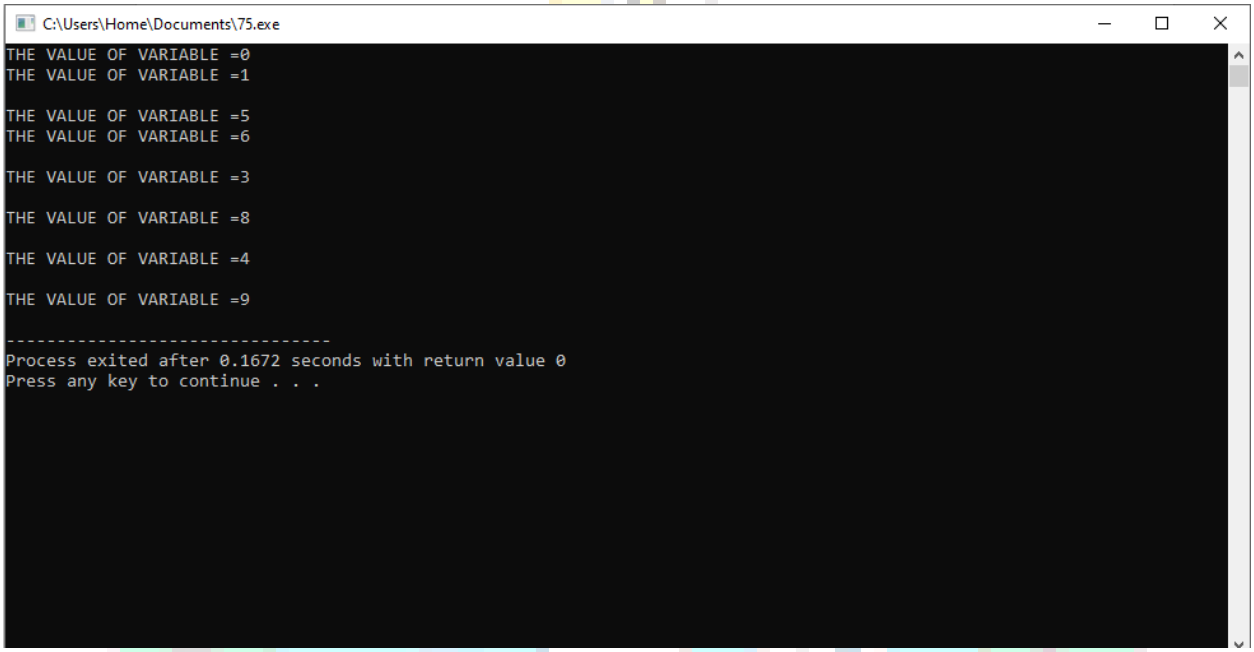
```
#include<iostream>
using namespace std;
class Pen
{
private:
        int x;
public:
Pen()
{
        x=0;
}
Pen(int n)
{
x=n;
```

```
}
void show_count()
{
        cout<<"THE VALUE OF VARIABLE ="<<x<<endl;
}
void operator ++()
{
        x=x+1;
}
void  operator ++(int)
{
        x=x+1;
}
};
int main()
{
        Pen a,b(5);
        a.show_count();
        ++a;
```

```
a.show_count();
cout<<endl;
b.show_count();
++b;
b.show_count();
cout<<endl;
a++;
a++;
a.show_count();
cout<<endl;
b++;
b++;
b.show_count();
cout<<endl;
++a;
a.show_count();
cout<<endl;
++b;
b.show_count();
```

```
    return 0;
}
```

OUTPUT:



QUESTION :11

Create a class book have two data member and one constructor with paarmeter or create a increment overloaded operator or decrement overloaded operator.

SOLUTION:

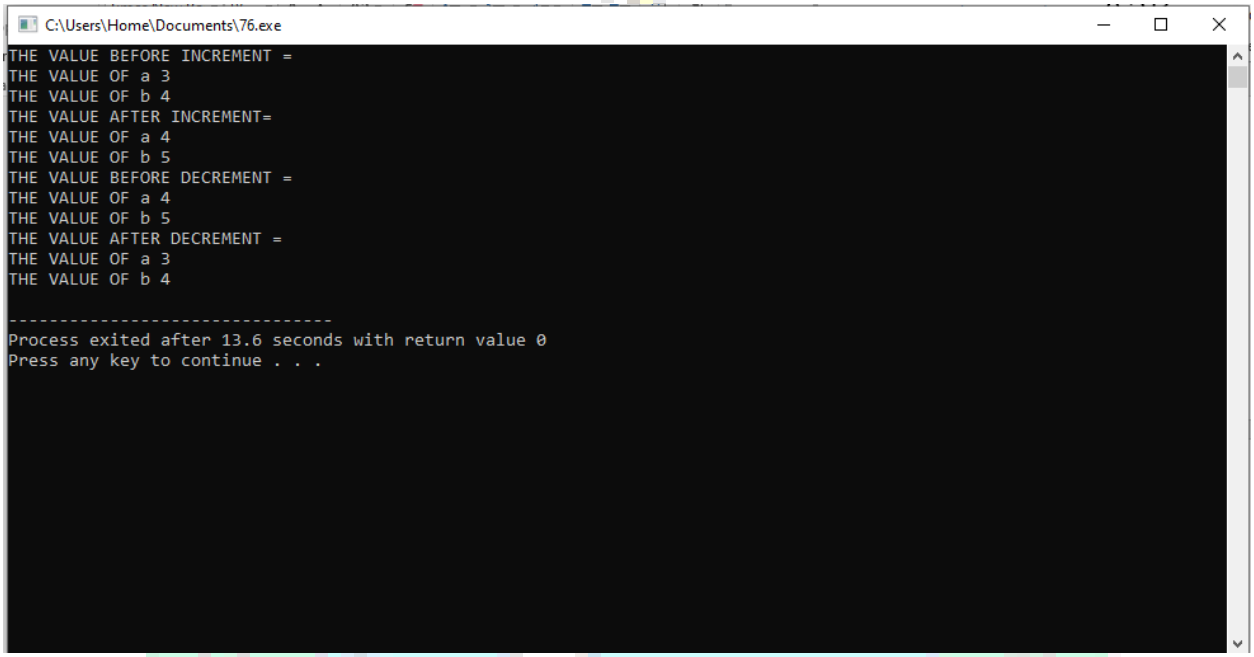
PROGRAM:

```
#include<iostream>
using namespace std;
class Book
{
    private:
        int a,b;
        public:
    Book(int x,int y)
    {
        a=x;
        b=y;
            }
    void show()
    {
```

```
            cout<<"THE VALUE OF a "<<a<<endl;
            cout<<"THE VALUE OF b "<<b<<endl;
        }
void operator ++()
{
        a++;
        b++;
}
void operator --()
{
        a--;
        b--;
}

};
int main()
{
        Book  c(3,4);
        cout<<"THE VALUE BEFORE INCREMENT ="<<endl;
```

```
        c.show();
        cout<<"THE VALUE AFTER INCREMENT="<<endl;
        ++c;
        c.show();
        cout<<"THE VALUE BEFORE DECREMENT ="<<endl;
        c.show();
        cout<<"THE VALUE AFTER DECREMENT ="<<endl;
        --c;
        c.show();
        return 0;
}
```

OUTPUT:


C:\Users\Home\Documents\76.exe
THE VALUE BEFORE INCREMENT =
THE VALUE OF a 3
THE VALUE OF b 4
THE VALUE AFTER INCREMENT=
THE VALUE OF a 4
THE VALUE OF b 5
THE VALUE BEFORE DECREMENT =
THE VALUE OF a 4
THE VALUE OF b 5
THE VALUE AFTER DECREMENT =
THE VALUE OF a 3
THE VALUE OF b 4

Process exited after 13.6 seconds with return value 0
Press any key to continue . . .

QUESTION :12

Create a class with name time that have three data member with name hours,minutes or seconds.Create a parameterized constructor that take values as parameter and assign to data member.This operator having a ovreloaded addition operator that add 1 in data member values and have a overloaded subtraction operator that decreased the value of data member with 1.

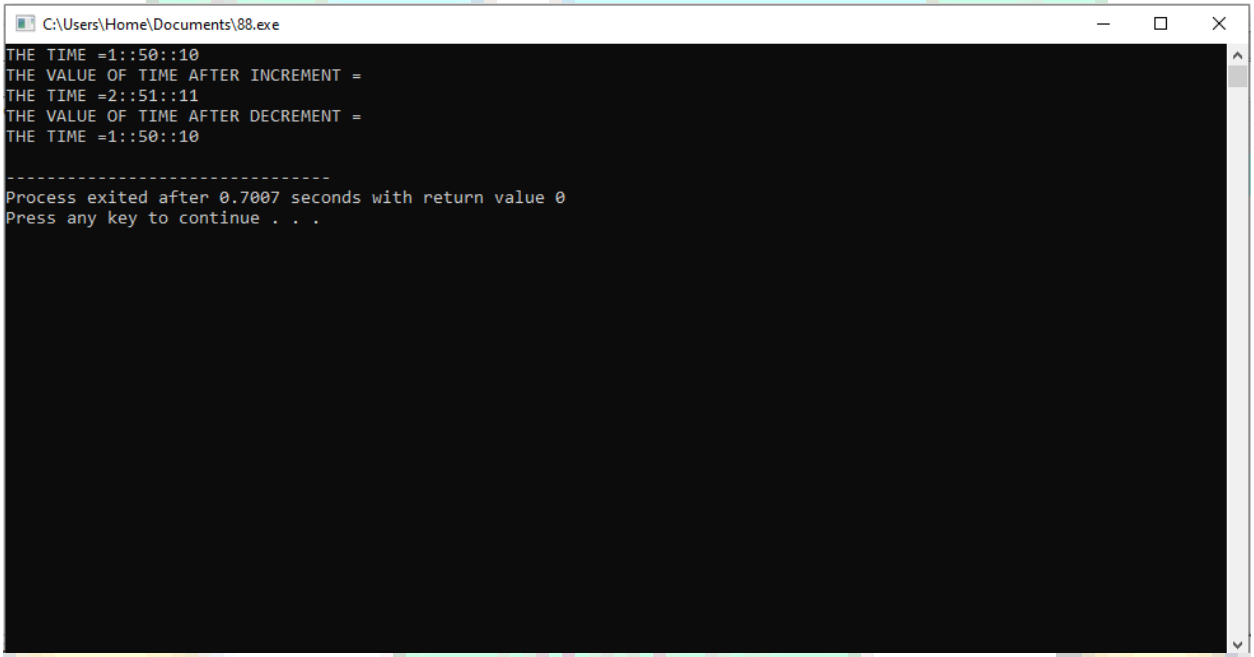
SOLUTION:

PROGRAM:

```
#include<iostream>
using namespace std;
class Time
{
	private:
	int hours,minutes,seconds;
	public:
	Time()
	{
		hours=1;
		minutes=50;
		seconds=10;
	}
void show()
{
	cout<<"THE TIME =" <<hours<<"::"<<minutes<<"::"<<seconds<<endl;
}
void operator ++()
{
	hours=hours+1;
	minutes=minutes+1;
	seconds=seconds+1;
}
void operator --()
{
	minutes=minutes-1;
	hours=hours-1;
	seconds=seconds-1;
```

```
}
};
int main()
{
        Time p1;
        p1.show();
        cout<<"THE VALUE OF TIME AFTER INCREMENT ="<<endl;
        ++p1;
        p1.show();
        cout<<"THE VALUE OF TIME AFTER DECREMENT ="<<endl;
        --p1;
        p1.show();
        return 0;
}
```

OUTPUT:



QUESTION:13

Write a program that overloads the comparison operators == to work with String class. The result of the comparison must be 1 if the two strings are of same length and 0 otherwise.

SOLUTION:

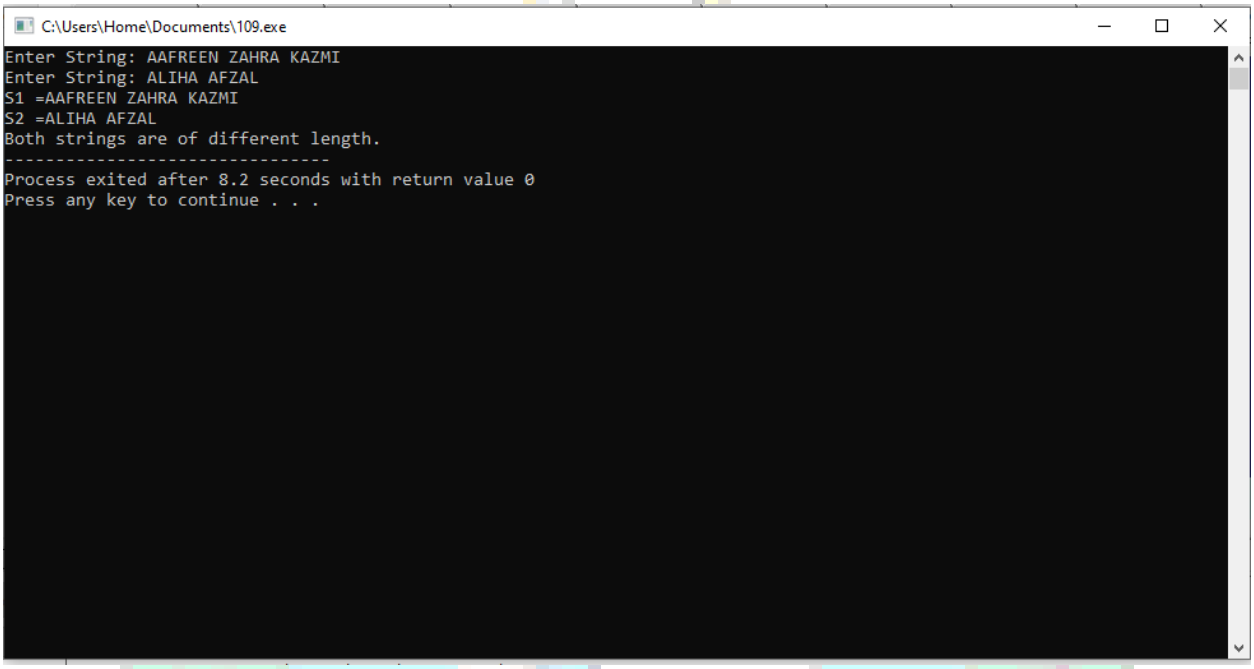
PROGRAM:

```
#include <iostream>
#include<string.h>
using namespace std;
class String {
   private:
   char str[50];
  public:
   String ()
   {  str[0]= '\0'; }
    void in()
   { cout<<"Enter String: ";
     gets(str);
   }
   void show()
```

```
    { cout<<str<<endl;
    }
    int operator ==(String s)
    { if(strlen(s.str)==strlen(str))
        return 1;
        else
        return 0;
       } };
int main () {
  String s1, s2;
  s1.in();
  s2.in();
  cout<<"S1 =";
  s1.show();
   cout<<"S2 =";
  s2.show();
 if(s1==s2)
  cout<<"Both strings are of equal length.";
 else
```

```
  cout<<"Both strings are of different length.";
  return 0;
}
```

OUTPUT:



LAB TASK #9

QUESTION :1

Write a program that explains the concepts of execution of constructor in single inheritance.

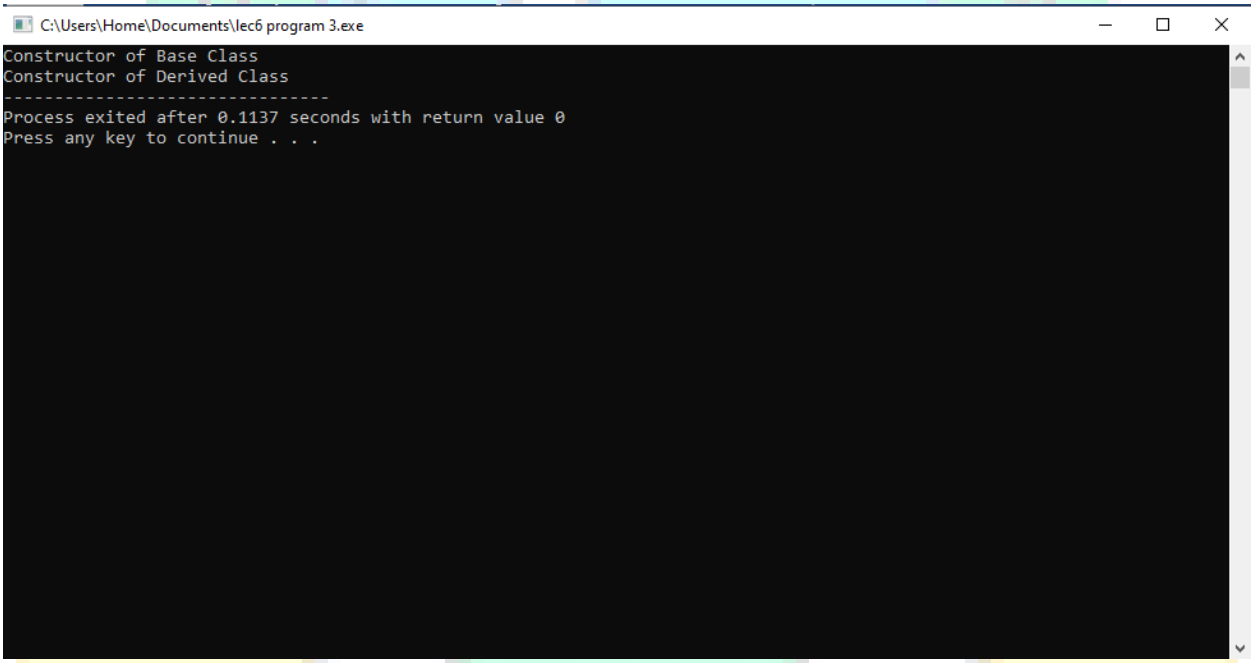
SOLUTION:

PROGRAM:

```
#include <iostream>
using namespace std;
class BB {
   public:
   BB()
   {  cout<<"Constructor of Base Class\n";
      }
};
class DD:public BB
{  public:
    DD()
     {  cout<<"Constructor of Derived Class";
      }
```

```
};


int main ()
{
 DD obj;
 return 0;
}
```

OUTPUT:



QUESTION :2

Write a class Person that has attributes of id, name and address. It has a constructor to initialize, a member function to input and a member function to display data members. Create another class Student that inherits Person class. It has additional attributes of roll number and marks. It has member function to input and display its data members.

SOLUTION:

PROGRAM:

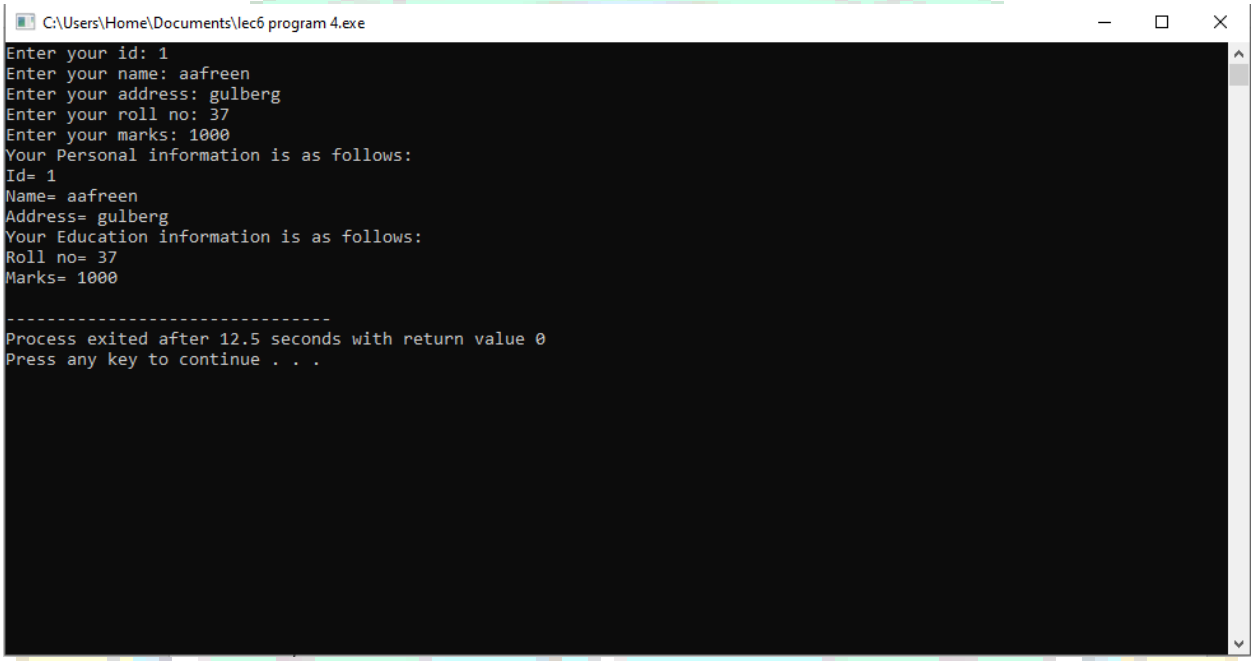
```
#include <iostream>

using namespace std;

class Person {

  protected:

   int id;

   char name[50], address[100];

 public:

  Person()

  {  id=0;

      name[0]='\0';

      address[0]='\0';     }

      void GetInfo()
```

```
{  cout<<"Enter your id: ";
    cin>>id;
    cout<<"Enter your name: ";
    cin>>name;
    cout<<"Enter your address: ";
    cin>>address; }
    void ShowInfo()
{  cout<<"Your Personal information is as follows:\n";
    cout<<"Id= "<<id<<endl;
    cout<<"Name= "<<name<<endl;
    cout<<"Address= "<<address<<endl;  }
    };
class Student:public Person
{private:
    int rno, marks;
 public:
   Student()
   {   Student::Person();
```

```
    rno=marks=0;
  }
 void GetEdu()
 {  cout<<"Enter your roll no: ";
    cin>>rno;
   cout<<"Enter your marks: ";
    cin>>marks;
 }
void ShowEdu()
 {  cout<<"Your Education information is as follows:\n";
   cout<<"Roll no= "<<rno<<endl;
   cout<<"Marks= "<<marks<<endl;
 }
};
int main ()
{
Student s;
s.GetInfo();
```

```
s.GetEdu();
s.ShowInfo();
s.ShowEdu();
 return 0;
}
```

OUTPUT:



QUESTION :3

- **Write two classes Parent and Child**
- **Parent class has a data member int n and a function show() to show the value of data member**
- **Child class has a data member char ch and a function show() to show the value of data member**
- **Note: object of derived class will pass values to the constructor and the derived class function show() will override the show() function of parent class.**

SOLUTION:

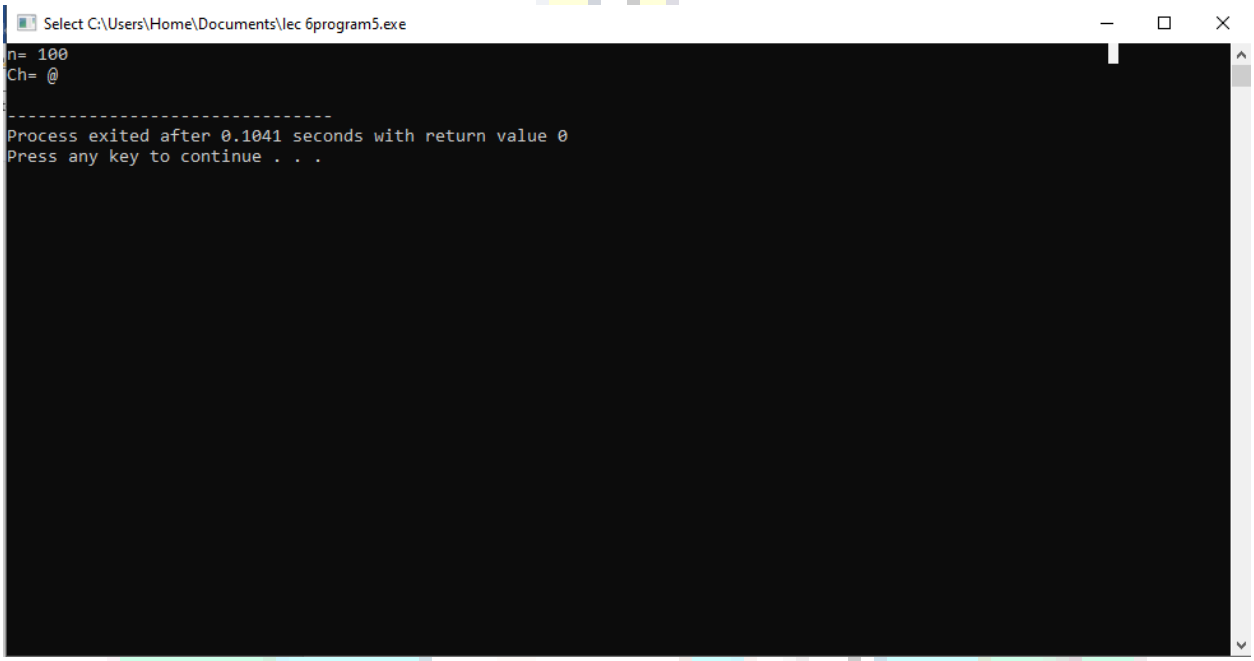
PROGRAM:

```
#include <iostream>

using namespace std;

class Parent {

  protected:

      int n;

 public:

   Parent(int p)

   {  n=p;

     }

   void show()

   {cout<<"n= "<<n<<endl;
```

```
        } };
class Child:public Parent
{
        private:
         char ch;
 public:
        Child(char c, int m):Parent(m)
         {   ch=c;
         }
         void show()
   { Parent::show();
     cout<<"Ch= "<<ch<<endl;
        } };
int main ()
{
 Child obj('@', 100);
 obj.show();
 return 0;
```

```
}
```

OUTPUT:


Select C:\Users\Home\Documents\lec 6program5.exe
n= 100
Ch= @

Process exited after 0.1041 seconds with return value 0
Press any key to continue . . .

QUESTION :4

- **Write a class two classes. The parent class is called Simple that has two data members a and b to store two numbers. It also has four member function:**
- **The add() function adds two numbers and displays the result.**
- **The sub() function subtracts two members and display the result.**
- **The mul() function multiples two numbers and displays the result.**
- **The div() function divides two numbers and displays the result.**

SOLUTION:

PROGRAM:

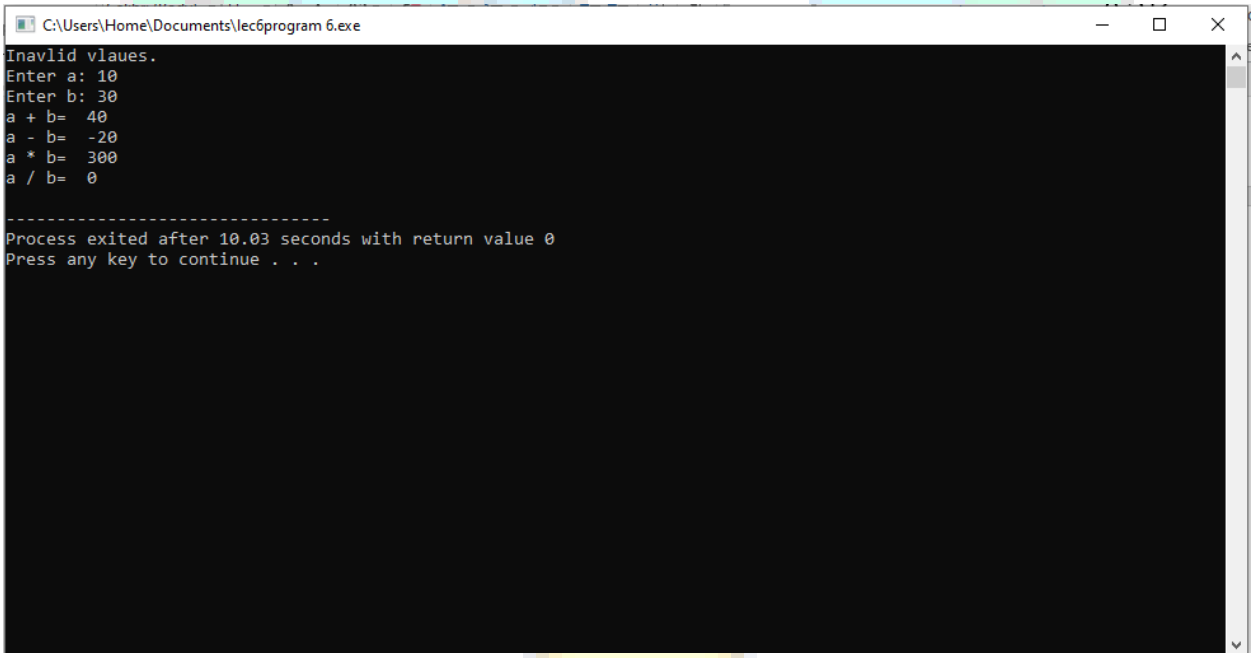
```
#include <iostream>

using namespace std;

class Simple{

  protected:

  int a,b;

 public:

  Simple()

  {  a=b=0; }

  void in()

  {  cout<<"Enter a: ";

     cin>>a;
```

```
        cout<<"Enter b: ";
        cin>>b;
        }
     void add()
    { cout<<"a + b=  "<<a+b<<endl; }
      void sub()
    {  cout<<"a - b=  "<<a-b<<endl; }
     void mul()
    {  cout<<"a * b=  "<<a*b<<endl; }
     void div()
    {   cout<<"a / b=  "<<a/b<<endl; } };
class Complex:public Simple
{    public:
     void add()
    { if(a<=0 || b<=0)
      cout<<"Inavlid vlaues."<<endl;
      else
      Simple::add();   }
```

```
    void sub()
  { if(a<=0 || b<=0)
    cout<<"Inavlid vlaues."<<endl;
    else
    Simple::sub();   }
     void mul()
  { if(a<=0 || b<=0)
    cout<<"Inavlid vlaues."<<endl;
    else
    Simple::mul();   }
     void div()
  { if(a<=0 || b<=0)
    cout<<"Inavlid vlaues."<<endl;
    else
    Simple::div();    }
  };
int main ()
```

```
{
 Complex obj;
 obj.add();
 obj.in();
 obj.add();
 obj.sub();
 obj.mul();
 obj.div();
 return 0;
}
```

OUTPUT:



QUESTION :5

Write a base class Computer that contains data members of wordSize (in bits), memorySize (in megabytes), storageSize (in megabytes) and speed (in megahertz). Derive a Laptop class that is a kind of Computer class but also specifies the object's length, width, height and weight. Member functions of both classes should include a default constructor, a constructor to initializes all components and a function to display data member.

SOLUTION:

PROGRAM:

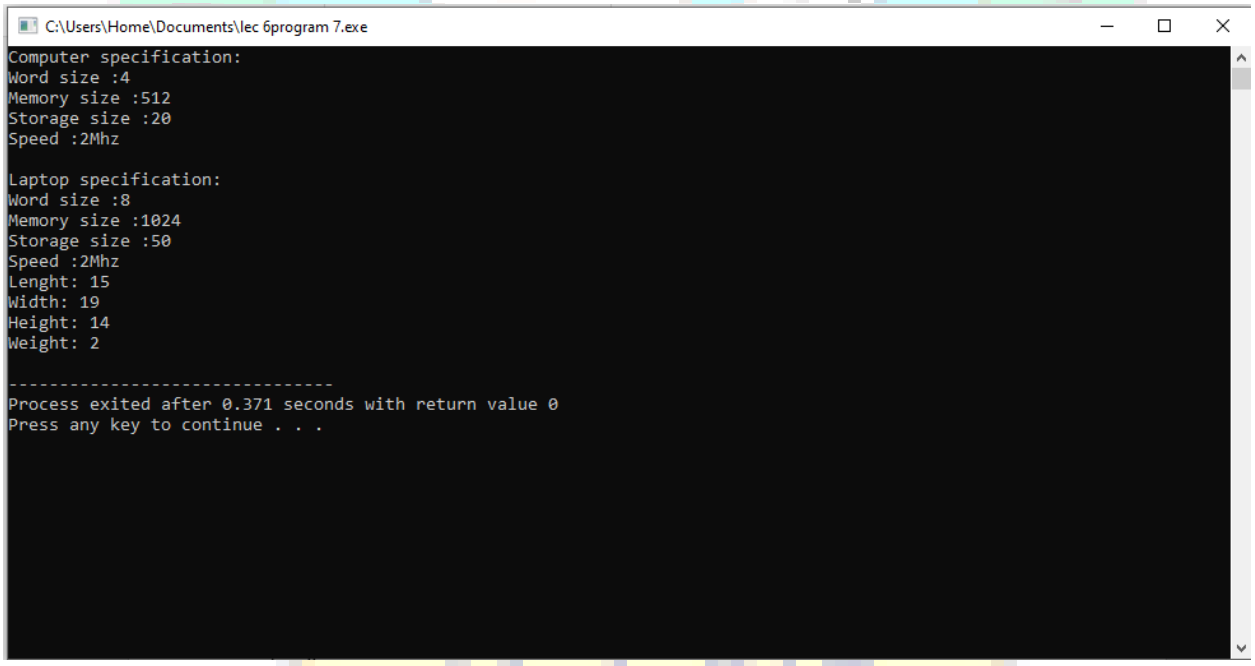
```
#include <iostream>

using namespace std;

class Computer{

      protected:

            int wordSize;

            int memorySize;

            double storageSize;

            int speed;

 public:

  Computer() {      }

  Computer(int, int, double, int);

  void show();
```

```
   };
class Laptop:public Computer
{      private:
       double lenght, width, height;
       double weight;
   public:
       Laptop()  { }
       Laptop(int, int, double, int, double, double, double,
double);
   void show();
 };
Computer::Computer(int wdsiz, int memsiz, double storsiz, int
spd)
 {     wordSize=wdsiz;
       memorySize=memsiz;
   storageSize=storsiz;
       speed=spd;  }
 void Computer::show()
 {     cout<<"Word size :"<<wordSize<<endl;
```

```
        cout<<"Memory size :"<<memorySize<<endl;
        cout<<"Storage size :"<<storageSize<<endl;
        cout<<"Speed :"<<speed<<"Mhz"<<endl;  }
 Laptop::Laptop(int wdsiz, int memsiz, double storsiz, int spd,
double len, double wid, double ht, double wt) :
Computer(wdsiz, memsiz, storsiz, spd)
 { lenght=len;
   width=wid;
   height=ht;
   weight=wt; }
void Laptop::show()
{ Computer::show();
  cout<<"Lenght: "<<lenght<<endl;
  cout<<"Width: "<<width<<endl;
  cout<<"Height: "<<height<<endl;
  cout<<"Weight: "<<weight<<endl; }


int main ()
```

```
{
 Computer comp(4,512,20,2);
 Laptop lap(8,1024, 50,2, 15, 19,14,2);
 cout<<"Computer specification:"<<endl;
 comp.show();
 cout<<"\nLaptop specification:"<<endl;
 lap.show();
 return 0;
}
```

OUTPUT:



QUESTION :6

Write a program that declares two classes and defines a relationship between them using public inheritance.

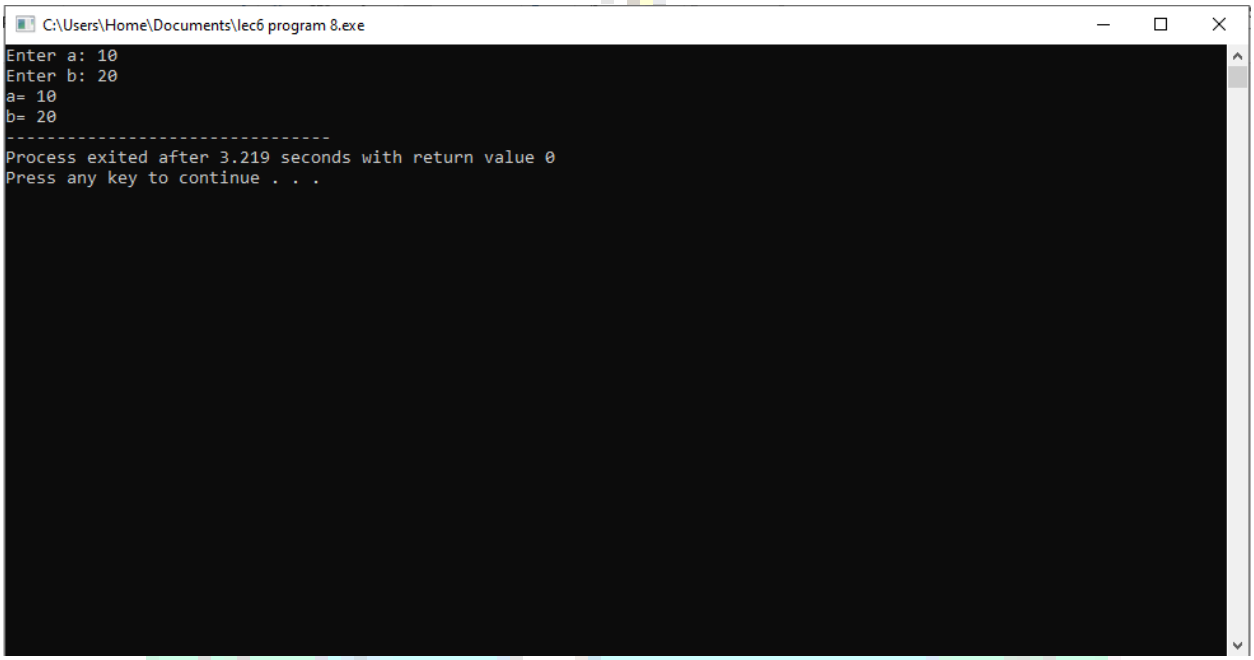
SOLUTION:

PROGRAM:

```
#include <iostream>
using namespace std;
class Parent{
  private:
      int c;
  protected:
      int b;
  public:
      int a;
 };
class Child: public Parent
 { public:
      void in()
      {
```

```
        cout<<"Enter a: ";
        cin>>a;
        cout<<"Enter b: ";
        cin>>b;
    }
    void out()
        {
        cout<<"a= "<<a<<endl;
        cout<<"b= "<<b;
        } };
int main ()
{
 Child obj;
 obj.in();
 obj.out();
 return 0;
}
```

OUTPUT:


C:\Users\Home\Documents\lec6 program 8.exe
Enter a: 10
Enter b: 20
a= 10
b= 20

Process exited after 3.219 seconds with return value 0
Press any key to continue . . .

QUESTION :7

Write a program that declares two classes and defines a relationship between them using protected inheritance.

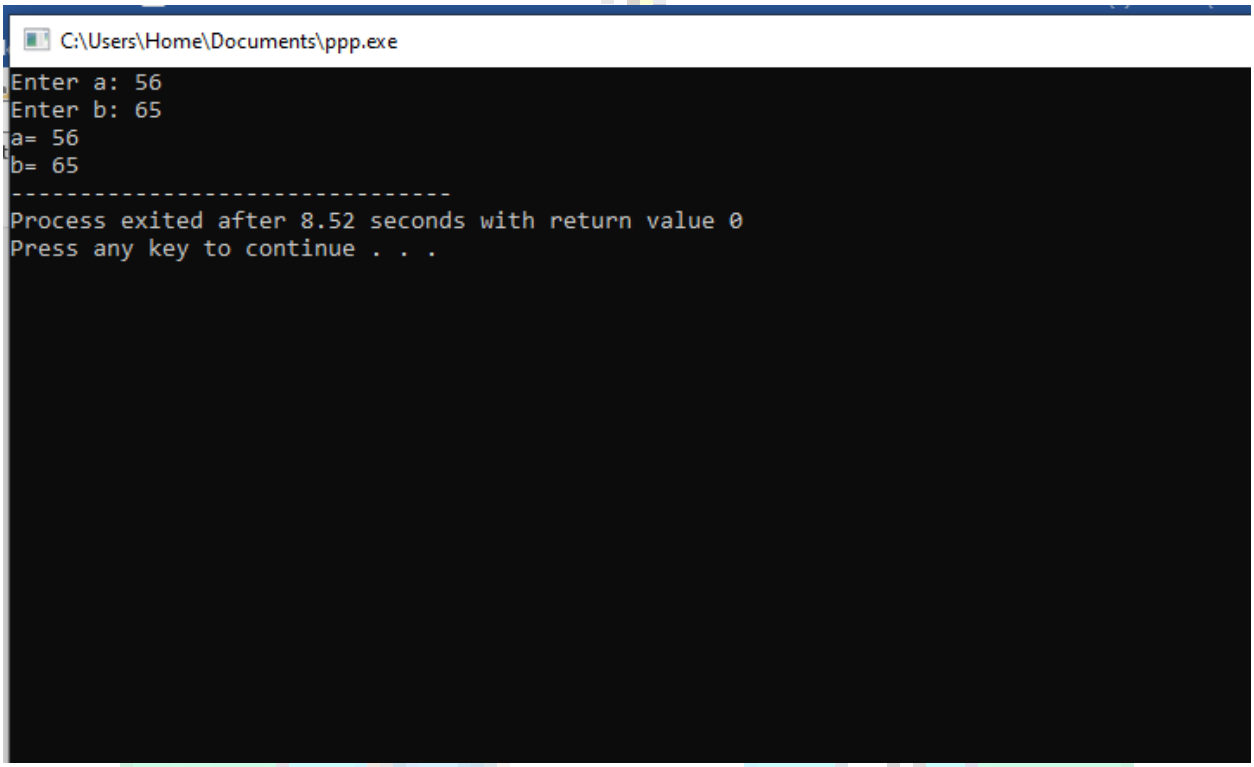
SOLUTION:

PROGRAM:

```
#include <iostream>
using namespace std;
class Parent{
  private:
      int c;
  protected:
      int b;
  public:
      int a;
 };
class Child: protected Parent
 { public:
      void in()
      {
```

```
        cout<<"Enter a: ";
        cin>>a;
        cout<<"Enter b: ";
        cin>>b;
    }
    void out()
        {
        cout<<"a= "<<a<<endl;
        cout<<"b= "<<b;
        } };
int main ()
{
 Child obj;
 obj.in();
 obj.out();
 return 0;
}
```

OUTPUT:


C:\Users\Home\Documents\ppp.exe
Enter a: 56
Enter b: 65
a= 56
b= 65

Process exited after 8.52 seconds with return value 0
Press any key to continue . . .

QUESTION :8

Write a program that declares two classes and defines a relationship between them using private inheritance.

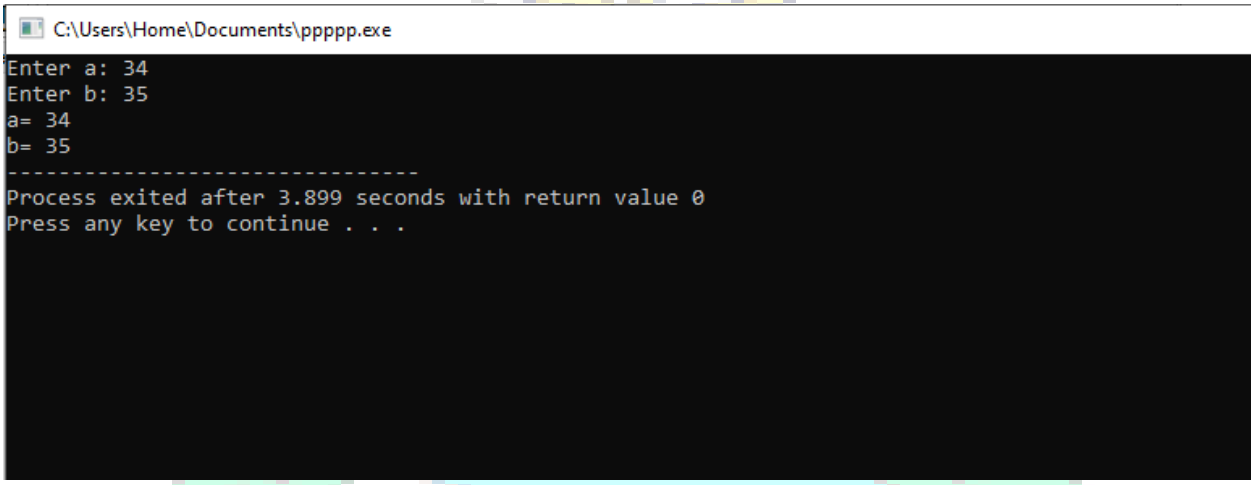
SOLUTION:

PROGRAM:

```
#include <iostream>

using namespace std;

class Parent{

  private:

      int c;

  protected:

      int b;

  public:

      int a;

 };

class Child: private Parent

 { public:

      void in()

      {
```

```
        cout<<"Enter a: ";
        cin>>a;
        cout<<"Enter b: ";
        cin>>b;
    }
    void out()
        {
        cout<<"a= "<<a<<endl;
        cout<<"b= "<<b;
        } };
int main ()
{
 Child obj;
 obj.in();
 obj.out();
 return 0;
}
```

OUTPUT:


C:\Users\Home\Documents\ppppp.exe
Enter a: 34
Enter b: 35
a= 34
b= 35

Process exited after 3.899 seconds with return value 0
Press any key to continue . . .

QUESTION :9

Write a program that declares two classes and defines a relationship between them using private inheritance.

SOLUTION:

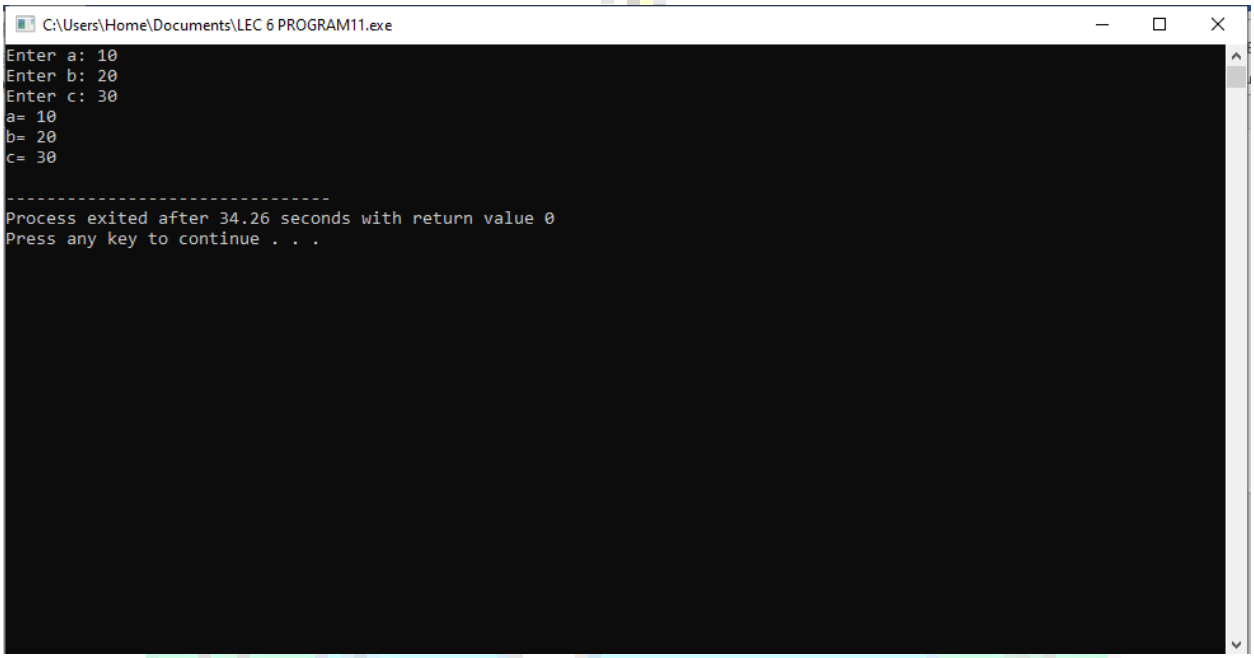
PROGRAM:

```
#include <iostream>
using namespace std;
class A
{  private:
        int a;
   public:
        void in()
        {cout<<"Enter a: ";
         cin>>a; }
    void out()
        { cout<<"a= "<<a<<endl;  }
 };
class B: public A
 { private:
```

```
        int b;
    public:
        void in()
        {A::in();
         cout<<"Enter b: ";
         cin>>b;  }
     void out()
        { A::out();
         cout<<"b= "<<b<<endl;  }
};
class C: public B
 { private:
        int c;
    public:
        void in()
        { B::in();
         cout<<"Enter c: ";
         cin>>c;
```

```
    }
    void out()
        {B::out();
         cout<<"c= "<<c<<endl;
        }
};

int main ()
{
 C obj;
 obj.in();
 obj.out();
 return 0;
}
```

OUTPUT:


C:\Users\Home\Documents\LEC 6 PROGRAM11.exe
Enter a: 10
Enter b: 20
Enter c: 30
a= 10
b= 20
c= 30

Process exited after 34.26 seconds with return value 0
Press any key to continue . . .

QUESTION :10

Write a class Person that has the attributes of id, name and address. It has a constructor to initialize, a member function to input and a member function to display data members.

Create 2nd class Student that inherits Person class. It has additional attributes of roll number and marks. It also has member function to input and display its data members.

Create 3rd class Scholarship that inherits Student class. It has additional attributes of Scholarship name and amount. It also has member function to input and display its data members.

SOLUTION:

PROGRAM:

```
#include <iostream>

using namespace std;

class Person{

  protected:

     int id;

     char name[50], address[100];

  public:

     Person()

     {id=0;

     name[0]='\0';
```

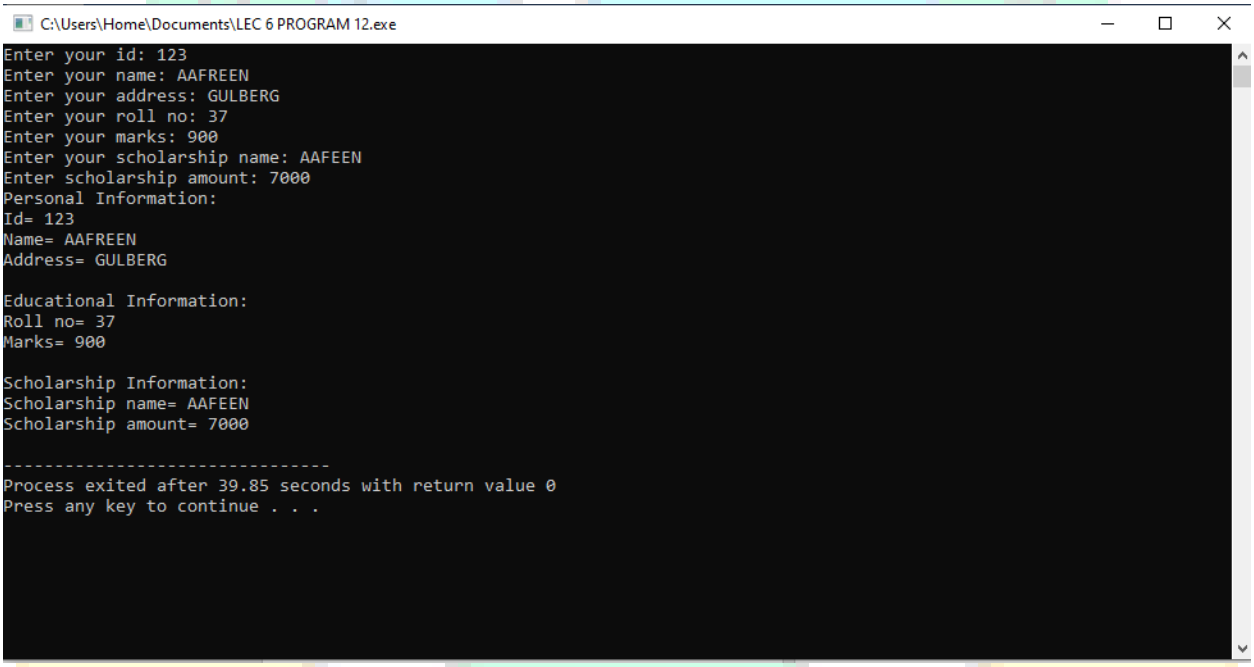
```
        address[0]='\0';}
        void input()
        { cout<<"Enter your id: ";
         cin>>id;
         cout<<"Enter your name: ";
         cin>>name;
         cout<<"Enter your address: ";
         cin>>address; }
    void output()
    {cout<<"Personal Information:\n";
      cout<<"Id= "<<id<<endl;
     cout<<"Name= "<<name<<endl;
    cout<<"Address= "<<address<<endl;
        } };
class Student: public Person
 { private:
        int rno, marks;
        public:
```

```
    Student()
    {   Person();
        rno=marks=0; }
  void input()
  {Person::input();
    cout<<"Enter your roll no: ";
    cin>>rno;
    cout<<"Enter your marks: ";
     cin>>marks; }
  void output()
   { Person::output();
cout<<"\nEducational Information:\n";
 cout<<"Roll no= "<<rno<<endl;
 cout<<"Marks= "<<marks<<endl;
  }
};
class Scholarship: public Student
 { private:
```

```
 char sname[50];
  long amount;
   public:
   void input()
 { Student::input();
cout<<"Enter your scholarship name: ";
 cin>>sname;
 cout<<"Enter scholarship amount: ";
 cin>>amount;
      }
  void output()
 { Student::output();
 cout<<"\nScholarship Information:\n";
cout<<"Scholarship name= "<<sname<<endl;
 cout<<"Scholarship amount= "<<amount<<endl;
     }
};
int main ()
```

```
{
 Scholarship obj;
 obj.input();
 obj.output();
 return 0;
}
```

OUTPUT:



QUESTION :11

Write a program that demonstrate the use of multilevel inheritance(with parameters).

SOLUTION:

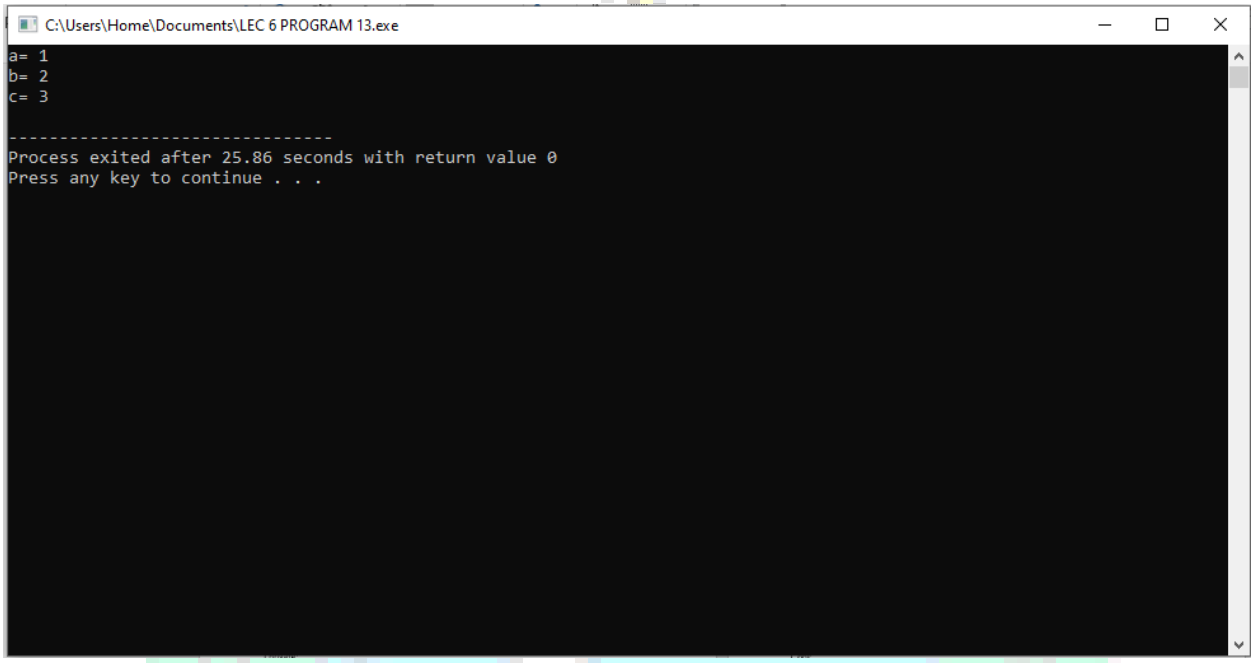
PROGRAM:

```
#include <iostream>
using namespace std;
class A{
  private:
      int a;
  public:
   void set(int x)
    {  a=x;  }
  void out()
    { cout<<"a= "<<a<<endl;
} };
class B: public A
 { private:
     int b;
```

```
  public:
    void set(int m, int n)
       { A::set(m);
         b=n; }
    void out()
      {  A::out();
         cout<<"b= "<<b<<endl;
        }
};
class C: public B
 { private:
       int c;
  public:
       void set(int g, int h, int k)
       {
             B::set(g,h);
         c=k;
   }
```

```
    void out()
        {
         B::out();
        cout<<"c= "<<c<<endl;
        }
 };

int main ()
{
 C obj;
 obj.set(1,2,3);
 obj.out();
 return 0;
}
```

OUTPUT:


C:\Users\Home\Documents\LEC 6 PROGRAM 13.exe
a= 1
b= 2
c= 3

Process exited after 25.86 seconds with return value 0
Press any key to continue . . .

QUESTION :12

Write a program that demonstrate the use of multiple inheritance

SOLUTION:

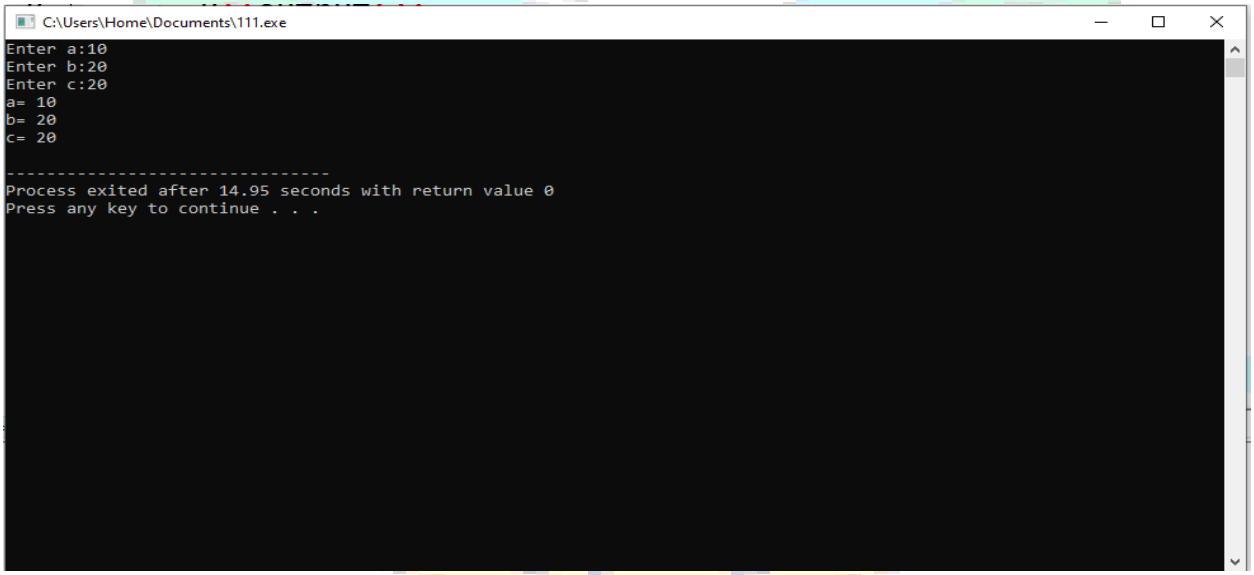
PROGRAM:

```
#include <iostream>
using namespace std;
class A{
   private:
     int a;
   public:
     void in()
     { cout<<"Enter a:";
        cin>>a; }
    void out()
     { cout<<"a= "<<a<<endl;
        } };
class B
  { private:
     int b;
```

```
public:
  void input()
  { cout<<"Enter b:";
    cin>>b;
  }
  void output()
    { cout<<"b= "<<b<<endl;
      } };
class C: public A, public B
{ private:
     int c;
  public:
     void get()
     { A::in();
      B::input();
      cout<<"Enter c:";
      cin>>c;
  }
  void show()
```

```
{ A::out();
  B::output();
 cout<<"c= "<<c<<endl;
} };

int main ()
{ C obj;
  obj.get();
  obj.show();
  return 0;
}
```

OUTPUT:



QUESTION :13

Write a program that demonstrates the use of constructor (without parameter) in multiple inheritance.

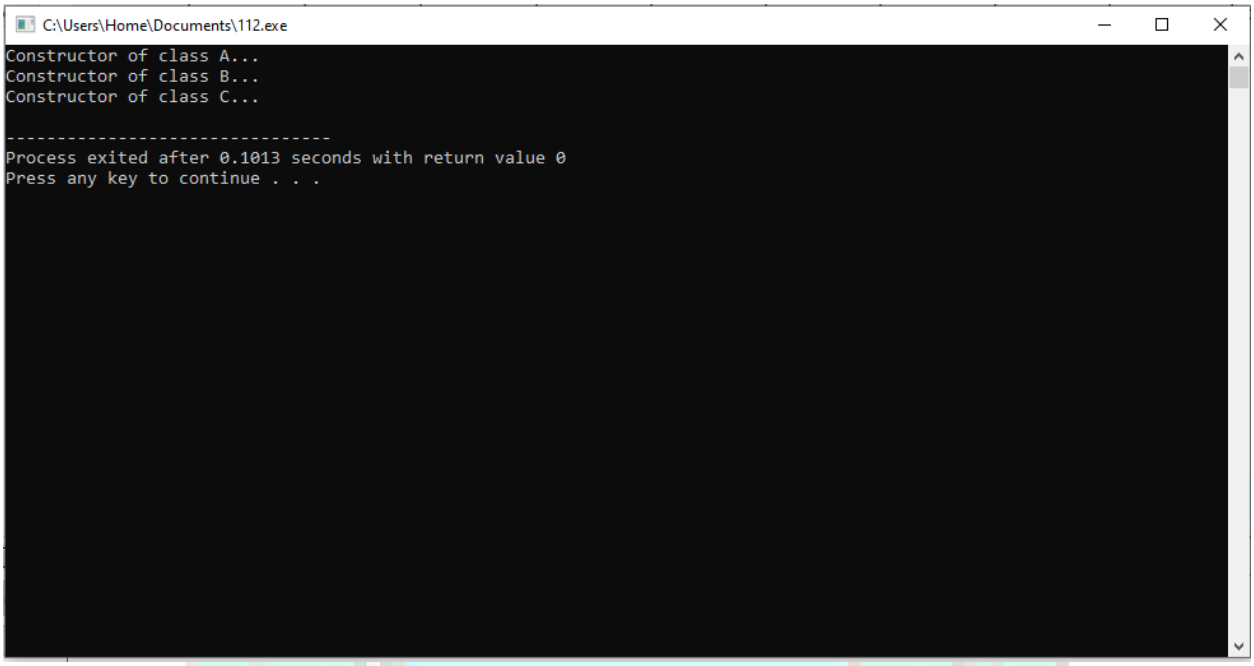
SOLUTION:

PROGRAM:

```
#include <iostream>
using namespace std;
class A{
  public:
   A()
   {
    cout<<"Constructor of class A..."<<endl;
   }  };
class B
 {
  public:
   B()
   {
    cout<<"Constructor of class B..."<<endl;
```

```
    } };
class C: public A, public B
  {
   public:
   C():B(),A()
  {
   cout<<"Constructor of class C..."<<endl;
    } };
int main ()
{
 C obj;
 return 0;
}
```

OUTPUT:


C:\Users\Home\Documents\112.exe
Constructor of class A...
Constructor of class B...
Constructor of class C...

Process exited after 0.1013 seconds with return value 0
Press any key to continue . . .

QUESTION :14

Write a program that demonstrates the use of constructor (with parameter) in multiple inheritance.

SOLUTION:

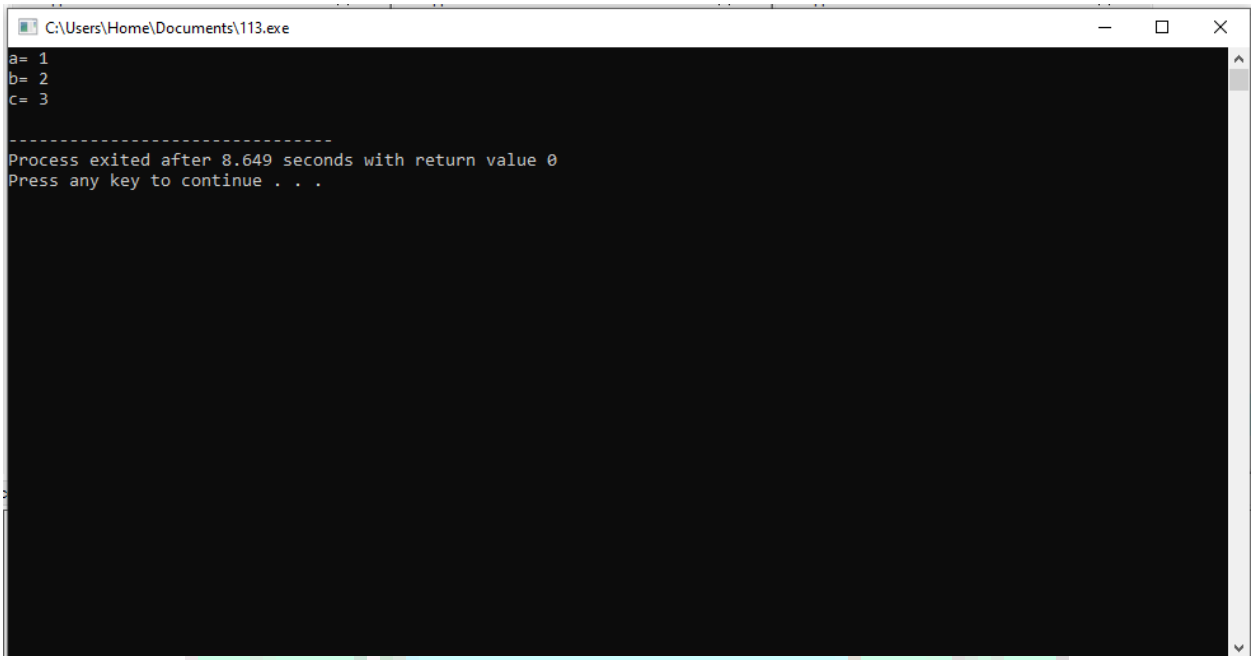
PROGRAM:

```
#include <iostream>
using namespace std;
class A{
   private:
       int a;
   public:
    A()
   { a=0; }
   A(int n)
   { a=n;  }
   void showA()
   {cout<<"a= "<<a<<endl; }  };
class B{
   private:
```

```
    int b;
  public:
   B()
   { b=0; }
   B(int n)
    { b=n;  }
   void showB()
   {cout<<"b= "<<b<<endl;
      } };
class C: public A, public B
{
  private:
      int c;
  public:
   C():B(), A()
   { c=0;
   }
   C(int x, int y, int z): A(x), B(y)
   {  c=z;
```

```
    }
    void showC()
    { A::showA();
      B::showB();
      cout<<"c= "<<c<<endl;
        }};

int main ()
{
 C obj(1,2,3);
 obj.showC();
 return 0;
}
```

OUTPUT:


C:\Users\Home\Documents\113.exe
a= 1
b= 2
c= 3

Process exited after 8.649 seconds with return value 0
Press any key to continue . . .

QUESTION :15

Write a program that demonstrate ambiguity in multiple inheritance.

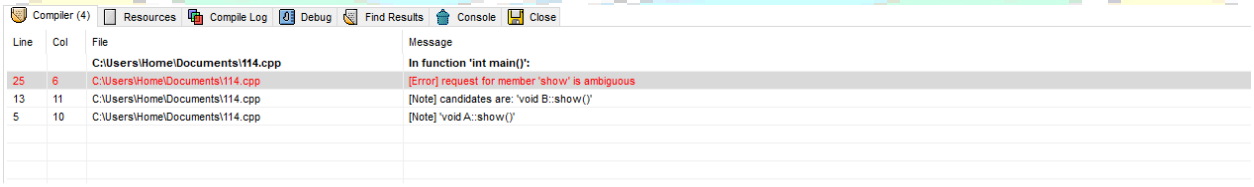
SOLUTION:

PROGRAM:

```
#include <iostream>
using namespace std;
class A{
   public:
    void show()
    {
      cout<<"Class A..."<<endl;
    }
  };
class B
  {
   public:
    void show()
     {
      cout<<"Class B..."<<endl;
```

```
    }
 };
class C: public A, public B
{
};

int main ()
{
 C obj;
 obj.show();
 return 0;
}
```

OUTPUT:



Line	Col	File	Message
		C:\Users\Home\Documents\114.cpp	In function 'int main()':
25	6	C:\Users\Home\Documents\114.cpp	[Error] request for member 'show' is ambiguous
13	11	C:\Users\Home\Documents\114.cpp	[Note] candidates are: 'void B::show()'
5	10	C:\Users\Home\Documents\114.cpp	[Note] 'void A::show()'

QUESTION :16

Write a program that demonstrate ambiguity in multiple inheritance.

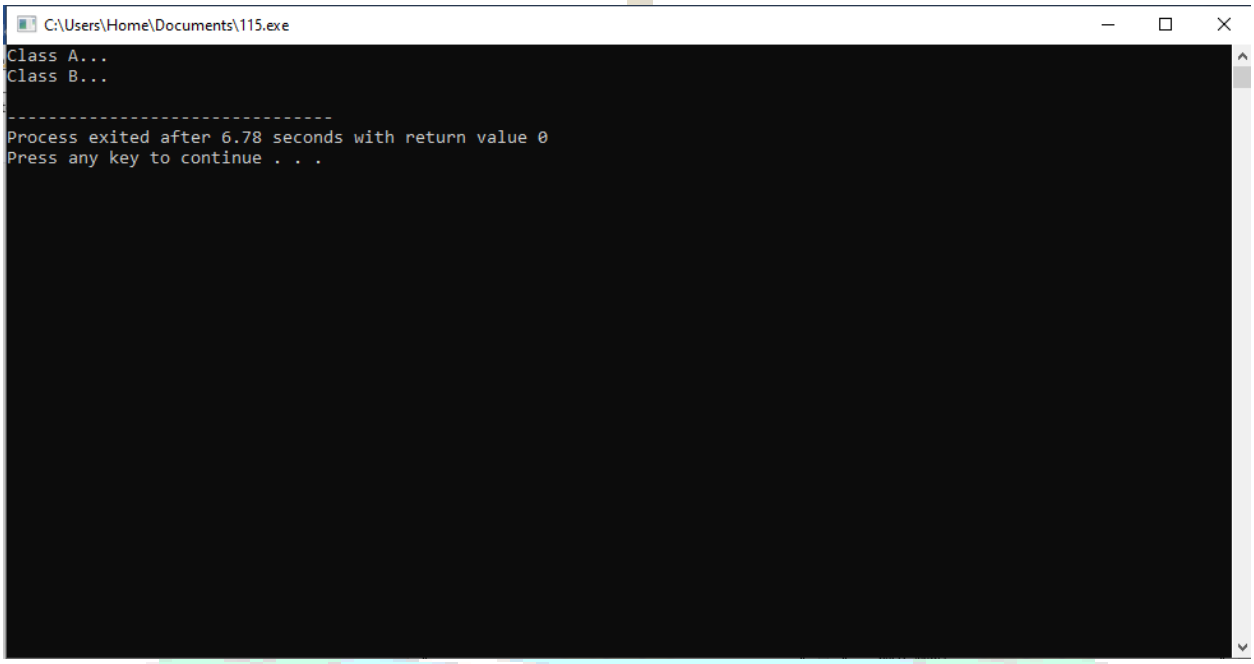
SOLUTION:

PROGRAM:

```
#include <iostream>
using namespace std;
class A{
   public:
    void show()
    {
      cout<<"Class A..."<<endl;
    }
  };
class B
  {
    public:
     void show()
      {
       cout<<"Class B..."<<endl;
```

```
    }
 };
class C: public A, public B
{
};
int main ()
{
 C obj;
 obj.A::show();
 obj.B::show();
 return 0;
}
```

OUTPUT:


C:\Users\Home\Documents\115.exe
Class A...
Class B...

Process exited after 6.78 seconds with return value 0
Press any key to continue . . .

QUESTION :17

Write a program that removes the ambiguity in multiple inheritance.

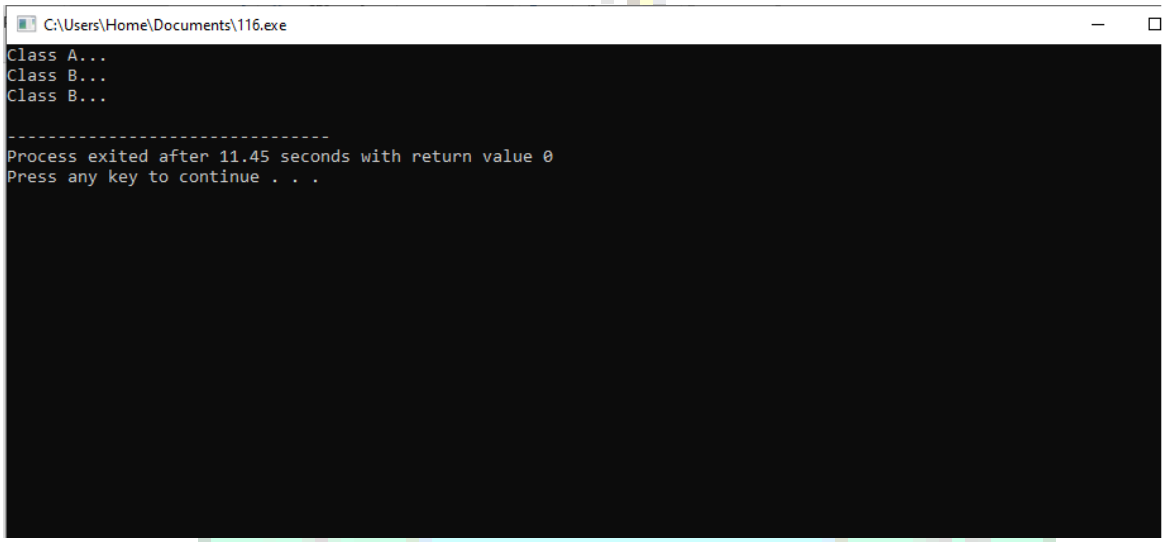
SOLUTION:

PROGRAM:

```
#include <iostream>
using namespace std;
class A{
   public:
    void show()
    {
      cout<<"Class A..."<<endl;
    }
  };
class B
 {
   public:
    void show()
    {
     cout<<"Class B..."<<endl;
```

```
    }
 };
class C: public A, public B
{
 public:
        void show()
        {
          A::show();
       B::show();
          cout<<"Class B..."<<endl;
    }
};
int main ()
{
 C obj;
 obj.show();
 return 0;
}
```

OUTPUT:


C:\Users\Home\Documents\116.exe
Class A...
Class B...
Class B...

Process exited after 11.45 seconds with return value 0
Press any key to continue . . .

QUESTION :18

Write a class Result that has an array of integers as attributes. It has a member function to input and a member function to display average of array elements.

Create another class Student that inherits Result class. It has additional attributes of roll number, name and an object of type Result. It has a member function to input and a member function to display its data members

SOLUTION:

PROGRAM:

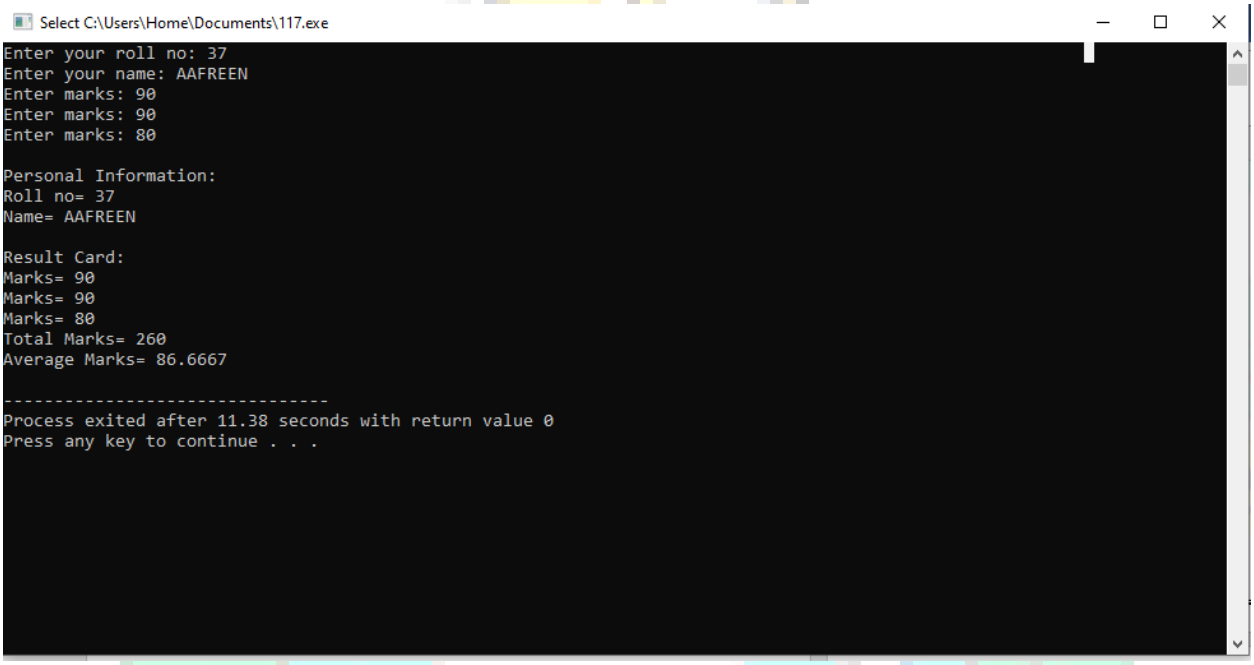
```
#include <iostream>
using namespace std;
class Result{
  private:
   int marks[3];
  public:
  void input()
 { for(int i=0; i<3; i++)
   {  cout<<"Enter marks: ";
     cin>>marks[i];
      } }
   void show()
```

```
{    int t=0;
  cout<<"\nResult Card: \n";
  for(int i=0; i<3; i++)
{
cout<<"Marks= "<<marks[i]<<endl;
 t=t+marks[i];
}
cout<<"Total Marks= "<<t<<endl; cout<<"Average Marks=
"<<float(t)/3.0<<endl;
      }
};
class Student
{ private:
    int rno;
    char name[50];
    Result res;
   public:
 void input()
 {cout<<"Enter your roll no: ";
```

```
    cin>>rno;
    cout<<"Enter your name: ";
     cin>>name;
    res.input();
       }
   void show()
  {
  cout<<"\nPersonal Information:\n";
  cout<<"Roll no= "<<rno<<endl;
  cout<<"Name= "<<name<<endl;
    res.show();
       }
 };
int main ()
{
 Student obj;
 obj.input();
 obj.show();
 return 0;
```

}

OUTPUT:


Select C:\Users\Home\Documents\117.exe
Enter your roll no: 37
Enter your name: AAFREEN
Enter marks: 90
Enter marks: 90
Enter marks: 80
Personal Information:
Roll no= 37
Name= AAFREEN
Result Card:
Marks= 90
Marks= 90
Marks= 80
Total Marks= 260
Average Marks= 86.6667
Process exited after 11.38 seconds with return value 0
Press any key to continue . . .