PRACTICAL FILE
ON
OBJECT ORIENTED PROGRAMMIG USING C++

SESSION 2024 – 2025

DAYANAND COLLEGE

HISAR

Submitted to:-

Mrs. Pushpa Mam

[Assistant Professor
Computer Science
Department]

Submitted by:-

Vivek

Class:- BCA-2nd Sem.

Uni. ROLL NO.: 243042220115

Index

Question 1. Write a program to check whether a number is even or not. 4

Question 2. Write a program to check whether a number is prime or not. 6

Question 3. Write a program to find the factorial of given number. 8

Question 4. Write a program to find out the area of square, rectangle and circle by using function overloading. 10

Question 5. Write a program find out the average of two members by using member function define inside the class definition. 14

Question 6. Write a program to find the simple interest by using member member function define outside the class definition. 16

Question 7. Write a program to perform all arithmetic operation such as addition, subtraction, multiplication, division and modulus using inline function. 20

Question 8. Write a program to explain the concept of static data member. 24

Question 9. Write a program to explain the concept of static member function. 26

Question 10. Write a program to use the concept of friend function. 28

Question 11. Write a program to use the concept of friend class. 30

Question 12. Write a program to use the concept of parameterized constructor. 32

Question 13. Write a program to use the concept of copy constructor. 36

Question 14. Write a program to use the concept of constructor overloading. 38

Question 15. Write a program to use the concept of destructor. 40

Question 16. Write a program to overload the unary operator by using member function. 42

..... 43

Question 17. Write a program to overload the binary operator by using friend function. 44

Question 18. Write a program to use the concept of single inheritance (by using public method). 48

..... 51

Question 19. Write a program to use the concept of single inheritance (by using private method). 52

..... 53

Question 20. Write a program to sue the concept of multilevel inheritance (by using protected method). .54

Question 21. Write a program by using concept of multiple inheritance. 58

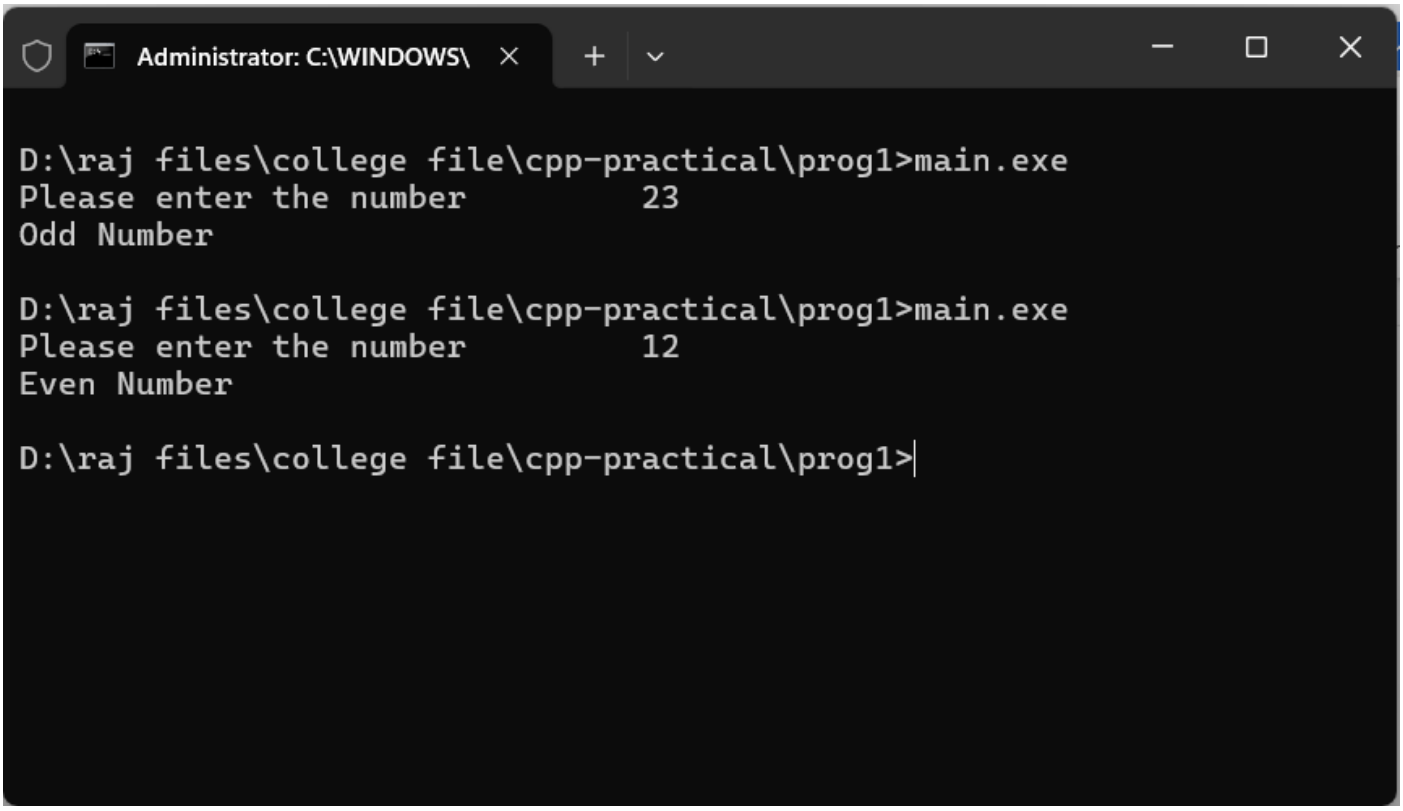
Question 22. Write a program by using various Manipulators. 60

Question 23. Write a program to use the concept of function overriding. 62

Question 24. Write a program to use the concept of virtual base class. 64

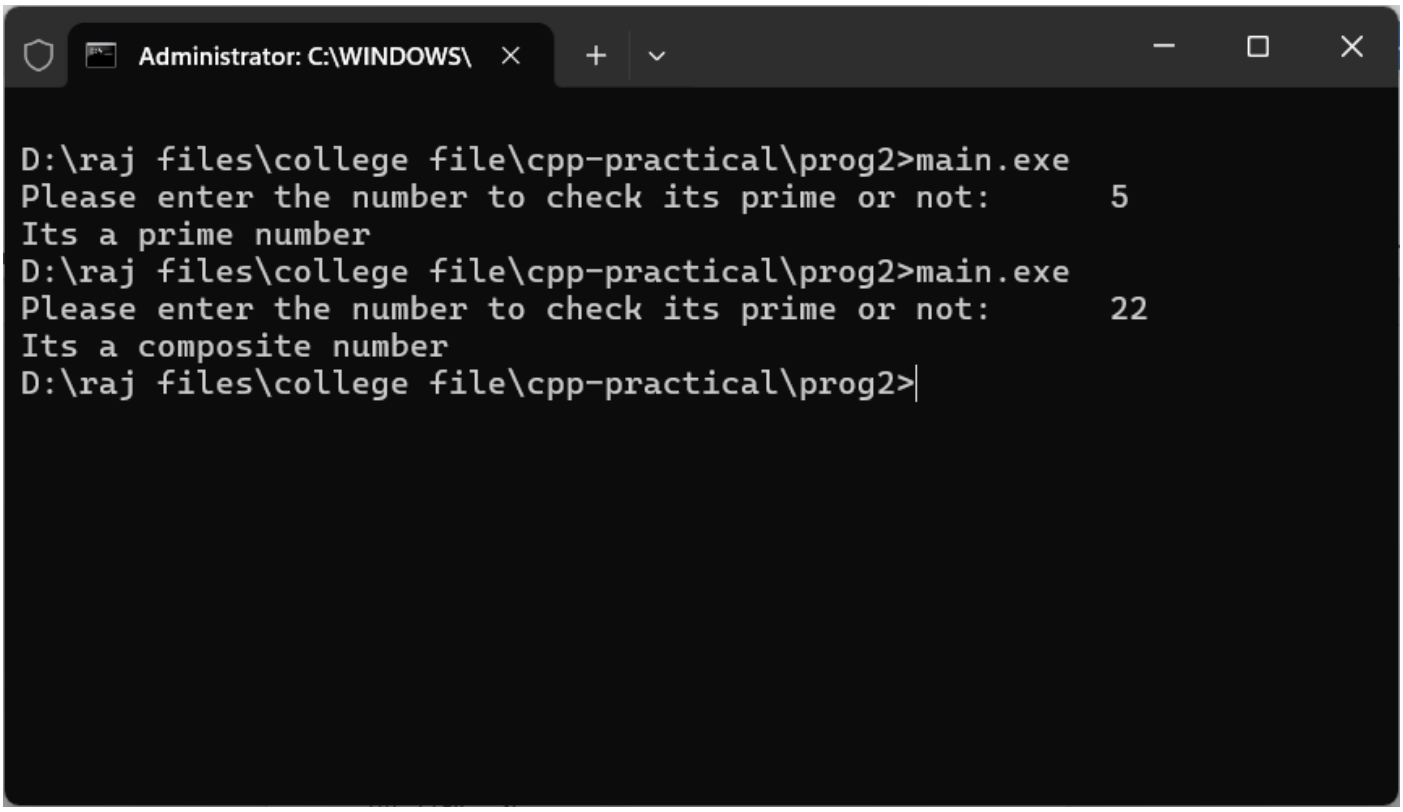
Question 25. Write a program to use the concept of inheritance and parameterized constructor. 66

Question 26. Write a program to use the concept of virtual function. 68


Administrator: C:\WINDOWS\
D:\raj files\college file\cpp-practical\prog1>main.exe
Please enter the number 23
Odd Number
D:\raj files\college file\cpp-practical\prog1>main.exe
Please enter the number 12
Even Number
D:\raj files\college file\cpp-practical\prog1>

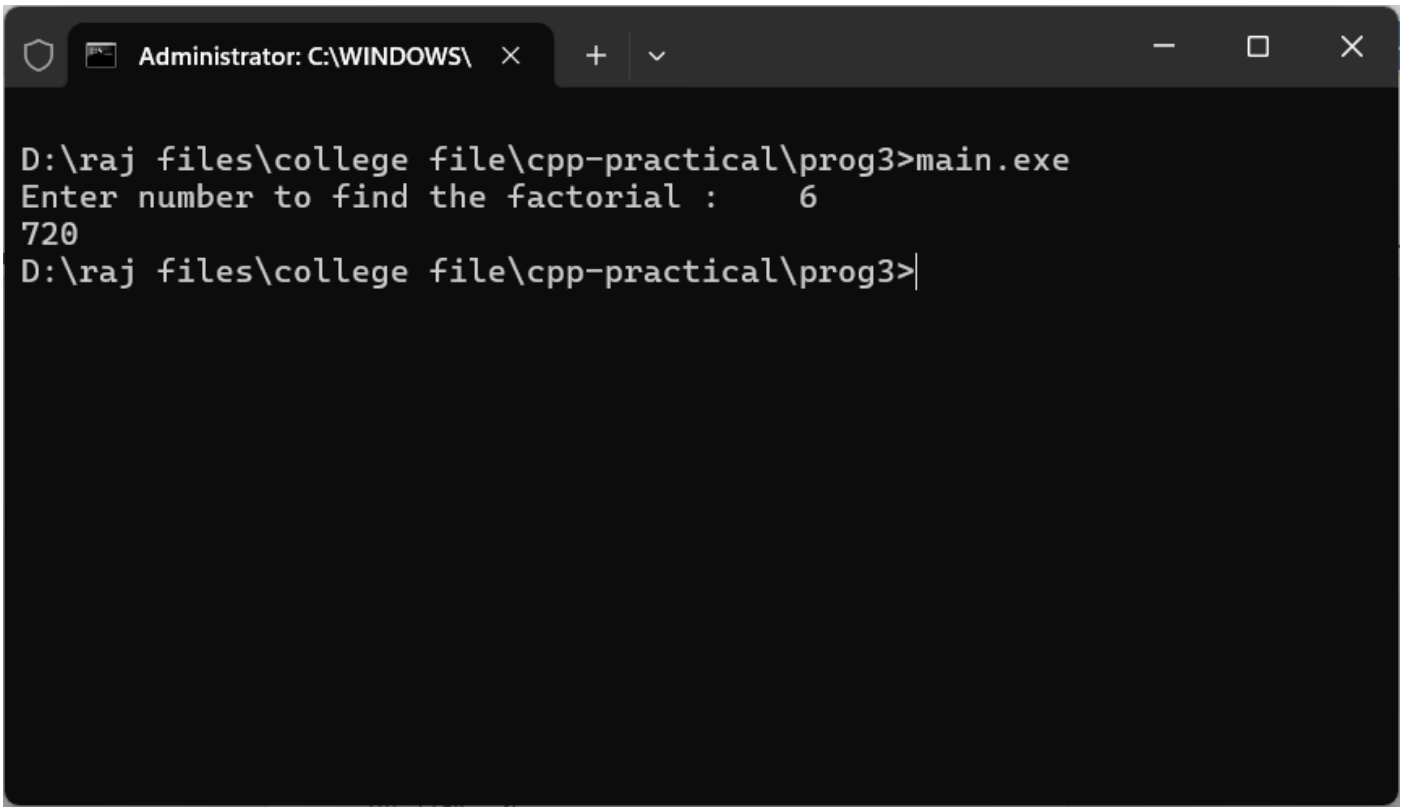
Question 1. Write a program to check whether a number is even or not.

```
#include <iostream>
using namespace std;
void parity(int num);
int main()
{
    int num;
    cout << "Please enter the number \t";
    cin >> num;
    parity(num);
    return 0;
}
void parity(int num)
{
    (num%2 == 0)? cout << "Even Number\n" : cout << "Odd
Number\n";
}
```


Administrator: C:\WINDOWS\
D:\raj files\college file\cpp-practical\prog2>main.exe
Please enter the number to check its prime or not: 5
Its a prime number
D:\raj files\college file\cpp-practical\prog2>main.exe
Please enter the number to check its prime or not: 22
Its a composite number
D:\raj files\college file\cpp-practical\prog2>

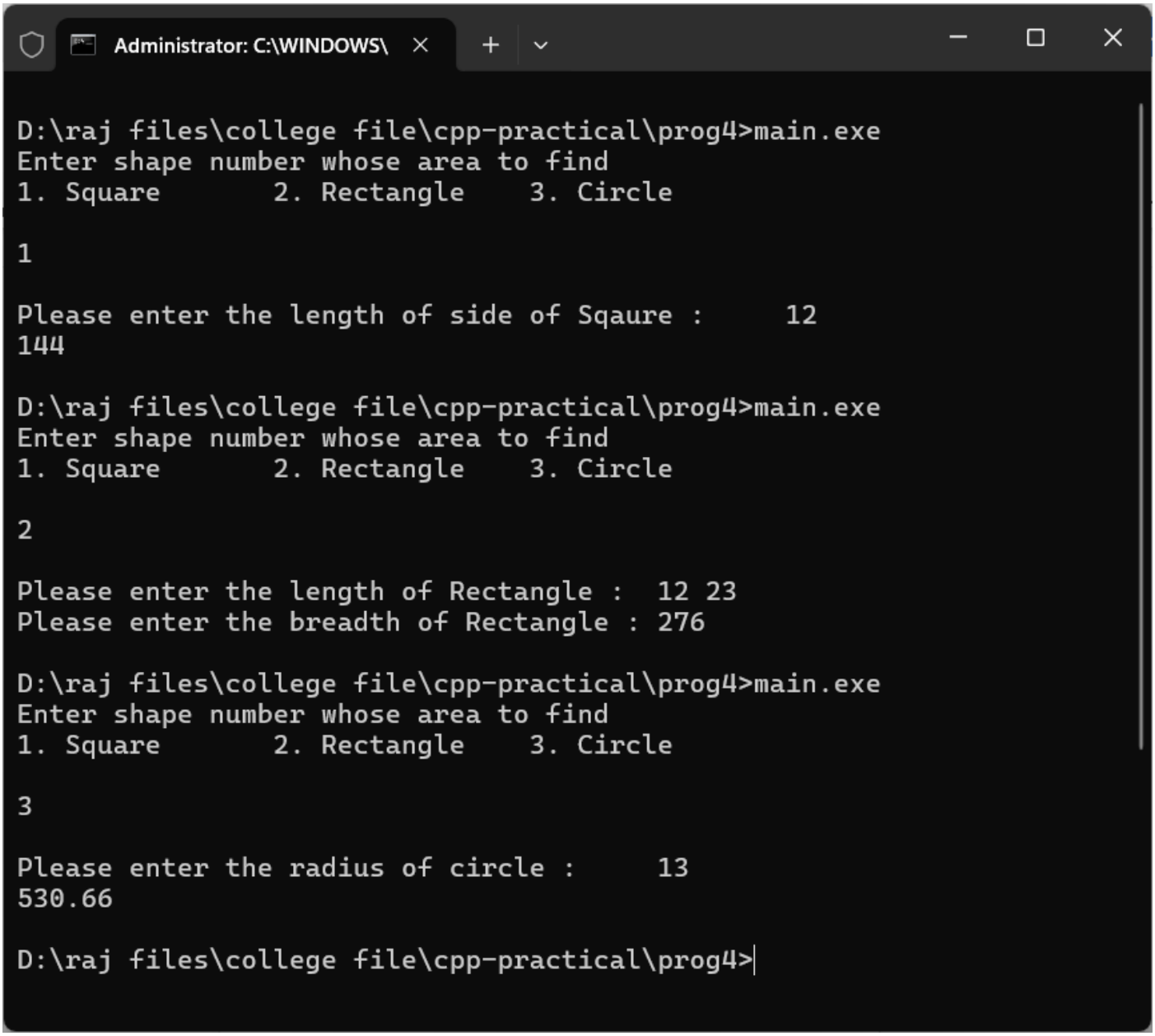
Question 2. Write a program to check whether a number is prime or not.

```
#include<iostream>
using namespace std;
void primality(int num);
int main()
{
    int num;
    cout << "Please enter the number to check its prime or not:\t";
    cin >> num;
    primality(num);
    return 0;
}
void primality(int num)
{
    int flag = 0;
    if (num<=1){cout << "Its not a prime number or composite number"; return ;}
    for (int i = 2; i<num; i++)
    {
        if ((num % i) == 0){flag++; break;}
    }
    if (flag) {cout <<"Its a composite number"; return ;}
    else {cout <<"Its a prime number"; return ;}}
```


Administrator: C:\WINDOWS\
D:\raj files\college file\cpp-practical\prog3>main.exe
Enter number to find the factorial : 6
720
D:\raj files\college file\cpp-practical\prog3>

Question 3. Write a program to find the factorial of given number.

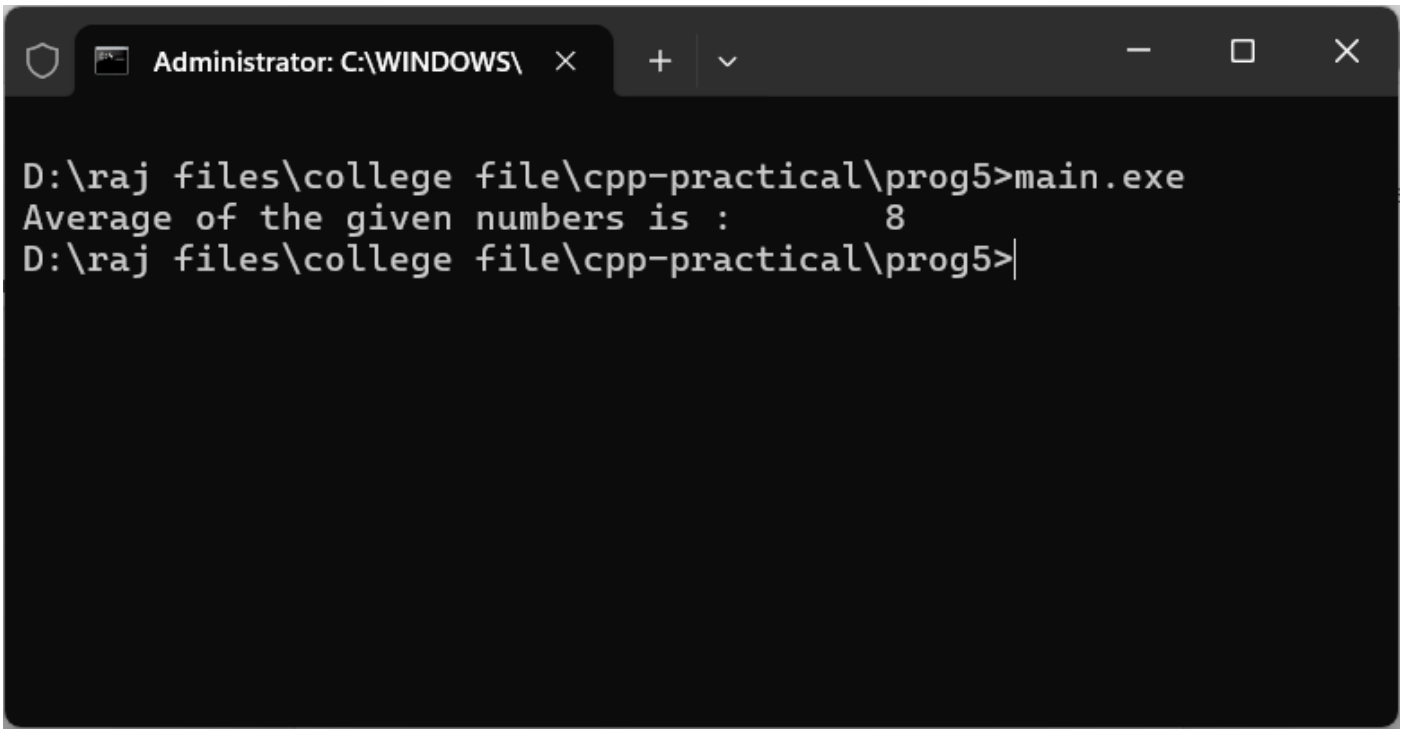
```
#include<iostream>
using namespace std;
int fact(int num);
int main()
{
    int num;
    cout << "Enter number to find the factorial : \t";
    cin >> num;
    cout << fact(num);
    return 0;
}
int fact(int num)
{
    if((num == 0) || (num == 1)){return num;}
    else {return num * fact(num-1);}
}
```


Administrator: C:\WINDOWS\
D:\raj files\college file\cpp-practical\prog4>main.exe
Enter shape number whose area to find
1. Square 2. Rectangle 3. Circle
1
Please enter the length of side of Sqaure : 12
144
D:\raj files\college file\cpp-practical\prog4>main.exe
Enter shape number whose area to find
1. Square 2. Rectangle 3. Circle
2
Please enter the length of Rectangle : 12 23
Please enter the breadth of Rectangle : 276
D:\raj files\college file\cpp-practical\prog4>main.exe
Enter shape number whose area to find
1. Square 2. Rectangle 3. Circle
3
Please enter the radius of circle : 13
530.66
D:\raj files\college file\cpp-practical\prog4>

Question 4. Write a program to find out the area of square, rectangle and circle by using function overloading.

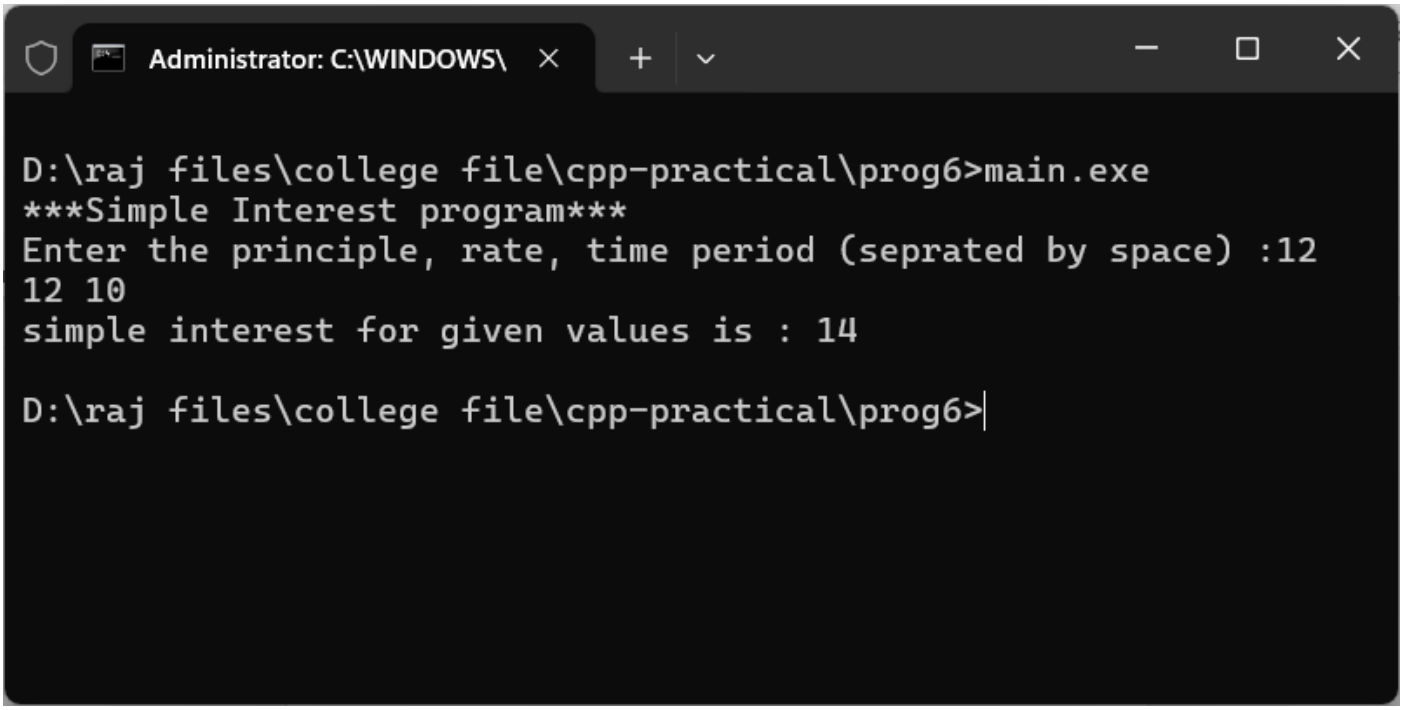
```
#include <iostream>
#define PI 3.14
using namespace std;
void area(int length);
void area(int length, int breadth);
void area(int radius, char circle);
int main()
{
    int opt, length, breadth, radius;
    cout<<"Enter shape number whose area to find\n1. Square\t2. Rectangle\t3. Circle\n"<<endl;
    cin >> opt;
    switch (opt)
    {
        case 1:
            cout << "\nPlease enter the length of side of Sqaure :\t";
            cin >> length;
            area(length);
            break;
        case 2:
            cout << "\nPlease enter the length of Rectangle :\t";
            cin >> length;
            cout << "Please enter the breadth of Rectangle :\t";
            cin >> breadth;
```

```
            area(length, breadth);
            break;
        case 3:
            cout << "\nPlease enter the radius of circle :\t";
            cin >> radius;
            area(radius, 'c');
            break;
    }
    return 0;
}
void area(int length)
{
    cout << length*length << endl;
}
void area(int length, int breadth)
{
    cout << length*breadth << endl;
}
void area(int radius, char circle)
{
    cout << (PI * radius * radius) << endl;
}
```


Administrator: C:\WINDOWS\
D:\raj files\college file\cpp-practical\prog5>main.exe
Average of the given numbers is :   8
D:\raj files\college file\cpp-practical\prog5>

Question 5. Write a program find out the average of two members by using member function define inside the class definition.

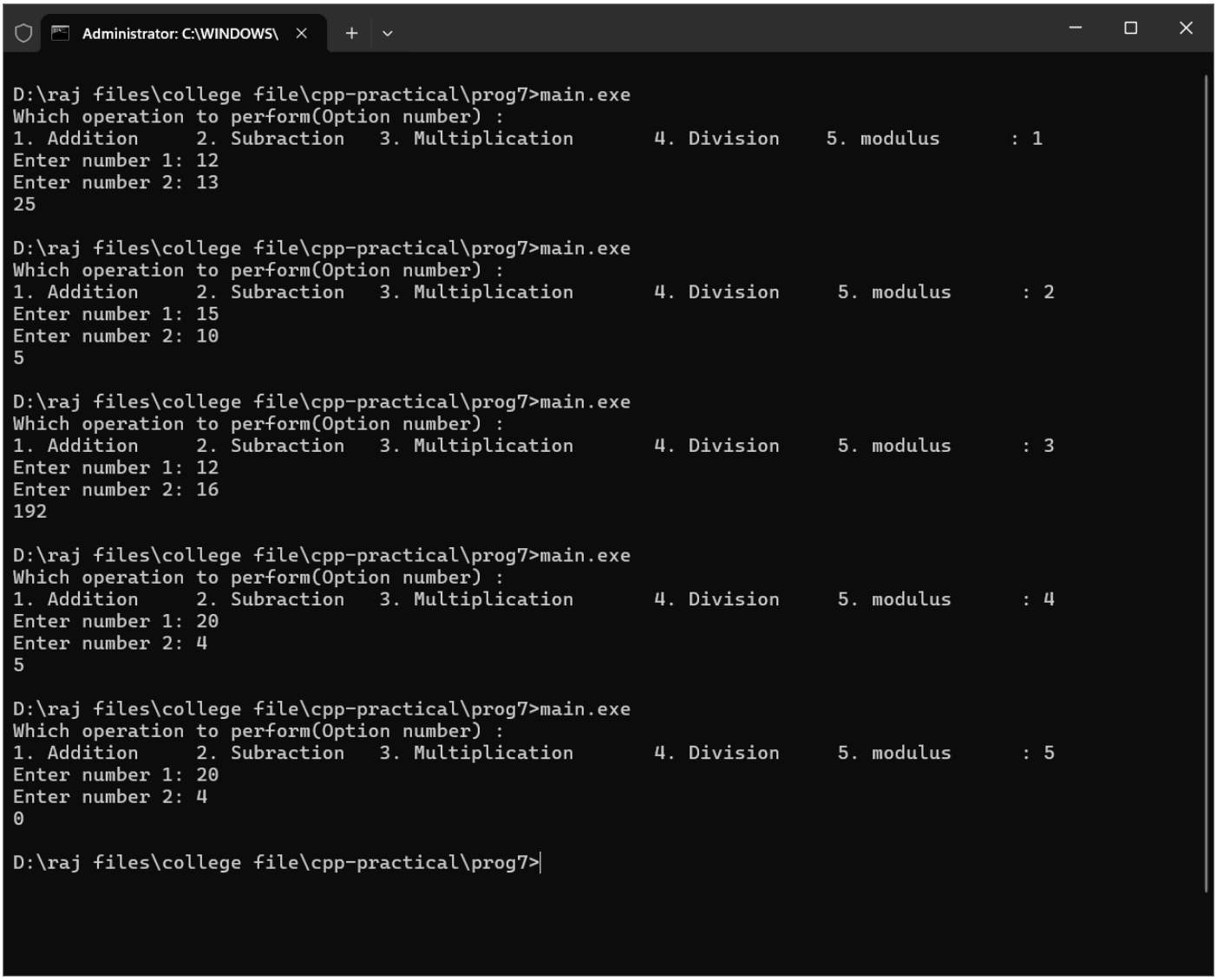
```
#include<iostream>
using namespace std;
class Math_Function
{
    int num1, num2;
    public:
        Math_Function(int first, int second)
        {
            num1 = first;
            num2 = second;
        }
        void average()
        {
            cout<< "Average of the given numbers is :\t"<<
((num1 + num2)/2);
        }
};
int main()
{
    Math_Function obj1(5, 12);
    obj1.average();
    return 0;
}
```


Administrator: C:\WINDOWS\
D:\raj files\college file\cpp-practical\prog6>main.exe
Simple Interest program
Enter the principle, rate, time period (seprated by space) :12
12 10
simple interest for given values is : 14
D:\raj files\college file\cpp-practical\prog6>

Question 6. Write a program to find the simple interest by using member member function define outside the class definition.

```
#include<iostream>
using namespace std;
class MyClass
{
    int principle, rate, time;
    public:
        void SetValues(int p, int r, int t);
        void Interest();
};
void MyClass :: SetValues(int p, int r, int t)
{
    principle = p; rate = r; time = t;
}
void MyClass :: Interest()
{
    cout << "simple interest for given values is : " <<
((principle * rate * time) / 100) << endl;
}
int main()
{
    int p, r, t;
    MyClass obj1;
    cout << "***Simple Interest program***" << endl;
    cout << "Enter the principle, rate, time period (seprated
by space) : ";
    cin >> p >> r >> t;
```

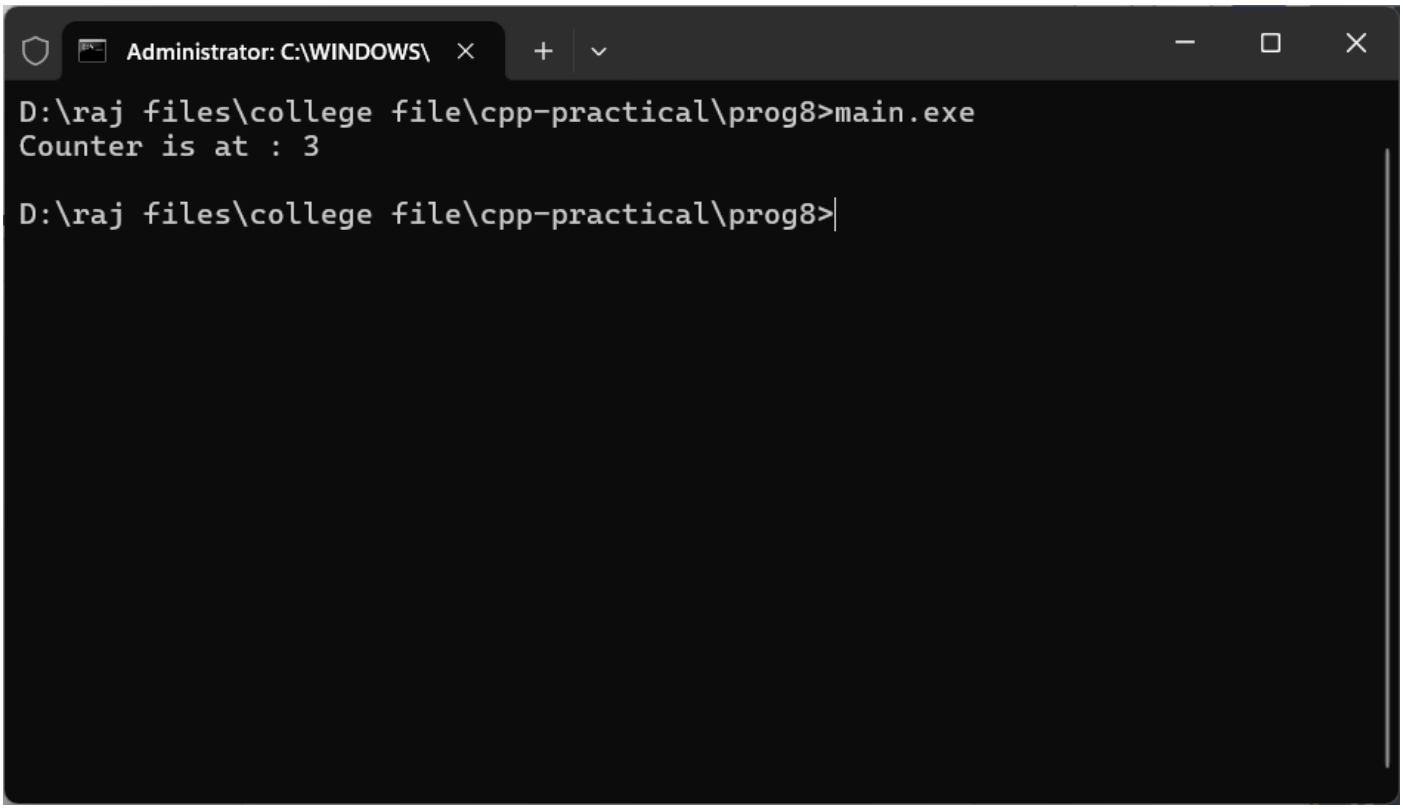
```
    obj1.SetValues(p, r, t);
    obj1.Interest();
    return 0;
}
```


Administrator: C:\WINDOWS\
D:\raj files\college file\cpp-practical\prog7>main.exe
Which operation to perform(Option number) :
1. Addition 2. Subraction 3. Multiplication 4. Division 5. modulus : 1
Enter number 1: 12
Enter number 2: 13
25
D:\raj files\college file\cpp-practical\prog7>main.exe
Which operation to perform(Option number) :
1. Addition 2. Subraction 3. Multiplication 4. Division 5. modulus : 2
Enter number 1: 15
Enter number 2: 10
5
D:\raj files\college file\cpp-practical\prog7>main.exe
Which operation to perform(Option number) :
1. Addition 2. Subraction 3. Multiplication 4. Division 5. modulus : 3
Enter number 1: 12
Enter number 2: 16
192
D:\raj files\college file\cpp-practical\prog7>main.exe
Which operation to perform(Option number) :
1. Addition 2. Subraction 3. Multiplication 4. Division 5. modulus : 4
Enter number 1: 20
Enter number 2: 4
5
D:\raj files\college file\cpp-practical\prog7>main.exe
Which operation to perform(Option number) :
1. Addition 2. Subraction 3. Multiplication 4. Division 5. modulus : 5
Enter number 1: 20
Enter number 2: 4
0
D:\raj files\college file\cpp-practical\prog7>

Question 7. Write a program to perform all arithmetic operation such as addition, subtraction, multiplication, division and modulus using inline function.

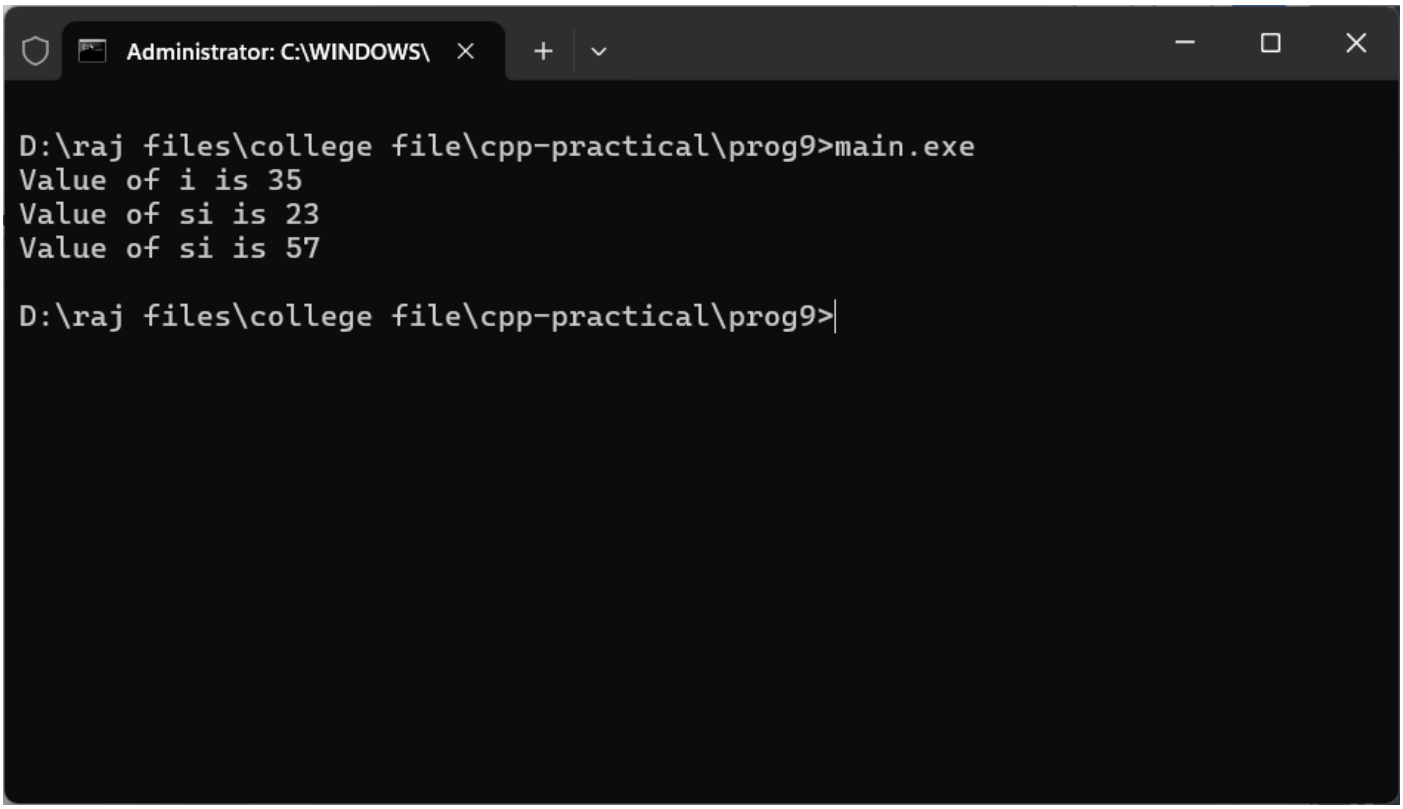
```
#include<iostream>
using namespace std;
int num1, num2;
inline void add(){cout << num1+num2 << endl;}
inline void sub(){cout << num1-num2 << endl;}
inline void mult(){cout << num1*num2 << endl;}
inline void div(){cout << num1/num2 << endl;}
inline void mod(){cout << num1%num2 << endl;}
int main()
{
    int opt;
    cout << "Which operation to perform(Option number) :\n";
    cout << "1. Addition\t2. Subraction\t3. Multiplication\t4.
Division\t5. modulus\t: ";
    cin >> opt;
    cout << "Enter number 1: ";
    cin >> num1;
    cout << "Enter number 2: ";
    cin >> num2;
    switch (opt)
    {
        case 1: add(); break;
        case 2: sub(); break;
        case 3: mult(); break;
        case 4: div(); break;
```

```
        case 5: mod(); break;
        default:
            cout << "Invalid input";
    }
    return 0;
}
```


Administrator: C:\WINDOWS\
D:\raj files\college file\cpp-practical\prog8>main.exe
Counter is at : 3
D:\raj files\college file\cpp-practical\prog8>

Question 8. Write a program to explain the concept of static data member.

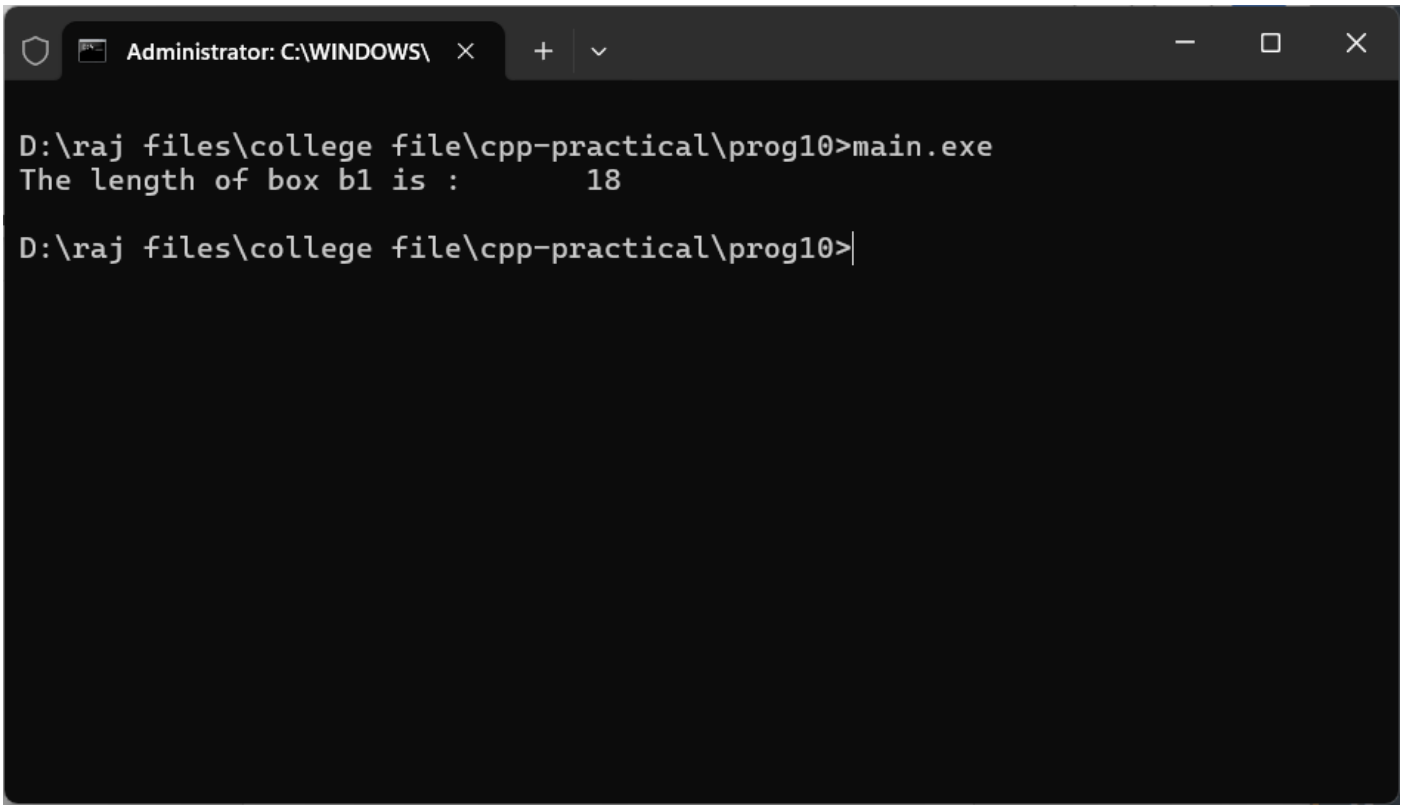
```
#include<iostream>
using namespace std;
class Static_Data
{
    public:
        static int counter;
        Static_Data(){counter++;}
};
int Static_Data::counter = 0;
int main()
{
    Static_Data obj1, obj2, obj3;
    cout << "Counter is at :\t" << Static_Data::counter<<endl;
    return 0;
}
```


Administrator: C:\WINDOWS\
D:\raj files\college file\cpp-practical\prog9>main.exe
Value of i is 35
Value of si is 23
Value of si is 57
D:\raj files\college file\cpp-practical\prog9>

Question 9. Write a program to explain the concept of static member function.

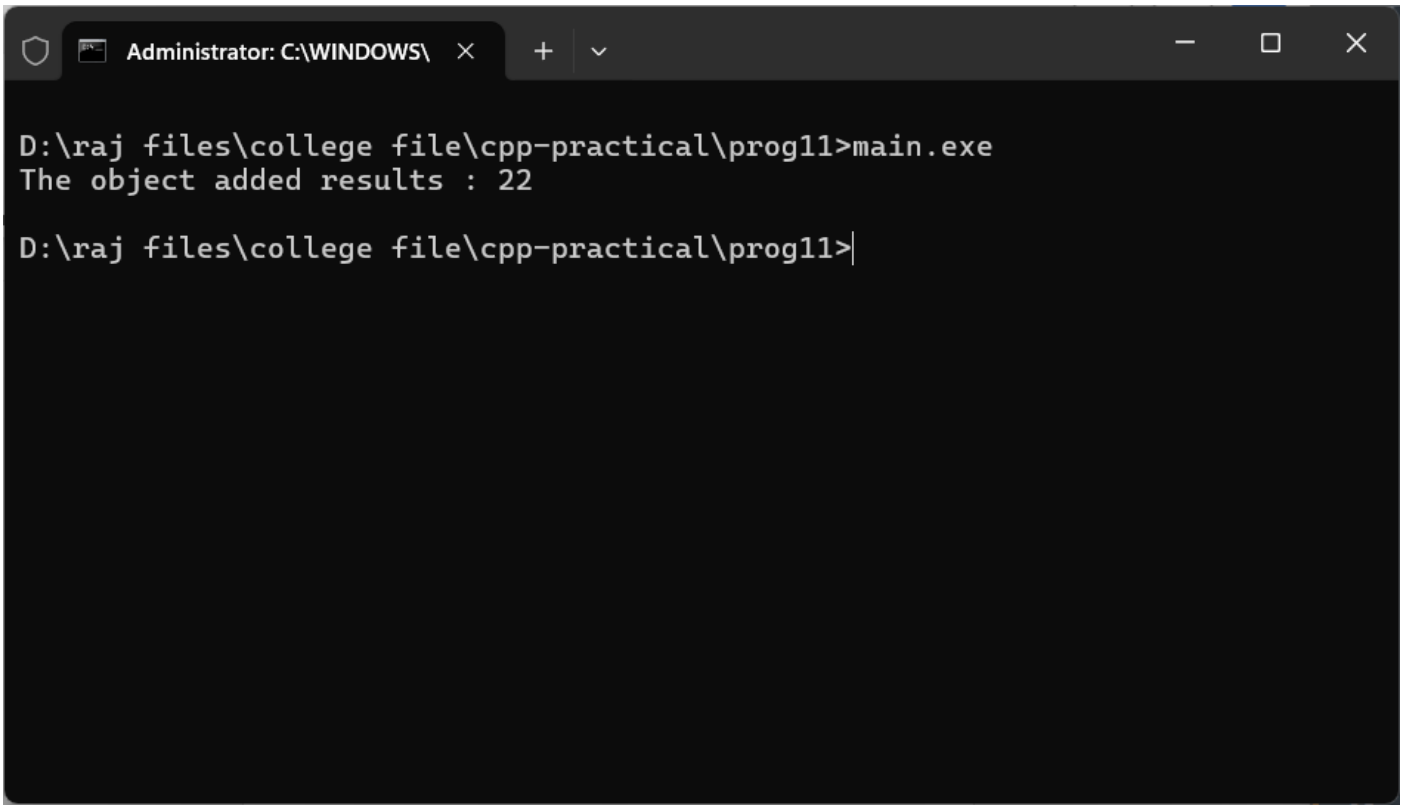
```
#include<iostream>
using namespace std;
class MyClass
{
    private:
        int i;
        static int si;
    public:
        void set_i(int arg){i = arg;}
        static void set_si(int arg){si = arg;}

        void print_i(){cout << "Value of i is " << i << endl;}
        static void print_si(){cout << "Value of si is " << si
<< endl;}
};
int MyClass :: si = 23;
int main()
{
    MyClass obj1;
    obj1.set_i(35);
    obj1.print_i();

    MyClass::print_si();
    MyClass::set_si(57);
    MyClass::print_si();
    return 0;
```

```
}
```


Administrator: C:\WINDOWS\
D:\raj files\college file\cpp-practical\prog10>main.exe
The length of box b1 is :   18
D:\raj files\college file\cpp-practical\prog10>

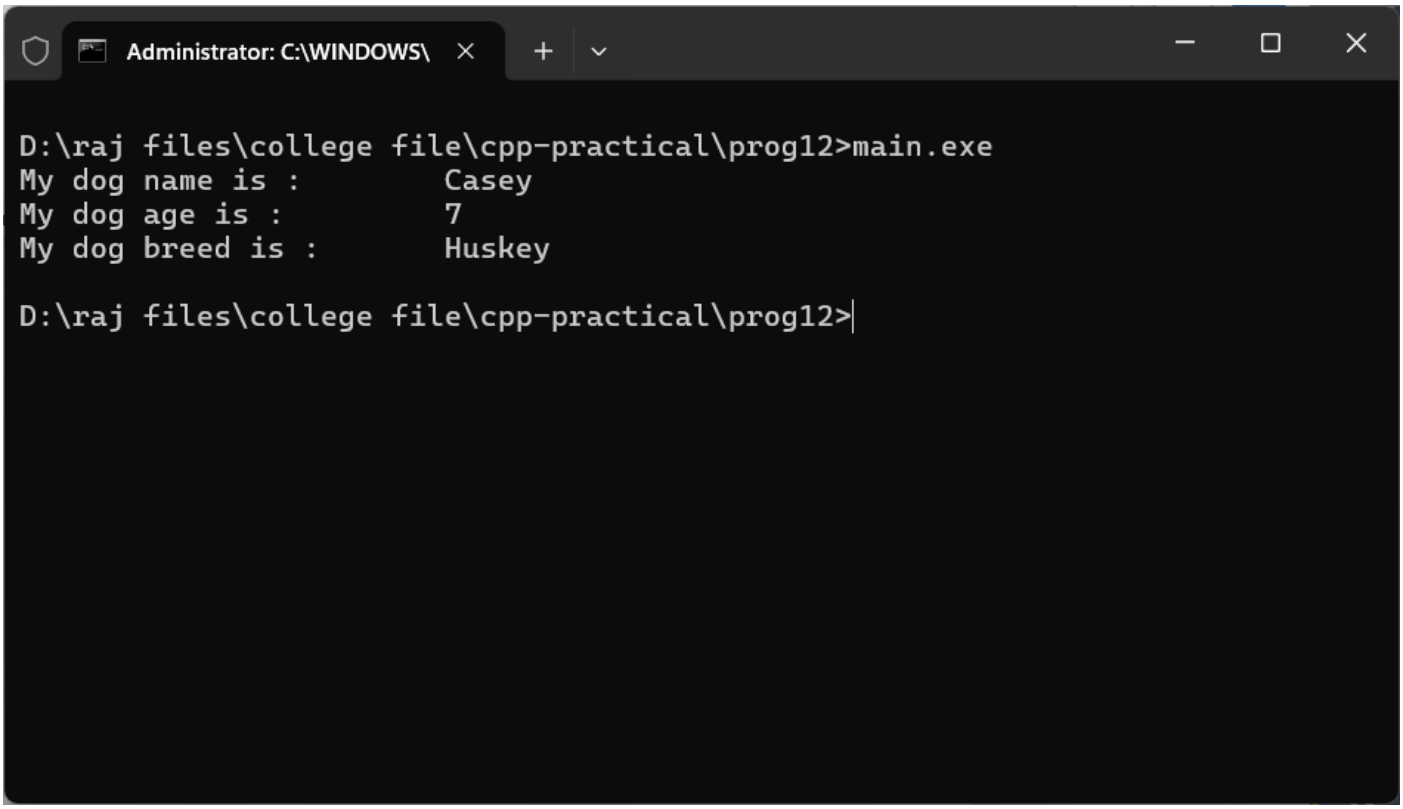
Question 10. Write a program to use the concept of friend function.

```
#include<iostream>
using namespace std;
class Box
{
    int length;
    public:
        Box(int len){length = len;}
        friend int print_len(Box);
};
int print_len(Box b){b.length += 10; return b.length;}
int main()
{
    Box b1(8);
    cout << "The length of box b1 is :\t" << print_len(b1) <<
endl;
    return 0;
}
```


Administrator: C:\WINDOWS\
D:\raj files\college file\cpp-practical\prog11>main.exe
The object added results : 22
D:\raj files\college file\cpp-practical\prog11>

Question 11. Write a program to use the concept of friend class.

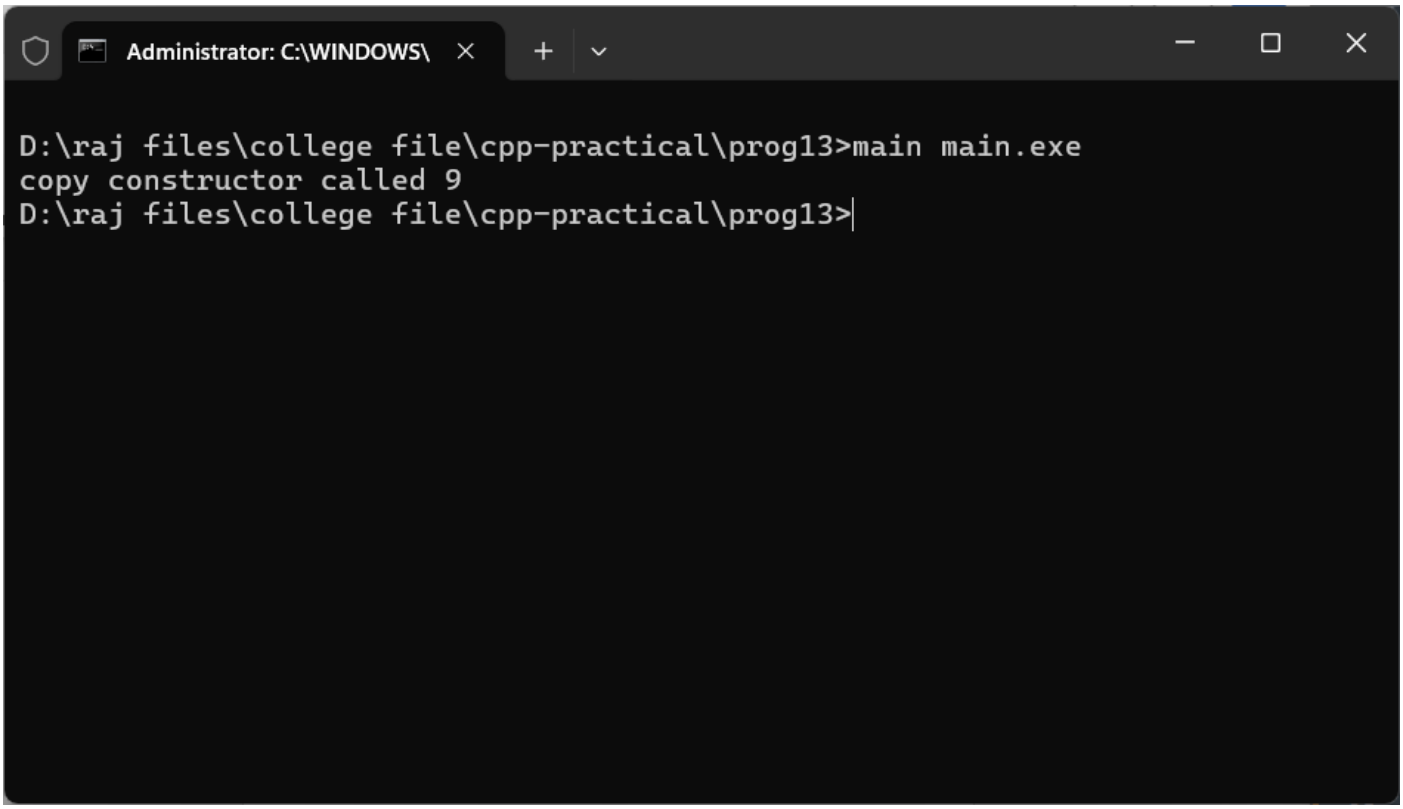
```
#include<iostream>
using namespace std;
class Friend_Class;
class Base_Class
{
    int size1;
    friend Friend_Class;
    public:
        Base_Class():size1(12){}
};
class Friend_Class
{
    int size2;
    public:
        Friend_Class():size2(10){}
        int add(){Base_Class b1; return b1.size1 + size2;}
};
int main()
{
    Friend_Class obj1;
    cout << "The object added results : " << obj1.add() <<
endl;
    return 0;
}
```


Administrator: C:\WINDOWS\
D:\raj files\college file\cpp-practical\prog12>main.exe
My dog name is :   Casey
My dog age is :   7
My dog breed is :   Huskey
D:\raj files\college file\cpp-practical\prog12>

Question 12. Write a program to use the concept of parameterized constructor.

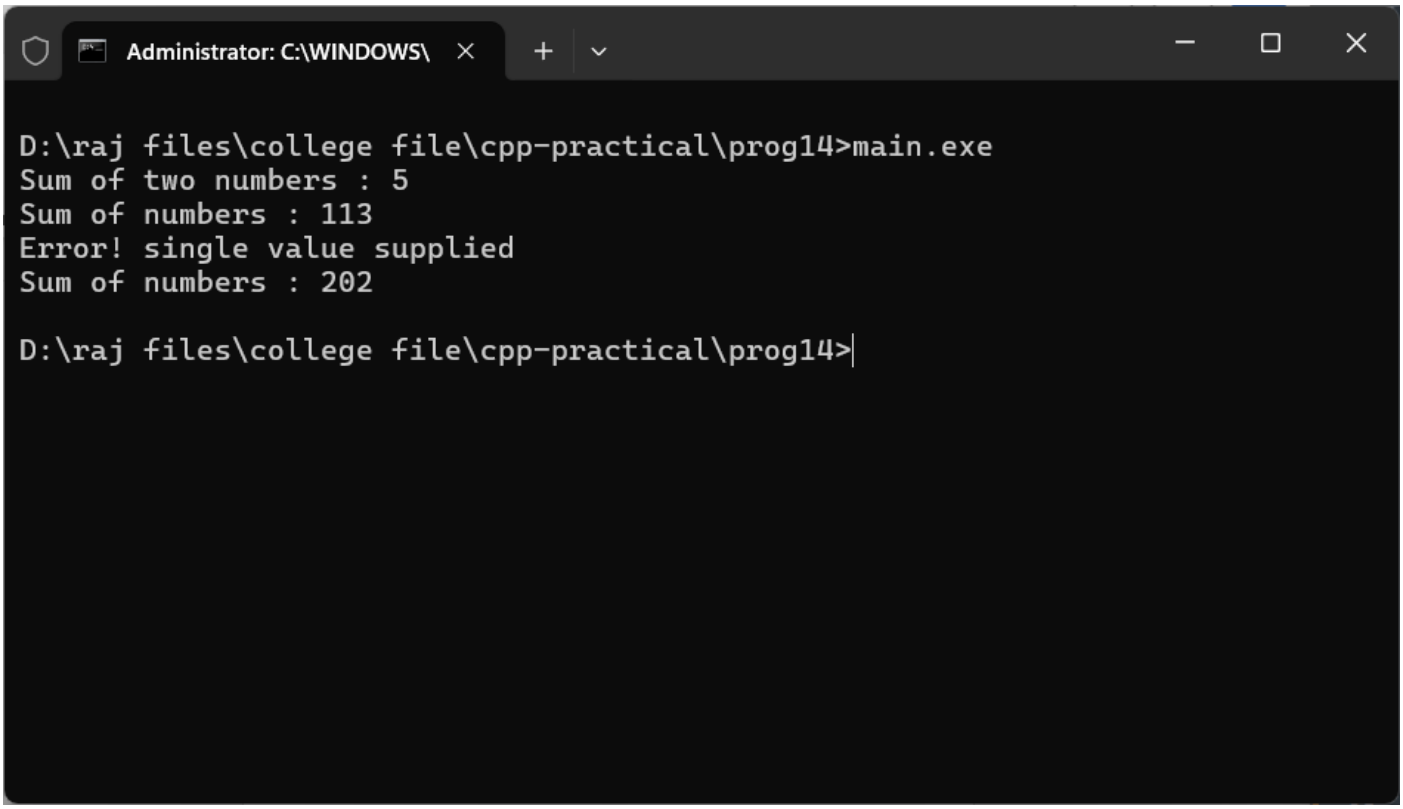
```
#include<iostream>
#include<string>
using namespace std;
class Dog
{
    private:
        string name;
        int age;
        string breed;
    public:
        Dog(string dog_name, int dog_age, string dog_breed)
        {
            name = dog_name;
            age = dog_age;
            breed = dog_breed;
        }
        void dog_info()
        {
            cout << "My dog name is : \t" << name << endl;
            cout << "My dog age is : \t" << age << endl;
            cout << "My dog breed is :\t" << breed << endl;
        }
};
int main()
{
```

```
Dog my_dog("Casey", 7, "Huskey");
    my_dog.dog_info();
    return 0;
}
```


Administrator: C:\WINDOWS\
D:\raj files\college file\cpp-practical\prog13>main main.exe
copy constructor called 9
D:\raj files\college file\cpp-practical\prog13>

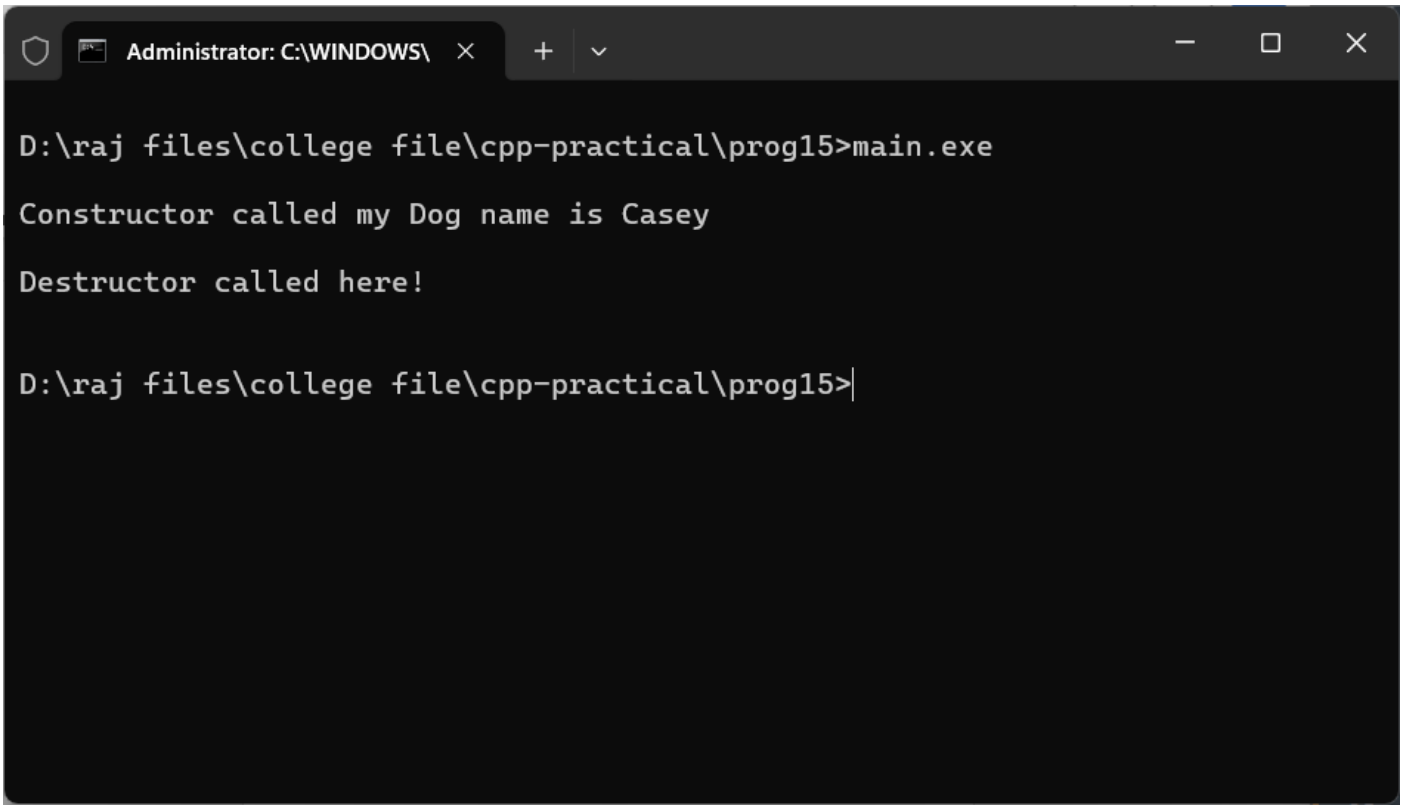
Question 13. Write a program to use the concept of copy constructor.

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

class sample{
public:
    int x,y;
    sample(int a,int b):x(a),y(b){}
    sample(sample &obj){
        x=obj.x;
        y=obj.y;
        cout<<"copy constructor called "<<x+y;
    }
};

int main()
{
    sample s1(4,5);
    sample s2(s1);
    return 0;
}
```


Administrator: C:\WINDOWS\
D:\raj files\college file\cpp-practical\prog14>main.exe
Sum of two numbers : 5
Sum of numbers : 113
Error! single value supplied
Sum of numbers : 202
D:\raj files\college file\cpp-practical\prog14>

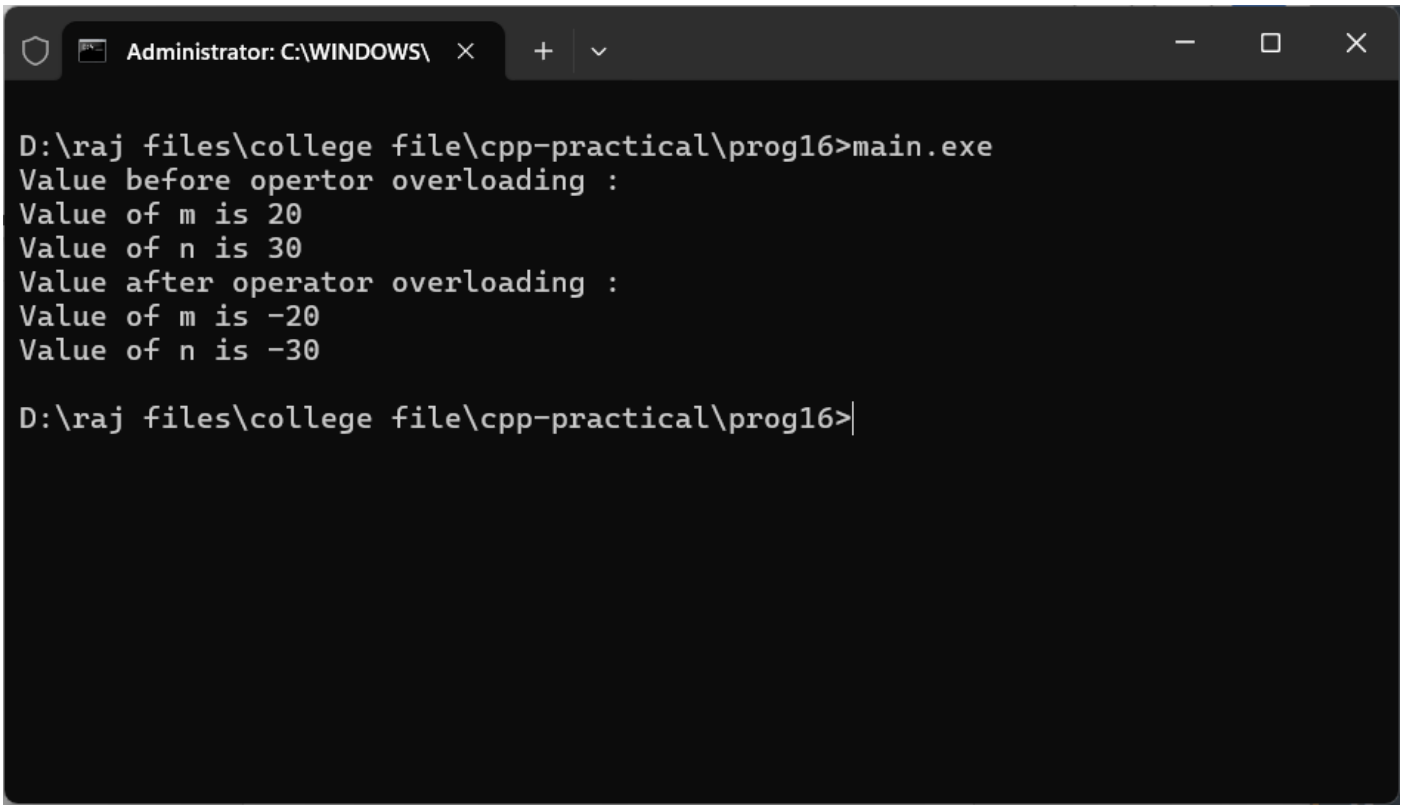
Question 14. Write a program to use the concept of constructor overloading.

```
#include<iostream>

using namespace std;

class addition

{

    public:

        addition(int a){cout << "Error! single value
supplied"<<endl;}

        addition(int a, int b){cout << "Sum of two numbers : "
<< a + b << endl;}

        addition(int a, int b, int c){cout << "Sum of numbers :
" << a+b+c << endl;}

        addition(int a, int b, int c, int d){cout << "Sum of
numbers : " << a+b+c+d << endl;}

};

int main()

{

    addition sum1(2,3), sum2(4, 8, 12, 89), sum3(9), sum4(78,
56, 68);

    return 0;

}
```


Administrator: C:\WINDOWS\
D:\raj files\college file\cpp-practical\prog15>main.exe
Constructor called my Dog name is Casey
Destructor called here!
D:\raj files\college file\cpp-practical\prog15>

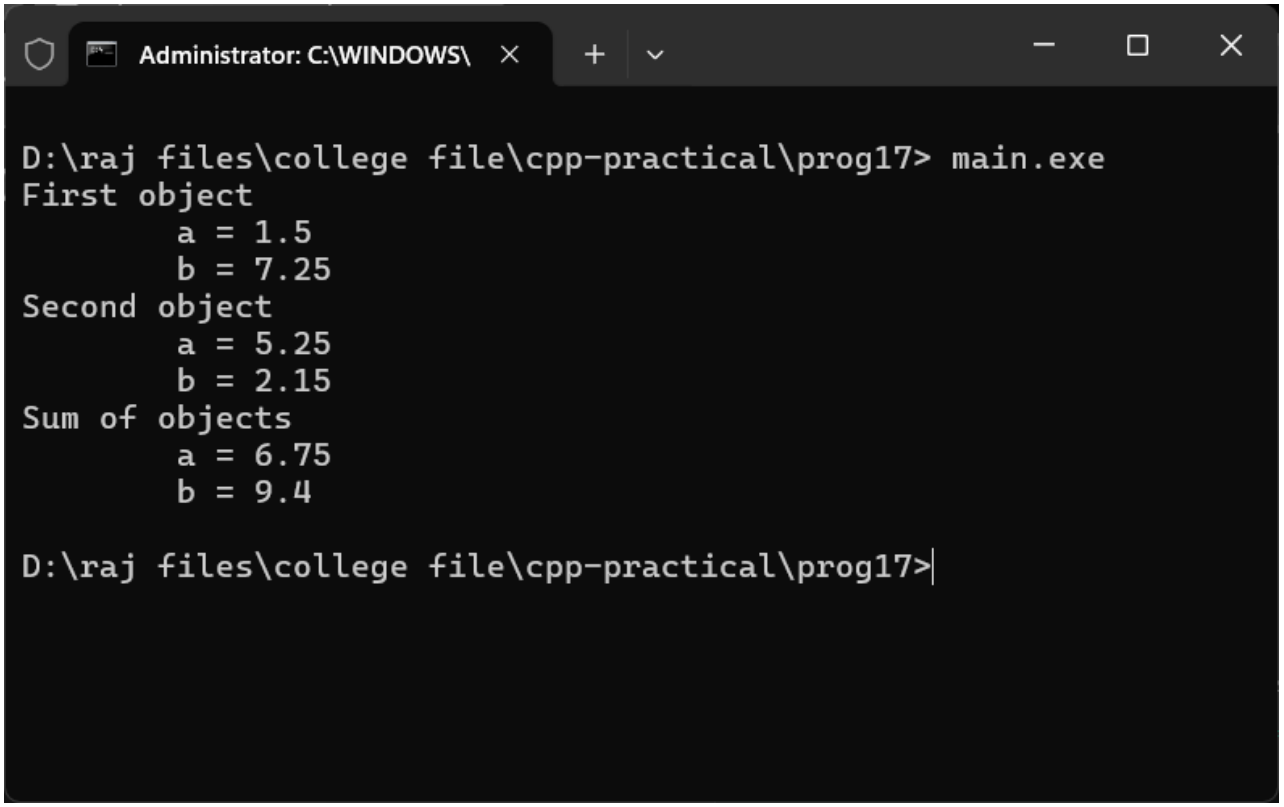
Question 15. Write a program to use the concept of destructor.

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

class Dog
{
    string name;
    public:
        Dog(string dog_name):name(dog_name){cout <<
"\nConstructor called my Dog name is " << name<<endl<<endl;}
        ~Dog(){cout << "Destructor called here!"<<endl<<endl;}
};

int main()
{
    Dog dog1("Casey");
    return 0;
}
```


Administrator: C:\WINDOWS\
D:\raj files\college file\cpp-practical\prog16>main.exe
Value before opertor overloading :
Value of m is 20
Value of n is 30
Value after operator overloading :
Value of m is -20
Value of n is -30
D:\raj files\college file\cpp-practical\prog16>

Question 16. Write a program to overload the unary operator by using member function.

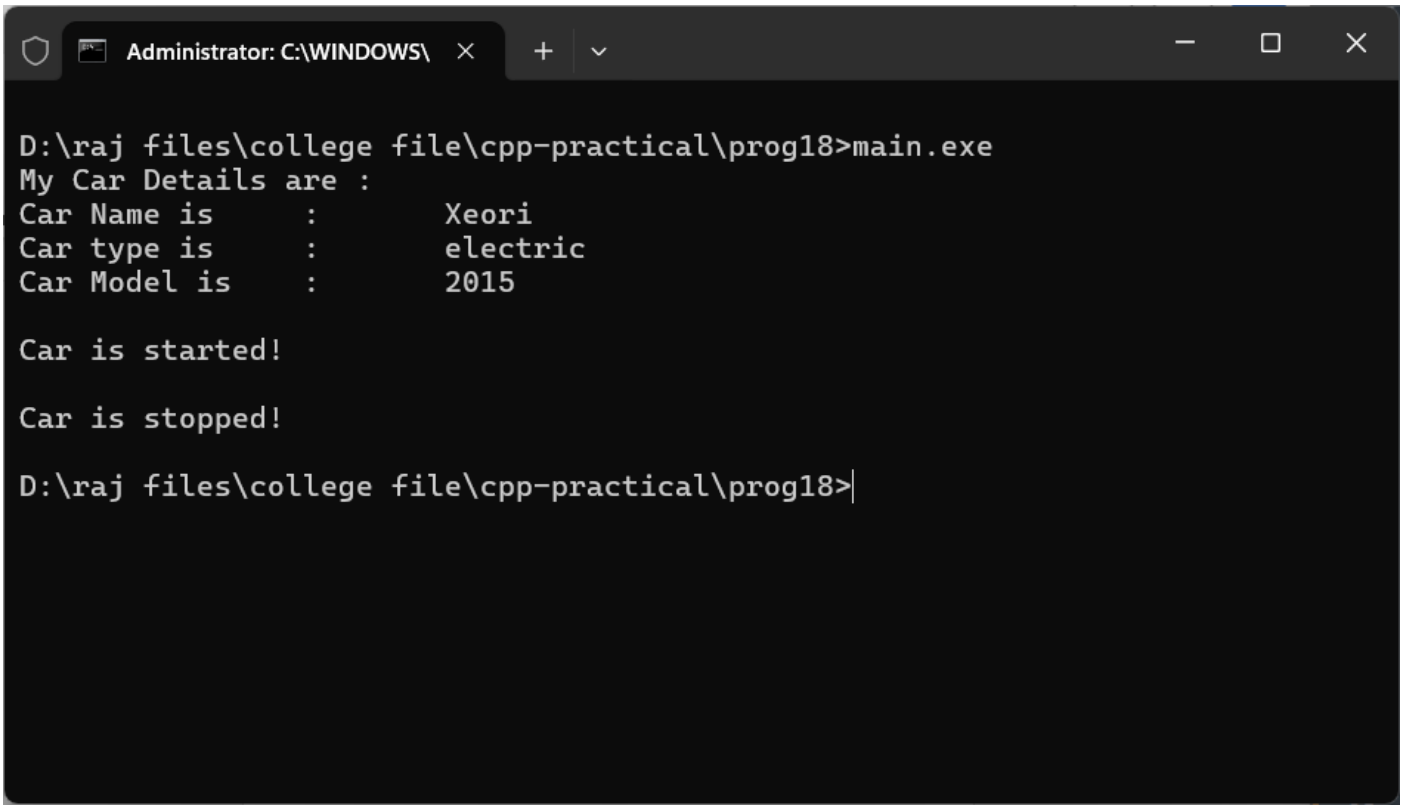
```
#include<iostream>
using namespace std;
class sample
{
    int m, n;
    public:
        void getdata(int a, int b);
        void display();
        void operator - ();
};
void sample:: getdata(int a, int b){m = a; n = b;}
void sample:: display(){cout << "Value of m is " << m <<
"\nValue of n is " << n << endl;}
void sample:: operator - (){m = -m; n = -n;}
int main()
{
    sample obj;
    obj.getdata(20, 30);
    cout << "Value before opertor overloading :\n";
    obj.display();
    -obj;
    cout << "Value after operator overloading :\n";
    obj.display();
    return 0;
}
```


Administrator: C:\WINDOWS\
D:\raj files\college file\cpp-practical\prog17> main.exe
First object
a = 1.5
b = 7.25
Second object
a = 5.25
b = 2.15
Sum of objects
a = 6.75
b = 9.4
D:\raj files\college file\cpp-practical\prog17>

Question 17. Write a program to overload the binary operator by using friend function.

```
#include<iostream>
using namespace std;
class sample
{
    float a,b;
    public:
        sample(){};
        sample(float x, float y):a(x), b(y){}
        friend sample operator + (sample, sample);
        void display(){cout<<"\ta = "<<a<<endl;cout<<"\tb =
"<<b<<endl;}
};

sample operator + (sample s1, sample s2)
{
    sample temp;
    temp.a = s1.a + s2.a;
    temp.b = s1.b + s2.b;
    return temp;
}

int main()
{
    sample x, y, z;
    x = sample(1.5, 7.25);
    y = sample(5.25, 2.15);
```

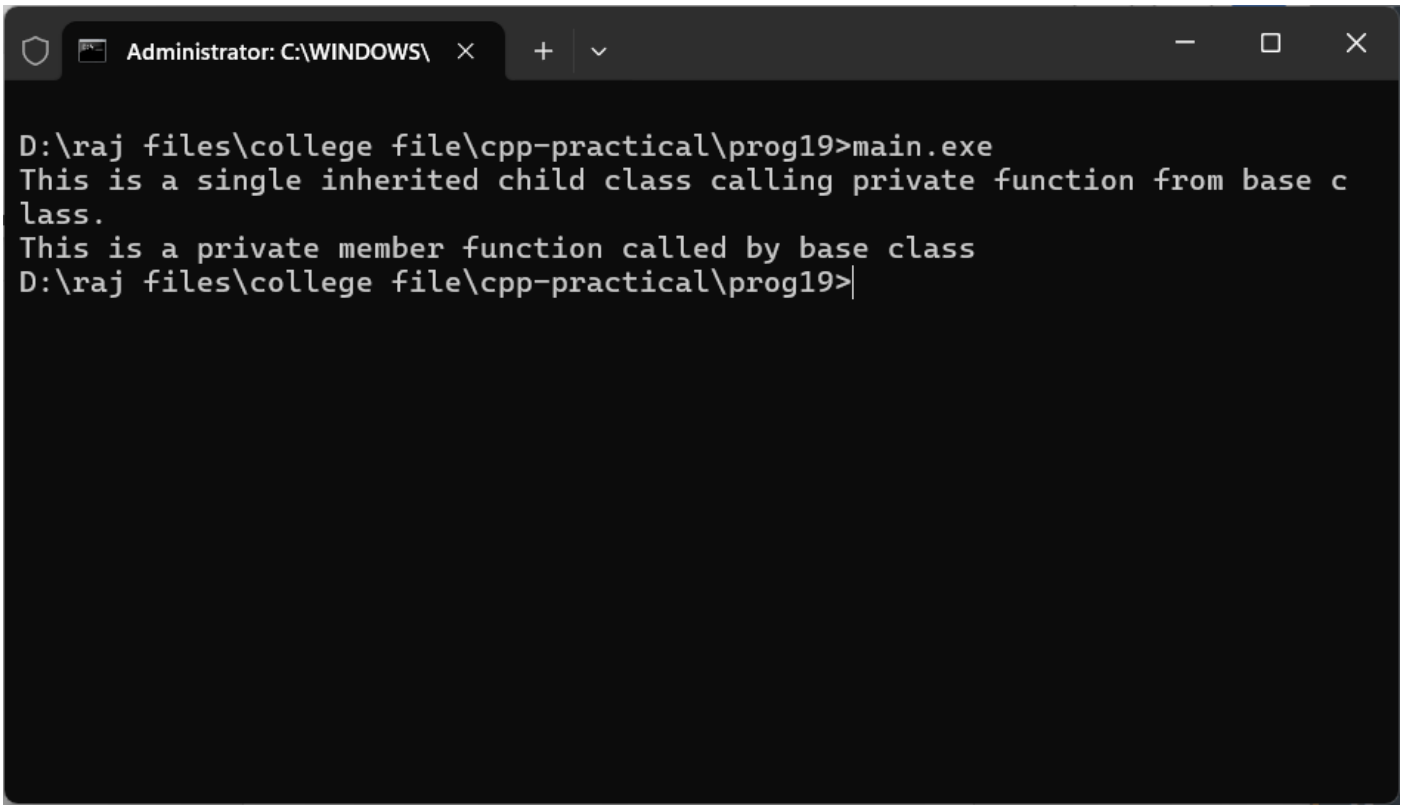
```
 z = x + y;
    cout << "First object"<<endl;
    x.display();
    cout << "Second object" << endl;
    y.display();
    cout << "Sum of objects" << endl;
    z.display();
    return 0;
}
```


Administrator: C:\WINDOWS\
D:\raj files\college file\cpp-practical\prog18>main.exe
My Car Details are :
Car Name is : Xeori
Car type is : electric
Car Model is : 2015
Car is started!
Car is stopped!
D:\raj files\college file\cpp-practical\prog18>

Question 18. Write a program to use the concept of single inheritance (by using public method).

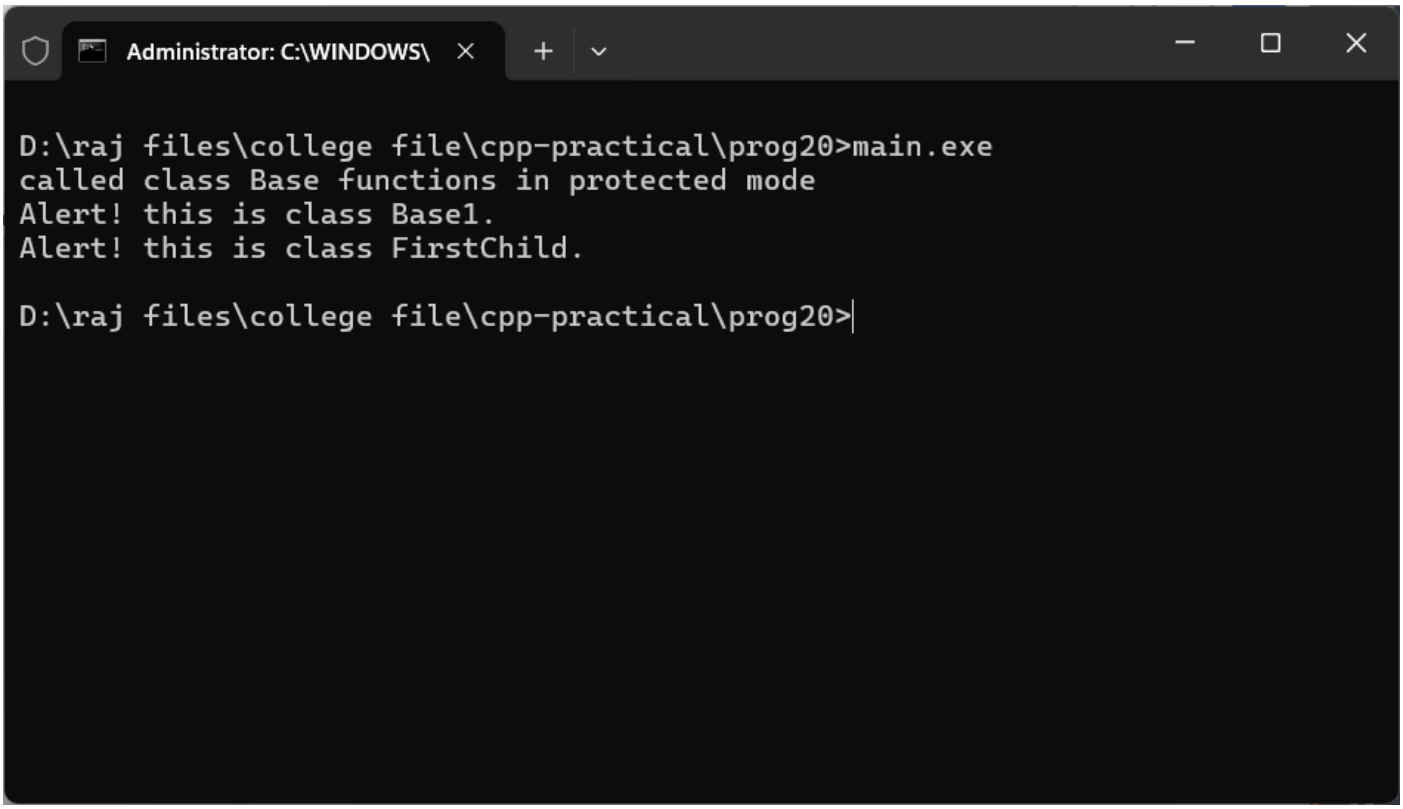
```
#include<iostream>
#include <string>
using namespace std;
class Car
{
    public:
        string name, type;
        int model;
        void car_info()
        {
            cout << "My Car Details are :"<<endl;
            cout << "Car Name is \t:\t" << name << endl;
            cout << "Car type is \t:\t" << type << endl;
            cout << "Car Model is \t:\t" << model <<endl;
        }
        void start(){cout << "\nCar is started!" << endl;}
        void stop(){cout << "\nCar is stopped!" << endl;}
};
class EV_Car : public Car
{
    public:
        EV_Car(string ev_name,int ev_model)
        {
            type = "electric";
            name = ev_name;
```

```
model = ev_model;
            car_info();
        }
};
int main()
{
    EV_Car car1("Xeori", 2015);
    car1.start();
    car1.stop();
    return 0;
}
```


Administrator: C:\WINDOWS\
D:\raj files\college file\cpp-practical\prog19>main.exe
This is a single inherited child class calling private function from base c
lass.
This is a private member function called by base class
D:\raj files\college file\cpp-practical\prog19>

Question 19. Write a program to use the concept of single inheritance (by using private method).

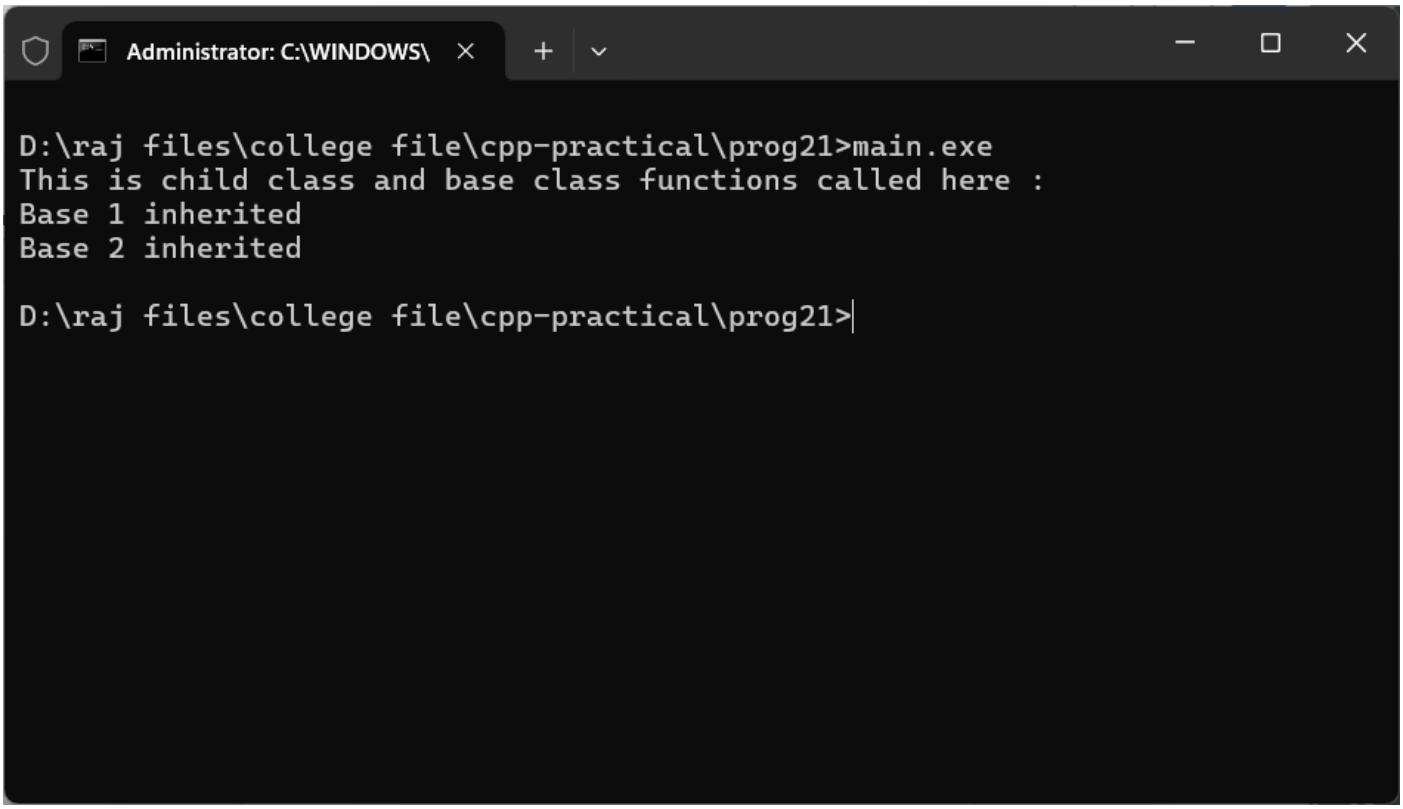
```
#include <iostream>
using namespace std;
class Base
{
    public:
        void display(){cout<<"This is a private member function called by base class";}
};
class Child:private Base
{
    public:
        Child()
        {
            cout<<"This is a single inherited child class calling private function from base class."<<endl;
            display();
        }
};
int main()
{
    Child c1;
    return 0;
}
```


Administrator: C:\WINDOWS\
D:\raj files\college file\cpp-practical\prog20>main.exe
called class Base functions in protected mode
Alert! this is class Base1.
Alert! this is class FirstChild.
D:\raj files\college file\cpp-practical\prog20>

Question 20. Write a program to sue the concept of multilevel inheritance (by using protected method).

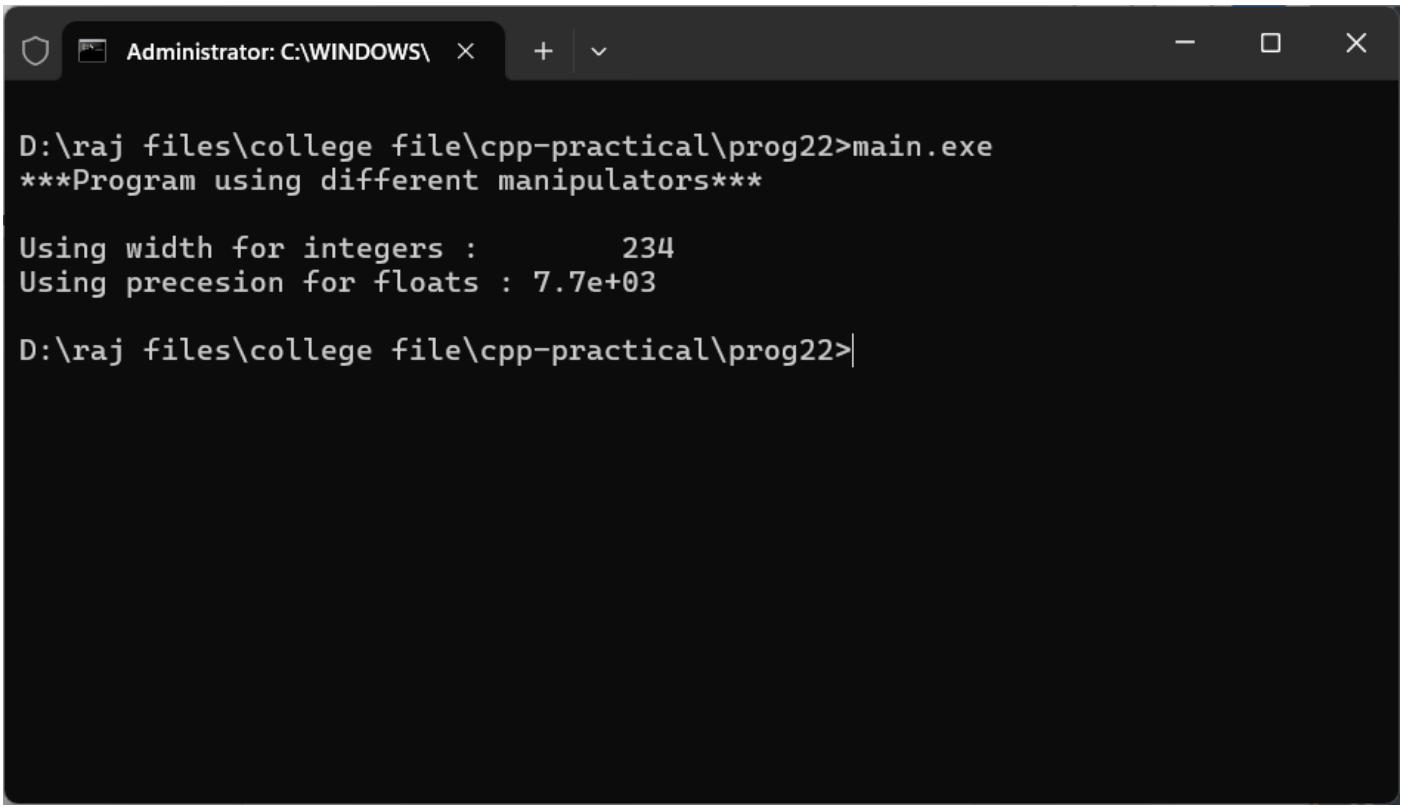
```
#include<iostream>
using namespace std;
class Base
{
    protected:
        void display1(){cout<<"Alert! this is class
Base1."<<endl;}
};
class FirstChild: protected Base
{
    protected:
        void display2(){cout<<"Alert! this is class
FirstChild."<<endl;}
};
class SecondChild: public FirstChild
{
    public:
        SecondChild()
        {
            cout<<"called class Base functions in protected
mode"<<endl;
            display1();
            display2();
        }
};
int main()
```

```
{
    SecondChild c1;
    return 0;
}
```


Administrator: C:\WINDOWS\
D:\raj files\college file\cpp-practical\prog21>main.exe
This is child class and base class functions called here :
Base 1 inherited
Base 2 inherited
D:\raj files\college file\cpp-practical\prog21>

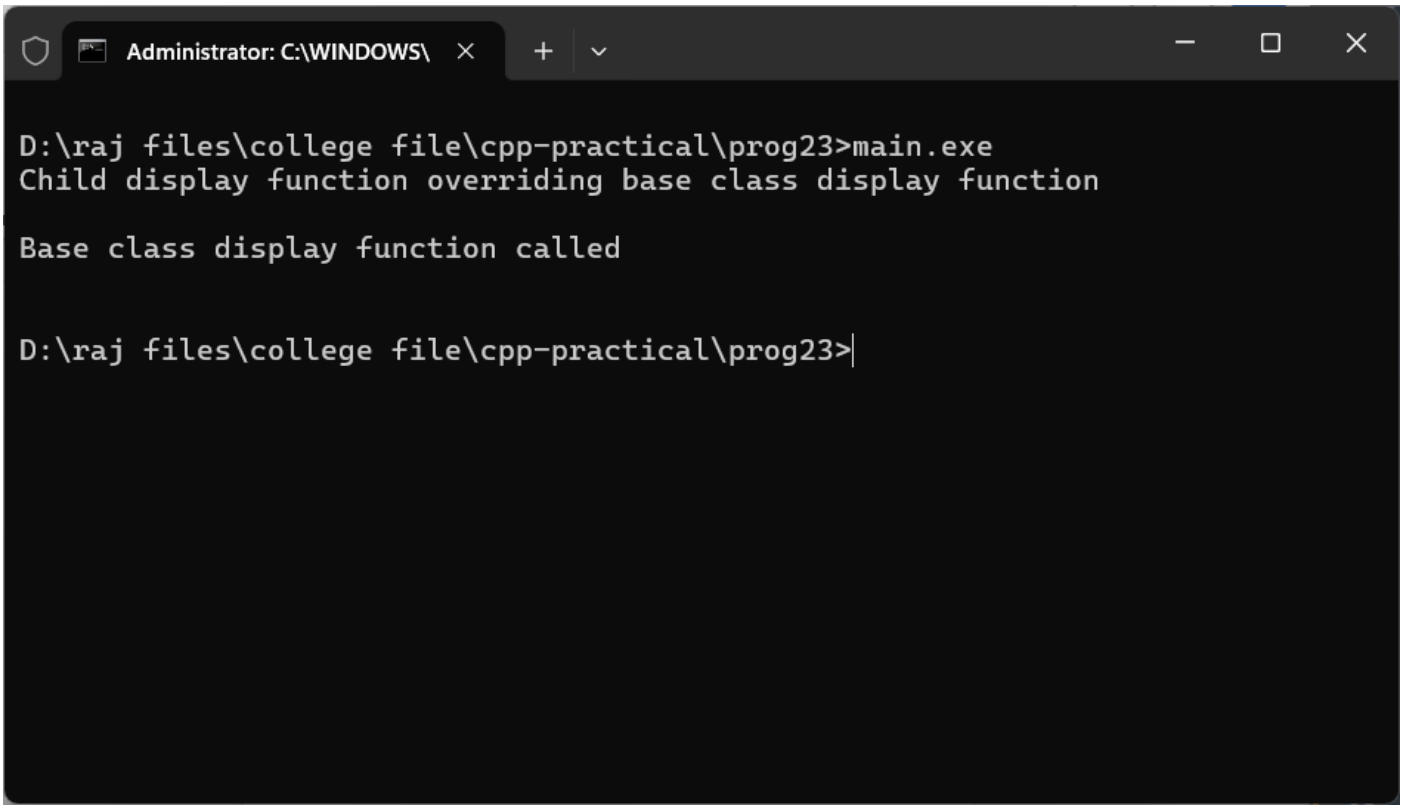
Question 21. Write a program by using concept of multiple inheritance.

```
#include<iostream>
using namespace std;
class Base1{public:void fun1(){cout<<"Base 1 inherited"<<endl;}};
class Base2{public:void fun2(){cout<<"Base 2 inherited"<<endl;}};
class Child:public Base1, public Base2
{
    public:
        Child()
        {
            cout<<"This is child class and base class functions called here :"<<endl;
            fun1();
            fun2();
        }
};
int main()
{
    Child c1;
    return 0;
}
```


Administrator: C:\WINDOWS\
D:\raj files\college file\cpp-practical\prog22>main.exe
Program using different manipulators
Using width for integers :   234
Using precesion for floats : 7.7e+03
D:\raj files\college file\cpp-practical\prog22>

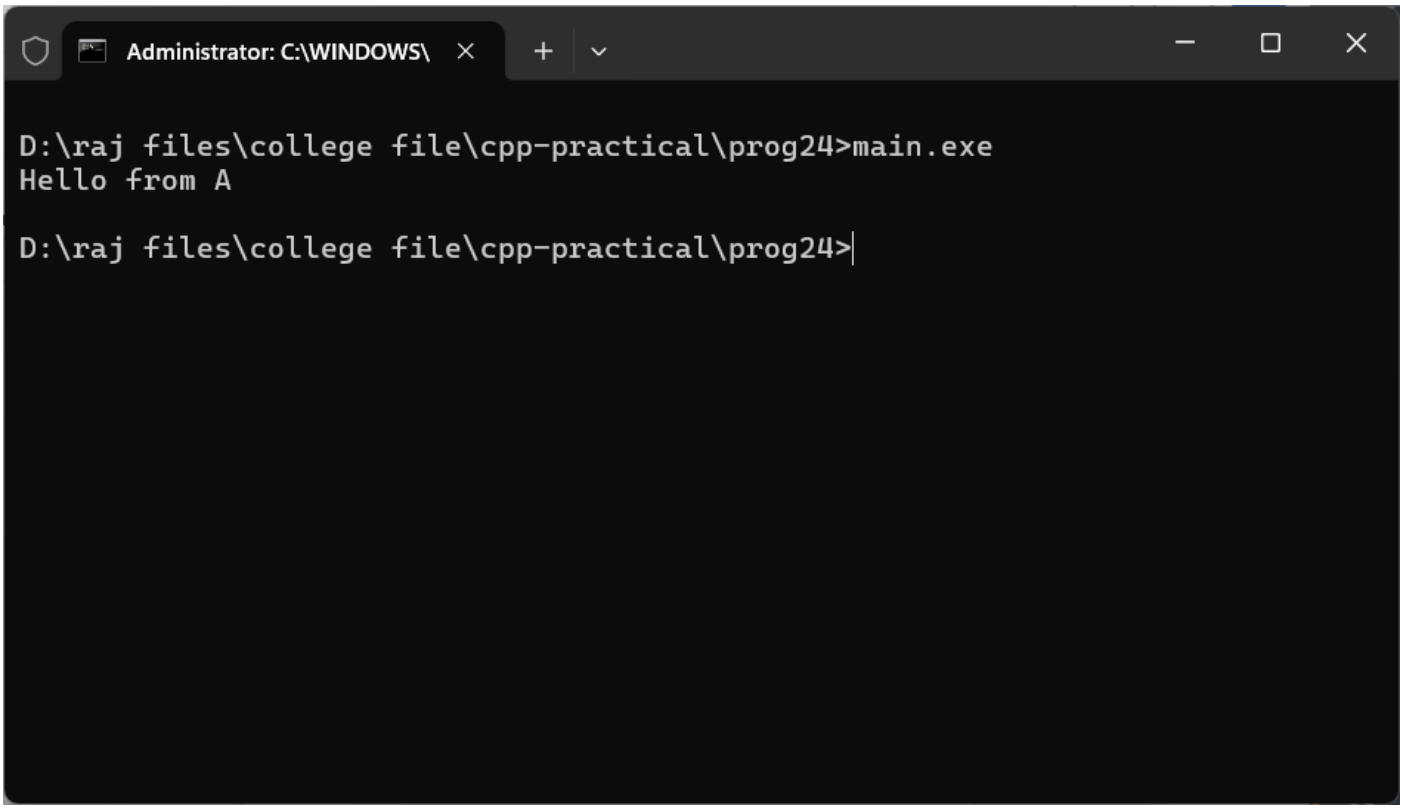
Question 22. Write a program by using various Manipulators.

```
#include<iostream>
#include<iomanip>
using namespace std;
int main()
{
    cout<< "***Program using different manipulators***\n";
    cout<< "\nUsing width for integers : " << setw(10) << 234
<<endl;
    cout<< "Using precesion for floats : " << setprecision(2)
<< 7678.328403 <<endl;
    return 0;
}
```


Administrator: C:\WINDOWS\
D:\raj files\college file\cpp-practical\prog23>main.exe
Child display function overriding base class display function
Base class display function called
D:\raj files\college file\cpp-practical\prog23>

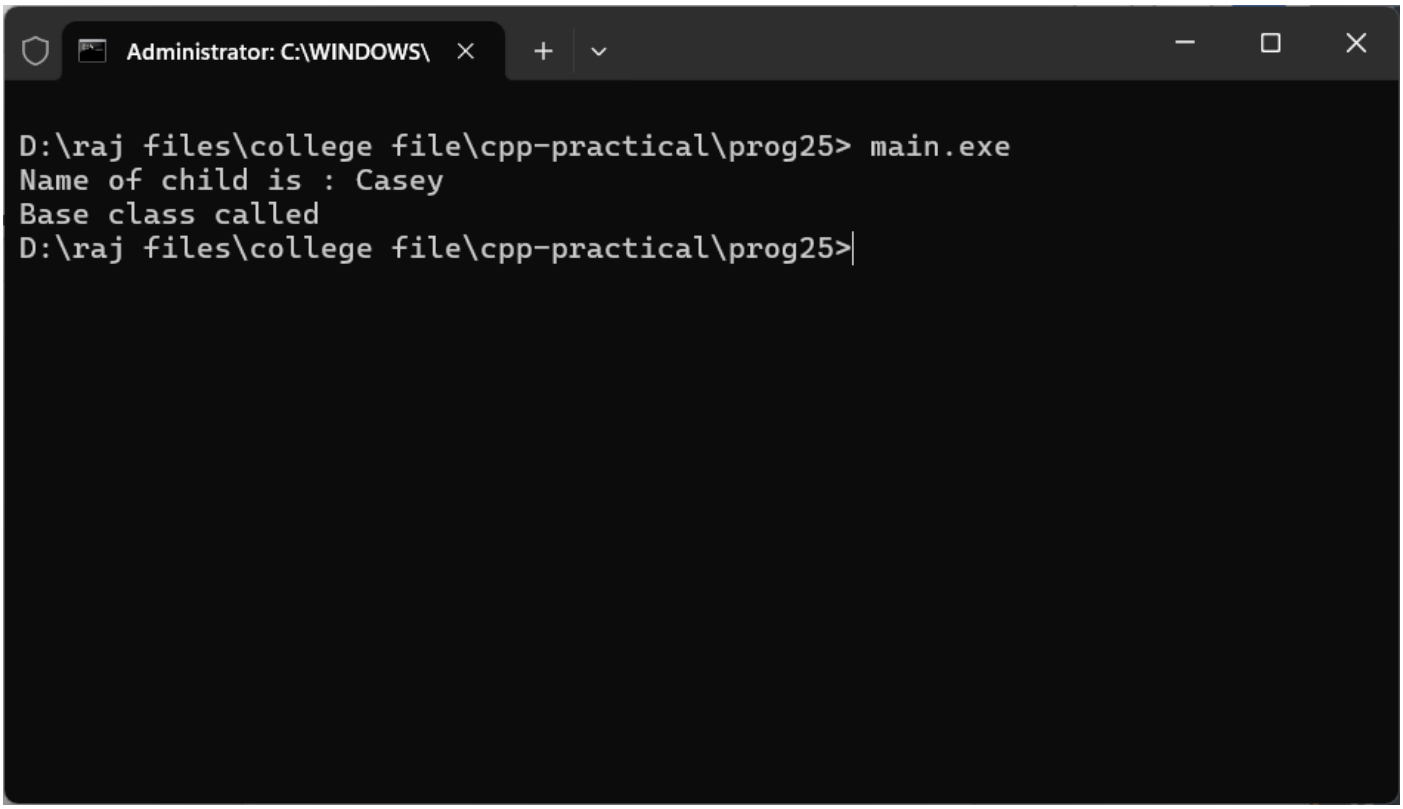
Question 23. Write a program to use the concept of function overriding.

```
#include<iostream>
using namespace std;
class Base
{
    public:
        void display(){cout << "Base class display function called\n"<< endl;}
};
class Child : public Base
{
    public:
        void display(){cout<<"Child display function overriding base class display function\n"<<endl;}
};
int main()
{
    Child c1;
    c1.display();
    c1.Base :: display();
    return 0;
}
```


Administrator: C:\WINDOWS\
D:\raj files\college file\cpp-practical\prog24>main.exe
Hello from A
D:\raj files\college file\cpp-practical\prog24>

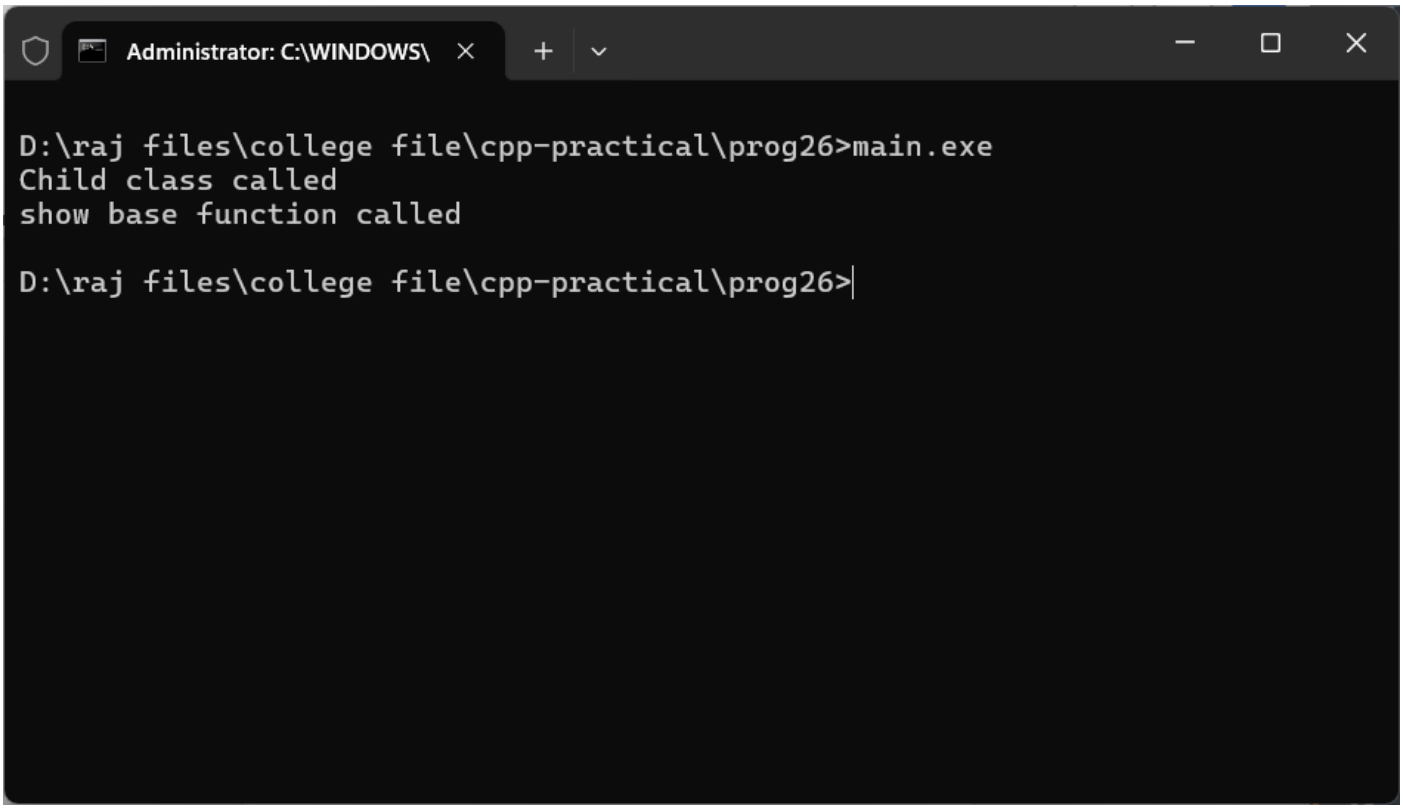
Question 24. Write a program to use the concept of virtual base class.

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

class A
{
    public: void show(){cout <<"Hello from A \n";}
};

class B : public virtual A {};
class C : public virtual A {};
class D : public B, public C {};

int main()
{
    D object;
    object.show();
    return 0;
}
```


Administrator: C:\WINDOWS\
D:\raj files\college file\cpp-practical\prog25> main.exe
Name of child is : Casey
Base class called
D:\raj files\college file\cpp-practical\prog25>

Question 25. Write a program to use the concept of inheritance and parameterized constructor.

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

class Base{public : void display(){cout <<"Base class
called";}};

class Child : public Base
{
    string name;
    public:
        Child(string child_name)
        {
            name = child_name;
            cout<<"Name of child is : "<<name<<endl;
            display();
        }
};

int main()
{
    Child c1("Casey");
    return 0;
}
```


Administrator: C:\WINDOWS\
D:\raj files\college file\cpp-practical\prog26>main.exe
Child class called
show base function called
D:\raj files\college file\cpp-practical\prog26>

Question 26. Write a program to use the concept of virtual function.

```
#include<iostream>
using namespace std;
class Base
{
public:
    virtual void display(){cout << "Base class function"
<<endl;}
    void show(){cout << "show base function called"<<endl;}
};
class Child: public Base
{
    public:
        void display(){cout <<"Child class called"<<endl;}
        void show(){cout << "child show function
called"<<endl;}
};
int main()
{
    Base * ptr;
    Child c1;
    ptr = &c1;
    ptr -> display();
    ptr -> show();
    return 0;}
```