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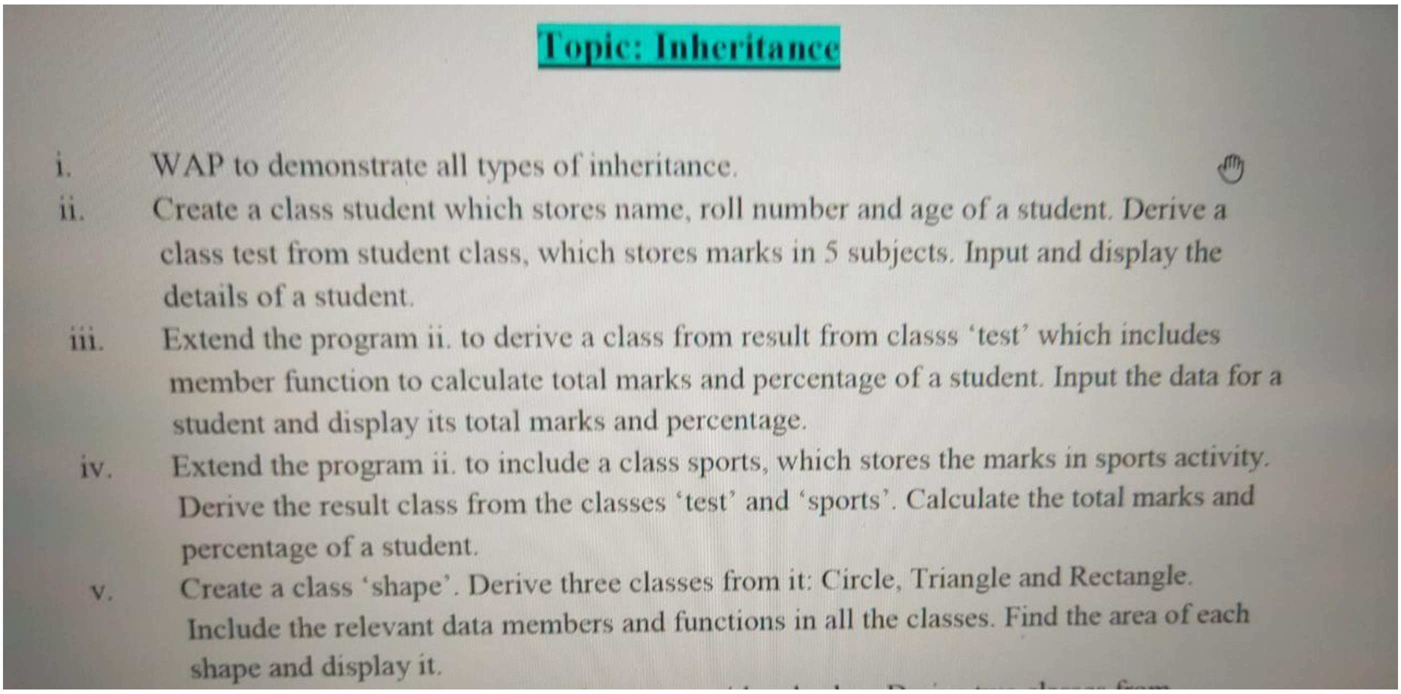
OOP LAB-6

Date : 05-09-2020



Topic: Inheritance

i. WAP to demonstrate all types of inheritance.

ii. Create a class student which stores name, roll number and age of a student. Derive a class test from student class, which stores marks in 5 subjects. Input and display the details of a student.

iii. Extend the program ii. to derive a class from result from classs 'test' which includes member function to calculate total marks and percentage of a student. Input the data for a student and display its total marks and percentage.

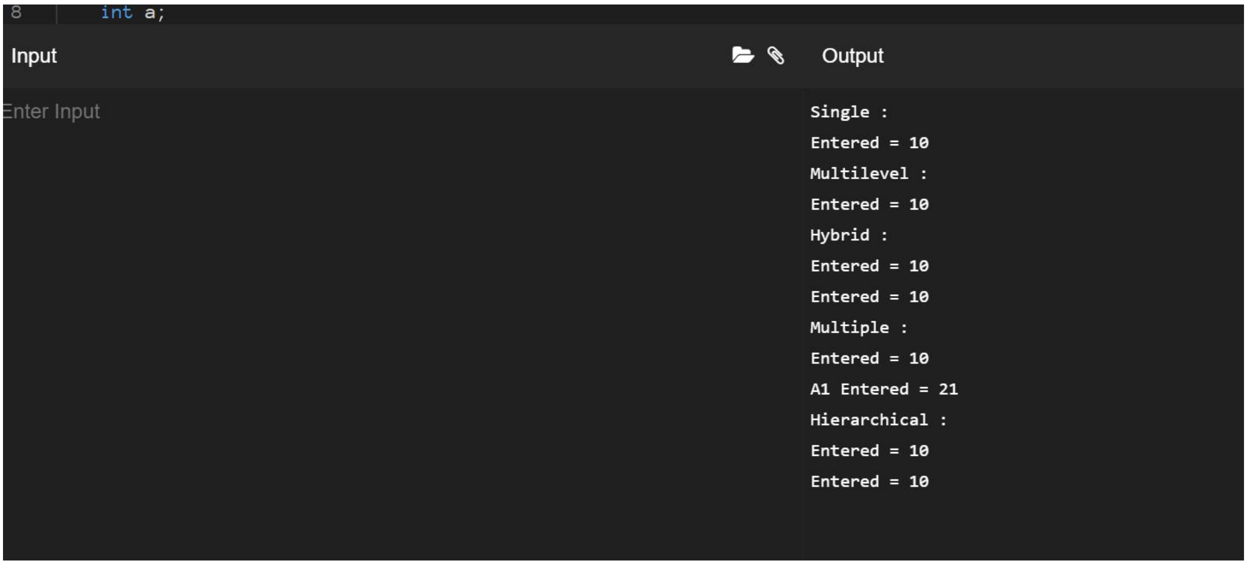
iv. Extend the program ii. to include a class sports, which stores the marks in sports activity. Derive the result class from the classes 'test' and 'sports'. Calculate the total marks and percentage of a student.

v. Create a class 'shape'. Derive three classes from it: Circle, Triangle and Rectangle. Include the relevant data members and functions in all the classes. Find the area of each shape and display it.

1.

```
#include<iostream>

using namespace std;

class A

{

    protected:

    int a;

    public:

    void dispa()

    {

        a=10;

        cout << "Entered = " << a << endl;
    }

};
class A1
{
    protected:
    int a1;
    public:
    void dispa1()
    {
        a1=21;
        cout << "A1 Entered = " << a1 << endl;
    }

};

class B : public A
{
    protected:
    int b;
    public:
    void dispb()
    {
        b=20;
        cout << "B Entered = " << b << endl;
    }

};
class C : public A
{
    protected:
    int c;
    public:
    void dispc()
    {
        c=30;
        cout << "C Entered = " << c << endl;
        }
};

class D : public B
{
        protected:
        int d;
        public:
        void dispd()
        {
                d=40;
                cout << "D Entered = " << d << endl;
        }
};

class E : public A, public A1
{
        protected:
        int e;
        public:
        void dispe()
        {
                e=50;
                cout << "E Entered = " << e << endl;
        }

};

class F : public B
{
        protected:
        int f;
        public:
        void dispf()
        {
                f=60;
                cout << "D Entered = " << f << endl;
```

```
    }
};

int main()
{
    B obb;
    C obc;
    D obd;
    E obe;
    F obf;
    cout << "Single : \n";
    obb.dispa();
    cout << "Multilevel : \n";
    obd.dispa();
    cout << "Hybrid : \n";
    obd.dispa();
    obf.dispa();
    cout << "Multiple : \n";
    obe.dispa();
    obe.dispa1();
    cout << "Hierarchical : \n";
    obb.dispa();
    obc.dispa();
}
```



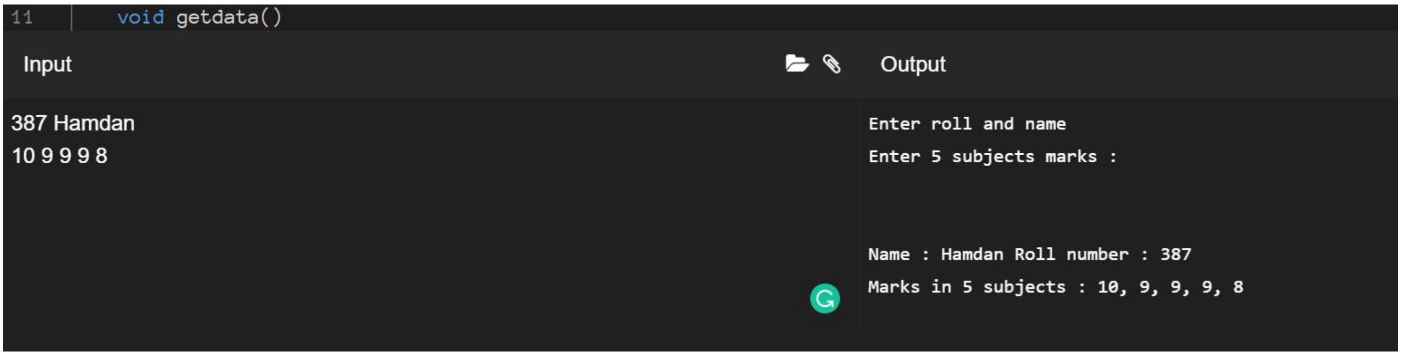
```
    int a;
```

```
Single :
Entered = 10
Multilevel :
Entered = 10
Hybrid :
Entered = 10
Entered = 10
Multiple :
Entered = 10
A1 Entered = 21
Hierarchical :
Entered = 10
Entered = 10
```

2.

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

class student
{
        protected:
        char name[20];
        int roll;
        public:
        void getdata()
        {
                cout << "Enter roll and name " << endl;
                cin >> roll >> name;
        }

};

class test : public student
{
        protected:
        int sub[5];
        public:
        void getmark()
        {
                cout << "Enter 5 subjects marks : " << endl;
                cin >> sub[0] >> sub[1]>> sub[2]>> sub[3]>> sub[4];
        }
```

```
    void details()

    {

        cout << "\n\nName : " << name << " Roll number : " << roll << endl;

        cout << "Marks in 5 subjects : " << sub[0] << ", " << sub[1] << ", " << sub[2] << ", " << sub[3] << ", " << sub[4] << endl;

    }


};




int main()

{

    test ob;

    ob.getdata();

    ob.getmark();

    ob.details();

}
```



```
    void getdata()
```

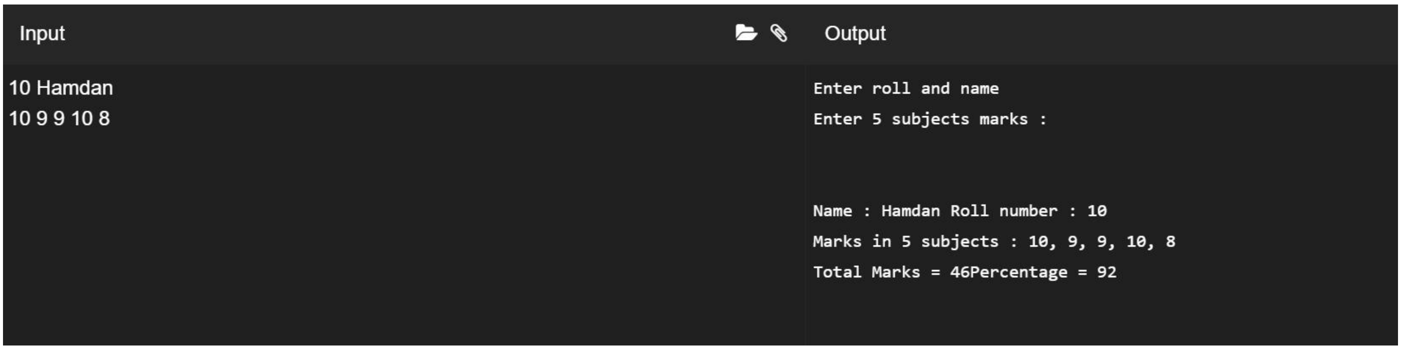
```
387 Hamdan
10 9 9 9 8
```

```
Enter roll and name
Enter 5 subjects marks :


Name : Hamdan Roll number : 387
Marks in 5 subjects : 10, 9, 9, 9, 8
```

3.

```
#include<iostream>

using namespace std;


class student

{

	protected:

	char name[20];

	int roll;

	public:

	void getdata()

	{

		cout << "Enter roll and name " << endl;

		cin >> roll >> name;

	}


};




class test : public student

{

	protected:

	int sub1;

	int sub2;

	int sub3;

	int sub4;

	int sub5;

	public:
    void getmark()

    {

        cout << "Enter 5 subjects marks : " << endl;

        cin >> sub1 >> sub2>> sub3 >> sub4 >> sub5;

    }

    void details()

    {

        cout << "\n\nName : " << name << " Roll number : " << roll << endl;

        cout << "Marks in 5 subjects : " << sub1 << ", " << sub2 << ", " << sub3 << ", " << sub4 << ", " << sub5 << endl;

    }


};


class result : public test

{


    int total;

    float percent;

    public:

        void calc()

        {

            total = sub1+sub2+sub3+sub4+sub5;

            percent = (total *100)/50;


        }

        void display()

        {

            cout << "Total Marks = " << total << "Percentage = " << percent << endl;

        }
```

```
};




int main()

{

        result ob1;

        ob1.calc();

        ob1.getdata();

        ob1.getmark();

        ob1.details();

        ob1.calc();

        ob1.display();


}
```



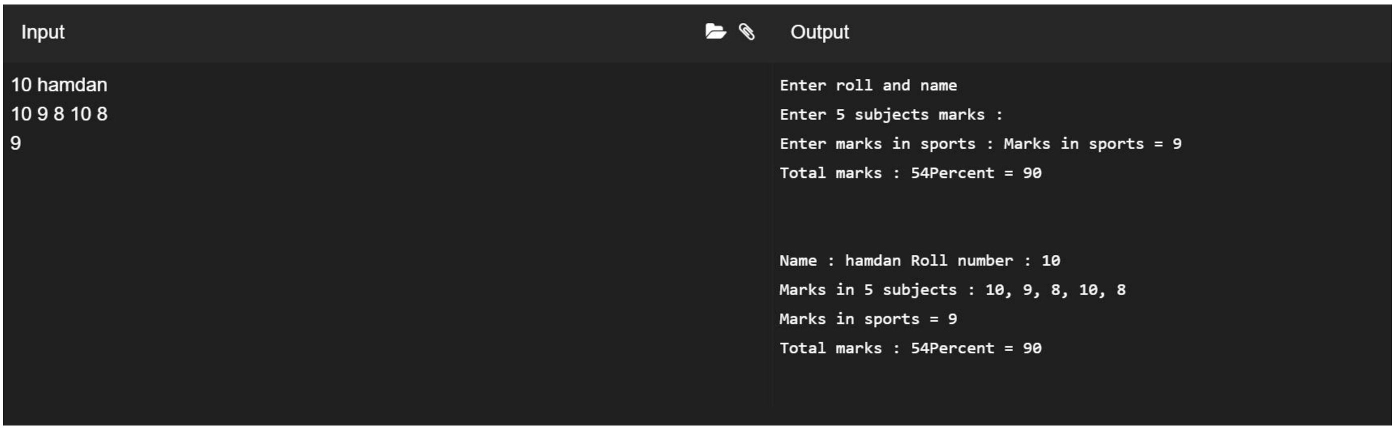
```
10 Hamdan
10 9 9 10 8
```

```
Enter roll and name
Enter 5 subjects marks :


Name : Hamdan Roll number : 10
Marks in 5 subjects : 10, 9, 9, 10, 8
Total Marks = 46Percentage = 92
```

4.

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

class student
{
    protected:
    char name[20];
    int roll;
    public:
    void getdata()
    {
        cout << "Enter roll and name " << endl;
        cin >> roll >> name;
    }

};

class test : public student
{
    protected:
    int sub1;
    int sub2;
    int sub3;
    int sub4;
    int sub5;
```

```
        public:
        void getmark()
        {
                cout << "Enter 5 subjects marks : " << endl;
                cin >> sub1 >> sub2>> sub3 >> sub4 >> sub5;
        }
        void details()
        {
                cout << "\n\nName : " << name << " Roll number : " << roll << endl;
                cout << "Marks in 5 subjects : " << sub1 << ", " << sub2 << ", " << sub3 << ", " << sub4 << ", " <<
sub5 << endl;
        }


};


class sports
{
        protected:
        int msports;
        public:
                void getspo()
                {
                        cout << "Enter marks in sports : ";
                        cin >> msports;


                }
};


class result : public sports, public test
{
    int total;
    float percent;
    public:
    void display()
    {
        cout << "Marks in sports = " << msports << endl;
        total = sub1+sub2+sub3+sub4+sub5+msports;
        percent = (total*100)/60;
        cout << "Total marks : " << total << "Percent = " << percent << endl;
    }
};

int main()
{
    result ob1;
    ob1.getdata();
    ob1.getmark();
    ob1.getspo();
    ob1.display();
    ob1.details();
    ob1.display();
}
```

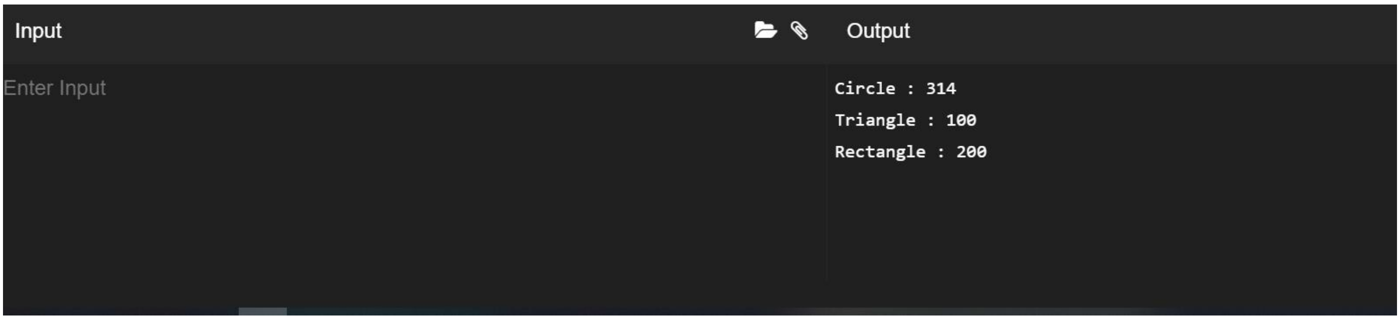


```
10 hamdan
10 9 8 10 8
9
```

```
Enter roll and name
Enter 5 subjects marks :
Enter marks in sports : Marks in sports = 9
Total marks : 54Percent = 90


Name : hamdan Roll number : 10
Marks in 5 subjects : 10, 9, 8, 10, 8
Marks in sports = 9
Total marks : 54Percent = 90
```

5.

```
#include<iostream>
using namespace std;
class shape
{
    protected:
        float areac;
        float areat;
        float arear;
};
class circle : public shape
{
    public:
        void carea()
        {
            int a=10;
            areac = 3.14*a*a;
            cout << "Circle : " << areac << endl;
        }
};
class triangle : public shape
{
    public:
        void tarea()
        {
            int a=10;
            int b=20;
            areat = 0.5*a*b;
            cout << "Triangle : " << areat << endl;
        }
};
class rectangle : public shape
{
    public:
        void rarea()
        {
            int a=10;
            int b=20;
            arear = a*b;
            cout << "Rectangle : " << arear << endl;
        }
};
int main()
{
    circle obc;
    obc.carea();
    triangle obt;
    obt.tarea();
    rectangle obr;
    obr.rarea();
    return 0;
}
```



```
Circle : 314
Triangle : 100
Rectangle : 200
```