18. Write a program in JAVA to create an abstract class FIGURE and also create a CIRCLE and a SQUARE class to compute the area of the respective figures using method overriding.

abstract class Figure {

    final double PI = 3.14;

    double len;

    abstract void findArea();

}

class Circle extends Figure {

    Circle() {

        len = 0;

    }

    Circle(double r) {

        len = r;

    }

    void findArea() {

        System.out.println("Area of Circle is: " + (PI \* len \* len));

    }

}

class Square extends Figure{

    Square() {

        len = 0;

    }

    Square(double a) {

        len = a;

    }

    void findArea() {

        System.out.println("Area of Square is: " + (len \* len));

    }

}

class testArea {

    public static void main(String[] args) {

        Circle obj1 = new Circle(Double.parseDouble(args[0]));

        Square obj2 = new Square(Double.parseDouble(args[1]));

        obj1.findArea();

        obj2.findArea();

    }

}

OUTPUT:

Microsoft Windows [Version 10.0.19045.3448]

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C:\Users\Anurag Singh>d:

D:\>cd desktop

D:\Desktop>cd java

D:\Desktop\Java>cd assignment

D:\Desktop\Java\Assignment>javac computeArea.java

D:\Desktop\Java\Assignment>java testArea 3.5 4.5

Area of Circle is: 38.465

Area of Square is: 20.25

19. Do the earlier program by using dynamic dispatch

class Figure1 {

    final double PI = 3.14;

    double len;

    Figure1() {

        len = 0;

    }

    void findArea(){

        return;

    }

}

class Circle1 extends Figure1 {

    Circle1() {

        super();

    }

    Circle1(double r) {

        len = r;

    }

    void findArea() {

        System.out.println("Area of Circle is: " + (PI \* len \* len));

    }

}

class Square1 extends Figure1{

    Square1() {

        super();

    }

    Square1(double a) {

        len = a;

    }

    void findArea() {

        System.out.println("Area of Square is: " + (len \* len));

    }

}

class testArea1 {

    public static void main(String[] args) {

        Circle1 obj1 = new Circle1(Double.parseDouble(args[0]));

        Square1 obj2 = new Square1(Double.parseDouble(args[1]));

        Figure1 obj;

        obj = obj1;

        obj.findArea();

        obj = obj2;

        obj.findArea();

    }

}

OUTPUT:

Microsoft Windows [Version 10.0.19045.3448]

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C:\Users\Anurag Singh>d:

D:\>cd desktop

D:\Desktop>cd java

D:\Desktop\Java>cd assignment

D:\Desktop\Java\Assignment>javac usingDynamicDispatch.java

D:\Desktop\Java\Assignment>java testArea1 5 7

Area of Circle is: 78.5

Area of Square is: 49.0

20. Write a program in JAVA to create an interface RATEOFINTEREST that consists of the rate of interest for a loan amount. Also create a class INTEREST that computes the simple and compound interest for a principle amount for certain time duration. The principle and the duration of the loan amount are given in a class PRINCIPAL. Use multiple inheritance to implement the problem.

interface RateOfInterest {

    double RATE = 7.5;

}

class Principal {

    double principal, duration;

    Principal() {

        principal = duration = 0.0;

    }

    Principal(double principal, double duration) {

        this.principal = principal;

        this.duration = duration;

    }

}

class Interest extends Principal implements RateOfInterest

{

    Interest() {

        super();

    }

    Interest(double principal, double duration) {

        super(principal, duration);

    }

    void findSimpleInterest() {

        double simpleInterest = (principal \* RATE \* duration) / 100.0;

        System.out.println("Simple Interest: " + simpleInterest);

    }

    void findCompoundInterest() {

        double compoundInterest = principal \* (Math.pow((1 + (RATE / 100.0)), duration) - 1);

        System.out.println("Compound Interest: " + compoundInterest);

    }

}

class testInterest {

    public static void main(String[] args) {

        Interest obj = new Interest(Double.parseDouble(args[0]), Double.parseDouble(args[1]));

        obj.findSimpleInterest();

        obj.findCompoundInterest();

    }

}

OUTPUT:

Microsoft Windows [Version 10.0.19045.3448]

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C:\Users\Anurag Singh>d:

D:\>cd desktop

D:\Desktop>cd java

D:\Desktop\Java>cd assignment

D:\Desktop\Java\Assignment>javac computeInterest.java

D:\Desktop\Java\Assignment>java testInterest 15000 2

Simple Interest: 2250.0

Compound Interest: 2334.3745