

2.1 Create an abstract class Figure with following properties and functions:

Properties: double dim1;

Methods: abstract void findArea();

abstract void findPerimeter();

Create three subclasses Circle, Rectangle and Triangle that extends Figure class and define both the methods.

Write a program that will find the area and perimeter of 3 Figures and print the details for all.

2.2 Code with Comments

Figure Abstract Class

```
package assignments;

public abstract class Figure {
    public double dim1;

    public abstract void findArea();

    public abstract void findPerimeter();
}
```

Circle Class

```
package assignments;

import java.util.Scanner;

public class Circle extends Figure{

    double pi=3.14;

    @Override
    public void findArea() {
        Scanner scan=new Scanner(System.in);

        System.out.println("Enter the radius of the circle");
        int r=scan.nextInt();
        dim1= pi*r*r;
        System.out.println("Area of the circle = " + dim1);
    }
}
```

```

    }

    @Override
    public void findPerimeter() {
        Scanner scan=new Scanner(System.in);
        System.out.println("Enter the radius of the circle");
        int r=scan.nextInt();
        dim1=2*pi*r;
        System.out.println("Perimeter of the circle =" + dim1);
    }
}

```

Rectangle Class

```

package assignments;

import java.util.Scanner;

public class Rectangle extends Figure {

    @Override
    public void findArea() {
        Scanner scanner = new Scanner(System.in);
        System.out.println(" Enter the length of Rectangle: ");
        double length = scanner.nextDouble();
        System.out.println("Enter the width of Rectangle:");
        double width = scanner.nextDouble();
        dim1 = length*width; //area=l*b
        System.out.println("Area of Rectangle is:"+dim1);
    }

    @Override
    public void findPerimeter() {
        Scanner scanner = new Scanner(System.in);
        System.out.println(" Enter the length of Rectangle: ");
        double length = scanner.nextDouble();
        System.out.println("Enter the width of Rectangle:");
        double width = scanner.nextDouble();
        dim1 =2*(length+width); //2*(l+b)
        System.out.println("Perimeter of Rectangle is:"+dim1);
    }
}

```

Triangle Class

```

package assignments;

import java.util.Scanner;

```

```

public class Triangle extends Figure {

    @Override
    public void findArea() {

        Scanner scan = new Scanner(System.in);
        System.out.println("Enter the width of the Triangle:");
        double base = scan.nextDouble();

        System.out.println("Enter the height of the Triangle:");
        double height = scan.nextDouble();

        //Area = (width*height)/2
        dim1 = (base* height)/2;
        System.out.println("Area of Triangle is: " + dim1);
    }

    @Override
    public void findPerimeter() {
        Scanner scan = new Scanner(System.in);
        System.out.println("Enter the sides of the triangle");
        float a=scan.nextFloat();
        float b=scan.nextFloat();
        float c=scan.nextFloat();
        dim1=a+b+c;
        System.out.println("Perimeter of Triangle is: "+dim1);
    }

}

```

Main Class

```

package assignments;

public class FigureMainClass {

    public static void main(String[] args) {

        Circle c=new Circle();
        Rectangle r=new Rectangle();
        Triangle t=new Triangle();
        c.findArea();
        c.findPerimeter();
        r.findArea();
        r.findPerimeter();
        t.findArea();
        t.findPerimeter();
    }

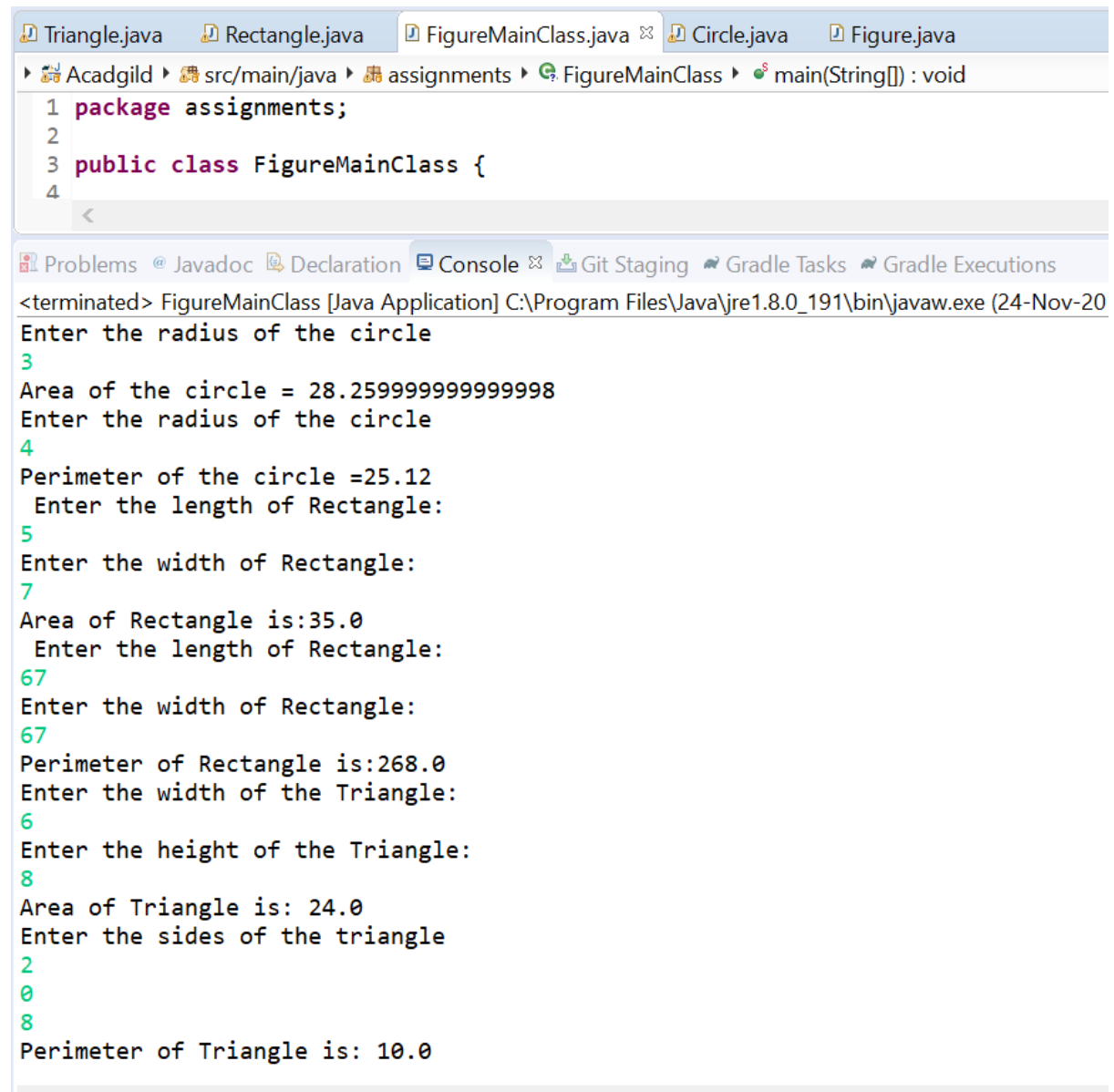
}

```

2.3 Explanation of the code

I created one abstract class with abstract method and one property and I created 3 subclasses as Circle, Rectangle and Triangle. Added all the unimplemented methods and calculated the area and perimeter of the circle, triangle and rectangle. I created a new class with main function and created an object for all the classes and called all the methods and got the output.

2.4 Output



The screenshot shows an IDE with several tabs: Triangle.java, Rectangle.java, FigureMainClass.java (active), Circle.java, and Figure.java. The active tab displays the following code:

```
1 package assignments;
2
3 public class FigureMainClass {
4
```

Below the code editor, the Console tab shows the execution output for FigureMainClass [Java Application] C:\Program Files\Java\jre1.8.0_191\bin\javaw.exe (24-Nov-20):

```
<terminated> FigureMainClass [Java Application] C:\Program Files\Java\jre1.8.0_191\bin\javaw.exe (24-Nov-20)
Enter the radius of the circle
3
Area of the circle = 28.259999999999998
Enter the radius of the circle
4
Perimeter of the circle =25.12
Enter the length of Rectangle:
5
Enter the width of Rectangle:
7
Area of Rectangle is:35.0
Enter the length of Rectangle:
67
Enter the width of Rectangle:
67
Perimeter of Rectangle is:268.0
Enter the width of the Triangle:
6
Enter the height of the Triangle:
8
Area of Triangle is: 24.0
Enter the sides of the triangle
2
0
8
Perimeter of Triangle is: 10.0
```