**2D Graphics Library**

Beqa kopadze

Ilia university student

[beka.kopadze.2@iliauni.edu.ge](mailto:beka.kopadze.2@iliauni.edu.ge)

**Description**

Create 2D Graphics Library(Graphic2D) in java. Graphic2D is important software for making 2D graphics effectively and efficiently. It can be simple and also hugely complex. Our example is basic one. Which have the following features:

1. Ability to create a working window
2. Ability to create simple shapes like Circle and Rectangle
3. Ability to position and scale objects as we want

**Graphics2D structure**

We will need the following classes for the software

1.Shape – Abstract class for the all the shapes

2.Circle – circle class with all of its features

3.Rectangle – rectangle class with all of its features

4.Graphics2DTest – class to test everything

|  |  |
| --- | --- |
| Abstract class | Shape |
| int | x |
| Int | Y |
| void | draw() |
| double | getArea() |
| double | getPerimeter() |

|  |  |
| --- | --- |
| class | Circle |
| constructor | (int x, int y, int radius) |
| Int | radius |

|  |  |
| --- | --- |
| class | Rectangle |
| constructor | (int x, int y, int height, int width) |
| int | height |
| int | width |

**Abstract Class Shape**

the Shape has simple fields like pos x and y, the constructure which takes in position. Also voids draw, getArrea and getPerimeter

public abstract class Shape {

protected int x, y;

public Shape(int x, int y) {

this.x = x;

this.y = y;

}

public abstract void draw();

public abstract double getArea();

public abstract double getPerimeter();

}

**Class Circle**

Circle extends the Shape but it has its own field “radius” and constructor which takes in pos x, y and radius

// Circle.java

public class Circle extends Shape {

private int radius;

public Circle(int x, int y, int radius) {

super(x, y);

this.radius = radius;

}

@Override

public void draw() {

// Draw a circle using graphics library

System.out.println("Drawing a circle at (" + x + ", " + y + ") with radius " + radius);

}

@Override

public double getArea() {

return Math.PI \* radius \* radius;

}

@Override

public double getPerimeter() {

return 2 \* Math.PI \* radius;

}

}

**Class Rectangle**

Rectangle extends Abstract Class Shape and it also adds fields width and height. In constructor we need to send pos x, y and also width and height

// Rectangle.java

public class Rectangle extends Shape {

private int width, height;

public Rectangle(int x, int y, int width, int height) {

super(x, y);

this.width = width;

this.height = height;

}

@Override

public void draw() {

// Draw a rectangle using graphics library

System.out.println("Drawing a rectangle at (" + x + ", " + y + ") with width " + width + " and height " + height);

}

@Override

public double getArea() {

return width \* height;

}

@Override

public double getPerimeter() {

return 2 \* (width + height);

}

}

**Class Graphics2DTest**

This class creates two functions to test Circle and Rectangle and all its functions

public class 2DGraphicsTest {

public static void main(String[] args) {

testCircle();

testRectangle();

}

private static void testCircle() {

System.out.println("Testing Circle class");

Circle circle1 = new Circle(10, 20, 5);

circle1.draw();

System.out.println("Circle 1 area: " + circle1.getArea());

System.out.println("Circle 1 perimeter: " + circle1.getPerimeter());

System.out.println();

}

private static void testRectangle() {

System.out.println("Testing Rectangle class");

Rectangle rectangle1 = new Rectangle(30, 40, 10, 15);

rectangle1.draw();

System.out.println("Rectangle 1 area: " + rectangle1.getArea());

System.out.println("Rectangle 1 perimeter: " + rectangle1.getPerimeter());

System.out.println();

}

}