Lab 5: Inheritance

Exercise 1: Create a Project

1. Create a project called “lab5”
   a) If you are using Eclipse create a project in Eclipse as we did in previous weeks.
   b) If you are using text editor, create a “lab5” directory in “java” directory which is in your home directory.
2. Download the Circle.java from the below link and put it into your project. Note that Circle class is defined in a package named shapes2d.
   https://piazza.com/class_profile/get_resource/ik40jqi7ip06/ilca9i9y41r3d7

3. If you are not using Eclipse compile Circle.java. In order compile you should issue the following command in “lab4” directory.
   javac /shapes2d/Circle.java

Exercise 2: Create Cylinder Class

1. Create a Cylinder class in package named “shapes3d”
   a) If you are using text editor, create “shapes3d” directory in “lab5” directory. In this “shapes3d” directory, create a java file called Cylinder.java. The first line of this file should be:

```
package shapes3d;
```

2. In Cylinder class import the Circle class.

```
import shapes2d.Circle;
```

3. Declare an instance variable for representing height property.
4. Extend the Cylinder class from the Circle class and implement the following methods.
   a) Constructor without parameters which sets radius and height to 1.
      i. **public Cylinder()**
   b) Constructor with a height parameter which sets radius to 1 and height of the cylinder to the given parameter.
      i. **public Cylinder(double height)**
   c) Constructor with radius and height parameter which sets the radius and height of the cylinder.
      i. **public Cylinder(double radius, double height)**
   d) Method that calculates the area of the cylinder

   i. **public double area()**

e) Method that calculates the volume of the cylinder
   i. **public double volume()**

f) Override the toString method to return values of size of the cylinder such as
   i. radius= 5, height=7

g) Override equals method to return true when the size of the given cylinder is equal to the cylinder object.

Exercise 3: Test Cylinder Class

1. Create a Test class in package named "test"
2. In Test class, declare the "public static void main" method.
3. In the main method declare and create an instance of Cylinder class. Note that you should import the Cylinder class in Test class.
4. Print the area of the cylinder instance
5. Print the volume of the cylinder instance
6. Print the cylinder instance
7. Create another instance of Cylinder having the same sizes as the previous cylinder instance
8. Use equals method to compare these two cylinders