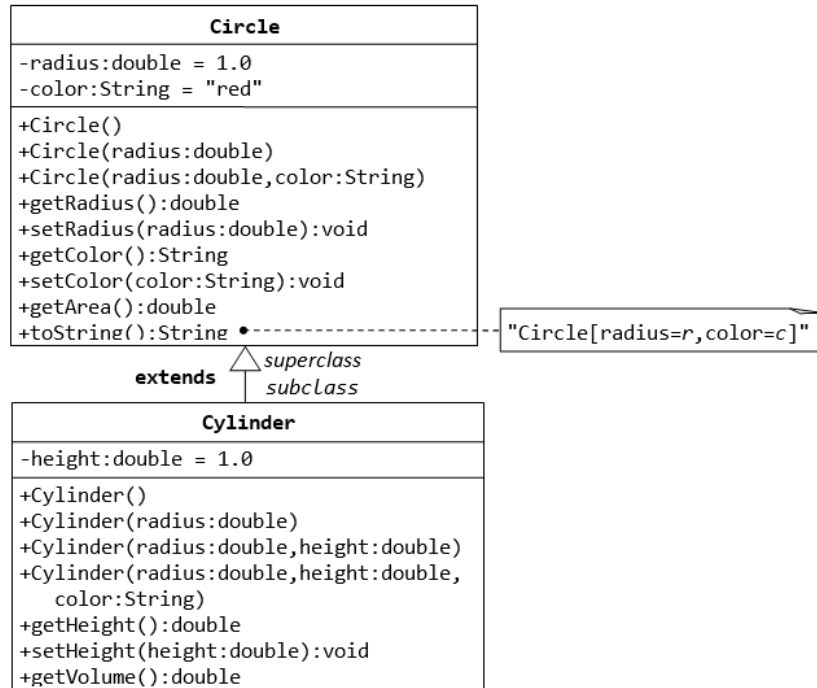# Lab 4

CPS501 Advanced Programming and Data Structures

1. Open NetBeans
2. Close any opening projects (if applicable)
3. Create a new project: Lab4

```
                    Circle
  -radius:double = 1.0
  -color:String = "red"

  +Circle()
  +Circle(radius:double)
  +Circle(radius:double,color:String)
  +getRadius():double
  +setRadius(radius:double):void
  +getColor():String
  +setColor(color:String):void
  +getArea():double
  +toString():String ●----------------- "Circle[radius=r,color=c]"
                      △ superclass
           extends      subclass
                   Cylinder
  -height:double = 1.0

  +Cylinder()
  +Cylinder(radius:double)
  +Cylinder(radius:double,height:double)
  +Cylinder(radius:double,height:double,
     color:String)
  +getHeight():double
  +setHeight(height:double):void
  +getVolume():double
```

4. Task 1:
   Implement the class **Circle** with the attributes and behaviors shown in the UML above.

5. Task 2:
   In the **main** function, create two Circle objects with two different constructors and show the result.

```
Circle c1 = new Circle();
System.out.println("The circle has radius of "
   + c1.getRadius() + " and area of " + c1.getArea());


Circle c2 = new Circle(2.0);
System.out.println("The circle has radius of "
   + c2.getRadius() + " and area of " + c2.getArea());
```

6. Task 3:
   Implement the class **Cylinder** is derived from the superclass **Circle**.

7. Task 4:
   In the **main** function, create 3 Cylinder objects with different constructors

```java
Cylinder c1 = new Cylinder();
System.out.println("Cylinder:"
      + " radius=" + c1.getRadius()
      + " height=" + c1.getHeight()
      + " base area=" + c1.getArea()
      + " volume=" + c1.getVolume());

Cylinder c2 = new Cylinder(10.0);
System.out.println("Cylinder:"
      + " radius=" + c2.getRadius()
      + " height=" + c2.getHeight()
      + " base area=" + c2.getArea()
      + " volume=" + c2.getVolume());

Cylinder c3 = new Cylinder(2.0, 10.0);
System.out.println("Cylinder:"
      + " radius=" + c3.getRadius()
      + " height=" + c3.getHeight()
      + " base area=" + c3.getArea()
      + " volume=" + c3.getVolume());
```