## **INFSCI 0017 – Fundamentals of Object-Oriented Programming (Fall 2018)**

## **Lab 9**

## Topics Reviewed

1. Inheritance
2. Subclass / superclass
3. super()
4. Abstract Classes

## Grading and Submission

You are to write a complete Java program that meets the requirements outlined in the Lab 9 Tasks section.

Once you have completed the program, you should demonstrate your program for your Lab TA.

There will be 5 points for this lab, broken down in the following way:

1. Each correctly implemented class in task 1 is worth 1 point (total of 2 points)
2. Each correctly implemented class in task 2 is worth 1 point (total of 3 points)

Note that if your program does not compile, the TA will not grade it.

## 

## Lab 9 Tasks

## Task 1

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| |  | | --- | | **Circle** | | -radius:double = 5.0  -color:String = “Green” | | +Circle()  +Circle(radius:double)  +Circle(radius:double, color:String)  +getRadius():double  +setRadius(radius:double):void  +getColor():String  +setColor(color:String):void  +getArea():double | | |  | | --- | | **Cylinder** | | -height:double = 1.0 | | +Cylinder()  +Cylinder(radius:double, height:double)  +Cylinder(radius:double, height:double, color:String)  +getHeight():double  +setHeight(height:double):void  +getVolume():double | |

For task 1, implement the two classes (Circle and Cylinder) that are described above. Note that class Cylinder is derived from the superclass Circle -- in other words Cylinder inherits from Circle. Make sure that the subclass Cylinder invokes the superclass' constructors (via super() and super(radius)) and correctly inherits the variables and methods from the superclass Circle.

## 

## Task 2

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  | | --- | | **<abstract> Person** | | -name:String  -address:String = “String” | | +getName():String  +getAddress():String  +setAddress(address:String):void  +setName(name:String):void |  |  | | --- | | **Staff** | | -school:String  -pay:double | | +Staff(name:String, address:String, pay:double)  +getSchool():String  +setSchool(school:String):void  +getPay():double  +setPay(pay:double):void  +toString():String | | |  | | --- | | **Student** | | -program:String  -year:int  -fee:double | | +Student(name:String, address:String, program:String, year:int, fee:double)  +getProgram():String  +setProgram(program:String):void  +getYear():int  +setYear(year:int):void  +getFee():double  +setFee(fee:double):void  +toString():String | |

For task 2, implement the three classes (Person, Student, and Staff) that are described above. Note that classes Staff and Student are derived from the superclass Person -- in other words Staff and Student inherit from Person. Make sure that the subclasses Student and Staff invoke the superclass' constructors and correctly inherit the variables and methods from the superclass Person. Also note that Person is an **abstract** class.