**4.3 – Understanding Object**

**Oriented Programming Theory**

For this assignment we will be using A Guide to Programming in JAVA by Beth Brown. Please type your answers in this document. When you are done, upload the file to your GitHub account in a repo called “Assignment 4-3” available at:

<https://bbarrettchs.weebly.com/uploads/3/7/7/8/37782575/lvp_java_text.pdf>

**Who are you?**

0. What is your name?

* Ethan Yen

**What is an Object?**

Read page 179-180 and answer the following questions:

1. The textbook describes an object as a collection of state and behaviour. What is meant by state and behaviour?

* State: what is stored in the class
* Behaviour: what the class does

2. Define Encapsulation / Information Hiding.

* Hides data from other code

3. Define client code.

* Has class code inside

**Designing and Writing a Class**

Read page 180-182 and answer the following questions:

4. Define Functional Decomposition.

* Class separated into individual behaviours

5. What three things does the class declaration contain?

* Access level, keyword, class name

6. What three things does the class body contain?

* Variables, constructers, methods

7. Access levels: what does it mean to make a variable or method public? What does it mean to make a variable or method private?

* Private: code can only be seen by class, not client
* Public: code can be seen by client aswell

8. What is an interface?

* How the client code interacts with objects

9. Define accessor method, modifier method, and helper method. Which one of these types of methods is NOT part of the interface?

* Accessor methods: determine value of variables
* Modifier method: returns value of variable
* Helper method: help to complete task, not part of interface

10. Do the problem "Review: Circle - part 1 of 4" on page 182

**Writing Constructors**

Read page 183 and answer the following questions:

11. What does it mean for an object to be instantiated?

12. What is a constructor method and what does it do?

13. What two things are always true about constructor methods?

13. What does it mean to "overload" a constructor method?

14. Do the problem "Review: Circle - part 2 of 4" on page 184

**Instance and Class Members**

Read page 184-185 and answer the following questions:

Public double circumference(double r) {

Double cir = 0;

cir = math.PI \* r \* 2;

Return cir;

}

15. What is the difference between an instance variable and a class variable? How do you declare a variable as an instance variable? How do you declare a variable as a class variable? Give an example of each from the Circle class.

* Instance variable: for objects – eg. Radius
* Class variable: declared with “static” – eg. PI

16. What is the difference between an instance method and a class method? How do you declare a method as an instance method? How do you declare a method as a class method? Give an example of each from the Circle class.

17. Do the problem "Review: Circle - Part 3 of 4" on page 185.

public class TestCircle {

public static void main(String[] args) {

Circle spot = new Circle(5);

System.out.println("Circle radius:" + spot.getRadius());

System.out.println("Circle area: " + spot.area());

Circle.displayAreaFormula();

}

Public double displayAreaFormula(double r) {

Double area = 0;

Area = math.PI \* math.pow(r, 2);

Return area;

}

}