**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?

Justin Ho

**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: Data an object stores. Behaviour is defined by action and communication it provides

2. Define Encapsulation / Information Hiding.

Projecting an object’s data

3. Define client code.

Application that uses one or more objects

**Designing and Writing a Class**

Read page 180-182 and answer the following questions:

4. Define Functional Decomposition.

Process of creating clearly designed functions/behavior for a class

5. What three things does the class declaration contain?

Access level, keyword class and class name

6. What three things does the class body contain?

Variables, constructors and 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?

Public: Visible to other classes and used to instantiate objects in them.

Private: Makes it visible to other classes but not to client code. Encapsulates data and causes data hiding. Cannot be directly accessed by other class statements.

8. What is an interface?

How client code can interact with an object.

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

Accessor: Determines value of variable

Modifier: Changes value of variable.

Helper: Called from within another class by other methods. Used to help complete a method and are private.

Helper not part of interface.

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

Void circumference() {

R=This.radius;

R=2\*R\*Math.PI;

Retutn R;

}

**Writing Constructors**

Read page 183 and answer the following questions:

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

For a constructor of a class to be immediately executed.

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

A constructor is a method without a return type and the same name as the class. It is used to create objects.

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

Doesn’t have a return type and has same name as the class.

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

To add a parameter to the constructor to make it assign a value to an object as its created

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

Public circle( double radius) {

This.radius=radius;

}

**Instance and Class Members**

Read page 184-185 and answer the following questions:

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.

An instance variable is a class’s own copy of a variable. A class variable is a single copy all class’s refer too instead. Declare a class variable with private static. (Private static final double PI=3.14) Declare instance variable with private. (Private double radius)

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.

An instance method changes the state of an object, and must called from an instance of a class, while class method can be called from the class. Class methods are declared with static. Example of class method from the circle class would be “public static void displayAreaFormula()” and an instance method would be “getRadius();”

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

public static void displayAreaFormula() {

System.out.println("The formula for the area of a

circle is a=Pi\*r\*r");

}