**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?**

What is your name?

**Braiden Boechler**

**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?

The state is the values that an object contains while the behaviour is methods that interact with the rest of the code. It communicates with the code and provides actions.

2. Define Encapsulation / Information Hiding.

Encapsulation is when you hide the data which changes components of an object from the rest of the code outside the class.

3. Define client code.

Client code refers to an application that uses multiple other classes. It can access the methods of the class, however, it cannot access the data directly defined in the class.

**Designing and Writing a Class**

Read page 180-182 and answer the following questions:

4. Define Functional Decomposition.

The process of breaking down a class into its variables and methods along with their descriptions to clearly show how a class works.

5. What three things does the class declaration contain?

It contains an access level (i.e. Public, private, etc.), along with the keyword *class*, and the name of the class.

6. What three things does the class body contain?

The class body contains 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?

If something is public, it can be accessed by other classes. If it is private, it cannot be accessed by other classes.

8. What is an interface?

The interface is how the client code interacts with an object. The public methods of a class define the interface of 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 methods are methods that return the value of a variable. Modifier methods are methods that change the value of a variable. These two methods are public so that they can be accessed outside the class. Helper methods are methods that are called within a class by other methods, therefore, they are private and not part of the interface. They are used to help complete tasks and shorten code.

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

public double circumference() {

return (2\*Math.PI\*radius);

}

**Writing Constructors**

Read page 183 and answer the following questions:

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

It means the object has been created.

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

Constructors initialize a new object and the data of the new object.

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

It always has the same name as the class and it does not have a return type.

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

When you create multiple versions of the same constructor. They all have the same names, but different arguments that it accepts.

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.

Instance variables refer to the variables of the class while class variables are declared with *static* and only contains one copy for all objects to refer to.

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.

Instance methods are ones that change the state (values) of an object. Class methods are declared with the keyword *static* and are called from the class itself.

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

Circle.displayAreaFormula();