**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?

**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 of the object refers to the data it stores while the behavior is its action and communication it provides.

2. Define Encapsulation / Information Hiding.

Encapsulation hides certain data from code outside the class. This helps by only changing data when it is called to.

3. Define client code.

An application that uses one or more classes

**Designing and Writing a Class**

Read page 180-182 and answer the following questions:

4. Define Functional Decomposition.

Creating clearly defined functions, or behaviours 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 means it is visible to other classes and be used to instantiate objects in those classes.

Private makes the variable visible to the class but not the client code

8. What is an interface?

Public methods of a class, how client code interacts with the 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 called to determine the value of a variable.

A modifier method is called to change the value of a variable

Helper methods are called within a class by other methods. They help complete a task and have access level private.

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

Public double circumference(){

Return 2\*radius\*PI;

}

**Writing Constructors**

Read page 183 and answer the following questions:

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

The constructor class is automatically executed

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

It can call methods of a class in any order

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

No return type and have same name as the class

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

More than 1 constructors so it is more efficient to assign values

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

Public Circle(double r){

This.radius=r;

}

**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 have multiple variables that belong to each class, while class variable has only 1. Using static. Private double radius(instance variable), private static final double PI(class variable).

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 change the state of an object and must be called from an instance of a class.

Class methods can be called from the class itself rather than the object and are declared by keyword static. displayAreaFormula()(class method), getRadius()(instance method).

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

Public static Circle displayAreaFormula(){

System.out.println(“Area formula:PI\*r\*r”);

}