**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? Brady

**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 is information stored and behavior is methods that performs

1. Define Encapsulation / Information Hiding. Encapsulation hides codes using private methods

3. Define client code. Codes that refers to a class that it’s outside of.

**Designing and Writing a Class**

Read page 180-182 and answer the following questions:

1. Define Functional Decomposition. Decomposing a class’s behaviors into a set of simple methods

5. What three things does the class declaration contain? Name, keyword, public/private

6. What three things does the class body contain? Constructor, methods and instance/member variables

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 methods can be accessed by client code while private can only be used within it’s own class

8. What is an interface? All public methods the client code can use to create instances of this class

9. Define accessor method, modifier method, and helper method. Which one of these types of methods is NOT part of the interface? Accessor allows client code to access but not modify instances while mutator allows them to modify aswell as access, but Helper variable are private methods and not part of the interface

1. 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? Creating a new keyword by calling the constructor, creating a object in memory and initializing it as per the constructor, assigning a pointer to that memory location

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

13. What two things are always true about constructor methods? Doesn’t return and have the same name as class

13. What does it mean to "overload" a constructor method? Making multiple versions of it

1. 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:

1. 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.

Class methods are called from static keywords so it share the same copy in the class, while the instance variables could have multiple versions. Radius is an instance variable and pi is a class variable Instance methods operate on the state of an object and must be called from an instance of a class. Class methods are called from the class itself, rather than an object of the class, to perform a task. Area(), getRadius(), and setRadius() are all instance methods, whereas displayAreaFormula is a class method.

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.

1. 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”);

}