**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 Yuen

**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?

Behaviour are the methods that a state uses. State is the info an object stores.

2. Define Encapsulation / Information Hiding.

Encapsulation protects an objects data. It prevents people from using the vairables by using private methods.

3. Define client code.

Client code is a piece of code that uses a class but another class is supposed to be a client

**Designing and Writing a Class**

Read page 180-182 and answer the following questions:

4. Define Functional Decomposition.

it is when you break up a problem into smaller bits.

5. What three things does the class declaration contain?

private or public, claass keyword and name

6. What three things does the class body contain?

methods, contrucotrs and instance 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 means that anything is accessible while private means that it can only be used in the class it is in

8. What is an interface?

A list of public methods that is used to interact with variables of the class

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

accessor methods can access instancces varibales, mutator methods modify and access instances variables and helper methods assist them but are not part of the interface as they are 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?

it is when you call up the construcotr

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

Initializes instance vairiables

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

theres no return and are the same name as the class

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

overloading means you are making multiple versions of a constructor method which gives client code different ways for instantiating a class

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.

Class variables are declared with the static keyword, instance variables

are not. The difference is that each instance of the class maintains its own independent copy of each

instance variable, whereas there is only 1 copy of a class variable for all instances of that class. In the

Circle class, radius is an instance variable whereas PI is a 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 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.

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”);

}