CS163/164: Worksheet More Classes
Name(s):_____

Analyze the class Product presented below to answer the following questions:

a. Identify the instance variables, how many are they and what are their types and names?
    a. Three instance variables: String name, double price, int quantity
b. Do we have any class variables?
    a. Yes, only one: double VALUE.
    We know that this belongs to the class because of the keyword "static" and we know that this is a constant because of the keyword "final".
c. Is the constructor method overloaded? Explain your answer.
    a. Yes. We have two constructor methods. The first one receives only one String as a parameter and the second one receives three parameters.
d. What is the minimum price for a product when you create an object? How do you know that?
    a. Minimum price is 9.99. We know that because of the if statement inside of the setPrice method.
e. What is the minimum quantity for a product? How do you know that?
    a. Minimum quantity is 1. We know that because of the if statement inside of the setQuantity method.
f. What do the method changePrice does?
    a. It increases the price in 10%.
g. What do the toString method does?
    a. Returns a String containing the current value of the instance variables.

```
public class Product {
    private String name;
    private double price;
    private int quantity;
    private final static double VALUE = 0.1;
    public Product(String name){
        setName(name);
        setPrice(9.99);
        setQuantity(1);
    }
    public Product(String name, double price, int quantity){
        setName(name);
        setPrice(price);
        setQuantity(quantity);
    }
    public void setName(String name){
        this.name = name;
    }
    public void setPrice(double price){
        if(price < 9.99) this.price = 9.99;
        else this.price = price;
    }
    public void setQuantity(int quantity){
        if(quantity < 1) this.quantity = 1;
        else this.quantity = quantity;
    }
    public String getName(){
        return name;
    }
    public double getPrice(){
        return price;
    }
    public int getQuantity(){
```

```
        return quantity;
    }
    public void changePrice(){
        double value = price * VALUE;
        price += value;
    }
    public String toString(){
        String msg = String.format("Name: %s, Price: %.2f, Quantity: %d\n", name,
price, quantity);
        return msg;
    }
}
```

Analyze the classes presented below to answer the following questions:

a. Identify their instance variables and class variables if they exist.
    a. Instance variables: String name, Product p1, p2, p3.
    b. There is no class variable, no variable is declared as "static" in the class.
b. Identify constant values, if they exist.
    a. There is one final variable, which is the Scanner scanner
c. Explain what each method is doing.

```
public class Store {
    private String name;
    private Product p1, p2, p3;
    public Store(String name){ //initialize the instance variables
        this.name = name;
        p1=p2=p3=null;
    }
    public String getName(){         return name;     } //return name
    public boolean addProduct(String name, double price, int quantity){
        if(p1 != null && p2 !=null && p3 != null)       //add an object Product if
            return false;                               //the store has space to hold
        Product p = new Product(name,price, quantity);  //one more object Product
        if(p1 == null) p1 = p;                          //if all references to Product
        else if(p2 == null) p2 = p;                     //objects are not full
        else if(p3 == null) p3 = p;                     //there is no space
        return true;                                    //if there is space look for
    }                                                 //which object can hold the Product
    public void randomChange(String name){
        if(p1 != null && name.equalsIgnoreCase(p1.getName())) //check if there is a
            p1.changePrice();                                 //Product object and if
        else if(p2 != null && name.equalsIgnoreCase(p2.getName())) //the name of the
            p2.changePrice();                                      //Product is equal
        else if(p3 != null && name.equalsIgnoreCase(p3.getName())) //to the parameter
            p3.changePrice();                                      //if it is, call
    }                           //changePrice method over the specific object Product
    public String toString(){
        String msg = name + "\n"; //builds a String with the name of the Store
        if(p1!=null) msg += p1.toString() + "\n";  //and information about all
        if(p2!=null) msg += p2.toString() + "\n";  //Product that the store has
        if(p3!=null) msg += p3.toString() + "\n";
        if(msg.equals(name + "\n")) return "No Products in Store!\n";
        return msg;
    }
}
```

```
import java.util.Scanner;

public class AppStore {
    private Store store;
```

```
    private final Scanner scanner;
    public AppStore(String name){ //initialize all the instance variables
        store = new Store(name);
        scanner = new Scanner(System.in);
    }
    public void printMenu() { //print menu of options
        System.out.println("Type \"X\" to exit at any time.");
        System.out.println("[A]dd products");
        System.out.println("[L]ist products");
        System.out.println("[C]hange price");
        System.out.println();
    }

    public void go(){
        printMenu(); //call the method that prints the menu
        System.out.println("What would you like to do?");
        String action = scanner.nextLine().toLowerCase(); //reads a line and converts
                                                          //to lower case
        while(!action.startsWith("x")) { //if line is different then "X" enter
            if (action.startsWith("a")) { //if line is "a" ask for info to add a
                                          //Product in the store
                System.out.println("Enter the name of the product: ");
                String name = scanner.nextLine().toLowerCase();
                System.out.println("Enter the price of the product: ");
                double price = scanner.nextDouble();
                System.out.println("Enter the quantity of the product: ");
                int quantity = scanner.nextInt();
                if(store.addProduct(name, price, quantity))
                    System.out.println("Product added!");
                else System.out.println("Could not add product, store is full!");
            } else if (action.startsWith("l")) { //if line is "l" call toString over
                                                  //store
                System.out.println(store.toString());
            } else if (action.startsWith("c")) { //if line is "c" read the name of
                                          //of the Product to change price and call
                                          //randomChange to change the price
                System.out.println("Enter the name of the product you will randomly
change the price: ");
                String name = scanner.nextLine().toLowerCase();
                store.randomChange(name);
            } else { //if line is none of the above, print the message
                System.out.println("Please enter a valid command.");
            }
            printMenu(); //print menu
            System.out.println("What would you like to do?");
            action = scanner.nextLine().toLowerCase(); //read new option
        }
    }
    public static void main(String args[]){
        AppStore app = new AppStore("STORE"); //creates an AppStore object
        app.go();                             //call method "go" to the AppStore object
    }
}
```