Homework Assignment #4

CS5004 – Object-Oriented Design
Northeastern University – Silicon Valley
Summer 2019

Due 06/09 at 11:00pm PDT

Grading: Each programming problem is graded as follows

- A submission which does not compile gets 0.
- A submission which compiles but does something completely irrelevant gets 0.
- A submission which works (partially) correctly, gets (up to) %80 of the total credit.
- %20 is reserved for the coding style. Follow the coding style described in the book.

Problem 1 [20pts]. Create a class `Employee` that includes three instance variables—a first name (`String`), a last name (`String`) and a monthly salary (`double`). Provide a constructor that initializes the three instance variables. Provide a `set` and a `get` method for each instance variable. If the monthly salary is not positive, do not set its value. Write a test app named `EmployeeTest` that demonstrates class `Employee`'s capabilities. Create two `Employee` objects and display each object's yearly salary. Then give each employee a 10% raise and display each employee's yearly salary again.
Submission format: You must define two classes. One is `Employee` which must be declared as a non-public class. Two is `EmployeeTest` which is `public` and contains the `main()` method. So, you must submit one file `EmployeeTest.java` containing the above two classes. The tests must be performed in the `main()` method.

Problem 2 [40pts]. Create a class named `Pizza` that stores information about a single pizza. It should contain the following:

- Private instance variables to store the size of the pizza (either small, medium, or large), the number of cheese toppings, the number of pepperoni toppings, and the number of ham toppings.
- Constructor(s) that set all of the instance variables.

- Public methods to get and set the instance variables.
- A public method named `calCost` that returns a `double` that is the cost of the pizza. Pizza cost is determined by:
  - Small: $10 + $2 per topping
  - Medium: $12 + $2 per topping
  - Large: $14 + $2 per topping
- A public method named `getDescription` that returns a `String` containing the pizza size, quantity of each topping, and the pizza cost as calculated by `calCost`.

Write test code to create several pizzas and output their descriptions. For example, a large pizza with one cheese, one pepperoni and two ham toppings should cost a total of $22.
Submission format: You must must two classes. One is `Pizza` which must be declared as a non-public class. Two is `PizzaTest` which is `public` and contains the `main()` method. So, you must submit one file `PizzaTest.java` containing the above two classes. The tests must be performed in the `main()` method

Problem 3 [60pts]. Create a `PizzaOrder` class that allows up to three pizzas to be saved in an order. Each pizza saved should be a `Pizza` object as described in Problem 3. In addition to appropriate instance variables and constructors, add the following methods:

- `public void setNumPizzas(int numPizzas)`—sets the number of pizzas in the order. `numPizzas` must be between 1 and 3.
- `public void setPizza1(Pizza pizza1)`—sets the first pizza in the order.
- `public void setPizza2(Pizza pizza2)`—sets the second pizza in the order.
- `public void setPizza3(Pizza pizza3)`—sets the third pizza in the order.
- `public double calcTotal()`—returns the total cost of the order.

Write a main method to test the class. The `setPizza2` and `setPizza3` methods will be used only if there are two or three pizzas in the order, respectively. Sample code illustrating the methods is shown below. Note that first three lines are incomplete.

```
Pizza pizza1 = // Code to create a large pizza, 1 cheese, 1 ham
Pizza pizza2 = // Code to create a medium pizza, 2 cheese, 2 pepperoni
PizzaOrder order = // Code to create an order
order.setNumPizzas(2); // 2 pizzas in the order
order.setPizza1(pizza1); // Set first pizza
order.setPizza2(pizza2); // Set second pizza
double total = order.calcTotal(); // Should be 18+20 = 38
```

Submission format: You must define *three* classes: `Pizza`, `PizzaOrder` which are non-public classes, and `PizzaOrderTest` which is `public` and contains the `main()` method. So, you must submit one file `PizzaOrderTest.java` containing the above classes. The tests must be performed in the `main()` method.