Programming 1

Project 2

Designed by Dr Wang

Programming 1
Project 2 (Final Exam)

Due Date:

****Friday the 11th of December before midnight *****. Late submission will directly be marked as 0.

Submission:

Please submit .java files for the code. Upload the zipped folder that contains all of the classes and the .java files. (What you are usually asked to upload and upload for your assignments).

Full Score: 100

Requirement:

1. Keep your code clean (indent, right spacing, appropriate identifier, camel case). Each line of unclean code will get -1 penalty.
2. Add appropriate comments to your code if it is necessary.
3. Do NOT use magic numbers
4. This project is considered as the final exam of the Programming 1 course. Any kind of cheating is intolerable. Please make sure the solution is your original work.

A Restaurant is about to open, and it requires a system to support its business. The good news is that somehow the owner knows a friend that knows how to draw a class diagram so at least the programmer, i.e.: you, don't need to directly talk to the owner.

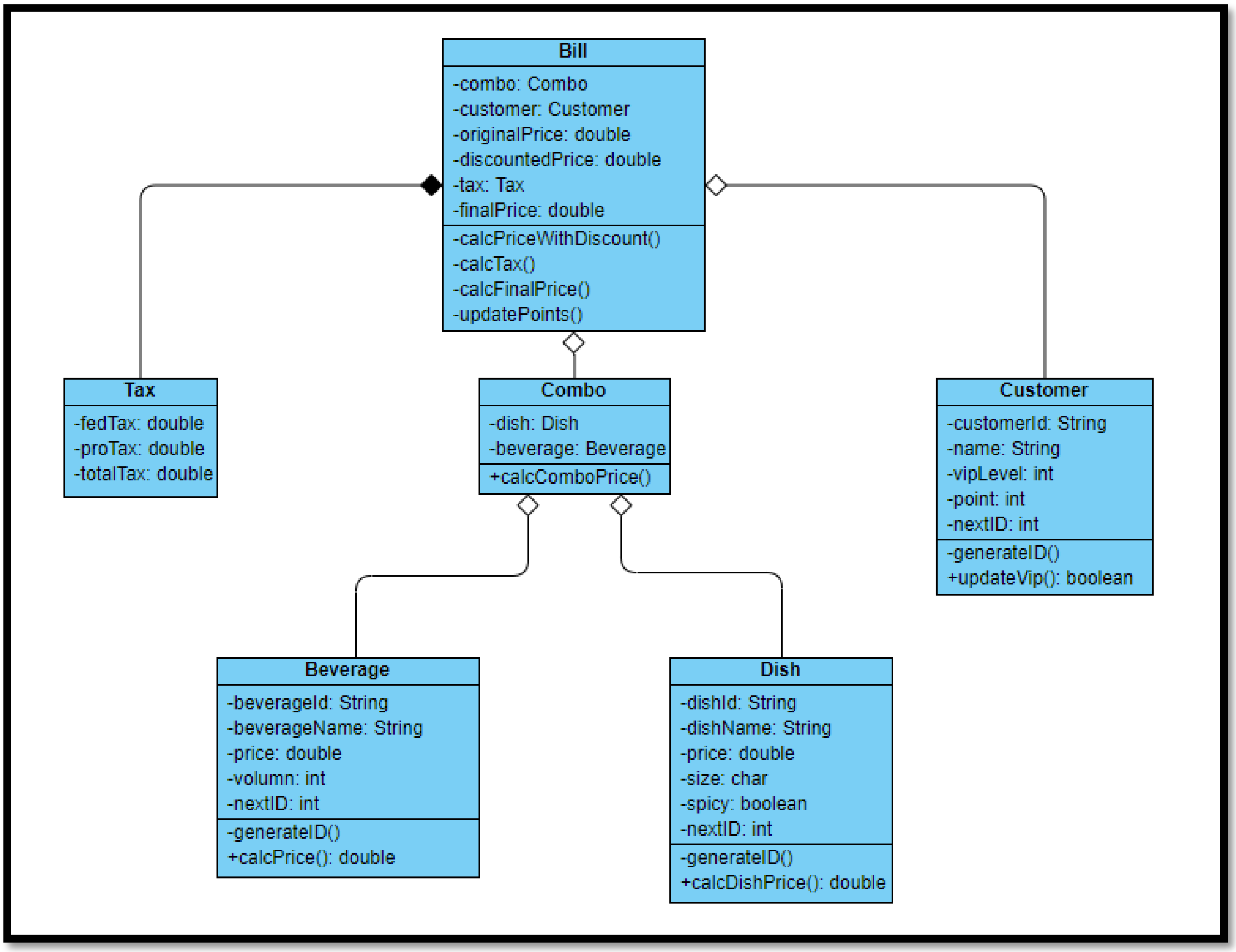


Fig 1: Class Diagram

1 Restaurant Project

This Restaurant only sells beverages and dishes as combos.

1.1 Beverage Class

1.1.1 Data Members

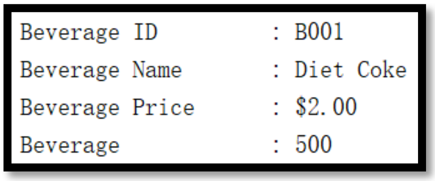
1. String beverageId: the ID of the beverage
2. String beverageName: the name of the beverage
3. double price: the price of the beverage
4. int volume: the volume of the beverage

1.1.2 Static Variable

1. int nextId: the ID of the next beverage

1.1.3 Methods

1. Default constructor: beverageId should use generateId()
2. Constructor with beverageName, price, and volume as parameters. beverageId should use generateId method
3. Copy Constructor
4. generateId method: to generate beverage IDs.
    a. The formatting for the first beverage should be as follows: B001.
    b. The value should increase by one every time a beverage is created.
5. calcPrice method: This method calculates the price of the beverage based on the volume:
    a. If the volume is bigger than 500 mL, the price should be returned directly.
    b. Otherwise, the price should be multiplied by 0.6.
6. equals method (overloaded version)
7. toString: the formatting should be as follows:



```
Beverage ID          : B001
Beverage Name        : Diet Coke
Beverage Price       : $2.00
Beverage             : 500
```

Note: this pattern should be followed for all of the toString methods that follow.

8. getter and setter

1.2 Dish Class

1.2.1 Data Members

1. String dishId: the ID of the dish
2. String dishName: the name of the dish
3. char size: the size of the dish. Can be ‘x’, ‘l’, ‘m’, or ‘s’.
4. double price: the price of the dish
5. boolean spicy: is the dish spicy or not

1.2.2 Static Variable

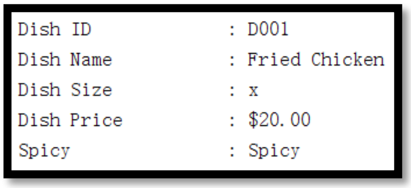
1. int nextId: the ID of the next dish

1.2.3 Methods

1. Default constructor: dishId should use generateId method
2. Constructor with dishName, size, price, and spicy as parameters. beverageId should use generateId method
3. Copy Constructor
4. generateId method: to generate dish IDs.
    a. The formatting for the first dish should be as followed: D001.

   b. The value should increase by one every time a dish is created.

5. calcDishPrice method: to calculate the price of a dish based on the size.
   a. If the size is extra-large, the price should be multiplied by 1.2.
   b. If it’s large, the price should be returned directly.
   c. If it’s medium, it should be multiplied by 0.6
   d. If it’s small, it should be multiplied by 0.4.
6. equals method (overloaded version)
7. toString: You should add a line for “Spicy: Spicy” or “Spicy: Not Spicy” based on the boolean.



```
Dish ID              : D001
Dish Name            : Fried Chicken
Dish Size            : x
Dish Price           : $20.00
Spicy                : Spicy
```

8. getter and setter

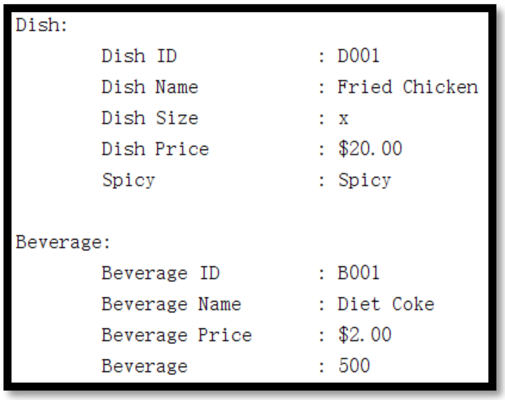
1.3 COMBO CLASS

1.3.1 Data Members

1. Dish dish: a dish
2. Beverage beverage: a beverage

1.3.2 Methods

1. Default constructor
2. Constructor with dish and beverage as parameters
3. Copy Constructor
4. calcComboPrice method: to calculate the total price of the combo without tax and tips.
   a. The price of the dish and the beverage should be multiplied by 0.9.
5. equals method (overloaded version)
6. toString



```
Dish:
        Dish ID              : D001
        Dish Name            : Fried Chicken
        Dish Size            : x
        Dish Price           : $20.00
        Spicy                : Spicy

Beverage:
        Beverage ID          : B001
        Beverage Name        : Diet Coke
        Beverage Price       : $2.00
        Beverage             : 500
```

7. getter and setter

1.4 Customer Class

1.4.1 Data Members

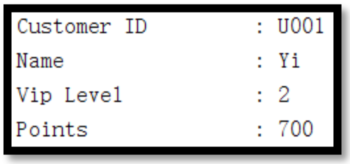
1. String customerId: the ID of the customer
2. String name: the name of the customer
3. int vipLevel: the VIP level of the customer. Can be 0, 1, 2, or 3.
4. int point: the amount of points the customer has

1.4.2 Static Variable

1. int nextId: the ID of the next customer

1.4.3 Methods

1. Default constructor: customerId should use generateId()
2. Constructor with name, vipLevel and point as parameters. customerId should use generateId()
3. Copy Constructor
4. generateId method: to generate customer IDs.
   a. The formatting for the first customer should be as followed: C001.
   b. The value should increase by one every time a customer is created.
5. updateVip method: To update the VIP level of a customer.
   a. To go from level 0 to 1, the customer should use 50 points.
   b. From 1 to 2, the customer should use 80 points.
   c. From 2 to 3, the customer should use 100 points.
   d. Anything else should be returned as false (for example when you don't have the point to update the score).
8. equals method (overloaded version)
6. toString



```
Customer ID          : U001
Name                 : Yi
Vip Level            : 2
Points               : 700
```

7. getter and setter

1.5 Tax Class

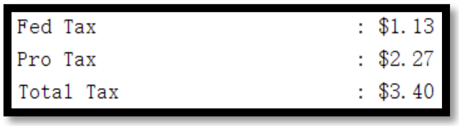
1.5.1 Data Members

1. double fedTax: the federal tax
2. double proTax: the provincial tax
3. double totalTax: the total tax

1.5.2 Methods

1. Default constructor
2. Constructor with fedTax, proTax, and totalTax as parameters
3. Copy constructor
4. equals method (overloaded version)

5. toString



```
Fed Tax                          : $1.13
Pro Tax                          : $2.27
Total Tax                        : $3.40
```

6. getter and setter

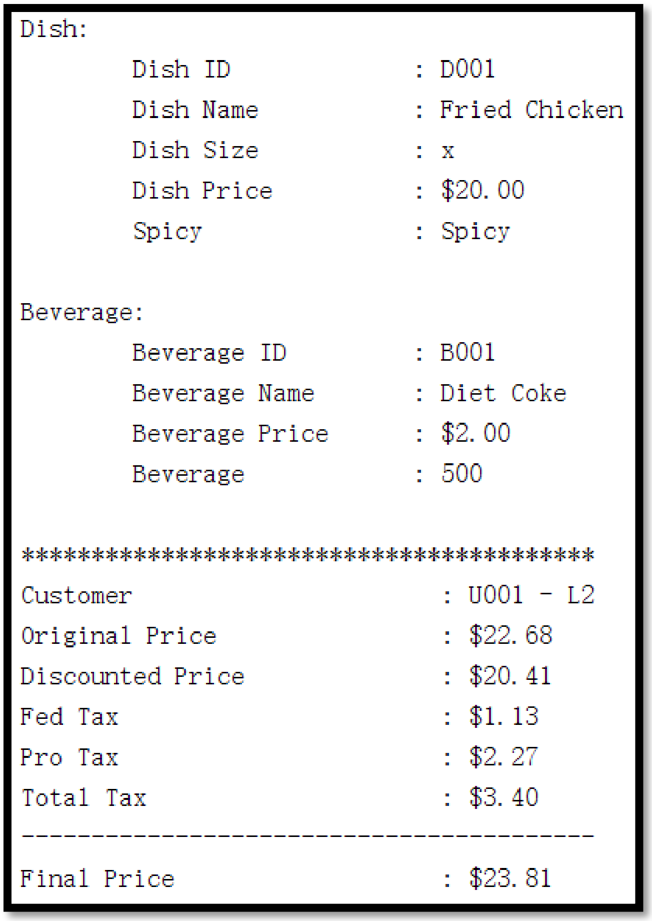
1.6 Bill Class

1.6.1 Data Members

1. Combo combo: a combo
2. Customer customer: a customer
3. double originalPrice: the original price
4. double discountedPrice: the price with a discount
5. Tax tax: the tax
6. double finalPrice: the final price

1.6.2 Methods

1. Default constructor
2. Constructor with dish, beverage, and customer as parameters.
    a. The combo object should be created using the dish and beverage.
    b. The original price should be the combo price.
    c. The discounted price should be called from the calcPriceWithDiscount() method.
    d. The tax should be called from the calcTax() method.
    e. The final price should be called from calcFinalPrice().
3. Copy Constructor
4. calcPriceWithDiscount method: To calculate the price after applying the discount based on the customer's VIP level.
    a. If the vipLevel is 0, or if the customer is null, the combo price should be returned directly.
    b. If the level is 1, discounted price should be the combo price times 0.95.
    c. If the level is 2, it should be combo price times 0.9.
    d. If the level is 3, it should be combo price times 0.85.
5. calcTax method: To calculate the tax of the meal.
    a. The federal tax should be multiplied by 0.05
    b. The provincial tax should be multiplied by 0.1.
    c. The tax object should then be updated with these new values.
6. calcFinalPrice method: To calculate the final price of the meal. It should be the discountedPrice plus the total tax.
7. updatePoints method: To update the points of a customer. For each 10$ spent, the customer gets a point.
8. equals method (overloaded version)
9. toString: should include combo, customer, original price, discounted price, federal tax, provincial tax, total tax, and final price



```
Dish:
        Dish ID                 : D001
        Dish Name               : Fried Chicken
        Dish Size               : x
        Dish Price              : $20.00
        Spicy                   : Spicy

Beverage:
        Beverage ID             : B001
        Beverage Name           : Diet Coke
        Beverage Price          : $2.00
        Beverage                : 500

*****************************************
Customer                          : U001 - L2
Original Price                    : $22.68
Discounted Price                  : $20.41
Fed Tax                           : $1.13
Pro Tax                           : $2.27
Total Tax                         : $3.40
-----------------------------------------
Final Price                       : $23.81
```

10. getter and setter

Good luck

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