Computer Programming (2) Final Project

Write a complete Java program based on the UML class diagram given in Figure 1 and driver program named Invoice.java (refer to Figure 2). Your program should be able to produce the output shown in Figure 3.

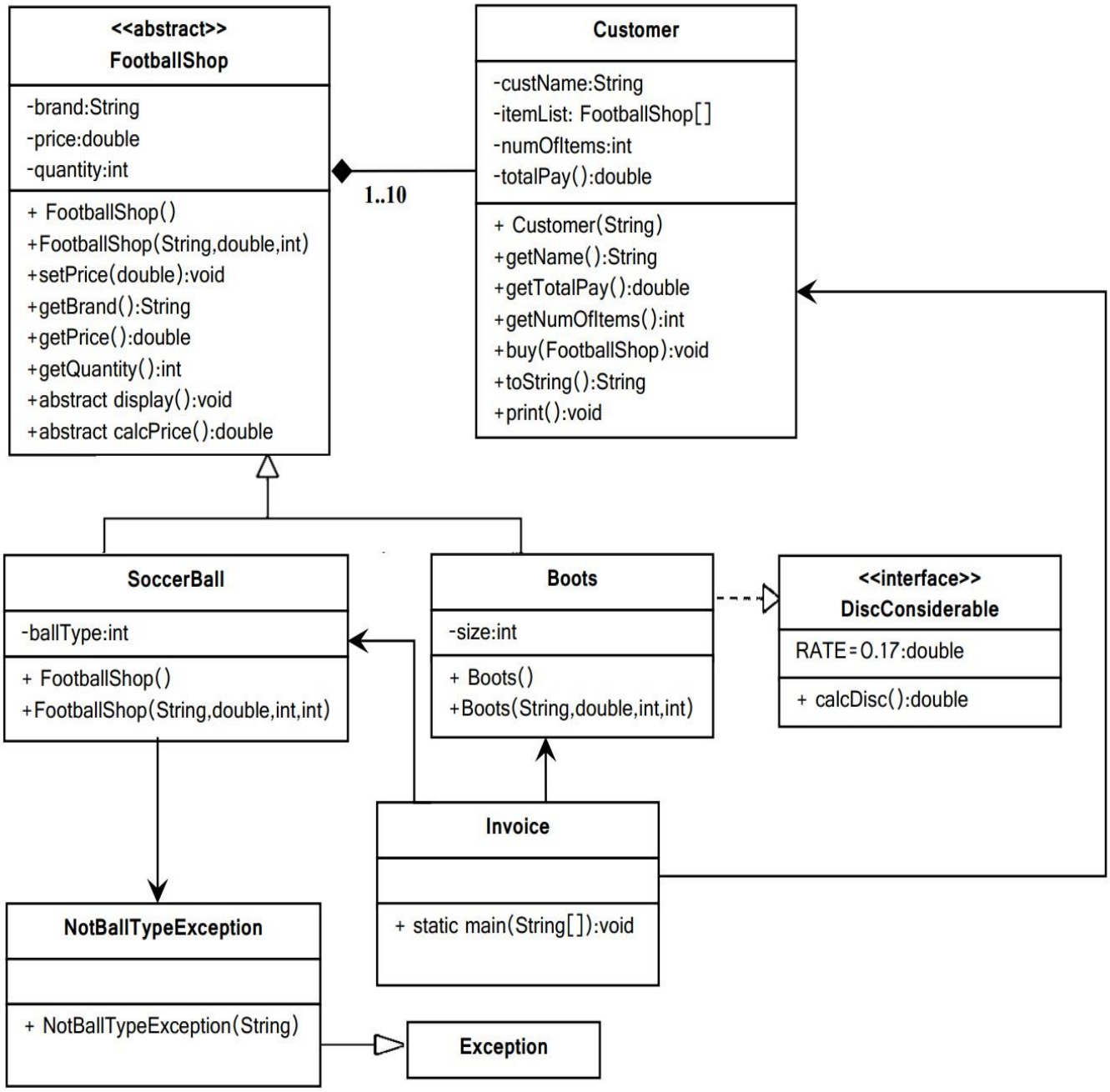

Figure 1 Class Diagram

Instructions:

1. Project due date 20 May 2023
2. Solutions should be unique, any copy from any source/ other student will grade ZERO.
3. The project grade = 25 → 15 for coding and 10 for discussion.
4. You must implement all classes in class diagram Figure 1
5. You must write the driver class as it is in Figure 2
6. The output must be exactly as in Figure 3 including blank lines.

```
package Project;

public class Invoice {

    public static void main(String[] args) {

        FootballShop p1 = new SoccerBall ("Addidas", 0, 3, 2);
        FootballShop p2 = new Boots ("PUMA", 44.00, 3, 42);
        FootballShop p3 = new Boots ("Nike", 48.00, 5, 46);
        FootballShop p4 = new SoccerBall ("PUMA", 0, 4, 5);
        Customer c = new Customer ("Jemmy Tomas");
        System.out.println(c);
        c.buy(p1);
        c.buy(p2);
        c.buy(p3);
        c.buy(p4);
        c.print();
    }
}
```

Figure 2 Driver Class

```
Welcome Jemmy Adams

List of Football Items Bought

Item 1
SOCCER BALL
Brand :Addidas
Type  :Match
price :$80.0
No Discount!
Quantity:3
Subtotal: $240.0

Item 2
SOCCER BOOTS
Brand :  PUMA
price :  $49.0 for size 42
Discount: 17.0%
Quantity: 3
Subtotal: $122.01

Item 3
SOCCER BOOTS
Brand :  Nike
price :  $50.0 for size 46
Discount: 17.0%
Quantity: 5
Subtotal: $207.5

Item 4
SOCCER BALL
Brand :PUMA
5 Not a valid soccer ball type, Changing the soccer ball type to
training  ball

SOCCER BALL
Brand :PUMA
Type  :Training
price :$50.0
No Discount!
Quantity:4
Subtotal: $200.0

Total = $769.51
```

Figure 3 The output

You must write six complete Java programs, FootballShop.java, Boots.java, SoccerBall.java, Customer.java, DiscConsiderable.java and NotBallTypeException based on the instruction given below:

(a) Write an abstract superclass named FootballShop. The class provides the following methods:

(1) Write the codes for a constructor with no argument that will do nothing.

(ii) Write the codes for a constructor with arguments that will initialize all the member attributes to the values received as arguments.

(iii) Write suitable codes for the accessor and mutator methods, if applicable (Not All the accessor and mutator methods as shown in Figure 1).

(iv) Write two abstract methods as shown in Figure 1.

(b) Write a subclass Boots and implements interface with the following codes:

(i) Write the codes for a constructor with no argument that will do nothing.

(ii) Write the codes for a constructor with arguments that will initialize all the member attributes for the class, including the superclass's attributes.

(iii) Write the codes for calcDisc() method that will calculate and return the new price after the discount deducted, that discount received which is 17 percent of the price of the balls.

(iv) Write the codes for the abstract method display () that will print the brand, price, size, discount received, and quantity of set of boots can purchased. The method will also print the total price of set of boots purchased after the discount deducted by calling calcPrice ().

(c) Write an interface named DiscConsiderable with the following codes:

(i) Declaration of one final static variable

(ii) Declaration of one abstract method

(d) Write a subclass SoccerBall with the following codes:

(i) Write the codes for a constructor with no argument that will do nothing.

(ii) Write the codes for a constructor with arguments that will initialize all the member attributes for the class, including the superclass's attributes.

(iii) Write the codes for the abstract method display ( ) that will print the brand, name of SoccerBall type, price, and quantity of SoccerBalls purchased. If the number entered is not a soccer ball type the method should throw NotBallTypeException and print " the number of ball type + Not a valid soccer ball type" and handle it by changing the ball type to training ball according to Table 1.

(iv) Write the codes for calcPrice () that will calculate and return the total price of soccer balls purchased.

Table 1 Soccer ball types

Soccer Ball Type	Type Name	Price ($)
1	Professional Match	200
2	Match	80
3	Training	50
4	Recreational	20

(e) Write a class named Customer. The class provides the following methods:

(1) Write the codes for a constructor with arguments that accepts the customer's name. This value should be assigned to the customer's name member variable.

(ii) Write the codes for buy (FootballShop product) method that will receive one argument of instance, update the array named itemList to include the new instance of FootballShop in the array, update number of football items' in the array itemList, and print the information of the item bought (using display() method) and update the total payment for all items bought (including discount).

(iii) Write the codes for toString() method to return message "Welcome the customer" and "List of Football Items Bought".

(iv) Write the codes for print() method that will display message "TOTAL: $xx.xx".

(f) Write a class name NotBallTypeException which defines an exception

(i) Write the codes for a constructor with arguments that will initialize the superclass's attributes.