Lab 12 - Inheritance

1) Before you begin this lab, scan through this document to see all the specifications and the UML diagram provided.

2) Navigate to the **Labs** package in IntelliJ and create another package named **Lab12** and create a Java class that is public, without a main method, called **`Card`** that represents a general type of membership card. The **`Card`** class will have one instance variable called **name** of type String. Write a default constructor that sets **name** to the empty String. Write a parameterized constructor that receives a single String parameter and sets **name** to this given parameter. The **`Card`** class must also implement the following method:

```
public String toString(){}
```

   which returns the String "Card Holder: " concatenated with the name instance variable.

3) Create a class **`DebitCard`** which is a subclass to the **`Card`** class. The **`DebitCard`** class will have two instance variables of type int, **cardNumber** and **pin**.
   - Write a default constructor which calls the constructor of its superclass, setting the **name** variable to the string "Jane Doe". The default constructor must also initialize the variables **cardNumber** to 00000000 and **pin** to 0.
   - Write a parameterized constructor which takes three parameters: A string for the **name**, an int for the **cardNumber**, and an int for the **pin**. The parameterized constructor calls the constructor of its superclass, passing it the **name** parameter. The parameterized constructor must also initialize **cardNumber** and **pin** in the **`DebitCard`** class.
   - The **`DebitCard`** class must also implement the following method:
     - A **toString()** method which calls the super class's **toString()** method and concatenates it with " Card Number: " and the value of the **cardNumber** instance variable.

4) Create a class **`IDCard`** which is a subclass to the **`Card`** class. The **`IDCard`** class will have one instance variable called **idNumber** of type int.
   - Write a default constructor which passes the string "Jane Smith" to the superclass constructor and then sets the idNumber to 0.
   - Write a parameterized constructor which takes a String for **name** and an int for the **idNumber**, passing the superclass constructor the **name** parameter and initializing the **idNumber** in the **`IDCard`** class.
   - Write a **toString()** method which calls the super class's **toString()** method and concatenates it with " ID Number: " and the value of the **idNumber** instance variable.

5) Create a class **`DriversLicense`** which is a subclass to the **`IDCard`** class. The **`DriversLicense`** class will have two instance variables: called **expirationYear** of type int and one called **expirationMonth** of type Month, an enum consisting of the month names, remember they are constants. (Note: the Month enum should be in a separate class called

Month.)

- Write a default constructor which calls the superclass' default constructor and then sets expirationYear to 1969 and expirationMonth to the first value in the Month enum.
- Write a parameterized constructor which takes a String for **name**, an int for **idNumber**, an int for **expirationYear**, and a Month for **expirationMonth**. It will pass to the superclass constructor the **name** and **idNumber** parameters and then initialize the **expirationYear** and **expirationMonth** instance variables in the **`DriversLicense`** class.
- Write a **toString()** method which calls the super class's **toString()** method and concatenates it with " Expiration Month & Year: " and the value of the **expirationMonth** and **expirationYear** instance variables separated by a space.

6) Test your class with the Lab12Test.java file. Make sure all tests pass.

7) Upload your files to Gradescope and ensure that all tests pass.

8) Take a screenshot of your tests passing and upload it along with the five classes you created to the submission area in Canvas.

Card Hierarch UML Class