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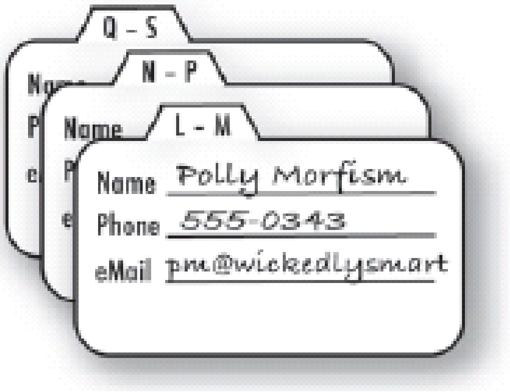
Lab Session 2 : Objects and Classes

Exercise 1: Write a Java class “NameCard” and a Java tester class “NameCardTestDrive” to present the corresponding NameCard design:

- Apply the “Encapsulation” concept in your classes
- The tester class should print out the instance NameCard values



Exercise 2: Write a Java class “Cow” and a Java tester class “CowTestDrive” to implement the OOP class design: “Cow”

- Apply the “Encapsulation” concept in your classes
- The moo() method should print out the text “Moo…!”
- The tester class should:
  - Make a Cow object
  - Set the age of the Cow to 4
  - Call the moo() method

Cow
name breed age
moo()

Exercise 3: Write a Java class “Vector” and a Java tester class “VectorTestDrive” to implement the OOP class design: “Vector”.

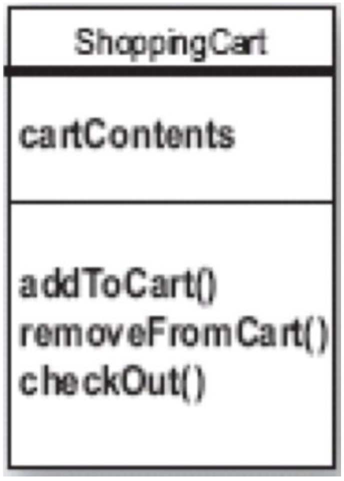
- Apply “Encapsulation” concept in your classes
- In your tester class “VectorTestDrive”:
  - Create and print out information of 2 vectors
  - Calculate and print out the addition, subtraction and multiplication of the two created vectors

Vector
int x int y

add(Vector other)
subtract(Vector other)
multiply(Vector other)

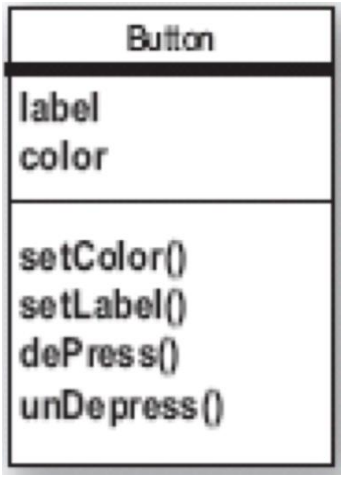
Exercise 4: Write a Java class “ShoppingCart” and a Java tester class “ShoppingCartTestDrive” to implement the OOP class design: “ShoppingCart”.

- Apply “Encapsulation” concept in your classes
- Implement three methods addToCart(), removeFromCart(), checkOut() and print demo results to the screen



Exercise 5: Write a Java class “Button” and a Java tester class “ButtonTestDrive” to implement the class design: “Button.

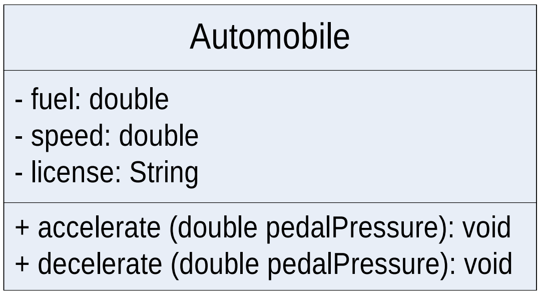
- Apply “Encapsulation” concept in your classes
- Implement four methods setColor(), setLabel(), dePress(), unDepress() and print demo results to the screen



Exercise 6: The following codes implement the OOP class design: “Automobile”. However, these codes have **some problems with OOP principles**. Try to run these codes, then find the problems and fix them as much as possible.

```
class Automobile {
        static double fuel;
        static double speed;
        static String license;
        static void init(double f, double s, String l) {
                fuel = f;
                speed = s;
                license = l;
        }
        static void accelerate(double v) {
              if (fuel > 0) speed += v;
        }
        static void decelerate(double v) {
              if (fuel <= 0) speed -= v;
        }
        public static void main(String args[]) {
                init(4.5,34,”29JAD”);
                accelerate(4);
                decelerate(5);
        }
}
```

class Automobile



Automobile

- fuel: double
- speed: double
- license: String

+ accelerate (double pedalPressure): void
+ decelerate (double pedalPressure): void