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Question 1

a) **Methods of the Sports Car class:**

- PressClutch
- Move
- Stop
- Turn
- SetSpeedMPH
- GetSpeedMPH
- GetSpeedKPH
- SetMileage

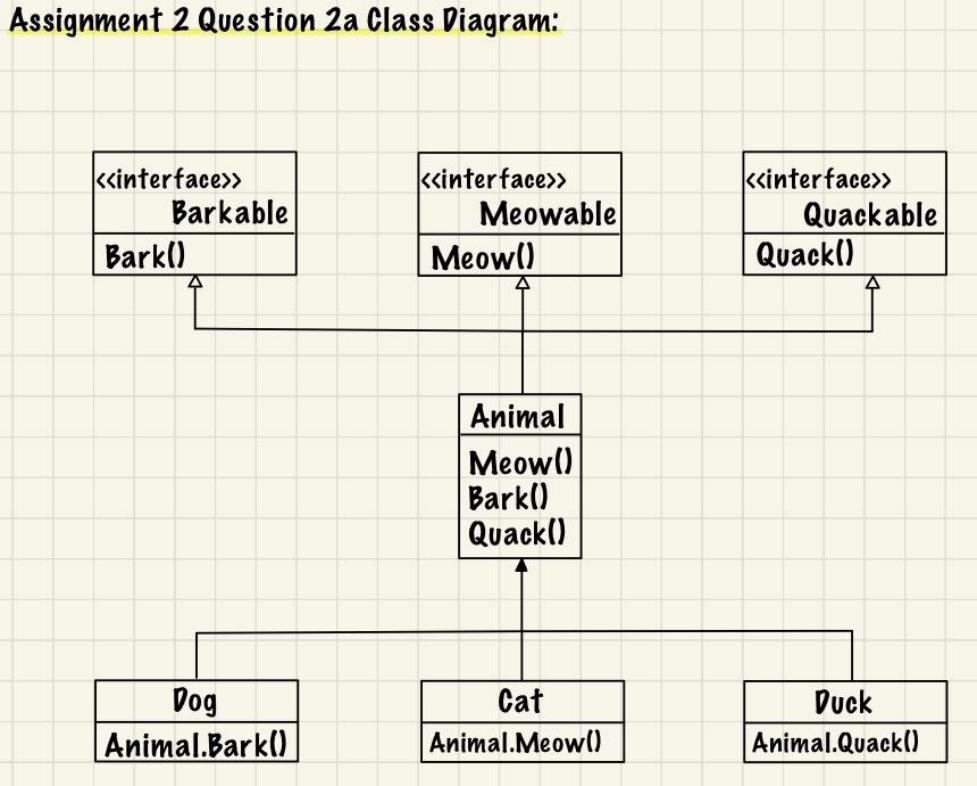
b) **SetMileage method in the Station Wagon class (True/False):** This is true because StationWagon is inherited the Car class which has the SetMileage defined.

c) **Generalization in class diagrams:** Generalization represent an “is-a” relationship i.e., a subclass inherits the attributes and methods from a super class.

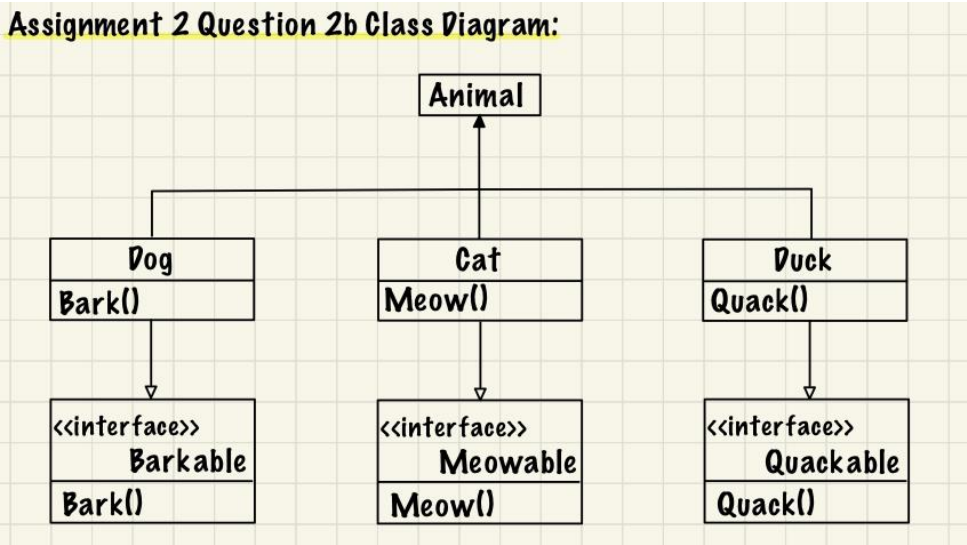
- Vehicle is a generalization of Car
- Vehicle is a generalization of Bicycle
- Vehicle is a generalization of RollerSkates
- Car is a generalization of SportsCar
- Car is a generalization of StationWagon

Question 2

a) **Open-Close Principle:** The Open-Close Principle suggests that classes should be open for extension but closed for modification.



b) **Dependency Inversion Principle:** The Dependency Inversion Principle suggests that a components/classes should depend on abstractions and not concretions.



Question 3

a) **Square Adapter Design:**

```java
public class SquareAdapter implements Rectangle {
    private final Square square;

    public SquareAdapter(Square square) {
        this.square = square;
    }

    @Override
    public void setWidth(int width) {
        square.setSide(width); // Setting width is the same as setting the side in Square
    }

    @Override
    public void setHeight(int height) {
        square.setSide(height); // Setting height is the same as setting the side in Square
    }

    @Override
    public int getWidth() {
        return square.getSide();
    }

    @Override
    public int getHeight() {
        return square.getSide();
    }
}
```

b) **Output of the Main Method:** Since a Square has equals sides so when setting the width and height, they will always be equal. A Rectangle allows different values for width and height so when setting either width or height on the adapter ultimately sets the side of the Square, this results in equal width and height which is the incorrect behavior for a Rectangle.

```java
public class Client {
    Run | Debug | Run main | Debug main
    public static void main(String[] args) {
        Square square = new Square();
        square.setSide(side:5);

        Rectangle rectangle = new SquareAdapter(square);
        rectangle.setWidth(width:10);
        rectangle.setHeight(height:20);

        System.out.println("Width: " + rectangle.getWidth());
        System.out.println("Height: " + rectangle.getHeight());
    }
}
```

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  PORTS                                    Code

[Running] cd "/Users/romericodavid/repos/Software-Engineering/assignment-2/question3/" && javac Client.
java && java Client
Width: 20
Height: 20

[Done] exited with code=0 in 0.565 seconds
```

c) **Class Diagram for Adapter Pattern:**

Assignment 2 Question 3 Class Diagram: