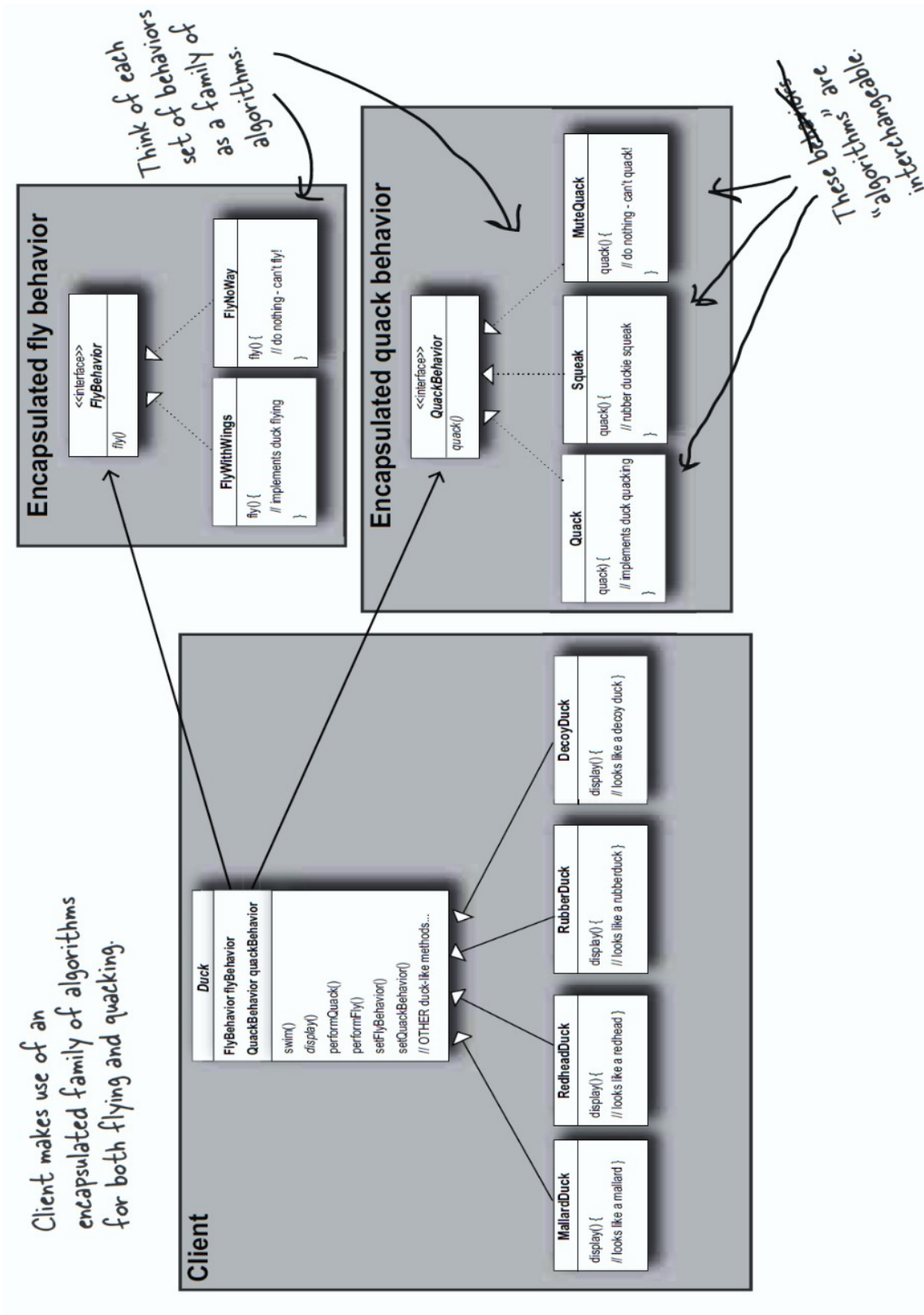Exercise 1

Below is the class diagram of the Duck Simulator Program case study presented in Lecture 6 and found in Chapter 1 of "Head First Design Patterns".

Your first task is to implement this class diagram using C# as a DLL project. In order for us to be able to test this program in a Form, you will need to modify the class diagram slightly so that all behavioural methods return a string that will be displayed in a form. This means that the `Display()` method for the `MallardDuck` will return a string "I am a Mallard Duck", for `ReadheadDuck` "I am a Readhead Duck" and so on. Likewise, each family of behaviour classes will return a string eg. fly behaviour classes like `FlyWithWings` will return "I can fly with my wings" when `Fly()` is called, while calling `Fly()` on FlyNoWay will return "I cannot fly" etc. Apply the same pattern to the `QuackBehaviour` classes. Remember to modify the `PerformQuack()` and `PerformFly()` methods in the Duck class so that they return a string as well.

Exercise 2

Once you have completed the implementation of the class diagram in exercise 1, you are ready to proceed and test it out. In this step you will create a new Windows Forms project and a single form that will reference and call into the DLL you created above. Below is the example of what your form should look like and the results it should display if Mallard duck selected and the Display button clicked (left) and followed by a click on the Fly button (right) :
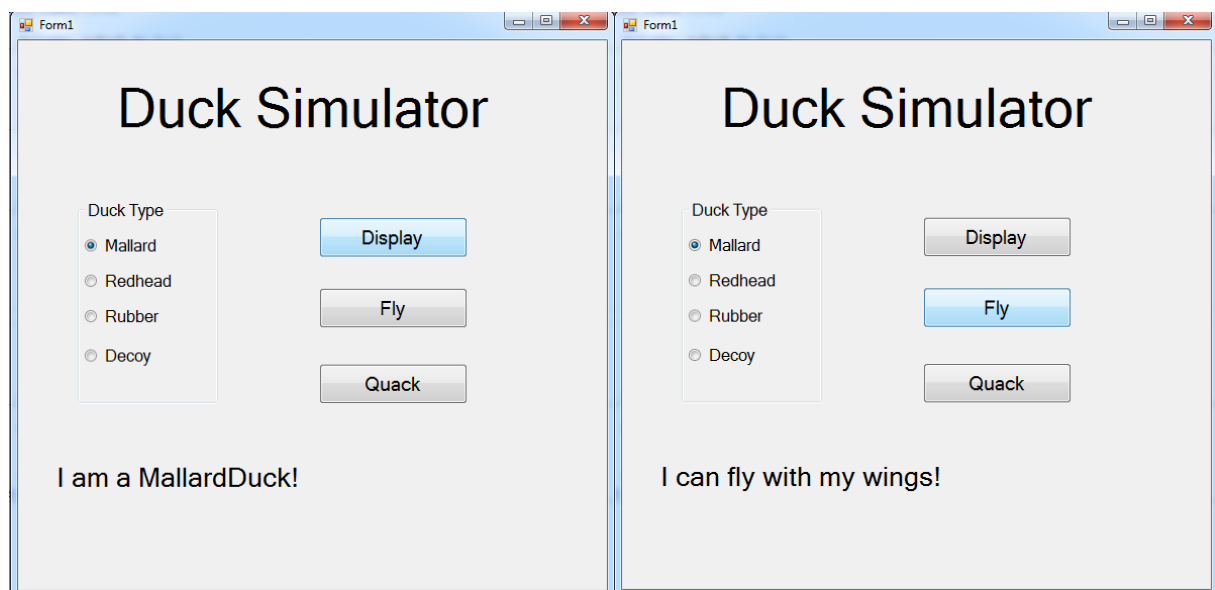
Likewise if the Rubber duck is selected and the Fly button is clicked the following should display (left), and if the Quack button is selected on the same duck then it should change accordingly (right):