Exercise: Design Patterns (I)

Purpose

Introduce you to to two important patterns, State and Observer, and give you a chance to think and talk about patterns and their use in general.

Exercises

This sheet is randomised: you will need a coin to toss, or another means of producing a random value for boolean **b**. Assign a value to **b** now. (Of course, nobody can tell whether you cheated :-)

If b = true, then use the "starting from criteria" sheet (Problem 1) for State and the "starting from solution" sheet (Problem 8) for Observer. If b = false, use the "starting from solution" sheet (Problem 10) for State and the "starting from criteria" sheet (Problem 3) for Observer.

Pattern	starting from criteria	starting from solution
State	Problem 1	Problem 10
Observer	Problem 3	Problem 8

For *each* of State and Observer, go through the following steps:

1. Look at the problem sheet appropriate to your value of **b**. You will see that it introduces a problem situation and then has a space for you to sketch an initial solution. Come up with some design that you might use in the situation. Don't spend too much time thinking about what would be a good design: the idea is to come up with the obvious, "it's Friday and I want to go home" solution at this stage. Explain your solution in appropriate UML diagrams (and make sure you get them exactly correct!)

2. Then depending on which type of sheet you have, either:

   - the sheet gives you some criteria that the design should satisfy. Look at your initial solution and see how well it satisfies the criteria. Can you improve the design to satisfy the criteria better?

     Or:

   - the sheet gives you a design to solve the problem. Compare it with your initial solution. What are the pros and cons of each? Can you suggest when the design given on the sheet would be a good one to use?

3. After you have worked at the sheet you chose, look at the other sheet for the same pattern and compare your answers with it. You should end up understanding the pattern. Then – or when you get stuck – have a google for explanations of it. (These patterns are all famous ones from the Gamma book, with lots of information online. For example, see `http://sourcemaking.com/design_patterns` .)