Tutorial: design patterns

Purpose

To introduce a few key design patterns and help you understand when they are useful.

How to proceed

Pattern	starting from criteria	starting from solution
State	Problem 1	Problem 10
Visitor	Problem 2	Problem 9
Observer	Problem 3	Problem 8
Decorator	Problem 4	Problem 7
Strategy	Problem 5	Problem 6

1. Pick one of the problem sheets 1-10. 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 if you have picked a problem from the first column, you will see that 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?

   If you have picked a problem from the second column, you will see that 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 in the same row and compare your answers with it. You should end up understanding the pattern. If not, have a google for explanations of it. (These patterns are all famous ones from the Gamma book, with lots of information online.)

4. Repeat, starting with a problem sheet from a row you haven't looked at and from the column you didn't start with last time.

Do as many as you have time for.

Note

There is almost certainly more here than you're going to find time to work through in one week or to discuss in detail in one tutorial. Decide collectively, perhaps by voting, which patterns to discuss first, and see how much you get through. Come back to the sheets for revision, and ask on the forum if anything is unclear: **all these patterns, and the ones discussed in lectures, are examinable.** (So if you find any completely confusing, those are the ones to discuss in the tutorial!)