Tutorial 3
More on Design patterns

Study Several Examples of Design Patterns
Explain its relation to our course projects

Last lecture…
On design patterns

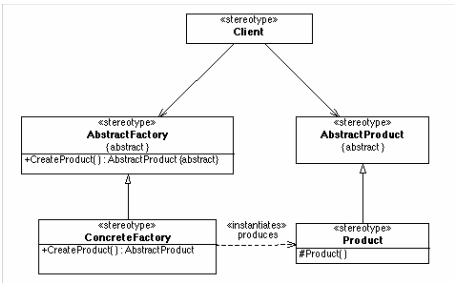
- We explained what are patterns, what are design patterns
- How are they categorized?
- How to apply them?
- How to identify them?
- How to assess them?

Today…

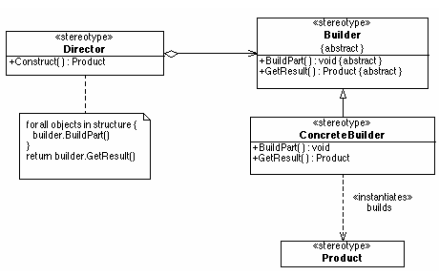
1. Design patterns structures
   Creational patterns
   Structural patterns
   Behavioural patterns
2. How are they related to each other?
3. Design patterns by examples
   Some special design in OpenOME
4. Their relation to your course project

1. The GOF Catalogue

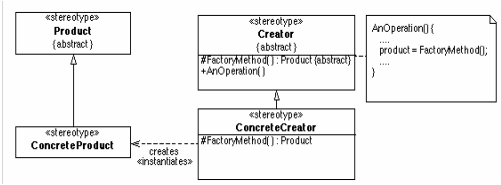
- Creational
  Abstract Factory, Builder, Factory method, Prototype, Singleton
- Structural
  Adapter, Bridge, Composite, Decorator, Façade, Flyweight, Proxy
- Behavioural
  Chain of Responsibility, Command, Interpreter, Iterator, Mediator, Memento, Observer, State, Strategy, Template Method, Visitor



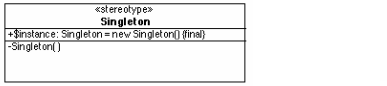
Abstract Factory



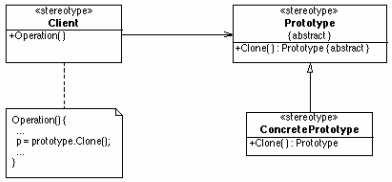
Builder



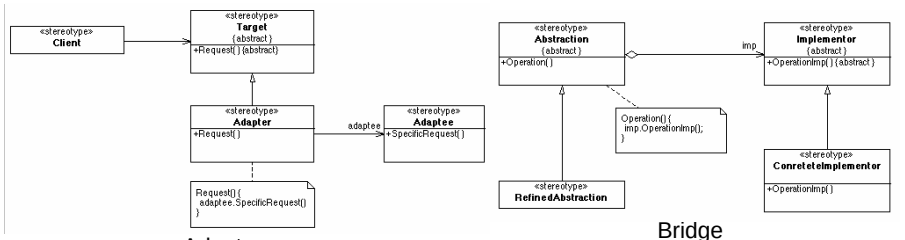
Factory method



Singleton

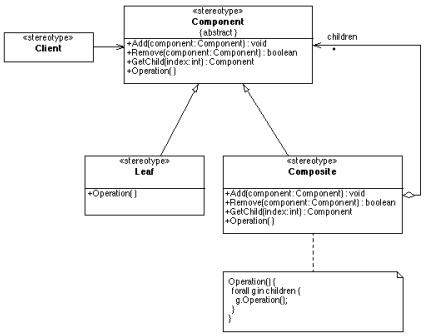


Prototype

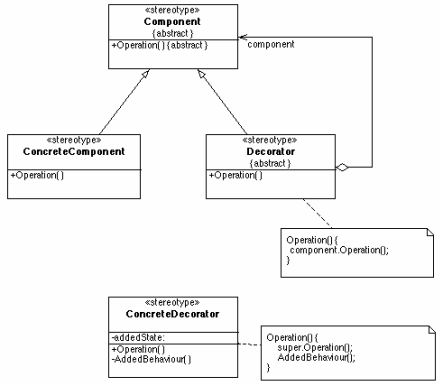


Adapter

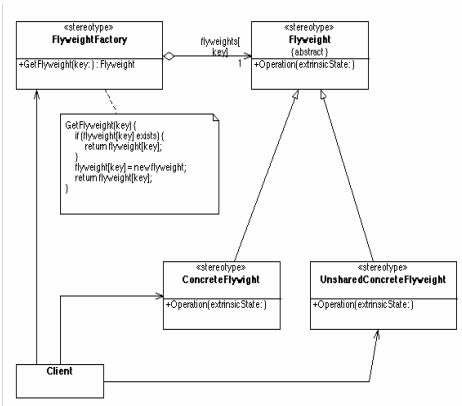
Bridge



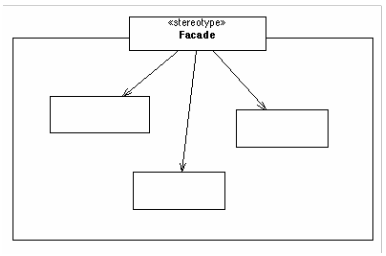
Composite



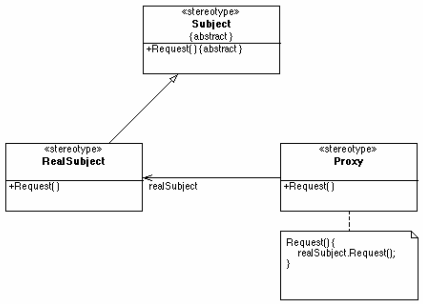
Decorator



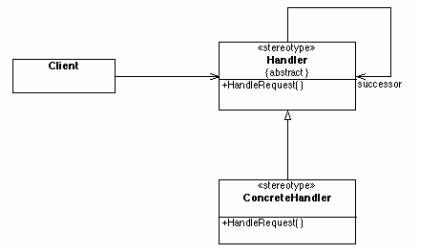
Flyweight



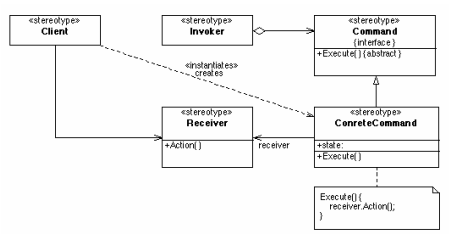
Façade



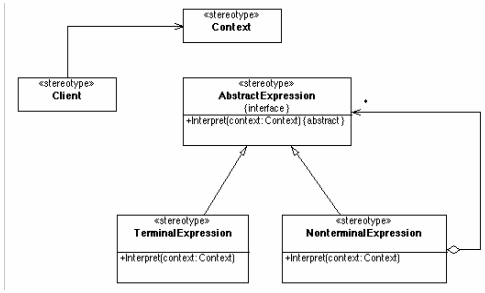
Proxy



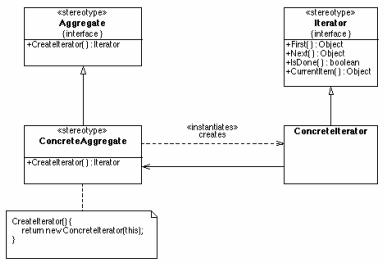
Chain of Responsibility



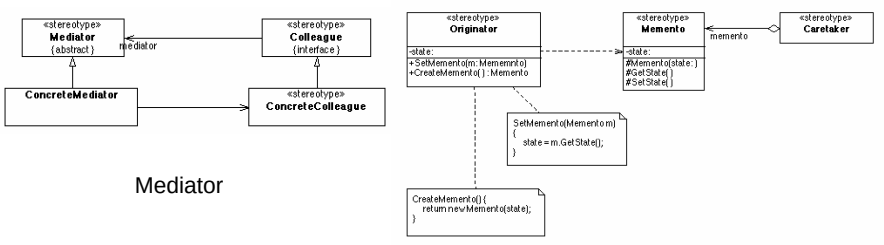
Command



Interpreter

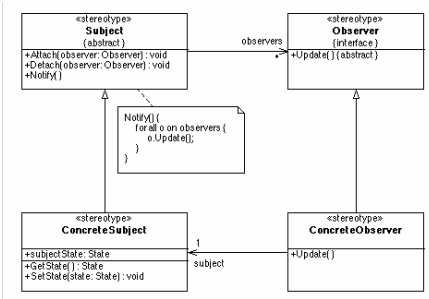


Iterator

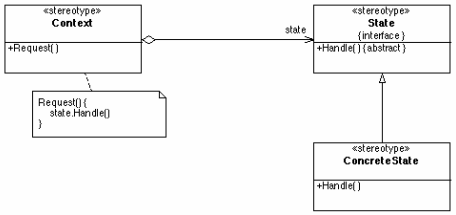


Mediator

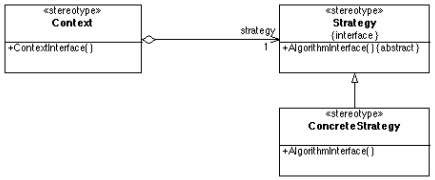
Memento



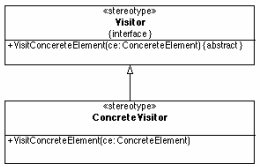
Observer

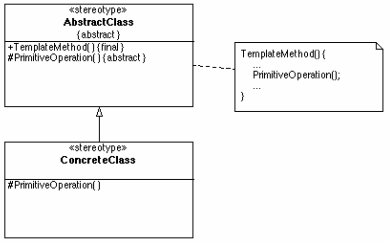


State

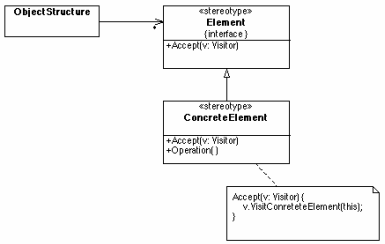


Strategy



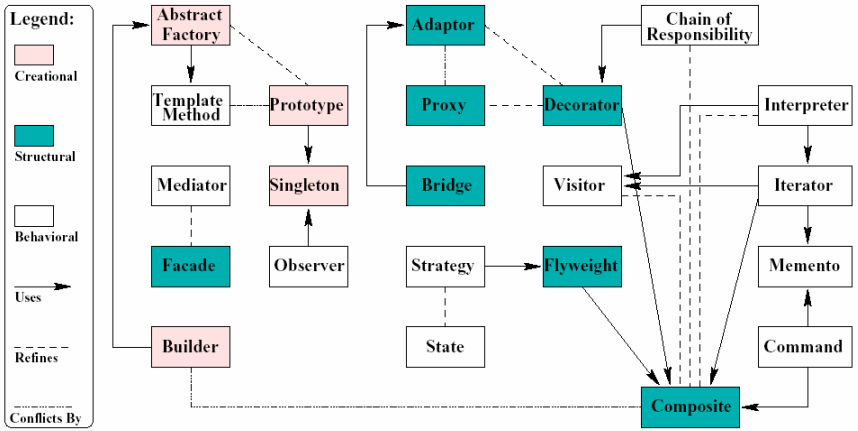


•Template Method



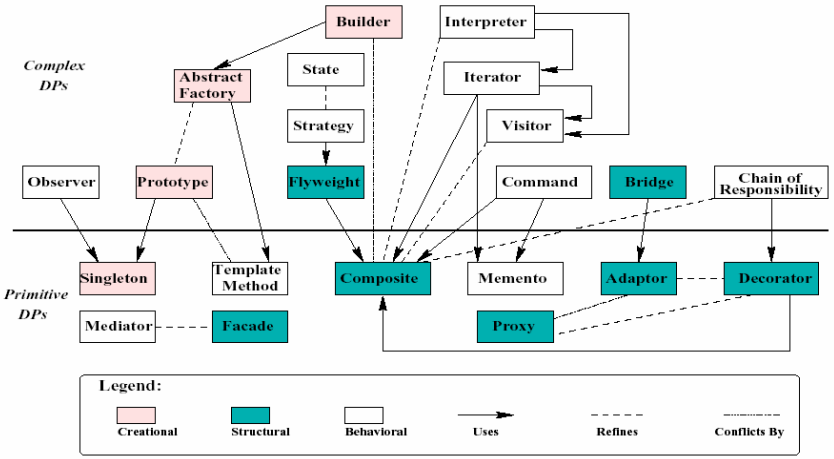
•Visitor

2. Relation among patterns



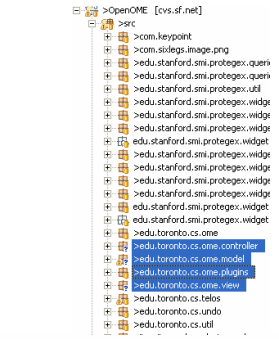
Ladan Tahvildari and Kostas Kontogiannis. “On the Role of Design Patterns in Quality-Driven Re-engineering”

A layered version

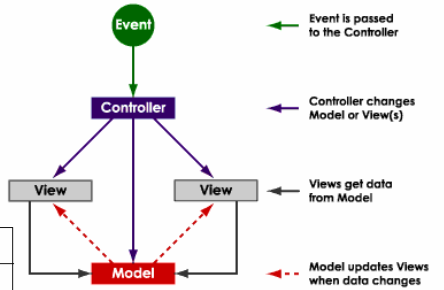


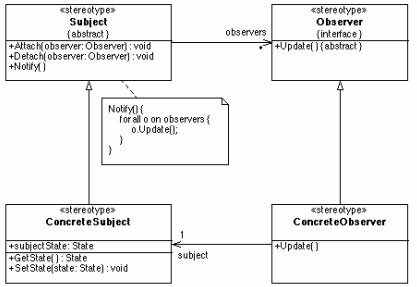
3. Some Special design patterns in our legacy software

1. MVC patterns
   classic design pattern from SmallTalk
   Most editors follows the pattern
2. Plugin patterns
   OpenOME, Protégé, Eclipse
3. Meta-modelling patterns
   Telos, EMF, UML, Protégé

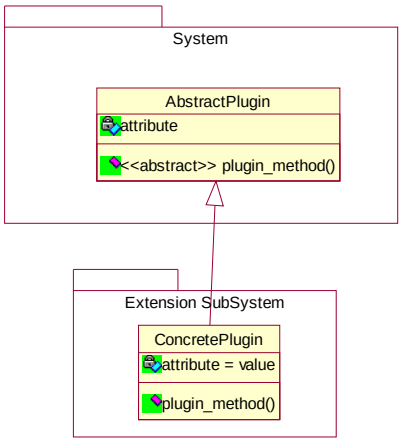


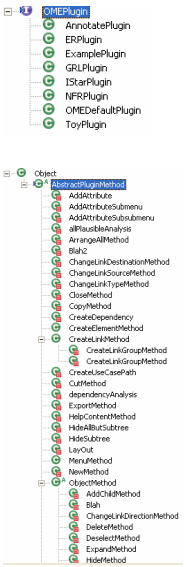
3.1 MVC





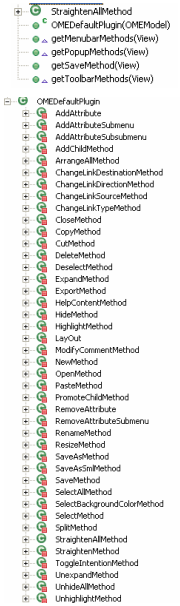
3.2 Plugin patterns





3.2.1 OpenOME

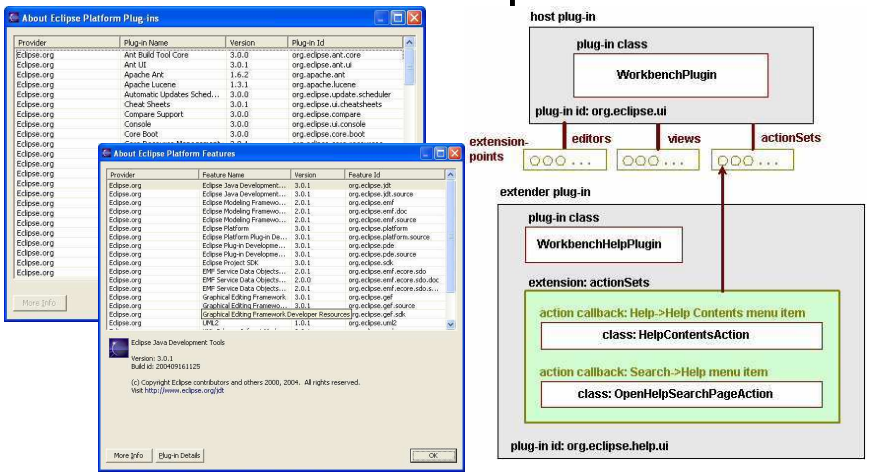
- AbstractPluginMethod.java
  - PluginMethod.java
- OMEPlugin.java
  - OMEDefaultPlugin.java
    A bunch of methods
  - Extended by …
- *edu.toronto.cs.ome.plugins*
  - *ERPlugin.java*
  - *NFRPlugin.java*
  - *IStarPlugin.java*
  - …
- Plugin is selected at run-time, depending on the input class.ForName(…)



3.2.2 Protégé

- ClsWidget, ExportPlugin, ImportPlugin, ProjectPlugin, SlotWidget, TabWidget, Widget
- Plugins are packaged into a JAR file, under the “plugins” subdirectory
- OMETab.java is a TabWidget plugin packaged as *plugins/edu.toronto.cs.ome/OpenOME.jar*

3.2.3 Eclipse



http://www.eclipse.org/articles/Article-Plug-in-architecture/plugin_architecture.html

And many articles on its plugin developments … plugin.xml, feature.xml

4. Think about these …

- How would you classify the classes in edu.toronto.cs.ome.OME into the MVC pattern?
- Which design pattern is used by Web-Service projects?
- Which basic design patterns are used by the aforementioned Plugin patterns?

5. Relation to your project

- Opportunities:
  - You may add junit test cases to the code base to reveal bugs (publish it to the bug tracking system) and fix them (+5%)
  - *You may apply design patterns, refactoring techniques on this legacy code base, showing as an improved complexity metrics (+2.5%)*
  - You may tune the performance of the system to speed up the display, load/save for scalable graphs (+2.5%)
- Don’t forget your major project task (up to 100%!)
  - To study the editor methods in the OpenOME and adapt them to the OmniGraphEditor web service.