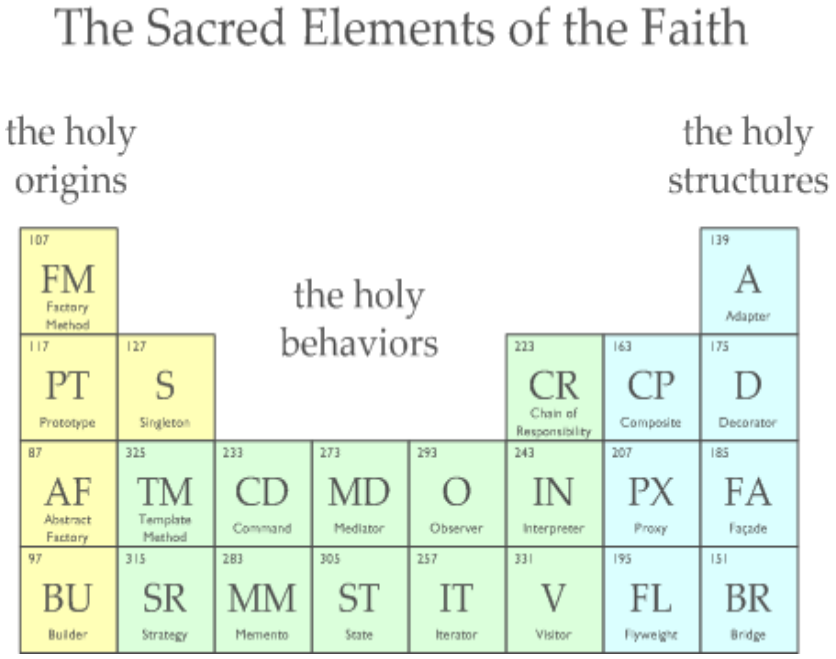
OOSE200 Report

Company Training Simulation

Connor Beardsmore - 15504319



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"Company Training Simulation"

Polymorphism

Throughout the Company Simulator, polymorphism is extensively utilized to both generalise and decouple code, leading to increased testability. To allow for the use of polymorphism, both implementation inheritance and interface inheritance has been employed.

- Property - kept in map, polymorphically call calcProfit() via strategy
- Events + Plan - both use strategy so can call run() on parent class
- WageObserver list allows ANY class to become an observer if it implements

Design Patterns Implemented

Factory Method Pattern

A Factory was employed to encapsulate object instantiation for both the Event and Plan subclasses.

Dependency Injection Pattern

The Dependency Injection pattern worked to remove all hard-coded dependencies, with the primary injector code being located in the main method with al calls to *new* located in either the main or the two Factory classes.

Model View Controller Pattern

The MVC pattern was utilized for the overall architectural design of the system, due to its flexibility and its strong separation of concerns.

Observer Pattern

An observer was set up for WageEvents, allowing all relevant Property's to be updated easily by the notify method

Composite Pattern

The tree of Properties form a version of the Composite pattern, where each Company owns zero or more other Properties. These properties can either be leaf nodes (BusinessUnit) or further composite nodes (Company).

Template Method Pattern

The Template Method pattern was used in the reading of files. The common code for opening and closing files was kept in the superclass, with the subclasses implementing the protected abstract processLine() method.

Strategy Pattern

The run() method located in both Event and Plan subclasses is a form of the strategy pattern, with each subclass implementing this method differently. Also utilizing the Strategy pattern is the calcProfit() method in Property subclasses, as all Properties calculate profit differently.

Miscellaneous Patterns

The use of for each loops throughout the system illustrate a form of the simplistic but ever useful Iterator pattern. While the Decorator pattern was not used in any of the designed classes, the objects used for file reading from the Java API utilize the Decorator pattern.

Testability

- Test cases!! sample outputs to clear up order ambiguity
- Factory + Dependency Injection allow for easy mocking of objects, low coupling
- Mad toStrings() and debug output methods
- clear and consie exception handling
- tested on heaps of invalid file types for all 3 input files

Alternative Design Choices

Despite the design having a high level of testability and maintainability, there are alternative design choices that could have been employed.

- Iterators instead of for loops
- Controllers are easy to switch in and out, could have used one bunta controller
- could have used scanner instead of BufferedReader