Comp-304 : Observer / Template Methods (concluded)

Lecture 28

Alexandre Denault
Original notes by Hans Vangheluwe
Computer Science
McGill University
Fall 2007
This is the final assignment for Comp-304.
It's worth a bit more than the other assignments.
In addition, it's the only one I want to meet you guys (most likely on Thursday, April 12th).
In this assignment, you will implement Ultimate Sudoku, a Sudoku game that uses the Observer Pattern.

You'll find that many of the other design patterns (such as Command) will make the implementation much easier and more elegant.
- Ultimate Sudoku also features two undo functionalities.
- The first, "undo last move", allows a player to undo his last move.
- The second, "undo since error", will allow a player to undo moves if he has committed an error.
Course evaluations are one of the most important communication means for students to provide constructive feedback to their instructors. Course evaluation results are also used by the Faculty when making decisions concerning tenure and promotions.

Accessing Mercury

1. Log in to Minerva for students
2. Student Menu > Mercury – McGill Online Evaluations
During the main evaluation period, students will receive
• 4 automatic email reminders
• a pop-up window when logging into MINERVA and WebCT Vista
• regular reminders from me
Evaluation results for instructors will be available once ALL the final grades for ALL of their courses in a term have been submitted.
Model View Controller (MVC) is an application architecture that heavily depends on the observer pattern.
MVC Explained

- **Model**: The domain-specific representation of the information on which the application operates.
- **View**: Renders the model into a form suitable for interaction, typically a user interface element.
- **Controller**: Processes and responds to events, typically user actions, and may invoke changes on the model.
MVC in action

Client

View

Controller

Model

action()

request()

query()

update()

new view is sent to client

controller chooses new view

returns new data

change()
Observer in MVC

Observer Pattern

Publisher

Model

Observer

View

Controller
MVC is highly used in web application framework
  - Such as Struts, Spring, Django, Ruby on Rails, etc
Most multi-player use networking scheme that implements the observer pattern ...
... or a slight variation of it.

In this architecture
  * game objects (players, items, surroundings) are the subjects
  * clients are the observers.
Board Games
In another popular game...
In a massively multi-player game, broadcasting all state changes to every player is not a viable solution.

Interest management is a technique that only sends relevant state changes to each player.
Who should see who?
My research deals with ...
The Observer pattern is heavily used in data replication.

In data replication, there exists one master copy of the data and several replicas.

- The master copy is considered the subject.
- The replicas are observers, attached to this subject.
- When the master copy is updated, so are the replicas.
- If the master copy is lost, then one of the replicas becomes the new subject.
Spread is an open source toolkit that provides a high performance messaging service that is resilient to faults across local and wide area networks.

Spread functions as a unified message bus for distributed applications, and provides highly tuned application-level multicast, group communication, and point to point support.
The primitive operations in group communications are:
- Join a group
- Leave a group
- Send a message to the group.

These primitive operations are very similar to those found in the observer pattern.
- Attach, detach, notify

It turns out that networked observer patterns is often implemented using group communication protocols.