

# **Observer / Template Methods (concluded)**

Comp-304 : Observer / Template Methods (concluded)  
Lecture 28

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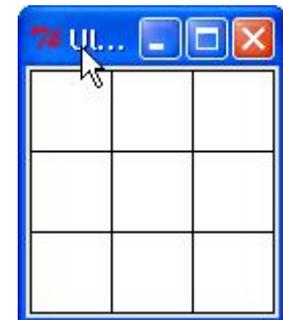
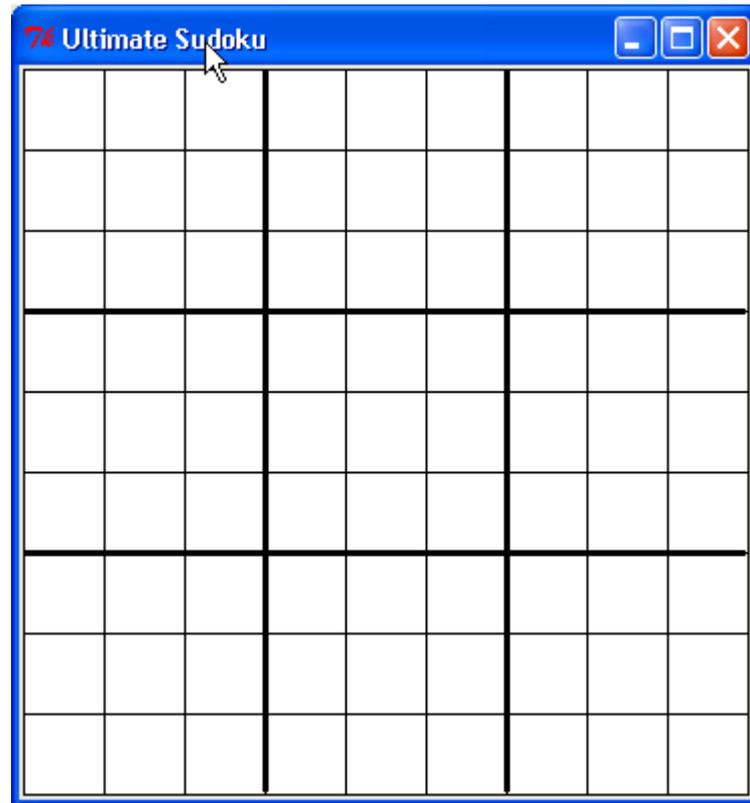
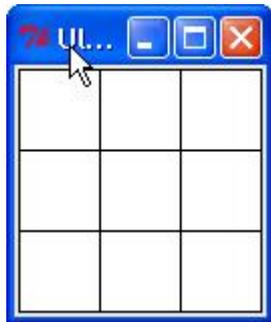
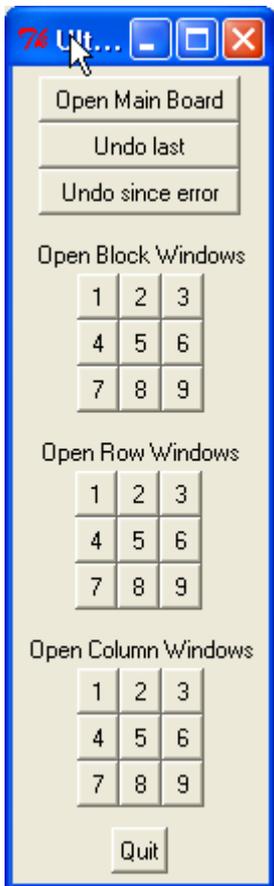
# Assignment 6

- 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).

# Ultimate Sudoku

- 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.

# Multi Window



- 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

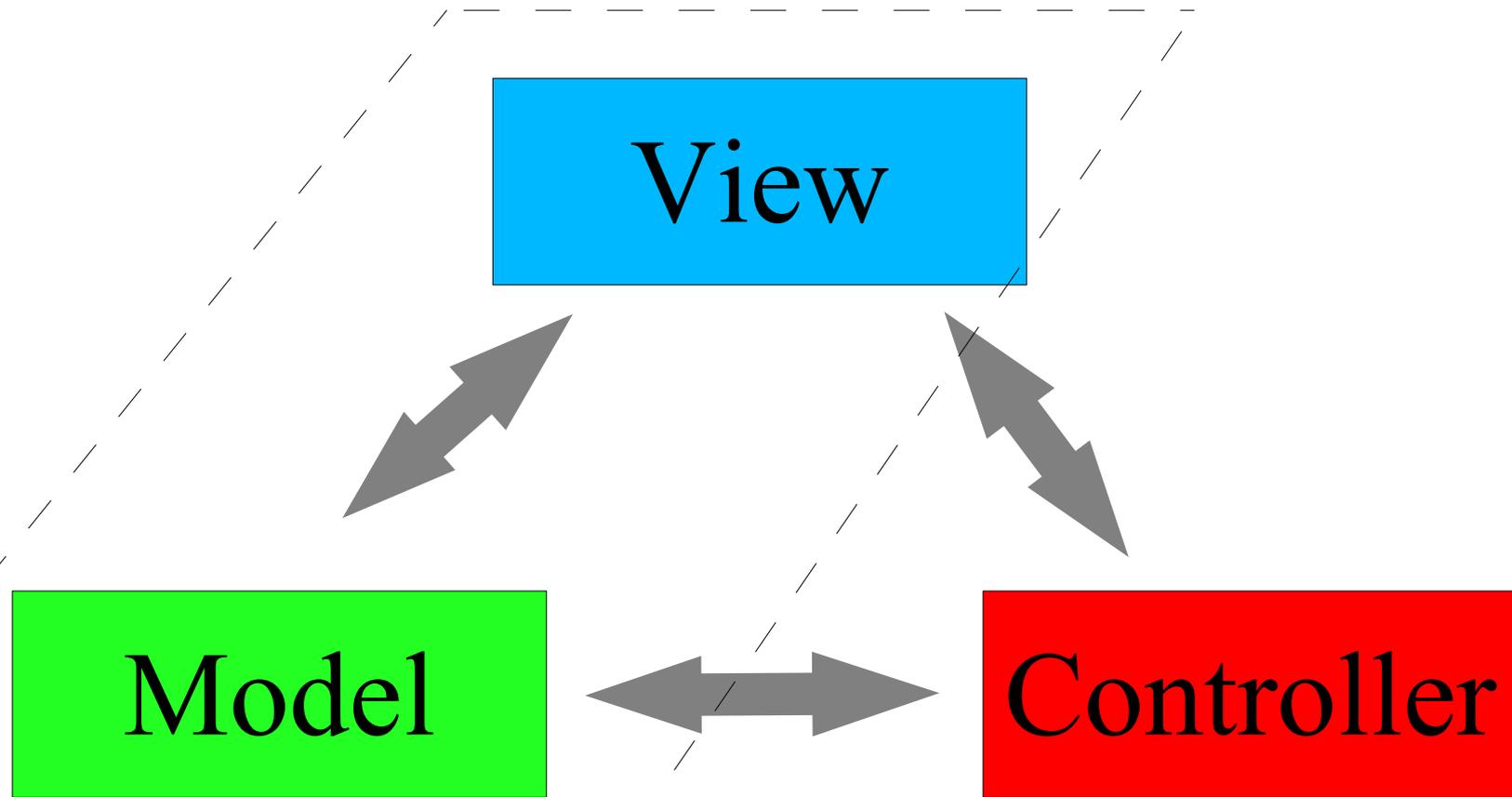
# Reminders

- 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

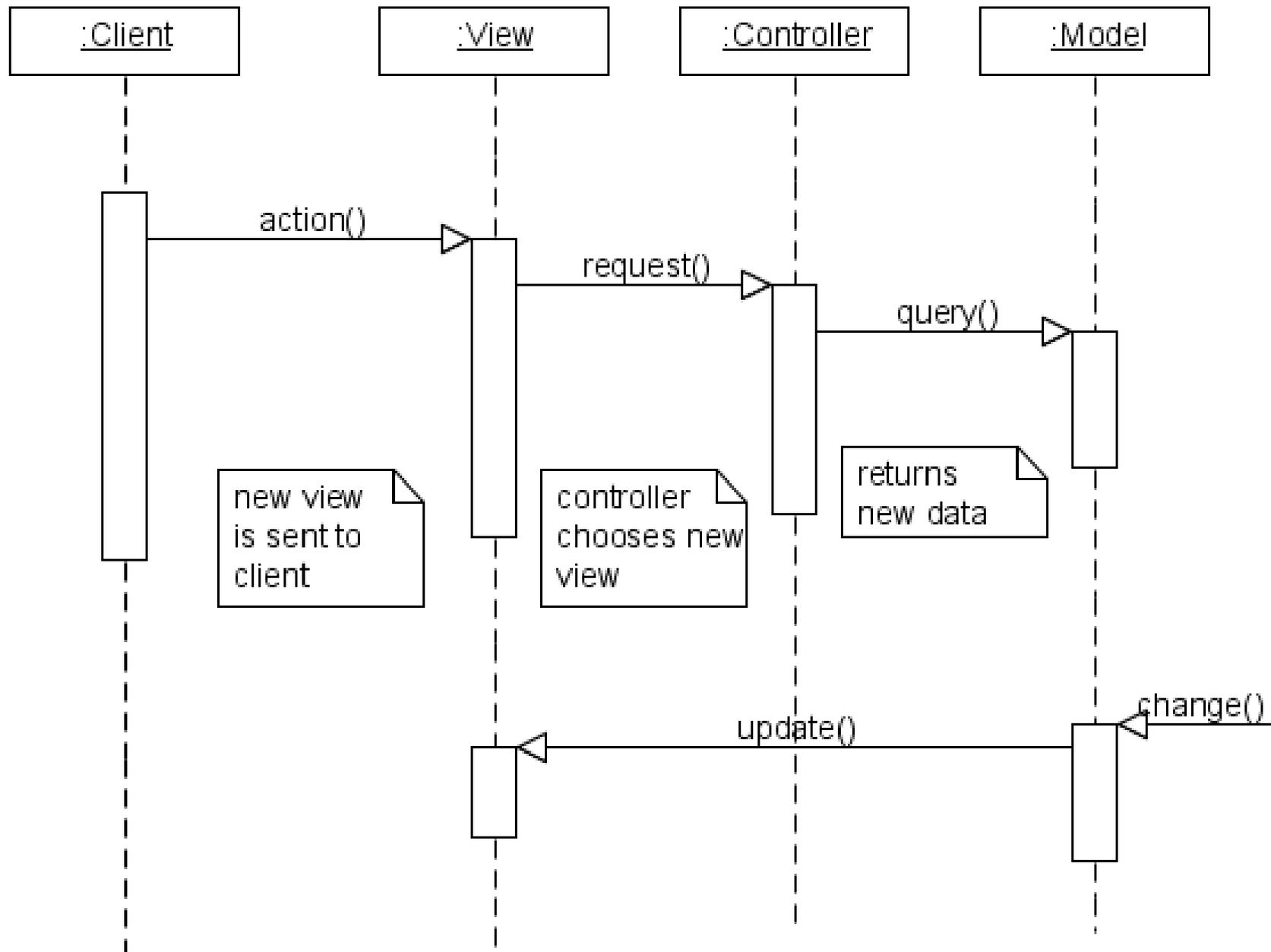
- Model View Controller (MVC) is an application architecture that heavily depends on the observer pattern.



# MVC Explained

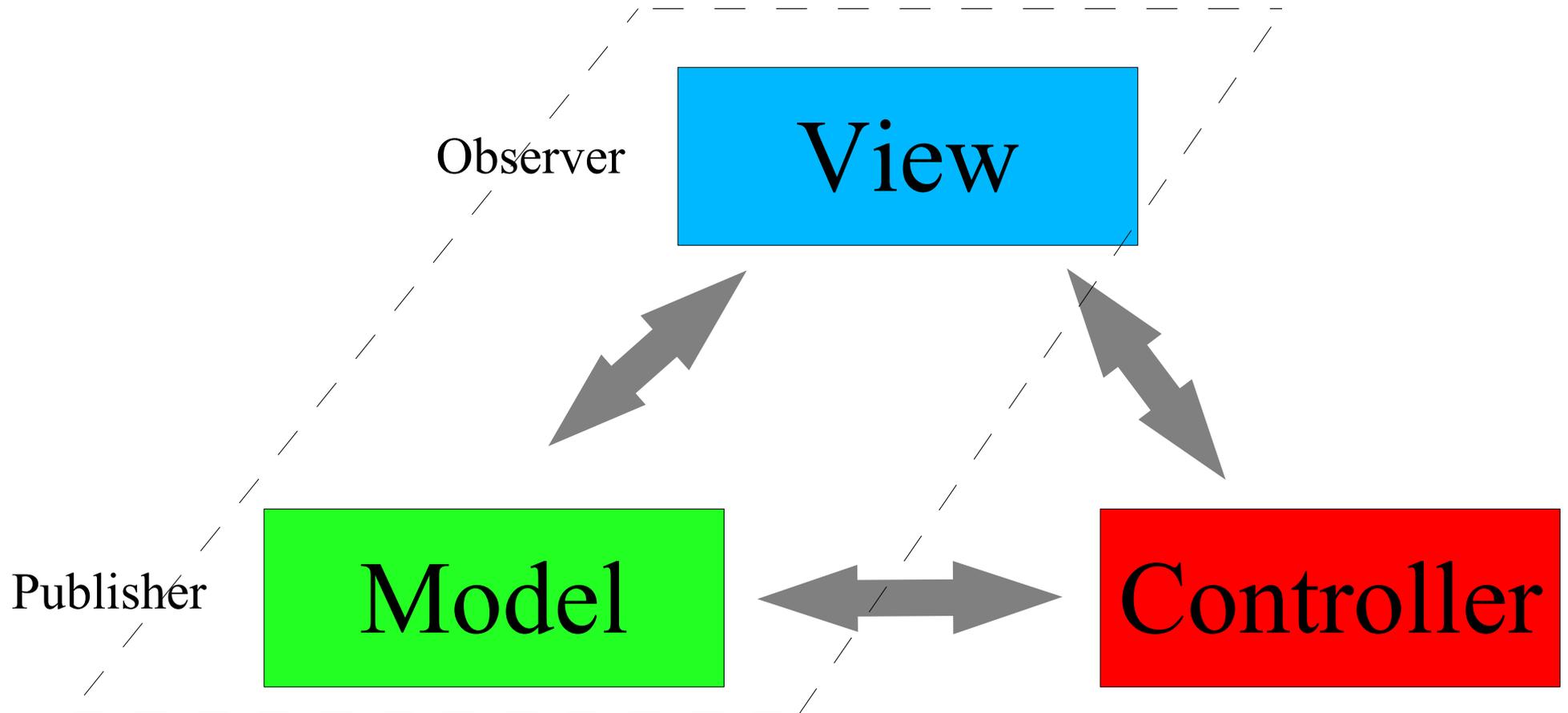
- Model : The domain-specific representation of the information on which the application operates.
- View : Renders the model into a form suitable for interaction, typically a user interface element.
- Controller : Processes and responds to events, typically user actions, and may invoke changes on the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

# MVC in action



# Observer in MVC

Observer Pattern



# Where is MVC used?

- MVC is highly used in web application framework
  - ◆ Such as Struts, Spring, Django, Ruby on Rails, etc

# Observer Pattern in Games

- 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.

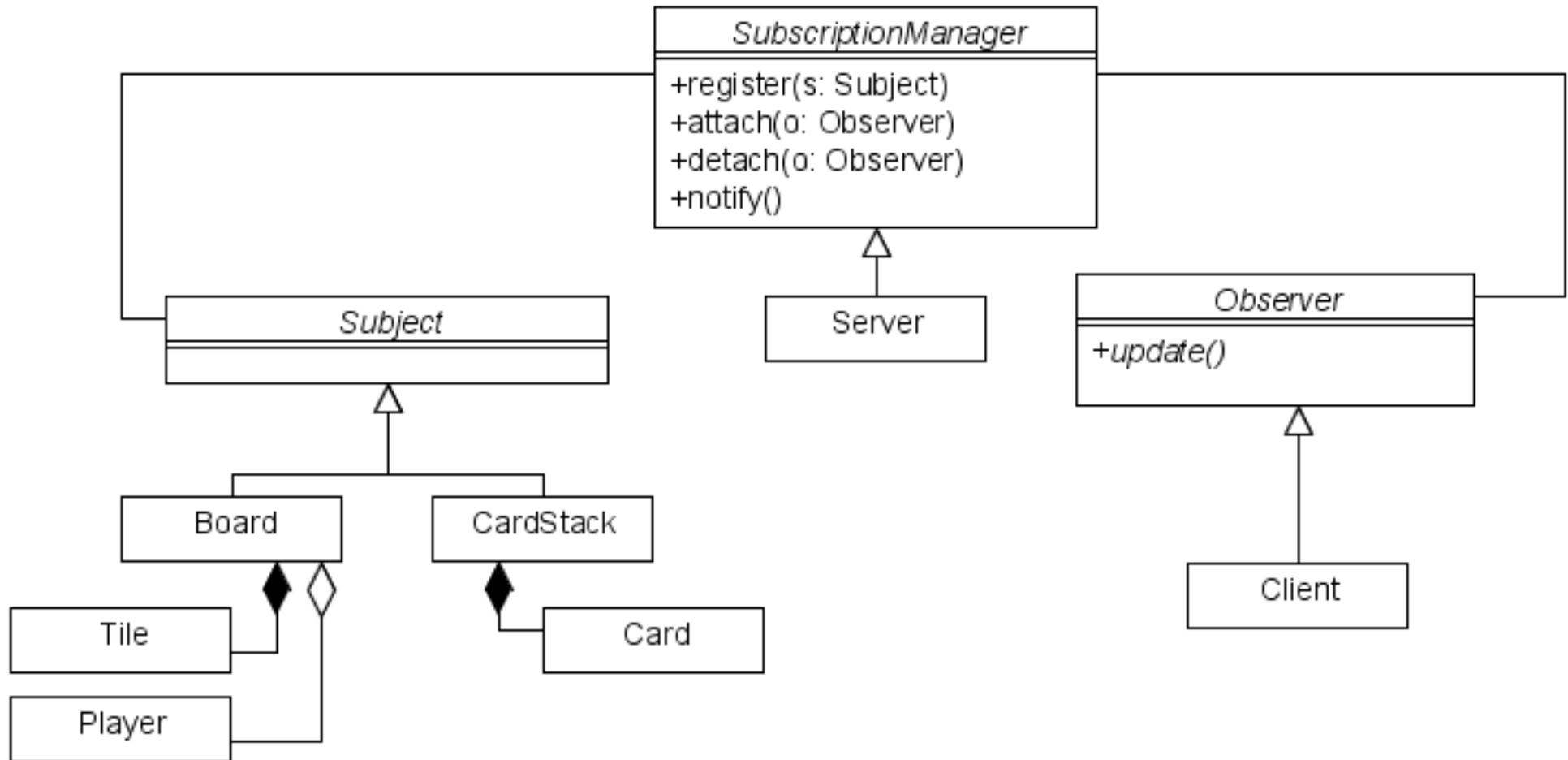
# Board Games



# Implementation



# Participants



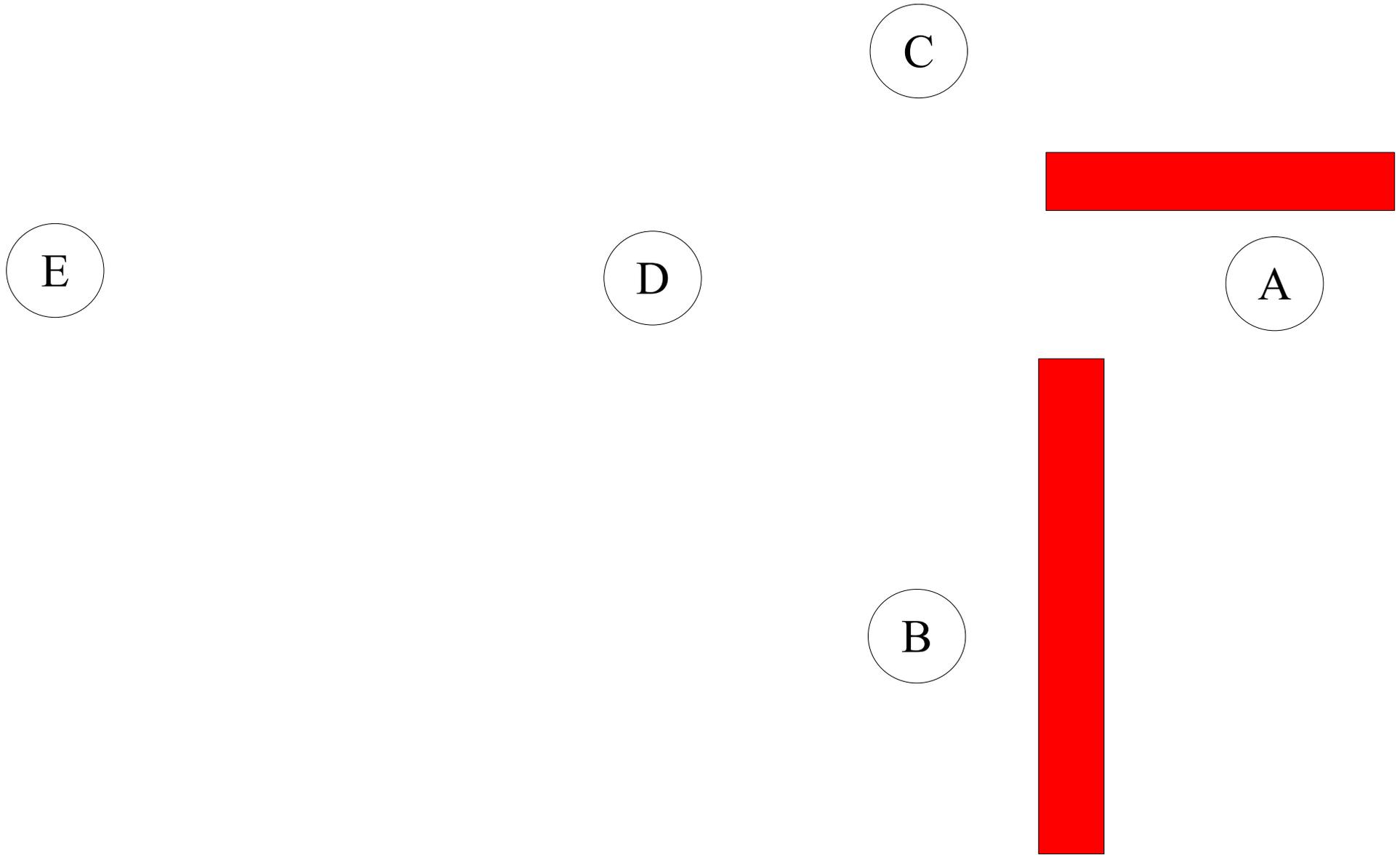
# In another popular game ...



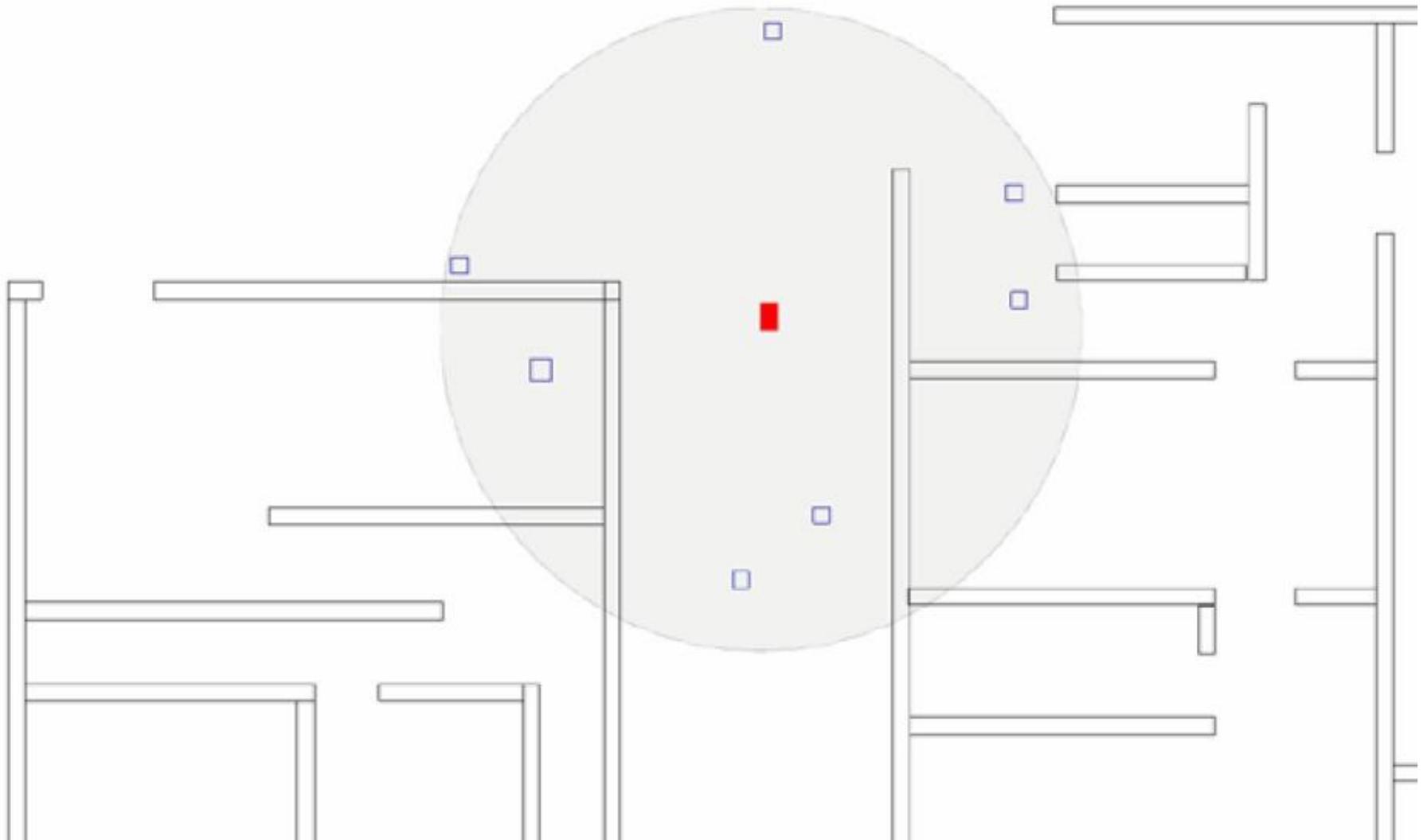
# Interest Management

- In a massively multi-player game, broadcasting all state changes to every player of a is not a viable solution.
- Interest management is a techniques that only sends relevant state changes to each player.

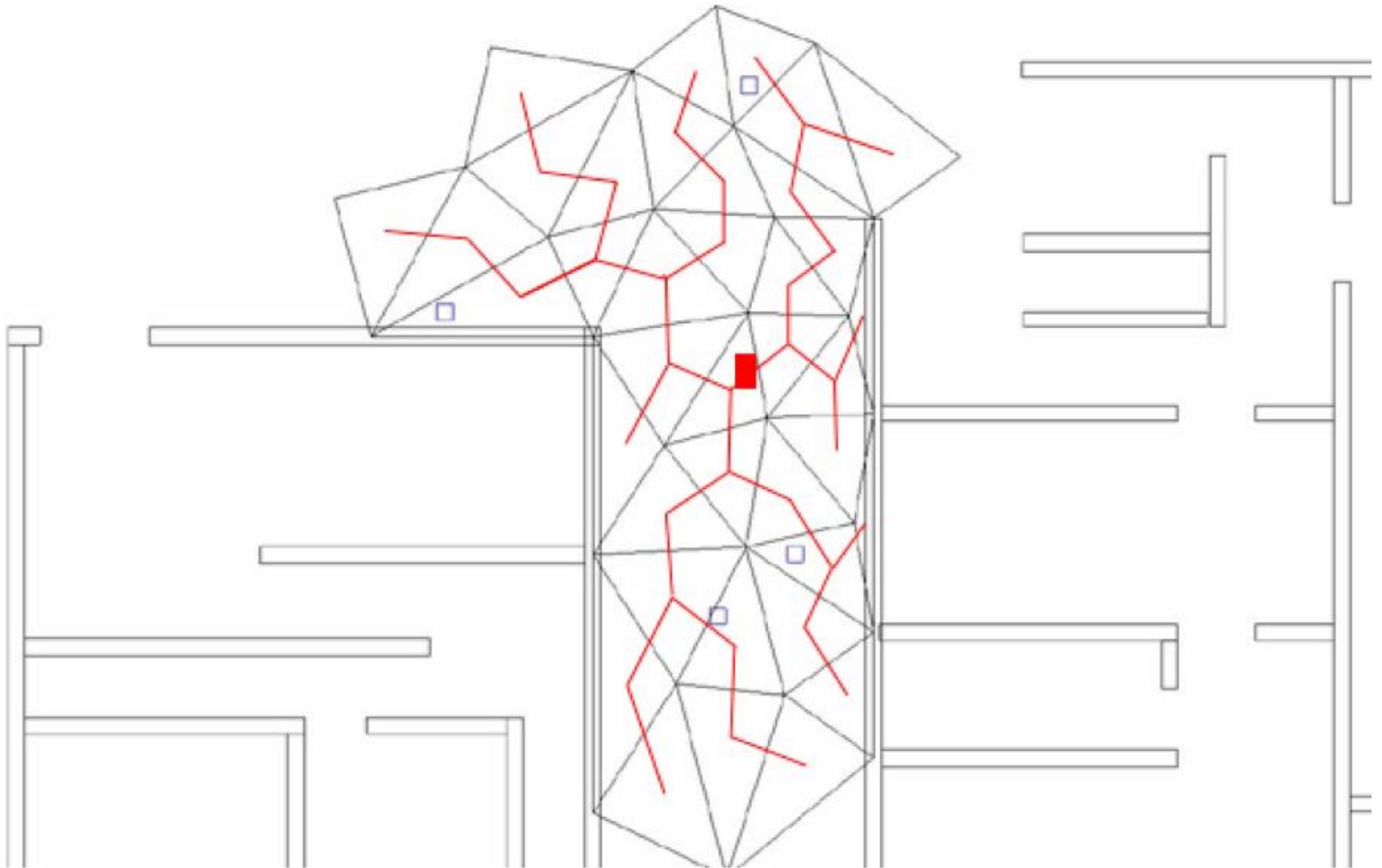
# Who should see who?



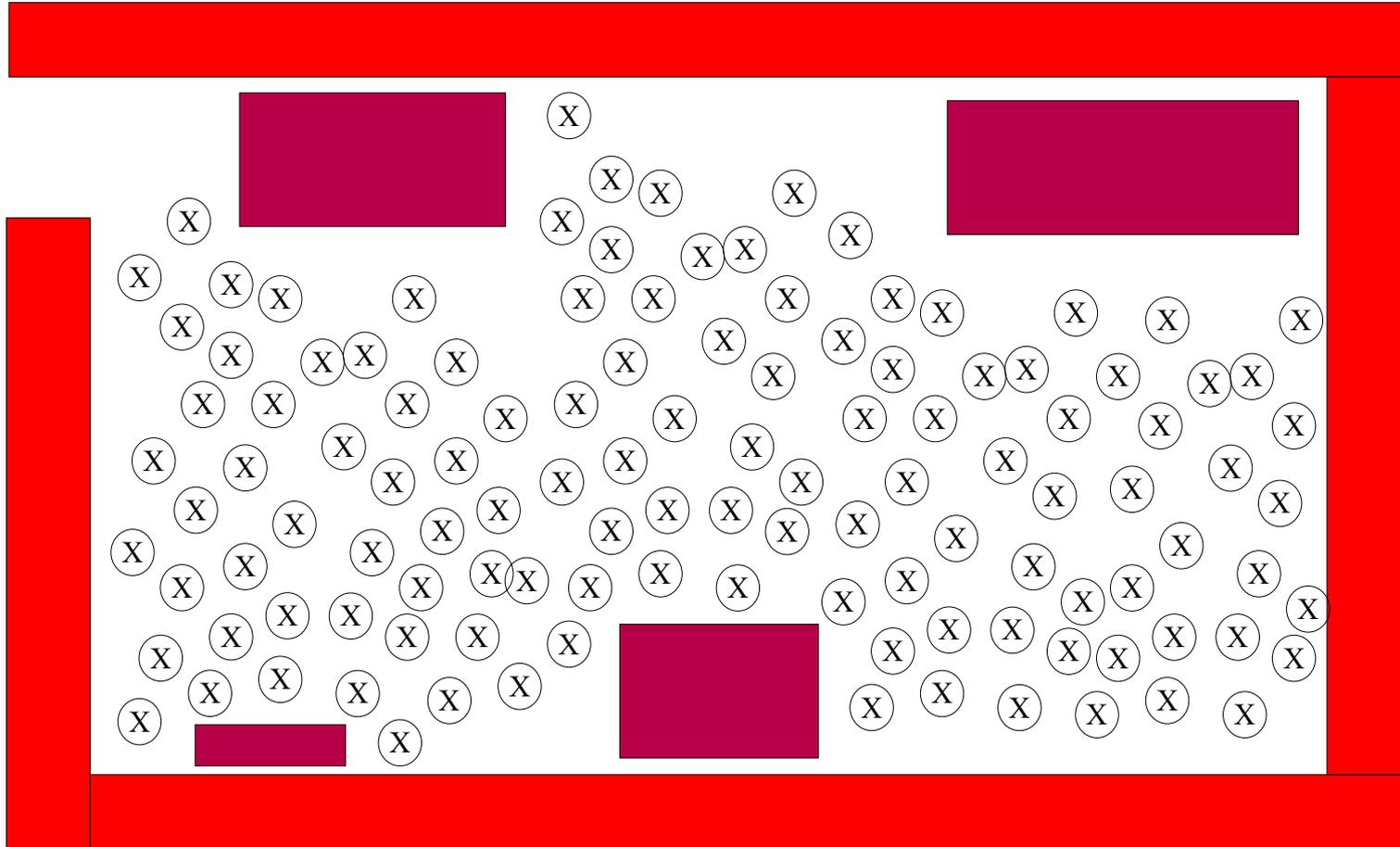
# Radius



# Tiles



# My research deals with ...



# Replication

- 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 Toolkit

- 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.

# Group Communication

- 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.