

## More GUIs in Java Swing

This recitation requires you to make a GUI for an implementation of Tic-Tac-Toe.

We have provided an implementation of Tic-Tac-Toe in the package `edu.cmu.cs.cs214.rec08.core`. It provides a `GameChangeListener` interface, a `TicTacToe` interface, and the core implementation of the game in `TicTacToeImpl`. The `GameChangeListener` is used to create listeners that can be registered to be notified any time a square is changed on the board, the current player changes, or the game ends. The `TicTacToe` interface allows users to make a move, maintain the current game state, and allows listeners to determine whether or not someone has won or if the game has resulted in a stalemate.

### A sample application: ChatServer

You should examine the example application in the `edu.cmu.cs.cs214.rec08.samples` package. This example shows a similar application to Tic-Tac-Toe and Scrabble by having separate core and GUI components.

Pay attention to how the GUI and core interact with each other. In particular, notice the way that each `ChatPanel` is registered as a subscriber to the `ChatServer`. What design pattern is this?

Run `main` in `SimpleChatClient.java` to run the ChatServer application. It will present a screen where users can be registered, and the “Start Chat” button will open a new chat window for each user.

### Instructions to build a GUI for Tic-Tac-Toe

- Examine and understand the sample ChatServer application.
- Skim the Tic-Tac-Toe core implementation to familiarize yourself with the code.
- Develop a GUI for Tic-Tac-Toe. This entails:
  - Create a GUI class (or classes) in the `edu.cmu.cs.cs214.rec08.gui` package. Your GUI should be an observer of the Tic-Tac-Toe core implementation. To represent the board you should create a grid of buttons, and for each button add an `ActionListener` that plays a move at the appropriate position.
  - Update `Main.java` to create a game core, create your GUI, and start the game.
- Time permitting, write unit tests to test the Tic-Tac-Toe core implementation. You can add test methods to the `TicTacToeTest` class in the `edu.cmu.cs.cs214.rec08.core` package in the `src/test/java` directory.