CS 520
Homework 1
Code Review & Architecture

Due: **Thursday September 30, 2021, 9:00 PM** via Moodle. You may work with others on this assignment but each student must submit their own write up (with their name at the top), clearly specifying the collaborators (also at the top). The write ups should be individual, not created jointly, and written in the student's own words. Late assignments will be accepted for extenuating circumstances.

Overview and goal

The goal of this assignment is to code review, redesign, and reimplement a Tic Tac Toe game, according to the model-view-controller (MVC) architecture pattern.

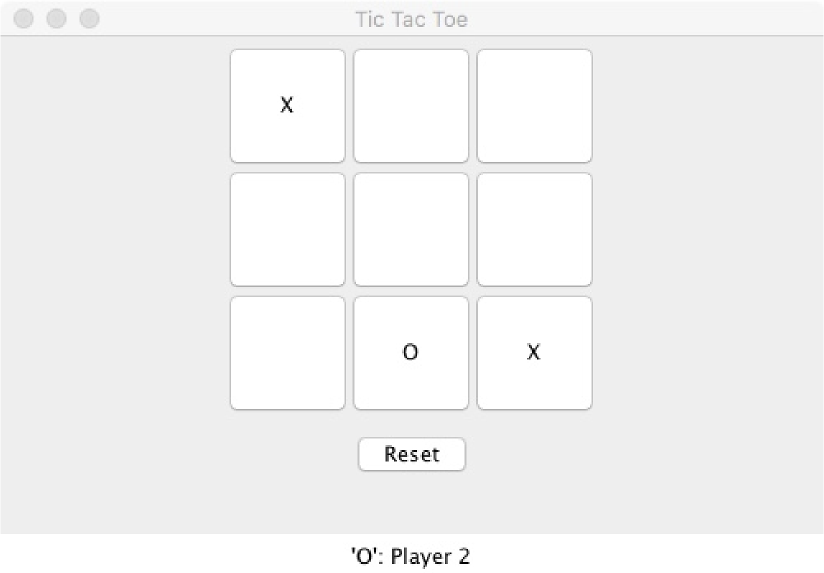

Figure 1: Screenshot of the 'TicTacToe' UI

This quick-and-dirty implementation satisfies some best practices but violates other best practices. It needs a major architecture overhaul. In contrast to the current version, your implementation should try to improve understandability, extensibility, and testability.

How to get started

1. Clone the repository with the following command: git clone -b hw1 https://github.com/LASER-UMASS/cs520
2. Read the provided *README* in the *tictactoe* folder.
3. Use the commands to document, compile, test, and run the application from that folder.
4. Familiarize yourself with the original application source code contained in the *src* folder: src/TicTacToeGame.java and src/TicTacToeBlock.java.

Code review

You are expected to code review the original version of the application focusing on the expected behavior (e.g., encapsulation, extensibility, testability) instead of coding style (e.g., amount of whitespace, if vs switch statement).

In particular, you need to identify 4 cases where best practices are satisfied. Your code review should use the following pattern **for each identified satisfaction of best practices**:

- Brief summary of the design principle or best programming practice (a few keywords)
- An illustrative example from the code

Additionally, you need to identify 4 cases where best practices are violated. Your code review should then use the following pattern **for each identified violation of best practices**:

- Brief summary of this issue (a few keywords)
- Explanation of the issue (could refer to general principles or poor design choices with respect to the desired encapsulation, extensibility, and testability)
- How to fix it (a few sentences)

In the second homework, 4 identified violations WILL need to be implemented.

MVC architecture pattern

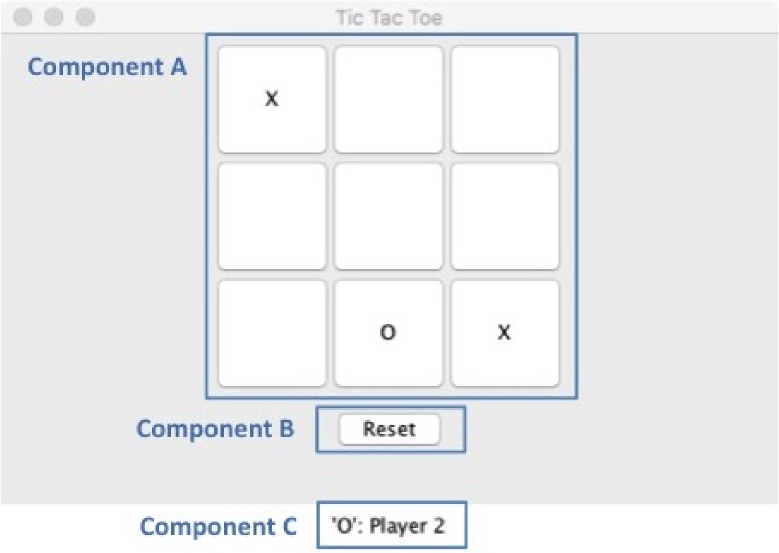

Figure 2: Main components of the ‘TicTacToe‘ UI

Identify the following in the Tic Tac Toe UI:

- Component A: View, Controller, or both?
- Component B: View, Controller, or both?

- Component C: View, Controller, or both?

Identify the original application source code (including classes, fields, and methods) corresponding to the:

- Model
- One view (from above)
- One controller (from above)

Proposed extension

You should provide a description of how to extend the game board model to parameterize its size. In other words, the game board should be generalized from 3X3 to nXm where n and m are both greater than or equal to 3 but n and m do not need to be equal to each other. For simplicity, you can assume the same winning condition, meaning the r in a row where r is currently set to 3, is being used even though that winning condition highly favors the first player.

Your description should identify the set of fields and methods that need to be changed to support the extension. For each identified field or method, you should briefly describe the necessary changes to support the extension.

Deliverables

Your submission, via Moodle, must be a single document (plain text or PDF) named *hw1.txt or hw1.pdf*, containing:

1. Your full name and any collaborators (both at the top)
2. Code review comments
3. Identification of the *MVC architecture pattern* in the UI and the application code
4. Proposed extension