CSCI 1130A&B Introduction to Computing Using Java 2022-2023 First Term

Department of Computer Science and Engineering
The Chinese University of Hong Kong

Due date: 9 December 2022 (Fri)

Assignment 6

Full mark: 100
Expected normal time spent: 6 hours

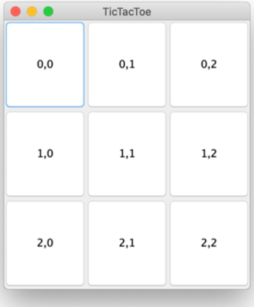
Tic Tac Toe

Aim:
1. using an existing subclass TTTButton (that extends JButton)
2. implementing all methods defined in an interface TTTGamePlayMethods
3. define a new subclass TicTacToeWithSaveGame

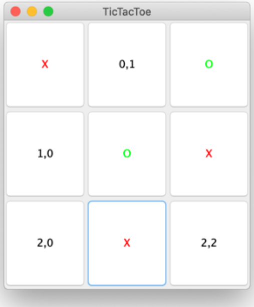
Task: Create a Tic Tac Toe Game App.

This is a board game starting with an empty board of size 3x3 = 9 slots for two players ‘X’ and ‘O’ who take turn to make a move in at most 9 rounds, with player ‘X’ first. In each move, a new piece of the player is marked in an empty slot on the board. Whoever can get 3 straightly-connected same-side pieces first wins the game; or it is a Draw Game if all slots are occupied (round 9) but without winner.

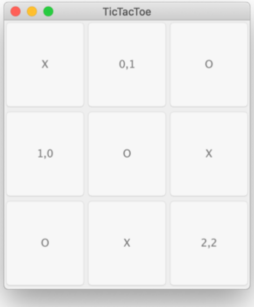
Sample Run:



Initial Game



Ignore invalid moves, i.e., clicking on an occupied slot



End-Game (O Won)

All buttons are disabled

```
TicTacToe
Initial empty board on screen:
_ _ _
_ _ _
_ _ _

Turn: X

1) Player X clicked button at (0, 0)
X _ _
_ _ _
_ _ _

Turn: O

2) Player O clicked button at (1, 1)
X _ _
_ O _
_ _ _

Turn: X

3) Player X clicked button at (1, 1)
3) Player X clicked button at (1, 2)
X _ _
_ O X
_ _ _

Turn: O

4) Player O clicked button at (0, 2)
X _ O
_ O X
_ _ _

Turn: X

5) Player X clicked button at (2, 1)
X _ O
_ O X
_ X _

Turn: O

6) Player O clicked button at (0, 2)
6) Player O clicked button at (2, 0)
X _ O
_ O X
O X _

O Won
```

Game Play and Guidelines:

1. A skeleton class TicTacToe with pre-built GUI and some given methods is provided.

2. Class TicTacToe uses another given class TTTButton. There are nine TTTButton's in a 2D array.

3. When the user clicks on a TTTButton (no matter it is empty or occupied,) an event will be triggered such that your app can make a move accordingly.

4. You have to implement all the methods defined in the given interface TTTGamePlayMethods, namely, makeMove(), checkDrawGame(), checkWin(), changeTurn() and disableTTTBoard().

5. Because this is a GUI application, the given main() method is a one-liner. Note that the program does NOT terminate after the main() method finishes and returns. After the TicTacToe constructor finishes all the setups, the Java GUI system (AWT) will take over. Your application will sit and wait for messages delivered to your makeMove(row, col) method. Game logic and screen printouts are thus handled in makeMove() and your TTTGamePlayMethods.

   a) Ignore invalid moves, i.e., clicking on an occupied slot. Just print the move and do nothing.

   b) At end game, print either "X Won", "O Won" or "Draw Game". Mind you that at round 9, all three outcomes are possible.

6. In addition to the GUI game board, TicTacToe shall print the game history on System.out.

7. Final task: complete one more class TicTacToeWithSaveGame that is a subclass of TicTacToe. It adds a feature of saving the game history to a file named "ttt.txt" in current working folder. You just need to complete its constructor. The constructor shall simply redirect System.out with a proper PrintStream. Use simple try-catch to silent all PrintStream related Exceptions.

   a) TicTacToeWithSaveGame will only display these few lines on the screen output:

   b) All the rest will be saved to file "ttt.txt".

   c) Due to inheritance, it works like TicTacToe.

```
TicTacToeWithSaveGame
Initial empty board on screen:

- - -
- - -
- - -

Turn: X
```

8. Please refer to documentations and samples given in the ZIP package to finish this assignment.

Submission:

1. Prepare the header comment block properly in all your Java source files to include academic honesty declaration and your personal particulars.

2. **Locate** your NetBeans project folder, e.g., `H:\JAVA_ASG6\TicTacToe`.

3. ZIP the project folder `TicTacToe`. Upload and Submit `TicTacToe.zip` via Online Assignment Collection Box on Blackboard <https://blackboard.cuhk.edu.hk>

Marking Scheme and Notes:

1. The submitted program should be free of any typing mistakes and compilation errors. Comment/remark, indentation, style are under assessment in every programming assignments unless specified otherwise. Variable naming, proper indentation for code blocks and adequate comments are important.

2. Remember to do your submission before 6:00 p.m. of the due date. No late submission would be accepted.

3. If you submit multiple times, **ONLY** the content and time-stamp of the **latest** one would be counted. You may delete (i.e. take back) your attached file and re-submit. We ONLY take into account the last submission.

University Guideline for Plagiarism

Attention is drawn to University policy and regulations on honesty in academic work, and to the disciplinary guidelines and procedures applicable to breaches of such policy and regulations. Details may be found at http://www.cuhk.edu.hk/policy/academichonesty/. With each assignment, students are required to submit a statement that they are aware of these policies, regulations, guidelines and procedures.