

Programming Exam #2

CSCI 201L Spring 2017

12% of course grade

Part 1 – Tic Tac Toe

For this exam, you will create tic tac toe. The output only needs to be text, but it will be displayed in a browser through a file named `ttt.html`. Note that the file we will load is a `.html` file. The look of the GUI is not the important part of this program, so focus on the functionality instead of the format of the output.

Display a GUI in the browser that looks like the following:

	A	B	C
1			
2			
3			

Player X

The empty box at the bottom is a drop down box where the user can choose one of a predetermined set of values. The options should be from the following set: {A1, A2, A3, B1, B2, B3, C1, C2, C3}. On each move, the user will select a move for the designated player and click the “Submit Move” button. The format of the text that is submitted is completely up to you. The text “Player X” will change to “Player O” when it is O’s turn to play. Note that the browser page should not refresh completely but should use AJAX to update that section.

The move will be submitted to a servlet on the server through AJAX. The servlet will respond back with a message letting the user know whether that was a valid move. All of the logic for valid moves should reside on the server. Note that a player cannot select the same space that already contains a letter.

- This needs to be validated on the server, but you could also remove the option from the drop-down list.

If the move was valid, display the corresponding letter (either X or O) in the space with a corresponding message to the user.

X placed at A1.

	A	B	C
1	X		
2			
3			

Player O

Submit Move

If the move was invalid, display an error message to the user, similar to what is shown.

ERROR: O cannot be placed at A1.

	A	B	C
1	X		
2			
3			

Player O

Submit Move

The game will terminate in one of two ways:

- X or O has gotten three in a row horizontally, vertically, or diagonally.
- All of the spaces are filled, and neither player has three in a row horizontally, vertically, or diagonally. This is known as a "cat's game".

Display a message to the user at the end of the game, and remove the ability to submit any further moves, as shown below:

GAME OVER: This is a cat's game.

	A	B	C
1	X	O	X
2	X	X	O
3	O	X	O

Or if there is a winner:

GAME OVER: X won!

	A	B	C
1	X	O	X
2	O	X	O
3			X

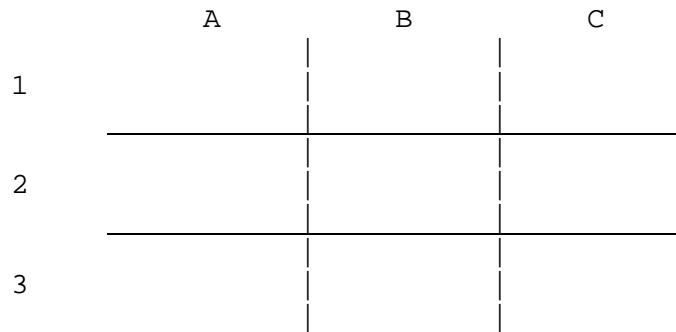
To play the game again, the user will need to refresh the page.

Part 2 – Networked Tic Tac Toe

For this part, you will allow two players to play against each other. The game play will be exactly the same as what is displayed above with a few small changes as explained below.

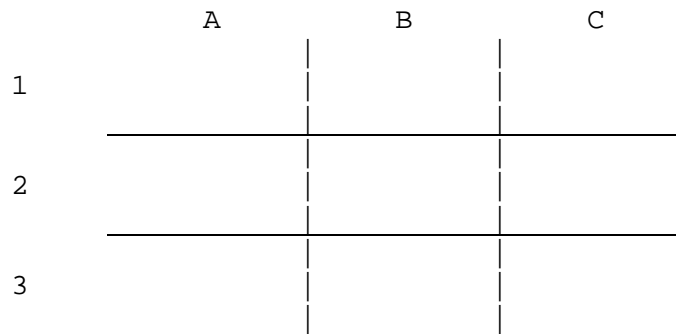
A game will start when two players have loaded a page called `ttt2.html`. If only one user has loaded the page, the following will be displayed.

Waiting for a second player to join the game.



And then when a second player has loaded the page, the following will be displayed.

Player O joined. You are Player X.



Player X

The second player who joined will see the following. Notice that Player O does not see the form for making a move since it is not his turn.

Both players joined. You are Player O.

	A	B	C
1			
2			
3			

Once Player X makes a move, he will see the following.

X placed at B1.

	A	B	C
1		X	
2			
3			

Player O will then see the following. Notice Player O will now see the form since it is his move.

X placed at B1.

	A	B	C
1		X	
2			
3			

Player O

Submit Move

Error messages still need to be displayed as they were in part 1, and keep in mind that a player should **not** lose his turn if there is an error.

Once the game finishes with a winner or a cat's game, display the message and remove the form on both players' screens.

All of the commands above should be made through AJAX. Refreshing the page will start a new game.

Grading

% of Final Grade	Criteria
<i>Part 1 – 4.0%</i>	
0.2%	Naming the page <code>ttt.html</code> .
0.2%	The GUI renders with a tic tac toe board.
0.2%	The GUI has the form with a drop down list and a submit button.
0.2%	The drop down list is initially populated with {A1, B1, C1, A2, B2, C2, A3, B3, C3}
0.5%	When a player makes a valid move, the form changes to the other player.
0.2%	When a player makes a valid move, the proper message is displayed.
0.5%	When a player makes a valid move, the tic tac toe board places the corresponding letter in the appropriate square.
0.2%	An error message is displayed if the user tries to make an invalid move. OR The player is not able to make an invalid move because the option is not available from the drop down list.
0.2%	A message is displayed if a player wins before all the squares are filled if the win is horizontal.
0.2%	A message is displayed if a player wins before all the squares are filled if the win is vertical.
0.2%	A message is displayed if a player wins before all the squares are filled if the win is diagonal.
0.2%	A “cat’s game” message is displayed if all the spaces are filled and there is no winner.
0.2%	When a game terminates, the form is no longer displayed.
0.5%	The game is sending AJAX calls to the server so there is no refreshing of the page.
0.3%	Refreshing the page starts a new game.
<i>Part 2 – 8.0%</i>	
0.5%	Naming the page <code>ttt2.html</code> .
0.5%	Message displayed with no form when waiting for a second player to join.
0.5%	When second player joins, Player X message displayed and form is shown on Player X’s game.
0.5%	When second player joins, Player O message displayed and no form is shown on Player Y’s game.
0.5%	When a player makes a valid move, the proper message is displayed on both players’ screens.
0.5%	When a player makes a valid move, the tic tac toe board places the corresponding letter in the appropriate square on both players’ screens.
0.5%	When a player makes a valid move, the form is removed from his page and displayed on the other player’s page.
0.5%	An error message is displayed if the user tries to make an invalid move. OR

	The player is not able to make an invalid move because the option is not available from the drop down list.
0.5%	A message is displayed on both players' screens if a player wins before all the squares are filled if the win is horizontal.
0.5%	A message is displayed on both players' screens if a player wins before all the squares are filled if the win is vertical.
0.5%	A message is displayed on both players' screens if a player wins before all the squares are filled if the win is diagonal.
0.5%	A "cat's game" message is displayed on both players' screens if all the spaces are filled and there is no winner.
0.5%	When a game terminates, the form is no longer displayed.
1.0%	The game is sending AJAX calls to the server so there is no refreshing of the page.
0.5%	Refreshing the page starts a new game or forces a player to wait until another player joins if there is not another player yet.