

Homework 01

ECE 587, Spring 2025

Due Date: 02/09 (Sun.) by the end of the day (Chicago time)

In this homework, we will study the FSM model to build an interactive tic-tac-toe game. Since our focus will be the FSM model itself, we don't care how the game will be implemented, i.e. we don't care what language should be used and you are not required to actually implement the game.

The tic-tac-toe game, as shown below, uses a 3-by-3 board. Two players, X and O, take turns to fill an empty board until one of them wins by placing the same three in a row (horizontal, vertical, or diagonal).

X	O	
	X	
		O

As a hint, let's use the board itself as the state of our FSM model. Here are the questions you'll need to answer. The answers should be concise, say 3 to 5 sentences at most.

1. (1 point) How many states are there in the FSM model? (Hint: First decide how many ways you could fill a single box. For simplicity you could count a state even if it cannot appear in a valid game, e.g. a board filled with all X.)
2. (1 point) What are the initial states and the final states?
3. (1 point) What is the output function like?
4. (1 point) What are the inputs? What is the next-state function like?
5. (1 point) We would like to have the ability to inspect any previous moves by the players in the current game. Describe how this could be achieved by the FSM model.

Though not required, for those who would like to see the actual code, please refer to the page <https://reactjs.org/tutorial/tutorial.html> .