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Formal Languages and Computability

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Project Proposal

For my project, I will build a tic-tac-toe game. The user will choose a spot on the board to place the first 'X' then the second user will choose a spot on the board for an 'O' until the game is complete. A DFA will define all the possible moves and winning states. Each symbol in the alphabet will represent one possible position on the board. The starting state is an empty board. Each state is one possible layout of the board. The DFA receives a symbol representing the location of the first X and transitions to the state that has an X in that location. There are 9 possible states the starting location could transition to because there are 9 symbols in the alphabet which correspond to the 9 spots on the board. From that state there are 8 possible states to transition to. This will continue until one of the users has 3 symbols in a row(accepting states). If all goes well with constructing a 2-player tic tac toe game, I will attempt to implement an AI to select a state to allow for single player play.

The first step in building this project is to define the DFA. Once the DFA is defined I will need to build a base tic-tac-toe game for 2 players that uses the DFA to transition from state to state and declare a winner. Finally I will need to create some kind of rule that chooses a state to transition to(or sends a symbol to the DFA) based on the player's move. This may prove to be a challenge, but at the very least I will have a functioning DFA that controls 2-player gameplay.