Setup
Python3 -m venv .venv
Source .venv/bin/activate

Install Dependencies
Python3 -m pip install -r requirements.txt

Run the Project
Python3 app.py

The game has two main modes, an interactive mode where the user can play versus an AI, and an AI vs AI mode. The AI has three algorithms it will use to determine moves. The simplest is the Random Mode, where the AI will randomly choose from the pool of available moves. The efficiency of each algorithm is measured by counting the number of nodes each algorithm visits before choosing the optimal move, and is visible under the game's grid.

The second mode utilizes the Minimax algorithm to compute all possible permutations of a game of Tic-Tac-Toe from the current state, and then chooses the best available move. It calculates the efficacy of a move by assigning a score to the game outcome, 1 if X wins, -1 if O wins, and 0 for a draw. If there are multiple moves with an equal score, then the algorithm randomly chooses one of the available moves.

The third mode utilizes the Minimax algorithm with Alpha-Beta pruning to eliminate branches that are functionally identical to ones already considered, such as mirrored board states, as well as branches that will lead to outcomes worse than the best one already considered. This saves processing power, as can be seen by the differences in the nodes counts between the Minimax and Alpha-beta modes. Once again, if there are multiple moves with an equal score, then the algorithm randomly chooses one of the available moves.