Assignment 8

002311001041

Writeup

**Summary:**

For this assignment, I developed a console-based Tic-Tac-Toe game where a human can play against the computer. The AI uses the alpha-beta pruning technique to optimize its moves, making the game more challenging and efficient.

**Key Features Added:**

* Implemented alpha-beta pruning for the computer’s decision-making.
* Added difficulty levels: easy (random moves), medium (blocks player wins), and hard (uses alpha-beta pruning).
* Allowed the user to choose whether to play first or second.

**Main Functions Used:**

* *print\_b()*: Displays the current state of the board.
* *win()*: Checks if a player has won.
* *full()*: Checks if the board is full.
* *score()*: Evaluates the board for the AI.
* *ab():* Performs alpha-beta pruning to select the best move.
* *easy\_move(), medium\_move(), hard\_move()*: Select moves based on the chosen difficulty.
* *main()*: Handles the game loop, user input, and overall flow.

**Important Variables:**

* b: Represents the game board as a 2D list.
* user, ai: Symbols for the human and computer players.
* diff: Stores the selected difficulty level.
* turn: Tracks whose turn it is.

**Additional Details:**

The game logs each move and the final result to a text file for record-keeping.

The code is structured for clarity and simplicity, with short variable and function names.

Conclusion: This implementation demonstrates the use of search algorithms in game AI and provides a user-friendly interface with adjustable difficulty.