Spike: 4
Title: Graphs, Path And Search

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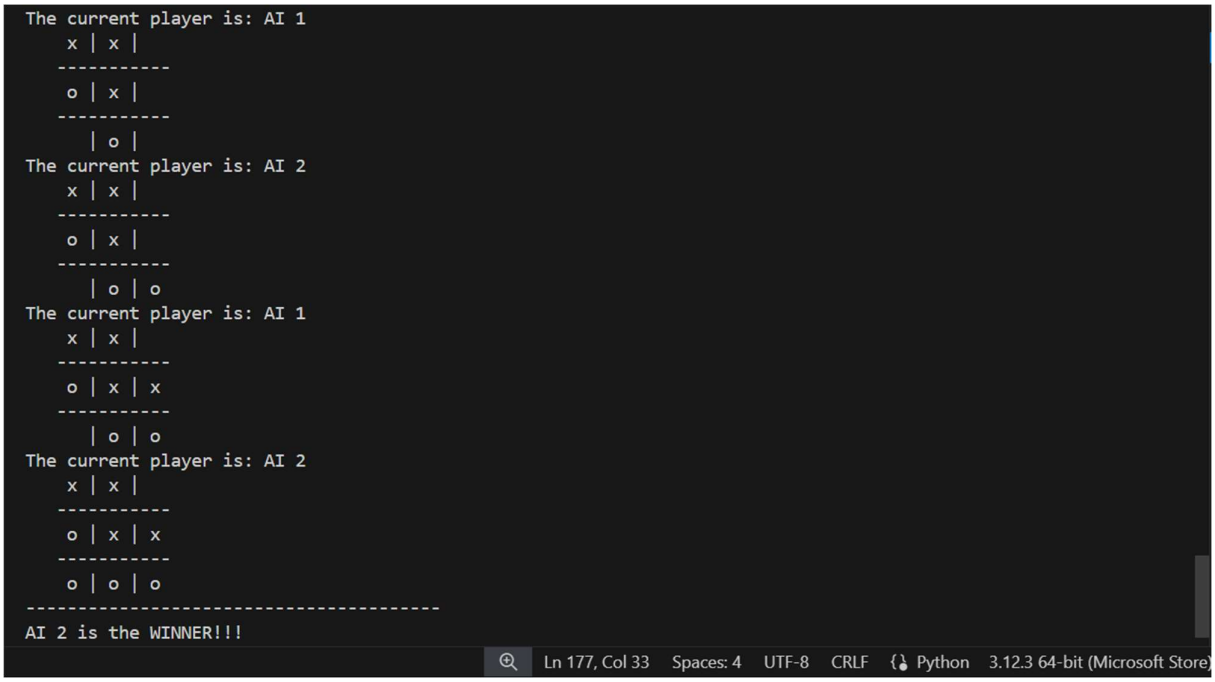
Goals / deliverables:
1. Tic-tac-toe code modified to represent the game state as a graph.
2. An AI that randomly searches the graph
3. An AI that improves the efficiency of a basic random search
4. An AI that improves the effectiveness of a basic random search

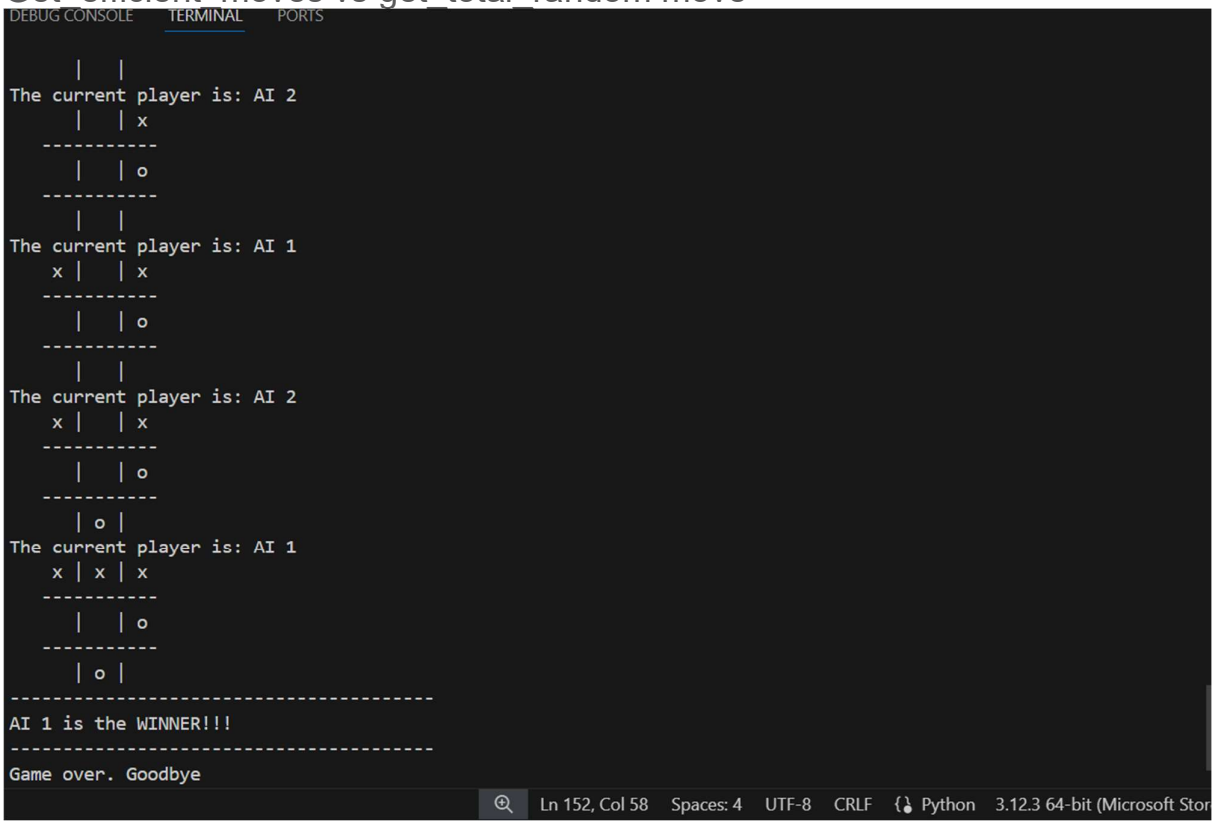
Technologies, Tools, and Resources used:
List of information needed by someone trying to reproduce this work
- Pycharm
- ChatGPT
- VSCode

Tasks undertaken:
- Copy code from Task 3
- Introduce the scoring system by adding self.scores. Where 1 for win by x, -1 for win by o and 0 for tie
- Write a function to identify possible moves the AI can take
- Write a function named get_total_random_moves to randomly shuffles the list of possible moves and select first one.
- Introduce a function named get_efficient_move to search for possible move using Minimax algorithm. This function should output the moves that maximise the chance of winning
- Introduce another function named get_effective_moves that either immediately win the game or block the opponent form winning in the net turn
- Write the function for Minimax algorithm
- Add a more robust check for tie condition, examining if all cells on the board are filled without having found a winner
- Change the flow of the game, form human vs AI to AI vs AI

What we found out:



Get_efficient_moves vs get_total_random move



Get_effective_moves vs get_total_random_move

Overall, it gives me an idea how minimax can be implemented and how I can improves the search method

Open issues/risks [Optional – **remove** heading/section if not used!]**:**
List out the issues and risks that you have been unable to resolve at the end of the spike. You may have uncovered a whole range of new risks as well.

- eg. Risk xyz (new)

Recommendations [Optional – **remove** heading/section if not used!]**:**
Often based on any open issues/risks identified. You may state that another spike is required to resolve new issues identified (or) indicate that this spike has increased your confidence in XYZ and should move on.