Project: Connect 4

Developers:

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Technology Used: Java, JavaFX

Features:

- ➔ Connect 4 board game
- ➔ Choosing disc colour
- ➔ Turn indicator
- ➔ Help button for gameplay details

Game Mechanics:

- ➔ Base algorithm used for AI: Minimax

- ➔ Alpha-Beta Pruning is used to minimise the game tree.

- ➔ Heuristic Method:

  The number of discs a player has in a winning pattern is a heuristic to estimate his chances of winning by completing that particular pattern (given that there is no opposing disc in that particular pattern).

- ➔ Evaluation Function:

  At a particular state, for every winning pattern, we count the number of discs for AI and Human.

  If, there is no opposing discs in a pattern,
  For AI, score = pow(count, count)
  For Human, score = - pow(count, count)

  Then all the scores for every winning pattern are summed to get the final evaluation for that particular state.

- ➔ Cutting off search is done at game tree depth = 5

- ➔ Additional Logic:
  - ◆ In cases where Human can win with a single move, AI will block that move without making the game tree.
  - ◆ In cases where AI can win with a single move, AI will make that move without making the game tree.
  - ◆ Utility value for winning is inversely proportional to depth of the winning node in the game tree.