Assignment 4 Report

The program has been implemented using python and the module that is used to build the UI for the game is pygame.

To run the program

1. Install the modules in the requirements.txt using the command -
   pip install -r requirements.txt
2. Run the program using the command -
   python Connect4.py

User Interaction -

When the program is executed the user will be asked if they want to use the alpha beta pruning method or not. The user can give a ‘y’ to use it and anything other than ‘y’ will be considered as a no and normal minimax algorithm will be used.

While playing the game the user’s mouse movements will be captured and will be used as inputs to check where the user wants to drop the disc.

Comparisons -

For both of the algorithms, the time taken to play each of the step is printed.

1. For minimax algorithm -
   Time taken without ab pruning - 0.001 seconds
   Time taken without ab pruning - 0.001 seconds
   Time taken without ab pruning - 0.001 seconds
   Time taken without ab pruning - 0.001 seconds
   Time taken without ab pruning - 0.002 seconds
   Time taken without ab pruning - 0.002 seconds
   Time taken without ab pruning - 0.001 seconds
   Time taken without ab pruning - 0.001 seconds
   Time taken without ab pruning - 0.001 seconds
   Average time taken - 0.001 seconds

2. For minimax algorithm with Alpha Beta pruning -
   Time taken with ab pruning - 0.655 seconds
   Time taken with ab pruning - 0.605 seconds
   Time taken with ab pruning - 0.476 seconds
   Time taken with ab pruning - 0.543 seconds
   Time taken with ab pruning - 0.811 seconds
   Time taken with ab pruning - 0.427 seconds
   Time taken with ab pruning - 0.201 seconds
   Average time taken - 0.531 seconds

The difficulty level with both the algorithms is almost the same and I was not able to beat the algorithm even once. I was able to tie the game once but it is difficult to win a game against the algorithm.