Gabe Isaacs 11/6/2022
AI Hw3

The first step to ensuring the best results for a connect 4 victory was ensuring that you use a proper heuristic. You cannot see if you are closer to winning if you don't properly check that you are picking the best move every time you go. Therefore, I would loop through all 7 moves creating the find the best column to put my piece in. Once that was done, I would go there initially. The way that evaluated my board was to increase the score of the board based on how close I was to a connect 4, with 4 in a row giving me the highest results by far and then 3 in a row etc. I would also make sure that I would block an opponent from winning and that would increase the score of the move as well.

However, having a good heuristic is not enough, the reason that this is so because this will only give you the best move currently, which uses no foresight to help see how future turns will play out. That is why I decided to use the min/max tree algorithm. What this does is that it looks ahead at all my possible moves, then it will look ahead at the opponents moves, and then will look ahead at all of my possible moves etc, however many moves you want it to look ahead. Once it can see the total results so far ahead, it now knows which one to pick. The AI knows that it's opponent will always pick it best move. So, using this information it will pick the best move that it's opponent will need to allow because they would rather you make this move then a different move.

Lasty, the alpha beta pruning helps this algorithm run properly without take an extremely long amount of time. The reason that this works is because once the maximizing player finds a move that the minimizing player will at very least need to allow it. The AI no longer needs to look at move or branches of the tree that are worse than the current move that it has. Even though there might have been a better result in that branch, it knows what the minimizing player will pick the move that is the lowest score and not let the higher score to pass up the tree. Because of that it will keep the higher score that it already has and will not look farther in the other branch.