Assignment 1

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For this assignment we had to develop a Connect 4 game that used the previous minimax tree from the previous assignment, but with a new twist. This time we were to start out with garbage aka random weights. So naturally one would assume that the AI would not play well. From these starting random values we were then to have the AI learn and adjust its weights by using our hand tuned static evaluator as a trainer.

The process with which I train my AI is using the least mean squared algorithm or LMS for short. To do this, my program generates thousands of boards in random board states. (All valid of course) From there we run the random AI against the boards and see what scores the static evaluator returns. We then store the values and run the hand tuned static evaluator against the same board. From there we compare the two scores for each column. The difference of the random AI and the hand tuned AI’s column scores is then used as the error. Using that error we then multiply it by a constant, in this case 0.1, and then add the value to the current random weight. By doing this we will start dialing the random weights to approach out hand tailored values.

Oddly enough while approaching the hand tailored weights I found that my best learned weights out performed any previous attempt in my ability to force wins against my AI. By adjusting the player threat weight higher than the computer win weight I found that while the AI was not as aggressive it was far more successful at frustrating my attempts to defeat it. I found this a little odd but discovered that while winning is indeed the best strategy if I block it every time it allows me to create multiple threats and force the win. Now however, the computer will attempt to stall me at every turn. This event leads to an update of the AI’s strength and weaknesses.

1. Strengths
   1. Player harassing game play
   2. Ability to stop isolated attacks quickly
   3. Ability to create multiple threats to force player into unsavory positions
   4. Improved reactions to players moves
   5. No remorse, no mercy
2. Weaknesses
   1. Multi-threats
   2. Random gameplay
   3. Short plys are easy to defeat