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Assignment #2: Dots and Boxes

Video:

https://www.youtube.com/watch?v=XaZGFFxzokI&feature=youtu.be

Analysis:

Despite not being able to finish the program completely, I am able to see the differences in speed and challenge of the CPU depending on how many plys there are. The larger the board, the bigger the potential moves are so it will slow down the algorithm when I start reaching boards larger than 5X5. The larger the board also means that each ply is going to take significantly longer to do. The increase of both values almost creates an exponential increase in time it takes to execute the CPU move as I am classifying it as PLY Time * BOARD_SIZE time. Around 4 plys is where the time it takes for the CPU to move becomes a little too unbearable to play a legitimate game with it. There are also numbers that I get to on board size and on the plys that will make the game crash and it times out. This is around 6-7 board size and 4 plys. When you are playing a game against the computer, you are expecting a quick result but also one that is challenging so it is about finding a good balance between the both.

I think I am assessing on the wrong values which makes the AI algorithm a little less accurate and challenging. While the CPU is still quite good at determining good moves and completing boxes, I felt it was not difficult to beat, especially with 2 plys. I interpreted a ply as a min and a max level, so a full set of moves between the CPU and the user. As I was not able to program the algorithm exactly the way it should have been to make the game a challenging experience, I only played in games that I won in. I think if I changed the way the moves were evaluated, I would be able to play a much more accurate and challenging AI algorithm. A higher ply on a smaller board is going to be challenging because the algorithm can cover more of the game space and thus, predict better moves. The larger the board and small the ply, the easier it will be for me to win. I did not find any definite numbers to present that represent an easy, medium, hard or challenging mode but the ply gets larger and the board may get smaller the more challenging something is categorized.

As I am also using a text interface, a larger board is tedious in many ways so that is one of the biases of the program that I created. If I were to do it over again, I would enhance the user experience by create a GUI that you would be able to click and place sides of the box.

Overall, I ultimately could not figure out the missing piece of this particular “smart” algorithm which effects how I view the final product and the fun in creating a personal Dots and Boxes CPU. The speed, challenge and interface are all aspects that can make or break a game. Building this CPU player taught me that a lot goes into creating a game that involves a “smart” computer game algorithm. I would like to understand more of how this algorithm applies to the industry and how professionals have optimized it to create meaningful and fun games.