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CS171 Intro to AI

### Third Milestone: Report for Group abc123AI.java

In this assignment (due Oct.31, 2016), we are trying to implement alpha-beta pruning algorithm to our ConnectK project. We modify our heuristic function, availableSpace, added Move class to help and change Minimax to AlphaBeta.

Our Move class has 2 member variables called v and p, where v is the value from the heuristic connected to p, the Point itself. We used the Move itself inside the Alpha Beta function. Our availableSpace function divided into gravity and no gravity. Both are the same, but with gravity we only looked at the width of the board, while no gravity we have to look at width and height. availableSpace tried to look at the space with most potential of winnings in each directions with surroundings function. It is started in the middle of the board and after no middle pieces available we are going to look at the straight line length of the piece with the middle piece (Euclid value).

We made changes to our heuristic function by implementing Even Odd strategy with Threat. We looked at both our moves and opponent moves, we divided it by the even and odd rows, and also if the moves is crossing the enemy's moves. After we added each even, odd, shared unshared of each player to the variables. We calculated each moves made 10 points is added. We also added 10 extra points for each moves that is intercepted opponent's crossingSection and 5 extra points if there is none crossingSection. Lastly, we check if any of the players won, or if not we subtracted our value – opponent value.

For Alpha Beta itself, we added the time to stop we search if we took too long for a move with the unique CANCEL variable. Then, we go into while loop that only stop if we find the value or we ran out of time. Inside the loop, first we go into firstMax, where we tried to find Maxvalue for the first move, and then we go into recursive loop of minValue and MaxValue. After the firstMax, we checked for LOSE, WIN value, and also the CANCEL if we ran out of time.