2048 Expectimax Solver

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***Abstract*—This text answers assignment 5: writing a solver for the game 2048. The purpose of the game is to slide tiles with numbers 2^n, and join them together to form 2048 (2^{11}), or possibly higher. We present a solver using Expectimax algorithm. We explain our choice of heuristics and results.**

2048 can be thought of as a 2-player, turn-based game. The opponent places tiles valued either 2 or 4 in an availible location. Then, the other player makes a move to slide all tiles in a given direction. This goes back and forth until there are no more availible moves.

In a turn-based game, you have the time to consider the consequences for each possible action. This gives computers immense advantages over humans: IBM's chess-solving machine "Deep Blue" won against Garry Kasparov in 1997 considered more than 200 million possible moves per second[1]. In the case of 2048, this could yield a valid solution in a short amount of time. However, not everyone has access to such fast hardware and multi-threading so a way to prune the search space is needed.

Minimax Algorithm

end

[1]For more, see http://www-03.ibm.com/ibm/history/ibm100/us/en/icons/deepblue/