CS 4341 Project 1 Empirical Valuation Report

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For our empirical evaluation, we decided to map the change in computation time of our move selection algorithm as we shifted the depth limit on its tree search. We did this by running a game at each depth, recording the computation times, and taking the average time for each match. Here are our results:

|  |  |
| --- | --- |
| Depth: | Avg Time: |
| 5 | 0.002916667 |
| 7 | 0.012333333 |
| 10 | 0.111 |
| 12 | 0.751363636 |
| 15 | 11.87533333 |

As expected, it showed a pretty sharp exponential growth. Admittedly, the averaging leaves out a few quirks in the base data, as in later parts of longer matches the times actually decrease significantly, presumably because there are fewer possible outcomes so there’s less of a decision tree for the algorithm to search through. Still, overall this seems to capture the shape of the data pretty well.

The results themselves are fairly acceptable, since with exponential growth some kind of explosion was fairly unavoidable. It’s even fairly useful, since now we know the sweet spot for results at minimal marginal cost in time is somewhere around depth 10 to 12. I do wish we could eke out a bit more before the growth got away from us though.