

**COMP20003 Algorithms and Data Structures**  
**Semester 2 2016**  
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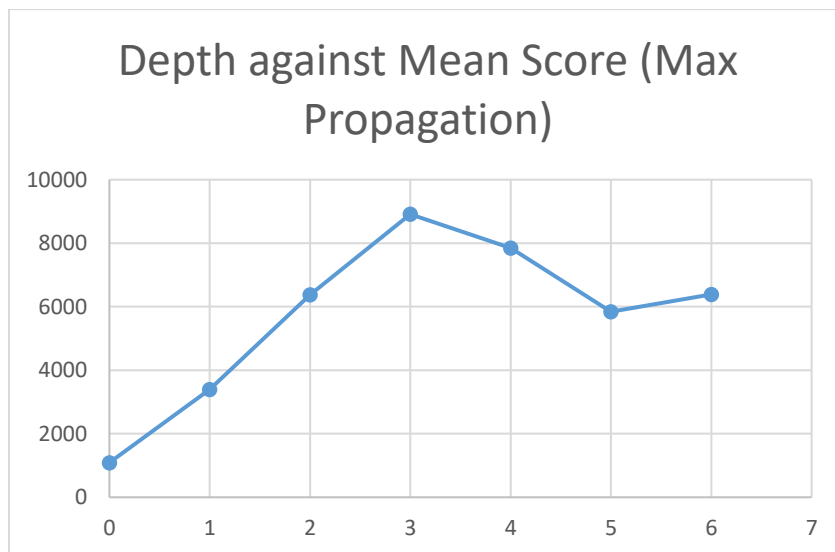
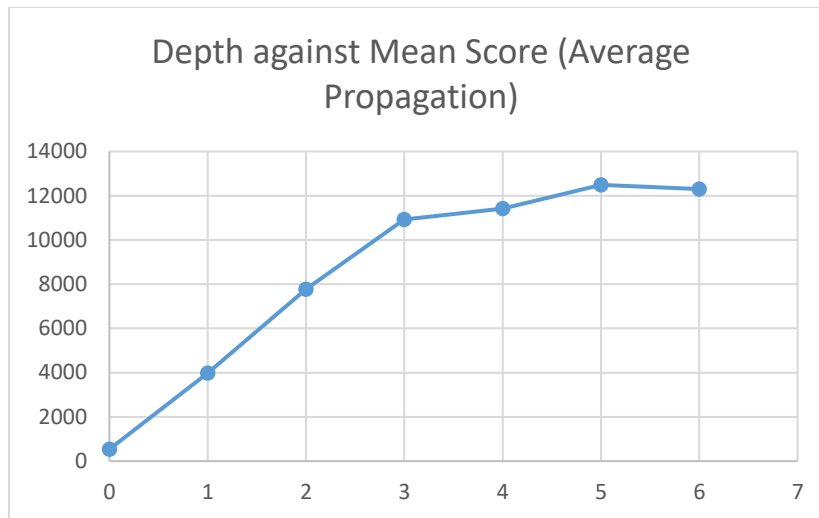
The tables and graphs below represent the data obtained from the output of running the ai against different propagation and depths.

**Average Propagation**

Depth	Mean Score	Score Deviation	Mean Max_Tile	Max_Tile Deviation	Average Total Time
0	536.4	215.38	54.4	30.36	0.036
1	3980.6	1704.27	307.2	150.24	0.162
2	7769.6	3671.12	614.4	300.48	0.335
3	10929.8	4125.13	844.8	296.83	0.38
4	11414.2	4668.22	844.8	296.83	0.285
5	12489.2	3282.74	921.6	215.8	0.303
6	12302.8	3135	921.6	215.8	0.45

**Max Propagation**

Depth	Mean Score	Score Deviation	Mean Max_Tile	Max_Tile Deviation	Average Total Time
0	1090.8	672.43	88	44.78	0.1721
1	3389.6	1579.6	281.6	132.2	0.1897
2	6375.6	4257.19	499.2	310.32	0.249
3	8911.2	3659.32	665.6	247.32	0.352
4	7844	3070.83	640	276.5	0.174
5	5839.2	2354.62	486.4	224.15	0.21
6	6387.6	2551.65	512	209.02	0.266



Comparing the values for average propagation and max propagation under the same depth we can clearly see that, the average propagation yields a higher mean score for all depths except for the case of depth equals to 0 as it is just truly random and based on luck. This is due to the fact that, you could have a high deviation in scores between the max value paths and other pathways which could have a significantly lower score, but if you take the average you would always be doing following the best average score path consistently well with less deviation. From the graphs of the depth against the mean score for both methods of propagation, we can see a clear trend in that by increasing the depth, the higher the mean score increases as well, except for depths above 3 for the max propagation, but this could be due to the random component of 2048 in which tiles can appear in random areas, thus putting the AI in unfavorable positions, but the graph for the average score has a clear increase until a max depth of 5 and above in which it starts to stabilize slowly. Therefore, it can be concluded that there is a ceiling to the score that the AI can achieve without the implementation of heuristics at about an average

score of 12000+. From these results we can conclude that the best propagation is average and higher depths will get you a better score until you reach a score ceiling in your ai.