

COMP20003**Assignment Two****Deliverable Two****Experimentation****Results Tables**

Depth	1	Propagation	Max	Depth	1	Propagation	Average
Run	Score	Max Tile	Time (ms)	Run	Score	Max Tile	Time (ms)
1	1488	128	0	1	1856	128	0
2	6696	512	30	2	2904	256	10
3	1484	128	10	3	3064	256	10
4	4372	256	20	4	1688	128	0
5	1188	64	0	5	2112	256	0
6	2204	128	10	6	3744	256	10
7	3464	256	20	7	3688	256	20
8	3444	256	10	8	1584	128	0
9	5304	512	20	9	1992	128	0
10	1320	128	10	10	2508	128	10
Average	3096.4	236.8	13	Average	2514	192	6

Depth	2	Propagation	Max	Depth	2	Propagation	Average
Run	Score	Max Tile	Time (ms)	Run	Score	Max Tile	Time (ms)
1	5476	512	30	1	1780	128	0
2	3168	256	20	2	5536	512	30
3	3348	256	20	3	3408	256	10
4	3444	256	10	4	1484	128	10
5	6568	512	30	5	4676	512	20
6	7040	512	40	6	724	64	0
7	3356	256	20	7	2660	256	10
8	14296	1024	70	8	3724	256	20
9	3140	256	20	9	3296	256	10
10	11788	1024	50	10	7464	512	40
Average	6162.4	486.4	31	Average	3475.2	288	15

Depth	3	Propagation	Max	Depth	3	Propagation	Average
Run	Score	Max Tile	Time (ms)	Run	Score	Max Tile	Time (ms)
1	7316	512	50	1	4436	256	30
2	7104	512	50	2	6036	512	40
3	7012	512	50	3	3244	256	20
4	3116	256	20	4	1648	128	10

5	7020	512	50
6	11456	1024	70
7	12164	1024	80
8	6320	512	40
9	10600	1024	60
10	11876	1024	70
Average	8398.4	691.2	54

5	2624	128	20
6	2232	128	20
7	1464	128	20
8	1772	128	10
9	1516	128	10
10	2516	128	20
Average	2748.8	192	20

Depth	4	Propagation	Max
Run	Score	Max Tile	Time (ms)
1	7016	256	70
2	6720	512	80
3	6444	512	70
4	11328	1024	110
5	6364	512	70
6	5408	512	60
7	6956	512	80
8	1252	64	10
9	11840	1024	130
10	9580	1024	90
Average	7290.8	595.2	77

Depth	4	Propagation	Average
Run	Score	Max Tile	Time (ms)
1	1472	64	20
2	3204	256	30
3	1876	128	20
4	2492	256	30
5	1708	128	20
6	3260	256	50
7	1564	128	20
8	1780	128	30
9	3420	256	40
10	2148	128	20
Average	2292.4	172.8	28

Depth	5	Propagation	Max
Run	Score	Max Tile	Time (ms)
1	10448	1024	230
2	6692	512	160
3	3160	256	90
4	6212	256	140
5	7020	512	160
6	6408	512	150
7	5304	512	130
8	6360	512	150
9	2976	256	80
10	6884	512	160
Average	6146.4	486.4	145

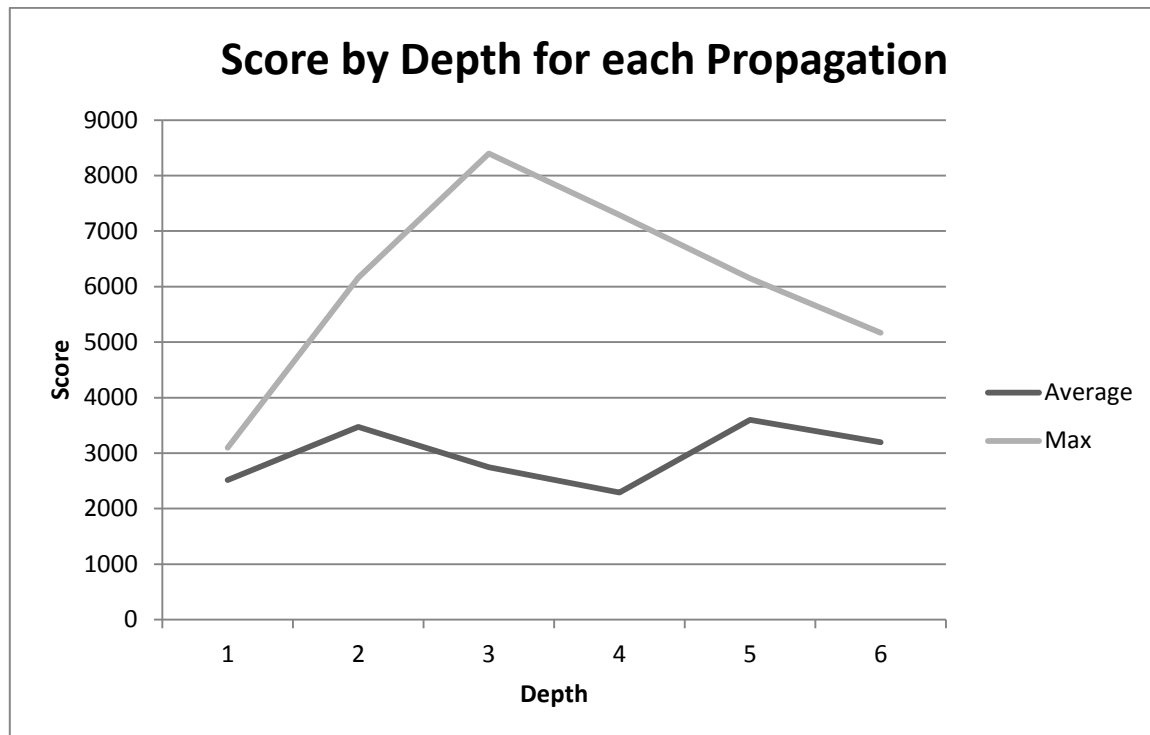
Depth	5	Propagation	Average
Run	Score	Max Tile	Time (ms)
1	3556	256	90
2	3044	256	90
3	7500	512	180
4	1644	128	50
5	4492	256	110
6	4768	256	130
7	1832	128	60
8	1800	128	60
9	1804	128	60
10	5560	512	140
Average	3600	256	97

Depth	6	Propagation	Max
Run	Score	Max Tile	Time (ms)
1	5048	512	310
2	2900	256	200
3	5308	512	330
4	7024	512	410
5	3776	256	260
6	5188	512	310
7	3120	256	220
8	6788	512	380

Depth	6	Propagation	Average
Run	Score	Max Tile	Time (ms)
1	2980	256	200
2	1916	128	150
3	3236	256	220
4	6612	512	380
5	2508	256	160
6	1428	128	100
7	1692	128	150
8	1224	128	100

9	7064	512	440	9	6948	512	400
10	5476	512	330	10	3428	256	210
Average	5169.2	435.2	319	Average	3197.2	256	207

Graph



Summary

The purpose of this assignment was to implement a variation of Dijkstra's algorithm with an underlying max heap data structure to find a path to the highest scoring game state in 2048.

There are two propagation techniques that can be chosen from for the game intelligence – maximum and average. Propagation refers to the first action being updated with the scores of its children. Score is used as a heuristic to rank moves.

Through experimentation it was discovered that using maximum propagation yields much higher scores than average propagation for all depths.

Depth 3 with max propagation returned the highest average score, with depth 1 returning the lowest average scores for both average and max propagation.

With increase in depth, the run time of the program increases as more nodes are being generated and expanded.