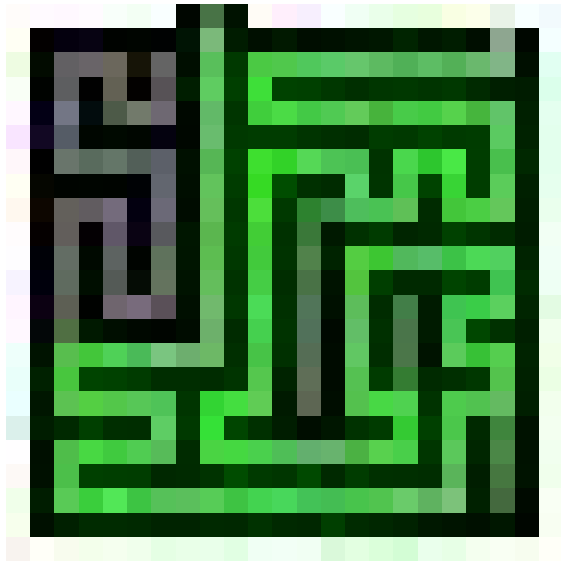


ANA* Report

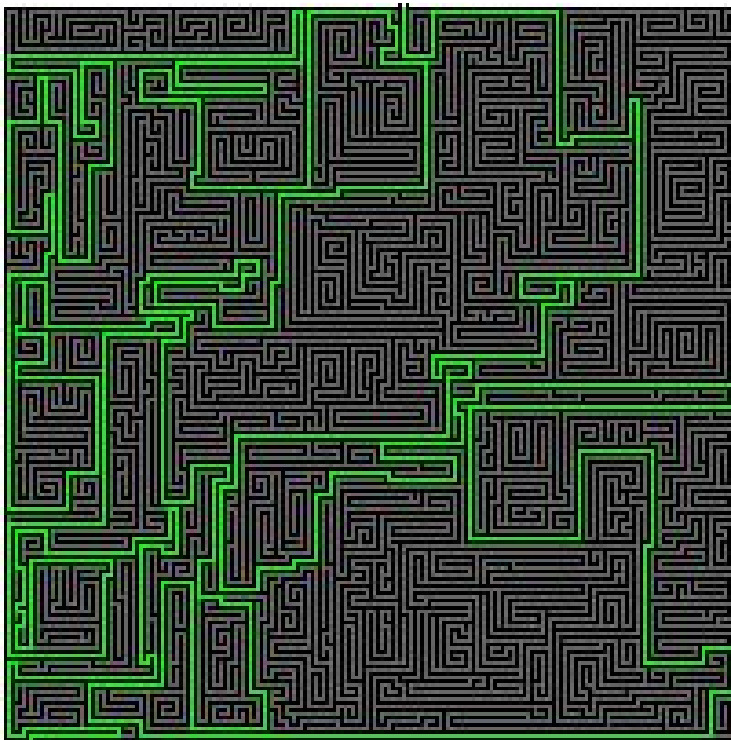
The results for the maps given in the Assignment using ANA* is in the below table:

Improvements	Parameters	Trivial	Medium	Hard	Very Hard	Circuit
1	Cost G (units)	146	3226	8286	18062	1614
	Sub-Optimality E	2.70×10^{13}	3.25×10^{12}	1.62×10^{12}	6.798×10^{11}	1.1428×10^{12}
	Time Taken (secs)	0.001796	0.1007	0.2243	2.734	0.2955
2	Cost G (units)	146	3226	8286	18062	1294
	Sub-Optimality E	1.17	2.8912	1.004	9.028	1.9830
	Time Taken (secs)	0.00186	0.1080	0.33807	2.8965	1.0111
3	Cost G (units)					1248
	Sub-Optimality E					1.1975
	Time Taken (secs)					4.25
4	Cost G (units)					1248
	Sub-Optimality E					1.0019
	Time Taken (secs)					4.659

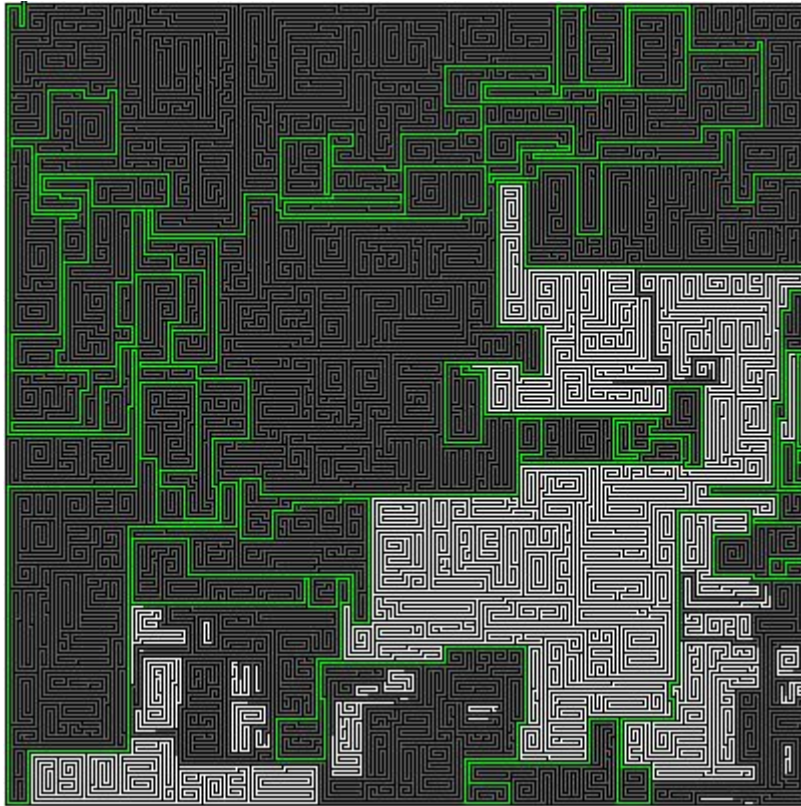
ANA* Output - Trivial Maze



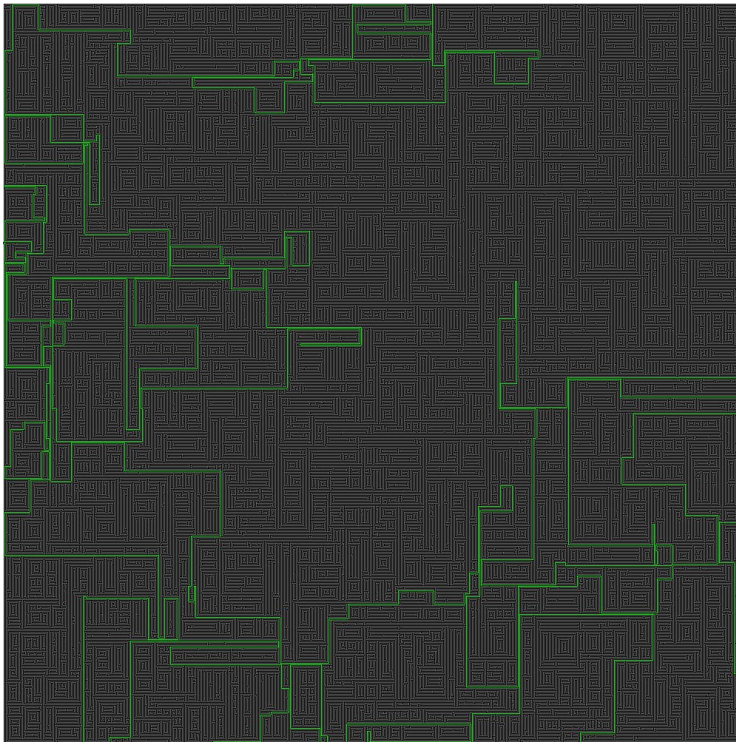
ANA* Output - Medium Maze



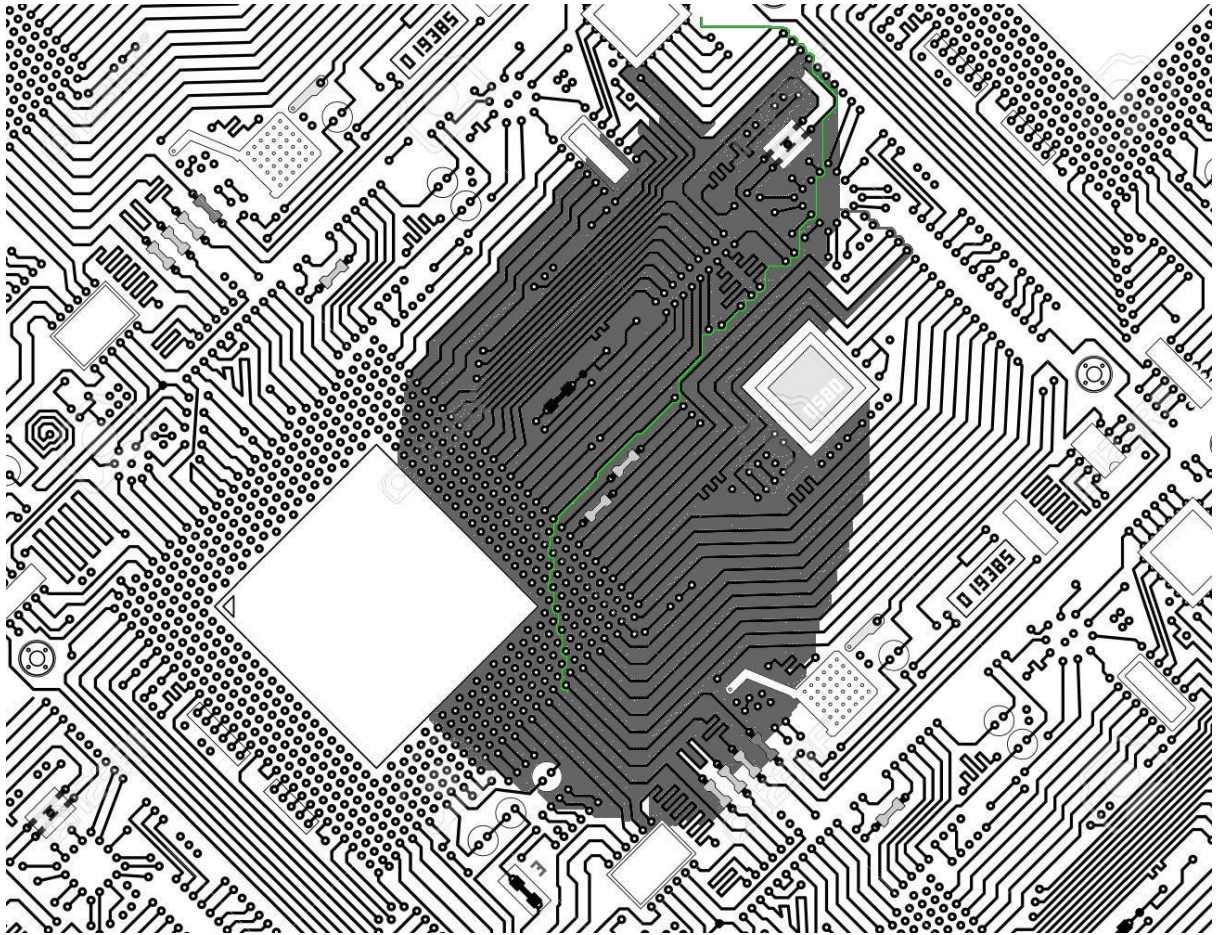
ANA* Output - Hard Maze



ANA* Output - Very Hard Maze



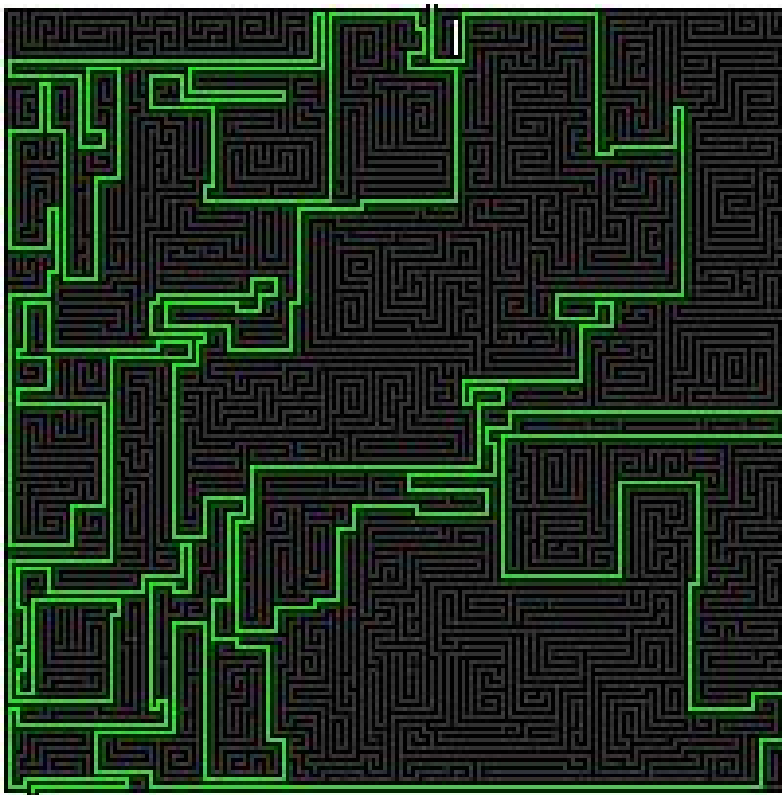
ANA* Output - Circuit



The results for the maps given in the Assignment using A* is in the below table:

Parameters	Medium	Hard	Very Hard	Circuit
Cost G (units)	3228	8228	18062	1248
Time Taken (secs)	0.08999	0.28431	2.0647	1.15473

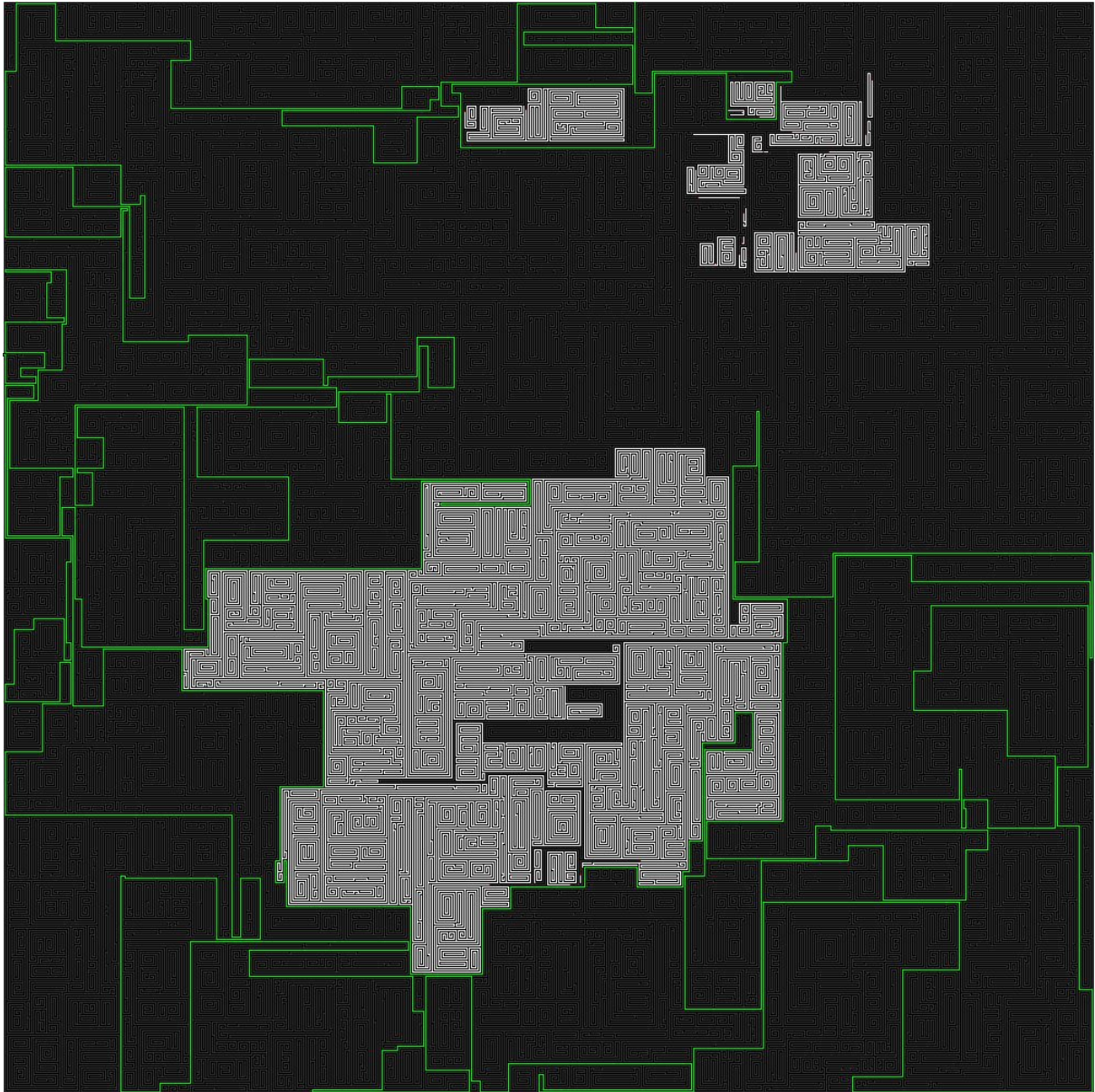
A* Output - Medium Maze



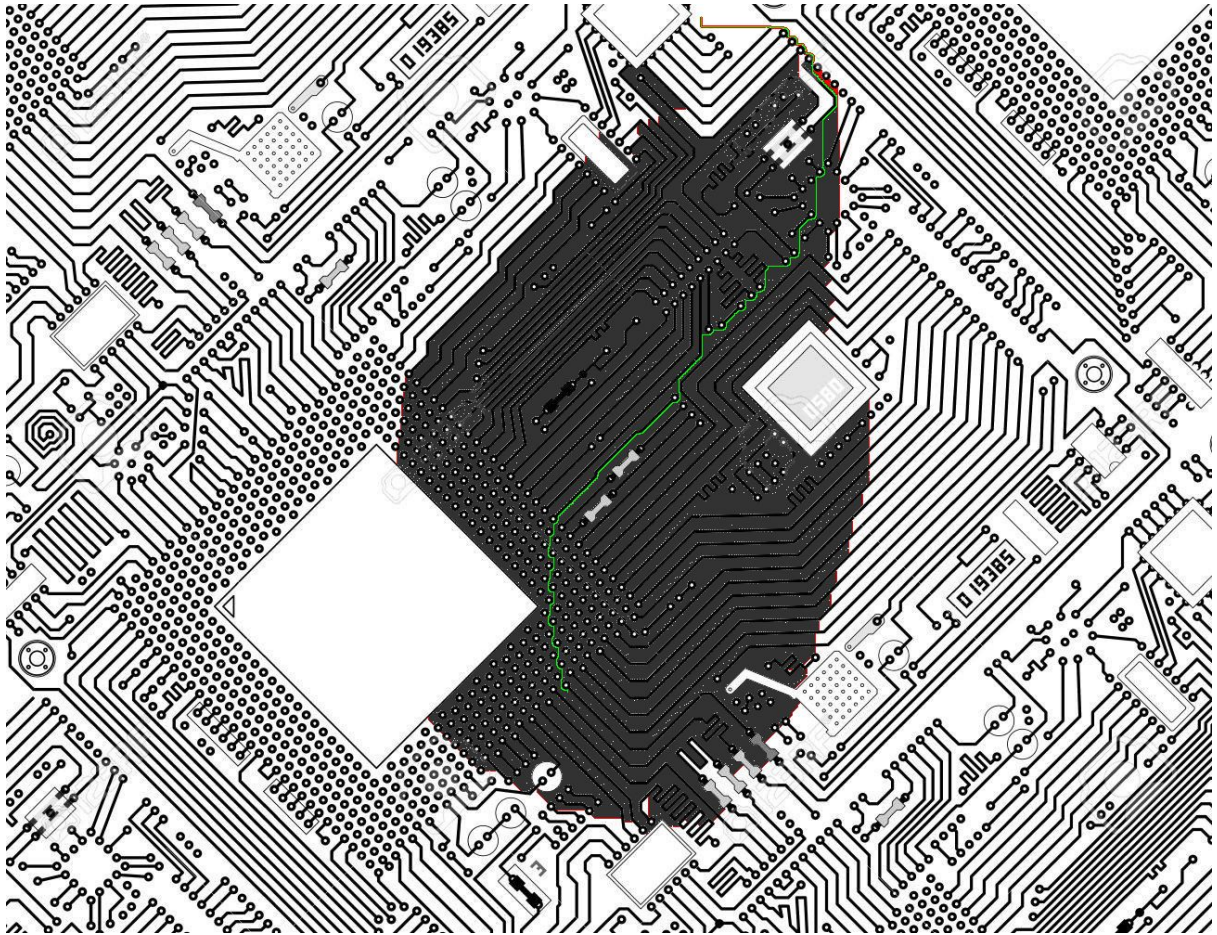
A* Output - Hard Maze



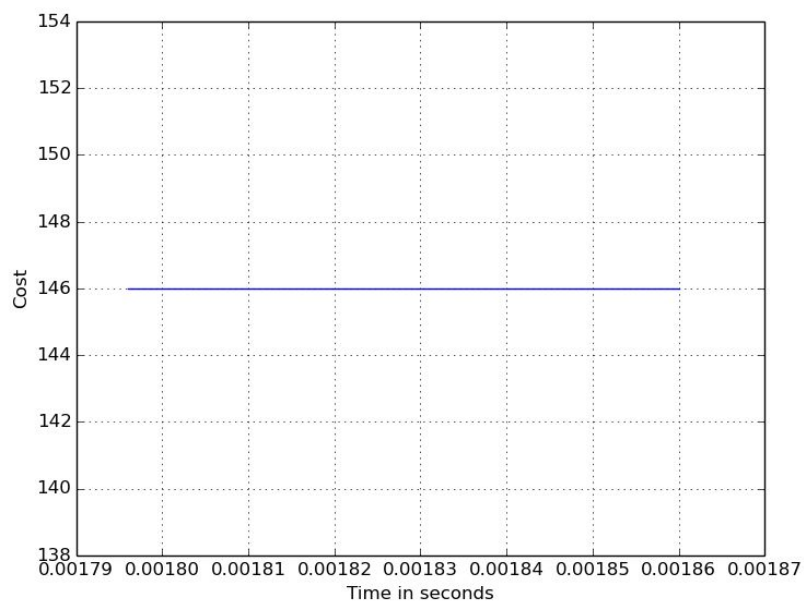
A* Output - Very Hard Maze



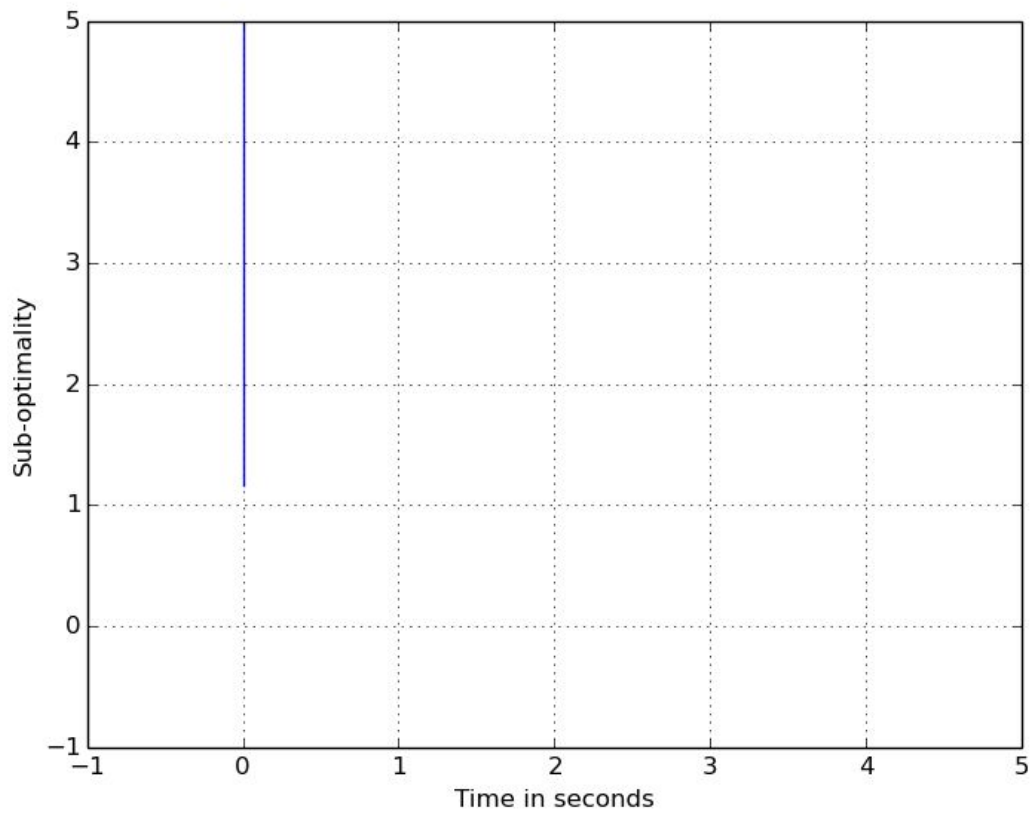
A* Output - Circuit



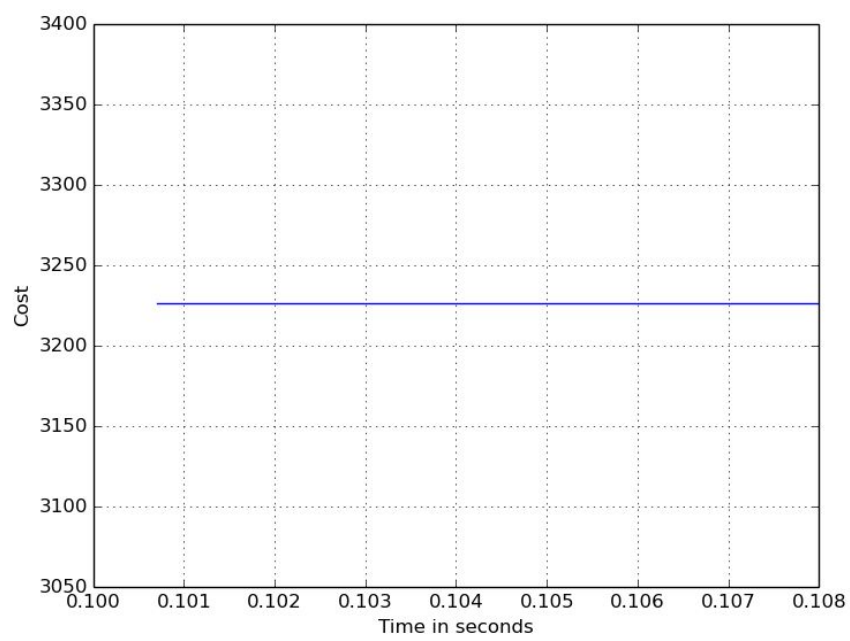
ANA* - Trivial Maze
Cost vs Time



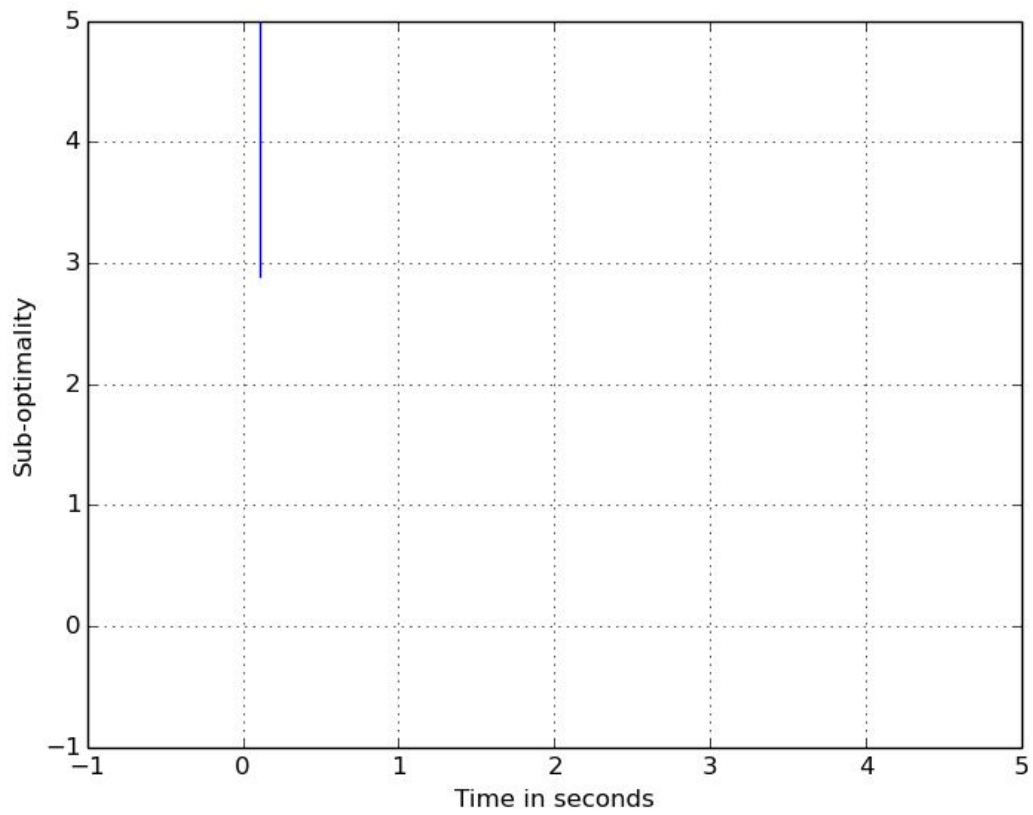
Sub-optimality vs Time



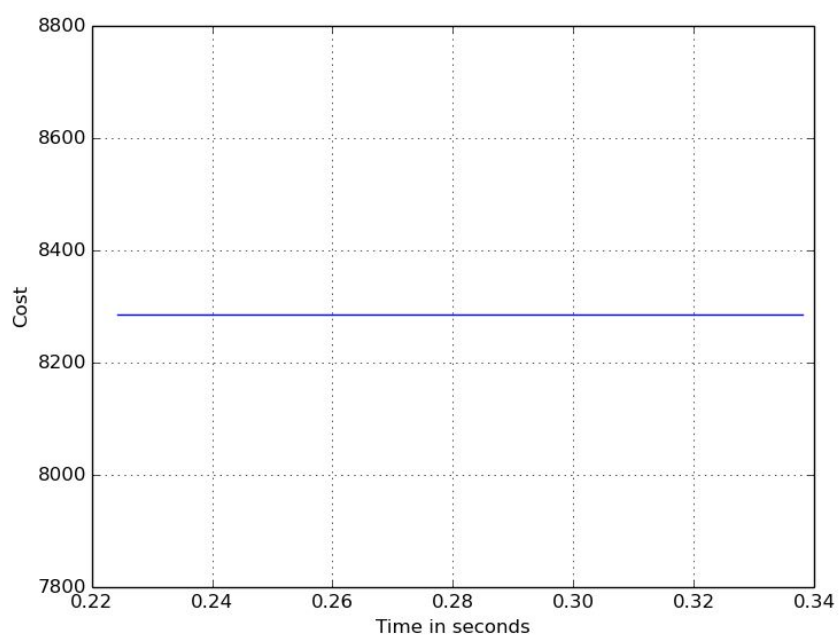
ANA* Medium Maze
Cost vs Time



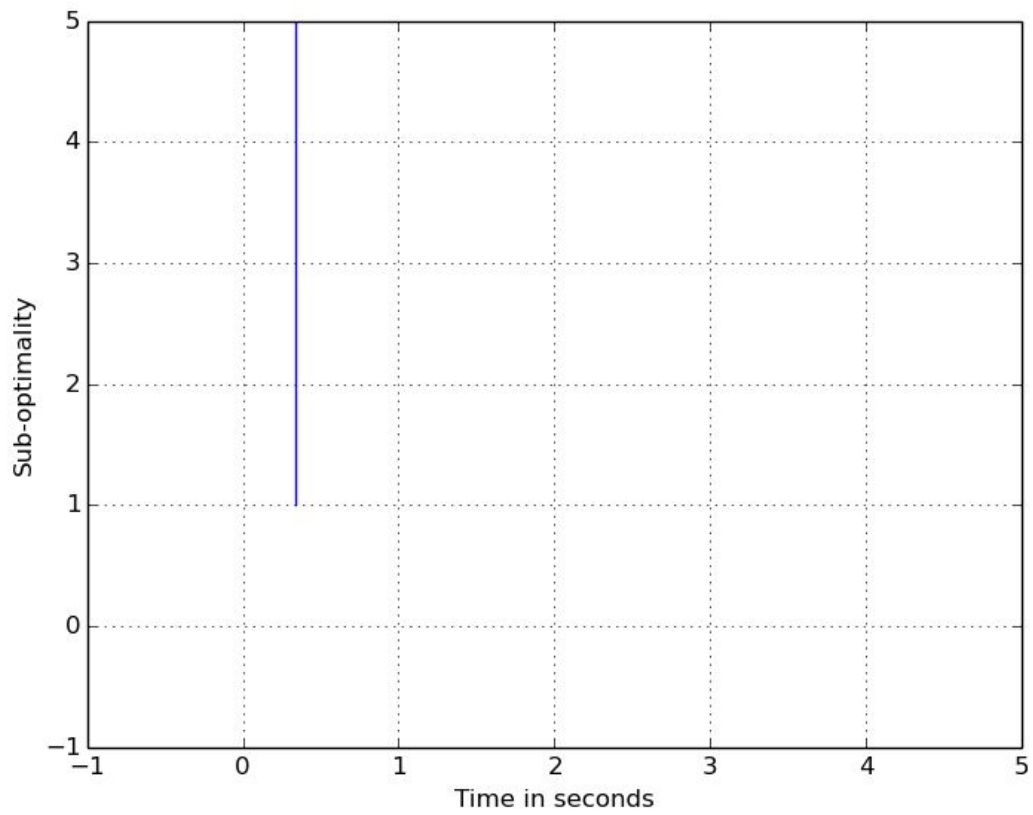
Sub-optimality vs Time



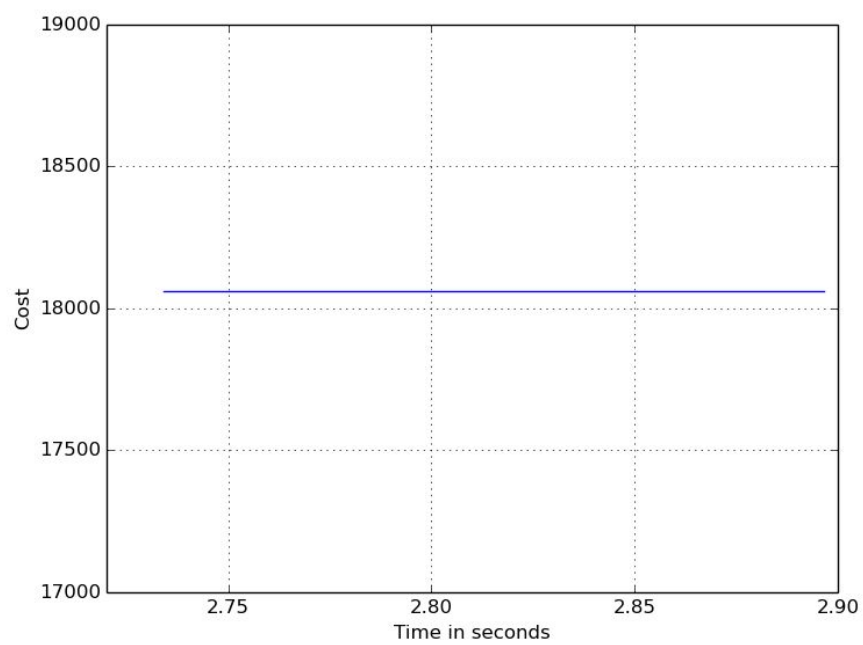
ANA* Hard Maze
Cost vs Time



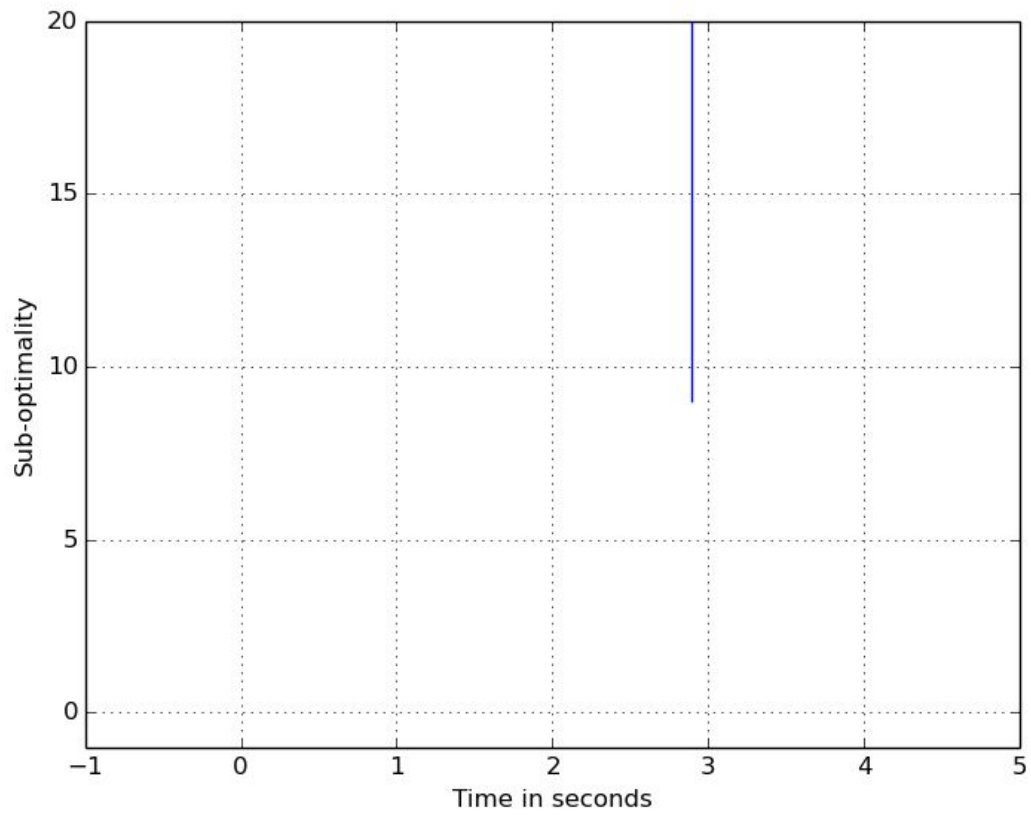
Sub-optimality vs Time



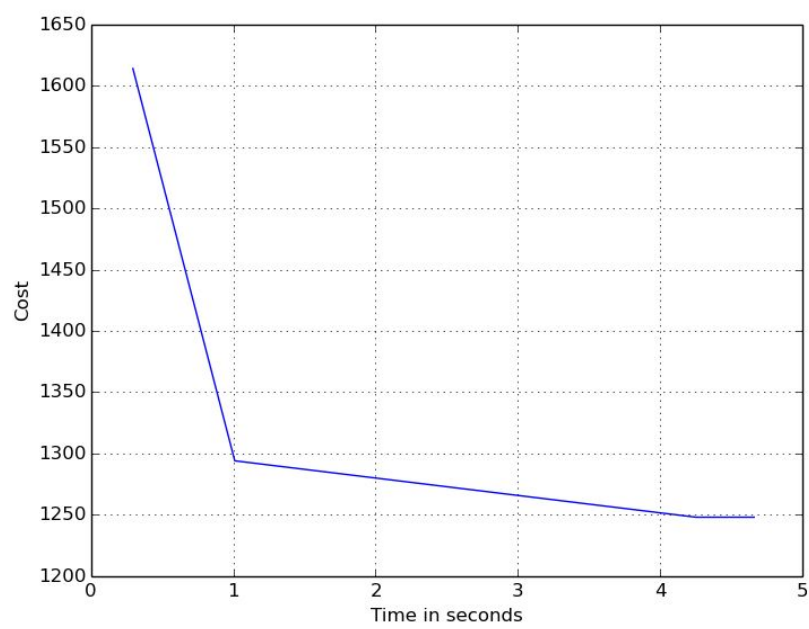
ANA* Very Hard Maze
Cost vs Time



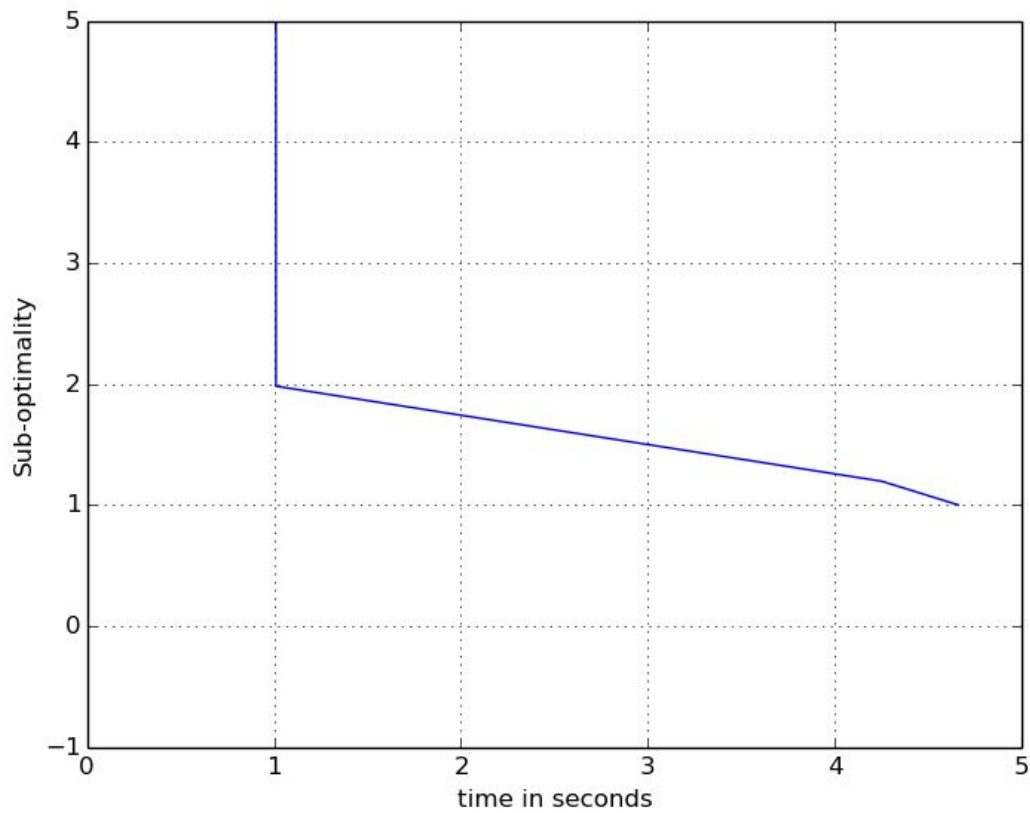
Sub-optimality vs Time



ANA* Circuit
Cost vs Time



Suboptimality vs Time



RESULTS:

- A* outperforms in almost all the mazes with respect to how fast the algorithm produces an initial optimal solution
- However, ANA* was quicker to produce an initial sub-optimal solution and it gradually improved over time. The optimality of solution increases as E decreases from infinity to 1.
- So, to conclude, ANA* over A* is favorable when the environment is not too complex.