

Heuristic Analysis

Performance Comparison

All output are in output folder. The plans of each problems are in the log files.

Algo	Problem	Expansions	Goal Tests	New Nodes	Plan length	Time	Filename
BFS	1	43	56	180	6	0.025	p1s1.log
BFS	2	3343	4609	30509	9	11.67	p2s1.log
BFS	3	14663	18098	129631	12	87.47	p3s1.log
DFS	1	12	13	48	12	0.006	p1s3.log
DFS	2	582	583	5211	575	2.641	p2s3.log
DFS	3	627	628	5176	596	2.836	p3s3.log
UCS	1	55	57	224	6	0.033	p1s5.log
UCS	2	4823	4825	43774	9	37.190	p2s5.log
UCS	3	18235	18237	159716	12	314.1	p3s5.log
A*HIP	1	41	43	170	6	0.039	p1s9.log
A*HIP	2	1494	1496	13708	9	12.13	p2s9.log
A*HIP	3	5118	5120	45650	12	115.1	p3s9.log
A*HPL	1	7	9	28	6	1.377	p1s10.log
A*HPL	2	13	15	123	9	35.58	p2s10.log
A*HPL	3	46	48	449	14	178.2	p3s10.log

- DFS is the quickest among all search algo. However, it's plan length is highest. Because DFS is not optimized for cost reduction.
- The number of expansion, Goal tests and New nodes of A-Star ignore-preconditions (AHIP) and A-Star level-sum (AHPL) are lowest among the 5 searches. That is because A-star search use heuristic function to reduce number of search node. However, the run time used is high. Since the run time of heuristic function is high.
- Among 2 A-Star searches, A-Star ignore-preconditions has lowest number of expansion, Goal tests and New nodes. However, it use highest time since the heuristic function has heavy work load.
- For problem which have obvious good heuristic function, BFS and A-star with provided heuristic function can be a good choice. For more complex problem, we can consider A-star level sum as it can highly reduce search space.