Heuristics Planning Analysis

The computer used for this evaluate is Intel i5-7400 CPU @ 3.00GHz with 32 GB ram

Metrics for Non-heuristic planning searches

Problems air_cargo_1,2,3 are analysed with non-heuristic search, breath_first_search, breath_first_tree_search, depth_first_graph_search

Problem	Algorithm	Expansions	Goal Tests	New Nodes	Plan	Time
Air cargo 1	breath_first_search	43	56	180	6	0.0212704
Air cargo 1	breath_first_tree_search	1458	1459	5960	6	0.6591583
Air cargo 1	depth_first_graph_search	12	13	48	12	0.0054694
Air cargo 2	breath_first_search	3343	4609	30509	9	6.5994291
Air cargo 2	breath_first_tree_search	-	-	-	-	> 20 mins
Air cargo 2	depth_first_graph_search	1170	1171	10460	1104	6.9235766
Air cargo 3	breath_first_search	14663	18098	129631	12	32.8395247
Air cargo 3	breath_first_tree_search	-	-	-	-	> 20 mins
Air cargo 3	depth_first_graph_search	592	593	4927	571	2.4648877

Metrics for A* searches

Problems air_cargo_1,2,3 are analysed with heuristic search, astar_search h_1, astar_search h_ignore_preconditions, astar_search h_pg_levelsum

Problem	Algorithm	Expansions	Goal Tests	New Nodes	Plan	Time
Air cargo 1	astar_search h_1	55	57	224	6	0.0249638
Air cargo 1	astar_search h_ignore_preconditions	41	43	170	6	0.0563573
Air cargo 1	astar_search h_pg_levelsum	39	41	161	6	0.9335388
Air cargo 2	astar_search h_1	4849	4851	44001	9	9.1497729
Air cargo 2	astar_search h_ignore_preconditions	1443	1445	13234	9	3.9777611
Air cargo 2	astar_search h_pg_levelsum	3456	3458	31890	9	492.7057724
Air cargo 3	astar_search h_1	18235	18237	159716	12	39.6152831
Air cargo 3	astar_search h_ignore_preconditions	4945	4947	43991	12	14.9142144
Air cargo 3	astar_search h_pg_levelsum	-	-	-	-	> 20 mins

Evaluation

For problem air_cargo_1, all the heuristic searches have reached the optimal path while astar_search h_ignore_preconditions has completed in fastest time. Only one non-heuristic search did not reach optimal path is the depth_first_graph_search but noticeably has completed in all the fastest time among all the searches.

For problem air_cargo_2, all the heuristic searches have reached the optimal path while breath_first_tree_search from the non-heuristic search was not able to complete the test. Even depth_first_graph_search has completed the

test, however it did not reach the optimal path. Once again, heuristic search astar_search h_ignore_preconditions was fastest among all the optimal solutions.

For problem air_cargo_3, not all of the heuristic and non-heuristic searches were able to complete the test. The breath_first_tree_search was again not able to complete the test while depth_first_graph_search did not reach the optimal plan but it was fastest among all. The astar_search h_pg_levelsum was the only test not able to complete the test in heuristic search while astar_search h_ignore_preconditions and astar_search h_1 have both reach the optimal plan. The astar_search h_ignore_preconditions again was the fastest solutions.

In net, heuristic searches are more stable to reach optimal plan and able to complete the test while non-heuristic searches might not reach the optimal plan or complete the test, but it has yielded the fastest time out of all the test. Out of all astar_search h_ignore_preconditions is the best solutions to reach optimal plan and fastest time out of all the solutions.