This is a short summary of the results of running non-heuristic and A* searches on planning problems air_cargo_p1, air_cargo_p2, and air_cargo_p3.

First, we present one instance of an optimal solution for each of the problems. An instance of an optimal solution (length 6) for air_cargo_p1 is

1. Load(C1, P1, SFO)
2. Load(C2, P2, JFK)
3. Fly(P2, JFK, SFO)
4. Unload(C2, P2, SFO)
5. Fly(P1, SFO, JFK)
6. Unload(C1, P1, JFK)

An instance of an optimal solution (length 9) for air_cargo_p2 is

1. Load(C1, P1, SFO)
2. Load(C2, P2, JFK)
3. Load(C3, P3, ATL)
4. Fly(P2, JFK, SFO)
5. Unload(C2, P2, SFO)
6. Fly(P1, SFO, JFK)
7. Unload(C1, P1, JFK)
8. Fly(P3, ATL, SFO)
9. Unload(C3, P3, SFO)

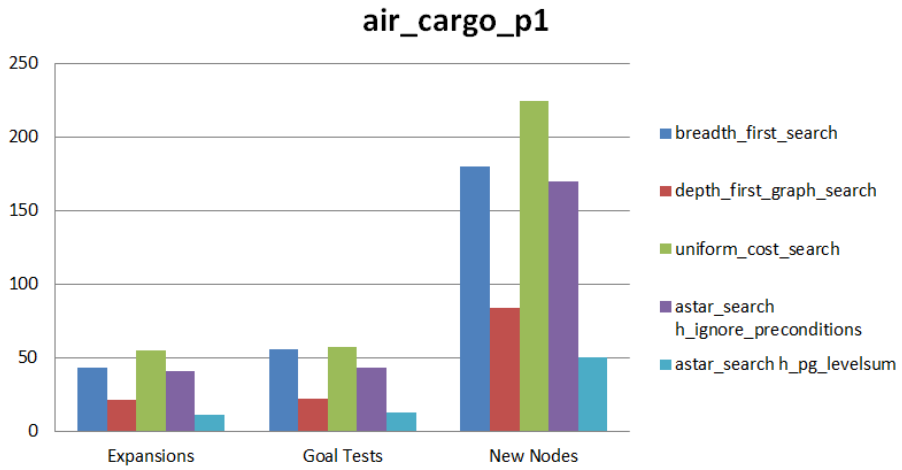
An instance of an optimal solution (length 12) for air_cargo_p3 is

1. Load(C1, P1, SFO)
2. Load(C2, P2, JFK)
3. Fly(P2, JFK, ORD)
4. Load(C4, P2, ORD)
5. Fly(P1, SFO, ATL)
6. Load(C3, P1, ATL)
7. Fly(P1, ATL, JFK)

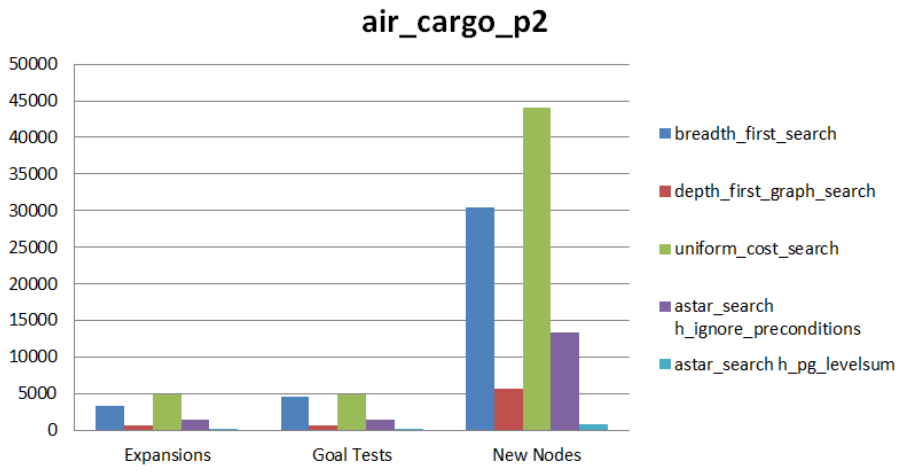
8. Unload(C1, P1, JFK)
9. Unload(C3, P1, JFK)
10. Fly(P2, ORD, SFO)
11. Unload(C2, P2, SFO)
12. Unload(C4, P2, SFO)

Next, we show metrics for different uninformed (breadth first search, depth first search, uniform cost search) and A* (with heuristics ignore_precond and levelsum) planning searches.

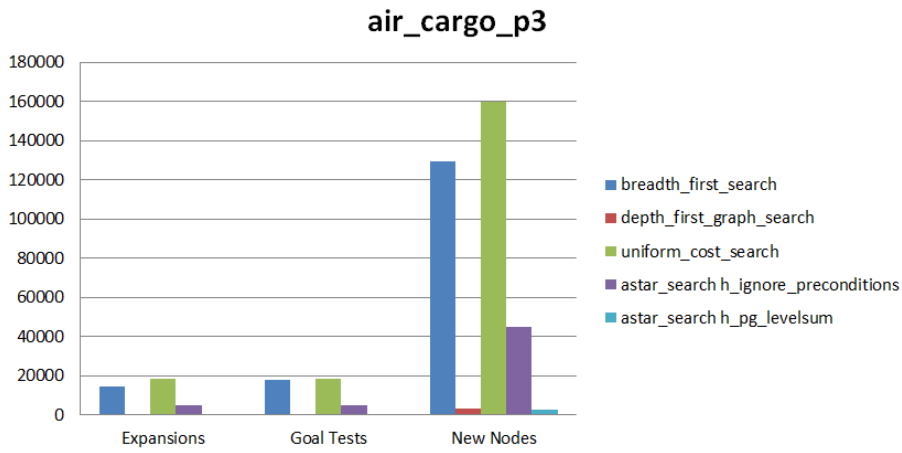
air_cargo_p1	Expansions	Goal Tests	New Nodes
breadth_first_search	43	56	180
depth_first_search	21	22	84
uniform_cost_search	55	57	224
astar h_ignore_precond	41	43	170
astar h_pg_levelsum	11	13	50



air_cargo_p2	Expansions	Goal Tests	New Nodes
breadth_first_search	3343	4609	30509
depth_first_search	624	625	5602
uniform_cost_search	4852	4854	44030
astar h_ignore_precond	1450	1452	13303
astar h_pg_levelsum	86	88	841



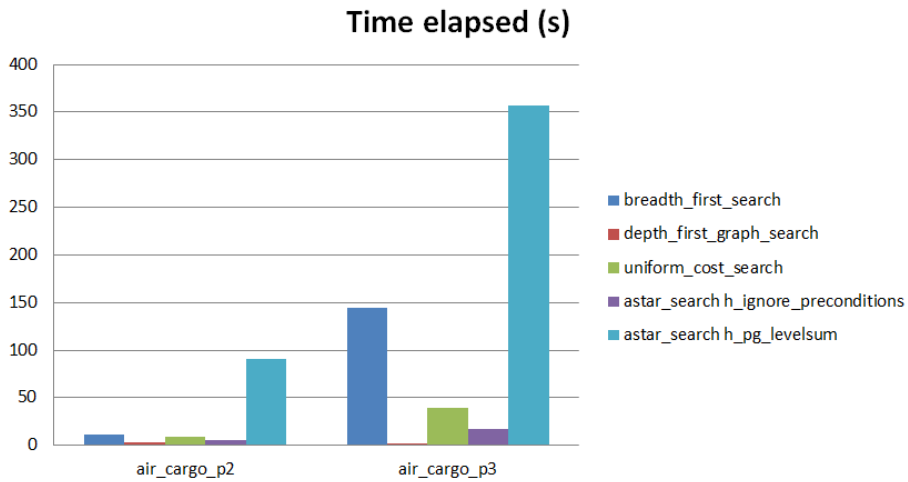
air_cargo_p3	Expansions	Goal Tests	New Nodes
breadth_first_search	14663	18098	129631
depth_first_search	408	409	3364
uniform_cost_search	18234	18236	159707
astar h_ignore_precond	5040	5042	44944
astar h_pg_levelsum	318	320	2934



Time elapsed for each search is expressed in seconds. Graph only shows

elapsed times for problems air_cargo_p2 and air_cargo_p3 since all the searches on air_cargo_p1 finished in under one second.

Time(s)	air_cargo_p1	air_cargo_p2	air_cargo_p3
breadth_first_search	0,0229	11,6106	144,2118
depth_first_search	0,012	3,0959	1,6119
uniform_cost_search	0,0272	8,7258	38,8938
astar h_ignore_precond	0,026	5,1328	17,1431
astar h_pg_levelsum	0,7579	90,2429	356,6258



For all three problems, depth first search was the only search method which didn't result in a solution of optimal length. A* search with levelsum heuristic proved to be the best when it comes to the number of expansions, goal tests and new nodes, but it had the longest execution time of all the tested searches. Even though it never gave a solution of optimal length, depth first search was the fastest search.

In short, the results are in line with the characteristics of each search method. For uninformed search methods, breadth first search and uniform cost search always returned optimal solutions, but had worse space complexity than the depth first search. A* search with levelsum heuristic had the best space complexity, but the downside was the longest execution time.