

Performance Comparison

I ran all the 30 combinations of problems and search algorithm with a timeout of 15 minutes. Below table contains the results of the run. The table is sorted on Problem (color coded) and then time in seconds (fastest first).

Problem	Algorithm	Expansions	Goal Tests	New Nodes	Length	Time in seconds
Problem_1	greedy_best_first_graph_search--h_1	7	9	28	6	0.01
Problem_1	depth_first_graph_search	12	13	48	12	0.01
Problem_1	astar_search--h_ignore_preconditions	41	43	170	6	0.03
Problem_1	breadth_first_search	43	56	180	6	0.03
Problem_1	astar_search--h_1	55	57	224	6	0.04
Problem_1	uniform_cost_search	55	57	224	6	0.04
Problem_1	depth_limited_search	101	271	414	50	0.09
Problem_1	breadth_first_tree_search	1458	1459	5960	6	0.92
Problem_1	astar_search--h_pg_levelsum	11	13	50	6	1.09
Problem_1	recursive_best_first_search--h_1	4229	4230	17029	6	2.64
Problem_2	greedy_best_first_graph_search--h_1	998	1000	8982	21	2.40
Problem_2	astar_search--h_ignore_preconditions	1450	1452	13303	9	3.53
Problem_2	depth_first_graph_search	1124	1125	10017	1085	9.43
Problem_2	astar_search--h_1	4853	4855	44041	9	11.48
Problem_2	uniform_cost_search	4853	4855	44041	9	12.31
Problem_2	breadth_first_search	3346	4612	30534	9	14.61
Problem_2	astar_search--h_pg_levelsum	86	88	841	9	201.76
Problem_2	depth_limited_search	213491	1967093	1967471	50	891.29
Problem_2	breadth_first_tree_search	Timeout				
Problem_2	recursive_best_first_search--h_1	Timeout				
Problem_3	depth_first_graph_search	627	628	5176	596	3.22
Problem_3	astar_search--h_ignore_preconditions	5040	5042	44944	12	14.34
Problem_3	greedy_best_first_graph_search--h_1	5578	5580	49150	22	15.56
Problem_3	uniform_cost_search	18223	18225	159618	12	50.08

Problem_3	astar_search--h_1	18223	18225	159618	12	50.55
Problem_3	breadth_first_search	14663	18098	129631	12	103.75
Problem_3	astar_search--h_pg_levelsum	Timeout				
Problem_3	breadth_first_tree_search	Timeout				
Problem_3	depth_limited_search	Timeout				
Problem_3	recursive_best_first_search--h_1	Timeout				

Of the 30 cases, 6 cases could not complete within given time interval. breadth_first_tree_search and recursive_best_first_search--h_1 timedout for Air Cargo Problem 2. For Air Cargo Problem 3, astar_search--h_pg_levelsum, breadth_first_tree_search, depth_limited_search and recursive_best_first_search--h_1 timedout.

As per the analysis, greedy_best_first_graph_search--h_1 performed the best as it got an average Rank of 1.7 based on time taken for the three Air Cargo Problems. It was followed by depth_first_graph_search and astar_search--h_ignore_preconditions with average rank of 2.0 and 2.3 respectively.

	AVERAGE of Rank	COUNTA of Rank
greedy_best_first_graph_search--h_1	1.7	3
depth_first_graph_search	2.0	3
astar_search--h_ignore_preconditions	2.3	3
astar_search--h_1	4.7	3
uniform_cost_search	5.0	3
breadth_first_search	5.3	3
depth_limited_search	7.5	2
astar_search--h_pg_levelsum	8.0	2
breadth_first_tree_search	8.0	1
recursive_best_first_search--h_1	10.0	1

All three non-heuristic search algorithms, ie, breadth first, uniform cost search and depth first graph search, were able to find a solution to all the air cargo problems. Breadth first always considers the shortest path first [1] and as a result it finds a solution to the problem in a reasonable amount of time.

Depth first graph search does find a quick solution and requires a small amount of memory, but it lacks optimality. It is not optimal because it does not consider if a node is better than another, it simply explores the nodes that take it as deep as possible in the graph even if the goal is in another direction. For instance in Air Cargo Problem 3, it gave the fastest results but took 596 length; producing an un-optimal solution.

Performance of greedy algorithm came as a surprise to me but greedy algos can not be relied upon for very long worst case solutions.

Heuristic based search `astar_search--h_ignore_preconditions` and `astar_search--h1` performed decently well. Infact their performance rank was better in Problem 2 and 3 which indicates that as the complexity of problem increases heuristics becomes important.

Below table provides top two solutions by time:

Problem_1	greedy_best_first_graph_search--h_1	Load(C1, P1, SFO) Load(C2, P2, JFK) Fly(P1, SFO, JFK) Fly(P2, JFK, SFO) Unload(C1, P1, JFK) Unload(C2, P2, SFO)
Problem_1	depth_first_graph_search	Fly(P1, SFO, JFK) Fly(P2, JFK, SFO) Load(C1, P2, SFO) Fly(P2, SFO, JFK) Fly(P1, JFK, SFO) Unload(C1, P2, JFK) Fly(P2, JFK, SFO) Fly(P1, SFO, JFK) Load(C2, P1, JFK) Fly(P2, SFO, JFK) Fly(P1, JFK, SFO) Unload(C2, P1, SFO)

Problem_2	greedy_best_first_graph_search--h_1	Load(C1, P1, SFO) Load(C2, P2, JFK) Load(C3, P3, ATL) Fly(P1, SFO, ATL) Fly(P2, JFK, ATL) Fly(P3, ATL, JFK) Fly(P2, ATL, SFO) Unload(C2, P2, SFO) Fly(P2, SFO, ATL) Fly(P3, JFK, SFO) Load(C2, P3, SFO) Fly(P3, SFO, JFK) Fly(P1, ATL, JFK) Unload(C1, P1, JFK) Load(C1, P3, JFK) Fly(P1, JFK, ATL) Fly(P3, JFK, SFO) Unload(C3, P3, SFO) Unload(C2, P3, SFO) Fly(P3, SFO, JFK) Unload(C1, P3, JFK)
Problem_2	astar_search--h_ignore_preconditions	Load(C3, P3, ATL) Fly(P3, ATL, SFO) Unload(C3, P3, SFO) Load(C2, P2, JFK) Fly(P2, JFK, SFO) Unload(C2, P2, SFO) Load(C1, P1, SFO) Fly(P1, SFO, JFK) Unload(C1, P1, JFK)

Problem_3	depth_first_graph_search	Fly(P1, SFO, ORD) Fly(P2, JFK, ORD) Fly(P1, ORD, ATL) Fly(P2, ORD, ATL) Fly(P1, ATL, JFK) Fly(P2, ATL, SFO) Load(C1, P2, SFO) Fly(P2, SFO, ORD) Fly(P1, JFK, ORD) Fly(P2, ORD, ATL) Fly(P1, ORD, ATL) Fly(P2, ATL, JFK) Fly(P1, ATL, SFO) Unload(C1, P2, JFK) Fly(P1, SFO, ORD) Fly(P2, JFK, ORD) Fly(P1, ORD, ATL) Fly(P2, ORD, ATL) Fly(P1, ATL, JFK) Fly(P2, ATL, SFO) Load(C2, P1, JFK) Fly(P2, SFO, ORD) Fly(P1, JFK, ORD) Fly(P2, ORD, ATL) Fly(P1, ORD, ATL) Fly(P2, ATL, JFK) Fly(P1, ATL, SFO) Unload(C2, P1, SFO) Fly(P1, SFO, ORD) Fly(P2, JFK, ORD) Fly(P1, ORD, ATL) Fly(P2, ORD, ATL) Fly(P1, ATL, JFK) Fly(P2, ATL, SFO) Load(C2, P2, SFO) Fly(P2, SFO, ORD) Fly(P1, JFK, ORD) Fly(P2, ORD, ATL) Fly(P1, ORD, ATL) Fly(P2, ATL, JFK) Load(C3, P1, ATL) Fly(P1, ATL, ORD)
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		Fly(P2, JFK, ORD) Fly(P1, ORD, SFO) Fly(P2, ORD, ATL) Fly(P1, SFO, JFK) Fly(P2, ATL, SFO) Unload(C2, P2, SFO) Fly(P2, SFO, ORD) Fly(P1, JFK, ORD) Fly(P2, ORD, ATL) Fly(P1, ORD, SFO) Fly(P2, ATL, JFK) Fly(P1, SFO, ATL) Load(C1, P2, JFK) Fly(P1, ATL, ORD) Fly(P2, JFK, ORD) Fly(P1, ORD, SFO) Fly(P2, ORD, ATL) Fly(P1, SFO, JFK) Fly(P2, ATL, SFO) Unload(C1, P2, SFO) Fly(P2, SFO, ORD) Fly(P1, JFK, ORD) Fly(P2, ORD, ATL) Fly(P1, ORD, ATL) Fly(P2, ATL, JFK) Fly(P1, ATL, SFO) Unload(C3, P1, SFO) Fly(P1, SFO, ORD) Fly(P2, JFK, ORD) Fly(P1, ORD, ATL) Fly(P2, ORD, ATL) Fly(P1, ATL, JFK) Fly(P2, ATL, SFO) Load(C3, P2, SFO) Fly(P2, SFO, ORD) Fly(P1, JFK, ORD) Fly(P2, ORD, ATL) Fly(P1, ORD, ATL) Fly(P2, ATL, JFK) Fly(P1, ATL, SFO) Unload(C3, P2, JFK) Fly(P1, SFO, ORD)
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		Fly(P2, JFK, ORD) Fly(P1, ORD, ATL) Fly(P2, ORD, SFO) Load(C2, P2, SFO) Fly(P1, ATL, ORD) Fly(P2, SFO, ORD) Fly(P1, ORD, SFO) Fly(P2, ORD, ATL) Fly(P1, SFO, JFK) Fly(P2, ATL, JFK) Unload(C2, P2, JFK) Fly(P2, JFK, ORD) Fly(P1, JFK, ORD) Fly(P2, ORD, ATL) Fly(P1, ORD, ATL) Fly(P2, ATL, SFO) Fly(P1, ATL, SFO) Load(C1, P2, SFO) Fly(P2, SFO, ORD) Fly(P1, SFO, ORD) Fly(P2, ORD, ATL) Fly(P1, ORD, ATL) Fly(P2, ATL, JFK) Fly(P1, ATL, JFK) Unload(C1, P2, JFK) Fly(P2, JFK, ORD) Fly(P1, JFK, ORD) Fly(P2, ORD, ATL) Load(C4, P1, ORD) Fly(P1, ORD, ATL) Fly(P2, ATL, ORD) Fly(P1, ATL, SFO) Fly(P2, ORD, SFO) Fly(P1, SFO, JFK) Fly(P2, SFO, JFK) Unload(C4, P1, JFK) Fly(P2, JFK, ORD) Load(C3, P1, JFK) Fly(P2, ORD, ATL) Fly(P1, JFK, ORD) Fly(P2, ATL, SFO) Fly(P1, ORD, ATL)
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		Fly(P2, SFO, JFK) Fly(P1, ATL, SFO) Unload(C3, P1, SFO) Fly(P1, SFO, ORD) Fly(P2, JFK, ORD) Fly(P1, ORD, ATL) Fly(P2, ORD, ATL) Fly(P1, ATL, JFK) Fly(P2, ATL, SFO) Load(C3, P2, SFO) Fly(P2, SFO, ORD) Fly(P1, JFK, ORD) Fly(P2, ORD, ATL) Fly(P1, ORD, ATL) Fly(P2, ATL, JFK) Fly(P1, ATL, SFO) Load(C4, P2, JFK) Fly(P1, SFO, ORD) Fly(P2, JFK, ORD) Fly(P1, ORD, ATL) Fly(P2, ORD, ATL) Fly(P1, ATL, JFK) Fly(P2, ATL, SFO) Unload(C4, P2, SFO) Fly(P2, SFO, ORD) Fly(P1, JFK, ORD) Fly(P2, ORD, ATL) Fly(P1, ORD, ATL) Fly(P2, ATL, JFK) Fly(P1, ATL, SFO) Unload(C3, P2, JFK) Fly(P1, SFO, ORD) Fly(P2, JFK, ORD) Fly(P1, ORD, ATL) Fly(P2, ORD, ATL) Fly(P1, ATL, JFK) Fly(P2, ATL, SFO) Load(C4, P2, SFO) Fly(P2, SFO, ATL) Fly(P1, JFK, ORD) Unload(C4, P2, ATL) Fly(P1, ORD, SFO)
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		Fly(P2, ATL, ORD) Fly(P1, SFO, JFK) Fly(P2, ORD, SFO) Fly(P1, JFK, ATL) Fly(P2, SFO, JFK) Load(C3, P2, JFK) Fly(P1, ATL, ORD) Fly(P2, JFK, ORD) Fly(P1, ORD, SFO) Fly(P2, ORD, ATL) Unload(C3, P2, ATL) Fly(P2, ATL, ORD) Fly(P1, SFO, ORD) Fly(P2, ORD, SFO) Fly(P1, ORD, ATL) Fly(P2, SFO, JFK) Fly(P1, ATL, JFK) Load(C2, P2, JFK) Fly(P2, JFK, ORD) Fly(P1, JFK, ORD) Fly(P2, ORD, ATL) Fly(P1, ORD, ATL) Fly(P2, ATL, SFO) Fly(P1, ATL, SFO) Unload(C2, P2, SFO) Fly(P2, SFO, ORD) Fly(P1, SFO, ORD) Fly(P2, ORD, ATL) Fly(P1, ORD, ATL) Fly(P2, ATL, JFK) Fly(P1, ATL, JFK) Load(C1, P2, JFK) Fly(P2, JFK, ORD) Fly(P1, JFK, ORD) Fly(P2, ORD, ATL) Fly(P1, ORD, ATL) Fly(P2, ATL, SFO) Fly(P1, ATL, SFO) Unload(C1, P2, SFO) Fly(P2, SFO, ORD) Fly(P1, SFO, ORD) Fly(P2, ORD, ATL)
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		Fly(P1, ORD, ATL) Fly(P2, ATL, JFK) Load(C4, P1, ATL) Fly(P1, ATL, ORD) Fly(P2, JFK, ORD) Fly(P1, ORD, SFO) Fly(P2, ORD, ATL) Fly(P1, SFO, JFK) Fly(P2, ATL, SFO) Unload(C4, P1, JFK) Fly(P2, SFO, ORD) Fly(P1, JFK, ORD) Fly(P2, ORD, ATL) Fly(P1, ORD, ATL) Fly(P2, ATL, JFK) Fly(P1, ATL, SFO) Load(C2, P1, SFO) Fly(P1, SFO, ORD) Fly(P2, JFK, ORD) Fly(P1, ORD, ATL) Fly(P2, ORD, ATL) Fly(P1, ATL, JFK) Fly(P2, ATL, SFO) Unload(C2, P1, JFK) Fly(P2, SFO, ORD) Fly(P1, JFK, ORD) Fly(P2, ORD, ATL) Fly(P1, ORD, ATL) Fly(P2, ATL, JFK) Fly(P1, ATL, SFO) Load(C1, P1, SFO) Fly(P1, SFO, ORD) Fly(P2, JFK, ORD) Fly(P1, ORD, ATL) Fly(P2, ORD, ATL) Fly(P1, ATL, JFK) Fly(P2, ATL, SFO) Unload(C1, P1, JFK) Fly(P2, SFO, ORD) Fly(P1, JFK, ORD) Fly(P2, ORD, JFK) Fly(P1, ORD, SFO)
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		Load(C4, P2, JFK) Fly(P1, SFO, ATL) Fly(P2, JFK, SFO) Fly(P1, ATL, ORD) Unload(C4, P2, SFO) Fly(P1, ORD, SFO) Fly(P2, SFO, ORD) Fly(P1, SFO, ATL) Fly(P2, ORD, JFK) Fly(P1, ATL, JFK) Fly(P2, JFK, ATL) Load(C2, P1, JFK) Fly(P2, ATL, ORD) Fly(P1, JFK, ORD) Fly(P2, ORD, SFO) Fly(P1, ORD, ATL) Fly(P2, SFO, JFK) Fly(P1, ATL, SFO) Unload(C2, P1, SFO) Fly(P1, SFO, ORD) Fly(P2, JFK, ORD) Fly(P1, ORD, ATL) Fly(P2, ORD, ATL) Fly(P1, ATL, JFK) Fly(P2, ATL, SFO) Load(C4, P2, SFO) Fly(P2, SFO, ORD) Fly(P1, JFK, SFO) Fly(P2, ORD, ATL) Load(C3, P2, ATL) Fly(P2, ATL, ORD) Fly(P1, SFO, ORD) Fly(P2, ORD, SFO) Fly(P1, ORD, ATL) Fly(P2, SFO, JFK) Fly(P1, ATL, JFK) Unload(C4, P2, JFK) Fly(P2, JFK, ORD) Fly(P1, JFK, ORD) Fly(P2, ORD, ATL) Fly(P1, ORD, ATL) Fly(P2, ATL, SFO)
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		Fly(P1, ATL, SFO) Unload(C3, P2, SFO) Fly(P2, SFO, ORD) Fly(P1, SFO, ORD) Fly(P2, ORD, ATL) Fly(P1, ORD, ATL) Fly(P2, ATL, JFK) Fly(P1, ATL, JFK) Load(C4, P2, JFK) Fly(P2, JFK, ORD) Fly(P1, JFK, ORD) Fly(P2, ORD, ATL) Fly(P1, ORD, ATL) Unload(C4, P2, ATL) Fly(P2, ATL, ORD) Fly(P1, ATL, ORD) Fly(P2, ORD, SFO) Fly(P1, ORD, SFO) Fly(P2, SFO, JFK) Fly(P1, SFO, JFK) Load(C1, P2, JFK) Fly(P2, JFK, ORD) Fly(P1, JFK, ORD) Fly(P2, ORD, ATL) Fly(P1, ORD, ATL) Fly(P2, ATL, SFO) Fly(P1, ATL, SFO) Unload(C1, P2, SFO) Fly(P2, SFO, ORD) Fly(P1, SFO, ORD) Fly(P2, ORD, ATL) Fly(P1, ORD, ATL) Fly(P2, ATL, JFK) Load(C4, P1, ATL) Fly(P1, ATL, SFO) Fly(P2, JFK, ORD) Fly(P1, SFO, JFK) Fly(P2, ORD, ATL) Fly(P1, JFK, ORD) Fly(P2, ATL, SFO) Load(C3, P2, SFO) Fly(P1, ORD, ATL)
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		Fly(P2, SFO, ORD) Fly(P1, ATL, SFO) Fly(P2, ORD, JFK) Fly(P1, SFO, JFK) Unload(C3, P2, JFK) Fly(P2, JFK, ORD) Fly(P1, JFK, ATL) Fly(P2, ORD, ATL) Fly(P1, ATL, ORD) Fly(P2, ATL, SFO) Fly(P1, ORD, SFO) Unload(C4, P1, SFO) Fly(P2, SFO, ORD) Fly(P1, SFO, ORD) Fly(P2, ORD, ATL) Fly(P1, ORD, ATL) Fly(P2, ATL, JFK) Fly(P1, ATL, JFK) Load(C3, P2, JFK) Fly(P2, JFK, ORD) Fly(P1, JFK, ORD) Fly(P2, ORD, ATL) Fly(P1, ORD, ATL) Fly(P2, ATL, SFO) Fly(P1, ATL, SFO) Unload(C3, P2, SFO) Fly(P1, SFO, ORD) Load(C4, P2, SFO) Fly(P1, ORD, ATL) Fly(P2, SFO, JFK) Fly(P1, ATL, SFO) Fly(P2, JFK, ORD) Load(C3, P1, SFO) Fly(P2, ORD, ATL) Fly(P1, SFO, ORD) Fly(P2, ATL, SFO) Fly(P1, ORD, ATL) Fly(P2, SFO, JFK) Fly(P1, ATL, JFK) Unload(C4, P2, JFK) Fly(P2, JFK, ORD) Fly(P1, JFK, ORD)
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		Fly(P2, ORD, ATL) Fly(P1, ORD, SFO) Fly(P2, ATL, SFO) Fly(P1, SFO, ATL) Load(C2, P2, SFO) Fly(P1, ATL, ORD) Fly(P2, SFO, ORD) Fly(P1, ORD, SFO) Fly(P2, ORD, ATL) Fly(P1, SFO, JFK) Fly(P2, ATL, JFK) Unload(C2, P2, JFK) Fly(P2, JFK, ORD) Fly(P1, JFK, ORD) Fly(P2, ORD, ATL) Fly(P1, ORD, SFO) Fly(P2, ATL, SFO) Fly(P1, SFO, ATL) Load(C1, P2, SFO) Fly(P1, ATL, ORD) Fly(P2, SFO, ORD) Fly(P1, ORD, SFO) Fly(P2, ORD, ATL) Fly(P1, SFO, JFK) Fly(P2, ATL, JFK) Load(C4, P2, JFK) Fly(P2, JFK, ORD) Fly(P1, JFK, ORD) Fly(P2, ORD, ATL) Fly(P1, ORD, ATL) Fly(P2, ATL, SFO) Fly(P1, ATL, SFO) Unload(C4, P2, SFO) Fly(P2, SFO, ORD) Fly(P1, SFO, ORD) Fly(P2, ORD, ATL) Fly(P1, ORD, ATL) Fly(P2, ATL, JFK) Fly(P1, ATL, JFK) Unload(C1, P2, JFK) Fly(P2, JFK, ORD) Fly(P1, JFK, ORD)
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		Fly(P2, ORD, ATL) Fly(P1, ORD, ATL) Fly(P2, ATL, SFO) Fly(P1, ATL, SFO) Unload(C3, P1, SFO) Fly(P2, SFO, ORD) Fly(P1, SFO, ORD) Fly(P2, ORD, ATL) Fly(P1, ORD, ATL) Fly(P2, ATL, JFK) Fly(P1, ATL, JFK) Load(C2, P2, JFK) Fly(P2, JFK, ORD) Fly(P1, JFK, ORD) Fly(P2, ORD, ATL) Fly(P1, ORD, ATL) Fly(P2, ATL, SFO) Fly(P1, ATL, SFO) Unload(C2, P2, SFO) Fly(P2, SFO, ORD) Fly(P1, SFO, ORD) Fly(P2, ORD, ATL) Fly(P1, ORD, ATL) Fly(P2, ATL, JFK) Fly(P1, ATL, JFK) Load(C1, P2, JFK) Fly(P2, JFK, ORD) Fly(P1, JFK, ORD) Fly(P2, ORD, ATL) Fly(P1, ORD, ATL) Fly(P2, ATL, SFO) Load(C2, P2, SFO) Fly(P1, ATL, ORD) Fly(P2, SFO, ORD) Fly(P1, ORD, SFO) Fly(P2, ORD, ATL) Fly(P1, SFO, JFK) Unload(C2, P2, ATL) Fly(P2, ATL, ORD) Fly(P1, JFK, ORD) Fly(P2, ORD, SFO) Fly(P1, ORD, ATL)
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		Fly(P2, SFO, JFK) Fly(P1, ATL, SFO) Unload(C1, P2, JFK) Fly(P1, SFO, ORD) Fly(P2, JFK, ORD) Fly(P1, ORD, ATL) Fly(P2, ORD, SFO) Fly(P1, ATL, JFK) Fly(P2, SFO, ATL) Load(C1, P1, JFK) Fly(P2, ATL, ORD) Fly(P1, JFK, ORD) Fly(P2, ORD, SFO) Fly(P1, ORD, ATL) Fly(P2, SFO, JFK) Fly(P1, ATL, SFO) Unload(C1, P1, SFO) Fly(P1, SFO, ORD) Fly(P2, JFK, ORD) Fly(P1, ORD, ATL) Fly(P2, ORD, ATL) Fly(P1, ATL, JFK) Fly(P2, ATL, SFO) Load(C4, P2, SFO) Fly(P2, SFO, ORD) Fly(P1, JFK, ORD) Fly(P2, ORD, ATL) Fly(P1, ORD, ATL) Fly(P2, ATL, JFK) Fly(P1, ATL, SFO) Unload(C4, P2, JFK) Fly(P1, SFO, ORD) Fly(P2, JFK, ORD) Fly(P1, ORD, ATL) Fly(P2, ORD, ATL) Fly(P1, ATL, JFK) Fly(P2, ATL, SFO) Load(C3, P2, SFO) Fly(P2, SFO, ORD) Fly(P1, JFK, ORD) Fly(P2, ORD, ATL) Fly(P1, ORD, ATL)
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		Fly(P2, ATL, JFK) Fly(P1, ATL, SFO) Unload(C3, P2, JFK) Fly(P1, SFO, ORD) Fly(P2, JFK, ORD) Fly(P1, ORD, ATL) Fly(P2, ORD, ATL) Fly(P1, ATL, JFK) Fly(P2, ATL, SFO) Load(C1, P2, SFO) Fly(P2, SFO, ORD) Fly(P1, JFK, ORD) Fly(P2, ORD, ATL) Fly(P1, ORD, ATL) Fly(P2, ATL, JFK) Fly(P1, ATL, SFO) Unload(C1, P2, JFK) Fly(P1, SFO, ORD) Fly(P2, JFK, ORD) Fly(P1, ORD, ATL) Fly(P2, ORD, ATL) Fly(P1, ATL, JFK) Fly(P2, ATL, SFO) Load(C4, P1, JFK) Fly(P2, SFO, ORD) Fly(P1, JFK, ORD) Fly(P2, ORD, ATL) Fly(P1, ORD, ATL) Fly(P2, ATL, JFK) Fly(P1, ATL, SFO) Unload(C4, P1, SFO) Fly(P1, SFO, ORD) Fly(P2, JFK, ORD) Fly(P1, ORD, ATL) Fly(P2, ORD, ATL) Fly(P1, ATL, JFK) Fly(P2, ATL, SFO) Load(C4, P2, SFO) Fly(P2, SFO, ORD) Fly(P1, JFK, ORD) Fly(P2, ORD, ATL) Fly(P1, ORD, ATL)
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		Fly(P2, ATL, JFK) Load(C2, P1, ATL) Fly(P1, ATL, ORD) Fly(P2, JFK, ORD) Fly(P1, ORD, SFO) Fly(P2, ORD, ATL) Unload(C4, P2, ATL) Fly(P2, ATL, ORD) Fly(P1, SFO, ORD) Fly(P2, ORD, SFO) Fly(P1, ORD, ATL) Fly(P2, SFO, JFK) Fly(P1, ATL, JFK) Load(C3, P2, JFK) Fly(P2, JFK, ORD) Fly(P1, JFK, ORD) Fly(P2, ORD, ATL) Fly(P1, ORD, ATL) Fly(P2, ATL, SFO) Unload(C2, P1, ATL) Fly(P1, ATL, ORD) Fly(P2, SFO, ORD) Fly(P1, ORD, SFO) Fly(P2, ORD, ATL) Fly(P1, SFO, JFK) Fly(P2, ATL, JFK) Unload(C3, P2, JFK) Fly(P2, JFK, ORD) Fly(P1, JFK, ORD) Fly(P2, ORD, SFO) Fly(P1, ORD, SFO) Fly(P2, SFO, ATL) Load(C2, P2, ATL) Fly(P2, ATL, ORD) Fly(P1, SFO, ORD) Fly(P2, ORD, SFO) Fly(P1, ORD, ATL) Unload(C2, P2, SFO) Fly(P1, ATL, SFO) Fly(P2, SFO, JFK) Fly(P1, SFO, ORD) Fly(P2, JFK, ORD)
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		Fly(P1, ORD, JFK) Fly(P2, ORD, ATL) Load(C4, P2, ATL) Fly(P2, ATL, ORD) Fly(P1, JFK, ORD) Fly(P2, ORD, SFO) Fly(P1, ORD, ATL) Unload(C4, P2, SFO)
Problem_3	astar_search--h_ignore_preconditions	Load(C2, P2, JFK) Fly(P2, JFK, ORD) Load(C4, P2, ORD) Fly(P2, ORD, SFO) Unload(C4, P2, SFO) Load(C1, P1, SFO) Fly(P1, SFO, ATL) Load(C3, P1, ATL) Fly(P1, ATL, JFK) Unload(C3, P1, JFK) Unload(C2, P2, SFO) Unload(C1, P1, JFK)

Reference

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