

Planning search

Metrics description for non-heuristic planning solution searches

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Tests summary

In total three non-heuristics planning solutions were tested, each on three cargo transfer tasks defined in project briefing. Those solutions are: breadth-first search, depth-first-search and uniform cost search. All test runs finished successfully, exact solutions found, runtime required and some related info provided in relevant sections of this document. By the construction of the algorithm breadth-first search and uniform cost search produced optimal solutions in terms of operations length for the path. Depth-first search produced significantly longer non-optimal paths for all test cases.

Breadth-first search

Air Cargo Problem 1

Expansions	Goal Tests	New Nodes
43	56	180

Plan length: 6 Time elapsed in seconds: 0.045186803331299104

Plan produced:

Load(C1, SFO, P1), Load(C2, JFK, P2), Fly(P2, JFK, SFO), Unload(C2, SFO, P2), Fly(P1, SFO, JFK), Unload(C1, JFK, P1)

Air Cargo problem 2

Expansions	Goal Tests	New Nodes
3346	4612	30534

Plan length: 9 Time elapsed in seconds: 17.151455844655164

Plan produced:

Load(C1, SFO, P1), Load(C2, JFK, P2), Load(C3, ATL, P3), Fly(P1, SFO, JFK), Unload(C1, JFK, P1), Fly(P2, JFK, SFO), Unload(C2, SFO, P2), Fly(P3, ATL, SFO), Unload(C3, SFO, P3)

Air Cargo Problem 3

Expansions	Goal Tests	New Nodes
14120	17673	124926

Plan length: 12 Time elapsed in seconds: 172.5876692353786

Plan produced:

Load(C1, SFO, P1), Load(C2, JFK, P2), Fly(P1, SFO, ATL), Load(C3, ATL, P1), Fly(P2, JFK, ORD), Load(C4, ORD, P2), Fly(P1, ATL, JFK), Unload(C1, JFK, P1), Unload(C3, JFK, P1), Fly(P2, ORD, SFO), Unload(C2, SFO, P2), Unload(C4, SFO, P2)

Depth first search

Air Cargo Problem 2

Expansions	Goal Tests	New Nodes
21	22	84

Plan length: 20 Time elapsed in seconds: 0.028018328618808784

Plan produced:

Fly(P1, SFO, JFK), Fly(P2, JFK, SFO), Load(C2, JFK, P1), Fly(P1, JFK, SFO), Fly(P2, SFO, JFK), Unload(C2, SFO, P1), Fly(P1, SFO, JFK), Fly(P2, JFK, SFO), Load(C2, SFO, P2), Fly(P1, JFK, SFO), Load(C1, SFO, P2), Fly(P2, SFO, JFK), Fly(P1, SFO, JFK), Unload(C2, JFK, P2), Unload(C1, JFK, P2), Fly(P2, JFK, SFO), Load(C2, JFK, P1), Fly(P1, JFK, SFO), Fly(P2, SFO, JFK), Unload(C2, SFO, P1)

Air Cargo Problem 3

Expansions	Goal Tests	New Nodes
292	293	2388

Plan length: 288 Time elapsed in seconds: 1.532692063256472

Plan produced:

Fly(P2, JFK, ORD), Fly(P1, SFO, ORD), Fly(P2, ORD, ATL), Fly(P1, ORD, ATL), Fly(P2, ATL, SFO), Fly(P1, ATL, JFK), Load(C2, JFK, P1), Fly(P1, JFK, ORD), Fly(P2, SFO, ORD), Fly(P1, ORD, ATL), Fly(P2, ORD, ATL), Fly(P1, ATL, SFO), Fly(P2, ATL, JFK), Unload(C2, SFO, P1), Fly(P2, JFK, ORD), Fly(P1, SFO, ORD), Fly(P2, ORD, ATL), Fly(P1, ORD, ATL), Fly(P2, ATL, SFO), Fly(P1, ATL, JFK), Load(C2, SFO, P2), Fly(P1, JFK, ORD), Fly(P2, SFO, ORD), Fly(P1, ORD, ATL), Fly(P2, ORD, ATL), Fly(P1, ATL, SFO), Unload(C2, ATL, P2), Fly(P2, ATL, ORD), Fly(P1, SFO, ORD), Fly(P2, ORD, JFK), Fly(P1, ORD, ATL), Fly(P2, JFK, SFO), Fly(P1, ATL, JFK), Load(C1, SFO, P2), Fly(P1, JFK, ORD), Fly(P2, SFO, ORD), Fly(P1, ORD, ATL), Fly(P2, ORD, ATL), Fly(P1, ATL, SFO), Fly(P2, ATL, JFK), Unload(C1, JFK, P2), Fly(P2, JFK, ORD), Fly(P1, SFO, ORD), Fly(P2, ORD, ATL), Fly(P1, ORD, ATL), Fly(P2, ATL, SFO), Fly(P1, ATL, JFK), Load(C1, JFK, P1), Fly(P1, JFK, ORD), Fly(P2, SFO, ORD), Fly(P1, ORD, ATL), Fly(P2, ORD, ATL), Load(C3, ATL, P2), Fly(P2, ATL, ORD), Fly(P1, ATL, ORD), Fly(P2, ORD, JFK), Fly(P1, ORD, JFK), Fly(P2, JFK, SFO), Fly(P1, JFK, SFO), Unload(C3, SFO, P2), Fly(P2, SFO, ORD), Fly(P1, SFO, ORD), Fly(P2, ORD, ATL), Fly(P1, ORD, ATL), Fly(P2, ATL, JFK),

Expansions	Goal Tests	New Nodes
55	57	224

Plan length: 6 Time elapsed in seconds: 0.09636143442600302

Plan produced:

Load(C1, SFO, P1), Load(C2, JFK, P2), Fly(P1, SFO, JFK), Fly(P2, JFK, SFO), Unload(C1, JFK, P1), Unload(C2, SFO, P2)

Air Cargo Problem 2

Expansions	Goal Tests	New Nodes
4853	4855	44041

Plan length: 9 Time elapsed in seconds: 22.710844643323785 Load(C1, SFO, P1), Fly(P1, SFO, JFK), Load(C2, JFK, P2), Fly(P2, JFK, SFO), Load(C3, ATL, P3), Fly(P3, ATL, SFO), Unload(C3, SFO, P3), Unload(C2, SFO, P2), Unload(C1, JFK, P1)

Air Cargo Problem 3

Expansions	Goal Tests	New Nodes
18233	18235	159697

Plan length: 12 Time elapsed in seconds: 109.60073753427338 Load(C1, SFO, P1), Fly(P1, SFO, ATL), Load(C2, JFK, P2), Fly(P2, JFK, ORD), Load(C3, ATL, P1), Load(C4, ORD, P2), Fly(P2, ORD, SFO), Unload(C4, SFO, P2), Fly(P1, ATL, JFK), Unload(C3, JFK, P1), Unload(C2, SFO, P2), Unload(C1, JFK, P1)