Solving Air Cargo Problem 1 using breadth\_first\_search...

Expansions Goal Tests New Nodes

43 56 180

Plan length: 6 Time elapsed in seconds: 0.031114676000470354

Load(C2, P2, JFK)

Load(C1, P1, SFO)

Fly(P2, JFK, SFO)

Unload(C2, P2, SFO)

Fly(P1, SFO, JFK)

Unload(C1, P1, JFK)

---

Solving Air Cargo Problem 1 using breadth\_first\_tree\_search...

Expansions Goal Tests New Nodes

1458 1459 5960

Plan length: 6 Time elapsed in seconds: 0.9585413770000741

Load(C2, P2, JFK)

Load(C1, P1, SFO)

Fly(P2, JFK, SFO)

Unload(C2, P2, SFO)

Fly(P1, SFO, JFK)

Unload(C1, P1, JFK)

---

Solving Air Cargo Problem 1 using depth\_first\_graph\_search...

Expansions Goal Tests New Nodes

12 13 48

Plan length: 12 Time elapsed in seconds: 0.008025950999581255

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)

---

Solving Air Cargo Problem 1 using depth\_limited\_search...

Expansions Goal Tests New Nodes

101 271 414

Plan length: 50 Time elapsed in seconds: 0.09673362499961513

Load(C2, P2, JFK)

Load(C1, P1, SFO)

Unload(C2, P2, JFK)

Load(C2, P2, JFK)

Unload(C2, P2, JFK)

Load(C2, P2, JFK)

…

…

…

---

Solving Air Cargo Problem 1 using uniform\_cost\_search...

Expansions Goal Tests New Nodes

55 57 224

Plan length: 6 Time elapsed in seconds: 0.038539630999821384

Load(C1, P1, SFO)

Load(C2, P2, JFK)

Fly(P1, SFO, JFK)

Fly(P2, JFK, SFO)

Unload(C1, P1, JFK)

Unload(C2, P2, SFO)

---

Solving Air Cargo Problem 1 using recursive\_best\_first\_search with h\_1...

Expansions Goal Tests New Nodes

4229 4230 17029

Plan length: 6 Time elapsed in seconds: 2.8106302940000205

Load(C1, P1, SFO)

Load(C2, P2, JFK)

Fly(P2, JFK, SFO)

Unload(C2, P2, SFO)

Fly(P1, SFO, JFK)

Unload(C1, P1, JFK)

---

Solving Air Cargo Problem 1 using greedy\_best\_first\_graph\_search with h\_1...

Expansions Goal Tests New Nodes

7 9 28

Plan length: 6 Time elapsed in seconds: 0.005094423999707942

Load(C1, P1, SFO)

Load(C2, P2, JFK)

Fly(P1, SFO, JFK)

Fly(P2, JFK, SFO)

Unload(C1, P1, JFK)

Unload(C2, P2, SFO)

-------------------------------------------------

Solving Air Cargo Problem 2 using breadth\_first\_search...

Expansions Goal Tests New Nodes

2844 4033 23627

Plan length: 9 Time elapsed in seconds: 11.738680307000323

Load(C2, P2, JFK)

Load(C1, P1, SFO)

Load(C3, P3, ATL)

Fly(P2, JFK, SFO)

Unload(C2, P2, SFO)

Fly(P1, SFO, JFK)

Unload(C1, P1, JFK)

Fly(P3, ATL, SFO)

Unload(C3, P3, SFO)

---

Solving Air Cargo Problem 2 using breadth\_first\_tree\_search...

MORE THAN 10 MINS (more than 30 mins)

---

Solving Air Cargo Problem 2 using depth\_first\_graph\_search...

Expansions Goal Tests New Nodes

44 45 275

Plan length: 38 Time elapsed in seconds: 0.09034268100003828

Fly(P3, ATL, SFO)

Fly(P1, SFO, ATL)

Fly(P3, SFO, JFK)

Fly(P1, ATL, JFK)

Fly(P2, JFK, ATL)

Fly(P1, JFK, SFO)

Fly(P2, ATL, SFO)

Load(C1, P2, SFO)

Fly(P2, SFO, ATL)

Fly(P1, SFO, ATL)

Fly(P2, ATL, JFK)

…

…

---

Solving Air Cargo Problem 2 using depth\_limited\_search...

Expansions Goal Tests New Nodes

174367 1468432 1468810

Plan length: 50 Time elapsed in seconds: 690.636708176

Load(C2, P2, JFK)

Load(C1, P1, SFO)

Load(C3, P3, ATL)

Unload(C2, P2, JFK)

Load(C2, P2, JFK)

Unload(C2, P2, JFK)

Load(C2, P2, JFK)

Unload(C2, P2, JFK)

Load(C2, P2, JFK)

Unload(C2, P2, JFK)

Load(C2, P2, JFK)

Unload(C2, P2, JFK)

Load(C2, P2, JFK)

Unload(C2, P2, JFK)

Load(C2, P2, JFK)

Unload(C2, P2, JFK)

Load(C2, P2, JFK)

Unload(C2, P2, JFK)

Load(C2, P2, JFK)

…

…

---

Solving Air Cargo Problem 2 using uniform\_cost\_search...

Expansions Goal Tests New Nodes

4281 4283 35054

Plan length: 9 Time elapsed in seconds: 10.026005287999851

Load(C1, P1, SFO)

Load(C2, P2, JFK)

Load(C3, P3, ATL)

Fly(P1, SFO, JFK)

Fly(P2, JFK, SFO)

Fly(P3, ATL, SFO)

Unload(C1, P1, JFK)

Unload(C2, P2, SFO)

Unload(C3, P3, SFO)

---

Solving Air Cargo Problem 2 using recursive\_best\_first\_search with h\_1...

MORE THAN 10 MINS

---

Solving Air Cargo Problem 2 using greedy\_best\_first\_graph\_search with h\_1...

Expansions Goal Tests New Nodes

478 480 3646

Plan length: 19 Time elapsed in seconds: 1.1182538400003068

Load(C1, P1, SFO)

Load(C2, P2, JFK)

Load(C3, P3, ATL)

Fly(P1, SFO, ATL)

Fly(P2, JFK, ATL)

Fly(P3, ATL, SFO)

Unload(C1, P1, ATL)

Load(C1, P2, ATL)

Fly(P2, ATL, SFO)

Unload(C2, P2, SFO)

Load(C2, P3, SFO)

Fly(P2, SFO, ATL)

Unload(C1, P2, ATL)

Load(C1, P1, ATL)

Fly(P1, ATL, JFK)

Unload(C1, P1, JFK)

Fly(P1, JFK, ATL)

Unload(C2, P3, SFO)

Unload(C3, P3, SFO)

---------------------------------------------------

Solving Air Cargo Problem 3 using breadth\_first\_search...

Expansions Goal Tests New Nodes

14663 18098 129631

Plan length: 12 Time elapsed in seconds: 104.00590677799846

Load(C2, P2, JFK)

Load(C1, P1, SFO)

Fly(P2, JFK, ORD)

Load(C4, P2, ORD)

Fly(P1, SFO, ATL)

Load(C3, P1, ATL)

Fly(P1, ATL, JFK)

Unload(C1, P1, JFK)

Unload(C3, P1, JFK)

Fly(P2, ORD, SFO)

Unload(C2, P2, SFO)

Unload(C4, P2, SFO)

---

Solving Air Cargo Problem 3 using breadth\_first\_tree\_search...

MORE THAN 10 MINS(more than 15 mins)

---

Solving Air Cargo Problem 3 using depth\_first\_graph\_search...

Expansions Goal Tests New Nodes

627 628 5176

Plan length: 596 Time elapsed in seconds: 3.2801819629985403

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)

…

…

---

Solving Air Cargo Problem 3 using depth\_limited\_search...

MORE THAN 10 MINS

---

Solving Air Cargo Problem 3 using uniform\_cost\_search...

Expansions Goal Tests New Nodes

18150 18152 159029

Plan length: 12 Time elapsed in seconds: 59.11737455899947

Load(C1, P1, SFO)

Load(C2, P2, JFK)

Fly(P1, SFO, ATL)

Load(C3, P1, ATL)

Fly(P2, JFK, ORD)

Load(C4, P2, ORD)

Fly(P2, ORD, SFO)

Fly(P1, ATL, JFK)

Unload(C1, P1, JFK)

Unload(C2, P2, SFO)

Unload(C3, P1, JFK)

Unload(C4, P2, SFO)

---

Solving Air Cargo Problem 3 using recursive\_best\_first\_search with h\_1...

MORE THAN 10 MINS

---

Solving Air Cargo Problem 3 using greedy\_best\_first\_graph\_search with h\_1...

Expansions Goal Tests New Nodes

5389 5391 47596

Plan length: 26 Time elapsed in seconds: 17.62139108499923

Load(C1, P1, SFO)

Load(C2, P2, JFK)

Fly(P1, SFO, ORD)

Load(C4, P1, ORD)

Fly(P2, JFK, ATL)

Load(C3, P2, ATL)

Fly(P2, ATL, ORD)

Unload(C1, P1, ORD)

Load(C1, P2, ORD)

Fly(P1, ORD, ATL)

Unload(C4, P1, ATL)

Fly(P1, ATL, ORD)

Fly(P2, ORD, ATL)

Load(C4, P2, ATL)

Fly(P2, ATL, ORD)

Unload(C3, P2, ORD)

Load(C3, P1, ORD)

Unload(C1, P2, ORD)

Load(C1, P1, ORD)

Fly(P1, ORD, JFK)

Unload(C1, P1, JFK)

Unload(C3, P1, JFK)

Fly(P1, JFK, ORD)

Fly(P2, ORD, SFO)

Unload(C2, P2, SFO)

Unload(C4, P2, SFO)

------------------------------------------------------------

------------------------------------------------------------

------------------------------------------------------------

Solving Air Cargo Problem 1 using astar\_search with h\_1...

Expansions Goal Tests New Nodes

55 57 224

Plan length: 6 Time elapsed in seconds: 0.05131694800002151

Load(C1, P1, SFO)

Load(C2, P2, JFK)

Fly(P1, SFO, JFK)

Fly(P2, JFK, SFO)

Unload(C1, P1, JFK)

Unload(C2, P2, SFO)

---

Solving Air Cargo Problem 1 using astar\_search with h\_ignore\_preconditions...

Expansions Goal Tests New Nodes

41 43 170

Plan length: 6 Time elapsed in seconds: 0.038284258999738086

Load(C1, P1, SFO)

Fly(P1, SFO, JFK)

Unload(C1, P1, JFK)

Load(C2, P2, JFK)

Fly(P2, JFK, SFO)

Unload(C2, P2, SFO)

----

Solving Air Cargo Problem 1 using astar\_search with h\_pg\_levelsum...

Expansions Goal Tests New Nodes

11 13 50

Plan length: 6 Time elapsed in seconds: 0.9733871130001717

Load(C1, P1, SFO)

Fly(P1, SFO, JFK)

Load(C2, P2, JFK)

Fly(P2, JFK, SFO)

Unload(C1, P1, JFK)

Unload(C2, P2, SFO)

-----------------------

Solving Air Cargo Problem 2 using astar\_search with h\_1...

Expansions Goal Tests New Nodes

4281 4283 35054

Plan length: 9 Time elapsed in seconds: 11.147939880000195

Load(C1, P1, SFO)

Load(C2, P2, JFK)

Load(C3, P3, ATL)

Fly(P1, SFO, JFK)

Fly(P2, JFK, SFO)

Fly(P3, ATL, SFO)

Unload(C1, P1, JFK)

Unload(C2, P2, SFO)

Unload(C3, P3, SFO)

---

Solving Air Cargo Problem 2 using astar\_search with h\_ignore\_preconditions...

Expansions Goal Tests New Nodes

1272 1274 10732

Plan length: 9 Time elapsed in seconds: 3.8083249060000526

Load(C1, P1, SFO)

Fly(P1, SFO, JFK)

Unload(C1, P1, JFK)

Load(C2, P2, JFK)

Fly(P2, JFK, SFO)

Unload(C2, P2, SFO)

Load(C3, P3, ATL)

Fly(P3, ATL, SFO)

Unload(C3, P3, SFO)

---

Solving Air Cargo Problem 2 using astar\_search with h\_pg\_levelsum...

Expansions Goal Tests New Nodes

172 174 1314

Plan length: 9 Time elapsed in seconds: 189.99759807900045

Load(C1, P1, SFO)

Fly(P1, SFO, JFK)

Load(C2, P2, JFK)

Fly(P2, JFK, SFO)

Load(C3, P3, ATL)

Fly(P3, ATL, SFO)

Unload(C1, P1, JFK)

Unload(C2, P2, SFO)

Unload(C3, P3, SFO)

---------------------

Solving Air Cargo Problem 3 using astar\_search with h\_1...

Expansions Goal Tests New Nodes

18150 18152 159029

Plan length: 12 Time elapsed in seconds: 60.76012559799983

Load(C1, P1, SFO)

Load(C2, P2, JFK)

Fly(P1, SFO, ATL)

Load(C3, P1, ATL)

Fly(P2, JFK, ORD)

Load(C4, P2, ORD)

Fly(P2, ORD, SFO)

Fly(P1, ATL, JFK)

Unload(C1, P1, JFK)

Unload(C2, P2, SFO)

Unload(C3, P1, JFK)

Unload(C4, P2, SFO)

---

Solving Air Cargo Problem 3 using astar\_search with h\_ignore\_preconditions...

Expansions Goal Tests New Nodes

5038 5040 44926

Plan length: 12 Time elapsed in seconds: 17.06239399199967

Load(C1, P1, SFO)

Fly(P1, SFO, ATL)

Load(C3, P1, ATL)

Fly(P1, ATL, JFK)

Unload(C1, P1, JFK)

Load(C2, P2, JFK)

Fly(P2, JFK, ORD)

Load(C4, P2, ORD)

Fly(P2, ORD, SFO)

Unload(C2, P2, SFO)

Unload(C3, P1, JFK)

Unload(C4, P2, SFO)

---

Solving Air Cargo Problem 3 using astar\_search with h\_pg\_levelsum...

Expansions Goal Tests New Nodes

314 316 2894

Plan length: 12 Time elapsed in seconds: 861.3721957330008

Load(C2, P2, JFK)

Fly(P2, JFK, ORD)

Load(C4, P2, ORD)

Fly(P2, ORD, SFO)

Load(C1, P1, SFO)

Fly(P1, SFO, ATL)

Load(C3, P1, ATL)

Fly(P1, ATL, JFK)

Unload(C1, P1, JFK)

Unload(C2, P2, SFO)

Unload(C3, P1, JFK)

Unload(C4, P2, SFO)