Heuristic Review

**Provide** an optimal plan for Problems 1, 2, and 3.

For Problem 1, an optimal plan would be:

Load(C1, P1, SFO)

Load(C2, P2, JFK)

Fly(P1, SFO, JFK)

Fly(P2, JFK, SFO)

Unload(C1, P1, JFK)

Unload(C2, P2, SFO)

For Problem 2, an optimal plan would be:

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(C3, P3, SFO)

Unload(C1, P1, JFK)

Unload(C2, P2, SFO)

For Problem 3, an optimal plan would be:

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(C4, P2, SFO)

Unload(C3, P1, JFK)

Unload(C2, P2, SFO)

Unload(C1, P1, JFK)

**Compare** and contrast non-heuristic search result metrics (optimality, time elapsed, number of node expansions) for Problems 1,2, and 3. Include breadth-first, depth-first, and at least one other uninformed non-heuristic search in your comparison.

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|  | S1(BFS)  Exp/ GoalTest/ NewNode | S3(DFS)  Exp/ GoalTest/ NewNode | S5(Uniform)  Exp/ GoalTest/ NewNode |
| P1 | 43/56/180 | 12/13/48 | 55/57/224 |
| P2 | 3343/4609/30509 | 582/583/5211 | 4853/4855/44041 |
| P3 | 14663/18098/129631 | 627/628/5176 | 18223/18225/159618 |

**Compare** and contrast heuristic search result metrics using A\* with the "ignore preconditions" and "level-sum" heuristics for Problems 1, 2, and 3.

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| --- | --- | --- |
|  | S9(A\* w/ ignore)  Exp/ GoalTest/ NewNode | S10(A\* w/ levelsum)  Exp/ GoalTest/ NewNode |
| P1 | 41/43/170 | 11/13/50 |
| P2 | 1450/1452/13303 | 86/88/841 |
| P3 | 5040/5042/44944 | 325/327/3002 |

**What** was the best heuristic used in these problems? Was it better than non-heuristic search planning methods for all problems? Why or why not?