**Build a Forward Planning Agent**

By Jonfranco Shattuck

# Search Complexity

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | *AIR CARGO PROBLEM* | *1* | *2* | *3* | *4* |
|  | **Number of Actions** | **20** | **72** | **88** | **104** |
| **Nodes Expanded** | *1. BFS* | 43 | 3343 | 14663 | 99736 |
| *2. DFS* | 21 | 624 | 408 | 25174 |
| *3. UCS* | 60 | 5154 | 18510 | 113339 |
| *4. GBFS UNMET GOALS* | 7 | 17 | 25 | 29 |
| *5. GBFS LEVELSUM* | 6 | 9 | 14 | 17 |
| *6. GBFS MAXLEVEL* | 6 | 27 | 21 | 56 |
| *7. GBFS SETLEVEL* | 6 | 9 | 35 | 107 |
| *8. ASTAR UNMET GOALS* | 50 | 2467 | 7388 | 34330 |
| *9. ASTAR LEVELSUM* | 28 | 357 | 369 | 1208 |
| *10. ASTAR MAXLEVEL* | 43 | 2887 | 9580 | 62077 |
| *11. ASTAR SETLEVEL* | 33 | 1037 | 3423 | 22606 |

**Analysis:**

Asdf

# Search Time

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | *AIR CARGO PROBLEM* | *1* | *2* | *3* | *4* |
|  | **Number of Actions** | **20** | **72** | **88** | **104** |
| **Search Time (seconds)** | *1. BFS* | 0.016 | 0.320 | 0.697 | 3.674 |
| *2. DFS* | 0.006 | 0.425 | 0.191 | 720.470 |
| *3. UCS* | 0.020 | 0.475 | 1.160 | 5.349 |
| *4. GBFS UNMET GOALS* | 0.004 | 0.030 | 0.039 | 0.037 |
| *5. GBFS LEVELSUM* | 0.194 | 0.554 | 0.998 | 1.057 |
| *6. GBFS MAXLEVEL* | 0.176 | 0.706 | 1.034 | 1.710 |
| *7. GBFS SETLEVEL* | 0.457 | 1.518 | 4.662 | 14.290 |
| *8. ASTAR UNMET GOALS* | 0.022 | 0.863 | 1.643 | 5.067 |
| *9. ASTAR LEVELSUM* | 0.333 | 4.386 | 8.434 | 36.536 |
| *10. ASTAR MAXLEVEL* | 0.321 | 19.840 | 127.082 | 1250.124 |
| *11. ASTAR SETLEVEL* | 0.709 | 47.746 | 268.545 | 2621.855 |

**Analysis:**

Asdf

# Optimality

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | *AIR CARGO PROBLEM* | *1* | *2* | *3* | *4* |
|  | **Number of Actions** | **20** | **72** | **88** | **104** |
| **Optimality (Length of Plan)** | *1. BFS* | 6 | 9 | 12 | 14 |
| *2. DFS* | 20 | 619 | 392 | 24132 |
| *3. UCS* | 6 | 9 | 12 | 14 |
| *4. GBFS UNMET GOALS* | 6 | 9 | 15 | 18 |
| *5. GBFS LEVELSUM* | 6 | 9 | 14 | 17 |
| *6. GBFS MAXLEVEL* | 6 | 9 | 13 | 17 |
| *7. GBFS SETLEVEL* | 6 | 9 | 17 | 23 |
| *8. ASTAR UNMET GOALS* | 6 | 9 | 12 | 14 |
| *9. ASTAR LEVELSUM* | 6 | 9 | 12 | 15 |
| *10. ASTAR MAXLEVEL* | 6 | 9 | 12 | 14 |
| *11. ASTAR SETLEVEL* | 6 | 9 | 12 | 14 |

# Report Questions

**Which algorithm or algorithms would be most appropriate for planning in a very restricted domain (i.e., one that has only a few actions) and needs to operate in real time?**

Asdf

**Which algorithm or algorithms would be most appropriate for planning in very large domains (e.g., planning delivery routes for all UPS drivers in the U.S. on a given day)?**

asdf

**Which algorithm or algorithms would be most appropriate for planning problems where it is important to find only optimal plans?**

asdf