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6.S078 Assignment 5

10/15/13

\*Using 2nd and 3rd Late Days\*

**Description**

I implemented the blocks and painting actions from the last assignment. To test, I formulated a simple unstack and restack 3 blocks in an inverted order problem as well as paint and stack problems p1, p2, and p3 from the last assignment. All heuristics obtained the optimal length plan for these cases. FF with helpful actions was by far the best. It was even competitive with Blackbox for p3! FF in general required significantly fewer iterations of the search at the cost of extra time to evaluate the heuristic. Below are tables for the runtime, number of iterations of the search, and lengths of the paths found. For p3, the no heuristic and literals in goal heuristic searches ran through too many iterations and terminated (they never finished in a reasonable time when I unbounded them).

**Unstack and restack 3 blocks in inverted order**

|  |  |  |  |
| --- | --- | --- | --- |
| Search Heuristic | Run time (s) | Iterations | Plan Length |
| No Heuristic | 0.0019998550415 | 9 | 6 |
| Literals Not in Goal | 0.00200009346008 | 7 | 6 |
| FF | 0.0139999389648 | 6 | 6 |
| FF with Helpful Actions | 0.0159997940063 | 6 | 6 |
| Blackbox | 0.002 | N/A | 6 |

**P1 – Paint a block red**

|  |  |  |  |
| --- | --- | --- | --- |
| Search Heuristic | Run time (s) | Iterations | Plan Length |
| No Heuristic | 0.00600004196167 | 30 | 4 |
| Literals Not in Goal | 0.00399994850159 | 15 | 4 |
| FF | 0.0160000324249 | 4 | 4 |
| FF with Helpful Actions | 0.0139999389648 | 4 | 4 |
| Blackbox | 0.003 | N/A | 4 |

**P2 – Paint a block red and spray-paint a stacked block blue**

|  |  |  |  |
| --- | --- | --- | --- |
| Search Heuristic | Run time (s) | Iterations | Plan Length |
| No Heuristic | 37.0739998817 | 83408 | 10 |
| Literals Not in Goal | 6.68300008774 | 14354 | 10 |
| FF | 8.66499996185 | 357 | 10 |
| FF with Helpful Actions | 2.86800003052 | 128 | 10 |
| Blackbox | 0.045 | N/A | 10 |

**P3 – Paint 3 blocks red, blue, and green using sprayers or brushes**

|  |  |  |  |
| --- | --- | --- | --- |
| Search Heuristic | Run time (s) | Iterations | Plan Length |
| No Heuristic | > 134.476000071 | >100000 | None |
| Literals Not in Goal | > 172.017999887 | >100000 | None |
| FF | 732.876999855 | 8996 | 9 |
| FF with Helpful Actions | 58.1050000191 | 1402 | 9 |
| Blackbox | 10.663 | N/A | 9 |