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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