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Assignment 8 Writeup

1. Describe any implmentation choices you made that you felt were important. Mention anything else we should know when evaluating your program.
I grounded my actions into a hash table, mapping each predicate to a list of actions that have that predicate as a precondition.

Also, my program is only fast enough to solve study2.in with an extremely high weight and the "h-goal-lits" heuristic. I believe the reason is that the reachability heuristic is expensive to compute, and study2.in is a very large problem space. The reference solution shows identical behavior. (i.e. can only solve with high weight and h-goal-lits).

-bash-4.3$ ./run.sh 1000000 h-goal-lits < worlds/study2.in
Picked up JAVA_TOOL_OPTIONS: -Xmx256m
0 Study TheMuffinMan TheMuffinMan
1 Study ComputerScience Ethan
2 Study TheMuffinMan Ethan
3 Study ComputerScience Jordan
4 Study Math Jordan
195 nodes generated
5 nodes expanded

2. Which of your heuristic are admissible?
h0 and h1 are admissible. h-goal-lits and h1sum are not.

3. What can you say about the time and space complexity of your program?
The time and space complexity of this program is the same as a-star:

Time: b^d
Space: b^d

4. What suggestions do you have for this assignment in the future?
Nothing to report.

Table showing proper heuristic domination on groceryworld.in:

Heuristic	Plan Cost	Nodes Generated	Nodes Expanded
h0	5	2723	413
h1	5	2278	342
h1sum	5	1482	217
h-goal-lits	5	543	83

Note that weight is set to 1.0 for all of these experiments. Also note that number of unachieved goal literals does not necessarily have to dominate h1 and h1sum, it just does in this example. The transcript of the validator running with these test runs is below.

Validator Running on Problems:
-bash-4.3$ ./strips-plan-validator ./run.sh 1 h0 < worlds/groceryworld.in
Picked up JAVA_TOOL_OPTIONS: -Xmx256m
Program exited with status 0

Found a plan:

0 Go Home SM
1 Buy SM Milk
2 Buy SM Bananas
3 Go SM HWS
4 Buy HWS Drill
5 Go HWS Home
2723 nodes generated
413 nodes expanded

Checking Solution...
Valid Solution
Solver used 1.00 Seconds
Solver used approximately 988 KB of memory

-bash-4.3$ ./strips-plan-validator ./run.sh 1 h1 < worlds/groceryworld.in
Picked up JAVA_TOOL_OPTIONS: -Xmx256m
Program exited with status 0

Found a plan:

0 Go Home SM
1 Buy SM Milk
2 Buy SM Bananas
3 Go SM HWS
4 Buy HWS Drill
5 Go HWS Home
2278 nodes generated
342 nodes expanded

Checking Solution...
Valid Solution
Solver used 0.000 Seconds
Solver used approximately 988 KB of memory

-bash-4.3$ ./strips-plan-validator ./run.sh 1 h1sum < worlds/groceryworld.in
Picked up JAVA_TOOL_OPTIONS: -Xmx256m
Program exited with status 0

Found a plan:

0 Go Home HWS
1 Buy HWS Drill
2 Go HWS SM
3 Buy SM Milk
4 Buy SM Bananas
5 Go SM Home
1482 nodes generated
217 nodes expanded

Checking Solution...
Valid Solution
Solver used 1.00 Seconds
Solver used approximately 988 KB of memory

-bash-4.3$ ./strips-plan-validator ./run.sh 1 h-goal-lits < worlds/groceryworld.in
Picked up JAVA_TOOL_OPTIONS: -Xmx256m
Program exited with status 0

Found a plan:

0 Go Home SM
1 Buy SM Bananas
2 Buy SM Milk
3 Go SM HWS
4 Buy HWS Drill
5 Go HWS Home
543 nodes generated
83 nodes expanded

Checking Solution...
Valid Solution
Solver used 0.000 Seconds
Solver used approximately 988 KB of memory