Parsing...  
Parsing: [0.000s CPU, 0.004s wall-clock]  
Normalizing task... [0.000s CPU, 0.000s wall-clock]  
Instantiating...  
Generating Datalog program... [0.000s CPU, 0.000s wall-clock]  
Normalizing Datalog program...  
Normalizing Datalog program: [0.010s CPU, 0.004s wall-clock]  
Preparing model... [0.000s CPU, 0.001s wall-clock]  
Generated 24 rules.  
Computing model... [0.000s CPU, 0.011s wall-clock]  
81 relevant atoms  
60 auxiliary atoms  
141 final queue length  
180 total queue pushes  
Completing instantiation... [0.000s CPU, 0.003s wall-clock]  
Instantiating: [0.010s CPU, 0.020s wall-clock]  
Computing fact groups...  
Finding invariants...  
10 initial candidates  
Finding invariants: [0.010s CPU, 0.002s wall-clock]  
Checking invariant weight... [0.000s CPU, 0.000s wall-clock]  
Instantiating groups... [0.000s CPU, 0.000s wall-clock]  
Collecting mutex groups... [0.000s CPU, 0.000s wall-clock]  
Choosing groups...  
0 uncovered facts  
Choosing groups: [0.000s CPU, 0.000s wall-clock]  
Building translation key... [0.000s CPU, 0.000s wall-clock]  
Computing fact groups: [0.010s CPU, 0.004s wall-clock]  
Building STRIPS to SAS dictionary... [0.000s CPU, 0.000s wall-clock]  
Building dictionary for full mutex groups... [0.000s CPU, 0.000s wall-clock]  
Building mutex information...  
Building mutex information: [0.000s CPU, 0.000s wall-clock]  
Translating task...  
Processing axioms...  
Simplifying axioms... [0.000s CPU, 0.000s wall-clock]  
Processing axioms: [0.000s CPU, 0.000s wall-clock]  
Translating task: [0.000s CPU, 0.003s wall-clock]  
0 effect conditions simplified  
0 implied preconditions added  
Detecting unreachable propositions...  
0 operators removed  
0 axioms removed  
3 propositions removed  
Detecting unreachable propositions: [0.010s CPU, 0.002s wall-clock]  
Reordering and filtering variables...  
7 of 7 variables necessary.  
4 of 7 mutex groups necessary.  
34 of 34 operators necessary.  
0 of 0 axiom rules necessary.  
Reordering and filtering variables: [0.000s CPU, 0.001s wall-clock]  
Translator variables: 7  
Translator derived variables: 0  
Translator facts: 24  
Translator goal facts: 4  
Translator mutex groups: 4  
Translator total mutex groups size: 16  
Translator operators: 34  
Translator axioms: 0  
Translator task size: 233  
Translator peak memory: 28072 KB  
Writing output... [0.000s CPU, 0.001s wall-clock]  
Done! [0.030s CPU, 0.037s wall-clock]  
INFO     Running search (release32).  
INFO     search input: output.sas  
INFO     search arguments: ['--if-unit-cost', '--heuristic',  
'hlm=lama\_synergy(lm\_rhw(reasonable\_orders=true))', '--heuristic',  
'hff=ff\_synergy(hlm)', '--search',  
'iterated([lazy\_greedy([hff,hlm],preferred=[hff,hlm]),lazy\_wastar([hff,hlm],preferred=[hff,hlm],w=5),lazy\_wastar([hff,hlm],preferred=[hff,hlm],w=3),lazy\_wastar([hff,hlm],preferred=[hff,hlm],w=2),lazy\_wastar([hff,hlm],preferred=[hff,hlm],w=1)],repeat\_last=true,continue\_on\_fail=true)',  
'--if-non-unit-cost', '--heuristic',  
'hlm1=lama\_synergy(lm\_rhw(reasonable\_orders=true,lm\_cost\_type=one),transform=adapt\_costs(one))',  
'--heuristic', 'hff1=ff\_synergy(hlm1)', '--heuristic',  
'hlm2=lama\_synergy(lm\_rhw(reasonable\_orders=true,lm\_cost\_type=plusone),transform=adapt\_costs(plusone))',  
'--heuristic', 'hff2=ff\_synergy(hlm2)', '--search',  
'iterated([lazy\_greedy([hff1,hlm1],preferred=[hff1,hlm1],cost\_type=one,reopen\_closed=false),lazy\_greedy([hff2,hlm2],preferred=[hff2,hlm2],reopen\_closed=false),lazy\_wastar([hff2,hlm2],preferred=[hff2,hlm2],w=5),lazy\_wastar([hff2,hlm2],preferred=[hff2,hlm2],w=3),lazy\_wastar([hff2,hlm2],preferred=[hff2,hlm2],w=2),lazy\_wastar([hff2,hlm2],preferred=[hff2,hlm2],w=1)],repeat\_last=true,continue\_on\_fail=true)',  
'--always']  
INFO     search time limit: None  
INFO     search memory limit: None  
INFO     search executable: /home/akshay/downward/builds/release32/bin/downward  
INFO     callstring:  
/home/akshay/downward/builds/release32/bin/downward --if-unit-cost  
--heuristic 'hlm=lama\_synergy(lm\_rhw(reasonable\_orders=true))'  
--heuristic 'hff=ff\_synergy(hlm)' --search  
'iterated([lazy\_greedy([hff,hlm],preferred=[hff,hlm]),lazy\_wastar([hff,hlm],preferred=[hff,hlm],w=5),lazy\_wastar([hff,hlm],preferred=[hff,hlm],w=3),lazy\_wastar([hff,hlm],preferred=[hff,hlm],w=2),lazy\_wastar([hff,hlm],preferred=[hff,hlm],w=1)],repeat\_last=true,continue\_on\_fail=true)'  
--if-non-unit-cost --heuristic  
'hlm1=lama\_synergy(lm\_rhw(reasonable\_orders=true,lm\_cost\_type=one),transform=adapt\_costs(one))'  
--heuristic 'hff1=ff\_synergy(hlm1)' --heuristic  
'hlm2=lama\_synergy(lm\_rhw(reasonable\_orders=true,lm\_cost\_type=plusone),transform=adapt\_costs(plusone))'  
--heuristic 'hff2=ff\_synergy(hlm2)' --search  
'iterated([lazy\_greedy([hff1,hlm1],preferred=[hff1,hlm1],cost\_type=one,reopen\_closed=false),lazy\_greedy([hff2,hlm2],preferred=[hff2,hlm2],reopen\_closed=false),lazy\_wastar([hff2,hlm2],preferred=[hff2,hlm2],w=5),lazy\_wastar([hff2,hlm2],preferred=[hff2,hlm2],w=3),lazy\_wastar([hff2,hlm2],preferred=[hff2,hlm2],w=2),lazy\_wastar([hff2,hlm2],preferred=[hff2,hlm2],w=1)],repeat\_last=true,continue\_on\_fail=true)'  
--always --internal-plan-file sas\_plan < output.sas  
reading input... [t=0.000110846s]  
done reading input! [t=0.000759591s]  
packing state variables...done! [t=0.000833725s]  
Variables: 7  
FactPairs: 24  
Bytes per state: 4  
Building successor generator...done! [t=0.000931542s]  
peak memory difference for root successor generator creation: 0 KB  
time for root successor generation creation: 2.6909e-05s  
done initializing global data [t=0.000974133s]  
Initializing Exploration...  
Initializing landmarks count heuristic...  
Generating landmarks using the RPG/SAS+ approach  
approx. reasonable orders  
approx. obedient reasonable orders  
Removed 0 reasonable or obedient reasonable orders  
Landmarks generation time: 0.000493379s  
Discovered 14 landmarks, of which 4 are disjunctive and 0 are conjunctive  
21 edges  
Initializing LAMA-FF synergy master  
Initializing LAMA-FF synergy slave  
Starting search: lazy\_greedy(list(hff, hlm), preferred = list(hff, hlm))  
Conducting lazy best first search, (real) bound = 2147483647  
5 initial landmarks, 4 goal landmarks  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 9  
New best heuristic value for ff\_synergy(hlm): 9  
[g=0, 1 evaluated, 0 expanded, t=0.00264059s, 4476 KB]  
Initial heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 9  
Initial heuristic value for ff\_synergy(hlm): 9  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 8  
New best heuristic value for ff\_synergy(hlm): 8  
[g=1, 3 evaluated, 2 expanded, t=0.00279825s, 4476 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 7  
[g=2, 5 evaluated, 4 expanded, t=0.0028843s, 4476 KB]  
New best heuristic value for ff\_synergy(hlm): 7  
[g=3, 6 evaluated, 5 expanded, t=0.00293186s, 4476 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 6  
New best heuristic value for ff\_synergy(hlm): 6  
[g=4, 8 evaluated, 7 expanded, t=0.00299801s, 4476 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 5  
New best heuristic value for ff\_synergy(hlm): 5  
[g=5, 10 evaluated, 9 expanded, t=0.00306605s, 4476 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 4  
New best heuristic value for ff\_synergy(hlm): 4  
[g=7, 12 evaluated, 11 expanded, t=0.00313452s, 4476 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 3  
New best heuristic value for ff\_synergy(hlm): 3  
[g=8, 14 evaluated, 13 expanded, t=0.00321873s, 4476 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 2  
New best heuristic value for ff\_synergy(hlm): 2  
[g=9, 15 evaluated, 14 expanded, t=0.0032699s, 4476 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 1  
New best heuristic value for ff\_synergy(hlm): 1  
[g=10, 16 evaluated, 15 expanded, t=0.00331591s, 4476 KB]  
Solution found!  
Actual search time: 0.000748269s [t=0.00335745s]  
pick ball1 rooma left (1)  
pick ball2 rooma right (1)  
move rooma roomb (1)  
drop ball1 roomb left (1)  
drop ball2 roomb right (1)  
move roomb rooma (1)  
pick ball3 rooma left (1)  
pick ball4 rooma right (1)  
move rooma roomb (1)  
drop ball3 roomb left (1)  
drop ball4 roomb right (1)  
Plan length: 11 step(s).  
Plan cost: 11  
Expanded 16 state(s).  
Reopened 0 state(s).  
Evaluated 17 state(s).  
Evaluations: 34  
Generated 63 state(s).  
Dead ends: 0 state(s).  
Number of registered states: 17  
Int hash set load factor: 17/32 = 0.53125  
Int hash set resizes: 5  
Best solution cost so far: 11  
Solution found - keep searching  
Starting search: lazy\_wastar(list(hff, hlm), preferred = list(hff, hlm), w = 5)  
Conducting lazy best first search, (real) bound = 11  
5 initial landmarks, 4 goal landmarks  
New best heuristic value for ff\_synergy(hlm): 9  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 9  
[g=0, 1 evaluated, 0 expanded, t=0.00360934s, 4476 KB]  
Initial heuristic value for ff\_synergy(hlm): 9  
Initial heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 9  
New best heuristic value for ff\_synergy(hlm): 8  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 8  
[g=1, 3 evaluated, 2 expanded, t=0.00374006s, 4476 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 7  
[g=2, 5 evaluated, 4 expanded, t=0.00383924s, 4476 KB]  
New best heuristic value for ff\_synergy(hlm): 7  
[g=3, 6 evaluated, 5 expanded, t=0.00388556s, 4476 KB]  
New best heuristic value for ff\_synergy(hlm): 6  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 6  
[g=4, 8 evaluated, 7 expanded, t=0.00396754s, 4476 KB]  
New best heuristic value for ff\_synergy(hlm): 5  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 5  
[g=5, 10 evaluated, 9 expanded, t=0.00403583s, 4476 KB]  
New best heuristic value for ff\_synergy(hlm): 4  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 4  
[g=7, 12 evaluated, 11 expanded, t=0.00410497s, 4476 KB]  
New best heuristic value for ff\_synergy(hlm): 3  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 3  
[g=8, 14 evaluated, 13 expanded, t=0.00417337s, 4476 KB]  
New best heuristic value for ff\_synergy(hlm): 2  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 2  
[g=9, 15 evaluated, 14 expanded, t=0.00423681s, 4476 KB]  
New best heuristic value for ff\_synergy(hlm): 1  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 1  
[g=10, 16 evaluated, 15 expanded, t=0.00428745s, 4476 KB]  
Completely explored state space -- no solution!  
Actual search time: 0.0106238s [t=0.0142181s]  
Expanded 393 state(s).  
Reopened 147 state(s).  
Evaluated 393 state(s).  
Evaluations: 639  
Generated 1393 state(s).  
Dead ends: 0 state(s).  
Number of registered states: 246  
Int hash set load factor: 246/256 = 0.960938  
Int hash set resizes: 8  
Best solution cost so far: 11  
No solution found - keep searching  
Starting search: lazy\_wastar(list(hff, hlm), preferred = list(hff, hlm), w = 3)  
Conducting lazy best first search, (real) bound = 11  
5 initial landmarks, 4 goal landmarks  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 9  
New best heuristic value for ff\_synergy(hlm): 9  
[g=0, 1 evaluated, 0 expanded, t=0.0144444s, 4476 KB]  
Initial heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 9  
Initial heuristic value for ff\_synergy(hlm): 9  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 8  
New best heuristic value for ff\_synergy(hlm): 8  
[g=1, 3 evaluated, 2 expanded, t=0.0146704s, 4476 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 7  
[g=2, 5 evaluated, 4 expanded, t=0.0147495s, 4476 KB]  
New best heuristic value for ff\_synergy(hlm): 7  
[g=3, 6 evaluated, 5 expanded, t=0.0148048s, 4476 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 6  
New best heuristic value for ff\_synergy(hlm): 6  
[g=4, 8 evaluated, 7 expanded, t=0.0148913s, 4476 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 5  
New best heuristic value for ff\_synergy(hlm): 5  
[g=5, 10 evaluated, 9 expanded, t=0.0149675s, 4476 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 4  
New best heuristic value for ff\_synergy(hlm): 4  
[g=7, 12 evaluated, 11 expanded, t=0.0150596s, 4476 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 3  
New best heuristic value for ff\_synergy(hlm): 3  
[g=8, 14 evaluated, 13 expanded, t=0.0151354s, 4476 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 2  
New best heuristic value for ff\_synergy(hlm): 2  
[g=9, 15 evaluated, 14 expanded, t=0.0151856s, 4476 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 1  
New best heuristic value for ff\_synergy(hlm): 1  
[g=10, 16 evaluated, 15 expanded, t=0.0152388s, 4476 KB]  
Completely explored state space -- no solution!  
Actual search time: 0.00723776s [t=0.0216612s]  
Expanded 320 state(s).  
Reopened 74 state(s).  
Evaluated 320 state(s).  
Evaluations: 566  
Generated 1128 state(s).  
Dead ends: 0 state(s).  
Number of registered states: 246  
Int hash set load factor: 246/256 = 0.960938  
Int hash set resizes: 8  
Best solution cost so far: 11  
No solution found - keep searching  
Starting search: lazy\_wastar(list(hff, hlm), preferred = list(hff, hlm), w = 2)  
Conducting lazy best first search, (real) bound = 11  
5 initial landmarks, 4 goal landmarks  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 9  
New best heuristic value for ff\_synergy(hlm): 9  
[g=0, 1 evaluated, 0 expanded, t=0.0218915s, 4476 KB]  
Initial heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 9  
Initial heuristic value for ff\_synergy(hlm): 9  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 8  
New best heuristic value for ff\_synergy(hlm): 8  
[g=1, 3 evaluated, 2 expanded, t=0.0221024s, 4476 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 7  
[g=2, 5 evaluated, 4 expanded, t=0.0222314s, 4476 KB]  
New best heuristic value for ff\_synergy(hlm): 7  
[g=3, 6 evaluated, 5 expanded, t=0.0223005s, 4476 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 6  
New best heuristic value for ff\_synergy(hlm): 6  
[g=4, 12 evaluated, 11 expanded, t=0.0224931s, 4476 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 5  
New best heuristic value for ff\_synergy(hlm): 5  
[g=5, 16 evaluated, 15 expanded, t=0.0227682s, 4476 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 4  
New best heuristic value for ff\_synergy(hlm): 4  
[g=7, 18 evaluated, 17 expanded, t=0.022866s, 4476 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 3  
New best heuristic value for ff\_synergy(hlm): 3  
[g=8, 20 evaluated, 19 expanded, t=0.0230642s, 4476 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 2  
New best heuristic value for ff\_synergy(hlm): 2  
[g=9, 21 evaluated, 20 expanded, t=0.0232043s, 4476 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 1  
New best heuristic value for ff\_synergy(hlm): 1  
[g=10, 22 evaluated, 21 expanded, t=0.0232888s, 4476 KB]  
Completely explored state space -- no solution!  
Actual search time: 0.00686803s [t=0.028708s]  
Expanded 273 state(s).  
Reopened 27 state(s).  
Evaluated 273 state(s).  
Evaluations: 519  
Generated 966 state(s).  
Dead ends: 0 state(s).  
Number of registered states: 246  
Int hash set load factor: 246/256 = 0.960938  
Int hash set resizes: 8  
Best solution cost so far: 11  
No solution found - keep searching  
Starting search: lazy\_wastar(list(hff, hlm), preferred = list(hff, hlm), w = 1)  
Conducting lazy best first search, (real) bound = 11  
5 initial landmarks, 4 goal landmarks  
New best heuristic value for ff\_synergy(hlm): 9  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 9  
[g=0, 1 evaluated, 0 expanded, t=0.0290658s, 4476 KB]  
Initial heuristic value for ff\_synergy(hlm): 9  
Initial heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 9  
New best heuristic value for ff\_synergy(hlm): 8  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 8  
[g=1, 3 evaluated, 2 expanded, t=0.0292115s, 4476 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 7  
[g=2, 8 evaluated, 7 expanded, t=0.0293495s, 4476 KB]  
New best heuristic value for ff\_synergy(hlm): 7  
[g=3, 23 evaluated, 22 expanded, t=0.0295768s, 4476 KB]  
New best heuristic value for ff\_synergy(hlm): 6  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 6  
[g=4, 42 evaluated, 41 expanded, t=0.0300159s, 4476 KB]  
New best heuristic value for ff\_synergy(hlm): 5  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 5  
[g=5, 71 evaluated, 70 expanded, t=0.0305006s, 4476 KB]  
New best heuristic value for ff\_synergy(hlm): 4  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 4  
[g=7, 133 evaluated, 132 expanded, t=0.0316746s, 4476 KB]  
New best heuristic value for ff\_synergy(hlm): 3  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 3  
[g=8, 159 evaluated, 158 expanded, t=0.0322487s, 4476 KB]  
New best heuristic value for ff\_synergy(hlm): 2  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 2  
[g=9, 217 evaluated, 216 expanded, t=0.0331764s, 4476 KB]  
New best heuristic value for ff\_synergy(hlm): 1  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 1  
[g=10, 229 evaluated, 228 expanded, t=0.0334332s, 4476 KB]  
Completely explored state space -- no solution!  
Actual search time: 0.00588077s [t=0.0348899s]  
Expanded 252 state(s).  
Reopened 6 state(s).  
Evaluated 252 state(s).  
Evaluations: 498  
Generated 891 state(s).  
Dead ends: 0 state(s).  
Number of registered states: 246  
Int hash set load factor: 246/256 = 0.960938  
Int hash set resizes: 8  
Best solution cost so far: 11  
No solution found - keep searching  
Actual search time: 0.032421s [t=0.034943s]  
Cumulative statistics:  
Expanded 1254 state(s).  
Reopened 254 state(s).  
Evaluated 1255 state(s).  
Evaluations: 2256  
Generated 4441 state(s).  
Dead ends: 0 state(s).  
Search time: 0.0324298s  
Total time: 0.03495s  
Solution found.  
Peak memory: 4476 KB