akshay@akshay-VirtualBox ~/downward $ ./fast-downward.py --alias  
seq-sat-lama-2011 misc/tests/benchmarks/assign3/prob.pddl  
INFO     Running translator.  
INFO     translator input:  
['misc/tests/benchmarks/assign3/domain.pddl',  
'misc/tests/benchmarks/assign3/prob.pddl']  
INFO     translator arguments: []  
INFO     translator time limit: None  
INFO     translator memory limit: None  
INFO     callstring: /usr/bin/python  
/home/akshay/downward/builds/release32/bin/translate/translate.py  
misc/tests/benchmarks/assign3/domain.pddl  
misc/tests/benchmarks/assign3/prob.pddl  
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, 0.001s wall-clock]  
Normalizing Datalog program...  
Normalizing Datalog program: [0.010s CPU, 0.004s wall-clock]  
Preparing model... [0.000s CPU, 0.003s wall-clock]  
Generated 42 rules.  
Computing model... [0.010s CPU, 0.012s wall-clock]  
223 relevant atoms  
253 auxiliary atoms  
476 final queue length  
610 total queue pushes  
Completing instantiation... [0.010s CPU, 0.016s wall-clock]  
Instantiating: [0.030s CPU, 0.036s wall-clock]  
Computing fact groups...  
Finding invariants...  
12 initial candidates  
Finding invariants: [0.010s CPU, 0.005s wall-clock]  
Checking invariant weight... [0.000s CPU, 0.000s wall-clock]  
Instantiating groups... [0.000s CPU, 0.001s wall-clock]  
Collecting mutex groups... [0.000s CPU, 0.000s wall-clock]  
Choosing groups...  
10 uncovered facts  
Choosing groups: [0.000s CPU, 0.001s wall-clock]  
Building translation key... [0.000s CPU, 0.000s wall-clock]  
Computing fact groups: [0.010s CPU, 0.009s 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, 0.001s wall-clock]  
Translating task: [0.020s CPU, 0.018s wall-clock]  
54 effect conditions simplified  
0 implied preconditions added  
Detecting unreachable propositions...  
0 operators removed  
0 axioms removed  
4 propositions removed  
Detecting unreachable propositions: [0.010s CPU, 0.006s wall-clock]  
Reordering and filtering variables...  
14 of 14 variables necessary.  
10 of 14 mutex groups necessary.  
118 of 118 operators necessary.  
0 of 0 axiom rules necessary.  
Reordering and filtering variables: [0.000s CPU, 0.003s wall-clock]  
Translator variables: 14  
Translator derived variables: 0  
Translator facts: 59  
Translator goal facts: 3  
Translator mutex groups: 10  
Translator total mutex groups size: 40  
Translator operators: 118  
Translator axioms: 0  
Translator task size: 900  
Translator peak memory: 28032 KB  
Writing output... [0.000s CPU, 0.003s wall-clock]  
Done! [0.070s CPU, 0.082s 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=4.2715e-05s]  
done reading input! [t=0.00189294s]  
packing state variables...done! [t=0.00191055s]  
Variables: 14  
FactPairs: 59  
Bytes per state: 4  
Building successor generator...done! [t=0.00208039s]  
peak memory difference for root successor generator creation: 0 KB  
time for root successor generation creation: 0.00011062s  
done initializing global data [t=0.00212305s]  
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: 0.00279414s  
Discovered 26 landmarks, of which 0 are disjunctive and 0 are conjunctive  
98 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  
10 initial landmarks, 3 goal landmarks  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 16  
New best heuristic value for ff\_synergy(hlm): 14  
[g=0, 1 evaluated, 0 expanded, t=0.00648782s, 4476 KB]  
Initial heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 16  
Initial heuristic value for ff\_synergy(hlm): 14  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 15  
New best heuristic value for ff\_synergy(hlm): 13  
[g=1, 2 evaluated, 1 expanded, t=0.00660582s, 4476 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 14  
[g=2, 3 evaluated, 2 expanded, t=0.00668746s, 4476 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 13  
New best heuristic value for ff\_synergy(hlm): 12  
[g=3, 5 evaluated, 4 expanded, t=0.00679885s, 4476 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 12  
[g=9, 25 evaluated, 24 expanded, t=0.00756531s, 4476 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 9  
[g=21, 106 evaluated, 105 expanded, t=0.0103924s, 4476 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 8  
[g=22, 107 evaluated, 106 expanded, t=0.0104852s, 4476 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 7  
[g=37, 183 evaluated, 182 expanded, t=0.0134008s, 4476 KB]  
New best heuristic value for ff\_synergy(hlm): 11  
[g=42, 199 evaluated, 198 expanded, t=0.0140805s, 4476 KB]  
New best heuristic value for ff\_synergy(hlm): 8  
[g=45, 202 evaluated, 201 expanded, t=0.0142722s, 4476 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 6  
[g=46, 204 evaluated, 203 expanded, t=0.0143913s, 4476 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 5  
[g=47, 205 evaluated, 204 expanded, t=0.0144677s, 4476 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 4  
[g=49, 209 evaluated, 208 expanded, t=0.0146546s, 4476 KB]  
New best heuristic value for ff\_synergy(hlm): 7  
[g=97, 1275 evaluated, 1274 expanded, t=0.059719s, 4612 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 3  
[g=100, 1283 evaluated, 1282 expanded, t=0.0600756s, 4612 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 2  
[g=124, 1532 evaluated, 1531 expanded, t=0.0691859s, 4612 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 1  
[g=125, 1533 evaluated, 1532 expanded, t=0.0692801s, 4612 KB]  
New best heuristic value for ff\_synergy(hlm): 4  
[g=127, 1535 evaluated, 1534 expanded, t=0.069383s, 4612 KB]  
New best heuristic value for ff\_synergy(hlm): 3  
[g=129, 1538 evaluated, 1537 expanded, t=0.0695695s, 4744 KB]  
New best heuristic value for ff\_synergy(hlm): 2  
[g=130, 1539 evaluated, 1538 expanded, t=0.0697451s, 4744 KB]  
New best heuristic value for ff\_synergy(hlm): 1  
[g=131, 1540 evaluated, 1539 expanded, t=0.0698207s, 4744 KB]  
Solution found!  
Actual search time: 0.0634644s [t=0.0698803s]  
move-without-ball arm r1 r4 (1)  
pickup arm ball2 r4 (1)  
move-with-ball arm ball2 r4 r5 (1)  
release arm ball2 r5 (1)  
move-without-ball arm r5 r6 (1)  
pickup arm ball1 r6 (1)  
move-with-ball arm ball1 r6 r3 (1)  
release arm ball1 r3 (1)  
move-without-ball arm r3 r6 (1)  
move-without-ball arm r6 r5 (1)  
move-without-ball arm r5 r8 (1)  
move-without-ball arm r8 r7 (1)  
pickup arm ball3 r7 (1)  
move-with-ball arm ball3 r7 r8 (1)  
release arm ball3 r8 (1)  
move-without-ball arm r8 r5 (1)  
pickup arm ball2 r5 (1)  
move-with-ball arm ball2 r5 r6 (1)  
release arm ball2 r6 (1)  
move-without-ball arm r6 r3 (1)  
pickup arm ball1 r3 (1)  
move-with-ball arm ball1 r3 r2 (1)  
release arm ball1 r2 (1)  
move-without-ball arm r2 r3 (1)  
move-without-ball arm r3 r6 (1)  
pickup arm ball2 r6 (1)  
move-with-ball arm ball2 r6 r3 (1)  
release arm ball2 r3 (1)  
move-without-ball arm r3 r6 (1)  
move-without-ball arm r6 r5 (1)  
move-without-ball arm r5 r8 (1)  
pickup arm ball3 r8 (1)  
move-with-ball arm ball3 r8 r5 (1)  
move-with-ball arm ball3 r5 r6 (1)  
move-with-ball arm ball3 r6 r9 (1)  
release arm ball3 r9 (1)  
move-without-ball arm r9 r6 (1)  
move-without-ball arm r6 r3 (1)  
pickup arm ball2 r3 (1)  
move-with-ball arm ball2 r3 r6 (1)  
release arm ball2 r6 (1)  
move-without-ball arm r6 r3 (1)  
move-without-ball arm r3 r2 (1)  
pickup arm ball1 r2 (1)  
move-with-ball arm ball1 r2 r3 (1)  
release arm ball1 r3 (1)  
move-without-ball arm r3 r6 (1)  
pickup arm ball2 r6 (1)  
move-with-ball arm ball2 r6 r5 (1)  
move-with-ball arm ball2 r5 r8 (1)  
release arm ball2 r8 (1)  
move-without-ball arm r8 r5 (1)  
move-without-ball arm r5 r6 (1)  
move-without-ball arm r6 r3 (1)  
pickup arm ball1 r3 (1)  
move-with-ball arm ball1 r3 r6 (1)  
move-with-ball arm ball1 r6 r5 (1)  
release arm ball1 r5 (1)  
move-without-ball arm r5 r6 (1)  
move-without-ball arm r6 r9 (1)  
pickup arm ball3 r9 (1)  
move-with-ball arm ball3 r9 r6 (1)  
move-with-ball arm ball3 r6 r3 (1)  
release arm ball3 r3 (1)  
move-without-ball arm r3 r6 (1)  
move-without-ball arm r6 r5 (1)  
pickup arm ball1 r5 (1)  
move-with-ball arm ball1 r5 r6 (1)  
release arm ball1 r6 (1)  
move-without-ball arm r6 r5 (1)  
move-without-ball arm r5 r8 (1)  
pickup arm ball2 r8 (1)  
move-with-ball arm ball2 r8 r5 (1)  
release arm ball2 r5 (1)  
move-without-ball arm r5 r6 (1)  
move-without-ball arm r6 r3 (1)  
pickup arm ball3 r3 (1)  
move-with-ball arm ball3 r3 r2 (1)  
release arm ball3 r2 (1)  
move-without-ball arm r2 r3 (1)  
move-without-ball arm r3 r6 (1)  
pickup arm ball1 r6 (1)  
move-with-ball arm ball1 r6 r3 (1)  
release arm ball1 r3 (1)  
move-without-ball arm r3 r6 (1)  
move-without-ball arm r6 r5 (1)  
pickup arm ball2 r5 (1)  
move-with-ball arm ball2 r5 r6 (1)  
move-with-ball arm ball2 r6 r9 (1)  
release arm ball2 r9 (1)  
move-without-ball arm r9 r6 (1)  
move-without-ball arm r6 r3 (1)  
pickup arm ball1 r3 (1)  
move-with-ball arm ball1 r3 r6 (1)  
release arm ball1 r6 (1)  
move-without-ball arm r6 r3 (1)  
move-without-ball arm r3 r2 (1)  
pickup arm ball3 r2 (1)  
move-with-ball arm ball3 r2 r3 (1)  
release arm ball3 r3 (1)  
move-without-ball arm r3 r6 (1)  
pickup arm ball1 r6 (1)  
move-with-ball arm ball1 r6 r5 (1)  
move-with-ball arm ball1 r5 r8 (1)  
release arm ball1 r8 (1)  
move-without-ball arm r8 r5 (1)  
move-without-ball arm r5 r6 (1)  
move-without-ball arm r6 r3 (1)  
pickup arm ball3 r3 (1)  
move-with-ball arm ball3 r3 r6 (1)  
move-with-ball arm ball3 r6 r5 (1)  
release arm ball3 r5 (1)  
move-without-ball arm r5 r8 (1)  
pickup arm ball1 r8 (1)  
move-with-ball arm ball1 r8 r7 (1)  
release arm ball1 r7 (1)  
move-without-ball arm r7 r8 (1)  
move-without-ball arm r8 r5 (1)  
move-without-ball arm r5 r6 (1)  
move-without-ball arm r6 r9 (1)  
pickup arm ball2 r9 (1)  
move-with-ball arm ball2 r9 r6 (1)  
move-with-ball arm ball2 r6 r3 (1)  
move-with-ball arm ball2 r3 r2 (1)  
release arm ball2 r2 (1)  
move-without-ball arm r2 r3 (1)  
move-without-ball arm r3 r6 (1)  
move-without-ball arm r6 r5 (1)  
pickup arm ball3 r5 (1)  
move-with-ball arm ball3 r5 r6 (1)  
move-with-ball arm ball3 r6 r9 (1)  
release arm ball3 r9 (1)  
Plan length: 132 step(s).  
Plan cost: 132  
Expanded 1540 state(s).  
Reopened 0 state(s).  
Evaluated 1541 state(s).  
Evaluations: 3082  
Generated 3567 state(s).  
Dead ends: 0 state(s).  
Number of registered states: 1541  
Int hash set load factor: 1541/2048 = 0.752441  
Int hash set resizes: 11  
Best solution cost so far: 132  
Solution found - keep searching  
Starting search: lazy\_wastar(list(hff, hlm), preferred = list(hff, hlm), w = 5)  
Conducting lazy best first search, (real) bound = 132  
10 initial landmarks, 3 goal landmarks  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 16  
New best heuristic value for ff\_synergy(hlm): 14  
[g=0, 1 evaluated, 0 expanded, t=0.0710706s, 4744 KB]  
Initial heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 16  
Initial heuristic value for ff\_synergy(hlm): 14  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 15  
New best heuristic value for ff\_synergy(hlm): 13  
[g=1, 2 evaluated, 1 expanded, t=0.0711902s, 4744 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 14  
[g=2, 3 evaluated, 2 expanded, t=0.0712774s, 4744 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 13  
New best heuristic value for ff\_synergy(hlm): 12  
[g=3, 5 evaluated, 4 expanded, t=0.0714012s, 4744 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 12  
[g=9, 26 evaluated, 25 expanded, t=0.0722745s, 4744 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 9  
[g=21, 122 evaluated, 121 expanded, t=0.0759108s, 4744 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 8  
[g=22, 123 evaluated, 122 expanded, t=0.0760029s, 4744 KB]  
New best heuristic value for ff\_synergy(hlm): 11  
[g=14, 245 evaluated, 244 expanded, 3 reopened, t=0.0807497s, 4744 KB]  
New best heuristic value for ff\_synergy(hlm): 8  
[g=17, 251 evaluated, 250 expanded, 3 reopened, t=0.0810359s, 4744 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 6  
[g=25, 273 evaluated, 272 expanded, 3 reopened, t=0.0820222s, 4744 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 5  
[g=30, 286 evaluated, 285 expanded, 3 reopened, t=0.0825651s, 4744 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 4  
[g=31, 287 evaluated, 286 expanded, 3 reopened, t=0.0826591s, 4744 KB]  
New best heuristic value for ff\_synergy(hlm): 6  
[g=34, 400 evaluated, 399 expanded, 19 reopened, t=0.0868901s, 4744 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 3  
New best heuristic value for ff\_synergy(hlm): 5  
[g=36, 402 evaluated, 401 expanded, 19 reopened, t=0.0870202s, 4744 KB]  
New best heuristic value for ff\_synergy(hlm): 4  
[g=37, 403 evaluated, 402 expanded, 19 reopened, t=0.0870968s, 4744 KB]  
New best heuristic value for ff\_synergy(hlm): 3  
[g=38, 404 evaluated, 403 expanded, 19 reopened, t=0.0871707s, 4744 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 2  
New best heuristic value for ff\_synergy(hlm): 2  
[g=39, 405 evaluated, 404 expanded, 19 reopened, t=0.0872388s, 4744 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 1  
New best heuristic value for ff\_synergy(hlm): 1  
[g=40, 406 evaluated, 405 expanded, 19 reopened, t=0.087327s, 4744 KB]  
Solution found!  
Actual search time: 0.0163791s [t=0.0874045s]  
move-without-ball arm r1 r4 (1)  
move-without-ball arm r4 r5 (1)  
move-without-ball arm r5 r8 (1)  
move-without-ball arm r8 r7 (1)  
pickup arm ball3 r7 (1)  
move-with-ball arm ball3 r7 r8 (1)  
release arm ball3 r8 (1)  
move-without-ball arm r8 r5 (1)  
move-without-ball arm r5 r6 (1)  
pickup arm ball1 r6 (1)  
move-with-ball arm ball1 r6 r3 (1)  
release arm ball1 r3 (1)  
move-without-ball arm r3 r6 (1)  
move-without-ball arm r6 r5 (1)  
move-without-ball arm r5 r8 (1)  
pickup arm ball3 r8 (1)  
move-with-ball arm ball3 r8 r5 (1)  
move-with-ball arm ball3 r5 r6 (1)  
move-with-ball arm ball3 r6 r9 (1)  
release arm ball3 r9 (1)  
move-without-ball arm r9 r6 (1)  
move-without-ball arm r6 r3 (1)  
pickup arm ball1 r3 (1)  
move-with-ball arm ball1 r3 r6 (1)  
move-with-ball arm ball1 r6 r5 (1)  
move-with-ball arm ball1 r5 r8 (1)  
move-with-ball arm ball1 r8 r7 (1)  
release arm ball1 r7 (1)  
move-without-ball arm r7 r8 (1)  
move-without-ball arm r8 r5 (1)  
move-without-ball arm r5 r4 (1)  
pickup arm ball2 r4 (1)  
move-with-ball arm ball2 r4 r5 (1)  
move-with-ball arm ball2 r5 r6 (1)  
move-with-ball arm ball2 r6 r3 (1)  
move-with-ball arm ball2 r3 r2 (1)  
release arm ball2 r2 (1)  
Plan length: 37 step(s).  
Plan cost: 37  
Expanded 406 state(s).  
Reopened 19 state(s).  
Evaluated 407 state(s).  
Evaluations: 795  
Generated 988 state(s).  
Dead ends: 0 state(s).  
Number of registered states: 388  
Int hash set load factor: 388/512 = 0.757812  
Int hash set resizes: 9  
Best solution cost so far: 37  
Solution found - keep searching  
Starting search: lazy\_wastar(list(hff, hlm), preferred = list(hff, hlm), w = 3)  
Conducting lazy best first search, (real) bound = 37  
10 initial landmarks, 3 goal landmarks  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 16  
New best heuristic value for ff\_synergy(hlm): 14  
[g=0, 1 evaluated, 0 expanded, t=0.0879516s, 4744 KB]  
Initial heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 16  
Initial heuristic value for ff\_synergy(hlm): 14  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 15  
New best heuristic value for ff\_synergy(hlm): 13  
[g=1, 2 evaluated, 1 expanded, t=0.0880435s, 4744 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 14  
[g=2, 3 evaluated, 2 expanded, t=0.0881224s, 4744 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 13  
New best heuristic value for ff\_synergy(hlm): 12  
[g=3, 5 evaluated, 4 expanded, t=0.088236s, 4744 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 12  
[g=9, 31 evaluated, 30 expanded, t=0.0892195s, 4744 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 11  
[g=14, 111 evaluated, 110 expanded, t=0.0921282s, 4744 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 10  
[g=16, 118 evaluated, 117 expanded, t=0.0924298s, 4744 KB]  
New best heuristic value for ff\_synergy(hlm): 11  
[g=14, 185 evaluated, 184 expanded, 1 reopened, t=0.0948515s, 4744 KB]  
New best heuristic value for ff\_synergy(hlm): 8  
[g=18, 189 evaluated, 188 expanded, 1 reopened, t=0.0950435s, 4744 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 8  
[g=21, 194 evaluated, 193 expanded, 1 reopened, t=0.0952584s, 4744 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 6  
[g=27, 209 evaluated, 208 expanded, 1 reopened, t=0.0958124s, 4744 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 5  
[g=32, 226 evaluated, 225 expanded, 1 reopened, t=0.096441s, 4744 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 4  
[g=33, 228 evaluated, 227 expanded, 1 reopened, t=0.0965959s, 4744 KB]  
New best heuristic value for ff\_synergy(hlm): 6  
[g=26, 304 evaluated, 303 expanded, 3 reopened, t=0.0993943s, 4744 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 3  
New best heuristic value for ff\_synergy(hlm): 5  
[g=28, 306 evaluated, 305 expanded, 3 reopened, t=0.0995114s, 4744 KB]  
New best heuristic value for ff\_synergy(hlm): 4  
[g=29, 307 evaluated, 306 expanded, 3 reopened, t=0.0995833s, 4744 KB]  
New best heuristic value for ff\_synergy(hlm): 3  
[g=30, 308 evaluated, 307 expanded, 3 reopened, t=0.0996524s, 4744 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 2  
New best heuristic value for ff\_synergy(hlm): 2  
[g=31, 309 evaluated, 308 expanded, 3 reopened, t=0.0997157s, 4744 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 1  
New best heuristic value for ff\_synergy(hlm): 1  
[g=32, 310 evaluated, 309 expanded, 3 reopened, t=0.0997754s, 4744 KB]  
Solution found!  
Actual search time: 0.0119132s [t=0.0998245s]  
move-without-ball arm r1 r4 (1)  
move-without-ball arm r4 r5 (1)  
move-without-ball arm r5 r6 (1)  
pickup arm ball1 r6 (1)  
move-with-ball arm ball1 r6 r3 (1)  
release arm ball1 r3 (1)  
move-without-ball arm r3 r6 (1)  
move-without-ball arm r6 r5 (1)  
move-without-ball arm r5 r8 (1)  
move-without-ball arm r8 r7 (1)  
pickup arm ball3 r7 (1)  
move-with-ball arm ball3 r7 r8 (1)  
move-with-ball arm ball3 r8 r5 (1)  
move-with-ball arm ball3 r5 r6 (1)  
move-with-ball arm ball3 r6 r9 (1)  
release arm ball3 r9 (1)  
move-without-ball arm r9 r6 (1)  
move-without-ball arm r6 r3 (1)  
pickup arm ball1 r3 (1)  
move-with-ball arm ball1 r3 r6 (1)  
move-with-ball arm ball1 r6 r5 (1)  
move-with-ball arm ball1 r5 r8 (1)  
move-with-ball arm ball1 r8 r7 (1)  
release arm ball1 r7 (1)  
move-without-ball arm r7 r8 (1)  
move-without-ball arm r8 r5 (1)  
move-without-ball arm r5 r4 (1)  
pickup arm ball2 r4 (1)  
move-with-ball arm ball2 r4 r5 (1)  
move-with-ball arm ball2 r5 r6 (1)  
move-with-ball arm ball2 r6 r3 (1)  
move-with-ball arm ball2 r3 r2 (1)  
release arm ball2 r2 (1)  
Plan length: 33 step(s).  
Plan cost: 33  
Expanded 310 state(s).  
Reopened 3 state(s).  
Evaluated 311 state(s).  
Evaluations: 619  
Generated 756 state(s).  
Dead ends: 0 state(s).  
Number of registered states: 308  
Int hash set load factor: 308/512 = 0.601562  
Int hash set resizes: 9  
Best solution cost so far: 33  
Solution found - keep searching  
Starting search: lazy\_wastar(list(hff, hlm), preferred = list(hff, hlm), w = 2)  
Conducting lazy best first search, (real) bound = 33  
10 initial landmarks, 3 goal landmarks  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 16  
New best heuristic value for ff\_synergy(hlm): 14  
[g=0, 1 evaluated, 0 expanded, t=0.100287s, 4744 KB]  
Initial heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 16  
Initial heuristic value for ff\_synergy(hlm): 14  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 15  
New best heuristic value for ff\_synergy(hlm): 13  
[g=1, 2 evaluated, 1 expanded, t=0.100373s, 4744 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 14  
[g=2, 3 evaluated, 2 expanded, t=0.100445s, 4744 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 13  
New best heuristic value for ff\_synergy(hlm): 12  
[g=3, 5 evaluated, 4 expanded, t=0.10055s, 4744 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 12  
[g=9, 35 evaluated, 34 expanded, t=0.101746s, 4744 KB]  
New best heuristic value for ff\_synergy(hlm): 11  
[g=14, 144 evaluated, 143 expanded, t=0.105816s, 4744 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 11  
[g=17, 150 evaluated, 149 expanded, t=0.106068s, 4744 KB]  
New best heuristic value for ff\_synergy(hlm): 8  
[g=18, 151 evaluated, 150 expanded, t=0.106148s, 4744 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 10  
[g=20, 190 evaluated, 189 expanded, t=0.10749s, 4744 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 8  
[g=21, 191 evaluated, 190 expanded, t=0.10757s, 4744 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 7  
[g=19, 201 evaluated, 200 expanded, t=0.107987s, 4744 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 6  
[g=20, 202 evaluated, 201 expanded, t=0.108074s, 4744 KB]  
New best heuristic value for ff\_synergy(hlm): 6  
[g=26, 217 evaluated, 216 expanded, t=0.108685s, 4744 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 5  
[g=27, 219 evaluated, 218 expanded, t=0.108829s, 4744 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 3  
New best heuristic value for ff\_synergy(hlm): 5  
[g=28, 221 evaluated, 220 expanded, t=0.108945s, 4744 KB]  
New best heuristic value for ff\_synergy(hlm): 4  
[g=29, 222 evaluated, 221 expanded, t=0.109018s, 4744 KB]  
New best heuristic value for ff\_synergy(hlm): 3  
[g=30, 223 evaluated, 222 expanded, t=0.109088s, 4744 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 2  
New best heuristic value for ff\_synergy(hlm): 2  
[g=31, 225 evaluated, 224 expanded, t=0.109196s, 4744 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 1  
New best heuristic value for ff\_synergy(hlm): 1  
[g=32, 226 evaluated, 225 expanded, t=0.109263s, 4744 KB]  
Completely explored state space -- no solution!  
Actual search time: 0.17256s [t=0.272817s]  
Expanded 4290 state(s).  
Reopened 384 state(s).  
Evaluated 4290 state(s).  
Evaluations: 8196  
Generated 9544 state(s).  
Dead ends: 0 state(s).  
Number of registered states: 3906  
Int hash set load factor: 3906/8192 = 0.476807  
Int hash set resizes: 13  
Best solution cost so far: 33  
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 = 33  
10 initial landmarks, 3 goal landmarks  
New best heuristic value for ff\_synergy(hlm): 14  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 16  
[g=0, 1 evaluated, 0 expanded, t=0.273146s, 4868 KB]  
Initial heuristic value for ff\_synergy(hlm): 14  
Initial heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 16  
New best heuristic value for ff\_synergy(hlm): 13  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 15  
[g=1, 2 evaluated, 1 expanded, t=0.273296s, 4868 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 14  
[g=2, 3 evaluated, 2 expanded, t=0.273376s, 4868 KB]  
New best heuristic value for ff\_synergy(hlm): 12  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 13  
[g=3, 5 evaluated, 4 expanded, t=0.273488s, 4868 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 12  
[g=9, 39 evaluated, 38 expanded, t=0.274678s, 4868 KB]  
New best heuristic value for ff\_synergy(hlm): 11  
[g=14, 210 evaluated, 209 expanded, t=0.280253s, 4868 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 11  
[g=17, 277 evaluated, 276 expanded, t=0.282494s, 4868 KB]  
New best heuristic value for ff\_synergy(hlm): 8  
[g=18, 290 evaluated, 289 expanded, t=0.282973s, 4868 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 10  
[g=18, 324 evaluated, 323 expanded, t=0.28424s, 4868 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 7  
[g=19, 343 evaluated, 342 expanded, t=0.28495s, 4868 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 6  
[g=20, 344 evaluated, 343 expanded, t=0.28503s, 4868 KB]  
New best heuristic value for ff\_synergy(hlm): 6  
[g=26, 504 evaluated, 503 expanded, 1 reopened, t=0.290852s, 4868 KB]  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 5  
[g=27, 572 evaluated, 571 expanded, 1 reopened, t=0.293422s, 4868 KB]  
New best heuristic value for ff\_synergy(hlm): 5  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 3  
[g=28, 603 evaluated, 602 expanded, 1 reopened, t=0.294548s, 4868 KB]  
New best heuristic value for ff\_synergy(hlm): 4  
[g=29, 604 evaluated, 603 expanded, 1 reopened, t=0.294625s, 4868 KB]  
New best heuristic value for ff\_synergy(hlm): 3  
[g=30, 614 evaluated, 613 expanded, 1 reopened, t=0.295015s, 4868 KB]  
New best heuristic value for ff\_synergy(hlm): 2  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 2  
[g=31, 697 evaluated, 696 expanded, 1 reopened, t=0.2982s, 4868 KB]  
New best heuristic value for ff\_synergy(hlm): 1  
New best heuristic value for lama\_synergy(lm\_rhw(reasonable\_orders = true)): 1  
[g=32, 735 evaluated, 734 expanded, 1 reopened, t=0.299642s, 4868 KB]  
Completely explored state space -- no solution!  
Actual search time: 0.156566s [t=0.429686s]  
Expanded 4141 state(s).  
Reopened 235 state(s).  
Evaluated 4141 state(s).  
Evaluations: 8047  
Generated 9185 state(s).  
Dead ends: 0 state(s).  
Number of registered states: 3906  
Int hash set load factor: 3906/8192 = 0.476807  
Int hash set resizes: 13  
Best solution cost so far: 33  
No solution found - keep searching  
Actual search time: 0.423604s [t=0.4299s]  
Cumulative statistics:  
Expanded 10687 state(s).  
Reopened 641 state(s).  
Evaluated 10690 state(s).  
Evaluations: 20739  
Generated 24040 state(s).  
Dead ends: 0 state(s).  
Search time: 0.423617s  
Total time: 0.42991s  
Solution found.  
Peak memory: 4916 KB