

Our new algorithm can **ground** almost* every planning task of our benchmarks

*And we can show that the rest are probably
out of reach.

Grounding via Solving

Convert your task to a **Datalog program**:

```
P(0,0), P(0,1), Q(0), Q(1)
ActionA(X, Y, Z) :- P(X,Y), P(Y,Z), Q(X), Q(Y), Q(Z)
E(Z) :- ActionA(X,Y,Z)
goal :- E(1)
```

Remove action predicates. They are too hard to ground!

```
P(0,0), P(0,1), Q(0), Q(1)
E(Z) :- P(X,Y), P(Y,Z), Q(X), Q(Y), Q(Z)
goal :- E(1)
```

Ground this new program using gringo, idlv, etc.

The model represents all **relaxed-reachable atoms**:

```
P(0,0), P(0,1), Q(0), Q(1), E(0), E(1), goal
```

For each action predicate removed, create a logic program in this format:

```
1 {V-assign(T) : Q(T)} 1. # for each V in {X, Y, Z}
F :- X-assign(T1), Y-assign(T2), not P(T1,T2).
F :- Y-assign(T1), Z-assign(T2), not P(T1,T2).
```

Each **stable model** of this program is a relaxed-reachable action instantiation.
Computing all models of all actions gives us all the **relaxed-reachable actions**.