

Prolog: how to do counting

Example: Count number of times $\text{pred}(x)$ holds for elements in a list

Intuition should structure prolog goals as
 $\text{goal}(\text{In1}, \text{In2}, \dots, \text{InN}, \text{Out1}, \dots, \text{OutN})$

```
Countpred([], 0) :- !.  
Countpred(List, Count) :-  
    List = [First | Rest],  
    Pred(First),  
    SubCount is Count - 1,  
    Countpred(Rest, Subcount).  
Countpred(List, Count) :-  
    List = [_ | Rest],  
    not(pred(First)),  
    Countpred(Rest, Count).
```

Blocks in order	A	B	C
Goal State			
	C		
	B		
	A		

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Possible next move from initial state

B
A C

Move(B, Table, A)

To compute effect of move, took initial state: $\text{On}(A, \text{Table}), \text{On}(B, \text{Table}), \text{On}(C, \text{Table}), \text{Block}(A), \text{Block}(B), \text{Block}(C), \text{Clear}(A), \text{Clear}(B), \text{Clear}(C)$.

For each positive effect add to new state

$\text{On}(B, A), \text{Clear}(\text{Table})$.

For each negative effect we delete corresponding positive things if had been in state.

$\text{GetFinally}, \text{On}(A, \text{Table}), \text{On}(B, A), \text{On}(C, \text{Table}), \text{Clear}(B), \text{Clear}(C), \text{Block}(A), \text{Block}(B), \text{Block}(C)$

In above example, effect & Possible axioms are combined together in something called an action schema.

These kind of rules have the format

action takes these preconditions
has the following effects

One planning program that uses action schema is called the STRIPS planner.

STRIPS = STanford Research Institute Planning Solver

STRIPS makes the following assumption to avoid the frame problem. (STRIPS assumption)

If we need to go from state S to state S' by an action, then if S already contains one of the positive effects of the action don't add it again.

If S does not have the corresponding positive literal for some negative effect of an action then ignore the negative effect.