Given the initial state:

```
[ontable(a,p1), ontable(d,p3), on(c,d), clear(a), clear(c), empty(p2), handempty]
```

(p1,p2,p3 are three positions on the table)

Actions are modelled as:

pickup(X,Pos)

PRECOND: ontable(X,Pos), clear(X), handempty

DELETE: ontable(X,Pos), clear(X), handempty

ADD: holding(X), empty(Pos)

putdown(X,Pos)

PRECOND: holding(X), empty(Pos)

DELETE: holding(X), empty(Pos)

ADD: ontable(X,Pos), clear(X), handempty

stack(X,Y)

PRECOND: holding(X), clear(Y)
DELETE: holding(X), clear(Y)

ADD: handempty, on(X,Y), clear(X)

unstack(X,Y)

PRECOND: handempty, on(X,Y), clear(X) DELETE: handempty, on(X,Y), clear(X)

ADD: holding(X), clear(Y)

The goal is **ontable(a,p2)**

Describe how the algorithm STRIPS finds a plan. Show ONLY ONE PATH from the root to the node.

```
State
                              Goal Stack
ontable(a,p1),
                        ontable(a,p2)
ontable(d,p3),
on (c,d),
clear(a),
clear(c),
empty(p2),
handempty
                           ontable(a,p2) unifies with an effect of
                           putdown(a,p2)
                              Goal Stack
         State
ontable(a,p1),
                        empty(p2)
ontable(d,p3),
                        holding(a)
on (c,d),
                        holding(a) ∧ empty(p2)
clear(a),
                        putdown(a,p2)
clear(c),
empty(p2),
handempty
                           empty(p2) is trrue in the current state
```

empty(p2) is true in the current state

```
State Goal Stack

ontable(a,p1), holding(a)

ontable(d,p3), holding(a) \wedge empty(p2)

on(c,d), putdown(a,p2)

clear(a),

clear(c),

empty(p2),

handempty
```

holding(a) unifies with an effect of pickup(a,Pos)

```
State
                                     Goal Stack
ontable(a,p1),
                            ontable(a,Pos)
ontable(d,p3),
                            clear(a)
on (c,d),
                            handempty
clear(a),
                            ontable(a,Pos)∧clear(a)∧han
clear(c),
                            dempty
empty(p2),
                            pickup(a,Pos)
                            holding(a) ∧ empty(p2)
Handempty
                            putdown (a,p2)
```

ontable(a,Pos) is true in the current state with the unification Pos/p1

ontable(a,Pos) is true in the current state with the unification Pos/p1

```
Goal Stack
        Current State
ontable(a,p1),
                              clear(a)
ontable(d,p3),
                              handempty
on (c,d),
                              ontable (a,p1) \land clear(a) \land hand
clear(a),
                              empty
clear(c),
                              pickup(a,p1)
empty(p2),
                              holding(a) ∧ empty(p2)
Handempty
                              putdown(a,p2)
```

clear(a) and handempty are true in the current state

```
Current State Goal Stack ontable (a,p1), ontable (d,p3), on (c,d), clear(a), clear(a), clear(c), empty (p2), empty (p2), Handempty Goal Stack ontable (a,p1)Goal Stack ontable (a,p2)Goal Stack ontable (a,p2)Goal Stack ontable (a,p2)Goal Stack ontable (a,p2)Goal Stack ontable (a,
```

The conjunction is true in the current state

```
Current State

ontable(a,p1),

ontable(d,p3),

on(c,d),

clear(a),

clear(c),

empty(p2),

Handempty

Coal State

pickup(a,p1)

holding(a) \( \triangle \text{empty}(p2)

putdown(a,p2)

Execution of action pickup(a,p1)
```

```
Current State Goal State empty(p1), holding(a), putdown(a,p2) ontable(d,p3), on(c,d), clear(c), empty(p2),
```

The conjunction is true in the current state

The conjunction is true in the current state

```
Current State Goal Stack

empty(p1), putdown(a,p2)

holding(a),
ontable(d,p3),
on(c,d),
clear(c),
empty(p2),
```

Execution of action putdown(a,p2)

```
Current State Goal Stack

empty(p1),

handempty(a),

ontable(d,p3),

on(c,d),

clear(c),

ontable(a,p2)
```