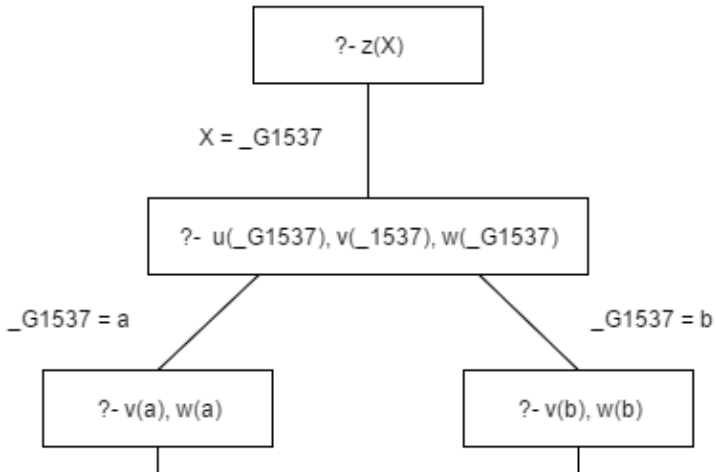
Backtracking

- When a search path is not valid, **backtracking** occurs: Traversing the tree in opposite direction until a variable binding (choise point) is reached
- If a result is found, one can choose to continue the search by using backtracking, using the "**;**" command

A simple example (2)

```
[trace] 6 ?- z(X).
   Call: (7) z(_G1537) ? creep
   Call: (8) u(_G1537) ? creep
   Exit: (8) u(a) ? creep
   Call: (8) v(a) ? creep
   Exit: (8) v(a) ? creep
   Call: (8) w(a) ? creep
   Fail: (8) w(a) ? creep
   Redo: (8) u(_G1537) ? creep
   Exit: (8) u(b) ? creep
   Call: (8) v(b) ? creep
   Exit: (8) v(b) ? creep
   Call: (8) w(b) ? creep
   Exit: (8) w(b) ? creep
   Exit: (7) z(b) ? creep
X = b.
```

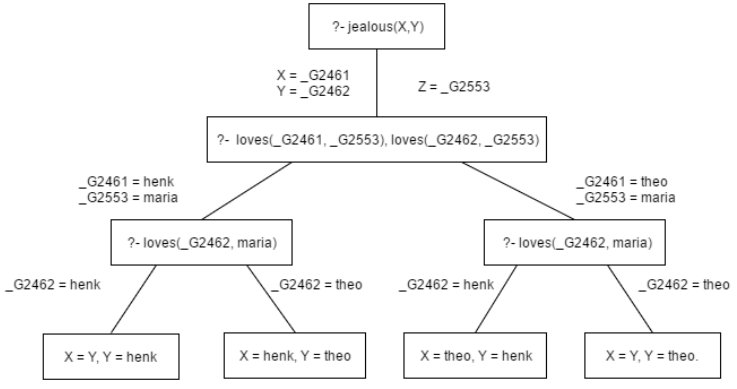
Figure 1: code



A more complicated example (2)

```
[trace] 13 ?- jealous(X,Y).
   Call: (7) jealous(_G2461, _G2462) ? creep
   Call: (8) loves(_G2461, _G2553) ? creep
   Exit: (8) loves(henk, maria) ? creep
   Call: (8) loves(_G2462, maria) ? creep
   Exit: (8) loves(henk, maria) ? creep
   Exit: (7) jealous(henk, henk) ? creep
X = Y, Y = henk ;
   Redo: (8) loves(_G2462, maria) ? creep
   Exit: (8) loves(theo, maria) ? creep
   Exit: (7) jealous(henk, theo) ? creep
X = henk,
Y = theo ;
   Redo: (8) loves(_G2461, _G2553) ? creep
   Exit: (8) loves(theo, maria) ? creep
   Call: (8) loves(_G2462, maria) ? creep
   Exit: (8) loves(henk, maria) ? creep
   Exit: (7) jealous(theo, henk) ? creep
X = theo,
Y = henk ;
   Redo: (8) loves(_G2462, maria) ? creep
   Exit: (8) loves(theo, maria) ? creep
   Exit: (7) jealous(theo, theo) ? creep
X = Y, Y = theo.
```

Figure 3: code



Powerful basis for logical inference

- Combining unification and backtracking to search trees results in a fast tool for logical inference
- Understanding of underlying concepts is important to understand results produced
- Various implementations might grant diffrent results, when cosidering a query like:

```
?- father(X) = X
```

!