

Logische Programmierung

4. Prolog in Aktion

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Das Lösen einer Anfrage mit Backtracking

Beispiel aus Clocksin Mellish S.14/15

```
likes(mary,food).  
likes(mary,wine).  
likes(john,wine).  
likes(john,mary).
```

```
?- likes(mary,X), likes(john,X).
```

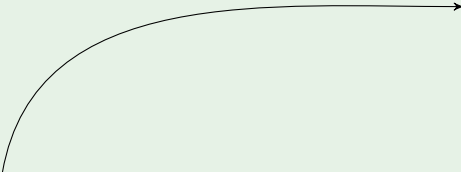
Das Lösen einer Anfrage mit Backtracking

Beispiel aus Clocksin Mellish S.14/15

?- likes(mary,X), likes(john,X).

gelingt

X=food



```
likes(mary,food).  
likes(mary,wine).  
likes(john,wine).  
likes(john,mary).
```

Das Lösen einer Anfrage mit Backtracking

Beispiel aus Clocksin Mellish S.14/15

```
?- likes(mary,X), likes(john,X).  
likes(mary,food).  
likes(mary,wine).  
likes(john,wine).  
likes(john,mary).
```

The diagram illustrates the backtracking process. A long arrow starts from the first clause of the query, `likes(mary,X)`, and points to the first clause of the database, `likes(mary,food).`. A shorter arrow starts from the second clause of the query, `likes(john,X)`, and points to the second clause of the database, `likes(john,wine).`

schlägt fehl

X=food

Das Lösen einer Anfrage mit Backtracking

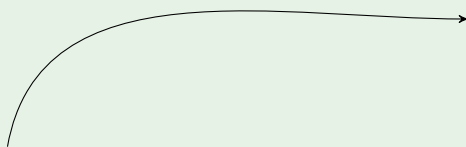
Beispiel aus Clocksin Mellish S.14/15

?- likes(mary,X), likes(john,X).

gelingt

X=wine

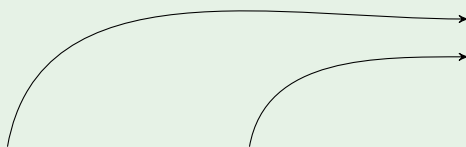
likes(mary,food).
likes(mary,wine).
likes(john,wine).
likes(john,mary).



Das Lösen einer Anfrage mit Backtracking

Beispiel aus Clocksin Mellish S.14/15

```
?- likes(mary,X), likes(john,X).  
likes(mary,food).  
likes(mary,wine).  
likes(john,wine).  
likes(john,mary).
```



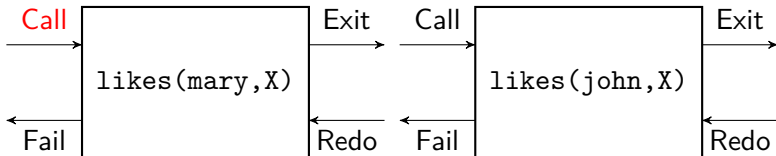
gelingt

X=wine

Byrd Box Model

?- likes(mary,X), likes(john,X).

```
likes(mary,food).  
likes(mary,wine).  
likes(john,wine).  
likes(john,mary).
```

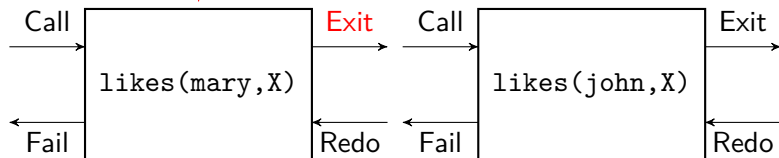


}

Byrd Box Model

?- likes(mary,X), likes(john,X).

likes(mary,food).
likes(mary,wine).
likes(john,wine).
likes(john,mary).

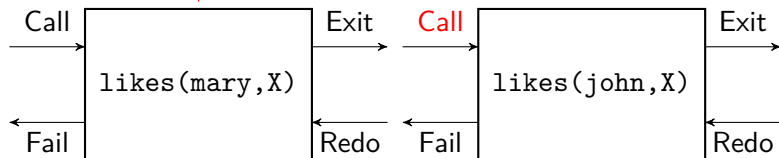


{X←food}

Byrd Box Model

?- likes(mary,X), likes(john,X).

likes(mary,food).
likes(mary,wine).
likes(john,wine).
likes(john,mary).

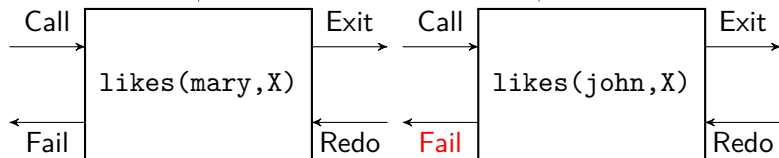


`{X←food}`

Byrd Box Model

?- likes(mary,X), likes(john,X).

likes(mary,food).
likes(mary,wine).
likes(john,wine).
likes(john,mary).

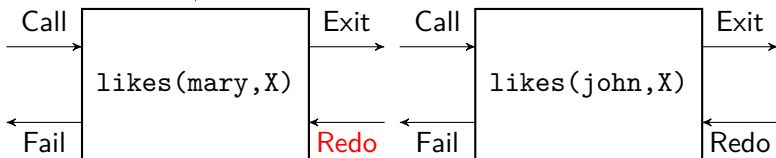


{X←food}

Byrd Box Model

?- likes(mary,X), likes(john,X).

likes(mary,food).
likes(mary,wine).
likes(john,wine).
likes(john,mary).

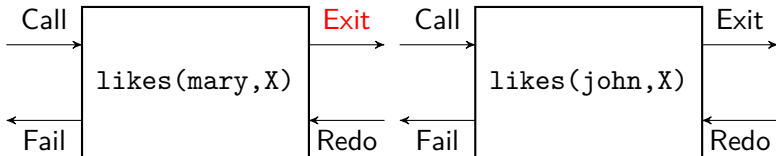


}

Byrd Box Model

?- likes(mary,X), likes(john,X).

likes(mary,food).
likes(mary,wine).
likes(john,wine).
likes(john,mary).

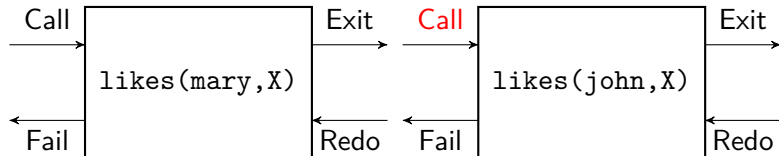


{X←wine}

Byrd Box Model

?- likes(mary,X), likes(john,X).

likes(mary,food).
likes(mary,wine).
likes(john,wine).
likes(john,mary).

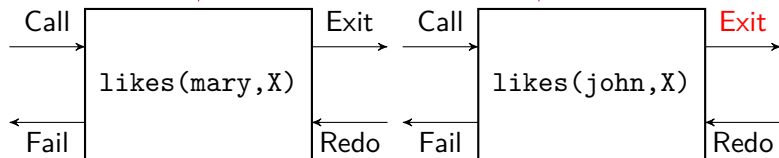


{X←wine}

Byrd Box Model

?- likes(mary,X), likes(john,X).

likes(mary,food).
likes(mary,wine).
likes(john,wine).
likes(john,mary).



`{X←wine}`

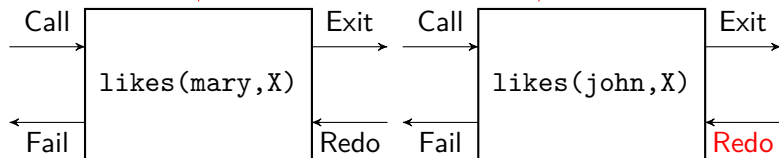
Prolog antwortet: `X=wine`

Benutzer gibt ; ein ...

Byrd Box Model

?- likes(mary,X), likes(john,X).

likes(mary,food).
likes(mary,wine).
likes(john,wine).
likes(john,mary).



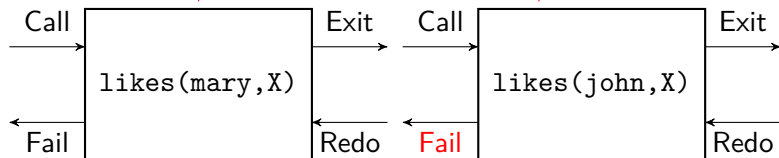
`{X←wine}`

... und erzwingt damit Backtracking (redo).

Byrd Box Model

?- likes(mary,X), likes(john,X).

likes(mary,food).
likes(mary,wine).
likes(john,wine).
likes(john,mary).

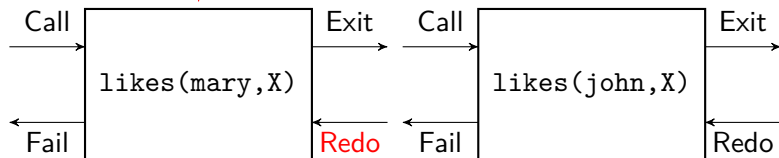


`{X←wine}`

Byrd Box Model

?- likes(mary,X), likes(john,X).

likes(mary,food).
likes(mary,wine).
likes(john,wine).
likes(john,mary).

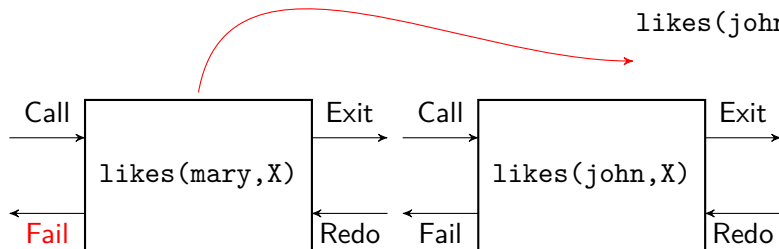


}

Byrd Box Model

?- likes(mary,X), likes(john,X).

likes(mary,food).
likes(mary,wine).
likes(john,wine).
likes(john,mary).

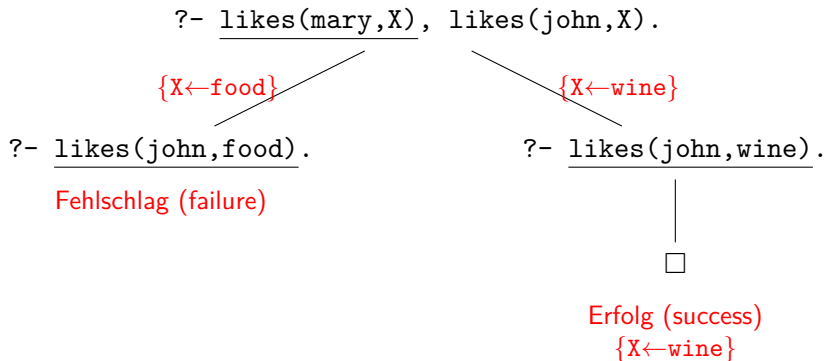


}

Anfrage schlägt fehl.

SLD-Baum

```
likes(mary,food).  
likes(mary,wine).  
likes(john,wine).  
likes(john,mary).
```



Jeder **Erfolgsast** liefert eine **Antwortsubstitution**, hier $\{X \leftarrow \text{wine}\}$.

Prolog antwortet: $X = \text{wine}$.