

# Foundations of Logic Programming

## Tutorial 6 (on January 5th)

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### Exercise 6.1:

Consider the following program. Give the full Prolog tree, **ignoring** the cut operator. Then indicate which branches would be ignored by the cut operator.

```
1 t(a).
2 t(b).
3 t(c).
4 u(c).
5 u(b).
6 w(a).
7 w(b).
8 w(c).

9 p(X) :- q(X).
10 p(X) :- r(X).
11 p(X) :- s(X).

12 q(X) :- t(X), u(X).
13 r(X) :- t(X), u(X), v(X).
14 s(X) :- v(X), u(X).

15 v(X) :- w(X), !.
```

### Exercise 6.2:

Consider the following program:

```
1 p([],X,X).
2 p([F|R1],X,[F|R2]) :- p(R1,X,R2).
```

- Provide the full Prolog tree for the query `?- p(X,Y,[1,2])`.
- Indicate the Prolog tree for the query `?- p(X,[1,2],Z)`.

- c) Provide a level mapping for which the program is recurrent.
- d) Is the query in a) bound w.r.t. the level mapping defined in c)?

**Additional Exercise 6.3:**

Consider the following program:

$$\begin{aligned}p(X) &\leftarrow r([a|X]) \\r([Y|X]) &\leftarrow s(X) \\s([Y|X]) &\leftarrow p(X)\end{aligned}$$

- a) Provide a level mapping for which the program is recurrent.
- b) Provide a bounded query for this level mapping which contains at least one variable.
- c) Provide an unbounded query for this level mapping.