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LIN 177

HW4

1)

```
:- use_module(library(tabling)).
:- table s/2.
:- table np/2.
:- table vp/2.
:- table pp/2.

% enter your rules

s --> np, vp.
np --> np, pp.
np --> det, n.
vp --> vp, pp.
vp --> v, np.
pp --> p, np.


% enter your lexical rules

det --> [the].
n --> [dogs].
n --> [cats].
n --> [garden].
p --> [in].
v --> [chased].
```

2)

```
:- use_module(library(tabling)).
:- table s/3.
:- table np/3.
:- table vp/3.
:- table pp/3.

% enter your rules

s(s(NP, VP)) --> np(NP), vp(VP).
np(np(NP, PP)) --> np(NP), pp(PP).
np(np(DET, N)) --> det(DET), n(N).
vp(vp(VP, PP)) --> vp(VP), pp(PP).
vp(vp(V, NP)) --> v(V), np(NP).
pp(pp(P, NP)) --> p(P), np(NP).

% enter your lexical rules

det(det(the)) --> [the].
n(n(dogs)) --> [dogs].
n(n(cats)) --> [cats].
n(n(garden)) --> [garden].
p(p(in)) --> [in].
v(v(chased)) --> [chased].



%TEMP RULES FOR PART 3:
%p(p(behind)) --> [behind].
%n(n(fence)) --> [fence].
%n(n(garden)) --> [garden].
```

3)

Number of PP’s	Number of trees
0	1
1	2
2	5
3	14
4	42

The sequence relating the number of trees to the number of PP’s is as follows (function form is trees[PP’s]):

-trees [0] = 1

-trees[i] =trees[i-1] + 3^[i-1]

This sequence is commonly known as the Catalan numbers and appears frequently in computer science concepts, especially those involving recursion.