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LIN 177

HW4

1)

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| --- |
| :- 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.