

Frank Richter:  
**Grammatikformalismen für die Computerlinguistik**

**Homework Assignment 3****Due: May 19th**

Exercises 1–5 presuppose our familiar signature with lists, birds and pets, available as a MoMo file in `Section2221, birdsandpets-exs2221.mmp`.<sup>1</sup>

Some of the exercises presuppose the descriptions of Exercise 1 of Homework Assignment 2. For your convenience, they are repeated on the second page of the present homework assignment.

**Exercise 1. [3 points]** Create three graphs that are not well-formed feature structures (with respect to the given signature), either because they violate the signature or other conditions on what constitutes a feature structure. Indicate briefly why each one of them is ill-formed. Please use a new interpretation window for each ill-formed graph and assign meaningful names to the interpretation windows.

**Exercise 2. [2 points]** Create interpretations with feature structures that satisfy the descriptions in (1) and in (8) of Exercise 1 in Homework Assignment 2.

**Exercise 3. [2 points]** Is the description in (12) in Exercise 1, Homework Assignment 2, satisfiable? If it is, draw a feature structure satisfying it. If not, give a short explanation why it is not.

**Exercise 4. [2 points]** Are there any well-formed descriptions in the given list of descriptions that admit a feature structure? If so, name at least one of them and give an example of a feature structure admitted by it. Please use MoMo to create a file `admission.mmp` with your solution to this exercise.

**Exercise 5. [2 points]** From Exercise 2 we already know that description (8) is satisfiable, and we have drawn one of the feature structures that satisfy it. Give a short reasoning why there are no models of that description. (This can be done in three or four sentences!)  
Hint: You may want to play with the modeling function of MoMo to get some feedback on your ideas when you think about this question.

**Exercise 6. [Extra Credit: 3 points]** Submit an mmp file in which you have saved graphs of concrete feature structure counterparts of the six abstract feature structures in the six examples on pages 59–60 of *Grammar Formalisms and Parsing*.

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<sup>1</sup>[milca.sfs.uni-tuebingen.de/A4/Course/Momo/mmps/Section2221/birdsandpets-exs2221.mmp](http://milca.sfs.uni-tuebingen.de/A4/Course/Momo/mmps/Section2221/birdsandpets-exs2221.mmp)

The descriptions from Exercise 1, Homework Assignment 2:

1. `nelist,head:(cat;three).`
2. `elist;(nelist,tail):elist.`
3. `~yellow;brown.`
4. `(~color):black.`
5. `woodpecker;legs.`
6. `(list,head:bird:legs:number,color:number);elist.`
7. `nelist,head:(pet:cat);dog.`
8. `head:(parrot,legs:two,color:(yellow;green,~brown)).`
9. `head:bird;pet *> color:color,legs:number.`
10. `color:red;legs:three <*> ~(bird),green,two.`
11. `head,tail *> nelist.`
12. `(head:green,color:one);(head:cat,color:cat).`
13. `animal:pet:(cat;dog).`
14. `~elist <*> nelist:(first,rest).`
15. `nelist,head:legs:(two;four),color:(green;red;yellow;brown),  
tail:nelist,head:canary,legs:two,color:yellow,tail:elist.`