Übungsaufgaben

Logik in der Praxis - Logikprogrammierung (Prolog)

Abgabe bis 02.12.08

Exercise 9.1 (1 Punkte)
Which of the following queries succeed, and which fail?

1. `?- 12 is 2*6`
2. `?- 14 =\= 2*6`
3. `?- 14 = 2*7`
4. `?- 14 == 2*7`
5. `?- 14 \== 2*7`
6. `?- 14 =:= 2*7`
7. `?- [1,2,3|[d,e]] == [1,2,3,d,e]`
8. `?- 2+3 == 3+2`
9. `?- 2+3 =:= 3+2`
10. `?- 7-2 =\= 9-2`
11. `?- p == 'p'`
12. `?- p =\= 'p'`
13. `?- vincent == VAR`
14. `?- vincent=VAR,VAR==vincent`

Exercise 9.2 (2 Punkte)
How does Prolog respond to the following queries?
1. `?- .(a,.(b,.(c,[]))) = [a,b,c]`
2. `?- .(a,.(b,.(c,[]))) = [a,b|[c]]`
3. `?- .(.(a,[]),.(.(b,[]),.(.(c,[]),[]))) = X`
4. `?- .(a,.(b,.(.(c,[]),[]))) = [a,b|[c]]`

Exercise 9.3 (3 Punkte)
Write a two-place predicate `termtype(+Term,?Type)` that takes a term and gives back the type(s) of that term (atom, number, constant, variable etc.). The types should be given back in the order of their generality. The predicate should, e.g., behave in the following way.
```
?- termtype(Vincent,variable).
yes
?- termtype(mia,X).
X = atom ;
X = constant ;
X = simple_term ;
X = term ;
no
?- termtype(dead(zed),X).
X = complex_term ;
X = term ;
no
```

Exercise 9.4 (2 Punkte)

Write a program that defines the predicate `groundterm(+Term)` which tests whether Term is a ground term. Ground terms are terms that don't contain variables. Here are examples of how the predicate should behave:

```
?- groundterm(X).
no
?- groundterm(french(bic_mac,le_bic_mac)).
yes
?- groundterm(french(whopper,X)).
no
```

Exercise 9.5 (2 Punkte)

Assume that we have the following operator definitions.

```
:- op(300, xfx, [are, is_a]).
:- op(300, fx, likes).
:- op(200, xfy, and).
:- op(100, fy, famous).
```

Which of the following is a wellformed term? What is the main operator? Give the bracketing.

```
?- X is_a witch.
?- harry and ron and hermione are friends.
?- harry is_a wizard and likes quidditch.
?- dumbledore is_a famous famous wizard.
```