Prolog Laboratory

Warm up Exercises - Prolog Syntax

1. For each of the strings below, mark them as their corresponding Prolog term type, as well as parse errors following the key: (P) Predicate, (V) Variable, (C) Constant, (E) Error

   (a) Marcelo

   (a) _____

   (b) Address

   (b) _____

   (c) tipo

   (c) _____

   (d) 120.70

   (d) _____

   (e) x

   (e) _____

   (f) Move(X,dir):- X ¡ 20.

   (f) _____

   (g) language(prolog).

   (g) _____

   (h) language(c, paradigm(procedural)).

   (h) _____

   (i) 'Tony'

   (i) _____

   (j) John

   (j) _____

   (k) a

   (k) _____

   (l) _

   (l) _____

   (m) luiz serra

   (m) _____

2. Do the Prolog terms below unify? If so, show the resulting variable assignment. The $\sim$ symbol is used to denote that terms unify so $A \sim B$ means that A unifies with B.

(a) `date(8, 3, 2001)` $\sim$ `date(X , 3, 01)`

(a) _____

(b) `date(8, 3, 2001)` $\sim$ `day(X, Y, 2001)`

(b) _____

(c) `date(D,M,A)`$\sim$ `date(20,May,2003)`

(c) _____

(d) `date(D,M,A)` $\sim$ `data (10, june, 1979)`

(d) _____

(e) `date(D, june, A)` $\sim$ `date( 2, Month, decade(70))`

(e) _____

(f) `book(subject('Artificial Intelligence'), author('Russel and Norvig'))` $\sim$ `book(A, A)`

(f) _____

(g) `book(subject('Artificial Intelligence'), author('Russel and Norvig'))` $\sim$ `book(As, Au)`

(g) _____

(h) `book(subject('AI'), author('RnN'))` $\sim$ `book(subject(A), author(N))`

(h) _____

(i) `person(Ana, 18, cs)` $\sim$ `person(x, 18, Y)`

(i) _____

(j) `person(ana, 18, cs)` $\sim$ `person(x, 18, Y)`

(j) _____

(k) `person(ana,cs)` $\sim$ `person(x,18,Y)`

(k) _____

(l) `person(ana, 18, cs)` $\sim$ `person(Name, _, Course)`

(l) _____

(m) `person(ana, 18, cs)` $\sim$ `persons(_, _, Course)`

(m) _____

(n) `computer(coreI7, 3)` $\sim$ `computer(coreI7,3,ram16)`

(n) _____

(o) `course(hardware, torres)` $\sim$ `course( _, X).`

(o) _____

(p) `object(ball, red, big)` $\sim$ `object(X, blue, Y).`

(p) _____

(q) `events(symposia, conferences, workshops)` $\sim$ `event (X, _, Y).`

(q) _____

(r) `person (adriano, 21)` $\sim$ `person(Andre,21).`

(r) _____

(s) `person(adriano,21,gender(male), course(cs))` $\sim$ `person(adriano, _, gender(X), course(Y)).`

(s) _____

(t) `book(linux, editor(makron), author(richard))` $\sim$ `book(linux, X, Y).`

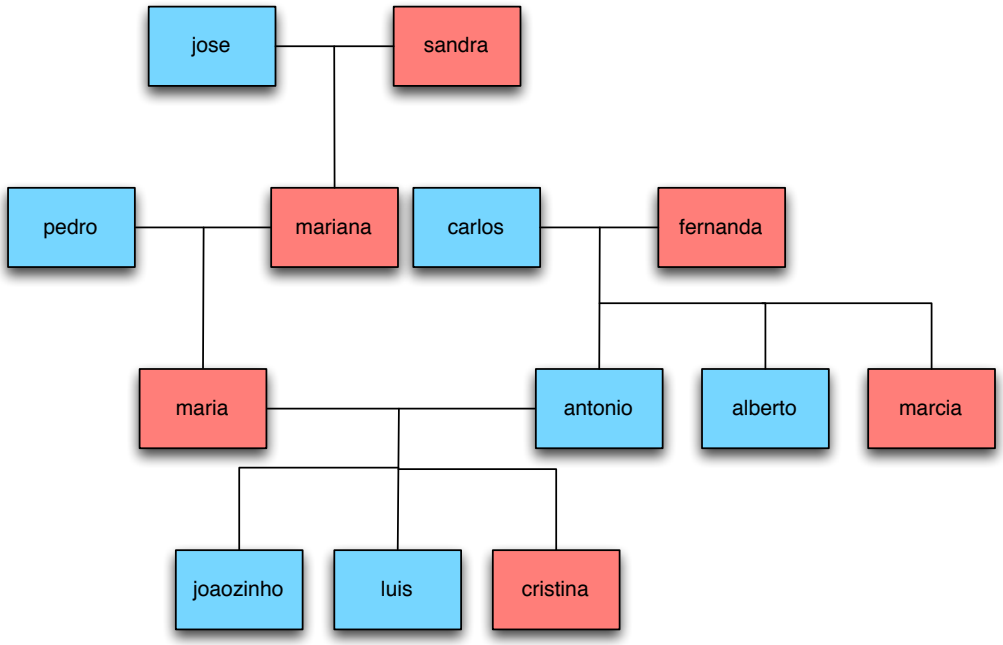
(t) _____

(u) `address(andradas, 1001, floor(7), phone('221-4589'), contact(maria))` $\sim$ `address(_,_,_,X,Y)`

(u) _____

1 Prolog Lab, part 1

3. Consider that the following Prolog knowledge base represents the family relations of "joaozinho" illustrated in the Figure.




```
parent(antonio,joaozinho).
parent(maria,joaozinho).
parent(antonio,luis).
parent(maria,luis).
parent(antonio, cristina).
parent(maria, cristina).
parent(carlos, antonio).
parent(fernanda, antonio).
parent(pedro, maria).
parent(mariana, maria).
parent(jose, mariana).
parent(sandra, mariana).
parent(carlos, alberto).
parent(fernanda, alberto).
parent(carlos, marcia).
parent(fernanda, marcia).

gender(joaozinho,male).
gender(antonio,male).
gender(maria,fem).
...
```

Define the following predicates:

- father
- mother
- brother
- sister
- uncle
- aunt

- grandfather
- grandmother
- great-grandfather
- great-grandmother
- ancestor

You should now submit your Prolog source to Moodle.

2 Prolog Lab, part 2

4. Define the following set relations, for which the tests to be applied are represented below:[1]

   (a) `median(List,Median)`

   ```
   ?- median([7,4,2,8,1,3,6],M).
   M = 4 ;
   no

   ?- median([1,2,3],2).
   yes

   ?- median([1,2,3],1).
   no
   ```

   (b) `setEq(S1, S2)`
   Note that you should test that a list is a valid set, i.e., that it does not include duplicate elements. Invalid sets should cause the set comparison to fail.

   ```
   ?- setEq([1,2,3],[2,1,3]).
   yes

   ?- setEq([john,paul],[george,ringo]).
   no

   ?- setEq([john,paul,john],[paul,john,ringo]).
   no
   ```

   (c) `subsets(S,PS)`
   Note that the subsets need not be listed exactly in the order shown. Hint, this generates the power set of S.

   ```
   ?- subsets([1,2],PS).
   PS = [[],[1],[2],[1,2]] ;
   no
   ```

   You should now submit your Prolog source to Moodle.

[1] Exercise adapted from Charles Fisher `http://pages.cs.wisc.edu/~fischer/`