Inteligência Artificial — Soluções – Aula 5

1.
```
p([N,L]) :- len(L,N).
p([N,L|T]) :- len(L,N), p(T).

len([],0).
len([H|T], R) :- len(T,M), R is M+1.
```

2.
```
elimina_repetidos([],[]).
elimina_repetidos([H|T],[H|R]) :-
        elimina(H,T,M),
        elimina_repetidos(M,R).

elimina(_,[],[]).
elimina(H,[H|T],R) :- elimina(H,T,R).
elimina(H,[O|T],[O|R]) :- elimina(H,T,R).
```

3.
```
palindromo(L) :- nrev(L,L).

nrev([X],[X]).
nrev([H|T],R) :- nrev(T,M), append(M,[H],R).

append([],L,L).
append([H|T],L,[H|R]) :- append(T,L,R).
```

4.
```
troca([I,I],[]).
troca([I,J],[J,I]).
troca([I,I|T],R) :- troca(T,R).
troca([I,J|T],[J,I|R]) :- troca(T,R).
```

5.
```
remove_dois(A,B,L1,L2) :- A<B, !, remove_pos(B,L1,L3),
                          remove_pos(A,L3,L2).
remove_dois(A,B,L1,L2) :- remove_pos(A,L1,L3),
                          remove_pos(B,L3,L2).

remove_pos(1,[H|T],T).
remove_pos(N,[H|T],[H|R]) :- M is N-1, remove_pos(M,T,R).
```

6.
```
metades(A,B,C) :-
    length(A,N),
    N >= 2,
    0 is N mod 2,
    S is N // 2,
```

```
    parte(A,S,B,C).

parte([H|T],1,[H],T) :- !.
parte([H|T],N,[H|R],B) :-
    M is N-1,
    parte(T,M,R,B).
```

7.
```
parte_por(S,L,A,B) :-
    count(S,L,1),
    parte_por1(S,L,A,B).

parte_por1(S,[S|T],[],T).
parte_por1(S,[X|T],[X|R],B) :-
    parte_por1(S,T,R,B).

count(S,[],0).
count(S,[S|T],R) :- !, count(S,T,N), R is N+1.
count(S,[_|T],R) :- count(S,T,R).
```

8. (a)
```
subarvore(no(_,T1,T2),T1).
subarvore(no(_,T2,T1),T1).
subarvore(no(_,T1,_),T):- subarvore(T1,T).
subarvore(no(_,_,T1),T):- subarvore(T1,T).
```

(b)
```
ord([]).
ord(no(V,E,D)) :- maior(V,E), menor(V,D),
  ord(E), ord(D).

maior(V,[]).
maior(V,no(X,E,D)) :- V>X, maior(V,E), maior(V,D).

menor(V,[]).
menor(V,no(X,E,D)) :- V<X, menor(V,E), menor(V,D).
```

(c)
```
pertence(X,no(X,_,_)).
pertence(X,no(V,E,D)) :- X>V, pertence(X,D).
pertence(X,no(V,E,D)) :- pertence(X,E).
```

(d)
```
del(X,no(X,[],T2),T2).
del(X,no(X,T2,[]),T2).
del(X,no(X,T1,T2),no(Y,T1,T3)):- delmin(Y,T2,T3).
del(X,no(R,T1,T2),no(R,T3,T2)):- X < R,
    del(X,T1,T3).
del(X,no(R,T1,T2),no(R,T1,T3)):- X > R,
    del(X,T2,T3).
```

```
delmin(Y,no(Y,[],L),L).
delmin(Y,no(R,T1,T2),no(R,T3,T2)):-
    delmin(Y,T1,T3).
```