```
% FILE: crypto.pro of directory xsolve2345
% TYPE: Prolog source
% LINE: Crypto - exhaustive solver for problems of order 2, 3, 4, or 5
% DATE: Fall 2011

%-----------------------------------------------------------------------
% load some files

:-consult('combosets.pro').

crypto(N1,N2,Goal,ex(N1,+,N2)) :- Goal is (N1+N2).
crypto(N1,N2,Goal,ex(N1,*,N2)) :- Goal is (N1*N2).
crypto(N1,N2,Goal,ex(N1,-,N2)) :- Goal is (N1-N2).
crypto(N1,N2,Goal,ex(N2,-,N1)) :- Goal is (N2-N1).
crypto(N1,N2,Goal,ex(N1,/,N2)) :- N2>0, Goal is (N1/N2).
crypto(N1,N2,Goal,ex(N2,/,N1)) :- N1>0, Goal is (N2/N1).

crypto(N1,N2,N3,G,Expr) :-
  combos(set(N1,N2,N3),combo(A,B),extras(C)),
  crypto(A,B,SG,SGE),
  crypto(C,SG,G,UGE),
  substitute(SGE,SG,UGE,Expr).

crypto(N1,N2,N3,N4,G,Expr) :-
  combos(set(N1,N2,N3,N4),combo(A,B),extras(C,D)),
  crypto(A,B,SG,SGE),
  crypto(C,D,SG,G,UGE),
  substitute(SGE,SG,UGE,Expr).

crypto(N1,N2,N3,N4,N5,G,Expr) :-
  combos(set(N1,N2,N3,N4,N5),combo(A,B),extras(C,D,E)),
  crypto(A,B,SG,SGE),
  crypto(C,D,E,SG,G,UGE),
  substitute(SGE,SG,UGE,Expr).

%-----------------------------------------------------------------------
% key substitution code

substitute(New,Old,ex(Old,O,Z),ex(New,O,Z)).
substitute(New,Old,ex(X,O,Old),ex(X,O,New)).
substitute(New,Old,ex(X,O,Z),ex(Q,O,Z)) :-
  substitute(New,Old,X,Q).
substitute(New,Old,ex(X,O,Z),ex(X,O,Q)) :-
  substitute(New,Old,Z,Q).
```