```prolog
%load the combos and permutations
:- consult('~/Documents/CSC366/Assignments/sets/combosets.pro').


%order 2
crypto(N1,N2,G,ex(N1,+,N2)) :- G is N1 + N2 .

crypto(N1,N2,G,ex(N1,*,N2)) :- G is N1 * N2 .

crypto(N1,N2,G,ex(N1,-,N2)) :- G is N1 - N2 .

crypto(N1,N2,G,ex(N2,-,N1)) :- G is N2 - N1 .

crypto(N1,N2,G,ex(N1,/,N2)) :- nonzero(N2),

        G is N1 / N2 .

crypto(N1,N2,G,ex(N2,/,N1)) :- nonzero(N1),

        G is N2 / N1 .

nonzero(N) :- N > 0.

nonzero(N) :- N < 0.


%order 3
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).


%order 4
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).
```

```prolog
%Place the solved expressions into the ultimate solution

substitute(New,Old,ex(Old,Op,Y),ex(New,Op,Y)).

substitute(New,Old,ex(X,Op,Old),ex(X,Op,New)).

substitute(New,Old,ex(X,Op,Y),ex(A,Op,Y)) :-
        substitute(New,Old,X,A).

substitute(New,Old,ex(X,Op,Y),ex(X,Op,B)) :-
        substitute(New,Old,Y,B).
```