

```
% combination procedures
```

```
combos(set(N1,N2,N3), combo(N1,N2), extra(N3)).
combos(set(N1,N2,N3), combo(N2,N3), extra(N1)).
combos(set(N1,N2,N3), combo(N1,N3), extra(N2)).
```

```
combos(set(N1,N2,N3,N4), combo(N1,N2), extra(N3,N4)).
combos(set(N1,N2,N3,N4), combo(N1,N3), extra(N2,N4)).
combos(set(N1,N2,N3,N4), combo(N1,N4), extra(N2,N3)).
combos(set(N1,N2,N3,N4), combo(N2,N3), extra(N1,N4)).
combos(set(N1,N2,N3,N4), combo(N2,N4), extra(N1,N3)).
combos(set(N1,N2,N3,N4), combo(N3,N4), extra(N1,N2)).
```

```
combos(set(N1,N2,N3,N4,N5), combo(N1,N2), extra(N3,N4,N5)).
combos(set(N1,N2,N3,N4,N5), combo(N1,N3), extra(N2,N4,N5)).
combos(set(N1,N2,N3,N4,N5), combo(N1,N4), extra(N2,N3,N5)).
combos(set(N1,N2,N3,N4,N5), combo(N1,N5), extra(N2,N3,N4)).
combos(set(N1,N2,N3,N4,N5), combo(N2,N3), extra(N1,N4,N5)).
combos(set(N1,N2,N3,N4,N5), combo(N2,N4), extra(N1,N3,N5)).
combos(set(N1,N2,N3,N4,N5), combo(N2,N5), extra(N1,N3,N4)).
combos(set(N1,N2,N3,N4,N5), combo(N3,N4), extra(N1,N2,N5)).
combos(set(N1,N2,N3,N4,N5), combo(N3,N5), extra(N1,N2,N4)).
combos(set(N1,N2,N3,N4,N5), combo(N4,N5), extra(N1,N2,N3)).
```

```
% the permutation facts
```

```
perm(s(A,B), p(A,B)).
perm(s(A,B), p(B,A)).
```

```
perm(s(A,B,C), p(A,X,Y)):- perm(s(B,C), p(X,Y)).
perm(s(A,B,C), p(B,X,Y)):- perm(s(A,C), p(X,Y)).
perm(s(A,B,C), p(C,X,Y)):- perm(s(A,B), p(X,Y)).
```

```
perm(s(A,B,C,D), p(A,X,Y,Z)):- perm(s(B,C,D), p(X,Y,Z)).
perm(s(A,B,C,D), p(B,X,Y,Z)):- perm(s(A,C,D), p(X,Y,Z)).
perm(s(A,B,C,D), p(C,X,Y,Z)):- perm(s(A,B,D), p(X,Y,Z)).
perm(s(A,B,C,D), p(D,X,Y,Z)):- perm(s(A,B,C), p(X,Y,Z)).
```

```
perm(s(A,B,C,D,E), p(A,X,Y,Z,W)):- perm(s(B,C,D,E), p(X,Y,Z,W)).
perm(s(A,B,C,D,E), p(B,X,Y,Z,W)):- perm(s(A,C,D,E), p(X,Y,Z,W)).
perm(s(A,B,C,D,E), p(C,X,Y,Z,W)):- perm(s(B,A,D,E), p(X,Y,Z,W)).
perm(s(A,B,C,D,E), p(D,X,Y,Z,W)):- perm(s(B,C,A,E), p(X,Y,Z,W)).
perm(s(A,B,C,D,E), p(E,X,Y,Z,W)):- perm(s(B,C,D,A), p(X,Y,Z,W)).
```