Recursion in PROLOG

Lecture 1bis

Summary

- "is" Predicate
- recursion with numbers
- exercises

Prolog: is predicate

`A is B`

is a system predicate, true when the *evaluation* of the expression B returns a value, that is **assigned** to the variable A.

The evaluation of B is done using system operators.

Predicates defined by `is` are NOT invertible:
`?5 is X+Y.`
does not return the values of X and Y making the atom true.

`?X is 3+4.`
succeeds and returns `X=7`.

Prolog: programs with `is`

```
factorial(0,1).
factorial(Y,X):-
        Y1 is Y-1,
        factorial (Y1,X1),
        X is Y*X1.
```

Exercises

Write the following PROLOG programs:

- `pow1(B,E,Z)`, where `Z` is the result of `B` raised to the `E`
- `minimum(X,Y,Z)`, using the predicate `lesseq1(N1,N2)` which is *true* when $X \leq Y$, *false* otherwise
- `sum(N,Z)`, where `N` is a positive integer and `Z` is the result of summing up the first N numbers.

Exercise: Erdos

Define in Prolog the program `erdosnum()`, given the following specs:

1. The Erdos number of Erdos is `erdosnum`=0
2. The Erdos number of X is `erdosnum` 1 + the minimum among the `erdosnum` of the coauthors of X.

Write the Prolog program `erdosnum(X,N)`, where `X` is the name of the researcher and `N` is the Erdos number.

Write the Prolog program `erdosnum(X,Y,N)`, where `X` and `Y` are the names of two researchers and `N` is the Erdos distance between them (i.e. the shortest chain of co-authors linking them).