# "What" vs "How"

Declarative vs Procedural Programming

Procedural programming

- The programmer has to specify *how* to get the output for the range of required inputs.

- The programmer must know the appropriate algorithm.

Declarative programming

- Requires a more descriptive style.

- The programmer must know *what* relationships hold between various entities.

# *Example: List Concatenation*

In procedural style:

```
list procedure cat(list a,list b)
{
    list t = list u = copylist(a);
    while (t.tail != nil) t = t.tail;
    t.tail = b;
    return u;
}
```

In declarative style:

```
cat([], Z, Z).
cat([H|T], L, [H|Z]) :- cat(T, L, Z).
```

# *Logic Programming*

- A declarative style programming paradigm.

- Computation through logical deduction.

- Uses the language of logic to express data and programs.

- Most of current logic programming languages use first order logic (FOL).

- Prolog – the most popular logic programming language.

# *History*

1970-ies:

Bob Kowalski
"Predicate Logic as a Programming Language"
IFIP Congress, Stockholm

Alain Colmerauer and his group
Interpreter of the first logic programming language – Prolog
Marseille

# *Prolog*

- The main subject of this course

- Used in Artificial Intelligence, Natural Language Processing, Automated Reasoning...

- Exists in many dialects (Sicstus Prolog, SWI Prolog, Prolog IV, BinProlog, Ciao Prolog, Prolog LPA, Visual Prolog, Strawberry Prolog...)

- (Almost) all the dialects agree on the "core" part (ISO Standard for Prolog)