



## Query Languages

1. procedural language
2. non-procedural (declarative) - humans like this better
3. theoretical (mathematical) language
4. real-world language. e.g. SQL, QBE.

procedural language specifies the computations needed to get the final results  
declarative languages describe what results are expected.

Upcoming:

Relational Algebra (1-2 weeks)

SQL (2 weeks)

## Algebra

- 1) has variables
- 2) operators
- 3) rules
- 4) Closeness of algebraic system

Relational algebra is a procedural language that is mainly used for internal representation of queries inside DBMS

$R1 (+) R2 \rightarrow R3 (+) R1 \rightarrow R2$

there should be a space between these two formulae

1.  $R_i$  is a relation
2. Relational algebraic operations:
  1. Unary:
    1. Select ( $\sigma$ )
    2. Project ( $\pi$ )
    3. Rename ( $\rho$ )

Select will scan the whole table and will find all rows that satisfy the condition.

e.g.  $\sigma \text{ salary} > 50K (\text{emp})$  means search employee table for any rows w/ salary  $> 50K$

- 1) for the resulting table, the schema is the same as in ~~emp~~.
- 2) the resulting table must contain  $\leq$  tuples as the operand table

the operand table

Format of condition:

term:  $\langle \text{attr} \rangle \text{ op } \langle \text{attr} \rangle \mid \text{constant}$

cond:  $\langle \text{term} \rangle \text{ and/or } \langle \text{term} \rangle$

not  $\langle \text{term} \rangle$

see textbook for more details