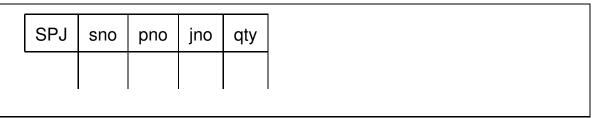# Topic 11:

Graphical Query Languages

QBE (Query By Example)

- Mid-1970s creation of Moshe Zloof at IBM Research

- Associated with development of Domain Relational Calculus

- Still available within IBM's QMF (Query Management Facility) component of DB2

- Most DBMSes offer a QBE-inspired interface

- Idea: Let users create queries by showing what they want to see

QBE Templates and π

A QBE template is the schema ('skeleton') of a table.

Example(s): The 'table skeleton' of the SPJ table:

SPJ	sno	pno	jno	qty

π: Easy! Type `P.` beneath each field to be displayed.

Example(s): In which cities are the suppliers located?

S	sno	sname	status	city

QBE and σ

To select tuples, place partial conditions under the attributes.

Example(s):

What are the names and numbers of the active suppliers in London?

S	sno	sname	status	city

QBE and ⋈

To force values to match, we add variables

— In QBE, variables begin with an underscore (' _ ').

Example(s):

What are the names of the parts that can be supplied by individual suppliers in quantity > 200?

P	pno	pname	color	weight	city

SPJ	sno	pno	jno	qty

QBE and ∪

To do Union, we need multiple lines in the templates.

Example(s):

What are the S#s of the suppliers who are either located in Athens or are inactive, or both?

S	sno	sname	status	city

QBE and ∩

For Intersection, we need multiple lines and a variable.

Example(s):

What are the names of the suppliers in London and Paris that share the same name?

S	sno	sname	status	city

QBE: Miscellaneous Notes

- Other π options: `P.ALL`, `P.AO`, `P.DO`

   (ALL = keep duplicates, AO = ascending order, DO = descending order)

- Aggregate functions include: `AVG`, `MIN`, `MAX`, `SUM`, `CNT`

   Example: `P.SUM.ALL`   (The `.ALL` is required.)

- Other actions:
  - `D.` under the relation name deletes tuples
  - `I.` inserts tuples
  - `U.` updates tuples

- IBM does have QBE documentation on-line, but it's not easy to find!

Microsoft Access Demonstration

What is the name of the employee who is supervising

building 'A'?

M

Num	Name
1	Roy
2	Amy
3	Joy

N

Building	Supervisor
A	2
B	1
C	2
D	NULL