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 $\pi$

**Example(s):**

<table>
<thead>
<tr>
<th>SPJ</th>
<th>sno</th>
<th>pno</th>
<th>jno</th>
<th>qty</th>
</tr>
</thead>
</table>

QBE and $\sigma$

**Example(s):**

<table>
<thead>
<tr>
<th>S</th>
<th>sno</th>
<th>sname</th>
<th>status</th>
<th>city</th>
</tr>
</thead>
</table>
QBE and \( \Join \)

Example(s):

\[
\begin{array}{|c|c|c|c|c|}
\hline
P & pno & pname & color & weight & city \\
\hline
\end{array}
\]

\[
\begin{array}{|c|c|c|c|c|}
\hline
SPJ & sno & pno & jno & qty \\
\hline
\end{array}
\]

QBE and \( \bigcup \)

Example(s):

\[
\begin{array}{|c|c|c|c|c|}
\hline
S & sno & sname & status & city \\
\hline
\end{array}
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QBE: Miscellaneous Notes

- Other $\pi$ options: P.ALL, P.AO, P.DO
  
  (ALL = keep dups, 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!
What is the name of the employee who is supervising building ‘A’?

<table>
<thead>
<tr>
<th>Num</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Roy</td>
</tr>
<tr>
<td>2</td>
<td>Amy</td>
</tr>
<tr>
<td>3</td>
<td>Joy</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Building</th>
<th>Supervisor</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>2</td>
</tr>
<tr>
<td>B</td>
<td>1</td>
</tr>
<tr>
<td>C</td>
<td>2</td>
</tr>
<tr>
<td>D</td>
<td>NULL</td>
</tr>
</tbody>
</table>