Conditions in SQL

Examples (company)

SELECT lname, SSN
FROM employee
WHERE salary > 40000

SELECT lname, SSN
FROM employee, department
WHERE dno = dnumber and
dname = ‘Research’

Boolean Logic

George Boole (1815-1864): Laws of Thought (1854)

Operators

and

or

not

Truth-tables

<table>
<thead>
<tr>
<th>p</th>
<th>q</th>
<th>p and q</th>
</tr>
</thead>
<tbody>
<tr>
<td>false</td>
<td>false</td>
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<tr>
<td>false</td>
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</tbody>
</table>

DeMorgan’s rule

<table>
<thead>
<tr>
<th>p</th>
<th>q</th>
<th>p or q</th>
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</thead>
<tbody>
<tr>
<td>false</td>
<td>false</td>
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</table>
**Condition examples**

Company
- Female employees who make less than 30000
- Employees who are older than 40 and employees younger than 30
- Employees who are older than 60, unless they make more than 45000
- Names of dependents who are not spouses

**More examples**

Company
- Male employees which work for administration or research departments
- Employees working on both the Newbenefits and the ProjectX projects
- Departments with locations in Houston and Stafford
- Names of employees with dependent children
- We want to add a new rule: all managers must make at least $30,000. Is there anybody who violates that rule?

**Even More examples**

Company
- Departments not located in Houston?
- Employees without dependents?
Set Operations

<table>
<thead>
<tr>
<th>Operation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>UNION</td>
<td>(union)</td>
</tr>
<tr>
<td>INTERSECT</td>
<td>(intersection)</td>
</tr>
<tr>
<td>EXCEPT (MINUS)</td>
<td>(set difference)</td>
</tr>
</tbody>
</table>

\[
\{\text{Alice, Queen}\} \text{ UNION } \{\text{Alice, King}\} = \{\text{King, Alice, Queen}\}
\]

\[
\{\text{Alice, Queen}\} \text{ INTERSECT } \{\text{Alice, King}\} = \{\text{Alice}\}
\]

\[
\{\text{Alice, Queen}\} \text{ EXCEPT } \{\text{Alice, King}\} = \{\text{Queen}\}
\]

Duplicates with Set Operations

Duplicates are eliminated if we use set operations like

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Example (Company):

- List the SSN of all employees working for the research department, or supervising somebody in the research department
- List employees working on both ProductX and ProductY
- Departments not located in Houston

Intersection and Difference

Not supported by either Access or SQLServer.

Example workaround for intersection:

Managers that are supervisors

```
SELECT fname, lname, ssn
FROM employee AS e, employee AS s, department AS d
WHERE s.ssn = e.superssn AND s.ssn = d.mgrssn
```

Better solution (also works for difference) later.
Null Values

Comparisons with null values always fail.

```sql
SELECT *
FROM employee
WHERE superssn = superssn;
```

Use `is null` and `is not null`

```sql
SELECT *
FROM employee
WHERE superssn is null;
```

```sql
SELECT *
FROM employee
WHERE superssn is not null;
```

Example

- All employees for which we have address info
- Employees which are missing first or last name

Examples

- List paperback books, unless they are more expensive that $15 (with sales tax).
- List books that have both Stephen King and Peter Straub among their authors
- List hardcover book titles in the following genres: horror, sci-fi and fantasy.
- List non-fiction, non-travel books by John Steinbeck