Conditions in SQL

Examples (company)

```sql
SELECT lname, SSN
FROM employee
WHERE salary > 40000
```

```sql
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>
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<tbody>
<tr>
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DeMorgan’s rule

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

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

More examples

- Male employees which work for administration or research departments
- Employees working on both the Newbenefits and the ProjectX projects
- Departments located in Houston and Stafford
- Names of employees with dependent children
- Departments not located in Houston?
- Employees without dependents?

Set Operations

UNION (union)
INTERSECT (intersection)
EXCEPT (MINUS) (set difference)

\{Alice, Queen\} UNION \{Alice, King\}
= \{King, Alice, Queen\}

\{Alice, Queen\} INTERSECT \{Alice, King\}
= \{Alice\}

\{Alice, Queen\} EXCEPT \{Alice, King\}
= \{Queen\}
Duplicates with Set Operations

Duplicates are eliminated if we use set operations like

- **UNION** (union)
- **INTERSECT** (intersection)
- **EXCEPT** (set difference)

Example (Company):
- List the SSN of all employees working for department 5, or supervising somebody in department 5
- 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

More general solution (also for difference) later.

Null Values

Comparisons with null values always fail.

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

Use `is null` and `is not null`

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