Ordering tuples in result

$$\texttt{select } dept_name, floor$$
$$\texttt{from } department$$
$$\texttt{order by } floor$$

* **Default is ascending**

$$\texttt{select } dept_name, floor$$
$$\texttt{from } department$$
$$\texttt{order by } floor \texttt{ desc}, dept\_id$$

* `order` by requires **sorting** – expensive, limit its use.

Set Operations

- `union` (∪), `intersect` (∩), `except` (—)
- the relations must be *compatible.* same attributes.
    - two relations w/ same attrbts:

$$\texttt{select } name$$
$$\texttt{from } employee$$

$$\texttt{select } name$$
$$\texttt{from } customer$$

Union

$$(\texttt{select } name$$
$$\texttt{ from } employee)$$
$$\texttt{ union}$$
$$(\texttt{select } name$$
$$\texttt{ from } customer)$$

gives **no dupes**.

$$(\texttt{select } name$$
$$\texttt{ from } employee)$$
$$\texttt{ union all}$$
$$(\texttt{select } name$$
$$\texttt{ from } customer)$$

gives **dupes**.

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Intersection

Employees who is a customer also:

$$
\begin{array}{l}
(\texttt{select } \textit{name} \\
\ \texttt{from } \textit{employee}) \\
\ \texttt{intersect} \\
(\texttt{select } \textit{name} \\
\ \texttt{from } \textit{customer})
\end{array}
$$

gives **no dupes**.

$$
\begin{array}{l}
(\texttt{select } \textit{name} \\
\ \texttt{from } \textit{employee}) \\
\ \texttt{intersect all} \\
(\texttt{select } \textit{name} \\
\ \texttt{from } \textit{customer})
\end{array}
$$

gives **dupes**.

Except

Employees who are not customers

$$
\begin{array}{l}
(\texttt{select } \textit{name} \\
\ \texttt{from } \textit{employee}) \\
\ \texttt{except} \\
(\texttt{select } \textit{name} \\
\ \texttt{from } \textit{customer})
\end{array}
$$

gives **no dupes**.

$$
\begin{array}{l}
(\texttt{select } \textit{name} \\
\ \texttt{from } \textit{employee}) \\
\ \texttt{except all} \\
(\texttt{select } \textit{name} \\
\ \texttt{from } \textit{customer})
\end{array}
$$

gives **dupes**.

Aggregate Functions

`avg` (numeric only), `sum` (numeric only), `min`, `max`, `count`. **Query**: Average salary for department with id $= 3$

$$
\begin{array}{l}
\texttt{select avg}(\textit{salary}) \\
\texttt{from } \textit{employee} \\
\texttt{where } \textit{dept\_id} = 3
\end{array}
$$

avg(salary)
2300