SQL QUERIES

CS121: Introduction to Relational Database Systems

Fall 2016 – Lecture 5

SQL Queries

- SQL queries use the **SELECT** statement

- General form is:

```
SELECT A1, A2, ...
  FROM r1, r2, ...
  WHERE P;
```

  - r_i are the relations (tables)
  - A_i are attributes (columns)
  - P is the selection predicate

- Equivalent to: $\Pi_{A_1, A_2, \ldots}(\sigma_P(r_1 \times r_2 \times \ldots))$

Ordered Results

- SQL query results can be ordered by particular attributes

- Two main categories of query results:
    - "Not ordered by anything"
        - Tuples can appear in *any* order
    - "Ordered by attributes A_1, A_2, …"
        - Tuples are sorted by specified attributes
        - Results are sorted by A_1 first
        - Within each value of A_1, results are sorted by A_2
        - etc.

- Specify an **ORDER BY** clause at end of **SELECT** statement

Ordered Results (2)

- Find bank accounts with a balance under $700:

```
SELECT account_number, balance
   FROM account
   WHERE balance < 700;
```

```
+----------------+---------+
| account_number | balance |
+----------------+---------+
| A-102          |  400.00 |
| A-101          |  500.00 |
| A-444          |  625.00 |
| A-305          |  350.00 |
+----------------+---------+
```

- Order results in increasing order of bank balance:

```
SELECT account_number, balance
   FROM account
   WHERE balance < 700
   ORDER BY balance;
```

```
+----------------+---------+
| account_number | balance |
+----------------+---------+
| A-305          |  350.00 |
| A-102          |  400.00 |
| A-101          |  500.00 |
| A-444          |  625.00 |
+----------------+---------+
```

  - Default order is ascending order

Ordered Results (3)

- Say **ASC** or **DESC** after attribute name to specify order
  - **ASC** is redundant, but can improve readability in some cases

- Can list multiple attributes, each with its own order

  "Retrieve a list of all bank branch details, ordered by branch city, with each city's branches listed in reverse order of holdings."

```
SELECT * FROM branch
   ORDER BY branch_city ASC, assets DESC;
```

```
+-------------+-------------+-------------+
| branch_name | branch_city | assets      |
+-------------+-------------+-------------+
| Pownal      | Bennington  |   400000.00 |
| Brighton    | Brooklyn    | 7000000.00  |
| Downtown    | Brooklyn    |   900000.00 |
| Round Hill  | Horseneck   | 8000000.00  |
| Perryridge  | Horseneck   | 1700000.00  |
| Mianus      | Horseneck   |   400200.00 |
| Redwood     | Palo Alto   | 2100000.00  |
| ...         | ...         |         ... |
```