CS122 Using Relational Databases and SQL
Set Operations

Chengyu Sun
California State University, Los Angeles

Set

◆ A collection of elements
- No ordering

A1 = { a, b, c, d }
A2 = { b, c, d, a }

Set Operations

◆ In
- $e \in A$
◆ Union
- $A \cup B$
◆ Intersection
- $A \cap B$
◆ Difference
- $A - B$

A = { a, b, c }
B = { c, a, d }

$A \cup B$ = ??
$A \cap B$ = ??
$A - B$ = ??
$B - A$ = ??

IN in Subquery Form

expression IN (subquery)

◆ Single column on both sides
◆ Return TRUE if the value of the expression equals any row in subquery result

SELECT * FROM Movie_stars m WHERE m.fname, m.lname
    IN (SELECT * FROM Singers2);

SELECT * FROM Movie_stars m WHERE m.fname +" " + m.lname
    IN (SELECT * FROM Singers);

More about IN

◆ IN in scalar form

expression IN (value1, ...)
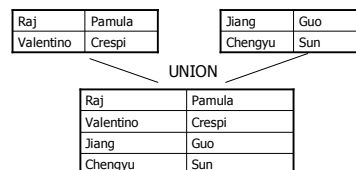
SELECT name FROM People WHERE id IN (10003, 10004);

◆ NOT IN

SELECT name FROM People WHERE id NOT IN (10003, 10004);

UNION Operation in SQL

◆ Combine *result sets* of multiple queries
◆ Syntax:

query1 UNION query2 [UNION query3 ...];

Raj	Pamula
Valentino	Crespi

Jiang	Guo
Chengyu	Sun

UNION

Raj	Pamula
Valentino	Crespi
Jiang	Guo
Chengyu	Sun

UNION vs. Cartesian Product

◆ UNION
  - Merge two tables vertically
  - Tables have to be results of subqueries

◆ Cartesian product
  - Merge two tables horizontally
  - Tables can be original database tables

Some UNION Examples

SELECT * FROM Movie_stars UNION SELECT * FROM Singers;

SELECT fname FROM Movie_stars UNION SELECT * FROM Singers;

SELECT * FROM Singers UNION SELECT fname FROM Movie_stars;

SELECT *, 'no name' FROM Singers UNION SELECT * FROM Movie_stars;

SELECT NULL, fname, lname, NULL, NULL, NULL FROM Movie_stars
UNION
SELECT * FROM People;

SELECT 0, fname, lname, NULL, 0, 0 FROM Movie_stars
UNION
SELECT * FROM People;

About UNION Operation

◆ Number of columns
◆ Column headings
◆ Duplicates
◆ Sorting
◆ Union compatibility
  - Numerical, Text, and Date/Time
◆ Place holders
  - Don't use NULL as place holders for numerical or date types

UNION ALL

◆ Do not remove duplicates
◆ Do not sort the results

query1 UNION ALL query2 [UNION ALL query3 ...];

Intersection and Difference in MS Access

◆ Intersection
  - $e \in A \cap B$ iff $e \in A$ and $e \in B$
◆ Difference
  - $e \in A - B$ iff $e \in A$ and $e \notin B$