CS2102 Tutorial 4

15 Sep 2021

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- Submit the ER Diagram by:
  Week 6: Saturday, 18 September 2021 (23:59)

Recap

Introduction (SQL Queries)

```
SELECT DISTINCT a1, a2
  FROM Employees
  WHERE a1 > 1;
```
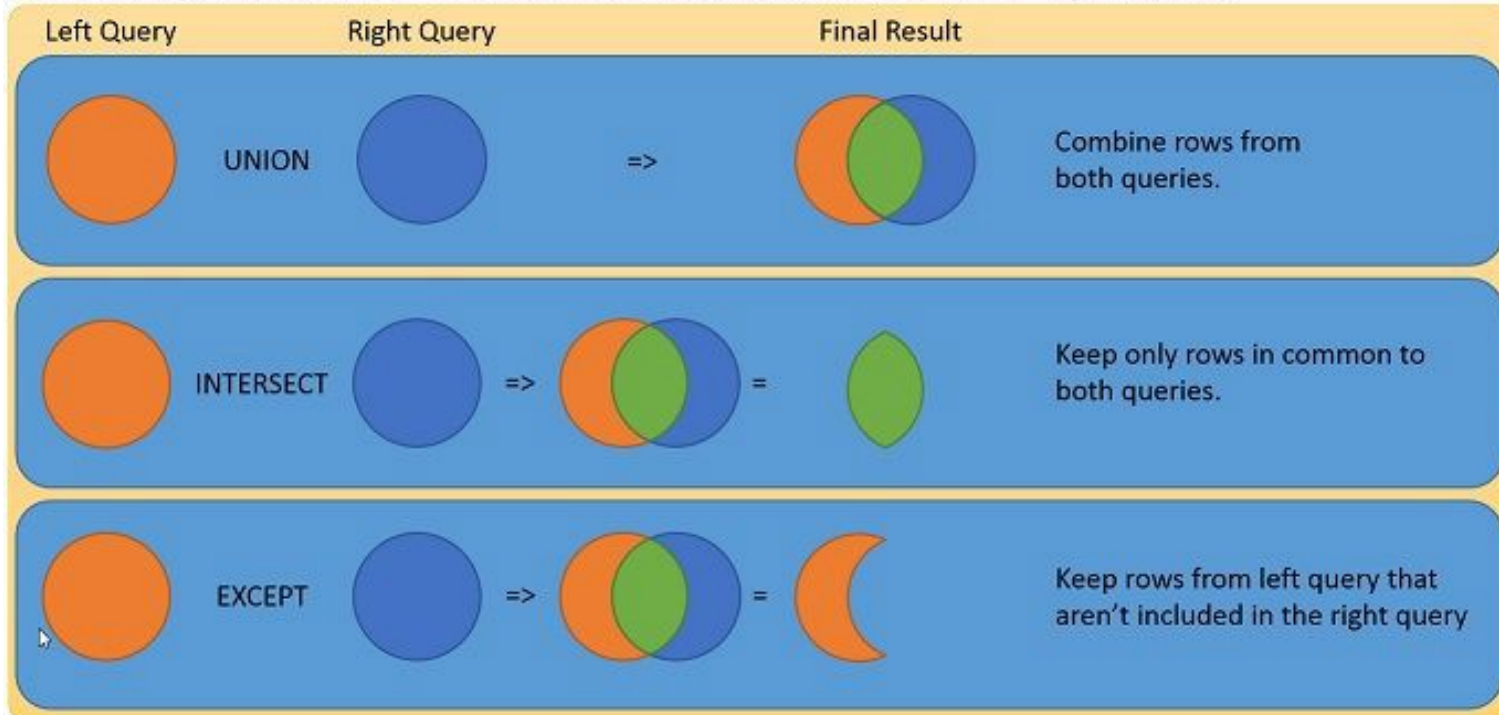
Forms the basis of your SQL Queries

Use Distinct to *enforce duplicate elimination*

Is equivalent to: $\pi_{(a_1, a_2)}(\sigma_{(a_1 > 1)}(Employees)))$

NULL value: Please do not use = NULL or <> NULL when checking for null values. Instead use `IS NULL` or `IS NOT NULL`

Set Operations

Visual Explanation of UNION, INTERSECT, and EXCEPT operators

Left Query	Right Query		Final Result	
	UNION	=>		Combine rows from both queries.
	INTERSECT	=>	=	Keep only rows in common to both queries.
	EXCEPT	=>	=	Keep rows from left query that aren't included in the right query

UNION, INTERSECT, EXCEPT: Ignore Duplicates

UNION ALL, INTERSECT ALL, EXCEPT ALL: Keep Duplicates

Be careful of **Union Compatibility**

Join Operations

SELECT c.name, n.name
FROM cities AS c, countries AS n
WHERE c.country_iso2 = n.iso2;

Similar to what you have been done for your RA Queries.

For Syntax, refer to lectures notes or PostgreSQL documentation!

name	name
Mexico City	Mexico
Jakarta	Indonesia
Delhi	India
Mumbai	India
Singapore	Singapore
Manila	Philippines
Mexico City	Mexico
Seoul	South Korea
...	...

Subqueries

1. Must be in parentheses (brackets)
2. Have a Table Alias (mandatory)
3. Column Aliases are **optional.**

SELECT *
FROM (
    SELECT n.iso2, n.name
    FROM countries n, borders b
    WHERE n.iso2 = b.country1_iso2
    AND country2_iso2 IS NULL
) **AS** LandborderfreeCountries(code, name);

code	name
AU	Australia
BS	Bahamas
SG	Singapore
CU	CUBA
JP	Japan
MV	Maldives
...	...

Subquery Expressions

IN: Found in the subquery set of rows   EXISTS:
True if subquery returns >= 1 row
ANY / SOME: True if comparison matches any subquery row ALL: True if
comparison matches **all** subquery rows

SELECT name
FROM countries
WHERE name IN (**SELECT** name
                   FROM cities);

name
Singapore
Mexico
Sierra Madre
Monaco
Mali
Hong Kong
China
Poland
...

Sorting & Rank-Based Selection

ORDER BY: Orders the columns by [ATTR1] [DIRECTION1] ...

LIMIT [k]: Returns the 1st k rows of the result

OFFSET [i]: Disregards the first i rows.

SELECT name, (gdp/population) **AS** gdp_per_capita
FROM countries
ORDER BY gdp_per_capita DESC;

name	gdp_per_capita
Monaco	250809
Qatar	148342
Liechtenstein	131270
United Arab Emirates	112526
Kuwait	106256
Macao	105820
Luxembourg	100877
Singapore	84403
...	...