ECS 116
Databases for Non-Majors

Discussion 2
(4/11/24) |Spring ‘24

Today's Agenda

1. Quick Updates
2. Today's Work in Queries
3. Importing required files
4. Working on the data (queries) - practice
5. Q/A?

Quick Updates

Piazza

- Classroom discussions 24/7 !
- Ask questions
- Reply to answers
- Ask anonymously

Assignment 1

- Is live
- Last date is April 19th @ 11:59 pm
- Late policy -> 10% reduction for 0 to 24 hrs, 20% for 24 to 48 hrs, no submissions after that

Creating Groups

- Assignment 2 onwards will be grouped (3 ppl)
- Go to this excel sheet and write names

Today's Work in Queries

We will go over the following:

1. Look at prompts
2. See how the queries are built
3. Run the queries in DBeaver
4. Compare the results

The script of today's queries can be found in *Files->Discussion->Scripts* and the ppt in *Files->Discussion->Presentations*

Importing the data

PC:

Go to files ->Installing PostgreSQL and DBeaver on PC-v01.pdf

- Follow the instructions

Mac:

Go to files ->Installing PostgreSQL and DBeaver on Mac-v02.docx

- Follow the instructions

Download, extract COMPANY-EXAMPLE-no-caps.zip.

Import the data set to the table **discussion2-new** and schema **company**

Set as default and search_path to **company**

Simple Queries

Using SELECT and WHERE

1. Retrieve all data from the employee table

   *SELECT * FROM employee;*

2. Get the names and birth dates of all dependents

SELECT Dependent_name, Bdate FROM dependent;

3. Find all locations of the 'Research' department

SELECT Dlocation FROM dept_locations WHERE Dnumber = (SELECT Dnumber FROM department WHERE Dname = 'Research');

Adding Tables, Insert, Delete and Update

Using CREATE, ADD, ALTER, INSERT and DELETE

1. Create a new table employee_feedback

```
CREATE TABLE employee_feedback (

feedback_id SERIAL PRIMARY KEY,

employee_ssn CHAR(9),

feedback_date DATE,

feedback_text TEXT

);
```

2. Insert data into the table

```
INSERT INTO employee_feedback (employee_ssn, feedback_date, feedback_text)

VALUES

('123456789', '2023-04-01', 'Shows excellent leadership skills and initiative.'),

('987654321', '2023-04-02', 'Needs to improve on time management and deadlines.'),

('555666777', '2023-04-03', 'Consistently exceeds expectations in project delivery.');
```

Adding Tables, Insert, Delete and Update Contd….

Using CREATE, ADD, ALTER, INSERT and DELETE

3. Change data for employee_ssn *'123456789'*

UPDATE employee_feedback SET feedback_text = 'Needs to be FIRED' WHERE employee_ssn = '123456789';

4.. Delete employee

DELETE FROM employee_feedback WHERE employee_ssn = '123456789';

5. Change column name

ALTER TABLE employee_feedback

RENAME COLUMN feedback_text TO feedback;

Step_2-6. Insert a new employee with the following data:

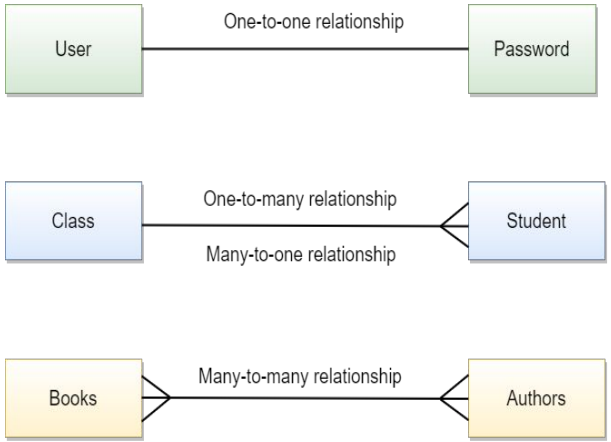
'112233435', '2023-04-10', 'Make him the CEO'

Can you do this?

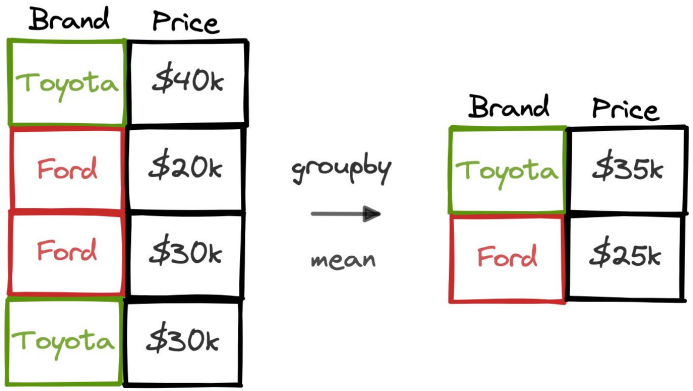
7. Delete data from table

DELETE FROM employee_feedback;

Relationships in dBs, Groupings and Aliases

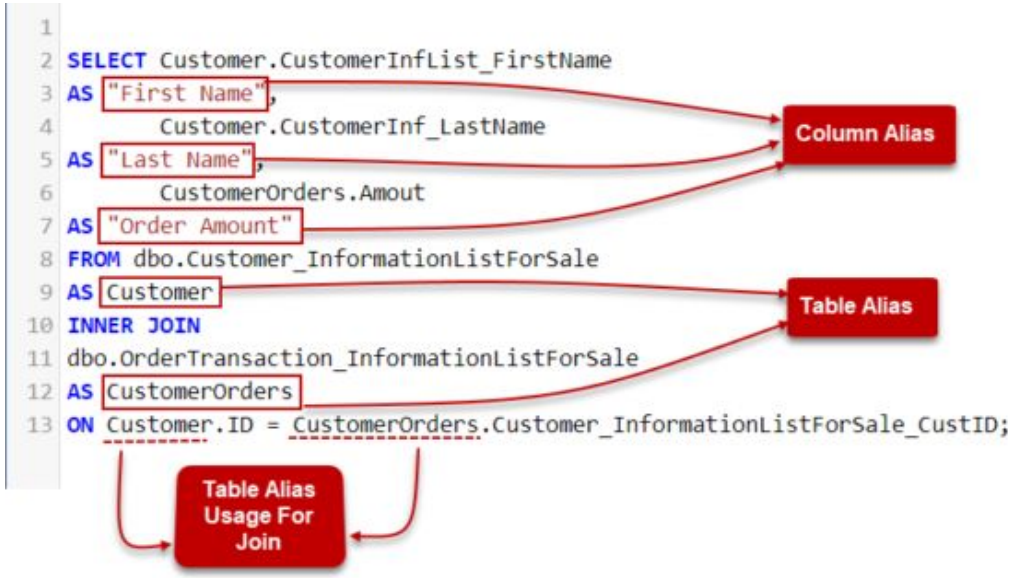


- One to One
- One to Many
- Many to Many



GROUP BY is used to group (no surprise) data which have the same value

Relationships in dBs, Groupings and Aliases Contd….



- Used for readability
- Self Referencing
- Aggregation and Groupings

Relations

Using JOIN and Aliases

1. List all employees and their department names

SELECT E.Fname, E.Lname, D.Dname FROM employee E JOIN department D ON E.Dno = D.Dnumber;

	fname	lname	dno
1	John	Smith	5
2	Franklin	Wong	5
3	Alicia	Zelaya	4
4	Jennifer	Wallace	4
5	Ramesh	Narayan	5
6	Joyce	English	5
7	Ahmad	Jabbar	4
8	James	Borg	1

2. Get the names and birth dates of all dependents

SELECT E.Fname, E.Lname, Dep.Dependent_name FROM employee E JOIN dependent Dep ON E.Ssn = Dep.Essn;

	dname	dnumber	mgr_ssn	mgr_start_date
1	Research	5	333,445,555	5/22/88
2	Administration	4	987,654,321	1/1/95
3	Headquarters	1	888,665,555	6/19/81

Step_3-3. Get all projects along with department names

Can you do this?

	fname	lname	dname
1	Joyce	English	Research
2	Ramesh	Narayan	Research
3	Franklin	Wong	Research
4	John	Smith	Research
5	Ahmad	Jabbar	Administration
6	Jennifer	Wallace	Administration
7	Alicia	Zelaya	Administration
8	James	Borg	Headquarters

Complex Queries

1. Find pairs of employees who work in the same department

SELECT E1.Fname AS Employee1, E2.Fname AS Employee2, D.Dname

FROM employee E1

JOIN employee E2 ON E1.Dno = E2.Dno AND E1.Ssn != E2.Ssn

JOIN department D ON E1.Dno = D.Dnumber;

2. Finding pairs of employees who report to the same supervisor

SELECT A.Fname AS Employee1, B.Fname AS Employee2, A.Super_ssn AS SupervisorSSN

FROM employee A, employee B

WHERE A.Super_ssn = B.Super_ssn AND A.Ssn != B.Ssn;

	fname	lname	dno
1	John	Smith	5
2	Franklin	Wong	5
3	Alicia	Zelaya	4
4	Jennifer	Wallace	4
5	Ramesh	Narayan	5
6	Joyce	English	5
7	Ahmad	Jabbar	4
8	James	Borg	1

	employee1	employee2	dname	dno
7	Franklin	John	Research	5
8	Franklin	Ramesh	Research	5
9	Franklin	Joyce	Research	5
10	John	Franklin	Research	5
11	John	Ramesh	Research	5
12	John	Joyce	Research	5
13	Ahmad	Alicia	Administration	4
14	Ahmad	Jennifer	Administration	4

Solve: Complex Queries

Step_4-4. Given a table *employee* containing salaries and departments (dno) of individual employees compute a table which compares salaries of employees within the same department. The column names should correspond to employee 1 and 2. Pairs should not repeat.

	employee1	salary1	employee2	salary2
1	John	30,000	Joyce	25,000
2	Franklin	40,000	Joyce	25,000
3	Franklin	40,000	Ramesh	38,000
4	Franklin	40,000	John	30,000
5	Jennifer	43,000	Ahmad	25,000

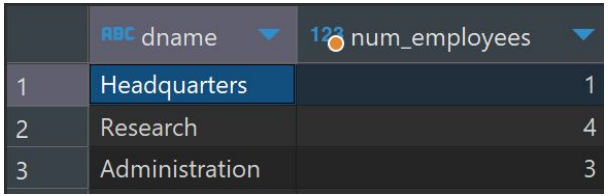
	fname	lname	dno	salary
1	John	Smith	5	30,000
2	Franklin	Wong	5	40,000
3	Alicia	Zelaya	4	25,000
4	Jennifer	Wallace	4	43,000
5	Ramesh	Narayan	5	38,000
6	Joyce	English	5	25,000
7	Ahmad	Jabbar	4	25,000

Aggregation

Using COUNT, AVG, also GROUP BY

1. Count the number of employees in each department

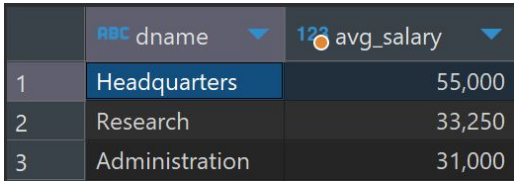
SELECT D.Dname, COUNT(*) AS Num_Employees FROM employee E JOIN department D ON E.Dno = D.Dnumber GROUP BY D.Dname;



	dname	num_employees
1	Headquarters	1
2	Research	4
3	Administration	3

2. Calculate the average salary of employees in each department

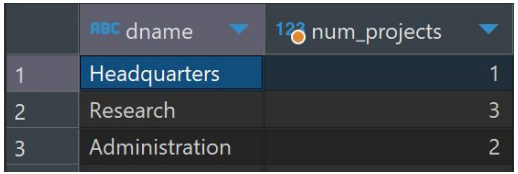
SELECT D.Dname, AVG(E.Salary) AS Avg_Salary FROM employee E JOIN department D ON E.Dno = D.Dnumber GROUP BY D.Dname;



	dname	avg_salary
1	Headquarters	55,000
2	Research	33,250
3	Administration	31,000

Step_5-3. List all departments and the number of projects they have.

Can you do this?



	dname	num_projects
1	Headquarters	1
2	Research	3
3	Administration	2

String Operations

1. Department Names Containing 'a'

SELECT dname FROM department WHERE dname LIKE '%a%';

	dname
1	Research
2	Administration
3	Headquarters

2. Employee Names Starting With 'J'

SELECT fname, minit, lname FROM employee WHERE fname LIKE 'J%';

	fname	minit	lname
1	John	B	Smith
2	Jennifer	S	Wallace
3	Joyce	A	English
4	James	E	Borg

3. Project locations with departments

```
SELECT p.pname, p.plocation, d.dname
FROM project p
JOIN department d ON p.dnum = d.dnumber
WHERE p.plocation LIKE '%Stafford%';
```

	pname	plocation	dname
1	Newbenefits	Stafford	Administration
2	Computerization	Stafford	Administration

Solve!

Step_6-4: Create a table which showcases employees whose names contain 'a' and manage departments in multiple cities (Hint: Use aggregation and *having*)

	fname	lname	dname	location_count
1	Franklin	Wong	Research	3

Step_7-1. Create a table which showcases a list employees who work on a project located in 'Houston' ordered by last name.

	lname	fname
1	Borg	James
2	Narayan	Ramesh
3	Wallace	Jennifer
4	Wong	Franklin

What did we learn today?

1. Simple Queries
2. Adding, altering and deleting values and tables
3. Relations
4. Self-joins
5. Aggregation
6. String Operations
7. Some Examples

Thank You!

See you next Thursday!