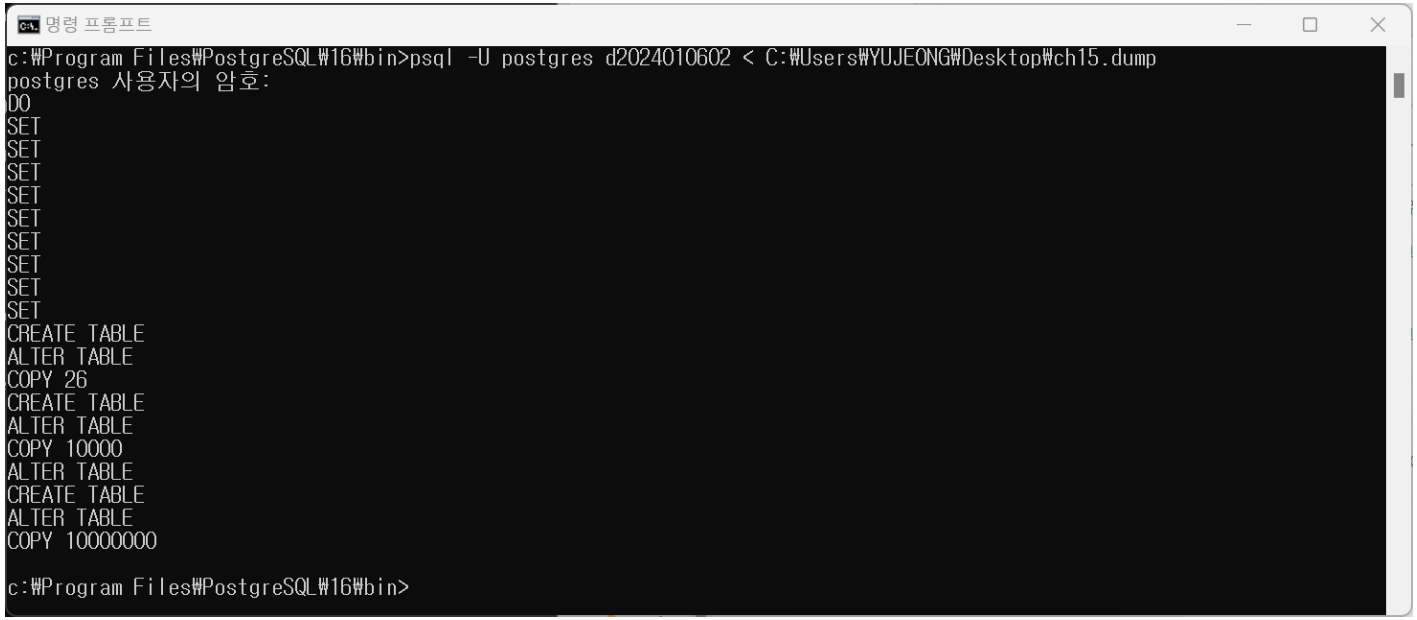
KOREA UNIVERSITY
DATABASE LAB

Chapter 15 - Lab

Query Processing

Lab Setup (Windows)

- Open Command Prompt (cmd.exe) and type the following commands:
  1. cd C:\Program Files\PostgreSQL\16\bin
     - This is the default path. If you installed it somewhere else, go to that path.
  2. psql -U postgres d{StudentID} < [filepath]\ch15.dump
     - For [filepath], type the path where you downloaded “ch15.dump”.
  3. Type your own PostgreSQL password



Lab Setup (Mac OS X)

- Open Terminal and type the following commands:
  1. cd /Library/PostgreSQL/16/bin
     - This is the default path. If you installed it somewhere else, go to that path.
  2. ./psql -U postgres d{StudentID} < [filepath]/ch15.dump
     - For [filepath], type the path where you downloaded “ch15.dump”.
  3. Type your own PostgreSQL password

Lab Setup

- Execute PostgreSQL SQL Shell (psql) and login your database
  - Server [localhost]: Press the enter key
  - Database [postgres]: Press the enter key
  - Port [5432]: Press the enter key
  - Username [postgres]: Press the enter key
  - Password for user postgres: Type your own password
  - \c d{StudentID}
- Type on psql command line
  - SET enable_bitmapscan=false;
  - SET max_parallel_workers_per_gather=0;

Table Information

- Schema of each table is as follows:

"table1"
(10,000,000 rows)

Attribute	Data Type	Cardinality	Features
sorted	integer	2,000,000	Sorted
unsorted	integer	1,986,519	Unsorted
rndm	integer	100,000	Dummy field
dummy	character(40)	1	Dummy field

"nation"
(26 rows)

Attribute	Data Type	Cardinality	Features
n_nationkey	integer	26	
n_nationname	character varying(50)	26	

Table Information

- Schema of each table is as follows:

"supplier"
(10,000 rows)

Attribute	Data Type	Cardinality	Features
s_suppkey	integer	10,000	primary key
s_name	character varying(200)	10,000	
s_address	character varying(200)	10,000	
s_nationkey	integer	25	
s_phone	character varying(200)	10,000	
s_acctbal	double precision	9,955	
s_comment	character varying(200)	10,000	

Exercise 1

- Consider two join cases below:
  a. Equi-join two tables of “supplier” and “nation” with “s_nationkey” and “n_nationkey” as join keys
  b. Attach the above SQL statement with “ORDER BY s_nationkey”, and test again
     - Hint: ORDER BY s_nationkey

- Estimate join algorithms that are applied to each case
- Verify whether your estimation is correct by using ‘EXPLAIN ANALYZE’

Exercise 2

- Consider two self-join cases below:
  a. Equi-join of the table “nation” with “n_nationkey” as a join key
  b. Non equi-join of the table “nation” with “n_nationkey” as a join key

- Estimate join algorithms that are applied to each case
- Verify whether your estimation is correct by using ‘EXPLAIN ANALYZE’

Exercise 3

- Consider two join cases below:
  a. Equi-join two tables of “supplier” and “table1” with “s_suppkey” and “sorted” as join keys
  b. Equi-join two tables of “supplier” and “table1” with “s_suppkey” and “unsorted” as join keys

- Estimate execution time and join algorithms that are applied to each case
- Verify whether your estimation is correct by using ‘EXPLAIN ANALYZE’

Exercise 4

- Create three indexes:
  - CREATE INDEX sorted_idx on table1(sorted);
  - CREATE INDEX unsorted_idx on table1(unsorted);
  - CREATE INDEX suppkey_idx on supplier(s_suppkey);
  - ANALYZE table1;
  - ANALYZE supplier;

- Consider two join cases below:
  a. Equi-join two tables of “supplier” and “table1” with “s_suppkey” and “sorted” as join keys
  b. Equi-join two tables of “supplier” and “table1” with “s_suppkey” and “unsorted” as join keys

- Estimate execution time and join algorithms that are applied to each case
- Verify whether your estimation is correct by using ‘EXPLAIN ANALYZE’

Exercise 5-1

- Type on psql command line
  - SET enable_memoize = off;

- Consider two join cases below:
  a. Equi-join two tables of “supplier” and “table1” with “s_nationkey” and “sorted” as join keys
  b. Equi-join two tables of “supplier” and “table1” with “s_nationkey” and “unsorted” as join keys

- Estimate execution time and join algorithms that are applied to each case
- Verify whether your estimation is correct by using ‘EXPLAIN ANALYZE’

Exercise 5-2

- Add a large number of records to the s_nationkey as follows.
  - INSERT INTO supplier(s_suppkey, s_nationkey) SELECT generate_series(10001, 10000000), generate_series(10001, 10000000);
  - ANALYZE supplier;

- Consider two join cases below:
  a. Equi-join two tables of “supplier” and “table1” with “s_nationkey” and “sorted” as join keys
  b. Equi-join two tables of “supplier” and “table1” with “s_nationkey” and “unsorted” as join keys

- Estimate execution time and join algorithms that are applied to each case
- Verify whether your estimation is correct by using ‘EXPLAIN ANALYZE’

Homework

- Complete today's practice exercises
- Write your queries and take screenshots of execution results
- Submit your report on blackboard
  - 10:29:59, October 21th, 2024
  - **Only PDF files** are accepted
  - **No late submission**

End of Lab