Advanced Database - TP 1

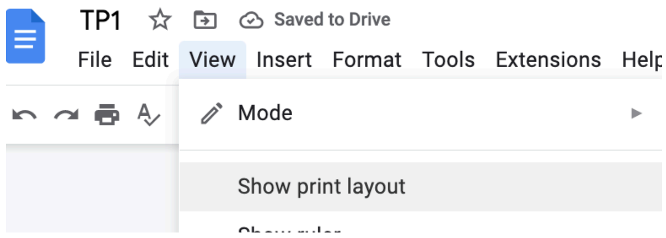
SQL

Install PostgreSql and client

Follow instructions here.

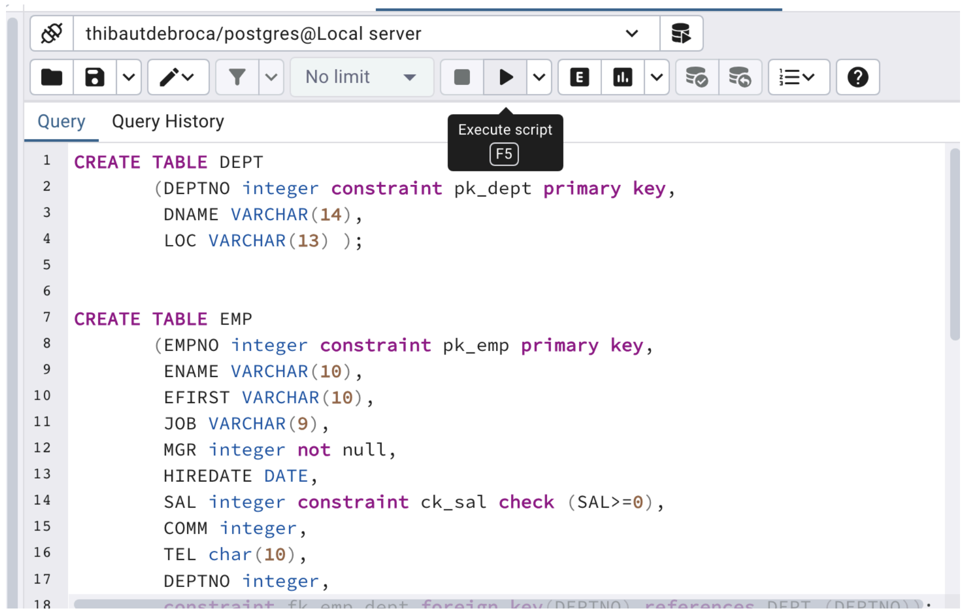
Tip using Google Doc

In order to read more easily the google doc, I recommend you un-check this option in Google Doc:



Exercice 1: DDL queries

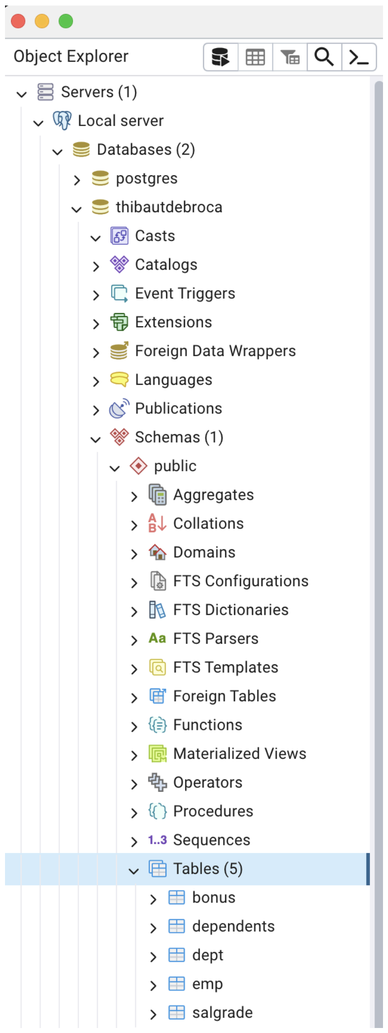
1. **Copy** the content of the script creation.sql and paste in a Sql editor in Postgresql.



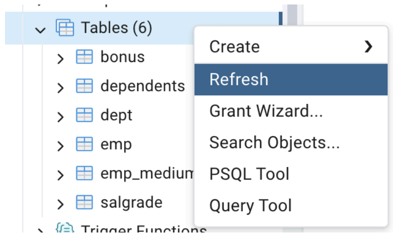
```
CREATE TABLE DEPT
       (DEPTNO integer constraint pk_dept primary key,
        DNAME VARCHAR(14),
        LOC VARCHAR(13) );


CREATE TABLE EMP
       (EMPNO integer constraint pk_emp primary key,
        ENAME VARCHAR(10),
        EFIRST VARCHAR(10),
        JOB VARCHAR(9),
        MGR integer not null,
        HIREDATE DATE,
        SAL integer constraint ck_sal check (SAL>=0),
        COMM integer,
        TEL char(10),
        DEPTNO integer,
        constraint fk_emp_dept foreign key(DEPTNO) references DEPT (DEPTNO));
```

Run the creation script (F5).

Check if the tables appear in the list of tables:



If you can't see the tables, right click and click on "refresh":



2. **E/R diagram:** Identify the different tables created and integrity constraints to ensure data consistency. Draw the entity / relational model from the given database.

Note: Dependents mean a person who depends on another person to be affiliated to the social Security System. In that case a dependent can be a child whose father is an employee (defined by empno link).

3. **First integrity Constraint:** Define an integrity constraint to prohibit the possibility of two employees to own the same firstname, lastname and phone number. Use the alter table statement.

4. **Second integrity Constraint:** More and more employees have two phone numbers: a fixed and a mobile phone. Unfortunately, the database allows us to store one phone number. Bring the necessary modifications to the database. Set up an integrity constraint in order to make sure that the entered mobile number begins with 06.

5. **Third integrity Constraint On Delete:** In practice, we realize that when one wants to delete an employee, it is necessary to remove all his dependents. How is it possible to make such removal dynamic? Do not forget to first remove the referential constraint fk_ depenent_emp that already exists.

6. **Explain Errors for Integrity Constraint:** Fill the tables with the insert.sql script. Explain the errors that you could get and correct them.

7. **Define a sequence** to make easy creation of a new dependent. This sequence has to start with the value 8000 and an increment gap of 1.

The instruction to create a sequence:

```
 CREATE SEQUENCE ma_sequence [START WITH] ... [INCREMENT BY]...
[MINVALUE]...[MAXVALUE]...[CYCLE|NOCYCLE];
```

8. **Use Sequence:** Add some tuples to the DEPENDENT table using the previous sequence
Use ma_sequence.NEXTVAL to get the values from the sequence

9. **Discuss** on the best way to do an auto-increment with postgres. Apart from Sequence, there is also the "serial" data object. But there is also the "identity" since postgres 10 (2017):

https://wiki.postgresql.org/wiki/Don%27t_Do_This#Don.27t_use_serial

https://stackoverflow.com/a/55300741/1029722

Exercise 2: DML queries Answer the following queries using SQL.

1. List the content of all tables to see the attributes names
2. Select employees whose commission is higher than their salary
3. Select employees earning between 1200 and 2400
4. Select employees who are CLERK or ANALYST

5. Select employees whose name begins by M

6. Select employees whose name includes a L in second position

7. Select employees who are MANAGER or CLERK in the department 10 and whose salary is greater than 1500

8. Select employees whose commission is NULL

9. Select employees by ascending order

10. Select employees ordered by job, and for each job, by decreasing salary

11. Select departments without employees

12. List employees indicating for each the name of his/her manager

13. List employees earning more than JONES

14. List employees displaying in the same column salary and commission

15. List department numbers which are both in table EMP and in table DEPT

16. List employees working in CHICAGO and having the same job than JONES

17. List employees who don't work in the same department than their manager

18. List employees working in a department having at least one CLERK

19. List employees of department 10 having the same job than someone from the department SALES

20. List employees having the same job than JONES or a salary greater than FORD's salary

21. List employees having a salary greater than all employees of department 20

Exercise 3: Join Table.

1. **Create a Table for employee's Projects:** Each employee is working on one or several projects. Create a table "project" containing the number, name, starting date and budget of each project

Write the corresponding SQL Request

Table name is: "project"

Attributes are: "projno", "pname", "startdate", "budget"

2. **Create the Join Table:** An Employee can work on many projects and a project can be affected by many employees. Create the necessary tools for that. Insert some elements in the tables.

Write the SQL query to create the corresponding table (name of the table is : "project_emp"). Tip: don't forget foreign keys

Write some requests to insert elements in the table:

- You should have 4 projects in the project table
- In the join table ‘project_emp’ you should have at least 30 lines.
    - One of the employee should be assigned to all the projects

3. **List all employees (by empno) who work on all projects ?**

Write 1 SQL query to answer this question, return only the employee number (empno)

4. **Options on View creation:** Explain the following instruction

```
CREATE VIEW sales_staff AS

SELECT empno, ename, deptno

    FROM emp

    WHERE deptno = 10 WITH CHECK OPTION
```

5. **View Creation:** Create the view and try the following queries, explain the result

INSERT INTO sales_staff VALUES (7584, 'OSTER', 10);

INSERT INTO sales_staff VALUES (7591, 'WILLIAMS', 30);

6. Division Query: Find all employees that are assigned to all projects.

7. Analyze: Give the number of projects per employee and display only employees assigned to at least 2 projects.