CS130 Databases
Laboratory Assessment Sheet: Lab 9

In this lab today you must connect to your OWN schema in the PostgreSQL database. This means that when you connect to PostgreSQL on webcourse.cs.nuim.ie you do not click on the public schema. **You scroll through the cs130 database to find YOUR schema.** Your schema will match your USERNAME – for example u181234 or p189876. When you have clicked on YOUR schema then you can open the PGAdmin query tool. There is NO SQL file to download today.

SAVE your work in a SQL file as you work.

CONTEXT:

Air Quality monitoring is performed by the Environmental Protection Agency in Ireland. There are around 40 Air Quality monitoring stations in Ireland. All Air Quality monitoring is done in regards to European Air Quality Directives. Every station in every country in Europe is part of the European network and has a unique station code. Every air quality pollutant is given a unique pollutant number to avoid any confusion regarding monitoring of pollutants with similar chemical composition.

TASK 1: Given the following dataset called **Lab9_Station** – write an appropriate CREATE statement and then INSERT statements to represent this dataset in a PostgreSQL table. You are advised to use the column names as shown below. You should decide on the Primary Key, the column data types, etc.

EIONetCode	Station	Status
IE0145A	Mayo Claremorris	Rural-Remote
IE0028A	Dublin Rathmines	Urban
IE0125A	Galway City	Suburban
IE0111A	Laois Emo Court	Rural-regional
IE0090A	Monaghan Kilkitt	Rural-regional
IE0147A	Kilkenny Seville Lodge	Suburban

TASK 2: Given the following dataset called **Lab9_Pollutant** – write an appropriate CREATE statement and then INSERT statements to represent this dataset in a PostgreSQL table. You are advised to use the column names as shown below. You should decide on the Primary Key, the column data types, etc.

EEAPol	Pollutant	Notation
1	Sulphur dioxide (air)	SO2
10	Carbon monoxide (air)	CO
7	Ozone (air)	O3
8	Nitrogen dioxide (air)	NO2
5	Particulate matter < 10 (aersol)	PM10
6001	Particulate matter < 2.5 (aersol)	PM2.5

TASK 3: Each station can monitor multiple air pollutants. All stations monitor at least one pollutant. Rathmines monitors all of the pollutants, stations with a status containing the term 'Rural' monitor all pollutants except SO2 and CO, while suburban stations monitor all pollutants except Ozone and Carbon Monoxide.

Write an appropriate CREATE statement and then INSERT statements to represent these relationships in a PostgreSQL table. You should call the table **Lab9_Monitors**. This table should enforce Referential Integrity on all UPDATES and DELETES.

QUESTION 1
Write a JOIN query which shows all of the relations between the **Lab9_Station** and **Lab9_Pollutant** tables. The Moodle Quiz will ask you to indicate how many rows are returned by this query.

QUESTION 2

There is a problem with the Lab9_Monitors table. This table establishes the relationships between Stations and the Pollutants that are monitored at stations. However depending on the station status, and due to European Air Quality Directive legislation, different pollutants are monitored at different frequencies. Some pollutants are monitored and reported on an hourly frequency while other pollutants are monitored and reported on a daily frequency. A pollutant at a given station cannot have two frequencies. For example O3 cannot be monitored and reported at an hourly and daily frequency in the same station. It must be one frequency or the other.

All pollutants, except the Particulate Matter pollutants, are monitored and reported on an hourly basis at all stations where they are currently monitored. The Particulate Matter pollutants are monitored and reported on a daily basis at all stations where they are currently monitored.

Write an ALTER table statement to change the structure of the **Lab9_Monitors** table to include a text column called Frequency. Do not include referential integrity constraints for this new column. Write an appropriate number of UPDATE statements to assign the monitoring and reporting frequency for each relationship in the **Lab9_Monitors** table, based on the information provided.

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The Moodle Quiz.

To attempt the Moodle Quiz you will need to have completed the lab assignment up to this point. The Moodle Quiz has a total of 10 questions – the quiz will RANDOMLY SELECT 6 questions for each student.
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