CS621 Lab Exam 1 2019 [White]

Exam Duration: 1 hour 45 minutes
Date: 24th October 2019 – 11:15

On Moodle you will find an SQL file called **CS621LabExam1.sql** which must be executed **on your own schema**. It is a geolocated listing of the observations of rainfall in the London region, UK. All observations are recorded between January 2019 and May 2019 (inclusive). All of the locations with the `TheGeom` column are recorded in EPSG:4326 Latitude Longitude. You are advised that for the purposes of this exam you should consider British National Grid as acceptable for all of United Kingdom (this means EPSG:27700) meter-based measurements.

There are 5 columns in the table. The fields/columns are as follows:

tIndex – this is a String or text value representing a unique field. It has the structure as follows: four digits, a hyphen, four uppercase letters, a hyhen, four lowercase letters, a hyphen and finishing with two digits

rainfall – this is a real value representing the rainfall in millimeters

ts – this is the timestamp of the observation

TheGeom – this is the geographical location in WGS 84 (EPSG:4326) Longitude Latitude of where the observation of rainfall was made

observer– this is a text field with a string representing the username of the person who recorded this value. The field contains lower case letters. It may sometimes contain digits.

All answers must be entered into the Moodle Quiz for Lab Exam 1. Please familiarise yourself with the rules of the Lab Exam. **Absolutely no late submissions are allowed. UNLESS OTHERWISE STATED each question in the Moodle Quiz will require you to specify the number of rows returned or affected. There are TWO ATTEMPTS allowed in the Moodle Quiz.**

ALWAYS SAVE YOUR WORK – You must hand up this question sheet SIGNED at the end of the examination.

QUESTION 1: Write an SQL query which returns all rows where the number of characters in the observer column is greater than 10?

QUESTION 2: Write an SQL query which returns all of the observations in the table where the rainfall is between 40 and 50 millimeters inclusive and the month is May 2019.

QUESTION 3: Write an SQL query which returns all observations in the table where the only digit used in the **tIndex** column is the digit 3?

QUESTION 4: Write an SQL query which returns all observations in the table where the **tIndex** column contains only even digits (excluding the digit 0)?

QUESTION 5: Write an SQL query which returns all observations in the table where the rainfall is greater than 30 millimeters and the **tIndex** column contains at least two uppercase vowels (beside each other)? ;

QUESTION 6: Given the location with longitude -0.1936 and latitude 51.4579, write an SQL query to find all observations which were made within 3KM of this location.

QUESTION 7: Westminister Bridge has coordinates (longitude,latitude) -0.121661 51.500835. Write an SQL query which finds all of the observations which were made within 10KM of this location and the month is from April onwards?

QUESTION 8: Suppose you are provided with a geolocation expressed as Well Known Text `POINT(-0.1926 51.4556)`. Write an SQL query to satisfy the following criteria. Return all observations made within 8.5 KM of this location where either the hour of the timestamp (on any day) or the rainfall amount value are greater or equal to 20?

QUESTION 9: Write an SQL query which returns observations matching the following criteria. Regardless of any other character, the **tIndex** column ends in an odd number digit and the **observer** column also ends in an odd number digit?

QUESTION 10: Write an SQL which allows us to find the names of observers who measured rainfall observations greater than 40mm in April 2019. What is the name of the observer who measured the 3rd observation (in chronological) order, according to these criterion? NOTE: The Moodle quiz will require the name of the observer, not the number of rows.

QUESTION 11: Write an SQL query which returns all observations where the observation was made in February 2019 and the sum of the hour, minute and second of the observation is greater than 10 times the rainfall value for this observation.

QUESTION 12: Write an SQL query which returns all observations where the name in the observer field does not contain any vowels (regardless of case).

PRINTED NAME:

STUDENT ID:

This exam paper MUST be handed back before you leave the exam.