

# DEMO Lab Exam 1 – 2025

The Moodle Quiz provides you with TWO ATTEMPTS only. The overall duration of the quiz is 24 Hours (to allow you take breaks between attempts). **You are strongly advised to make a note of your answers (number of rows or otherwise as specified per question) in the event of a loss of data or other incident.** Unless otherwise stated the Moodle Quiz will ask you to provide the number of rows returned by the corresponding query. Please read each question carefully!

**CONTEXT:** The file on Moodle called “**LabExam12022-Table-SQL.sql**” will be used to automatically create a table called **LabExam12022** which you will use to answer the questions below. The table represents a fictional dataset of automated highway speed control cameras in the Milan area of Northern Italy. **The data represents time periods in the year 2021 only.**

- Column: **pkid** – the primary key
- Column: **thegeom** – the geometry (POINT) in EPSG:4326 representing the location where the speed camera detected the corresponding vehicle.
- Column: **mph** – an integer representing the speed (in miles per hour) detected for the vehicle passing the speed control camera.
- Column: **trapTS** – a timestamp representing the date and time when the speed camera detected the vehicle.
- Column: **reg** – the registration plate of the vehicle. **The registration strictly follows the pattern** – two upper case letters, 4 digits, two upper case letters.
- Column: **vehicle** – the type of vehicle detected by the speed control camera. Look at the contents of this column. Each vehicle is assigned a single type.

**Meter-based calculations:** You are asked to use **EPSG:6875** which is officially called RDN2008 / Italy zone (N-E). This SRS is meter-based for Northern Italy.

**QUESTION 1:** Write an SQL query to return all rows where the **vehicle** is a car, the captured speed is between 100 and 140 mph (both inclusive) and the speed camera observed this vehicle on ANY day in December.

**QUESTION 2:** Write a query returning rows where the day of any month is 7 or 14.

**QUESTION 3:** The *Autostrada del Sole* close to the town of Melegano in the south of Milano is a well known motorway junction. The center point of this junction is given as **WKT** in **EPSG:4326** as **POINT(9.303231 45.355149)**. Write an SQL query which returns ALL rows where the **vehicle** is a bus and the location is less than or equal to 10KM away from this point.

**QUESTION 4:** Suppose you are given the location in **WKT** in **EPSG:4326** as **POINT(9.262569 45.382383)**. Write an SQL query which finds the REGISTRATION PLATE of the ‘van’ vehicle detected at the location closest to this point. The vehicle must be detected travelling at less than 90 mph.

**QUESTION 5:** Suppose you are given a point in **WKT** expressed in **EPSG:3857** as follows **POINT (1016235.07 5696786.90)**. Write an SQL query to return all rows where vehicles are travelling over 100mph within 2KM of this location.

**QUESTION 6:** Write an SQL query to return all rows where the registration plate begin with two vowels and ends with two vowels. [Vowels are A, E, I, O and U]

**QUESTION 7:** Considering 'truck' and 'motorcycle' (note the spelling) only, write an SQL query to return all rows where these vehicles have registration plates where the first and last characters are both one of the following alphabetical characters A, B, C, D, M, N, O, P. The other letters and digits in the registration plate are not relevant.

**QUESTION 8:** Write an SQL query to return all rows where the registration plate contains 3 or 4 adjacent digits where the adjacent digits are only 1, 2 and 3. For example **AH7312HA** or **PG3123HJ** are registrations displaying this pattern. The registration **BG3183KJ** does not display this pattern. You may have repeated digits

**QUESTION 9:** Write an SQL query that returns all rows where the **traps** timestamp is between exactly midnight (inclusive) and before 01:30 for any day recorded.

**QUESTION 10:** Write an SQL query which returns all rows where the sum of the hour, minute and second value of **traps** is greater or equal to the corresponding **mph** value. The query should only show vehicles where the **type** of vehicle is not listed as a **car**.

**QUESTION 11:** Consider the **reg** column. The structure is described above. If one considers the four digits in the **reg** value as a numerical value by reading the digits from left to right. For example **JY9655YL**. As a numerical value this equals 9,655. Write an SQL query which returns all rows containing **reg** column values where the NUMERICAL VALUE of the FOUR DIGITS in the registration plate is greater or equal to 9,600.

**QUESTION 12:** Refer to the description in Question 11. In this question you will use the very same definition. Write an SQL query which returns all rows containing **reg** column values where the NUMERICAL VALUE of the FOUR DIGITS in the registration plate is less than 4,600.