Structured Query Language
Module 3, 2022/2023

Natalia Ostroukhova
Sberbank
natosova@gmail.com

TAs: Ermak Anton and Kurseev Maxim

Course description

The purpose of this course is to provide basic Structured Query Language (SQL) skills and to explain how SQL could help you in business or academic career. An overview of the SQL syntax together with lots of practice will allow you to obtain experience that might be helpful for your future life. Each lecture (excluding the first one) will start with a short quiz, based on the material of previous classes.

Course requirements, grading, and attendance policies

The course grade is based on short quizzes (10%), homework assignments (40%) and personal test (exam) (50%). Active class participation may contribute to the grade when it is on the margin (note that quality rather than quantity of your interventions will count).
The typical student will use a laptop running Windows or MacOS.
Prerequisites: No prior experience required, basic computer skills only.

Course contents

Lecture 1. Why do you need SQL. Dialects of the language and different DBMS. Data types. Casting of types. The SELECT statement. Restrictions on output in different DBMS or why it is not recommended to do SELECT *. The CASE expression and simple value processing. Tricky NULL.

Lecture 2. Why can't all the data be put into one table or why do you need the JOIN operator. Database normalization: how it should be and how it really is. Connection types, foreign keys, indices. What is the difference between JOIN and UNION (intersect/except).

Lecture 3. Limitations on output. The WHERE operator. How to display all users with last name ending with "ev" or what is LIKE.

Lecture 4. Measuring the average: aggregate functions GROUP BY and HAVING.

Lecture 5. Subqueries. Generating lists of dates. Recursive subqueries and what are they useful for. SELECT from DUAL in Oracle or how do I get constants.

Lecture 6. Window functions: moving average, top *n* and others. OVER, PARTITION BY, ORDERED BY and other keywords.

Lecture 7. Everything you don't need as an analyst, though it turns out useful once. Permissions, users and roles. Updating and deleting data, Truncate vs Delete, triggers on tables. Procedures, functions and small automation. How can you make Python and SQL become friends. Connectors to different types of databases. How SQL is similar to Pandas.

Course materials

All materials will be provided during lectures and will be available on my.nes.ru

Academic integrity policy

Cheating, plagiarism, and any other violations of academic ethics at NES are not tolerated.