Practical script Nr. 3

# Reading data from various tables

In case you to check information regarding examinations and teachers, who performed those examinations, you need to select data from tables Examination and Teacher. In case those records are read separately, it becomes hard to tell which examinations belong to which teachers.

SQL query allows to select data from multiple tables by specifying the list of tables in FROM clause.

**SELECT \*   
FROM Examination, Teacher**

This SELECT statement is not very optimal, as it creates a cartesian product of two tables. The proper way of selecting matching records is to specify how to much them using WHERE statement conditions.

**SELECT \*   
FROM Examination, Teacher  
WHERE Responsible\_teacher\_ID=Teacher\_ID**

In a similar way, we can select examination courses.

**SELECT \*   
FROM Examination, Course  
WHERE Examination.Course\_ID=Course.Course\_ID**

Note that in the WHERE clause it is important to specify table names as well, without the table names SQL will through an error, as there are multiple Course\_ID columns in the select.

***Practice. Select all data about students and their lecture attendance. (Student, Attendance).***

SELECT distinct Name, Surname

FROM Student, Attendance

WHERE Student.Student\_ID = Attendance.Student\_ID

AND Attendance.Attendance='N'

You can select specific columns in the select and add more conditions in the WHERE statement, as per usual SQL syntax.

# JOIN clause syntax

Multiple tables can be selected using JOIN syntax, which is the same as selecting data from various tables, only with more context appropriate syntax.

**SELECT \*   
FROM Examination   
JOIN Teacher ON Examination.Responsible\_teacher\_ID=Teacher.Teacher\_ID**

***Practice. Select all data about students and their lecture attendance  
(Student, Attendance) using JOIN syntax.***

SELECT distinct Lecture\_ID

FROM Student

JOIN Attendance

ON Student.Student\_ID=Attendance.Student\_ID

WHERE Student.Name LIKE 'Z%'

In practice you can JOIN tables using not one, but multiple conditions as well.

# JOINing 3 and more tables

You can select data from many tables, for example selecting teachers, their courses and additional details about those cources.

**SELECT Teacher.Name, Surname, Start\_date, End\_date, Course.Name   
FROM Teacher JOIN Course\_teacher  
 ON Teacher.Teacher\_ID=Course\_teacher.Teacher\_ID  
JOIN Course  
 ON Course.Course\_ID=Course\_teacher.Course\_ID**

# JOIN the same table multiple times

Selecting teachers and their mentors

**SELECT \*  
FROM Teacher T1 JOIN Teacher T2  
 ON T1.Mentor\_ID = T2.Teacher\_ID**

This is usually when you need to create hierarchies within a single tables, one of examples is parent / child concept, popular in tree data structures.

SELECT \*

FROM Teacher T1 JOIN Teacher T2

ON T1.Mentor\_ID = T2.Teacher\_ID

JOIN Teacher T3

ON T2.Mentor\_ID = T3.Teacher\_ID

# OUTER JOIN

Selecting all the courses and courses examinations (if those exist). Simple JOIN would not be enough, as it filters out those courses, which do not have examinations. OUTER JOIN allows to select all the courses, and if they have examinations – select those as well.

**SELECT \*   
FROM Course  
LEFT OUTER JOIN Examination  
ON Course.Course\_ID=Examination.Course\_ID**

Explain the difference between RIGHT and LEFT join here

SELECT \*

FROM Course

RIGHT OUTER JOIN Examination

ON Course.Course\_ID=Examination.Course\_ID

SELECT \*

FROM Examination

RIGHT OUTER JOIN Course

ON Course.Course\_ID=Examination.Course\_ID

SELECT \*

FROM Course

LEFT OUTER JOIN Examination

ON Course.Course\_ID=Examination.Course\_ID

WHERE Examination.Course\_ID IS NULL

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