

# Advanced SQL Queries Lab

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#### Outline

- > Entrance Test
- Problem Statement
- Create a Table by Script
- > Tasks 1-9 + bonus (10<sup>th</sup>)
- Information for Laboratory Reports



#### **Problem Statement**

In this Lab Exercise you will construct a number of SQL queries for the given database. The purpose of this lab is to become familiar with advanced SQL queries on multiple tables. You will write basic SQL queries as well as more complex ones by using aggregate functions on joined tables and obtaining summary data.



#### **Create Tables**

➤ Use Lab3-CreateTables.sql script to create tables you will work with during the lab. You can use the existing database (e.g. the one you have created on Labs 1 or 2) or create a new one.

Run the script. Check that all tables have been created correctly and filled with data. Check the types and the constraints.

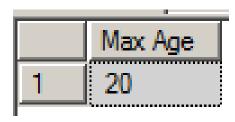


Find the names of all Juniors (level = JR) who are enrolled in a class taught by I. Teach

|   | Sname              |
|---|--------------------|
| 1 | Christopher Garcia |
| 2 | Paul Hall          |



- Find the age of the oldest student who is either a History major or enrolled in a course taught by I. Teach. Rename the resulting column to "Max Age".
  - As the 'fname' column of Faculty contains full names, you should take it into account when designing your query





> Find the names of all classes that either meet in room R128 or have five or more students enrolled.

|   | name                          |
|---|-------------------------------|
| 1 | Dairy Herd Management         |
| 2 | Data Structures               |
| 3 | Database Systems              |
| 4 | History of the Choson Dynasty |
| 5 | Intoduction to Math           |
| 6 | Operating System Design       |
| 7 | Patent Law                    |



Find the names of all students who are enrolled in two different classes that meet at the same time

➤ The resulting set should be empty. Usually, it is not allowed to enroll in two parallel classes, hence you will be unable to attend both at the same time.



- Find the names of faculty members who teach in every room some class is taught
  - Please note that there is a difference between vendor-specific SQLs. If you solve this task with Transact-SQL (MS SQL Server), then you will use the keyword EXCEPT. However, in PL\SQL (Oracle) the corresponding keyword would be MINUS.





> Find the names of faculty members for whom the combined enrollment of the courses that they teach is less than five

|    | fname            |  |
|----|------------------|--|
| 1  | Barbara Wilson   |  |
| 2  | David Anderson   |  |
| 3  | Elizabeth Taylor |  |
| 4  | James Smith      |  |
| 5  | Jennifer Thomas  |  |
| 6  | John Williams    |  |
| 7  | Mary Johnson     |  |
| 8  | Michael Miller   |  |
| 9  | Patricia Jones   |  |
| 10 | Richard Jackson  |  |
| 11 | Robert Brown     |  |
| 12 | Ulysses Teach    |  |
| 13 | William Moore    |  |
|    |                  |  |



For each level, print the level and the average age of students for that level

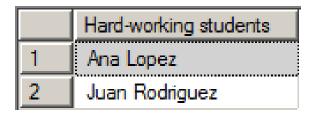
|   | standing | (No column name) |
|---|----------|------------------|
| 1 | FR       | 17               |
| 2 | JR       | 19               |
| 3 | SO       | 18               |
| 4 | SR       | 20               |

For all levels except JR print the level and the average age of students for that level

|   | standing | (No column name) |
|---|----------|------------------|
| 1 | FR       | 17               |
| 2 | SO       | 18               |
| 3 | SR       | 20               |



Find the names of students enrolled in the maximum number of classes. Rename the resulting column to "Hard-working students"





> Find the names of students not enrolled in any class. Rename the resulting column to "Lazy students"

|    | Lazy students   |
|----|-----------------|
| 1  | Angela Martinez |
| 2  | Charles Harris  |
| 3  | Daniel Lee      |
| 4  | Donald King     |
| 5  | Dorthy Lewis    |
| 6  | Edward Baker    |
| 7  | George Wright   |
| 8  | Margaret Clark  |
| 9  | Maria White     |
| 10 | Mark Young      |
| 11 | Nancy Allen     |
| 12 | Steven Green    |
| 13 | Thomas Robinson |
|    |                 |



# Task 10 (bonus)

- For each age value that appears in Student, find the level value that appears most often.
  - For example, if there are more FR level students aged 18 than SR, JR or SO students aged 18, you should print the pair (18, FR).

|   | age | standing |
|---|-----|----------|
| 1 | 17  | FR       |
| 2 | 18  | FR       |
| 3 | 19  | SO       |
| 4 | 20  | JR       |
| 5 | 21  | SR       |
| 6 | 22  | SR       |



### Modifying database, writing queries

Follow the instructions of the Lab Instructor.



## Information for Laboratory Reports

- > Lab title: "Advanced SQL Queries"
- > Instructor: Dmitriy Dunaev
- Department: Automation & Applied Informatics
- Lab sequence number: 3