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# **Assignment 8**

Hand in this assignment until Thursday, 29 June 2023, 12:00 at the latest.

### ▲ Lecture Evaluation

In the upcoming days, you will have the opportunity to **evaluate lectures** you are attending. With this in mind, we kindly ask you to keep an eye on your inbox and to provide us with **your** valuable feedback. Thank you!

## **E**xam-style Exercises

Exercises marked with (E) are similar in style to those you will find in the exam. You can use these to hone your expectations and gauge your skills.

## Running out of ideas?

Are you hitting a roadblock? Are some of the exercises unclear? Do you just need that one hint to get the ball rolling? Refer to the #forum channel on our Discord server and check the tag for this assignment —maybe you'll find just the help you need.

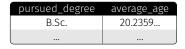
# Task 1: Aggregate Queries

#### Note

In the below task, we will be using the university data set, i.e., the schemas and instances from Assignment 6.

Formulate SQL queries. Make sure that the results of your SQL queries adhere to the schemata on the right.

- (a) (E) For each type of degree, i.e., B.Sc. and M.Sc., calculate the average age of the students.
- (b) **(E)** List the **number of different** majors in which students are enrolled.
- (c) **(E)** Find the oldest student(s).
- (d) Count the classes each student is enrolled in. Submit **two queries**. The first query should include students who are not enrolled in classes (with a count of zero), the second should omit those students.





student_name	age
Kenneth Hill	35

student_name	classes_count
Ana Lopez	3

### Task 2: LEGO Data Warehouse

We have provided you with a dataset that you already know from the lecture: The LEGO Data Warehouse (legodw.sql). Load the file into a PostgreSQL database. Then, write queries for the following tasks, making sure that the resulting adhere to the schemata on the right.

- (a) For each store in Germany, sum the overall sales per day of the week.
- (b) For each store in Germany, find the day(s) with the highest sales.
- (c) Calculate the most popular set(s) per country, i.e., the sets with the most *items* sold.

store	city	dow	turnover
1	BERLIN	1	\$594.26

store	city	dow	turnover
1	BERLIN	6	\$644.31

country	set	items
USA	10000-1	9

# Task 3: From NF<sup>2</sup> to 1NF

Table departments contains information about the departments of a company, including the contacts of each department, as well as their employees and their tasks. The Boolean column client indicates whether a contact is a client (as opposed to an employee, for example). The table is presented in a non-first normal form (or NF<sup>2</sup>).

- (a) E Transform the NF<sup>2</sup> schema into an equivalent 1NF database schema using the nf2to1nf algorithm from Slide Set 8, Slide 10. Then formulate appropriate SQL DDL statements to create the resulting flat tables.
- (c) For each of the following tasks, write a single SQL query using the tables of your 1NF representation. Results should adhere to the schemata on the right.
  - i. Count the number of employees per department.
  - ii. Find departments without contacts.
  - iii. Return the names and department of employees without tasks.
  - iv. Compute the number of clients per department.



name	department	
Alice	IT Security	

department	clients_count
Engineering	0

### Note

Obviously, some departments don't have any clients. Nevertheless, they should be included in the result with their correct number of clients. Think about using a *correlated subquery*.

departments department		employees	contacts
Engineering	name sala		Ø
	John Doe \$7.00		
	Jane Doe \$10.0	task duedate task3 19.01.2014 task4 18.01.2014 task5 17.01.2014 task6 10.01.2014 task7 23.12.2013	
IT Security	name         salary           Eve         \$10.00           Mallory         \$5.000           Alice         \$5.000           Bob         \$5.000	task duedate task8 19.01.2014 task9 18.01.2014  task duedate task10 19.01.2014	contact client contact4 true contact5 false contact6 false
Advertising	Donal Draper \$1	10.000 task duedate task14 19.01.2014 task15 18.01.2014	contact9 true