



**Database System Concepts for Non-Computer Scientist – WiSe 20/21**

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<http://db.in.tum.de/teaching/ws2021/DBSandere/?lang=en>

**Sheet 09**

**Exercise 1**

Answer the following questions on our university database using SQL:

- a) Calculate how many lectures each student is attending. Students who do not attend any lecture should be included in the result as well (*attend\_count* = 0) (use outer joins).
- b) Figure out how many students each professor knows: A professor knows students from one of their lectures or via a test they have supervised. Include professors not knowing any students and use outer joins. Hint: <sup>1</sup>

**Exercise 2**

Create SQL DML statements for the following tasks:

- a) “Professor meeting”: Move all professors to room 419.
- b) “Lazy students”: Remove all students from the database who have ever failed a test (grade worse than 4.0).

**Exercise 3**

Find those students who have attended all lectures that they wrote a test in.

**Exercise 4**

Considering the following table definitions:

- 1) `create table A(a int primary key);`  
`create table B(b int);`
- 2) `create table A(a int primary key);`  
`create table B(b int references A(a));`

Assuming the cardinalities (number of tuples) of the relation *A* and *B* are  $|A|$  and  $|B|$ , respectively. How many tuples are produced by the following queries. If no exact estimate is possible, give an range. Alternatively you can use mathematical set operations.

- a) `select * from A, B;`
- b) `select * from A join B on A.a = B.b;`
- c) `select * from A left outer join B on A.a = B.b;`
- d) `select * from A right outer join B on A.a = B.b;`
- e) `select * from A full outer join B on A.a = B.b;`

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<sup>1</sup>Remember that SQL has set operations.