Databases I. Exam

Dear Students,

Here I would like to give you some important information about the exam.
The exercise types that may occur in the exam are listed below.
In the exam, you will get only 6 exercises, chosen from the types below.
The exams will be offline (in class). You will need to run relational algebra queries (in Relax), run SQL in Oracle, and type in "paper" exercises into a file, then you should submit your solutions by email.

1. Relational algebra

- You have to express a query in relational algebra for some sample data and you must run the query in relational algebra calculator (Relax).
- You must compute the result of some relational algebra expression in paper, like in db1_exercise5b.pdf (Exercise 3, Exercise 4).
- You must convert a relational algebra expression into SELECT.

2. SQL SELECT

- You have to write an SQL query and run it on some sample data.
- You have to convert a SELECT statement into relational algebra.

3. SQL DML statement

- You have to write an SQL DML statement (INSERT, DELETE, UPDATE) and run it on some sample data.

4. SQL WITH statement

- You have to write an SQL query using the WITH statement and run it on some sample data.

5. DATALOG

- You have to express a query in Datalog (in paper).
- You have to convert relational algebra into Datalog and vice versa. (See Textbook 5.4.8: Exercises)

6. Recursion in Datalog and in SQL

- You have to write a recursive query (WITH or CONNECT BY) and run it on some sample data.
- You have to write a recursive Datalog query (in paper).

7. Entity-Relationship models and DDL

- You will get an E-R model, you have to convert it into relations, and you have to write the appropriate CREATE TABLE statements with primary key and foreign key definitions.

8. Functional Dependencies

- Compute the closure of a set of attributes. (See Algorithm 3.7 and Example 3.8 in Textbook)

- Decide if a Functional Dependency follows from some other FD's. (See Example 3.9)
- Find the keys of a relation. (Like Exercise 3.2.1 in Textbook)
- Compute a minimal basis for a set of Functional Dependencies.
- Compute the projection of a set of FD's. (Alg. 3.12, Example 3.13, Exercise 3.2.10)

9. Normal Forms, decomposition

- Decompose a relation into relations which are in Boyce-Codd Normal Form. (Alg. 3.20, Exercise 3.3.1)
- Test if a decomposition is a Lossless Join decomposition -> Chase Test. (Example 3.22, Example 3.23, Example 3.24, Exercise 3.4.1)