

CS4416 Project: 20 marks = 20%

Spring 2016

This is a **group** project. A project group should consist of **either 4 or 3 students**.

Part A – Design a relational database schema

1. Design a relational database schema consisting of at least 5 tables in Third Normal Form (3NF). Pick any domain. You can reuse a schema from a project you have done for another module.
2. For each table, assert some functional dependencies (FDs) and identify its keys.

Part B – Implement a MySQL-compatible relational database schema

1. Create file **schema.sql** which contains:
 - i. a **CREATE TABLE** statement for each table defined in part A; include definitions of primary keys, any foreign keys and any unique attributes; specify any default values of attributes;
 - ii. **INSERT INTO** statements that insert some example data into the tables (at least 5 data rows per table).
2. Create file **queries.sql** which contains:
 - i. 3 *meaningful* and complex SQL queries for your database. Each of them must contain either a **subquery** or **GROUP BY** and **HAVING** clauses;
 - ii. definition of at least one view that might be useful either for the queries you have written or for other queries;
 - iii. definitions of any indexes necessary for the optimal performance of your queries.
3. Create file **trigger.sql** which contains 2 triggers for your database.
4. Create file **procedures.sql** which contains 2 two stored procedures/function for your database.

Part C – Write a report which includes:

1. The names of the students in your project group and which parts of the project each student has worked on.
2. A couple of paragraphs explaining what your database is about. Include an entity-relationship diagram.
3. An example of each table with some data and primary key attributes clearly identified.
4. The list of FDs for each table.
5. Proof that each table is in 3NF.
6. Justification for the usefulness of the queries and views proposed in part B within a scenario for possible use of the database within a software system.
7. Analysis of the speed of your queries and justification for the indexes proposed in part B.
8. Justification for the necessity of the triggers and stored procedures/functions proposed in part B within a scenario for possible use of the database within a software system.

Submission

Email your report (part C) and all .sql files (part B) to nikola.nikolov@ul.ie by the 18th of April, 6 pm (Monday, week 12). Late submissions are subject to -5 marks penalty. No submissions will be accepted after the 1st of May.

The subject of your submission email must be **CS4416 project submission**; the names and the student IDs of all group members must be in the body of your submission email and all group members must be copied on the email message.

Marking:

1. Quality of schema design as described in the report (C.1-C.5): **5 marks**
2. Correctness and completeness of implementation (part B): **8 marks**
3. Quality of report:
 - a. Quality of writing (part C): **2 marks**
 - b. Quality of analysis and justification (parts C.6-C.8): **5 marks**

All students in a project group will receive the same marks (i.e. the marks given to the project) unless there is evidence for significant imbalance of workload distribution between project group members.