

# CS4416 Project: 60 marks = 60%

## Spring 2018

This is either an **individual** or a **group** project. A project group can consist of **either 2 or 3 students**. Groups should work on **all tasks** specified in this document.

### Part A – Design a relational database schema

**Individual projects:** complete the whole part A

1. Design a relational database schema consisting of at least 5 tables in Third Normal Form (3NF). Note that if your tables are in BCNF they are also in 3NF. Pick any domain.
2. For each table, assert some functional dependencies (FDs) and identify its keys.

### Part B – Implement a MySQL-compatible relational database schema

**Individual projects:** complete B.1.i-B.1.iii and either B.2 or B.3

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).
  - iii. definitions of at least three views that might be useful for your database. The query for each view must contain either a **subquery** or **GROUP BY** and **HAVING** clauses;
  - iv. definitions of any indexes necessary for the optimal performance of queries (see C.7. below).
2. Create file **trigger.sql** which contains 2 triggers for your database. Each trigger must have at least two SQL statements in its body.
3. Create file **procedures.sql** which contains 2 two stored procedures/function for your database. Each procedure/function must have at least two SQL statements in its body.

### Part C – Write a report which includes:

**Individual projects:** complete C.1-C.6

1. **Individual projects:** name and student ID; **groups projects:** names and student IDs 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. Optionally, 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 views proposed in part B within a scenario for possible use of the database within a software system.
7. Justification for the indexes proposed in part B within a scenario for possible use of the database within a software system.
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

Zip your report (part C) and all .sql files (part B) and email them to [nikola.nikolov@ul.ie](mailto:nikola.nikolov@ul.ie) by the 14<sup>th</sup> of May 2018. Late submissions are subject to -5 marks penalty. No submissions will be accepted after the 18<sup>th</sup> of May 2018.

## Marking

1. Quality of schema design: **15 marks**
2. Correctness and completeness of implementation: **40 marks**
3. Quality of report: **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.**