CMSC 508 – Database Theory Virginia Commonwealth University, Spring 2017

Final project: Phase I: problem definition and database design

Due date: March 19, 2017

Objective

The objective of the first phase of the final project is to design a database that reflects a real-world problem selected by the student group. Groups are composed by two members unless explicitly allowed by the instructor. Students may choose any problem related to their own personal interests and background. Some examples may be: online bike store management, DNA database sequencing, University students' records, music/movies rating, sports/players database, collaborative networks, etc.

The main aim is designing a database that satisfies the information and functional requisites extracted from the analysis of the problem statement, in order to demonstrate the students' expertise and proficiency on the use of database design methodologies to create an accurate and faithful database. The design must reflect all expected information, scenarios, and functionality. Should you consider sensitive data (e.g. passwords for the login of users in the system), the database must provide the security mechanisms/constraints for guaranteeing privacy preserving.

Students must deliver (by uploading the following documentation in Blackboard):

1. Problem statement: a 2-4-page document with the definition of the real-world problem, providing contextualization, scope of the system, and listing all expected information and functionality.

2. Entity-relationship diagram (ERD). Created using proper software tools and consistent notation.

3. Translation of the ERD into the relational model (tables). Enumeration of tables, their attributes, types, domain, and constraints, identification of the primary key and foreign keys.

4. Identification of the Functional Dependencies happening among data.

5. Normalization of the relations according to BCNF/4NF. Describe in a document the process of decomposing the tables extracted from the ERD translation into relations satisfying BCNF/4NF.

6. Exemplary data populating tables to illustrate the behavior and interrelationships among data.

Important! Students must verify that the solution in the form of tables is capable of reflecting all data scenarios and information requisites identified in the problem statement. Decomposition via BCNF/4NF must be lossless.