COSC 3P32 – Introduction to Database Systems
Winter 2025
Group Project, part 1

Due Date: March 10th, 2025, 11:59pm No late assignments are accepted.
This work accounts for 4% of your final grade and is worth a total of 40 marks.

There are 2 parts to this project. In part 1 of the project, you are to revise the design of the hockey league database already seen in Assignment 1. In part 2, you are to use database tools to build the database, and demonstrate different ways of interacting with the database.

The information to be stored in the database is the same as given in assignment 1, with the following exceptions:

- No owner is allowed to own more than one team.
- No team can play itself (i.e. be both "home" and "away" team in the same game).
- No team can play more than one game on the same day (whether "home" or "away" team).
- There cannot be more than two assists per goal.
- A player cannot assist on a goal they have scored, or assist twice on the same goal.
- We wish to add the attribute "penalty type" (minor, major, etc.) to the PenaltyAssigned table, and the defined length of a penalty is determined based on its type. For example, a minor penalty has a defined length of two minutes.
- A penalty must end later than it started.

Note that some of the above information will lead to functional dependencies within a table, and must be dealt with in part 1 of the project. Others will require the use of check constraints, triggers or other means, and must be implemented in part 2 of the project. There are also constraint(s) that could not be handled in assignment 1 because you did not have the required knowledge at the time – these also must be handled in part 2 of the project.

Note: Sample solutions (including an ER diagram and a set of `CREATE TABLE` statements) for assignment 1 are available on Brightspace. You can either start this project using that solution, or modify your own solution, as you wish.

For part 1 of your project, you must complete all of the following steps:

1. [4 marks] Provide an ER model for the above database. All attributes of each entity set and relationship set must be shown. All keys must be shown for each entity set. All key and participation constraints must be shown for each relationship set. In addition, write a paragraph specifying any necessary overlap and covering constraints.
2. [4 marks] Based on the ER model, specify a relational schema for the database.
3. [24 marks] For each relation, identify all functional dependencies that hold on the fields of that table. For each table, specify if that table is in BCNF, 3NF or neither. If a table is not in BCNF, then attempt to find a BCNF decomposition that is both lossless-join and dependency-preserving. If this is not possible, then a lossless-join, dependency-preserving 3NF decomposition is acceptable. Clearly specify the resulting relational schema.

4. [8 marks] Write the SQL statements necessary to create the tables for the above database, capturing as many constraints as possible. Note: the implementation of check constraints, triggers, etc. can be delayed until part 2 of the project.

Submission Requirements:

1. Ensure that you have fully complied with all notation and formatting requirements.
2. You must submit a report containing all answers to all questions. The report should also have a cover page that includes the names and email addresses of all members of the group.
3. The report must be submitted as a single PDF file using Brightspace.
4. Each member of the group must submit the same report.