

Assignment 2 Brief: Logical Database Design

1 Introduction

This assignment is about the logical database design for the carpark-sharing database introduced in your first assignment. The objectives are to gain practical experience in relational database schema creation, including integrity constraints, based upon a given entity-relationship (ER) diagram. This is a group assignment for teams of about 3 members, and it is assumed that you will continue in your Assignment 1 group. You should inform your tutor in Week 5 (before the Easter break) if you wish to change groups.

Please also keep an eye on the discussion forum and further announcements in Piazza.

2 Submission Details

A final version of your database schema should be submitted via eLearning by midnight FRIDAY Week 7.

2.1 Submission Items

Please submit your solution in the 'Assignment' section of the unit e-learning site by the deadline, including the following items:

RM diagram This diagram should show a correct mapping of the provided E-R model into relations. Your diagram should follow the conventions presented in the Logical Database Design lecture (Week 3), clearly identifying all relations and their attributes, along with primary keys and foreign keys (indicating which key is referenced in each case). Your diagram should ideally be in PDF format, but an image format such as PNG, GIF or JPEG is also acceptable. You can annotate your diagram with comments where necessary. The target paper size should be A4. If required you can spread your diagram over several pages.

Database schema DDL Your submitted SQL database schema should be a text file (.txt or .sql file suffix) containing all DDL statements necessary to fully instantiate a working database, consistent with your RM diagram. Your file should run without errors in PostgreSQL 9. You can annotate your statements using '--' at the start of lines of comment. You should group your statements for ease of reading (e.g., by keeping all table constraints within the relevant CREATE TABLE statement rather than declaring them externally, if possible).

Example data DML Your sample data file should use INSERT statements to populate every relation with at least one row of data. Your file should run without errors in PostgreSQL 9, assuming your database schema has already been created.

2.2 Plagiarism

By uploading your submission to eLearning your group implicitly agrees to abide by the University policies regarding academic honesty, and in particular that all the work is original and not plagiarised from the work of others. If you believe that part of your submission is not the work of your group members you must bring this to the attention of your tutor or lecturer immediately. See the policy slides released in Week 1 for further details.

In assessing a piece of submitted work, the School of IT may reproduce it entirely, may provide a copy to another member of faculty, and/or communicate a copy of this assignment to a plagiarism checking service or in-house computer program. A copy of the assignment may be maintained by the service or the School of IT for the purpose of future plagiarism checking.

2.3 Late submissions

Please start early so that your tutor can give you feedback on your approach in the tutorials of Week 6 and 7. The final submissions deadline is Friday of Week 7. An example solution to the assignment will be presented in the week of the final submission deadline, so please keep to the deadline. Late submissions will be penalised 20% per day late.

3 Marking

This assignment is worth 5% of your final grade for the unit of study. Your group's draft and final submissions will be marked according to the attached rubric.

3.1 Rubric

Your submissions will be marked according to the following rubric, with a maximum possible score of 10 points.

	Novice (0 pts)	Competent (1 pt)	Proficient (2 pts)
Relational Model (RM diagram)	Less than competent model of the given scenario	Most entities and relationships of core model are correctly mapped	Complete mapping of ER model with foreign key dependencies correctly shown.
DDL Implementation (SQL schema)	Less than competent model of the given scenario	Not all major entities and relationships of core model are correctly captured	Tables completely match RM diagram
Key Constraints	No key constraints captured	Most primary and foreign keys correctly defined	all necessary primary keys and foreign keys given including some useful ON DELETE and ON UPDATE clauses
Semantic constraints	no constraints other than key constraints captured	some semantic integrity constraints such as CHECK, DEFAULT or NOT NULL were defined, but either incorrectly or incomplete	all necessary semantic integrity constraints for the model were given including a trigger
Example Data	No example data given or yielded multiple errors	All main tables populated with a consistent set of data	Database fully populated with a consistent set of data, with good examples of each significant constraint.

3.2 Feedback

You are actively encouraged to consult with your tutor about your progress each week. So feedback will be available after the tutor has marked your submission, which is likely to be of use in the final exam.

3.3 Group member participation

If members of your group do not contribute sufficiently you should alert your tutor as soon as possible. The tutor has the discretion to scale the group's mark for each member as follows:

Level of contribution	Proportion of final grade received
No participation.	0%
Full understanding of the submitted work.	50%
Minor contributor to the group's submission.	75%
Major contributor to the group's submission.	100%

4 Design Brief: Relational Database Schema for a Car-park Sharing System

Your task is to create a relational database schema for the entity-relationship design that is shown on the following page. This should happen in two stages (cf. Section 2.1): First in diagram form similar to the graphical format of the lecture in Week 3, then in textual SQL form.

In particular your solution should include:

- Tables and attributes with suitable data types to capture all information in the model;
- Appropriate key constraints (PRIMARY KEY, UNIQUE, FOREIGN KEY) for all tables;
- Correct foreign key specifications including ON DELETE/ON UPDATE clauses where suitable;
- Appropriate additional integrity constraints expressed by means of NOT NULL, DEFAULT or CHECK clauses;
- INSERT statements to populate each relation with at least one record, to demonstrate a database instance consistent with the ER model.

Additional details: In addition to the E-R model given , the following details apply:

- All Pod and Tag IDs are created as 10-digit numeric codes;
- Although nicknames are optional, they should be unique;

For Distinction/High Distinction level submissions, proficiency can be demonstrated through appropriate use of the following features:

- examples of DML statements to demonstrate functionality of integrity constraints (put in a separate file to your main DML statements);
- a non-trivial trigger definition supporting a constraint that cannot be enforced through the methods already listed above;
- advanced domain constraints, e.g., using regular expressions;
- substitution of mutable natural keys with surrogate sequences.

4.1 ER Model

