



DATABASES (4TH SEM.)

Instructor: prof. Yannis Theodoridis

ERASMUS project assignment

Introduction

The database of a car sales-service company stores information about the following:

- The **employees** of the company, who belong to two categories, salesmen and technicians, respectively. For each employee, the DB keeps a record with his/her full name, email address and Tax Registration Number (TRN). Additionally:
 - For each technician, the DB keeps records about the vehicle repairs assigned to him/her, including at least the following attributes: technician's ID, information about the vehicle to be repaired (see below), (estimated) cost of repair, repair start and completeness date (if not declared, it means that the repair is in progress).
 - For each sales person, the DB keeps records about the purchases from / sales to individuals he/she has performed, including at least the following attributes: sales person's ID, information about the vehicle purchased or sold (see below), purchase / sale price, purchase / sale date.
- The **vehicles** managed by the company (could be either for repair or after purchase and for sale). For each vehicle, the DB keeps a record with vehicle's license number (in the case it concerns a second-hand vehicle), information about the vehicle owner (see below), manufacturer, model, manufacturing date, status (second-hand vs. new vehicle).
- The **individuals** with whom the company makes business. For each individual, the DB keeps a record with his/her Tax Registration Number (TRN), first and last name, mobile phone number, email address.

Task 1 (40%). Build a relational DB

- (a) Based on the above description, prepare a relational database schema and implement it on PostgreSQL DBMS (CREATE TABLE commands). In addition, you are required to document the table integrity constraints as well as to load sample data into the DB tables. The deliverable of this task includes the relational schema of the DB, the

CREATE TABLE commands, and the files you load in the tables. Hint: to produce sample data that make sense, it is recommended to use a data generator tool (e.g. www.mockaroo.com).

- (b) Apply the normalization theory to the DB relational schema that you provided in (a) and check whether it is consistent with the third normal form (3NF) or the Boyce-Codd normal form (BCNF).

Task 2 (30%). Run the following SQL queries (SELECT commands).

- (a) Which are the most damaging vehicle models.
- (b) What is the company's average profit from repairs (= average cost of damages) per month.
- (c) Who is the sales person with the highest "turnover" (= sales value –purchase value).
- (d) Which are the repairs that are still pending (i.e., have not been completed yet).
- (e) Which are the vehicles that have been repaired more than once in the last year.

Task 3 (30%). Establishing a connection with JDBC client

Implement a client with a programming language of your preference (e.g. Java) using the appropriate link library with PostgreSQL (e.g. JDBC). The client will connect to PostgreSQL, execute the queries of task 2 and display the results to the user (using either terminal or graphical interface).

Project due:

The project is due Thursday, May 31th, 2018 at 12 noon. You will provide a report of your work (together with accompanying files) and you will make an oral presentation to the TAs. For any question about the project, please contact the TAs.

Teaching Assistants (TA): Mr. Yannis Kontoulis, Mr. Petros Petrou, room nr. 205 (central building), e-mail: {ikontoulis|ppetrou}@unipi.gr