ACADEMIC YEAR 2021-2022
FALL SEMESTER
LESSON: Introduction to Data Management and Engineering
PROJECT 2 – E-R Diagrams and Database Programming with Python

The aim of the second project is to familiarize you with the programming API that is offered by Python for SQL manipulation in a specific business case.

Business Case

Design a database for an automobile company to provide to its dealers to assist them in maintaining customer records and dealer inventory and to assist sales staff in ordering cars.

Each vehicle is identified by a vehicle identification number (VIN). Each individual vehicle is a particular model of a particular brand offered by the company (e.g., the XF is a model of the car brand Jaguar of Tata Motors). Each model can be offered with a variety of options, but an individual car may have only some (or none) of the available options. The database needs to store information about models, brands, and options, as well as information about individual dealers, customers, and cars.

For the following business case:

Question1 (10%)

Design the respective simple E-R diagram. Provide the schema diagram that you have created.

Question 2 (20%)

Implement the database in the database system of your choice and fill it with sample data.

a) Provide the .SQL file with the DDL statements (create table, indices, etc.) and
b) the SQL file that fills the table with sample data.

Question 3 (10%)

Identify queries that you expect to be asked more often and implement any indexes that can optimize their execution

Provide the .SQL file that creates the indices and contains the required SELECT statements/views, etc.

Question 4 (60%)

Implement a menu of choices written in Python (using for instance, PyCharm or an editor of your choice) with the following options:

1) Entity management
2) Entity Search
3) Perform specific query (from question 2)

For each option from 1 or 2, the program **will prompt the user** to select one of the existing entities (either for management or search).

If the user selects Management, the following options appear in the next menu:

(a) Insert entity 1
(b) Delete entity 1
(c) Entity update 1

If the user selects Search, the following options appear in the next menu:

a) Search Entity 1 using field: "Field 1"
b) Search Entity 1 using field: "Field 2"
...

Field selections will be dynamically generated, depending on the fields each entity has. The search will ask the user to give a string or e.g., a number (depending on the field type), search the database for records that meet the given criteria, and return the result list to the user

If the user selects “perform specific query” the following options appear in the next menu

a) Perform Q1 using given parameters (to be collected by the user)
b) Perform Q2 using given parameters (to be collected by the user)
c) ….

Submission Information

Deadline: **Sunday 19/12/2021 23:55.** You must upload your code (python scripts and .SQL files) and your report in the eclass in the respective section. The file must be in the form of .zip with the following name: AM _proj2.zip, where AM is your registration number.

The project is individual.

Implementation Information

For the project implementation, any questions/clarifications will be uploaded by you in the Discussions (Συζητήσεις) section of the eclass in the respective section. Before posting a question, please check if it has already been asked (and answered) before.