

University College London

Department of Information Studies

MSc Information Science

Student Number (SRN): 20040340

Module Code and Title: INST0012 Database Theory and Practise

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Assignment: Assessed Exercise 2

 $April\ 23^{rd}\ 2021$

1. MAPPINGS FROM CONCEPTUAL TO LOGICAL RELATIONAL REPRESENTATION: 1.1 MAPPINGS TO THE LOGICAL DATA MODEL

EXAMINER(Employee-ID, Name, Centre)

Centre: foreign key refers to Location in relation Examination Centre: NULL not allowed

EXAM_OPPORTUNITY(ID, Date, Tried-By, Assignee, Route)

Tried-By: foreign key refers to SSN in relation Driving License Exam Applicant: NULL not allowed

Assignee: foreign key refers to Employee-ID in relation Examiner: NULL not allowed

Route: foreign key refers to Route-ID in relation Exam Driving Route: NULL not allowed

DRIVING_LICENSE_EXAM_APPLICANT(SSN, Name, Taught-By)

Taught-By: foreign key refers to SSN in relation Driving Instructor: NULL not allowed

EXAMINATION_CENTRE(Location)

EXAM_DRIVING_ROUTE(Route-ID, Possible-In-Winter, Centre)

Centre: foreign key refers to Location in relation Examination Centre: NULL not allowed

DRIVING_INSTRUCTOR(SSN, Name)

CAR(<u>Registration</u>, Brand, Year-Of-Purchase, *Company*)

Company: foreign key refers to VAT Number in relation Driving School Company: NULL not allowed

DRIVING_SCHOOL_COMPANY(VAT-Number, Name)

TRAINED_OFFICIAL_DRIVING_INSTRUCTOR_DI(<u>TODI-DI-SSN</u>, Years-Instructed, Company)

<u>TODI-DI-SSN</u>: foreign key refers to SSN in relation Driving Instructor: NULL not allowed

Company: foreign key refers to VAT Number in relation Driving School Company: NULL not allowed

FAMILY MEMBER DI (FM-DI-SSN)

<u>FM-DI-SSN</u>: foreign key refers to SSN in relation Driving Instructor: NULL not allowed

 $IS_TAUGHT_BY(\underline{\textit{DLEA-SSN}},\underline{\textit{DI-SSN}})$

<u>DLEA-SSN</u>: foreign key refers to SSN in relation Driving License Exam Applicant: NULL not allowed

<u>DI-SSN</u>: foreign key refers to SSN in relation Driving Instructor: NULL not allowed

1.2 INFORMATION ON LOSS OF SEMANTICS DUE TO MAPPING

- The overlap specialisation of *Driving_Instructor* into *Trained_Official_Driving_Instructor* and *Family_member* cannot be enforced. There is no attribute in the parent table which can enforce this. This has to be checked in the application layer (data entry layer).
- The minimum cardinality of 1 in the relationship type Taught_By between Driving_License_

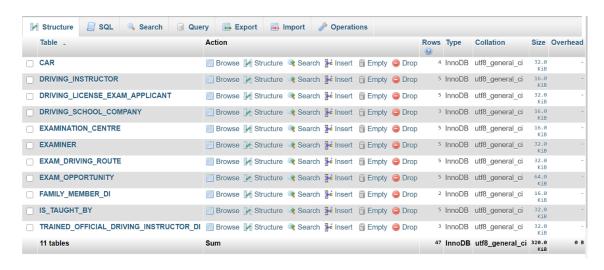
- *Exam_Applicant* and *Driving_Instructor* cannot be enforced. The reason for this is because there is no attribute or route to enforce this. Therefore, this will have to be checked in the application layer (data entry layer).
- The minimum cardinality of 2 in the relationship type *Driving_License_Exam_Applicant* and *Driving_Instructor* cannot be enforced. The reason for this is because there is no attribute or route to enforce this. Therefore, this will have to be checked in the application layer (data entry layer).

1.3 NOTES

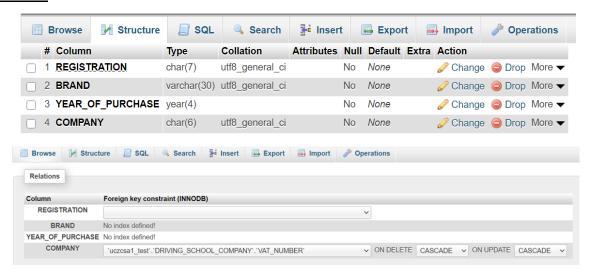
• The green-coloured attributes are the attributes I have added which are not from the scenario

2. DATABASE

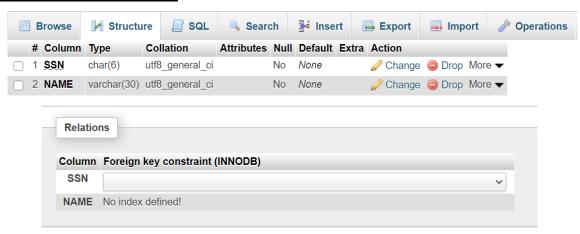
2.1 OVERALL DATABASE STRUCTURE



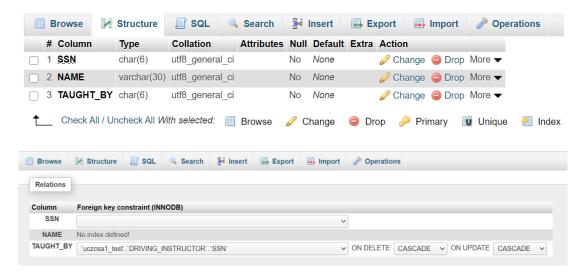
2.2 CAR



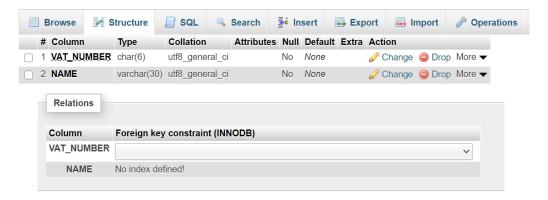
2.3 DRIVING INSTRUCTOR



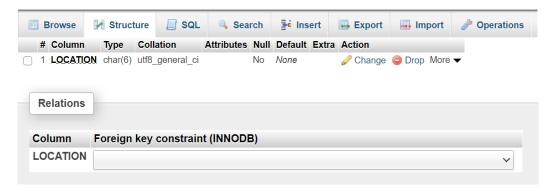
2.4 DRIVING LICENSE EXAM APPLICANT



2.5 DRIVING_SCHOOL_COMPANY



2.6 EXAMINATION_CENTRE

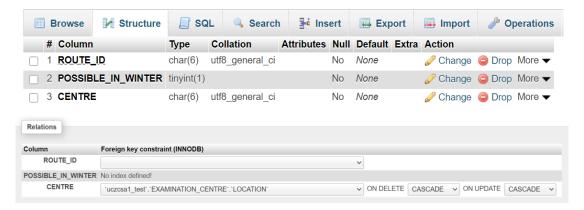


2.7 EXAMINER

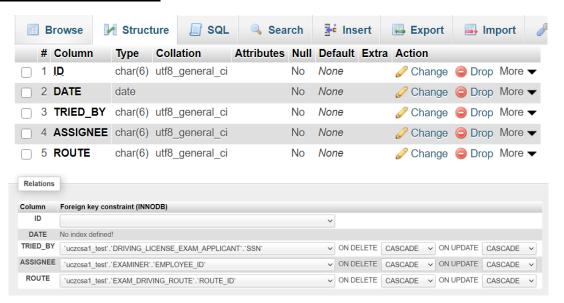




2.8 EXAM DRIVING ROUTE



2.9 EXAM_OPPORTUNITY



2.10 FAMILY_MEMBER_DI

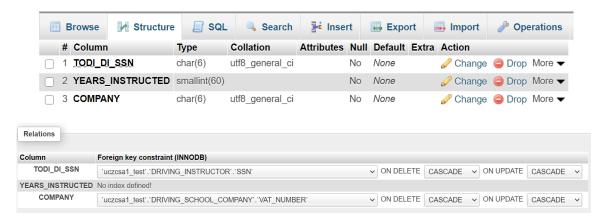


2.11 IS_TAUGHT_BY



This table has been created as a new relation between Binary (N:M) relationship entities: *Driving License Exam Applicant and Driving Instructor*. The primary key of *IS_TAUGHT_BY* is a combination of foreign keys referring to the primary keys of the relations corresponding to the participating entity types.

2.12 TRAINED_OFFICIAL_DRIVING_INSTRUCTOR_DI



2.13 NOTES

• MySQL automatically converts boolean data types (the attribute *Possible_In_Winter* from *Exam_Driving_Route*) into *tinyint* data types. The 0 represents *FALSE* and 1 represents *TRUE*

3. SQL QUERIES

QUERY 1

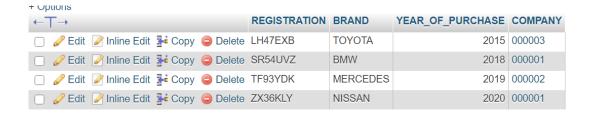
An SQL Update statement using WHERE

This query updates the brand of the car whose registration is 'ZX36KLY', from 'LAMBORGHINI' to 'NISSAN'





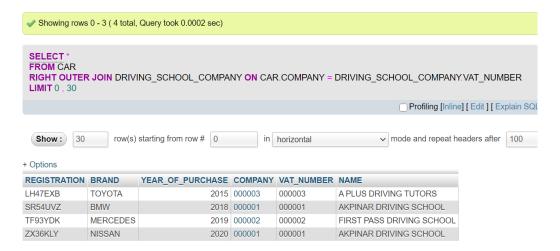




QUERY 2

An outer join SQL query

Performs a right outer join between the 'CAR' and 'DRIVING_SCHOOL_COMPANY' on the COMPANY (VAT_NUMBER) column.



QUERY 3

A correlated SQL query with NOT EXISTS

Returns all the 'EXAMINER' IDs and Names who have not been assigned to an 'EXAM OPPORTUNITY' (examiners who have not been assigned to any exams). 'AS' has been used to change the column names accordingly. 'ORDER BY' and 'ASC' have been used to order the results by ascending 'EMPLOYEE_ID'. (Note: *Inline* option on the query has been selected to ensure the whole query can be viewed).

