MONASH University
Information Technology

FIT9132 Introduction to Databases

2019 Semester 2

Assignment 2 - Database Design - Traffic Demerit System (TDS)

Assignment weighting 15% - Lecturer in Charge: Dwi Rahayu

This task continues the work you have started in assignment 1 by refining/extending the model you developed and implementing it as a set of tables under your Monash Oracle database account. Since this is an ongoing development process based on your assignment 1 submission and marker feedback, ***you must ensure that your submission and the marker feedback remains confidential and is only seen by yourself and the FIT9132 teaching staff***.

Assignment 2's brief must be read in conjunction with the assignment 1 brief - ie your final model must encompass both sets of requirements.

You may modify your assignment 1 conceptual model in any manner you wish as you work through assignment 2, provided your final model meets both sets of requirements.
Further discussions with the local government authority have revealed that some demerits, particularly blood alcohol charges (BAC), are regarded as serious demerits and lead to an immediate licence cancellation. As well as recording the demerit details you have depicted in assignment 1, the authority needs to have recorded, for each demerit, if the demerit leads to an automatic cancellation and for those that do, the number of months for which the licence will be cancelled. When a licence is cancelled, its expiry date is set to the date of the offence which triggered the cancellation. Cancelled drivers need to apply to a court to get their licence back. If granted the driver will be reinstated under their old licence number.

The local government authority have provided three of the forms, depicted below, which they make use of showing some of the data they wish to record:

- a sample vehicle report,
- two sample driver reports, and
- a driver cancellation report.

Sample Vehicle Report

Vehicle Details

VIN	JM0DE10Y2C0229386

Type of vehicle - select one from below:

Car	[X]	**Motorcycle**	[ ]
Tractor	[ ]	**Marine**	[ ]
Trucks:			
Light Rigid	[ ]	**Medium Rigid**	[ ]
Heavy Rigid	[ ]	**Heavy Combination**	[ ]
Multi Combination	[ ]		

Model	Mazda 2 Hatch Manual 1.5L
Year Manufactured	2014
Vehicle Main Colour	Soul Red
Manufacturer code	MA

Manufacturer Details

Manufacturer Name	Mazda		
Manufacturer Country:			
ISO 3166 Alpha-3 Code	JPN	**Name**	Japan

Model Details

Manual Transmission	[X]	**Automatic Transmission**	[ ]
Engine Type:			
Petrol Engine	[X]	**Diesel Engine**	[ ]
Electric Engine	[ ]		
Engine Size:	1.5 L		
Ground Clearance:			
Laden	155 mm	**Unladen**	160mm

Registration Details

Date Registered	**Registration Number**	**Date DeRegistered**
10 March 2014	IKA123	12 Jan 2016
12 Jan 2016	ABLE12	1 July 2019
1 July 2019	IKA123	

* Note that the local government authority has indicated that it needs flexibility in the design to be able to add new, and remove current, vehicle types as circumstances change.

Sample Driver Reports - Report A

LICENCED DRIVER REPORT

As at: 30th July 2019

Licence Number 123456789
Licence Status Active

Name:
First Mary
Last Xiue

Residential Address:
Street 123 Wide Rd
Town West Nowhere
Postcode 1234

Date Of Birth 24 May 1971

Licence Expiry Date 01 June 2021

Type of Licences held - (multiple selections available) select all held :

Car	[X]	**Motorcycle**	[X]
Tractor	[ ]	**Marine**	[ ]
Trucks:			
Light Rigid	[ ]	**Medium Rigid**	[ ]
Heavy Rigid	[ ]	**Heavy Combination**	[ ]
Multi Combination	[ ]		

LICENCE SUSPENSIONS

Date Suspended	Suspension End Date
Nil	

LICENCE CANCELLATIONS

Date Cancelled	Cancellation Period (months)	Reason Cancelled
Nil		

* Note that the local government authority has indicated that it needs flexibility in the design to be able to add new, and remove current, licence types as circumstances change. The licence types match the same set of selections as vehicle types, since drivers are licenced for a vehicle type.

LICENCED DRIVER REPORT

As at: 30th July 2019

Licence Number 123456
Licence Status CANCELLED

Name:
First Pierre
Last Willing

Residential Address:
Street 23 Narrow St
Town Somewhere
Postcode 3456

Date Of Birth 10 July 1950

Licence Expiry Date 13 July 2019

Type of Licences held - (multiple selections available) select all held :

Car	[X]	**Motorcycle**	[ ]
Tractor	[ ]	**Marine**	[ ]
Trucks:			
Light Rigid	[ ]	**Medium Rigid**	[ ]
Heavy Rigid	[X]	**Heavy Combination**	[ ]
Multi Combination	[ ]		

LICENCE SUSPENSIONS

Date Suspended	Suspension End Date
12 Feb 2015	12 Aug 2015
25 Jun 2019	25 Dec 2019

LICENCE CANCELLATIONS

Date Cancelled	Cancellation Period (months)	Reason Cancelled
01 Apr 2010	12	BAC > 0.15
13 Jul 2019	18	Driving while suspended

* Note that the local government authority has indicated that it needs flexibility in the design to be able to add new, and remove current, licence types as circumstances change.The licence types match the same set of selections as vehicle types, since drivers are licenced for a vehicle type.

Sample Cancellation Report

Driver Licence Cancellation Report

As at: 30th July 2019

Licence Number	First Name	Last Name
123456	Pierre	Willing

Date Cancelled	Reason Cancelled	Court Hearing Date	Licence Reinstatment Date
01 Apr 2010	BAC > 0.15	15 Apr 2011	21 Apr 2011
13 Jul 2019	Driving while suspended		

REMEMBER you must keep up to date with the Moodle assignment 2 forum where further clarifications may be posted (this forum is to be treated as your client). Please be careful to ensure you do not post anything which includes your reasoning, logic or any part of your work to this forum, doing so violates Monash plagiarism/collusion rules.

You are free to make assumptions if needed however they must align with the details here and in the assignment forums and must be clearly documented (see the required submission files).

TASKS

ENSURE your **name and ID are shown on every page of any document you submit**. If a document is a multipage document (such as the normalisation), please also make sure you include page numbers on every page.

GIT STORAGE

All working files, as you work on this assignment task, ***must be stored in GIT and must show a clear history of development***. Your work for this task **MUST** be saved in your local repo in your Assignment 2 folder ***and regularly pushed to the FIT GitLab server to*** build this history of development. Any submission with less than three pushes to the FITGitLab server will incur a grade penalty of 10 marks (a 10 mark deduction).

Before submission via Moodle you **must** log into the web interface of the GitLab server and ensure your files are present.

All source documents must be available in your FIT GitLab server account and must not be modified in any manner following your submission. For example with your normalisation you are required to submit a PDF copy of your work, however your source documents (MS Word, Pages or an MS Word export from Google Docs) **must exist in your FIT GitLab account for your work to be acceptable for marking.**

Task to complete:

1. Perform **normalisation to 3NF** for the data depicted in the sample Vehicle, Driver and Driver Cancellation reports. Note that only one normalisation is required for the driver report, you have been provided with two samples so you can appreciate some of the variety which occurs.

   The approach you are required to use is the same approach as shown in the normalisation lab solution. *The normalisation must begin by you representing the supplied documents as a **single** UNF form*.

   During normalisation, you must:

   - **Not** add surrogate keys. They may be added after you have reached a final set of relations if desired (alternatively you may add them on your task 2 logical model).
   - You **must** include all attributes (you must **not remove** any attribute as derivable)
   - Clearly show UNF, 1NF, 2NF and 3NF.
   - Clearly identify the Primary Key in all relations.
   - Clearly identify **all partial and transitive dependencies** (if they exist) in all 1NF relations. You may use a dependency diagram or alternative notation (see the normalisation tutorial sample solution for a possible alternative representation). If none exist you must note this by stating: *No partial dependencies present* and/or *No transitive dependencies present*
   - If required, carry out attribute synthesis.

   The attribute names used in your normalisation and those on your subsequent logical model must be consistent i.e. the same name used on each for the same property.

2. Based on your assignment 1 conceptual model, your markers feedback, your reading of this case study and the normalisations you carried out in step 1 above, **prepare a logical level design** for the Traffic Demerits System database.

   - The logical model must be drawn using the Oracle Data Modeler. The information engineering or Crow's foot notation must be used in drawing the model. Your logical model must **not** show datatypes.
   - All relations depicted must be in 3NF
   - You are required to add at least one surrogate key to your design (you are free to select the most appropriate relation to make this change in)
   - All attributes must be commented ***in the database*** (ie. the comments must be part of the table structure, not simply comments in the schema file).
   - Check clauses/look up tables must be applied to attributes where appropriate.
   - You **MUST** include the legend as part of your model.
   - Note that your GIT repository must clearly indicate your development history with multiple commits/pushes as you work on your model.

3. **Generate the schema for the database** in Oracle Data Modeler and use the schema to create the database in your Oracle account. The ***only*** edit you are permitted to carry out to the generated schema file is to add header comment/s containing your details (student name/id) and the commands to spool/echo your run of the script.

   - Capture the output of the schema statements using the spool command.
   - Ensure your script includes drop table statements at the start of the script.
   - Name the schema file as **tds_schema.sql.**

Submission Requirements

Assignment 2:

Due: Thursday 26th September 2019 (Week 9) 6 PM

The following files are to be submitted and **must exist** in your FITGitLab server repo, *along with the source documents from which they were generated*:

- A pdf document showing your full normalisation of the sample Vehicle and Driver documents showing all normal forms (UNF, 1NF, 2NF and 3NF). Name the file **tds_normalisation.pdf**
- A single page pdf file containing the final logical Model you created in Oracle Data Modeller. Name the file **tds_logical.pdf.** This pdf must be created via File - Data Modeler - Print Diagram - To PDF File from within SQL Developer, do not use screen capture.
- A zip file containing your Oracle data modeler project (in zipping these files be sure you include the .dmd file and the folder of the same name). Name the file **tds_oraclemodel.zip.**
    - Part of the assessment of your submission will involve your marker extracting your model from this zip, opening it in SQL Developer Data Modeller, engineering to a new Relational model and from this your marker will generate a schema which will then be compared with your submitted schema (they must be the same for your schema to be accepted). For this reason your **model must be able to be opened by your marker and contain your full model *otherwise your task 2 will not be able to be marked***. For this reason, you **MUST** carefully check that your model is complete - ensure to take your submission archive, copy it to a new temporary folder, extract your submission parts, extract your model and ensure it opens correctly ***before*** submission.
- A schema file (CREATE TABLE statements) generated by Oracle Data Modeller. Name the file **tds_schema.sql**
- The output from SQL Developer spool command showing the tables have been created. Name the file **tds_schema_output.txt**
- A pdf document containing any assumptions you have made in developing the model or comments your marker should be aware of. Name the file **tds_assumptions.pdf**

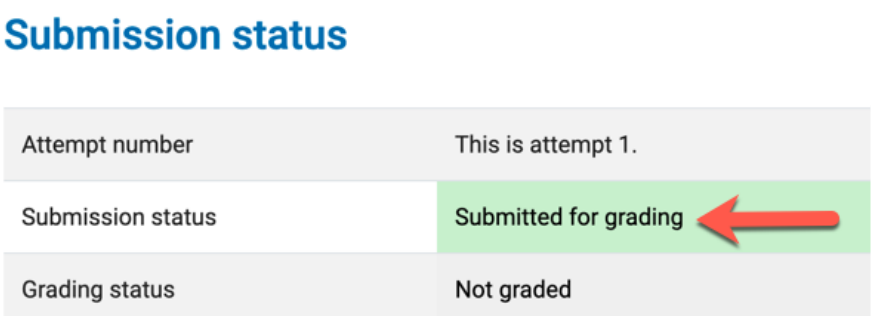
These files must be **zipped into a single zip file named a2-<yourauthcateid>.zip** e.g., a2-xyz123.zip before the assignment due date/time. Submit the a2-xyz123.zip to Moodle before the due date.

Late submission will incur penalties as outlined in the unit guide (5 marks deduction per day or part thereof).

Please note we **cannot mark any work on the Git Server**, you need to ensure that you submit correctly via Moodle since it is only in this process that you complete the required student declaration without which work **cannot be assessed**.

It is your responsibility to **ENSURE** that the files you submit are the correct files - we strongly recommend after uploading a submission, and prior to actually submitting, that you download the submission and double check its contents.

Your assignment **MUST** show a status of "Submitted for grading" before it will be marked.



If your submission shows a status of "Draft (not submitted)" it will not be assessed and **will incur late penalties after the due date/time**.

Please ***carefully*** read the documentation under "Assignment Submission" on the Moodle Assessments page.

Marking Rubric

	Outstanding (Range HD)	Adequate (Range P - D)	Not Adequate (N)
Understand and follow normalisation methodology [30 marks]	All/majority of the normalisation steps have been correctly followed: ● All/most normalisation processes are correct ● Dependency diagrams have been provided and match normalisation. ● Normalisation result is correctly integrated into logical model	Some of the normalisation steps have been correctly followed: ● Majority of Normalisation processes are correct ● Dependency diagrams have been provided and match normalisation in the majority of situations. ● Majority of normalisation result is correctly integrated into logical model	Few of the normalisation steps have been correctly followed: ● Significant errors during the Normalisation processes ● Dependency diagrams not provided or have major errors ● Normalisation result is not correctly integrated into logical model
Identify the data requirements to support an organisations operations from the supplied case study and expresses these via a database logical model. [55 marks]	All Traffic Demerit System operations are supported: ● All/most required relations identified. ● All relations are in 3NF ● All/most required relationships have been captured by placing FK in correct relation ● All/most required cardinality and participation have been captured ● All/most data types and data integrity requirements (Entity, Referential, Domain) have been correctly identified	Some of Traffic Demerit System operations are supported: ● Majority of relations identified. ● Majority of relations are in 3NF ● Majority of required relationships have been captured by placing FK in correct relation ● Majority of required cardinality and participation have been captured ● Majority of data types and data integrity requirements (entity, referential, domain) have been correctly identified	Few of Traffic Demerit System operations are supported: ● None/few of relations identified. ● Majority of relations are not in 3NF ● None/few required relationships have been captured. Majority of FKs are placed in incorrect relations. ● None/few of required cardinality and participation have been captured ● None/few of data types and data integrity requirements (entity, referential, domain) have been correctly identified

Marking Rubric continued

	Outstanding (Range HD)	Adequate (Range P - D)	Not Adequate (N)
Able to generate and modify relational model and schema given a logical model in SQL Developer. [10 marks]	All/majority of the schema generation processes have been correctly followed: ● SQL Developer Relational model correctly generated from the logical model ● All drop commands, database comments and spool command included ● No “extra” edit in schema file ● The DDL script was executed without errors.	Some of the schema generation processes have been correctly followed: ● SQL Developer Relational model correctly generated from the logical model ● Some of drop commands, database comments and spool command included ● The DDL script was executed without errors.	Few of the schema generation processes have been correctly followed: ● SQL Developer Relational model not correctly generated from the logical model ● There is “extra” edit (other than identity information and set echo/spool commands) in schema file ● The DDL script was executed with errors.
Able to correctly use the required notation convention and be consistent in its usage. [5 marks]	All notations in the model are consistent and follow FIT9132 Logical Model standards.	Most notations in the model are consistent and follow FIT9132 Logical Model standards.	Few notations in the model are consistent or follow FIT9132 Logical Model standards.
Able to correctly push all files to FITGitLab server with a development history of at least three pushes.			If less than three pushes showing a clear development history a grade deduction of 10 marks applied.