FIT9132 Introduction to Databases

Normalisation and Logical Database Design - World Cruises (WC)

Purpose	**Given the provided case study from assignment 1A, and additional forms/documents related to the case study, students will be asked to transform the information provided into a sound database design and implement it in Oracle. This task covers learning outcomes:** **1. Apply the theories of the relational database model;** **2. Develop a sound relational database design;** **3. Implement a relational database based on a sound database design.**
Your task	**This is an open book, group task (students will work in groups of two or three students with members selected randomly). The final output for this task will be a logical model implemented in the Oracle RDBMS**
Value	**25** % of your total marks for the unit
Due Date	**Thursday, 28 April 2022, 4:30 PM (AEST)**
Submission	• Via Moodle Assignment Submission. • **FIT GitLab check ins will be used to assess history of development**
Assessment Criteria	• **Normalise the supplied case study documents and integrate the resultant relations into a logical model.** • **Depict the data requirements expressed in the case study via a relational database logical model.** • **Generate a schema which meets the case study data requirements from the logical model produced** • **Consistent use of industry standard notation and convention**
Late Penalties	• 10% deduction per calendar day or part thereof for up to one week • Submissions more than 7 calendar days after the due date will receive a mark of zero (0) and no assessment feedback will be provided.
Support Resources	See Moodle Assessment page
Feedback	Feedback will be provided on student work via: • general cohort performance • specific student feedback ten working days post submission • ***a sample solution following assignment 1B marking***

INSTRUCTIONS

This task continues the work you have started in assignment 1A 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 1A submission and marker feedback, ***you must ensure that your assignment 1A submission and the marker feedback remains confidential and is only seen by the members of your group and the FIT9132 teaching staff***.

Assignment 1B's brief must be read in conjunction with the assignment 1A brief - ie. your final model must encompass both sets of requirements. You may modify your assignment 1A conceptual model in any manner you wish as you work through assignment 1B, provided your final model meets both sets of requirements.

In developing your final logical data model, composite attributes present on your conceptual model must be expanded into their component simple attributes, unless otherwise directed. If the supplementary material presented in this document does not guide you in deciding the components you may make any reasonable decision on their simple component attributes.

Further discussions with World Cruises have revealed the points listed below:

a. World Cruises record for each passenger their contact phone number, for a minor no contact number will be recoded, the contact for their guardian will be used (in modelling this point keep phone number as a simple attribute of passenger, do not create a further PHONE relation)

b. at ports, where a cruise stops, local entrepreneurs offer various tours to the passengers which they can participate in while the ship is in port. The tours are not specific to a particular cruise, any ship which is in port can have passengers partake in an advertised tour. Some tours provide audio commentary to help explain what passengers are experiencing. Where possible the tours are encouraged to supply the commentary in a range of languages so as to support the needs of as many passengers as possible. The commentary languages available for a tour must be stored as part of your model.

   Tours are offered at regular intervals for example every weekday, every Saturday, on Monday only, etc (this range of offerings may be changed regularly, including adding new ranges). A particular tour only runs once on any given date.

   Each offering of a particular tour uses the same tour number. Tour numbers are reused for each port ie. each port has a tour number 1. Each tour has a minimum number of participants, a particular tour offering is not run unless this minimum number of participants have booked for it.

c. cabins across the various ships are assigned a cabin class as one of the following
   - interior
   - ocean view
   - balcony, or
   - suite

   These classes are fixed and will not be modified.

d. country codes stored in the system make use of the ISO 3166-1 Alpha-2 codes eg. Australia is AU

e. languages stored in the system are stored as ISO 639-1 Alpha-2 codes eg. English is EN

f. latitudes and longitudes stored in the system are stored in decimal form, for example the latitude and longitude of Hobart, Tasmania, Australia is:
   - latitude: -42.8825088
   - longitude: 147.3281233

World Cruises have supplied the following forms which are used within their business:

(i) Tours which are available in a given port:

Port Tours Available

Port Code AUHOB
Port Name Hobart
Country Code AU
Country Name Australia

Port Temperature

Month	Average High	Average Low
Jan	22	13
Feb	22	13
Mar	20	12
Apr	18	10
May	15	8
Jun	12	6
July	12	6
Aug	14	6
Sep	16	7
Oct	17	8
Nov	19	10
Dec	21	11

Tours Available

Tour Number	Tour Name	Tour Description	Hours Required	Tour Cost Per Person	Wheel Chair Access	Tour Availability	Start Time
1	Hobart Shopping	Shop at the Cat & Fiddle Arcade for a full range of Tasmanian treats (bus transfer only)	2.5	15	Yes	Weekdays	11:00
2	Port Arthur	Visit the world heritage listed 19th century penal setlement and open-air museum via local ferry. Includes lunch and entry	8	270	No	Daily	09:00
3	MONA	Visit the Museum of Old and New Art (MONA) - includes ferry ride to the museum and entry	4	70	Yes	Daily	13:00
4	Salamanca Market	Shop in the bohemian market stalls of the Salamanca market selling the best local produce and goods (bus transfer only)	3	15	Yes	Saturday	11:00

(ii) Participants for a particular tour instance:

Port - Tour Participant Report

Port Code	AUHOB	**Generated:**	24th March 2022
Tour Number	3		
Tour Name	MONA		
Tour Date	25th March 2022		
Tour Start Time	13:00		

Passenger ID	Passenger Name	Principal Spoken Language	Cruise ID	Cruise Name	Payment Received
10210	Gilberto Bwy	English	1024	Sydney to Hobart	Yes
10211	Fransyne Bwy	English	1024	Sydney to Hobart	Yes
10029	Friedrick Geist	German	1095	New Zealand Sea Escape	No
10789	Brier Kilgour	English	1095	New Zealand Sea Escape	No
10301	Shandra Lindblom	French	1024	Sydney to Hobart	Yes
10302	Pierre Lindblom	French	1024	Sydney to Hobart	Yes
10303	Michael Lindblom	French	1024	Sydney to Hobart	Yes
13456	Myriam Stirley	English	1095	New Zealand Sea Escape	Yes

.... Only partial data shown .....

REMEMBER you must keep up to date with the Ed Assignment 1B forum where further clarifications may be posted (this forum is to be treated as your client). Please be careful to **ensure you do not publicly post anything which includes your reasoning, logic or any part of your work to this forum**, *doing so violates Monash plagiarism/collusion rules* and has significant academic penalties. Use private posts or email your allocated tutor to raise such questions.

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). Other than surrogate keys, where appropriate, you must remember the design adage "All that is required has been included and all that is included was required" ie. you must not add features outside the requirements expressed in the brief.

TASKS

ENSURE your **group name and members names 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

Your work for these tasks MUST be saved in your group local working directory (repo) in the Assignment 1B folder and regularly pushed to the FIT GitLab server to build a clear history of development of your model. Any submission with less than nine pushes to the FITGitLab server will incur a grade penalty of 10 marks. Please note nine pushes is a *minimum*, in practice we would expect significantly more. This number of pushes must be evenly distributed amongst group members.

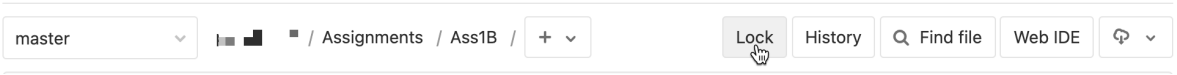
Before submission via Moodle you **must** log into the web interface of the GitLab server and ensure your files are present in the group repo.

All source documents must be available in your group's FIT GitLab server account or your MS Teams channel and must not be modified in any manner following your submission.

If multiple students work on a logical model at the same time, merging these changes can be quite difficult. For this reason you are required to take a simple approach to working on the model - whenever a particular student wishes to work on the model you should go to the Git Server web interface and check if the assignment 1B folder has been locked by another member of your group.

If it has, you must not carry out any work on the assignment task.

If it has not been locked, you can proceed to lock the folder by selecting "Lock":



Ensure you are located in the correct folder.

You will know the items are locked as each will have a lock icon attached to it:

If you hover over the padlock icon, you will be able to see who currently has the folder locked.

When you have completed your work, and pushed it to Git, you should return to the Git web interface and unlock the folder:

It is our expectation that all members of the group will contribute to building the model, **it must not be completed by just one member.** In assessing your group's work we will examine the commit log to ensure all members of the group have participated.

Task to complete:

1. Perform **normalisation to 3NF** for the data depicted in the sample documents.

   The approach **you are required to use** is the same approach as shown in the normalisation applied class solution. *The normalisation must be carried out form by form, beginning by representing the document you are working on as a **single** UNF relation* and then moving through 1NF, 2NF and 3NF.

   During normalisation, you must:

   - **Not** add surrogate keys.
   - 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 dependencies** at the various normalisation stages (Partial at 1NF, Transitive at 2NF and Full at 3NF). You should use the same notation as depicted in the normalisation sample solutions, for example:

     attr1 -> attr2, attr3

     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 throughout your normalisation and those on your subsequent logical model **must be the same**.

   Your normalisation must be carried out in an MS Word document in your group's private MS Teams channel so that a full development history is available.

2. Based on your group's assignment 1A 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 World Cruises 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 data types.
   - 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. Please edit the legend panel to show your group name
   - 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 (this should be tested in your individual Oracle accounts - a group Oracle account is not available).

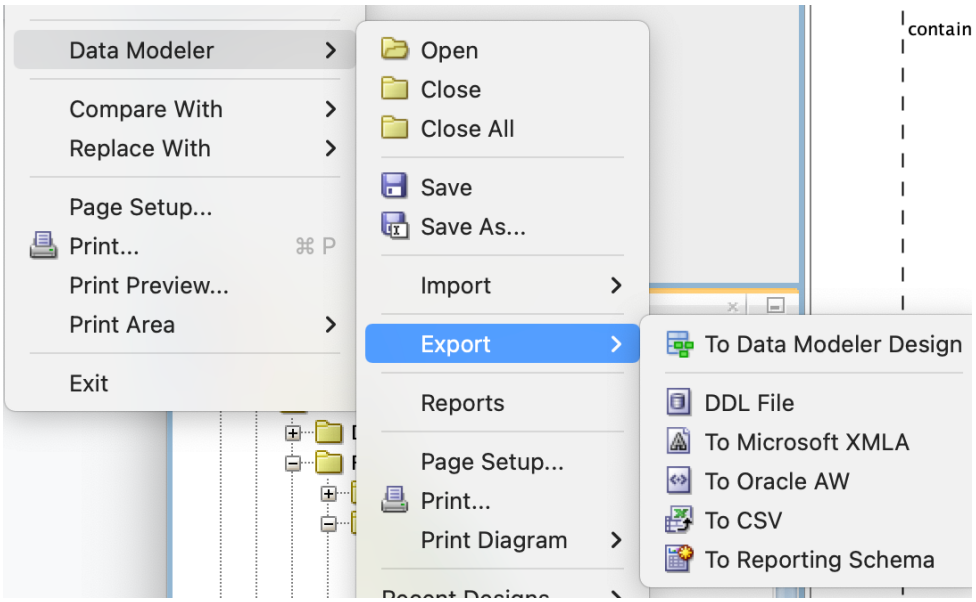
The ***only*** edit you are permitted to carry out to the generated schema file is to add header comment/s containing your details (group/members names) and the commands to spool/echo your run of the script. In generating your schema file ensure you:

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

4. Maintain a Group Diary which records when the group met/communicated to discuss/work on the task, including the date, who was present and a brief statement of what occurred. This Group Diary must be maintained in Microsoft Teams as a shared document in your private group channel.

As part of submission of your assignment each group member will be required to provide confidential feedback on the group members performance/interactions. ***Where uneven contributions to the task are noted the awarded mark will be amended (reduced) for members who have not fully participated.***

Please note when working with your model **ensure that you DO NOT select any export options from the Data Modeller menu**:



such actions can fill your Oracle account space and render it unusable.

Submission Requirements

Assignment 1B: Due: Thursday, 28 April 2022, 4:30 PM (AEST)

The following files are to be submitted and **must exist** in your group FITGitLab server repo. The source files must exist in either your GitLab Repo or your MS Teams Private channel:

- A **pdf** document showing your full normalisation of the sample World Cruise documents showing all normal forms (UNF, 1NF, 2NF and 3NF). Name the file **wc_normalisation.pdf**
- A single page **pdf** file containing the final logical Model you created in Oracle Data Modeler. Name the file **wc_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 **wc_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 and 3 will not be able to be fully marked resulting in significant loss of marks***. You **MUST** carefully check that your model is complete - ensure you 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. Please view the video on Moodle under week 6, "Preparing Files for Submission", which demonstrates this process.
- A schema file (CREATE TABLE statements) generated by Oracle Data Modeller. Name the file **wc_schema.sql**
- The output from SQL Developer spool command showing the tables have been created. Name the file **wc_schema_output.txt**
- A pdf document containing any assumptions you have made in developing the model or comments your marker should be aware of. If you have made no assumptions, submit the document with a single statement saying "No assumptions made". Name the file **wc_assumptions.pdf**
- A PDF copy of your group diary named as **wc_group##_diaryAss1B.pdf** (replace ## with your group number eg. wc_group01_diaryAss1B.pdf for group01)

These files must be *submitted as individual files* **ie. you must upload to Moodle seven separate files as named above** (the seven files must ***not*** be zipped into a single archive) before the assignment due date/time. **The files only need to be submitted by one member of the group after the group has agreed that the submission is complete and ready to be graded**.

Late submission will incur penalties of 10 marks deduction per day or part thereof late. Submissions are not accepted beyond 7 days late.

Please note we **cannot mark any work on the FITGitLab 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 in Moodle, 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.

Submission status

Attempt number	This is attempt 1.
Submission status	Submitted for grading
Grading status	Not graded

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**.

Resubmission

If you wish to resubmit your assignment you must email your tutor, provide your full details as listed in the Unit Information (see below) and request that they reopen your submission for a second submission. Note if this resubmission is after the due date/time the submission will be regarded as late.

You must NOT assume that your tutor will be available if you require a resubmission close to the due date/time - they may have classes or not be available for other reasons, so do not leave submission to the very last minute.

When you contact your tutor (or workshop leader) via email, please ensure you clearly include your full name, unit code and applied class number as part of every email you send so they can identify who the message has come from. This will ensure we can respond as quickly and accurately as possible.

Marking Guide

Submitted designs will be assessed against the optimal solution for this task - this optimal solution will be available as a sample solution after assignment 1B has been graded.

Marking Criteria	Items assessed
Normalise the supplied case study documents and integrate the resultant relations into a logical model.	**Maximum 24 marks - Normalisation:** ● Marks awarded for each correct normalisation step ● Marks awarded for correct attribute synthesis ● Mark penalty for additional attributes or surrogate keys added during normalisation **Maximum 6 marks - Dependency diagrams:** ● Marks awarded for each correct dependency depicted within normalisation **Maximum 5 marks - Mapping to logical model:** ● Mark penalty for incorrect mapping of each relation to logical model
Depict the data requirements expressed in the case study via a relational database logical model.	**Maximum 10 marks - Relations:** ● Marks awarded for each required relation and its attributes identified ● Mark penalty for extra relations included ● Marks penalty for placement of attribute in incorrect relation ● Mark penalty for multivalued attributes included **Maximum 10 marks - Primary keys:** ● Marks awarded for each correct assignment of a primary key **Maximum 10 marks - Relationships:** ● Marks awarded for each required relationship identified ● Mark penalty for each incorrect minimum and maximum cardinality for each required relationship depicted ● Mark penalty for unnecessary relationships included ● Mark penalty for redundant relationships included **Maximum 5 marks - Surrogate key:** ● Marks awarded for creation of at least one appropriate surrogate key ● Marks awarded for creation of unique index/s to protect natural key/s

	Maximum 5 marks - Attribute data types: ● Marks awarded for each correctly identified Oracle data type ● Marks awarded for each null constraint correctly implemented based on business rules **Maximum 10 marks - Business Rules:** ● Marks awarded for each correctly identified integrity requirement to implement case studies business rules
Generate a schema which meets the case study data requirements from the logical model produced	**5 marks - Relational model generation:** ● Marks awarded for correct generation of relational model from submitted logical model? **5 marks - Schema generation:** ● Marks awarded for correct generation of SQL schema file from submitted logical model ● Mark penalty for missing column comments
Consistent use of industry standard notation and convention	**Maximum 5 marks - Modelling standards:** ● Marks awarded for application of Unit logical model notation convention ● Mark penalty for showing data types on logical model ● Mark penalty for missing model legend and/or relationship labels
Penalty Criteria	**Penalty Applied**
Limited/No push of model to FITGitLab server resulting in lack of development history.	If less than nine pushes showing a clear development history a ***grade deduction of 10 marks applied***.
Evidence of uneven contribution by a member/s towards group goals.	Where uneven contributions to the task are noted the ***awarded mark will be amended (reduced) for members who have not fully participated***.