
Name	Assessment 1 - ORM
Due	Sunday 1 May 11:59pm
Weight	20%
Type	Individual
Submit	PDF Document via Blackboard

Rationale and Description

Understanding, designing, and managing databases are foundational to addressing business concerns. This implies an understanding of the techniques that may be used to model data and an ability to develop a concise conceptual model representing a given universe of discourse.

This assessment will involve creating a conceptual schema design for a given universe of discourse and the generation of a relational mapping.

You will use your knowledge from the lectures together with the techniques practiced in the tutorial sessions and apply both to a set of tasks that refer to some business concern. You will not only perform the necessary steps to solve the tasks but also provide an explanation of your approach.

Learning Outcomes

A successful completion of this task will demonstrate:

1. Knowledge of conceptual data modelling principles to understand, capture and analyse an abstraction of the complex data aspect of business domains.
2. Develop rigorous database design underpinned by a conceptual data model

Instructions

This assessment is **individual**. You will have to solve **two tasks**:

- (1) Apply the Conceptual Schema Design Process (steps 1 – 6) to a given business concern;
- (2) Map a conceptual schema design to a relational database schema.

For task 1, you can use any modelling tool (including MS PowerPoint, LucidChart, Draw.io or even handwriting if it is understandable and clear) to draw your models. Make sure the diagrams are readable. Assignment submissions are to be made via IFB105 Blackboard.

Assignment submissions **MUST be a single PDF file** properly identified (student name and number).

Feedback

Feedback will be provided on **specific** questions related to the assessment during the tutorial times, and via MTeams. Please note, that the teaching team will **NOT** respond to general “is this good enough” style questions or requests to pre-assess your work.

Late Submission

According to QUT policies, submissions past the deadline will NOT be marked, and will thus attract a mark of 0. Therefore, you are strongly advised to submit your report, even if it is only partially complete, by the due date.

Extensions

According to QUT policies, an extension to the due date of the assignment may be granted depending on specific circumstances. Please see the late assignments and extensions information on [QUT Virtual](#).

Reviews

We cannot remark assessments. All assessments will be returned with feedback explaining the reasons for the marks allocated. If you require additional feedback or clarification, discuss it with your tutor. If you believe that there is a component that has not been marked in accordance with the criteria sheet, you must identify it in writing to your tutor.

Academic Honesty

Any action or practice on your part which would defeat the purposes of assessment is regarded as academic dishonesty. The penalties for academic dishonesty are provided in the [Student Rules](#). For more information consult the QUT Library resources for avoiding plagiarism.

Resources

The following resources may assist with the completion of this task:

- Refer to tutorial materials, Microsoft Teams, and any lecture videos.
- Refer to the recommended book.

Questions

Questions related to the assessment should be directed to the teaching team during the tutorials or consolidation lectures, and via MS Teams.

The teaching team will not be available to answer questions outside business hours, nor in the hours immediately before the assessment is due.

Assessment Tasks

Task 1 [70 marks] - Individual

Congratulations on your recent appointment as database designer for the IT Department of Queensland University of Technology (QUT). Your first task is to develop a *Staff Records database*, starting with the design phase, using ORM. QUT IT requires this system to **manage their growing team, system access and leave balances**.

The requirements are as follows.

All staff demographic details must be recorded in the system. This includes their first name, surname, date of birth, mailing address, phone number, email, and gender (from a list: female (F), male (M), or other (O)). Part of your job is to perform advanced data analytics. When doing your database, be mindful that **it is required to be able to efficiently access information including the suburbs where staff members live**.

The following table shows an example of part of the information that is currently available. The “?” corresponds to missing information.

Staff ID	Staff First Name	Staff Last Name	Date of Birth	Email	Gender	Staff phone	Staff Address
S100	Charlie	Brown	11/12/1976	c.brown@qut.com	M	4663451	22 Farmers Road, Abbeywood, QLD, 4613 Australia
S101	Isabella	Sinclair	10/11/1980	i.sinclair@qut.com	F	4663452	1 Greensill Road, Albany Creek, QLD, 4035 Australia
S102	Jacob	White	05/06/1990	j.white@qut.com	O	?	7 Birrimba Street, Alderley, QLD, 4051 Australia
S103	Damian	Hull	07/01/1985	d.hull@qut.com	M	4663454	22 South Street, Acland, QLD, 4401 Australia
S104	Harry	Potter	25/04/1985	h.potter@qut.com	M	4663455	?
S105	Tom	White	19/02/1979	t.white@qut.com	O	?	7 Birrimba Street, Alderley, QLD, 4051 Australia
S106	Michelle	Granger	08/08/1988	m.granger@qut.com	F	4663457	?
S107	Kyle	Dawson	08/09/1993	k.dawson@qut.com	M	?	28 Wills Court, Albany Creek, QLD, 4035 Australia
S108	Amelia	Rose	10/11/1980	a.rose@qut.com	F	4663459	?
S109	Tom	Sawyer	01/06/1975	t.sawyer@qut.com	M	4663460	2 Panorama Close, Agnes Water, QLD, 4677 Australia
(...)							

Currently, QUT offers the following jobs to staff members: IT Support Officer, IT Support Engineer, Head of IT, Junior Database Designer, Database Administrator, and Software Engineer. Each of these jobs are represented by a unique code, their description, and they are specific to a department at QUT. Each job is associated to a Pay Rate that can only range from Level 1 to 3, where Level 3 is the highest pay rate and Level 1 the lowest. The following table represents an example of the current information about QUT’s staff members and their jobs.

Staff ID	Job Code	Position name	Description	Pay rate	Department
S100	H_IT	Head of IT	Managers the entire division.	Level 3	Science IT Department
S101	IT_OFF	IT support officer	Provides end services to users.	Level 1	Science IT Department
S102	JUN_DES	Junior database designer	Designs the new staff database.	Level 1	Engineering IT Department
S103	IT_OFF	IT support officer	Provides end services to users.	Level 1	Engineering IT Department
S104	DB_ADMIN	Database administrator	Oversees the entire database system.	Level 2	Business and Law IT Department
S105	SEC_ENG	Security engineer	Oversees all security elements.	Level 2	Business and Law IT Department
S106	IT_ENG	IT support engineer	Provides system access and high-level support.	Level 2	Biomedical Sciences IT Department
S107	JUN_DES	Junior database designer	Designs the new staff database.	Level 1	Biomedical Sciences IT Department
S108	H_IT	Head of IT	Managers the entire division.	Level 3	Engineering IT Department
S109	H_IT	Head of IT	Managers the entire division.	Level 3	Creative Industries IT Department
S105	SEC_ENG	Security engineer	Oversees all security elements.	Level 2	Biomedical Sciences IT Department
S104	DB_ADMIN	Database administrator	Oversees the entire database system.	Level 2	Engineering IT Department
S101	IT_OFF	IT support officer	Provides end services to users.	Level 1	Business and Law IT Department
S103	IT_ENG	IT support engineer	Provides system access and high-level support.	Level 2	Engineering IT Department
S107	IT_OFF	IT support officer	Provides end services to users.	Level 1	Creative Industries IT Department
S102	JUN_DES	Junior database designer	Designs the new staff database.	Level 1	Engineering IT Department
(...)					

Depending on the type of job, staff members will have access to different numbers of days for leave. There are only three types of leave that a staff member can take: *Annual Leave*, *Personal Leave*, and *Emergency Leave*. **The leave days allocated to each staff member differ from each job.** This means that a person that is a Junior Database Designer will have a different number of leave days from the Head of the IT department. The following table shows an example of the number of leave days a staff member can take.

Job Code	Leave Type	Annual Days Allocated
H_IT	Annual Leave	30
	Personal Leave	15
	Emergency Leave	5
IT_OFF	Annual Leave	10
	Personal Leave	7
	Emergency Leave	5
JUN_DES	Annual Leave	10
	Personal Leave	7
	Emergency Leave	5
DB_ADMIN	Annual Leave	20
	Personal Leave	15
	Emergency Leave	5
IT_ENG	Annual Leave	20
	Personal Leave	15
	Emergency Leave	5
SEC_ENG	Annual Leave	20
	Personal Leave	15
	Emergency Leave	5

Lastly, for security reasons, the system must store information on what staff member has access to each system. The information recorded must include the system (either O365, Google Drive, DropBox, or CRM) and the level of access (either read (R), edit (W) or admin access (A)). All staff have at least read access to all systems.

Staff ID	Job Code	System Access	Access Type
S100	H_IT	O365	{R,W}
		Google Drive	{R, W}
		DropBox	{R, W}
		CRM	{R}
S107	IT_OFF	O365	{R, W}
		Google Drive	{R, W}
		DropBox	{R, W}
		CRM	{R, W}
S101	IT_OFF	O365	{R}
		Google Drive	{R}
		DropBox	{R}
		CRM	{R}
S104	DB_ADMIN	O365	{R, W, A}
		Google Drive	{R, W, A}
		DropBox	{R, W, A}
		CRM	{R, W, A}
S105	SEC_ENG	O365	{R, W, A}
		Google Drive	{R, W, A}
		DropBox	{R, W, A}
		CRM	{R, W, A}
S107	JUN_DES	O365	{R}
		Google Drive	{R}
		DropBox	{R}
		CRM	{R}
(...)	(...)	(...)	(...)

Assignment task:

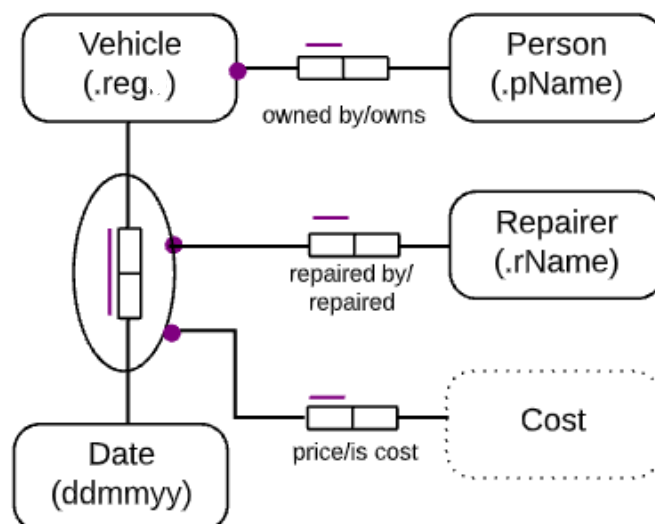
- ➔ Perform CSDP step 1 ~ 6 and **present your final ORM diagram**. You are not required to submit your results from each individual step. If you want to submit your elementary facts or note any assumptions in your diagram, you are free to do so, but only the final ORM diagram will be evaluated.

Criteria Sheet - Task 1 [70 marks]

Criteria	High Distinction [70 – 60 marks]	Distinction / Credit [59 – 50 marks]	Credit / Pass [49 – 40 marks]	Pass / Borderline [39 – 30 marks]	Fail [29– 0 marks]
Syntactic Correctness [25 marks]	The model is complete and fully syntactically correct	The model is complete and mostly syntactically correct	The model is mostly complete and/or reasonably syntactically correct	The model is partially complete and/or mainly syntactically incorrect	The model is mostly incomplete and/or syntactically incorrect
Semantic Correctness [35 marks]	The model fully and correctly reflects every aspect of the facts described in the scenario	The model fully and correctly reflects most aspects of the facts described in the scenario	The model correctly reflects many aspects of the facts described in the scenario, or reflects most aspects but is somewhat incorrect or inefficient in structure	The model reflects a few aspects of the facts described in the scenario and/or has an incorrect or inefficient structure	The model incorrectly reflects the facts described in the scenario
Pragmatic Correctness [10 marks]	The model has a clear structure designed for maximal understandability by stakeholders (layout, labels, annotations, etc)	The model has a mostly clear structure and/or is designed for high understandability by stakeholders (layout, labels, annotations, etc)	The model has a mainly clear structure and/or is designed for reasonable understandability by stakeholders (layout, labels, annotations, etc)	The model has a somewhat messy structure and/or does not reflect that it has been designed with consideration for stakeholder understandability	The model has an unclear structure and/or most would find it difficult to understand

Task 2 [30 marks] – Individual

The following is an ORM model for employee. **Map the schema to a relational database schema.** Any possible constraints need to be included (e.g., primary key, foreign key).



Criteria Sheet - Task 2

Marks will be awarded for the following:

- Full marks will be awarded if all relations are correctly mapped with the schema including correct primary/foreign keys.
- Any incorrect/missing relations will be deducted:
 - penalise for missing relations and penalise for each missing key
 - 5 if a relation is missing
 - 2 for missing primary key or missing foreign key
 - 1 mark for minor errors

