School of Computer Science

COMP9120 Database Management Systems
2025 semester2

Assignment 1: Conceptual Modelling & Logical DB Design

Notice:
Our goal is to create the best possible assignment for you. However, mistakes can happen. If we identify an error, we'll announce it on Ed and record it here. We appreciate your understanding and ask that you check your email regularly for Ed announcements.

Update Log – (last updated: 27 Aug 2025, 6:54pm)

- *27 Aug 2025, 6:54pm :: A new link was created that allows students to download the spec as it was requested by students.* But please make sure you check this page regularly so if there is any clarifications, you can know about it.

Group assignment (12.5 %)

Introduction

The purpose of this assignment is to provide you with experience in conceptual and relational database modelling. You are given a domain description for the Sydney Music Group. There are 2 high level tasks in this assignment:

- Create an Entity Relationship Diagram (ERD) that captures the business concepts and requirements conveyed in this description,
- Translate your ER diagram into a logical database design including relational database schema creation, key constraints and integrity constraints.

This is a group assignment for teams of 3 people per group. You must be enrolled in an assignment group on Canvas.

Please also keep an eye on your email, Ed and the first page of this live assignment for any related announcements or posts.

Submission Details

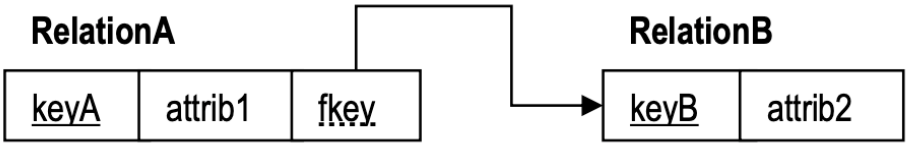
The submission of your solution is due at 11:59pm on Sunday 14/Sep/2025 (Week 6). You must submit the items for submission (detailed below) via Canvas.

Items for submission

Please submit your solution to Assignment 1, in the 'Assignment' section of the unit's Canvas site by the deadline, including the following four files:

1. Firstly, you should submit an assignment coversheet as a PDF document (.pdf file suffix) which is available for download from this link.
2. Secondly, you are required to submit your conceptual model in the form of an E-R diagram using the lecture notation, formatted as a PDF document (.pdf file suffix). **Please justify your choices for entity types, relationship types, attributes, primary keys, constraints and design specialties, including any further assumptions made.**
3. Thirdly, you should submit an SQL file (.sql file suffix) containing all DDL statements (including any constraints) necessary to fully instantiate a working database based upon your ER diagram, and DML statements to populate each relation. Your file should run without errors in **PostgreSQL v16.2**. You can annotate your statements using

   '--' at the start of lines for comment. You should group your statements for ease of reading (e.g. by keeping all table constraints within the relevant CREATE TABLE statement rather than declaring them externally, if possible).
4. Lastly, you should submit another pdf document (.pdf file suffix) including the Relational Model (RM) diagram that provides a visual model of your database schema. The following figure summarises the syntax you must use for the RM diagram:



Domain Description

"Sydney Music" is a newly established startup that has engaged you as a database consultant to design a conceptual model for their system. The system stores information on songs, albums, and third-party data such as customers and artists. The core business is music. Customers should be able to view a track's genre(s), duration, title, and all contributing artists. For each artist, their role must also be visible. A track can belong to one or multiple albums. The app will mark the most popular song(s) in each album with a dot. The company also wants to record how many times each customer listens to a track so it can be highlighted as a year-end celebration.

Each customer may leave a review on any track. Reviews include a rating on a five-point scale, with 5 as the highest. Customers can also write an optional short review to help others considering their opinion. Every review automatically records the date and time it was created. Staff members may remove a review if they consider it inappropriate. When this happens, the date, time, reason for removal, and the staff member who removed it are stored for auditing.

Customers can create playlists for themselves. A playlist contains tracks arranged in the order preferred by the user. No customer may have two playlists with the same name.

The company needs to record credentials for each artist, including full name, email, unique login name, password, and mobile number. Customers require similar details, plus their age and date of birth due to legal restrictions on certain songs. Staff records include the same details as artists, along with address and compensation. Neither artists nor staff may use their professional accounts to listen to music. If a staff member is also an artist, they must register a separate account for their artistic work and cannot combine roles under one account.

Further assumptions

If you feel you want to make further assumptions, it is important that you provide a justification as to the reasons behind them. Your assumptions should be rooted in common sense and how most car dealerships in Australia operate. You should avoid any constraints that only apply to specific cases. When in doubt, adhere to what is explicitly stated in this assignment. For example, if you decide to make an attribute as a composite attribute or define a relationship with total participation when it was not clearly described in the domain text as such, you would need to make an argument about your choice.

Task 1: Entity Relationship Diagram (ERD)

"Sydney Music" has recruited you as a database designer to develop a conceptual model, described in an ER diagram, to represent the database design of their system. You should also document any assumptions you made which justify your design decisions.

Task 2: Relational Database Design & Modelling

Your second task is to design and create a relational database schema based on the Entity Relationship Diagram (ERD) modelled from the first task. In particular, your solution should include:

- A Relational Model mapping (i.e., RM diagram) of the ERD which describes the tables and attributes with appropriate data types to capture all information in the model (please use the same names as in your ER diagram for naming tables and attributes);
- Creation of the database schema using PostgreSQL which include the appropriate PRIMARY KEY, UNIQUE, FOREIGN KEY constraints for all tables;
- Correct foreign key specifications including ON DELETE clauses where suitable;
- Appropriate additional integrity constraints expressed by means of NOT NULL or CHECK clauses or other types of integrity constraint statements;
- INSERT statements to populate each relation with at least one record, to demonstrate a database instance consistent with the ER model.

Additional details

In addition to the model captured through your ER diagram, the following details apply:

1. Attributes representing names should always have values.
2. Fields representing dates and/or times should always have values.
3. All attributes in a tuple relating to details about a track should always have values.
4. The staff's compensation should always be larger than nil but not exceeding $200,000.
5. The average rating of a track should have a value of between 1 to 5.
6. All tracks must have at least one associated artist.
7. All albums must contain at least one track.

Escaping PostgreSQL keywords in DDL

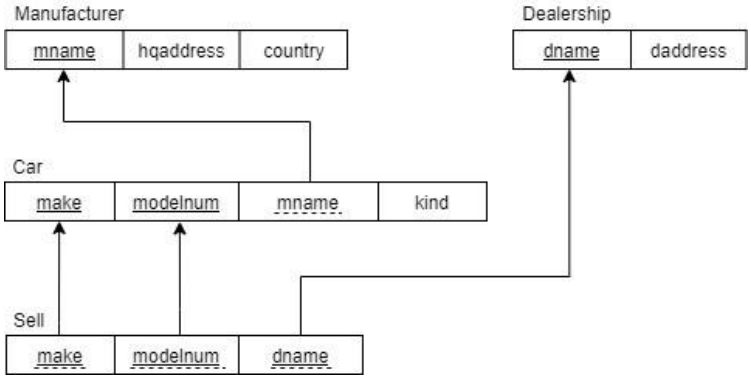
If you need to escape PostgreSQL keywords like "Table", you will need to use double quotes.

e.g. CREATE TABLE "Table" (…);

Q&A

Q: How to draw the link from foreign key in a table to its referenced candidate key in another table if the foreign key contains more than one attributes?

A: You should draw it in a similar way to the following RM diagram (specifically, see the Sell table). You can use any of the available tools such as draw.io, Visio, Lucidchart, Excalidraw, Good Draw etc. to draw your diagram.



Marking

This assignment is worth 12.5% of your final grade for the unit of study. Your group's submission will be marked according to the attached rubric (see last section of this assignment description).

Group member participation

If you are having difficulties with a teammate and have already tried to resolve it without success, please complete the form below as soon as possible to let me, Armin, know so I can help you address the issue. Keep in mind that unequal contribution percentages will only be accepted if you have previously reported the problem to both your tutor and the unit coordinator using this form.
https://forms.office.com/r/1ZvePBafFj

The course instructor has the discretion to scale the group's mark for each member as follows:

Percentage of contribution	Proportion of final grade received
< 5% contribution	0%
5 - 10% contribution	20%
11 - 15% contribution	40%
16 - 20% contribution	50%
21 - 24% contribution	60%
25 - 28% contribution	80%
29 - 30% contribution	90%
> 30% contribution	100%

Note: The above table assumes that each group will have 3 members, so, on average, around 33% contribution is expected from each member of the group. In special case, if the group has less than 3 members then the contribution percentage will be adjusted accordingly. You must justify your contribution percentage by providing detailed explanation of your individual contribution on the assignment coversheet mentioned before. You should also maintain a diary of your group meetings and discussions on Canvas. Furthermore, we may run random face-to-face interviews to understand and justify your contribution, if needed.

Marking Rubric

Your submissions will be marked according to the following rubric, with a maximum possible score of 16 points. To convert this into your final mark (which is worth 12.5), your score will be multiplied by 12.5/16. This will give your result out of 12.5.

	Novice (0 – 1 pt)	**Competent (1.5 – 2 pts)**	**Proficient (2.5 pts – 3pts)**
ERD Notation & Core Model	Major mistakes in the usage of ER notation. Less than competent model of the given scenario. Many entities, relationships, or attributes were not correctly captured by the model.	Good usage of E-R notation with a few mistakes. Entities, relationships, or attributes were correctly captured by the model, but with minor mistakes.	Proficient usage of the E-R notation. The core model was very well designed, and all the main entities, relationships and attributes were correctly captured by the model.
ERD Constraints	Many constraints were incorrectly captured in the model, or no constraints captured at all.	Constraints (key / total participation constraints on relationship types, etc.) were correctly included in the model, but with minor mistakes.	All appropriate constraints were modelled correctly.
ERD Design Specialities	Majority of design specialities used were inappropriate or incomplete, or no design specialities were used.	At least one useful ISA, weak entity or aggregation used appropriately. Minor or no mistakes on design specialities used.	All design specialities were used appropriately.
Relational Mappings	Less than competent relational schema of the given scenario.	All main entities and relationships were mapped correctly to relations, with appropriate choice of data types for most attributes.	The core model was very well mapped to a relational schema and appropriate choice of data types for all attributes.
Key Constraints & Semantic Constraints	Major issues with key constraints, or no key constraints captured at all. Major issues with integrity constraints, or no integrity constraints given.	Primary keys and foreign keys were defined appropriately, but with minor mistakes. Integrity constraints such as CHECK or NOT NULL were defined correctly, but with minor mistakes.	All the necessary primary keys and foreign keys were defined correctly, including appropriate ON DELETE clauses. All the necessary integrity constraints for the model were defined correctly.
Example Data & RM Diagram	No example data given or yielded multiple errors. No RM diagram submitted, or major issues with the RM diagram	Some table example data missing or generated an error. RM diagram does not exactly match the relational schema created by the submitted SQL file.	Database fully populated with a consistent and correct set of data. RM diagram is correct and exactly matches the relational schema created by the submitted SQL file (Not: semantic constraints and example data are not required in RM diagram).

	No Marks (0 pt)	Full Marks (1 pt)
Record Keeping of Group Discussion	One or more issues reported or found with group member contribution, or with maintaining records of group meetings and discussions regularly on Canvas.	No issue reported or found with group member participation. All group members participate and regularly maintain a diary of group meetings and discussions on Canvas.