

School of Science

## ISYS2095 Database Concepts

Assessment 2: Database Design



**Assessment Type:** PDF

**Word limit:** N/A (see instructions)



**Due date:** Sunday 24<sup>th</sup> January 2021 (end of week 8), 23:59 (AEDT)



30% of your overall grade

### Overview

The objective of this assignment is to measure your understanding of SQL querying, table creation, data insertion and creating a view.

### Assessment Criteria

This assessment will measure your ability to:

- Write SQL statements for retrieving data for specific user requirements;
- Create tables on SQLite Studio and populate them with specified data.
- Create a SQL view of the constructed database;

### Course Learning Outcomes

This assessment is relevant to the following Course Learning Outcomes:

- CLO 4: Apply SQL as a programming language to define database schemas and update database contents.

- CLO 5: Apply SQL as a programming language to extract data from databases for specific users' information needs.

## Assessment details

Tasks 1, 2 and 3 utilise a (fictional) 'research' database instance with the following schema:

```
Department(DeptNum, Descrip, Instname, DeptName, State, Postcode)
Academic(AcNum, DeptNum*, FamName, GiveName, Initials, Title)
Paper(PaNum, Title)
Author(PaNum*, AcNum*)
Field(FieldNum, ID, Title)
Interest(FieldNum*, AcNum*, Descrip)
```

- The keys for departments, academics, papers, and fields of interest are DeptNum, AcNum, PaNum, and FieldNum respectively. These keys are used as foreign keys in other tables.
- Each Academic belongs to one Department and is the Author of some (or no) Papers. Each Paper has at least one Author, but there could be several Authors for a Paper. Each Academic works in some (or no) Fields (i.e. research areas) that are described in the table Fields. The Interest table stores data about the fields of research an academic is interested in and the Descrip attribute provides a more detailed description of the academic's work.

The research database instance is available on Canvas under Modules->Sample Databases and Tools.

### Task 1: Non-nested queries (25 marks)

Provide SQL queries that answer the following questions. The queries must be non-nested. Views are not to be used. The LIMIT clause is not to be used.

- 1.1 How many interests are missing a description?
- 1.2 What are the names of institutes located in NSW or WA? Only list an institution once and sort the list into reverse alphabetical order.
- 1.3 What fields share the same title? For each such shared field title, output the field title and, under the heading "Count", a count of the number of fields sharing that title.
- 1.4 List the academic number, family and given names of academics who authored papers containing 'spline' somewhere in the title.
- 1.5 Which departments in Queensland ('QLD' or 'Qld') don't have any academics? List the institute name and department name.
- 1.6 Find the academic number and full name of academics that have written one or more papers with Lance Baliga. Do not include Lance Baliga in the result. Do not include duplicates.

## Task 2: Nested queries (29 marks)

Provide **nested** SQL queries that answer the following questions. Views are not to be used. Set operators are not to be used. The LIMIT clause is not to be used.

- 2.1 Which departments in Queensland ('QLD' or 'Qld') do not have any academics? List the institute name and department name. Use IN or NOT IN as part of your query.
- 2.2 Which departments in Queensland ('QLD' or 'Qld') do not have any academics? List the institute name and department name. Use EXISTS or NOT EXISTS as part of your query.
- 2.3 Find the academic number and full name of academics that have written one or more papers with Lance Baliga. Do not include Lance Baliga in the result. Do not include duplicates.
- 2.4 Find and list the most common department name (remember, the LIMIT clause is not to be used).

## Task 3: Set operators (23 marks)

- 3.1 Find the academic number of academics who have five or more interests and yet have not authored any papers. Use a set operator as part of your query.
- 3.2 Find the academic number of academics whose interests include all the interests of academic number 114. Do not report duplicates. Do not report academic 114. Use a set operator as part of your query.
- 3.3 Which departments in Queensland ('QLD' or 'Qld') do not have any academics? List the institute name and department name. Do not use EXISTS, NOT EXISTS, IN or NOT IN as part of your query. Use a set operator as part of your query.

## Task 4: SQL CREATE and INSERT statements (13 marks)

Note: This task doesn't use the 'research' database'.

Assume a club offers members the opportunity to book tickets to workshops:

- The database should have three tables:
  - Member, for recording details of each club member
  - Workshop, for recording details of each workshop
  - Booking, for recording details of each booking
- Members have a unique four-digit memberID, they also have a first name, surname and, usually, a phone number.
- Workshops have a unique three-digit workshop ID, they also have a title, a session date, a price and the number of remaining tickets is also recorded.
- For each booking, the ID of the booking member, the ID of the booked workshop, the date of the booking and the quantity of tickets booked is recorded. A member can only have one booking for a given workshop.

## Member

<i>memberID</i>	<i>firstName</i>	<i>surname</i>	<i>phone</i>
1000	Aksha	Shaikh	0456123456
1001	Eric	Rostron	0439774776
1002	Zhe	Ding	0459914321

## Workshop

<i>workshopID</i>	<i>title</i>	<i>sessionDate</i>	<i>price</i>	<i>qtyRemaining</i>
100	Firing a steam locomotive	2021-12-31	89.95	2
101	Rail signalling	2021-12-17	55.50	9
102	Shunt rolling stock	2021-02-03	78.00	6

## Booking

<i>memberID</i>	<i>workshopID</i>	<i>qtyTickets</i>
1001	102	2
1000	101	1
1002	102	1

- 4.1 Write SQL statements to create Member, Workshop and Booking tables with appropriate data types, primary and foreign keys. Ensure the tables will maintain data integrity of:
- key constraints
  - entity integrity constraints
  - referential integrity constraints
- 4.2 Write SQL statements to populate the Member, Workshop and Booking tables with the above instance data.
- 4.3 Write an SQL statement to create a view called *sales* giving for each workshop, the workshopID, title, session date (formatted as DD/MM/YYYY and called “date”), total number of tickets sold for that workshop (as “total Sales”) and number of tickets remaining.

## Referencing guidelines

Use Harvard referencing style for this assessment. You must acknowledge all the sources of information you have used in your assessments.

Refer to the RMIT Easy Cite referencing tool to see examples and tips on how to reference in the appropriate style. You can also refer to the library referencing page for more tools such as EndNote, referencing tutorials and referencing guides for printing.

You should submit one SQLite script with all answers together. Please preface each answer with an SQL comment indicating the question (e.g: --Task 1.1). Submit to the assessment page in canvas by the due date.

## Academic integrity and plagiarism

Academic integrity is about honest presentation of your academic work. It means acknowledging the work All code or other material that is not original must be fully credited. That is, any material that is copied or derived from another source must be clearly identified as such and the original author must be identified. Sometimes students assist each other with an assignment, but end up working together too closely, so that the students' separate solutions have significant parts in common; unless the solutions were developed independently, they are regarded as plagiarised.

Plagiarism is a very serious offence. Any submissions determined to be a result of plagiarism will be deemed as an academic misconduct and harsh penalties apply. It is also an offence for students to allow their work to be plagiarised by another student. You should familiarize yourself with the university website for Academic Integrity Policy, Procedures and Guidelines: <https://www.rmit.edu.au/students/student-essentials/rights-and-responsibilities/academic-integrity>

All work is to be done individually and plagiarism of any form will be dealt with according to the RMIT plagiarism policy.

## Penalties for late submissions

Late submissions of assignments will be penalised as follows. For 1 to 5 days late, a penalty of 10% (i.e. 10% out of total marks, not 10% out of your marks) per day. For assignments more than 5 days late, 100% penalty applies.

## Special Consideration

If unexpected circumstances affect your ability to complete the assignment you can apply for special consideration. If you seek a short extension, you can directly contact the lecturer. For longer extensions, you must follow instructions provided at: <http://www1.rmit.edu.au/students/specialconsideration>

## Assessment declaration

When you submit work electronically, you agree to the [assessment declaration](#).