

## CP5804 Database Systems - Assessment #3

### Assignment 3 – Database implementation and query formulation

**Due date:** 8:00 PM (AEST) Wednesday of Week 7, 25 April 2018

**Assessment weight:** 40%

#### **Rationale**

This assignment has been designed to give students experience using Structured Query Language (SQL) and other database management systems (DBMS) facilities to create/alter a relational database and to query the DBMS. This assignment addresses the following learning objectives for this subject:

- implement a database design as a relational database using Microsoft Access
- formulate queries in SQL.

This assignment consists of two main tasks:

1. Creating the database (by following three subtasks):
  - Create a relational database for a given conceptual model (ERD) using MySQL Workbench
  - Create a physical database model on MySQL Workbench by applying the forward engineer process
  - Import raw data from the external file to a table using the MySQL Workbench facility
2. Writing SQL queries for given problems.

Further details about each task are presented in the following pages.

#### **Submission**

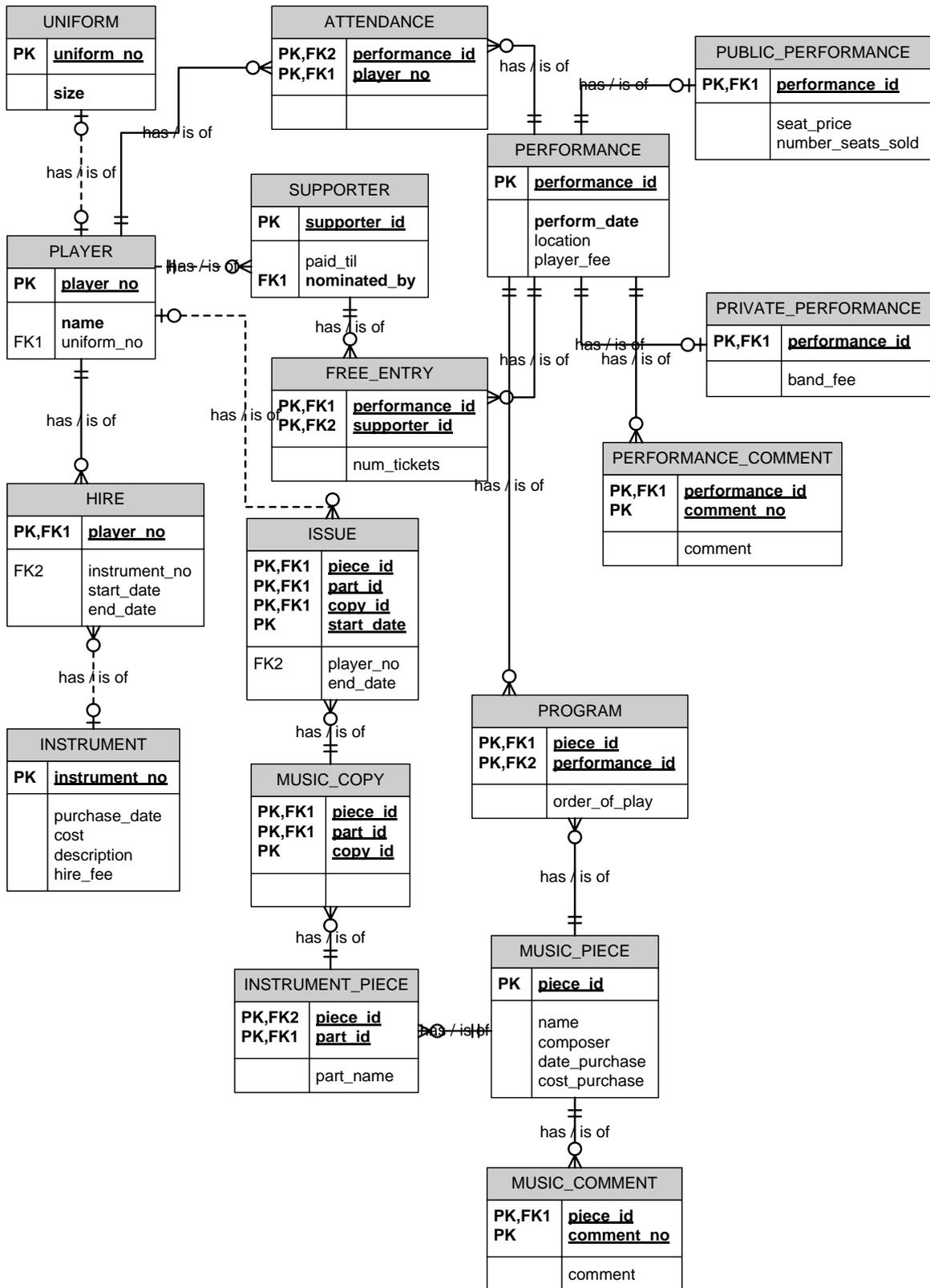
- An MySQL Workbench file containing the ERD you created (.mwb)
- A database dump file built and exported on MySQL Workbench (.sql)
- A Word file containing all SQL query codes and result tables (.doc or .docx)

#### **Task 1: Creating the database [69 marks]**

1. Use MySQL Workbench to create a relational data model supplied below. This is an extended version of the FNQ Brass Band database model you created for a previous assignment (Assignment 1 Business Scenario #3). PKs should be correctly specified. All necessary attributes should be specified by setting correct data types and appropriate field lengths. **[Save the completed model as a .mwb file]**

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## FNQ Brass Band Database Model



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### Some useful information about this database model

This ERD was designed to address the brass band problem introduced in Assignment 1 Business Scenario #3. The original scenario must be extended to cope with further entities and relationships. This is because a series of further requirements have been identified, as summarised below.

#### **Further requirements**

It is now necessary to record the following additional information:

- **Members:** The band now has two categories of member: players and supporters. Supporters must be recommended by a player before they can join and must pay an annual subscription fee. Players do not pay a subscription fee. Supporters are entitled to five free tickets to band concerts each year. It is necessary to keep track of the concerts for which each supporter has had free tickets in the current year.
- **Pieces of music owned by the band:** The band purchases multiple copies of pieces of music and issues them to players as appropriate. Information recorded for a piece of music include its name, composer, date and cost of purchase. Additionally, for each piece of music there will be a number of copies for each instrument required in the piece (what instrument parts the band has, and how many copies of each (e.g., two copies of the 1st trumpet part, two of the 2nd trumpet part, three of the euphonium part)).
- **Copies of music pieces:** If the band is currently playing or rehearsing a piece of music, then copies will be issued to players, to be kept by them until the band ceases to play that music. The master (original) copy never leaves the band's office. Each copy is identified by three numbers shown on it: for example, '137 5 2' represents Piece of music number 137 (e.g., *Blue Danube Waltz*), Part number 5 (e.g., 2nd trumpet) and Copy number 2. (Note that Part number 5 for the *Flight of the Bumble Bee* would not necessarily be for 2nd trumpet). It is necessary to keep records of which copies have been issued to which players. Information about who was issued with which copies, and start and end dates for each issue is to be retained permanently on the system. It represents a useful guide of who can play what.
- **Program:** For each performance the band now needs to store the name of each piece of music played, and the order in which they were played. The band will only perform pieces of music that it owns.
- **Performances:** Performances are now of two types: those for which the band sells tickets itself (e.g., a concert at City Hall) and those for which the band does not sell tickets (e.g., a concert in the park or a wedding). For performances for which the band does sell tickets, it needs to record the ticket price (all seats cost the same), the number of tickets sold and the number of free tickets given to supporters.
- **Comments:** The new system should allow zero, one or more comments to be recorded for each piece of music (but not each performance of it) and each performance (the concert as a whole).

2. Create a physical database model using the forward engineering process on MySQL Workbench.
3. Insert the data supplied (as MS Excel files) into the database. You may choose to use either the SQL INSERT syntax or the import utility provided by MySQL Workbench. (Note: the names or order of attributes in the raw data files may not exactly match those presented in the ERD)

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4. Finally, dump the database into one integrated file on MySQL Workbench **[Save the completed database as a .sql file]**

#### **Task 2: Creating queries [36 marks]**

Using the database you constructed in Task 1, create the following SQL queries in MySQL Workbench. The resulting table for each query should look like the one provided for each question. **[Paste your SQL query into a Word document to submit]**

##### **Notes:**

- For assignment submission, paste the SQL query into a Word document
- Each part of your assignment should be clearly labelled to identify the question that is being answered
- Queries should be written so that they would work with all reasonable sets of test data, not just that which have been supplied
- Marks may be deducted if your SQL is excessively complicated
- Full marks will be awarded where the solution provided is correct in all respects
- Partial marks may be allocated where students are deemed to have made a significant effort towards a correct result, even if the solution contains some errors
- No marks will be awarded where no solution is provided or the solution provided is deemed to be mostly incorrect
- The SQL query questions are of varying difficulty. It is not expected that all students will answer all questions. Given that each question is worth only 1 mark, students should make decisions regarding the value of time spent answering a question versus the value of the question.

- a) Show the name of the town from which the player with player\_id number '001' comes.

town
Bathurst

- b) Show the name and address of the player that recommended supporter number '499'.

name
Carolyn Lodge

- c) Show the names and player identities (ids) of players that have borrowed a copy of the trumpet piece for the music composed by 'Hummel'.

name	player_no
Ima Idjit	078
Iva Sawpit	077

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- d) Show the performance attended on 10/9/05 by the supporter recommended by the player with id '078'.

comment
Stimulating arrangements

- e) List the titles of music pieces that are exactly the same length as other pieces.

name	length
When the Saints Go Marching In	7
Fantasy, Opus 96	7
The Flight of the Bumblebee	7
Pizzicato	9
Sheep May Safely Graze	9

- f) List the names of all players who have borrowed a copy of an instrument piece for the music titled 'Sheep May Safely Graze'.

name
Carolyn Lodge
Ima Idjit
Iva Sawpit
Robert Moffatt
Ronald Smith

- g) List the names and player ids of players who have borrowed a copy of a music piece and have not returned it.

name	player_no
Carolyn Lodge	006
Daisy Blackmore	012
Danielle Blackmore	011
Erin Nesbitt	008
Errol Curry	002
Fred Frog	076
Ima Idjit	078
Iva Sawpit	077
Jenny Hammond	003
Joseph Witney	001
Karen Wilkins	005
Marie Chopping	007
Robert Moffatt	009
Ronald Smith	065
Sue Wilson	004

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- h) List the names and player ids for players who have borrowed a copy of a music piece and did not return it within 10 days.

name	player_no
Carolyn Lodge	006
Daisy Blackmore	012
Danielle Blackmore	011
Erin Nesbitt	008
Errol Curry	002
Fred Frog	076
Ima Idjit	078
Iva Sawpit	077
Jenny Hammond	003
Jessica Wood	010
Joseph Witney	001
Karen Wilkins	005
Marie Chopping	007
Robert Moffatt	009
Ronald Smith	065
Sue Wilson	004

- i) List the names and player ids for players who have never recommended a supporter.

name	player_no
Errol Curry	002
Sue Wilson	004
Marie Chopping	007
Jessica Wood	010
Ronald Smith	065
Fred Frog	076
Iva Sawpit	077

- j) List the names and player ids for players who have recommended at least one supporter.

name	player_no
Joseph Witney	001
Jenny Hammond	003
Karen Wilkins	005
Carolyn Lodge	006
Erin Nesbitt	008
Robert Moffatt	009
Danielle Blackmore	011
Daisy Blackmore	012
Ima Idjit	078

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- k) List the names and player ids for players who have recommended precisely two supporters.

name	player_no
Daisy Blackmore	012

- l) List the names and player ids for all players and sort the list in reverse alphabetical order (Z to A).

name	player_no
Sue Wilson	004
Ronald Smith	065
Robert Moffatt	009
Marie Chopping	007
Karen Wilkins	005
Joseph Witney	001
Jessica Wood	010
Jenny Hammond	003
Iva Sawpit	077
Ima Idjit	078
Fred Frog	076
Errol Curry	002
Erin Nesbitt	008
Danielle Blackmore	011
Daisy Blackmore	012
Carolyn Lodge	006

- m) Show the average length of performances in which music composed by the music composer with id number '1' are performed.

Average_Length
8.5
8
7.8
8.25
7.75
7.8
7.8

- n) List the names and composer ids for music composers who have composed precisely the same number of music pieces as the music composer with id number '1'.

composer_id	name
4	Bach

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- o) Show the average salary of all players for each type of instrument (note, a player may play more than one type of instrument and therefore should be counted in the calculation for each instrument type).

description	average_salary
Alto Saxophone	\$15.00
Bass Drum	\$15.00
Cymbols	\$13.57
Kettle Drum	\$13.57
Snare Drum	\$13.57
Tenor Saxophone	\$13.13
Tenor Trombone	\$13.75
Triangle	\$13.57
Trombone	\$15.00
Trumpet	\$13.57
Tuba	\$14.55
Xylophone	\$13.57

- p) In a correctly implemented database a single copy may not be loaned to several players at a single point in time. However, in such a database it is still possible for a copy to be borrowed before it has been returned (i.e., booking of a copy that is currently on loan). Create a query that lists all such occurrences.

onloan.player_no	Booked.player_no	piece_id	part_id	copy_id
012	009	141	6	1

- q) List all player names along with the names of their respective supporters.

player.name	supporter.name
Joseph Witney	Monica Aumann
Errol Curry	
Jenny Hammond	Nigel Nelson
Sue Wilson	
Karen Wilkins	Mary Abrahams
Carolyn Lodge	Lesley Gray
Marie Chopping	
Erin Nesbitt	Mary Napier
Robert Moffatt	Thomas Samuelson
Jessica Wood	
Danielle Blackmore	Olive Newman
Daisy Blackmore	John Gray
Daisy Blackmore	Melissa Brown
Ronald Smith	
Fred Frog	
Iva Sawpit	
Ima Idjit	Alice Strathclyde

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- r) List the titles of all music pieces performed at the performance held on 10/9/05, and for which a copy of an instrument piece has, on some occasion, been loaned to the player with player id '065'.

name
Sheep May Safely Graze
The Blue Danube Waltz
Wachet Auf
When the Saints Go Marching In

#### **Assignment #3 Database implementation and query formulation: Marking criteria**

Requirement	Criteria	Marks
Task 1: Creating the database	All tables required are correctly created, with: <ul style="list-style-type: none"> <li>• correct attributes</li> <li>• correct PKs</li> <li>• data added correctly</li> </ul>	___/51 (3 marks for each table)
	Relationships are constructed correctly	___/18 (1 mark for each relationship)
Task 2: Creating queries	Queries produce the correct results with correct logic	___/36 (2 marks for each query)
	Total Marks	___/95

**Your Assignment 3 mark (out of 40) = (Total marks /95) x 40**