Assignment 3 – Database implementation and query formulation
Due date: 11:59 PM (AEST) <mark>Wednesday of Week 7 22 April 2020</mark>
Assessment weight: <mark>15%</mark>

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.

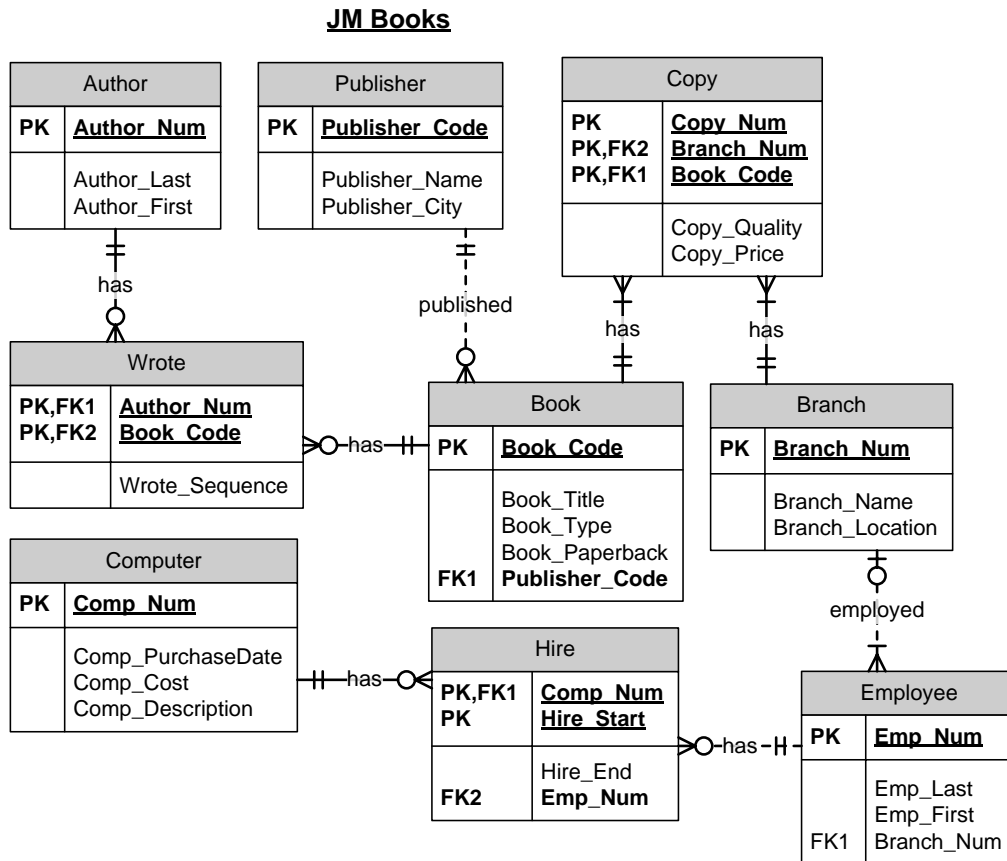Further details about each task are presented in the following pages.

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)

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1. Use MySQL Workbench to create a relational data model supplied below. This is a simplified version of the JM Books 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]**

JM Books

Author	
PK	**Author_Num**
	Author_Last Author_First

Publisher	
PK	**Publisher_Code**
	Publisher_Name Publisher_City

Copy	
PK PK,FK2 PK,FK1	**Copy_Num** **Branch_Num** **Book_Code**
	Copy_Quality Copy_Price

Wrote	
PK,FK1 PK,FK2	**Author_Num** **Book_Code**
	Wrote_Sequence

Book	
PK	**Book_Code**
	Book_Title Book_Type Book_Paperback
FK1	**Publisher_Code**

Branch	
PK	**Branch_Num**
	Branch_Name Branch_Location

Computer	
PK	**Comp_Num**
	Comp_PurchaseDate Comp_Cost Comp_Description

Hire	
PK,FK1 PK	**Comp_Num** **Hire_Start**
FK2	Hire_End **Emp_Num**

Employee	
PK	**Emp_Num**
	Emp_Last Emp_First
FK1	Branch_Num

has, published, has, has, employed, has, has

2. Create a physical database model using the forward engineering process on MySQL Workbench.

3. Insert the data supplied (as CSV 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)

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

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Task 2: Creating queries [40 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 if you created the database correctly as required. **[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 evenly 2 mark, students should make decisions regarding the value of time spent answering a question versus the value of the question.

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1. List the name of each publisher that's not located in New York. (Name the query as Q1)

PublisherName
Arkham House
Basic Books
Berkley Publishing
Course Technology
Jeremy P. Tarcher
McPherson and Co.
Taunton Press
Touchstone Books
Westview Press

2. List the title of each book published by Penguin USA.

Title
Of Mice and Men
Travels with Charley
East of Eden
The Grapes of Wrath

3. List the title of each book that has the type SFI and that is in paperback.

Title
A Deepness in the Sky

4. List the title of each book that is in the type of CMP, HIS, or SCI.

Title
The Soul of a New Machine
Band of Brothers
A Guide to SQL

5. Show how many books are written by Vernor Vintage or Dick Francis?

Book Count
4

6. List the title of each book that has the type FIC and that was written by John Steinbeck.

Title
Of Mice and Men
East of Eden
The Grapes of Wrath

7. Show how many book copies available at the JM Downtown branch have price that is greater than $10 but less than $20.

Book Count
11

8. List the branch name, copy number, quality, and price for each copy of The Stranger.

BranchName	CopyNum	Quality	Price
JM Downtown	1	Excellent	8.00
JM on the Hill	1	Excellent	8.00
JM on the Hill	2	Fair	3.50
JM on the Hill	3	Poor	2.25

9. For each book title (in an alphabetical order) with more than four copies, show how many copies in total the JM bookshop has and what the average price is.

Title	Count	Average Price
Dreamcatcher: A Novel	6	$20.62
Harry Potter and the Prisoner of Azkaban	6	$12.12
Jazz	7	$11.78
Second Wind	6	$23.95
Song of Solomon	7	$11.86
The Catcher in the Rye	5	$4.78
The Grapes of Wrath	8	$8.60

10. For each book copy available at the "JM on the Hill" branch whose quality is excellent, list the book's title and author names (in the order listed on the cover).

Title	AuthorFirst	AuthorLast
A Guide to SQL	Philip	Pratt
Band of Brothers	Stephen E.	Ambrose
Band of Brothers	Stephen E.	Ambrose
Beloved	Toni	Morrison
Beloved	Toni	Morrison
Dreamcatcher: A Novel	Stephen	King
Dreamcatcher: A Novel	Stephen	King
Dreamcatcher: A Novel	Stephen	King
Dreamcatcher: A Novel	Stephen	King
Franny and Zooey	J.D.	Salinger
Franny and Zooey	J.D.	Salinger
Jazz	Toni	Morrison
Jazz	Toni	Morrison
Jazz	Toni	Morrison
Jazz	Toni	Morrison
Magic Terror	Peter	Straub
Nine Stories	J.D.	Salinger
Second Wind	Dick	Francis
The Catcher in the Rye	J.D.	Salinger
The Catcher in the Rye	J.D.	Salinger
The Edge	Dick	Francis
The Grapes of Wrath	John	Steinbeck
The Soul of a New Machine	Tracy	Kidder
The Stranger	Albert	Camus

11. Create a new table named FictionCopies using the data in the BookCode, Title, BranchNum, CopyNum, Quality, and Price columns for those books that have the type FIC. The newly created FictionCopies table should look like the table as shown below:

BookCode	Title	BranchNum	CopyNum	Quality	Price
0200	The Stranger	1	1	Excellent	8.00
0200	The Stranger	2	1	Excellent	8.00
0200	The Stranger	2	2	Fair	3.50
0200	The Stranger	2	3	Poor	2.25
138X	Beloved	2	1	Excellent	12.95
138X	Beloved	2	2	Excellent	12.95
138X	Beloved	2	3	Good	6.95
2766	Of Mice and Men	3	1	Excellent	7.95
2766	Of Mice and Men	3	2	Good	3.95
3743	Nine Stories	2	1	Excellent	5.99
…					

12. JM Bookshop is considering increasing the price of all copies of fiction books whose current price is under $10.00 and quality is Excellent by 10%. To determine the new prices for the copy, list the book title, branch number, copy number and increased price of every book (copy) with "Excellent" quality in the FictionCopies table as well as the copy's original price. (Your computed column should determine 110% of the current price, which is 100% plus a 10% increase.) The increased price column should be null for the copy who's quality is "Excellent" but price has no change.

Title	BranchNum	CopyNum	Quality	OldPrice	IncreasedPrice
The Stranger	1	1	Excellent	$8.00	8.8
The Stranger	2	1	Excellent	$8.00	8.8
Beloved	2	1	Excellent	$12.95	
Beloved	2	2	Excellent	$12.95	
Of Mice and Men	3	1	Excellent	$7.95	8.745
Nine Stories	2	1	Excellent	$5.99	6.589
Catch-22	4	1	Excellent	$12.00	
Jazz	2	1	Excellent	$12.95	
Jazz	2	2	Excellent	$12.95	
…					

13. List the BookCode and title of all books that are published by Vintage Books or that are available in the JM Brentwood branch or both.

BookCode	Title
0200	The Stranger
0378	Venice
079X	Second Wind
1351	Dreamcatcher: A Novel
2226	Harry Potter and the Prisoner of Azkaban
2766	Of Mice and Men
3906	The Soul of a New Machine
6128	Jazz
7405	East of Eden
7559	The Fall
8092	Godel, Escher, Bach
9627	Song of Solomon
9701	The Grapes of Wrath
9882	Slay Ride

14. List the title, publisher name, and author names of each book that has two authors. (assuming every book kept by ABC bookshop has maximum two authors)

title	PublisherName	AuthorLast	AuthorFirst
Treasure Chests	Taunton Press	O'Rourke	Randy
Treasure Chests	Taunton Press	Schleining	Lon
Van Gogh and Gauguin	Westview Press	Collins	Bradley
Van Gogh and Gauguin	Westview Press	Collins, Jr.	Bradley
Black House	Random House	Straub	Peter
Black House	Random House	King	Stephen

15. List the name of all publishers whose books are not available in any branch of the JM bookshop.

PublisherName
Arkham House
Arcade Publishing
Jeremy P. Tarcher
McPherson and Co.
Schoken Books
Thames and Hudson
W.W. Norton

16. List each branch name and the total cost of computers which are currently hired by employees worked at the branch.

Branch Name	Total Cost of Computers
JM Brentwood	$6518
JM Downtown	$5807
JM Eastshore	$1900
JM on the Hill	$6090

17. List the Comp_Num and the purchase year of computers that were purchased in 2008 or before and have not been hired by Marie Chopping or Ronald Smith.

Comp_Num	Year Purchased
I002	2008
I003	2007
I005	2008
I006	2006
I007	2007
I008	2003
I012	2008
I014	2003
I016	2005

18. List each branch name and the number of employees of the branch in an descending order of the number of employees.

Branch	Num of Employees
JM Downtown	5
JM Brentwood	5
JM on the Hill	3
JM Eastshore	3

19. List Book_Code and Book_Title of each book that is possessed by both branches; JM Brentwood and JM on the Hill.

Book_Code	Title
079X	Second Wind
1351	Dreamcatcher: A Novel
3906	The Soul of a New Machine
6128	Jazz
9701	The Grapes of Wrath

20. List all publishers that published any book of the branch that has the most books. Note: the branch that has the most books doesn't mean the branch that has the biggest number of copies but the branch that has the biggest number of different books.

Publisher_Name
Back Bay Books
Course Technology
Fawcett Books
Jove Publications
Lb Books
Penguin USA
Plume
Putnam Publishing Group
Scribner
Taunton Press
Touchstone Books
Vintage Books

Assignment #3 Database implementation and query formulation: Marking criteria

	Criteria	Marks
Task 1: Creating the database	ERD - Attributes (1 mark for each table - correct naming for each attribute)	9
	ERD - PKs (1 mark for each table – correct PK setting for each table)	9
	ERD – Relationships (1 mark for each relationship – correct FK setting, correct cardinality/optionality presentation, correct identifying/non-identifying setting)	8
	DB Attributes (1 mark for each table - correct name and data type for each attribute)	9
	DB PKs (1 mark for each table – correct PK setting for each table)	9
	DB Data (1 mark for each table – all data are inserted/imported correctly)	9
	DB Relationships (1 mark for each relationship – correct FK setting)	8
Task 2: Creating queries	Queries produce the correct results with correct logic (2 marks for each query)	40
	Total Marks	101

Your Assignment 3 mark (out of 15) = (Total marks /101) x 15