



University of Johannesburg
Academy of Computer Science & Software Engineering
IFM2A10: Informatics 2A – Database Design
Practical Assignment 9 (Due: 26 April 2016 @ 12h30 PM)

Assignment

Golden Gardens is local gardening service that is looking to upgrade their current operations by making use of a database to keep track of the teams, gardens, clients and billings of each client per/week.

Each garden is serviced by one or more teams. A team goes out to a particular garden on a certain day of the week. Each gardening team has a team leader. Every gardener earns R100 per day, except the team leader who earns a unique amount.

The report that the *Golden Gardens'* manager produced in Microsoft Excel is illustrated as a spreadsheet in Figure 1 below.

Day	Client Code	Client Name	Team ID	Members	Team Leader	Leader Wage	Total
Monday	C4	Aeliana Gebahard	T3	6	Jaymes Merrickson	R 350	R 850
	C10	Alfher Dareia	T1	6	Geoffrey Glover	R 250	R 750
	C8	Felina Diodotus	T2	5	Elmer Victorson	R 300	R 700
Tuesday	C9	Brutus Sigihild	T4	7	Norris Mamadou	R 400	R 1 000
	C5	Sigibert Quirinus	T3	6	Jaymes Merrickson	R 350	R 850
	C9	Brutus Sigihild	T2	5	Elmer Victorson	R 300	R 700
	C10	Alfher Dareia	T5	5	Duncan Gardyner	R 450	R 850
	C7	Servius Ambrosia	T1	6	Geoffrey Glover	R 250	R 750
Wednesday	C10	Alfher Dareia	T2	5	Elmer Victorson	R 300	R 700
	C10	Alfher Dareia	T3	6	Jaymes Merrickson	R 350	R 850
	C1	Nikolaos Gallus	T4	7	Norris Mamadou	R 400	R 1 000
	C3	Amalia Prochoros	T2	5	Elmer Victorson	R 300	R 700
Thursday	C8	Felina Diodotus	T3	6	Jaymes Merrickson	R 350	R 850
	C2	Hariwini Agrippa	T4	7	Norris Mamadou	R 400	R 1 000
	C9	Brutus Sigihild	T2	5	Elmer Victorson	R 300	R 700
	C5	Sigibert Quirinus	T2	5	Elmer Victorson	R 300	R 700
Friday	C6	Artemisia Hippolytos	T3	6	Jaymes Merrickson	R 350	R 850
	C8	Felina Diodotus	T2	5	Elmer Victorson	R 300	R 700
	C4	Aeliana Gebahard	T1	6	Geoffrey Glover	R 250	R 750
	C9	Brutus Sigihild	T1	6	Geoffrey Glover	R 250	R 750
	C7	Servius Ambrosia	T4	7	Norris Mamadou	R 400	R 1 000
	C2	Hariwini Agrippa	T3	6	Jaymes Merrickson	R 350	R 850

Figure 1: Golden Gardens' management report

Questions

1. Illustrate the concept of Normalization by means of a dependency diagram that shows how the spreadsheet in Figure 1 would look in Third-Normal-Form.
 - You may use any **diagramming** tool to draw the ER diagram. No hand drawn diagrams will be accepted.
 - You must upload all designs and illustrations, along with your database, to EVE. Digital illustrations must be either in PDF or (JPG / PNG) image formats, **no other formats will be accepted.**
 - Paper submissions will not be accepted.
2. Illustrate a **conceptual design** of the database that needs to be built for *Golden Gardens* by means of an ER Diagram that reflects the **dependency diagram** produced in Question 1. **Show the data types of all attributes in your entities.**
 - You may use any **diagramming** tool to draw the ER diagram. No hand drawn diagrams will be accepted.
 - **DBMS-created diagrams are not allowed!** (i.e. – the diagrams MS Access generates for you are not allowed)
 - **Allowed notations: Crow's foot, Chen Model and UML.**
 - You must upload all designs and illustrations, along with your database, to EVE. Digital illustrations must be either in PDF or (JPG / PNG) image formats, **no other formats will be accepted.**
 - **Paper submissions will not be accepted.**
3. Implement the designed database using **Microsoft Access.**
 - Implement all tables and relationships using SQL.
 - Save all SQL statements for the creation of all tables and relationships.
4. Enter the data that is in the spreadsheet illustrated in Figure 1 to prove that your database is appropriately designed. You may enter the data directly into Microsoft Access, **therefore you don't need to write INSERT statements.**
 - Add **ALL** of the records that are shown in the spreadsheet above accurately.
 - You may make assumptions regarding the datatypes of the attributes that have not been displayed in the spreadsheet.

Questions (cont.)

5. To prove that the database you have implemented will meet the needs of *Golden Gardens*, you are required to write an **SQL statement** that will produce the report shown in Figure 1 with **all columns** as they are illustrated.
 - Implement and save this SQL statement with the use of a **single query**.
 - **Do not** make use of the **WHERE** clause within your SQL Statement.
6. Write an SQL query to calculate how much each client must pay every week.

You must upload all designs and illustrations, along with your database, to EVE. Digital illustrations must be either in PDF or image format. Paper submissions will NOT be accepted.

Instructions

- This solution must be implemented in Microsoft Access.
- Name all queries according to their question number. For example:
 - Question A as “**A**”
 - Question B1 as “**B1**”
 - etc.
- Submission details are outlined in the General Undergraduate Learning Guide. Please ensure that the submission complies with the instructions therein.
- Submit and upload a text file (extension: .txt) that adheres to the following rules:
 - Name your text file using your Student Number, Initials, Surname and Practical number.
 - E.g. 2014000001_A_SOMEONE_P04.txt
 - Include in your text file all your student details (Student Number, Initials, Surname and Practical number.)
 - Copy all your queries to the text file.
 - Use the Question Number as a heading for each query or set of queries.

Mark Allocation

Question 1 – Dependency Diagram	0 – 3	4 – 7	8 – 10
Table Structure	No or some attributes identified. No or only one attribute used as Primary Key identified	Most necessary attributes identified. Composite primary key identified without surrogate key	All basic attributes identified with some additional attributes identified for extra detail. Composite primary key identified with two surrogate attributes.
Dependencies	No or only a few dependencies identified	Most desired dependencies as well as all less desired (partial and transitive) dependencies identified	All desired dependencies as well as all less desired (partial and transitive) dependencies identified
Question 2 – ER Diagram	0 – 3	4 – 6	7 – 10
Entities formed	Wrong or no appropriate entities added	Most entities defined	All entities defined
Entity relationships	No or some relationships shown	Most relationships shown with correct attributes	Most relationships shown with correct attributes and correct multiplicity
Attributes	Some correct attributes assigned to entities	Most necessary attributes assigned to new entity	All necessary attributes assigned and keys assigned
Question 3 – MS Access Implementation	0 – 3	4 – 6	7 – 10
Entities and relationships implemented	No connection between implementation and conceptual design	Entities and relationships implemented correctly according to conceptual design	All entities and relationships implemented correctly
Question 4 – Minimum Data Requirements	0 – 2	3 – 9	10
Data in MS Access Database	Few, but close to no data	Some data entered, but not all data requested	All data shown on spreadsheet entered correctly
Question 5 – Query	10		
Question 6 – Query	10		

Total: 90 Marks