

### Syllabus

#### Course Overview

No matter where you go or what you do, you are surrounded by the inner workings of database systems (DBS). In this course, you will learn the basics of database systems, otherwise known as database management systems (DBMS).

This course will introduce you to:

- The basic vocabulary and components of database management systems.
- How a DBMS is designed.
- The life cycle of a DBMS.

#### Course Competencies

(Read Only)

To successfully complete this course, you will be expected to:

- 1 Describe the database component requirements using appropriate terminology.
- 2 Describe the database system life cycle.
- 3 Develop a simple relational database.
- 4 Perform simple database manipulations.
- 5 Communicate effectively.

#### Course Prerequisites

*There are no prerequisites for this course.*



The materials listed below are required to complete the learning activities in this course.

## Integrated Materials

Many of your required books are available via the VitalSource Bookshelf link in the courseroom, located in your Course Tools. Registered learners in a Resource Kit program can access these materials using the courseroom link on the Friday before the course start date. Some materials are available only in hard-copy format or by using an access code. For these materials, you will receive an email with further instructions for access. Visit the [Course Materials](#) page on Campus for more information.

### Book

Dyer, R. J. T. (2015). *Learning MySQL and MariaDB: Heading in the right direction with MySQL and MariaDB*. Sebastopol, CA: O'Reilly Media. ISBN: 9781449362904.

## External Resource

Please note that URLs change frequently. While the URLs were current when this course was designed, some may no longer be valid. If you cannot access a specific link, contact your instructor for an alternative URL. Permissions for the following links have been either granted or deemed appropriate for educational use at the time of course publication.

- MariaDB Foundation. (2016). [Alter table](https://mariadb.com/kb/en/mariadb/alter-table/). Retrieved from <https://mariadb.com/kb/en/mariadb/alter-table/>
- MariaDB Foundation. (2016). [Backup and restore overview](https://mariadb.com/kb/en/mariadb/backup-and-restore-overview/). Retrieved from <https://mariadb.com/kb/en/mariadb/backup-and-restore-overview/>
- MariaDB Foundation. (2016). [mysqldump](https://mariadb.com/kb/en/mariadb/mysqldump/). Retrieved from <https://mariadb.com/kb/en/mariadb/mysqldump/>
- MariaDB Foundation. (2019). [Mysql command-line client](https://mariadb.com/kb/en/library/mysql-command-line-client/). Retrieved from <https://mariadb.com/kb/en/library/mysql-command-line-client/>
- MariaDB Foundation. (n.d.). [Library](https://mariadb.com/kb/en/library/). Retrieved from <https://mariadb.com/kb/en/library/>
- [MariaDB Foundation](http://mariadb.org/). (n.d.). Retrieved from <http://mariadb.org/>
- MYSQL Tutorial. (n.d.). [MYSQL foreign key](http://www.mysqltutorial.org/mysql-foreign-key/). Retrieved from <http://www.mysqltutorial.org/mysql-foreign-key/>
- MySQL Tutorial. (n.d.). [MySQL primary key](http://www.mysqltutorial.org/mysql-primary-key/). Retrieved from <http://www.mysqltutorial.org/mysql-primary-key/>
- SQLCourse.com. (n.d.). [Creating tables](http://www.sqlcourse.com/create.html). Retrieved from <http://www.sqlcourse.com/create.html>
- SQLCourse.com. (n.d.). [Deleting records](http://www.sqlcourse.com/delete.html). Retrieved from <http://www.sqlcourse.com/delete.html>
- SQLCourse.com. (n.d.). [Drop a table](http://www.sqlcourse.com/drop.html). Retrieved from <http://www.sqlcourse.com/drop.html>
- SQLCourse.com. (n.d.). [Inserting into a table](http://www.sqlcourse.com/insert.html). Retrieved from <http://www.sqlcourse.com/insert.html>
- SQLCourse.com. (n.d.). [Selecting data](http://www.sqlcourse.com/select.html). Retrieved from <http://www.sqlcourse.com/select.html>
- SQLCourse.com. (n.d.). [Table basics](http://www.sqlcourse.com/table.html). Retrieved from <http://www.sqlcourse.com/table.html>
- SQLCourse.com. (n.d.). [Updating records](http://www.sqlcourse.com/update.html). Retrieved from <http://www.sqlcourse.com/update.html>
- SQLCourse.com. (n.d.). [What is SQL?](http://www.sqlcourse.com/intro.html) Retrieved from <http://www.sqlcourse.com/intro.html>
- w3schools.com. (n.d.). [SQL joins](https://www.w3schools.com/sql/sql_join.asp). Retrieved from [https://www.w3schools.com/sql/sql\\_join.asp](https://www.w3schools.com/sql/sql_join.asp)

## Suggested

The following materials are recommended to provide you with a better understanding of the topics in this course. These materials are not required to complete the course, but they are aligned to course activities and assessments and are highly recommended for your use.

## Optional

The following optional materials are offered to provide you with a better understanding of the topics in this course. These materials are not required to complete the course.

## Unit 1 >> Getting Started With Databases and Structured Query Language

### Introduction

Databases are a critical part of the world in which we work and live. They facilitate the transformation and organization of oceans of raw data into information with a meaning that allows us to understand the facts and act upon them.

The database system stores both the user's data and the metadata (data about data) that allows the storage and manipulation of that data. The database management system (DBMS) is a collection of programs and utilities that manage the structure of the data and control access to it.

In this unit, you get initial hands-on experience with a database (MariaDB) and the Structured Query Language (SQL) that allows you to interact with it.

This week you will:

- Participate in a discussion on the Database System Life Cycle.
- Download and install [MariaDB](#) software on your computer.
- Practice running SQL commands from chapter 3 of Dyer's Learning MySQL and MariaDB textbook.
- Complete exercises 1–3 at the end of Chapter 3 of Dyer's Learning MySQL and MariaDB textbook.

This week will be an introduction to MariaDB and the Structured Query Language (SQL). You will begin by downloading and installing MariaDB on your computer and then getting some hands-on experience with the MySQL command line client by running some basic SQL commands from chapter 3 of the Dyer's *Learning MySQL and MariaDB* textbook.

The following resources may be helpful as you proceed through this week's activities:

- Dyer, R. J. T. (2015). *Learning MySQL and MariaDB: Heading in the right direction with MySQL and MariaDB*. Sebastopol, CA: O'Reilly Media.
  - Foreword (Explains origins and relationship between MySQL and MariaDB).
  - Chapter 1, "Introduction."

- Chapter 2, "Installing MySQL and MariaDB."
- Chapter 3, "The Basics and the MySQL Client."

If you encounter any difficulties in the download and installation process, post a detailed question in the Ask Your Instructor section of the course. Your instructor should be able to help you or point you in the right direction for the answers you need.

## Learning Activities

### u01s1 - Software Preparation and Technology Access

In this course, you will be using software and technology that is needed to complete designated activities and assignments. There is no additional cost for this software and technology. Some software packages will be made available to you at no additional cost through Capella's subscription with Microsoft, while other software packages are available for free download through open-source licensing.

Capella University requires learners to meet certain minimum [computer requirements](#). Please note that some software required for a course may exceed these minimum requirements. Check the requirements for the software you may need to download and install to make sure it will work on your device. Most software will require a Windows PC. If you use a Mac, refer to [Installing a Windows Virtual Environment](#).

The software and technologies below are strongly recommended to support you in completing the course objectives. If you have access to other tools that you believe may still meet the requirements of this course, please discuss your selected alternatives with your instructor.

If you use assistive technology or any alternative communication methods to access course content, please contact [Disability Services](#) with any access-related questions or to request accommodations.

For this course, follow the instructions provided through the links below to download and install software or register for an account, as required.

## Open-Source Software

- **MariaDB:** Go to Capella's [MariaDB](#) page and follow the installation instructions.
- **Microsoft Software:**
  - Visit Capella's [Microsoft Office Software](#) page for instructions on obtaining free Microsoft software. Find your IT-specific resources at [Courseroom Software Resources](#).
  - Identify the version of MS Visio, Project, Access, Visual Studio Enterprise, SQL Server, et cetera that is compatible with your operating system.
  - Download and install.

If you encounter any difficulties in the download and installation process, post a detailed question in the Ask Your Instructor section of the course. Your instructor should be able to help you or point you in the right direction for the

answers you need.

## u01s2 - Studies

## Reading

Access your eBook for your learning activities:

- Dyer, R. J. T. (2015). *Learning MySQL and MariaDB: Heading in the right direction with MySQL and MariaDB*. Sebastopol, CA: O'Reilly Media.
  - Chapter 1, "Introduction."
  - Chapter 2, "Installing MySQL and MariaDB."
  - Chapter 3, "The Basics and the MySQL Client."

## Terms and Definitions

Become familiar with the following vocabulary that will be used throughout this course.

- **MariaDB** – an open source relational database management system built by the original developers of MySQL.
- **MySQL** – an open source relational database management system.
- **MySQL Client** – a program that interfaces with the database server.
- **Open Source** – a program whose source code is available for modification and redistribution at no cost to users and developers.
- **Relational Database** – a database that stores data in a structured format, using columns and rows.
- **SQL** – (Structured Query Language); a language used to manipulate and access a database.
- **Tee** – a MySQL command that sends database output to both your monitor and a text file.

## Internet Resources

Access the following Internet resources by clicking the links provided. Please note that URLs change frequently. Permissions for the following links have been either granted or deemed appropriate for educational use at the time of course publication.

- [MariaDB Foundation](http://mariadb.org/). (n.d.). Retrieved from <http://mariadb.org/>
- MariaDB Foundation. (n.d.). [Library](https://mariadb.com/kb/en/library/). Retrieved from <https://mariadb.com/kb/en/library/>
- SQLCourse.com. (n.d.). [Table basics](http://www.sqlcourse.com/table.html). Retrieved from <http://www.sqlcourse.com/table.html>
- MariaDB Foundation. (2019). [Mysql command-line client](https://mariadb.com/kb/en/library/mysql-command-line-client/). Retrieved from <https://mariadb.com/kb/en/library/mysql-command-line-client/>
- SQLCourse.com. (n.d.). [What is SQL?](http://www.sqlcourse.com/intro.html) Retrieved from <http://www.sqlcourse.com/intro.html>

## u01s3 - Optional – Help With Academic Skills

During this course and throughout your academic journey, you will be expected to communicate effectively in your assignments and discussions. Effective communication includes the use of APA formatting, writing in a professional manner, and the submission of work without grammar and spelling errors.

Refer to the [Academic Skills](#) page on Campus for help with writing, APA style and format, and more.

## u01a1 - First Steps With SQL

### Overview

This assignment will not only help you better understand database concepts by introducing you to MariaDB and the MySQL command line client, but it will also give you the opportunity to practice basic SQL statements. In preparing to complete this assignment, be sure to review and practice the SQL commands presented in Chapter 3 of Dyer's *Learning MySQL and MariaDB*.

### Instructions

Your assignment will be scored on the following criteria. You will use the Weekly Solutions Submission Template to submit your assignment.

Use the Capella library or the Internet to research the Database System Life Cycle. Find at least two references and cite them. Note that the names and wording in the steps of the life cycle may superficially vary between different sources. Focus on understanding the concepts presented, rather than the language.

1. Using the MySQL command line client, log in to MariaDB and complete exercises 1–3 at the end of Chapter 3 of Dyer's *Learning MySQL and MariaDB*.
  - Save the SQL statements and results to a text file using the MySQL tee command.
  - Take screenshots of your SQL statements and results for each exercise to be included in the Weekly Solutions Submission Template.

2. Reflecting on this assignment, summarize the steps taken to complete the assignment and any issues you encountered.
3. The Database System Life Cycle, otherwise known as the System Development Life Cycle (SDLC), consists of five important steps:
  - Investigation.
  - System Design.
  - Development.
  - Execution.
  - Maintenance.
4. Summarize each Database System Life Cycle step and describe how they work together.
5. Explain how you have used, or can use, the Life Cycle in another context. For example, how can these steps be used when buying a car or planning a trip?
6. Use a table to show parallels between developing a database and performing the task you chose.
7. Use the Weekly Solutions Submission Template in the Resources. Your writing should be generally free from spelling, grammatical, or other mechanical errors.

Submit your completed document in the assignment area.

#### Course Resources

Weekly Solutions Submission Template

[Introduction to the Writing Center](#)

[APA Style and Format](#)

[MariaDB](#)

### u01d1 - First Attempts at Working With the Client and MariaDB

Work through at least some of the SQL commands in Chapter 3 of Dyer's *Learning mySQL and MariaDB* (you will need to run all of them for Part 1 of the assignment).

Discuss your initial experience with working with MariaDB in the command line environment. Summarize what you have tried and describe your experience. Be sure to use terminology from the study assignment correctly. What issues did you run into and what questions do you have at this point?

## Response Guidelines



After posting your discussion, provide a substantive response to at least two other learners. Consider the insights, comments, or questions raised as a result of the posts of your peers. Be sure to reference sources as appropriate in supporting your views.

Course Resources
Undergraduate Discussion Participation Scoring Guide
<a href="#">APA Style and Format</a>

**u01d2 - Database System Life Cycle**

Thinking about the research you have completed on the database life cycle for this week’s assignment, discuss how the different stages (Investigation, System Design, Development, Execution, and Maintenance) will be involved in the implementation of your volunteer database.

**Response Guidelines**

After posting your discussion, provide a substantive response to at least two other learners. Consider the insights, comments, or questions raised as a result of your peers' posts. Be sure to reference sources as appropriate in supporting your views.

Course Resources
Undergraduate Discussion Participation Scoring Guide
<a href="#">APA Style and Format</a>

**Unit 2 >> Creating a Table, Inserting Data, and Simple Queries**

**Introduction**

This week you will:

- Participate in a discussion about data normalization.
- Use the SQL Create table statement to create the initial table for the Volunteer Database.
- Use the SQL INSERT INTO statement to populate your person table with information for ten volunteers.
- Use SQL SELECT statements with ORDER BY clauses to sort query results.

This week builds upon the concepts introduced in Unit 1. We learn that gathering the data—the raw facts—and organizing it into database tables is the first step in creating a useful database. This week we will practice the entire process of setting up database tables, inserting records, and then retrieving data by running basic SQL queries.

The following resources will help you learn about or review SQL basics in preparation for this week's activities:

- Dyer, R. J. T. (2015). *Learning MySQL and MariaDB: Heading in the right direction with MySQL*. Sebastopol, CA: O'Reilly.
  - The following chapters cover SQL basic commands:
    - Chapter 4, "Creating Databases and Tables."
    - Chapter 6, "Inserting Data."
    - Chapter 7, "Selecting Data."

## Learning Activities

### u02s1 - Studies

## Reading

Access your eBook for your learning activities:

- Dyer, R. J. T. (2015). *Learning MySQL and MariaDB: Heading in the Right Direction with MySQL*. Sebastopol, CA: O'Reilly.
  - Chapter 4, "Creating Databases and Tables."
  - Chapter 6, "Inserting Data."
  - Chapter 7, "Selecting Data."

## Terms and Definitions

Become familiar with the following vocabulary:

- **Data normalization** – is the process of organizing data to minimize data redundancy and usually involves dividing a database into two or more tables and defining relationships between the database tables.
- **SQL SELECT statements** – retrieve data from a database table or tables according to clauses (i.e. FROM, JOIN, and WHERE).
- **SQL INSERT INTO statements** – are used to add new rows of data to database tables.
- **SQL UPDATE statements** – are used to modify data in a database table.

- **SQL DELETE statements** – are used to delete rows of data from a table, entire database tables, and even entire databases.

## Internet Resources

Access and review the following resources by clicking the links provided. Note that because MariaDB has branched off the MySQL database, just about any MySQL resources are useful when working with MariaDB.

- SQLCourse.com. (n.d.). [Creating tables](http://www.sqlcourse.com/create.html). Retrieved from <http://www.sqlcourse.com/create.html>
- SQLCourse.com. (n.d.). [Inserting into a table](http://www.sqlcourse.com/insert.html). Retrieved from <http://www.sqlcourse.com/insert.html>
- SQLCourse.com. (n.d.). [Selecting data](http://www.sqlcourse.com/select.html). Retrieved from <http://www.sqlcourse.com/select.html>
- MySQL Tutorial. (n.d.). [MySQL primary key](http://www.mysqltutorial.org/mysql-primary-key/). Retrieved from <http://www.mysqltutorial.org/mysql-primary-key/>
- MYSQL Tutorial. (n.d.). [MYSQL foreign key](http://www.mysqltutorial.org/mysql-foreign-key/). Retrieved from <http://www.mysqltutorial.org/mysql-foreign-key/>

### u02a1 - Creating the Initial Table for the Volunteer Database

## Overview

Through the remaining assignments in the course, you will be creating a simple database for tracking information about volunteers working and raising money for a community organization. This assignment requires you to create the initial table, called PERSON, to hold basic information about individual volunteers. You will be refining the design and building the database in the assignments for upcoming units.

## Instructions

Your assignment will be scored on the following criteria. You will use the Weekly Solutions Submission Template to submit your assignment.

1. Think about the design of the table to hold a volunteer's ID number, name, mailing address, phone number, email address, and three more fields of your choice.
  - Briefly summarize (2–3 paragraphs) your design for this table.
  - Explain your decisions about the structure of the table and the data types used.
  - Discuss how you would go about gathering and normalizing the information that you need for putting the volunteer database together and how that fits into the database life cycle. Consider your vocabulary and communication style in your response. Your target audience would be the volunteer organization's leadership.
2. Write a SQL statement to create a new database named VOLUNTEER.

- Save your SQL to a text file using the **MySQL tee** command and document the process with screenshots.

3. Write a SQL table creation statement and run it to create the PERSON in your database (as noted above).
  - After creating the table, write and run SQL statements to insert rows in the table for 10 volunteers.
  - Save your SQL to a text file using the **MySQL tee** command and document the process with screenshots.
4. Write a SQL creation table statement and run it to create a PERSON table in your database (as discussed above)
  - After creating the table, write and run SQL statements to insert rows in the table for 10 volunteers.
  - Save your SQL to a text file using the **MySQL tee** command and document the process with screenshots.
5. Submit the Weekly Solutions Submission Template in the Resources area. Your writing should be generally free from spelling, grammatical, or other mechanical errors.

Submit your completed document in the assignment area.

#### Course Resources

Weekly Solutions Submission Template

[APA Style and Format](#)

[Introduction to the Writing Center](#)

## u02d1 - Data Gathering and Normalization

Imagine you have been hired to develop a database to track volunteers who work and raise funds for a local community organization. Discuss data gathering process for the volunteer organization. Discuss how to approach the design of the tables and normalize the data acquired. Provide your proposed table structure as a table or a diagram.

## Response Guidelines

After posting your discussion, provide a substantive response to at least two other learners. Consider the insights, comments, or questions raised as a result of your peers' posts. Be sure to reference sources as appropriate in supporting your views.

## Unit 3 >> Database Backup and Modifying Data

### Introduction

This week you will:

- Participate in a discussion about database backups.
- Use the mysqldump command line tool to backup the data in your Volunteer database.
- Create three new tables (ADDRESS, PHONE, and EMAIL) for your volunteer database. These new tables will hold the street address, phone number, and email address for each volunteer.
- Use the SQL INSERT INTO statement to populate your new tables with information for the volunteers in the PERSON table.
- Modify the PERSON table to remove the columns for the data moved to the new tables.

This week, we will learn how to backup our volunteer database by using the command-line utility mysqldump.exe. After you have a database backup, you will then practice database normalization by splitting the PERSON table into smaller tables containing the contact information of our volunteers.

The following resources will help you learn about or review the SQL database backup process and database modifications in preparation for this week's activities:

- Dyer, R. J. T. (2015). *Learning MySQL and MariaDB: Heading in the right direction with MySQL and MariaDB*. Sebastopol, CA: O'Reilly Media.
  - The following chapters cover SQL basic commands:
    - Chapter 14, "Backing Up and Restoring Databases."
    - Chapter 5, "Altering Tables."
    - Chapter 8, "Updating and Deleting Data."

### Learning Activities

### u03s1 - Studies

### Reading

Access your eBook for your learning activities:

- Dyer, R. J. T. (2015). *Learning MySQL and MariaDB: Heading in the right direction with MySQL and MariaDB*. Sebastopol, CA: O'Reilly Media.
  - Chapter 14, "Backing Up and Restoring Databases."
  - Chapter 5, "Altering Tables."
  - Chapter 8, "Updating and Deleting Data."

## Terms and Definitions

Review the following vocabulary:

- **Database backup** – a copy of the data in a database that can be used to reconstruct that data.
- **Database restore** – the process of restoring the data in a database from a database backup file. You can restore all of the databases, a single database, individual tables, or even specific rows of data.
- **Database Backup Policy** – a defined schedule of data to be backed up to ensure data availability and recoverability to protect against accidental deletion, corrupted information, or a system outage.
- **mysqldump utility** – a free utility included with MySQL and MariaDB that is used to make backup copies of database data.
- **Primary key** – uniquely identifies a record in the database table. Cannot accept NULL values. A database table can only have one Primary key.
- **Foreign key** – a field (or collection of fields) in the table that refers to the Primary key in another table, and is used to link two tables together.

## Internet Resources

Access the following Internet resources by clicking the links provided. Please note that URLs change frequently. Permissions for the following links have been either granted or deemed appropriate for educational use at the time of course publication.

- MariaDB Foundation. (2016). [Backup and restore overview](https://mariadb.com/kb/en/mariadb/backup-and-restore-overview/). Retrieved from <https://mariadb.com/kb/en/mariadb/backup-and-restore-overview/>
- MariaDB Foundation. (2016). [mysqldump](https://mariadb.com/kb/en/mariadb/mysqldump/). Retrieved from <https://mariadb.com/kb/en/mariadb/mysqldump/>
- MariaDB Foundation. (2016). [Alter table](https://mariadb.com/kb/en/mariadb/alter-table/). Retrieved from <https://mariadb.com/kb/en/mariadb/alter-table/>
- SQLCourse.com. (n.d.). [Updating records](http://www.sqlcourse.com/update.html). Retrieved from <http://www.sqlcourse.com/update.html>
- SQLCourse.com. (n.d.). [Deleting records](http://www.sqlcourse.com/delete.html). Retrieved from <http://www.sqlcourse.com/delete.html>
- SQLCourse.com. (n.d.). [Drop a table](http://www.sqlcourse.com/delete.html). Retrieved from <http://www.sqlcourse.com/delete.html>

# Overview

Through the remaining assignments due in this course, you will be creating a simple database for tracking information about volunteers working and raising money for a community organization. This assignment requires that you create the initial table, called PERSON, to hold basic information about volunteers. You will be redefining the design and building the database in the upcoming unit assignments.

## Instructions

Your assignment will be scored on the following criteria. You will use the Weekly Solutions Submission Template to submit your assignment.

1. Use the **mysqldump.exe** command line tool to backup the data in your volunteer database.
  - To access the **mysqldump.exe** tool, start the MySQL command line tool.
  - Use the **quit** command to exit to the system command prompt.
  - Run **mysqldump.exe** and direct the output of the backup to an appropriately named file.
  - Create a new database and restore the database from the backup to the new database. Submit a screenshot to document the restoration of the data to a new database.
2. Write SQL CREATE TABLE statements and run them to create three new tables (ADDRESS, PHONE, AND EMAIL) to split out the contact information for your volunteers that is currently contained in the PERSON table.
  - Each table should have a unique primary key and foreign key constraint reference to the PERSON table.
  - Save your SQL statements to a text file using the **MySQL tee** command and document the process with screenshots.
3. After creating the new tables (in Step 2), write and run SQL to insert the relevant data for the volunteers in the new tables.
  - Save your SQL statements to a text file using the **MySQL tee** command and document the process with screenshots.
4. Modify the PERSON table using the ALTER TABLE statement to remove the columns for the data moved to the new tables.
  - Save your SQL statements to a text file using the **MySQL tee** command and document the process with screenshots.
5. Use the Weekly Solutions Submission Template in the Resources area. Your writing should be generally free from spelling, grammatical, or mechanical errors.

Submit your completed document in the assignment area.

### Course Resources

Weekly Solutions Submission Template

[APA Style and Format](#)

[Introduction to the Writing Center](#)

## u03d1 - Database Backup Policy and Process

Discuss database backup policy and the backup process. Develop a backup policy for the community organization's volunteer database and describe the backup process.

## Response Guidelines

After posting your discussion, provide a substantive response to at least two other learners. Consider the insights, comments, or questions raised as a result of your peers' posts. Be sure to reference sources as appropriate in supporting your views.

### Course Resources

Undergraduate Discussion Participation Scoring Guide

[APA Style and Format](#)

## Unit 4 >> Joins and Subqueries

### Introduction

This week you will:

- Participate in a discussion about SQL JOIN clauses and SQL subqueries.
- Create two additional tables for the volunteer database to track hours worked per week by the volunteers and amounts of funds raised.
- Create SQL queries with JOIN clauses to retrieve information for all volunteers.



This week, we will learn how to produce complex pictures of the data in the Volunteer database by combining data from multiple tables in our SQL queries by using SQL JOINS clauses and SQL subqueries.

For information on SQL JOINS and subqueries to prepare for this week's activities, refer to the following resources:

- Dyer, R. J. T. (2015). *Learning MySQL and MariaDB: Heading in the right direction with MySQL and MariaDB*. Sebastopol, CA: O'Reilly Media.
  - The following chapter covers SQL JOINS and subqueries:
    - Chapter 9, "Joining and Subquerying Data."

## Learning Activities

### u04s1 - Studies

## Reading

Access your eBook for your learning activities:

- Dyer, R. J. T. (2015). *Learning MySQL and MariaDB: Heading in the right direction with MySQL and MariaDB*. Sebastopol, CA: O'Reilly Media.
  - Chapter 9, "Joining and Subquerying Data."

## Terms and Definitions

Review the following vocabulary:

- **JOIN** – Combines rows from two or more database tables, using a related column between them.
- **INNER JOIN** – Returns all rows having matching values in both tables.
- **LEFT OUTER JOIN** – Returns all rows from the left table, and matching rows from the right table.
- **RIGHT OUTER JOIN** – Returns all rows from the right table, and matching rows from the left table.

## Internet Resources

Access and review the following Internet resource. Please note that URLs change frequently. Permissions to the following link has been either granted or deemed appropriate for educational use at the time of course publication.

- w3schools.com. (n.d.). [SQL joins](https://www.w3schools.com/sql/sql_join.asp). Retrieved from [https://www.w3schools.com/sql/sql\\_join.asp](https://www.w3schools.com/sql/sql_join.asp)

# Overview

For this assignment, you will add two additional tables to track hours worked per week by the volunteers and amounts of funds raised each week. You will then create SQL queries with JOIN clauses to retrieve information for all volunteers.

Remember to design the new tables with appropriate primary and foreign keys so you can relate these records to volunteers in the PERSON table. Each table should include an ID column as the primary key and a column to hold a date to identify the start of the week.

# Instructions

Your assignment will be scored on the following criteria. You will use the Weekly Solutions Submission Template to submit your assignment.

1. Create a new table named HOURS for your volunteer database. The HOURS table will be used to track hours worked per week by the volunteers.
  - Write and run SQL INSERT statements to insert at least 10 rows of data into the HOURS table.
2. Create a new table named FUNDS for your volunteer database. The FUNDS table will be used to track amount of funds raised per week by the volunteers.
  - Write and run SQL INSERT statement to insert at least 10 rows of data into the FUNDS table.
3. Write and run SQL INSERT statements to insert rows in each new table for 10 volunteers.
4. Save your SQL statements to a text file using the **MySQL tee** command and document the process with screenshots.
5. Reflecting on this assignment, summarize the steps taken to complete the assignment and any issues you encountered.
6. Use the Weekly Solutions Submission Template in the Resources. Your writing should be generally free from spelling, grammatical, or other mechanical errors.

Submit your completed document in the assignment area.

### Course Resources

Weekly Solutions Submission Template

[Introduction to the Writing Center](#)

[APA Style and Format](#)

## u04d1 - Using JOIN Queries to Combine Data From DB Tables

Discuss the use of joins and subqueries to produce more complex pictures of the data. Describe at least three JOIN queries that will provide useful reports from the data in the volunteer database.

### Response Guidelines

After posting your discussion, provide a substantive response to at least two other learners. Consider the insights, comments, or questions raised as a result of your peers' posts. Be sure to reference sources as appropriate in supporting your views.

Course Resources
Undergraduate Discussion Participation Scoring Guide
<a href="#">APA Style and Format</a>

## Unit 5 >> SQL Functions and Aggregates

### Introduction

This week you will:

- Participate in a discussion about SQL functions.
- Participate in a second discussion reflecting on your experience of building the volunteer database.
- Complete an assignment on SQL function.

In this final unit, you will learn about some SQL functions that are useful for working with strings, dates, and numbers.

For information on SQL JOINS and subqueries to prepare for this week's activities, read:

- Dyer, R. J. T. (2015). *Learning MySQL and MariaDB: Heading in the right direction with MySQL and MariaDB*. Sebastopol, CA: O'Reilly Media.
  - The following chapters cover SQL JOINS and subqueries:
    - Chapter 10, "String Functions."
    - Chapter 11, "Date and Time Functions."

- Chapter 12, "Aggregate and Numeric Functions."

## Learning Activities

### u05s1 - Studies

## Reading

Access your eBook for your learning activities:

- Dyer, R. J. T. (2015). *Learning MySQL and MariaDB: Heading in the right direction with MySQL and MariaDB*. Sebastopol, CA: O'Reilly Media.
  - Chapter 10, "String Functions."
  - Chapter 11, "Date and Time Functions."
  - Chapter 12, "Aggregate and Numeric Functions."

## Terms and Definitions

Review the following vocabulary:

- **Built-In Functions** – SQL functions built into MariaDB and available for use in SQL Statements. MariaDB has three main groups of built-in functions: string, date and time, and numeric.
- **String functions** – SQL functions used to convert and format text.
- **Date and Time functions** – SQL functions used to retrieve and format date and time values.
- **Numeric or Arithmetic functions** – SQL functions used to perform calculations on data.

### u05a1 - SQL Functions

## Overview

For this final assignment, you will practice using built-in SQL functions to INSERT data into a new table, and SELECT data from tables for reporting purposes.

*Note:* Remember to design the new table with appropriate primary and foreign keys so you can relate these records to volunteers in the Person table. Each table should include an ID column as the primary key.

## Instructions

Your assignment will be scored on the following criteria. You will use the Weekly Solutions Submission Template to submit your assignment.

1. Create a new table named USERS for your volunteer database. The USERS table will be used to store a USERNAME for each volunteer.
2. Use an INSERT INTO statement with a subquery containing a SQL string function to create user names for the volunteers based on their legal names and insert them into the table.
  - *Hint:* Take a look at the CONCAT() and SUBSTRING() functions.
3. Use SQL aggregate functions such as COUNT(), MIN(), and MAX() and write three queries to report on various aspects of the organization's volunteers.
4. Save your SQL statements for Steps 1–3 to a text file using the **MySQL tee** command and document the process with screenshots.
5. Review and reflect on all of the work you have completed this quarter.
  - Briefly summarize in 2–3 paragraphs the key components of the volunteer database.
  - Discuss how the database life cycle has progressed through the phases of Investigation, System Design, Development, Execution, and Maintenance.
6. Use the Weekly Solutions Submission Template in the Resources. Your writing should be generally free from spelling, grammatical, or other mechanical errors.

Submit your completed document in the assessment area.

Course Resources
Weekly Solutions Submission Template
<a href="#">APA Style and Format</a>
<a href="#">Introduction to the Writing Center</a>

u05d1 - Working With SQL Functions

Discuss how you will use some of the SQL functions you have read about in SQL queries to generate reports on the data in the volunteer database. Identify one or two common reports that may be valuable to display information from the volunteer database and post your SQL query that will be used to generate the report.

Response Guidelines

After posting your discussion, provide a substantive response to at least two other learners. Consider the insights, comments, or questions raised as a result of your peers' posts. Be sure to reference sources as appropriate in supporting your views.

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**u05d2 - Reflection: Building the Volunteer Database**

Reflect on the process of building the volunteer database that you have worked through over the last few weeks. Relate this development to the database life cycle that you investigated for the discussion in Unit 1.

**Response Guidelines**

After posting your discussion, provide a substantive response to at least two other learners.

Course Resources
Undergraduate Discussion Participation Scoring Guide