

Objectives

To learn the database configuration and operations in Raspberry Pi.

Hardware

Raspberry Pi.

Background

Internet of Things (IoT) is one of the key features of our program. It is natural that we shall have some IoT elements in our database module. In this lab, we will practice how to set up the Raspberry Pi environment for creating and using the database. At the end of this lab, you might have the feeling that it is not challenging at all to implement a database in Raspberry Pi. But it is also interesting to find out some differences, e.g., speed.

(Note: You are encouraged to go beyond our lecture materials to explore the latest and advanced database technologies.)

Tasks:

- Q1. Update and upgrade Raspberry Pi. (In most cases, it is a good practice to keep your system updated.)
- Q2. Install mariadb-server in Raspberry Pi. Set a password for the root user.
- Q3. Log into the root user account, to verify if the database is successfully installed and if the password works correctly.
- Q4. After logged in, show a list of users in your system using SQL.
- Q5. Show a list of the existing databases.
- Q6. Create a new database called "<your name>DB", e.g., ZhangWeiDB, if it does not exist; otherwise, delete the existing one first and then create a new one.
- Q7. Under the newly created database, create a table called Students with 3 columns, sid, sname, and gender. The first one is the primary key.  
(Note: Please consider real scenarios to figure out a proper data type, e.g., considering storage overhead or access efficiency.)
- Q8. Insert 3 students into the newly created table. You may get the info from yourself and two of your teammates. Show all the rows in the Students table.
- Q9. Delete all the male students from your table. Show all the rows in the table.

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- Q10. Delete the table Students. Show all tables in the current database, i.e., "<your name>DB".
- Q11. Delete the database. Show all the remaining databases in the current MariaDB.
- Q12. Show profiles of the above SQL statements. Understand the time usage of different operations. Compare to your laptop/desktop implementations, to understand the performance difference.

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