



IUT D'ORSAY

S103 Project Report

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Our organization during the project

- Steven did the database creation script.
- Vianney did the research (concerning the Raspberry Pi setup, ssh, mariaDB, ...)
- Jérémy analyzed the python script to tell us what was expected from us in order to know how to set up the Raspberry Pi and mariaDB.

- We did not encounter a lot of difficulties, during the project.
However, database table row names aren't the same between the S103 reference guide and what is expected by the python script, To comply with the script we just had to replace some 'e' with 'é'.

Our comprehensive guide on how to set up a mariaDB server on a Raspberry Pi complying with S103's expectations

Step 1: Basic setup of the Raspberry Pi card

The following instructions can't be done on the Raspberry Pi:

Insert the micro SD card into the computer.

Flash the micro SD drive with "Raspberry Pi imager" tool:

1. Launch Raspberry Pi imager by typing `sudo rpi-imager` in a terminal
2. Select the OS: **Raspberry Pi OS (Arm 64 bits)**
3. Configure options to
 - a. **enable ssh** with password authentication
 - b. set login to **student** and password to **pwdstudent**
 - c. set locale to **Europe/Paris** time zone and **fr** keyboard layout (because in our case the Raspberry Pi has an "azerty" keyboard)
4. Select the micro SD drive to flash and click on the **write** button, **wait** until everything is completed.

Eject the micro SD card.

The following instructions must be done on the Raspberry Pi:

Insert the micro SD card into the Raspberry Pi.

Connect it to a screen with the HDMI cable.

Connect it to the network via a PC with the RJ45 (ethernet) cable and RJ45 to USBa adapter.

Start the Raspberry Pi by connecting its USBc port to a power source.

Log in and check if the keyboard layout is set to **fr** (typing "**pwdstudent**" shouldn't result in "**pzdstudent**", you can also check it by typing random things in a terminal)

If not, change it by following this tutorial:

1. open the main menu
2. go to Preferences > Raspberry Pi Configuration
3. then change the keyboard layout in the "Localisation" tab

Set the system time (because in our case, the card can't connect to the server from which it fetches the time due to the IUT firewall restrictions) **you must do this step on each start-up**

type `sudo date -s "YYYY-MM-JJ HH:mm:ss"` in a terminal,

replace **YYYY-MM-JJ HH:mm:ss** with the current date and time (e.g. 2024-01-30 23:45:59)

Step 2: Setup of mariaDB and the CAMPING database

The following instructions must be done on the Raspberry Pi:

Open a terminal.

Update software packages information with `sudo apt update`.

Upgrade installed software packages with `sudo apt upgrade`.

Install mariaDB with `sudo apt install mariadb-server`.

Type “Y” and Enter to continue, **wait** until the installation process is complete.

Finish to set up mariaDB with `sudo mysql_secure_installation`.

Press **enter** to continue (there is no password by default for the root user).

Press “Y” to switch to unix_socket authentication.

Then type “Y” to set a new password, and enter `pwdstudent`.

Now, press “Y” three more times to:

- Remove anonymous users.
- Disallow root login remotely.
- Remove the test database.

Now, *mariaDB is ready to use with root login.*

In order for the database to be accessible from another computer on the network:

Set mariaDB to start at boot (boot of the RaspBerry Pi): `systemctl enable mariadb`.

Edit the configuration file **my.cnf** of mysql: `sudo nano /etc/mysql/my.cnf`

Add the following text in the file (if it is not already there):

`[mysqld]`

`skip-networking=0`

`skip-bind-address`

You may have to comment (with #) or delete `skip-networking` and `bind-address = <some ip-address>`, do it if they are present under `[mysqld]`.

Exit nano editor and **save** modifications (Ctrl+X).

Restart mariaDB to ensure that the changes are applied by typing: `systemctl restart mariadb`.

Connect to mariaDB with root login: `sudo mysql -u root -p`, enter `pwdstudent` (password set when setting up mariaDB earlier)

Create the database by launching the SQL script at the end of this report

Once the database is created, you can verify its content by executing these SQL queries:

- `SELECT * FROM ACTIVITE;`
- `SELECT * FROM CAMPING;`
- `SELECT * FROM ACTICAMPING;`

Create a new user **prof** usable with all possible hosts by executing this SQL query:

```
CREATE USER 'prof'@'%' IDENTIFIED BY 'pwdprof';
```

Grant it access to all privileges on the "CAMPING" database:

```
GRANT ALL PRIVILEGES ON CAMPING.* TO 'prof'@'%';
```

Reload permissions with: **FLUSH PRIVILEGES;**

Lastly, create a **students.txt** file in the **/home/student** directory and write something in it.

EVERYTHING IS NOW SET UP ! 🎉

Now you can test if everything is set up properly:

On the computer connected to the Raspberry Pi via the RJ45 cable, create a new file **script.py** and copy the python script from Moodle to this new file.

Then execute the script by running the command **python3 path-to-the-file/script.py** in a terminal (on Linux).

What you get should look like this:

```
{'user': 'prof', 'password': 'pwdprof', 'host': '10.42.0.2', 'database': 'CAMPING'}
```

```
PING 10.42.0.2 (10.42.0.2) 56(84) bytes of data.
```

```
64 bytes from 10.42.0.2: icmp_seq=1 ttl=64 time=0.252 ms
```

```
--- 10.42.0.2 ping statistics ---
```

```
1 packets transmitted, 1 received, 0% packet loss, time 0ms
```

```
rtt min/avg/max/mdev = 0.252/0.252/0.252/0.000 ms
```

```
Warning: Permanently added '10.42.0.2' (ECDSA) to the list of known hosts.
```

```
Raspberry at 10.42.0.2: SSH connection successful. Content of students.txt:
```

```
I am
```

```
the content
```

```
Of students.txt.
```

```
Table ACTICAMPING content:
```

```
(1, 101, Decimal('20.50'))
```

```
(1, 102, Decimal('15.75'))
```

```
(2, 101, Decimal('18.00'))
```

```
Table ACTIVITE content:
```

```
(101, 'Randonnée pédestre', 'plein air')
```

```
(102, 'Escalade', 'Aventure')
```

```
(103, 'Yoga', 'Bien-être')
```

```
Table CAMPING content:
```

```
(1, 'Le Paradis', '123 Rue de la Forêt', '01 23 45 67 89', datetime.date(2023, 5, 1), datetime.date(2023, 10, 31), 4, 'Excellente')
```

```
(2, 'Belle Nature', '456 Avenue des Montagnes', '98 76 54 32 10', datetime.date(2023, 6, 15), datetime.date(2023, 9, 30), 3, 'Bonne')
```

```
Raspberry at 10.42.0.2: All checks passed. Giving 20 points.
```

Annex: SQL database creation script:

(this SQL script creates a mySQL database "CAMPING" with all the tables requested and completed as requested)

```
CREATE DATABASE CAMPING;
USE CAMPING;
CREATE TABLE ACTIVITE(
    NumActivité INT UNSIGNED NOT NULL UNIQUE AUTO_INCREMENT PRIMARY KEY,
    NomActivité VARCHAR(64) NOT NULL,
    TypeActivité VARCHAR(64) NOT NULL
);
CREATE TABLE CAMPING(
    NumCamping INT UNSIGNED NOT NULL UNIQUE AUTO_INCREMENT PRIMARY KEY,
    NomCamping VARCHAR(64) NOT NULL,
    AddrCamping VARCHAR(255) NOT NULL,
    TelCamping VARCHAR(14) NOT NULL,
    DateOuv DATE,
    DateFerm DATE,
    NbEtoiles INT UNSIGNED,
    QualitéFrance VARCHAR(64),
    CHECK (TelCamping REGEXP '^[0-9]{2}([0-9]{2}){4}$'),
    CHECK (NbEtoiles BETWEEN 1 AND 5)
);
CREATE TABLE ACTICAMPING(
    NumCamping INT UNSIGNED NOT NULL,
    NumActivité INT UNSIGNED NOT NULL,
    PrixActivité DECIMAL(8,2) UNSIGNED,
    UNIQUE (NumCamping, NumActivité),
    PRIMARY KEY (NumCamping, NumActivité),
    FOREIGN KEY (NumCamping) REFERENCES CAMPING(NumCamping),
    FOREIGN KEY (NumActivité) REFERENCES ACTIVITE(NumActivité)
);

INSERT INTO CAMPING (NumCamping, NomCamping, AddrCamping, TelCamping, DateOuv,
DateFerm, NbEtoiles, QualitéFrance) VALUES (1, 'Le Paradis', '123 Rue de la Forêt',
'01 23 45 67 89', '2023-05-01', '2023-10-31', 4, 'Excellente'), (2, 'Belle Nature',
'456 Avenue des Montagnes', '98 76 54 32 10', '2023-06-15', '2023-09-30', 3, 'Bonne');

INSERT INTO ACTIVITE (NumActivité, NomActivité, TypeActivité) VALUES (101, 'Randonnée
pédestre', 'plein air'), (102, 'Escalade', 'Aventure'), (103, 'Yoga', 'Bien-être');

INSERT INTO ACTICAMPING (NumCamping, NumActivité, PrixActivité) VALUES (1, 101,
20.50), (1, 102, 15.75), (2, 101, 18.00);
```