Question 1: Update and Upgrade Raspberry Pi

Command used:

1. sudo su
2. apt-get update

```
[root@raspberrypi:/home/pi# apt-get update
Get:1 http://archive.raspberrypi.org/debian buster InRelease [32.6 kB]
Get:2 http://raspbian.raspberrypi.org/raspbian buster InRelease [15.0 kB]
Get:3 http://raspbian.raspberrypi.org/raspbian buster/main armhf Packages [13.0
MB]
Get:4 http://archive.raspberrypi.org/debian buster/main armhf Packages [392 kB]
Fetched 13.5 MB in 11s (1,270 kB/s)
Reading package lists... Done
root@raspberrypi:/home/pi#
```

3. apt-get upgrade

```
[root@raspberrypi:/home/pi# apt-get upgrade
Reading package lists... Done
Building dependency tree
Reading state information... Done
Calculating upgrade... Done
The following package was automatically installed and is no longer required:
  lxplug-volume
Use 'sudo apt autoremove' to remove it.
The following packages will be upgraded:
  code libsnmp-base libsnmp30 node-minimatch
4 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
Need to get 88.4 MB of archives.
After this operation, 0 B of additional disk space will be used.
Do you want to continue? [Y/n] y
```

4. y – to continue the upgrade

```
Do you want to continue? [Y/n] y
Get:1 http://archive.raspberrypi.org/debian buster/main armhf code armhf 1.74.3
1673283261 [84.6 MB]
Get:2 http://mirror.rise.ph/raspbian/raspbian buster/main armhf libsnmp-base al
 5.7.3+dfsg-5+deb10u4 [1,595 kB]
Get:3 http://mirror.rise.ph/raspbian/raspbian buster/main armhf libsnmp30 armhf
5.7.3+dfsg-5+deb10u4 [2,194 kB]
Get:4 http://mirror.rise.ph/raspbian/raspbian buster/main armhf node-minimatch
ll 3.0.4-3+deb10u1 [13.8 kB]
Fetched 88.4 MB in 12s (7,470 kB/s)
Reading changelogs... Done
(Reading database ... 226639 files and directories currently installed.)
Preparing to unpack .../code_1.74.3-1673283261_armhf.deb ...
Unpacking code (1.74.3-1673283261) over (1.74.2-1671532193) ...
Preparing to unpack .../libsnmp-base_5.7.3+dfsg-5+deb10u4_all.deb ...
Unpacking libsnmp-base (5.7.3+dfsg-5+deb10u4) over (5.7.3+dfsg-5+deb10u3) ...
Preparing to unpack .../libsnmp30_5.7.3+dfsg-5+deb10u4_armhf.deb ...
Unpacking libsnmp30:armhf (5.7.3+dfsg-5+deb10u4) over (5.7.3+dfsg-5+deb10u3) ..
Preparing to unpack .../node-minimatch_3.0.4-3+deb10u1_all.deb ...
Unpacking node-minimatch (3.0.4-3+deb10u1) over (3.0.4-3) ...
Setting up code (1.74.3-1673283261) ...
Setting up libsnmp-base (5.7.3+dfsg-5+deb10u4) ...
Setting up libsnmp30:armhf (5.7.3+dfsg-5+deb10u4) ...
Setting up node-minimatch (3.0.4-3+deb10u1) ...
Processing triggers for mime-support (3.62) ...
Processing triggers for gnome-menus (3.31.4-3) ...
Processing triggers for libc-bin (2.28-10+rpt2+rpi1+deb10u1) ...
Processing triggers for man-db (2.8.5-2) ...
Processing triggers for shared-mime-info (1.10-1) ...
Processing triggers for desktop-file-utils (0.23-4) ...
root@raspberrypi:/home/pi#
```

5. apt-get dist-upgrade

```
root@raspberrypi:/home/pi# apt-get dist-upgrade
Reading package lists... Done
Building dependency tree
Reading state information... Done
Calculating upgrade... Done
The following package was automatically installed and is no longer required:
  lxplug-volume
Use 'sudo apt autoremove' to remove it.
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
root@raspberrypi:/home/pi#
```

Question 2: Install Mariadb-server and set password for the root user.

Command Used:

1. apt install mariadb-server

```
[root@raspberrypi:/home/pi# apt install mariadb-server
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following package was automatically installed and is no longer required:
  lxplug-volume
Use 'sudo apt autoremove' to remove it.
The following additional packages will be installed:
  galera-3 gawk libcgi-fast-perl libcgi-pm-perl libdbd-mysql-perl libdbi-perl
  libfcgi-perl libhtml-template-perl libreadline5 libterm-readkey-perl
  mariadb-client-10.3 mariadb-client-core-10.3 mariadb-server-10.3
  mariadb-server-core-10.3 socat
Suggested packages:
  gawk-doc libclone-perl libmldbm-perl libnet-daemon-perl
  libsql-statement-perl libipc-sharedcache-perl mailx mariadb-test tinyca
The following NEW packages will be installed:
  galera-3 gawk libcgi-fast-perl libcgi-pm-perl libdbd-mysql-perl libdbi-perl
  libfcgi-perl libhtml-template-perl libreadline5 libterm-readkey-perl
  mariadb-client-10.3 mariadb-client-core-10.3 mariadb-server
  mariadb-server-10.3 mariadb-server-core-10.3 socat
0 upgraded, 16 newly installed, 0 to remove and 0 not upgraded.
Need to get 17.6 MB of archives.
After this operation, 149 MB of additional disk space will be used.
[Do you want to continue? [Y/n] y
Get:2 http://mirror.nus.edu.sg/raspbian/raspbian buster/main armhf galera-3 armh
f 25.3.25-2 [811 kB]
Get:3 http://mirror.rise.ph/raspbian/raspbian buster/main armhf libdbi-perl armh
f 1.642-1+deb10u2 [767 kB]
Get:5 http://mirror.rise.ph/raspbian/raspbian buster/main armhf mariadb-client-c
ore-10.3 armhf 1:10.3.36-0+deb10u2 [4,741 kB]
Get:1 http://mirror.freedif.org/Raspbian/raspbian buster/main armhf gawk armhf 1
:4.2.1+dfsg-1 [590 kB]
Get:4 http://mirror.freedif.org/Raspbian/raspbian buster/main armhf libreadline5
 armhf 5.2+dfsg-3 [103 kB]
Get:6 http://mirror.rise.ph/raspbian/raspbian buster/main armhf mariadb-client-1
0.3 armhf 1:10.3.36-0+deb10u2 [989 kB]
Get:7 http://mirror.rise.ph/raspbian/raspbian buster/main armhf mariadb-server-c
ore-10.3 armhf 1:10.3.36-0+deb10u2 [5,245 kB]
Get:8 http://mirror.nus.edu.sg/raspbian/raspbian buster/main armhf socat armhf 1
.7.3.2-2 [324 kB]
Get:9 http://mirror.rise.ph/raspbian/raspbian buster/main armhf mariadb-server-1
0.3 armhf 1:10.3.36-0+deb10u2 [3,573 kB]
Get:10 http://mirror.nus.edu.sg/raspbian/raspbian buster/main armhf libcgi-pm-pe
rl all 4.40-1 [222 kB]
Get:11 http://mirror.freedif.org/Raspbian/raspbian buster/main armhf libfcgi-per
l armhf 0.78-2+b2 [35.0 kB]
Get:12 http://mirror.nus.edu.sg/raspbian/raspbian buster/main armhf libcgi-fast-
perl all 1:2.13-1 [11.4 kB]
Get:13 http://mirror.nus.edu.sg/raspbian/raspbian buster/main armhf libdbd-mysql
-perl armhf 4.050-2 [114 kB]
Get:14 http://mirror.nus.edu.sg/raspbian/raspbian buster/main armhf libhtml-temp
```

```
..
Unpacking mariadb-server-10.3 (1:10.3.36-0+deb10u2) ...
Selecting previously unselected package libcgi-pm-perl.
Preparing to unpack .../09-libcgi-pm-perl_4.40-1_all.deb ...
Unpacking libcgi-pm-perl (4.40-1) ...
Selecting previously unselected package libfcgi-perl.
Preparing to unpack .../10-libfcgi-perl_0.78-2+b2_armhf.deb ...
Unpacking libfcgi-perl (0.78-2+b2) ...
Selecting previously unselected package libcgi-fast-perl.
Preparing to unpack .../11-libcgi-fast-perl_1%3a2.13-1_all.deb ...
Unpacking libcgi-fast-perl (1:2.13-1) ...
Selecting previously unselected package libdbd-mysql-perl:armhf.
Preparing to unpack .../12-libdbd-mysql-perl_4.050-2_armhf.deb ...
Unpacking libdbd-mysql-perl:armhf (4.050-2) ...
Selecting previously unselected package libhtml-template-perl.
Preparing to unpack .../13-libhtml-template-perl_2.97-1_all.deb ...
Unpacking libhtml-template-perl (2.97-1) ...
Selecting previously unselected package libterm-readkey-perl.
Preparing to unpack .../14-libterm-readkey-perl_2.38-1_armhf.deb ...
Unpacking libterm-readkey-perl (2.38-1) ...
Selecting previously unselected package mariadb-server.
Preparing to unpack .../15-mariadb-server_1%3a10.3.36-0+deb10u2_all.deb ...
Unpacking mariadb-server (1:10.3.36-0+deb10u2) ...
Setting up libreadline5:armhf (5.2+dfsg-3) ...
Setting up gawk (1:4.2.1+dfsg-1) ...
Setting up libcgi-pm-perl (4.40-1) ...
Setting up libhtml-template-perl (2.97-1) ...
Setting up socat (1.7.3.2-2) ...
Setting up mariadb-server-core-10.3 (1:10.3.36-0+deb10u2) ...
Setting up galera-3 (25.3.25-2) ...
Setting up mariadb-client-core-10.3 (1:10.3.36-0+deb10u2) ...
Setting up libfcgi-perl (0.78-2+b2) ...
Setting up libterm-readkey-perl (2.38-1) ...
Setting up libdbi-perl:armhf (1.642-1+deb10u2) ...
Setting up libcgi-fast-perl (1:2.13-1) ...
Setting up mariadb-client-10.3 (1:10.3.36-0+deb10u2) ...
Setting up libdbd-mysql-perl:armhf (4.050-2) ...
Setting up mariadb-server-10.3 (1:10.3.36-0+deb10u2) ...
Created symlink /etc/systemd/system/mysql.service → /lib/systemd/system/mariadb.
service.
Created symlink /etc/systemd/system/mysqld.service → /lib/systemd/system/mariadb
.service.
Created symlink /etc/systemd/system/multi-user.target.wants/mariadb.service → /l
ib/systemd/system/mariadb.service.
Setting up mariadb-server (1:10.3.36-0+deb10u2) ...
Processing triggers for man-db (2.8.5-2) ...
Processing triggers for systemd (241-7~deb10u8+rpi1) ...
root@raspberrypi:/home/pi#
```

2. ALTER USER 'root'@localhost IDENTIFIED BY 'P@ssw0rd'

flush privileges;

```
[MariaDB [(none)]> ALTER USER 'root'@localhost IDENTIFIED BY 'P@ssw0rd';
Query OK, 0 rows affected (0.001 sec)

[MariaDB [(none)]> flush privileges;
Query OK, 0 rows affected (0.001 sec)

MariaDB [(none)]>
```

Question 3: Login to root user account, verify if database is installed correctly and check if password works correctly.

Command Used:

1. sudo mysql -uroot -p123 (Entered wrong password)

```
[pi@raspberrypi:~ $ mysql -uroot -p123
ERROR 1045 (28000): Access denied for user 'root'@'localhost' (using password: Y
ES)
pi@raspberrypi:~ $
```

2. sudo mysql -uroot -pP@ssw0rdCorrect password)

```
[pi@raspberrypi:~ $ mysql -uroot -pP@ssw0rd
Welcome to the MariaDB monitor.  Commands end with ; or \g.
Your MariaDB connection id is 73
Server version: 10.3.36-MariaDB-0+deb10u2 Raspbian 10

Copyright (c) 2000, 2018, Oracle, MariaDB Corporation Ab and others.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

MariaDB [(none)]>
```

3. show databases;

```
[MariaDB [(none)]> show databases;
+--------------------+
| Database           |
+--------------------+
| information_schema |
| mysql              |
| performance_schema |
+--------------------+
3 rows in set (0.001 sec)

MariaDB [(none)]>
```

Question 4: After logged in, show list of users in system using SQL

Command Used:

1. USE mysql;
   SELECT User FROM mysql.user;

```
[MariaDB [mysql]> USE mysql;
Database changed
[MariaDB [mysql]> SELECT User FROM mysql.user;
+------+
| User |
+------+
| root |
+------+
1 row in set (0.001 sec)

MariaDB [mysql]>
```

Question 5: Show a list of existing databases
Command Used:
1. show databases;

```
[MariaDB [mysql]> show databases;
+--------------------+
| Database           |
+--------------------+
| information_schema |
| mysql              |
| performance_schema |
+--------------------+
3 rows in set (0.001 sec)

MariaDB [mysql]>
```

Question 6: Create new database called "LauJunXiangDB", if does not exists, otherwise, delete the existing one first then create a new one
Command Used:
1. DROP DATABASE IF EXISTS LauJunXiangDB; CREATE DATABASE IF NOT EXISTS LauJunXiangDB;

```
[MariaDB [(none)]> DROP DATABASE IF EXISTS LauJunXiangDB; CREATE DATABASE IF NOT EXISTS Lau
JunXiangDB;
Query OK, 0 rows affected (0.002 sec)

Query OK, 1 row affected (0.001 sec)

MariaDB [(none)]>
```

2. SHOW DATABASES;

```
[MariaDB [(none)]> show databases;
+--------------------+
| Database           |
+--------------------+
| LauJunXiangDB      |
| information_schema |
| mysql              |
| performance_schema |
+--------------------+
4 rows in set (0.001 sec)

MariaDB [(none)]>
```

Question 7: Create table called Students with 3 columns, sid, sname, gender. Sid = primary key.

Command Used:
1. CREATE TABLE IF NOT EXISTS Students (sid INT, sname VARCHAR(50) NOT NULL, gender VARCHAR(9) NOT NULL, PRIMARY KEY (sid), CHECK(gender in ("Male", "Female")));

   show tables;

```
[MariaDB [LauJunXiangDB]> CREATE TABLE IF NOT EXISTS Students ( sid INT, sname VARCHAR(50)
NOT NULL, gender VARCHAR(9) NOT NULL, PRIMARY KEY (sid), CHECK(gender in ("Male", "Female"
)));
Query OK, 0 rows affected (0.045 sec)

MariaDB [LauJunXiangDB]> show tables;
+-------------------------+
| Tables_in_LauJunXiangDB |
+-------------------------+
| Students                |
+-------------------------+
1 row in set (0.001 sec)

MariaDB [LauJunXiangDB]>
```

Question 8: Insert 3 students.

Command Used:
1. INSERT INTO Students (sid, sname, gender) VALUES (2100582, "Lau Jun Xiang", "Male");

   INSERT INTO Students (sid, sname, gender) VALUES (2101596, "Jeff Lee", "Male");

   INSERT INTO Students (sid, sname, gender) VALUES

(2100593, "Lim Kei Yiang", "Male");

```
MariaDB [LauJunXiangDB]> INSERT INTO Students (sid, sname, gender) VALUES (21005
82, "Lau Jun Xiang", "Male");
Query OK, 1 row affected (0.006 sec)

MariaDB [LauJunXiangDB]> INSERT INTO Students (sid, sname, gender) VALUES (21015
96, "Jeff Lee", "Male");
Query OK, 1 row affected (0.007 sec)

[MariaDB [LauJunXiangDB]> INSERT INTO Students (sid, sname, gender) VALUES (21005]
93, "Lim Kei Yiang", "Male");
Query OK, 1 row affected (0.007 sec)

MariaDB [LauJunXiangDB]>
```

2. SELECT * FROM Students;

```
MariaDB [LauJunXiangDB]> SELECT * FROM Students;
+---------+---------------+--------+
| sid     | sname         | gender |
+---------+---------------+--------+
| 2100582 | Lau Jun Xiang | Male   |
| 2100593 | Lim Kei Yiang | Male   |
| 2101596 | Jeff Lee      | Male   |
+---------+---------------+--------+
3 rows in set (0.001 sec)

MariaDB [LauJunXiangDB]>
```

Question 9: Delete all male students

Command Used:

1. DELETE FROM Students WHERE gender = 'Male';

```
[MariaDB [LauJunXiangDB]> DELETE FROM Students WHERE Gender = 'Male';
Query OK, 3 rows affected (0.007 sec)

MariaDB [LauJunXiangDB]>
```

2. SELECT * FROM Students;

```
[MariaDB [LauJunXiangDB]> SELECT * FROM Students;
Empty set (0.001 sec)

MariaDB [LauJunXiangDB]>
```

Question 10: Delete table Students.

Command Used:

1. DROP TABLE Students;

```
[MariaDB [LauJunXiangDB]> DROP TABLE Students;
Query OK, 0 rows affected (0.017 sec)

MariaDB [LauJunXiangDB]>
```

2. SHOW TABLES;

```
[MariaDB [LauJunXiangDB]> SHOW TABLES;
Empty set (0.001 sec)

MariaDB [LauJunXiangDB]>
```

Question 11: Delete database.
Command Used:

1. DROP DATABASE LauJunXiangDB;

```
[MariaDB [LauJunXiangDB]> DROP DATABASE LauJunXiangDB;
Query OK, 0 rows affected (0.002 sec)

MariaDB [(none)]>
```

2. SHOW DATABASES;

```
[MariaDB [LauJunXiangDB]> DROP DATABASE LauJunXiangDB;
Query OK, 0 rows affected (0.002 sec)

[MariaDB [(none)]> SHOW DATABASES;
+--------------------+
| Database           |
+--------------------+
| information_schema |
| mysql              |
| performance_schema |
+--------------------+
3 rows in set (0.002 sec)

MariaDB [(none)]>
```

Question 11: Profiling.
Command Used:

1. On Raspberry Pi

```
[MariaDB [LauJunXiangDB]> SET profiling = 1;
Query OK, 0 rows affected (0.000 sec)

[MariaDB [LauJunXiangDB]> INSERT INTO Students (sid, sname, gender) VALUES (2100582, "Lau Jun Xiang", "Male");
Query OK, 1 row affected (0.011 sec)

[MariaDB [LauJunXiangDB]> UPDATE Students SET sid= "2100123" WHERE sname = "Lau Jun Xiang";
Query OK, 1 row affected (0.010 sec)
Rows matched: 1  Changed: 1  Warnings: 0

[MariaDB [LauJunXiangDB]> SELECT * FROM Students WHERE sid=2100123
    -> ;
+---------+---------------+--------+
| sid     | sname         | gender |
+---------+---------------+--------+
| 2100123 | Lau Jun Xiang | Male   |
+---------+---------------+--------+
1 row in set (0.003 sec)

[MariaDB [LauJunXiangDB]> SHOW PROFILES;
+----------+------------+------------------------------------------------------------------------------------------+
| Query_ID | Duration   | Query                                                                                    |
+----------+------------+------------------------------------------------------------------------------------------+
|        1 | 0.01031074 | INSERT INTO Students (sid, sname, gender) VALUES (2100582, "Lau Jun Xiang", "Male")       |
|        2 | 0.01088745 | UPDATE Students SET sid= "2100123" WHERE sname = "Lau Jun Xiang"                          |
|        3 | 0.00249201 | SELECT * FROM Students WHERE sid=2100123                                                  |
+----------+------------+------------------------------------------------------------------------------------------+
3 rows in set (0.001 sec)

MariaDB [LauJunXiangDB]>
```

2. On MacOS (M2)

```
[MariaDB [LauJunXiangDB]> SET profiling = 1;
Query OK, 0 rows affected (0.000 sec)

[MariaDB [LauJunXiangDB]> INSERT INTO Students (sid, sname, gender) VALUES (2100582, "Lau Jun Xiang", "Male");
Query OK, 1 row affected (0.006 sec)

[MariaDB [LauJunXiangDB]> UPDATE Students SET sid= "2100123" WHERE sname = "Lau Jun Xiang";
Query OK, 1 row affected (0.003 sec)
Rows matched: 1  Changed: 1  Warnings: 0

[MariaDB [LauJunXiangDB]> SELECT * FROM Students WHERE sid = 2100123;
+---------+---------------+--------+
| sid     | sname         | gender |
+---------+---------------+--------+
| 2100123 | Lau Jun Xiang | Male   |
+---------+---------------+--------+
1 row in set (0.001 sec)

[MariaDB [LauJunXiangDB]> SHOW PROFILES;
+----------+------------+------------------------------------------------------------------------------------------+
| Query_ID | Duration   | Query                                                                                    |
+----------+------------+------------------------------------------------------------------------------------------+
|        1 | 0.00557000 | INSERT INTO Students (sid, sname, gender) VALUES (2100582, "Lau Jun Xiang", "Male")       |
|        2 | 0.00307900 | UPDATE Students SET sid= "2100123" WHERE sname = "Lau Jun Xiang"                          |
|        3 | 0.00064100 | SELECT * FROM Students WHERE sid = 2100123                                                |
+----------+------------+------------------------------------------------------------------------------------------+
3 rows in set (0.001 sec)

MariaDB [LauJunXiangDB]> 
```