

Cloud Computing Lab 5:

Deploying Application-II

Due Date: Tuesday, March 9, 2021 (11:59pm).

Student Name:

Student ID:

Objective

Deploying enterprise applications onto virtual machines on VMware platform that are hosted on local machines

Equipment, Tools, Hardware, and Software Needed

1. Desktop PC, Laptop with internet connection.
2. VMware Workstation software - free downloadable
3. Ubuntu (live image) - free downloadable. You may download other Operating Systems image.
4. Apache2 server, **PHP**, **MySQL** server

Theorem

The deployment of an Enterprise Application one of the important practice in cloud computing. Implementing a multitier application on cloud is a vital job.

In this Lab, we will prepare and deploy a Web/Application/Database application to our VMware platform, as shown in the below Figure 1.

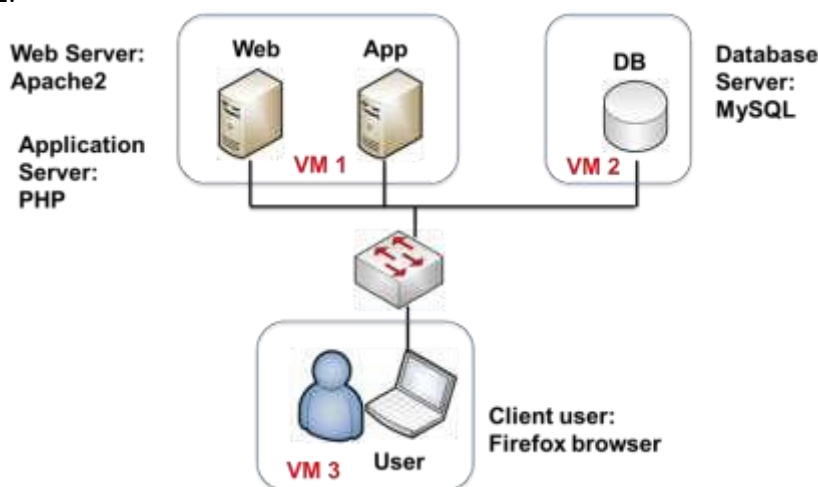


Figure 1 Deploying a Multitier Application

Procedure

***** Note: Use your previous Lab VMs**

To do the deployment we have to do the procedure based on the services in sequence:

First, Database Server – VM 2

Power On VM 2, and do the following installation and implementation steps.

sudo apt install mysql-server
sudo mysql_secure_installation
set one password and Just hit ENTER for the rest of questions
sudo mysql
exit
sudo vi /etc/mysql/mysql.conf.d/mysqld.cnf # Go to the line with “bind-address 127.0.0.1” and comment it out by adding “#” at the beginning Press “i” in keyboard, and add “#” at the beginning of the line # hit button “esc” # press “:wq” keyboard to save the file
sudo service mysql restart

Create a database and Filling it up with data

sudo mysql
CREATE DATABASE example_database;
CREATE USER 'example_user'@'%' IDENTIFIED WITH mysql_native_password BY 'password';
GRANT ALL ON example_database.* TO 'example_user'@'%';
SHOW DATABASES;
CREATE TABLE example_database.todo_list (item_id INT AUTO_INCREMENT, content VARCHAR(255), PRIMARY KEY(item_id));

```
INSERT INTO example_database.todo_list (content) VALUES ("My first important item");  
INSERT INTO example_database.todo_list (content) VALUES ("My second important item");  
INSERT INTO example_database.todo_list (content) VALUES ("My third important item");  
INSERT INTO example_database.todo_list (content) VALUES ("My fourth important item");  
INSERT INTO example_database.todo_list (content) VALUES ("My fifth important item");
```

```
SELECT * FROM example_database.todo_list;
```

```
exit
```

Second, Application Server – VM 1

On VM 1, and do the following installation and implementation steps.

```
sudo vi /var/www/html/todo_list.php
```

press “i” for editing, and copy & paste the following code:

don’t forget to change the red color **VM_2__IP_Address** with the IP address of VM 2

```
<?php
    $ip = "VM_2__IP_Address";
    $user = "example_user";
    $password = "password";
    $database = "example_database";
    $table = "todo_list";

    try {
        $db = new PDO("mysql:host=$ip;dbname=$database", $user, $password);
        echo "<h2>TODO</h2><ol>";
        foreach($db->query("SELECT content FROM $table") as $row) {
            echo "<li>" . $row['content'] . "</li>";
        }
        echo "</ol>";
    } catch (PDOException $e) {
        print "Error!: " . $e->getMessage() . "<br/>";
        die();
    }
}
```

hit button “esc”

press “:wq”

Third, Client User – VM 3 (or your host machine or desktop)

Open the internet browser (Chrome, Firefox, or any other internet browser)

Type the following address, (change the **VM_1_IP_Address** with the proper VM 1 IP Address)

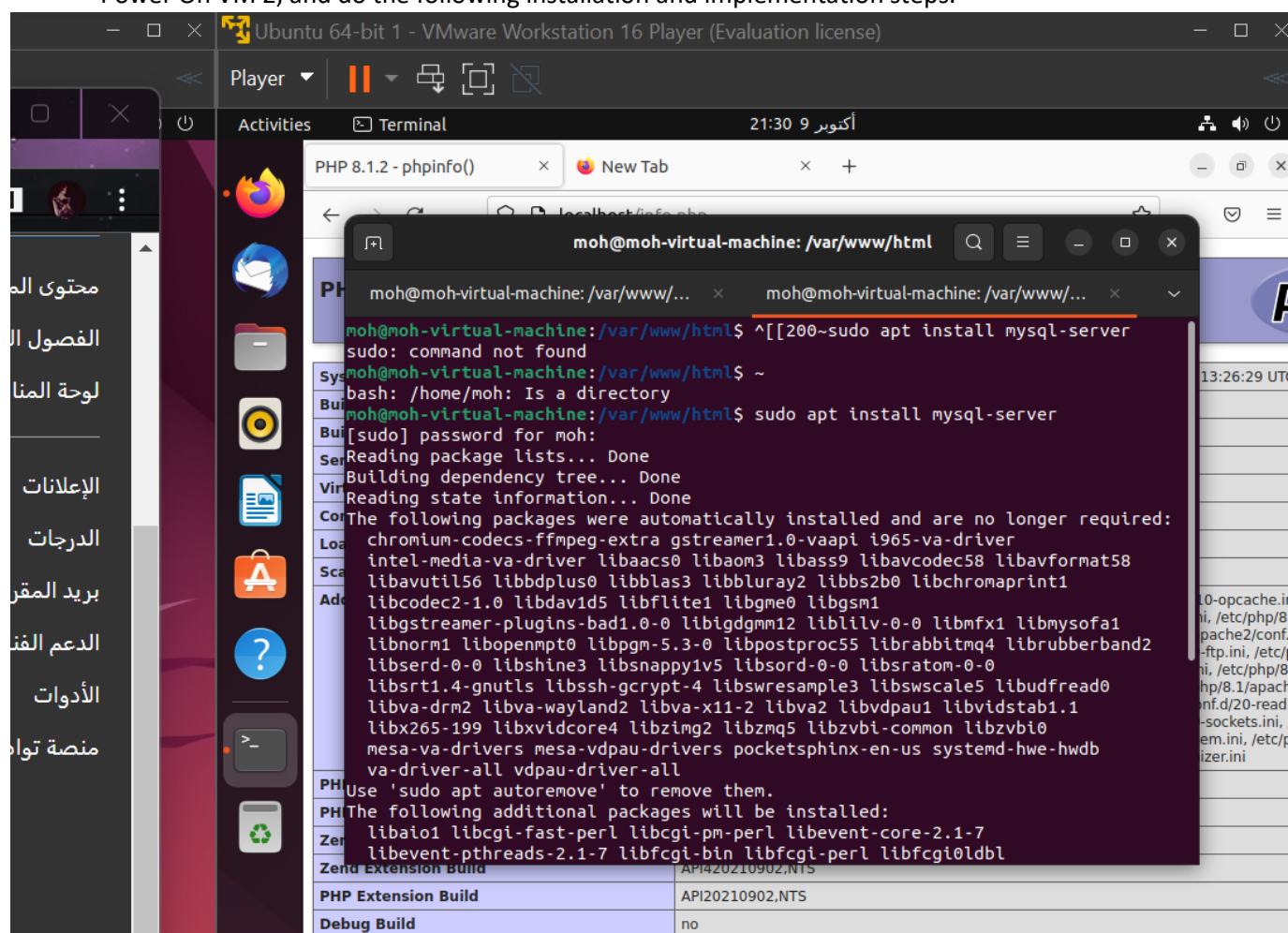
http://**VM_1_IP_Address**/todo_list.php **Lab Task**

1. Report all outputs of all commands on the procedure above in addition to the below configuration settings.

Lab Report

For the lab report, take a screenshots of your VMware Workstation configuration and include Command Line logs for the Virtual Machines as requested in the Lab Task.

Power On VM 2, and do the following installation and implementation steps.



The screenshot shows the VMware Workstation 16 Player interface. The main window displays the Ubuntu 64-bit 1 VM. The terminal window is open, showing the command line and the output of the installation process.

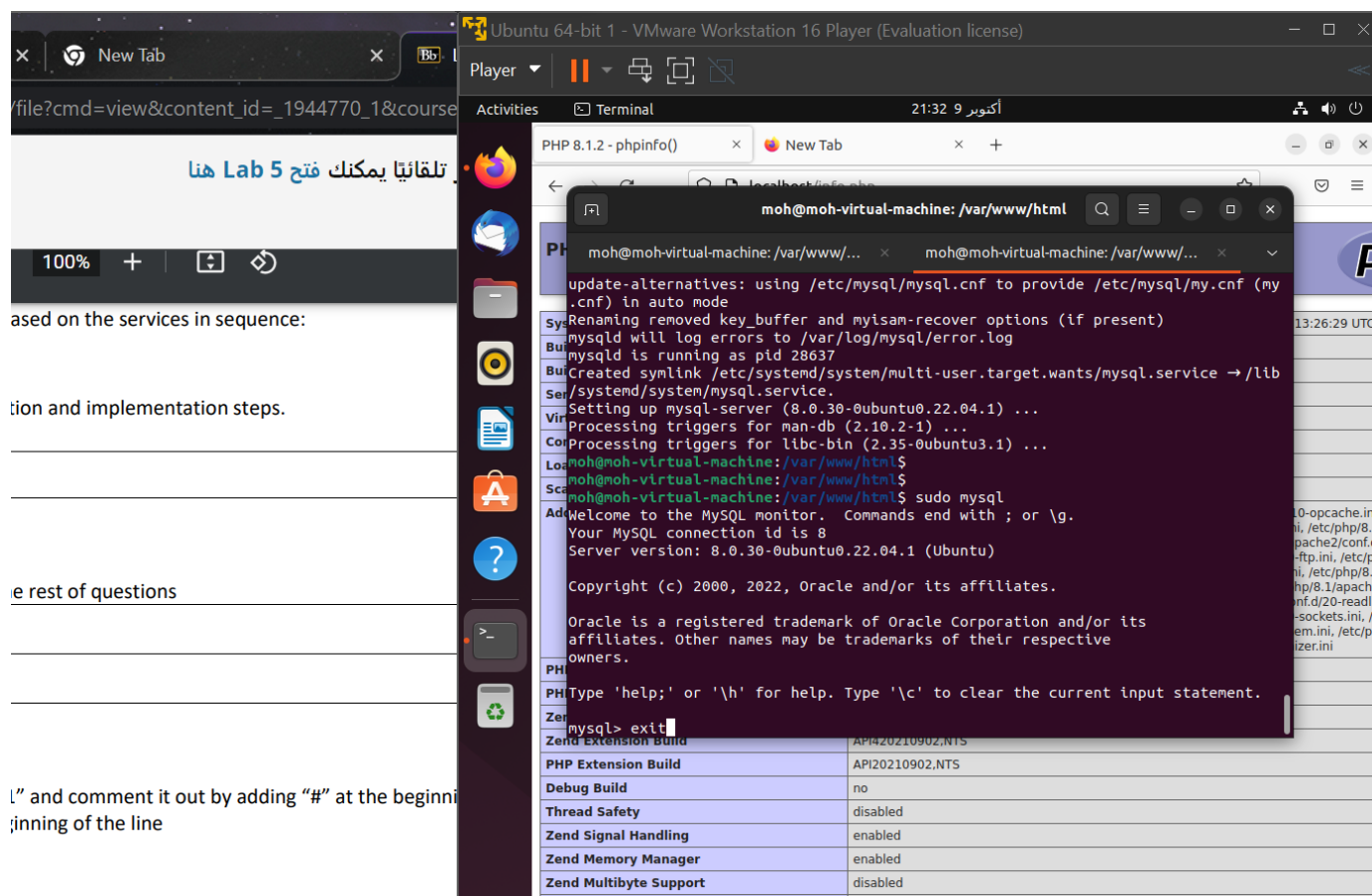
```

moh@moh-virtual-machine: /var/www/html$ sudo apt install mysql-server
sudo: command not found
moh@moh-virtual-machine: /var/www/html$ ~
bash: /home/moh: Is a directory
moh@moh-virtual-machine: /var/www/html$ sudo apt install mysql-server
[sudo] password for moh:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following packages were automatically installed and are no longer required:
chromium-codecs-ffmpeg-extra gstreamer1.0-vaapi i965-va-driver
intel-media-va-driver libaac3 libaom3 libass9 libavcodec58 libavformat58
libavutil56 libbdplus0 libblas3 libbluray2 libbs2b0 libchromaprint1
libcodecs2-1.0 libdavid5 libflite1 libgme0 libgsm1
libgstreamer-plugins-bad1.0-0 libigdgmm12 liblilv-0-0 libmfx1 libmysofa1
libnorm1 libopenmpt0 libpgm-5.3-0 libpostproc55 librabbitmq4 librubberband2
libserd-0-0 libshine3 libsnappy1v5 libsord-0-0 libsratom-0-0
libstr1.4-gnutls libssh-gcrypt-4 libswresample3 libswscale5 libudfread0
libva-drm2 libva-wayland2 libva-x11-2 libva2 libvdpau1 libvidstab1.1
libx265-199 libxvidcore4 libzing2 libzmq5 libzvb-common libzvb0
mesa-va-drivers mesa-vdpau-drivers pocketsphinx-en-us systemd-hwe-hwdb
va-driver-all vdpau-driver-all
Use 'sudo apt autoremove' to remove them.
The following additional packages will be installed:
libaio1 libcgi-fast-perl libcgi-pm-perl libevent-core-2.1-7
libevent-pthreads-2.1-7 libfcgi-bin libfcgi-perl libfcgi0ldbl
Zend Extension Build API420210902.NTS
PHP Extension Build API20210902.NTS
Debug Build no
  
```

Exit !

A screenshot of a terminal window running inside a VMware Workstation 16 Player. The window title is "Ubuntu 64-bit v2 - VMware Workstation 16 Player (Evaluation license)". The terminal shows the output of the command `mysql --help`. The output lists various options for the MySQL client, including options for help, defaults, and specific program entries. The terminal is titled "moh2@moh2-virtual-machine: ~". The background of the terminal is dark purple with light green text. The VMware interface shows the "Player" tab and a "Terminal" icon in the top bar. The system clock in the top right corner of the terminal window shows "21:55 9 أكتوبر".

Here we open the sql file
Then we need to create a data base



The screenshot shows a VMware Workstation 16 Player window titled "Ubuntu 64-bit 1 - VMware Workstation 16 Player (Evaluation license)". Inside the VM, there is a terminal window and a web browser window.

The terminal window shows the following output:

```

update-alternatives: using /etc/mysql/mysql.cnf to provide /etc/mysql/my.cnf (my.cnf) in auto mode
Renaming removed key_buffer and myisam-recover options (if present)
mysqld will log errors to /var/log/mysql/error.log
mysqld is running as pid 28637
Created symlink /etc/systemd/system/multi-user.target.wants/mysql.service → /lib/systemd/system/mysql.service.
Setting up mysql-server (8.0.30-0ubuntu0.22.04.1) ...
Processing triggers for man-db (2.10.2-1) ...
Processing triggers for libc-bin (2.35-0ubuntu3.1) ...
moh@moh-virtual-machine: /var/www/html$
moh@moh-virtual-machine: /var/www/html$
moh@moh-virtual-machine: /var/www/html$ sudo mysql
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 8
Server version: 8.0.30-0ubuntu0.22.04.1 (Ubuntu)

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owners.

MySQL> exit

```

The web browser window shows a page with the text "تلقائياً يمكنك فتح Lab 5 هنا" (You can automatically open Lab 5 here).

Below the screenshot, there is a table with system information:

Zend Extension Build	API420210902.NTS
PHP Extension Build	API20210902.NTS
Debug Build	no
Thread Safety	disabled
Zend Signal Handling	enabled
Zend Memory Manager	enabled
Zend Multibyte Support	disabled

l" and comment it out by adding "#" at the beginning of the line



```
Ubuntu 64-bit v2 - VMware Workstation 16 Player (Evaluation license)
Player
Activities Gedit 21:56 أكتوبر 9
mysql.cnf /etc/mysql/mysql.conf.d Save
1 #
2 # The MySQL database server configuration file.
3 #
4 # One can use all long options that the program supports.
5 # Run program with --help to get a list of available options and with
6 # --print-defaults to see which it would actually understand and use.
7 #
8 # For explanations see
9 # http://dev.mysql.com/doc/mysql/en/server-system-variables.html
10
11 # Here is entries for some specific programs
12 # The following values assume you have at least 32M ram
13
14 [mysqld]
15 #
16 # * Basic Settings
17 #
18 user                = mysql
19 pid-file             = /var/run/mysqld/mysqld.pid
20 # socket              = /var/run/mysqld/mysqld.sock
21 port                 = 3306
22 datadir              = /var/lib/mysql
23
24
25 # If MySQL is running as a replication slave, this should be
26 # changed. Ref https://dev.mysql.com/doc/refman/8.0/en/server-system-variables.html#sysvar_tmpdir
27 tmpdir               = /tmp
28 #
29 # Instead of skip-networking the default is now to listen only on
30 # localhost which is more compatible and is not less secure.
31 bind-address          = 127.0.0.1
32 mysqlx-bind-address  = 127.0.0.1
33 #
34 # * Fine Tuning
35 #
36 key_buffer_size      = 16M
37 max_allowed_packet   = 64M
38 thread_stack         = 256K
39
40 thread_cache_size    = -1
```

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```
sudo vi /etc/mysql/mys
```

Go to the line with "bind-address" in keyboard, and

hit button "esc"

press ":wq" keyboard

sudo service mysql restart

Create a database and Fill

```
sudo mysql
CREATE DATABASE example_database;
CREATE USER 'example_user'@'localhost';
GRANT ALL ON example_database.* TO 'example_user'@'localhost';
SHOW DATABASES;
CREATE TABLE example_table (
    item_id INT PRIMARY KEY,
    item_name VARCHAR(255)
);
INSERT INTO example_table (item_id, item_name) VALUES (1, 'Example Item 1');
```

```
Player
Activities Terminal 22:18 أكتوبر 9
moh2@moh2-virtual-machine: ~
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 9
Server version: 8.0.30-0ubuntu0.22.04.1 (Ubuntu)

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affiliates. Other names may be trademarks of their respective
owners.

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

mysql> CREATE DATABASE example_database;
ERROR 1007 (HY000): Can't create database 'example_database'; database exists
mysql> CREATE DATABASE example_database;
ERROR 1007 (HY000): Can't create database 'example_database'; database exists
mysql> CREATE DATABASE example_database;
Query OK, 1 row affected (0.01 sec)

mysql> CREATE USER 'example_user'@'localhost' IDENTIFIED WITH mysql_native_password BY 'Aa@123456';
Query OK, 0 rows affected (0.01 sec)

mysql> GRANT ALL ON example_database.* TO 'example_user'@'localhost';
Query OK, 0 rows affected (0.00 sec)

mysql> SHOW DATABASES;
+-----+
| Database |
+-----+
| example_database |
| example_database |
| information_schema |
| mysql |
| performance_schema |
| sys |
+-----+
6 rows in set (0.00 sec)

mysql>
```

```
IDENTIFIED WITH mysql_native_password BY 'Aa@123456';
example_user'@'localhost';

Windows (CRLF) UTF-8
```


Ubuntu 64-bit v2 - VMware Workstation 16 Player (Evaluation license)

Player ▾ | [Pause] [Full Screen] [Close]

Activities | Terminal | 22:20 9 أكتوبر

moh2@moh2-virtual-machine: ~

moh2@moh2-virtual-machine: ~ x moh2@moh2-virtual-machine: ~ x moh2@moh2-virtual-machine: ~ x ▾

```
mysql
| performance_schem
| sys
+-----+
6 rows in set (0.00 sec)

mysql> CREATE TABLE eexample_database.todo_list (item_id INT AUTO_INCREMENT, content VARCHAR(255),
-> PRIMARY KEY(item_id));
Query OK, 0 rows affected (0.02 sec)

mysql> INSERT INTO eexample_database.todo_list (content) VALUES ("My first important item");
Query OK, 1 row affected (0.01 sec)

mysql> INSERT INTO eexample_database.todo_list (content) VALUES ("My second important item");
Query OK, 1 row affected (0.01 sec)

mysql> INSERT INTO eexample_database.todo_list (content) VALUES ("My third important item");
Query OK, 1 row affected (0.00 sec)

mysql> INSERT INTO eexample_database.todo_list (content) VALUES ("My fourth important item");
Query OK, 1 row affected (0.00 sec)

mysql> INSERT INTO eexample_database.todo_list (content) VALUES ("My fifth important item");
Query OK, 1 row affected (0.00 sec)

mysql> SHOW DATABASES;
+-----+
| Database
+-----+
| eexample_database
| example_database
| information_schem
| mysql
| performance_schem
| sys
+-----+
6 rows in set (0.01 sec)

mysql>
```


Ubuntu 64-bit v2 - VMware Workstation 16 Player (Evaluation license)

Player

Activities

Terminal

21:58 9 أكتوبر

moh2@moh2-virtual-machine: ~

```

ess "dbus-launch" (No such file or directory)
(gedit:2684): dconf-WARNING **: 21:56:14.737: failed to commit changes to dconf: Failed to execute child process "dbus-launch" (No such file or directory)
(gedit:2684): dconf-WARNING **: 21:56:14.738: failed to commit changes to dconf: Failed to execute child process "dbus-launch" (No such file or directory)
(gedit:2684): dconf-WARNING **: 21:56:14.738: failed to commit changes to dconf: Failed to execute child process "dbus-launch" (No such file or directory)
** (gedit:2684): WARNING **: 21:57:14.368: Set document metadata failed: Setting attribute metadata::gedit-shell-language not supported
** (gedit:2684): WARNING **: 21:57:14.368: Set document metadata failed: Setting attribute metadata::gedit-encoding not supported
** (gedit:2684): WARNING **: 21:57:17.764: Set document metadata failed: Setting attribute metadata::gedit-shell-language not supported
** (gedit:2684): WARNING **: 21:57:17.766: Set document metadata failed: Setting attribute metadata::gedit-encoding not supported
sudo service mysql restart

** (gedit:2684): WARNING **: 21:57:53.722: Set document metadata failed: Setting attribute metadata::gedit-shell-language not supported
** (gedit:2684): WARNING **: 21:57:53.723: Set document metadata failed: Setting attribute metadata::gedit-encoding not supported
** (gedit:2684): WARNING **: 21:58:02.003: Set document metadata failed: Setting attribute metadata::gedit-position not supported
(gedit:2684): dconf-WARNING **: 21:58:02.006: failed to commit changes to dconf: Failed to execute child process "dbus-launch" (No such file or directory)
moh2@moh2-virtual-machine:~$ sudo service mysql restart

```

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Lab 5

رأسية

Lab 5

```

sudo vi /etc/mysql/mysql.conf.d/mysqld.cnf

# Go to the line with "bind-address 127.0.0.1" and comment it out
Press "I" in keyboard, and add "#" at the beginning of the line

# hit button "esc"

# press ":wq" keyboard to save the file

sudo service mysql restart

Create a database and Filling it up with data

sudo mysql

CREATE DATABASE example_database;

CREATE USER 'example_user'@'%' IDENTIFIED WITH mysql_native_password BY 'password';

GRANT ALL ON example_database.* TO 'example_user'@'%';

SHOW DATABASES;

CREATE TABLE example_database.todo_list (item_id INT AUTO_INCREMENT, content VARCHAR(255), PRIMARY KEY(item_id));

INSERT INTO example_database.todo_list (content) VALUES ("My first important item");

```

Ubuntu 64-bit v2 - VMware Workstation 16 Player (Evaluation license)

Player

Activities

Terminal

22:03 9 أكتوبر

moh2@moh2-virtual-machine: ~

```

** (gedit:2684): WARNING **: 21:57:53.723: Set document metadata failed: Setting attribute metadata::gedit-encoding not supported
** (gedit:2684): WARNING **: 21:58:02.003: Set document metadata failed: Setting attribute metadata::gedit-position not supported
(gedit:2684): dconf-WARNING **: 21:58:02.006: failed to commit changes to dconf: Failed to execute child process "dbus-launch" (No such file or directory)
moh2@moh2-virtual-machine:~$ sudo service mysql restart

moh2@moh2-virtual-machine:~$ sudo mysql
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 8
Server version: 8.0.30-0ubuntu0.22.04.1 (Ubuntu)

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

mysql> CREATE DATABASE example_database;
Query OK, 1 row affected (0.00 sec)

mysql> CREATE USER 'moh'@'%' IDENTIFIED WITH mysql_native_password BY 'Aa@12345678';
Query OK, 0 rows affected (0.02 sec)

mysql>

```

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Lab 5

مقررات الدراسية

Lab 5

```

file

th data

ase;

IDENTIFIED WITH mysql_native_password BY 'password';

TO 'example_user'@'%';

odo_list (item_id INT AUTO_INCREMENT, content VARCHAR(255),

o_list (content) VALUES ("My first important item");
o_list (content) VALUES ("My second important item");
o_list (content) VALUES ("My third important item");
o_list (content) VALUES ("My fourth important item");
o_list (content) VALUES ("My fifth important item");

atabase.todo_list;

```

TODO

1. First
2. Second
3. Third
4. Forth
5. Fifth

