CS 513 Software Systems(ESD)

Lab 1 - Environment Setup

Lab Objectives

We would be installing all the necessary packages and libraries that are needed for a simple 3-tier full stack development project up and running.

At the end of this lab, we"ll be ready with and environment that supports:

- Front-end:
  - HTML
  - CSS
  - ReactJS
  - JavaScript

- Middleware
  - Java
  - Maven
  - Hibernate

- Backend
  - MySQL

Lab Activities

1. **Installing Java**

   - Ubuntu 22.04
     https://www.digitalocean.com/community/tutorials/how-to-install-java-with-apt-on-ubuntu-22-04

   - Ubuntu 20.04
     https://www.digitalocean.com/community/tutorials/how-to-install-java-with-apt-on-ubuntu-20-04

- Ubuntu 18.04: https://www.digitalocean.com/community/tutorials/how-to-install-java-with-apt-on-ubuntu-18-04

For testing java installation:

$ java -version
$ javac -version

For changing java version:

$ sudo update-alternatives –config javac
$ sudo update-alternatives –config java

2. **Installing MySQL**

   - For Ubuntu 22.04 https://www.digitalocean.com/community/tutorials/how-to-install-mysql-on-ubuntu-22-04

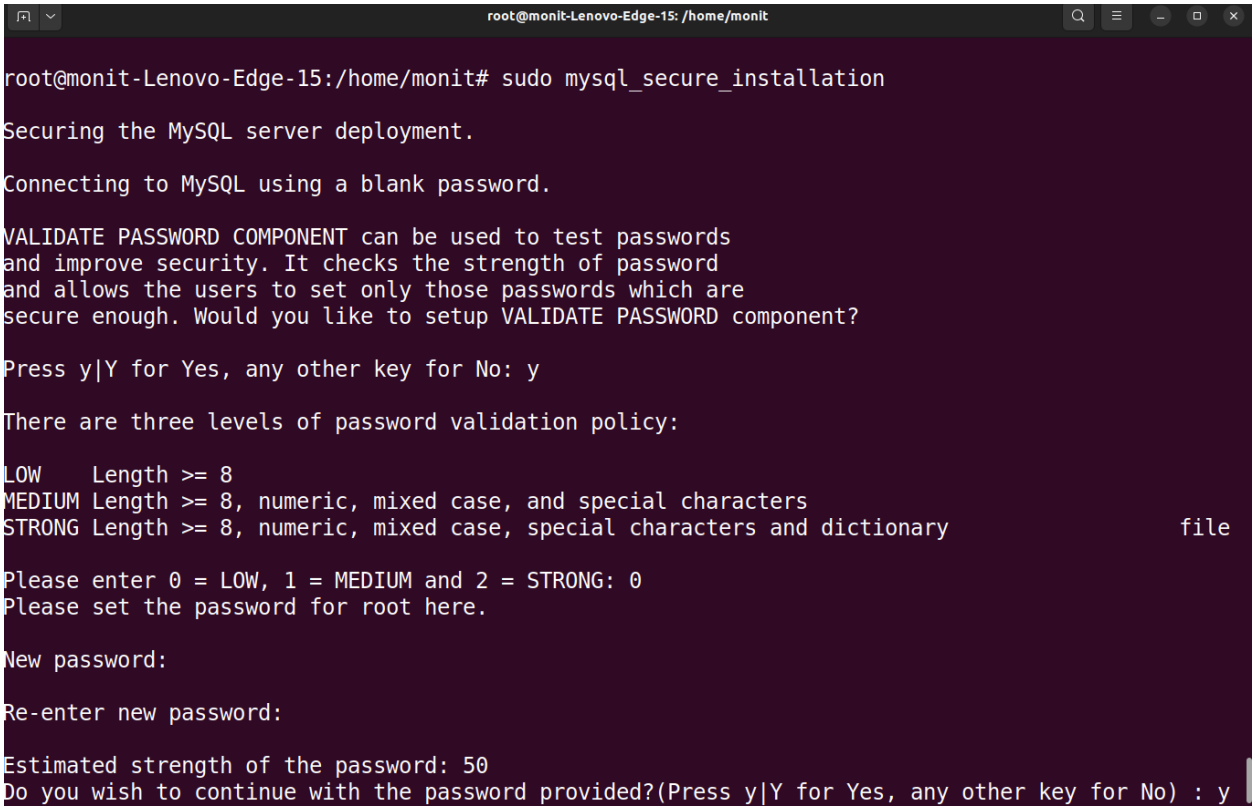
   - For Ubuntu 20.04 https://www.digitalocean.com/community/tutorials/how-to-install-mysql-on-ubuntu-20-04

   - For Ubuntu 18.04 https://www.digitalocean.com/community/tutorials/how-to-install-mysql-on-ubuntu-18-04

$ sudo apt update
$ sudo apt install mysql-server

This will install mysql but will not prompt you to set a password or make any other configuration changes. because this leaves your installation of MySQL insecure, we will address this next.

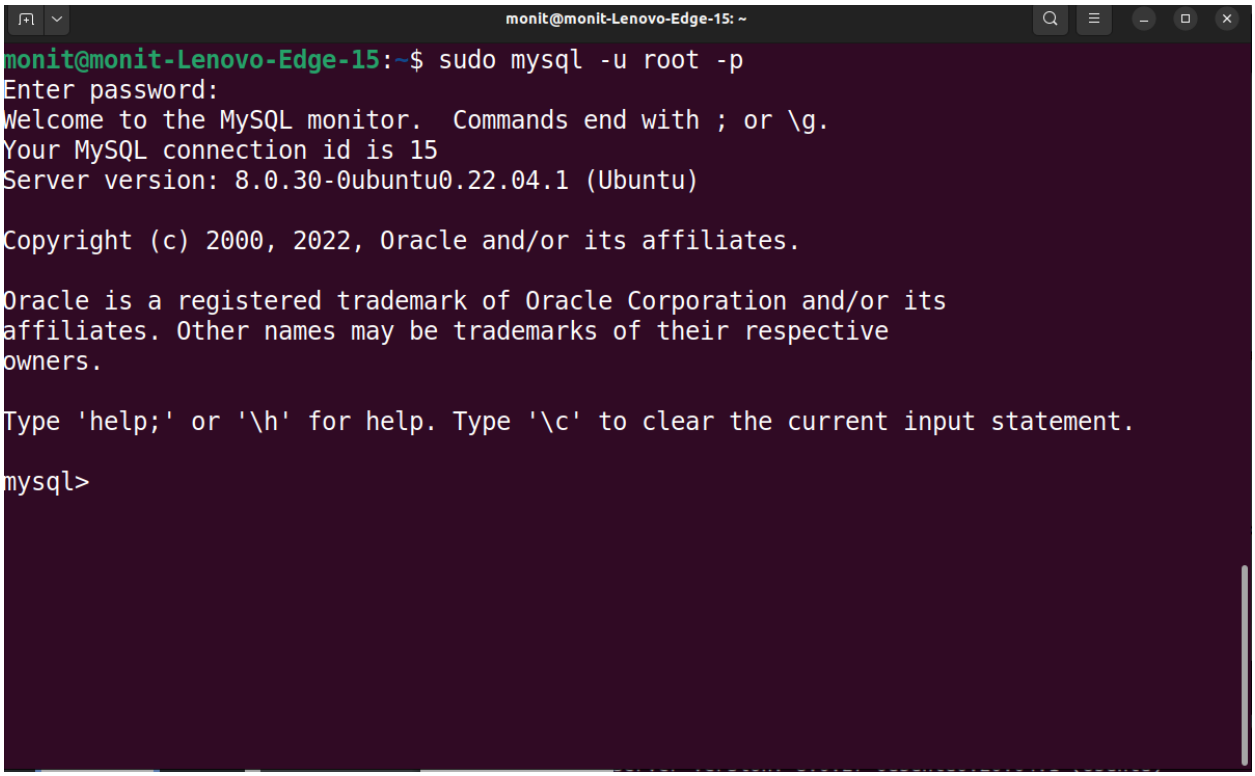
$ sudo mysql_secure_installation


root@monit-Lenovo-Edge-15: /home/monit
root@monit-Lenovo-Edge-15:/home/monit# sudo mysql_secure_installation
Securing the MySQL server deployment.
Connecting to MySQL using a blank password.
VALIDATE PASSWORD COMPONENT can be used to test passwords
and improve security. It checks the strength of password
and allows the users to set only those passwords which are
secure enough. Would you like to setup VALIDATE PASSWORD component?
Press y|Y for Yes, any other key for No: y
There are three levels of password validation policy:
LOW Length >= 8
MEDIUM Length >= 8, numeric, mixed case, and special characters
STRONG Length >= 8, numeric, mixed case, special characters and dictionary file
Please enter 0 = LOW, 1 = MEDIUM and 2 = STRONG: 0
Please set the password for root here.
New password:
Re-enter new password:
Estimated strength of the password: 50
Do you wish to continue with the password provided?(Press y|Y for Yes, any other key for No) : y


monit@monit-Lenovo-Edge-15: ~
New password:
Re-enter new password:
Estimated strength of the password: 50
Do you wish to continue with the password provided?(Press y|Y for Yes, any other key for No) : y
By default, a MySQL installation has an anonymous user,
allowing anyone to log into MySQL without having to have
a user account created for them. This is intended only for
testing, and to make the installation go a bit smoother.
You should remove them before moving into a production
environment.
Remove anonymous users? (Press y|Y for Yes, any other key for No) : y
Success.
Normally, root should only be allowed to connect from
'localhost'. This ensures that someone cannot guess at
the root password from the network.
Disallow root login remotely? (Press y|Y for Yes, any other key for No) : n

Now you can login into MySQL using following command

$ sudo mysql -u root -p



We have login into MySql with root privileges, follow the given process below to add the user and login into MySql through non-root users.

mysql> show databases;

mysql> use mysql;

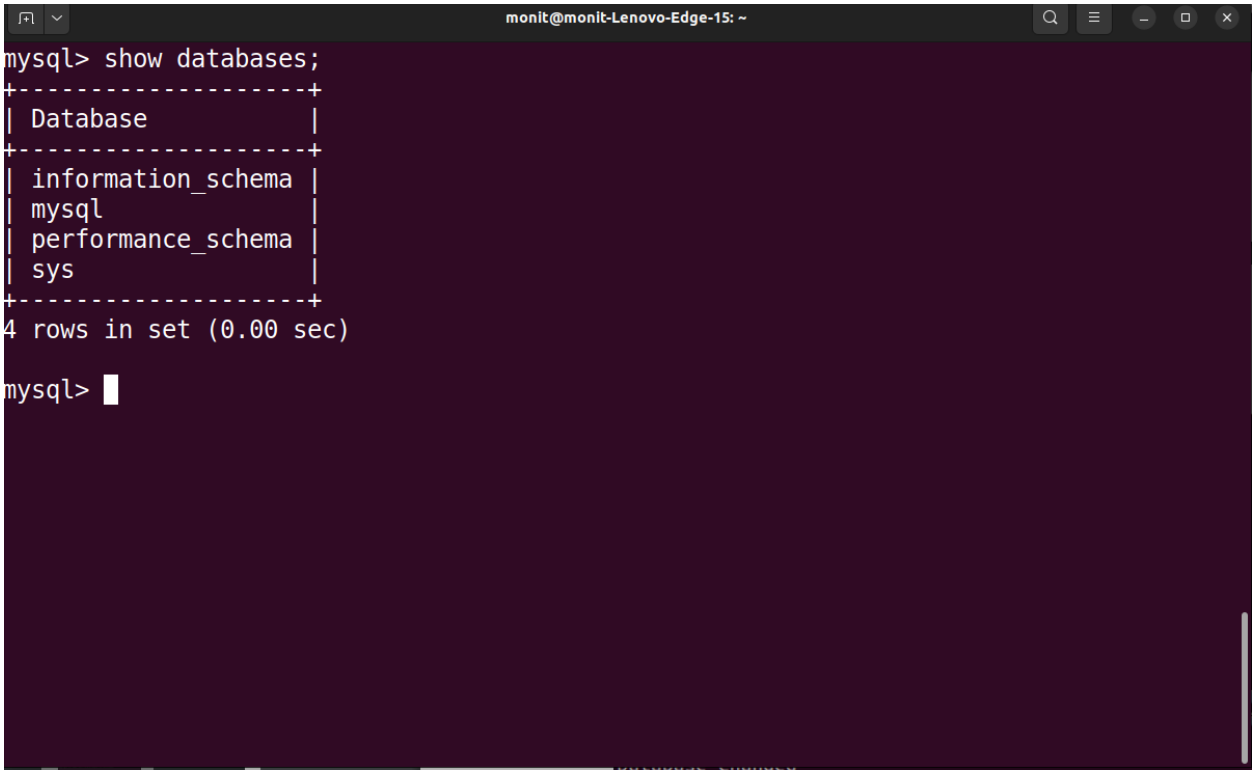
mysql> select Host, User from user;

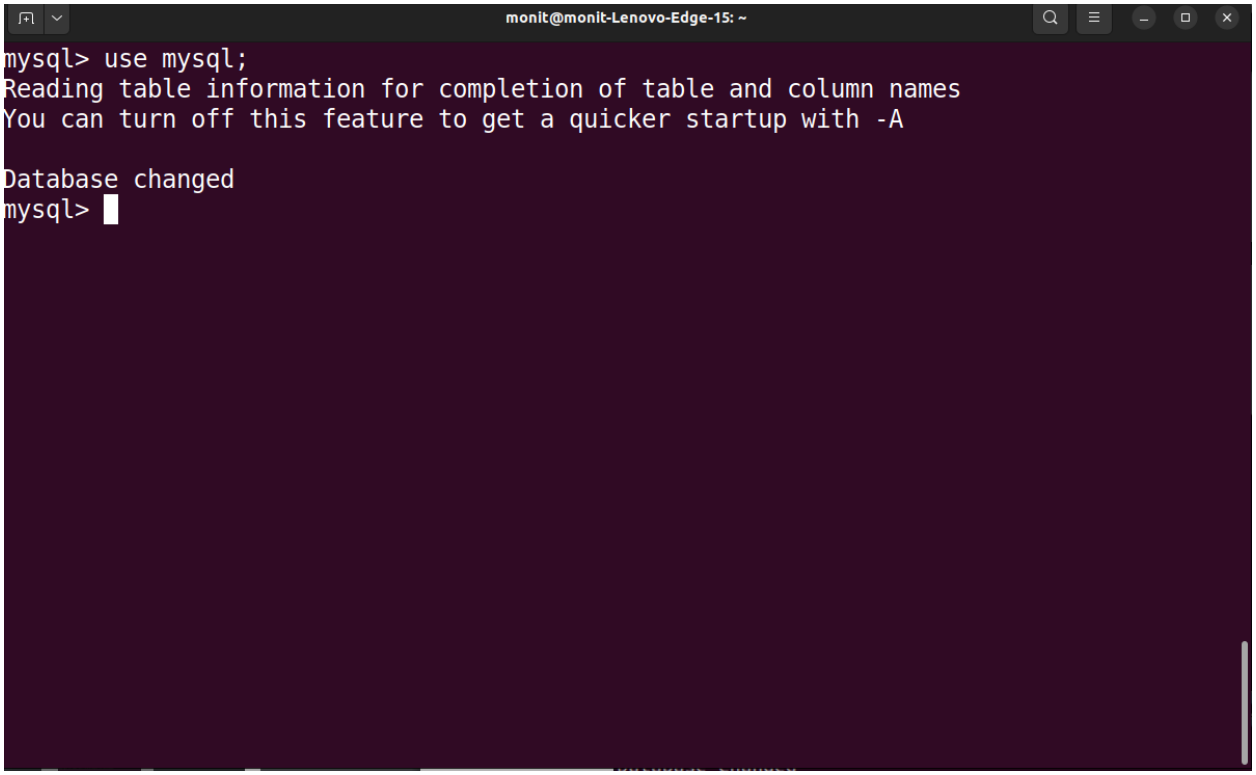
*mysql> alter user root@localhost identified with mysql_native_password by '**yourpassword**';*

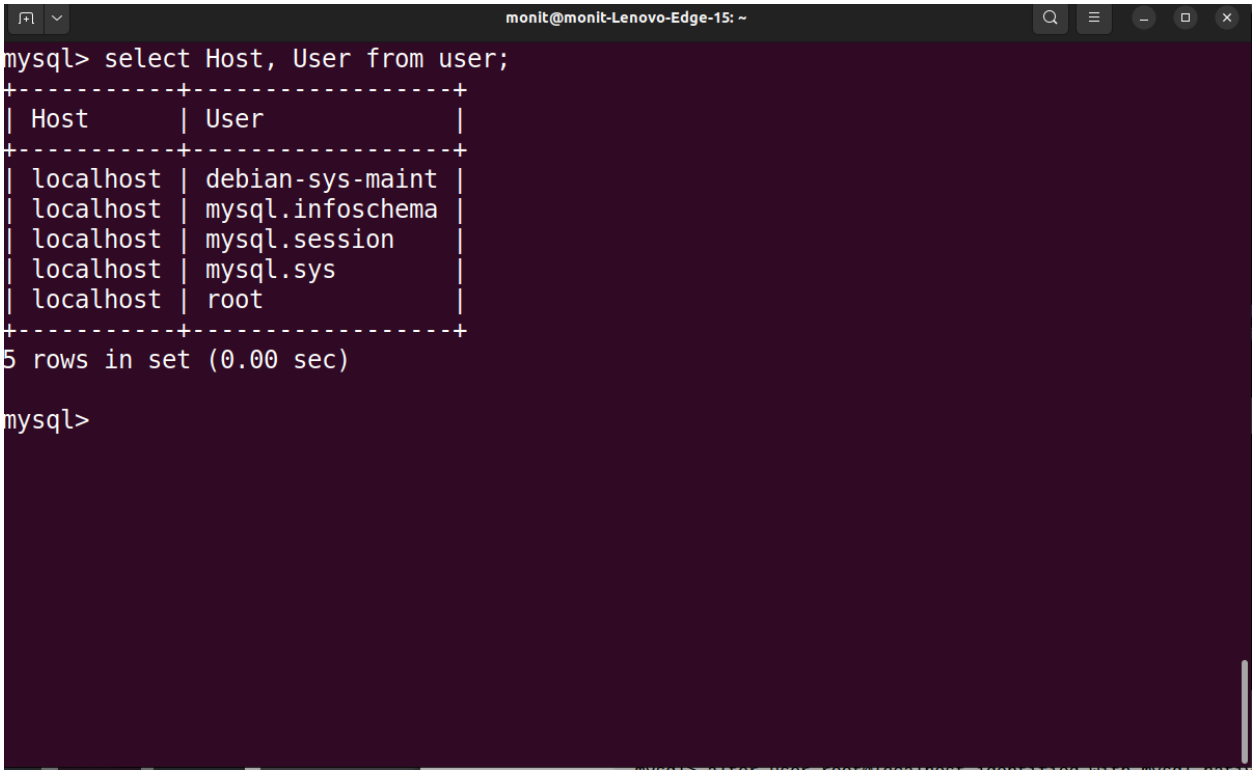
mysql> flush privileges;

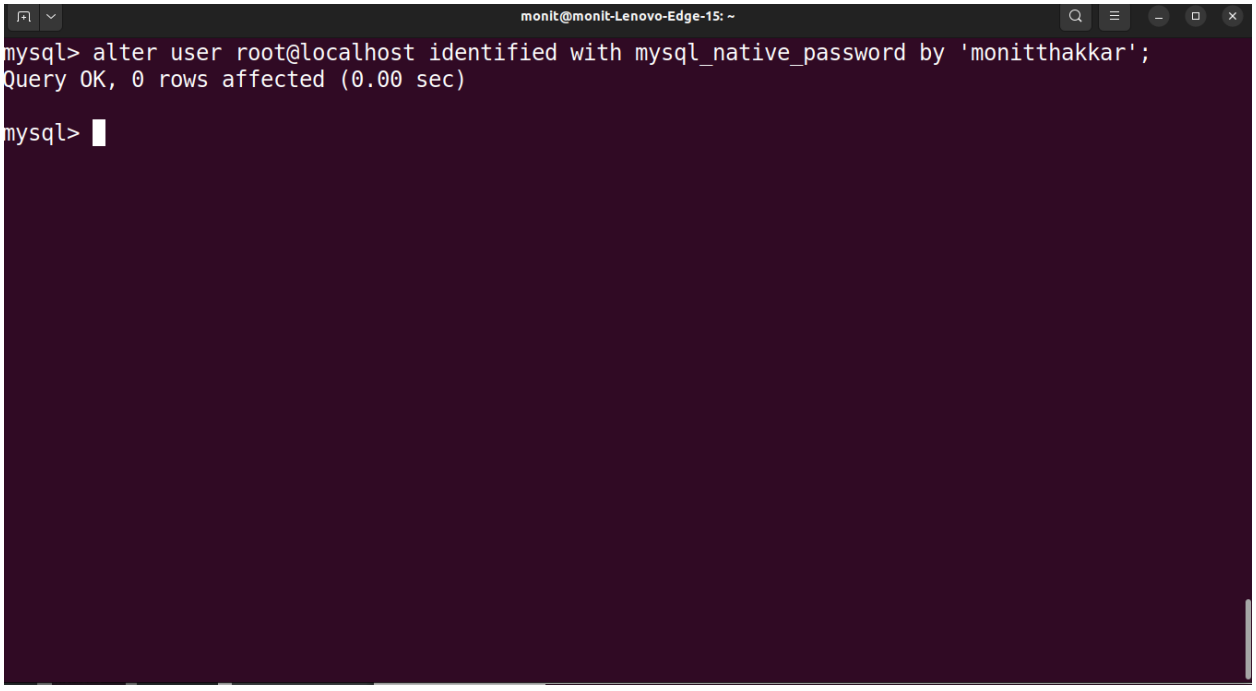
*mysql> create user **yourusername**@localhost identified by '**yourpassword**'*

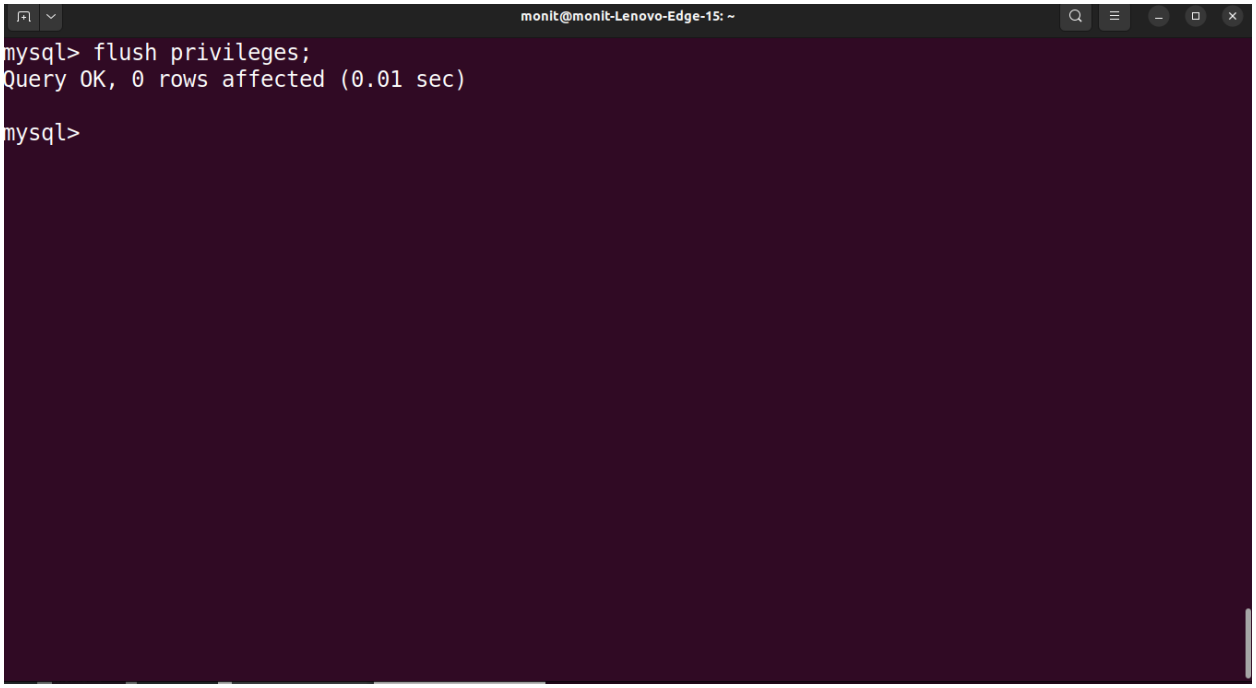
*mysql> GRANT ALL PRIVILEGES ON *.* to monit@localhost WITH GRANT OPTION;*
mysql>exit;

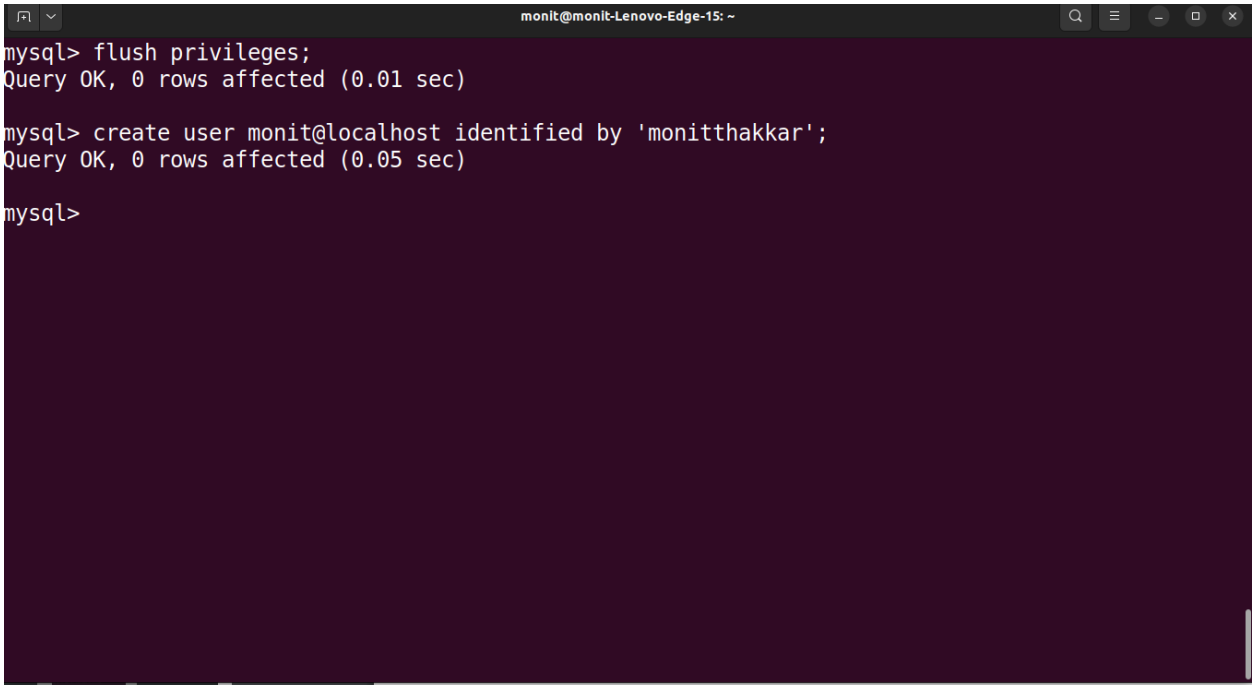

monit@monit-Lenovo-Edge-15: ~
mysql> show databases;
+--------------------+
| Database |
+--------------------+
| information_schema |
| mysql |
| performance_schema |
| sys |
+--------------------+
4 rows in set (0.00 sec)
mysql>

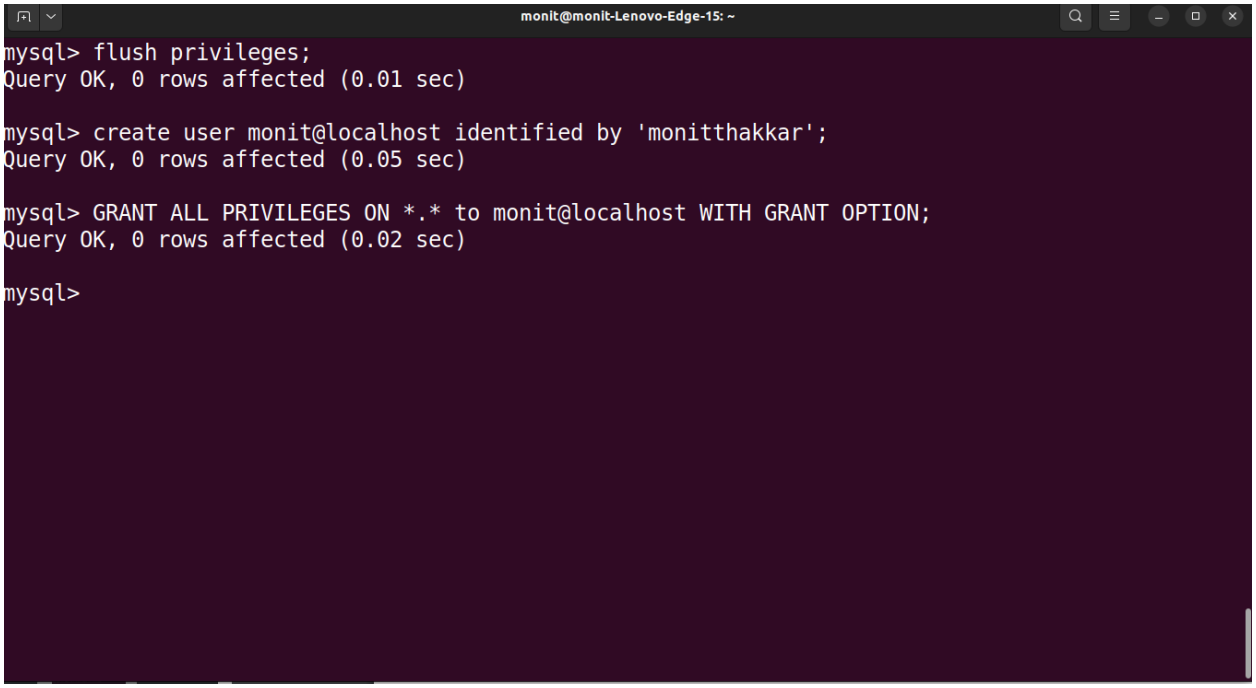

monit@monit-Lenovo-Edge-15: ~
mysql> use mysql;
Reading table information for completion of table and column names
You can turn off this feature to get a quicker startup with -A
Database changed
mysql>

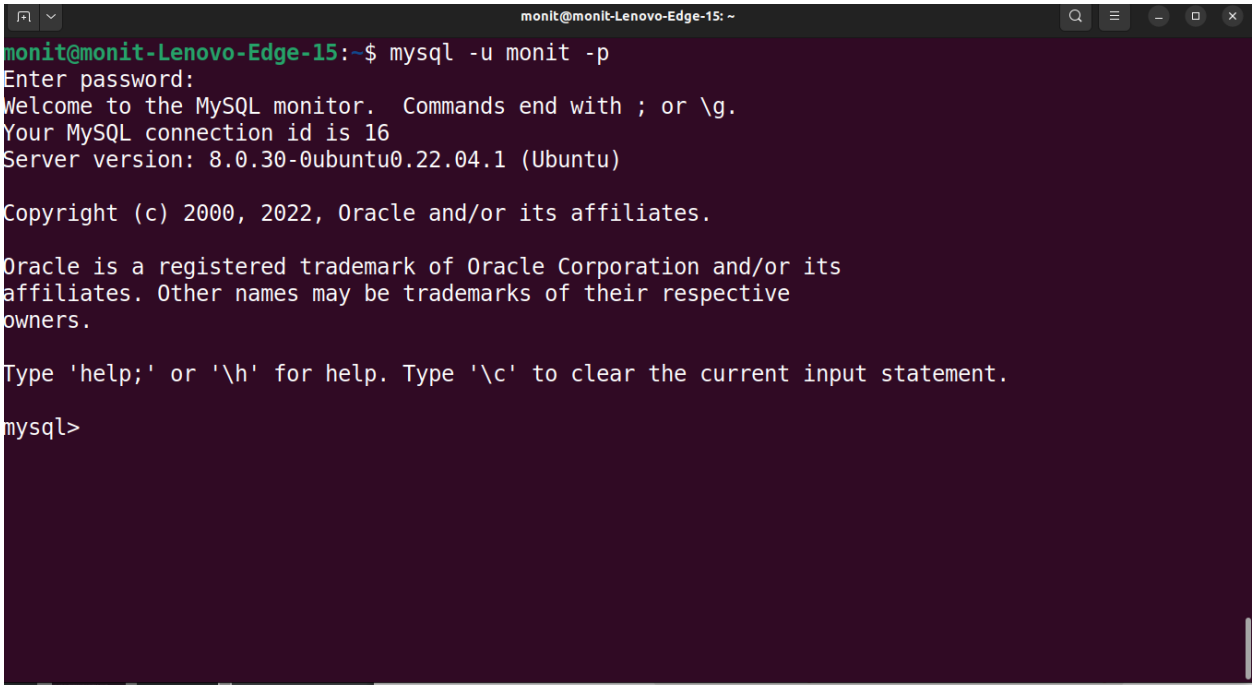

monit@monit-Lenovo-Edge-15: ~
mysql> select Host, User from user;
+-----------+------------------+
| Host | User |
+-----------+------------------+
localhost	debian-sys-maint
localhost	mysql.infoschema
localhost	mysql.session
localhost	mysql.sys
localhost	root
+-----------+------------------+
5 rows in set (0.00 sec)
mysql>


monit@monit-Lenovo-Edge-15: ~
mysql> alter user root@localhost identified with mysql_native_password by 'monitthakkar';
Query OK, 0 rows affected (0.00 sec)
mysql>


monit@monit-Lenovo-Edge-15: ~
mysql> flush privileges;
Query OK, 0 rows affected (0.01 sec)
mysql>


monit@monit-Lenovo-Edge-15: ~
mysql> flush privileges;
Query OK, 0 rows affected (0.01 sec)
mysql> create user monit@localhost identified by 'monitthakkar';
Query OK, 0 rows affected (0.05 sec)
mysql>


monit@monit-Lenovo-Edge-15: ~
mysql> flush privileges;
Query OK, 0 rows affected (0.01 sec)
mysql> create user monit@localhost identified by 'monitthakkar';
Query OK, 0 rows affected (0.05 sec)
mysql> GRANT ALL PRIVILEGES ON *.* to monit@localhost WITH GRANT OPTION;
Query OK, 0 rows affected (0.02 sec)
mysql>


monit@monit-Lenovo-Edge-15: ~
monit@monit-Lenovo-Edge-15:~$ mysql -u monit -p
Enter password:
Welcome to the MySQL monitor. Commands end with ; or \g.
Your MySQL connection id is 16
Server version: 8.0.30-0ubuntu0.22.04.1 (Ubuntu)
Copyright (c) 2000, 2022, Oracle and/or its affiliates.
Oracle is a registered trademark of Oracle Corporation and/or its
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>

3. Install NodeJS

Node.js provides a runtime environment to execute JavaScript code from outside a browser. NPM, the Node package manager, is used for managing and sharing the packages for either React or Angular.

Install NodeJS in Ubuntu:

$ sudo apt update
$ sudo apt install nodejs

Check the installation of NodeJS:

$ node -v

You must get the appropriate nodeJS version as an output.

Install the NPM package:

$ sudo apt install npm

The next step is to install a tool called create-react-app using NPM. This tool is used to create react applications easily from our system. You can install this at the system level or temporarily at a folder level. We will install it globally by using the following command.

$ npm install -g create-react-app

After the create-react-app is installed, we can create our first react application. create a new Project now using the following command:

$ create-react-app test-project

Note: if you get the version related error while running the command, then try the following commands and rerun the above command:

```
$ npm cache clean -f
$ sudo npm install -g n
$ sudo n latest
```

Run the react project using the following commands:

$ cd test-project
$ npm start

Launch the browser and visit http://localhost:3000.

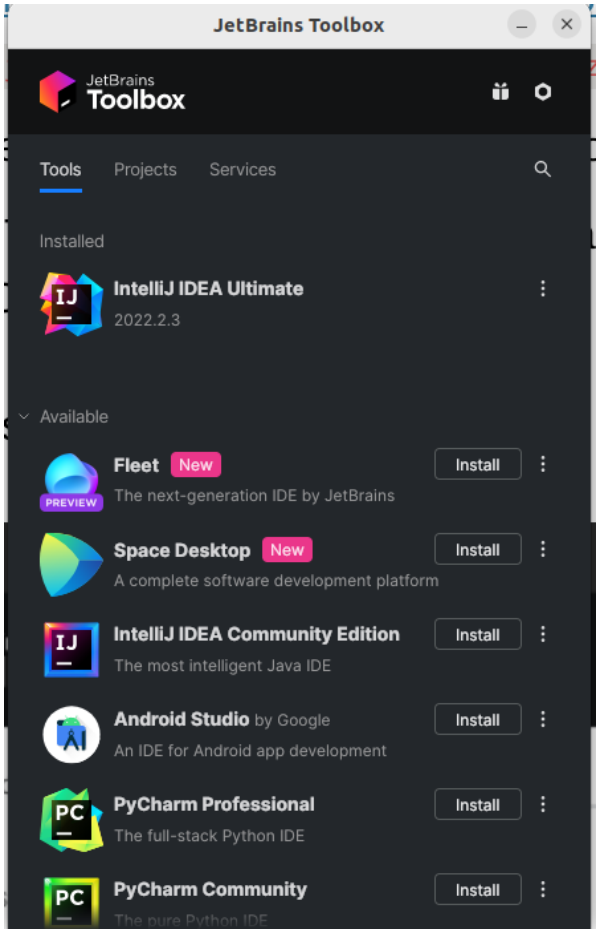
4. **IntelliJ and Maven**

Download the toolbox: https://www.jetbrains.com/toolbox-app/

Extract it and install it by double clicking the executable file to start the toolbox.

Create an account with your IIITB email address to avail 1 year free ultimate edition of IntelliJ. You can proceed with the community edition as well.

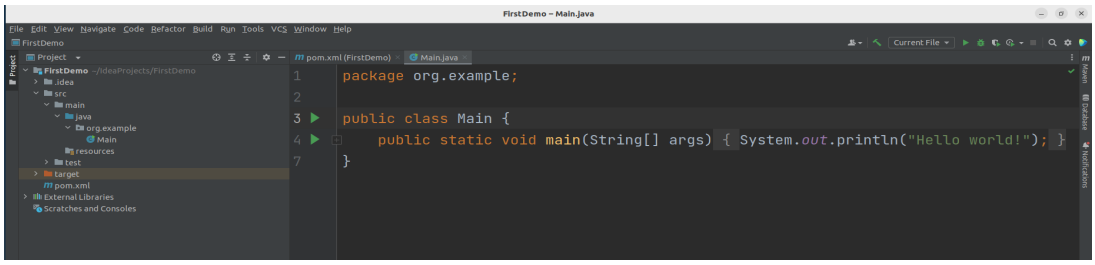
Login with your account and install the desired version of intelliJ.



Open IntelliJ and create a new maven project. IntelliJ will automatically detect your java SDK when you create a new project. Proceed with default configuration. Create a new project to run the hello world program.

Right click on the source folder and create a new class called HelloWorld

Paste in the following code in your newly created class HelloWorld and run it.



You should see “hello world!” on your output screen.

5. Hibernate

- When you create a maven project you will notice a pom.xml file automatically created
- Add this code snippet to get hibernate dependencies for your project

```
    <groupId>org.example</groupId>
    <artifactId>FirstDemo</artifactId>
    <version>1.0-SNAPSHOT</version>

    <properties>
        <maven.compiler.source>11</maven.compiler.source>
        <maven.compiler.target>11</maven.compiler.target>
        <project.build.sourceEncoding>UTF-8</project.build.sourceEncoding>
    </properties>
    <dependencies>
    <dependency>
        <groupId>org.hibernate</groupId>
        <artifactId>hibernate-core</artifactId>
        <version>6.1.4.Final</version>
        <type>pom</type>
    </dependency>
    </dependencies>

</project>
```

You can get more dependencies later from : https://mvnrepository.com. They can be incorporated in a similar manner.