Objective(s):

Lab 01: Foundation statements of SQL

1. Basics of SQL
2. MYSQL Installation
3. Connect to MYSQL Database from Command Line
4. Understand the basic terminology of SQL
5. How to Load the Sample Database into MySQL Server
6. SHOW, USE, SOURCE Statement
7. SELECT Statement.
8. DISTINCT Statement.
9. SELECT Top Clause.
10. Functions with SELECT Statement.

1: Basics of SQL

Database is a structured collection of data. The data relating to each other by nature, e.g., a product belonged to a product category and associated with multiple tags. Therefore, we use the term relational database. Because we deal with a significant amount of data, we need a way to define the databases, tables, etc., and process data more efficiently. Besides, we want to turn the data into information.

And this is where SQL comes to play.

MySQL My is the daughter's name of the MySQL's co-founder, Monty Widenius. SQL is a standard language for accessing and manipulating databases. SQL stands for Structured Query Language, it lets you access and manipulate databases. It is open source software backed by Oracle. It means you can use MySQL without paying a dime. Also, if you want, you can change its source code to suit your needs.

Even though MySQL is open source software, you can buy a commercial license version from Oracle to get premium support services.

SQL can do...
SQL can execute queries against a database

SQL can retrieve data from a database

SQL can insert records in a database

SQL can update records in a database
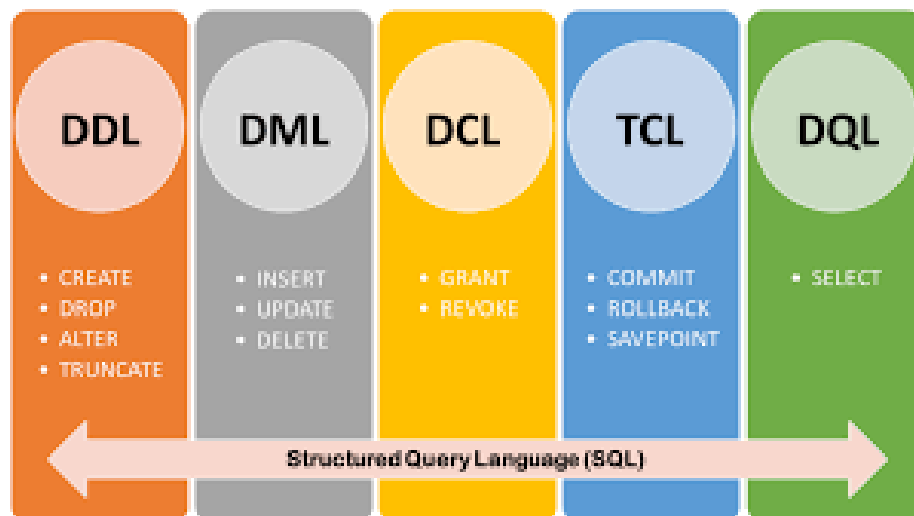
SQL can delete records from a database

SQL can create new databases

SQL can create new tables in a database

SQL can create stored procedures in a database

SQL can create views in a database

SQL can set permissions on tables, procedures, and views

Structured Query Language (SQL)

There are five types of SQL statements, outlined in the following list:

1. Data Query Language statement (DQL) retrieve rows stored in database tables. You write a query using the SQL
   a. **SELECT** statement.
2. Data Manipulation Language (DML) statements modify the contents of tables. There are three DML statements:
   a. **INSERT** adds rows to a table.
   b. **UPDATE** changes rows.
   c. **DELETE** removes rows.
3. Data Definition Language (DDL) statements define the data structures, such as tables, that make up a database. There are five basic types of DDL statements:
   a. **CREATE** creates a database structure. For example, CREATE TABLE is used to create a table; another example is CREATE USER, which is used to create a database user.
   b. **ALTER** modifies a database structure. For example, ALTER TABLE is used to modify a table.
   c. **DROP** removes a database structure. For example, DROP TABLE is used to remove a table.
   d. **RENAME** changes the name of a table.
   e. **TRUNCATE** deletes all the rows from a table.
4. Transaction Control (TC) statements either permanently record any changes made to rows, or undo those changes. There are three TC statements:
   a. **COMMIT** permanently records changes made to rows.
   b. **ROLLBACK** undoes changes made to rows.
   c. **SAVEPOINT** sets a "save point" to which you can roll back changes.
5. Data Control Language (DCL) statements change the permissions on database structures. There are two DCL statements:
   a. **GRANT** gives another user access to your database structures.
   b. **REVOKE** prevents another user from accessing your database structures.
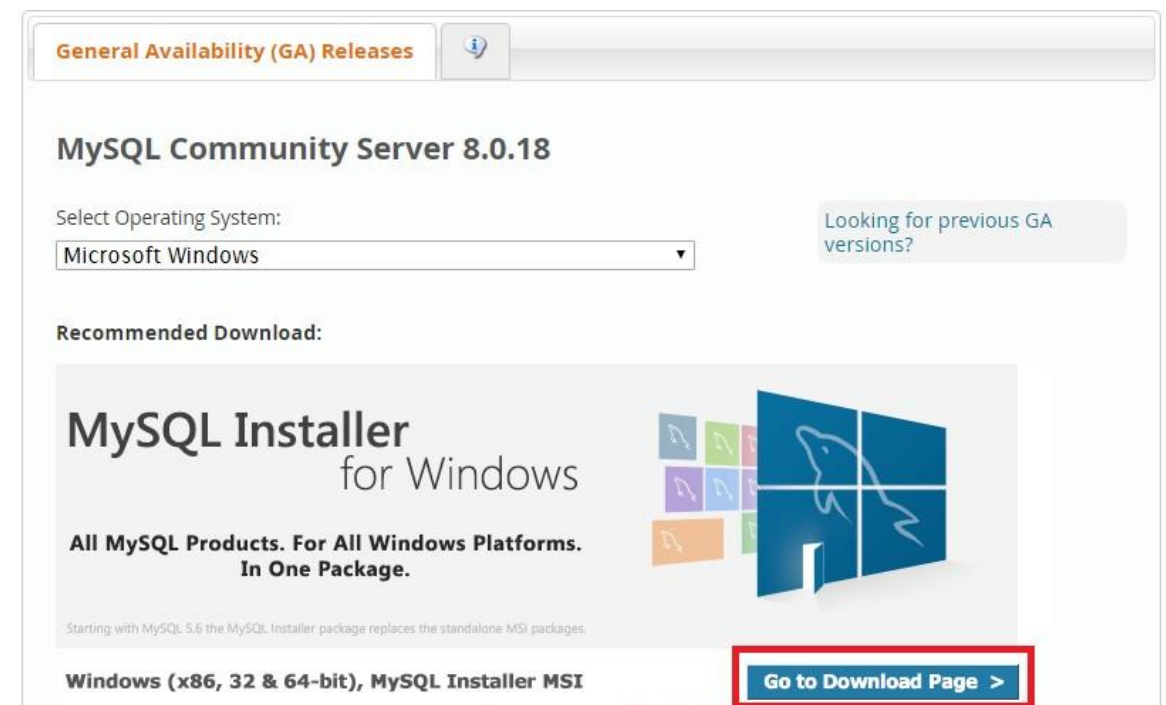
2: MYSQL Installation

Step 01:

[Download MYSQL](#)

Step 02:

Step 03:

Step 04:

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‹ MySQL Installer

| General Availability (GA) Releases | Archives | ⓘ |

MySQL Installer 8.0.32

Select Operating System:

Microsoft Windows ⌄

Looking for previous GA versions?

Windows (x86, 32-bit), MSI Installer	8.0.32	2.4M	**Download**
(mysql-installer-web-community-8.0.32.0.msi)		MD5: 0f882590f8338adc614e9dc5cb00ca0b	Signature
Windows (x86, 32-bit), MSI Installer	**8.0.32**	**437.3M**	**Download**
(mysql-installer-community-8.0.32.0.msi)		**MD5: a29b5817cba2c7bc0e0b97e897c2591f | Signature**

Step 05:

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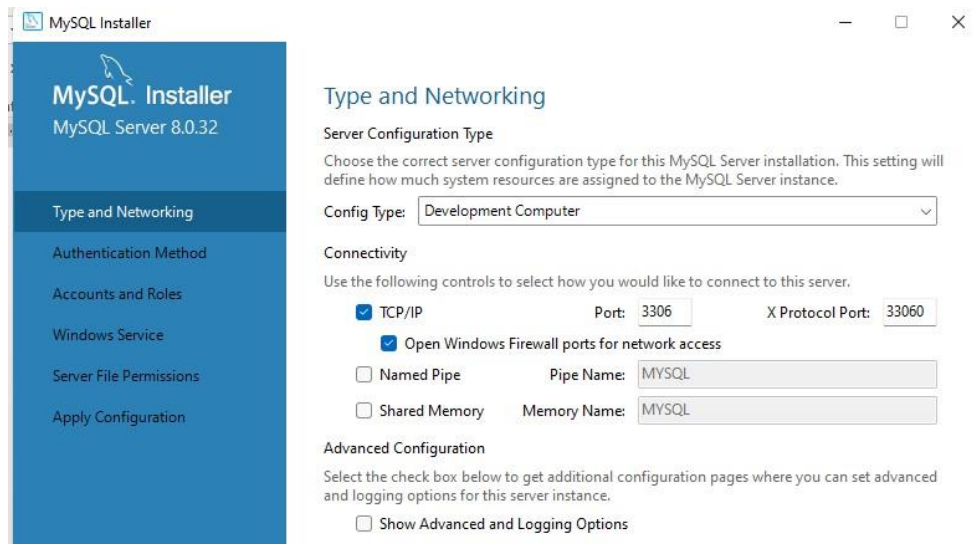**No thanks, just start my download.**

Step 06:

Run the downloaded file and follow the steps in the wizard.

Make sure that you have installed the following products:

1. MySQL Server 8.0.32
2. MySQL Workbench 8.0.32
3. MySQL Shell 8.0.32

The installer may also download Visual Studio Tools as a pre-requisite for MySQL Download.

- Configuration step: don't change anything

- Keep a strong password. My suggestion is to keep the password same for the whole class so that you may have any problem if you log on some other system next time.
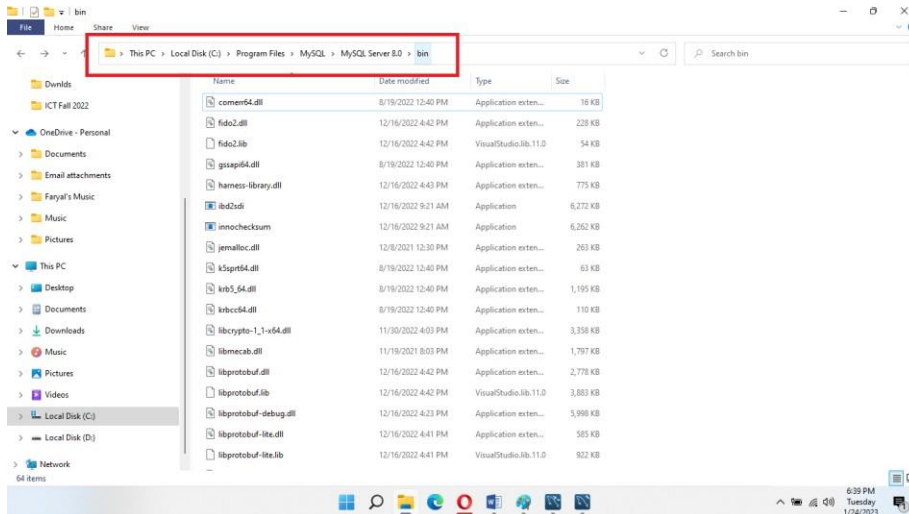- Password: **Username-123**
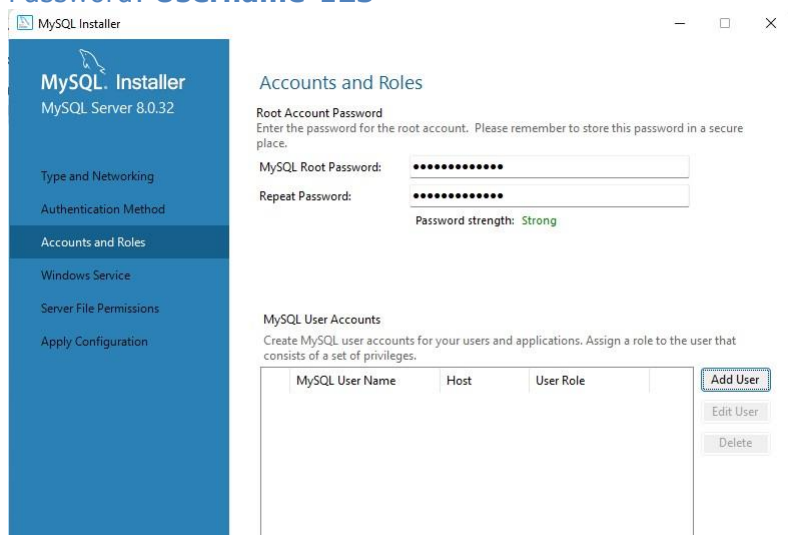
- Default user is root
- You may add more users by clicking "Add User"
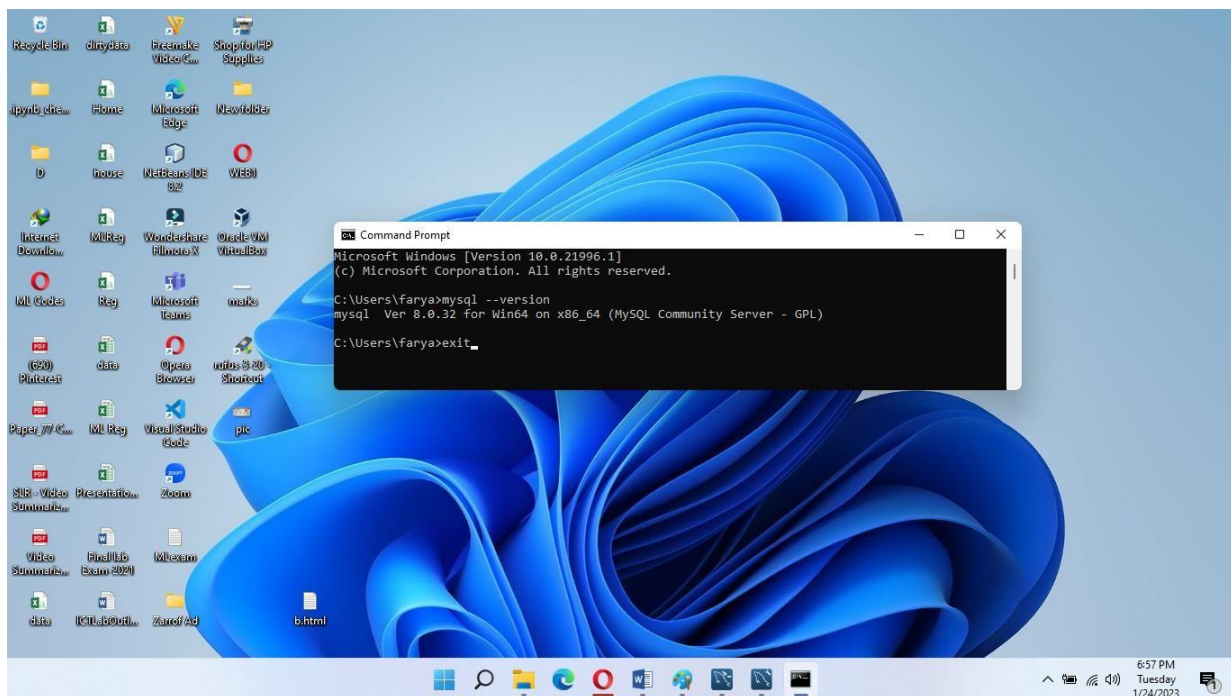
2: Connect to MYSQL Database from Command Line

Step 01:   Set Environment Variables:

Path = C:\Program Files\MySQL\MySQL Server 8.0\bin

Step 02: Run Command prompt and use the following command to ensure success

At the command line, type the following command, replacing *USERNAME* with your username:

```
mysql -u USERNAME -p
```

At the **Enter Password** prompt, type your password. When you type the correct password, the **mysql>** prompt appears.

To display a list of databases, type the following command at the **mysql>** prompt:

```
show databases;
```

To access a specific database, type the following command at the **mysql>** prompt, replacing *DBNAME* with the database that you want to access:

```
use DBNAME;
```

After you access a database, you can run SQL queries, list tables, and so on.

4: USE Statement

To select a particular database to work with you issue the USE statement as follows:

```
USE database_name;
```

In this statement, following the USE keyword is the name of the database that you want to select.

5: SELECT Statement

The SELECT statement is used to select data from a database. The data returned is stored in a result table, called the result-set. A SELECT indicates that we are merely reading information, as opposed to modifying it. What we are selecting is identified by an expression or column list immediately following the SELECT. The FROM statement specifies the name of the table or tables from which we are getting our data.

When you want to select **particular fields** available in the table, use the following syntax:

```
SELECT column1, column2, ...
FROM table_name;
```

Example:

```
SELECT FirstName, LastName
FROM Employees;
```

Selects data of these two columns from the Employees table

When you want to select **all the fields** available in the table, use the following syntax:

```
SELECT *
FROM table_name;
```

Example:

```
SELECT *
FROM Employees;
```

Selects all the employees records from the database and displays its columns.

6: DISTINCT Statement

The SELECT DISTINCT statement is used to return only distinct (different) values.

Inside a table, a column often contains many duplicate values; and sometimes you only want to list the different (distinct) values.

Syntax:

```
SELECT DISTINCT column1, column2, ...
FROM table_name;
```

7: SELECT Top Clause

The SELECT TOP clause is used to specify the number of records to return.

The SELECT TOP clause is useful on large tables with thousands of records. Returning a large number of records can impact performance.

Note: Not all database systems support the SELECT TOP clause. MySQL supports the **LIMIT** clause to select a limited number of records while Oracle uses ROWNUM.

MYSQL Syntax:

```
SELECT *
FROM table_name
LIMIT number;
```

The **OFF SET** value is also most often used together with the LIMIT keyword. The OFF SET value allows us to specify which row to start from retrieving data.

LIMIT with OFFSET Syntax:

```
SELECT *
FROM table_name
LIMIT OFFSET, number;
```

[Visit link for Oracle & SQL Server Syntax](#)

8: Functions with SELECT Statement

There are some functions that can be used in select statement.

Syntax:

```
SELECT function_name()
FROM table_name;
```

Functions are:

- MIN
- MAX
- AVG
- SUM
- COUNT
- UPPER
- LOWER
- LENGTH
- etc

9: Aliases

SQL aliases are used to give a table, or a column in a table, a temporary name. Aliases are often used to make column names more readable.

An alias only exists for the duration of the query.

Alias Column Syntax:

```
SELECT column_name AS alias_name
FROM table_name;
```

Alias Table Syntax:

```
SELECT column_name(s)
FROM table_name AS alias_name;
```

10: ORDER BY Keyword

The ORDER BY keyword is used to sort the result-set in ascending or descending order.

The ORDER BY keyword sorts the records in ascending order by default. To sort the records in descending order, use the DESC keyword.

Syntax:

```
SELECT column_name(s)
FROM table_name
ORDER BY column1, column2, ... ASC|DESC
```

Lab Task(s):

1. Download and install MYSQL in your computer.
2. Import provided "hr.sql" database by using command line.
3. Connect imported database from command line.

Exercise 2 (SELECT Statement)

1. Write a query to display the names (first_name, last_name) using the alias name "First Name", "Last Name".
2. Write a query to get a unique department ID from the employee table.
3. Write a query to get all employee details from the employee table order by the first name, descending.
4. Write a query to get the employee ID, names (first_name, last_name), salary in ascending order of salary.
5. Write a query to get the total salaries payable to employees.
6. Write a query to get the maximum and minimum salary from the employee's table.
7. Write a query to get the average salary and number of employees in the employees' table.
8. Write a query to get the number of jobs available in the employee's table.
9. Write a query to get all first names from the employee's table in the upper case.
10. Write a query to select the first 10 records from a table.
11. Write a query to select the 3rd & 4th records of the employee's table.
12. Write a query to select 2nd last record of the employee's table.

THE END