National University of Sciences and Technology (NUST)
School of Electrical Engineering and Computer Science

Department of Computing

Laboratory Manual

CS-220: Database Systems

Fall 2017

Class: BS(CS)-6B

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Introduction

Data is a collection of raw facts and figures. It is being processed to obtain useful information to assist organization in taking better decisions. Database is an organized collection of related data. In order to manage the databases, **Database Management Systems (DBMS)** or **Database Systems** offer sets of program and tools to efficiently access and manage the databases.

Relational data model is used to model the databases in Database Systems in the form of *relation* (table) comprising of *tuples* (rows) and *attributes* (columns). Primary key is the unique identifier for the relation and foreign key is used for referential purposes by the relation to include or refer to other relations data.

Structured Query Language (SQL) is used to access and modify the relational database. It's the most widely used query language supported by modern database management systems. SQL is a nonprocedural language.

Objectives

After performing this lab the students should be

- familiarized with MySQL and Workbench environment
- Load or unload a database in MySQL through MySQL Workbench
- Explore structure of tables in a database
- Create a test database

Tools/Software Requirement

Tools	Purpose
MySQL Community Server (5.6+)	Freely downloadable version of the world's most popular open source database
MySQL Workbench (6.1+)	MySQL Workbench provides a graphical tool for working with MySQL Servers and databases

Description

Understanding the Work Bench Environment

1. MySQL Workbench is a unified visual tool for database architects, developers, and DBAs. You can find it installed on your workstation. Select **Start>Program>MySQL>Workbench** to start up. The home screen shown in Figure 1:

Figure 1: Workbench Home Window

2. When MySQL Workbench first starts, it presents the **Home** window, which has three main sections:
   - List of MySQL Connections (help to manage and connect with MySQL server that actually runs the database)
   - Models (facilitate database design)
   - Shortcuts (quick access)
3. MySQL Workbench provides extensive facilities for working directly with SQL code. Before working directly with a live server, a connection must be created using **MySQL Connections** section on **Home** Window. After a connection is established, it is possible to execute SQL code directly on the server and manipulate the server using SQL code.

Making connection with MySQL Server

1. To administer your MySQL Server, you must first create a MySQL connection. Creating a MySQL connection is often the first action performed after installing MySQL Workbench.
2. To add a connection, click the **[+]** icon to the right of the **MySQL Connections** label on **Home** Window. This opens the **Setup New Connection** form. Fill out the connection detail as shown in Figure 2:

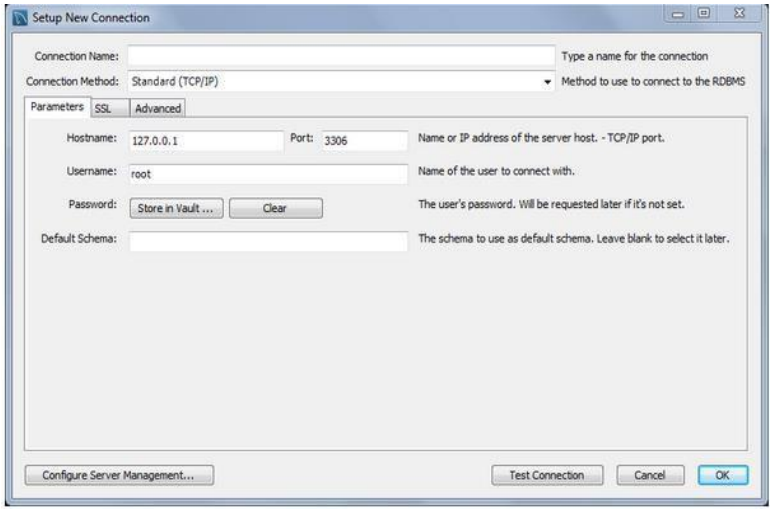


Figure 2: MySQL Server Connection Setup Window

3. Define the Connection Name value as **MyFirstConnection**. Click **OK**. The connection will appear in MySQL Connections list on **Home** Window.
4. Select the **MyFirstConnection** from **Home** Window, this opens the **SQL Editor** screen as shown in Figure 3:

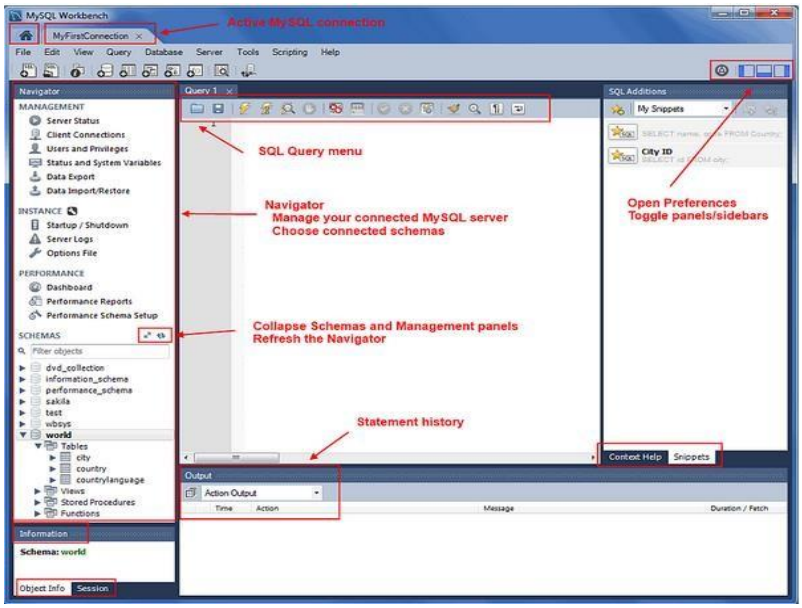


Figure 3: SQL Editor

5. For querying use **SQL Query** menu. It will open the **SQL Query Panel** as shown in Figure 4:

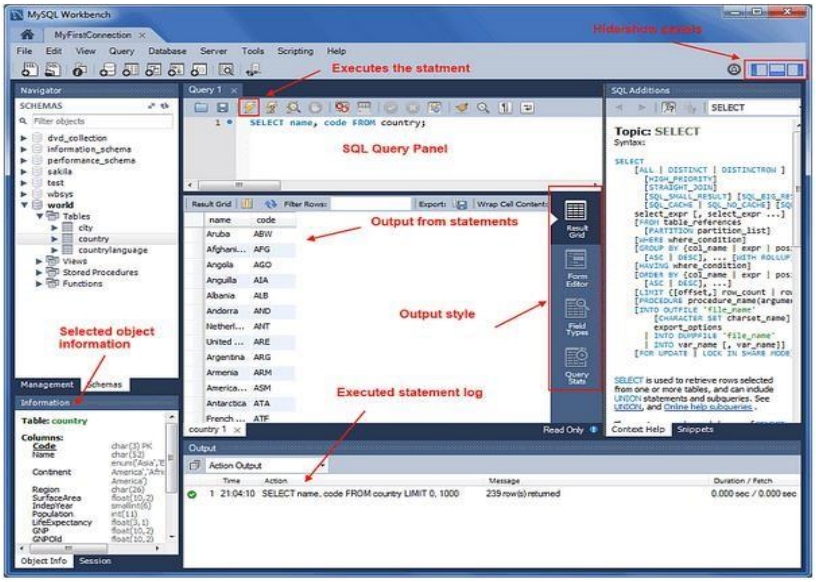
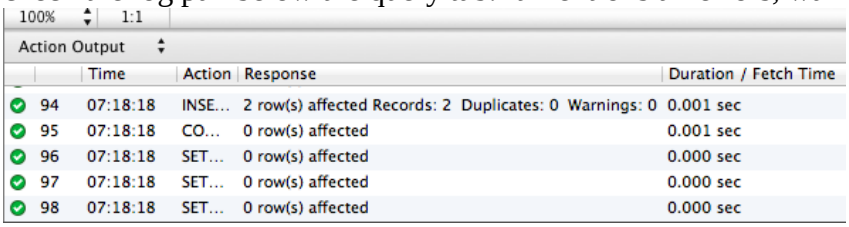


Figure 4: SQL Query Panel

Using the Sakila database

1. Download and unzip Sakila database. The archive contains three files: sakila-data.sql, sakila-schema.sql, and sakila.mwb.
2. Now right click and select drop on an existing database schema named Sakila. You will load it a fresh.
3. From File menu select Open SQL Script. Select sakila-schema.sql from the file selection dialog. It would open the file in the query pan. Now select Execute All from Query menu. You can alternatively press the Execute All icon  from the toolbar. Don't forget to check the log pan below the query tab. It mentions all errors, warnings, and messages.



4. Press the refresh icon in the schema section 

. You must see Sakila database in the list of the databases.
5. Repeat the process for sakila-data.sql file. If all goes well, you have successfully loaded the sakila database and now you can close the files (but not the Workbench).
6. Expand the Sakila database. Among the listed categories, expand Tables. You will see list of tables (relations) in Sakila database.
7. Right click on a table and explore the second option Table Inspector. It opens a new tab showing relation schema, attribute names and other metadata.
8. Afterwards right click on the same table and explore the first option: Select Rows. It will open another tab for navigating through the contents of the relation.
9. The data view supports many different options such as sorting on a column by selecting its header, searching contents, deleting a row, adding another, or exporting the contents to an external file. You can play with these options.

Lab Task

1. Create a sample database named *"Software_Engineering"* using MySQLWorkbench.

2. Add table "*Class"* to "*Software_Engineering"* database created in Task 1 and set the following fields as:

Column Name	Data Type	Column Properties
Class_ID	INT	PK, NN, AI
Semester	INT	None
Student_Name	VARCHAR(25)	None

3. Add the following data to *Class* table created in Task 2.

Student_name	Semester
Ali	4
Asad	5
Sara	6
Saba	3
Mohsin	3

Deliverables

Complete your lab tasks and write steps/screenshots of all the questions attempted in a document and upload on LMS. The marking will be based on viva/lab task submitted.