



Database Systems 1

Lab – Introduction to MySQL Workbench



Department of Information Technology

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RDBMS Software



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MySQL

- **MySQL** is the world's most popular open-source database management system.
- **MySQL** is an SQL-based relational database designed to store and manage structured data.
- **MySQL** is a popular database management system used in web development as a web application backend.

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SQL Language

- **SQL (Structured Query Language)** is used for
 - managing and manipulating relational databases.
- **SQL** is designed to interact with databases
 - by defining, querying, updating, and managing the data within them.

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Microsoft Access vs. MySQL

MS Access	MySQL
Slower, small number of users	Quicker, better performance for many users
Single login and password	Multiple security options
Can handle lower numbers of queries & payment transactions	Better for eCommerce - can support multiple queries and payment transactions
Cost per user licence can become expensive	No licences, more cost effective
Has a maximum storage and user number	Easily scalable for a growing business

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MySQL Key Benefits

- **Ease of Use**
- **Reliability**
- **Scalability**
- **Performance**
- **High Availability**
- **Security**
- **Flexibility**

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MySQL Workbench

- **MySQL Workbench** is a graphical tool for working with **MySQL** servers and databases.

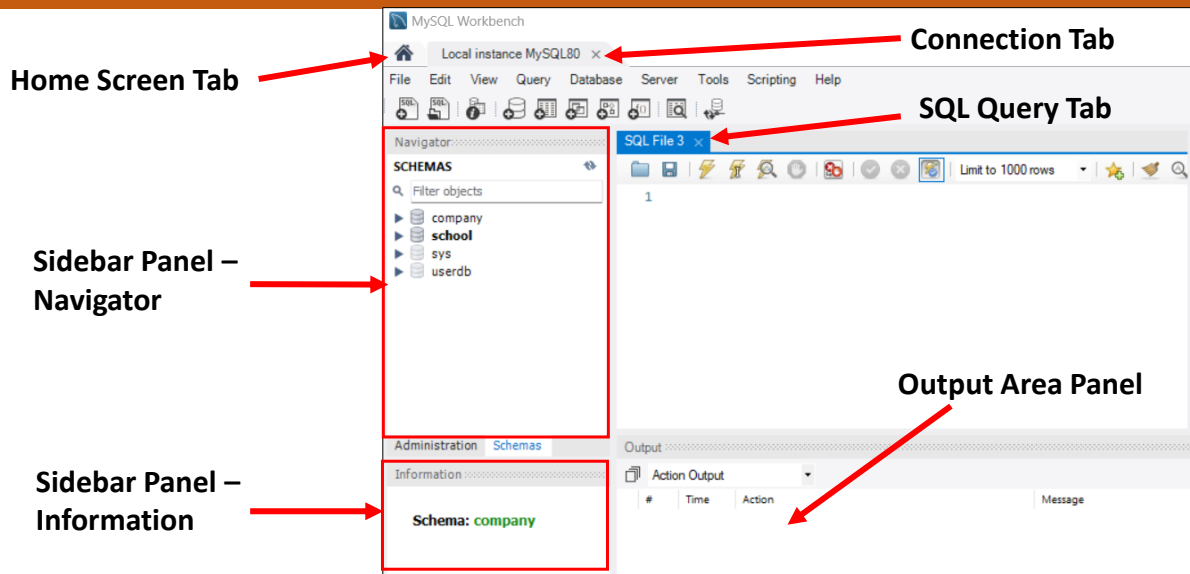
- **MySQL Workbench** is available in two editions:

- **Community** Edition → free of charge
- **Commercial** Edition → provides advanced features, not free.

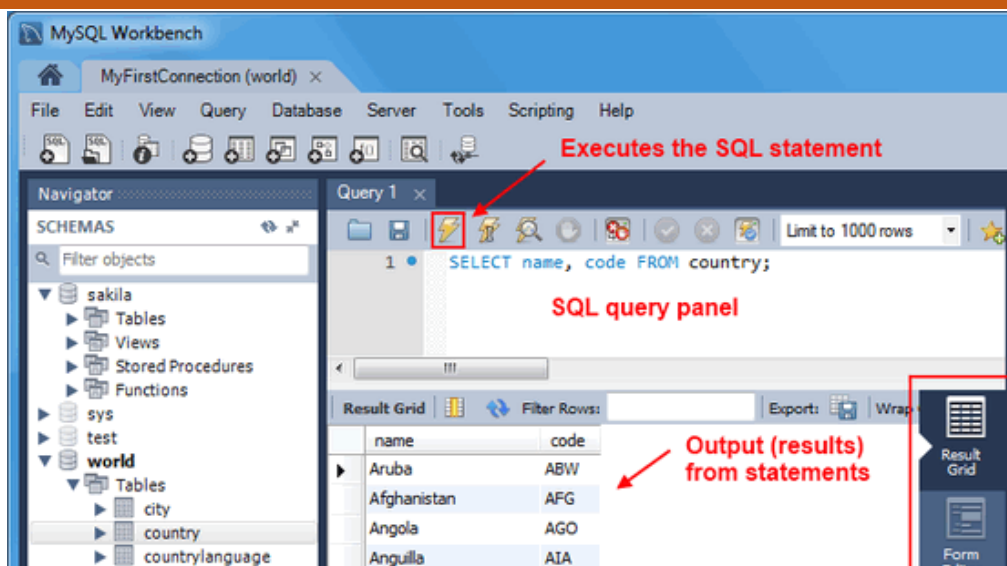


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MySQL Workbench Environment



SQL Editor –SQL Query Tab



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Some Data Types in MySQL

Data Type	Description	Storage (Bytes)
INT	A standard integer	4 Bytes
DECIMAL	A fixed-point number	4 Bytes
NUMERIC	A fixed-point number	4 Bytes
FLOAT	A floating-point number	4 Bytes
DOUBLE	A floating-point number that stores larger values than FLOAT	8 bytes

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Some Data Types in MySQL

Data Type	Description	Number of Characters
CHAR (M)	A fixed-length string	M → 0-255
VARCHAR (M)	A variable-length string	M → 0-255
TEXT (M)	A long string	M → 0-65,535

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Some Data Types in MySQL

Data Type	Description	Storage
DATE	A date	3 Bytes
DATETIME	A date and time combination	8 Bytes
TIME	A time	3 Bytes
YEAR	A year in four-digit format	1 Byte
TIMESTAMP	A timestamp	4 Bytes

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Create and Use a Database

- Creating a new database in MySQL:

```
create database <database_name> ;
```

- Selecting the Database for Use:

```
use <database_name> ;
```

- Show list of all databases:

```
show databases;
```

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Let's Start Creating our First Database in MySQL

- **Database Schema:**

- **First Step** – Creating a Database with any desired name (**College**)
- **Second Step** – Creating 3 tables with the following schemas:

department (deptname , building , budget)

student (SID , name, deptname)

teacher (TID , name, deptname, salary)

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Creating New Table

- **Creating a new table in MySQL:**

CREATE TABLE <table_name>

(column_name1 **data_type**,

column_name2 **data_type**,

...

CONSTRAINTS);

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Department Table

- Type the command below in query window to create department table:

```
department ( deptname , building , budget)
```

```
CREATE TABLE department  
( deptname  varchar (150),  
  building   int,  
  budget     numeric(9,4),  
  primary key (deptname) );
```

deptname	building	budget
Civil Eng.	9	8000.9800
Comp. Sci.	9	7000.5000
English	1	3700.6500
Mathematics	7	6000.0000
Sport	1	6500.5200

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Student Table

```
student ( SID , name, deptname)
```

```
CREATE TABLE student  
( SID      int,  
  name     varchar(100),  
  deptname varchar (150),  
  primary key (SID),  
  foreign key (deptname) references department );
```

SID	name	deptname
14	John	Comp. Sci.
15	Laura	Sport
19	Peter	Sport
20	Kate	English
27	David	Civil Eng.

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Teacher Table

teacher (TID, name, deptname, salary)

CREATE TABLE teacher

(TID **int**,
name **varchar(100)**,
deptname **varchar (150)**,
salary **numeric (7 , 2)**,
primary key (TID),
foreign key (deptname) **references** department);

TID	name	deptname	Salary
5	Collin	English	24000.00
6	James	Civil Eng.	30000.00
9	Lara	Sport	20000.00

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Lab Task – Create Advisor Table

advisor (StudentId, TeacherId)

CREATE TABLE advisor

(StudentId **int**,
TeacherId **int**,
primary key (StudentId, TeacherId),
foreign key (StudentId) **references** Student(SID),
foreign key (TeacherId) **references** Teacher(TID),
);

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