

MIS2502:

Data Analytics

MySQL and SQL Workbench

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MySQL

- MySQL is a database management system (DBMS)
- Implemented as a **server**

What is a server?

- Software specifically built to provide services to other applications

Examples

- File server
- Print server
- Web server
- Database server

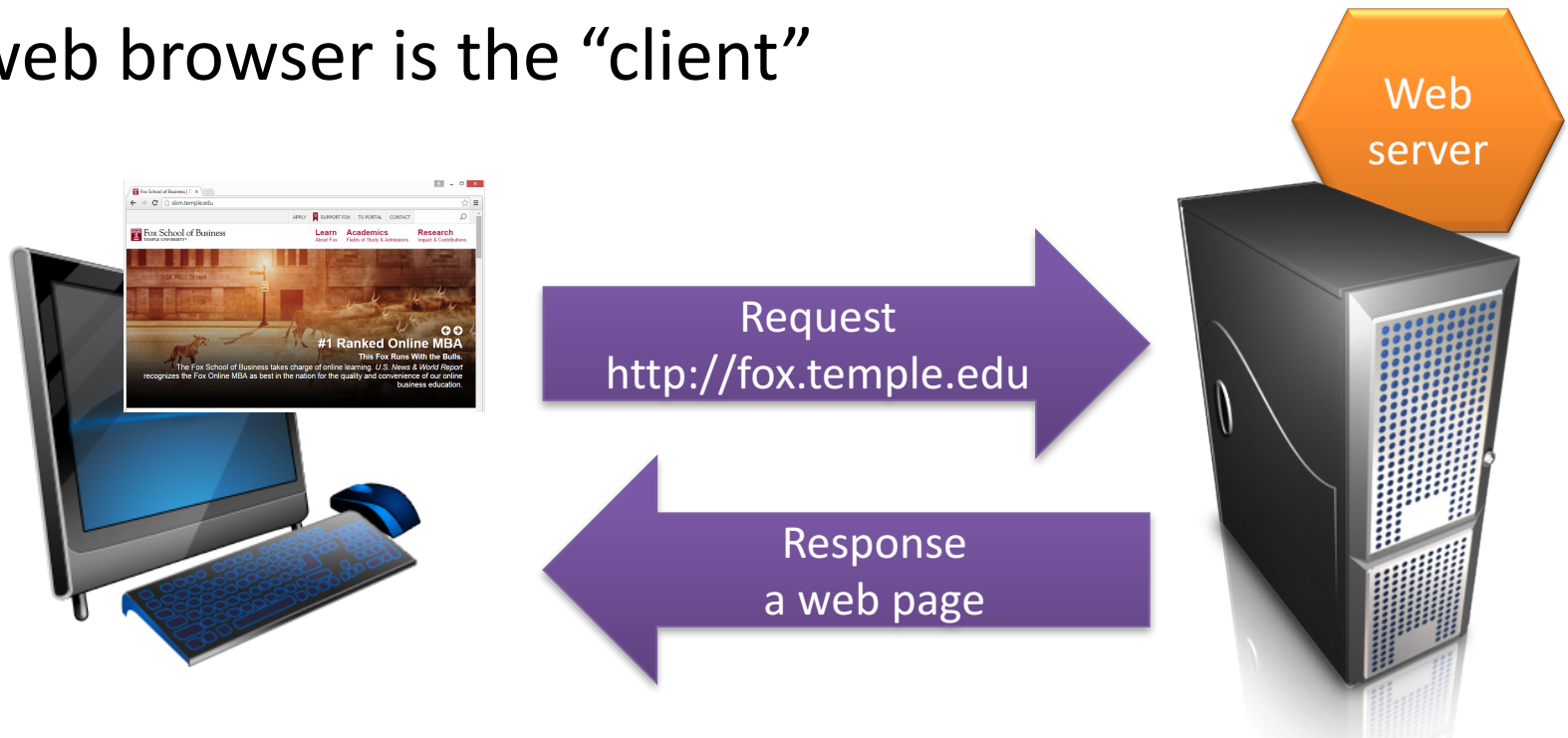


Example: The web server

The web server “serves” web pages to the web browser

The web browser allows the user to interact with the server

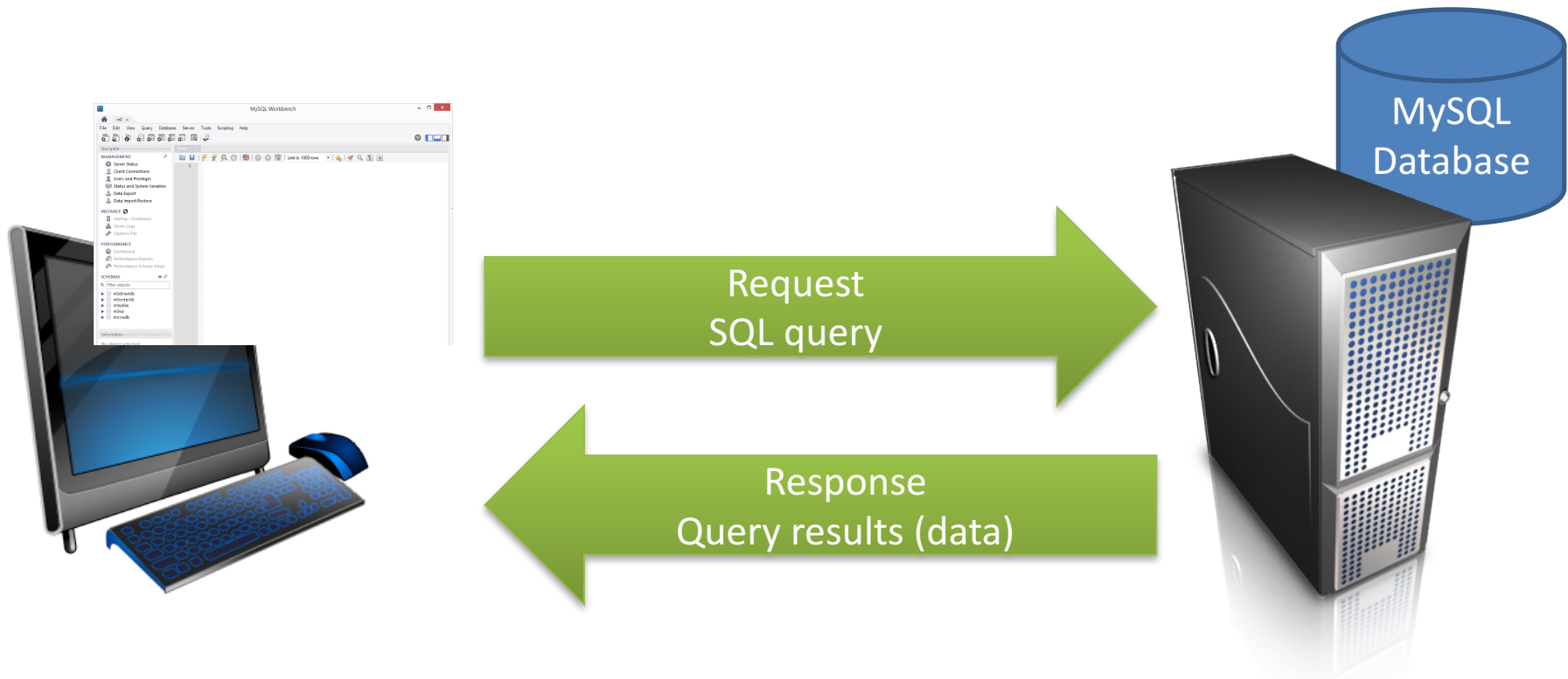
The web browser is the “client”



Interacting with MySQL

The **client** can either be a business application or a utility

We're going to use the **MySQL Workbench** utility



MySQL Workbench

Enables the user to interact directly with the database

- Create and make changes to tables
- Extract information from tables
- Provide help creating SQL statements
- Create ERDs

We'll use SQL workbench to

- Create and execute SQL commands
- View query results

But we won't use it for modeling

- We want to do some things ourselves!

Limits of MySQL Workbench

It isn't meant for business users

For that, we'd construct an application

Why do we create applications for users, instead of allowing direct database interaction?

Placing an order at Amazon

- You don't interact with Amazon's database directly
- You do it through Amazon.com

Registering for a course

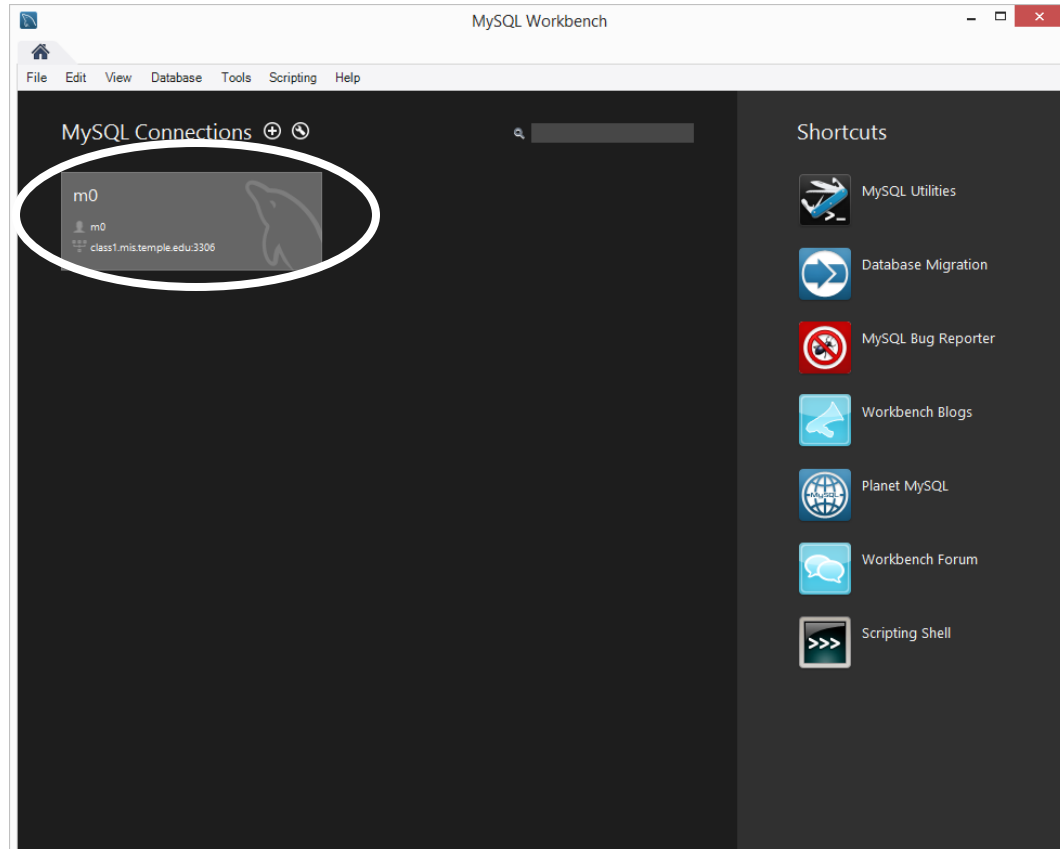
- You don't interact with Temple's database directly
- You do it through Owlnet

Connecting to a MySQL server

This is the opening screen

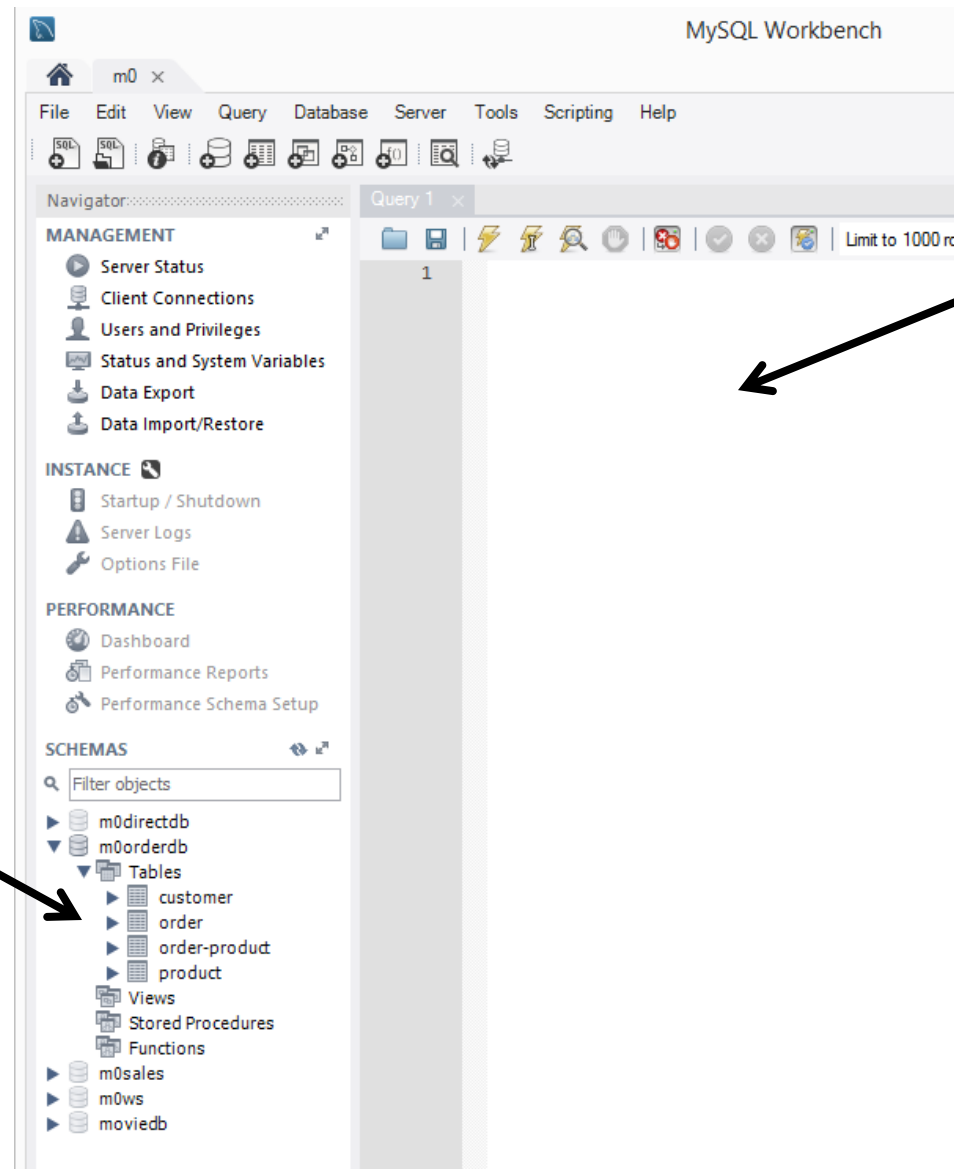
You click on a connection to connect to a server

You'll have access to your schemas on that server



We'll give you instructions explaining how to set up your connection to the class server, based on your username and password.

The MySQL Workbench interface



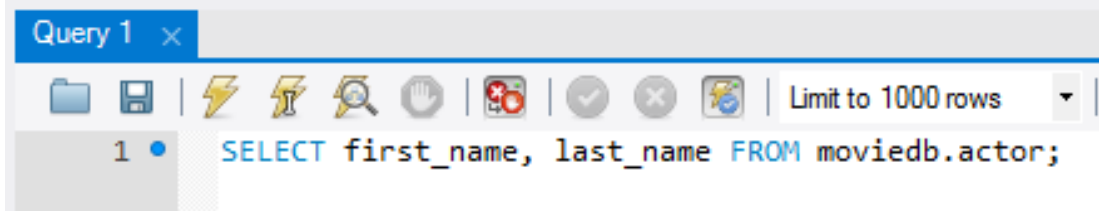
Overview
tabsheet (the
database
schemas)

*How many
tables are in the
m0orderdb
schema?*

SQL Query
panel

Composing a SQL statement

- Let's just type this into the query panel



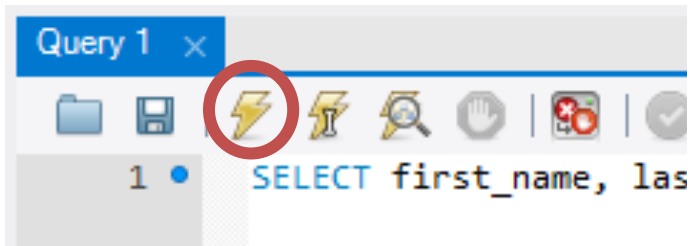
The screenshot shows a query editor window titled "Query 1". The toolbar includes icons for file operations, execution, search, and a "Limit to 1000 rows" dropdown. The query text is: `1 • SELECT first_name, last_name FROM moviedb.actor;` The words "SELECT" and "FROM" are highlighted in blue, while the rest of the text is black.

Don't worry about the syntax itself yet. We'll get to that soon...

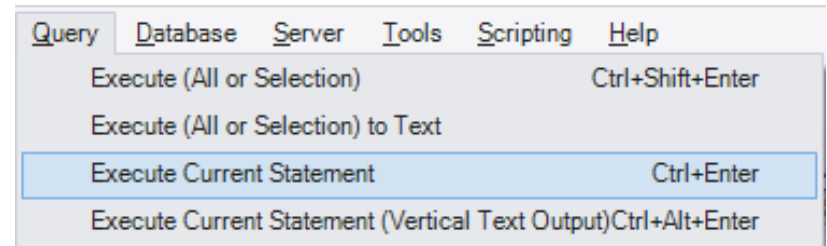
- Notice how the words SELECT and FROM are highlighted in blue.
 - Those are the keywords (part of the SQL language)
 - The black indicates it isn't part of SQL
 - So they are part of the database itself, like schemas, tables, and fields

To execute the query

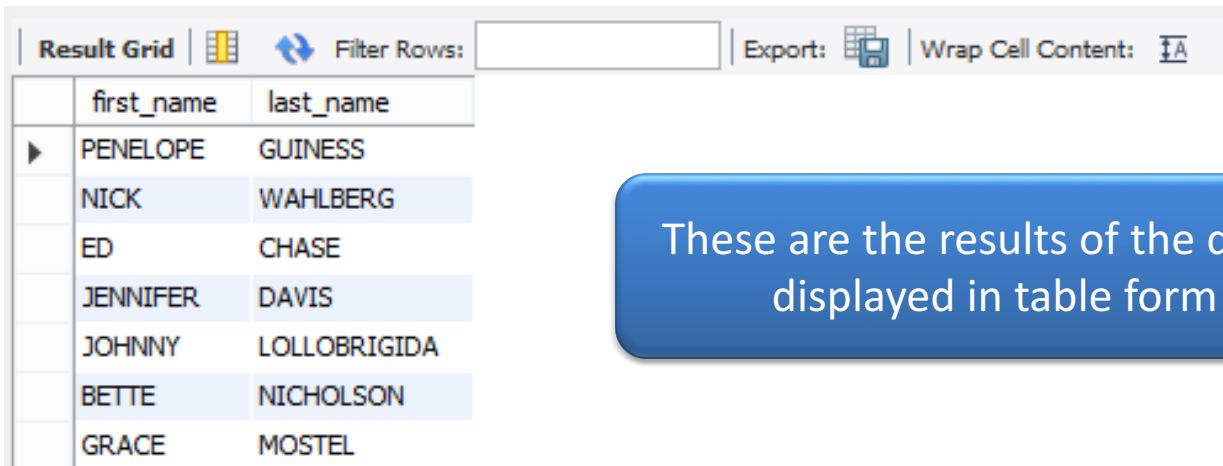
Click on the lightning bolt icon...



...or select “Execute Current Statement” from the Query menu



...and you'll wind up with this result

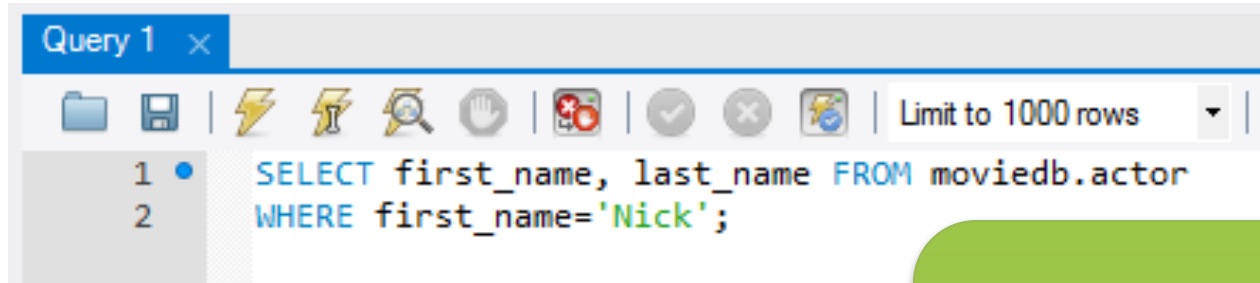


	first_name	last_name
▶	PENELOPE	GUINNESS
	NICK	WAHLBERG
	ED	CHASE
	JENNIFER	DAVIS
	JOHNNY	LOLLOBRIGIDA
	BETTE	NICHOLSON
	GRACE	MOSTEL

These are the results of the query, displayed in table form

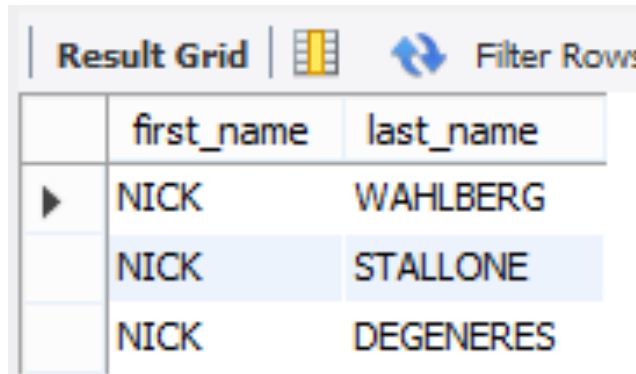
Another example

- This query



```
Query 1 x
Limit to 1000 rows
1 SELECT first_name, last_name FROM moviedb.actor
2 WHERE first_name='Nick';
```

- gives us this



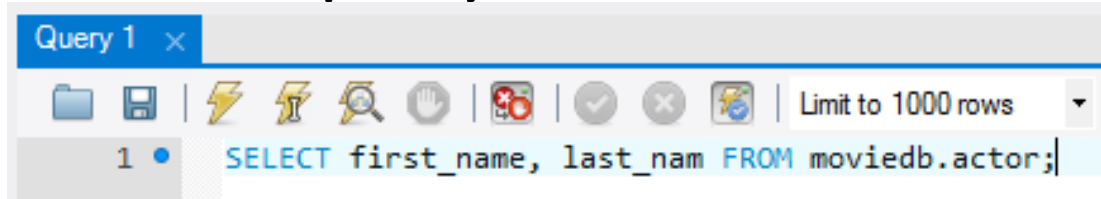
	first_name	last_name
▶	NICK	WAHLBERG
	NICK	STALLONE
	NICK	DEGENERES

The green highlighting indicates this is a string literal, or a set of letters a numbers.

In other words, what's between the quotes isn't a SQL command OR an element in the database

The editor will catch mistakes

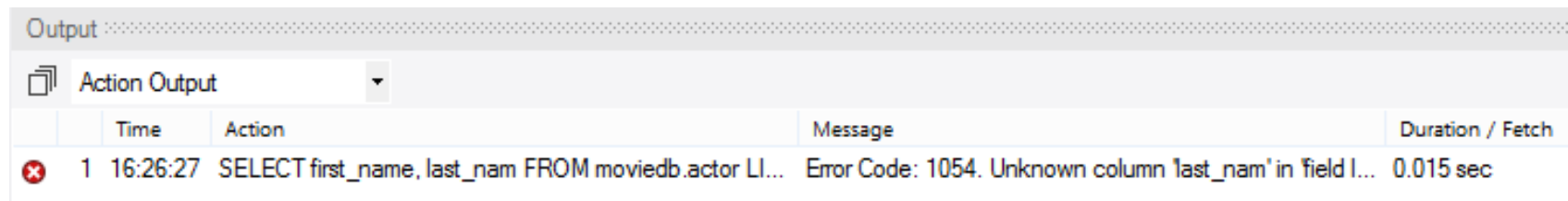
- This is a query with no answer



A screenshot of a SQL query editor window titled "Query 1". The editor contains the following SQL query: `SELECT first_name, last_nam FROM moviedb.actor;`. The toolbar above the query includes icons for file operations, execution, and search, along with a "Limit to 1000 rows" dropdown menu.

because “last_nam” isn’t a field in the table

- Instead of query results, we now get this



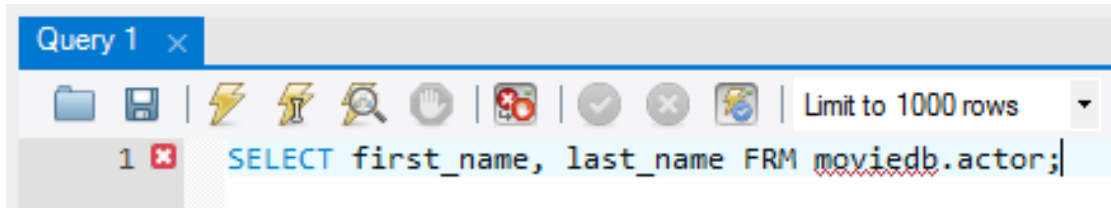
A screenshot of an "Output" window showing an error message. The window has a dropdown menu set to "Action Output". The error message is as follows:

	Time	Action	Message	Duration / Fetch
✖	1 16:26:27	SELECT first_name, last_nam FROM moviedb.actor LI...	Error Code: 1054. Unknown column 'last_nam' in field l...	0.015 sec

indicating the source of the error

If the syntax is wrong...

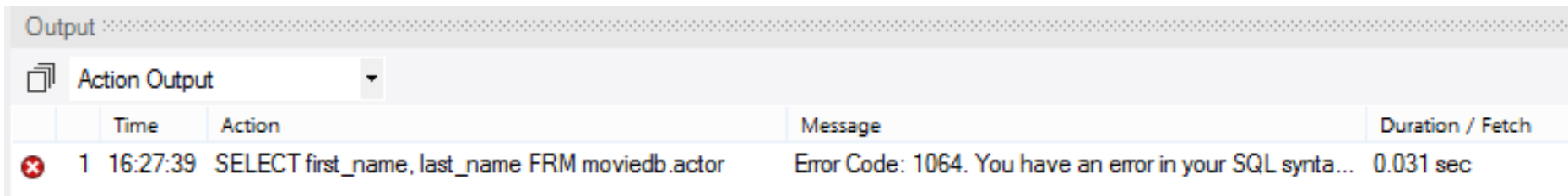
- We've spelled "FROM" wrong



A screenshot of the MySQL Workbench query editor. The title bar says "Query 1". Below the title bar is a toolbar with various icons. The main area shows a SQL query: `SELECT first_name, last_name FRM moviedb.actor;`. The word "FRM" is highlighted in blue, and a red squiggly line is under it, indicating a syntax error.

FRM isn't green because it is not recognized as a SQL keyword!

- And now we get this error



A screenshot of the MySQL Workbench Output window. The window title is "Output". Below the title bar is a dropdown menu set to "Action Output". The main area shows a table with columns: "Time", "Action", "Message", and "Duration / Fetch". There is one row of data:

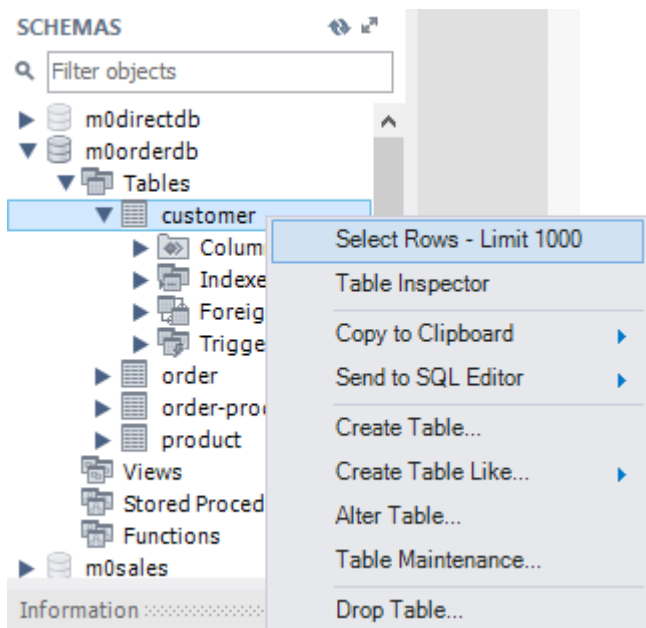
	Time	Action	Message	Duration / Fetch
✖	1 16:27:39	SELECT first_name, last_name FRM moviedb.actor	Error Code: 1064. You have an error in your SQL synta...	0.031 sec

- MySQL Workbench can't tell quite what's wrong, but it knows it isn't a correctly formatted SQL command
- It thinks "moviedb" is the source of the problem, but really it's a misspelled keyword

Automatically generated SQL

MySQL Workbench can generate the more complex queries for you

Right-click on the customer table in m0orderdb and Select Rows...



...and you'll see an editable table that you can work with.

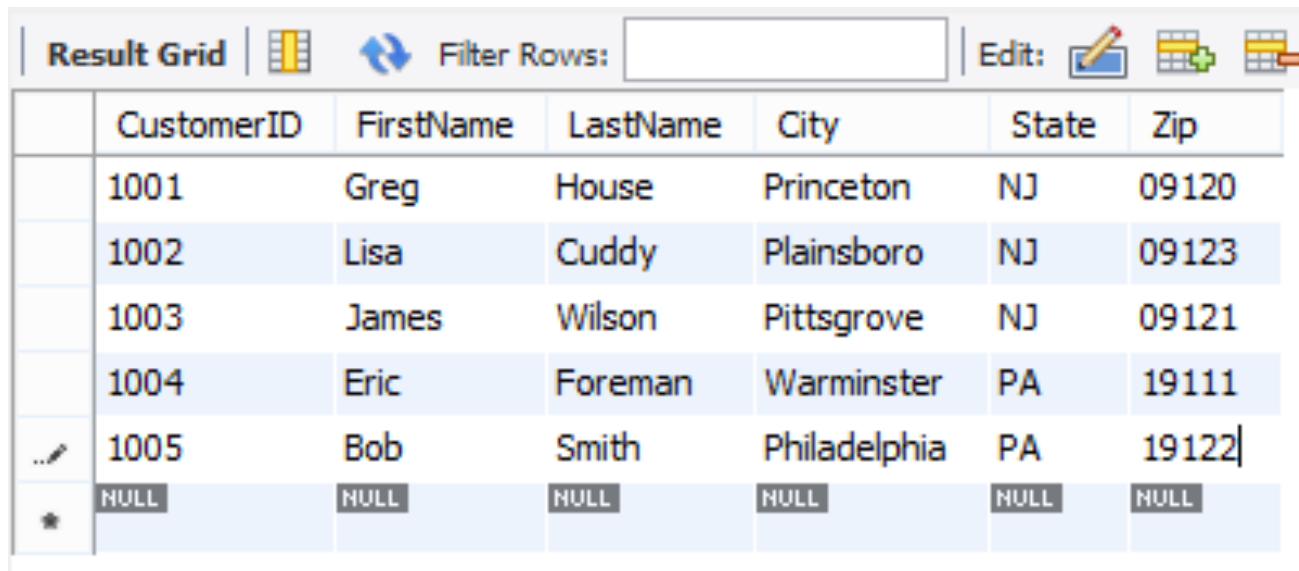
The screenshot shows the 'Result Grid' in MySQL Workbench. The table has the following columns: CustomerID, FirstName, LastName, City, State, and Zip. The data rows are:

CustomerID	FirstName	LastName	City	State	Zip
1001	Greg	House	Princeton	NJ	09120
1002	Lisa	Cuddy	Plainsboro	NJ	09123
1004	Eric	Foreman	Warminster	PA	19111
1003	James	Wilson	Pittsgrove	NJ	09121
NULL	NULL	NULL	NULL	NULL	NULL

Instead of m0orderdb, you'll have your own number (i.e., m33orderdb). That's ok.

Example: Adding a row

Now we'll add another row to the table, just like we're filling in a spreadsheet



	CustomerID	FirstName	LastName	City	State	Zip
	1001	Greg	House	Princeton	NJ	09120
	1002	Lisa	Cuddy	Plainsboro	NJ	09123
	1003	James	Wilson	Pittsgrove	NJ	09121
	1004	Eric	Foreman	Warminster	PA	19111
..✎	1005	Bob	Smith	Philadelphia	PA	19122
*	NULL	NULL	NULL	NULL	NULL	NULL

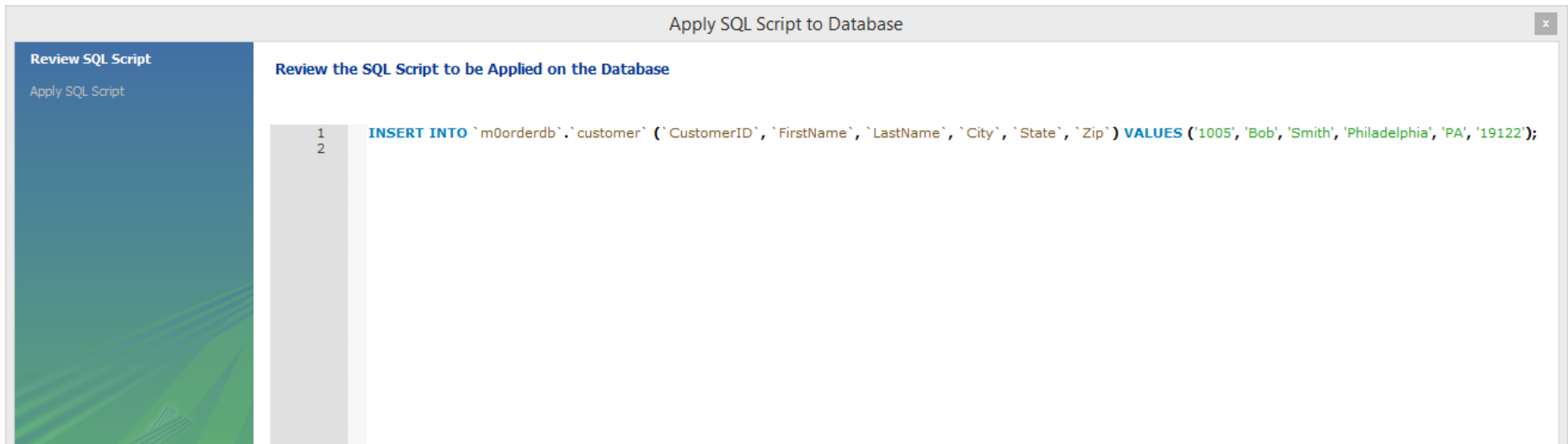
Click on the “Apply” button in the bottom right corner of the window

Apply

Revert

The generated SQL statement

This is the SQL statement that will add the row to the database



The screenshot shows a web application window titled "Apply SQL Script to Database". On the left, there is a sidebar with the text "Review SQL Script" and "Apply SQL Script". The main content area is titled "Review the SQL Script to be Applied on the Database" and displays the following SQL statement:

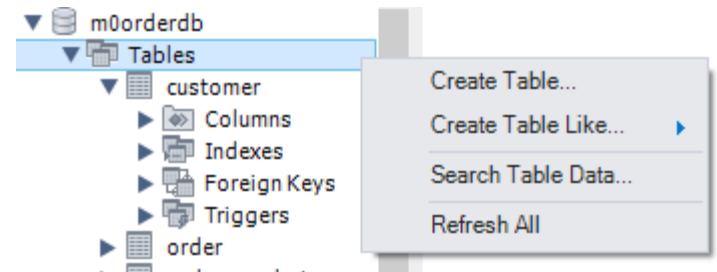
```
1 INSERT INTO `m0orderdb`.`customer` (`CustomerID`, `FirstName`, `LastName`, `City`, `State`, `Zip`) VALUES ('1005', 'Bob', 'Smith', 'Philadelphia', 'PA', '19122');  
2
```

You can make changes to the SQL, or just click “Apply”

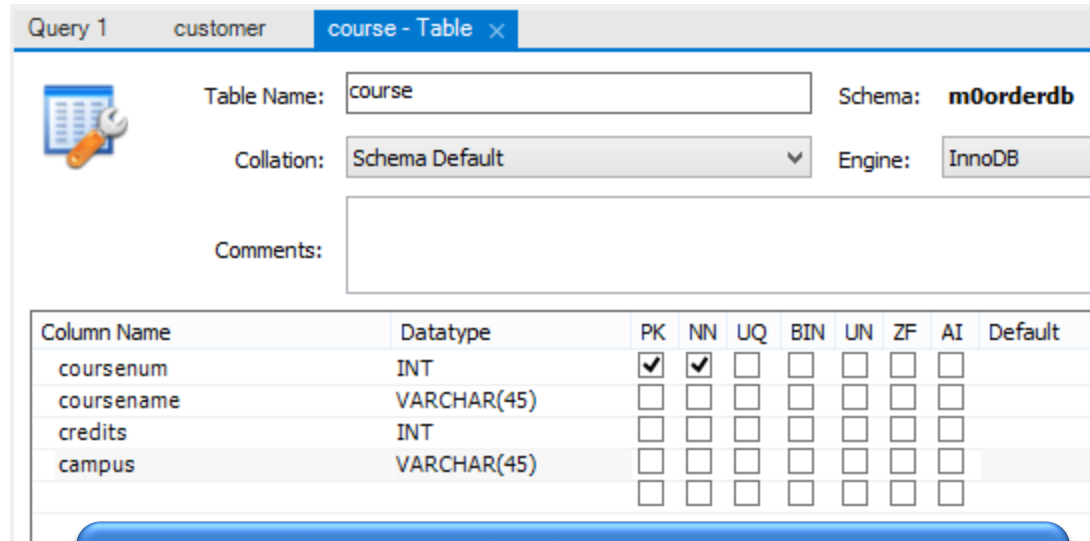
- That will send the SQL statement to the MySQL database server for processing

Adding a table

- In the Object Browser, right-click on Tables under **m0orderdb**
- Then select “Create Table” from the menu

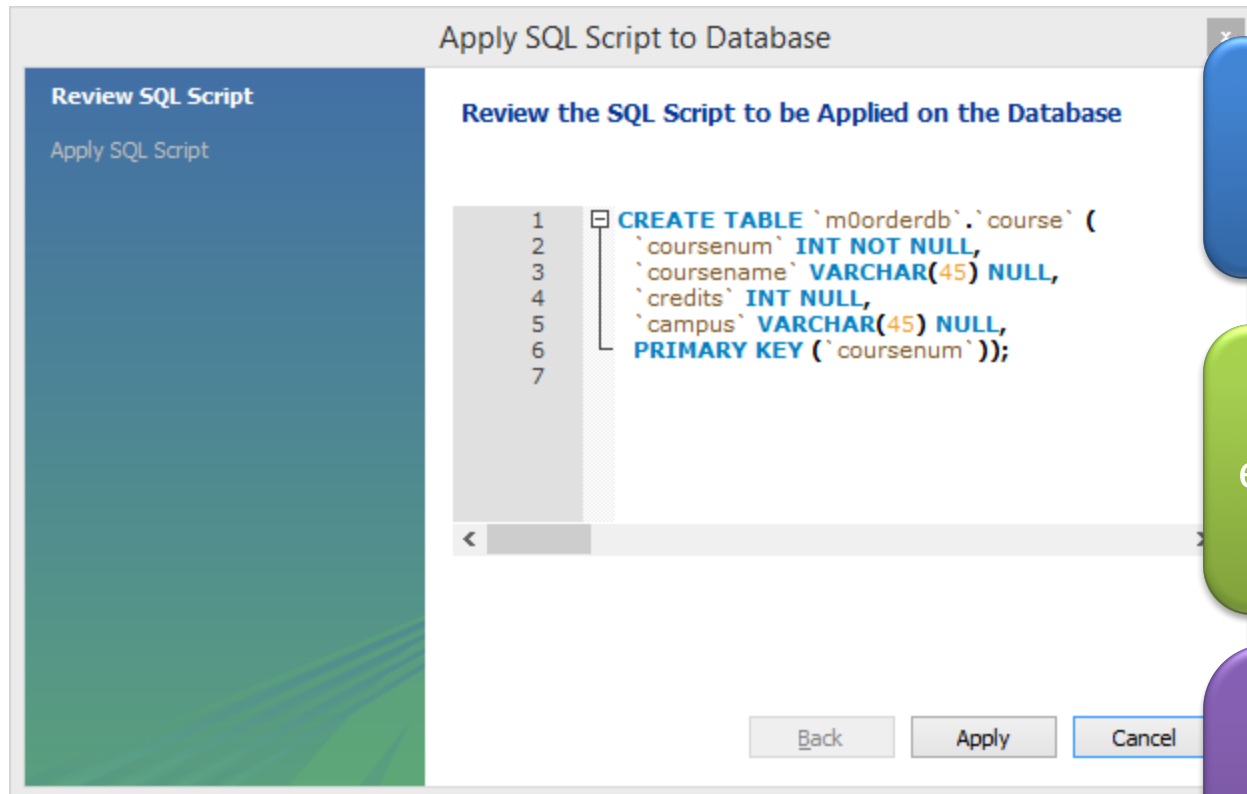


- Give the table a name, then enter column names and data types
- Then click the “Apply” button



We'll learn what the data types mean a little later...

And the result is this...



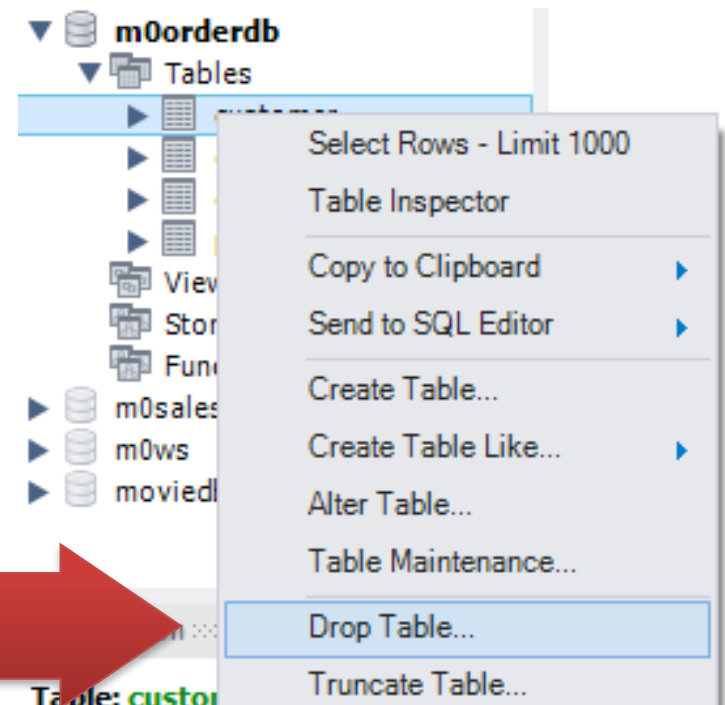
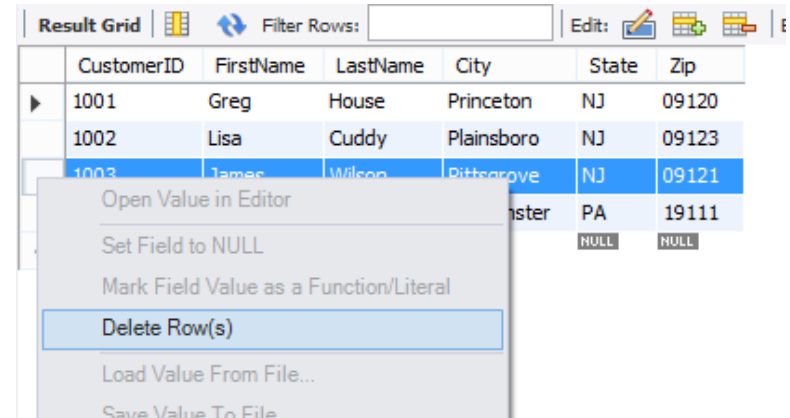
We'll learn the syntax for all of these statements.

But every query can be entered directly through the query panel.

You'll need to know how to create the SQL yourself, even if you use MySQL Workbench for help.

It will also generate statements for...

- Deleting a row from the table (SQL DELETE)
 - Right-click on a field in the row and select “Delete Row(s)”
- Changing a row in a table (SQL UPDATE)
- Delete an entire table (SQL DROP)
 - Right-click on the table name and select “Drop Table...”



By the way...DON'T DO THIS!!

The bottom line

SQL Workbench makes it easy to interact with a MySQL database

It can help you compose queries through highlighting, syntax checking, and the automated query functions

In reality, a database administrator would use a combination of automated query generation and manual entry

The more complex the query, the more likely it will have to be entered manually