

## CSPB 3287: Lab #3

### SQL

#### Overview

This assignment will give you hands-on practice in working with MySQL and the SQL language. In this assignment you will use the pre-created sample database to run a variety of queries to obtain results to answer a few questions.

#### Objectives

- Become familiar with the SQL language & syntax for SELECT queries including optional clauses, subqueries, and table joins.
- Become familiar with a tool of your choice for building and submitting queries (whether in command or GUI mode).
- Run SQL queries against your database to answer the assigned problems.

#### Step 1: Choose your Preferred Query Editor Tool

In order to create SQL queries and run them against our course MySQL Server database, you will need a tool or a user interface through which you can create and execute queries, and then view/copy/export the answer set.

Managing and running queries against MySQL databases is simpler, faster and easier if you use a GUI (graphic user interface) tool. There are many available.

There is an open-source software tool that can manage the tables and data inside the database via a web interface. The **phpMyAdmin** tool is a free software tool written in [PHP](#), intended to handle the administration of [MySQL](#) over the Web. While phpMyAdmin supports a wide range of operations on MySQL, it is most frequently used for operations such as managing databases, tables, columns, relations, indexes, users, permissions, as well as having the ability to directly execute any SQL statement. You can access the MySQL server for the course via phpMyAdmin by typing the following link into your browser:

<https://applied-sql.cs.colorado.edu/phpmyadmin/index.php>

You should have received an email from the CS Support Team with a username and password to use. Check your junk or spam folders for this email. If you cannot find your information, contact us immediately.

Alternatively, you can use **MySQL Workbench** on your local system and connect to the MySQL Server. You have seen your instructor use MySQL Workbench in class to create an ERD (Entity Relationship Diagram) data model and then generate SQL to create tables. MySQL Workbench is free. You can use MySQL

Workbench to build and submit queries against your databases on the server. MySQL offers versions for Windows, Linux, MAC. It is available here: <https://dev.mysql.com/downloads/workbench/>

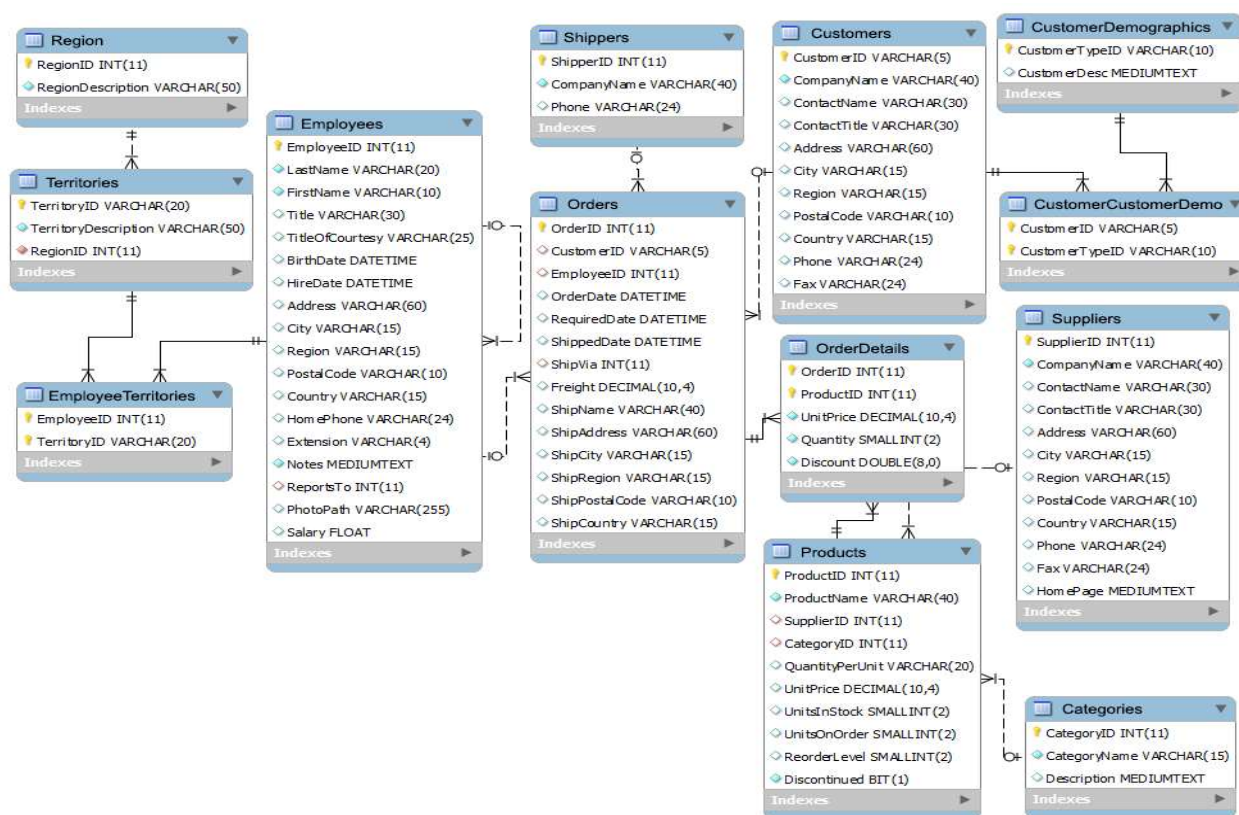
A great open source alternative is **DBeaver**. The community edition is free and it comes with versions for many different OS builds and works fine with MySQL. <https://dbeaver.io/download/>

Another alternative for MAC users is **DataGrip**. <https://www.jetbrains.com/datagrip/> They offer a free 30-day trial, and a special free edition for students that you can sign up for.

## Step 2: Access the Course MySQL Server

Once you have selected your query editor, you need to make sure you can see the data. Using your query editor, **connect** to the MySQL Server and verify you can see the "Northwind" database. There are 13 tables in the database.

**HINT:** You should download and print this ERD (below) and keep it handy when you are writing your queries. It is very helpful to have table and column names in front of you when writing SQL queries.



When you are using the command line editor, you can enter "SHOW TABLES" and MySQL will show you all the tables in your database. However, as we add access to more databases and you create your own tables, the list will get large. Use the command shown below to list the tables in the Northwind database. You should see the table names and row counts for the database.

```
SELECT table_schema, table_name,
table_rows
FROM information_schema.tables
WHERE table_schema LIKE 'North%';
```

Showing rows 0 - 12 (13 total, Query took 0.0021 seconds.)

SELECT table\_schema, table\_name, table\_rows FROM information\_schema.tables WHERE TABLE\_SCHEMA LIKE 'North%'

☐ Profiling [ Edit inline ] [ Edit ] [ Explain SQL ] [ Create PHP code ] [ Refresh ]

☐ Show all | Number of rows: 25 | Filter rows: Search this table

+ Options

TABLE_SCHEMA	TABLE_NAME	TABLE_ROWS
Northwind	Categories	8
Northwind	CustomerDemographics	0
Northwind	Customers	93
Northwind	Region	4
Northwind	Shippers	3
Northwind	Suppliers	29
Northwind	CustomerCustomerDemo	0
Northwind	Employees	9
Northwind	EmployeeTerritories	49
Northwind	OrderDetails	2155
Northwind	Orders	830

### Step 3: Submitting your Assignment

Your results for this assignment should be captured in a document (such as a .txt file, MS Word or similar tool.) Please then save your final deliverable document as a PDF. Your submission should be a document saved and submitted as a PDF file via the Moodle Assignment link.

In your assignment PDF, you must specify both the SQL Code and the ANSWER SET returned by the DBMS (unless otherwise specified). Please include the question number, your SQL code, and the answer set as displayed in the sample below.

#### Sample Submission Format:

Question 42:

```
SELECT CustomerID
CONCAT(ContactName, ': ', ContactTitle) AS Name
FROM Customers
WHERE country = 'Canada'
```

☐ Show all | Number of rows: 25 | Filter rows: Search this table | Sort by key: None

+ Options

	CustomerID	Name
<input type="checkbox"/> Edit Copy Delete	BOTTM	Elizabeth Lincoln: Accounting Manager
<input type="checkbox"/> Edit Copy Delete	LAUGB	Yoshi Tannamuri: Marketing Assistant
<input type="checkbox"/> Edit Copy Delete	MEREP	Jean Fresnire: Marketing Assistant

↑ ☐ Check all | With selected: Edit Copy Delete Export

## Query Problems

For this assignment you must create and execute queries against the Northwind database to fulfill the requirements listed below.

For each problem where a multi-row answer set is created, as a “hint”, the number of rows to expect in your answer set is listed in parentheses after the problem/question. It may happen that some queries DO NOT produce an answer set.

1. List in alphabetical order without duplicates the Title of Courtesy for employees. (5)
2. List only the name of the company(s) that reside in London and a field called Contact that contains the name and title of the contact person for that company. (6)
3. List the ProductID, ProductName, UnitPrice, and UnitsInStock for all products that have a value between 19 and 19.5 for the price. Make sure results are sorted by the price. (4)
4. List the ProductID, ProductName, UnitPrice, and UnitsInStock by the number of units in stock. Only show products that have a value less than 14.0 for the price and have at least 100 units available. (2)
5. List the product ID, name, and price for all products that are in the "Seafood" category [Use a subquery matching the category name]. Show the most expensive items first. (12)
6. List the top 5 products in the company's inventory where the product is discontinued and they still have inventory. Display the product's name, unit price and total inventory value from most to least. Make the column headers "Name, Price, and Inventory Value". (4)
7. List each of the Sales employees' total number of orders (# Orders) and First and Last name together (Name). List the highest counts first. (7)
8. List each of the Sales Representatives' total number of orders (# Orders) and First and Last name together (Name). List the highest counts first and only if the count is at least 100. (3)
9. List all Suppliers by country ascending if the supplier's region is not indicated. (20)
10. Using a RIGHT JOIN of Orders to Employees, find all employees that do not have any orders (without grouping the data). Print the Full Name (First, space, Last) and the salary of the employee. (1)
11. Find all orders that were shipped over a week (7 days) later than required date. (9)  
Also answer the following questions in your submission for this problem:
  1. Which fields should be displayed and why?
  2. How should the results be ordered?

## SQL Tips

### Design:

- Determine where the data you need resides (which table(s), which column(s))
- Do you need a WHERE clause?
- Do you need any group functions?
  - What are you GROUPing BY?
- Do you need any DATE functions?
- Do you need a subquery?
- Do you need to JOIN multiple tables?

### Coding:

- Keep a copy of the data model handy when composing your queries
- Develop your code in a modular, iterative fashion
  - Code a little
  - Test it and get it working
  - Code some more, get it working
  - REPEAT.

## Grading Rubric

- Pretty, clean code
- Indentation
- Comments: Your comments should convey to anyone that you understand how your query works.
- Consistency across all your queries
- Separate clauses on separate lines
- Correct answer set – In this case, there is only ONE right answer for each question (although your SQL may vary...)
- **NUMBER each problem please!!!**
- Save your document as a PDF and submit the PDF