

MySQL 8.0 for Developers

MySQL

DURATION

5 Days

MODULES

18 Lectures

COURSE CODE

—

Course Overview

This course teaches developers how to build applications with MySQL 8.0 for Developers. Learn development best practices and techniques for MySQL solutions.

What You Will Learn

Introduction to MySQL

- Objectives
- Course Goals
- Course Lesson Map
- Introductions
- Classroom Environment
- MySQL Powers the Web
- MySQL Market Share: DB-Engines 2019
- MySQL Enterprise Edition
- Oracle Premier Support for MySQL
- MySQL and Oracle Integration
- MySQL Websites
- Community Resources
- Oracle University: MySQL Training
- MySQL Certification
- Summary
- Practice 1: Overview

Connectors and APIs

- Objectives
- Topics
- Programming MySQL
- MySQL Connectors

- Connectors Developed by Oracle
- Connectors Developed by the Community
- Quiz
- Topics
- MySQL and PHP
- Topics
- Connector/J
- Downloading Connector/J
- Installing Connector/J
- Topics
- Connector/Python
- Summary
- Practice 2: Overview

Using Connectors

- Objectives
- Topics
- Using PHP mysqli to Connect to and Query MySQL
- Example: PHP and mysqli
- Another Example: PHP and mysqli
- Using PDO_MySQL to Connect to and Query MySQL
- Retrieving Query Results with PDO_MySQL
- Example: PHP and PDO_MySQL
- Buffered Queries in PHP
- Quiz
- Topics
- Connecting to the MySQL Server with Connector/J
- Obtaining the Connector/J Connection Object
- Disconnecting from MySQL with Java
- Using Java to Execute SQL
- Example: Connector/J - executeUpdate()
- Example: Connector/J - executeQuery()
- JavaServer Pages
- JavaServer Pages Standard Tag Library (JSTL)
- Accessing MySQL with JSP/JSTL
- Quiz
- Topics
- Using Python to Connect to the MySQL Server
- Using Python to Execute SQL
- Example: Connector/Python - Modifying the Database
- Example: Connector/Python - Data Retrieval with fetchone()
- Example: Connector/Python - Data Retrieval with the cursor Object
- Buffered Cursors in Connector/Python
- Python CGI Programming
- Example: Python/MySQL CGI Programming

- Quiz
- Topics
- Connection Pooling
- Topics
- Using Special Characters in SQL Statements
- Referring to NULL Values in SQL Statements
- Dealing With NULL Values in the Result Set
- Topics
- Obtaining Connection Parameters
- Topics
- Securing Connections with SSL
- Connecting Via SSL with PDO_MySQL
- Connecting Via SSL with Connector/J
- Connecting Via SSL with Connector/Python
- Topics
- MySQL 8.0 and the caching_sha2_password Plugin
- Options for Connector not Supporting caching_sha2_password Plugin
- Summary
- Practice 3: Overview

Prepared Statements

- Objectives
- Topics
- Why Use Prepared Statements?
- Limitations of Prepared Statements
- SQL Injection
- Topics
- User-Defined Variables
- Topics
- Preparing a Statement
- Executing a Prepared Statement
- Deallocating a Prepared Statement
- Prepared Statement Example: SQL
- Quiz
- Topics
- Preparing Statements with Connectors
- Preparing Statements with PHP/PDO
- Example: Preparing Statements with PHP/PDO
- Preparing Statements with Connector/J
- Example: Preparing Statements with Connector/J
- Preparing Statements with Connector/Python
- Example: Preparing Statements with Connector/Python
- Quiz
- Summary
- Practice 4: Overview

Handling Errors and Warnings

- Objectives
- Topics
- SQL Modes
- The Default SQL Mode
- Setting SQL Modes
- Strict Mode
- Example: Strict Mode
- The NO_ENGINE_SUBSTITUTION SQL Mode
- Other Important SQL Modes
- Topics
- Interpreting Error Messages
- Investigating Error Codes with perror
- Troubleshooting Syntax Errors
- Using SHOW WARNINGS
- Example: SHOW WARNINGS
- Using SHOW ERRORS
- Topics
- Using MySQL Diagnostics
- Retrieving Diagnostic Information
- Example: Retrieving Diagnostic Information
- Topics
- Handling Errors When Using Connectors
- Connector/J: The SQLException Class
- Example: SQLException
- PHP/PDO Error Handling Mode
- PHP/PDO: The PDOException Class
- Example: PHP/PDO Exception Handling
- Connector/Python: The mysql.connector.Error Class
- Example: Connector/Python Error Handling
- Quiz
- Summary
- Practice 5: Overview

Creating Database-Driven Web Applications

- Objectives
- Topics
- Database-Driven Web Application
- Client Request
- Server Response
- Topics
- Displaying Query Results
- Displaying Query Results in Paragraph Tags (PHP/PDO)
- Displaying Query Results in Paragraph Tags (Java/JSP)

- Displaying Query Results in Paragraph Tags (Python)
- Separating Row Fetching and HTML Generation
- Quiz
- Displaying Query Results in a List
- Displaying Query Results in a List (PHP/PDO)
- Display Query Results in a List (Java/JSP)
- Displaying Query Results in a List (Python)
- Displaying Query Results in a Table
- HTML Table Markup
- Displaying Query Results in a Table (PHP/PDO): Header Row
- Displaying Query Results in a Table (PHP/PDO): Table Body
- Displaying Query Results in a Table (Java/JSP)
- Displaying Query Results in a Table (Python)
- Displaying Query Results as Hyperlinks (PHP/PDO)
- Displaying Query Results as Hyperlinks (Java/JSP)
- Displaying Query Results as Hyperlinks (Python)
- Topics
- Web Forms
- Comparing GET and POST Requests
- Web Form Processing
- Retrieving Request Parameters with PHP
- Retrieving Request Parameters with JSP/JSTL
- Retrieving Request Parameters with Python/CGI
- Topics
- Using Hyperlinks for Navigation (Single Page)
- Using Hyperlinks for Navigation (Multiple Pages)
- Topics
- Displaying Query Results on Multiple Pages
- Topics
- Using Hyperlinks to Sort by Column
- Summary
- Practice 6: Overview

Working with Views

- Objectives
- Topics
- Views
- Benefits of Views
- Creating Views
- Example: CREATE VIEW
- CREATE VIEW Options
- View Column Names
- Column Names Derived From Expressions
- Topics
- Updatable Views

- Example: Updatable View
- Insertable Views
- Updatable Versus Insertable Views
- Using WITH CHECK OPTION
- Using WITH CHECK OPTION: Example
- Updating Multiple-table Views
- Quiz
- Topics
- Checking Views
- Checking a View: Example
- Topics
- Altering Views
- Altering a View: Example
- Dropping Views
- Topics
- Obtaining View Metadata with INFORMATION_SCHEMA
- Obtaining View Metadata with INFORMATION_SCHEMA.TABLES: Example
- Obtaining View Metadata with INFORMATION_SCHEMA.VIEWS: Example
- Obtaining View Metadata with SHOW CREATE VIEW
- Other Metadata Statements for Views
- Quiz
- Summary
- Practice 7: Overview

Working with Strings

- Objectives
- Topics
- SQL Expressions
- String Expressions
- String Functions
- Topics
- Concatenating Strings Using MySQL Functions
- Concatenating NULL Values
- Concatenating Strings Using the || Operator
- Retrieving the Left and Right Portions of a String
- Retrieving Part of a String
- Trimming a String
- Inserting Into and Replacing Portions of a String
- Converting to Uppercase and Lowercase
- Topics
- Determining String Length
- Comparing Strings
- Finding Strings Within Strings
- Quiz
- Topics

- String Comparison and Sorting Behavior
- Character Sets and Collations
- Character Set and Collation Functions
- Changing the Default Collation
- Topics
- Simple Pattern Matching Using LIKE
- Examples: LIKE and NOT LIKE
- Complex Pattern Matching Using RLIKE
- Regular Expression Syntax
- Examples: Literal and Anchors
- Example: Alternative
- Example: Complex Pattern
- Examples: Escape Character
- Quiz
- Topics
- MySQL Full-Text Search
- Full-Text Index
- Natural Language Full-Text Search
- Boolean Full-Text Search
- Boolean Mode Operators
- Full-Text Index Configurations
- Summary
- Practice 8: Overview

Working with Numeric and Temporal Data

- Objectives
- Topics
- Boolean Expressions
- Numeric Literals
- Arithmetic Operators
- Numeric Expressions: Examples
- Topics
- Temporal Expressions
- Temporal Data Types
- Interval Arithmetic
- Quiz
- Topics
- Numeric Functions
- Using ABS() and SIGN()
- Approximating Numbers With FLOOR() and CEILING()
- Approximating Numbers With ROUND()
- Trigonometric Functions
- Quiz
- Topics
- Temporal Functions

- Temporal Functions Syntax
- Displaying the Current Date and Time
- Determining Date and Time Format
- Customizing the Output Format
- Retrieving Components of Dates and Times
- Creating Date and Time Values
- Performing Date Arithmetic Using Functions
- Topics
- CASE Expressions
- Examples: CASE Expressions
- NULLIF() and IFNULL() Functions
- IF() Function
- Quiz
- Summary
- Practice 9: Overview

Transactions

- Objectives
- Topics
- What Is a Transaction?
- Handling Partial Operations
- The ACID Properties of Transactions
- Topics
- Transaction Control Statements
- autocommit Mode
- Controlling autocommit Mode
- Statements Causing an Implicit COMMIT
- Topics
- General Approach to Coding Transactional Statements
- Coding Transactional Statements in PHP/PDO
- Coding Transactional Statements in Connector/J
- Coding Transactional Statements in Connector/Python
- Topics
- Retrieving the AUTO_INCREMENT Value of the Last Insertion
- Retrieving the ID of the Last Insert by Using PHP/PDO
- Retrieving the ID of the Last Insert by Using Connector/J
- Retrieving the Last Insert ID by Using Connector/Python
- Quiz
- Topics
- Consistency Issues
- Dirty Read: Example
- Non-repeatable Read: Example
- Phantom Read: Example
- Topics
- Isolation Levels

- Resolving Consistency Issues with Isolation Levels
- Setting Isolation Levels
- Displaying the Current Isolation Level
- Topics
- Locking
- Locking Reads
- SELECT...FOR SHARE: Example
- SELECT...FOR UPDATE: Example
- Quiz
- Summary
- Practice 10: Overview

Optimizing Queries

- Objectives
- Topics
- Why Optimize?
- Optimization Strategies
- Topics
- SQL Parser and Query Optimizer
- Topics
- Using Indexes for Optimization
- General Index Types
- Special Index Types
- Creating Indexes
- Adding Indexes to a New Table
- Multiple and Unique Value Indexes
- Primary Key Indexes
- Functional Index
- Naming Indexes
- Adding Indexes to Existing Tables
- Using Index Prefixes
- Indexing Large Columns Without Prefixes
- Indexing with Prefixes
- Evaluating Index Prefixes
- Leftmost Index Prefixes
- Leftmost Index Prefixes: Example
- Invisible Indexes
- Dropping Indexes
- Quiz
- Topics
- Using EXPLAIN to Analyze Queries
- How EXPLAIN Works
- EXPLAIN Output: Example 1
- EXPLAIN Output: Example 2
- EXPLAIN Output Columns

- EXPLAIN for Access Method Analysis
- EXPLAIN Types
- EXPLAIN for Simple Join
- Explanation of Simple Join Output
- Extra Column: Signs of Efficient Queries
- Extra Column: Signs of Inefficient Queries
- EXPLAIN Output in JavaScript Object Notation (JSON) Format
- Visual EXPLAIN
- Topics
- Query Rewriting Techniques
- Avoiding Column Expressions in Comparisons
- Creating Indexes to Support Joins
- Comparing Similar Data Types
- Avoiding Leading Wildcards in “LIKE” Patterns
- Creating Functional Indexes for Expressions
- Optimizing Queries by Limiting Output
- Using Summary Tables
- Using Summary Tables: Example
- Optimizing Data Modification Statements
- Quiz
- Topics
- MySQL Enterprise Monitor
- MySQL Enterprise Monitor Query Analyzer
- Summary
- Practice 11: Overview

Stored Routines

- Objectives
- Topics
- What Is a Stored Routine?
- Uses of Stored Routines
- Issues with Stored Routines
- Topics
- Creating Stored Procedures
- Creating Stored Functions
- Compound Statements in Stored Routines
- Compound Statement: Example
- Topics
- Local and User Variables
- DECLARE Statement
- Rules of Precedence for Variable Names
- Using SELECT...INTO
- Assigning Values to Variables with SET
- Parameter Declarations
- Parameter Declaration Syntax

- Topics
- Stored Routines in Databases
- Examining Stored Routines
- Removing Stored Routines
- Quiz
- Topics
- Control Flow Statements
- IF Statement
- CASE Statement: Simple Case
- CASE Statement: Searched Case
- REPEAT Statement
- WHILE Statement
- LOOP Statement
- LEAVE and ITERATE
- Quiz
- Topics
- Declaring Error Handlers
- Declaring Named Conditions
- RESIGNAL
- SIGNAL
- Topics
- Cursors
- Declaring Cursors
- Working with Cursors
- Working with Cursors: Example
- Limitations of Cursors
- Topics
- Limitations of Stored Routines
- Limitations of Stored Functions
- Summary
- Practice 12: Overview

Triggers and Scheduled Events

- Objectives
- Topics
- What Are Triggers?
- Trigger Use Cases
- Creating Triggers
- Trigger Events
- Using BEFORE Triggers
- Using AFTER Triggers
- Using OLD and NEW Qualifiers
- Trigger Metadata
- Trigger Error Handling
- Deleting Triggers

- Trigger Restrictions
- Quiz
- Topics
- Scheduling Database Operations
- Using the MySQL Event Scheduler
- Managing Events
- Summary
- Practice 13: Overview

Reporting

- Objectives
- Topics
- Calculating Totals and Averages
- Finding Minimum and Maximum Values
- Finding the Row Containing Minimum or Maximum Value
- Finding All Rows Containing the Minimum or Maximum Value
- Counting Rows
- Performing Multiple Counts on a Set of Rows
- Conditional Counting
- Calculating Percentages
- Multiple Conditions Within Aggregate Functions
- Quiz
- Topics
- Grouping by the Results of an Expression
- Grouping Temporal Data
- Grouping Nonrepetitive Data
- Grouping Nonrepetitive Data: Example
- Topics
- Generating Row Numbers
- Rank and Row Number
- Calculating Percentage Using Column Total
- Calculating Percentage using Partitioned Total
- Topics
- Materialized Views
- Summary Tables: Advantages and Disadvantages
- Topics
- Crosstab Reports
- Showing Totals in Crosstab Reports
- Topics
- Creating a SQL Bar Chart
- Adding Extra Information to the Bar Chart
- Topics
- Decision Tables
- Explaining the Decision Table
- Implementing the Decision Table in MySQL: Step 1

- Implementing the Decision Table in MySQL: Step 2
- Implementing the Decision Table in MySQL: Step 3
- Summary
- Practice 14: Overview

Spatial Data

- Objectives
- Topics
- Spatial Data Support in MySQL
- Topics
- OpenGIS Geometry Model
- Geometry Class
- More Geometry Class Properties
- Point Class
- Curve Class
- LineString Class
- Surface Class
- Polygon Class
- Collections of Geometries
- Topics
- Spatial Data Formats
- Representing Geometry Objects as WKT
- Creating Geometry Objects from WKT
- Well-Known Binary (WKB) Format
- Creating and Populating Spatial Columns
- Fetching Spatial Data
- Quiz
- Topics
- Spatial Reference Systems
- Spatial Reference IDs (SRIDs)
- Specifying the SRID
- Distance Calculations Depend on the SRID
- Topics
- Analyzing Spatial Data
- Spatial Indexes
- Creating and Dropping Spatial Indexes
- Creating a Spatial Index: Examples
- Topics
- Spatial Data Functions: Review
- Other Spatial Data Functions
- Examples of ST_Contains() and ST_Within()
- Examples of ST_Intersects()
- Examples of ST_Area()
- Quiz
- Summary
- Practice 15: Overview

JSON Data

- Objectives
- Topics
- JavaScript Object Notation (JSON)
- JSON Objects
- JSON Arrays
- Combinations of Nested Objects and Arrays
- Quiz
- Topics
- MySQL JSON Data Type
- Using a JSON Column in a Table
- Querying a JSON Column in a Table
- Topics
- JSON Functions in MySQL
- JSON_OBJECT() Function
- JSON_ARRAY() Function
- JSON_OBJECT() and JSON_ARRAY() Can Be Nested
- JSON Paths
- JSON Path Examples
- JSON_EXTRACT() Function
- JSON_UNQUOTE() Function
- JSON_PRETTY() Function
- JSON_REMOVE() Function
- JSON_SET() Function
- Updating JSON Columns
- Other JSON Functions
- Quiz
- Topics
- Generated Columns
- Indexing JSON Data with a Generated Column
- Storing Generated Columns
- Summary
- Practice 16: Overview

Document Store

- Objectives
- Topics
- NoSQL: Overview
- NoSQL and Traditional RDBMS: Comparison
- Topics
- Document Store and X DevAPI Functions
- A Document Store Example in world_x
- Example of a JSON Document in the countryinfo Collection
- X DevAPI Functions – Connecting to a Schema

- X DevAPI Functions – Accessing, Adding, and Dropping Collections
- X DevAPI Functions – Collections and Relational Tables
- X DevAPI Functions – Additional Functions
- X DevAPI Functions – Examples of Chaining Functions
- Quiz
- Topics
- Using X DevAPI with PHP to Access a Document Store
- PHP with X DevAPI – Reading Data from an Existing Collection
- PHP with X DevAPI – Creating and Modifying a Collection
- PHP with X DevAPI – Working with Relational Tables
- Topics
- Using X DevAPI with Connector/J to Access a Document Store
- Connector/J with X DevAPI – Reading Data from an Existing Collection
- Connector/J with X DevAPI – Creating and Modifying a Collection
- Connector/J with X DevAPI – Working with Relational Tables
- Topics
- Using X DevAPI with Connector/Python to Access a Document Store
- Connector/Python with X DevAPI – Reading Data from an Existing Collection
- Connector/Python with X DevAPI – Creating and Modifying a Collection
- Connector/Python with X DevAPI – Working with Relational Tables
- Topics
- Using MySQL Shell to Access JSON
- Starting MySQL Shell
- Using MySQL Shell to Access a Document Store – SQL Mode
- Using MySQL Shell to Access a Document Store – Current Schema
- Accessing the Document Store in MySQL Shell
- Accessing the Document Store in MySQL Shell – Vertical Format
- Accessing the Document Store in MySQL Shell – Pretty-printing
- Quiz
- Topics
- Issuing Python statements from MySQL Shell – Python as the Active Language
- 17-41
- Python in MySQL Shell – Reading Data from an Existing Collection
- Python in MySQL Shell – Executing X DevAPI Functions Interactively
- Python in MySQL Shell – Creating and Modifying a Collection
- Python in MySQL Shell – Working with Relational Tables
- Summary
- Practice 17: Overview

Conclusion

- Course Goals
- Oracle University: MySQL Training
- MySQL Websites
- Your Evaluation
- Thank You
- Q&A Session