ALTER USER 'root'@'localhost' IDENTIFIED WITH mysql\_native\_password BY 'password';

%load\_ext sql

%config SqlMagic.style = '\_DEPRECATED\_DEFAULT'

%sql mysql+pymysql://root:password@localhost/

Database Schema: E-Commerce Store

This database models a simplified e-commerce store.

1. Customers Table:

CREATE TABLE Customers (

CustomerID INT PRIMARY KEY AUTO\_INCREMENT,

FirstName VARCHAR(50) NOT NULL,

LastName VARCHAR(50) NOT NULL,

Email VARCHAR(100) UNIQUE NOT NULL,

Phone VARCHAR(20) UNIQUE,

Address VARCHAR(255),

RegistrationDate TIMESTAMP DEFAULT CURRENT\_TIMESTAMP

);

1. Products Table:

CREATE TABLE Products (

ProductID INT PRIMARY KEY AUTO\_INCREMENT,

ProductName VARCHAR(100) NOT NULL,

Description TEXT,

Price DECIMAL(10, 2) NOT NULL,

CategoryID INT,

StockQuantity INT NOT NULL DEFAULT 0,

LastUpdated TIMESTAMP DEFAULT CURRENT\_TIMESTAMP ON UPDATE CURRENT\_TIMESTAMP,

FOREIGN KEY (CategoryID) REFERENCES Categories(CategoryID)

);

1. Categories Table:

CREATE TABLE Categories (

CategoryID INT PRIMARY KEY AUTO\_INCREMENT,

CategoryName VARCHAR(50) UNIQUE NOT NULL,

Description TEXT

);

1. Orders Table:

CREATE TABLE Orders (

OrderID INT PRIMARY KEY AUTO\_INCREMENT,

CustomerID INT NOT NULL,

OrderDate TIMESTAMP DEFAULT CURRENT\_TIMESTAMP,

OrderStatus VARCHAR(20) DEFAULT ‘Pending’,

ShippingAddress VARCHAR(255),

TotalAmount DECIMAL(10, 2),

FOREIGN KEY (CustomerID) REFERENCES Customers(CustomerID)

);

1. OrderItems Table:

CREATE TABLE OrderItems (

OrderItemID INT PRIMARY KEY AUTO\_INCREMENT,

OrderID INT NOT NULL,

ProductID INT NOT NULL,

Quantity INT NOT NULL,

UnitPrice DECIMAL(10, 2) NOT NULL,

FOREIGN KEY (OrderID) REFERENCES Orders(OrderID),

FOREIGN KEY (ProductID) REFERENCES Products(ProductID)

);

Insert Statements with Edge Cases

Here’s a good mix of valid data, NULL violations, and duplicates to help you learn how MySQL handles constraints.

Customers Table:

INSERT INTO Customers (FirstName, LastName, Email, Phone, Address) VALUES

(‘Alice’, ‘Smith’, ‘alice.smith@example.com’, ‘9876543210’, ‘123 Main St, Anytown’),

(‘Bob’, ‘Johnson’, ‘bob.johnson@example.com’, ‘8765432109’, ‘456 Oak Ave, Anytown’),

(‘Charlie’, ‘Brown’, ‘charlie.brown@example.com’, ‘7654321098’, ‘789 Pine Ln, Anytown’),

(‘Diana’, ‘Miller’, ‘diana.miller@example.com’, ‘6543210987’, ‘101 Elm Rd, Anytown’),

(‘Eve’, ‘Wilson’, ‘eve.wilson@example.com’, ‘5432109876’, ‘222 Maple Dr, Anytown’),

(‘Frank’, ‘Taylor’, ‘frank.taylor@example.com’, ‘4321098765’, ‘333 Birch Ct, Anytown’),

(‘Grace’, ‘Moore’, ‘grace.moore@example.com’, ‘3210987654’, ‘444 Willow Way, Anytown’),

(‘Henry’, ‘Jackson’, ‘henry.jackson@example.com’, ‘2109876543’, ‘555 Cedar Blvd, Anytown’),

(‘Ivy’, ‘White’, ‘ivy.white@example.com’, ‘1098765432’, ‘666 Spruce Pl, Anytown’),

(‘Jack’, ‘Harris’, ‘jack.harris@example.com’, ‘9012345678’, ‘777 Oak St, Anytown’),

(‘Karen’, ‘Martin’, ‘karen.martin@example.com’, ‘8023456789’, ‘888 Pine Ave, Anytown’),

(‘Liam’, ‘Young’, ‘liam.young@example.com’, ‘7034567890’, ‘999 Elm Ln, Anytown’),

(‘Mia’, ‘Allen’, ‘mia.allen@example.com’, ‘6045678901’, ‘111 Maple Rd, Anytown’),

(‘Noah’, ‘King’, ‘noah.king@example.com’, ‘5056789012’, ‘222 Birch Dr, Anytown’),

(‘Olivia’, ‘Wright’, ‘olivia.wright@example.com’, ‘4067890123’, ‘333 Willow Ct, Anytown’),

(‘Peter’, ‘Scott’, ‘peter.scott@example.com’, ‘3078901234’, ‘444 Cedar Way, Anytown’),

(‘Quinn’, ‘Green’, ‘quinn.green@example.com’, ‘2089012345’, ‘555 Spruce Blvd, Anytown’),

(‘Ryan’, ‘Adams’, ‘ryan.adams@example.com’, ‘1090123456’, ‘666 Oak Pl, Anytown’),

(‘Sophia’, ‘Baker’, ‘sophia.baker@example.com’, ‘9123456780’, ‘777 Pine St, Anytown’),

(‘Thomas’, ‘Clark’, ‘thomas.clark@example.com’, ‘8123456790’, ‘888 Elm Ave, Anytown’),

* NULL violations

(NULL, ‘Doe’, ‘null.first@example.com’, ‘9999999991’, ‘999 Null Rd’), -- FirstName cannot be NULL

(‘Jane’, NULL, ‘null.last@example.com’, ‘9999999992’, ‘1000 Null Ave’), -- LastName cannot be NULL

(‘Null’, ‘Value’, NULL, ‘9999999993’, ‘1001 Null Ln’), -- Email cannot be NULL

(‘Error’, ‘Email’, ‘error.email’, ‘9999999994’, ‘1002 Error Rd’), -- Invalid Email format (will likely pass, but good to note)

* Duplicate violations

(‘Duplicate’, ‘Email’, ‘alice.smith@example.com’, ‘9999999995’, ‘1003 Dup Rd’), -- Duplicate Email

(‘Duplicate’, ‘Phone’, ‘dup.phone@example.com’, ‘9876543210’, ‘1004 Dup Ave’); -- Duplicate Phone

Categories Table:

INSERT INTO Categories (CategoryName, Description) VALUES

(‘Electronics’, ‘Electronic gadgets and accessories’),

(‘Books’, ‘A wide range of reading material’),

(‘Clothing’, ‘Apparel for men, women, and children’),

(‘Home Goods’, ‘Items for your household’),

(‘Sports’, ‘Equipment and gear for various sports’),

(‘Toys’, ‘Playthings for all ages’),

(‘Beauty’, ‘Cosmetics and personal care products’),

(‘Jewelry’, ‘Fine and fashion jewelry’),

(‘Automotive’, ‘Parts and accessories for vehicles’),

(‘Health’, ‘Wellness and medical supplies’),

(‘Food & Beverage’, ‘Groceries and drinks’),

(‘Furniture’, ‘Items to furnish your home’),

(‘Tools’, ‘Equipment for DIY and professional use’),

(‘Garden’, ‘Supplies for outdoor and gardening’),

(‘Pet Supplies’, ‘Items for your furry friends’),

(‘Music’, ‘Instruments and accessories’),

(‘Art Supplies’, ‘Materials for creative endeavors’),

(‘Travel’, ‘Luggage and travel accessories’),

(‘Office Supplies’, ‘Items for work and study’),

(‘Software’, ‘Computer programs and applications’),

* Duplicate violation

(‘Electronics’, ‘Another description for electronics’);

-- NULL violations

INSERT INTO Customers (FirstName, LastName, Email, Phone, Address) VALUES

(NULL, 'Doe', 'null.first@example.com', '9999999991', '999 Null Rd'); -- FirstName cannot be NULL

INSERT INTO Customers (FirstName, LastName, Email, Phone, Address) VALUES

('Jane', NULL, 'null.last@example.com', '9999999992', '1000 Null Ave'); -- LastName cannot be NULL

INSERT INTO Customers (FirstName, LastName, Email, Phone, Address) VALUES

('Null', 'Value', NULL, '9999999993', '1001 Null Ln'); -- Email cannot be NULL

INSERT INTO Customers (FirstName, LastName, Email, Phone, Address) VALUES

('Error', 'Email', 'error.email', '9999999994', '1002 Error Rd'); -- Potentially invalid email format

-- Duplicate violations

INSERT INTO Customers (FirstName, LastName, Email, Phone, Address) VALUES

('Duplicate', 'Email', 'alice.smith@example.com', '9999999995', '1003 Dup Rd'); -- Duplicate Email

INSERT INTO Customers (FirstName, LastName, Email, Phone, Address) VALUES

('Duplicate', 'Phone', 'dup.phone@example.com', '9876543210', '1004 Dup Ave'); -- Duplicate Phone

Products Table:

INSERT INTO Products (ProductName, Description, Price, CategoryID, StockQuantity) VALUES

(‘Laptop’, ‘High-performance laptop for professionals’, 1200.00, 1, 50),

(‘Novel – The Great Escape’, ‘A thrilling adventure novel’, 15.50, 2, 100),

(‘T-Shirt (Men, Blue)’, ‘Comfortable cotton t-shirt’, 25.00, 3, 200),

(‘Coffee Maker’, ‘Automatic drip coffee maker’, 45.99, 4, 75),

(‘Basketball’, ‘Official size and weight basketball’, 30.00, 5, 150),

(‘Building Blocks Set’, ‘Set of colorful building blocks for kids’, 35.75, 6, 120),

(‘Lipstick (Red)’, ‘Classic red lipstick’, 18.20, 7, 90),

(‘Silver Pendant’, ‘Elegant silver pendant necklace’, 75.00, 8, 60),

(‘Car Battery’, ‘High-performance car battery’, 110.50, 9, 40),

(‘Multivitamins’, ‘Daily multivitamins for adults’, 22.99, 10, 180),

(‘Ground Coffee (Arabica)’, ‘Premium arabica ground coffee’, 12.75, 11, 110),

(‘Sofa (3-Seater, Grey)’, ‘Comfortable three-seater sofa’, 550.00, 12, 30),

(‘Cordless Drill’, ‘Powerful cordless drill with accessories’, 89.99, 13, 70),

(‘Gardening Gloves’, ‘Durable gardening gloves’, 9.50, 14, 250),

(‘Dog Food (Large Breed)’, ‘Nutritious dog food for large breeds’, 40.25, 15, 95),

(‘Acoustic Guitar’, ‘Beginner-friendly acoustic guitar’, 150.00, 16, 55),

(‘Watercolor Paint Set’, ‘Set of 24 watercolor paints’, 28.50, 17, 130),

(‘Suitcase (Large, Black)’, ‘Durable and spacious suitcase’, 125.00, 18, 45),

(‘Notebook (A4, Lined)’, ‘Pack of 5 A4 lined notebooks’, 10.99, 19, 220),

(‘Antivirus Software (1 Year)’, ‘One-year subscription for antivirus protection’, 35.00, 20, 80),

(‘Smartwatch’, ‘Feature-rich smartwatch with fitness tracking’, 199.00, 1, 65),

(‘Mystery Novel – The Lost Key’, ‘A captivating mystery novel’, 14.00, 2, 130),

(‘Jeans (Women, Denim)’, ‘Classic denim jeans for women’, 40.00, 3, 180),

(‘Blender’, ‘High-speed kitchen blender’, 65.50, 4, 85),

(‘Soccer Ball’, ‘Regulation size soccer ball’, 28.75, 5, 160),

(‘Educational Toy – Robot Kit’, ‘DIY robot building kit for kids’, 55.00, 6, 100),

(‘Eyeliner (Black)’, ‘Long-lasting black eyeliner’, 15.90, 7, 110),

(‘Gold Bracelet’, ‘Elegant gold bracelet for women’, 120.00, 8, 70),

(‘Engine Oil (Synthetic)’, ‘Full synthetic engine oil’, 45.75, 9, 50),

(‘Vitamin C Tablets’, ‘Immunity-boosting Vitamin C tablets’, 19.50, 10, 200),

* NULL violation (CategoryID referencing non-existent category)

(‘Invalid Product’, ‘Product with invalid category’, 50.00, 999, 20),

* NULL violations (NOT NULL constraints)

(‘No Name Product’, NULL, 20.00, 1, 10),

(‘No Price Product’, ‘Product with no price’, NULL, 2, 15),

* Duplicate violation (assuming ProductName should be unique in a real-world scenario, though not enforced here)

(‘Laptop’, ‘Another laptop description’, 1150.00, 1, 40);

INSERT IGNORE INTO Categories (CategoryName, Description) VALUES

('Electronics', 'Another description for electronics');

UPDATE Categories

SET Description = 'Another description for electronics'

WHERE CategoryName = 'Electronics';

Orders Table:

INSERT INTO Orders (CustomerID, OrderStatus, ShippingAddress, TotalAmount) VALUES

(1, ‘Shipped’, ‘123 Main St, Anytown’, 1225.50),

(2, ‘Delivered’, ‘456 Oak Ave, Anytown’, 70.99),

(3, ‘Pending’, ‘789 Pine Ln, Anytown’, 25.00),

(4, ‘Shipped’, ‘101 Elm Rd, Anytown’, 18.20),

(5, ‘Delivered’, ‘222 Maple Dr, Anytown’, 110.50),

(6, ‘Pending’, ‘333 Birch Ct, Anytown’, 22.99),

(7, ‘Shipped’, ‘444 Willow Way, Anytown’, 12.75),

(8, ‘Delivered’, ‘555 Cedar Blvd, Anytown’, 550.00),

(9, ‘Pending’, ‘666 Spruce Pl, Anytown’, 89.99),

(10, ‘Shipped’, ‘777 Oak St, Anytown’, 9.50),

(11, ‘Delivered’, ‘888 Pine Ave, Anytown’, 40.25),

(12, ‘Pending’, ‘999 Elm Ln, Anytown’, 150.00),

(13, ‘Shipped’, ‘111 Maple Rd, Anytown’, 28.50),

(14, ‘Delivered’, ‘222 Birch Dr, Anytown’, 125.00),

(15, ‘Pending’, ‘333 Willow Ct, Anytown’, 10.99),

(16, ‘Shipped’, ‘444 Cedar Way, Anytown’, 35.00),

(17, ‘Delivered’, ‘555 Spruce Blvd, Anytown’, 199.00),

(18, ‘Pending’, ‘666 Oak Pl, Anytown’, 14.00),

(19, ‘Shipped’, ‘777 Pine St, Anytown’, 40.00),

(20, ‘Delivered’, ‘888 Elm Ave, Anytown’, 65.50),

(1, ‘Processing’, ‘123 Main St, Anytown’, 58.75),

(3, ‘Cancelled’, ‘789 Pine Ln, Anytown’, 110.00);

-- NULL violation (CustomerID referencing non-existent customer – will fail FK constraint)

-- (999, ‘Pending’, ‘Unknown Address’, 100.00);

INSERT INTO Orders (CustomerID, OrderStatus, ShippingAddress, TotalAmount) VALUES

(999, 'Pending', 'Unknown Address', 100.00); -- This will fail if no customer with ID 999 exists

OrderItems Table:

INSERT INTO OrderItems (OrderID, ProductID, Quantity, UnitPrice) VALUES

(1, 1, 1, 1200.00),

(1, 3, 1, 25.00),

(2, 4, 1, 45.99),

(2, 14, 3, 8.00),

(3, 3, 1, 25.00),

(4, 7, 1, 18.20),

(5, 9, 1, 110.50),

(6, 10, 2, 11.50),

(7, 11, 1, 12.75),

(8, 12, 1, 550.00),

(9, 13, 1, 89.99),

(10, 14, 2, 4.75),

(11, 15, 1, 40.25),

(12, 16, 1, 150.00),

(13, 17, 1, 28.50),

(14, 18, 1, 125.00),

(15, 19, 2, 5.00),

(16, 20, 1, 35.00),

(17, 21, 1, 199.00),

(18, 22, 1, 14.00),

(19, 23, 1, 40.00),

(20, 24, 1, 65.50),

(1, 5, 1, 30.50),

(3, 2, 2, 7.75);

-- NULL violations (NOT NULL constraints)

-- (NULL, 1, 1, 100.00), -- OrderID cannot be NULL

-- (1, NULL, 1, 50.00), -- Product

INSERT INTO OrderItems (OrderID, ProductID, Quantity, UnitPrice) VALUES

(NULL, 1, 1, 100.00), -- OrderID cannot be NULL

(1, NULL, 1, 50.00); -- ProductID cannot be NULL

**Copy Past Values to MYSQL**

CREATE DATABASE ecom;

USE ecom;

CREATE TABLE Customers (

CustomerID INT PRIMARY KEY AUTO\_INCREMENT,

FirstName VARCHAR(50) NOT NULL,

LastName VARCHAR(50) NOT NULL,

Email VARCHAR(100) UNIQUE NOT NULL,

Phone VARCHAR(20) UNIQUE,

Address VARCHAR(255),

RegistrationDate TIMESTAMP DEFAULT CURRENT\_TIMESTAMP

);

CREATE TABLE Categories (

CategoryID INT PRIMARY KEY AUTO\_INCREMENT,

CategoryName VARCHAR(50) UNIQUE NOT NULL,

Description TEXT

);

CREATE TABLE Products (

ProductID INT PRIMARY KEY AUTO\_INCREMENT,

ProductName VARCHAR(100) NOT NULL,

Description TEXT,

Price DECIMAL(10, 2) NOT NULL,

CategoryID INT,

StockQuantity INT NOT NULL DEFAULT 0,

LastUpdated TIMESTAMP DEFAULT CURRENT\_TIMESTAMP ON UPDATE CURRENT\_TIMESTAMP,

FOREIGN KEY (CategoryID) REFERENCES Categories(CategoryID)

);

CREATE TABLE Orders (

OrderID INT PRIMARY KEY AUTO\_INCREMENT,

CustomerID INT NOT NULL,

OrderDate TIMESTAMP DEFAULT CURRENT\_TIMESTAMP,

OrderStatus VARCHAR(20) DEFAULT 'Pending',

ShippingAddress VARCHAR(255),

TotalAmount DECIMAL(10, 2),

FOREIGN KEY (CustomerID) REFERENCES Customers(CustomerID)

);

CREATE TABLE OrderItems (

OrderItemID INT PRIMARY KEY AUTO\_INCREMENT,

OrderID INT NOT NULL,

ProductID INT NOT NULL,

Quantity INT NOT NULL,

UnitPrice DECIMAL(10, 2) NOT NULL,

FOREIGN KEY (OrderID) REFERENCES Orders(OrderID),

FOREIGN KEY (ProductID) REFERENCES Products(ProductID)

);

INSERT INTO Customers (FirstName, LastName, Email, Phone, Address) VALUES

('Alice', 'Smith', 'alice.smith@example.com', '9876543210', '123 Main St, Anytown'),

('Bob', 'Johnson', 'bob.johnson@example.com', '8765432109', '456 Oak Ave, Anytown'),

('Charlie', 'Brown', 'charlie.brown@example.com', '7654321098', '789 Pine Ln, Anytown'),

('Diana', 'Miller', 'diana.miller@example.com', '6543210987', '101 Elm Rd, Anytown'),

('Eve', 'Wilson', 'eve.wilson@example.com', '5432109876', '222 Maple Dr, Anytown'),

('Frank', 'Taylor', 'frank.taylor@example.com', '4321098765', '333 Birch Ct, Anytown'),

('Grace', 'Moore', 'grace.moore@example.com', '3210987654', '444 Willow Way, Anytown'),

('Henry', 'Jackson', 'henry.jackson@example.com', '2109876543', '555 Cedar Blvd, Anytown'),

('Ivy', 'White', 'ivy.white@example.com', '1098765432', '666 Spruce Pl, Anytown'),

('Jack', 'Harris', 'jack.harris@example.com', '9012345678', '777 Oak St, Anytown'),

('Karen', 'Martin', 'karen.martin@example.com', '8023456789', '888 Pine Ave, Anytown'),

('Liam', 'Young', 'liam.young@example.com', '7034567890', '999 Elm Ln, Anytown'),

('Mia', 'Allen', 'mia.allen@example.com', '6045678901', '111 Maple Rd, Anytown'),

('Noah', 'King', 'noah.king@example.com', '5056789012', '222 Birch Dr, Anytown'),

('Olivia', 'Wright', 'olivia.wright@example.com', '4067890123', '333 Willow Ct, Anytown'),

('Peter', 'Scott', 'peter.scott@example.com', '3078901234', '444 Cedar Way, Anytown'),

('Quinn', 'Green', 'quinn.green@example.com', '2089012345', '555 Spruce Blvd, Anytown'),

('Ryan', 'Adams', 'ryan.adams@example.com', '1090123456', '666 Oak Pl, Anytown'),

('Sophia', 'Baker', 'sophia.baker@example.com', '9123456780', '777 Pine St, Anytown'),

('Thomas', 'Clark', 'thomas.clark@example.com', '8123456790', '888 Elm Ave, Anytown');

INSERT INTO Categories (CategoryName, Description) VALUES

('Electronics', 'Electronic gadgets and accessories'),

('Books', 'A wide range of reading material'),

('Clothing', 'Apparel for men, women, and children'),

('Home Goods', 'Items for your household'),

('Sports', 'Equipment and gear for various sports'),

('Toys', 'Playthings for all ages'),

('Beauty', 'Cosmetics and personal care products'),

('Jewelry', 'Fine and fashion jewelry'),

('Automotive', 'Parts and accessories for vehicles'),

('Health', 'Wellness and medical supplies'),

('Food & Beverage', 'Groceries and drinks'),

('Furniture', 'Items to furnish your home'),

('Tools', 'Equipment for DIY and professional use'),

('Garden', 'Supplies for outdoor and gardening'),

('Pet Supplies', 'Items for your furry friends'),

('Music', 'Instruments and accessories'),

('Art Supplies', 'Materials for creative endeavors'),

('Travel', 'Luggage and travel accessories'),

('Office Supplies', 'Items for work and study'),

('Software', 'Computer programs and applications');

INSERT INTO Orders (CustomerID, OrderStatus, ShippingAddress, TotalAmount) VALUES

(1, 'Shipped', '123 Main St, Anytown', 1225.50),

(2, 'Delivered', '456 Oak Ave, Anytown', 70.99),

(3, 'Pending', '789 Pine Ln, Anytown', 25.00),

(4, 'Shipped', '101 Elm Rd, Anytown', 18.20),

(5, 'Delivered', '222 Maple Dr, Anytown', 110.50),

(6, 'Pending', '333 Birch Ct, Anytown', 22.99),

(7, 'Shipped', '444 Willow Way, Anytown', 12.75),

(8, 'Delivered', '555 Cedar Blvd, Anytown', 550.00),

(9, 'Pending', '666 Spruce Pl, Anytown', 89.99),

(10, 'Shipped', '777 Oak St, Anytown', 9.50),

(11, 'Delivered', '888 Pine Ave, Anytown', 40.25),

(12, 'Pending', '999 Elm Ln, Anytown', 150.00),

(13, 'Shipped', '111 Maple Rd, Anytown', 28.50),

(14, 'Delivered', '222 Birch Dr, Anytown', 125.00),

(15, 'Pending', '333 Willow Ct, Anytown', 10.99),

(16, 'Shipped', '444 Cedar Way, Anytown', 35.00),

(17, 'Delivered', '555 Spruce Blvd, Anytown', 199.00),

(18, 'Pending', '666 Oak Pl, Anytown', 14.00),

(19, 'Shipped', '777 Pine St, Anytown', 40.00),

(20, 'Delivered', '888 Elm Ave, Anytown', 65.50),

(1, 'Processing', '123 Main St, Anytown', 58.75),

(3, 'Cancelled', '789 Pine Ln, Anytown', 110.00);

ALTER TABLE OrderItems

DROP FOREIGN KEY OrderItems\_ibfk\_2;

INSERT INTO OrderItems (OrderID, ProductID, Quantity, UnitPrice) VALUES

(1, 1, 1, 1200.00),

(1, 3, 1, 25.00),

(2, 4, 1, 45.99),

(2, 14, 3, 8.00),

(3, 3, 1, 25.00),

(4, 7, 1, 18.20),

(5, 9, 1, 110.50),

(6, 10, 2, 11.50),

(7, 11, 1, 12.75),

(8, 12, 1, 550.00),

(9, 13, 1, 89.99),

(10, 14, 2, 4.75),

(11, 15, 1, 40.25),

(12, 16, 1, 150.00),

(13, 17, 1, 28.50),

(14, 18, 1, 125.00),

(15, 19, 2, 5.00),

(16, 20, 1, 35.00),

(17, 21, 1, 199.00),

(18, 22, 1, 14.00),

(19, 23, 1, 40.00),

(20, 24, 1, 65.50),

(1, 5, 1, 30.50),

(3, 2, 2, 7.75);

\

Database and Table Management

\* Database Operations: CREATE DATABASE, USE, SHOW DATABASES, DROP DATABASE

\* Table Operations: CREATE TABLE, ALTER TABLE, ADD COLUMN, MODIFY COLUMN, DROP COLUMN, RENAME COLUMN, RENAME TO, DROP TABLE, SHOW TABLES, DESCRIBE (DESC), CREATE TEMPORARY TABLE

\* Constraints: PRIMARY KEY, FOREIGN KEY, UNIQUE, NOT NULL, DEFAULT, CHECK, CONSTRAINT

Data Types

\* Numeric Types: INT, BIGINT, SMALLINT, TINYINT, DECIMAL, NUMERIC, FLOAT, DOUBLE, REAL, BIT, BOOLEAN

\* String Types: VARCHAR, CHAR, TEXT, MEDIUMTEXT, LONGTEXT, ENUM, SET

\* Date and Time Types: DATE, TIME, DATETIME, TIMESTAMP, YEAR

\* Binary Types: BINARY, VARBINARY, BLOB, MEDIUMBLOB, LONGBLOB

\* Spatial Types: GEOMETRY, POINT, LINESTRING, POLYGON (less common for beginners but good to be aware of)

\* JSON Data Type: JSON

Functions

\* Aggregate Functions: COUNT, SUM, AVG, MIN, MAX, GROUP\_CONCAT

\* String Functions: CONCAT, SUBSTRING (SUBSTR, MID), LENGTH, UPPER, LOWER, TRIM, LTRIM, RTRIM, REPLACE, LOCATE (INSTR), LEFT, RIGHT

\* Numeric Functions: ABS, CEIL (CEILING), FLOOR, ROUND, MOD, POW (POWER), SQRT, RAND

\* Date and Time Functions: NOW, CURDATE (CURRENT\_DATE), CURTIME (CURRENT\_TIME), DATE, TIME, YEAR, MONTH, DAY, HOUR, MINUTE, SECOND, DATE\_FORMAT, DATE\_ADD, DATE\_SUB, DATEDIFF

\* Control Flow Functions: IF, IFNULL, NULLIF, CASE

\* System Functions: USER, DATABASE, VERSION

\* Cast Functions: CAST, CONVERT

Joins

\* Basic Joins: INNER JOIN, LEFT JOIN (LEFT OUTER JOIN), RIGHT JOIN (RIGHT OUTER JOIN), FULL OUTER JOIN (MySQL doesn’t directly support FULL OUTER JOIN, often emulated with UNION ALL of LEFT JOIN and RIGHT JOIN)

\* Self Join: (Implied by joining a table to itself)

\* Cross Join: CROSS JOIN

Grouping and Aggregation

\* GROUP BY

\* HAVING

Subqueries (Nested Queries)

\* IN (with subquery)

\* NOT IN (with subquery)

\* EXISTS

\* NOT EXISTS

\* ANY (SOME)

\* ALL

\* Correlated Subqueries

Views

\* CREATE VIEW

\* ALTER VIEW

\* DROP VIEW

\* SHOW CREATE VIEW

Transactions

\* START TRANSACTION (BEGIN)

\* COMMIT

\* ROLLBACK

\* SAVEPOINT

\* RELEASE SAVEPOINT

Indexing

\* CREATE INDEX

\* CREATE UNIQUE INDEX

\* DROP INDEX

\* SHOW INDEX (SHOW INDEXES, SHOW KEYS)

\* Index Types: B-TREE, HASH, FULLTEXT, SPATIAL (awareness is key)

User and Privilege Management

\* CREATE USER

\* ALTER USER

\* DROP USER

\* GRANT

\* REVOKE

\* SHOW GRANTS

Stored Procedures and Functions

\* CREATE PROCEDURE

\* CALL

\* DROP PROCEDURE

\* CREATE FUNCTION

\* DROP FUNCTION

\* SHOW PROCEDURE STATUS

\* SHOW FUNCTION STATUS

Triggers

\* CREATE TRIGGER

\* DROP TRIGGER

\* SHOW TRIGGERS

Events (Scheduled Tasks)

\* CREATE EVENT

\* ALTER EVENT

\* DROP EVENT

\* SHOW EVENTS

Full-Text Search

\* FULLTEXT index

\* MATCH, AGAINST

Spatial Data Types and Functions

* (Keywords related to GEOMETRY, POINT, LINESTRING, POLYGON and functions like ST\_Contains, ST\_Distance – focus on core SQL first)

JSON Functions

* (Keywords like JSON\_EXTRACT, JSON\_OBJECT, JSON\_ARRAY, JSON\_INSERT, JSON\_REPLACE – explore after mastering core data types)

Window Functions

\* OVER, PARTITION BY, ORDER BY (within OVER)

\* ROW\_NUMBER(), RANK(), DENSE\_RANK(), NTILE()

\* LAG(), LEAD()

\* FIRST\_VALUE(), LAST\_VALUE()

\* SUM(), AVG(), MIN(), MAX() (as window functions)

Miscellaneous

\* EXPLAIN (to analyze query execution plans)

\* LOCK TABLES, UNLOCK TABLES (for concurrency control – more advanced)

\* AUTO\_INCREMENT (for automatically generating sequence numbers)

Window Functions included:

Core SQL Operations

* Data Retrieval (SELECT): SELECT, FROM, WHERE, AND, OR, NOT, IN, BETWEEN, LIKE, IS NULL, IS NOT NULL, ORDER BY, ASC, DESC, LIMIT, OFFSET
* Data Manipulation (INSERT, UPDATE, DELETE): INSERT INTO, VALUES, SET, UPDATE, DELETE FROM, TRUNCATE TABLE

This comprehensive list should provide a strong foundation for your MySQL learning journey. Focus on understanding the core SQL operations and gradually move towards the more advanced topics.

Performance and Optimization

\* Query Optimization: EXPLAIN, INDEX, ANALYZE TABLE, OPTIMIZE TABLE, STRAIGHT\_JOIN, SQL\_CACHE, SQL\_NO\_CACHE, query hints, understanding execution plans.

\* Indexing Strategies: Composite indexes, covering indexes, index cardinality, when to index, when not to index.

\* Server Configuration (High-Level Awareness): Key buffer pool settings (innodb\_buffer\_pool\_size), query cache (though largely deprecated in newer versions), connection pooling.

Security

\* Authentication: User accounts, host restrictions.

\* Authorization: GRANT, REVOKE, roles (in newer MySQL versions).

\* Data Encryption: ENCRYPT(), DECODE(), AES\_ENCRYPT(), AES\_DECRYPT(), SHA2(), awareness of Transparent Data Encryption (TDE).

\* SQL Injection Prevention: Parameterized queries, input validation (though not a MySQL keyword, it’s a crucial concept).

Data Import and Export

\* LOAD DATA INFILE

\* SELECT ... INTO OUTFILE

\* mysqldump (command-line tool, but essential for backups and data export)

\* mysqlimport (command-line tool for data import)

Replication and High Availability (More Advanced)

\* Replication Concepts: Master/Slave (or Source/Replica), binary logs (binlog), relay logs.

\* Replication Configuration Keywords: CHANGE MASTER TO, START SLAVE, STOP SLAVE, SHOW SLAVE STATUS.

\* Group Replication: (More recent HA solution)

Backup and Recovery

\* mysqldump (for logical backups)

\* Awareness of physical backups.

\* Recovery procedures.

Character Sets and Collations

* CHARACTER SET, COLLATE, utf8mb4, latin1, SHOW CHARACTER SET, SHOW COLLATION.

Storage Engines (Beyond the Default InnoDB)

\* MyISAM (older, non-transactional)

\* MEMORY (in-memory tables)

\* CSV (for CSV file integration)

\* ARCHIVE (for compressed, historical data)

\* SHOW ENGINES.

\* ENGINE table option in CREATE TABLE.

Partitioning

\* PARTITION BY, RANGE, LIST, HASH, KEY, COLUMNS.

\* CREATE TABLE ... PARTITION BY.

\* ALTER TABLE ... PARTITION BY.

Common Table Expressions (CTEs)

* WITH (recursive and non-recursive CTEs).

Geospatial Data Types and Functions (If Relevant)

\* More in-depth look at GEOMETRY, POINT, LINESTRING, POLYGON, MULTIPOLYGON, etc.

\* Functions like ST\_Distance, ST\_Contains, ST\_Intersects, MBRContains, etc.

Full-Text Search (More Detail)

\* FULLTEXT index options.

\* MATCH ... AGAINST operators and modifiers (e.g., BOOLEAN MODE).

\* Relevance scoring.

System Variables and Status Variables

\* SHOW VARIABLES

\* SHOW STATUS

Prepared Statements

* PREPARE, EXECUTE, DEALLOCATE PREPARE.

Cursors (Within Stored Procedures/Functions)

* DECLARE CURSOR, OPEN, FETCH, CLOSE.

Error Handling (Within Stored Procedures/Functions)

* DECLARE CONTINUE HANDLER, DECLARE EXIT HANDLER, SIGNAL.

Data Dictionary and Metadata

* Information Schema tables (e.g., information\_schema.TABLES, information\_schema.COLUMNS, information\_schema.KEY\_COLUMN\_USAGE).

MySQL Ecosystem Tools (Awareness)

\* mysqladmin

\* mysqlbinlog

\* MySQL Workbench (GUI tool)

This expanded list covers more advanced topics and areas crucial for a well-rounded understanding of MySQL, especially for someone with existing SQL experience. Depending on your specific goals, some of these areas might be more relevant than others.