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Module: Databases for Analytics

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CA1: Project: Online Retail Business

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# Overview and Background

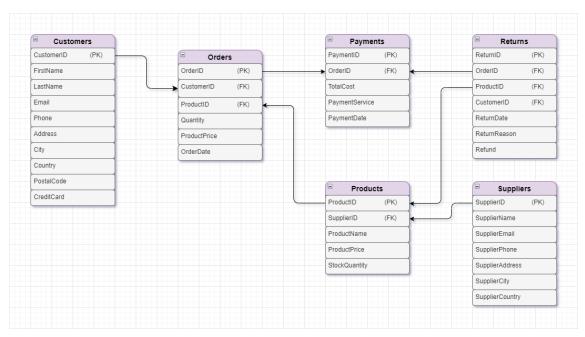
The project is based on an online retail store designed to enable customers purchase products online. In my case, the online business is specialised in combat sports gear and equipment. The idea for this online store comes from my personal passion and involvement in Muay Thai and my respect for Martial Arts philosophy as a whole.

The benefits of an online store are convenience, accessibility, and scalability. Convenience and accessibility because customers can purchase products from any location and outside of store hours. Scalability because as the business grows, an online platform can easily adjust to hold more products, users, and services.

My online store is a small business offering combat sport gear and as any modern retail business, it needs a database system with every stakeholder involved, all attributes, and daily routines. In this project, I will be developing this database.

# **ERD Diagram**

An ERD (Entity-Relationship Diagram) diagram for a retail business is developed based on its structure and relationships between the entities within the business. Following this basic logic, my ERD diagram, as shown below, provides a visual representation of my business entities and how they interact with each other.



My ERD diagram includes the following tables:

- Customers: Contains information on the people that purchased products.
   Attributes: Customer ID (Primary Key), FirstName, LastName, Email, Phone, Address, City, Country, Postal Code, Credit Card
- Suppliers: Contains information on the suppliers of products for my business.
   Attributes: Supplier ID (Primary Key), Supplier Name, Supplier Email, Supplier Phone, Supplier Address, Supplier City, Supplier Country
- Products: Contains information on products sold by my business and stock quantity.
   Attributes: Product ID (Primary Key), Supplier ID (Foreign Key), Product Name, Product Price,
   Stock Quantity
- Orders: Contains information on the orders created by customers.
   Attributes: Order ID (Primary Key), Customer ID (Foreign Key), Product ID (Foreign Key),
   Quantity, Product Price, Order Date
- Payments: Contains information on the payments of each order.
   Attributes: Payment ID (Primary Key), Order ID (Foreign Key), Total Cost, Payment Service
- **Returns**: Contains information on the returned orders, the products included and the reason. Attributes: Return ID (Primary Key), Order ID (Foreign Key), Product ID (Foreign Key), Customer ID (Foreign Key), Return Date, Return Reason, Refund

## **Database Development**

To build my database I use MySQL Workbench 8.0. Using the statement CREATE DATABASE MartialArtsGear; I created my database. By using the statement CREATE TABLE TableName (column1 datatype, column2 datatype, ...) I created the 6 tables that form the basis of my database. In Customers table where primary key is CustomerID, the customer's credit card is one of the pieces of information included. In Suppliers table the primary key is SupplierID. In Products table the primary key is ProductID and foreign key is SupplierID. In Orders table the primary key is OrderID and there are two foreign keys for CustomerID and ProductID. In Payments table the primary key is PaymentID, the foreign key is OrderID and there is also an attribute PaymentService used for the type of payment, like credit card or PayPal. In Returns table the primary key is ReturnID, there are two foreign keys for OrderID and CustomerID, the attribute Refund is used for the amount (Product Price) to be refunded to customer, and the attribute ReturnReason for the reason the order is returned such as: 'Damaged or defective product', 'Wrong product delivered', 'Order arrived too late'.

The data that are later added to all tables, including the Products (STOCK) table, were generated at mocharoo.com, as advised.

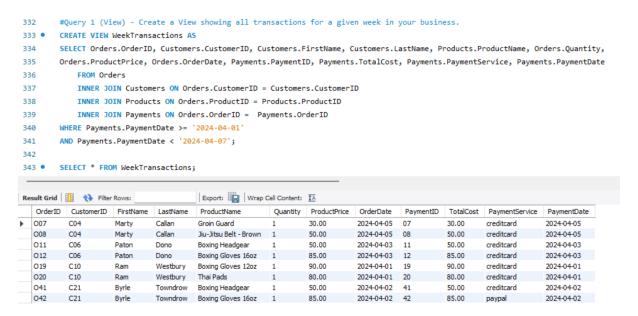
All relevant coding to create the database, the tables, insert values, create the Data Mart, and generate the requested Queries are included in the **MartialArtsGear.sql** file, found in the .zip folder.

# **SQL** Queries

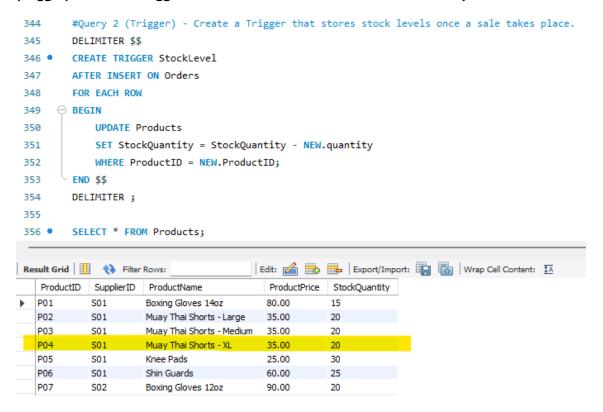
In the .sql file, the comment # under every query must be removed for the result to be displayed!

## Query 1

#### (View) - Create a View showing all transactions for a given week in your business.

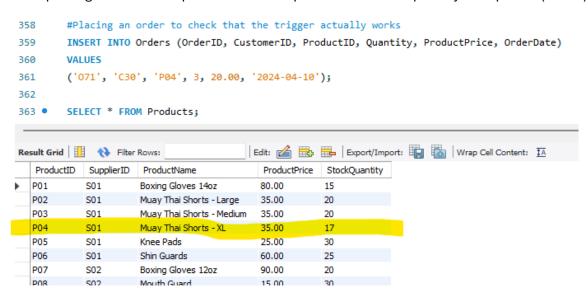


#### (Trigger) - Create a Trigger that stores stock levels once a sale takes place.



Before placing an order for 3 pieces of the P04 product the Stock quantity is 20 pieces (above)

After placing an order for 3 pieces of the P04 product the Stock quantity is 17 pieces (below)



#### (View) - Create a View of stock (by supplier) purchased by you (business).

```
#Query 3 (View) - Create a View of stock (by supplier) purchased by you.
367 •
         CREATE VIEW MyPurchasedStock AS
368
              SELECT Products.ProductID, Products.ProductName, Products.StockQuantity, Suppliers.SupplierName
369
              FROM Products
370
         JOIN Suppliers ON Products.SupplierID = Suppliers.SupplierID;
371
         SELECT * FROM MyPurchasedStock;
Export: Wrap Cell Content: IA
                                      StockQuantity SupplierName
                                                   Fairtex
             Boxing Gloves 14oz
  P02
             Muay Thai Shorts - Large
                                     20
                                                   Fairtex
  P03
             Muay Thai Shorts - Medium
                                     20
                                                   Fairtex
  P04
             Muay Thai Shorts - XL
                                     17
                                                   Fairtex
  P05
             Knee Pads
                                                   Fairtex
                                     30
  P06
             Shin Guards
                                   25
                                                   Fairtex
  P07
             Boxing Gloves 12oz
                                     20
                                                   Adidas
                                                   Adidas
  P08
             Mouth Guard
                                     30
  P09
             Boxing Hand Wraps
                                     40
                                                   Adidas
  P10
             Boxing Gloves 16oz
                                     15
                                                   Adidas
  P11
             Wrist Bands
                                                   Adidas
                                     10
                                                   Adidas
  P12
             Punching Bag
  P13
             BJJ Gi - White
                                     10
             BJJ Gi - Black
  P14
                                     10
                                                   Tatami
  P15
             Jiu-Jitsu Belt - White
                                     20
                                                   Tatami
  P16
             Grappling Dummy
                                     10
                                                   Tatami
  P17
                                                   Tatami
             Jiu-Jitsu Belt - Brown
                                     10
  P18
             Jiu-Jitsu Belt - Blue
                                     20
  P19
                                                   TwinsSpecial
             Sparring Headgear
                                     20
  P20
             Boxing Gloves 16oz
                                                   TwinsSpecial
  P21
             Kick Shield
                                     20
                                                   TwinsSpecial
             Thai Pads
                                     15
  P22
                                                   TwinsSpecial
  P23
             Boxing Gloves 12oz
                                                   TwinsSpecial
             Kickboxing Pants - Large
  P24
                                     30
                                                   TwinsSpecial
  P25
             Groin Guard
                                                   Venum
  P26
             MMA Gloves - Red
                                     15
                                                   Venum
  P27
             MMA Gloves - Black
                                     15
                                                   Venum
  P28
             Boxing Headgear
                                     20
                                                   Venum
  P29
             Boxing Punching Bag
                                     10
                                                   Venum
  P30
             Mouth Guard Case
                                                   Venum
```

#### (View) - Create a View of total stock sold to general public (group by supplier).

```
#Query 4 (View) - Create a View of total stock sold to general public (group by supplier).
        #Since all my customers are "public" the script below is applicable.
376
377
       #If I had different types of customers like "public", "business" etc. Before GROUPBY I would add: WHERE Customers.CustomerType = 'Public'
378 • CREATE VIEW TotalStockSold AS
          SELECT Products.SupplierID, Suppliers.SupplierName, SUM(Orders.Quantity) AS TotalStockSold
380
          FROM Orders
         JOIN Products ON Orders.ProductID = Products.ProductID

JOIN Suppliers ON Products.SupplierID = Suppliers.SupplierID
382
383 GROUP BY Products.SupplierID, Suppliers.SupplierName;
 384
Export: Wrap Cell Content: TA
SupplierID SupplierName TotalStockSold

S01 Fairtex 18
   S02 Adidas 14
   S04 TwinsSpecial 14
  S05
           Venum
                       13
```

# Detail and total all transactions (SALES) for the month-to-date. (A Group By with Roll-Up) – 1 month

```
388
        #Query 5 - Detail and total all transactions (SALES) for the month-to-date. (A Group By with Roll-Up) - 1 month
389
        DELIMITER $$
390 • CREATE PROCEDURE month_to_date_transactions(current_month INT, current_year INT)
391 ⊖ BEGIN
392
            SELECT
                COALESCE(OrderDate, 'Total') AS OrderDate,
393
394
                OrderID,
                SUM(ProductPrice) AS TotalPrice,
395
                SUM(Quantity) AS TotalQuantity,
396
                CustomerID
397
            FROM orders
398
                WHERE MONTH(OrderDate) = current_month AND YEAR(OrderDate) = current_year
399
            GROUP BY OrderDate, OrderID, CustomerID WITH ROLLUP;
400
        END $$
401
402
        DELIMITER;
403
404 • CALL month_to_date_transactions(MONTH(CURRENT_DATE()), YEAR(CURRENT_DATE()));
                                     Export: Wrap Cell Content: IA
Result Grid Filter Rows:
   OrderDate OrderID TotalPrice TotalQuantity CustomerID
  2024-04-01
             019
                     90.00
  2024-04-01 O19 90.00 1
  2024-04-01 020
                     80.00
                                           C10
  2024-04-01 O20 80.00
2024-04-01 170.00
                                           NULL
  2024-04-02 041 50.00
                                           C21
  2024-04-02 041
                     50.00
                                           C21
  2024-04-02 042 85.00
                              1
  2024-04-02 O42
2024-04-02 NULL
                     85.00
                                           HULL
                   135.00
  2024-04-03 O11
                     50.00
                                          C06
  2024-04-03 O11 50.00
                                          C06
                     85.00
  2024-04-03 012
  2024-04-03 O12
2024-04-03
                    85.00
                                           NULL
                     135.00
  2024-04-05 007
                     30.00
                                          CO4
                              1
  2024-04-05 007
                     30.00
  2024-04-05 O08
                                           C04
                     50.00
```

•••

OrderDate	OrderID	TotalPrice	TotalQuantity	CustomerID		
2024-04-10	NULL	225.00	7	NULL		
2024-04-11	O59	45.00	1	C30		
2024-04-11	O59	45.00	1	NULL		
2024-04-11	O60	100.00	1	C30		
2024-04-11	O60	100.00	1	NULL		
2024-04-11	NULL	145.00	2	NULL		
2024-04-12	O37	30.00	1	C19		
2024-04-12	037	30.00	1	NULL		
2024-04-12	O38	50.00	1	C19		
2024-04-12	O38	50.00	1	NULL		
2024-04-12	NULL	80.00	2	NULL		
2024-04-13	O69	35.00	1	C05		
2024-04-13	O69	35.00	1	NULL		
2024-04-13	O70	45.00	1	C05		
2024-04-13	070	45.00	1	NULL		
2024-04-13	HULL	80.00	2	NULL		
Total	NULL	1535.00	29	NULL		

#### Detail and total all SALES for the year-to-date. (A Group By with Roll-Up) - All months

```
#Query 6 - Detail and total all SALES for the year-to-date. (A Group By with Roll-Up) - All months
409
       CREATE PROCEDURE year_to_date_transactions(current_year INT)
410 ⊝ BEGIN
411
               COALESCE(MONTH(OrderDate), 'Total') AS Month,
412
413
                COALESCE(YEAR(OrderDate), current_year) AS Year,
414
              OrderID.
415
              SUM(ProductPrice) AS TotalPrice,
416
               SUM(Quantity) AS TotalQuantity,
417
              CustomerTD
418
          FROM orders
           WHERE YEAR(OrderDate) = current_year
419
           GROUP BY COALESCE(YEAR(OrderDate), current_year), COALESCE(MONTH(OrderDate), 'Total'), OrderID, CustomerID, OrderDate WITH ROLLUP;
420
421
422
       DELIMITER :
423
424 • CALL year_to_date_transactions(YEAR(CURRENT_DATE()));
Result Grid Filter Rows:
                                  Export: Wrap Cell Content: IA
   Month Year OrderID TotalPrice TotalQuantity CustomerID
         2024 004
                      60.00
                                          C03
                    60.00
        2024 004
                                          CO3
         2024
              004
                      60.00
         2024 013
         2024
              013
                      50.00
        2024 013
                     50.00
                                          C07
         2024 014
                      100.00
        2024 014
  2
         2024
              014
                      100.00
         2024 023
                                          C12
                      5.00
         2024 023
                      5.00
                                          C12
         2024 023
         2024 024
                      15.00
                                          C12
        2024 024
                      15.00 1
         2024 024
                      15.00
         2024 025
Result 10 ×
   2
          2024 065
                       35.00
                                             C03
          2024
                065
                        35.00
                                             C03
                        35.00
          2024 065
                                             C03
          2024
                066
                        90.00
          2024 066
                        90.00
          2024 O66
2024 NULL
                                             NULL
   2
                       1075.00 19
          2024
               003
                        35.00
                                             C02
   3
          2024 003
                        35.00
                                             CO2
          2024
                003
                        35.00
   3
          2024 005
                        35.00
                                             C03
                005
                        35.00
                                             C03
                        35.00 1
               006
                        90.00
                                             C03
                        90.00 1
                                             CO3
          2024 006
   3
          2024
               006
                        90.00
```

•••

Month	Year	OrderID	TotalPrice	TotalQuantity	CustomerID
3	2024	064	60.00	1	NULL
3	2024	067	30.00	1	C04
3	2024	067	30.00	1	C04
3	2024	067	30.00	1	NULL
3	2024	O68	50.00	1	C04
3	2024	O68	50.00	1	C04
3	2024	O68	50.00	1	NULL
3	2024	NULL	1500.00	25	NULL
4	2024	001	80.00	1	C01
4	2024	001	80.00	1	C01
4	2024	001	80.00	1	NULL
4	2024	O02	30.00	1	C01
4	2024	O02	30.00	1	C01
4	2024	O02	30.00	1	NULL
4	2024	O07	30.00	1	C04
4	2024	O07	30.00	1	C04
Parult 10					

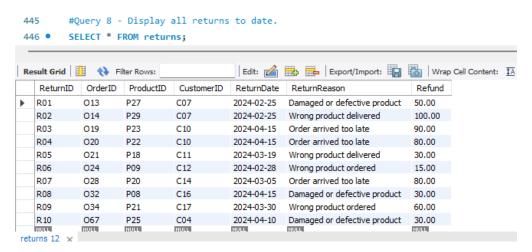
4	2024	061	80.00	1	C01
4	2024	061	80.00	1	HULL
4	2024	062	30.00	1	C01
4	2024	062	30.00	1	C01
4	2024	062	30.00	1	NULL
4	2024	069	35.00	1	C05
4	2024	069	35.00	1	C05
4	2024	069	35.00	1	NULL
4	2024	070	45.00	1	C05
4	2024	070	45.00	1	C05
4	2024	070	45.00	1	NULL
4	2024	071	20.00	3	C30
4	2024	071	20.00	3	C30
4	2024	071	20.00	3	NULL
4	2024	NULL	1535.00	29	HULL
NULL	2024	NULL	4110.00	73	HULL
Darolf 1	n				

Display the growth in sales/services (as a percentage) for your business, from the 1st month of opening until now.

```
427
        #Query 7 - Display the growth in sales/services (as a percentage) for your business, from the 1st month of opening until now.
428
            CONCAT(FORMAT(((SUM(Orders.TotalAmount) - first_month_sales) / first_month_sales) * 100, 2), "%") AS sales_growth_percentage
429
430
        FROM
431
           (SELECT
432
                 SUM(ProductPrice) AS first_month_sales
433
             FROM Orders
434
            WHERE YEAR(OrderDate) = 2024 AND MONTH(OrderDate) = 2) AS first_sales,
435
436
                YEAR(OrderDate) AS year,
437
                MONTH(OrderDate) AS month,
438
                SUM(ProductPrice) AS TotalAmount
439
             FROM Orders
440
             WHERE (YEAR(OrderDate) = 2024 AND MONTH(OrderDate) >= 2) OR (YEAR(OrderDate) = 2024 AND MONTH(OrderDate) <= 4)
441
             GROUP BY YEAR(OrderDate), MONTH(OrderDate)) AS Orders
442
       GROUP BY first month sales;
                                      Export: Wrap Cell Content: IA
sales_growth_percentage
282.33%
```

#### Query 8

#### Display all returns to date.



## Data Mart (View Results)

463 • select \* from TotalStockSold;

#### The Data Mart containing results only from Views (Questions 1, 3 and 4 ONLY)

```
# Creating the Data Mart containing the results ONLY from Views (Questions 1, 3 and 4)
449 •
       DROP DATABASE IF EXISTS DataMart;
450 • CREATE DATABASE DataMart;
451 • USE DataMart;
452
453
       \#Query\ 1\ (View) - Create a View showing all transactions for a given week in your business.
454 • CREATE TABLE DataMart.WeekTransactions AS SELECT * FROM MartialArtsGear.WeekTransactions;
455 • select * from WeekTransactions;
456
       #Query 3 (View) - Create a View of stock (by supplier) purchased by you.
457
458 • CREATE TABLE DataMart.MyPurchasedStock AS SELECT * FROM MartialArtsGear.MyPurchasedStock;
459 • select * from MyPurchasedStock;
460
461
       #Query 4 (View) - Create a View of total stock sold to general public (group by supplier).
462 • CREATE TABLE DataMart.TotalStockSold AS SELECT * FROM MartialArtsGear.TotalStockSold;
```

Res	ult Grid	📙 🙌 Filter	Rows:		Export: Wrap C	Cell Content:	ĪA					
П	OrderID	CustomerID	FirstName	LastName	ProductName	Quantity	ProductPrice	OrderDate	PaymentID	TotalCost	PaymentService	PaymentDate
	007	C04	Marty	Callan	Groin Guard	1	30.00	2024-04-05	07	30.00	creditcard	2024-04-05
	008	C04	Marty	Callan	Jiu-Jitsu Belt - Brown	1	50.00	2024-04-05	08	50.00	creditcard	2024-04-05
	011	C06	Paton	Dono	Boxing Headgear	1	50.00	2024-04-03	11	50.00	creditcard	2024-04-03
	012	C06	Paton	Dono	Boxing Gloves 16oz	1	85.00	2024-04-03	12	85.00	creditcard	2024-04-03
	O19	C10	Ram	Westbury	Boxing Gloves 12oz	1	90.00	2024-04-01	19	90.00	creditcard	2024-04-01
	O20	C10	Ram	Westbury	Thai Pads	1	80.00	2024-04-01	20	80.00	creditcard	2024-04-01
	041	C21	Byrle	Towndrow	Boxing Headgear	1	50.00	2024-04-02	41	50.00	creditcard	2024-04-02
	042	C21	Byrle	Towndrow	Boxing Gloves 16oz	1	85.00	2024-04-02	42	85.00	paypal	2024-04-02

	ProductID	ProductName	StockQuantity	SupplierNa	ame	
•	P01	Boxing Gloves 14oz	15	Fairtex		
	P02	Muay Thai Shorts - Large	20	Fairtex		
	P03	Muay Thai Shorts - Mediun	n 20	Fairtex		
	P04	Muay Thai Shorts - XL	17	Fairtex		
	P05	Knee Pads	30	Fairtex		
	P06	Shin Guards	25	Fairtex		
	P07	Boxing Gloves 12oz	20	Adidas		
	P08	Mouth Guard	30	Adidas		
	P09	Boxing Hand Wraps	40	Adidas		
	P10	Boxing Gloves 16oz	15	Adidas		
	P11	Wrist Bands	20	Adidas		
	P12	Punching Bag	10	Adidas		
	P13	BJJ Gi - White	10	Tatami		
	P14	BJJ Gi - Black	10	Tatami		
	P15	Jiu-Jitsu Belt - White	20	Tatami		
	P16	Grappling Dummy	10	Tatami		
	P17	Jiu-Jitsu Belt - Brown	10	Tatami		
	P18	Jiu-Jitsu Belt - Blue	20	Tatami		
	P19	Sparring Headgear	20	TwinsSpecial		
	P20	Boxing Gloves 16oz	25	TwinsSpecial		
	P21	Kick Shield	20	TwinsSpecial		
	P22	Thai Pads	15	TwinsSpecial		
	P23	Boxing Gloves 12oz	15	TwinsSpecial		
	P24	Kickboxing Pants - Large	30	TwinsSpecial		
	P25	Groin Guard	20	Venum		
	P26	MMA Gloves - Red	15	Venum		
	P27	MMA Gloves - Black	15	Venum		
	P28	Boxing Headgear	20	Venum		
	P29	Boxing Punching Bag	10	Venum		
	P30	Mouth Guard Case	20	Venum		
Res	ult 16	WeekTransactions 17	MyPurchasedStock	18 × Tot	alSto	