**Coding Challenge**

***-Create the Artists table***

CREATE TABLE Artists (

ArtistID INT PRIMARY KEY,

Name VARCHAR(255) NOT NULL,

Biography TEXT,

Nationality VARCHAR(100));

mysql> desc artists;

+-------------+--------------+------+-----+---------+-------+

| Field | Type | Null | Key | Default | Extra |

+-------------+--------------+------+-----+---------+-------+

| ArtistID | int | NO | PRI | NULL | |

| Name | varchar(255) | NO | | NULL | |

| Biography | text | YES | | NULL | |

| Nationality | varchar(100) | YES | | NULL | |

+-------------+--------------+------+-----+---------+-------+

4 rows in set (3.45 sec)

***-- Create the Categories table***

CREATE TABLE Categories (

CategoryID INT PRIMARY KEY,

Name VARCHAR(100) NOT NULL);

mysql> desc categories;

+------------+--------------+------+-----+---------+-------+

| Field | Type | Null | Key | Default | Extra |

+------------+--------------+------+-----+---------+-------+

| CategoryID | int | NO | PRI | NULL | |

| Name | varchar(100) | NO | | NULL | |

+------------+--------------+------+-----+---------+-------+

2 rows in set (0.01 sec)

***-- Create the Artworks table***

CREATE TABLE Artworks (

ArtworkID INT PRIMARY KEY,

Title VARCHAR(255) NOT NULL,

ArtistID INT,

CategoryID INT,

Year INT,

Description TEXT,

ImageURL VARCHAR(255),

FOREIGN KEY (ArtistID) REFERENCES Artists (ArtistID),

FOREIGN KEY (CategoryID) REFERENCES Categories (CategoryID));

mysql> desc artworks;

+-------------+--------------+------+-----+---------+-------+

| Field | Type | Null | Key | Default | Extra |

+-------------+--------------+------+-----+---------+-------+

| ArtworkID | int | NO | PRI | NULL | |

| Title | varchar(255) | NO | | NULL | |

| ArtistID | int | YES | MUL | NULL | |

| CategoryID | int | YES | MUL | NULL | |

| Year | int | YES | | NULL | |

| Description | text | YES | | NULL | |

| ImageURL | varchar(255) | YES | | NULL | |

+-------------+--------------+------+-----+---------+-------+

7 rows in set (0.00 sec)

***-- Create the Exhibitions table***

CREATE TABLE Exhibitions (

ExhibitionID INT PRIMARY KEY,

Title VARCHAR(255) NOT NULL,

StartDate DATE,

EndDate DATE,

Description TEXT);

mysql> desc exhibitions;

+--------------+--------------+------+-----+---------+-------+

| Field | Type | Null | Key | Default | Extra |

+--------------+--------------+------+-----+---------+-------+

| ExhibitionID | int | NO | PRI | NULL | |

| Title | varchar(255) | NO | | NULL | |

| StartDate | date | YES | | NULL | |

| EndDate | date | YES | | NULL | |

| Description | text | YES | | NULL | |

+--------------+--------------+------+-----+---------+-------+

5 rows in set (0.04 sec)

***-- Create a table to associate artworks with exhibitions***

CREATE TABLE ExhibitionArtworks (

ExhibitionID INT,

ArtworkID INT,

PRIMARY KEY (ExhibitionID, ArtworkID),

FOREIGN KEY (ExhibitionID) REFERENCES Exhibitions (ExhibitionID),

FOREIGN KEY (ArtworkID) REFERENCES Artworks (ArtworkID));

mysql> desc exhibitionartworks;

+--------------+------+------+-----+---------+-------+

| Field | Type | Null | Key | Default | Extra |

+--------------+------+------+-----+---------+-------+

| ExhibitionID | int | NO | PRI | NULL | |

| ArtworkID | int | NO | PRI | NULL | |

+--------------+------+------+-----+---------+-------+

2 rows in set (0.00 sec)

**DML(Insert sample data to tables)**

***-- Insert sample data into the Artists table***

INSERT INTO Artists (ArtistID, Name, Biography, Nationality) VALUES

(1, 'Pablo Picasso', 'Renowned Spanish painter and sculptor.', 'Spanish'),

(2, 'Vincent van Gogh', 'Dutch post-impressionist painter.', 'Dutch'),

(3, 'Leonardo da Vinci', 'Italian polymath of the Renaissance.', 'Italian');

select \*from artists;

+----------+-------------------+----------------------------------------+-------------+

| ArtistID | Name | Biography | Nationality |

+----------+-------------------+----------------------------------------+-------------+

| 1 | Pablo Picasso | Renowned Spanish painter and sculptor. | Spanish |

| 2 | Vincent van Gogh | Dutch post-impressionist painter. | Dutch |

| 3 | Leonardo da Vinci | Italian polymath of the Renaissance. | Italian |

+----------+-------------------+----------------------------------------+-------------+

3 rows in set (0.09 sec)

***-- Insert sample data into the Categories table***

INSERT INTO Categories (CategoryID, Name) VALUES

(1, 'Painting'),

(2, 'Sculpture'),

(3, 'Photography');

mysql> select \*from categories;

+------------+-------------+

| CategoryID | Name |

+------------+-------------+

| 1 | Painting |

| 2 | Sculpture |

| 3 | Photography |

+------------+-------------+

3 rows in set (0.00 sec)

***-- Insert sample data into the Artworks table***

INSERT INTO Artworks (ArtworkID, Title, ArtistID, CategoryID, Year, Description, ImageURL) VALUES

(1, 'Starry Night', 2, 1, 1889, 'A famous painting by Vincent van Gogh.', 'starry\_night.jpg'),

(2, 'Mona Lisa', 3, 1, 1503, 'The iconic portrait by Leonardo da Vinci.', 'mona\_lisa.jpg'), (3, 'Guernica', 1, 1, 1937, 'Pablo Picasso\'s powerful anti-war mural.', 'guernica.jpg');

mysql> select \*from artworks;

+-----------+--------------+----------+------------+------+-------------------------------------------+------------------+

| ArtworkID | Title | ArtistID | CategoryID | Year | Description | ImageURL |

+-----------+--------------+----------+------------+------+-------------------------------------------+------------------+

| 1 | Starry Night | 2 | 1 | 1889 | A famous painting by Vincent van Gogh. | starry\_night.jpg |

| 2 | Mona Lisa | 3 | 1 | 1503 | The iconic portrait by Leonardo da Vinci. | mona\_lisa.jpg |

| 3 | Guernica | 1 | 1 | 1937 | Pablo Picasso's powerful anti-war mural. | guernica.jpg |

+-----------+--------------+----------+------------+------+-------------------------------------------+------------------+

3 rows in set (0.00 sec)

***-- Insert sample data into the Exhibitions table***

INSERT INTO Exhibitions (ExhibitionID, Title, StartDate, EndDate, Description) VALUES

(1, 'Modern Art Masterpieces', '2023-01-01', '2023-03-01', 'A collection of modern art masterpieces.'),

(2, 'Renaissance Art', '2023-04-01', '2023-06-01', 'A showcase of Renaissance art treasures.');

mysql> select \*from exhibitions;

+--------------+-------------------------+------------+------------+------------------------------------------+

| ExhibitionID | Title | StartDate | EndDate | Description |

+--------------+-------------------------+------------+------------+------------------------------------------+

| 1 | Modern Art Masterpieces | 2023-01-01 | 2023-03-01 | A collection of modern art masterpieces. |

| 2 | Renaissance Art | 2023-04-01 | 2023-06-01 | A showcase of Renaissance art treasures. |

+--------------+-------------------------+------------+------------+------------------------------------------+

2 rows in set (0.00 sec)

***-- Insert artworks into exhibitions***

INSERT INTO ExhibitionArtworks (ExhibitionID, ArtworkID) VALUES

(1, 1),

(1, 2),

(1, 3),

(2, 2);

mysql> select \*from ExhibitionArtworks;

+--------------+-----------+

| ExhibitionID | ArtworkID |

+--------------+-----------+

| 1 | 1 |

| 1 | 2 |

| 2 | 2 |

| 1 | 3 |

+--------------+-----------+

4 rows in set (0.42 sec)

1. Retrieve the names of all artists along with the number of artworks they have in the gallery, and list them in descending order of the number of artworks.

mysql> SELECT Artists.Name, COUNT(Artworks.ArtworkID) AS ArtworkCount

-> FROM Artists

-> LEFT JOIN Artworks ON Artists.ArtistID = Artworks.ArtistID

-> GROUP BY Artists.Name

-> ORDER BY ArtworkCount DESC;

+-------------------+--------------+

| Name | ArtworkCount |

+-------------------+--------------+

| Pablo Picasso | 1 |

| Vincent van Gogh | 1 |

| Leonardo da Vinci | 1 |

+-------------------+--------------+

3 rows in set (0.13 sec)

1. List the titles of artworks created by artists from 'Spanish' and 'Dutch' nationalities, and order them by the year in ascending order.

mysql> SELECT Artworks.Title, Artworks.Year

-> FROM Artworks

-> JOIN Artists ON Artworks.ArtistID = Artists.ArtistID

-> WHERE Artists.Nationality IN ('Spanish', 'Dutch')

-> ORDER BY Artworks.Year ASC;

+--------------+------+

| Title | Year |

+--------------+------+

| Starry Night | 1889 |

| Guernica | 1937 |

+--------------+------+

2 rows in set (0.05 sec)

1. Find the names of all artists who have artworks in the 'Painting' category, and the number of artworks they have in this category.

mysql> SELECT Artists.Name, COUNT(Artworks.ArtworkID) AS ArtworkCount

-> FROM Artists

-> JOIN Artworks ON Artists.ArtistID = Artworks.ArtistID

-> JOIN Categories ON Artworks.CategoryID = Categories.CategoryID

-> WHERE Categories.Name = 'Painting'

-> GROUP BY Artists.Name;

+-------------------+--------------+

| Name | ArtworkCount |

+-------------------+--------------+

| Vincent van Gogh | 1 |

| Leonardo da Vinci | 1 |

| Pablo Picasso | 1 |

+-------------------+--------------+

3 rows in set (0.04 sec)

1. List the names of artworks from the 'Modern Art Masterpieces' exhibition, along with their artists and categories.

mysql> SELECT Artworks.Title, Artists.Name AS ArtistName, Categories.Name AS CategoryName

-> FROM ExhibitionArtworks

-> JOIN Artworks ON ExhibitionArtworks.ArtworkID = Artworks.ArtworkID

-> JOIN Artists ON Artworks.ArtistID = Artists.ArtistID

-> JOIN Categories ON Artworks.CategoryID = Categories.CategoryID

-> JOIN Exhibitions ON ExhibitionArtworks.ExhibitionID = Exhibitions.ExhibitionID

-> WHERE Exhibitions.Title = 'Modern Art Masterpieces';

+--------------+-------------------+--------------+

| Title | ArtistName | CategoryName |

+--------------+-------------------+--------------+

| Starry Night | Vincent van Gogh | Painting |

| Mona Lisa | Leonardo da Vinci | Painting |

| Guernica | Pablo Picasso | Painting |

+--------------+-------------------+--------------+

3 rows in set (0.01 sec)

1. Find the artists who have more than two artworks in the gallery.

SELECT Artists.Name, COUNT(Artworks.ArtworkID) AS ArtworkCount

-> FROM Artists

-> JOIN Artworks ON Artists.ArtistID = Artworks.ArtistID

-> GROUP BY Artists.Name

-> HAVING COUNT(Artworks.ArtworkID) > 2;

Empty set (0.04 sec)

1. Find the titles of artworks that were exhibited in both 'Modern Art Masterpieces' and 'Renaissance Art' exhibitions

mysql> SELECT Artworks.Title

-> FROM Artworks

-> JOIN ExhibitionArtworks E1 ON Artworks.ArtworkID = E1.ArtworkID

-> JOIN Exhibitions Ex1 ON E1.ExhibitionID = Ex1.ExhibitionID

-> JOIN ExhibitionArtworks E2 ON Artworks.ArtworkID = E2.ArtworkID

-> JOIN Exhibitions Ex2 ON E2.ExhibitionID = Ex2.ExhibitionID

-> WHERE Ex1.Title = 'Modern Art Masterpieces'

-> AND Ex2.Title = 'Renaissance Art';

+-----------+

| Title |

+-----------+

| Mona Lisa |

+-----------+

1 row in set (0.10 sec)

1. Find the total number of artworks in each category

> SELECT Categories.Name AS CategoryName, COUNT(Artworks.ArtworkID) AS TotalArtworks

-> FROM Categories

-> LEFT JOIN Artworks ON Categories.CategoryID = Artworks.CategoryID

-> GROUP BY Categories.Name;

+--------------+---------------+

| CategoryName | TotalArtworks |

+--------------+---------------+

| Painting | 3 |

| Sculpture | 0 |

| Photography | 0 |

+--------------+---------------+

3 rows in set (0.01 sec)

1. List artists who have more than 3 artworks in the gallery.

SELECT Artists.Name, COUNT(Artworks.ArtworkID) AS ArtworkCount

-> FROM Artists

-> JOIN Artworks ON Artists.ArtistID = Artworks.ArtistID

-> GROUP BY Artists.Name

-> HAVING COUNT(Artworks.ArtworkID) > 3;

Empty set (0.00 sec)

1. Find the artworks created by artists from a specific nationality (e.g., Spanish).

SELECT Artworks.Title

-> FROM Artworks

-> JOIN Artists ON Artworks.ArtistID = Artists.ArtistID

-> WHERE Artists.Nationality = 'Spanish';

+----------+

| Title |

+----------+

| Guernica |

+----------+

1 row in set (0.00 sec)

1. List exhibitions that feature artwork by both Vincent van Gogh and Leonardo da Vinci.

SELECT Exhibitions.Title

-> FROM Exhibitions

-> JOIN ExhibitionArtworks EA1 ON Exhibitions.ExhibitionID = EA1.ExhibitionID

-> JOIN Artworks A1 ON EA1.ArtworkID = A1.ArtworkID

-> JOIN Artists Artist1 ON A1.ArtistID = Artist1.ArtistID

-> JOIN ExhibitionArtworks EA2 ON Exhibitions.ExhibitionID = EA2.ExhibitionID

-> JOIN Artworks A2 ON EA2.ArtworkID = A2.ArtworkID

-> JOIN Artists Artist2 ON A2.ArtistID = Artist2.ArtistID

-> WHERE Artist1.Name = 'Vincent van Gogh'

-> AND Artist2.Name = 'Leonardo da Vinci';

+-------------------------+

| Title |

+-------------------------+

| Modern Art Masterpieces |

+-------------------------+

1 row in set (0.05 sec)

1. Find all the artworks that have not been included in any exhibition.

SELECT Artworks.Title

-> FROM Artworks

-> LEFT JOIN ExhibitionArtworks ON Artworks.ArtworkID = ExhibitionArtworks.ArtworkID

-> WHERE ExhibitionArtworks.ArtworkID IS NULL;

Empty set (0.00 sec)

1. List artists who have created artworks in all available categories.

SELECT Artists.Name

-> FROM Artists

-> JOIN Artworks ON Artists.ArtistID = Artworks.ArtistID

-> JOIN Categories ON Artworks.CategoryID = Categories.CategoryID

-> GROUP BY Artists.Name

-> HAVING COUNT(DISTINCT Artworks.CategoryID) = (SELECT COUNT(CategoryID) FROM Categories);

Empty set (0.75 sec)

1. List the total number of artworks in each category.

mysql> SELECT Categories.Name AS CategoryName, COUNT(Artworks.ArtworkID) AS TotalArtworks

-> FROM Categories

-> LEFT JOIN Artworks ON Categories.CategoryID = Artworks.CategoryID

-> GROUP BY Categories.Name;

+--------------+---------------+

| CategoryName | TotalArtworks |

+--------------+---------------+

| Painting | 3 |

| Sculpture | 0 |

| Photography | 0 |

+--------------+---------------+

3 rows in set (0.02 sec)

1. Find the artists who have more than 2 artworks in the gallery.

mysql> SELECT Artists.Name, COUNT(Artworks.ArtworkID) AS ArtworkCount

-> FROM Artists

-> JOIN Artworks ON Artists.ArtistID = Artworks.ArtistID

-> GROUP BY Artists.Name

-> HAVING COUNT(Artworks.ArtworkID) > 2;

Empty set (0.00 sec)

1. List the categories with the average year of artworks they contain, only for categories with more than 1 artwork.

SELECT Categories.Name AS CategoryName, AVG(Artworks.Year) AS AverageYear

-> FROM Categories

-> JOIN Artworks ON Categories.CategoryID = Artworks.CategoryID

-> GROUP BY Categories.Name

-> HAVING COUNT(Artworks.ArtworkID) > 1;

+--------------+-------------+

| CategoryName | AverageYear |

+--------------+-------------+

| Painting | 1776.3333 |

+--------------+-------------+

1. row in set (0.01 sec)
2. Find the artworks that were exhibited in the 'Modern Art Masterpieces' exhibition.

mysql> SELECT Artworks.Title

-> FROM Artworks

-> JOIN ExhibitionArtworks ON Artworks.ArtworkID = ExhibitionArtworks.ArtworkID

-> JOIN Exhibitions ON ExhibitionArtworks.ExhibitionID = Exhibitions.ExhibitionID

-> WHERE Exhibitions.Title = 'Modern Art Masterpieces';

+--------------+

| Title |

+--------------+

| Starry Night |

| Mona Lisa |

| Guernica |

+--------------+

1. rows in set (0.00 sec)
2. Find the categories where the average year of artworks is greater than the average year of all artworks.

> SELECT Categories.Name AS CategoryName, AVG(Artworks.Year) AS AverageYear

-> FROM Categories

-> JOIN Artworks ON Categories.CategoryID = Artworks.CategoryID

-> GROUP BY Categories.Name

-> HAVING AVG(Artworks.Year) > (SELECT AVG(Year) FROM Artworks);

Empty set (0.03 sec)

1. List the artworks that were not exhibited in any exhibition.

mysql> SELECT Artworks.Title

-> FROM Artworks

-> LEFT JOIN ExhibitionArtworks ON Artworks.ArtworkID = ExhibitionArtworks.ArtworkID

-> WHERE ExhibitionArtworks.ArtworkID IS NULL;

Empty set (0.00 sec)

1. Show artists who have artworks in the same category as "Mona Lisa."

> SELECT DISTINCT Artists.Name

-> FROM Artists

-> JOIN Artworks ON Artists.ArtistID = Artworks.ArtistID

-> WHERE Artworks.CategoryID = (SELECT CategoryID FROM Artworks WHERE Title = 'Mona Lisa');

+-------------------+

| Name |

+-------------------+

| Pablo Picasso |

| Vincent van Gogh |

| Leonardo da Vinci |

+-------------------+

1. rows in set (0.02 sec)
2. List the names of artists and the number of artworks they have in the gallery.

> SELECT Artists.Name, COUNT(Artworks.ArtworkID) AS ArtworkCount

-> FROM Artists

-> LEFT JOIN Artworks ON Artists.ArtistID = Artworks.ArtistID

-> GROUP BY Artists.Name;

+-------------------+--------------+

| Name | ArtworkCount |

+-------------------+--------------+

| Pablo Picasso | 1 |

| Vincent van Gogh | 1 |

| Leonardo da Vinci | 1 |

+-------------------+--------------+

3 rows in set (0.00 sec)