

## Coding Challenge SQL

### Virtual Art Gallery Shema DDL and DML

-- Create the Artists table

```
CREATE TABLE Artists (  
    ArtistID INT PRIMARY KEY,  
    Name VARCHAR(255) NOT NULL,  
    Biography TEXT,  
    Nationality VARCHAR(100));
```

```
mysql> CREATE DATABASE ArtGallery;  
Query OK, 1 row affected (0.02 sec)
```

```
mysql> USE ArtGallery;  
Database changed
```

```
mysql> CREATE TABLE Artists (  
    ->     ArtistID INT PRIMARY KEY,  
    ->     Name VARCHAR(255) NOT NULL,  
    ->     Biography TEXT,  
    ->     Nationality VARCHAR(100)  
    -> );  
Query OK, 0 rows affected (0.04 sec)
```

```
mysql> |
```

-- Create the Categories table

```
CREATE TABLE Categories (  
    CategoryID INT PRIMARY KEY,  
    Name VARCHAR(100) NOT NULL);
```

```
mysql> CREATE TABLE Categories (  
    ->     CategoryID INT PRIMARY KEY,  
    ->     Name VARCHAR(100) NOT NULL  
    -> );  
Query OK, 0 rows affected (0.02 sec)
```

```
mysql> |
```

-- 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> CREATE TABLE Categories (
  ->     CategoryID INT PRIMARY KEY,
  ->     Name VARCHAR(100) NOT NULL
  -> );
Query OK, 0 rows affected (0.02 sec)

mysql> 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)
  -> );
Query OK, 0 rows affected (0.05 sec)

mysql> |
```

-- Create the Exhibitions table

```
CREATE TABLE Exhibitions (
  ExhibitionID INT PRIMARY KEY,
  Title VARCHAR(255) NOT NULL,
  StartDate DATE,
  EndDate DATE,
  Description TEXT);
```

```
mysql> CREATE TABLE Exhibitions (
  ->     ExhibitionID INT PRIMARY KEY,
  ->     Title VARCHAR(255) NOT NULL,
  ->     StartDate DATE,
  ->     EndDate DATE,
  ->     Description TEXT
  -> );
Query OK, 0 rows affected (0.03 sec)

mysql> |
```

-- 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> CREATE TABLE ExhibitionArtworks (
  ->     ExhibitionID INT,
  ->     ArtworkID INT,
  ->     PRIMARY KEY (ExhibitionID, ArtworkID),
  ->     FOREIGN KEY (ExhibitionID) REFERENCES Exhibitions (ExhibitionID),
  ->     FOREIGN KEY (ArtworkID) REFERENCES Artworks (ArtworkID)
  -> );
Query OK, 0 rows affected (0.04 sec)

mysql> |
```

### 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');
```

```
mysql> 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');
Query OK, 3 rows affected (0.01 sec)
Records: 3  Duplicates: 0  Warnings: 0
```

```
mysql> 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 (0.00 sec)

mysql> |
```

-- Insert sample data into the Categories table

```
INSERT INTO Categories (CategoryID, Name) VALUES
  (1, 'Painting'),
  (2, 'Sculpture'),
  (3, 'Photography');
```

```
mysql> INSERT INTO Categories (CategoryID, Name) VALUES
    -> (1, 'Painting'),
    -> (2, 'Sculpture'),
    -> (3, 'Photography');
Query OK, 3 rows affected (0.01 sec)
Records: 3 Duplicates: 0 Warnings: 0
```

```
mysql> select * from categories ;
+-----+-----+
| CategoryID | Name      |
+-----+-----+
|          1 | Painting  |
|          2 | Sculpture |
|          3 | Photography |
+-----+-----+
3 rows in set (0.00 sec)

mysql> |
```

-- 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> 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');
Query OK, 3 rows affected (0.01 sec)
Records: 3 Duplicates: 0 Warnings: 0

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)

mysql> |
```

-- 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> 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.');
```

Query OK, 2 rows affected (0.01 sec)  
Records: 2 Duplicates: 0 Warnings: 0

```
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)

```
mysql> |
```

-- Insert artworks into exhibitions

INSERT INTO ExhibitionArtworks (ExhibitionID, ArtworkID) VALUES

(1, 1),

(1, 2),

(1, 3),

(2, 2);

```
mysql> INSERT INTO ExhibitionArtworks (ExhibitionID, ArtworkID) VALUES
-> (1, 1),
-> (1, 2),
-> (1, 3),
-> (2, 2);
```

Query OK, 4 rows affected (0.01 sec)  
Records: 4 Duplicates: 0 Warnings: 0

```
mysql> select * from ExhibitionArtworks;
```

ExhibitionID	ArtworkID
1	1
1	2
2	2
1	3

4 rows in set (0.00 sec)

```
mysql> |
```

**Solve the below queries:**

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.

Query :

```
SELECT A.Name, COUNT(Ar.ArtworkID) AS ArtworkCount
FROM Artists A
```

```

LEFT JOIN Artworks Ar ON A.ArtistID = Ar.ArtistID
GROUP BY A.Name
ORDER BY ArtworkCount DESC;

```

```

mysql> SELECT A.Name, COUNT(Ar.ArtworkID) AS ArtworkCount
-> FROM Artists A
-> LEFT JOIN Artworks Ar ON A.ArtistID = Ar.ArtistID
-> GROUP BY A.Name
-> ORDER BY ArtworkCount DESC;
+-----+-----+
| Name           | ArtworkCount |
+-----+-----+
| Pablo Picasso  | 1            |
| Vincent van Gogh | 1            |
| Leonardo da Vinci | 1            |
+-----+-----+
3 rows in set (0.00 sec)

mysql> |

```

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

Query :

```

SELECT Ar.Title
FROM Artworks Ar
JOIN Artists A ON Ar.ArtistID = A.ArtistID
WHERE A.Nationality IN ('Spanish', 'Dutch')
ORDER BY Ar.Year ASC;

```

```

mysql> SELECT Ar.Title
-> FROM Artworks Ar
-> JOIN Artists A ON Ar.ArtistID = A.ArtistID
-> WHERE A.Nationality IN ('Spanish', 'Dutch')
-> ORDER BY Ar.Year ASC;
+-----+-----+
| Title           |
+-----+-----+
| Starry Night    |
| Guernica        |
+-----+-----+
2 rows in set (0.01 sec)

mysql> |

```

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

Query:

```

SELECT A.Name, COUNT(*) AS PaintingCount

```

```

FROM Artists A
JOIN Artworks Ar ON A.ArtistID = Ar.ArtistID
JOIN Categories C ON Ar.CategoryID = C.CategoryID
WHERE C.Name = 'Painting'
GROUP BY A.Name;

```

```

mysql> SELECT A.Name, COUNT(*) AS PaintingCount
-> FROM Artists A
-> JOIN Artworks Ar ON A.ArtistID = Ar.ArtistID
-> JOIN Categories C ON Ar.CategoryID = C.CategoryID
-> WHERE C.Name = 'Painting'
-> GROUP BY A.Name;
+-----+
| Name          | PaintingCount |
+-----+
| Vincent van Gogh |          1 |
| Leonardo da Vinci |          1 |
| Pablo Picasso   |          1 |
+-----+
3 rows in set (0.00 sec)

mysql> |

```

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

Query :

```

SELECT Ar.Title, A.Name AS Artist, C.Name AS Category
FROM ExhibitionArtworks EA
JOIN Exhibitions E ON EA.ExhibitionID = E.ExhibitionID
JOIN Artworks Ar ON EA.ArtworkID = Ar.ArtworkID
JOIN Artists A ON Ar.ArtistID = A.ArtistID
JOIN Categories C ON Ar.CategoryID = C.CategoryID
WHERE E.Title = 'Modern Art Masterpieces';

```

```

mysql> SELECT Ar.Title, A.Name AS Artist, C.Name AS Category
-> FROM ExhibitionArtworks EA
-> JOIN Exhibitions E ON EA.ExhibitionID = E.ExhibitionID
-> JOIN Artworks Ar ON EA.ArtworkID = Ar.ArtworkID
-> JOIN Artists A ON Ar.ArtistID = A.ArtistID
-> JOIN Categories C ON Ar.CategoryID = C.CategoryID
-> WHERE E.Title = 'Modern Art Masterpieces';
+-----+
| Title          | Artist          | Category |
+-----+
| Starry Night   | Vincent van Gogh | Painting |
| Mona Lisa      | Leonardo da Vinci | Painting |
| Guernica        | Pablo Picasso   | Painting |
+-----+
3 rows in set (0.00 sec)

mysql> |

```

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

a. Got an empty table return so updated by inserting 2 more columns

Query :

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

```
(4, 'The Weeping Woman', 1, 1, 1937, 'Another famous Picasso painting.',
'weeping_woman.jpg'),
```

```
(5, 'Les Demoiselles d'Avignon', 1, 1, 1907, 'Pioneering work of Cubism.', 'demoiselles.jpg');
```

```
SELECT A.Name, COUNT(Ar.ArtworkID) AS ArtworkCount
```

```
FROM Artists A
```

```
JOIN Artworks Ar ON A.ArtistID = Ar.ArtistID
```

```
GROUP BY A.Name
```

```
HAVING COUNT(Ar.ArtworkID) > 2;
```

```
mysql> SELECT A.Name, COUNT(Ar.ArtworkID) AS ArtworkCount
-> FROM Artists A
-> JOIN Artworks Ar ON A.ArtistID = Ar.ArtistID
-> GROUP BY A.Name
-> HAVING COUNT(Ar.ArtworkID) > 2;
+-----+-----+
| Name          | ArtworkCount |
+-----+-----+
| Pablo Picasso |             3 |
+-----+-----+
1 row in set (0.00 sec)

mysql> |
```

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

Query:

```
SELECT Ar.Title
```

```
FROM ExhibitionArtworks EA1
```

```
JOIN Exhibitions E1 ON EA1.ExhibitionID = E1.ExhibitionID
```

```
JOIN ExhibitionArtworks EA2 ON EA1.ArtworkID = EA2.ArtworkID
```

```
JOIN Exhibitions E2 ON EA2.ExhibitionID = E2.ExhibitionID
```

```
JOIN Artworks Ar ON EA1.ArtworkID = Ar.ArtworkID
```

```
WHERE E1.Title = 'Modern Art Masterpieces' AND E2.Title = 'Renaissance Art';
```



```
mysql> SELECT Ar.Title
-> FROM ExhibitionArtworks EA1
-> JOIN Exhibitions E1 ON EA1.ExhibitionID = E1.ExhibitionID
-> JOIN ExhibitionArtworks EA2 ON EA1.ArtworkID = EA2.ArtworkID
-> JOIN Exhibitions E2 ON EA2.ExhibitionID = E2.ExhibitionID
-> JOIN Artworks Ar ON EA1.ArtworkID = Ar.ArtworkID
-> WHERE E1.Title = 'Modern Art Masterpieces' AND E2.Title = 'Renaissance Art';
+-----+
| Title |
+-----+
| Mona Lisa |
+-----+
1 row in set (0.00 sec)

mysql> |
```

7. Find the total number of artworks in each category

Query :

```
SELECT C.Name, COUNT(Ar.ArtworkID) AS TotalArtworks
FROM Categories C
LEFT JOIN Artworks Ar ON C.CategoryID = Ar.CategoryID
GROUP BY C.Name;
```

```
mysql> SELECT C.Name, COUNT(Ar.ArtworkID) AS TotalArtworks
-> FROM Categories C
-> LEFT JOIN Artworks Ar ON C.CategoryID = Ar.CategoryID
-> GROUP BY C.Name;
+-----+-----+
| Name | TotalArtworks |
+-----+-----+
| Painting | 5 |
| Sculpture | 0 |
| Photography | 0 |
+-----+-----+
3 rows in set (0.00 sec)

mysql> |
```

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

a. Got empty table so added 1 more row

Query :

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

```
(6, 'Girl before a Mirror', 1, 1, 1932, 'A famous surrealist painting by Picasso.',
'girl_before_mirror.jpg');
```

```
SELECT A.Name, COUNT(*) AS ArtworkCount
```

```

FROM Artists A
JOIN Artworks Ar ON A.ArtistID = Ar.ArtistID
GROUP BY A.Name
HAVING COUNT(*) > 3;

```

```

mysql> SELECT A.Name, COUNT(*) AS ArtworkCount
-> FROM Artists A
-> JOIN Artworks Ar ON A.ArtistID = Ar.ArtistID
-> GROUP BY A.Name
-> HAVING COUNT(*) > 3;
+-----+-----+
| Name          | ArtworkCount |
+-----+-----+
| Pablo Picasso |             4 |
+-----+-----+
1 row in set (0.00 sec)

mysql> |

```

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

Query :

```

SELECT Ar.Title
FROM Artworks Ar
JOIN Artists A ON Ar.ArtistID = A.ArtistID
WHERE A.Nationality = 'Spanish';

```

```

mysql> SELECT Ar.Title
-> FROM Artworks Ar
-> JOIN Artists A ON Ar.ArtistID = A.ArtistID
-> WHERE A.Nationality = 'Spanish';
+-----+-----+
| Title          |
+-----+-----+
| Guernica       |
| The Weeping Woman |
| Les Demoiselles d'Avignon |
| Girl before a Mirror |
+-----+-----+
4 rows in set (0.00 sec)

mysql> |

```

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

Query :

```

SELECT DISTINCT E.Title
FROM Exhibitions E
JOIN ExhibitionArtworks EA1 ON E.ExhibitionID = EA1.ExhibitionID

```

```

JOIN Artworks Ar1 ON EA1.ArtworkID = Ar1.ArtworkID
JOIN Artists A1 ON Ar1.ArtistID = A1.ArtistID
JOIN ExhibitionArtworks EA2 ON E.ExhibitionID = EA2.ExhibitionID
JOIN Artworks Ar2 ON EA2.ArtworkID = Ar2.ArtworkID
JOIN Artists A2 ON Ar2.ArtistID = A2.ArtistID
WHERE A1.Name = 'Vincent van Gogh' AND A2.Name = 'Leonardo da Vinci';

```

```

mysql> SELECT DISTINCT E.Title
-> FROM Exhibitions E
-> JOIN ExhibitionArtworks EA1 ON E.ExhibitionID = EA1.ExhibitionID
-> JOIN Artworks Ar1 ON EA1.ArtworkID = Ar1.ArtworkID
-> JOIN Artists A1 ON Ar1.ArtistID = A1.ArtistID
-> JOIN ExhibitionArtworks EA2 ON E.ExhibitionID = EA2.ExhibitionID
-> JOIN Artworks Ar2 ON EA2.ArtworkID = Ar2.ArtworkID
-> JOIN Artists A2 ON Ar2.ArtistID = A2.ArtistID
-> WHERE A1.Name = 'Vincent van Gogh' AND A2.Name = 'Leonardo da Vinci';
+-----+
| Title |
+-----+
| Modern Art Masterpieces |
+-----+
1 row in set (0.01 sec)

```

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

Query :

```

SELECT Ar.Title
FROM Artworks Ar
LEFT JOIN ExhibitionArtworks EA ON Ar.ArtworkID = EA.ArtworkID
WHERE EA.ArtworkID IS NULL;

```

```

mysql> SELECT Ar.Title
-> FROM Artworks Ar
-> LEFT JOIN ExhibitionArtworks EA ON Ar.ArtworkID = EA.ArtworkID
-> WHERE EA.ArtworkID IS NULL;
+-----+
| Title |
+-----+
| The Weeping Woman |
| Les Demoiselles d'Avignon |
| Girl before a Mirror |
+-----+
3 rows in set (0.00 sec)

mysql> |

```

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

Updated tables with insertions in photography & sculpture

--sculpture

```
INSERT INTO Artworks (ArtworkID, Title, ArtistID, CategoryID, Year, Description, ImageURL)
VALUES
(7, 'Picasso Sculpture', 1, 2, 1930, 'A modern sculpture by Picasso.', 'picasso_sculpture.jpg');
```

--Photography

```
INSERT INTO Artworks (ArtworkID, Title, ArtistID, CategoryID, Year, Description, ImageURL)
VALUES
(8, 'Picasso Photograph', 1, 3, 1935, 'A rare photograph attributed to Picasso.',
'picasso_photo.jpg');
```

Query :

```
SELECT A.Name
FROM Artists A
JOIN Artworks Ar ON A.ArtistID = Ar.ArtistID
GROUP BY A.ArtistID, A.Name
HAVING COUNT(DISTINCT Ar.CategoryID) = (SELECT COUNT(*) FROM Categories);
```

```
mysql> SELECT A.Name
-> FROM Artists A
-> JOIN Artworks Ar ON A.ArtistID = Ar.ArtistID
-> GROUP BY A.ArtistID, A.Name
-> HAVING COUNT(DISTINCT Ar.CategoryID) = (SELECT COUNT(*) FROM Categories);
+-----+
| Name |
+-----+
| Pablo Picasso |
+-----+
1 row in set (0.02 sec)

mysql> |
```

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

Query :

```
SELECT C.Name AS CategoryName, COUNT(A.ArtworkID) AS TotalArtworks
FROM Categories C
LEFT JOIN Artworks A ON C.CategoryID = A.CategoryID
GROUP BY C.CategoryID, C.Name;
```

```
mysql> SELECT C.Name AS CategoryName, COUNT(A.ArtworkID) AS TotalArtworks
-> FROM Categories C
-> LEFT JOIN Artworks A ON C.CategoryID = A.CategoryID
-> GROUP BY C.CategoryID, C.Name;
```

CategoryName	TotalArtworks
Painting	6
Sculpture	1
Photography	1

3 rows in set (0.00 sec)

```
mysql> |
```

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

Query :

```
SELECT A.Name, COUNT(Ar.ArtworkID) AS ArtworkCount
FROM Artists A
JOIN Artworks Ar ON A.ArtistID = Ar.ArtistID
GROUP BY A.ArtistID, A.Name
HAVING COUNT(Ar.ArtworkID) > 2;
```

```
mysql> SELECT A.Name, COUNT(Ar.ArtworkID) AS ArtworkCount
-> FROM Artists A
-> JOIN Artworks Ar ON A.ArtistID = Ar.ArtistID
-> GROUP BY A.ArtistID, A.Name
-> HAVING COUNT(Ar.ArtworkID) > 2;
```

Name	ArtworkCount
Pablo Picasso	6

1 row in set (0.00 sec)

```
mysql>
```

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

Query :

```
SELECT C.Name, AVG(Ar.Year) AS AvgYear
FROM Categories C
JOIN Artworks Ar ON C.CategoryID = Ar.CategoryID
GROUP BY C.CategoryID, C.Name
HAVING COUNT(*) > 1;
```

```
mysql> SELECT C.Name, AVG(Ar.Year) AS AvgYear
-> FROM Categories C
-> JOIN Artworks Ar ON C.CategoryID = Ar.CategoryID
-> GROUP BY C.CategoryID, C.Name
-> HAVING COUNT(*) > 1;
+-----+-----+
| Name   | AvgYear |
+-----+-----+
| Painting | 1850.8333 |
+-----+-----+
1 row in set (0.01 sec)

mysql> |
```

16. Find the artworks that were exhibited in the 'Modern Art Masterpieces' exhibition.

Query :

```
SELECT Ar.Title
FROM ExhibitionArtworks EA
JOIN Exhibitions E ON EA.ExhibitionID = E.ExhibitionID
JOIN Artworks Ar ON EA.ArtworkID = Ar.ArtworkID
WHERE E.Title = 'Modern Art Masterpieces';
```

```
mysql> SELECT Ar.Title
-> FROM ExhibitionArtworks EA
-> JOIN Exhibitions E ON EA.ExhibitionID = E.ExhibitionID
-> JOIN Artworks Ar ON EA.ArtworkID = Ar.ArtworkID
-> WHERE E.Title = 'Modern Art Masterpieces';
+-----+
| Title   |
+-----+
| Starry Night |
| Mona Lisa  |
| Guernica   |
+-----+
3 rows in set (0.00 sec)

mysql> |
```

17. Find the categories where the average year of artworks is greater than the average year of all artworks.

Query :

```
SELECT C.Name AS CategoryName, AVG(A.Year) AS AvgYear
FROM Categories C
JOIN Artworks A ON C.CategoryID = A.CategoryID
GROUP BY C.CategoryID, C.Name
```

```
HAVING AVG(A.Year) > (
  SELECT AVG(Year) FROM Artworks
);
```

```
mysql> SELECT AVG(Year) AS OverallAverageYear FROM Artworks;
+-----+
| OverallAverageYear |
+-----+
|          1871.2500 |
+-----+
1 row in set (0.00 sec)

mysql> SELECT C.Name AS CategoryName, AVG(A.Year) AS AvgYear
-> FROM Categories C
-> JOIN Artworks A ON C.CategoryID = A.CategoryID
-> GROUP BY C.CategoryID, C.Name
-> HAVING AVG(A.Year) > (
->   SELECT AVG(Year) FROM Artworks
-> );
+-----+-----+
| CategoryName | AvgYear |
+-----+-----+
| Sculpture    | 1930.0000 |
| Photography  | 1935.0000 |
+-----+-----+
2 rows in set (0.00 sec)

mysql> |
```

18. List the artworks that were not exhibited in any exhibition.  
Query :

```
SELECT A.ArtworkID, A.Title, A.ArtistID
FROM Artworks A
LEFT JOIN ExhibitionArtworks EA ON A.ArtworkID = EA.ArtworkID
WHERE EA.ExhibitionID IS NULL;
```

```
mysql> SELECT A.ArtworkID, A.Title, A.ArtistID
-> FROM Artworks A
-> LEFT JOIN ExhibitionArtworks EA ON A.ArtworkID = EA.ArtworkID
-> WHERE EA.ExhibitionID IS NULL;
+-----+-----+-----+
| ArtworkID | Title                               | ArtistID |
+-----+-----+-----+
| 4         | The Weeping Woman                  | 1        |
| 5         | Les Demoiselles d'Avignon         | 1        |
| 6         | Girl before a Mirror               | 1        |
| 7         | Picasso Sculpture                  | 1        |
| 8         | Picasso Photograph                 | 1        |
+-----+-----+-----+
5 rows in set (0.00 sec)

mysql> |
```

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

Query :

```
SELECT DISTINCT A.Name
FROM Artists A
JOIN Artworks Ar ON A.ArtistID = Ar.ArtistID
WHERE Ar.CategoryID = (
    SELECT CategoryID FROM Artworks WHERE Title = 'Mona Lisa'
)
AND A.ArtistID != (SELECT ArtistID FROM Artworks WHERE Title = 'Mona Lisa');
```

```
mysql> SELECT DISTINCT A.Name
-> FROM Artists A
-> JOIN Artworks Ar ON A.ArtistID = Ar.ArtistID
-> WHERE Ar.CategoryID = (
->     SELECT CategoryID FROM Artworks WHERE Title = 'Mona Lisa'
-> )
-> AND A.ArtistID != (SELECT ArtistID FROM Artworks WHERE Title = 'Mona Lisa');
+-----+-----+
| Name           |
+-----+-----+
| Vincent van Gogh |
| Pablo Picasso   |
+-----+-----+
2 rows in set (0.00 sec)

mysql> |
```

20. List the names of artists and the number of artworks they have in the gallery.

Query:

```
SELECT A.Name, COUNT(Ar.ArtworkID) AS ArtworkCount
```



```
FROM Artists A  
LEFT JOIN Artworks Ar ON A.ArtistID = Ar.ArtistID  
GROUP BY A.Name;
```

```
mysql> SELECT A.Name, COUNT(Ar.ArtworkID) AS ArtworkCount  
-> FROM Artists A  
-> LEFT JOIN Artworks Ar ON A.ArtistID = Ar.ArtistID  
-> GROUP BY A.Name;
```

Name	ArtworkCount
Pablo Picasso	6
Vincent van Gogh	1
Leonardo da Vinci	1

```
3 rows in set (0.00 sec)
```

```
mysql>
```