

# CODING CHALLENGE 5

## VIRTUAL ART GALLERY

Step 1: Creating database tables and Insert the given Sample Data.

The screenshot shows the MySQL Workbench interface. In the SQL Editor tab, a script named 'SQL File 3' is open, containing the following SQL code:

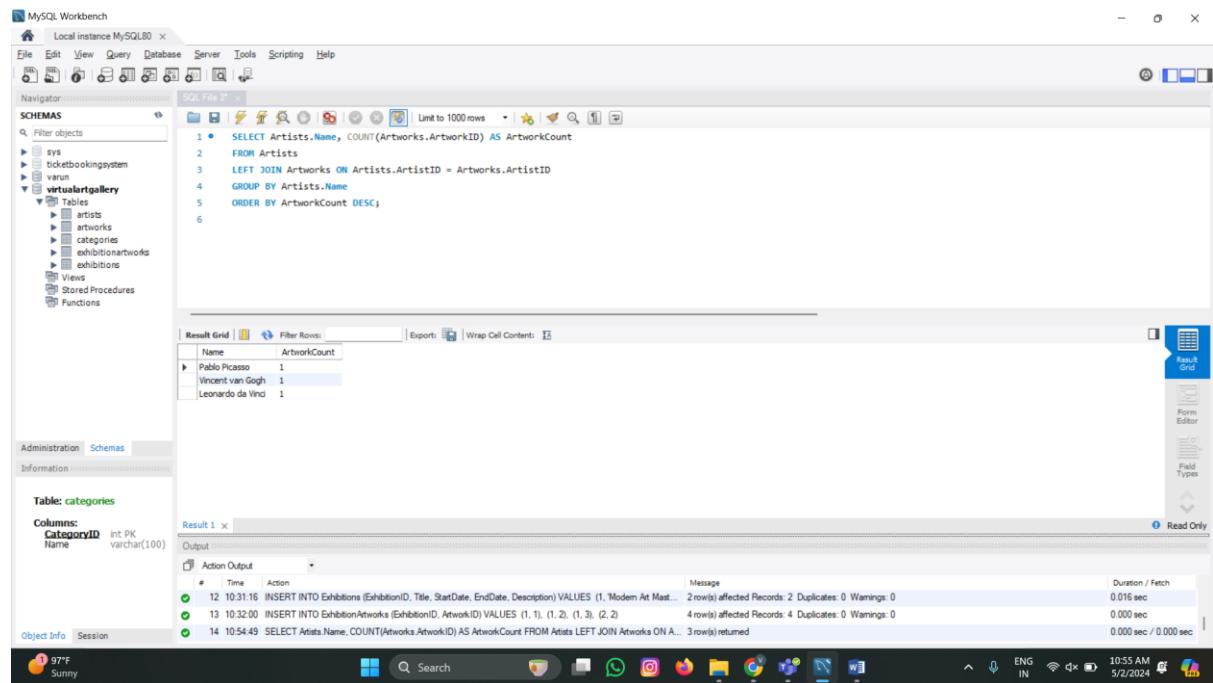
```
-- Insert artworks into exhibitions
INSERT INTO ExhibitionArtworks (ExhibitionID, ArtworkID) VALUES
(1, 1),
(1, 2),
(1, 3),
(2, 2);
```

In the Output tab, the results of the execution are shown in a table:

#	Time	Action	Message	Duration / Fetch
1	09:53:42	Apply Select output pane		0.031 sec
2	09:57:26	create schema VirtualArtGallery	1 row(s) affected	0.000 sec
3	10:07:29	use VirtualArtGallery	0 rows(s) affected	0.000 sec
4	10:08:24	CREATE TABLE Artists (ArtistID INT PRIMARY KEY, Name VARCHAR(255) NOT NULL, Biography TEXT, Na...	0 rows(s) affected	0.078 sec
5	10:12:55	CREATE TABLE Categories (CategoryID INT PRIMARY KEY, Name VARCHAR(100) NOT NULL)	0 rows(s) affected	0.047 sec
6	10:14:54	CREATE TABLE Artworks (ArtworkID INT PRIMARY KEY, Title VARCHAR(255) NOT NULL, ArtistID INT, Cat...	0 rows(s) affected	0.078 sec
7	10:15:34	CREATE TABLE Exhibitions (ExhibitionID INT PRIMARY KEY, Title VARCHAR(255) NOT NULL, StartDate DA...	0 rows(s) affected	0.047 sec
8	10:28:09	CREATE TABLE ExhibitionArtworks (ExhibitionID INT, ArtworkID INT, PRIMARY KEY (ExhibitionID, ArtworkID))	0 rows(s) affected	0.078 sec
9	10:28:57	INSERT INTO Artists (ArtistID, Name, Biography, Nationality) VALUES (1, 'Pablo Picasso', 'Renowned Spanish p...', 3 rows(s) affected Records: 3 Duplicates: 0 Warnings: 0)	0.063 sec	
10	10:29:43	INSERT INTO Categories (CategoryID, Name) VALUES (1, 'Painting'), (2, 'Sculpture'), (3, 'Photography')	3 rows(s) affected Records: 3 Duplicates: 0 Warnings: 0	0.016 sec
11	10:30:30	INSERT INTO Artworks (ArtworkID, Title, ArtistID, CategoryID, Year, Description, ImageURL) VALUES (1, 'Starry ...', 3 rows(s) affected Records: 3 Duplicates: 0 Warnings: 0)	0.016 sec	
12	10:31:16	INSERT INTO Exhibitions (ExhibitionID, Title, StartDate, EndDate, Description) VALUES (1, 'Modern Art Master...', 2 rows(s) affected Records: 2 Duplicates: 0 Warnings: 0)	0.016 sec	
13	10:32:00	INSERT INTO ExhibitionArtworks (ExhibitionID, ArtworkID) VALUES (1, 1), (1, 2), (1, 3), (2, 2)	4 rows(s) affected Records: 4 Duplicates: 0 Warnings: 0	0.000 sec

Query 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.

```
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;
```



The screenshot shows the MySQL Workbench interface. The SQL editor contains the query:

```
1 • SELECT Artists.Name, COUNT(Artworks.ArtworkID) AS ArtworkCount
2   FROM Artists
3   LEFT JOIN Artworks ON Artists.ArtistID = Artworks.ArtistID
4   GROUP BY Artists.Name
5   ORDER BY ArtworkCount DESC;
6
```

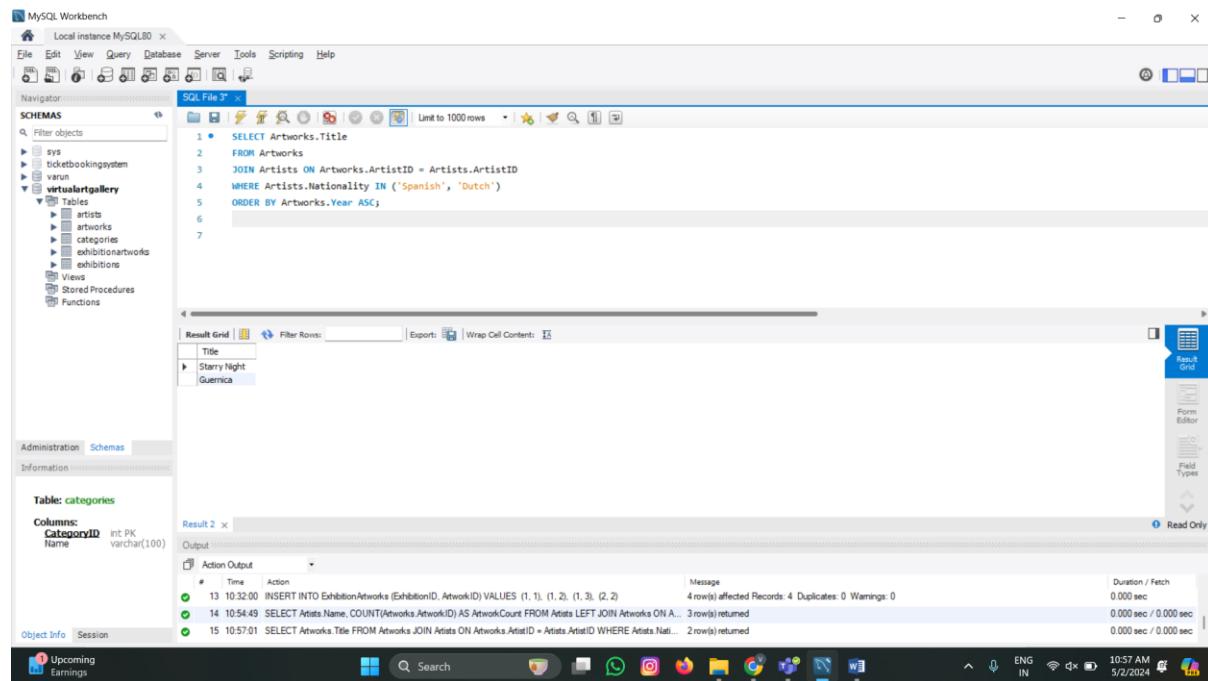
The results grid displays the following data:

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

The status bar at the bottom right shows the date and time as 10:55 AM 5/2/2024.

Query 2: List the titles of artworks created by artists from 'Spanish' and 'Dutch' nationalities, and order them by the year in ascending order.

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



Query 3: Find the names of all artists who have artworks in the 'Painting' category, and the number of artworks they have in this category.

```
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;
```

The screenshot shows the MySQL Workbench interface with the following details:

- Navigator:** Shows the database schema with the 'museumgallery' schema expanded, revealing tables like 'artists', 'artworks', 'categories', etc.
- SQL Editor:** Contains the SQL query provided above.
- Result Grid:** Displays the query results in a grid format:

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

- Table: categories:** Shows the structure of the 'categories' table with columns 'CategoryID' and 'Name'.
- Action Output:** Shows the log of actions taken by the query:

#	Time	Action	Message	Duration / Fetch
14	10:54:49	SELECT Artists.Name, COUNT(Artworks.ArtworkID) AS ArtworkCount FROM Artists LEFT JOIN Artworks ON ... 3 row(s) returned	Message	0.000 sec / 0.000 sec
15	10:57:01	SELECT Artworks.Title FROM Artworks JOIN Artists ON Artworks.ArtistID = Artists.ArtistID WHERE Artists.Nat... 2 row(s) returned	Message	0.000 sec / 0.000 sec
16	10:59:11	SELECT Artists.Name, COUNT(Artworks.ArtworkID) AS ArtworkCount FROM Artists JOIN Artworks ON Artists... 3 row(s) returned	Message	0.000 sec / 0.000 sec

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

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

The screenshot shows the MySQL Workbench interface with the following details:

- Navigator:** Shows the database schema with the **virtualartsgallery** database selected, containing tables like **artists**, **artworks**, **categories**, and **exhibitionartworks**.
- SQL Editor:** Displays the SQL query:

```
1 • SELECT Artworks.Title, Artists.Name AS Artist, Categories.Name AS Category
2   FROM `Create the statement under the keyboard cursor` 
3   JOIN ExhibitionArtworks ON Artworks.ArtworkID = ExhibitionArtworks.ArtworkID
4   JOIN Exhibitions ON ExhibitionArtworks.ExhibitionID = Exhibitions.ExhibitionID
5   JOIN Artists ON Artworks.ArtistID = Artists.ArtistID
6   JOIN Categories ON Artworks.CategoryID = Categories.CategoryID
7   WHERE Exhibitions.Title = 'Modern Art Masterpieces';
8
```

- Result Grid:** Shows the results of the query:

Title	Artist	Category
Starry Night	Vincent van Gogh	Painting
Mona Lisa	Leonardo da Vinci	Painting
Guernica	Pablo Picasso	Painting

- Table Information:** Shows the structure of the **categories** table:

CategoryID	Name
1	Painting
2	Sculpture
3	Photography
4	Printmaking
5	Digital Art

- Output Window:** Displays the execution log:

#	Time	Action	Message	Duration / Fetch
15	10:57:01	SELECT Artworks.Title FROM Artworks JOIN Artists ON Artworks.ArtistID = Artists.ArtistID WHERE Artists.Na...	2 rows(s) returned	0.000 sec / 0.000 sec
16	10:59:11	SELECT Artists.Name, COUNT(Artworks.ArtworkID) AS ArtworkCount FROM Artists JOIN Artworks ON Artists...	3 rows(s) returned	0.000 sec / 0.000 sec
17	11:00:37	SELECT Artworks.Title, Artists.Name AS Artist, Categories.Name AS Category FROM Artworks JOIN Exhibitions...	3 rows(s) returned	0.000 sec / 0.000 sec

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

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

The screenshot shows the MySQL Workbench interface with the following details:

- Navigator:** Shows the database schema with the **virtualartgallery** database selected, containing tables like **artists**, **artworks**, **categories**, and **exhibitions**.
- SQL Editor:** Displays the query code for finding artists with more than two artworks.
- Result Grid:** Shows the output of the query, with a single row for the artist "Name".
- Output:** Shows the execution log with three entries, all completed successfully with 0.000 sec / 0.000 sec duration.
- System Bar:** Includes icons for search, file operations, and system status (e.g., battery level, network).

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

```
SELECT Artworks.Title  
FROM Artworks  
JOIN ExhibitionArtworks ON Artworks.ArtworkID =  
ExhibitionArtworks.ArtworkID  
JOIN Exhibitions ON ExhibitionArtworks.ExhibitionID =  
Exhibitions.ExhibitionID  
WHERE Exhibitions.Title IN ('Modern Art Masterpieces', 'Renaissance Art')  
GROUP BY Artworks.Title  
HAVING COUNT(DISTINCT Exhibitions.ExhibitionID) = 2;
```

The screenshot shows the MySQL Workbench interface with the following details:

- Navigator:** Shows the database schema with tables like sys, varun, and virtusartsgallery.
- SQL File 3:** Contains the SQL query provided above.
- Result Grid:** Displays the result of the query, showing a single row with "Title" and "Mona Lisa".
- Object Info:** Shows information for the "categories" table, including columns: CategoryID (int PK), Name (varchar(100)).
- Result 6:** Shows the execution log with three entries:

  - 17 11:00:37 SELECT Artworks.Title, Artists.Name AS Artist, Categories.Name AS Category FROM Artworks JOIN Exhibitions ON Artworks.ExhibitionID = Exhibitions.ExhibitionID WHERE Exhibitions.Title IN ('Modern Art Masterpieces', 'Renaissance Art')
  - 18 11:02:35 SELECT Artists.Name FROM Artists JOIN ( SELECT ArtworkID, COUNT(ArtworkID) AS ArtworkCount FROM Artworks GROUP BY ArtworkID ) AS ArtworkCounts ON Artworks.ArtworkID = ArtworkCounts.ArtworkID WHERE ArtworkCounts.ArtworkCount > 1
  - 19 11:14:46 SELECT Artworks.Title FROM Artworks JOIN ExhibitionArtworks ON Artworks.ArtworkID = ExhibitionArtworks.ExhibitionArtworkID WHERE ExhibitionArtworks.ExhibitionID IN ( SELECT ExhibitionID FROM Exhibitions WHERE Title IN ('Modern Art Masterpieces', 'Renaissance Art') ) GROUP BY Artworks.Title HAVING COUNT(DISTINCT Exhibitions.ExhibitionID) = 2

- System Tray:** Shows system icons including a currency converter (USD/JPY +0.8%), search, and various application icons.

Query 7: Find the total number of artworks in each category.

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

The screenshot shows the MySQL Workbench interface with the following details:

- Navigator:** Shows the database structure with Schemas: sys, ticketbookingsystem, vartest, and artulartsgallery. Under artulartsgallery, there are Tables: artists, artworks, categories, and exhibitionartworks, along with Views, Stored Procedures, and Functions.
- SQL Editor:** Contains the SQL query:

```
1 • SELECT Categories.Name, COUNT(Artworks.ArtworkID) AS ArtworkCount
2   FROM Categories
3   LEFT JOIN Artworks ON Categories.CategoryID = Artworks.CategoryID
4   GROUP BY Categories.Name;
5
```
- Result Grid:** Displays the results of the query:

Name	ArtworkCount
Painting	3
Sculpture	0
Photography	0
- Output:** Shows the log of actions taken:

#	Time	Action	Message	Duration / Fetch
18	11:02:35	SELECT Artists.Name FROM Artists JOIN (	SELECT ArtworkID, COUNT(ArtworkID) AS ArtworkCount FROM... 0 row(s) returned	0.000 sec / 0.000 sec
19	11:14:46	SELECT Artworks.Title FROM Artworks JOIN ExhibitionsArtworks ON Artworks.ArtworkID = ExhibitionsArtworks...	1 row(s) returned	0.047 sec / 0.000 sec
20	11:16:55	SELECT Categories.Name, COUNT(Artworks.ArtworkID) AS ArtworkCount FROM Categories LEFT JOIN Artw...	3 row(s) returned	0.000 sec / 0.000 sec

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

```
SELECT Artists.Name  
FROM Artists  
JOIN Artworks ON Artists.ArtistID = Artworks.ArtistID  
GROUP BY Artists.ArtistID  
HAVING COUNT(Artworks.ArtworkID) > 3;
```

The screenshot shows the MySQL Workbench interface. In the top panel, a SQL editor window displays the query:

```
1 • SELECT Artists.Name  
2   FROM Artists  
3   JOIN Artworks ON Artists.ArtistID = Artworks.ArtistID  
4   GROUP BY Artists.ArtistID  
5   HAVING COUNT(Artworks.ArtworkID) > 3;
```

In the bottom panel, a results grid shows a single row with the name "Name".

Below the results grid, the "Action Output" pane shows the following log entries:

#	Time	Action	Message	Duration / Fetch
19	11:14:46	SELECT Artworks.Title FROM Artworks JOIN ExhibitionArtworks ON Artworks.ArtworkID = ExhibitionArtworks...	1 row(s) returned	0.047 sec / 0.000 sec
20	11:16:55	SELECT Categories.Name, COUNT(Artworks.ArtworkID) AS ArtworkCount FROM Categories LEFT JOIN Artw...	3 row(s) returned	0.000 sec / 0.000 sec
21	11:22:52	SELECT Artists.Name FROM Artists JOIN Artworks ON Artists.ArtistID = Artworks.ArtistID GROUP BY Artists.Ar...	0 row(s) returned	0.000 sec / 0.000 sec

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

```
SELECT Artworks.Title, Artists.Name  
FROM Artworks  
JOIN Artists ON Artworks.ArtistID = Artists.ArtistID  
WHERE Artists.Nationality = 'Spanish';
```

The screenshot shows the MySQL Workbench interface with the following details:

- Navigator:** Shows the database schema with the **virtualartgallery** database selected, containing tables like **artists**, **artworks**, **categories**, **exhibitionartworks**, and **exhibitions**.
- SQL Editor:** Displays the SQL query:

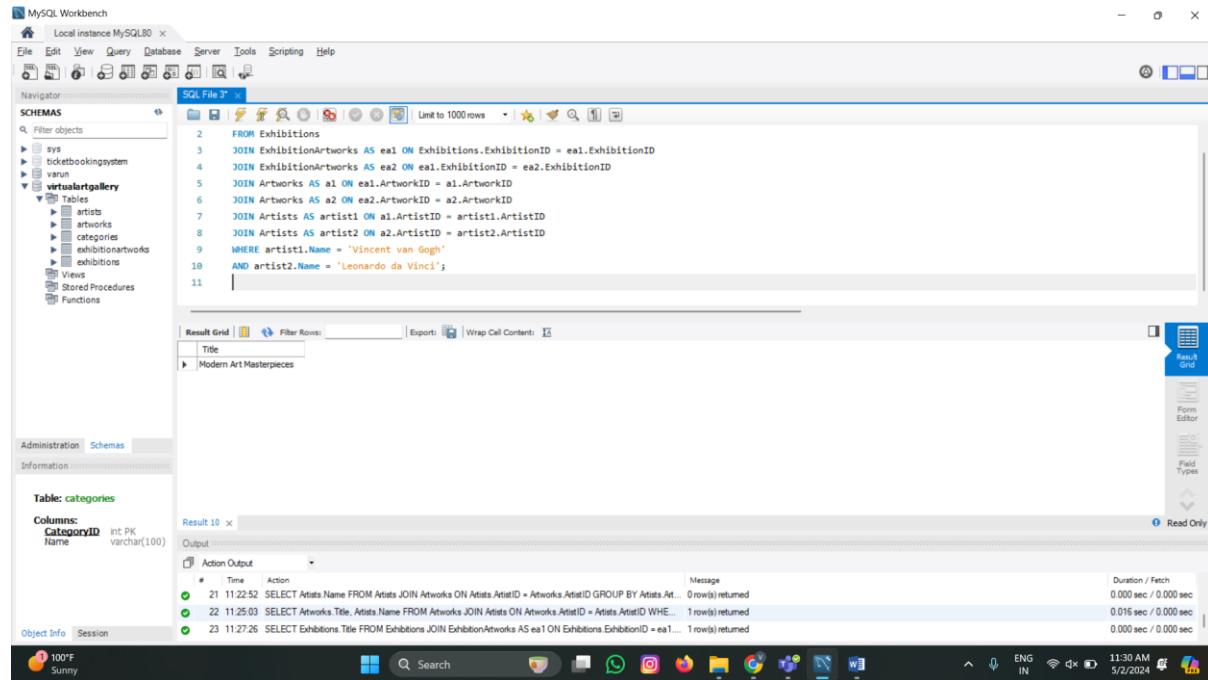
```
1 • SELECT Artworks.Title, Artists.Name  
2   FROM Artworks  
3   JOIN Artists ON Artworks.ArtistID = Artists.ArtistID  
4   WHERE Artists.Nationality = 'Spanish';  
5
```
- Result Grid:** Shows the query results:

Title	Name
Guernica	Pablo Picasso
- Output:** Shows the execution log for the query:

#	Time	Action	Message	Duration / Fetch
20	11:16:55	SELECT Categories.Name, COUNT(Artworks.ArtworkID) AS ArtworkCount FROM Categories LEFT JOIN Artworks ON Categories.CategoryID = Artworks.CategoryID GROUP BY Categories.CategoryID	3 row(s) returned	0.000 sec / 0.000 sec
21	11:22:52	SELECT Artists.Name FROM Artists JOIN Artworks ON Artists.ArtistID = Artworks.ArtistID GROUP BY Artists.ArtistID	0 row(s) returned	0.000 sec / 0.000 sec
22	11:25:03	SELECT Artworks.Title, Artists.Name FROM Artworks JOIN Artists ON Artworks.ArtistID = Artists.ArtistID WHERE Artists.Nationality = 'Spanish'	1 row(s) returned	0.016 sec / 0.000 sec

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

```
SELECT Exhibitions.Title
FROM Exhibitions
JOIN ExhibitionArtworks AS ea1 ON Exhibitions.ExhibitionID = ea1.ExhibitionID
JOIN ExhibitionArtworks AS ea2 ON ea1.ExhibitionID = ea2.ExhibitionID
JOIN Artworks AS a1 ON ea1.ArtworkID = a1.ArtworkID
JOIN Artworks AS a2 ON ea2.ArtworkID = a2.ArtworkID
JOIN Artists AS artist1 ON a1.ArtistID = artist1.ArtistID
JOIN Artists AS artist2 ON a2.ArtistID = artist2.ArtistID
WHERE artist1.Name = 'Vincent van Gogh'
AND artist2.Name = 'Leonardo da Vinci';
```

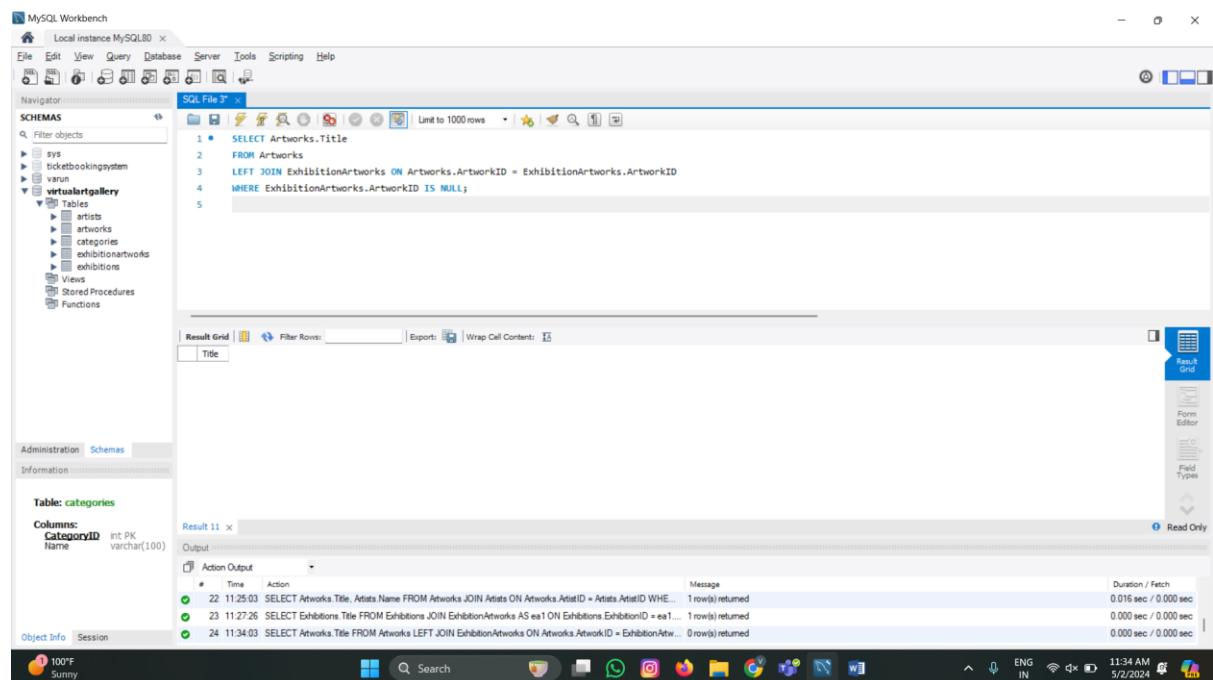


The screenshot shows the MySQL Workbench interface with the following details:

- Navigator:** Shows the database schema with tables like sys, ticketbookingystem, varun, virtusartgallery, artists, artworks, categories, exhibitionartworks, and exhibitions.
- SQL Editor:** Contains the SQL query for finding exhibitions featuring artworks by both Vincent van Gogh and Leonardo da Vinci.
- Result Grid:** Displays the result of the query, showing a single row with the title "Modern Art Masterpieces".
- Output:** Shows the execution log with three entries corresponding to the query steps.
- System Bar:** Includes icons for weather (100°F, sunny), search, and various system applications.

Query 11: 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;
```



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

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

The screenshot shows the MySQL Workbench interface with the following details:

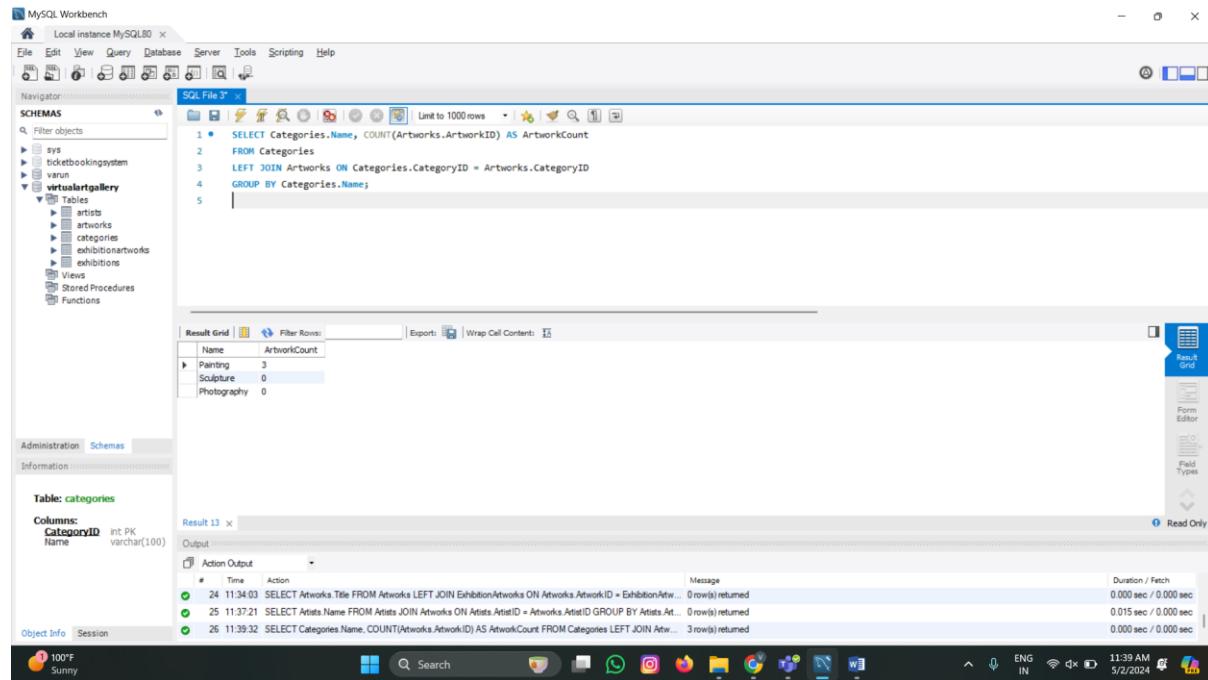
- Navigator:** Shows the database schema with the **vinodartsgallery** database selected. Under **Tables**, it lists **artists**, **artworks**, **categories**, **exhibitonartworks**, and **exhibitions**.
- SQL File 3:** Contains the SQL query for Query 12.
- Result Grid:** Displays the results of the query, showing a single column **Name** with one row.
- Output:** Shows the execution log with three entries:

  - 23 11:27:26 SELECT Exhibitions.Title FROM Exhibitions JOIN ExhibitionArtworks AS ea1 ON Exhibitions.ExhibitionID = ea1.ExhibitionID LEFT JOIN Artworks ON Artworks.ArtistID = ea1.ArtistID WHERE ea1.ExhibitionID = 1 rows returned
  - 24 11:34:03 SELECT Artworks.Title FROM Artworks LEFT JOIN ExhibitionArtworks ON Artworks.ArtworkID = ExhibitionArtworks.ArtworkID WHERE ea1.ExhibitionID = 1 rows returned
  - 25 11:37:21 SELECT Artists.Name FROM Artists JOIN Artworks ON Artists.ArtistID = Artworks.ArtistID GROUP BY Artists.ArtistID Duration / Fetch 0.000 sec / 0.000 sec 0.000 sec / 0.000 sec 0.015 sec / 0.000 sec

- Object Info:** Shows the **categories** table definition.
- Session:** Shows the current session status.

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

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



The screenshot shows the MySQL Workbench interface with the following details:

- Navigator:** Shows the database schema with tables: sys, ticketbookingsystem, var, and artulartsgallery.
- SQL Editor:** Contains the SQL query:

```
1 •  SELECT Categories.Name, COUNT(Artworks.ArtworkID) AS ArtworkCount
2   FROM Categories
3   LEFT JOIN Artworks ON Categories.CategoryID = Artworks.CategoryID
4   GROUP BY Categories.Name;
5
```
- Result Grid:** Displays the results of the query:

Name	ArtworkCount
Painting	3
Sculpture	0
Photography	0
- Output:** Shows the history of actions taken:

#	Action	Message	Duration / Fetch
24	11:34:03	SELECT Artworks Title FROM Artworks LEFT JOIN ExhibitionArtworks ON Artworks.ArtworkID = ExhibitionArtw...	0.000 sec / 0.000 sec
25	11:37:21	SELECT Artists.Name FROM Artists JOIN Artworks ON Artists.ArtistID = Artworks.ArtistID GROUP BY Artists.Ar...	0.015 sec / 0.000 sec
26	11:39:32	SELECT Categories.Name, COUNT(Artworks.ArtworkID) AS ArtworkCount FROM Categories LEFT JOIN Artw...	0.000 sec / 0.000 sec

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

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

The screenshot shows the MySQL Workbench interface. In the top-left pane, the 'Navigator' shows the database schema with the 'virtualartgallery' database selected. The 'Tables' section under 'virtualartgallery' lists 'artists', 'artworks', 'categories', 'exhibitionartworks', 'exhibitions', 'VirtualArt', 'Stored Procedures', and 'Functions'. In the center, the 'SQL File 3' tab contains the SQL query:

```
1 • SELECT Artists.Name  
2   FROM Artists  
3   JOIN Artworks ON Artists.ArtistID = Artworks.ArtistID  
4   GROUP BY Artists.ArtistID  
5   HAVING COUNT(Artworks.ArtworkID) > 2;
```

Below the SQL editor is the 'Result Grid' pane, which displays the results of the query. The results show a single row with the name 'Name'. At the bottom of the window, the taskbar shows various application icons, and the system tray indicates it's 11:41 AM on 5/2/2024.

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

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

The screenshot shows the MySQL Workbench interface with the following details:

- Navigator:** Shows the database structure with the schema `virtualartgallery` selected, containing tables `artists`, `artworks`, `categories`, and `exhibitionartworks`.
- SQL Editor:** Displays the query:

```
1 • SELECT Categories.Name, AVG(Artworks.Year) AS AverageYear  
2   FROM Categories  
3   JOIN Artworks ON Categories.CategoryID = Artworks.CategoryID  
4   GROUP BY Categories.Name  
5   HAVING COUNT(Artworks.ArtworkID) > 1;
```
- Result Grid:** Shows the result of the query:

Name	AverageYear
Painting	1776.3333
- Output:** Shows the execution log with three entries:

#	Action	Message	Duration / Fetch
26	21 11:39:32 SELECT Categories.Name, COUNT(Artworks.ArtworkID) AS ArtworkCount FROM Categories LEFT JOIN Artw...	3 row(s) returned	0.000 sec / 0.000 sec
27	27 11:41:56 SELECT Artists.Name FROM Artists JOIN Artworks ON Artists.ArtistID = Artworks.ArtistID GROUP BY Artists.Ar...	0 row(s) returned	0.000 sec / 0.000 sec
28	28 11:42:50 SELECT Categories.Name, AVG(Artworks.Year) AS AverageYear FROM Categories JOIN Artworks ON Catego...	1 row(s) returned	0.000 sec / 0.000 sec

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

```
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';
```

The screenshot shows the MySQL Workbench interface with the following details:

- Navigator:** Shows the database schema with the **virtualartgallery** database selected, containing tables like **artists**, **artworks**, **categories**, **exhibitionartworks**, **exhibitions**, and **news**.
- SQL File 3:** Contains the SQL query:

```
1 • SELECT Artworks.Title  
2   FROM Execute the statement under the keyboard cursor  
3   JOIN ExhibitionArtworks ON Artworks.ArtworkID = ExhibitionArtworks.ArtworkID  
4   JOIN Exhibitions ON ExhibitionArtworks.ExhibitionID = Exhibitions.ExhibitionID  
5   WHERE Exhibitions.Title = 'Modern Art Masterpieces'  
6 |
```
- Result Grid:** Displays the results of the query:

Title
Starry Night
Mona Lisa
Guernica
- Object Info:** Shows information for the **categories** table, including columns **CategoryID** and **Name**.
- Action Output:** Shows the log of actions taken:

#	Time	Action	Message	Duration / Fetch
27	11:41:56	SELECT Artists.Name FROM Artists JOIN Artworks ON Artists.ArtistID = Artworks.ArtistID GROUP BY Artists.Art...	0 row(s) returned	0.000 sec / 0.000 sec
28	11:42:50	SELECT Categories.Name, AVG(Artworks.Year) AS AverageYear FROM Categories JOIN Artworks ON Catego...	1 row(s) returned	0.000 sec / 0.000 sec
29	11:44:03	SELECT Artworks.Title FROM Artworks JOIN ExhibitionArtworks ON Artworks.ArtworkID = ExhibitionArtworks...	3 row(s) returned	0.000 sec / 0.000 sec

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

```
SELECT Categories.Name  
FROM Categories  
JOIN Artworks ON Categories.CategoryID = Artworks.CategoryID  
GROUP BY Categories.Name  
HAVING AVG(Artworks.Year) > (SELECT AVG(Year) FROM Artworks);
```

The screenshot shows the MySQL Workbench interface with the following details:

- SQL Editor:** Contains the query:

```
1 • SELECT Categories.Name  
2   FROM Categories  
3   JOIN Artworks ON Categories.CategoryID = Artworks.CategoryID  
4   GROUP BY Categories.Name  
5   HAVING AVG(Artworks.Year) > (SELECT AVG(Year) FROM Artworks);  
6
```
- Result Grid:** Shows a single column "Name" with no data returned.
- Output Log:** Displays the execution log for "Result 17":

#	Time	Action	Message	Duration / Fetch
28	11:42:50	SELECT Categories.Name, AVG(Artworks.Year) AS AverageYear FROM Categories JOIN Artworks ON Categories.CategoryID = Artworks.CategoryID	1 row(s) returned	0.000 sec / 0.000 sec
29	11:44:03	SELECT Artworks.Title FROM Artworks JOIN ExhibitionArtworks ON Artworks.ArtworkID = ExhibitionArtworks.ExhibitionArtworkID	3 row(s) returned	0.000 sec / 0.000 sec
30	11:45:04	SELECT Categories.Name FROM Categories JOIN Artworks ON Categories.CategoryID = Artworks.CategoryID	0 row(s) returned	0.000 sec / 0.000 sec
- System Bar:** Shows the date and time as 11:45 AM 5/2/2024.

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

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

The screenshot shows the MySQL Workbench interface with the following details:

- Navigator:** Shows the database schema with the **virtualartgallery** database selected, containing tables like **artworks**, **categories**, **exhibitionartworks**, and **exhibitions**.
- SQL Editor:** Displays the SQL query:

```
1 • SELECT Artworks.Title  
2   FROM Artworks  
3   LEFT JOIN ExhibitionArtworks ON Artworks.ArtworkID = ExhibitionArtworks.ArtworkID  
4 WHERE ExhibitionArtworks.ArtworkID IS NULL;  
5
```
- Result Grid:** A table with a single column "Title" currently empty.
- Table: categories:** Shows the structure of the categories table with columns **CategoryID** and **Name**.
- Result 18:** A results pane showing the output of the query. It lists three rows returned from the **artworks** table, all of which have a corresponding entry in the **exhibitionartworks** table.
- System Tray:** Shows the date and time as 11:58 AM, 5/2/2024, and icons for weather (100°F mostly sunny), search, file explorer, and other system functions.

Query 19: 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  
JOIN Categories ON Artworks.CategoryID = Categories.CategoryID  
WHERE Categories.Name IN (  
    SELECT Categories.Name  
    FROM Artworks  
    JOIN Categories ON Artworks.CategoryID = Categories.CategoryID  
    WHERE Artworks.Title = 'Mona Lisa'  
);
```

The screenshot shows the MySQL Workbench interface with the following details:

- Navigator:** Shows the database schema with tables: sys, ticketbookingsystem, varun, and virtualartgallery.
- SQL File 3:** Contains the SQL query from the text above.
- Result Grid:** Displays the results of the query, showing three artist names: Pablo Picasso, Vincent van Gogh, and Leonardo da Vinci.
- Output:** Shows the execution log with three entries corresponding to the query steps.
- System Tray:** Shows the weather as 100°F Mostly sunny and the system time as 12:33 PM 5/2/2024.

Query 20: List the names of artists and the number of artworks they have

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

The screenshot shows the MySQL Workbench interface with the following details:

- Navigator:** Shows the database schema with the `artsgallery` database selected, containing tables like `artists`, `artworks`, `categories`, `exhibitionartworks`, and `exhibitions`.
- SQL Editor:** Displays the SQL query:

```
1 • SELECT Artists.Name, COUNT(Artworks.ArtworkID) AS ArtworkCount
2   FROM Artists
3   LEFT JOIN Artworks ON Artists.ArtistID = Artworks.ArtistID
4   GROUP BY Artists.Name;
5
```
- Result Grid:** Shows the results of the query:

Name	ArtworkCount
Pablo Picasso	1
Vincent van Gogh	1
Leonardo da Vinci	1
- Output Window:** Shows the log of actions taken:

#	Time	Action	Message	Duration / Fetch
31	11:58:10	SELECT Artworks.Title FROM Artworks LEFT JOIN ExhibitionArtworks ON Artworks.ArtworkID = ExhibitionArtworks.ArtworkID + ExhibitionArtworks.ExhibitionID	0 row(s) returned	0.000 sec / 0.000 sec
32	12:03:51	SELECT DISTINCT Artists.Name FROM Artists JOIN Artworks ON Artists.ArtistID = Artworks.ArtistID JOIN Categories ON Artworks.CategoryID = Categories.CategoryID	3 row(s) returned	0.000 sec / 0.000 sec
33	12:05:06	SELECT Artists.Name, COUNT(Artworks.ArtworkID) AS ArtworkCount FROM Artists LEFT JOIN Artworks ON Artists.ArtistID = Artworks.ArtistID GROUP BY Artists.Name	3 row(s) returned	0.000 sec / 0.000 sec