Virtual Art Work Database

```sql
Create DATABASE Gallery ;
use Gallery;

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

-- Create the Categories table
CREATE TABLE Categories (
CategoryID INT PRIMARY KEY,
Name VARCHAR(100) NOT NULL);

-- 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));

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

-- 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));

-- 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');

-- Insert sample data into the Categories table
INSERT INTO Categories (CategoryID, Name) VALUES
(1, 'Painting'),
(2, 'Sculpture'),
(3, 'Photography');

-- 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');

-- 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.');

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

--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.
SELECT Artists.Name, COUNT(Artworks.ArtworkID) AS NumArtworks
FROM Artists
LEFT JOIN Artworks ON Artists.ArtistID = Artworks.ArtistID
GROUP BY Artists.ArtistID, Artists.Name
ORDER BY NumArtworks DESC;

Results   Messages

	Name	NumArtworks
1	Pablo Picasso	1
2	Vincent van Gogh	1
3	Leonardo da Vinci	1

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

	Title	Year
1	Starry Night	1889
2	Guernica	1937

--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 NumArtworks
FROM Artists
JOIN Artworks ON Artists.ArtistID = Artworks.ArtistID
WHERE Artworks.CategoryID = 1 -- Assuming 'Painting' has CategoryID 1
GROUP BY Artists.ArtistID, Artists.Name;

	Name	NumArtworks
1	Pablo Picasso	1
2	Vincent van Gogh	1
3	Leonardo da Vinci	1

--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';

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

--5. Find the artists who have more than two artworks in the gallery.
SELECT Artists.Name
FROM Artists
JOIN Artworks ON Artists.ArtistID = Artworks.ArtistID
GROUP BY Artists.ArtistID, Artists.Name
HAVING COUNT(Artworks.ArtworkID) > 2;

Results	Messages

Name

--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;

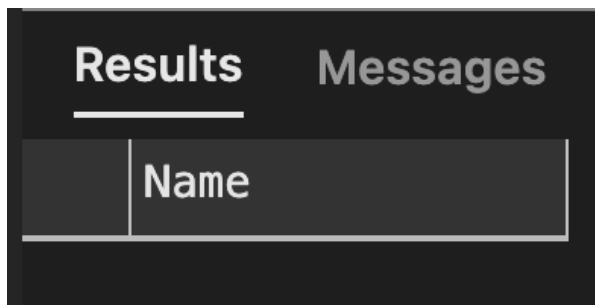| Results	Messages

	Title ∨
1	Mona Lisa

--7. Find the total number of artworks in each category
SELECT Categories.Name, COUNT(Artworks.ArtworkID) AS TotalArtworks
FROM Categories
LEFT JOIN Artworks ON Categories.CategoryID = Artworks.CategoryID
GROUP BY Categories.CategoryID, Categories.Name;

Results	Messages

	Name ∨	TotalArtworks ∨
1	Painting	3
2	Sculpture	0
3	Photography	0

--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, Artists.Name
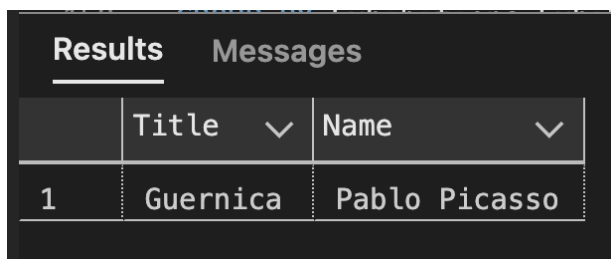HAVING COUNT(Artworks.ArtworkID) > 3;

Results   Messages

Name

--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
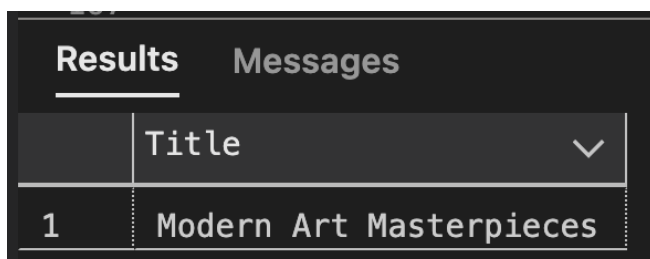WHERE Artists.Nationality = 'Spanish';

Results   Messages

	Title	Name
1	Guernica	Pablo Picasso

--10. List exhibitions that feature artwork by both Vincent van Gogh and Leonardo da Vinci.
SELECT Exhibitions.Title
FROM Exhibitions
JOIN ExhibitionArtworks ON Exhibitions.ExhibitionID = ExhibitionArtworks.ExhibitionID
JOIN Artworks ON ExhibitionArtworks.ArtworkID = Artworks.ArtworkID
JOIN Artists ON Artworks.ArtistID = Artists.ArtistID
WHERE Artists.Name IN ('Vincent van Gogh', 'Leonardo da Vinci')
GROUP BY Exhibitions.ExhibitionID, Exhibitions.Title
HAVING COUNT(DISTINCT Artists.ArtistID) = 2;

Results   Messages

	Title
1	Modern Art Masterpieces

--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;

Results	Messages
Title	

--12. List artists who have created artworks in all available categories.
SELECT Artists.Name
FROM Artists
CROSS JOIN Categories
WHERE NOT EXISTS (
    SELECT 1
    FROM Categories
    LEFT JOIN Artworks ON Categories.CategoryID = Artworks.CategoryID
    LEFT JOIN Artists ON Artworks.ArtistID = Artists.ArtistID
    WHERE Artists.ArtistID IS NULL
);

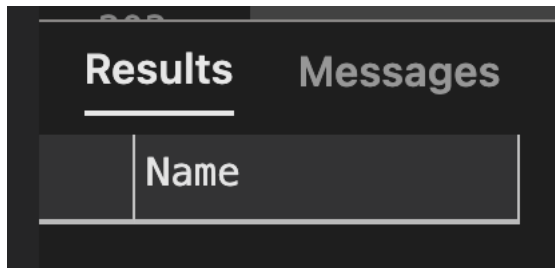| Results	Messages
Name	

--13. List the total number of artworks in each category.
SELECT Categories.Name, COUNT(Artworks.ArtworkID) AS TotalArtworks
FROM Categories
LEFT JOIN Artworks ON Categories.CategoryID = Artworks.CategoryID
GROUP BY Categories.CategoryID, Categories.Name;

	Name	TotalArtworks
1	Painting	3
2	Sculpture	0
3	Photography	0

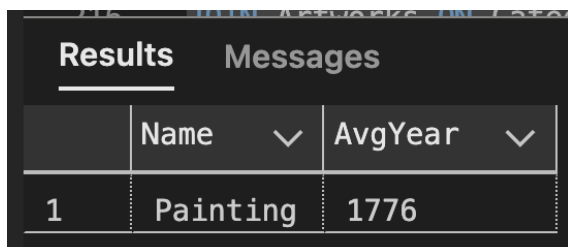--14. Find the artists who have more than 2 artworks in the gallery.
SELECT Artists.Name
FROM Artists
JOIN Artworks ON Artists.ArtistID = Artworks.ArtistID
GROUP BY Artists.ArtistID, Artists.Name
HAVING COUNT(Artworks.ArtworkID) > 2;

Name

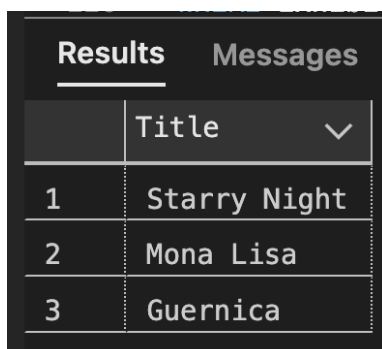--15. List the categories with the average year of artworks they contain, only for categories with more than 1 artwork.
SELECT Categories.Name, AVG(Artworks.Year) AS AvgYear
FROM Categories
JOIN Artworks ON Categories.CategoryID = Artworks.CategoryID
GROUP BY Categories.CategoryID, Categories.Name
HAVING COUNT(Artworks.ArtworkID) > 1;

	Name	AvgYear
1	Painting	1776

--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';

	Title
1	Starry Night
2	Mona Lisa
3	Guernica

--17. Find the categories where the average year of artworks is greater than the average year of all artworks.
SELECT Categories.Name, AVG(Artworks.Year) AS AvgCategoryYear, AVG(AvgAllArtworksYear) AS AvgAllArtworksYear
FROM Categories
JOIN Artworks ON Categories.CategoryID = Artworks.CategoryID
CROSS JOIN (SELECT AVG(Year) AS AvgAllArtworksYear FROM Artworks) AS AllArtworksAvg
GROUP BY Categories.CategoryID, Categories.Name
HAVING AVG(Artworks.Year) > AVG(AvgAllArtworksYear);

Results   Messages

Name	AvgCategoryYear	AvgAllArtworks…

--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;

Results   **Messages**

Title

--19. Show artists who have artworks in the same category as "Mona Lisa."
SELECT DISTINCT Artists.Name
FROM Artists
JOIN Artworks AS MonaLisaArtwork ON Artists.ArtistID = MonaLisaArtwork.ArtistID
JOIN Categories ON MonaLisaArtwork.CategoryID = Categories.CategoryID
JOIN Artworks ON Categories.CategoryID = Artworks.CategoryID
WHERE Artworks.Title <> 'Mona Lisa';

Results   Messages

	Name
1	Leonardo da Vinci
2	Pablo Picasso
3	Vincent van Gogh

--20. List the names of artists and the number of artworks they have in the gallery.
SELECT Artists.Name, COUNT(Artworks.ArtworkID) AS NumArtworks
FROM Artists
LEFT JOIN Artworks ON Artists.ArtistID = Artworks.ArtistID
GROUP BY Artists.ArtistID, Artists.Name;

Results   Messages

	Name	NumArtworks
1	Pablo Picasso	1
2	Vincent van Gogh	1
3	Leonardo da Vinci	1