```
Create database Virtual_art_gallery;
use Virtual_art_gallery;
-- Create the Artist 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 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);
/*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.*/
```

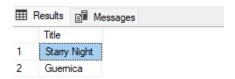
```
select a.Name, COUNT(aw.ArtworkID) as Num_of_Artworks from Artists a
JOIN Artworks aw
ON a.ArtistID = aw.ArtistID
group by a.Name
order by Num_of_Artworks desc;
```

Output:

⊞ Results			
	Name	Num_of_Artworks	
1	Leonardo da Vinci	1	
2	Pablo Picasso	1	
3	Vincent van Gogh	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 aw.Title From Artworks aw
Join Artists a
ON a.ArtistID=aw.ArtistID
where a.Nationality='Spanish' or a.Nationality='Dutch'
ORDER by aw.year;
```

output:



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

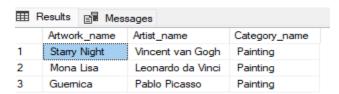
Select a.Name , count(aw.ArtworkId) as Num_of_Paintings
from Artworks aw
JOIN Artists a
on a.ArtistID= aw.ArtistID
Join Categories c
on aw.CategoryID=c.CategoryID
where c.name='Painting'
Group by a.Name;
```

output:



```
/*4. List the names of artworks from the 'Modern Art Masterpieces' exhibition, along
  with their
artists and categories. */
select aw.title as Artwork_name ,a.Name as Artist_name, c.Name as Category_name
from Artworks aw
JOIN Artists a
on a.ArtistID=aw.ArtistID
Join categories c
on c.CategoryID=aw.CategoryID
Join ExhibitionArtworks ea
on ea.ArtworkID=aw.ArtworkID
Join Exhibitions e
on e.ExhibitionID=ea.ExhibitionID
where e.Title='Modern Art Masterpieces';
```

Output:



```
/*5. Find the artists who have more than two artworks in the gallery. */
select a.Name , count(aw.ArtworkID) as Num_of_Artworks

from Artists a
JOIN Artworks aw
ON a.ArtistID=aw.ArtistID
group by a.Name
Having count(aw.ArtworkID) >2;
```

Output:

```
    ⊞ Results

    Messages

           Num_of_Artworks
     Name
/*6. Find the titles of artworks that were exhibited in both 'Modern Art Masterpieces'▶
    and
 'Renaissance Art' exhibitions */
SELECT aw.title as Title_of_Artworks
FROM artworks aw
JOIN ExhibitionArtworks ea
ON ea.ArtworkID=aw.ArtworkID
JOIN exhibitions e
ON ea.ExhibitionID = e.ExhibitionID
WHERE e.Title IN ('Modern Art Masterpieces', 'Renaissance Art')
GROUP BY aw.Title;
Output:
Title_of_Artworks
1
     Guemica
2
     Mona Lisa
3
     Starry Night
/*7. Find the total number of artworks in each category*/
select c.name, count(aw.ArtworkID) as No_of_artworks
from Categories c
left Join Artworks aw
on c.CategoryID=aw.CategoryID
group by c.name ;
output:
Results Ressages
    name
                No_of_artworks
                3
1
    Painting
2
     Photography
                0
3
     Sculpture
                0
```

/*8. List artists who have more than 3 artworks in the gallery. */
Select a.Name
FROM Artists a
JOIN Artworks Aw
ON A.ArtistID = Aw.ArtistID
GROUP BY A.Name
HAVING COUNT(Aw.ArtworkID) >3;

Output:

```
■ Results
         Name
/*9. Find the artworks created by artists from a specific nationality (e.g.,
  Spanish).*/
SELECT aw.title AS Artwork_title, a.Name, aw.year
FROM artworks aw
JOIN artists a
ON aw.ArtistID = a.ArtistID
WHERE a.nationality = 'Spanish';
Output:
 Results 📳 Messages
     Artwork title
                Name
                            vear
     Guemica
                 Pablo Picasso
                             1937
/*10. List exhibitions that feature artwork by both Vincent van Gogh and Leonardo da →
  Vinci.*/
SELECT e.Title
FROM Exhibitions e
JOIN ExhibitionArtworks eal ON e.ExhibitionID = eal.ExhibitionID
JOIN Artworks aw1 ON ea1.ArtworkID = aw1.ArtworkID
JOIN Artists a1 ON aw1.ArtistID = a1.ArtistID
JOIN ExhibitionArtworks ea2 ON e.ExhibitionID = ea2.ExhibitionID
JOIN Artworks aw2 ON ea2.ArtworkID = aw2.ArtworkID
JOIN Artists a2 ON aw2.ArtistID = a2.ArtistID
WHERE a1.Name = 'Vincent van Gogh' AND a2.Name = 'Leonardo da Vinci';
```

Output

1 Modern Art Masterpieces

```
/*11. Find all the artworks that have not been included in any exhibition.*/
select aw.title, a.Name
From Artworks aw
Join Artists a on aw.ArtistID=a.ArtistID
Left join ExhibitionArtworks ea on aw.ArtworkID=ea.ArtworkID
where ea.ExhibitionID IS null;
Output:

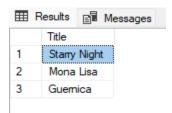
    ⊞ Results

          Messages
     title
          Name
/*12. List artists who have created artworks in all available categories.*/
SELECT a.Name FROM Artists a
JOIN Artworks aw ON a.ArtistID = aw.ArtistID
JOIN Categories c ON aw.CategoryID = c.CategoryID
GROUP BY a.Name
HAVING COUNT(DISTINCT c.CategoryID) = (SELECT COUNT(CategoryID) FROM Categories);
         /Output is empty because of no artist created artwork in all categories/
    Name
/*13. List the total number of artworks in each category. */
select c.name, count(aw.ArtworkID) as No_of_artworks
from Categories c
left Join Artworks aw
on c.CategoryID=aw.CategoryID
group by c.name;
output:
 Results Messages
                 No_of_artworks
      name
      Painting
                 3
      Photography
 2
                 0
 3
      Sculpture
                 0
/*14. Find the artists who have more than 2 artworks in the gallery. */
Select a.Name FROM Artists a
JOIN Artworks Aw
ON A.ArtistID = Aw.ArtistID
GROUP BY A.Name
HAVING COUNT(Aw.ArtworkID) >2;
Output:
            /No artist found more than 2 artworks in the gallery/
```

Name

```
/*15. List the categories with the average year of artworks they contain, only for
  categories with more
than 1 artwork. */
Select c.Name, AVG(Aw.Year) AS Average_Year
FROM Categories c
JOIN Artworks Aw
ON c.CategoryID = Aw.CategoryID
GROUP BY C.Name
HAVING COUNT(Aw.ArtworkID) > 1;
Output
1 Painting 1776
/*16. Find the artworks that were exhibited in the 'Modern Art Masterpieces'
  exhibition. */
SELECT Aw.Title
FROM Artworks Aw
JOIN ExhibitionArtworks ea ON Aw.ArtworkID = ea.ArtworkID
JOIN Exhibitions e ON ea.ExhibitionID = e.ExhibitionID
WHERE e.Title = 'Modern Art Masterpieces';
```

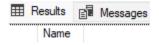
output



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

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

output



```
/*18. List the artworks that were not exhibited in any exhibition.*/
SELECT aw. Title FROM Artworks aw
LEFT JOIN ExhibitionArtworks ea
ON aw.ArtworkID = ea.ArtworkID
WHERE ea.ArtworkID IS NULL;
Output

    ⊞ Results

    Messages

     Title
/*19. Show artists who have artworks in the same category as "Mona Lisa." */
SELECT DISTINCT a.Name FROM Artists a
JOIN Artworks aw ON a.ArtistID = aw.ArtistID
WHERE aw.CategoryID = (SELECT CategoryID FROM Artworks WHERE Title = 'Mona Lisa');
Output
Results 📳 Messages
     Name
     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 a.Name, COUNT(aw.ArtworkID) AS ArtworkCount
FROM Artists a
JOIN Artworks aw ON a.ArtistID = aw.ArtistID
GROUP BY a.Name;
Output
Results 📳 Messages
     Name
                     ArtworkCount
     Leonardo da Vinci
      Pablo Picasso
                     1
 3
      Vincent van Gogh
```