RUSHALEE DAS
VIRTUAL ART GALLERY

```
mysql> CREATE DATABASE VirtualArtGallery;
Query OK, 1 row affected (0.03 sec)
```

```
mysql> SHOW DATABASES;
+--------------------+
| Database           |
+--------------------+
| hmbank             |
| information_schema |
| mysql              |
| performance_schema |
| sisdb              |
| students           |
| sys                |
| virtualartgallery  |
+--------------------+
8 rows in set (0.01 sec)
```

```
mysql> use virtualartgallery;
Database changed
```

```
mysql> use virtualartgallery;
Database changed
mysql> CREATE TABLE Artists(
    -> artist_id INT PRIMARY KEY,
    -> name VARCHAR(225) NOT NULL,
    -> biography TEXT,
    -> nationality VARCHAR(100));
Query OK, 0 rows affected (0.07 sec)

mysql> CREATE TABLE Categories(
    -> category_id INT PRIMARY KEY,
    -> name VARCHAR(100) NOT NULL);
Query OK, 0 rows affected (0.03 sec)
```

```
mysql> CREATE TABLE Artworks(
    -> artwork_id INT PRIMARY KEY,
    -> title VARCHAR(225) NOT NULL,
    -> artist_id INT,
    -> category_id INT,
    -> year INT,
    -> description TEXT,
    -> image_url VARCHAR(225),
    -> FOREIGN KEY (artist_id) REFERENCES Artists(artist_id),
    -> FOREIGN KEY (category_id) REFERENCES Categories(category_id));
Query OK, 0 rows affected (0.09 sec)

mysql> CREATE TABLE Exhibitions(
    -> exhibition_id INT PRIMARY KEY,
    -> title VARCHAR(225) NOT NULL,
    -> start_date DATE,
    -> end_date DATE,
    -> description TEXT);
Query OK, 0 rows affected (0.03 sec)

mysql> CREATE TABLE ExhibitionArtworks(
    -> exhibition_id INT,
    -> artwork_id INT,
    -> PRIMARY KEY (exhibition_id, artwork_id),
    -> FOREIGN KEY (exhibition_id) REFERENCES Exhibitions(exhibition_id),
    -> FOREIGN KEY (artwork_id) REFERENCES Artworks(artwork_id));
Query OK, 0 rows affected (0.08 sec)
```

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

```
mysql> INSERT INTO Artworks (artwork_id, title, artist_id, category_id, year, description, image_url) 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> INSERT INTO Exhibitions (exhibition_id, title, start_date, end_date, 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> INSERT INTO ExhibitionArtworks (exhibition_id, artwork_id) VALUES
    -> (1, 1),
    -> (1, 2),
    -> (1, 3),
    -> (2, 2);
Query OK, 4 rows affected (0.01 sec)
Records: 4  Duplicates: 0  Warnings: 0
```

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 artist.name AS Artist_Name,
    -> COUNT(artwork.artist_id) AS No_of_Artworks
    -> FROM Artists artist
    -> LEFT JOIN Artworks artwork ON artist.artist_id = artwork.artist_id
    -> GROUP BY artist.artist_id, artist.name
    -> ORDER BY No_of_Artworks DESC;
+-------------------+----------------+
| Artist_Name       | No_of_Artworks |
+-------------------+----------------+
| Pablo Picasso     |              1 |
| Vincent van Gogh  |              1 |
| Leonardo da Vinci |              1 |
+-------------------+----------------+
3 rows in set (0.00 sec)
```

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

```
mysql> SELECT AR.title AS Artwork_title,
    -> AR.year
    -> FROM Artworks AR
    -> JOIN Artists A ON A.artist_id = AR.artist_id
    -> WHERE A.nationality IN('Spanish', 'Dutch')
    -> ORDER BY AR.year ASC;
+---------------+------+
| Artwork_title | year |
+---------------+------+
| Starry Night  | 1889 |
| Guernica      | 1937 |
+---------------+------+
2 rows in set (0.00 sec)
```

3. 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 A.name AS Artist_name,
    -> COUNT(AR.artist_id) AS nof_artworks
    -> FROM Artists A
    -> JOIN Artworks AR ON AR.artist_id = A.artist_id
    -> JOIN Categories C ON C.category_id = AR.category_id
    -> WHERE C.name = 'Painting'
    -> GROUP BY A.name, A.artist_id
    -> ORDER BY A.artist_id;
+-------------------+--------------+
| Artist_name       | nof_artworks |
+-------------------+--------------+
| Pablo Picasso     |            1 |
| Vincent van Gogh  |            1 |
| Leonardo da Vinci |            1 |
+-------------------+--------------+
3 rows in set (0.00 sec)
```

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

```
mysql> SELECT AR.title AS NameofArtwork,
    -> A.name AS ArtistName,
    -> C.name AS Category
    -> FROM Artworks AR
    -> JOIN Artists A ON A.artist_id = AR.artist_id
    -> JOIN Categories C ON C.category_id = AR.category_id
    -> JOIN ExhibitionArtworks EA ON EA.artwork_id = AR.artwork_id
    -> JOIN Exhibitions E ON E.exhibition_id = EA.exhibition_id
    -> WHERE E.title = 'Modern Art Masterpieces';
+---------------+-------------------+----------+
| NameofArtwork | ArtistName        | Category |
+---------------+-------------------+----------+
| Starry Night  | Vincent van Gogh  | Painting |
| Mona Lisa     | Leonardo da Vinci | Painting |
| Guernica      | Pablo Picasso     | Painting |
+---------------+-------------------+----------+
3 rows in set (0.00 sec)
```

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

```
mysql>  INSERT INTO Artworks (artwork_id, title, artist_id, category_id, year, description, image_url) VALUES
    -> (4, 'Last Supper', 3, 1, 1495, 'The religious painting by Leonardo da Vinci.', 'last_supper.jpg');
Query OK, 1 row affected (0.02 sec)
```

```
mysql>  INSERT INTO Artworks (artwork_id, title, artist_id, category_id, year, description, image_url) VALUES
    -> (5, 'Salvator Mundi', 3, 1, 1500, 'The celestial sphere of the heavens by Leonardo da Vinci.', 'salvador_mundi.jpg');
Query OK, 1 row affected (0.01 sec)

mysql> SELECT A.artist_id,
    -> A.name AS Artistname,
    -> COUNT(AR.artwork_id) AS nofArtwork
    -> FROM Artists A
    -> JOIN Artworks AR ON AR.artist_id = A.artist_id
    -> GROUP BY A.artist_id, A.name
    -> HAVING COUNT(AR.artwork_id)>2;
+-----------+-------------------+------------+
| artist_id | Artistname        | nofArtwork |
+-----------+-------------------+------------+
|         3 | Leonardo da Vinci |          3 |
+-----------+-------------------+------------+
1 row in set (0.00 sec)
```

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

```
mysql> SELECT AR.title AS Artworktitle
    -> FROM Artworks AR
    -> JOIN ExhibitionArtworks EA ON AR.Artwork_id = EA.artwork_id
    -> JOIN Exhibitions E ON E.exhibition_id = EA.exhibition_id
    -> WHERE E.title IN ('Modern Art Masterpieces', 'Renaissance Art')
    -> GROUP BY AR.artwork_id, AR.title
    -> HAVING COUNT(DISTINCT E.exhibition_id) = 2;
+--------------+
| Artworktitle |
+--------------+
| Mona Lisa    |
+--------------+
1 row in set (0.00 sec)
```

7. Find the total number of artworks in each category

```
mysql> SELECT c.name AS CategoryName,
    -> COUNT(ar.artwork_id) AS TotalArtworks
    -> FROM Categories c
    -> LEFT JOIN Artworks ar ON c.category_id = ar.category_id
    -> GROUP BY c.category_id, c.name;
+--------------+---------------+
| CategoryName | TotalArtworks |
+--------------+---------------+
| Painting     |             5 |
| Sculpture    |             0 |
| Photography  |             0 |
+--------------+---------------+
3 rows in set (0.00 sec)
```

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

```
mysql>  INSERT INTO Artworks (artwork_id, title, artist_id, category_id, year, description, image_url) VALUES
    -> (6, 'Vitruvian Man', 3, 1, 1490, 'Illustrates Vitruvius's theory of an ideal human by Leonardo da Vinci.', 'vitruvian_man.jpg');
Query OK, 1 row affected (0.01 sec)

mysql> SELECT a.name AS ArtistName,
    -> COUNT(ar.artwork_id) AS nofArtwork
    -> FROM Artists a
    -> JOIN Artworks ar ON ar.artist_id = a.artist_id
    -> GROUP BY a.artist_id, a.name
    -> HAVING COUNT(ar.artwork_id)>3;
+-------------------+------------+
| ArtistName        | nofArtwork |
+-------------------+------------+
| Leonardo da Vinci |          4 |
+-------------------+------------+
1 row in set (0.00 sec)
```

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

```
mysql> SELECT ar.artwork_id,
    -> ar.title AS Artworktitle,
    -> a.name AS artistname,
    -> a.nationality
    -> FROM Artworks ar
    -> JOIN Artists a ON a.artist_id = ar.artist_id
    -> WHERE a.nationality = 'Spanish';
+------------+--------------+---------------+-------------+
| artwork_id | Artworktitle | artistname    | nationality |
+------------+--------------+---------------+-------------+
|          3 | Guernica     | Pablo Picasso | Spanish     |
+------------+--------------+---------------+-------------+
1 row in set (0.00 sec)
```

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

```
mysql> SELECT e.exhibition_id,
    -> e.title AS ExhibitionTitle,
    -> e.start_date,
    -> e.end_date,
    -> e.description
    -> FROM Exhibitions e
    -> JOIN ExhibitionArtworks ea ON e.exhibition_id = e.exhibition_id
    -> JOIN Artworks ar ON ea.artwork_id = ar.artwork_id
    -> JOIN Artists a ON ar.artist_id = a.artist_id
    -> WHERE a.name IN('Vincent van Gogh', 'Leonardo da Vinci')
    -> GROUP BY e.exhibition_id, e.title, e.start_date, e.end_date, e.description
    -> HAVING COUNT(DISTINCT a.artist_id) = 2;
+---------------+------------------------+------------+------------+------------------------------------------+
| exhibition_id | ExhibitionTitle        | start_date | end_date   | 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)
```

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

```
mysql> SELECT ar.artwork_id,
    -> ar.title AS ArtworkTitle,
    -> a.name AS ArtistName,
    -> c.name AS CategoryName
    -> FROM Artworks ar
    -> JOIN Artists a ON ar.artist_id = a.artist_id
    -> JOIN Categories c ON ar.category_id = c.category_id
    -> WHERE ar.artwork_id NOT IN (
    -> SELECT artwork_id FROM ExhibitionArtworks);
+------------+----------------+-------------------+--------------+
| artwork_id | ArtworkTitle   | ArtistName        | CategoryName |
+------------+----------------+-------------------+--------------+
|          4 | Last Supper    | Leonardo da Vinci | Painting     |
|          5 | Salvator Mundi | Leonardo da Vinci | Painting     |
+------------+----------------+-------------------+--------------+
2 rows in set (0.00 sec)
```

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

```
mysql> INSERT INTO Artworks (artwork_id, title, artist_id, category_id, year, description, image_url)
    -> VALUES (7, 'Man with Lamb', 1, 2, 1990, 'Illustrates a symbol of humanism by Pablo Picasso.', 'man_with_lamb.jpg');
Query OK, 1 row affected (0.01 sec)

mysql> INSERT INTO Artworks (artwork_id, title, artist_id, category_id, year, description, image_url)
    -> VALUES (8, 'Self Portrait', 1, 3, 1901, 'Illustrates a himself by Pablo Picasso.', 'photo.jpg');
Query OK, 1 row affected (0.00 sec)
```

```
mysql> SELECT a.artist_id,
    -> a.name AS artistname
    -> FROM Artists a
    -> JOIN Artworks ar ON a.artist_id = ar.artist_id
    -> JOIN Categories c ON c.category_id = ar.category_id
    -> GROUP BY a.artist_id, a.name
    -> HAVING COUNT(DISTINCT c.category_id) = (
    -> SELECT COUNT(*) FROM Categories);
+-----------+---------------+
| artist_id | artistname    |
+-----------+---------------+
|         1 | Pablo Picasso |
+-----------+---------------+
1 row in set (0.02 sec)
```

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

```
mysql> SELECT c.category_id,
    -> c.name AS categoryname,
    -> COUNT(ar.artwork_id) AS totalArtwork
    -> FROM Categories c
    -> LEFT JOIN Artworks ar ON ar.category_id = c.category_id
    -> GROUP BY c.category_id,c.name;
+-------------+--------------+--------------+
| category_id | categoryname | totalArtwork |
+-------------+--------------+--------------+
|           1 | Painting     |            6 |
|           2 | Sculpture    |            1 |
|           3 | Photography  |            1 |
+-------------+--------------+--------------+
3 rows in set (0.00 sec)
```

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

```
mysql> SELECT a.artist_id,
    -> a.name AS artistName,
    -> COUNT(ar.artwork_id) AS NofArtwork
    -> FROM Artists a
    -> JOIN Artworks ar ON a.artist_id = ar.artist_id
    -> GROUP BY a.artist_id, a.name
    -> HAVING COUNT(ar.artist_id)>2;
+-----------+-------------------+------------+
| artist_id | artistName        | NofArtwork |
+-----------+-------------------+------------+
|         1 | Pablo Picasso     |          3 |
|         3 | Leonardo da Vinci |          4 |
+-----------+-------------------+------------+
2 rows in set (0.00 sec)
```

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

```
mysql> SELECT c.category_id,
    -> c.name AS categoryname,
    -> AVG(ar.year) AS averageyear
    -> FROM Categories c
    -> JOIN Artworks ar ON c.category_id = ar.category_id
    -> GROUP BY c.category_id, c.name
    -> HAVING COUNT(ar.artwork_id) > 1;
+-------------+--------------+-------------+
| category_id | categoryname | averageyear |
+-------------+--------------+-------------+
|           1 | Painting     |   1635.6667 |
+-------------+--------------+-------------+
1 row in set (0.00 sec)
```

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

```
mysql> SELECT ar.artwork_id,
    -> ar.title AS artworktitle,
    -> a.name AS Artistname,
    -> c.name AS categoryname
    -> FROM Artworks ar
    -> JOIN Artists a ON ar.artist_id = a.artist_id
    -> JOIN Categories c ON c.category_id = ar.category_id
    -> JOIN ExhibitionArtworks ea ON ea.artwork_id = ar.artwork_id
    -> JOIN Exhibitions e ON ea.exhibition_id = e.exhibition_id
    -> WHERE e.title = 'Modern Art Masterpieces';
+-------------+--------------+-------------------+--------------+
| artwork_id  | artworktitle | Artistname        | categoryname |
+-------------+--------------+-------------------+--------------+
|           1 | Starry Night | Vincent van Gogh  | Painting     |
|           2 | Mona Lisa    | Leonardo da Vinci | Painting     |
|           3 | Guernica     | Pablo Picasso     | Painting     |
+-------------+--------------+-------------------+--------------+
3 rows in set (0.00 sec)
```

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

```
mysql> SELECT c.category_id,
    -> c.name AS category_name,
    ->  AVG(ar.year) AS category_avg_year
    -> FROM Categories c
    -> JOIN Artworks ar ON c.category_id = ar.category_id
    -> GROUP BY c.category_id, c.name
    -> HAVING AVG(ar.year) > (SELECT AVG(year) FROM Artworks);
+-------------+---------------+-------------------+
| category_id | category_name | category_avg_year |
+-------------+---------------+-------------------+
|           2 | Sculpture     |         1990.0000 |
|           3 | Photography   |         1901.0000 |
+-------------+---------------+-------------------+
2 rows in set (0.01 sec)
```

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

```
mysql> SELECT ar.artwork_id,
    -> ar.title AS artworktitle,
    -> a.name AS artistname,
    -> c.name AS categoryname
    -> FROM Artworks ar
    -> JOIN Artists a ON ar.artist_id = a.artist_id
    -> JOIN Categories c ON ar.category_id = c.category_id
    -> LEFT JOIN ExhibitionArtworks ea ON ar.artwork_id = ea.artwork_id
    -> WHERE ea.exhibition_id IS NULL;
+------------+----------------+-------------------+--------------+
| artwork_id | artworktitle   | artistname        | categoryname |
+------------+----------------+-------------------+--------------+
|          4 | Last Supper    | Leonardo da Vinci | Painting     |
|          5 | Salvator Mundi | Leonardo da Vinci | Painting     |
|          7 | Man with Lamb  | Pablo Picasso     | Sculpture    |
|          8 | Self Portrait  | Pablo Picasso     | Photography  |
+------------+----------------+-------------------+--------------+
4 rows in set (0.00 sec)
```

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

```
mysql> SELECT a.artist_id,
    -> a.name AS artistname,
    -> c.name AS categoryname
    -> FROM Artists a
    -> JOIN Artworks ar ON ar.artist_id = a.artist_id
    -> JOIN Categories c ON ar.category_id = c.category_id
    -> WHERE ar.title = 'Mona Lisa';
+-----------+-------------------+--------------+
| artist_id | artistname        | categoryname |
+-----------+-------------------+--------------+
|         3 | Leonardo da Vinci | Painting     |
+-----------+-------------------+--------------+
1 row in set (0.00 sec)
```

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

```
mysql> SELECT a.artist_id,
    -> a.name AS artistname,
    -> COUNT(ar.artwork_id) AS nofartwork
    -> FROM Artists a
    -> LEFT JOIN Artworks ar ON a.artist_id = ar.artist_id
    -> GROUP BY a.artist_id, a.name
    -> ORDER BY nofartwork DESC;
+-----------+-------------------+------------+
| artist_id | artistname        | nofartwork |
+-----------+-------------------+------------+
|         3 | Leonardo da Vinci |          4 |
|         1 | Pablo Picasso     |          3 |
|         2 | Vincent van Gogh  |          1 |
+-----------+-------------------+------------+
3 rows in set (0.00 sec)
```