

Coding Challenge

Virtual Art Gallery

Creating the database named "Virtualartgallery":

```
mysql> create database virtualartgallery;  
Query OK, 1 row affected (0.02 sec)
```

Use the database:

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

Creating the artists table:

```
mysql> create table artists (  
    -> artist_id int primary key,  
    -> name varchar(255) not null,  
    -> biography text,  
    -> nationality varchar(100));  
Query OK, 0 rows affected (0.07 sec)
```

Field	Type	Null	Key	Default	Extra
artist_id	int	NO	PRI	NULL	
name	varchar(255)	NO		NULL	
biography	text	YES		NULL	
nationality	varchar(100)	YES		NULL	

4 rows in set (0.01 sec)

Creating the categories table:

```
mysql> create table categories (  
    -> category_id int primary key,  
    -> name varchar(100) not null);  
Query OK, 0 rows affected (0.03 sec)
```

Field	Type	Null	Key	Default	Extra
category_id	int	NO	PRI	NULL	
name	varchar(100)	NO		NULL	

2 rows in set (0.00 sec)

Creating the Artworks table:

```
mysql> create table artworks (  
-> artwork_id int primary key,  
-> title varchar(255) not null,  
-> artist_id int,  
-> category_id int,  
-> year int,  
-> description text,  
-> image_url varchar(255),  
-> Foreign key(artist_id) references artists(artist_id),  
-> Foreign key(category_id) references categories(category_id));  
Query OK, 0 rows affected (0.10 sec)
```

Field	Type	Null	Key	Default	Extra
artwork_id	int	NO	PRI	NULL	
title	varchar(255)	NO		NULL	
artist_id	int	YES	MUL	NULL	
category_id	int	YES	MUL	NULL	
year	int	YES		NULL	
description	text	YES		NULL	
image_url	varchar(255)	YES		NULL	

7 rows in set (0.00 sec)

Creating exhibitions table:

```
mysql> create table exhibitions (  
-> exhibition_id int primary key,  
-> title varchar(255) not null,  
-> start_date date,  
-> end_date date,  
-> description text);  
Query OK, 0 rows affected (0.03 sec)
```

Field	Type	Null	Key	Default	Extra
exhibition_id	int	NO	PRI	NULL	
title	varchar(255)	NO		NULL	
start_date	date	YES		NULL	
end_date	date	YES		NULL	
description	text	YES		NULL	

5 rows in set (0.00 sec)

Creating a table to associate artworks with exhibitions:

```
mysql> create table exhibition_artworks (
  -> 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)
```

Field	Type	Null	Key	Default	Extra
exhibition_id	int	NO	PRI	NULL	
artwork_id	int	NO	PRI	NULL	

2 rows in set (0.00 sec)

Inserting sample data into the artists table:

```
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
```

artist_id	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)

Inserting sample data into the Categories table:

```
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
```

category_id	name
1	Painting
2	Sculpture
3	Photography

3 rows in set (0.00 sec)

Inserting sample data into the artworks table:

```
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
```

artwork_id	title	artist_id	category_id	year	description	image_url
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)

Inserting sample data into the exhibitions table:

```
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

exhibition_id	title	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)

Inserting artworks into exhibitions:

```
mysql> insert into exhibition_artworks (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
```

exhibition_id	artwork_id
1	1
1	2
2	2
1	3

4 rows in set (0.00 sec)

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.

```
mysql> select name, (select count(*) from artworks where artists.artist_id = artworks.artist_id) as artwork_count
-> from artists
-> order by artwork_count desc;
+-----+-----+
| name          | artwork_count |
+-----+-----+
| Pablo Picasso | 1             |
| Vincent van Gogh | 1           |
| Leonardo da Vinci | 1           |
+-----+-----+
3 rows in set (0.01 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 title
-> from artworks
-> where artist_id in (
->     select artist_id from artists where nationality in ('Spanish', 'Dutch')
-> )
-> order by year asc;
+-----+
| title      |
+-----+
| Starry Night |
| Guernica    |
+-----+
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 name,
->     (select count(*) from artworks where artists.artist_id = artworks.artist_id and category_id = (select category_id from categories where name = 'Painting')) as painting_count
-> from artists;
+-----+-----+
| name          | painting_count |
+-----+-----+
| Pablo Picasso | 1             |
| Vincent van Gogh | 1           |
| Leonardo da Vinci | 1           |
+-----+-----+
3 rows in set (0.01 sec)
```

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

```
mysql> select artworks.title,
-> (select artists.name from artists where artists.artist_id = artworks.artist_id) as artist,
-> (select categories.name from categories where categories.category_id = artworks.category_id) as category
-> from artworks
-> where artworks.artwork_id in (
-> select exhibition_artworks.artwork_id from exhibition_artworks where exhibition_artworks.exhibition_id in (
-> select exhibitions.exhibition_id from exhibitions where exhibitions.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)

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

```
mysql> select name
-> from artists
-> where artist_id in (
-> select artist_id from artworks group by artist_id having count(*) > 2
-> );
```

Empty set (0.00 sec)

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

```
mysql> select title
-> from artworks
-> where artwork_id in (
-> select artwork_id from exhibition_artworks where exhibition_id in (
-> select exhibition_id from exhibitions where title = 'Modern Art Masterpieces'
-> )
-> ) and artwork_id in (
-> select artwork_id from exhibition_artworks where exhibition_id in (
-> select exhibition_id from exhibitions where title = 'Renaissance Art'
-> )
-> );
```

title
Mona Lisa

1 row in set (0.00 sec)

7) Find the total number of artworks in each category

```
mysql> select name, (select count(*) from artworks where category_id = categories.category_id) as artwork_count
-> from categories;
```

name	artwork_count
Painting	3
Sculpture	0
Photography	0

3 rows in set (0.00 sec)

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

```
mysql> select name
-> from artists
-> where artist_id in (
-> select artist_id from artworks group by artist_id having count(*) > 3
-> );
Empty set (0.00 sec)
```

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

```
mysql> select title
-> from artworks
-> where artist_id in (
-> select artist_id from artists where nationality = 'Spanish'
-> );
+-----+
| title |
+-----+
| Guernica |
+-----+
1 row in set (0.00 sec)
```

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

```
mysql> select title
-> from exhibitions
-> where exhibition_id in (
-> select exhibition_id from exhibition_artworks where artwork_id in (
-> select artwork_id from artworks where artist_id in (
-> select artist_id from artists where name in ('Vincent van Gogh', 'Leonardo da Vinci')
-> ) group by artwork_id having count(*) = 2
-> )
-> );
Empty set (0.00 sec)
```

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

```
mysql> select title
-> from artworks
-> where artwork_id not in (
-> select artwork_id from exhibition_artworks
-> );
Empty set (0.00 sec)
```

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

```
mysql> select name
-> from artists
-> where (
-> select count(distinct category_id)
-> from artworks
-> where artists.artist_id = artworks.artist_id) = (select count(*)
-> from categories);
Empty set (0.01 sec)
```

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

```
mysql> select categories.name, count(artworks.artwork_id) as total_artworks
-> from categories
-> left join artworks on categories.category_id = artworks.category_id
-> group by categories.name;
+-----+-----+
| name      | total_artworks |
+-----+-----+
| Painting  | 3              |
| Sculpture | 0              |
| Photography | 0              |
+-----+-----+
3 rows in set (0.00 sec)
```

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

```
mysql> select name
-> from artists
-> where (
-> select count(*)
-> from artworks
-> where artists.artist_id = artworks.artist_id) > 2;
Empty 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 (select name from categories where category_id = artworks.category_id) as category, avg(year) as average_year from artworks
-> where category_id in (select category_id from artworks
-> group by category_id having count(*) > 1)
-> group by category;
+-----+-----+
| category | average_year |
+-----+-----+
| Painting | 1776.3333    |
+-----+-----+
1 row in set (0.00 sec)
```

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

```
mysql> select title from artworks
-> where artwork_id in (select artwork_id from exhibition_artworks
-> where exhibition_id = (select exhibition_id from exhibitions
-> where title = 'Modern Art Masterpieces' )
-> );
+-----+
| title      |
+-----+
| Starry Night |
| Mona Lisa  |
| Guernica    |
+-----+
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 (select name from categories where category_id = artworks.category_id) as category, avg(year) as category_average_year
from artworks
-> group by category_id having avg(year) > (select avg(year) from artworks);
Empty set (0.00 sec)
```

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

```
mysql> select title from artworks
-> where artwork_id not in ( select artwork_id
-> from exhibition_artworks);
Empty set (0.00 sec)
```

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

```
mysql> select name from artists
-> where artist_id in (select artist_id
-> from artworks where category_id = (select category_id
-> from artworks where title = 'Mona Lisa' )
-> );
```

name
Pablo Picasso
Vincent van Gogh
Leonardo da Vinci

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

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

```
mysql> select name, (select count(*) from artworks
-> where artists.artist_id = artworks.artist_id) as artwork_count
-> from artists;
```

name	artwork_count
Pablo Picasso	1
Vincent van Gogh	1
Leonardo da Vinci	1

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