

# Coding Challenge – Virtual Art Gallery

## Task-1: Database Design

1. Create the database named "Art\_Gallery"

```
[mysql]> CREATE DATABASE Art_Gallery;
Query OK, 1 row affected (0.06 sec)

[mysql]> Show databases;
+-----+
| Database |
+-----+
| Art_Gallery |
| Courier_Manage |
| information_schema |
| knapp |
| mysql |
| performance_schema |
| sys |
| TechShop |
+-----+
8 rows in set (0.03 sec)

[mysql]> USE Art_Gallery;
Database changed
mysql>
```

2. Define the schema for the tables:

- i) Create the Artists table:

```
[mysql]> CREATE TABLE Artists (
    -> ArtistID INT PRIMARY KEY,
    -> Name VARCHAR(255) NOT NULL,
    -> Biography TEXT,
    -> Nationality VARCHAR(100));
Query OK, 0 rows affected (0.04 sec)

[mysql]> show tables;
+-----+
| Tables_in_art_gallery |
+-----+
| Artists |
+-----+
1 row in set (0.00 sec)

mysql>
```

ii) Create the Categories table:

```
tanaygeet — mysql -u root -p — 89x29
mysql> CREATE TABLE Categories (
    -> CategoryID INT PRIMARY KEY,
    -> Name VARCHAR(100) NOT NULL;
[   -> Query OK, 0 rows affected (0.01 sec)

mysql> show tables;
+-----+
| Tables_in_art_gallery |
+-----+
| Artists                |
| Categories              |
+-----+
2 rows in set (0.00 sec)

mysql>
```

iii) Create the Artworks table:

```
tanaygeet — mysql -u root -p — 89x29
mysql> 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));
Query OK, 0 rows affected (0.06 sec)

mysql> show tables;
+-----+
| Tables_in_art_gallery |
+-----+
| Artists                |
| Artworks               |
| Categories              |
+-----+
3 rows in set (0.01 sec)

mysql>
mysql>
mysql>
mysql>
mysql>
mysql>
```

iv) Create the Exhibitions table:

```
tanaygeet - mysql -u root -p - 89x29
mysql> CREATE TABLE Exhibitions (
    -> ExhibitionID INT PRIMARY KEY,
    -> Title VARCHAR(255) NOT NULL,
    -> StartDate DATE,
    -> EndDate DATE,
    -> Description TEXT);
Query OK, 0 rows affected (0.02 sec)

[mysql> show tables;
+-----+
| Tables_in_art_gallery |
+-----+
| Artists                |
| Artworks               |
| Categories             |
| Exhibitions            |
+-----+
4 rows in set (0.01 sec)

mysql>
```

v) Create a table to associate artworks with exhibitions:

```
tanaygeet - mysql -u root -p - 89x29
mysql> CREATE TABLE ExhibitionArtworks (
    -> ExhibitionID INT,
    -> ArtworkID INT,
    -> PRIMARY KEY (ExhibitionID, ArtworkID),
    -> FOREIGN KEY (ExhibitionID) REFERENCES Exhibitions (ExhibitionID),
    -> FOREIGN KEY (ArtworkID) REFERENCES Artworks (ArtworkID));
Query OK, 0 rows affected (0.02 sec)

[mysql> show tables;
+-----+
| Tables_in_art_gallery |
+-----+
| Artists                |
| Artworks               |
| Categories             |
| ExhibitionArtworks   |
| Exhibitions            |
+-----+
5 rows in set (0.00 sec)

mysql>
```

3. Insert sample data into the tables:

i) Insert data into the Artists table:

```
tanaygeet — mysql -u root -p — 89x29
mysql> 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');
Query OK, 3 rows affected (0.01 sec)
Records: 3  Duplicates: 0  Warnings: 0

[mysql> select * from Artists;
+----+----+----+
| ArtistID | 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)

mysql> ]
```

ii) Insert data into the Categories table:

```
tanaygeet — mysql -u root -p — 89x29
mysql> INSERT INTO Categories (CategoryID, Name) VALUES
-> (1, 'Painting'),
-> (2, 'Sculpture'),
-> (3, 'Photography');
Query OK, 3 rows affected (0.01 sec)
Records: 3  Duplicates: 0  Warnings: 0

[mysql> select * from Categories;
+----+----+
| CategoryID | Name        |
+----+----+
|      1 | Painting   |
|      2 | Sculpture  |
|      3 | Photography |
+----+----+
3 rows in set (0.01 sec)

mysql> ]
```

### iii) Insert data into the Artworks table:

```
tanayeet — mysql -u root -p — 145x30
mysql> 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'),
-> (4, 'The Weeping Woman', 1, 1, 1937, 'Another famous painting by Picasso.', 'weeping_woman.jpg'),
-> (5, 'Sculpture of Peace', 1, 2, 1945, 'A sculpture by Picasso.', 'sculpture_peace.jpg'),
-> (6, 'La Vie', 1, 1, 1903, 'A famous blue period painting by Picasso.', 'la_vie.jpg'),
-> (7, 'Les Demoiselles d'Avignon', 1, 1, 1907, 'A revolutionary Picasso painting.', 'avignon.jpg'),
-> (8, 'Unseen Beauty', 3, 1, 1505, 'A lesser-known painting by Leonardo da Vinci.', 'unseen_beauty.jpg'),
-> (9, 'The Persistence of Memory', 1, 1, 1931, 'A surreal painting by Salvador Dali.', 'persistence_memory.jpg');
Query OK, 9 rows affected (0.01 sec)
Records: 9  Duplicates: 0  Warnings: 0
mysql> select * from Artworks;
+-----+-----+-----+-----+-----+-----+-----+
| ArtworkID | Title | ArtistID | CategoryID | Year | Description | ImageURL |
+-----+-----+-----+-----+-----+-----+-----+
| 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 |
| 4 | The Weeping Woman | 1 | 1 | 1937 | Another famous painting by Picasso. | weeping_woman.jpg |
| 5 | Sculpture of Peace | 1 | 2 | 1945 | A sculpture by Picasso. | sculpture_peace.jpg |
| 6 | La Vie | 1 | 1 | 1903 | A famous blue period painting by Picasso. | la_vie.jpg |
| 7 | Les Demoiselles d'Avignon | 1 | 1 | 1907 | A revolutionary Picasso painting. | avignon.jpg |
| 8 | Unseen Beauty | 3 | 1 | 1505 | A lesser-known painting by Leonardo da Vinci. | unseen_beauty.jpg |
| 9 | The Persistence of Memory | 1 | 1 | 1931 | A surreal painting by Salvador Dali. | persistence_memory.jpg |
+-----+-----+-----+-----+-----+-----+-----+
9 rows in set (0.00 sec)
mysql>
```

### iv) Insert data into the Exhibitions table:

```
tanayeet — mysql -u root -p — 145x30
mysql> 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.');
Query OK, 2 rows affected (0.02 sec)
Records: 2  Duplicates: 0  Warnings: 0
mysql> select * from Exhibitions;
+-----+-----+-----+-----+
| ExhibitionID | Title | StartDate | EndDate | 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)
mysql>
```

v) Insert artworks into exhibitions:

```
tanaygeet — mysql -u root -p — 72x30
mysql> INSERT INTO ExhibitionArtworks (ExhibitionID, ArtworkID) VALUES
-> (1, 1),
-> (1, 2),
-> (1, 3),
-> (2, 2),
-> (2, 1);
Query OK, 5 rows affected (0.01 sec)
Records: 5  Duplicates: 0  Warnings: 0

mysql> select * from ExhibitionArtworks;
+-----+-----+
| ExhibitionID | ArtworkID |
+-----+-----+
|          1 |        1 |
|          2 |        1 |
|          1 |        2 |
|          2 |        2 |
|          1 |        3 |
+-----+-----+
5 rows in set (0.00 sec)

mysql>
```

## Task-2: Complete all the following questions

Solve the following queries for the Schema.

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:

```
tanaygeet — mysql -u root -p — 84x30
mysql> SELECT A.Name, COUNT(Art.ArtworkID) AS ArtworkCount
-> FROM Artists A
-> LEFT JOIN Artworks Art ON A.ArtistID = Art.ArtistID
-> GROUP BY A.Name
-> ORDER BY ArtworkCount DESC;
+-----+-----+
| Name | ArtworkCount |
+-----+-----+
| Pablo Picasso | 6 |
| Leonardo da Vinci | 2 |
| Vincent van Gogh | 1 |
+-----+-----+
3 rows in set (0.02 sec)

mysql> █
```

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

```
tanaygeet — mysql -u root -p — 84x26
mysql> SELECT Art.Title
-> FROM Artworks Art
-> JOIN Artists A ON Art.ArtistID = A.ArtistID
-> WHERE A.Nationality IN ('Spanish', 'Dutch')
-> ORDER BY Art.Year ASC;
+-----+
| Title |
+-----+
| Starry Night |
| La Vie |
| Les Demoiselles d'Avignon |
| The Persistence of Memory |
| Guernica |
| The Weeping Woman |
| Sculpture of Peace |
+-----+
7 rows in set (0.01 sec)

mysql> █
```

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

```
tanaygeet — mysql -u root -p — 84x26
mysql> SELECT A.Name, COUNT(Art.ArtworkID) AS ArtworkCount
-> FROM Artists A
-> JOIN Artworks Art ON A.ArtistID = Art.ArtistID
-> JOIN Categories C ON Art.CategoryID = C.CategoryID
-> WHERE C.Name = 'Painting'
-> GROUP BY A.Name;
+-----+
| Name      | ArtworkCount |
+-----+
| Vincent van Gogh | 1 |
| Leonardo da Vinci | 2 |
| Pablo Picasso | 5 |
+-----+
3 rows in set (0.00 sec)

mysql>
```

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

```
tanaygeet — mysql -u root -p — 84x26
mysql> SELECT Art.Title, A.Name AS ArtistName, C.Name AS CategoryName
-> FROM ExhibitionArtworks EA
-> JOIN Artworks Art ON EA.ArtworkID = Art.ArtworkID
-> JOIN Artists A ON Art.ArtistID = A.ArtistID
-> JOIN Categories C ON Art.CategoryID = C.CategoryID
-> JOIN Exhibitions E ON EA.ExhibitionID = E.ExhibitionID
-> WHERE E.Title = 'Modern Art Masterpieces';
+-----+
| Title      | ArtistName     | CategoryName |
+-----+
| Starry Night | Vincent van Gogh | Painting    |
| Mona Lisa   | Leonardo da Vinci | Painting    |
| Guernica    | Pablo Picasso | Painting    |
+-----+
3 rows in set (0.00 sec)

mysql>
```

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

```
tanaygeet — mysql -u root -p — 84x26
mysql> SELECT A.Name
    -> FROM Artists A
    -> JOIN Artworks Art ON A.ArtistID = Art.ArtistID
    -> GROUP BY A.Name
    -> HAVING COUNT(Art.ArtworkID) > 2;
+-----+
| Name      |
+-----+
| Pablo Picasso |
+-----+
1 row in set (0.00 sec)

mysql> █
```

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

```
tanaygeet — mysql -u root -p — 84x26
mysql> SELECT Art.Title
    -> FROM ExhibitionArtworks EA1
    -> JOIN ExhibitionArtworks EA2 ON EA1.ArtworkID = EA2.ArtworkID
    -> JOIN Artworks Art ON EA1.ArtworkID = Art.ArtworkID
    -> JOIN Exhibitions E1 ON EA1.ExhibitionID = E1.ExhibitionID
    -> JOIN Exhibitions E2 ON EA2.ExhibitionID = E2.ExhibitionID
    -> WHERE E1.Title = 'Modern Art Masterpieces' AND E2.Title = 'Renaissance Art';
+-----+
| Title      |
+-----+
| Starry Night |
| Mona Lisa   |
+-----+
2 rows in set (0.00 sec)

mysql> █
```

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

```
tanaygeet — mysql -u root -p — 84x26
mysql> SELECT C.Name, COUNT(Art.ArtworkID) AS ArtworkCount
   -> FROM Categories C
   -> LEFT JOIN Artworks Art ON C.CategoryID = Art.CategoryID
   -> GROUP BY C.Name;
+-----+-----+
| Name      | ArtworkCount |
+-----+-----+
| Painting    |          8 |
| Sculpture   |          1 |
| Photography |          0 |
+-----+-----+
3 rows in set (0.00 sec)

mysql> █
```

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

```
tanaygeet — mysql -u root -p — 84x26
mysql> SELECT A.Name
   -> FROM Artists A
   -> JOIN Artworks Art ON A.ArtistID = Art.ArtistID
   -> GROUP BY A.Name
   -> HAVING COUNT(Art.ArtworkID) > 3;
+-----+
| Name      |
+-----+
| Pablo Picasso |
+-----+
1 row in set (0.00 sec)

mysql> █
```

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

```
tanaygeet — mysql -u root -p — 84x26
mysql> SELECT Art.Title
   -> FROM Artworks Art
   -> JOIN Artists A ON Art.ArtistID = A.ArtistID
   -> WHERE A.Nationality = 'Spanish';
+-----+
| Title
+-----+
| Guernica
| The Weeping Woman
| Sculpture of Peace
| La Vie
| Les Demoiselles d'Avignon
| The Persistence of Memory
+-----+
6 rows in set (0.01 sec)

mysql> █
```

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

```
tanaygeet — mysql -u root -p — 84x26
mysql> SELECT E.Title
   -> FROM Exhibitions E
   -> JOIN ExhibitionArtworks EA ON E.ExhibitionID = EA.ExhibitionID
   -> JOIN Artworks Art ON EA.ArtworkID = Art.ArtworkID
   -> JOIN Artists A ON Art.ArtistID = A.ArtistID
   -> WHERE A.Name IN ('Vincent van Gogh', 'Leonardo da Vinci')
   -> GROUP BY E.Title
   -> HAVING COUNT(DISTINCT A.ArtistID) = 2;
+-----+
| Title
+-----+
| Modern Art Masterpieces
| Renaissance Art
+-----+
2 rows in set (0.01 sec)

mysql> █
```

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

```
tanaygeet — mysql -u root -p — 84x26

mysql> SELECT Art.Title
-> FROM Artworks Art
-> LEFT JOIN ExhibitionArtworks EA ON Art.ArtworkID = EA.ArtworkID
[ -> WHERE EA.ExhibitionID IS NULL;
+-----+
| Title
+-----+
| The Weeping Woman
| Sculpture of Peace
| La Vie
| Les Demoiselles d'Avignon
| Unseen Beauty
| The Persistence of Memory
+-----+
6 rows in set (0.00 sec)

mysql>
```

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

```
tanaygeet — mysql -u root -p — 84x26

mysql> SELECT A.Name
-> FROM Artists A
-> JOIN Artworks Art ON A.ArtistID = Art.ArtistID
-> JOIN Categories C ON Art.CategoryID = C.CategoryID
-> GROUP BY A.Name
-> HAVING COUNT(DISTINCT Art.CategoryID) = (SELECT COUNT(*) FROM Categories);
Empty set (0.00 sec)

mysql>
```

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

```
tanaygeet — mysql -u root -p — 84x26
mysql> SELECT C.Name, COUNT(Art.ArtworkID) AS ArtworkCount
-> FROM Categories C
-> LEFT JOIN Artworks Art ON C.CategoryID = Art.CategoryID
[ -> GROUP BY C.Name;
+-----+-----+
| Name | ArtworkCount |
+-----+-----+
| Painting | 8 |
| Sculpture | 1 |
| Photography | 0 |
+-----+
3 rows in set (0.00 sec)

mysql> █
```

14. Find the artists who have more than 2 artworks in the gallery: (same as ques 5)

```
tanaygeet — mysql -u root -p — 84x26
mysql> SELECT A.Name
-> FROM Artists A
-> JOIN Artworks Art ON A.ArtistID = Art.ArtistID
-> GROUP BY A.Name
[ -> HAVING COUNT(Art.ArtworkID) > 2;
+-----+
| Name |
+-----+
| Pablo Picasso |
+-----+
1 row in set (0.00 sec)

mysql> █
```

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

```
tanaygeet — mysql -u root -p — 84x26
mysql> SELECT C.Name, AVG(Art.Year) AS AvgYear
-> FROM Categories C
-> JOIN Artworks Art ON C.CategoryID = Art.CategoryID
-> GROUP BY C.Name
[ -> HAVING COUNT(Art.ArtworkID) > 1;
+-----+-----+
| Name      | AvgYear   |
+-----+-----+
| Painting  | 1814.0000 |
+-----+-----+
1 row in set (0.05 sec)

mysql>
```

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

```
tanaygeet — mysql -u root -p — 84x26
mysql> SELECT Art.Title
-> FROM Artworks Art
-> JOIN ExhibitionArtworks EA ON Art.ArtworkID = EA.ArtworkID
-> JOIN Exhibitions E ON EA.ExhibitionID = E.ExhibitionID
[ -> WHERE E.Title = 'Modern Art Masterpieces';
+-----+
| Title    |
+-----+
| Starry Night |
| Mona Lisa   |
| Guernica    |
+-----+
3 rows in set (0.01 sec)

mysql>
```

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

```
tanaygeet — mysql -u root -p — 84x26
mysql> SELECT C.Name
    -> FROM Categories C
    -> JOIN Artworks Art ON C.CategoryID = Art.CategoryID
    -> GROUP BY C.Name
    -> HAVING AVG(Art.Year) > (SELECT AVG(Year) FROM Artworks);
+-----+
| Name   |
+-----+
| Sculpture |
+-----+
1 row in set (0.01 sec)

mysql> █
```

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

```
tanaygeet — mysql -u root -p — 84x26
mysql> SELECT Art.Title
    -> FROM Artworks Art
    -> LEFT JOIN ExhibitionArtworks EA ON Art.ArtworkID = EA.ArtworkID
    -> WHERE EA.ExhibitionID IS NULL;
+-----+
| Title      |
+-----+
| The Weeping Woman |
| Sculpture of Peace |
| La Vie      |
| Les Demoiselles d'Avignon |
| Unseen Beauty |
| The Persistence of Memory |
+-----+
6 rows in set (0.01 sec)

mysql> █
```

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

```
tanaygeet — mysql -u root -p — 89x26

mysql> SELECT A.Name
    -> FROM Artists A
    -> JOIN Artworks Art ON A.ArtistID = Art.ArtistID
    -> WHERE Art.CategoryID = (SELECT CategoryID FROM Artworks WHERE Title = 'Mona Lisa')
;
+-----+
| Name |
+-----+
| Pablo Picasso
| Vincent van Gogh
| Leonardo da Vinci
| Leonardo da Vinci
+-----+
8 rows in set (0.00 sec)

mysql>
```

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

```
tanaygeet — mysql -u root -p — 89x26

mysql> SELECT A.Name, COUNT(Art.ArtworkID) AS ArtworkCount
    -> FROM Artists A
    -> JOIN Artworks Art ON A.ArtistID = Art.ArtistID
    -> GROUP BY A.Name;
+
+-----+-----+
| Name | ArtworkCount |
+-----+-----+
| Pablo Picasso | 6 |
| Vincent van Gogh | 1 |
| Leonardo da Vinci | 2 |
+-----+-----+
3 rows in set (0.00 sec)

mysql>
```