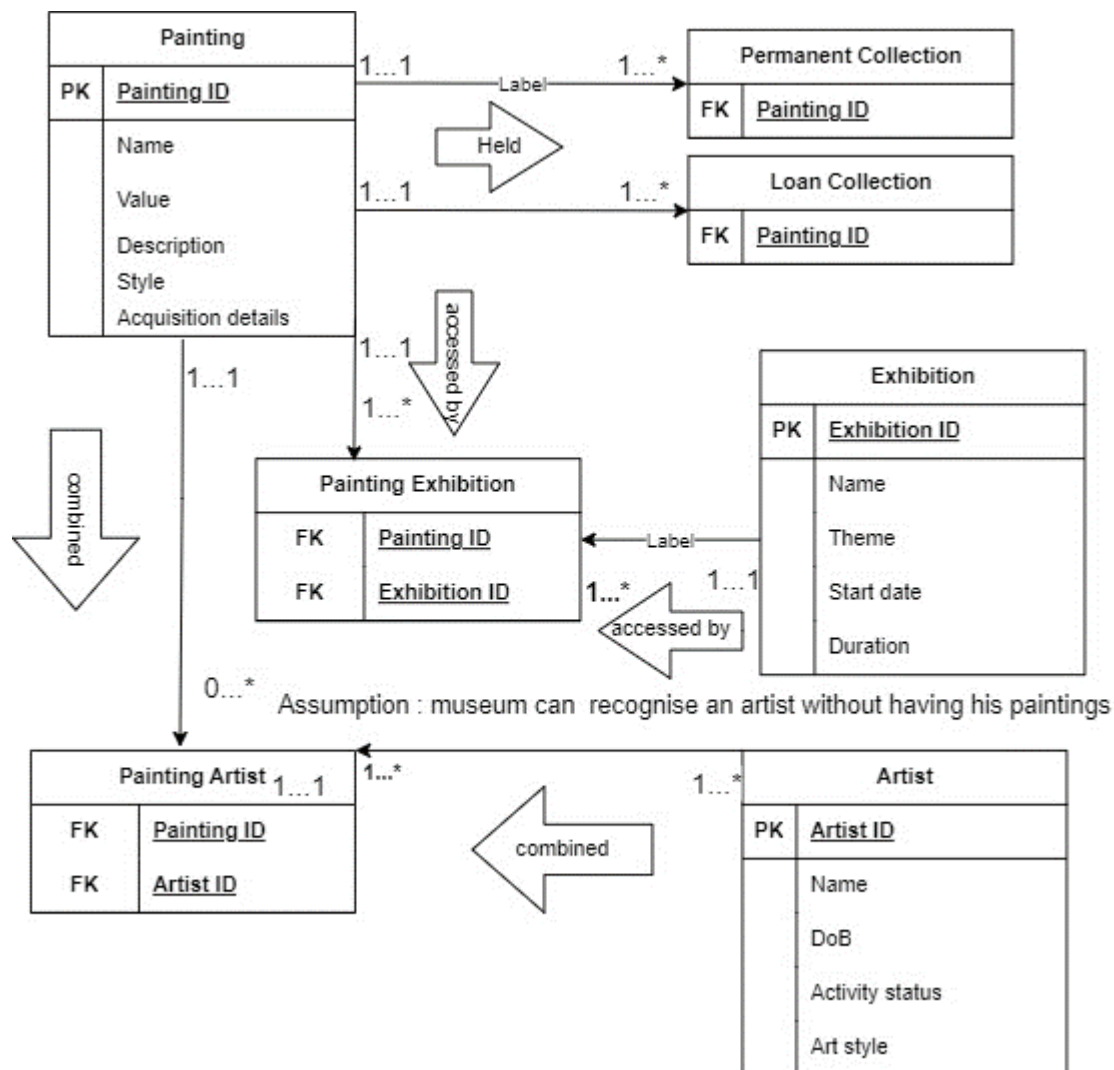# Art Gallery

Scenario

The Art Gallery boasts an impressive collection of paintings, each with its own distinct characteristics. Every painting is carefully catalogued with a unique identification, whenever possible, the artist's attribution, the creation year (if known), a descriptive title, and a detailed description. Additionally, comprehensive details include the paint type (such as oil or watercolours), the underlying material (ranging from paper and canvas to wood), and the artistic style (spanning Modern, Abstract, Impressionism, Expressionism, and Cubism).Paintings in the Gallery's collection are further classified into two categories: those that belong to the permanent collection, owned outright by the museum, with associated information encompassing the date of acquisition, current display status (whether they are exhibited or in storage), and their acquisition cost; and those that are temporarily on loan from external museums. For the latter, relevant details include the lending museum's identity, the date the painting was borrowed, and the anticipated return date. The Gallery meticulously maintains artists' records, capturing essential information including their name, date of birth, date of death (if applicable), country of birth, the artistic epoch they belong to, their primary artistic style, and a descriptive overview. It is assumed that each artist's name is unique. Moreover, the museum orchestrates various exhibitions throughout the year. Each of the exhibitions is defined by a distinctive name, a commencement date, and an end date. These exhibitions are intrinsically linked to the paintings that are on display during their respective timeframes, forming a dynamic and ever-evolving showcase of artistic expression. You have recently joined the Art Gallery as a junior database developer. Your line manager has asked you to design and develop a database system for the problem.

Entities

- Artist: Has a primary key (Client ID), which is needed to identify each individual artist as this PK is unique for every artist.
- Painting: Paintings also have a primary key (Painting ID), identifying each painting
- Exhibition: Each Exhibition also has a primary key (Exhibition ID), identifying each Exhibition
- Loaned collection: Has a foreign key (Painting ID)
- Permanent collection: Has a foreign Key (Painting ID)
- Painting Exhibition: Has two foreign keys (Painting ID, Exhibition ID)
- Painting Artist: Has two foreign keys (Painting ID, Exhibition ID)

Entity Relationship Diagram

Entity	Keys	Attributes	Relationships	Explanation
Artist	PK (Artist ID)	Name Date of Birth Art style Activity status	• Artist-Painting	Description of artists with PK to identify them.
Paintings	PK (Painting ID)	Painting name Painting value Painting description Painting style Acquisition details	• Painting-Exhibition • Painting-loan • Painting-permanent	Description of Paintings with PK.
Exhibition	PK (Exhibition ID)	Exhibition name Exhibition theme Start Date Planned duration	N/A	Description of Exhibition with PK.
Loan collection	FK (Painting ID)	N/A	N/A	Table with FK of Paintings.
Permanent collection	FK (Painting ID)	N/A	N/A	Table with FK of Paintings
Painting Exhibition	FK (Painting ID) FK (Exhibition ID)	N/A	N/A	Composite table with two FKs linking Paintings with Exhibitions.
Painting Artist	FK (Painting ID) FK (Artist ID)	N/A	N/A	Composite table with two FKs linking Paintings with Artists.

Painting

PK	Painting ID
	Name
	Value
	Description
	Style
	Acquisition details

1...1 — Label — 1...*

Held

Permanent Collection

FK	Painting ID

1...1 — 1...*

Loan Collection

FK	Painting ID

accessed by

1...1
1...*

combined

1...1

Exhibition

PK	Exhibition ID
	Name
	Theme
	Start date
	Duration

Painting Exhibition

FK	Painting ID
FK	Exhibition ID

Label — 1...1

1...* accessed by 1...1

0...*

Assumption : museum can recognise an artist without having his paintings

Painting Artist 1...1   1...*

FK	Painting ID
FK	Artist ID

combined

1...*

Artist

PK	Artist ID
	Name
	DoB
	Activity status
	Art style

SQL Table creation script

DROP TABLE IF EXISTS artists;

DROP TABLE IF EXISTS paintings;

DROP TABLE IF EXISTS exhibitions;

DROP TABLE IF EXISTS Lcollecton;

DROP TABLE IF EXISTS Pcollection;

DROP TABLE IF EXISTS Pexhibition;

DROP TABLE IF EXISTS Partist;

CREATE TABLE IF NOT EXISTS artists (

ARid INT PRIMARY KEY,

Fname VARCHAR(50) NOT NULL,

```sql
Lname VARCHAR(50) NOT NULL,

DoB DATE,

Astatus VARCHAR(50) DEFAULT "Inactive",

Astyle VARCHAR(50)


)ENGINE=InnoDB;


INSERT INTO artists (ARid,Fname,Lname,DoB,Astatus,Astyle)
VALUES
        (22365,"Leonardo"," Da Vinci","1452-04-15","Inactive","Sfumato technique"),
        (21489,"Michelangelo","Simoni","1475-03-06","Inactive","Frescoes"),
        (23690,"Rembrandt","Rijn","1606-07-15","Inactive","Baroque style"),
        (24691,"Johannes","Vermeer","1632-10-31","Inactive","Baroque style"),
        (25690,"Jean-Antoine","Watteau","1684-10-10","Inactive","Baroque style"),
        (26690,"Eugene","Delacroix","1798-04-26","Inactive","Flochetage"),
        (23692,"Claude","Monet","1840-11-14","Inactive","Impressionism"),
        (23693,"Georges","Seurat","1859-12-02","Inactive","pointilism"),
        (27677,"Vincent","van Gogh","1853-03-30","Inactive","Post-Impressionism"),
        (27660,"Edvard","Munch","1863-12-12","Inactive","Post-Impressionism"),
        (27650,"Pablo","Picasso","1881-10-25","Inactive","Collage"),
        (27990,"Frida","Kahlo","1907-07-06","Inactive","Realism");



CREATE TABLE IF NOT EXISTS paintings(

Pid INT PRIMARY KEY,

Pname VARCHAR(500) NOT NULL,

VlueUSD VARCHAR(500),

Dcription  VARCHAR(500),

Pstyle VARCHAR(500),

ACQdetails VARCHAR(500)
```

```sql
)ENGINE=InnoDB;


INSERT INTO paintings (Pid,Pname,VlueUSD,Dcription,Pstyle,ACQdetails)

VALUES

        (12365,"Mona Lisa","priceless","Renaissance depiction of the Virgin
        Mary","Sfumato","Loaned from Louvre Museum"),

        (11489,"Last Supper","450000000","Symbolizes the last meal shared with
        Christ","Frescoes","Bought from Santa Maria delle Grazie"),

        (13690,"Vitruvian Man","1000000000","Man portrayed in different stances
        simultaneously","Baroque","Bought from the Accademia Gallery"),

        (14691,"Self Portrait","450000000","Portrait of Leonardo da Vinci","Baroque","Loaned From
        Library of Turin"),

        (15690,"Guernica","200000000","Violent scene between half-man and half-animal
        creatures","Baroque","Bought from Museo Reina Sofia"),

        (16690,"The Weeping Woman","100000000","Tribute to Dora Maar","Flochetage","Bought
        from Tate Gallery"),

        (13692,"Starry Night","100000000","Landscape painting of an expressive night sky over a
        small hillside village ","Impressionism","Bought from The Museum of Modern Art"),

        (13693,"Sunflowers","72000000","Sunflowers in a vase","Pointilism","Loaned from Van Gogh
        Museum"),

        (17677,"Self-Portrait","71000000","One of the final portraits of himself before his
        death","Post-Impressionism","Bought from Musee d'Orsay"),

        (17660,"The Creation of Adam","undefined","Inspired biblical scenes taken from the book of
        genesis ","Post-Impressionism","Bought from Sistine Chapel"),

        (17650,"The Last Judgement","269000","Commisioned by Pope Clement
        VII","Fresco","Loaned from Sistine Chapel"),

        (17990,"The Two Fridas","undefined","In this painting Frida explores two sides of
        herself","Realism","Bought from Mexico city");



CREATE TABLE IF NOT EXISTS exhibitions (

Eid INT PRIMARY KEY,

Ename VARCHAR(500) NOT NULL,

Etheme VARCHAR(500),

Sdate  DATE,
```

```sql
DurationYRS FLOAT(2,1)


)ENGINE=InnoDB;


INSERT INTO exhibitions (Eid,Ename,Etheme,Sdate,DurationYRS)
VALUES
        (42365,"Sfumato","Leonardo da Vinci","2020-03-20","5.5"),
        (41489,"Collage","Pablo Picasso","2020-03-20","6"),
        (43690,"Post-Impressionism","Van Gogh","2020-03-20","6"),
        (44691,"Frescoes","Michelangelo","2022-08-10","7.5"),
        (45690,"Realism","Frida Kahlo","2022-10-10","2.5");


CREATE TABLE IF NOT EXISTS Lcollection (
FKpaintID INT,


FOREIGN KEY(FKpaintID) REFERENCES paintings(Pid)




)ENGINE=InnoDB;




INSERT INTO Lcollection (FKpaintID)
VALUES
        (12365),
        (14691),
        (13693),
        (17650);


CREATE TABLE IF NOT EXISTS Pcollection (
FKpaintID2 INT,
```

FOREIGN KEY(FKpaintID2) REFERENCES paintings(Pid)

)ENGINE=InnoDB;

INSERT INTO Pcollection (FKpaintID2)
VALUES

       (11489),

       (13690),

       (15690),

       (16690),

       (13692),

       (17677),

       (17660),

       (17990);

CREATE TABLE IF NOT EXISTS Pexhibition (

   FKexhibitionID INT,

   FKpaintID3 INT,

   FOREIGN KEY (FKpaintID3) REFERENCES paintings(Pid),

   FOREIGN KEY (FKexhibitionID) REFERENCES exhibitions(Eid)

) ENGINE=InnoDB;

INSERT INTO Pexhibition (FKpaintID3,FKexhibitionID)

VALUES

      (12365,42365),

      (11489,42365),

      (13690,42365),

      (14691,42365),

      (15690,41489),

      (16690,41489),

      (13692,43690),

      (13693,43690),

      (17677,43690),

      (17660,44691),

      (17650,44691),

      (17990,45690);

CREATE TABLE IF NOT EXISTS Partist (

  FKartistID INT,

  FKpaintID4 INT,

  FOREIGN KEY (FKpaintID4) REFERENCES paintings(Pid),

  FOREIGN KEY (FKartistID) REFERENCES artists(ARid)

) ENGINE=InnoDB;

INSERT INTO Partist (FKpaintID4, FKartistID)

VALUES

      (12365,22365),

      (11489,22365),

      (13690,22365),

      (14691,22365),

      (15690,27650),

      (16690,27650),

      (13692,27677),

(13693,27677),

(17677,27677),

(17660,21489),

(17650,21489),

(17990,27990);

SQL queries

1. **Calculating how long ago each artist was born.**
SELECT Fname, DATEDIFF(CURDATE(),DoB)/365 AS BYRSago
FROM artists;

Fname	BYRSago
Michelangelo	549.1123
Leonardo	572.0164
Rembrandt	417.6658
Claude	183.1753
Georges	164.1151
Johannes	391.3507
Jean-Antoine	339.3726
Eugene	225.7562
Pablo	142.2027
Edvard	160.0849
Vincent	170.7945
Frida	116.4932

2. **Counting the number of paintings for artist Leonardo Da Vinci from the composite table (Partist) using the foreign keys.**
SELECT COUNT(*) AS ptngcount
FROM Partist

```
JOIN artists ON FKartistID = ARid
JOIN paintings ON FKpaintID4 = Pid
WHERE Fname = "Leonardo";
```

ptngcount

4

3. **Listing the name and value of the paintings by Leonardo Da Vinci from the composite table (Partist) using the foreign keys.**

```
SELECT Pname,Vlue
FROM Partist
JOIN artists ON FKartistID = ARid
JOIN paintings ON FKpaintID4 = Pid
WHERE Fname = "Leonardo";
```

Pname	Vlue
Mona Lisa	priceless
Last Supper	450 million USD
Vitruvian Man	1 billion USD
Self Portrait	450 million USD

4. **Listing the name and value of paintings with the theme "Van Gogh" from the composite table (Pexhibition) using the foreign keys.**

```
SELECT Pname,Vlue
FROM Pexhibition
JOIN exhibitions ON FKexhibitionID = Eid
JOIN paintings ON FKpaintID3 = Pid
WHERE Etheme = "Van Gogh";
```

Pname	Vlue
Starry Night	100 million USD
Sunflowers	72 million USD
Self-Portrait	71 million USD

5. **Listing the name, value description and acquisition details for paintings with name starting with "S".**

```
SELECT Pname,Vlue,Dcription,ACQdetails
FROM paintings
WHERE Pname LIKE"S%";
```

			Pname	Vlue	Dcription	ACQdetails
☐	🖉 Edit	⬚ Copy ⊖ Delete	Starry Night	100 million USD	Landscape painting of an expressive night sky over...	Bought from The Museum of Modern Art
☐	🖉 Edit	⬚ Copy ⊖ Delete	Sunflowers	72 million USD	Sunflowers in a vase	Loaned from Van Gogh Museum
☐	🖉 Edit	⬚ Copy ⊖ Delete	Self Portrait	450 million USD	Portrait of Leonardo da Vinci	Loaned From Library of Turin
☐	🖉 Edit	⬚ Copy ⊖ Delete	Self-Portrait	71 million USD	One of the final portraits of himself before his d...	Bought from Musee d'Orsay

6. **Merging two columns "Fname" and "Lname" to create the full name for an artist.**

```
SELECT Fname,Lname, CONCAT(Fname," ",Lname) AS Fullname
FROM artists;
```

←T→				Fname	Lname	Fullname
☐	🖊 Edit	⧉ Copy	⊖ Delete	Michelangelo	Simoni	Michelangelo Simoni
☐	🖊 Edit	⧉ Copy	⊖ Delete	Leonardo	Da Vinci	Leonardo Da Vinci
☐	🖊 Edit	⧉ Copy	⊖ Delete	Rembrandt	Rijn	Rembrandt Rijn
☐	🖊 Edit	⧉ Copy	⊖ Delete	Claude	Monet	Claude Monet
☐	🖊 Edit	⧉ Copy	⊖ Delete	Georges	Seurat	Georges Seurat
☐	🖊 Edit	⧉ Copy	⊖ Delete	Johannes	Vermeer	Johannes Vermeer
☐	🖊 Edit	⧉ Copy	⊖ Delete	Jean-Antoine	Watteau	Jean-Antoine Watteau
☐	🖊 Edit	⧉ Copy	⊖ Delete	Eugene	Delacroix	Eugene Delacroix
☐	🖊 Edit	⧉ Copy	⊖ Delete	Pablo	Picasso	Pablo Picasso
☐	🖊 Edit	⧉ Copy	⊖ Delete	Edvard	Munch	Edvard Munch
☐	🖊 Edit	⧉ Copy	⊖ Delete	Vincent	van Gogh	Vincent van Gogh
☐	🖊 Edit	⧉ Copy	⊖ Delete	Frida	Kahlo	Frida Kahlo

7. **Listing columns from two different tables, matching each painting with their artist through the use of foreign keys from a composite table.**
SELECT Fname, Lname, Pname
FROM artists
JOIN Partist ON ARid = FKartistID
JOIN paintings ON FKpaintID4 = Pid;

Fname	Lname	Pname
Leonardo	Da Vinci	Mona Lisa
Leonardo	Da Vinci	Last Supper
Leonardo	Da Vinci	Vitruvian Man
Leonardo	Da Vinci	Self Portrait
Pablo	Picasso	Guernica
Pablo	Picasso	The Weeping Woman
Vincent	van Gogh	Starry Night
Vincent	van Gogh	Sunflowers
Vincent	van Gogh	Self-Portrait
Michelangelo	Simoni	The Creation of Adam
Michelangelo	Simoni	The Last Judgement
Frida	Kahlo	The Two Fridas

8. **Listing the name of each exhibition and how many paintings each one has through using the foreign keys in the composite table Pexhibition.**
SELECT Ename, COUNT(FKpaintID3) AS Paintingcount
FROM exhibitions
JOIN Pexhibition ON Eid = FKexhibitionID
GROUP BY Ename;

Ename	Paintingcount
Collage	2
Sfumato	4
Post-Impressionism	3
Frescoes	2
Realism	1

9. **Showing the names of artists who have a certain style, whilst also merging their first name and surname.**
SELECT CONCAT(Fname," ",Lname) AS Fullname, Astyle
FROM artists
WHERE Astyle = "Baroque style";

				Fullname	Astyle
☐	🖉 Edit	📋 Copy	⊖ Delete	Rembrandt Rijn	Baroque style
☐	🖉 Edit	📋 Copy	⊖ Delete	Johannes Vermeer	Baroque style
☐	🖉 Edit	📋 Copy	⊖ Delete	Jean-Antoine Watteau	Baroque style

10. **Totalling up the number of paintings from the composite tables "Pcollection" and "Lcollection" using their foreign keys.**
SELECT SUM(TotalPaintings) AS GrandTotal
FROM (
   SELECT COUNT(FKpaintID) AS TotalPaintings
   FROM Lcollection
   JOIN paintings ON FKpaintID = Pid

   UNION ALL

   SELECT COUNT(FKpaintID2) AS TotalPaintings
   FROM Pcollection
   JOIN paintings ON FKpaintID2 = Pid
) AS Subquery;

GrandTotal
12