

CODING CHALLENGE 5
EXECUTED BY
RAHUL S

```
CREATE DATABASE VirtualArtGallery;  
USE VirtualArtGallery ;
```

```
CREATE TABLE Artists (  
ArtistID INT PRIMARY KEY,  
Name VARCHAR(255) NOT NULL,  
Biography TEXT,  
Nationality VARCHAR(100));
```

```
CREATE TABLE Categories (  
CategoryID INT PRIMARY KEY,  
Name VARCHAR(100) NOT NULL);
```

```
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 TABLE Exhibitions (  
ExhibitionID INT PRIMARY KEY,  
Title VARCHAR(255) NOT NULL,  
StartDate DATE,  
EndDate DATE,  
Description TEXT);
```

```
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 INTO Categories (CategoryID, Name) VALUES
```

```
(1, 'Painting'),  
(2, 'Sculpture'),  
(3, 'Photography');
```

```
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 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 INTO ExhibitionArtworks (ExhibitionID, ArtworkID) VALUES
```

```
(1, 1),  
(1, 2),  
(1, 3),  
(2, 2);
```

```
-- Q1
```

```
SELECT Name, COUNT(*) AS ArtworkCount  
FROM Artists  
JOIN Artworks ON Artists.ArtistID = Artworks.ArtistID  
GROUP BY Name  
ORDER BY ArtworkCount DESC;
```

The screenshot shows the MySQL Workbench interface with the following details:

- SQL Editor:** Contains the SQL query for Q1:

```
-- Q1  
SELECT Name, COUNT(*) AS ArtworkCount  
FROM Artists  
JOIN Artworks ON Artists.ArtistID = Artworks.ArtistID  
GROUP BY Name  
ORDER BY ArtworkCount DESC;
```
- Result Grid:** Displays the results of the query:

Name	ArtworkCount
Pablo Picasso	1
Vincent van Gogh	1
Leonardo da Vinci	1
- Action Output:** Shows the log of database operations:

#	Time	Action	Message	Duration / Fetch
1	09:42:35	CREATE DATABASE VirtualArtGallery	1 row(s) affected	0.000 sec
2	09:42:47	USE VirtualArtGallery	0 row(s) affected	0.000 sec
3	09:43:19	CREATE TABLE Artists (ArtistID INT PRIMARY KEY, Name VARCHAR(255) NO...)	0 row(s) affected	0.015 sec
- Status Bar:** Shows "Query Completed" and the current date and time: 15-04-2025 12:46.

-- Q2

```
SELECT Title
FROM Artworks
JOIN Artists ON Artworks.ArtistID = Artists.ArtistID
WHERE Nationality IN ('Spanish', 'Dutch')
ORDER BY Year ASC;
```

The screenshot shows the MySQL Workbench interface with the following details:

- File Bar:** File, Edit, View, Query, Database, Server, Tools, Scripting, Help.
- Navigator:** Schemas (demo, filetransfer, techshop, test, ticketbookingsystem).
- SQL Editor:** SQL File 36*, containing the query:

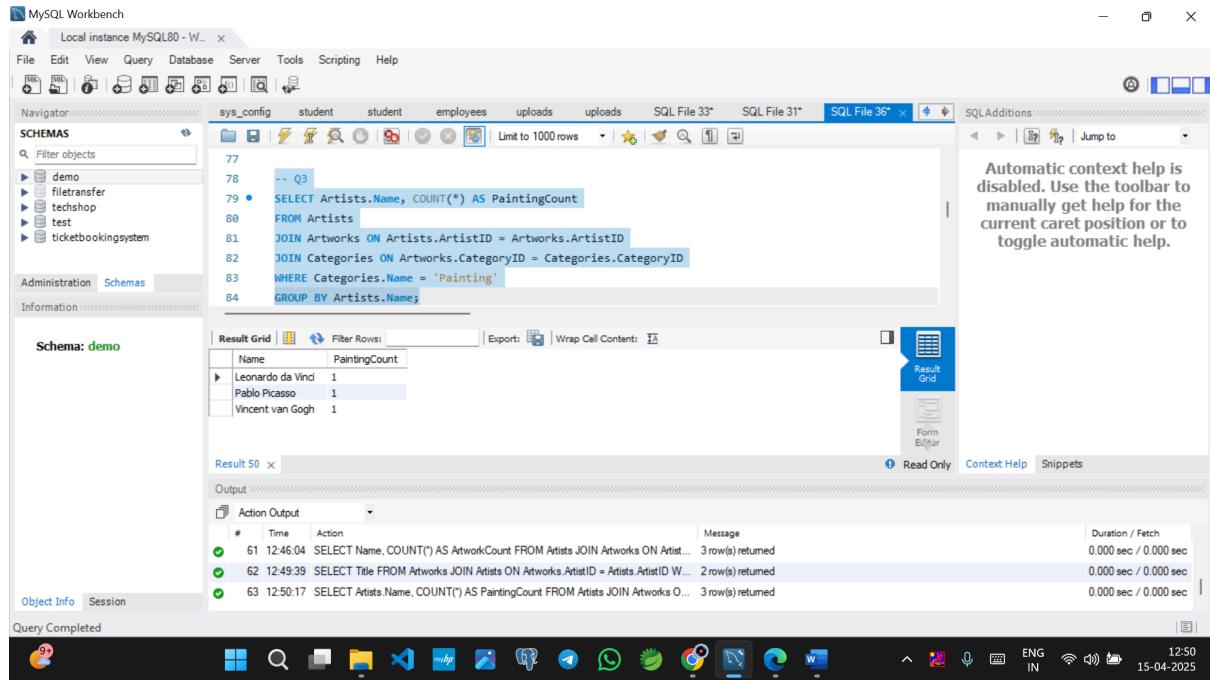
```
-- Q2
SELECT Title
FROM Artworks
JOIN Artists ON Artworks.ArtistID = Artists.ArtistID
WHERE Nationality IN ('Spanish', 'Dutch')
ORDER BY Year ASC;
```
- Result Grid:** Shows the results of the query:

Title
Starry Night
Guernica
- Output:** Action Output table showing log entries:

#	Time	Action	Message	Duration / Fee
60	12:05:52	SELECT Name, COUNT(*) AS ArtworkCount FROM Artists JOIN Artworks ON Artist...	3 row(s) returned	0.000 sec / 0
61	12:46:04	SELECT Name, COUNT(*) AS ArtworkCount FROM Artists JOIN Artworks ON Artist...	3 row(s) returned	0.000 sec / 0
62	12:49:39	SELECT Title FROM Artworks JOIN Artists ON Artworks.ArtistID = Artists.ArtistID W...	2 row(s) returned	0.000 sec / 0

-- Q3

```
SELECT Artists.Name, COUNT(*) AS PaintingCount
FROM Artists
JOIN Artworks ON Artists.ArtistID = Artworks.ArtistID
JOIN Categories ON Artworks.CategoryID = Categories.CategoryID
WHERE Categories.Name = 'Painting'
GROUP BY Artists.Name;
```



-- Q4

```

SELECT Artworks.Title AS ArtworkTitle, Artists.Name AS ArtistName, Categories.Name AS
CategoryName
FROM ExhibitionArtworks
JOIN Exhibitions ON ExhibitionArtworks.ExhibitionID = Exhibitions.ExhibitionID
JOIN Artworks ON ExhibitionArtworks.ArtworkID = Artworks.ArtworkID
JOIN Artists ON Artworks.ArtistID = Artists.ArtistID
JOIN Categories ON Artworks.CategoryID = Categories.CategoryID
WHERE Exhibitions.Title = 'Modern Art Masterpieces';

```

MySQL Workbench

Local instance MySQL80 - W...

File Edit View Query Database Server Tools Scripting Help

Navigator: Schemas: demo, filetransfer, techshop, test, ticketbookingsystem

SQL Editor: SQL File 33*, SQL File 31*, SQL File 36*

```

86 -- Q4
87 • SELECT Artworks.Title AS ArtworkTitle, Artists.Name AS ArtistName, Categories.Name AS CategoryName
88 FROM ExhibitionsArtworks
89 JOIN Exhibitions ON ExhibitionsArtworks.ExhibitionID = Exhibitions.ExhibitionID
90 JOIN Artworks ON ExhibitionsArtworks.ArtworkID = Artworks.ArtworkID
91 JOIN Artists ON Artworks.ArtistID = Artists.ArtistID
92 JOIN Categories ON Artworks.CategoryID = Categories.CategoryID
93 WHERE Exhibitions.Title = 'Modern Art Masterpieces'

```

Result Grid:

ArtworkTitle	ArtistName	CategoryName
Starry Night	Vincent van Gogh	Painting
Mona Lisa	Leonardo da Vinci	Painting
Guernica	Pablo Picasso	Painting

Output:

#	Time	Action	Message	Duration / Fetch
64	12:50:30	SELECT Title FROM Artworks JOIN Artists ON Artworks.ArtistID = Artists.ArtistID W...	2 row(s) returned	0.000 sec / 0.000 sec
65	12:50:49	SELECT Artworks.Title AS ArtworkTitle, Artists.Name AS ArtistName, Categories.Na...	3 row(s) returned	0.000 sec / 0.000 sec
66	12:51:14	SELECT Artworks.Title AS ArtworkTitle, Artists.Name AS ArtistName, Categories.Na...	3 row(s) returned	0.000 sec / 0.000 sec

Object Info Session

Query Completed

-- Q5

```

SELECT Artists.Name, COUNT(*) AS ArtworkCount
FROM Artists
JOIN Artworks ON Artists.ArtistID = Artworks.ArtistID
GROUP BY Artists.Name
HAVING COUNT(*) > 2;

```

MySQL Workbench

Local instance MySQL80 - W...

File Edit View Query Database Server Tools Scripting Help

Navigator: Schemas: demo, filetransfer, techshop, test, ticketbookingsystem

SQL Editor: SQL File 33*, SQL File 31*, SQL File 36*

```

94
95 -- Q5
96 • SELECT Artists.Name, COUNT(*) AS ArtworkCount
97 FROM Artists
98 JOIN Artworks ON Artists.ArtistID = Artworks.ArtistID
99 GROUP BY Artists.Name
100 HAVING COUNT(*) > 2;
101

```

Result Grid:

Name	ArtworkCount

Output:

#	Time	Action	Message	Duration / Fetch
65	12:50:49	SELECT Artworks.Title AS ArtworkTitle, Artists.Name AS ArtistName, Categories.Na...	3 row(s) returned	0.000 sec / 0.000 sec
66	12:51:14	SELECT Artworks.Title AS ArtworkTitle, Artists.Name AS ArtistName, Categories.Na...	3 row(s) returned	0.000 sec / 0.000 sec
67	12:51:34	SELECT Artists.Name, COUNT(*) AS ArtworkCount FROM Artists JOIN Artworks O...	0 row(s) returned	0.000 sec / 0.000 sec

Object Info Session

Query Completed

-- Q6

```
SELECT A.Title
FROM Artworks A
JOIN ExhibitionArtworks EA1 ON A.ArtworkID = EA1.ArtworkID
JOIN Exhibitions E1 ON EA1.ExhibitionID = E1.ExhibitionID
JOIN ExhibitionArtworks EA2 ON A.ArtworkID = EA2.ArtworkID
JOIN Exhibitions E2 ON EA2.ExhibitionID = E2.ExhibitionID
WHERE E1.Title = 'Modern Art Masterpieces'
AND E2.Title = 'Renaissance Art';
```

MySQL Workbench - Local instance MySQL80 - W...

File Edit View Query Database Server Tools Scripting Help

Navigator: sys_config student student employees uploads uploads SQL File 33* SQL File 31* SQL File 36* SQLAdditions...

SCHEMAS: demo filertransfer techshop test ticketbookingsystem

Administration Schemas

Information: Schema: demo

Result Grid: Title: Mona Lisa

Result 55 x Read Only Context Help Snippets

Action Output:

#	Time	Action	Message	Duration / Fetch
66	12:51:14	SELECT Artworks.Title AS ArtworkTitle, Artists.Name AS ArtistName, Categories.Na...	3 row(s) returned	0.000 sec / 0.000 sec
67	12:51:34	SELECT Artists.Name, COUNT(*) AS ArtworkCount FROM Artists JOIN Artworks O...	0 row(s) returned	0.000 sec / 0.000 sec
68	12:56:49	SELECT A.Title FROM Artworks A JOIN ExhibitionArtworks EA1 ON A.ArtworkID = ...	1 row(s) returned	0.000 sec / 0.000 sec

Object Info Session

Query Completed

12:56 15-04-2025

-- Q7

```
SELECT Categories.Name AS CategoryName, COUNT(Artworks.ArtworkID) AS
TotalArtworks
FROM Categories
LEFT JOIN Artworks ON Categories.CategoryID = Artworks.CategoryID
GROUP BY Categories.Name;
```

MySQL Workbench

Local instance MySQL80 - W...

File Edit View Query Database Server Tools Scripting Help

Schemas: sys_config student student employees uploads uploads SQL File 33* SQL File 31* SQL File 36* |

Navigator: sys_config student student employees uploads uploads SQL File 33* SQL File 31* SQL File 36* |

Limit to 1000 rows

SQLAdditions: Automatic context help is disabled. Use the toolbar to manually get help for the current caret position or to toggle automatic help.

```

111
112 -- Q7
113 • SELECT Categories.Name AS CategoryName, COUNT(Artworks.ArtworkID) AS TotalArtworks
114 FROM Categories
115 LEFT JOIN Artworks ON Categories.CategoryID = Artworks.CategoryID
116 GROUP BY Categories.Name;
117
118 -- Q8

```

Result Grid | Filter Rows: Export: Wrap Cell Content: Result 56 x | Read Only Context Help Snippets

Schema: demo

CategoryName	TotalArtworks
Painting	3
Photography	0
Sculpture	0

Action Output

#	Time	Action	Message	Duration / Fetch
67	12:51:34	SELECT Artists.Name, COUNT(*) AS ArtworkCount FROM Artists JOIN Artworks O...	0 row(s) returned	0.000 sec / 0.000 sec
68	12:56:49	SELECT A.Title FROM Artworks A JOIN ExhibitionArtworks EA ON A.ArtworkID = ...	1 row(s) returned	0.000 sec / 0.000 sec
69	12:57:05	SELECT Categories.Name AS CategoryName, COUNT(Artworks.ArtworkID) AS Tot...	3 row(s) returned	0.000 sec / 0.000 sec

Object Info Session

Query Completed

12:57 15-04-2025

-- Q8

```

SELECT Artists.Name, COUNT(Artworks.ArtworkID) AS ArtworkCount
FROM Artists
JOIN Artworks ON Artists.ArtistID = Artworks.ArtistID
GROUP BY Artists.Name
HAVING COUNT(Artworks.ArtworkID) > 3;

```

MySQL Workbench

Local instance MySQL80 - W...

File Edit View Query Database Server Tools Scripting Help

Schemas: sys_config student student employees uploads uploads SQL File 33* SQL File 31* SQL File 36* |

Navigator: sys_config student student employees uploads uploads SQL File 33* SQL File 31* SQL File 36* |

Limit to 1000 rows

SQLAdditions: Automatic context help is disabled. Use the toolbar to manually get help for the current caret position or to toggle automatic help.

```

117
118 -- Q8
119 • SELECT Artists.Name, COUNT(Artworks.ArtworkID) AS ArtworkCount
120 FROM Artists
121 JOIN Artworks ON Artists.ArtistID = Artworks.ArtistID
122 GROUP BY Artists.Name
123 HAVING COUNT(Artworks.ArtworkID) > 3;
124

```

Result Grid | Filter Rows: Export: Wrap Cell Content: Result 60 x | Read Only Context Help Snippets

Schema: demo

Name	ArtworkCount

Action Output

#	Time	Action	Message	Duration / Fetch
71	12:57:51	SELECT E.Title FROM Exhibitions E JOIN ExhibitionArtworks EA ON E.ExhibitionID = ...	1 row(s) returned	0.000 sec / 0.000 sec
72	12:58:11	SELECT Artists.Name, COUNT(Artworks.ArtworkID) AS ArtworkCount FROM Artists...	0 row(s) returned	0.015 sec / 0.000 sec
73	13:01:26	SELECT Artists.Name, COUNT(Artworks.ArtworkID) AS ArtworkCount FROM Artists...	0 row(s) returned	0.000 sec / 0.000 sec

Object Info Session

Query Completed

13:01 15-04-2025

-- Q9

```
SELECT Artworks.Title  
FROM Artworks  
JOIN Artists ON Artworks.ArtistID = Artists.ArtistID  
WHERE Artists.Nationality = 'Spanish';
```

The screenshot shows the MySQL Workbench interface. The query editor window displays the following code:

```
-- Execute the selected portion of the script or everything, if there is no selection  
126 • SELECT Artworks.Title  
127 FROM Artworks  
128 JOIN Artists ON Artworks.ArtistID = Artists.ArtistID  
129 WHERE Artists.Nationality = 'Spanish';  
130  
131 -- Q10
```

The results grid shows one row of data:

Title
Guernica

The output pane shows the execution log:

#	Time	Action	Message	Duration / Fetch
68	12:56:49	SELECT A.Title FROM Artworks A JOIN ExhibitionArtworks EA1 ON A.ArtworkID = EA1.ExhibitionArtworkID AS E WHERE E.ExhibitionID = EA.ExhibitionID AND EA.ArtworkID = A.ArtworkID AND A.ArtistID IN (SELECT ArtistID FROM Artists WHERE Name IN ('Vincent van Gogh', 'Leonardo da Vinci')) GROUP BY E.Title HAVING COUNT(DISTINCT A.ArtistID) = 2;	1 row(s) returned	0.000 sec / 0.000 sec
69	12:57:05	SELECT Categories.Name AS CategoryName, COUNT(Artworks.ArtworkID) AS TotalCount FROM Artworks JOIN Categories ON Artworks.CategoryID = Categories.CategoryID GROUP BY Categories.CategoryName ORDER BY TotalCount DESC;	3 row(s) returned	0.000 sec / 0.000 sec
70	12:57:32	SELECT Artworks.Title FROM Artworks JOIN Artists ON Artworks.ArtistID = Artists.ArtistID WHERE Artists.Nationality = 'Spanish';	1 row(s) returned	0.000 sec / 0.000 sec

-- Q10

```
SELECT E.Title  
FROM Exhibitions E  
JOIN ExhibitionArtworks EA ON E.ExhibitionID = EA.ExhibitionID  
JOIN Artworks A ON EA.ArtworkID = A.ArtworkID  
WHERE A.ArtistID IN (  
    SELECT ArtistID FROM Artists WHERE Name IN ('Vincent van Gogh', 'Leonardo da Vinci')  
)  
GROUP BY E.Title  
HAVING COUNT(DISTINCT A.ArtistID) = 2;
```

MySQL Workbench

Local instance MySQL80 - W...

File Edit View Query Database Server Tools Scripting Help

Navigator: Schemas: demo, student, student, employees, uploads, uploads, SQL File 33*, SQL File 31*, SQL File 36*

sys_config student student employees uploads uploads SQL File 33* SQL File 31* SQL File 36* Limit to 1000 rows

```

128 JOIN Artists ON Artworks.ArtistID = Artists.ArtistID
129 W Execute the selected portion of the script or everything, if there is no selection
130
131 -- Q10
132 • SELECT E.Title
133 FROM Exhibitions E
134 JOIN ExhibitionArtworks EA ON E.ExhibitionID = EA.ExhibitionID
135 JOIN Artworks A ON EA.ArtworkID = A.ArtworkID

```

Result Grid | Filter Rows: Export: Wrap Cell Content: Result Grid Form Editor

Schema: demo

Result 58 x Output

#	Time	Action	Message	Duration / Fetch
69	12:57:05	SELECT Categories.Name AS CategoryName, COUNT(Artworks.ArtworkID) AS TotalCount FROM Artworks GROUP BY Categories.Name	3 row(s) returned	0.000 sec / 0.000 sec
70	12:57:32	SELECT Artworks.Title FROM Artworks JOIN Artists ON Artworks.ArtistID = Artists.ArtistID WHERE Artists.Name = 'Pablo Picasso'	1 row(s) returned	0.000 sec / 0.000 sec
71	12:57:51	SELECT E.Title FROM Exhibitions E JOIN ExhibitionArtworks EA ON E.ExhibitionID = EA.ExhibitionID WHERE EA.ExhibitionID IS NULL	1 row(s) returned	0.000 sec / 0.000 sec

Action Output

Object Info Session

Query Completed

12:57 15-04-2025

-- Q11

```

SELECT A.Title
FROM Artworks A
LEFT JOIN ExhibitionArtworks EA ON A.ArtworkID = EA.ArtworkID
WHERE EA.ExhibitionID IS NULL;

```

MySQL Workbench

Local instance MySQL80 - W...

File Edit View Query Database Server Tools Scripting Help

Navigator: Schemas: demo, student, student, employees, uploads, uploads, SQL File 33*, SQL File 31*, SQL File 36*

sys_config student student employees uploads uploads SQL File 33* SQL File 31* SQL File 36* Limit to 1000 rows

```

141
142 -- Q11
143 • SELECT A.Title
144 FROM Artworks A
145 LEFT JOIN ExhibitionArtworks EA ON A.ArtworkID = EA.ArtworkID
146 WHERE EA.ExhibitionID IS NULL;
147
148 -- Q12

```

Result 61 x Output

#	Time	Action	Message	Duration / Fetch
72	12:58:11	SELECT Artists.Name, COUNT(Artworks.ArtworkID) AS ArtworkCount FROM Artworks JOIN Artists ON Artworks.ArtistID = Artists.ArtistID GROUP BY Artists.Name	0 row(s) returned	0.015 sec / 0.000 sec
73	13:01:26	SELECT Artists.Name, COUNT(Artworks.ArtworkID) AS ArtworkCount FROM Artworks JOIN Artists ON Artworks.ArtistID = Artists.ArtistID GROUP BY Artists.Name	0 row(s) returned	0.000 sec / 0.000 sec
74	13:03:32	SELECT A.Title FROM Artworks A LEFT JOIN ExhibitionArtworks EA ON A.ArtworkID = EA.ArtworkID WHERE EA.ExhibitionID IS NULL	0 row(s) returned	0.000 sec / 0.000 sec

Action Output

Object Info Session

Query Completed

13:03 15-04-2025

-- Q12

```
SELECT A.Name
FROM Artists A
JOIN Artworks AW ON A.ArtistID = AW.ArtistID
GROUP BY A.ArtistID, A.Name
HAVING COUNT(DISTINCT AW.CategoryID) = (SELECT COUNT(*) FROM Categories);
```

The screenshot shows the MySQL Workbench interface with the following details:

- File Bar:** File, Edit, View, Query, Database, Server, Tools, Scripting, Help.
- Navigator:** Schemas (sys_config, student, student, employees, uploads, uploads, SQL File 33*, SQL File 31*, SQL File 36*).
- SQL Editor:** Contains the SQL code for query Q12.
- Output Window:** Shows the results of the query, which is an empty set (0 rows returned).
- Action Output:** Displays log entries for the executed statements.
- System Bar:** Shows the date (15-04-2025), time (13:03), and system status (ENG IN).

-- Q13

```
SELECT Categories.Name AS Category, COUNT(Artworks.ArtworkID) AS TotalArtworks
FROM Categories
LEFT JOIN Artworks ON Categories.CategoryID = Artworks.CategoryID
GROUP BY Categories.CategoryID, Categories.Name;
```

The screenshot shows the MySQL Workbench interface with the following details:

- File Bar:** File, Edit, View, Query, Database, Server, Tools, Scripting, Help.
- Navigator:** Schemas (sys_config, student, student, employees, uploads, uploads, SQL File 33*, SQL File 31*, SQL File 36*).
- SQL Editor:** Contains the SQL code for query Q13.
- Output Window:** Shows the results of the query, displaying three categories: Painting (3), Sculpture (0), and Photography (0).
- Action Output:** Displays log entries for the executed statements.
- System Bar:** Shows the date (15-04-2025), time (13:04), and system status (ENG IN).

-- Q14

```
SELECT Artists.Name  
FROM Artists  
JOIN Artworks ON Artists.ArtistID = Artworks.ArtistID  
GROUP BY Artists.ArtistID, Artists.Name  
HAVING COUNT(Artworks.ArtworkID) > 2;
```

The screenshot shows the MySQL Workbench interface with the following details:

- Navigator:** Shows the schema `demo`.
- SQL Editor:** Contains the SQL code for query Q14.
- Result Grid:** Displays the results of the query, which are empty.
- Action Output:** Shows the log of actions taken by the system, including the execution of the query and its duration.
- Output:** Shows the log of actions taken by the system, including the execution of the query and its duration.
- System Bar:** Shows the date and time as 15-04-2025 13:04.

-- Q15

```
SELECT Categories.Name AS Category, AVG(Artworks.Year) AS AverageYear  
FROM Categories  
JOIN Artworks ON Categories.CategoryID = Artworks.CategoryID  
GROUP BY Categories.CategoryID, Categories.Name  
HAVING COUNT(Artworks.ArtworkID) > 1;
```

The screenshot shows the MySQL Workbench interface with the following details:

- Navigator:** Shows the schema `demo`.
- SQL Editor:** Contains the SQL code for query Q15.
- Result Grid:** Displays the results of the query, showing a single row for the category `Painting` with an average year of `1776.3333`.
- Action Output:** Shows the log of actions taken by the system, including the execution of the query and its duration.
- Output:** Shows the log of actions taken by the system, including the execution of the query and its duration.
- System Bar:** Shows the date and time as 15-04-2025 13:04.

-- Q16

```
SELECT Artworks.Title  
FROM Artworks  
JOIN ExhibitionArtworks ON Artworks.ArtworkID = ExhibitionArtworks.ArtworkID  
JOIN Exhibitions ON ExhibitionArtworks.ExhibitionID = Exhibitions.ExhibitionID  
WHERE Exhibitions.Title = 'Modern Art Masterpieces';
```

The screenshot shows the MySQL Workbench interface with the following details:

- SQL Editor:** Contains the SQL code for query Q16.
- Result Grid:** Displays the results of the query, showing three rows: "Starry Night", "Mona Lisa", and "Guernica".
- Action Output:** Shows the log of actions taken by the system during the query execution.
- System Bar:** Includes icons for file operations, search, and various system status indicators.
- Taskbar:** Shows the date and time as 15-04-2025 13:09.

-- Q17

```
SELECT Categories.Name AS Category, AVG(Artworks.Year) AS AverageYear  
FROM Categories  
JOIN Artworks ON Categories.CategoryID = Artworks.CategoryID  
GROUP BY Categories.CategoryID, Categories.Name  
HAVING AVG(Artworks.Year) > (  
    SELECT AVG(Year) FROM Artworks  
);
```

The screenshot shows the MySQL Workbench interface with the following details:

- SQL Editor:** Contains the SQL code for query Q17.
- Result Grid:** Displays the results of the query, showing one row with "Category" as "AverageYear".
- Action Output:** Shows the log of actions taken by the system during the query execution.
- System Bar:** Includes icons for file operations, search, and various system status indicators.
- Taskbar:** Shows the date and time as 15-04-2025 13:09.

-- Q18

```
SELECT Artworks.Title  
FROM Artworks  
LEFT JOIN ExhibitionArtworks ON Artworks.ArtworkID = ExhibitionArtworks.ArtworkID  
WHERE ExhibitionArtworks.ExhibitionID IS NULL;
```

The screenshot shows the MySQL Workbench interface with the following details:

- Navigator:** Shows the schema **demo** selected.
- SQL Editor:** Contains the SQL code for query Q18.
- Result Grid:** Displays the results of the query, showing a single column **Title** with three rows: "The Persistence of Memory", "Guernica", and "Mona Lisa".
- Output:** Shows the execution log with three entries corresponding to the query steps.
- System Bar:** Includes icons for file operations, a search bar, and system status information (e.g., battery level, network, date: 15-04-2025).

-- Q19

```
SELECT DISTINCT Artists.Name  
FROM Artists  
JOIN Artworks ON Artists.ArtistID = Artworks.ArtistID  
WHERE Artworks.CategoryID = (  
    SELECT CategoryID  
    FROM Artworks  
    WHERE Title = 'Mona Lisa'  
);
```

The screenshot shows the MySQL Workbench interface with the following details:

- Navigator:** Shows the schema **demo** selected.
- SQL Editor:** Contains the SQL code for query Q19.
- Result Grid:** Displays the results of the query, showing a single column **Name** with three rows: "Vincent van Gogh", "Leonardo da Vinci", and "Pablo Picasso".
- Output:** Shows the execution log with four entries corresponding to the query steps.
- System Bar:** Includes icons for file operations, a search bar, and system status information (e.g., battery level, network, date: 15-04-2025).

-- Q20

```
SELECT Artists.Name, COUNT(Artworks.ArtworkID) AS NumberOfArtworks
FROM Artists
JOIN Artworks ON Artists.ArtistID = Artworks.ArtistID
GROUP BY Artists.Name;
```

The screenshot shows the MySQL Workbench interface. In the SQL editor tab, a query is being run:

```
-- Q20
SELECT Artists.Name, COUNT(Artworks.ArtworkID) AS NumberOfArtworks
FROM Artists
JOIN Artworks ON Artists.ArtistID = Artworks.ArtistID
GROUP BY Artists.Name;
```

The results are displayed in the Result Grid:

Name	NumberOfArtworks
Leonardo da Vinci	1
Pablo Picasso	1
Vincent van Gogh	1

The Output pane shows the execution log:

#	Time	Action	Message	Duration / Fetch
81	13:09:40	SELECT Artworks.Title FROM Artworks LEFT JOIN ExhibitionArtworks ON Artworks...	0 row(s) returned	0.000 sec / 0.000 sec
82	13:10:04	SELECT DISTINCT Artists.Name FROM Artists JOIN Artworks ON Artists.ArtistID = ...	3 row(s) returned	0.000 sec / 0.000 sec
83	13:10:14	SELECT Artists.Name, COUNT(Artworks.ArtworkID) AS NumberOfArtworks FROM ...	3 row(s) returned	0.000 sec / 0.000 sec

