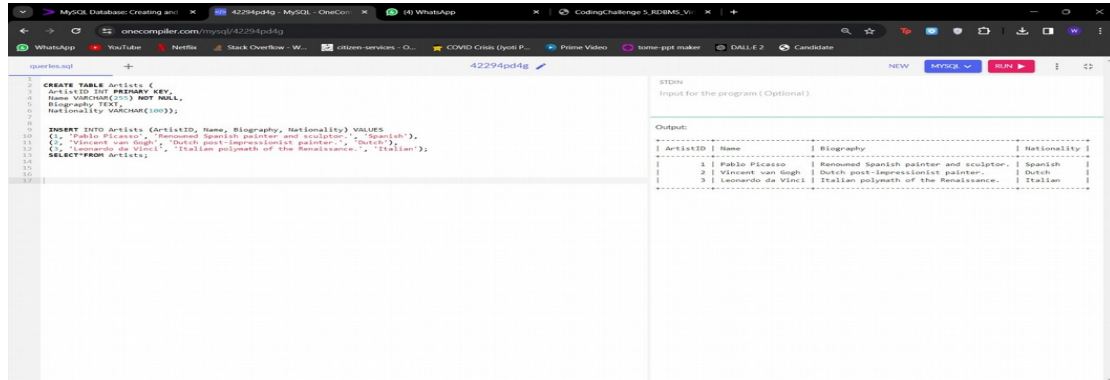


Name : **Sneha Das**

Project : Virtual Art Gallery Shema DDL and DML
Coding Challenge **SQL**

-- Create the Artists table



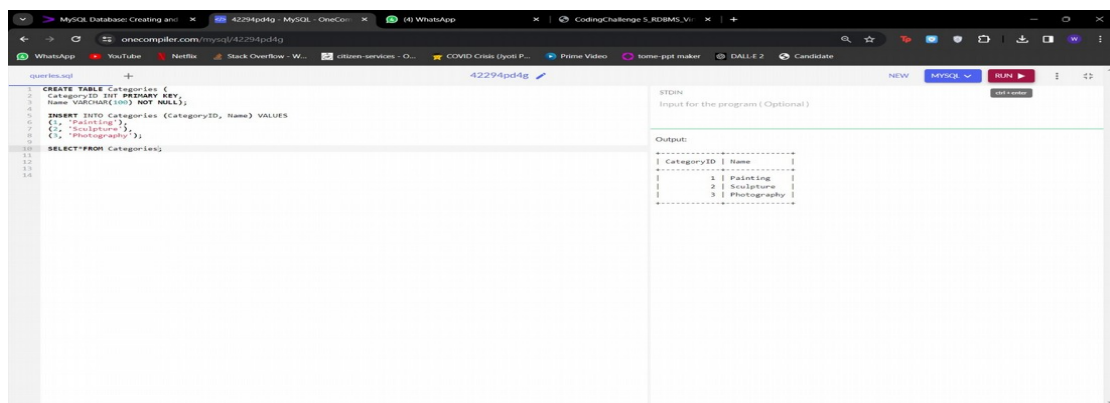
The screenshot shows a web-based SQL editor with the following code:

```
1 CREATE TABLE Artists (
2   ArtistID INT PRIMARY KEY,
3   Name VARCHAR(100) NOT NULL,
4   Biography TEXT,
5   Nationality VARCHAR(100));
6
7 INSERT INTO Artists (ArtistID, Name, Biography, Nationality) VALUES
8   (1, 'Pablo Picasso', 'Renowned Spanish painter and sculptor.', 'Spanish'),
9   (2, 'Vincent van Gogh', 'Dutch post-impressionist painter.', 'Dutch'),
10  (3, 'Leonardo da Vinci', 'Italian polymath of the Renaissance.', 'Italian');
11
12 SELECT * FROM Artists;
```

The output shows the data inserted into the Artists table:

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

- Create the Categories table



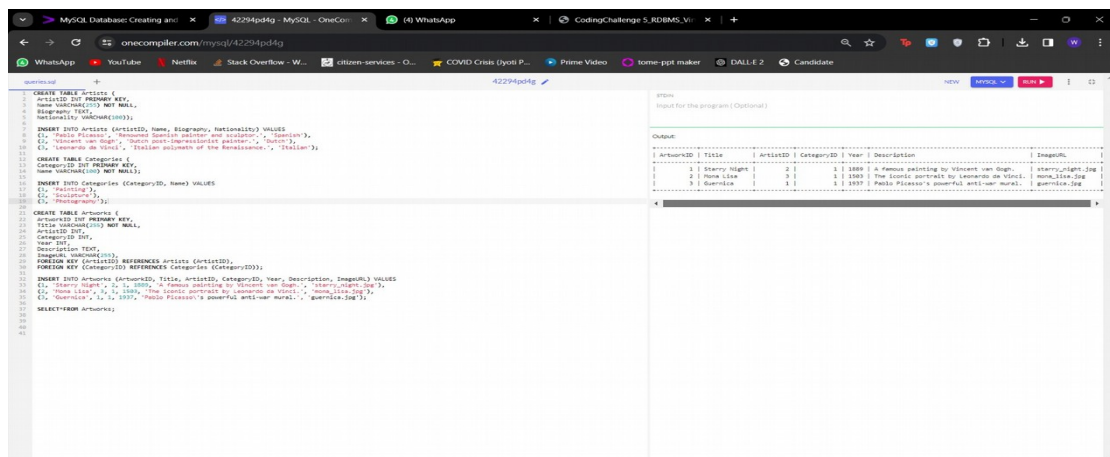
The screenshot shows a web-based SQL editor with the following code:

```
1 CREATE TABLE Categories (
2   CategoryID INT PRIMARY KEY,
3   Name VARCHAR(100) NOT NULL);
4
5 INSERT INTO Categories (CategoryID, Name) VALUES
6   (1, 'Painting'),
7   (2, 'Sculpture'),
8   (3, 'Photography');
9
10 SELECT * FROM Categories;
```

The output shows the data inserted into the Categories table:

CategoryID	Name
1	Painting
2	Sculpture
3	Photography

Create the Artworks table



The screenshot shows a web-based SQL editor with the following code:

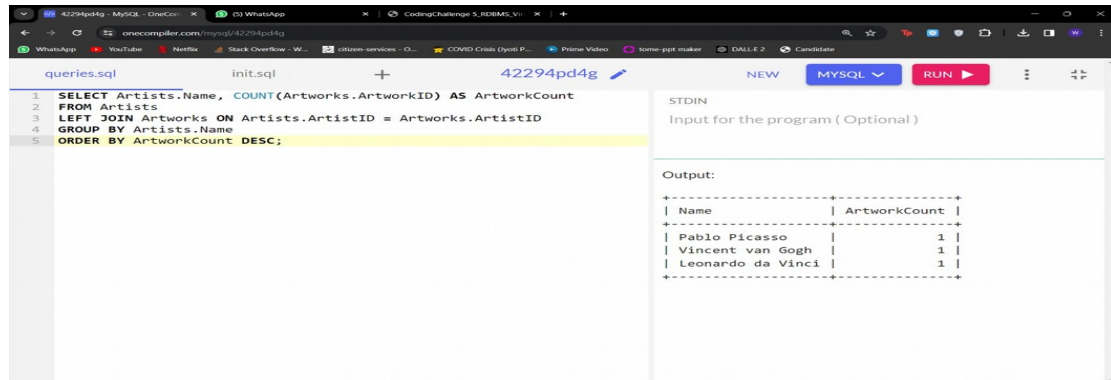
```
1 CREATE TABLE Artists (
2   ArtistID INT PRIMARY KEY,
3   Name VARCHAR(100) NOT NULL,
4   Biography TEXT,
5   Nationality VARCHAR(100));
6
7 INSERT INTO Artists (ArtistID, Name, Biography, Nationality) VALUES
8   (1, 'Pablo Picasso', 'Renowned Spanish painter and sculptor.', 'Spanish'),
9   (2, 'Vincent van Gogh', 'Dutch post-impressionist painter.', 'Dutch'),
10  (3, 'Leonardo da Vinci', 'Italian polymath of the Renaissance.', 'Italian');
11
12 CREATE TABLE Categories (
13   CategoryID INT PRIMARY KEY,
14   Name VARCHAR(100) NOT NULL);
15
16 INSERT INTO Categories (CategoryID, Name) VALUES
17   (1, 'Painting'),
18   (2, 'Sculpture'),
19   (3, 'Photography');
20
21 CREATE TABLE Artworks (
22   ArtworkID INT PRIMARY KEY,
23   Title VARCHAR(200) NOT NULL,
24   ArtistID INT,
25   Year INT,
26   Description TEXT,
27   ImageURL VARCHAR(200));
28 FOREIGN KEY (ArtistID) REFERENCES Artists (ArtistID);
29 FOREIGN KEY (CategoryID) REFERENCES Categories (CategoryID);
30
31 INSERT INTO Artworks (ArtworkID, Title, ArtistID, CategoryID, Year, Description, ImageURL) VALUES
32   (1, 'Starry Night', 2, 1, 1889, 'A famous painting by Vincent van Gogh.', 'starry_night.jpg'),
33   (2, 'Mona Lisa', 3, 1, 1503, 'The iconic portrait by Leonardo da Vinci.', 'mona_lisa.jpg'),
34   (3, 'Guernica', 1, 2, 1937, 'Pablo Picasso's powerful anti-war mural.', 'guernica.jpg');
35
36 SELECT * FROM Artworks;
```

The output shows the data inserted into the Artworks table:

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	2	1937	Pablo Picasso's powerful anti-war mural.	guernica.jpg

Q1

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



The screenshot shows a web-based MySQL query editor. The query is as follows:

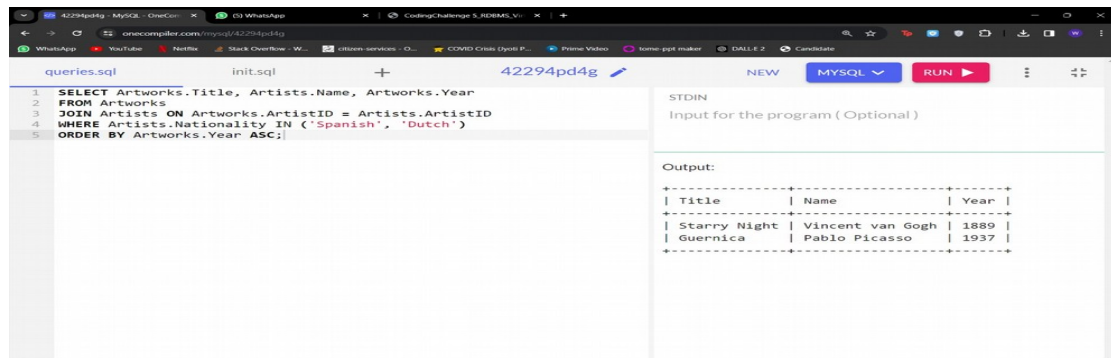
```
1 SELECT Artists.Name, COUNT(Artworks.ArtworkID) AS ArtworkCount
2 FROM Artists
3 LEFT JOIN Artworks ON Artists.ArtistID = Artworks.ArtistID
4 GROUP BY Artists.Name
5 ORDER BY ArtworkCount DESC;
```

The output of the query is displayed in a table format:

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

Q2

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



The screenshot shows a web-based MySQL query editor. The query is as follows:

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

The output of the query is displayed in a table format:

Title	Name	Year
Starry Night	Vincent van Gogh	1889
Guernica	Pablo Picasso	1937

Q3

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

The screenshot shows a web browser with the OneCompiler MySQL interface. The query editor contains the following SQL code:

```

1 SELECT Artists.Name, COUNT(Artworks.ArtworkID) AS ArtworkCount
2 FROM Artists
3 JOIN Artworks ON Artists.ArtistID = Artworks.ArtistID
4 JOIN Categories ON Artworks.CategoryID = Categories.CategoryID
5 WHERE Categories.Name = 'Painting'
6 GROUP BY Artists.Name;

```

The output section displays the following table:

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

Q4

```

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

```

Q5.SELECT Name

FROM Artists

WHERE ArtistID IN (

SELECT ArtistID

FROM Artworks

GROUP BY ArtistID

HAVING COUNT(ArtworkID) > 2

);

The screenshot shows a web browser with the OneCompiler MySQL interface. The query editor contains the following SQL code:

```

44 (1, 'Starry Night', 2, 1, 1889, 'A famous painting by Vincent van Gogh.', 'starry_night.jpg')
45 (2, 'Mona Lisa', 3, 1, 1503, 'The iconic portrait by Leonardo da Vinci.', 'mona_lisa.jpg'),
46 (3, 'Guernica', 1, 1, 1937, 'Pablo Picasso\'s powerful anti-war mural.', 'guernica.jpg');
47
48 CREATE TABLE ExhibitionArtworks (
49 ExhibitionID INT,
50 ArtworkID INT,
51 PRIMARY KEY (ExhibitionID, ArtworkID),
52 FOREIGN KEY (ExhibitionID) REFERENCES Exhibitions (ExhibitionID),
53 FOREIGN KEY (ArtworkID) REFERENCES Artworks (ArtworkID));
54
55 INSERT INTO ExhibitionArtworks (ExhibitionID, ArtworkID) VALUES
56 (1, 1),
57 (1, 2),
58 (1, 3),
59 (2, 2);
60
61 SELECT Name
62 FROM Artists
63 WHERE ArtistID IN (
64 SELECT ArtistID
65 FROM Artworks
66 GROUP BY ArtistID
67 HAVING COUNT(ArtworkID) > 2
68 );
69
70

```

The output section displays the following message:

Program did not output anything!

Q6.SELECT Artworks.Title

FROM Artworks

JOIN ExhibitionArtworks ON Artworks.ArtworkID =

ExhibitionArtworks.ArtworkID

JOIN Exhibitions ON ExhibitionArtworks.ExhibitionID = Exhibitions.ExhibitionID
 WHERE Exhibitions.Title IN ('Modern Art Masterpieces', 'Renaissance Art')
 GROUP BY Artworks.Title
 HAVING COUNT(DISTINCT Exhibitions.Title) = 2;

The screenshot shows a MySQL query editor with the following SQL code:

```

1 CREATE TABLE Exhibitions (
2   ExhibitionID INT PRIMARY KEY,
3   Title VARCHAR(255) NOT NULL,
4   StartDate DATE,
5   EndDate DATE,
6   Description TEXT);
7
8 INSERT INTO Exhibitions (ExhibitionID, Title, StartDate, EndDate, Description) VALUES
9   (1, 'Modern Art Masterpieces', '2023-01-01', '2023-03-01', 'A collection of modern
10  (2, 'Renaissance Art', '2023-04-01', '2023-06-01', 'A showcase of Renaissance art');
11
12 CREATE TABLE ExhibitionArtworks (
13   ExhibitionID INT,
14   ArtworkID INT,
15   PRIMARY KEY (ExhibitionID, ArtworkID),
16   FOREIGN KEY (ExhibitionID) REFERENCES Exhibitions (ExhibitionID),
17   FOREIGN KEY (ArtworkID) REFERENCES Artworks (ArtworkID));
18
19 INSERT INTO ExhibitionArtworks (ExhibitionID, ArtworkID) VALUES
20   (1, 1),
21   (1, 2),
22   (1, 3),
23   (2, 2);
24
25
26 SELECT Artworks.Title
27 FROM Artworks
28 JOIN ExhibitionArtworks ON Artworks.ArtworkID = ExhibitionArtworks.ArtworkID
29 JOIN Exhibitions ON ExhibitionArtworks.ExhibitionID = Exhibitions.ExhibitionID
30 WHERE Exhibitions.Title IN ('Modern Art Masterpieces', 'Renaissance Art')
31 GROUP BY Artworks.Title
32 HAVING COUNT(DISTINCT Exhibitions.Title) = 2;
  
```

The output of the query is displayed on the right:

```

Output:
-----
| Title          |
+-----+
| Mona Lisa     |
+-----+
  
```

Q7.
 SELECT Categories.Name, COUNT(Artworks.ArtworkID) AS ArtworkCount
 FROM Categories
 LEFT JOIN Artworks ON Categories.CategoryID = Artworks.CategoryID
 GROUP BY Categories.Name;

The screenshot shows a MySQL query editor with the following SQL code:

```

1 SELECT Categories.Name, COUNT(Artworks.ArtworkID) AS ArtworkCount
2 FROM Categories
3 LEFT JOIN Artworks ON Categories.CategoryID = Artworks.CategoryID
4 GROUP BY Categories.Name;
  
```

The output of the query is displayed on the right:

```

Output:
-----
| Name          | ArtworkCount |
+-----+
| Painting      | 2            |
| Sculpture     | 0            |
| Photography   | 0            |
+-----+
  
```

Q8.
 SELECT Artists.Name
 FROM Artists
 JOIN Artworks ON Artists.ArtistID = Artworks.ArtistID
 GROUP BY Artists.Name
 HAVING COUNT(Artworks.ArtworkID) > 3;

The screenshot shows a web browser with an online MySQL IDE. The query editor contains the following SQL code:

```
1 SELECT Artists.Name
2 FROM Artists
3 JOIN Artworks ON Artists.ArtistID = Artworks.ArtistID
4 GROUP BY Artists.Name
5 HAVING COUNT(Artworks.ArtworkID) > 3;
```

The output panel on the right shows "Program did not output anything!"

Q9.
SELECT Artworks.Title, Artists.Name
FROM Artworks
JOIN Artists ON Artworks.ArtistID = Artists.ArtistID
WHERE Artists.Nationality = 'Spanish';

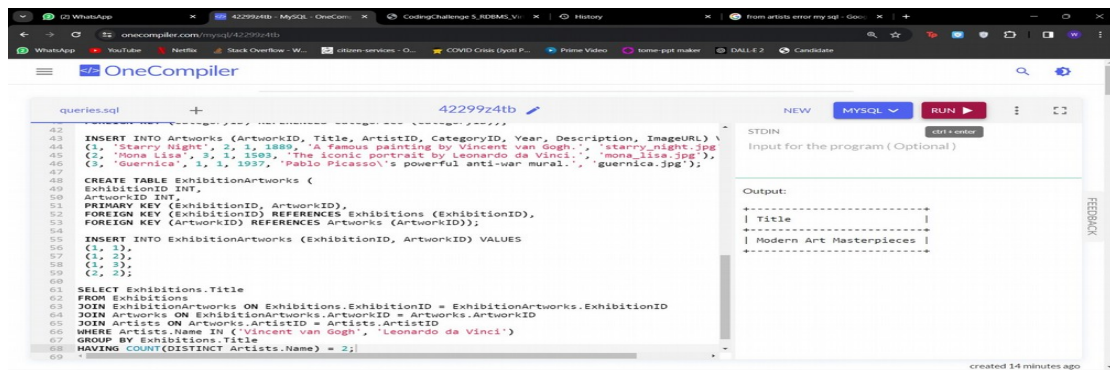
The screenshot shows the same online MySQL IDE with a new query:

```
1 SELECT Artworks.Title, Artists.Name
2 FROM Artworks
3 JOIN Artists ON Artworks.ArtistID = Artists.ArtistID
4 WHERE Artists.Nationality = 'Spanish';
```

The output panel displays the following results:

Title	Name
Guernica	Pablo Picasso

Q10.
SELECT Exhibitions.Title
FROM Exhibitions
JOIN ExhibitionArtworks ON Exhibitions.ExhibitionID =
ExhibitionArtworks.ExhibitionID
JOIN Artworks ON ExhibitionArtworks.ArtworkID = Artworks.ArtworkID
JOIN Artists ON Artworks.ArtistID = Artists.ArtistID
WHERE Artists.Name IN ('Vincent van Gogh', 'Leonardo da Vinci')
GROUP BY Exhibitions.Title
HAVING COUNT(DISTINCT Artists.Name) = 2;



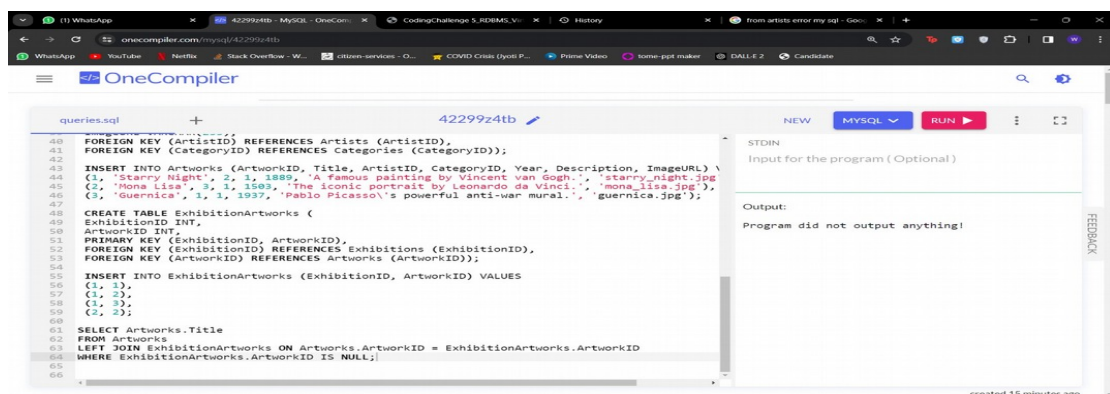
The screenshot shows the OneCompiler MySQL interface. The SQL editor contains the following code:

```
42 INSERT INTO Artworks (ArtworkID, Title, ArtistID, CategoryID, Year, Description, ImageURL) \
43 (1, 'Starry Night', 2, 1, 1889, 'A famous painting by Vincent van Gogh.', 'starry_night.jpg'),
44 (2, 'Mona Lisa', 3, 1, 1503, 'The iconic portrait by Leonardo da Vinci.', 'mona_lisa.jpg'),
45 (3, 'Guernica', 1, 1, 1937, 'Pablo Picasso\'s powerful anti-war mural.', 'guernica.jpg');
46
47
48 CREATE TABLE ExhibitionArtworks (
49 ExhibitionID INT,
50 ArtworkID INT,
51 PRIMARY KEY (ExhibitionID, ArtworkID),
52 FOREIGN KEY (ExhibitionID) REFERENCES Exhibitions (ExhibitionID),
53 FOREIGN KEY (ArtworkID) REFERENCES Artworks (ArtworkID));
54
55 INSERT INTO ExhibitionArtworks (ExhibitionID, ArtworkID) VALUES
56 (1, 1),
57 (1, 2),
58 (1, 3),
59 (2, 2);
60
61 SELECT Exhibitions.Title
62 FROM Exhibitions
63 JOIN ExhibitionArtworks ON Exhibitions.ExhibitionID = ExhibitionArtworks.ExhibitionID
64 JOIN Artworks ON ExhibitionArtworks.ArtworkID = Artworks.ArtworkID
65 JOIN Artists ON Artworks.ArtistID = Artists.ArtistID
66 WHERE Artists.Name IN ('Vincent van Gogh', 'Leonardo da Vinci')
67 GROUP BY Exhibitions.Title
68 HAVING COUNT(DISTINCT Artists.Name) = 2;
69
```

The output on the right shows:

```
Output:
+-----+
| Title |
+-----+
| Modern Art Masterpieces |
+-----+
```

Q11.
SELECT Artworks.Title
FROM Artworks
LEFT JOIN ExhibitionArtworks ON Artworks.ArtworkID =
ExhibitionArtworks.ArtworkID
WHERE ExhibitionArtworks.ArtworkID IS NULL;



The screenshot shows the OneCompiler MySQL interface. The SQL editor contains the following code:

```
40 FOREIGN KEY (ArtistID) REFERENCES Artists (ArtistID),
41 FOREIGN KEY (CategoryID) REFERENCES Categories (CategoryID));
42
43 INSERT INTO Artworks (ArtworkID, Title, ArtistID, CategoryID, Year, Description, ImageURL) \
44 (1, 'Starry Night', 2, 1, 1889, 'A famous painting by Vincent van Gogh.', 'starry_night.jpg'),
45 (2, 'Mona Lisa', 3, 1, 1503, 'The iconic portrait by Leonardo da Vinci.', 'mona_lisa.jpg'),
46 (3, 'Guernica', 1, 1, 1937, 'Pablo Picasso\'s powerful anti-war mural.', 'guernica.jpg');
47
48 CREATE TABLE ExhibitionArtworks (
49 ExhibitionID INT,
50 ArtworkID INT,
51 PRIMARY KEY (ExhibitionID, ArtworkID),
52 FOREIGN KEY (ExhibitionID) REFERENCES Exhibitions (ExhibitionID),
53 FOREIGN KEY (ArtworkID) REFERENCES Artworks (ArtworkID));
54
55 INSERT INTO ExhibitionArtworks (ExhibitionID, ArtworkID) VALUES
56 (1, 1),
57 (1, 2),
58 (1, 3),
59 (2, 2);
60
61 SELECT Artworks.Title
62 FROM Artworks
63 LEFT JOIN ExhibitionArtworks ON Artworks.ArtworkID = ExhibitionArtworks.ArtworkID
64 WHERE ExhibitionArtworks.ArtworkID IS NULL;
65
66
```

The output on the right shows:

```
Output:
Program did not output anything!
```

Q12.
SELECT Artists.Name
FROM Artists
JOIN Artworks ON Artists.ArtistID = Artworks.ArtistID
GROUP BY Artists.Name
HAVING COUNT(DISTINCT Artworks.CategoryID) = (SELECT COUNT(DISTINCT
CategoryID) FROM Categories);

The screenshot shows the OneCompiler MySQL interface. The query editor contains the following SQL code:

```

41 FOREIGN KEY (CategoryID) REFERENCES Categories (CategoryID);
42 FOREIGN KEY (CategoryID) REFERENCES Categories (CategoryID);
43 INSERT INTO Artworks (ArtworkID, Title, ArtistID, CategoryID, Year, Description, ImageURL) \
44 (3, 'Starry Night', 2, 1, 1889, 'A famous painting by Vincent van Gogh.', 'starry_night.jpg'),
45 (2, 'Mona Lisa', 3, 1, 1503, 'The iconic portrait by Leonardo da Vinci.', 'mona_lisa.jpg'),
46 (3, 'Guernica', 1, 1, 1937, 'Pablo Picasso\'s powerful anti-war mural.', 'guernica.jpg');
47 CREATE TABLE ExhibitionArtworks (
48 ExhibitionID INT,
49 ArtworkID INT,
50 PRIMARY KEY (ExhibitionID, ArtworkID),
51 FOREIGN KEY (ExhibitionID) REFERENCES Exhibitions (ExhibitionID),
52 FOREIGN KEY (ArtworkID) REFERENCES Artworks (ArtworkID);
53 INSERT INTO ExhibitionArtworks (ExhibitionID, ArtworkID) VALUES
54 (1, 1),
55 (1, 2),
56 (1, 3),
57 (2, 3);
58 SELECT Artists.Name
59 FROM Artists
60 JOIN Artworks ON Artists.ArtistID = Artworks.ArtistID
61 GROUP BY Artists.Name
62 HAVING COUNT(DISTINCT Artworks.CategoryID) = (SELECT COUNT(DISTINCT CategoryID) FROM Categories);
63

```

The output section shows "Program did not output anything!".

Q13.
 SELECT Categories.Name, COUNT(Artworks.ArtworkID) AS ArtworkCount
 FROM Categories
 LEFT JOIN Artworks ON Categories.CategoryID = Artworks.CategoryID
 GROUP BY Categories.Name
 HAVING ArtworkCount > 0;

The screenshot shows the OneCompiler MySQL interface. The query editor contains the following SQL code:

```

31 CREATE TABLE Artworks (
32 ArtworkID INT PRIMARY KEY,
33 Title VARCHAR(255) NOT NULL,
34 ArtistID INT,
35 CategoryID INT,
36 Year INT,
37 Description TEXT,
38 ImageURL VARCHAR(255),
39 FOREIGN KEY (ArtistID) REFERENCES Artists (ArtistID),
40 FOREIGN KEY (CategoryID) REFERENCES Categories (CategoryID);
41 INSERT INTO Artworks (ArtworkID, Title, ArtistID, CategoryID, Year, Description, ImageURL) \
42 (1, 'Starry Night', 2, 1, 1889, 'A famous painting by Vincent van Gogh.', 'starry_night.jpg'),
43 (2, 'Mona Lisa', 3, 1, 1503, 'The iconic portrait by Leonardo da Vinci.', 'mona_lisa.jpg'),
44 (3, 'Guernica', 1, 1, 1937, 'Pablo Picasso\'s powerful anti-war mural.', 'guernica.jpg');
45 CREATE TABLE ExhibitionArtworks (
46 ExhibitionID INT,
47 ArtworkID INT,
48 PRIMARY KEY (ExhibitionID, ArtworkID),
49 FOREIGN KEY (ExhibitionID) REFERENCES Exhibitions (ExhibitionID),
50 FOREIGN KEY (ArtworkID) REFERENCES Artworks (ArtworkID);
51 INSERT INTO ExhibitionArtworks (ExhibitionID, ArtworkID) VALUES
52 (1, 1),
53 (1, 2),
54 (2, 3);
55

```

The output section shows a table with the following data:

Name	ArtworkCount
Painting	3

Q14.
 SELECT Artists.Name
 FROM Artists
 JOIN Artworks ON Artists.ArtistID = Artworks.ArtistID
 GROUP BY Artists.Name
 HAVING COUNT(Artworks.ArtworkID) > 2;

The screenshot shows the OneCompiler MySQL interface. The query editor contains the following SQL code:

```

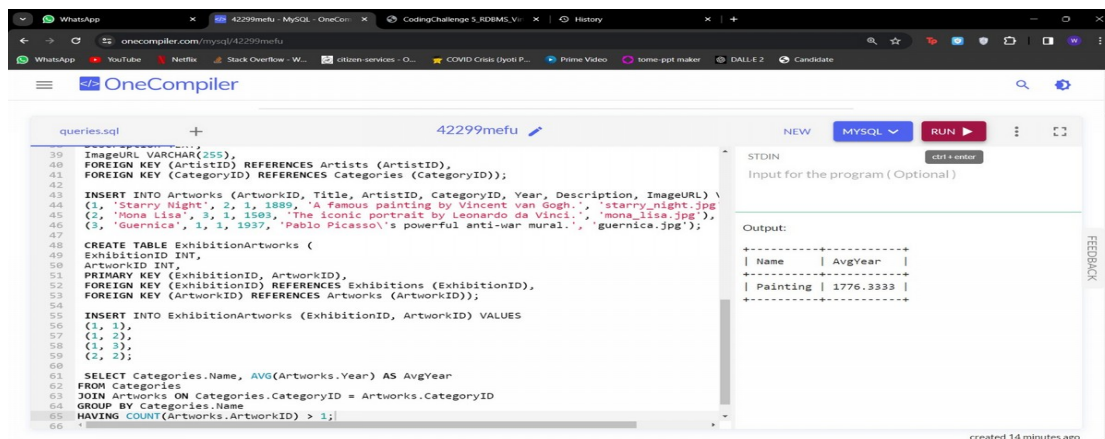
39 ImageURL VARCHAR(255),
40 FOREIGN KEY (ArtistID) REFERENCES Artists (ArtistID),
41 FOREIGN KEY (CategoryID) REFERENCES Categories (CategoryID);
42 INSERT INTO Artworks (ArtworkID, Title, ArtistID, CategoryID, Year, Description, ImageURL) \
43 (1, 'Starry Night', 2, 1, 1889, 'A famous painting by Vincent van Gogh.', 'starry_night.jpg'),
44 (2, 'Mona Lisa', 3, 1, 1503, 'The iconic portrait by Leonardo da Vinci.', 'mona_lisa.jpg'),
45 (3, 'Guernica', 1, 1, 1937, 'Pablo Picasso\'s powerful anti-war mural.', 'guernica.jpg');
46 CREATE TABLE ExhibitionArtworks (
47 ExhibitionID INT,
48 ArtworkID INT,
49 PRIMARY KEY (ExhibitionID, ArtworkID),
50 FOREIGN KEY (ExhibitionID) REFERENCES Exhibitions (ExhibitionID),
51 FOREIGN KEY (ArtworkID) REFERENCES Artworks (ArtworkID);
52 INSERT INTO ExhibitionArtworks (ExhibitionID, ArtworkID) VALUES
53 (1, 1),
54 (1, 2),
55 (2, 3);
56 SELECT Artists.Name
57 FROM Artists
58 JOIN Artworks ON Artists.ArtistID = Artworks.ArtistID
59 GROUP BY Artists.Name
60 HAVING COUNT(Artworks.ArtworkID) > 2;
61

```

The output section shows "Program did not output anything!".

Q15.

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



The screenshot shows the OneCompiler MySQL interface. The query editor contains the following SQL code:

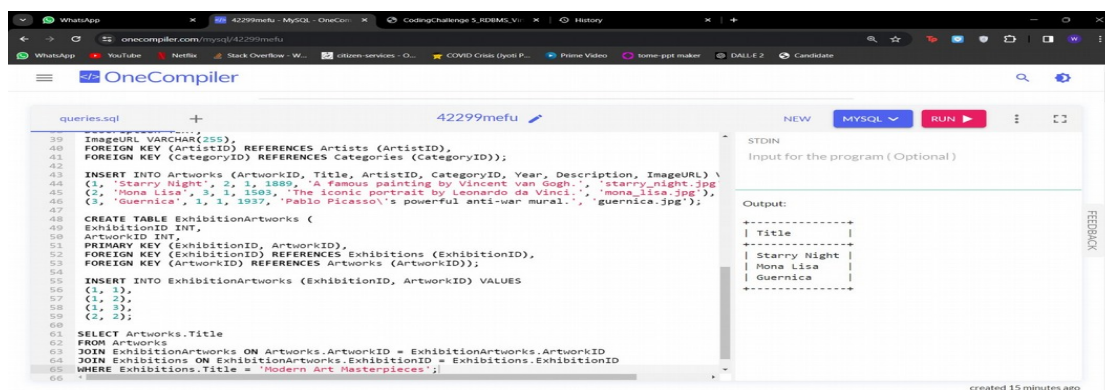
```
39: INSERT INTO Categories (CategoryID, Name) VALUES (1, 'Painting');
40: FOREIGN KEY (ArtistID) REFERENCES Artists (ArtistID);
41: FOREIGN KEY (CategoryID) REFERENCES Categories (CategoryID);
42:
43: INSERT INTO Artworks (ArtworkID, Title, ArtistID, CategoryID, Year, Description, ImageURL) \
44: (1, 'Starry Night', 2, 1, 1889, 'A famous painting by Vincent van Gogh.', 'starry_night.jpg'),
45: (2, 'Mona Lisa', 3, 1, 1503, 'The iconic portrait by Leonardo da Vinci.', 'mona_lisa.jpg'),
46: (3, 'Guernica', 1, 1, 1937, 'Pablo Picasso\'s powerful anti-war mural.', 'guernica.jpg');
47:
48: CREATE TABLE ExhibitionArtworks (
49: ExhibitionID INT,
50: ArtworkID INT,
51: PRIMARY KEY (ExhibitionID, ArtworkID),
52: FOREIGN KEY (ExhibitionID) REFERENCES Exhibitions (ExhibitionID),
53: FOREIGN KEY (ArtworkID) REFERENCES Artworks (ArtworkID));
54:
55: INSERT INTO ExhibitionArtworks (ExhibitionID, ArtworkID) VALUES
56: (1, 1),
57: (1, 2),
58: (1, 3),
59: (2, 2);
60:
61: SELECT Categories.Name, AVG(Artworks.Year) AS AvgYear
62: FROM Categories
63: JOIN Artworks ON Categories.CategoryID = Artworks.CategoryID
64: GROUP BY Categories.Name
65: HAVING COUNT(Artworks.ArtworkID) > 1;
66:
```

The output window shows the following result:

Name	AvgYear
Painting	1776.3333

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 OneCompiler MySQL interface. The query editor contains the following SQL code:

```
39: INSERT INTO Categories (CategoryID, Name) VALUES (1, 'Painting');
40: FOREIGN KEY (ArtistID) REFERENCES Artists (ArtistID);
41: FOREIGN KEY (CategoryID) REFERENCES Categories (CategoryID);
42:
43: INSERT INTO Artworks (ArtworkID, Title, ArtistID, CategoryID, Year, Description, ImageURL) \
44: (1, 'Starry Night', 2, 1, 1889, 'A famous painting by Vincent van Gogh.', 'starry_night.jpg'),
45: (2, 'Mona Lisa', 3, 1, 1503, 'The iconic portrait by Leonardo da Vinci.', 'mona_lisa.jpg'),
46: (3, 'Guernica', 1, 1, 1937, 'Pablo Picasso\'s powerful anti-war mural.', 'guernica.jpg');
47:
48: CREATE TABLE ExhibitionArtworks (
49: ExhibitionID INT,
50: ArtworkID INT,
51: PRIMARY KEY (ExhibitionID, ArtworkID),
52: FOREIGN KEY (ExhibitionID) REFERENCES Exhibitions (ExhibitionID),
53: FOREIGN KEY (ArtworkID) REFERENCES Artworks (ArtworkID));
54:
55: INSERT INTO ExhibitionArtworks (ExhibitionID, ArtworkID) VALUES
56: (1, 1),
57: (1, 2),
58: (1, 3),
59: (2, 2);
60:
61: SELECT Artworks.Title
62: FROM Artworks
63: JOIN ExhibitionArtworks ON Artworks.ArtworkID = ExhibitionArtworks.ArtworkID
64: JOIN Exhibitions ON ExhibitionArtworks.ExhibitionID = Exhibitions.ExhibitionID
65: WHERE Exhibitions.Title = 'Modern Art Masterpieces';
66:
```

The output window shows the following result:

Title
Starry Night
Mona Lisa
Guernica

Q17.

```
SELECT Categories.Name
```


FROM Categories
 JOIN Artworks ON Categories.CategoryID = Artworks.CategoryID
 GROUP BY Categories.Name
 HAVING AVG(Artworks.Year) > (SELECT AVG(Year) FROM Artworks);

The screenshot shows the OneCompiler MySQL editor interface. The SQL query in the editor is as follows:

```

39  ...;
40  FOREIGN KEY (ArtistID) REFERENCES Artists (ArtistID),
41  FOREIGN KEY (CategoryID) REFERENCES Categories (CategoryID));
42
43  INSERT INTO Artworks (ArtworkID, Title, ArtistID, CategoryID, Year, Description, ImageURL) \
44  (1, 'Starry Night', 2, 1, 1889, 'A famous painting by Vincent van Gogh.', 'starry_night.jpg') \
45  (2, 'Mona Lisa', 3, 1, 1503, 'The iconic portrait by Leonardo da Vinci.', 'mona_lisa.jpg'),
46  (3, 'Guernica', 1, 1, 1937, 'Pablo Picasso's powerful anti-war mural.', 'guernica.jpg');
47
48  CREATE TABLE ExhibitionArtworks (
49  ExhibitionID INT,
50  ArtworkID INT,
51  PRIMARY KEY (ExhibitionID, ArtworkID),
52  FOREIGN KEY (ExhibitionID) REFERENCES Exhibitions (ExhibitionID),
53  FOREIGN KEY (ArtworkID) REFERENCES Artworks (ArtworkID));
54
55  INSERT INTO ExhibitionArtworks (ExhibitionID, ArtworkID) VALUES
56  (1, 1),
57  (1, 2),
58  (1, 3),
59  (2, 2);
60
61  SELECT Categories.Name
62  FROM Categories
63  JOIN artworks ON Categories.CategoryID = Artworks.CategoryID
64  GROUP BY Categories.Name
65  HAVING AVG(Artworks.Year) > (SELECT AVG(Year) FROM Artworks);
66
  
```

The output panel on the right shows: "Program did not output anything!".

Q18.
 SELECT Artworks.Title
 FROM Artworks
 LEFT JOIN ExhibitionArtworks ON Artworks.ArtworkID =
 ExhibitionArtworks.ArtworkID
 WHERE ExhibitionArtworks.ArtworkID IS NULL;

The screenshot shows the OneCompiler MySQL editor interface. The SQL query in the editor is as follows:

```

40  FOREIGN KEY (ArtistID) REFERENCES Artists (ArtistID),
41  FOREIGN KEY (CategoryID) REFERENCES Categories (CategoryID));
42
43  INSERT INTO Artworks (ArtworkID, Title, ArtistID, CategoryID, Year, Description, ImageURL) \
44  (1, 'Starry Night', 2, 1, 1889, 'A famous painting by Vincent van Gogh.', 'starry_night.jpg') \
45  (2, 'Mona Lisa', 3, 1, 1503, 'The iconic portrait by Leonardo da Vinci.', 'mona_lisa.jpg'),
46  (3, 'Guernica', 1, 1, 1937, 'Pablo Picasso's powerful anti-war mural.', 'guernica.jpg');
47
48  CREATE TABLE ExhibitionArtworks (
49  ExhibitionID INT,
50  ArtworkID INT,
51  PRIMARY KEY (ExhibitionID, ArtworkID),
52  FOREIGN KEY (ExhibitionID) REFERENCES Exhibitions (ExhibitionID),
53  FOREIGN KEY (ArtworkID) REFERENCES Artworks (ArtworkID));
54
55  INSERT INTO ExhibitionArtworks (ExhibitionID, ArtworkID) VALUES
56  (1, 1),
57  (1, 2),
58  (1, 3),
59  (2, 2);
60
61  SELECT Artworks.Title
62  FROM Artworks
63  LEFT JOIN ExhibitionArtworks ON Artworks.ArtworkID = ExhibitionArtworks.ArtworkID
64  WHERE ExhibitionArtworks.ArtworkID IS NULL;
65
  
```

The output panel on the right shows: "Program did not output anything!".

Q19.
 SELECT DISTINCT Artists.Name
 FROM Artists
 JOIN Artworks ON Artists.ArtistID = Artworks.ArtistID
 JOIN Categories ON Artworks.CategoryID = Categories.CategoryID
 WHERE Categories.Name IN (
 SELECT Categories.Name
 FROM Categories

JOIN Artworks ON Categories.CategoryID = Artworks.CategoryID
 WHERE Artworks.Title = 'Mona Lisa'
);

The screenshot shows the MySQL online editor interface. The SQL query in the editor is as follows:

```

44 (1, 'Starry Night', 2, 1, 1889, 'A famous painting by Vincent van Gogh.', 'starry_night.jpg')
45 (2, 'Mona Lisa', 3, 1, 1503, 'The iconic portrait by Leonardo da Vinci.', 'mona_lisa.jpg'),
46 (3, 'Guernica', 1, 1, 1937, 'Pablo Picasso's powerful anti-war mural.', 'guernica.jpg');
47
48 CREATE TABLE ExhibitionArtworks (
49   ExhibitionID INT,
50   ArtworkID INT,
51   PRIMARY KEY (ExhibitionID, ArtworkID),
52   FOREIGN KEY (ExhibitionID) REFERENCES Exhibitions (ExhibitionID),
53   FOREIGN KEY (ArtworkID) REFERENCES Artworks (ArtworkID));
54
55 INSERT INTO ExhibitionArtworks (ExhibitionID, ArtworkID) VALUES
56 (1, 1),
57 (1, 2),
58 (1, 3),
59 (2, 2);
60
61 SELECT DISTINCT Artists.Name
62 FROM Artists
63 JOIN Artworks ON Artists.ArtistID = Artworks.ArtistID
64 JOIN Categories ON Artworks.CategoryID = Categories.CategoryID
65 WHERE Categories.Name IN (
66   SELECT Categories.Name
67   FROM Categories
68   JOIN Artworks ON Categories.CategoryID = Artworks.CategoryID
69   WHERE Artworks.Title = 'Mona Lisa'
70 );
71
  
```

The output of the query is displayed on the right side of the editor:

```

Output:
+-----+
| Name |
+-----+
| Pablo Picasso |
| Vincent van Gogh |
| Leonardo da Vinci |
+-----+
  
```

The editor is titled "MySQL online editor" and shows a "created 5 minutes ago" timestamp.

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

The screenshot shows the MySQL online editor interface. The SQL query in the editor is as follows:

```

38 Description TEXT,
39 ImageURL VARCHAR(255),
40 FOREIGN KEY (ArtistID) REFERENCES Artists (ArtistID),
41 FOREIGN KEY (CategoryID) REFERENCES Categories (CategoryID));
42
43 INSERT INTO Artworks (ArtworkID, Title, ArtistID, CategoryID, Year, Description, ImageURL)
44 (1, 'Starry Night', 2, 1, 1889, 'A famous painting by Vincent van Gogh.', 'starry_night.jpg')
45 (2, 'Mona Lisa', 3, 1, 1503, 'The iconic portrait by Leonardo da Vinci.', 'mona_lisa.jpg'),
46 (3, 'Guernica', 1, 1, 1937, 'Pablo Picasso's powerful anti-war mural.', 'guernica.jpg');
47
48 CREATE TABLE ExhibitionArtworks (
49   ExhibitionID INT,
50   ArtworkID INT,
51   PRIMARY KEY (ExhibitionID, ArtworkID),
52   FOREIGN KEY (ExhibitionID) REFERENCES Exhibitions (ExhibitionID),
53   FOREIGN KEY (ArtworkID) REFERENCES Artworks (ArtworkID));
54
55 INSERT INTO ExhibitionArtworks (ExhibitionID, ArtworkID) VALUES
56 (1, 1),
57 (1, 2),
58 (1, 3),
59 (2, 2);
60
61 SELECT Artists.Name, COUNT(Artworks.ArtworkID) AS ArtworkCount
62 FROM Artists
63 LEFT JOIN Artworks ON Artists.ArtistID = Artworks.ArtistID
64 GROUP BY Artists.Name;
65
  
```

The output of the query is displayed on the right side of the editor:

```

Output:
+-----+-----+
| Name | ArtworkCount |
+-----+-----+
| Pablo Picasso | 1 |
| Vincent van Gogh | 1 |
| Leonardo da Vinci | 1 |
+-----+-----+
  
```

The editor is titled "MySQL online editor" and shows a "created 6 minutes ago" timestamp.