SANJIVANI UNIVERSITY

Department of Cyber Security

ACADEMIC YEAR: 2024- 2025

24UETBS103 – Database Management System Lab

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PRN NO: 2124UCSM1047

SEM/YEAR : SEM-2/ First Year

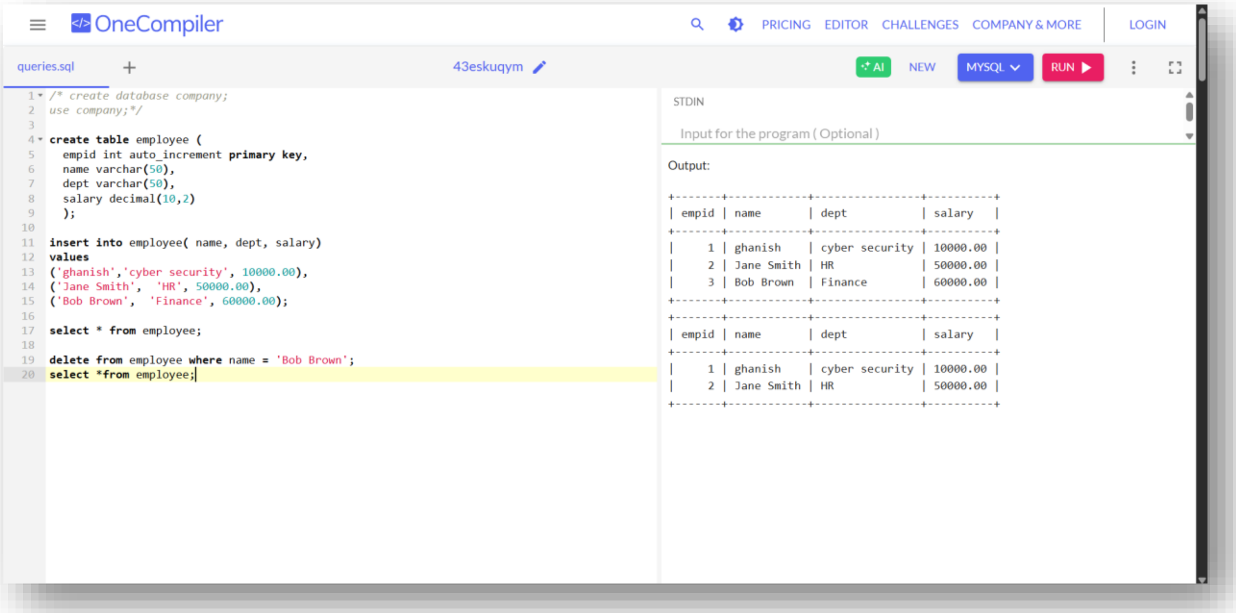
Practical No: 1

Aim: Install and set up MySQL. Create a database and a table to store employee details. Perform basic operations like INSERT & DELETE

Code:

```
/* create database company;
use company;*/


create table employee (
  empid int auto_increment primary key,
  name varchar(50),
  dept varchar(50),
  salary decimal(10,2)
  );


insert into employee( name, dept, salary)
values
('ghanish','cyber security', 10000.00),
('Jane Smith',  'HR', 50000.00),
('Bob Brown',  'Finance', 60000.00);


select * from employee;


delete from employee where name = 'Bob Brown';
select *from employee;
```

Screenshot of Output:-



```sql
/* create database company;
use company;*/

create table employee (
  empid int auto_increment primary key,
  name varchar(50),
  dept varchar(50),
  salary decimal(10,2)
  );

insert into employee( name, dept, salary)
values
('ghanish','cyber security', 10000.00),
('Jane Smith',  'HR', 50000.00),
('Bob Brown',  'Finance', 60000.00);

select * from employee;

delete from employee where name = 'Bob Brown';
select *from employee;
```

Output:

```
+-------+------------+----------------+----------+
| empid | name       | dept           | salary   |
+-------+------------+----------------+----------+
|     1 | ghanish    | cyber security | 10000.00 |
|     2 | Jane Smith | HR             | 50000.00 |
|     3 | Bob Brown  | Finance        | 60000.00 |
+-------+------------+----------------+----------+
+-------+------------+----------------+----------+
| empid | name       | dept           | salary   |
+-------+------------+----------------+----------+
|     1 | ghanish    | cyber security | 10000.00 |
|     2 | Jane Smith | HR             | 50000.00 |
+-------+------------+----------------+----------+
```

Practical No: 2

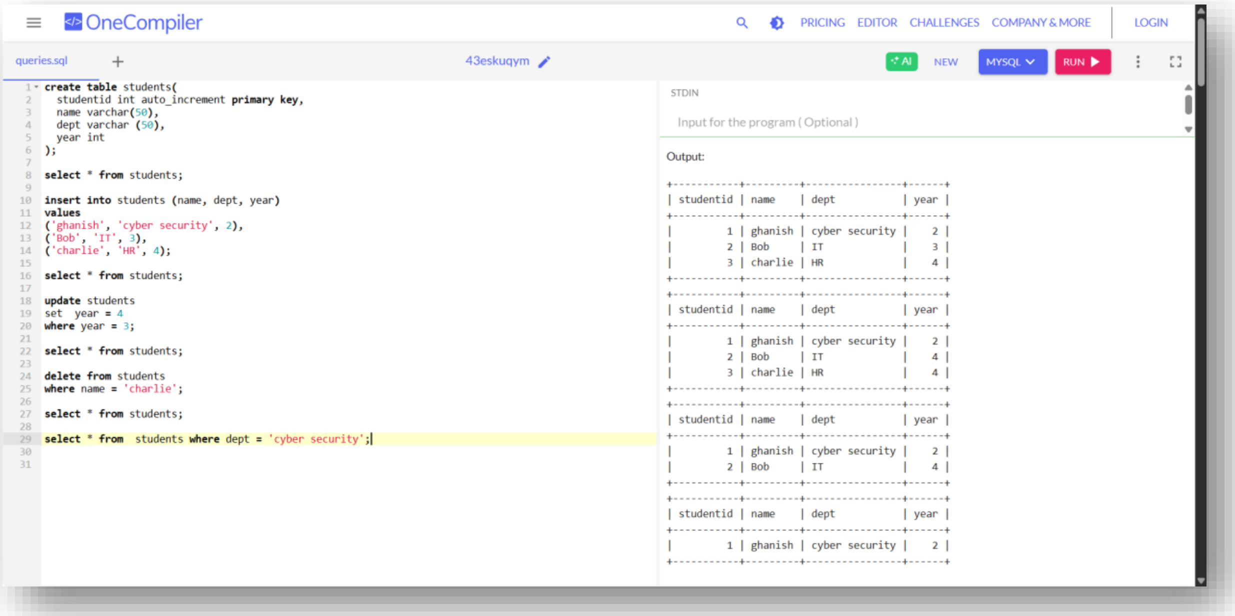
Aim: Create a table for storing student information. Insert sample data and perform basic operations: INSERT, UPDATE, DELETE, and SELECT.

Code:

```
create table students(
  studentid int auto_increment primary key,
  name varchar(50),
  dept varchar (50),
  year int
);

select * from students;

insert into students (name, dept, year)
values
('ghanish', 'cyber security', 2),
('Bob', 'IT', 3),
('charlie', 'HR', 4);

select * from students;

update students
set  year = 4
where year = 3;

select * from students;

delete from students
where name = 'charlie';

select * from students;
```

select * from students where dept = 'cyber security';

Screenshot of output:



```sql
create table students(
  studentid int auto_increment primary key,
  name varchar(50),
  dept varchar (50),
  year int
);

select * from students;

insert into students (name, dept, year)
values
('ghanish', 'cyber security', 2),
('Bob', 'IT', 3),
('charlie', 'HR', 4);

select * from students;

update students
set  year = 4
where year = 3;

select * from students;

delete from students
where name = 'charlie';

select * from students;

select * from  students where dept = 'cyber security';
```

Output:

```
+-----------+---------+----------------+------+
| studentid | name    | dept           | year |
+-----------+---------+----------------+------+
|         1 | ghanish | cyber security |    2 |
|         2 | Bob     | IT             |    3 |
|         3 | charlie | HR             |    4 |
+-----------+---------+----------------+------+
+-----------+---------+----------------+------+
| studentid | name    | dept           | year |
+-----------+---------+----------------+------+
|         1 | ghanish | cyber security |    2 |
|         2 | Bob     | IT             |    4 |
|         3 | charlie | HR             |    4 |
+-----------+---------+----------------+------+
+-----------+---------+----------------+------+
| studentid | name    | dept           | year |
+-----------+---------+----------------+------+
|         1 | ghanish | cyber security |    2 |
|         2 | Bob     | IT             |    4 |
+-----------+---------+----------------+------+
+-----------+---------+----------------+------+
| studentid | name    | dept           | year |
+-----------+---------+----------------+------+
|         1 | ghanish | cyber security |    2 |
+-----------+---------+----------------+------+
```

Practical No: 3

Aim: Create a table with columns for EmployeeID, Name, Salary, JoiningDate, and ActiveStatus using different data types. Insert sample data and perform queries to manipulate and retrieve data.

Code:

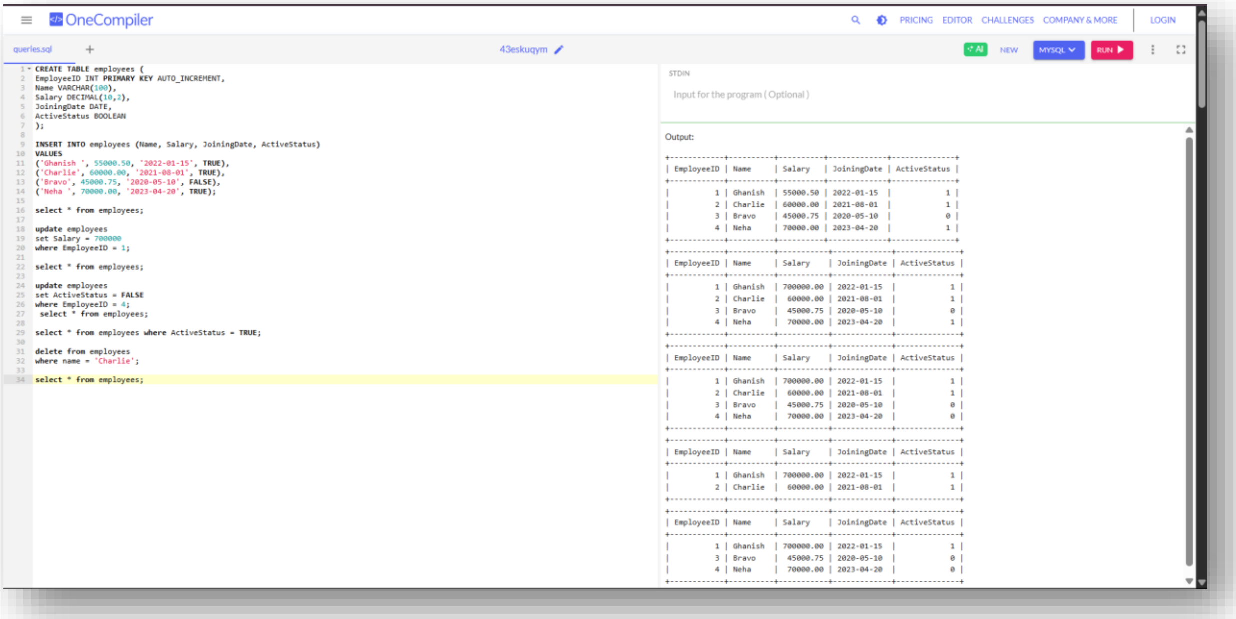
```
CREATE TABLE employees (

EmployeeID INT PRIMARY KEY AUTO_INCREMENT,

Name VARCHAR(100),

Salary DECIMAL(10,2),

JoiningDate DATE,

ActiveStatus BOOLEAN

);


INSERT INTO employees (Name, Salary, JoiningDate, ActiveStatus)

VALUES

('Ghanish ', 55000.50, '2022-01-15', TRUE),

('Charlie', 60000.00, '2021-08-01', TRUE),

('Bravo', 45000.75, '2020-05-10', FALSE),

('Neha ', 70000.00, '2023-04-20', TRUE);


select * from employees;


update employees

set Salary = 700000

where EmployeeID = 1;


select * from employees;


update employees

set ActiveStatus = FALSE

where EmployeeID = 4;

 select * from employees;


select * from employees where ActiveStatus = TRUE;
```

delete from employees

where name = 'Charlie';

select * from employees;

Screenshot of output:



```sql
CREATE TABLE employees (
EmployeeID INT PRIMARY KEY AUTO_INCREMENT,
Name VARCHAR(100),
Salary DECIMAL(10,2),
JoiningDate DATE,
ActiveStatus BOOLEAN
);

INSERT INTO employees (Name, Salary, JoiningDate, ActiveStatus)
VALUES
('Ghanish ', 55000.50, '2022-01-15', TRUE),
('Charlie', 60000.00, '2021-08-01', TRUE),
('Bravo', 45000.75, '2020-05-10', FALSE),
('Neha ', 70000.00, '2023-04-20', TRUE);

select * from employees;

update employees
set Salary = 700000
where EmployeeID = 1;

select * from employees;

update employees
set ActiveStatus = FALSE
where EmployeeID = 4;
 select * from employees;

select * from employees where ActiveStatus = TRUE;

delete from employees
where name = 'Charlie';

select * from employees;
```

```
+------------+---------+----------+-------------+--------------+
| EmployeeID | Name    | Salary   | JoiningDate | ActiveStatus |
+------------+---------+----------+-------------+--------------+
|          1 | Ghanish | 55000.50 | 2022-01-15  |            1 |
|          2 | Charlie | 60000.00 | 2021-08-01  |            1 |
|          3 | Bravo   | 45000.75 | 2020-05-10  |            0 |
|          4 | Neha    | 70000.00 | 2023-04-20  |            1 |
+------------+---------+----------+-------------+--------------+
+------------+---------+-----------+-------------+--------------+
| EmployeeID | Name    | Salary    | JoiningDate | ActiveStatus |
+------------+---------+-----------+-------------+--------------+
|          1 | Ghanish | 700000.00 | 2022-01-15  |            1 |
|          2 | Charlie |  60000.00 | 2021-08-01  |            1 |
|          3 | Bravo   |  45000.75 | 2020-05-10  |            0 |
|          4 | Neha    |  70000.00 | 2023-04-20  |            1 |
+------------+---------+-----------+-------------+--------------+
+------------+---------+-----------+-------------+--------------+
| EmployeeID | Name    | Salary    | JoiningDate | ActiveStatus |
+------------+---------+-----------+-------------+--------------+
|          1 | Ghanish | 700000.00 | 2022-01-15  |            1 |
|          2 | Charlie |  60000.00 | 2021-08-01  |            1 |
|          3 | Bravo   |  45000.75 | 2020-05-10  |            0 |
|          4 | Neha    |  70000.00 | 2023-04-20  |            0 |
+------------+---------+-----------+-------------+--------------+
+------------+---------+-----------+-------------+--------------+
| EmployeeID | Name    | Salary    | JoiningDate | ActiveStatus |
+------------+---------+-----------+-------------+--------------+
|          1 | Ghanish | 700000.00 | 2022-01-15  |            1 |
|          2 | Charlie |  60000.00 | 2021-08-01  |            1 |
+------------+---------+-----------+-------------+--------------+
+------------+---------+-----------+-------------+--------------+
| EmployeeID | Name    | Salary    | JoiningDate | ActiveStatus |
+------------+---------+-----------+-------------+--------------+
|          1 | Ghanish | 700000.00 | 2022-01-15  |            1 |
|          3 | Bravo   |  45000.75 | 2020-05-10  |            0 |
|          4 | Neha    |  70000.00 | 2023-04-20  |            0 |
+------------+---------+-----------+-------------+--------------+
```

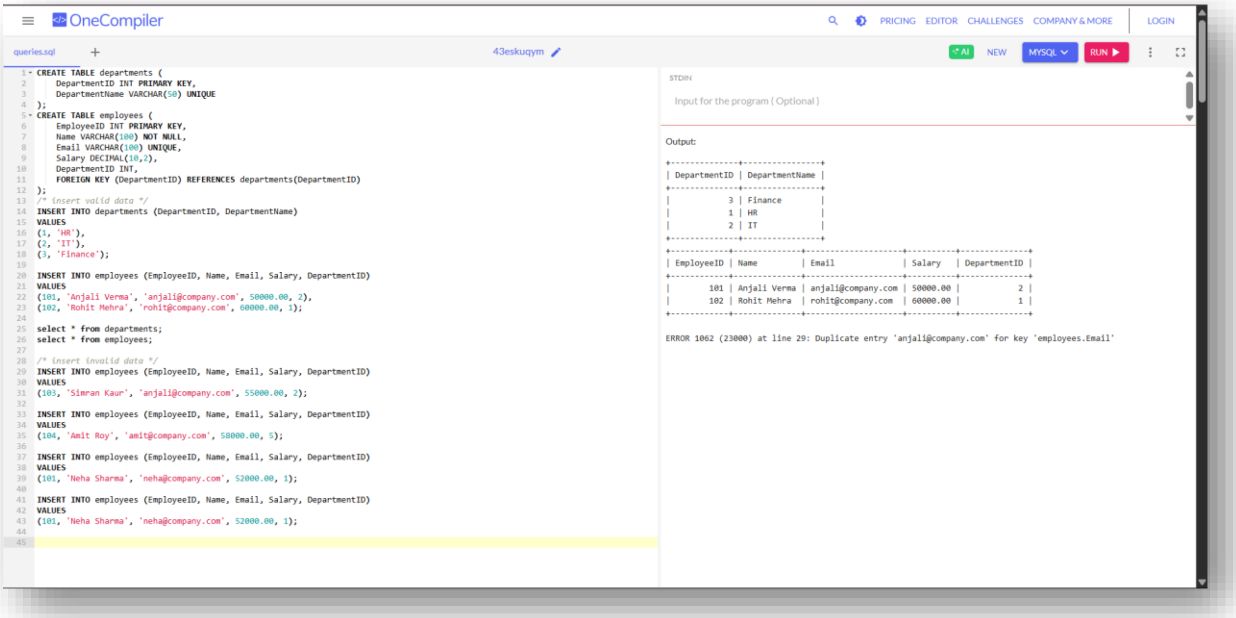
Practical No: 4

Aim: Create a table to store employee information with constraints like Primary Key, ForeignKey, and Unique. Insert valid and invalid data to test the constraints.

Code:

```
CREATE TABLE departments (
   DepartmentID INT PRIMARY KEY,
   DepartmentName VARCHAR(50) UNIQUE
);
CREATE TABLE employees (
   EmployeeID INT PRIMARY KEY,
   Name VARCHAR(100) NOT NULL,
   Email VARCHAR(100) UNIQUE,
   Salary DECIMAL(10,2),
   DepartmentID INT,
   FOREIGN KEY (DepartmentID) REFERENCES departments(DepartmentID)
);
/* insert valid data */
INSERT INTO departments (DepartmentID, DepartmentName)
VALUES
(1, 'HR'),
(2, 'IT'),
(3, 'Finance');

INSERT INTO employees (EmployeeID, Name, Email, Salary, DepartmentID)
VALUES
(101, 'Anjali Verma', 'anjali@company.com', 50000.00, 2),
(102, 'Rohit Mehra', 'rohit@company.com', 60000.00, 1);

select * from departments;
select * from employees;

/* insert invalid data */
INSERT INTO employees (EmployeeID, Name, Email, Salary, DepartmentID)
VALUES
(103, 'Simran Kaur', 'anjali@company.com', 55000.00, 2);

INSERT INTO employees (EmployeeID, Name, Email, Salary, DepartmentID)
VALUES
(104, 'Amit Roy', 'amit@company.com', 58000.00, 5);

INSERT INTO employees (EmployeeID, Name, Email, Salary, DepartmentID)
VALUES
(101, 'Neha Sharma', 'neha@company.com', 52000.00, 1);

INSERT INTO employees (EmployeeID, Name, Email, Salary, DepartmentID)
VALUES
(101, 'Neha Sharma', 'neha@company.com', 52000.00, 1);
```

Screenshot of output:



```sql
1  CREATE TABLE departments (
2      DepartmentID INT PRIMARY KEY,
3      DepartmentName VARCHAR(50) UNIQUE
4  );
5  CREATE TABLE employees (
6      EmployeeID INT PRIMARY KEY,
7      Name VARCHAR(100) NOT NULL,
8      Email VARCHAR(100) UNIQUE,
9      Salary DECIMAL(10,2),
10     DepartmentID INT,
11     FOREIGN KEY (DepartmentID) REFERENCES departments(DepartmentID)
12 );
13 /* insert valid data */
14 INSERT INTO departments (DepartmentID, DepartmentName)
15 VALUES
16 (1, 'HR'),
17 (2, 'IT'),
18 (3, 'Finance');
19
20 INSERT INTO employees (EmployeeID, Name, Email, Salary, DepartmentID)
21 VALUES
22 (101, 'Anjali Verma', 'anjali@company.com', 50000.00, 2),
23 (102, 'Rohit Mehra', 'rohit@company.com', 60000.00, 1);
24
25 select * from departments;
26 select * from employees;
27
28 /* insert invalid data */
29 INSERT INTO employees (EmployeeID, Name, Email, Salary, DepartmentID)
30 VALUES
31 (103, 'Simran Kaur', 'anjali@company.com', 55000.00, 2);
32
33 INSERT INTO employees (EmployeeID, Name, Email, Salary, DepartmentID)
34 VALUES
35 (104, 'Amit Roy', 'amit@company.com', 58000.00, 5);
36
37 INSERT INTO employees (EmployeeID, Name, Email, Salary, DepartmentID)
38 VALUES
39 (101, 'Neha Sharma', 'neha@company.com', 52000.00, 1);
40
41 INSERT INTO employees (EmployeeID, Name, Email, Salary, DepartmentID)
42 VALUES
43 (101, 'Neha Sharma', 'neha@company.com', 52000.00, 1);
44
45
```

```
+--------------+----------------+
| DepartmentID | DepartmentName |
+--------------+----------------+
|            3 | Finance        |
|            1 | HR             |
|            2 | IT             |
+--------------+----------------+
+------------+--------------+--------------------+----------+--------------+
| EmployeeID | Name         | Email              | Salary   | DepartmentID |
+------------+--------------+--------------------+----------+--------------+
|        101 | Anjali Verma | anjali@company.com | 50000.00 |            2 |
|        102 | Rohit Mehra  | rohit@company.com  | 60000.00 |            1 |
+------------+--------------+--------------------+----------+--------------+

ERROR 1062 (23000) at line 29: Duplicate entry 'anjali@company.com' for key 'employees.Email'
```

Practical No: 5

Aim: To test constraints like PRIMARY KEY, UNIQUE, and CHECK by inserting invalid data into the Employee table.

Code:

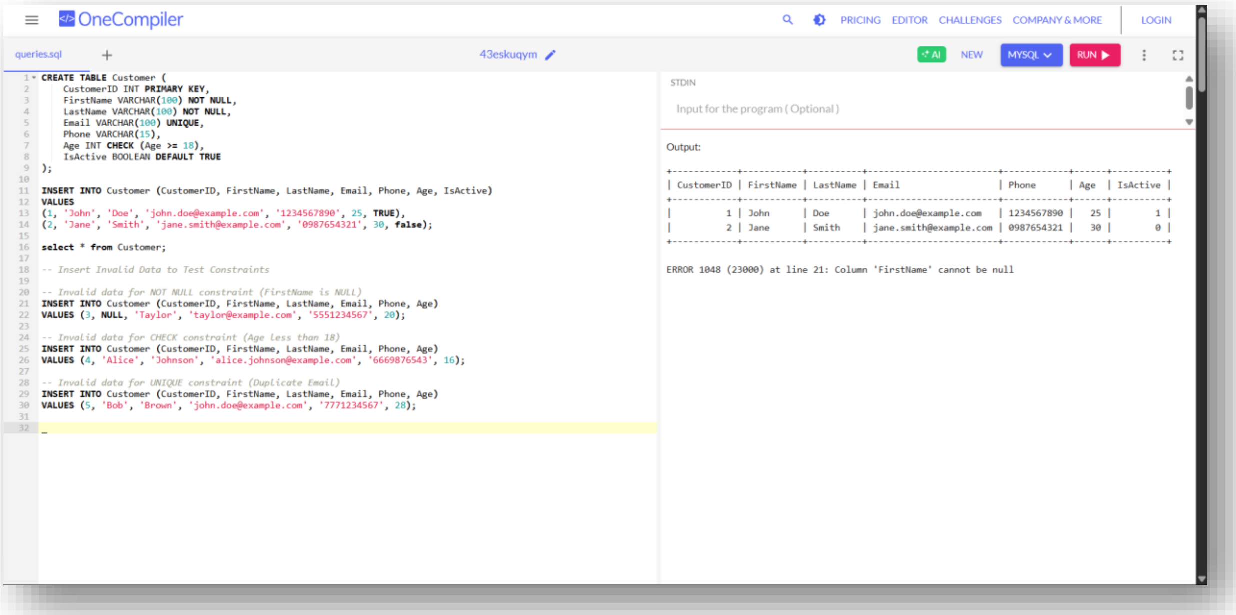
```
CREATE TABLE Customer (
   CustomerID INT PRIMARY KEY,
   FirstName VARCHAR(100) NOT NULL,
   LastName VARCHAR(100) NOT NULL,
   Email VARCHAR(100) UNIQUE,
   Phone VARCHAR(15),
   Age INT CHECK (Age >= 18),
   IsActive BOOLEAN DEFAULT TRUE
);

INSERT INTO Customer (CustomerID, FirstName, LastName, Email, Phone, Age, IsActive)
VALUES
(1, 'John', 'Doe', 'john.doe@example.com', '1234567890', 25, TRUE),
(2, 'Jane', 'Smith', 'jane.smith@example.com', '0987654321', 30, false);

select * from Customer;

-- Insert Invalid Data to Test Constraints

-- Invalid data for NOT NULL constraint (FirstName is NULL)
INSERT INTO Customer (CustomerID, FirstName, LastName, Email, Phone, Age)
VALUES (3, NULL, 'Taylor', 'taylor@example.com', '5551234567', 20);

-- Invalid data for CHECK constraint (Age less than 18)
INSERT INTO Customer (CustomerID, FirstName, LastName, Email, Phone, Age)
VALUES (4, 'Alice', 'Johnson', 'alice.johnson@example.com', '6669876543', 16);
```

-- Invalid data for UNIQUE constraint (Duplicate Email)

INSERT INTO Customer (CustomerID, FirstName, LastName, Email, Phone, Age)

VALUES (5, 'Bob', 'Brown', 'john.doe@example.com', '7771234567', 28);

Screenshots of Ouput:



```sql
1  CREATE TABLE Customer (
2      CustomerID INT PRIMARY KEY,
3      FirstName VARCHAR(100) NOT NULL,
4      LastName VARCHAR(100) NOT NULL,
5      Email VARCHAR(100) UNIQUE,
6      Phone VARCHAR(15),
7      Age INT CHECK (Age >= 18),
8      IsActive BOOLEAN DEFAULT TRUE
9  );
10
11 INSERT INTO Customer (CustomerID, FirstName, LastName, Email, Phone, Age, IsActive)
12 VALUES
13 (1, 'John', 'Doe', 'john.doe@example.com', '1234567890', 25, TRUE),
14 (2, 'Jane', 'Smith', 'jane.smith@example.com', '0987654321', 30, false);
15
16 select * from Customer;
17
18 -- Insert Invalid Data to Test Constraints
19
20 -- Invalid data for NOT NULL constraint (FirstName is NULL)
21 INSERT INTO Customer (CustomerID, FirstName, LastName, Email, Phone, Age)
22 VALUES (3, NULL, 'Taylor', 'taylor@example.com', '5551234567', 20);
23
24 -- Invalid data for CHECK constraint (Age less than 18)
25 INSERT INTO Customer (CustomerID, FirstName, LastName, Email, Phone, Age)
26 VALUES (4, 'Alice', 'Johnson', 'alice.johnson@example.com', '6669876543', 16);
27
28 -- Invalid data for UNIQUE constraint (Duplicate Email)
29 INSERT INTO Customer (CustomerID, FirstName, LastName, Email, Phone, Age)
30 VALUES (5, 'Bob', 'Brown', 'john.doe@example.com', '7771234567', 28);
31
32 _
```

Output:

```
+------------+-----------+----------+------------------------+------------+------+----------+
| CustomerID | FirstName | LastName | Email                  | Phone      | Age  | IsActive |
+------------+-----------+----------+------------------------+------------+------+----------+
|          1 | John      | Doe      | john.doe@example.com   | 1234567890 |   25 |        1 |
|          2 | Jane      | Smith    | jane.smith@example.com | 0987654321 |   30 |        0 |
+------------+-----------+----------+------------------------+------------+------+----------+

ERROR 1048 (23000) at line 21: Column 'FirstName' cannot be null
```

Practical No: 6

```sql
CREATE TABLE Employees (
    EmployeeID INT PRIMARY KEY,
    FirstName VARCHAR(50),
    LastName VARCHAR(50),
    Age INT,
    Department VARCHAR(50),
    Salary DECIMAL(10, 2)
);
-- (DML Command)
INSERT INTO Employees (EmployeeID, FirstName, LastName, Age, Department, Salary)
VALUES (1, 'John', 'Doe', 28, 'HR', 50000.00);

INSERT INTO Employees (EmployeeID, FirstName, LastName, Age, Department, Salary)
VALUES (2, 'Jane', 'Smith', 35, 'IT', 65000.00);

INSERT INTO Employees (EmployeeID, FirstName, LastName, Age, Department, Salary)
VALUES (3, 'Michael', 'Johnson', 40, 'Finance', 75000.00);

-- Updates (DML Commands)

-- 1. Update a single column (e.g., update salary for EmployeeID 2)
UPDATE Employees
SET Salary = 70000.00
WHERE EmployeeID = 2;

-- 2. Update multiple columns for a specific row (e.g., update name and salary for EmployeeID 2)
UPDATE Employees
SET FirstName = 'Janet', LastName = 'Williams', Salary = 75000.00
WHERE EmployeeID = 2;

-- 3. Update entire tuple (all columns for EmployeeID 3)
```

```
UPDATE Employees

SET FirstName = 'Michael', LastName = 'Brown', Age = 45, Department = 'Management', Salary =
80000.00

WHERE EmployeeID = 3;


-- 4. Update with a condition (e.g., increase salary by 10% for all employees in HR)

UPDATE Employees

SET Salary = Salary * 1.10

WHERE Department = 'HR';



UPDATE Employees

SET Salary = CASE

  WHEN Department = 'HR' THEN Salary * 1.05

  WHEN Department = 'IT' THEN Salary * 1.08

  WHEN Department = 'Finance' THEN Salary * 1.10

  ELSE Salary

END;



-- Delete Data from the Table (DML Command)

DELETE FROM Employees

WHERE EmployeeID = 1;


--  Select and Verify Data (SELECT Query)


-- To retrieve all data from the table

SELECT * FROM Employees;


-- To verify the update (checking updated values for EmployeeID 2)

SELECT * FROM Employees

WHERE EmployeeID = 2;
```

-- To verify the deletion (checking if EmployeeID 1 exists)

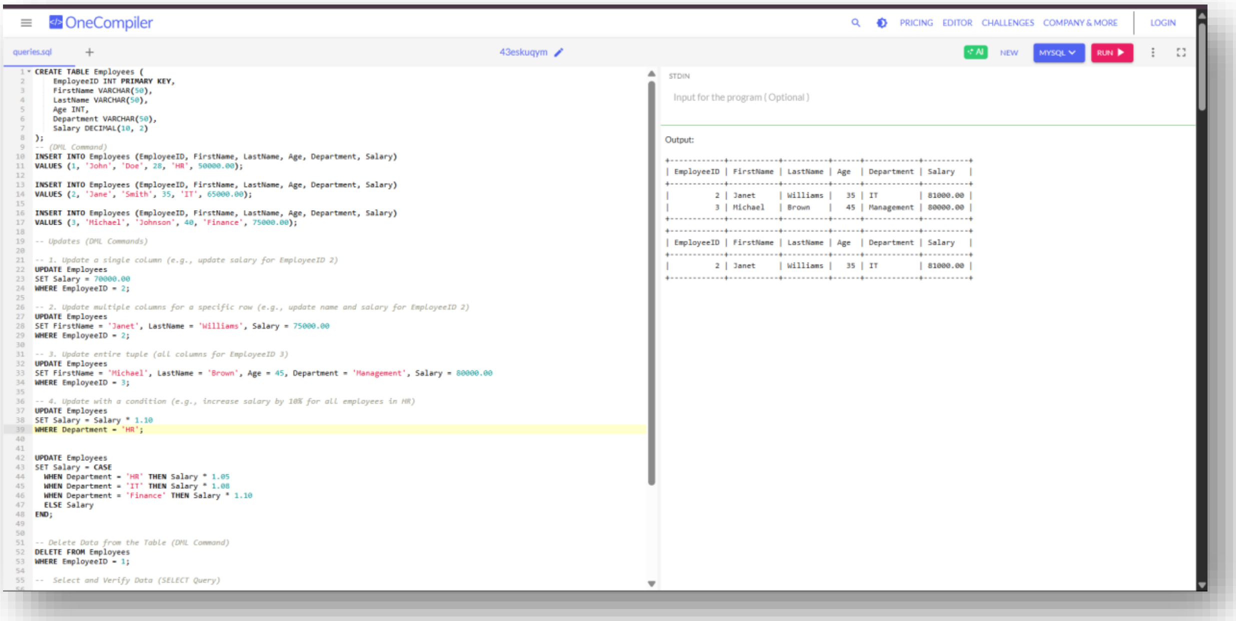
SELECT * FROM Employees

WHERE EmployeeID = 1;

Aim: Use DDL commands to create tables and DML commands to insert, update, and delete data. Write SELECT queries to retrieve and verify data changes.

Code:

Screenshots of Output:



```
CREATE TABLE Employees (
    EmployeeID INT PRIMARY KEY,
    FirstName VARCHAR(50),
    LastName VARCHAR(50),
    Age INT,
    Department VARCHAR(50),
    Salary DECIMAL(10, 2)
);
-- (DML Command)
INSERT INTO Employees (EmployeeID, FirstName, LastName, Age, Department, Salary)
VALUES (1, 'John', 'Doe', 28, 'HR', 50000.00);

INSERT INTO Employees (EmployeeID, FirstName, LastName, Age, Department, Salary)
VALUES (2, 'Jane', 'Smith', 35, 'IT', 65000.00);

INSERT INTO Employees (EmployeeID, FirstName, LastName, Age, Department, Salary)
VALUES (3, 'Michael', 'Johnson', 40, 'Finance', 75000.00);

-- Updates (DML Commands)

-- 1. Update a single column (e.g., update salary for EmployeeID 2)
UPDATE Employees
SET Salary = 70000.00
WHERE EmployeeID = 2;

-- 2. Update multiple columns for a specific row (e.g., update name and salary for EmployeeID 2)
UPDATE Employees
SET FirstName = 'Janet', LastName = 'Williams', Salary = 75000.00
WHERE EmployeeID = 2;

-- 3. Update entire tuple (all columns for EmployeeID 3)
UPDATE Employees
SET FirstName = 'Michael', LastName = 'Brown', Age = 45, Department = 'Management', Salary = 80000.00
WHERE EmployeeID = 3;

-- 4. Update with a condition (e.g., increase salary by 10% for all employees in HR)
UPDATE Employees
SET Salary = Salary * 1.10
WHERE Department = 'HR';


UPDATE Employees
SET Salary = CASE
  WHEN Department = 'HR' THEN Salary * 1.05
  WHEN Department = 'IT' THEN Salary * 1.08
  WHEN Department = 'Finance' THEN Salary * 1.10
  ELSE Salary
END;


-- Delete Data from the Table (DML Command)
DELETE FROM Employees
WHERE EmployeeID = 1;

--  Select and Verify Data (SELECT Query)
```

```
+------------+-----------+----------+------+------------+----------+
| EmployeeID | FirstName | LastName | Age  | Department | Salary   |
+------------+-----------+----------+------+------------+----------+
|          2 | Janet     | Williams |   35 | IT         | 81000.00 |
|          3 | Michael   | Brown    |   45 | Management | 80000.00 |
+------------+-----------+----------+------+------------+----------+
+------------+-----------+----------+------+------------+----------+
| EmployeeID | FirstName | LastName | Age  | Department | Salary   |
+------------+-----------+----------+------+------------+----------+
|          2 | Janet     | Williams |   35 | IT         | 81000.00 |
+------------+-----------+----------+------+------------+----------+
```

Practical No: 7

Aim: Create a Sales table and use aggregate functions like COUNT, SUM, AVG, MIN, and MAX to summarize sales data and calculate statistics.

Code:

```
CREATE TABLE Sales (
    SaleID INT PRIMARY KEY AUTO_INCREMENT,
    Product VARCHAR(50),
    Quantity INT,
    Price DECIMAL(10,2),
    SaleDate DATE
);

INSERT INTO Sales (Product, Quantity, Price, SaleDate) VALUES
('Laptop', 2, 75000.00, '2025-02-01'),
('Mobile', 5, 20000.00, '2025-02-02'),
('Tablet', 3, 30000.00, '2025-02-03'),
('Laptop', 1, 78000.00, '2025-02-04'),
('Mobile', 4, 22000.00, '2025-02-05'),
('Tablet', 2, 32000.00, '2025-02-06');

-- Count the number of sales records
SELECT COUNT(*) AS Total_Sales FROM Sales;

-- Sum of total revenue generated
SELECT SUM(Quantity * Price) AS Total_Revenue FROM Sales;

-- Average price of products sold
SELECT AVG(Price) AS Average_Price FROM Sales;

-- Minimum and Maximum price of a product sold
SELECT MIN(Price) AS Min_Price, MAX(Price) AS Max_Price FROM Sales;
```

```
-- COUNT
-- 1. Count the total number of sales records
SELECT COUNT(*) AS Total_Sales FROM Sales;

-- 2. Count the number of distinct products sold
SELECT COUNT(DISTINCT Product) AS Unique_Products FROM Sales;

-- 3. Count the number of sales per product
SELECT Product, COUNT(*) AS Sales_Count
FROM Sales
GROUP BY Product;

-- 4. Count the number of sales per day
SELECT SaleDate, COUNT(*) AS Sales_Per_Day
FROM Sales
GROUP BY SaleDate;

-- 5. Count the number of sales where more than 2 units were sold
SELECT COUNT(*) AS High_Quantity_Sales
FROM Sales
WHERE Quantity > 2;

-- 6. Count the number of sales in the current month
SELECT COUNT(*) AS Sales_This_Month
FROM Sales
WHERE MONTH(SaleDate) = MONTH(CURRENT_DATE)
AND YEAR(SaleDate) = YEAR(CURRENT_DATE);

-- 7. Count the number of sales transactions where total sale value was more than ₹50,000
SELECT COUNT(*) AS High_Value_Sales
FROM Sales
WHERE (Quantity * Price) > 50000;

-- 8. Count the number of sales records for each product where total sale value is greater than ₹40,000
```

```
SELECT Product, COUNT(*) AS High_Value_Transactions
FROM Sales
WHERE (Quantity * Price) > 40000
GROUP BY Product;

-- 9. Count the number of sales made after a specific date (e.g., Feb 3, 2025)
SELECT COUNT(*) AS Sales_After_Date
FROM Sales
WHERE SaleDate > '2025-02-03';

-- SUM
-- 1. Sum of total revenue generated
SELECT SUM(Quantity * Price) AS Total_Revenue FROM Sales;

-- 2. Sum of total quantity of products sold
SELECT SUM(Quantity) AS Total_Quantity_Sold FROM Sales;

-- 3. Sum of total revenue per product
SELECT Product, SUM(Quantity * Price) AS Revenue_Per_Product
FROM Sales
GROUP BY Product;

-- 4. Sum of total revenue per day
SELECT SaleDate, SUM(Quantity * Price) AS Revenue_Per_Day
FROM Sales
GROUP BY SaleDate;

-- 5. Sum of total revenue in the current month
SELECT SUM(Quantity * Price) AS Revenue_This_Month
FROM Sales
WHERE MONTH(SaleDate) = MONTH(CURRENT_DATE)
AND YEAR(SaleDate) = YEAR(CURRENT_DATE);

-- 6. Sum of revenue for sales where quantity sold is greater than 2
```

```
SELECT SUM(Quantity * Price) AS High_Quantity_Revenue
FROM Sales
WHERE Quantity > 2;

-- 7. Sum of total revenue generated after a specific date (e.g., Feb 3, 2025)
SELECT SUM(Quantity * Price) AS Revenue_After_Date
FROM Sales
WHERE SaleDate > '2025-02-03';

-- 8. Sum of revenue per product where the total revenue per transaction is greater than ₹40,000
SELECT Product, SUM(Quantity * Price) AS High_Value_Revenue
FROM Sales
WHERE (Quantity * Price) > 40000
GROUP BY Product;

-- AVG
-- 1. Average price of products sold
SELECT AVG(Price) AS Average_Price FROM Sales;

-- 2. Average quantity of products sold per transaction
SELECT AVG(Quantity) AS Average_Quantity_Sold FROM Sales;

-- 3. Average revenue per transaction
SELECT AVG(Quantity * Price) AS Average_Revenue_Per_Transaction FROM Sales;

-- 4. Average price per product
SELECT Product, AVG(Price) AS Average_Price_Per_Product
FROM Sales
GROUP BY Product;

-- 5. Average revenue per product
SELECT Product, AVG(Quantity * Price) AS Average_Revenue_Per_Product
FROM Sales
GROUP BY Product;
```

```sql
-- 6. Average quantity sold per product
SELECT Product, AVG(Quantity) AS Average_Quantity_Per_Product
FROM Sales
GROUP BY Product;

-- 7. Average revenue per day
SELECT SaleDate, AVG(Quantity * Price) AS Average_Revenue_Per_Day
FROM Sales
GROUP BY SaleDate;

-- 8. Average revenue in the current month
SELECT AVG(Quantity * Price) AS Average_Revenue_This_Month
FROM Sales
WHERE MONTH(SaleDate) = MONTH(CURRENT_DATE)
AND YEAR(SaleDate) = YEAR(CURRENT_DATE);

-- 9. Average price of products where more than 2 units were sold
SELECT AVG(Price) AS Avg_Price_High_Quantity_Sales
FROM Sales
WHERE Quantity > 2;

-- 10. Average revenue after a specific date (e.g., Feb 3, 2025)
SELECT AVG(Quantity * Price) AS Average_Revenue_After_Date
FROM Sales
WHERE SaleDate > '2025-02-03';

-- MIN, MAX-
-- 1. Minimum and Maximum price of a product sold
SELECT MIN(Price) AS Min_Price, MAX(Price) AS Max_Price FROM Sales;

-- 2. Minimum and Maximum quantity of products sold in a single transaction
SELECT MIN(Quantity) AS Min_Quantity_Sold, MAX(Quantity) AS Max_Quantity_Sold FROM Sales;
```

```
-- 3. Minimum and Maximum revenue generated from a single transaction
SELECT MIN(Quantity * Price) AS Min_Revenue, MAX(Quantity * Price) AS Max_Revenue FROM Sales;

-- 4. Minimum and Maximum price per product
SELECT Product, MIN(Price) AS Min_Price_Per_Product, MAX(Price) AS Max_Price_Per_Product
FROM Sales
GROUP BY Product;

-- 5. Minimum and Maximum revenue per product
SELECT Product, MIN(Quantity * Price) AS Min_Revenue_Per_Product, MAX(Quantity * Price) AS Max_Revenue_Per_Product
FROM Sales
GROUP BY Product;

-- 6. Minimum and Maximum quantity sold per product
SELECT Product, MIN(Quantity) AS Min_Quantity_Per_Product, MAX(Quantity) AS Max_Quantity_Per_Product
FROM Sales
GROUP BY Product;

-- 7. Minimum and Maximum revenue per day
SELECT SaleDate, MIN(Quantity * Price) AS Min_Revenue_Per_Day, MAX(Quantity * Price) AS Max_Revenue_Per_Day
FROM Sales
GROUP BY SaleDate;

-- 8. Minimum and Maximum revenue in the current month
SELECT MIN(Quantity * Price) AS Min_Revenue_This_Month, MAX(Quantity * Price) AS Max_Revenue_This_Month
FROM Sales
WHERE MONTH(SaleDate) = MONTH(CURRENT_DATE)
AND YEAR(SaleDate) = YEAR(CURRENT_DATE);

-- 9. Minimum and Maximum price of products where more than 2 units were sold
SELECT MIN(Price) AS Min_Price_High_Quantity_Sales, MAX(Price) AS Max_Price_High_Quantity_Sales
FROM Sales
```

WHERE Quantity > 2;

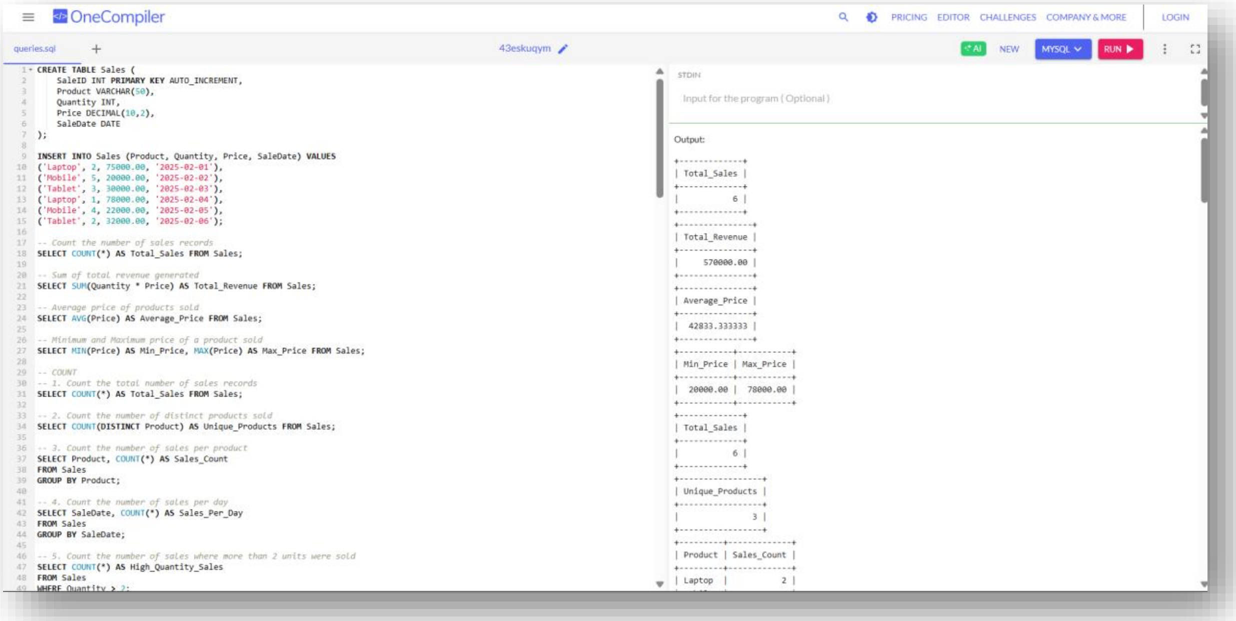
-- 10. Minimum and Maximum revenue after a specific date (e.g., Feb 3, 2025)

SELECT MIN(Quantity * Price) AS Min_Revenue_After_Date, MAX(Quantity * Price) AS Max_Revenue_After_Date

FROM Sales

WHERE SaleDate > '2025-02-03';

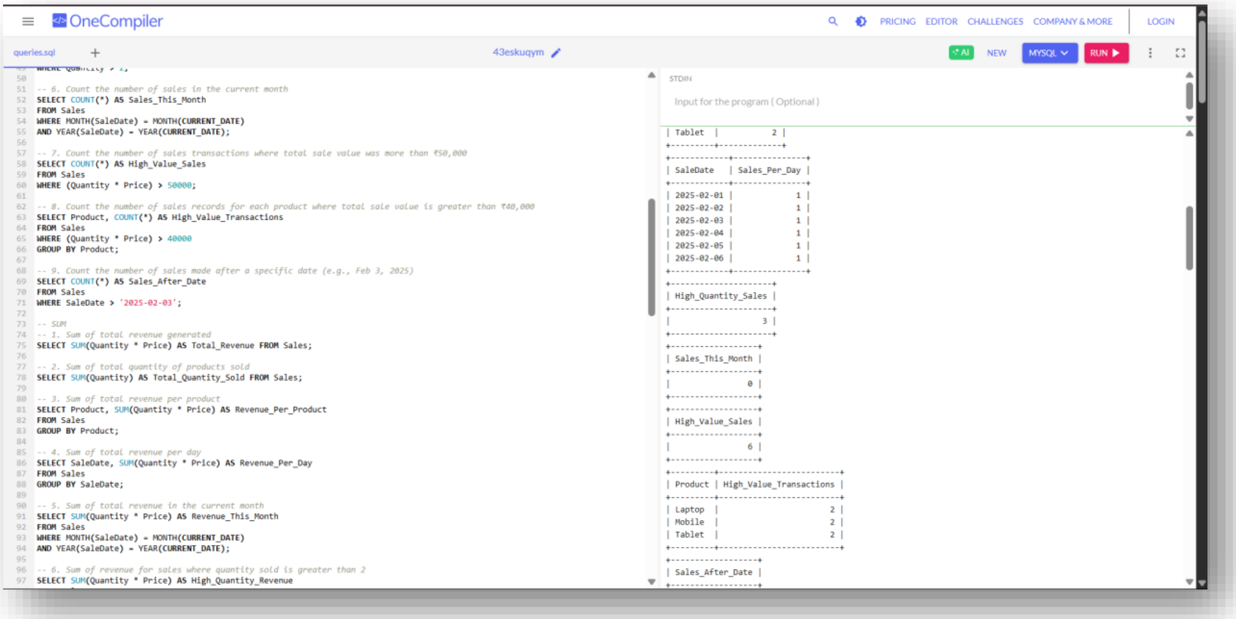
Screenshot of output:



```sql
CREATE TABLE Sales (
    SaleID INT PRIMARY KEY AUTO_INCREMENT,
    Product VARCHAR(50),
    Quantity INT,
    Price DECIMAL(10,2),
    SaleDate DATE
);

INSERT INTO Sales (Product, Quantity, Price, SaleDate) VALUES
('Laptop', 2, 75000.00, '2025-02-01'),
('Mobile', 5, 20000.00, '2025-02-02'),
('Tablet', 3, 30000.00, '2025-02-03'),
('Laptop', 1, 78000.00, '2025-02-04'),
('Mobile', 4, 22000.00, '2025-02-05'),
('Tablet', 2, 32000.00, '2025-02-06');

-- Count the number of sales records
SELECT COUNT(*) AS Total_Sales FROM Sales;

-- Sum of total revenue generated
SELECT SUM(Quantity * Price) AS Total_Revenue FROM Sales;

-- Average price of products sold
SELECT AVG(Price) AS Average_Price FROM Sales;

-- Minimum and Maximum price of a product sold
SELECT MIN(Price) AS Min_Price, MAX(Price) AS Max_Price FROM Sales;

-- COUNT
-- 1. Count the total number of sales records
SELECT COUNT(*) AS Total_Sales FROM Sales;

-- 2. Count the number of distinct products sold
SELECT COUNT(DISTINCT Product) AS Unique_Products FROM Sales;

-- 3. Count the number of sales per product
SELECT Product, COUNT(*) AS Sales_Count
FROM Sales
GROUP BY Product;

-- 4. Count the number of sales per day
SELECT SaleDate, COUNT(*) AS Sales_Per_Day
FROM Sales
GROUP BY SaleDate;

-- 5. Count the number of sales where more than 2 units were sold
SELECT COUNT(*) AS High_Quantity_Sales
FROM Sales
WHERE Quantity > 2;
```

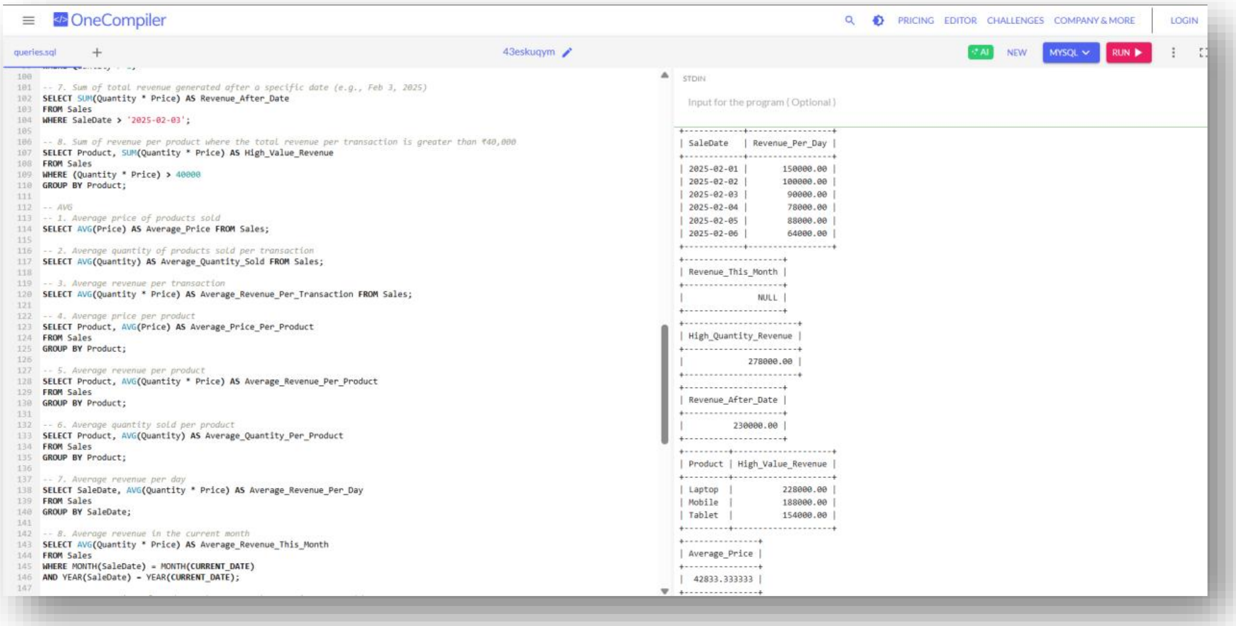
Output:

```
+-------------+
| Total_Sales |
+-------------+
|           6 |
+-------------+
+---------------+
| Total_Revenue |
+---------------+
|     570000.00 |
+---------------+
+---------------+
| Average_Price |
+---------------+
|  42833.333333 |
+---------------+
+-----------+-----------+
| Min_Price | Max_Price |
+-----------+-----------+
|  20000.00 |  78000.00 |
+-----------+-----------+
+-------------+
| Total_Sales |
+-------------+
|           6 |
+-------------+
+-----------------+
| Unique_Products |
+-----------------+
|               3 |
+-----------------+
+---------+-------------+
| Product | Sales_Count |
+---------+-------------+
| Laptop  |           2 |
```



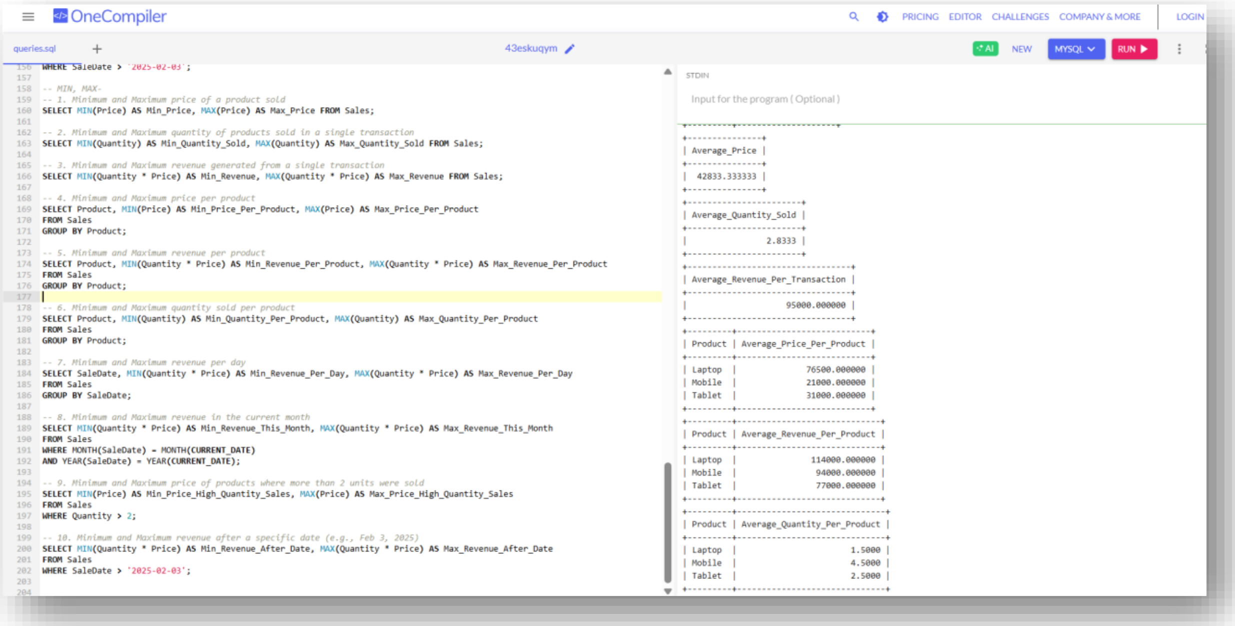
```sql

-- 6. Count the number of sales in the current month
SELECT COUNT(*) AS Sales_This_Month
FROM Sales
WHERE MONTH(SaleDate) = MONTH(CURRENT_DATE)
AND YEAR(SaleDate) = YEAR(CURRENT_DATE);

-- 7. Count the number of sales transactions where total sale value was more than ₹50,000
SELECT COUNT(*) AS High_Value_Sales
FROM Sales
WHERE (Quantity * Price) > 50000;

-- 8. Count the number of sales records for each product where total sale value is greater than ₹40,000
SELECT Product, COUNT(*) AS High_Value_Transactions
FROM Sales
WHERE (Quantity * Price) > 40000
GROUP BY Product;

-- 9. Count the number of sales made after a specific date (e.g., Feb 3, 2025)
SELECT COUNT(*) AS Sales_After_Date
FROM Sales
WHERE SaleDate > '2025-02-03';

-- SUM
-- 1. Sum of total revenue generated
SELECT SUM(Quantity * Price) AS Total_Revenue FROM Sales;

-- 2. Sum of total quantity of products sold
SELECT SUM(Quantity) AS Total_Quantity_Sold FROM Sales;

-- 3. Sum of total revenue per product
SELECT Product, SUM(Quantity * Price) AS Revenue_Per_Product
FROM Sales
GROUP BY Product;

-- 4. Sum of total revenue per day
SELECT SaleDate, SUM(Quantity * Price) AS Revenue_Per_Day
FROM Sales
GROUP BY SaleDate;

-- 5. Sum of total revenue in the current month
SELECT SUM(Quantity * Price) AS Revenue_This_Month
FROM Sales
WHERE MONTH(SaleDate) = MONTH(CURRENT_DATE)
AND YEAR(SaleDate) = YEAR(CURRENT_DATE);

-- 6. Sum of revenue for sales where quantity sold is greater than 2
SELECT SUM(Quantity * Price) AS High_Quantity_Revenue
```

```
| Tablet  |          2 |
+---------+------------+
+------------+--------------+
| SaleDate   | Sales_Per_Day |
+------------+--------------+
| 2025-02-01 |            1 |
| 2025-02-02 |            1 |
| 2025-02-03 |            1 |
| 2025-02-04 |            1 |
| 2025-02-05 |            1 |
| 2025-02-06 |            1 |
+------------+--------------+
+---------------------+
| High_Quantity_Sales |
+---------------------+
|                   3 |
+---------------------+
+------------------+
| Sales_This_Month |
+------------------+
|                0 |
+------------------+
+------------------+
| High_Value_Sales |
+------------------+
|                6 |
+------------------+
+---------+-------------------------+
| Product | High_Value_Transactions |
+---------+-------------------------+
| Laptop  |                       2 |
| Mobile  |                       2 |
| Tablet  |                       2 |
+---------+-------------------------+
+------------------+
| Sales_After_Date |
+------------------+
```



```sql

-- 7. Sum of total revenue generated after a specific date (e.g., Feb 3, 2025)
SELECT SUM(Quantity * Price) AS Revenue_After_Date
FROM Sales
WHERE SaleDate > '2025-02-03';

-- 8. Sum of revenue per product where the total revenue per transaction is greater than ₹40,000
SELECT Product, SUM(Quantity * Price) AS High_Value_Revenue
FROM Sales
WHERE (Quantity * Price) > 40000
GROUP BY Product;

-- AVG
-- 1. Average price of products sold
SELECT AVG(Price) AS Average_Price FROM Sales;

-- 2. Average quantity of products sold per transaction
SELECT AVG(Quantity) AS Average_Quantity_Sold FROM Sales;

-- 3. Average revenue per transaction
SELECT AVG(Quantity * Price) AS Average_Revenue_Per_Transaction FROM Sales;

-- 4. Average price per product
SELECT Product, AVG(Price) AS Average_Price_Per_Product
FROM Sales
GROUP BY Product;

-- 5. Average revenue per product
SELECT Product, AVG(Quantity * Price) AS Average_Revenue_Per_Product
FROM Sales
GROUP BY Product;

-- 6. Average quantity sold per product
SELECT Product, AVG(Quantity) AS Average_Quantity_Per_Product
FROM Sales
GROUP BY Product;

-- 7. Average revenue per day
SELECT SaleDate, AVG(Quantity * Price) AS Average_Revenue_Per_Day
FROM Sales
GROUP BY SaleDate;

-- 8. Average revenue in the current month
SELECT AVG(Quantity * Price) AS Average_Revenue_This_Month
FROM Sales
WHERE MONTH(SaleDate) = MONTH(CURRENT_DATE)
AND YEAR(SaleDate) = YEAR(CURRENT_DATE);

```

```
+------------+-----------------+
| SaleDate   | Revenue_Per_Day |
+------------+-----------------+
| 2025-02-01 |       150000.00 |
| 2025-02-02 |       100000.00 |
| 2025-02-03 |        90000.00 |
| 2025-02-04 |        78000.00 |
| 2025-02-05 |        88000.00 |
| 2025-02-06 |        64000.00 |
+------------+-----------------+
+--------------------+
| Revenue_This_Month |
+--------------------+
|               NULL |
+--------------------+
+-----------------------+
| High_Quantity_Revenue |
+-----------------------+
|             278000.00 |
+-----------------------+
+--------------------+
| Revenue_After_Date |
+--------------------+
|          230000.00 |
+--------------------+
+---------+--------------------+
| Product | High_Value_Revenue |
+---------+--------------------+
| Laptop  |          228000.00 |
| Mobile  |          188000.00 |
| Tablet  |          154000.00 |
+---------+--------------------+
+---------------+
| Average_Price |
+---------------+
|  42833.333333 |
+---------------+
```



```sql
WHERE SaleDate > '2025-02-03';

-- MIN, MAX-
-- 1. Minimum and Maximum price of a product sold
SELECT MIN(Price) AS Min_Price, MAX(Price) AS Max_Price FROM Sales;

-- 2. Minimum and Maximum quantity of products sold in a single transaction
SELECT MIN(Quantity) AS Min_Quantity_Sold, MAX(Quantity) AS Max_Quantity_Sold FROM Sales;

-- 3. Minimum and Maximum revenue generated from a single transaction
SELECT MIN(Quantity * Price) AS Min_Revenue, MAX(Quantity * Price) AS Max_Revenue FROM Sales;

-- 4. Minimum and Maximum price per product
SELECT Product, MIN(Price) AS Min_Price_Per_Product, MAX(Price) AS Max_Price_Per_Product
FROM Sales
GROUP BY Product;

-- 5. Minimum and Maximum revenue per product
SELECT Product, MIN(Quantity * Price) AS Min_Revenue_Per_Product, MAX(Quantity * Price) AS Max_Revenue_Per_Product
FROM Sales
GROUP BY Product;

-- 6. Minimum and Maximum quantity sold per product
SELECT Product, MIN(Quantity) AS Min_Quantity_Per_Product, MAX(Quantity) AS Max_Quantity_Per_Product
FROM Sales
GROUP BY Product;

-- 7. Minimum and Maximum revenue per day
SELECT SaleDate, MIN(Quantity * Price) AS Min_Revenue_Per_Day, MAX(Quantity * Price) AS Max_Revenue_Per_Day
FROM Sales
GROUP BY SaleDate;

-- 8. Minimum and Maximum revenue in the current month
SELECT MIN(Quantity * Price) AS Min_Revenue_This_Month, MAX(Quantity * Price) AS Max_Revenue_This_Month
FROM Sales
WHERE MONTH(SaleDate) = MONTH(CURRENT_DATE)
AND YEAR(SaleDate) = YEAR(CURRENT_DATE);

-- 9. Minimum and Maximum price of products where more than 2 units were sold
SELECT MIN(Price) AS Min_Price_High_Quantity_Sales, MAX(Price) AS Max_Price_High_Quantity_Sales
FROM Sales
WHERE Quantity > 2;

-- 10. Minimum and Maximum revenue after a specific date (e.g., Feb 3, 2025)
SELECT MIN(Quantity * Price) AS Min_Revenue_After_Date, MAX(Quantity * Price) AS Max_Revenue_After_Date
FROM Sales
WHERE SaleDate > '2025-02-03';
```

```
+---------+--------------------+
+---------------+
| Average_Price |
+---------------+
|  42833.333333 |
+---------------+
+----------------------+
| Average_Quantity_Sold |
+----------------------+
|               2.8333 |
+----------------------+
+-------------------------------+
| Average_Revenue_Per_Transaction |
+-------------------------------+
|                  95000.000000 |
+-------------------------------+
+---------+-------------------------+
| Product | Average_Price_Per_Product |
+---------+-------------------------+
| Laptop  |            76500.000000 |
| Mobile  |            21000.000000 |
| Tablet  |            31000.000000 |
+---------+-------------------------+
+---------+---------------------------+
| Product | Average_Revenue_Per_Product |
+---------+---------------------------+
| Laptop  |             114000.000000 |
| Mobile  |              94000.000000 |
| Tablet  |              77000.000000 |
+---------+---------------------------+
+---------+----------------------------+
| Product | Average_Quantity_Per_Product |
+---------+----------------------------+
| Laptop  |                     1.5000 |
| Mobile  |                     4.5000 |
| Tablet  |                     2.5000 |
+---------+----------------------------+
```

Practical No: 8

Aim: To Given Customers and Orders tables, write SQL queries to perform INNERJOIN, LEFTJOIN, and RIGHT JOIN to retrieve combined data for customer orders.

Code:

```
CREATE TABLE Customers (
   CustomerID INT PRIMARY KEY,
   Name VARCHAR(100),
   Email VARCHAR(100)
);
CREATE TABLE Orders (
   OrderID INT PRIMARY KEY,
   CustomerID INT,
   Product VARCHAR(100),
   OrderDate DATE,
   FOREIGN KEY (CustomerID) REFERENCES Customers(CustomerID)
);
INSERT INTO Customers (CustomerID, Name, Email)
VALUES
(1, 'Alice', 'alice@example.com'),
(2, 'Bob', 'bob@example.com'),
(3, 'Charlie', 'charlie@example.com'),
(4, 'Diana', 'diana@example.com');

INSERT INTO Orders (OrderID, CustomerID, Product, OrderDate)
VALUES
(101, 1, 'Laptop', '2024-12-01'),
(102, 2, 'Keyboard', '2024-12-02'),
(103, 1, 'Mouse', '2024-12-03'),
(104, 3, 'Monitor', '2024-12-04');


SELECT Customers.CustomerID, Customers.Name, Orders.Product, Orders.OrderDate
FROM Customers
```

INNER JOIN Orders ON Customers.CustomerID = Orders.CustomerID;

SELECT Customers.CustomerID, Customers.Name, Orders.Product, Orders.OrderDate

FROM Customers

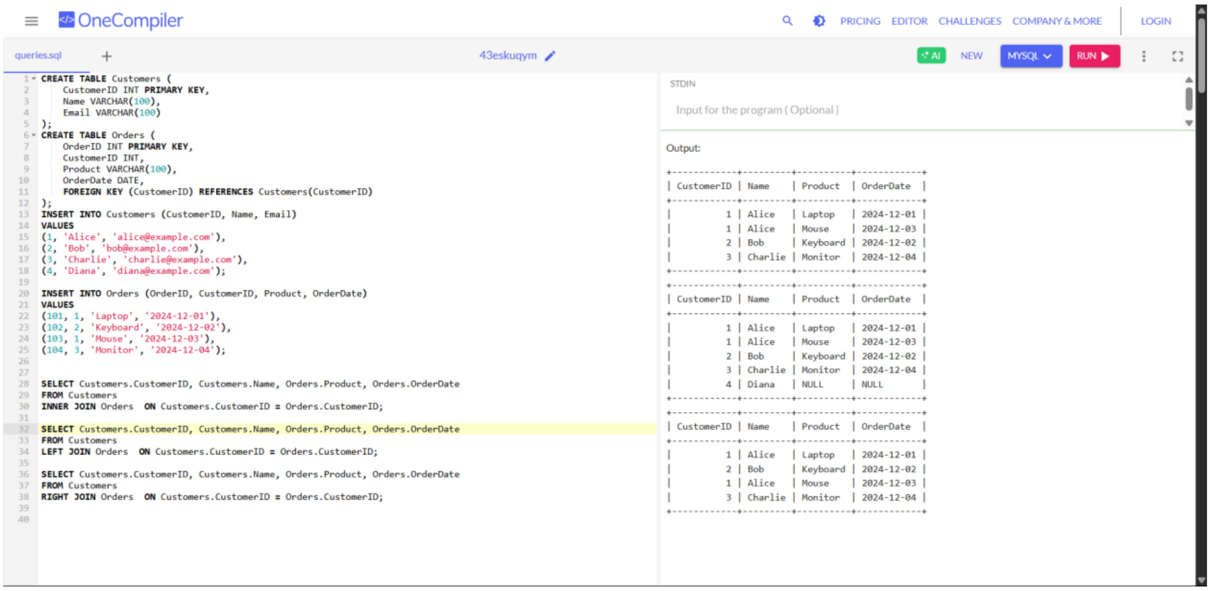
LEFT JOIN Orders ON Customers.CustomerID = Orders.CustomerID;

SELECT Customers.CustomerID, Customers.Name, Orders.Product, Orders.OrderDate

FROM Customers

RIGHT JOIN Orders ON Customers.CustomerID = Orders.CustomerID;

Screenshot of output:



```sql
CREATE TABLE Customers (
    CustomerID INT PRIMARY KEY,
    Name VARCHAR(100),
    Email VARCHAR(100)
);
CREATE TABLE Orders (
    OrderID INT PRIMARY KEY,
    CustomerID INT,
    Product VARCHAR(100),
    OrderDate DATE,
    FOREIGN KEY (CustomerID) REFERENCES Customers(CustomerID)
);
INSERT INTO Customers (CustomerID, Name, Email)
VALUES
(1, 'Alice', 'alice@example.com'),
(2, 'Bob', 'bob@example.com'),
(3, 'Charlie', 'charlie@example.com'),
(4, 'Diana', 'diana@example.com');

INSERT INTO Orders (OrderID, CustomerID, Product, OrderDate)
VALUES
(101, 1, 'Laptop', '2024-12-01'),
(102, 2, 'Keyboard', '2024-12-02'),
(103, 1, 'Mouse', '2024-12-03'),
(104, 3, 'Monitor', '2024-12-04');


SELECT Customers.CustomerID, Customers.Name, Orders.Product, Orders.OrderDate
FROM Customers
INNER JOIN Orders  ON Customers.CustomerID = Orders.CustomerID;

SELECT Customers.CustomerID, Customers.Name, Orders.Product, Orders.OrderDate
FROM Customers
LEFT JOIN Orders  ON Customers.CustomerID = Orders.CustomerID;

SELECT Customers.CustomerID, Customers.Name, Orders.Product, Orders.OrderDate
FROM Customers
RIGHT JOIN Orders  ON Customers.CustomerID = Orders.CustomerID;
```

Output:

```
+------------+---------+----------+------------+
| CustomerID | Name    | Product  | OrderDate  |
+------------+---------+----------+------------+
|          1 | Alice   | Laptop   | 2024-12-01 |
|          1 | Alice   | Mouse    | 2024-12-03 |
|          2 | Bob     | Keyboard | 2024-12-02 |
|          3 | Charlie | Monitor  | 2024-12-04 |
+------------+---------+----------+------------+
+------------+---------+----------+------------+
| CustomerID | Name    | Product  | OrderDate  |
+------------+---------+----------+------------+
|          1 | Alice   | Laptop   | 2024-12-01 |
|          1 | Alice   | Mouse    | 2024-12-03 |
|          2 | Bob     | Keyboard | 2024-12-02 |
|          3 | Charlie | Monitor  | 2024-12-04 |
|          4 | Diana   | NULL     | NULL       |
+------------+---------+----------+------------+
+------------+---------+----------+------------+
| CustomerID | Name    | Product  | OrderDate  |
+------------+---------+----------+------------+
|          1 | Alice   | Laptop   | 2024-12-01 |
|          2 | Bob     | Keyboard | 2024-12-02 |
|          1 | Alice   | Mouse    | 2024-12-03 |
|          3 | Charlie | Monitor  | 2024-12-04 |
+------------+---------+----------+------------+
```