Manav Rachna International Institute of Research and Studies

ORACLE LAB

Krish Mendiratta 22/FCA/BCA(CS)/022

EXERCISE 1

AIM: Create the following table

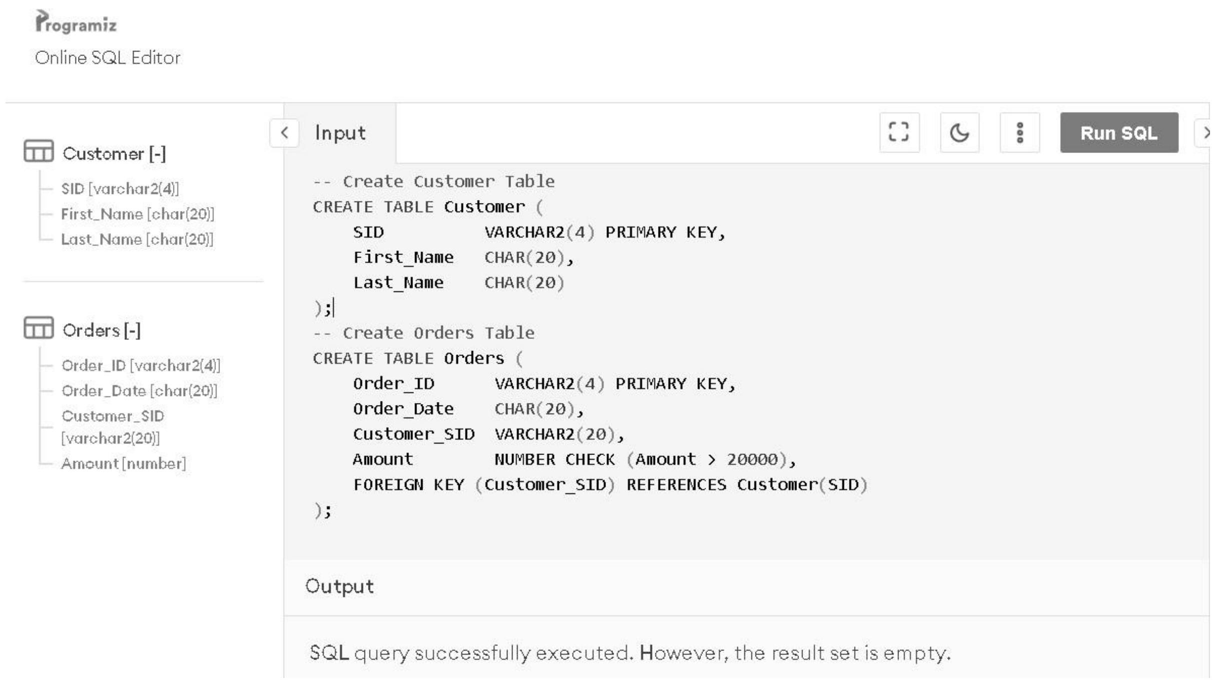
Customer

Column_name	**Data type**	**Size**	**Constraint**
SID	Varchar2	4	Primary Key
First_Name	Char	20	
Last_name	Char	20	

Orders

Column_name	**Data type**	**Size**	**Constraint**
Order_ID	Varchar2	4	Primary Key
Order_date	Char	20	
Customer_SID	Varchar2	20	Foreign Key
Amount	Number		Check > 20000

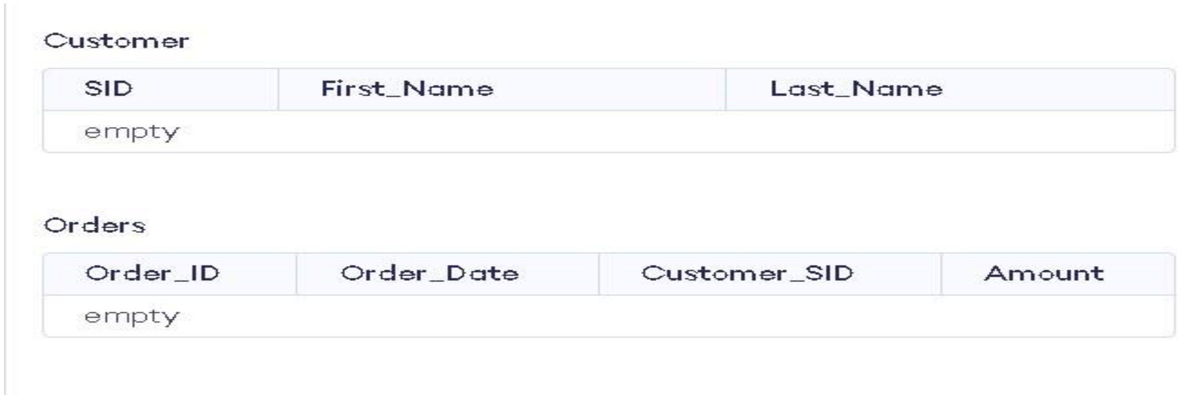
Table Creation:



```
-- Create Customer Table
CREATE TABLE Customer (
    SID         VARCHAR2(4) PRIMARY KEY,
    First_Name  CHAR(20),
    Last_Name   CHAR(20)
);
-- Create Orders Table
CREATE TABLE Orders (
    Order_ID     VARCHAR2(4) PRIMARY KEY,
    Order_Date   CHAR(20),
    Customer_SID VARCHAR2(20),
    Amount       NUMBER CHECK (Amount > 20000),
    FOREIGN KEY (Customer_SID) REFERENCES Customer(SID)
);
```

```
SQL query successfully executed. However, the result set is empty.
```

Output:



Customer

SID	First_Name	Last_Name
empty		

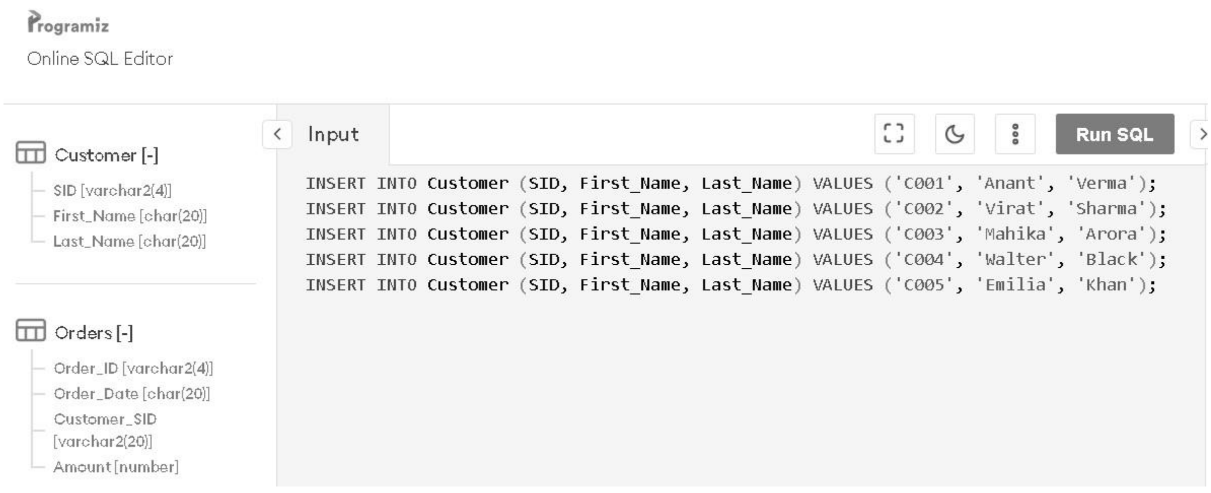
Orders

Order_ID	Order_Date	Customer_SID	Amount
empty			

EXERCISE 2

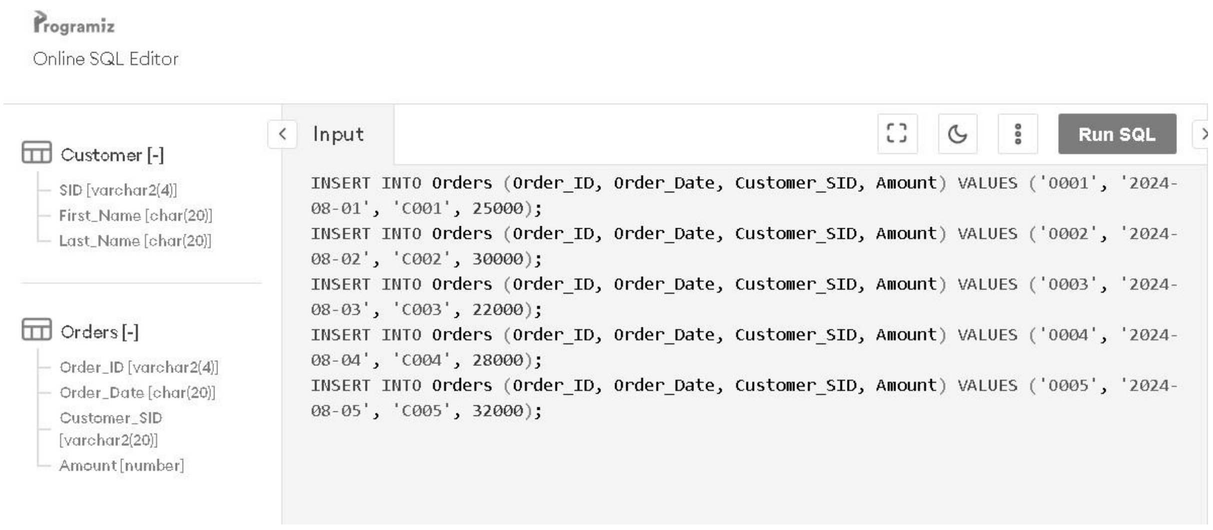
AIM: Insert 5 records for each table.

Inserting record in Customer ->



```
INSERT INTO Customer (SID, First_Name, Last_Name) VALUES ('C001', 'Anant', 'Verma');
INSERT INTO Customer (SID, First_Name, Last_Name) VALUES ('C002', 'Virat', 'Sharma');
INSERT INTO Customer (SID, First_Name, Last_Name) VALUES ('C003', 'Mahika', 'Arora');
INSERT INTO Customer (SID, First_Name, Last_Name) VALUES ('C004', 'Walter', 'Black');
INSERT INTO Customer (SID, First_Name, Last_Name) VALUES ('C005', 'Emilia', 'Khan');
```

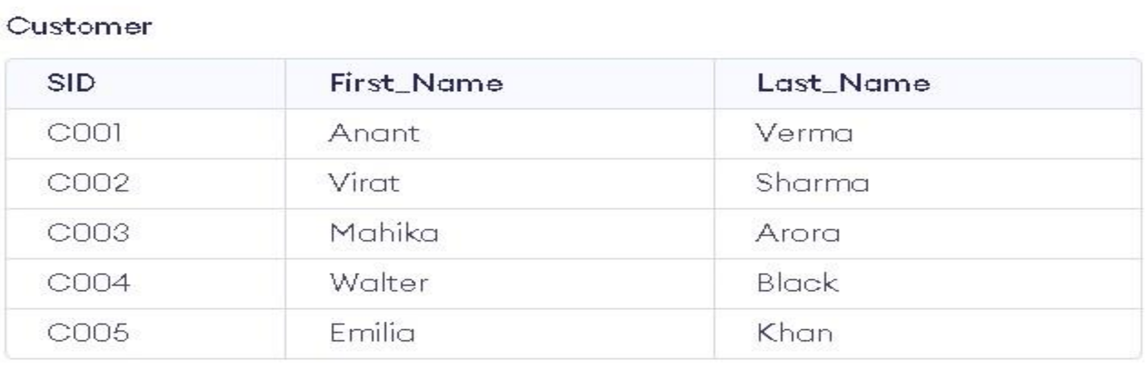
Inserting records Order ->



```
INSERT INTO Orders (Order_ID, Order_Date, Customer_SID, Amount) VALUES ('O001', '2024-
08-01', 'C001', 25000);
INSERT INTO Orders (Order_ID, Order_Date, Customer_SID, Amount) VALUES ('O002', '2024-
08-02', 'C002', 30000);
INSERT INTO Orders (Order_ID, Order_Date, Customer_SID, Amount) VALUES ('O003', '2024-
08-03', 'C003', 22000);
INSERT INTO Orders (Order_ID, Order_Date, Customer_SID, Amount) VALUES ('O004', '2024-
08-04', 'C004', 28000);
INSERT INTO Orders (Order_ID, Order_Date, Customer_SID, Amount) VALUES ('O005', '2024-
08-05', 'C005', 32000);
```

Output:

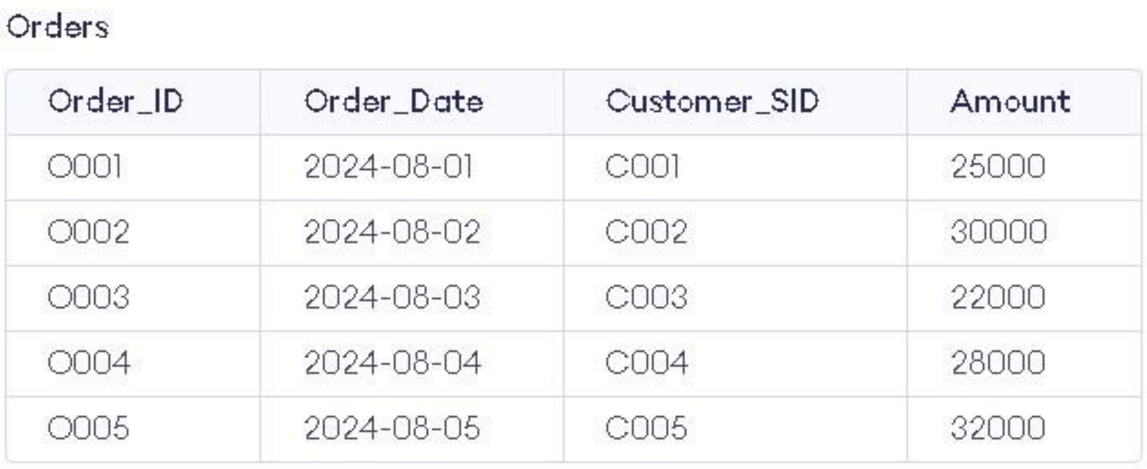
Table output for Customer



Customer

SID	First_Name	Last_Name
C001	Anant	Verma
C002	Virat	Sharma
C003	Mahika	Arora
C004	Walter	Black
C005	Emilia	Khan

Table output for Orders

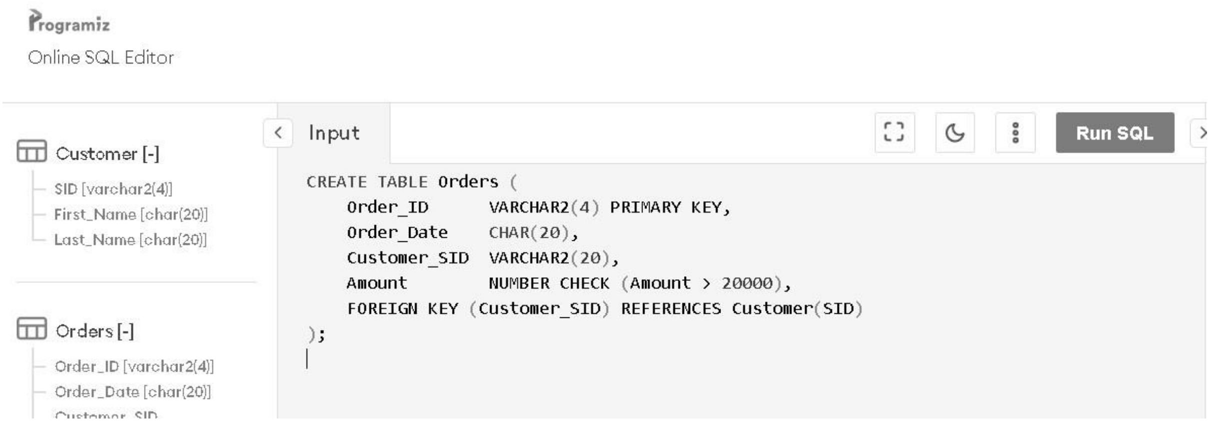


Orders

Order_ID	Order_Date	Customer_SID	Amount
O001	2024-08-01	C001	25000
O002	2024-08-02	C002	30000
O003	2024-08-03	C003	22000
O004	2024-08-04	C004	28000
O005	2024-08-05	C005	32000

EXERCISE 3

AIM: Customer SID column in the ORDERS table is a foreign key pointing to the SID column in the CUSTOMER table.



```
CREATE TABLE Orders (
    Order_ID      VARCHAR2(4) PRIMARY KEY,
    Order_Date    CHAR(20),
    Customer_SID  VARCHAR2(20),
    Amount        NUMBER CHECK (Amount > 20000),
    FOREIGN KEY (Customer_SID) REFERENCES Customer(SID)
);
```

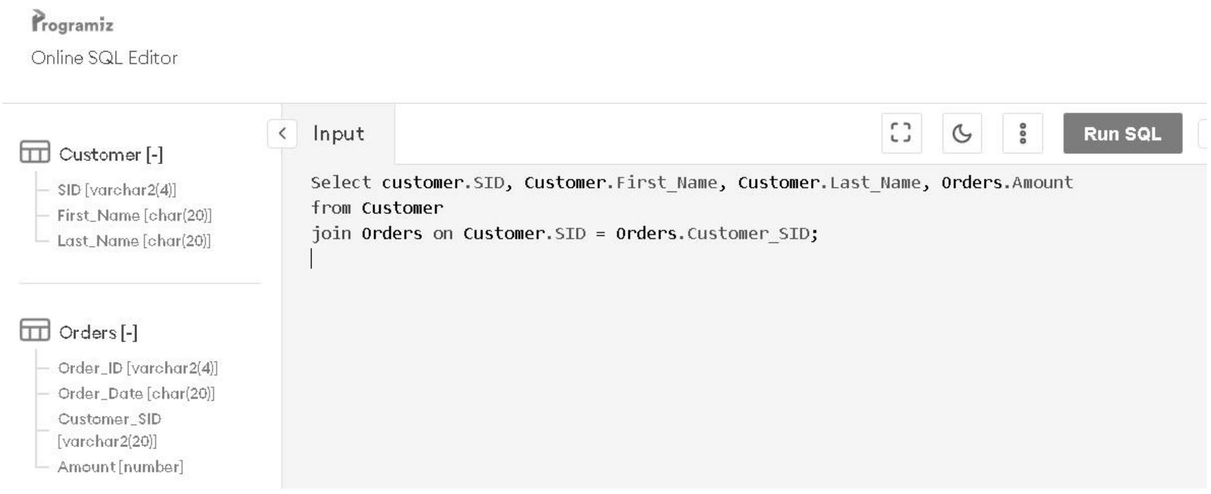
Output:

```
SQL query successfully executed. However, the result set is empty.
```

In this code:

- **The ‘Customer_SID’ column is a foreign key that links each order to a specific customer.**
- **The foreign key constraint ensures that any ‘Customer_SID’ in the Orders table must match an existing SID in the Customer table. This prevents orders from being associated with non-existent customers.**

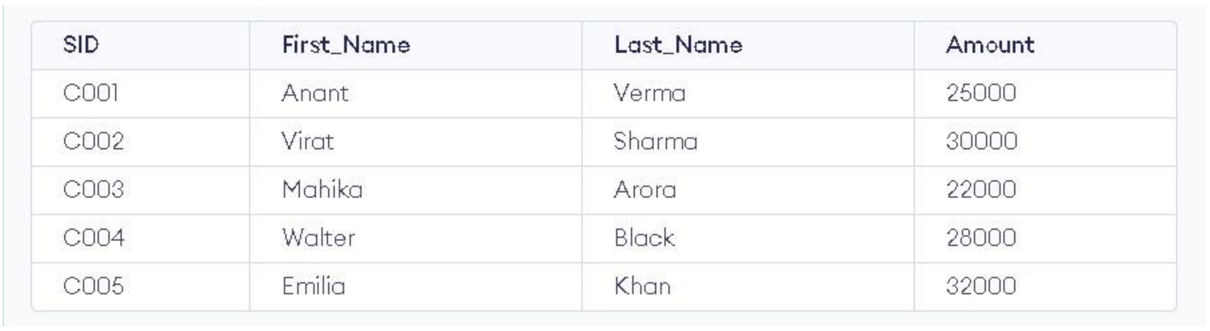
AIM: List the details of the customers along with the amount.



```
Select customer.SID, Customer.First_Name, Customer.Last_Name, Orders.Amount
from Customer
join Orders on Customer.SID = Orders.Customer_SID;
```

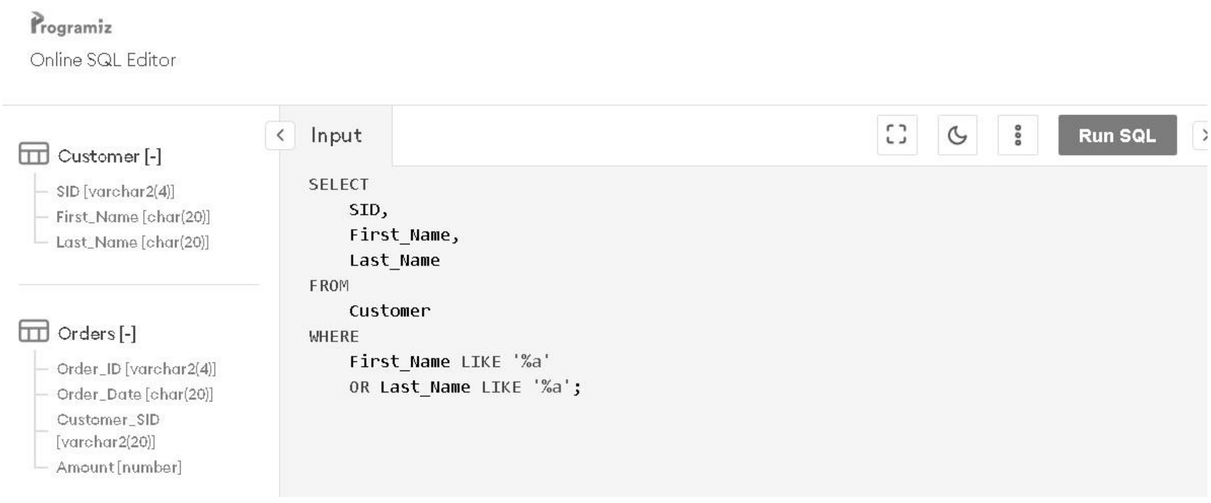
Output:

EXERCISE 4



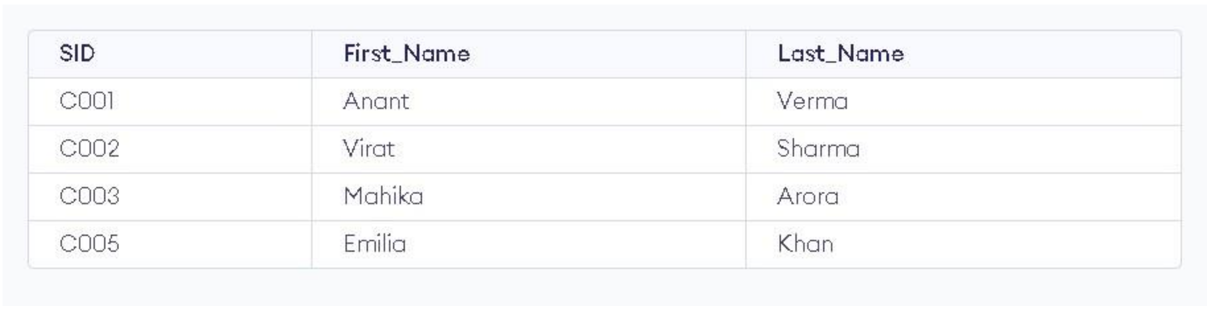
SID	First_Name	Last_Name	Amount
C001	Anant	Verma	25000
C002	Virat	Sharma	30000
C003	Mahika	Arora	22000
C004	Walter	Black	28000
C005	Emilia	Khan	32000

AIM: List the customers whose names end with "a".



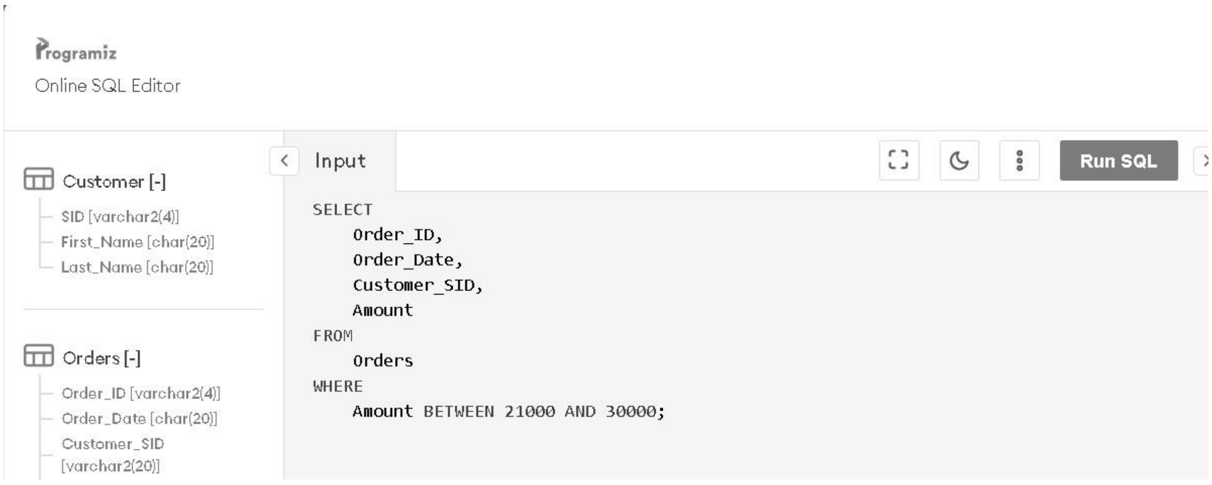
```
SELECT
    SID,
    First_Name,
    Last_Name
FROM
    Customer
WHERE
    First_Name LIKE '%a'
    OR Last_Name LIKE '%a';
```

Output:



SID	First_Name	Last_Name
C001	Anant	Verma
C002	Virat	Sharma
C003	Mahika	Arora
C005	Emilia	Khan

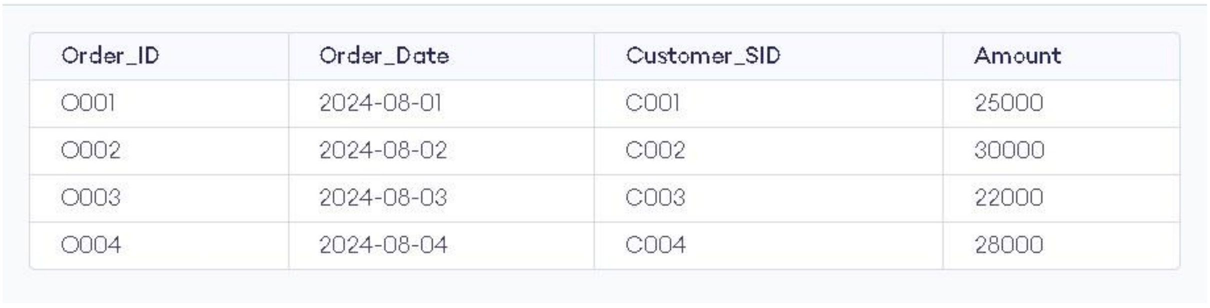
AIM: List the orders where amount is between 21000 and 30000



```
SELECT
    Order_ID,
    Order_Date,
    Customer_SID,
    Amount
FROM
    Orders
WHERE
    Amount BETWEEN 21000 AND 30000;
```

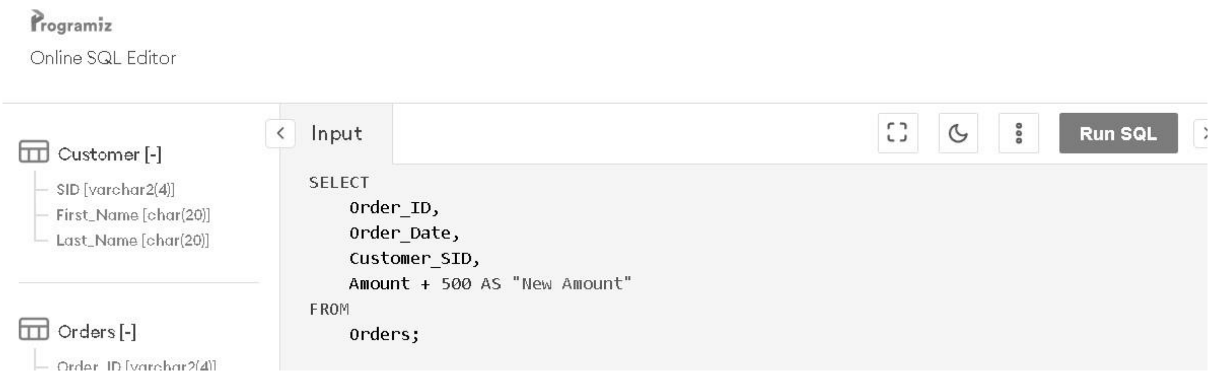
EXERCISE 5

Output:



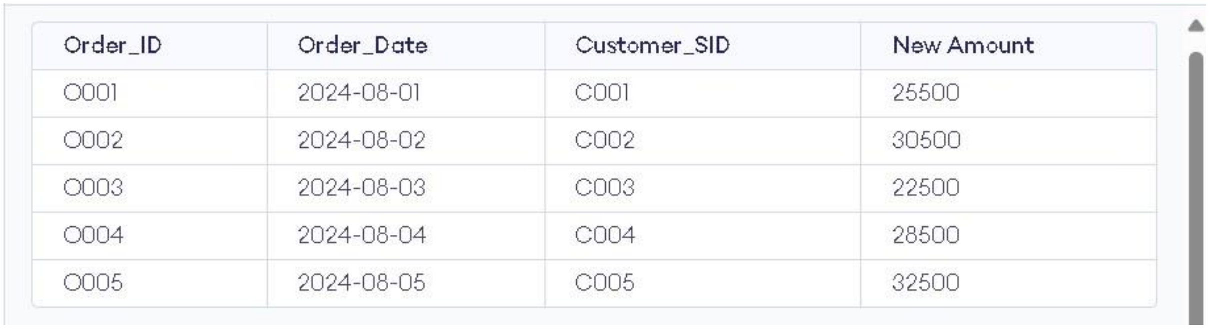
Order_ID	Order_Date	Customer_SID	Amount
O001	2024-08-01	C001	25000
O002	2024-08-02	C002	30000
O003	2024-08-03	C003	22000
O004	2024-08-04	C004	28000

AIM: List the orders where amount is increased by 500 and replace with name “new amount”



```
SELECT
    Order_ID,
    Order_Date,
    Customer_SID,
    Amount + 500 AS "New Amount"
FROM
    Orders;
```

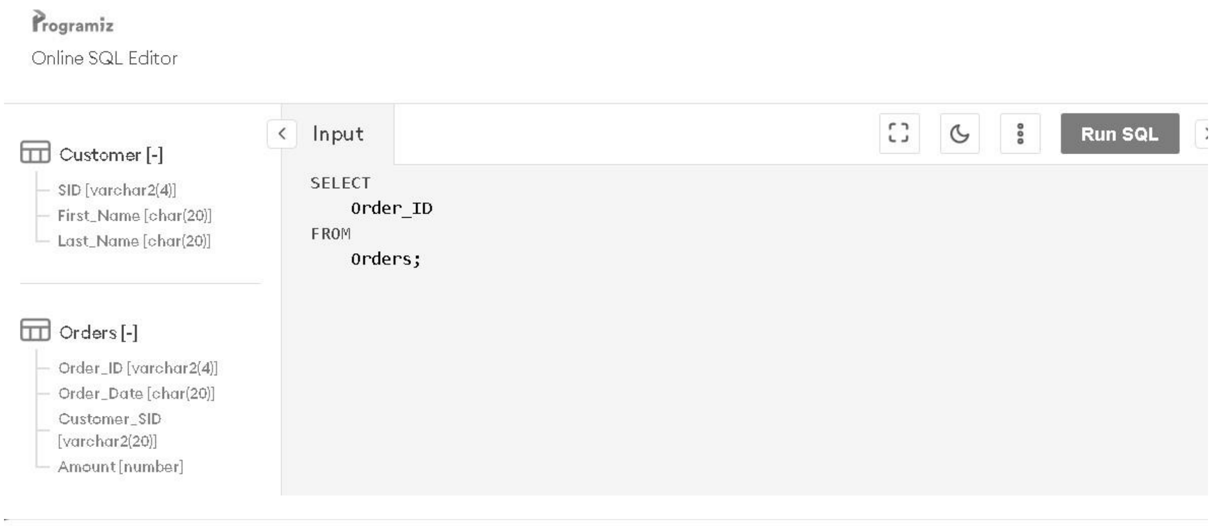
Output:



Order_ID	Order_Date	Customer_SID	New Amount
O001	2024-08-01	C001	25500
O002	2024-08-02	C002	30500
O003	2024-08-03	C003	22500
O004	2024-08-04	C004	28500
O005	2024-08-05	C005	32500

AIM: Display the order_id and total amount of orders.

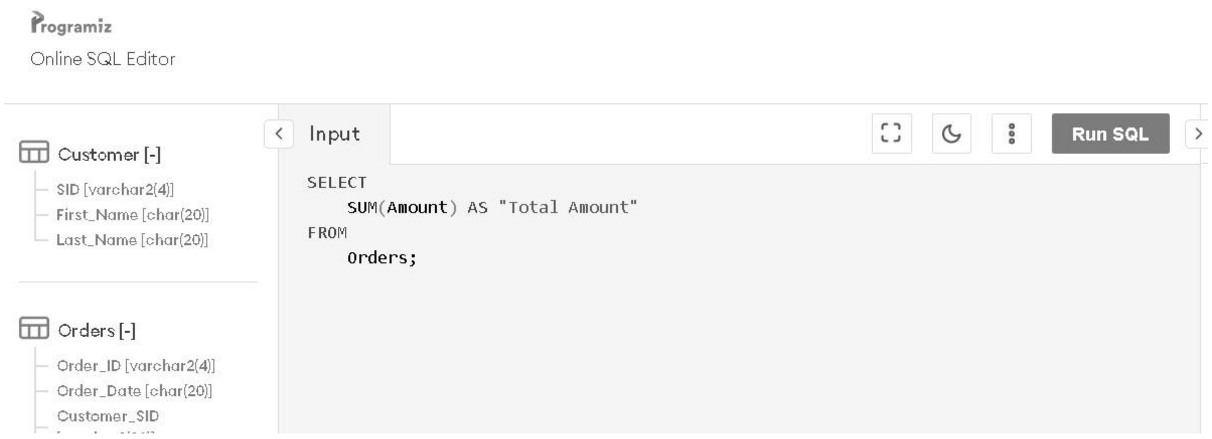
EXERCISE 6



Customer [-]
- SID [varchar2(4)]
- First_Name [char(20)]
- Last_Name [char(20)]

Orders [-]
- Order_ID [varchar2(4)]
- Order_Date [char(20)]
- Customer_SID [varchar2(20)]
- Amount [number]

```
SELECT
    Order_ID
FROM
    Orders;
```



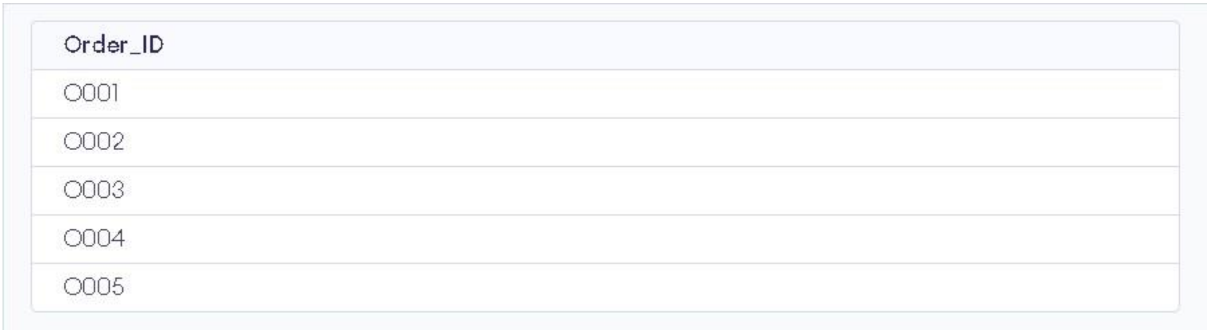
Customer [-]
- SID [varchar2(4)]
- First_Name [char(20)]
- Last_Name [char(20)]

Orders [-]
- Order_ID [varchar2(4)]
- Order_Date [char(20)]
- Customer_SID

```
SELECT
    SUM(Amount) AS "Total Amount"
FROM
    Orders;
```

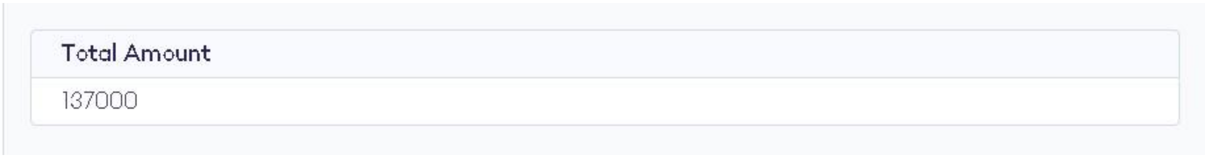
Output:

Table output for Order_ID from Orders ->



Order_ID
O001
O002
O003
O004
O005

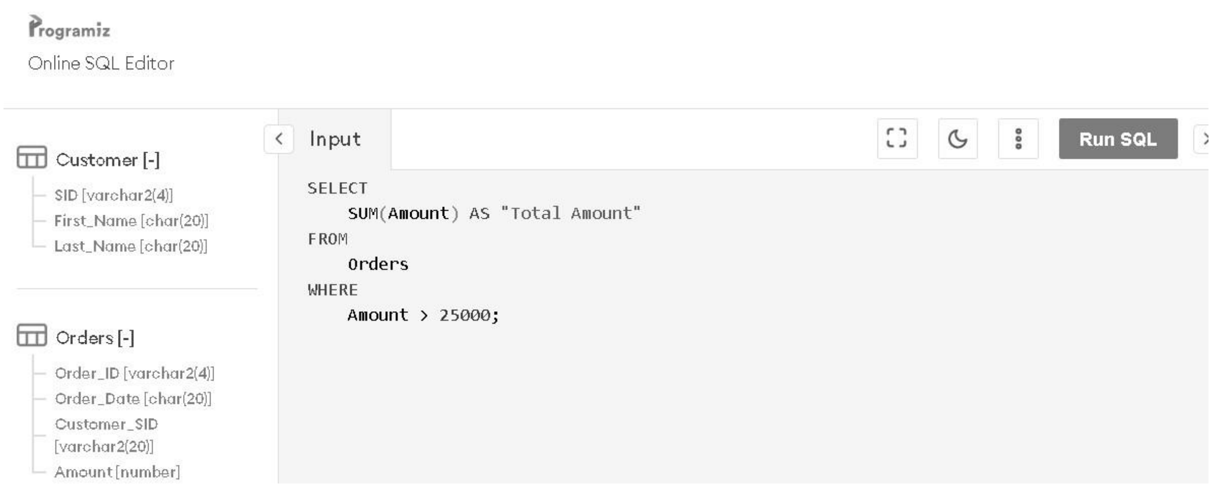
Output for Total amount of all Orders ->



Total Amount
137000

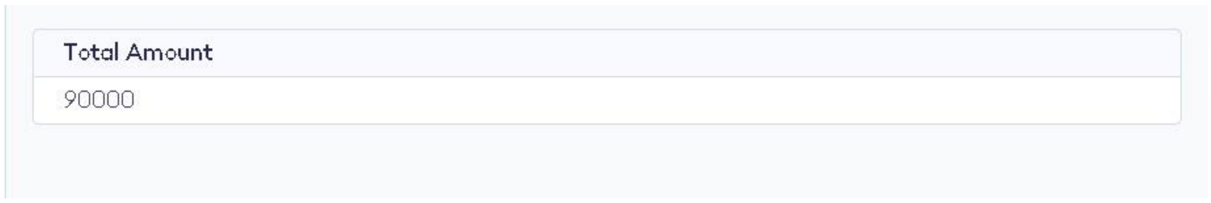
AIM: Calculate the total amount of orders that has more than 25000.

EXERCISE 7



```
SELECT
    SUM(Amount) AS "Total Amount"
FROM
    Orders
WHERE
    Amount > 25000;
```

Output:



```
Total Amount
90000
```

AIM: Display all the string functions used in SQL.

1. **LENGTH (string)**
   - **Returns the length of a string.**
2. **LOWER (string)**
   - **Converts all characters in a string to lowercase.**
3. **UPPER (string)**
   - **Converts all characters in a string to uppercase.**
4. **SUBSTR (string, start_position, length)**
   - **Extracts a substring from a string starting at a given position for a specified length.**
5. **INSTR (string, substring)**
   - **Returns the position of the first occurrence of a substring within a string.**
6. **TRIM ([LEADING | TRAILING | BOTH] trim_character FROM string)**
   - **Removes specified characters from the beginning (LEADING), end (TRAILING), or both ends (BOTH) of a string. By default, it removes spaces. 7. LTRIM (string)**
   - **Removes leading spaces from a string.**

8. **RTRIM (string)**
   - **Removes trailing spaces from a string.**

EXERCISE 8

9. **REPLACE (string, search_string, replace_string)**
   - **Replaces occurrences of a substring within a string with another substring.**
10. **CONCAT (string1, string2)**
    - **Concatenates two or more strings together.**
11. **LPAD (string, length, pad_string)**
    - **Pads the left side of a string with a specified character up to a certain length.**
12. **RPAD (string, length, pad_string)**
    - **Pads the right side of a string with a specified character up to a certain length.**
13. **LEFT (string, number_of_characters)**
    - **Returns the leftmost n characters from a string.**
14. **RIGHT (string, number_of_characters)**
    - **Returns the rightmost n characters from a string.**
15. **ASCII (character)**
    - **Returns the ASCII code of the first character in a string.**
16. **CHR (ascii_code)**
    - **Converts an ASCII code to its corresponding character.**

17. INITCAP (string)

- **Converts the first letter of each word in a string to uppercase and the rest to lowercase.**

18. REVERSE (string) (Available in some SQL variants like SQL Server)

- **Reverses the characters in a string.**

19. POSITION (substring IN string)

- **Returns the position of the first occurrence of a substring within a string.**

20. SOUNDEX (string)

- **Returns a string's phonetic representation, useful for comparing words that sound alike.**

21. DIFFERENCE (string1, string2) (Available in SQL Server)

- **Compares two strings and returns a value based on their phonetic similarity.**

22. FORMAT (number, format) (Available in SQL Server)

- **Returns a number formatted as a string, according to a specified format.**

23. TRANSLATE (string, from_chars, to_chars) (Available in Oracle SQL)

- **Replaces characters in a string with other characters based on their position.**

24. REPEAT (string, number) (Available in MySQL)

- **Repeats a string a specified number of times.**

25. SPACE (number) (Available in SQL Server)

- **Returns a string of spaces with the specified length.**

These functions are commonly used for manipulating and querying string data across different SQL databases. The availability of these functions may vary depending on the specific SQL database you are using.

EXERCISE 11 AIM:

Create the following table:

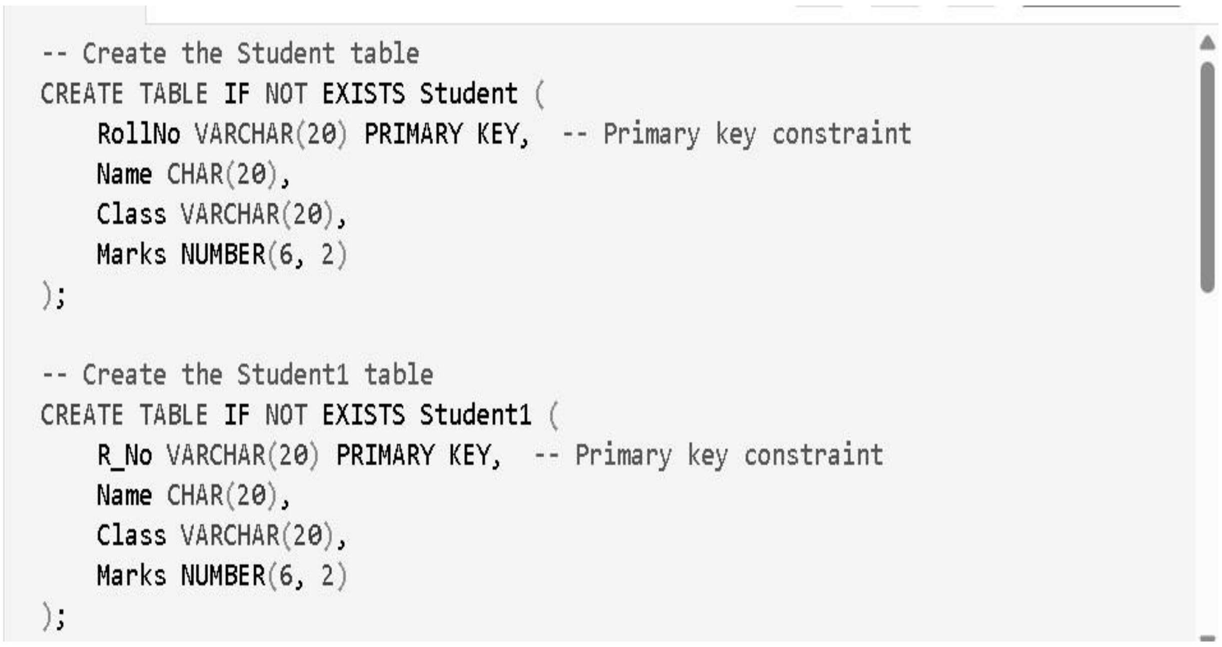
Student

Column_name	**Data type**	**Size**	**Constraint**
RollNo	Varchar2	20	Primary Key
Name	Char	20	
Class	Varchar2	20	
Marks	Number	6,2	

Student1

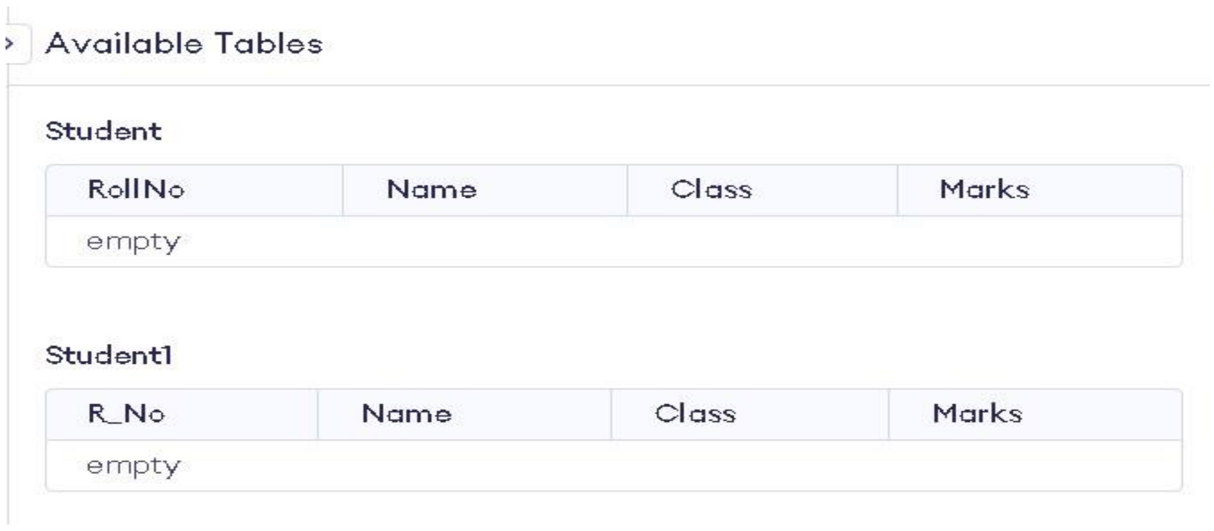
Column_name	**Data type**	**Size**	**Constraint**
R_No	Varchar2	20	Primary Key
Name	Char	20	
Class	Varchar2	20	
Marks	Number	6,2	

Table creation:



```
-- Create the Student table
CREATE TABLE IF NOT EXISTS Student (
    RollNo VARCHAR(20) PRIMARY KEY,  -- Primary key constraint
    Name CHAR(20),
    Class VARCHAR(20),
    Marks NUMBER(6, 2)
);

-- Create the Student1 table
CREATE TABLE IF NOT EXISTS Student1 (
    R_No VARCHAR(20) PRIMARY KEY,  -- Primary key constraint
    Name CHAR(20),
    Class VARCHAR(20),
    Marks NUMBER(6, 2)
);
```

Output:



Available Tables

Student

RollNo	Name	Class	Marks
empty			

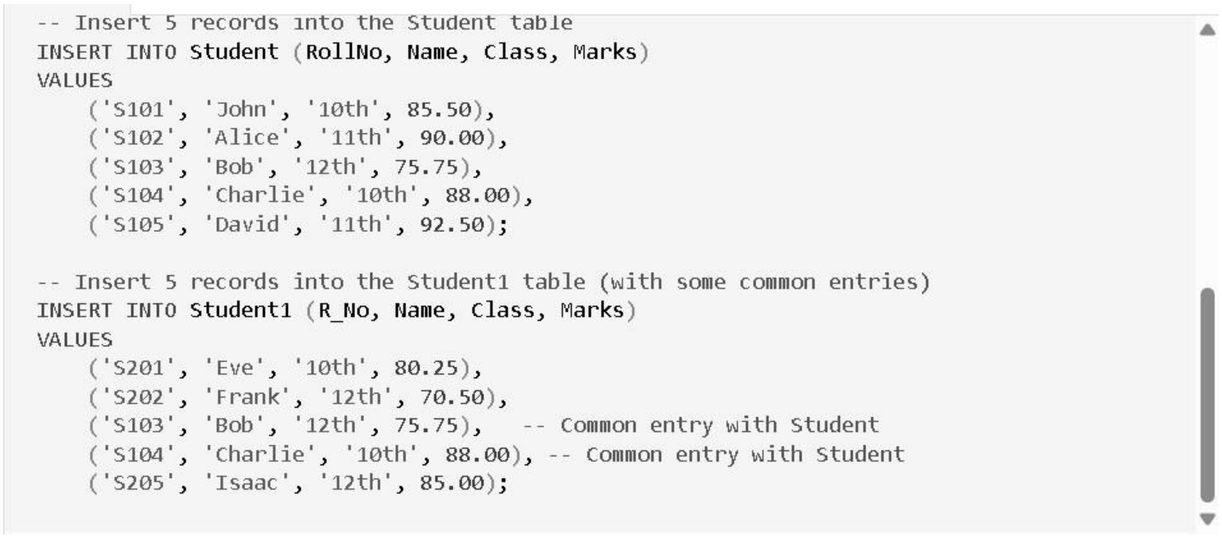
Student1

R_No	Name	Class	Marks
empty			

EXERCISE 12

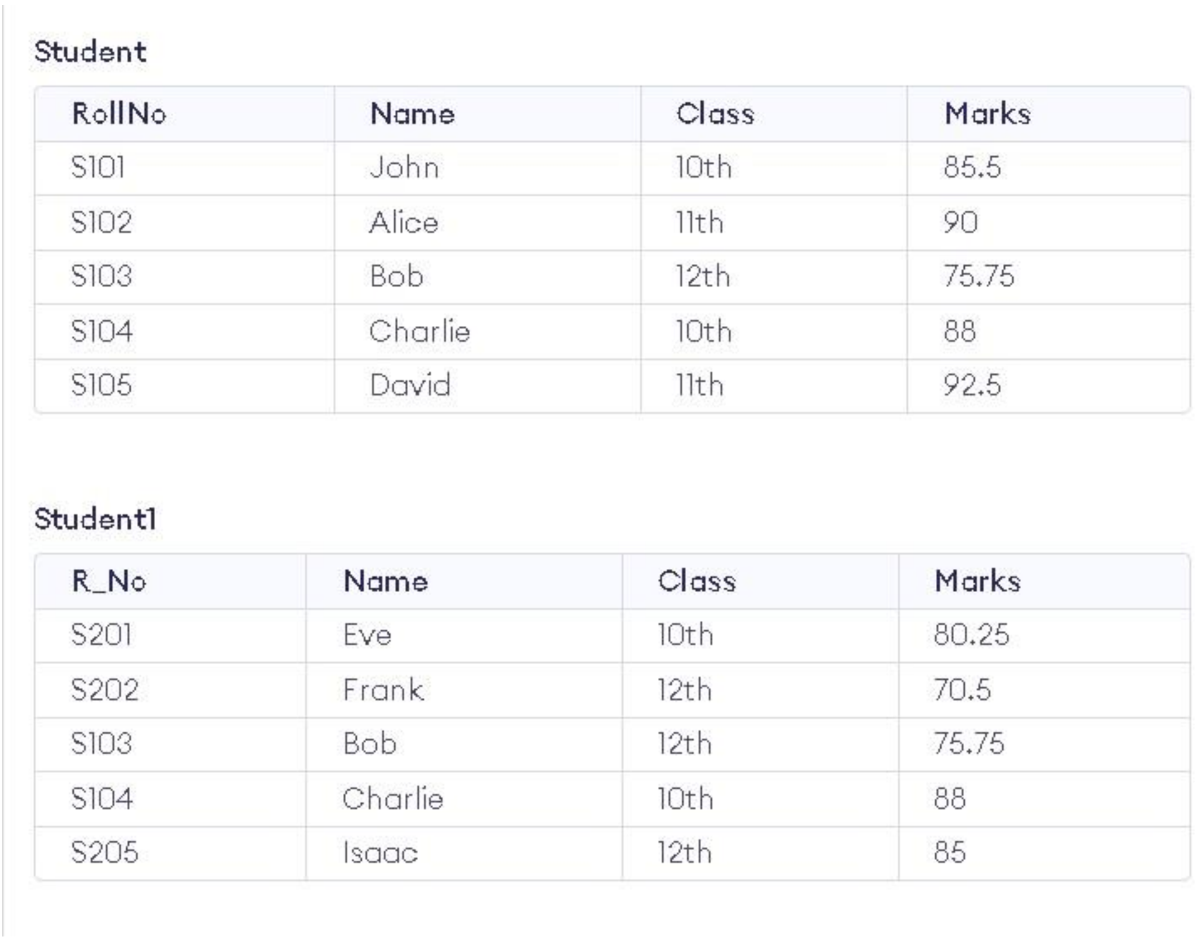
AIM: Display all the contents of student and student1 using union clause.

First insert 5 records in each table i.e. Student and Student1



```
-- Insert 5 records into the Student table
INSERT INTO Student (RollNo, Name, Class, Marks)
VALUES
    ('S101', 'John', '10th', 85.50),
    ('S102', 'Alice', '11th', 90.00),
    ('S103', 'Bob', '12th', 75.75),
    ('S104', 'Charlie', '10th', 88.00),
    ('S105', 'David', '11th', 92.50);

-- Insert 5 records into the Student1 table (with some common entries)
INSERT INTO Student1 (R_No, Name, Class, Marks)
VALUES
    ('S201', 'Eve', '10th', 80.25),
    ('S202', 'Frank', '12th', 70.50),
    ('S103', 'Bob', '12th', 75.75),    -- Common entry with Student
    ('S104', 'Charlie', '10th', 88.00), -- Common entry with Student
    ('S205', 'Isaac', '12th', 85.00);
```

Output:



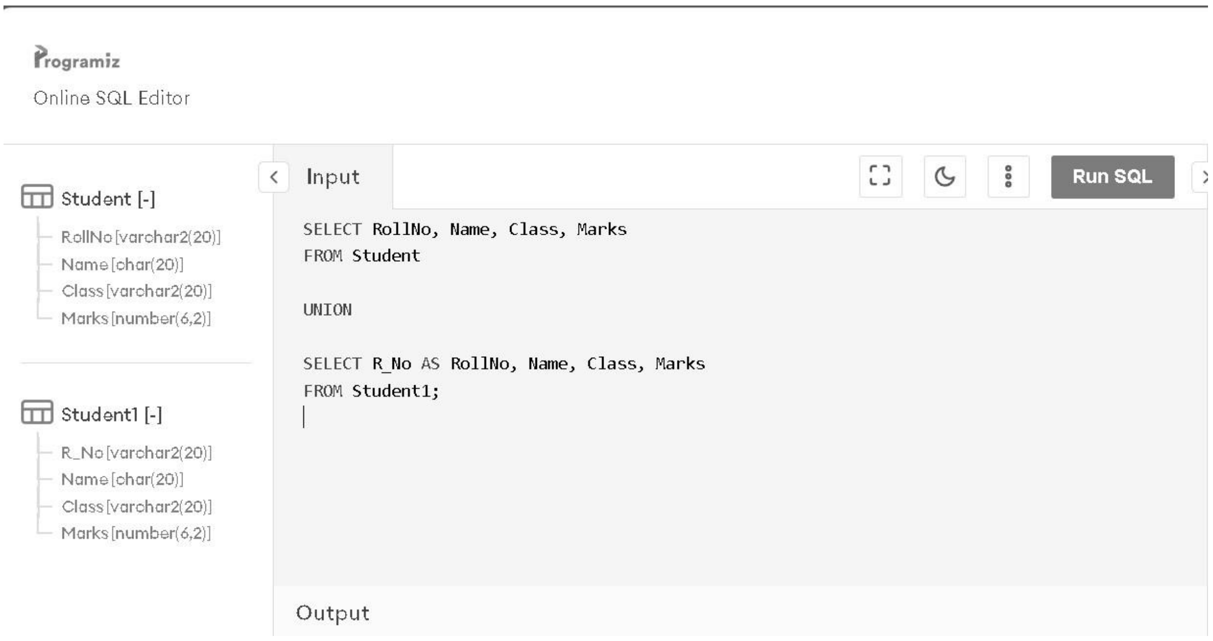
Student

RollNo	Name	Class	Marks
S101	John	10th	85.5
S102	Alice	11th	90
S103	Bob	12th	75.75
S104	Charlie	10th	88
S105	David	11th	92.5

Student1

R_No	Name	Class	Marks
S201	Eve	10th	80.25
S202	Frank	12th	70.5
S103	Bob	12th	75.75
S104	Charlie	10th	88
S205	Isaac	12th	85

Now union:


Programiz

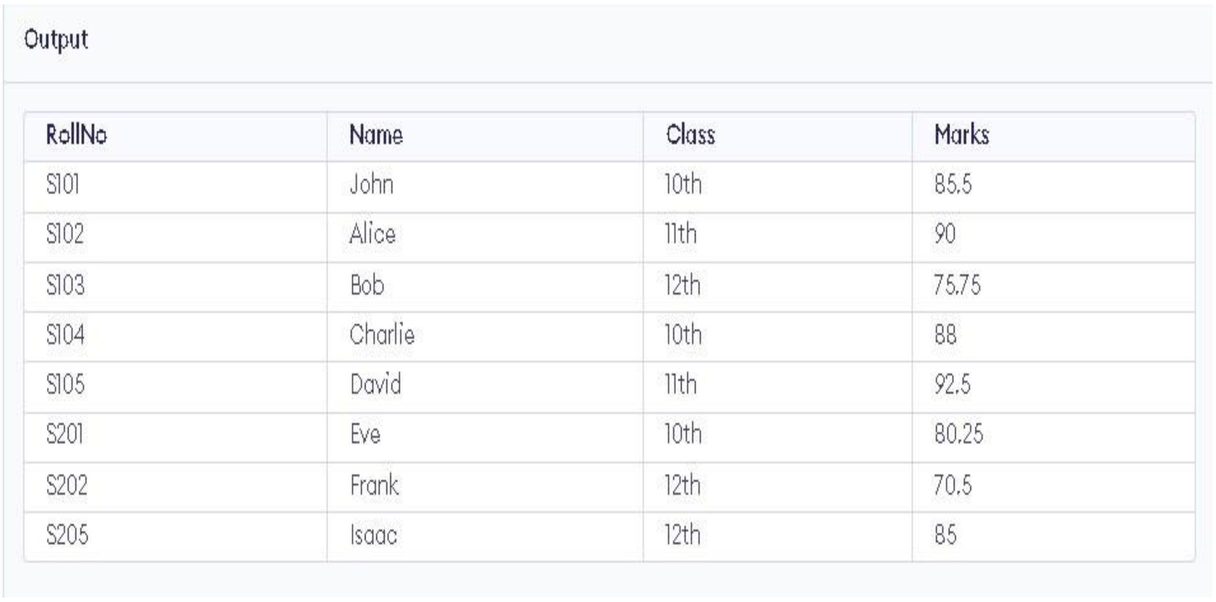
Online SQL Editor

Student [-]
- RollNo [varchar2(20)]
- Name [char(20)]
- Class [varchar2(20)]
- Marks [number(6,2)]

Student1 [-]
- R_No [varchar2(20)]
- Name [char(20)]
- Class [varchar2(20)]
- Marks [number(6,2)]

```sql
SELECT RollNo, Name, Class, Marks
FROM Student

UNION

SELECT R_No AS RollNo, Name, Class, Marks
FROM Student1;
```

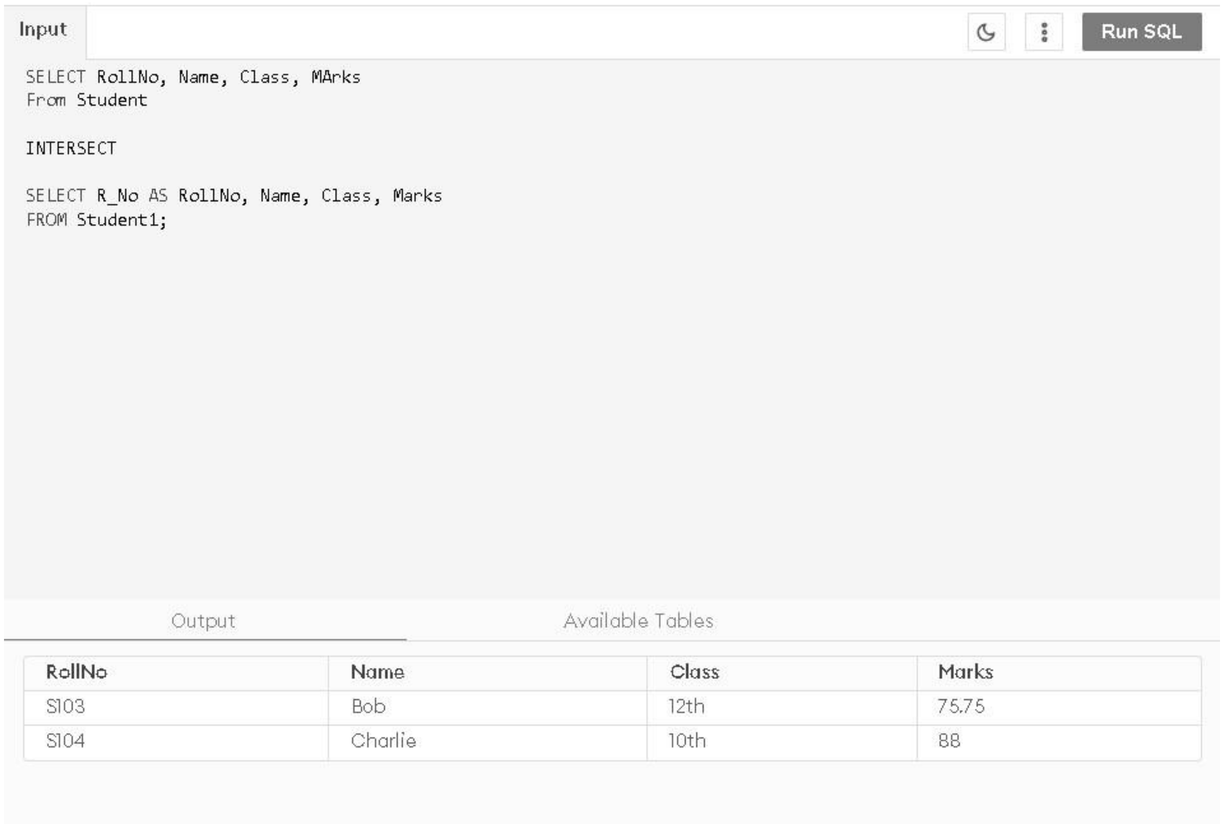
Output:


Output

RollNo	Name	Class	Marks
S101	John	10th	85.5
S102	Alice	11th	90
S103	Bob	12th	75.75
S104	Charlie	10th	88
S105	David	11th	92.5
S201	Eve	10th	80.25
S202	Frank	12th	70.5
S205	Isaac	12th	85

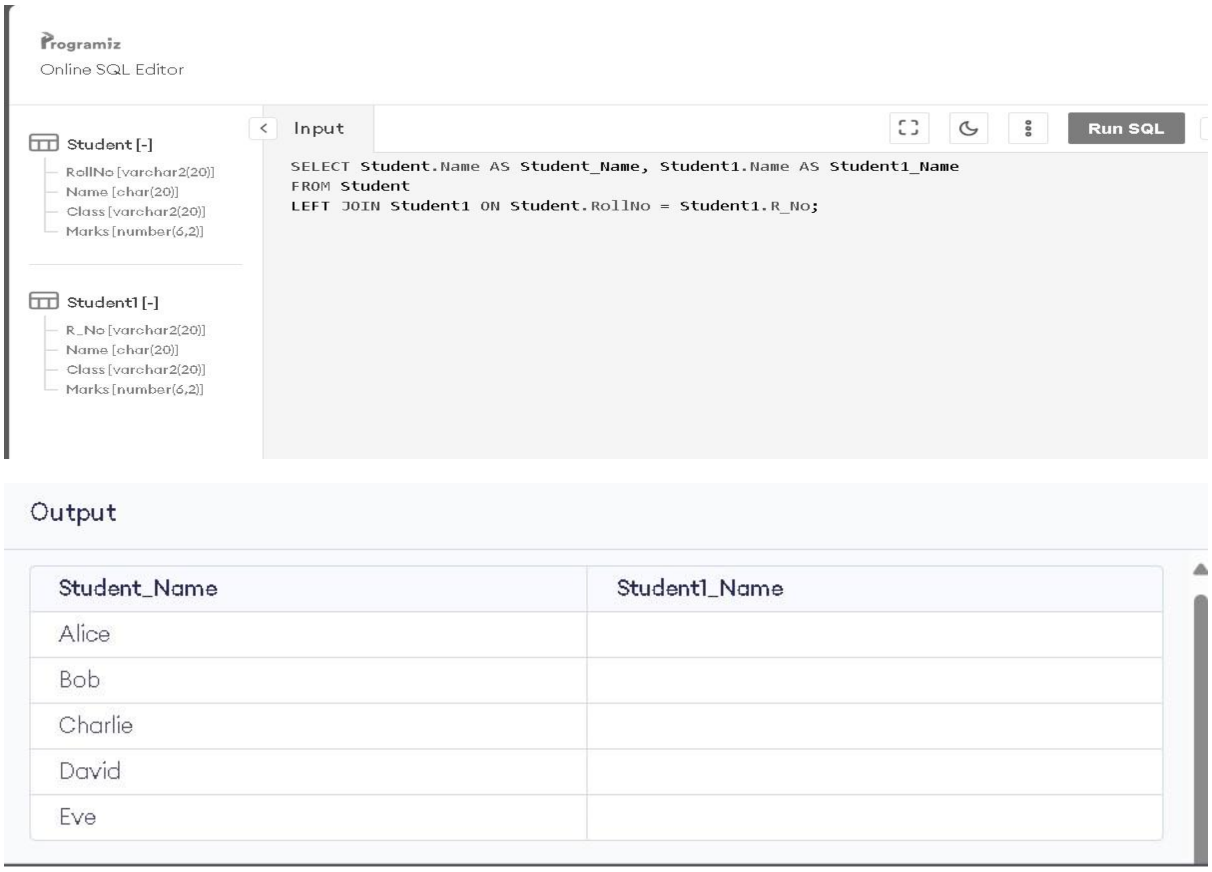
EXERCISE 13

AIM: Find out the intersection of student and student1 tables.



```
SELECT RollNo, Name, Class, MArks
From Student

INTERSECT

SELECT R_No AS RollNo, Name, Class, Marks
FROM Student1;
```

RollNo	Name	Class	Marks
S103	Bob	12th	75.75
S104	Charlie	10th	88



```
SELECT Student.Name AS Student_Name, Student1.Name AS Student1_Name
FROM Student
LEFT JOIN Student1 ON Student.RollNo = Student1.R_No;
```

Student_Name	Student1_Name
Alice	
Bob	
Charlie	
David	
Eve	

EXERCISE 14

AIM: Display the names of student and student1 tables using left, right, inner and full join.

INNER JOIN

```
-- INNER JOIN to display names of students from both tables where there's a match
SELECT S.Name AS Student_Name, S1.Name AS Student1_Name
FROM Student S
INNER JOIN Student1 S1
ON S.Name = S1.Name;
```

Output

Student_Name	Student1_Name
Bob	Bob
Charlie	Charlie

LEFT JOIN AND RIGHT JOIN

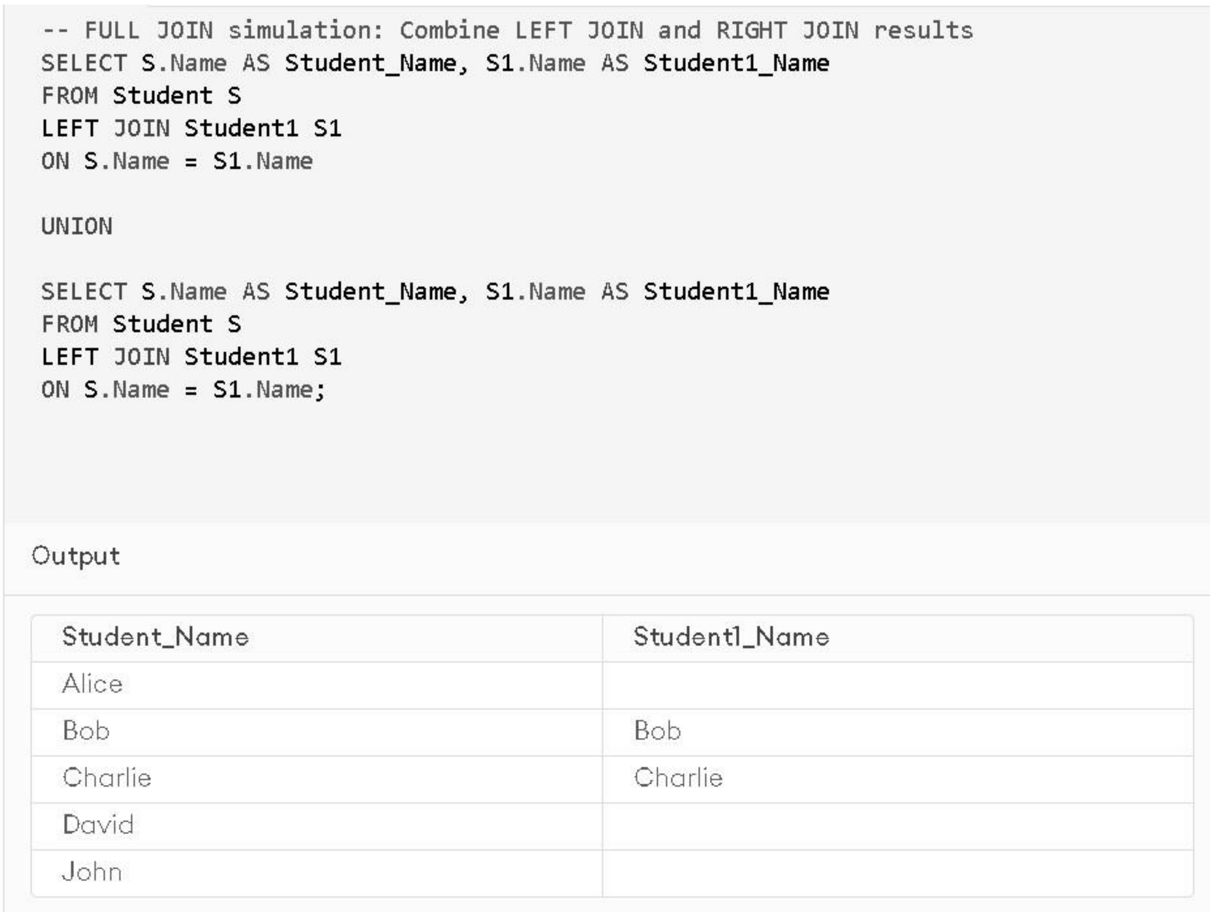
```
-- LEFT JOIN to display names from Student and corresponding names from Student1
(if any)
SELECT S.Name AS Student_Name, S1.Name AS Student1_Name
FROM Student S
LEFT JOIN Student1 S1
ON S.Name = S1.Name;
```

```
-- RIGHT JOIN simulation: Swap tables and use LEFT JOIN to simulate RIGHT JOIN
SELECT S.Name AS Student_Name, S1.Name AS Student1_Name
FROM Student S
LEFT JOIN Student1 S1
ON S.Name = S1.Name;
```

Output

Student_Name	Student1_Name
John	
Alice	
Bob	Bob
Charlie	Charlie
David	

FULL JOIN



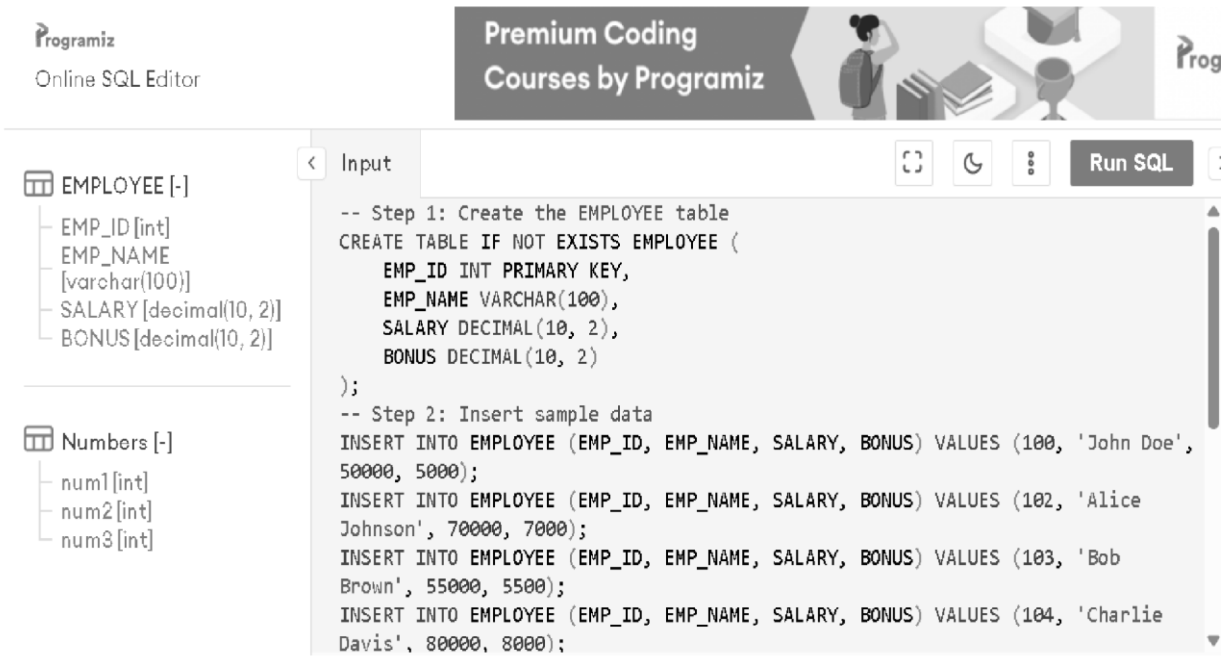
```sql
-- FULL JOIN simulation: Combine LEFT JOIN and RIGHT JOIN results
SELECT S.Name AS Student_Name, S1.Name AS Student1_Name
FROM Student S
LEFT JOIN Student1 S1
ON S.Name = S1.Name

UNION

SELECT S.Name AS Student_Name, S1.Name AS Student1_Name
FROM Student S
LEFT JOIN Student1 S1
ON S.Name = S1.Name;
```

Output

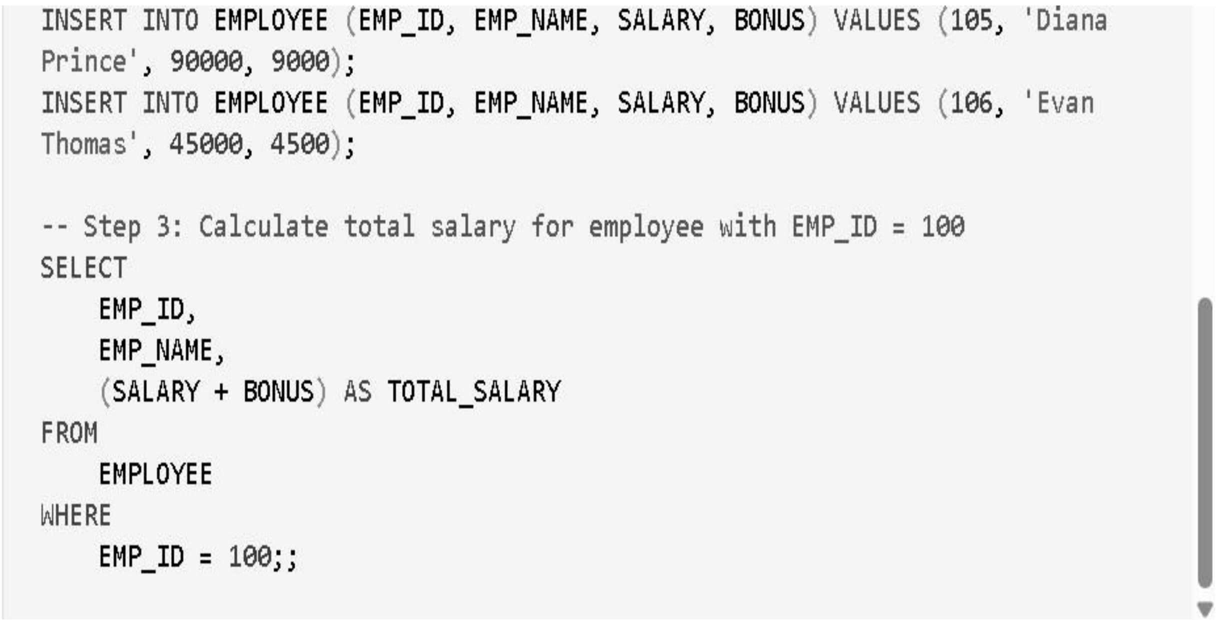
Student_Name	Student1_Name
Alice	
Bob	Bob
Charlie	Charlie
David	
John	

Exercise 15

AIM: To Write a PL/SQL block to calculate total salary of employee having employee number 100.

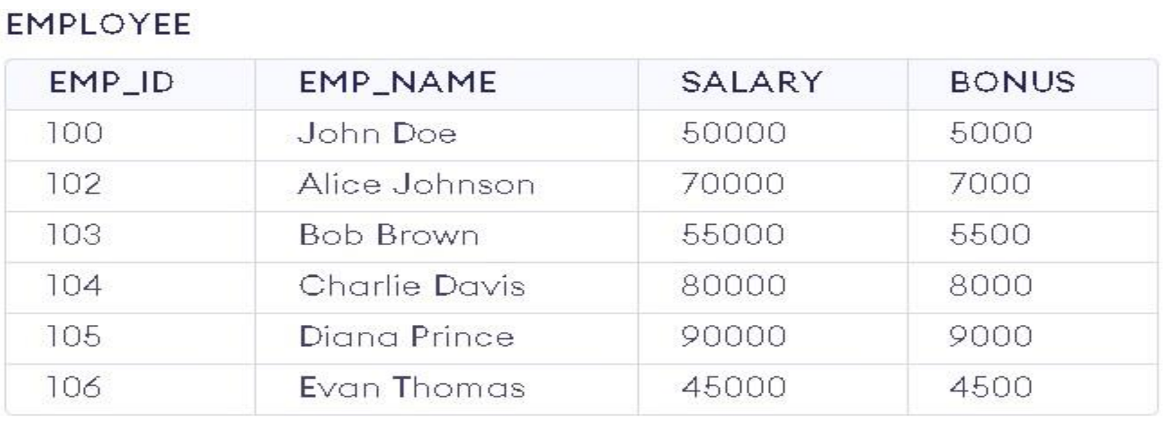


```
-- Step 1: Create the EMPLOYEE table
CREATE TABLE IF NOT EXISTS EMPLOYEE (
    EMP_ID INT PRIMARY KEY,
    EMP_NAME VARCHAR(100),
    SALARY DECIMAL(10, 2),
    BONUS DECIMAL(10, 2)
);
-- Step 2: Insert sample data
INSERT INTO EMPLOYEE (EMP_ID, EMP_NAME, SALARY, BONUS) VALUES (100, 'John Doe',
50000, 5000);
INSERT INTO EMPLOYEE (EMP_ID, EMP_NAME, SALARY, BONUS) VALUES (102, 'Alice
Johnson', 70000, 7000);
INSERT INTO EMPLOYEE (EMP_ID, EMP_NAME, SALARY, BONUS) VALUES (103, 'Bob
Brown', 55000, 5500);
INSERT INTO EMPLOYEE (EMP_ID, EMP_NAME, SALARY, BONUS) VALUES (104, 'Charlie
Davis', 80000, 8000);
```



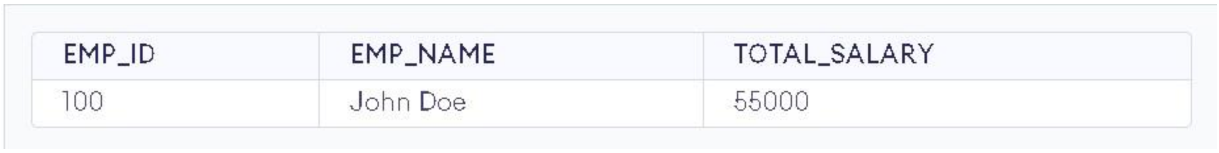
```
INSERT INTO EMPLOYEE (EMP_ID, EMP_NAME, SALARY, BONUS) VALUES (105, 'Diana
Prince', 90000, 9000);
INSERT INTO EMPLOYEE (EMP_ID, EMP_NAME, SALARY, BONUS) VALUES (106, 'Evan
Thomas', 45000, 4500);

-- Step 3: Calculate total salary for employee with EMP_ID = 100
SELECT
    EMP_ID,
    EMP_NAME,
    (SALARY + BONUS) AS TOTAL_SALARY
FROM
    EMPLOYEE
WHERE
    EMP_ID = 100;;
```

OUTPUT:



EMPLOYEE

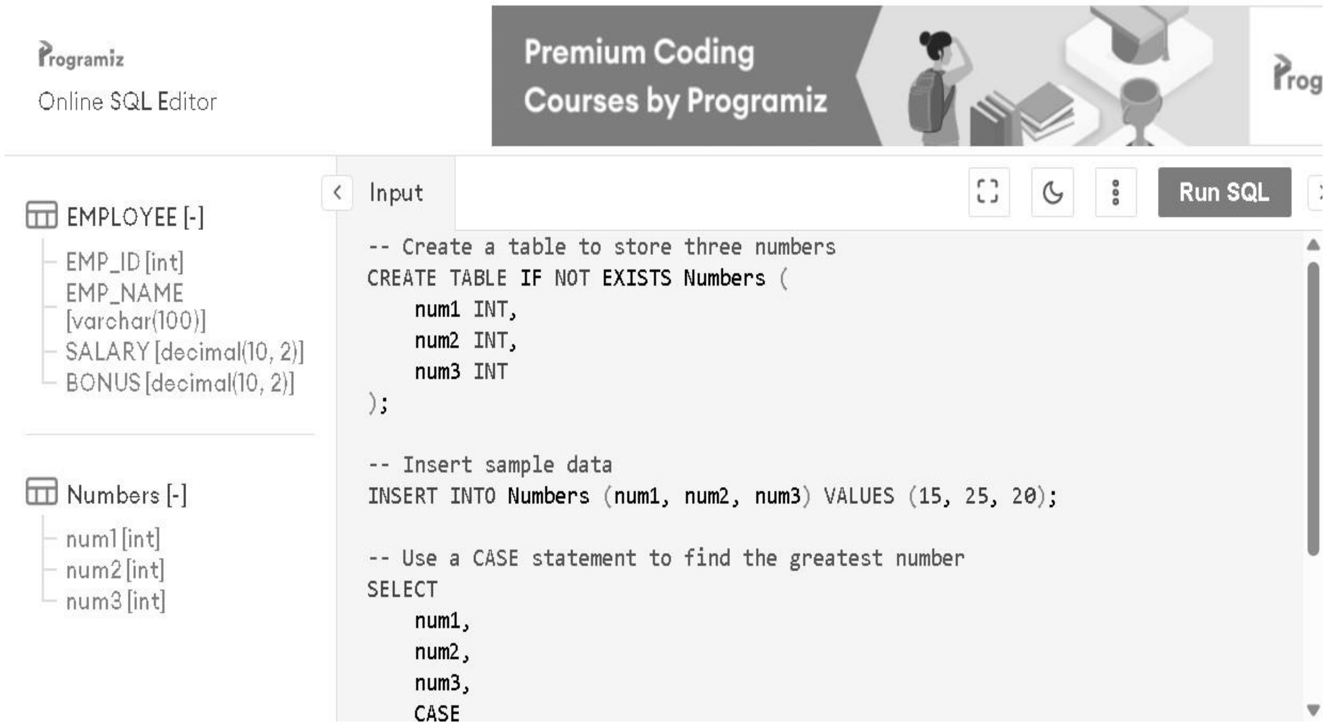
EMP_ID	EMP_NAME	SALARY	BONUS
100	John Doe	50000	5000
102	Alice Johnson	70000	7000
103	Bob Brown	55000	5500
104	Charlie Davis	80000	8000
105	Diana Prince	90000	9000
106	Evan Thomas	45000	4500



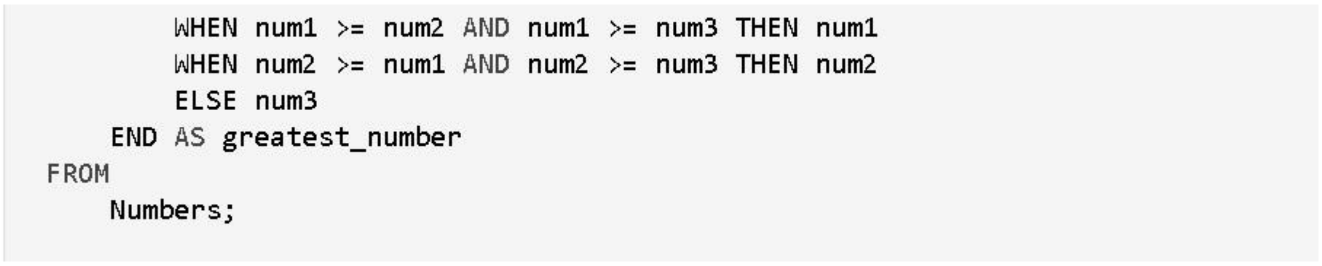
EMP_ID	EMP_NAME	TOTAL_SALARY
100	John Doe	55000

EXERCISE 16

AIM: To Write a PL/SQL code to find the greatest of three numbers.

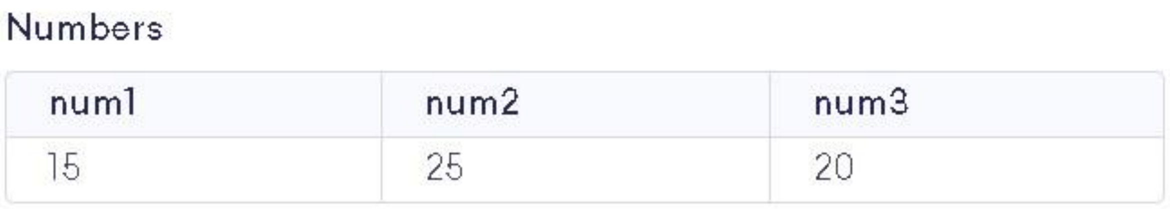


```
-- Create a table to store three numbers
CREATE TABLE IF NOT EXISTS Numbers (
    num1 INT,
    num2 INT,
    num3 INT
);

-- Insert sample data
INSERT INTO Numbers (num1, num2, num3) VALUES (15, 25, 20);

-- Use a CASE statement to find the greatest number
SELECT
    num1,
    num2,
    num3,
    CASE
```



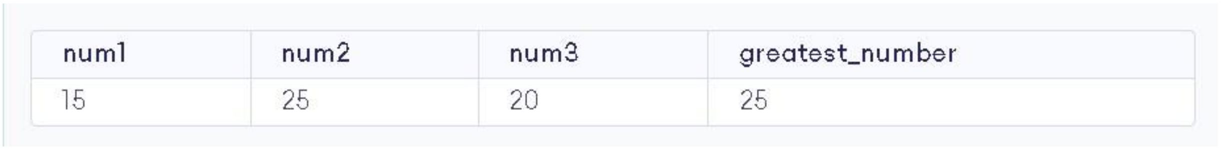
```
        WHEN num1 >= num2 AND num1 >= num3 THEN num1
        WHEN num2 >= num1 AND num2 >= num3 THEN num2
        ELSE num3
    END AS greatest_number
FROM
    Numbers;
```

OUTPUT:



Numbers

num1	num2	num3
15	25	20

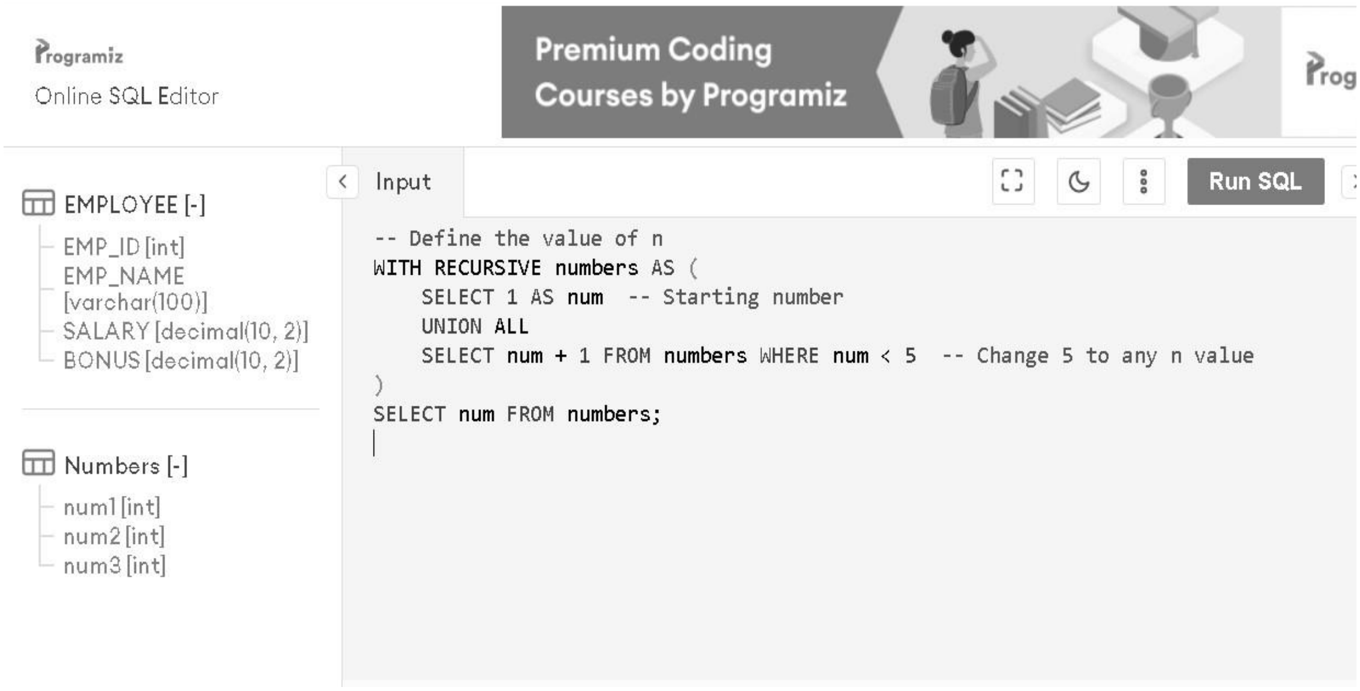


num1	num2	num3	greatest_number
15	25	20	25

EXERCISE 17

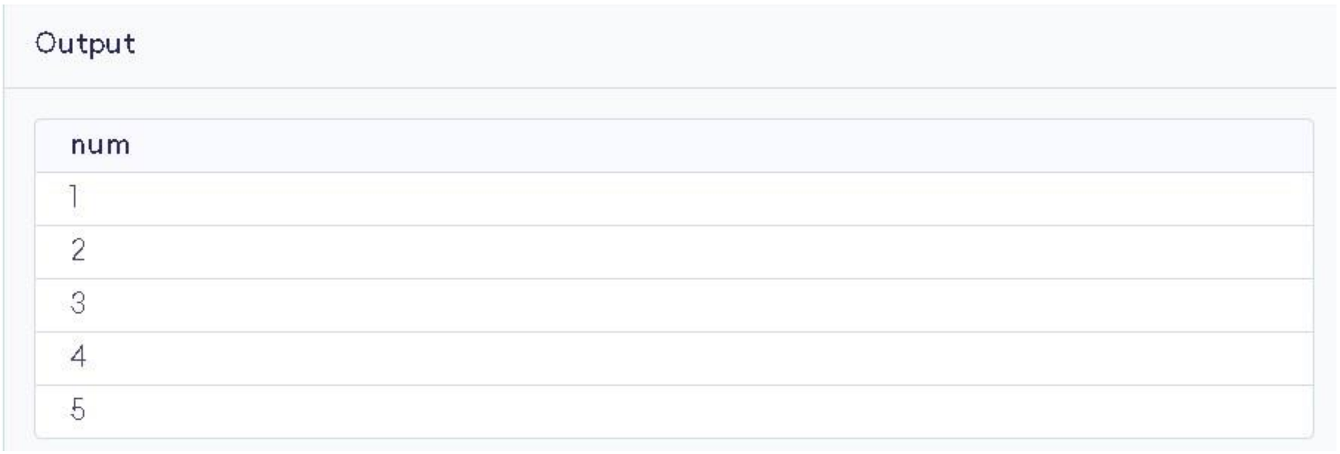
AIM: To

Write a PL/SQL code to print the numbers from 1 to n.



```
-- Define the value of n
WITH RECURSIVE numbers AS (
    SELECT 1 AS num  -- Starting number
    UNION ALL
    SELECT num + 1 FROM numbers WHERE num < 5  -- Change 5 to any n value
)
SELECT num FROM numbers;
```

OUTPUT:

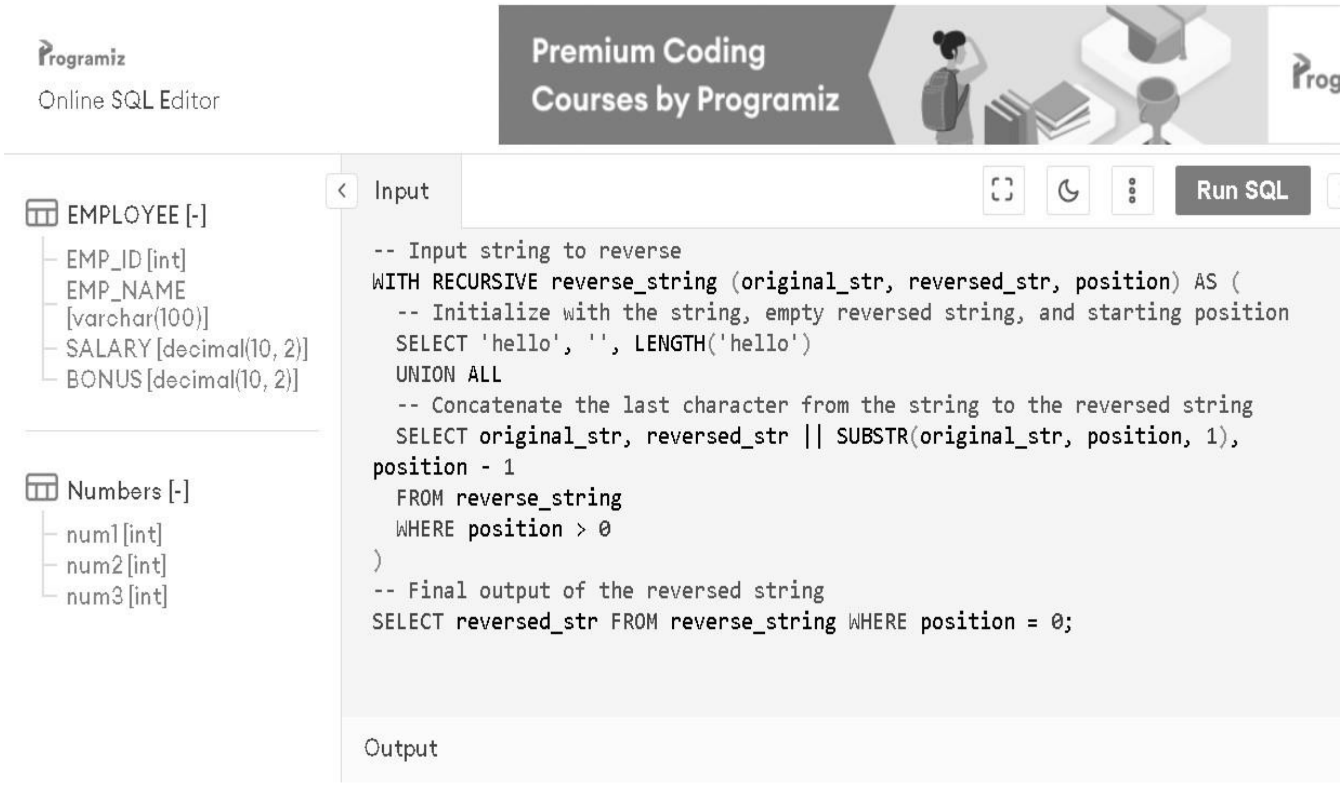


num
1
2
3
4
5

Write a PL/SQL code to reverse a string using for loop.

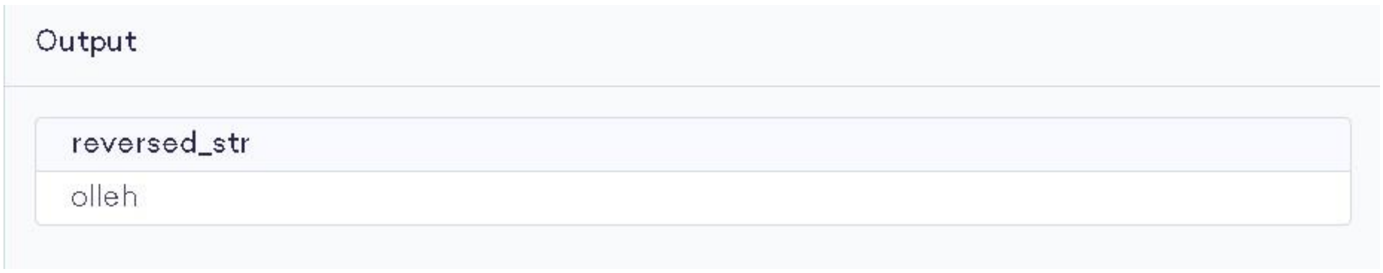
EXERCISE 18

AIM: To



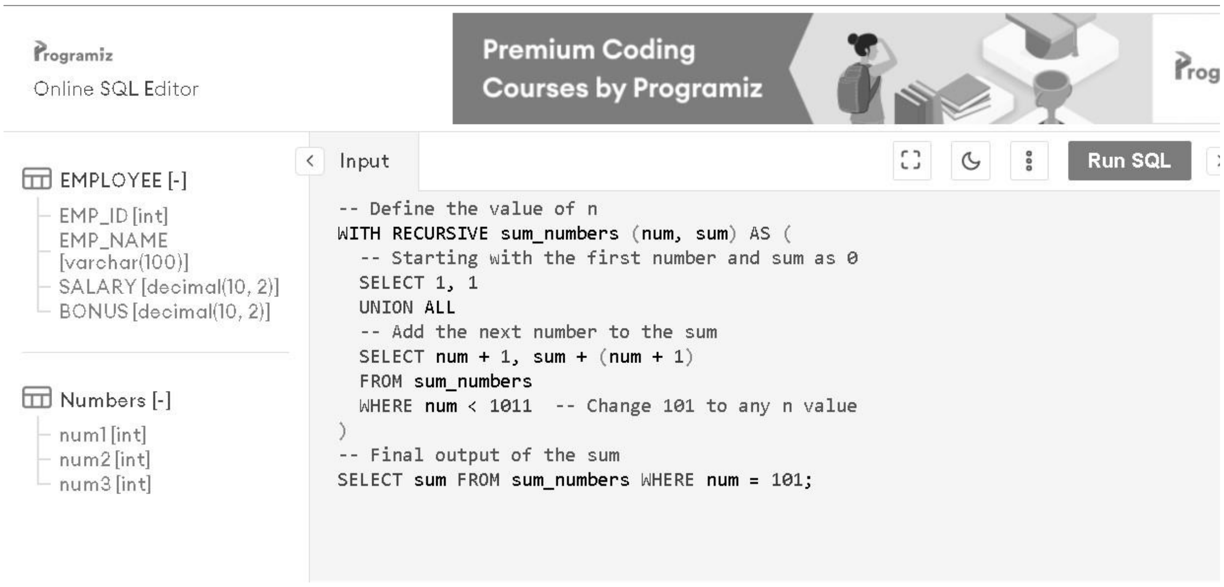
```sql
-- Input string to reverse
WITH RECURSIVE reverse_string (original_str, reversed_str, position) AS (
  -- Initialize with the string, empty reversed string, and starting position
  SELECT 'hello', '', LENGTH('hello')
  UNION ALL
  -- Concatenate the last character from the string to the reversed string
  SELECT original_str, reversed_str || SUBSTR(original_str, position, 1),
position - 1
  FROM reverse_string
  WHERE position > 0
)
-- Final output of the reversed string
SELECT reversed_str FROM reverse_string WHERE position = 0;
```

OUTPUT:



```
Output

reversed_str
olleh
```

Write a PL/SQL code to find the sum of n numbers.

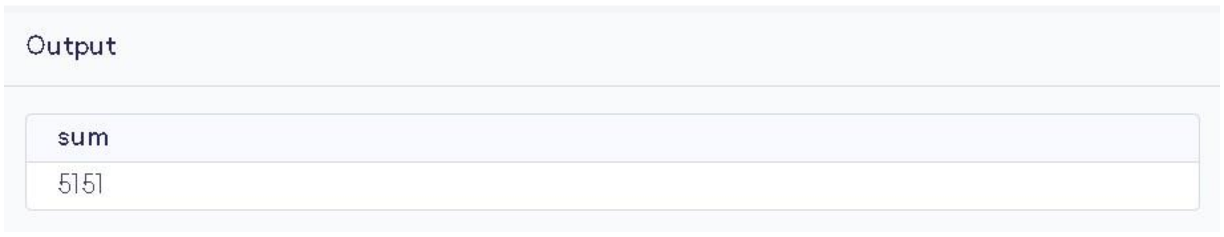


```sql
-- Define the value of n
WITH RECURSIVE sum_numbers (num, sum) AS (
  -- Starting with the first number and sum as 0
  SELECT 1, 1
  UNION ALL
  -- Add the next number to the sum
  SELECT num + 1, sum + (num + 1)
  FROM sum_numbers
  WHERE num < 1011   -- Change 101 to any n value
)
-- Final output of the sum
SELECT sum FROM sum_numbers WHERE num = 101;
```

OUTPUT:

EXERCISE 19

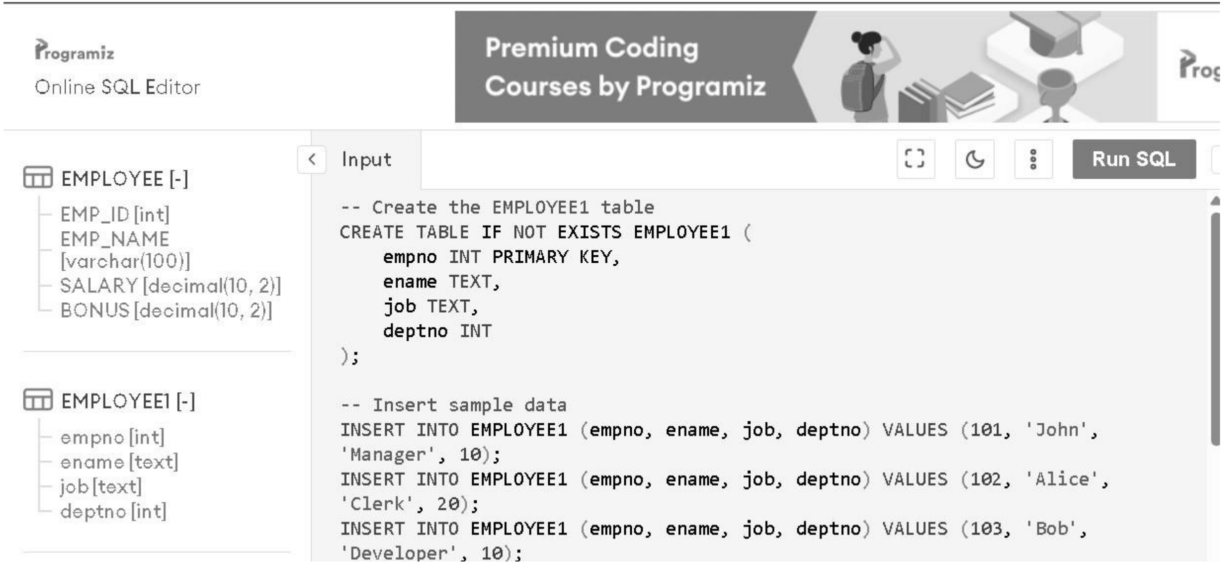
AIM: To



Output

sum
5151

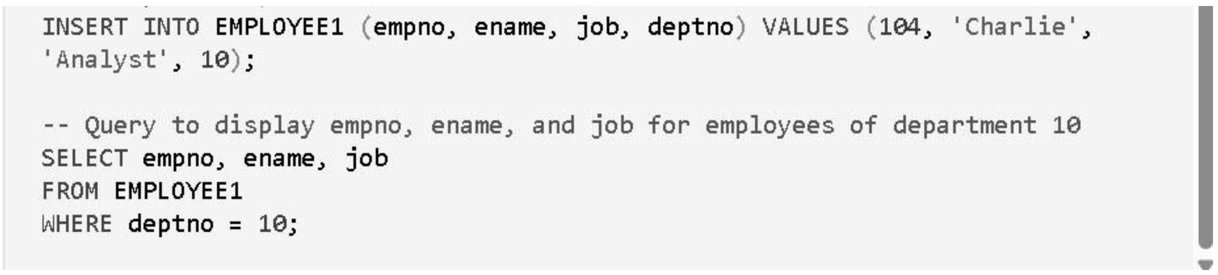
Consider a PL/SQL code to display the empno, ename, job of employees of department number 10.



EMPLOYEE [-]
- EMP_ID [int]
- EMP_NAME [varchar(100)]
- SALARY [decimal(10, 2)]
- BONUS [decimal(10, 2)]

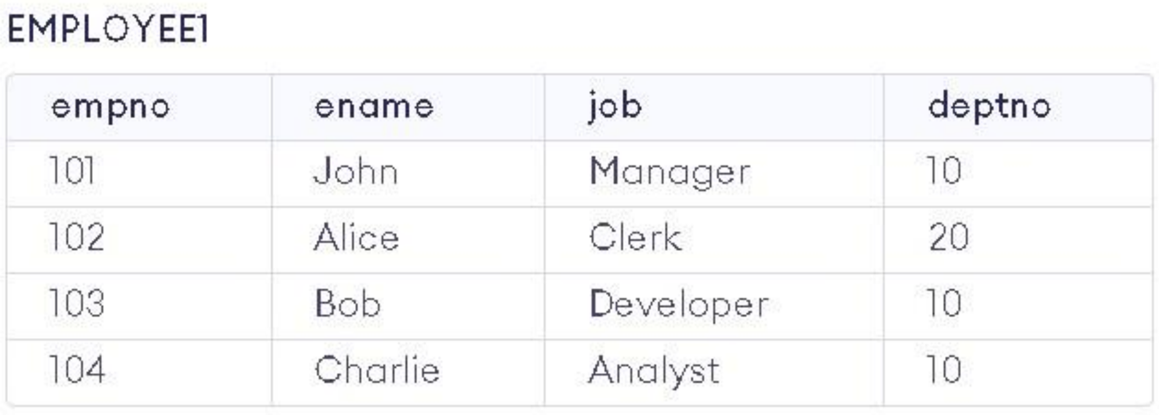
EMPLOYEE1 [-]
- empno [int]
- ename [text]
- job [text]
- deptno [int]

```sql
-- Create the EMPLOYEE1 table
CREATE TABLE IF NOT EXISTS EMPLOYEE1 (
    empno INT PRIMARY KEY,
    ename TEXT,
    job TEXT,
    deptno INT
);

-- Insert sample data
INSERT INTO EMPLOYEE1 (empno, ename, job, deptno) VALUES (101, 'John',
'Manager', 10);
INSERT INTO EMPLOYEE1 (empno, ename, job, deptno) VALUES (102, 'Alice',
'Clerk', 20);
INSERT INTO EMPLOYEE1 (empno, ename, job, deptno) VALUES (103, 'Bob',
'Developer', 10);
```



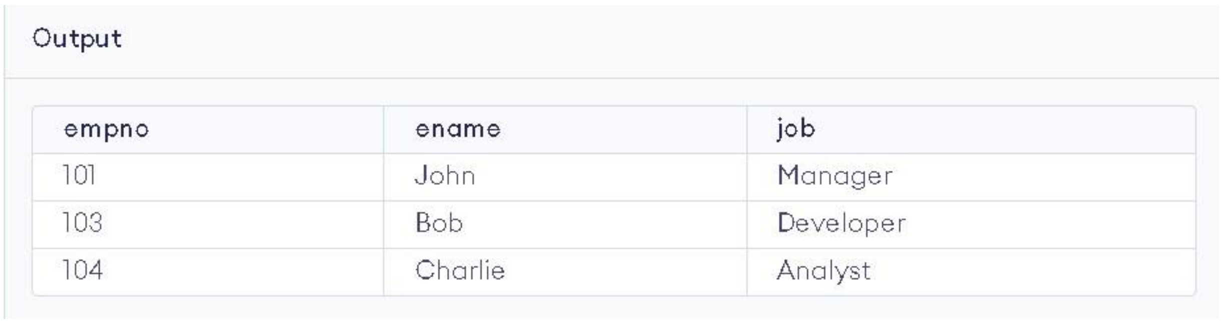
```sql
INSERT INTO EMPLOYEE1 (empno, ename, job, deptno) VALUES (104, 'Charlie',
'Analyst', 10);

-- Query to display empno, ename, and job for employees of department 10
SELECT empno, ename, job
FROM EMPLOYEE1
WHERE deptno = 10;
```

OUTPUT:



EMPLOYEE1

empno	ename	job	deptno
101	John	Manager	10
102	Alice	Clerk	20
103	Bob	Developer	10
104	Charlie	Analyst	10



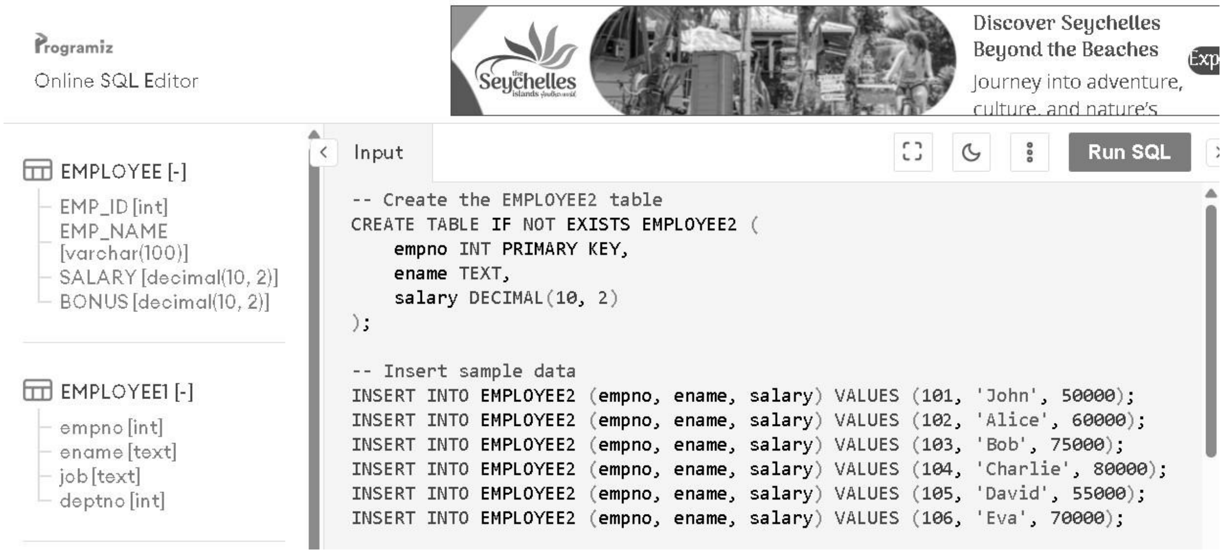
Output

empno	ename	job
101	John	Manager
103	Bob	Developer
104	Charlie	Analyst

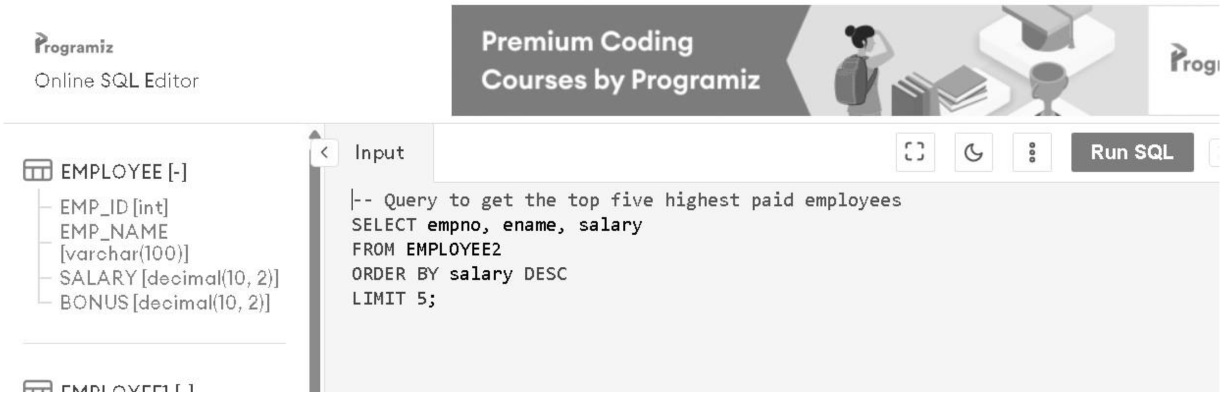
EXERCISE 20

AIM: To

Consider a PL/SQL code to display the employee number & name of top five highest paid employees.

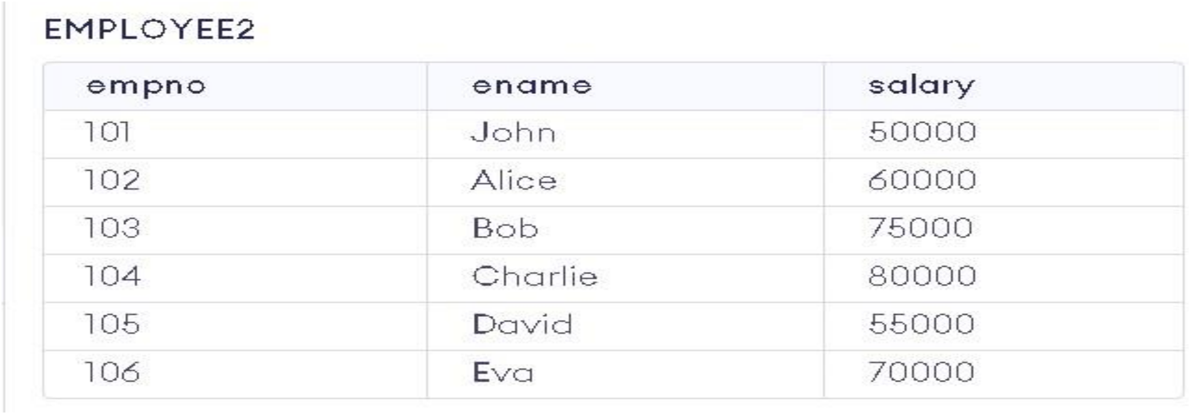


```
-- Create the EMPLOYEE2 table
CREATE TABLE IF NOT EXISTS EMPLOYEE2 (
    empno INT PRIMARY KEY,
    ename TEXT,
    salary DECIMAL(10, 2)
);

-- Insert sample data
INSERT INTO EMPLOYEE2 (empno, ename, salary) VALUES (101, 'John', 50000);
INSERT INTO EMPLOYEE2 (empno, ename, salary) VALUES (102, 'Alice', 60000);
INSERT INTO EMPLOYEE2 (empno, ename, salary) VALUES (103, 'Bob', 75000);
INSERT INTO EMPLOYEE2 (empno, ename, salary) VALUES (104, 'Charlie', 80000);
INSERT INTO EMPLOYEE2 (empno, ename, salary) VALUES (105, 'David', 55000);
INSERT INTO EMPLOYEE2 (empno, ename, salary) VALUES (106, 'Eva', 70000);
```



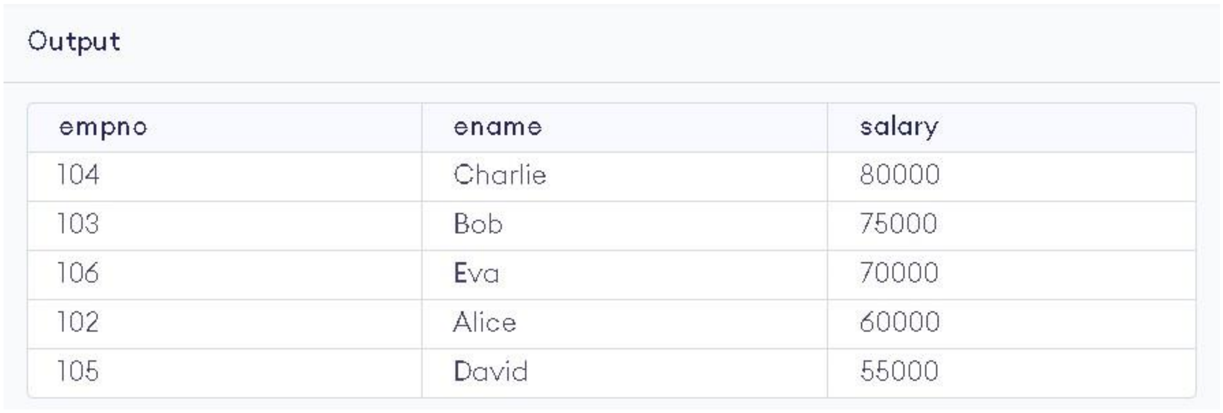
```
-- Query to get the top five highest paid employees
SELECT empno, ename, salary
FROM EMPLOYEE2
ORDER BY salary DESC
LIMIT 5;
```

OUTPUT:



EMPLOYEE2

empno	ename	salary
101	John	50000
102	Alice	60000
103	Bob	75000
104	Charlie	80000
105	David	55000
106	Eva	70000



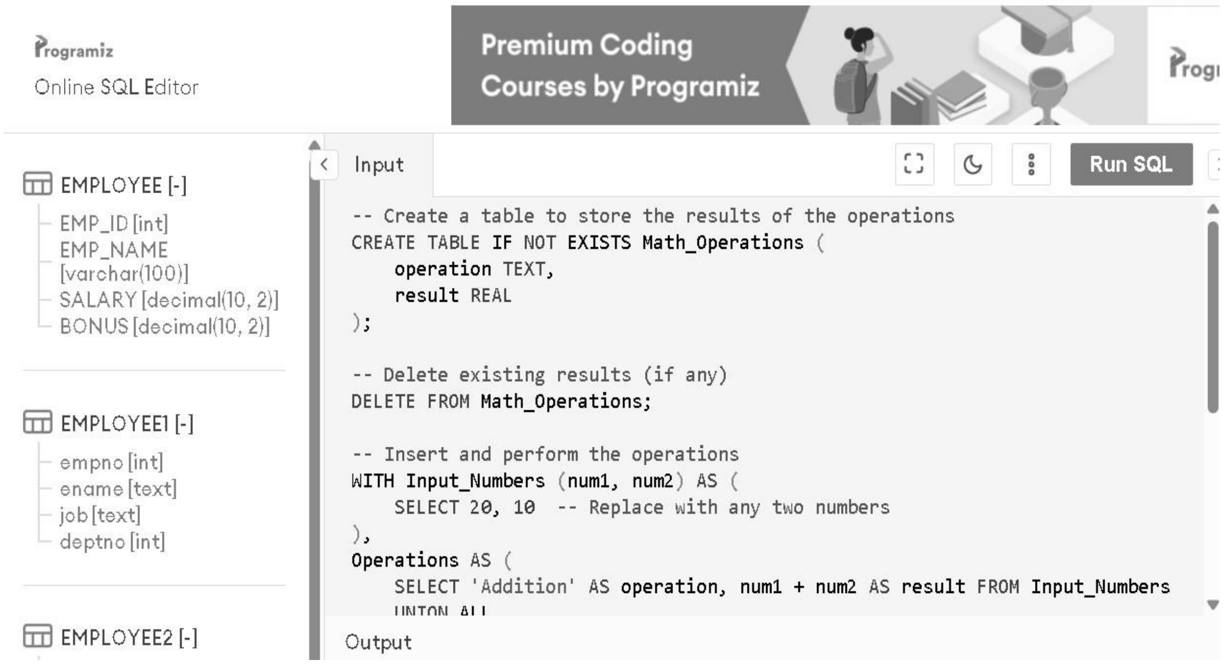
Output

empno	ename	salary
104	Charlie	80000
103	Bob	75000
106	Eva	70000
102	Alice	60000
105	David	55000

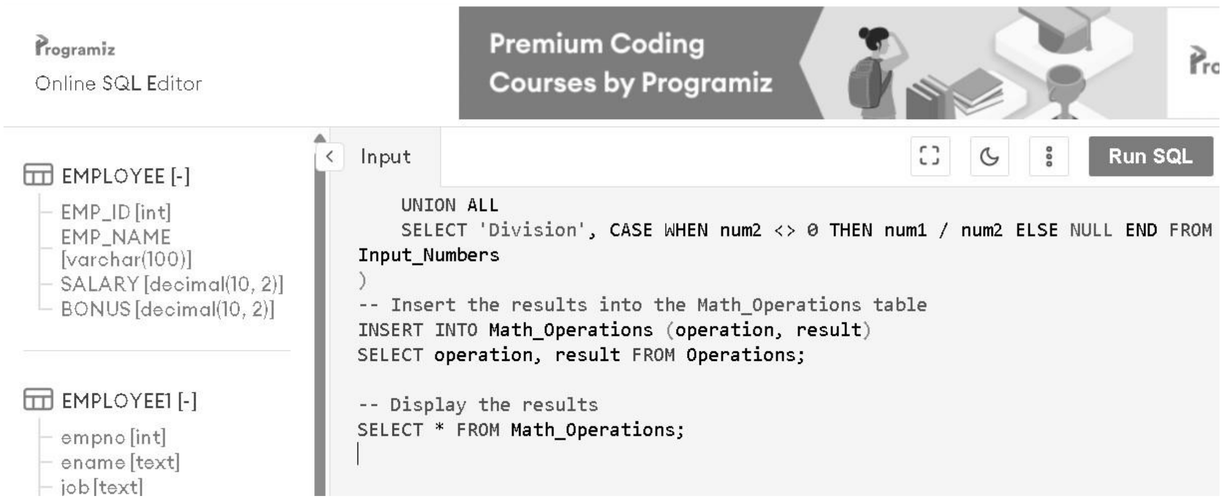
EXERCISE 21

AIM: To

Consider a PL/SQL procedure that accepts 2 numbers & return addition, subtraction, multiplication & division of two numbers using stored procedure AND local procedure.



```
-- Create a table to store the results of the operations
CREATE TABLE IF NOT EXISTS Math_Operations (
    operation TEXT,
    result REAL
);

-- Delete existing results (if any)
DELETE FROM Math_Operations;

-- Insert and perform the operations
WITH Input_Numbers (num1, num2) AS (
    SELECT 20, 10  -- Replace with any two numbers
),
Operations AS (
    SELECT 'Addition' AS operation, num1 + num2 AS result FROM Input_Numbers
    UNION ALL
```

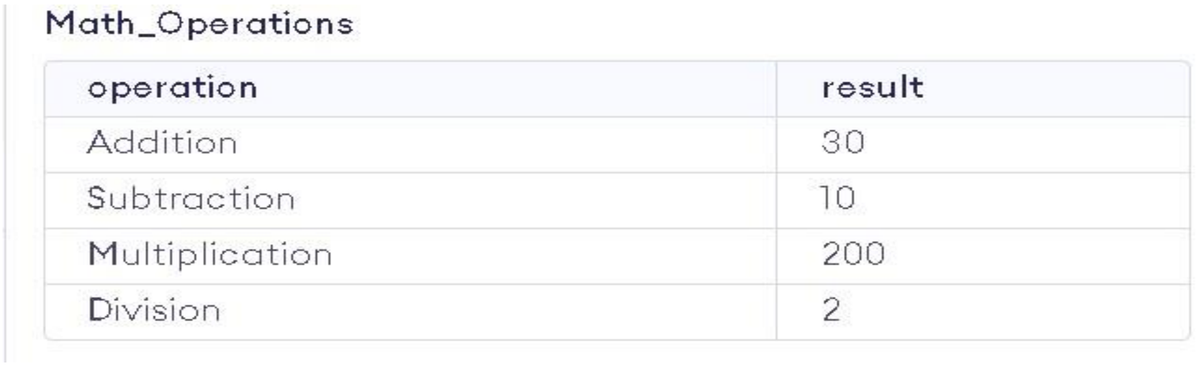


```
    UNION ALL
    SELECT 'Division', CASE WHEN num2 <> 0 THEN num1 / num2 ELSE NULL END FROM
Input_Numbers
)
-- Insert the results into the Math_Operations table
INSERT INTO Math_Operations (operation, result)
SELECT operation, result FROM Operations;

-- Display the results
SELECT * FROM Math_Operations;
```

OUTPUT:

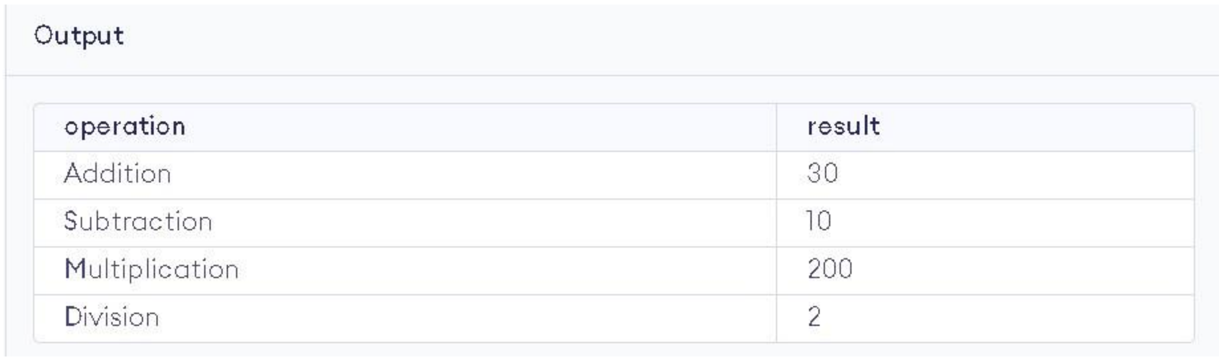
EXERCISE 22

AIM: To



Math_Operations

operation	result
Addition	30
Subtraction	10
Multiplication	200
Division	2

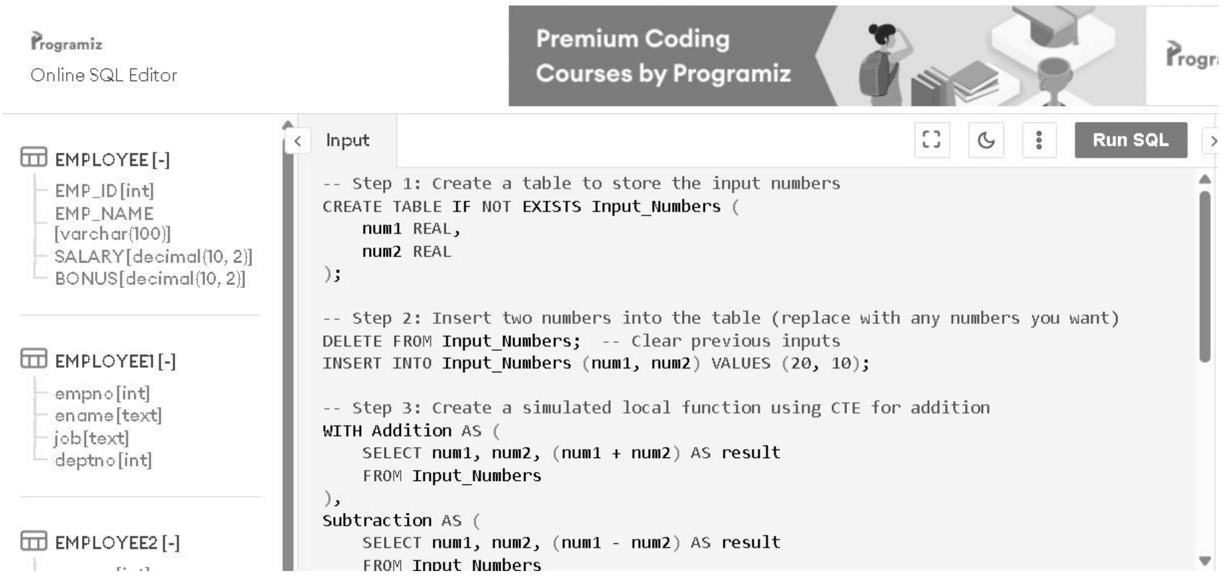


Output

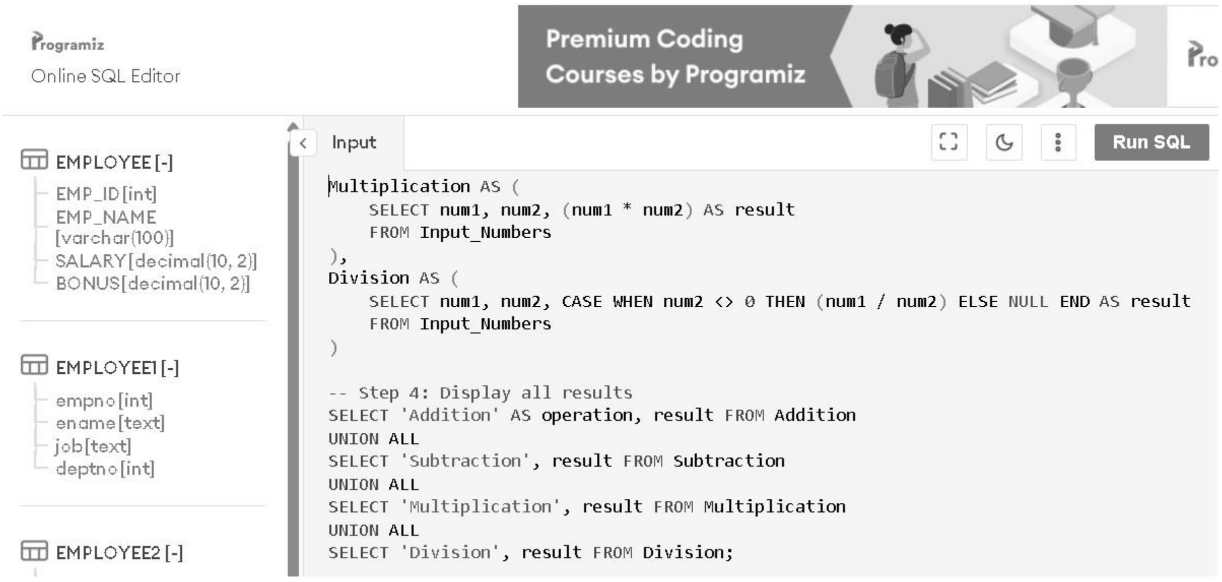
operation	result
Addition	30
Subtraction	10
Multiplication	200
Division	2

EXERCISE 23

AIM: To Consider a PL/SQL code that accepts 2 numbers & return addition, subtraction, multiplication & division of two numbers using stored functions and local function.



```
-- Step 1: Create a table to store the input numbers
CREATE TABLE IF NOT EXISTS Input_Numbers (
    num1 REAL,
    num2 REAL
);

-- Step 2: Insert two numbers into the table (replace with any numbers you want)
DELETE FROM Input_Numbers;  -- Clear previous inputs
INSERT INTO Input_Numbers (num1, num2) VALUES (20, 10);

-- Step 3: Create a simulated local function using CTE for addition
WITH Addition AS (
    SELECT num1, num2, (num1 + num2) AS result
    FROM Input_Numbers
),
Subtraction AS (
    SELECT num1, num2, (num1 - num2) AS result
    FROM Input_Numbers
```

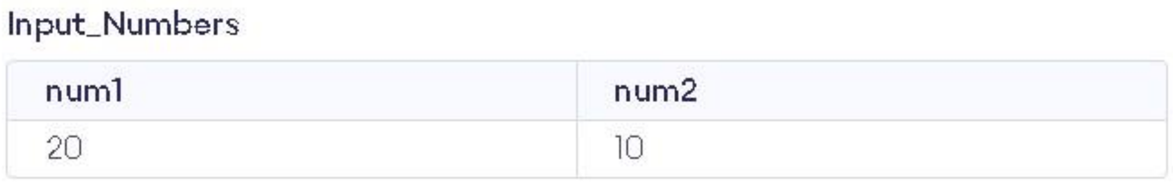


```
Multiplication AS (
    SELECT num1, num2, (num1 * num2) AS result
    FROM Input_Numbers
),
Division AS (
    SELECT num1, num2, CASE WHEN num2 <> 0 THEN (num1 / num2) ELSE NULL END AS result
    FROM Input_Numbers
)

-- Step 4: Display all results
SELECT 'Addition' AS operation, result FROM Addition
UNION ALL
SELECT 'Subtraction', result FROM Subtraction
UNION ALL
SELECT 'Multiplication', result FROM Multiplication
UNION ALL
SELECT 'Division', result FROM Division;
```

OUTPUT:

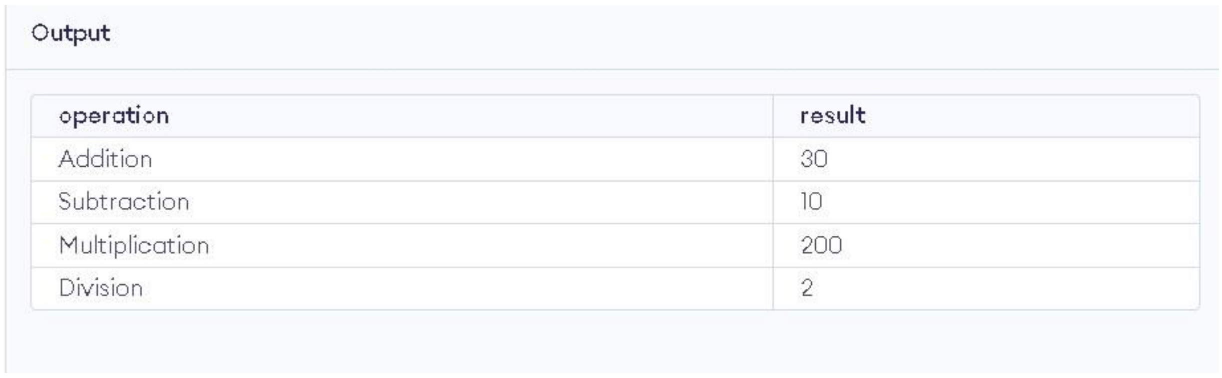
EXERCISE 24

AIM: To



Input_Numbers

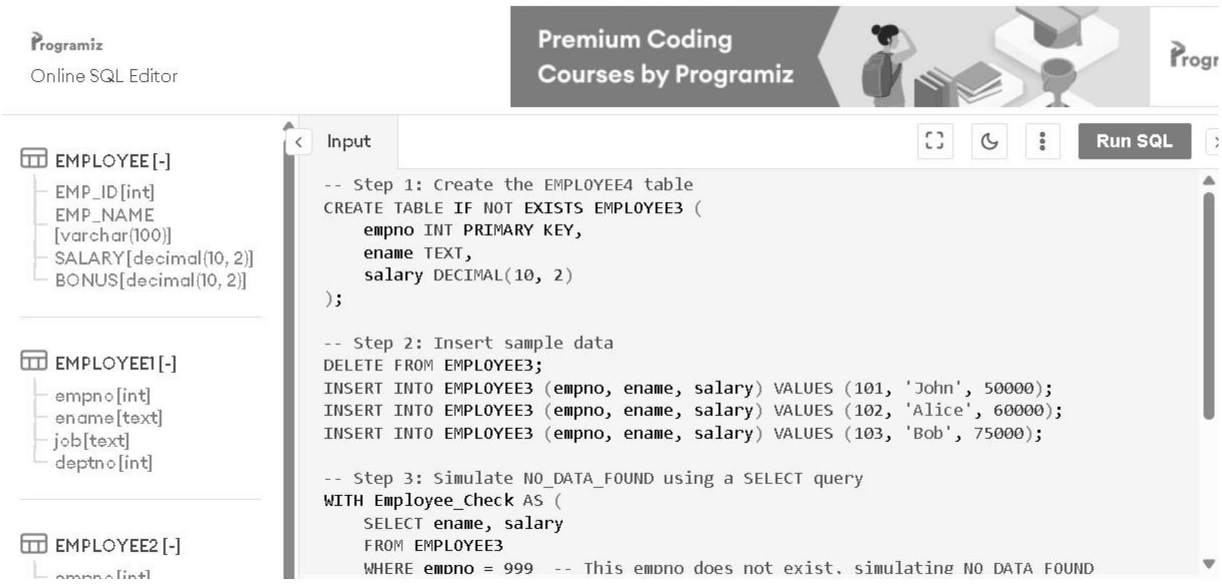
num1	num2
20	10



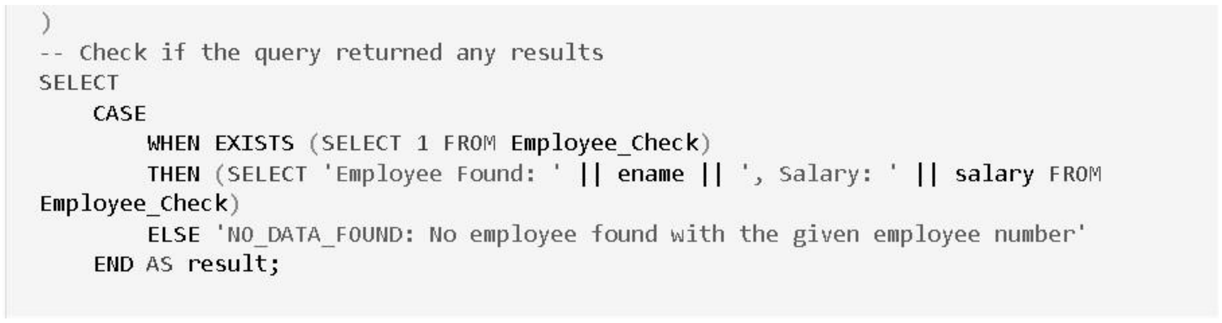
Output

operation	result
Addition	30
Subtraction	10
Multiplication	200
Division	2

Write a PL/SQL block to show the use of NO_DATA FOUND exception.



```
-- Step 1: Create the EMPLOYEE4 table
CREATE TABLE IF NOT EXISTS EMPLOYEE3 (
    empno INT PRIMARY KEY,
    ename TEXT,
    salary DECIMAL(10, 2)
);

-- Step 2: Insert sample data
DELETE FROM EMPLOYEE3;
INSERT INTO EMPLOYEE3 (empno, ename, salary) VALUES (101, 'John', 50000);
INSERT INTO EMPLOYEE3 (empno, ename, salary) VALUES (102, 'Alice', 60000);
INSERT INTO EMPLOYEE3 (empno, ename, salary) VALUES (103, 'Bob', 75000);

-- Step 3: Simulate NO_DATA_FOUND using a SELECT query
WITH Employee_Check AS (
    SELECT ename, salary
    FROM EMPLOYEE3
    WHERE empno = 999  -- This empno does not exist, simulating NO_DATA_FOUND
```

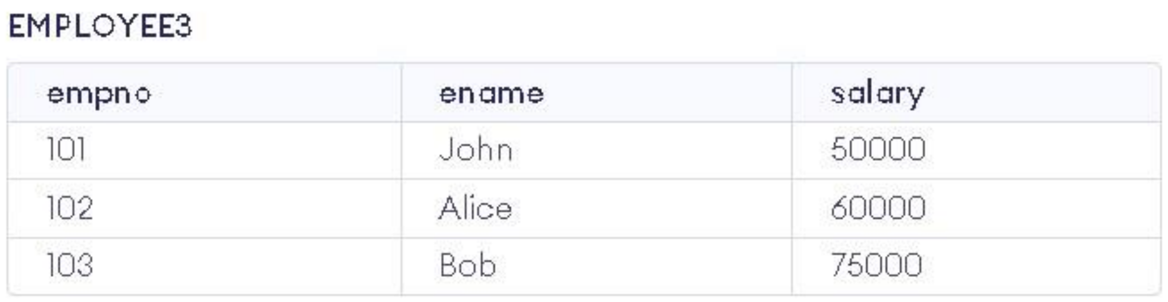


```
)
-- Check if the query returned any results
SELECT
    CASE
        WHEN EXISTS (SELECT 1 FROM Employee_Check)
        THEN (SELECT 'Employee Found: ' || ename || ', Salary: ' || salary FROM
Employee_Check)
        ELSE 'NO_DATA_FOUND: No employee found with the given employee number'
    END AS result;
```

OUTPUT:

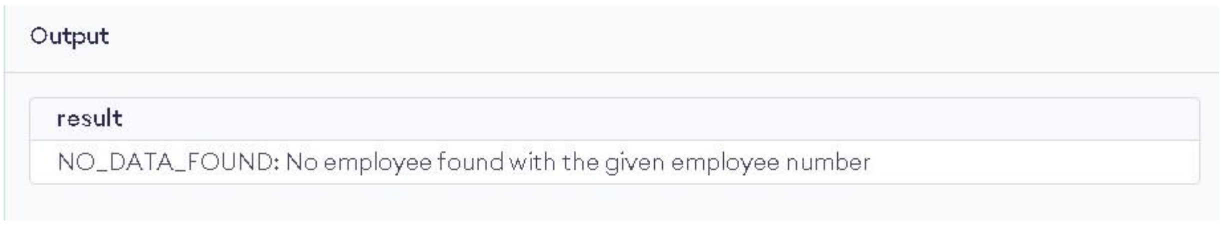
EXERCISE 25

AIM: To



EMPLOYEE3

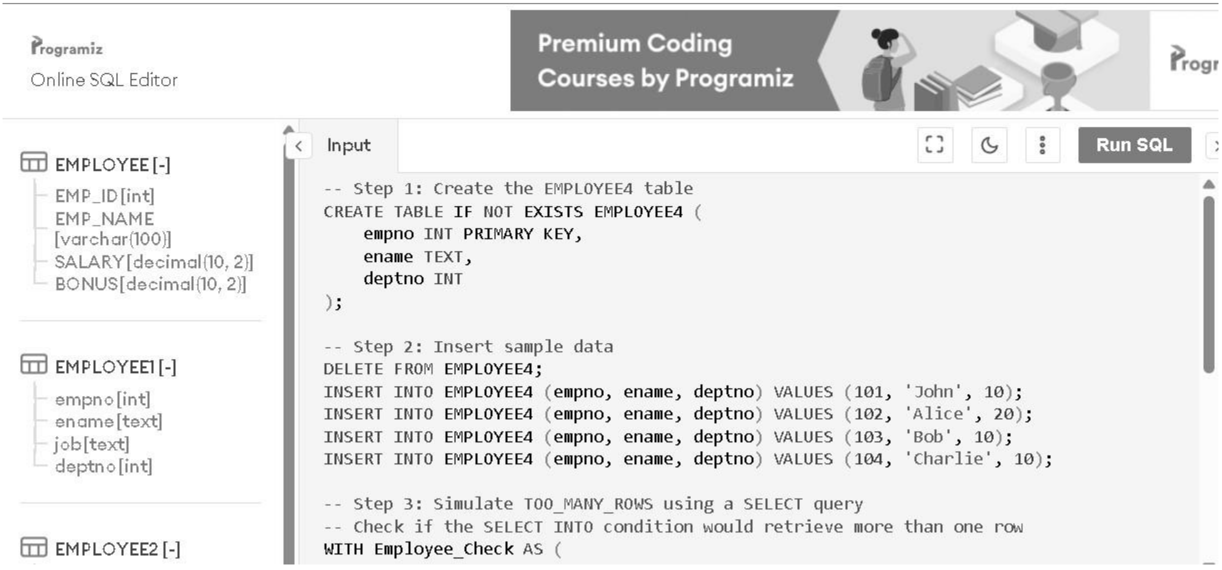
empno	ename	salary
101	John	50000
102	Alice	60000
103	Bob	75000



Output

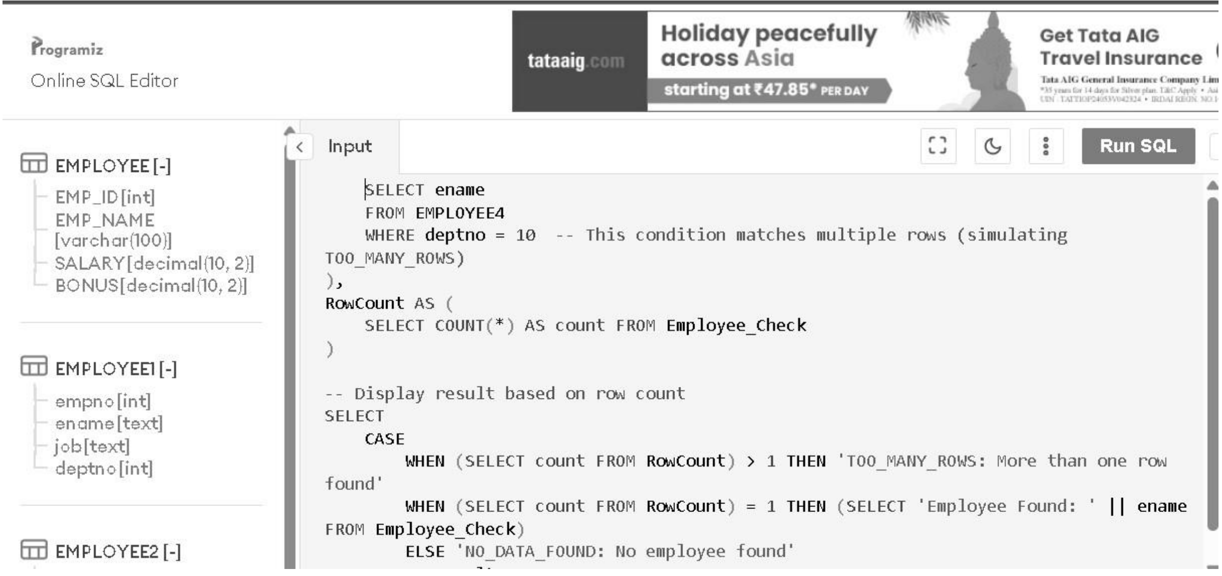
result
NO_DATA_FOUND: No employee found with the given employee number

Write a PL/SQL block to show the use of TOO_MANY ROWS exception.



```
EMPLOYEE [-]
  EMP_ID [int]
  EMP_NAME
  [varchar(100)]
  SALARY [decimal(10, 2)]
  BONUS [decimal(10, 2)]
EMPLOYEE1 [-]
  empno [int]
  ename [text]
  job [text]
  deptno [int]
EMPLOYEE2 [-]
```

```
-- Step 1: Create the EMPLOYEE4 table
CREATE TABLE IF NOT EXISTS EMPLOYEE4 (
    empno INT PRIMARY KEY,
    ename TEXT,
    deptno INT
);

-- Step 2: Insert sample data
DELETE FROM EMPLOYEE4;
INSERT INTO EMPLOYEE4 (empno, ename, deptno) VALUES (101, 'John', 10);
INSERT INTO EMPLOYEE4 (empno, ename, deptno) VALUES (102, 'Alice', 20);
INSERT INTO EMPLOYEE4 (empno, ename, deptno) VALUES (103, 'Bob', 10);
INSERT INTO EMPLOYEE4 (empno, ename, deptno) VALUES (104, 'Charlie', 10);

-- Step 3: Simulate TOO_MANY_ROWS using a SELECT query
-- Check if the SELECT INTO condition would retrieve more than one row
WITH Employee_Check AS (
```


Programiz
Online SQL Editor
tataaig.com
Holiday peacefully across Asia
starting at ₹47.85* PER DAY
Get Tata AIG Travel Insurance
Input
Run SQL

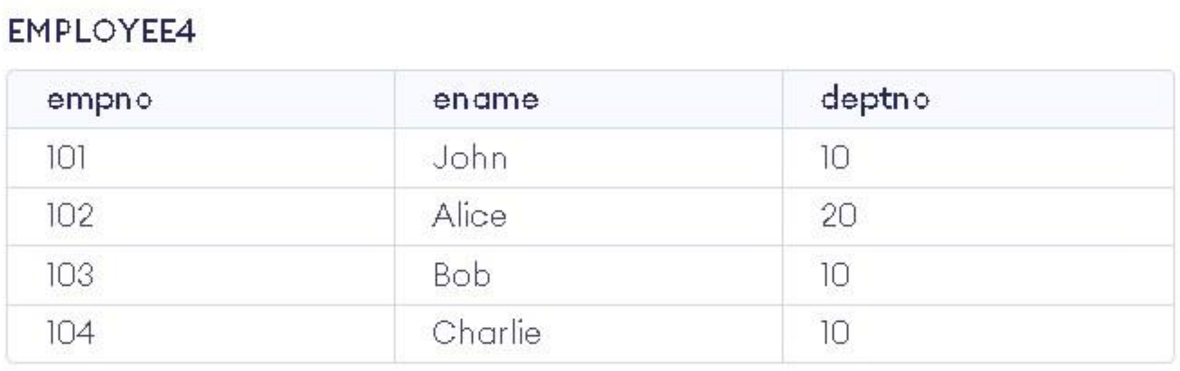
```
EMPLOYEE [-]
  EMP_ID [int]
  EMP_NAME
  [varchar(100)]
  SALARY [decimal(10, 2)]
  BONUS [decimal(10, 2)]
EMPLOYEE1 [-]
  empno [int]
  ename [text]
  job [text]
  deptno [int]
EMPLOYEE2 [-]
```

```
    SELECT ename
    FROM EMPLOYEE4
    WHERE deptno = 10  -- This condition matches multiple rows (simulating
TOO_MANY_ROWS)
),
RowCount AS (
    SELECT COUNT(*) AS count FROM Employee_Check
)

-- Display result based on row count
SELECT
    CASE
        WHEN (SELECT count FROM RowCount) > 1 THEN 'TOO_MANY_ROWS: More than one row
found'
        WHEN (SELECT count FROM RowCount) = 1 THEN (SELECT 'Employee Found: ' || ename
FROM Employee_Check)
        ELSE 'NO_DATA_FOUND: No employee found'
```

OUTPUT:

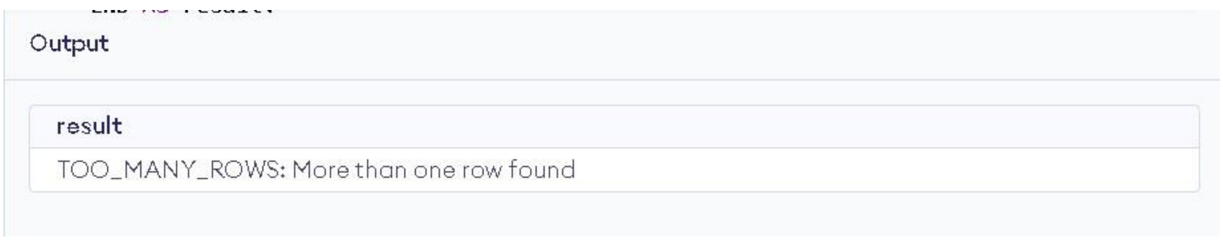
EXERCISE 26

AIM: To



EMPLOYEE4

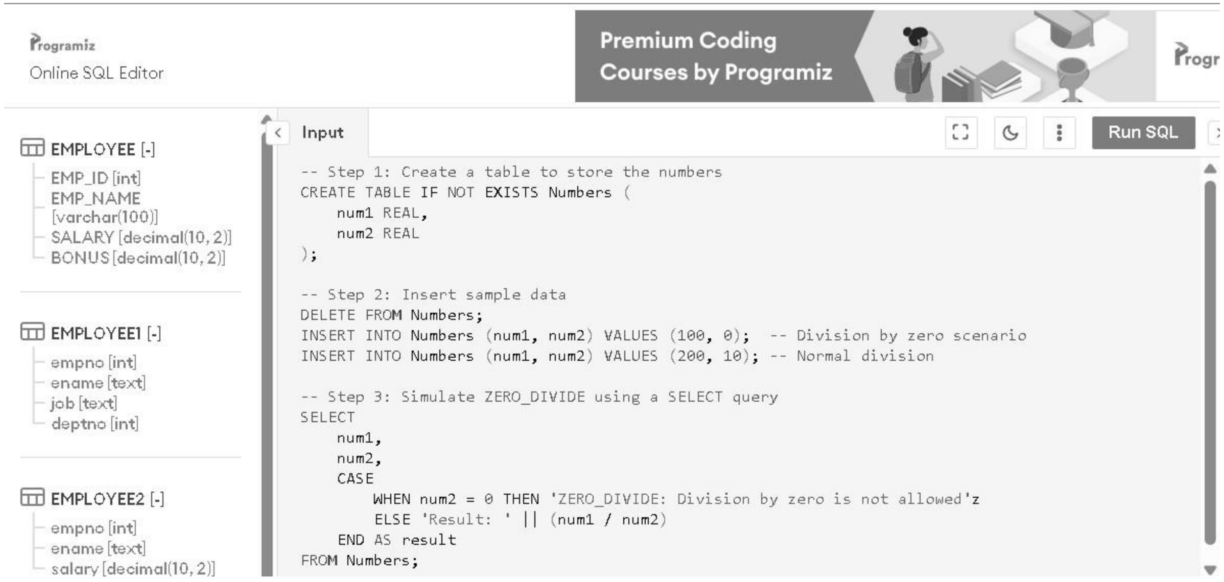
empno	ename	deptno
101	John	10
102	Alice	20
103	Bob	10
104	Charlie	10



Output

```
result
TOO_MANY_ROWS: More than one row found
```

Write a PL/SQL block to show the use of ZERO_DIVIDE exception.

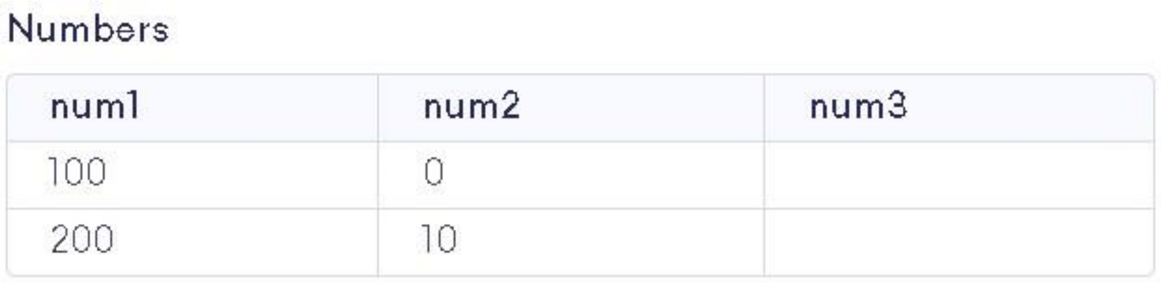


```
-- Step 1: Create a table to store the numbers
CREATE TABLE IF NOT EXISTS Numbers (
    num1 REAL,
    num2 REAL
);

-- Step 2: Insert sample data
DELETE FROM Numbers;
INSERT INTO Numbers (num1, num2) VALUES (100, 0);  -- Division by zero scenario
INSERT INTO Numbers (num1, num2) VALUES (200, 10); -- Normal division

-- Step 3: Simulate ZERO_DIVIDE using a SELECT query
SELECT
    num1,
    num2,
    CASE
        WHEN num2 = 0 THEN 'ZERO_DIVIDE: Division by zero is not allowed'z
        ELSE 'Result: ' || (num1 / num2)
    END AS result
FROM Numbers;
```

OUTPUT:

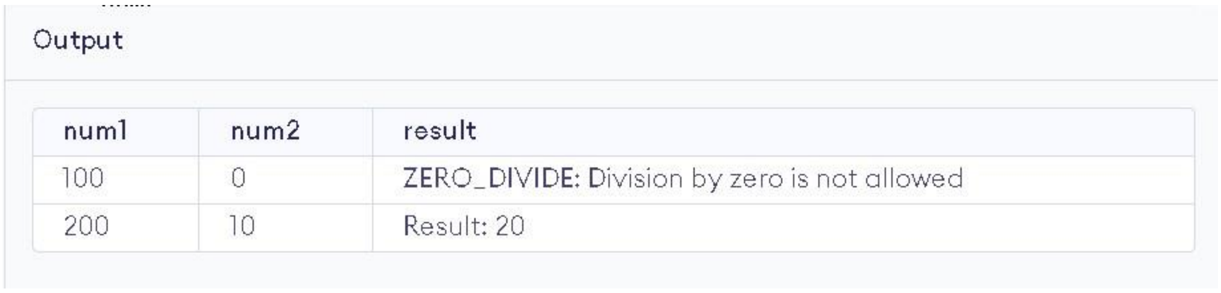
EXERCISE 27

AIM: To



Numbers

num1	num2	num3
100	0	
200	10	

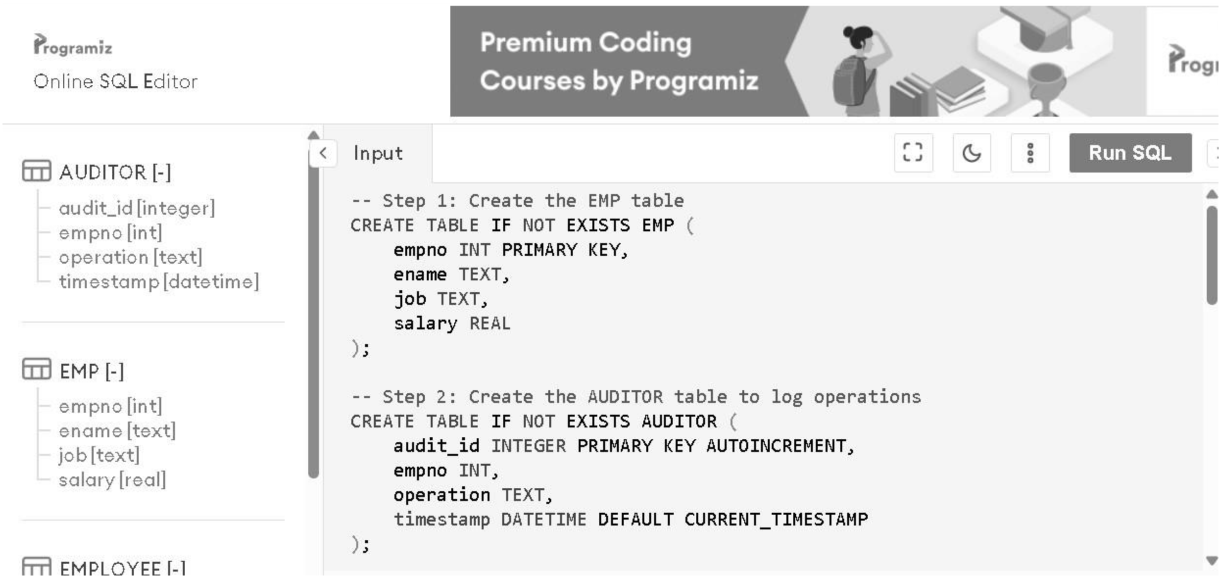


Output

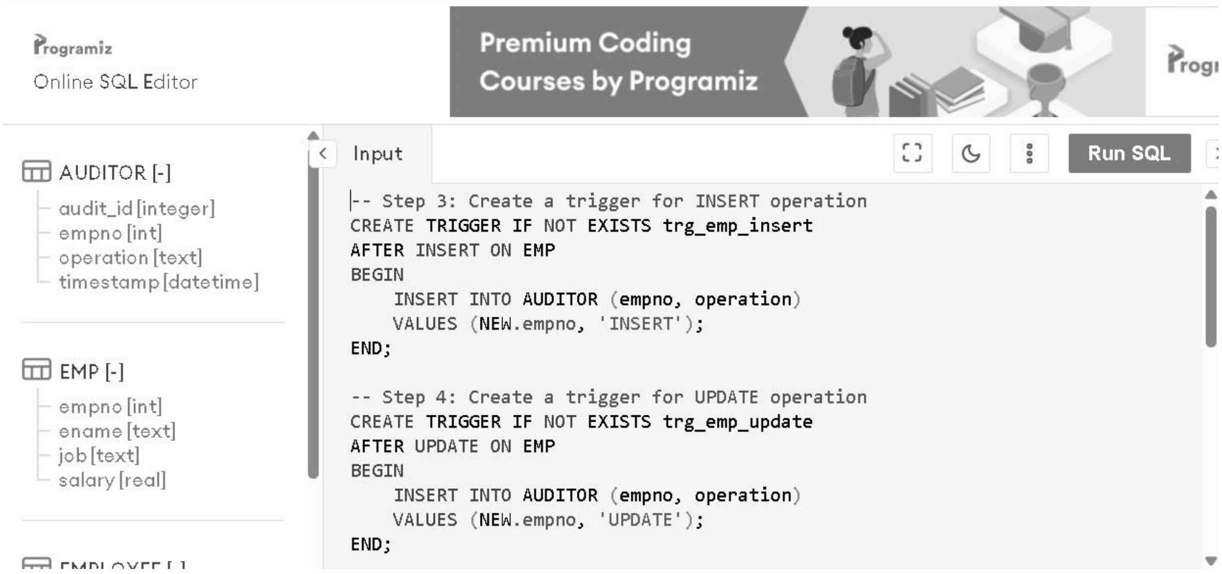
num1	num2	result
100	0	ZERO_DIVIDE: Division by zero is not allowed
200	10	Result: 20

EXERCISE 28

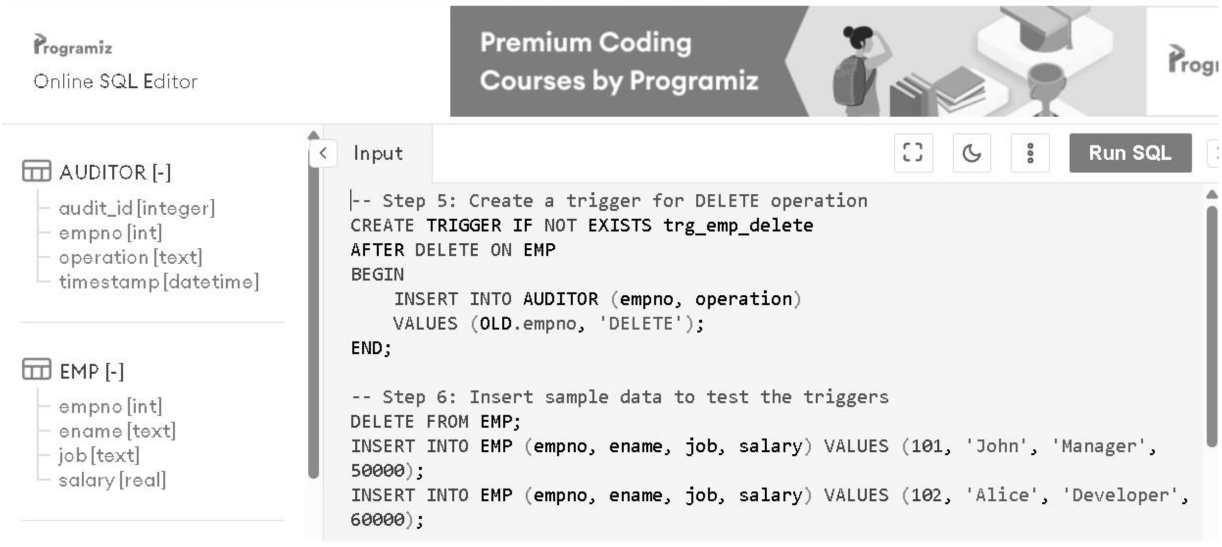
AIM: To create a trigger on the emp table, which store the empno& operation in the table auditor for each operation i.e. Insert, Update & Delete.



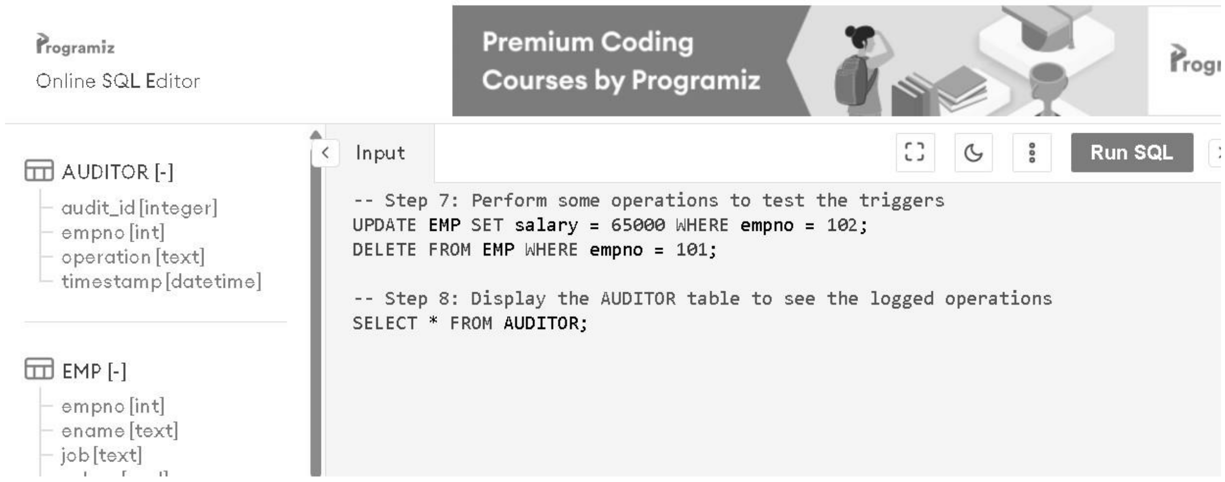
```
-- Step 1: Create the EMP table
CREATE TABLE IF NOT EXISTS EMP (
    empno INT PRIMARY KEY,
    ename TEXT,
    job TEXT,
    salary REAL
);

-- Step 2: Create the AUDITOR table to log operations
CREATE TABLE IF NOT EXISTS AUDITOR (
    audit_id INTEGER PRIMARY KEY AUTOINCREMENT,
    empno INT,
    operation TEXT,
    timestamp DATETIME DEFAULT CURRENT_TIMESTAMP
);
```



```
-- Step 3: Create a trigger for INSERT operation
CREATE TRIGGER IF NOT EXISTS trg_emp_insert
AFTER INSERT ON EMP
BEGIN
    INSERT INTO AUDITOR (empno, operation)
    VALUES (NEW.empno, 'INSERT');
END;

-- Step 4: Create a trigger for UPDATE operation
CREATE TRIGGER IF NOT EXISTS trg_emp_update
AFTER UPDATE ON EMP
BEGIN
    INSERT INTO AUDITOR (empno, operation)
    VALUES (NEW.empno, 'UPDATE');
END;
```



```
-- Step 5: Create a trigger for DELETE operation
CREATE TRIGGER IF NOT EXISTS trg_emp_delete
AFTER DELETE ON EMP
BEGIN
    INSERT INTO AUDITOR (empno, operation)
    VALUES (OLD.empno, 'DELETE');
END;

-- Step 6: Insert sample data to test the triggers
DELETE FROM EMP;
INSERT INTO EMP (empno, ename, job, salary) VALUES (101, 'John', 'Manager',
50000);
INSERT INTO EMP (empno, ename, job, salary) VALUES (102, 'Alice', 'Developer',
60000);
```

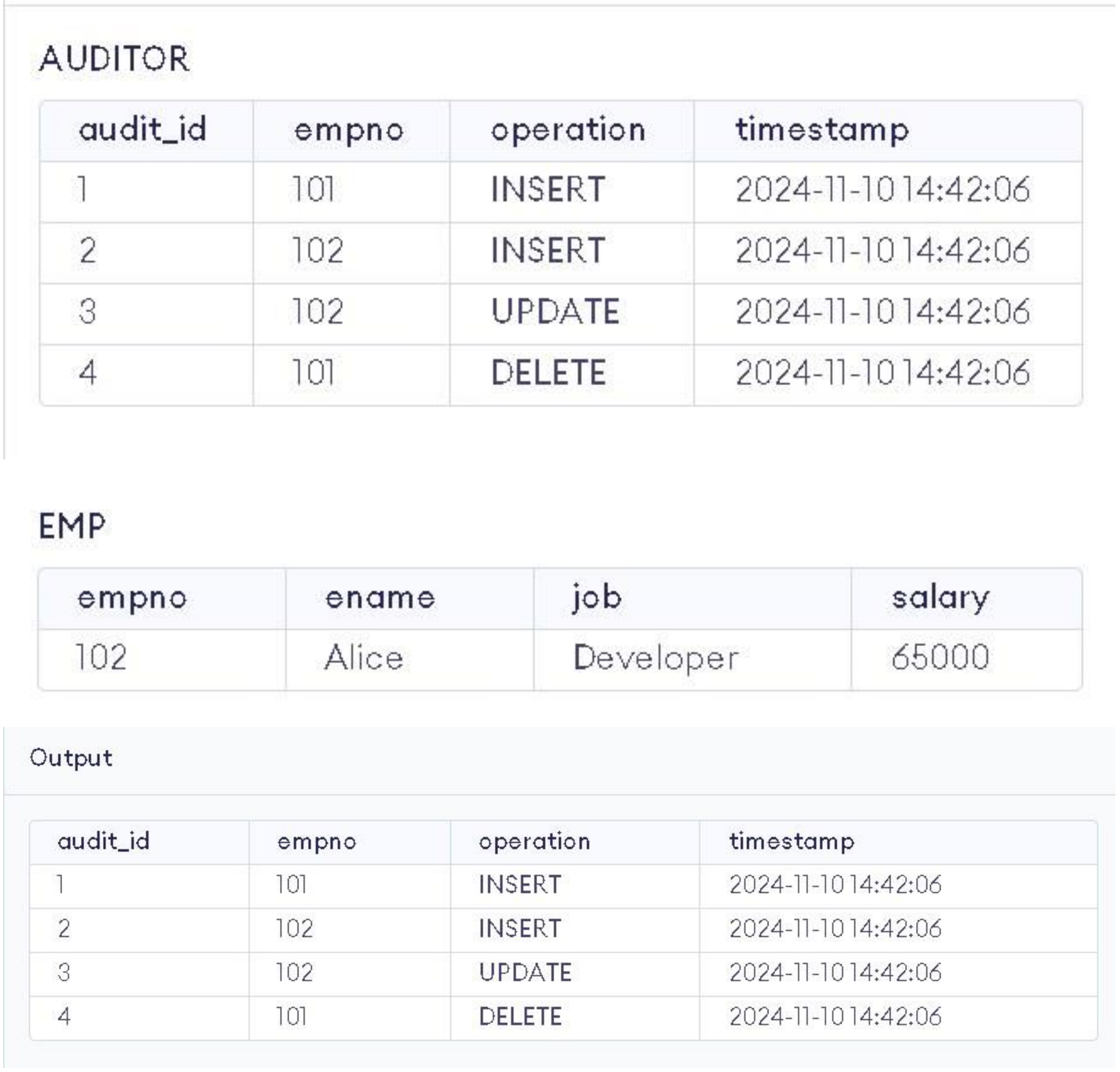


AUDITOR [-]
- audit_id [integer]
- empno [int]
- operation [text]
- timestamp [datetime]

EMP [-]
- empno [int]
- ename [text]
- job [text]

```
-- Step 7: Perform some operations to test the triggers
UPDATE EMP SET salary = 65000 WHERE empno = 102;
DELETE FROM EMP WHERE empno = 101;

-- Step 8: Display the AUDITOR table to see the logged operations
SELECT * FROM AUDITOR;
```

OUTPUT:



AUDITOR

audit_id	empno	operation	timestamp
1	101	INSERT	2024-11-10 14:42:06
2	102	INSERT	2024-11-10 14:42:06
3	102	UPDATE	2024-11-10 14:42:06
4	101	DELETE	2024-11-10 14:42:06

EMP

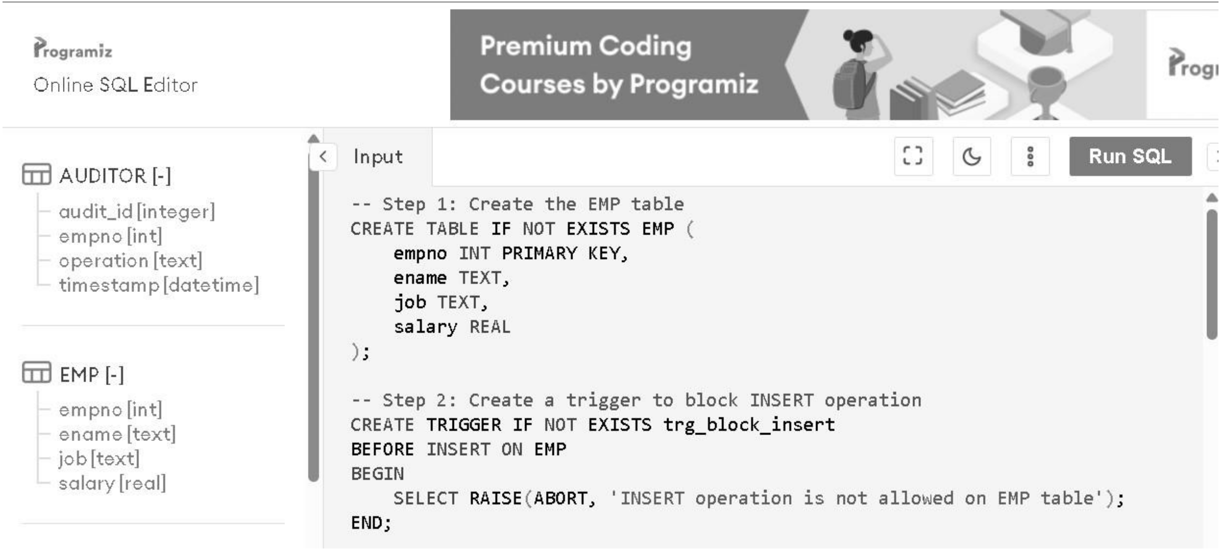
empno	ename	job	salary
102	Alice	Developer	65000

Output

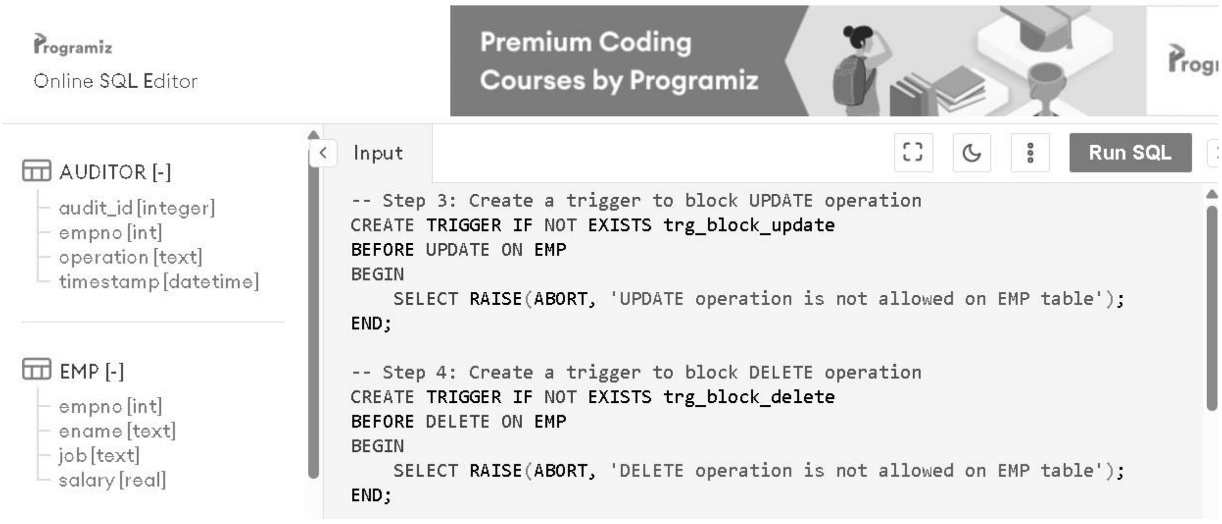
audit_id	empno	operation	timestamp
1	101	INSERT	2024-11-10 14:42:06
2	102	INSERT	2024-11-10 14:42:06
3	102	UPDATE	2024-11-10 14:42:06
4	101	DELETE	2024-11-10 14:42:06

EXERCISE 28

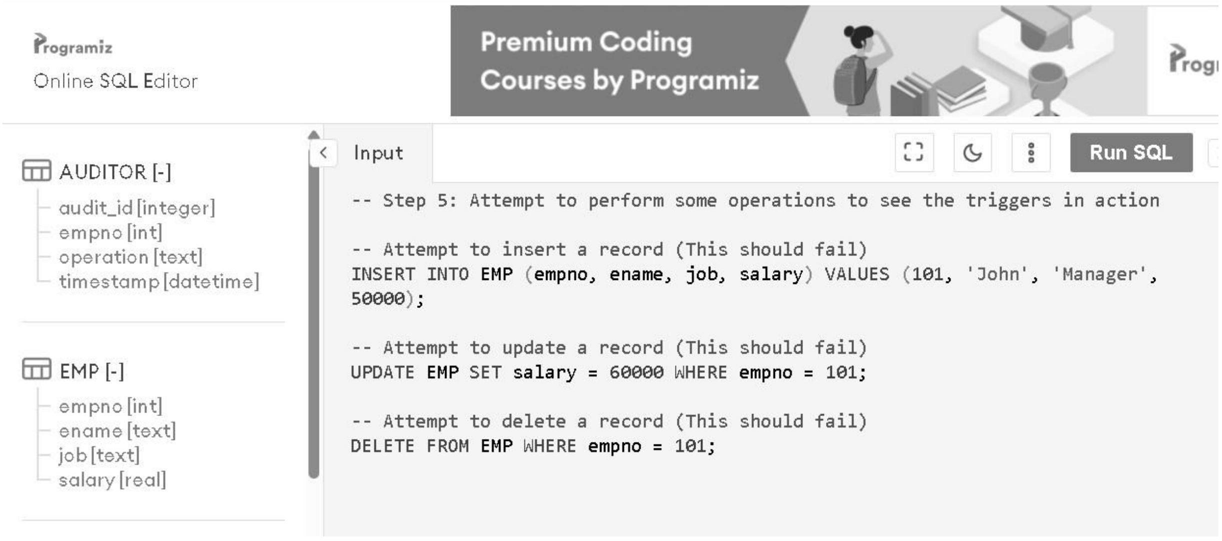
AIM: To create a trigger so that no operation can be performed on emp table.



```
-- Step 1: Create the EMP table
CREATE TABLE IF NOT EXISTS EMP (
    empno INT PRIMARY KEY,
    ename TEXT,
    job TEXT,
    salary REAL
);

-- Step 2: Create a trigger to block INSERT operation
CREATE TRIGGER IF NOT EXISTS trg_block_insert
BEFORE INSERT ON EMP
BEGIN
    SELECT RAISE(ABORT, 'INSERT operation is not allowed on EMP table');
END;
```

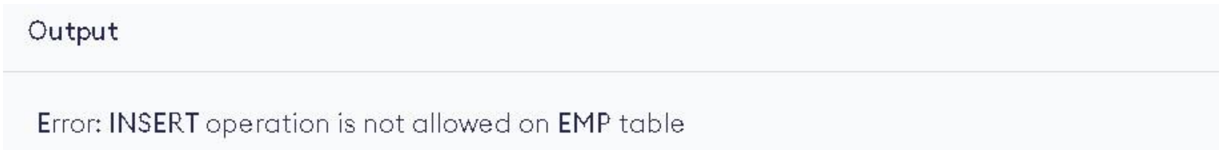


```
-- Step 3: Create a trigger to block UPDATE operation
CREATE TRIGGER IF NOT EXISTS trg_block_update
BEFORE UPDATE ON EMP
BEGIN
    SELECT RAISE(ABORT, 'UPDATE operation is not allowed on EMP table');
END;

-- Step 4: Create a trigger to block DELETE operation
CREATE TRIGGER IF NOT EXISTS trg_block_delete
BEFORE DELETE ON EMP
BEGIN
    SELECT RAISE(ABORT, 'DELETE operation is not allowed on EMP table');
END;
```



```
-- Step 5: Attempt to perform some operations to see the triggers in action

-- Attempt to insert a record (This should fail)
INSERT INTO EMP (empno, ename, job, salary) VALUES (101, 'John', 'Manager',
50000);

-- Attempt to update a record (This should fail)
UPDATE EMP SET salary = 60000 WHERE empno = 101;

-- Attempt to delete a record (This should fail)
DELETE FROM EMP WHERE empno = 101;
```

OUTPUT:



```
Error: INSERT operation is not allowed on EMP table
```