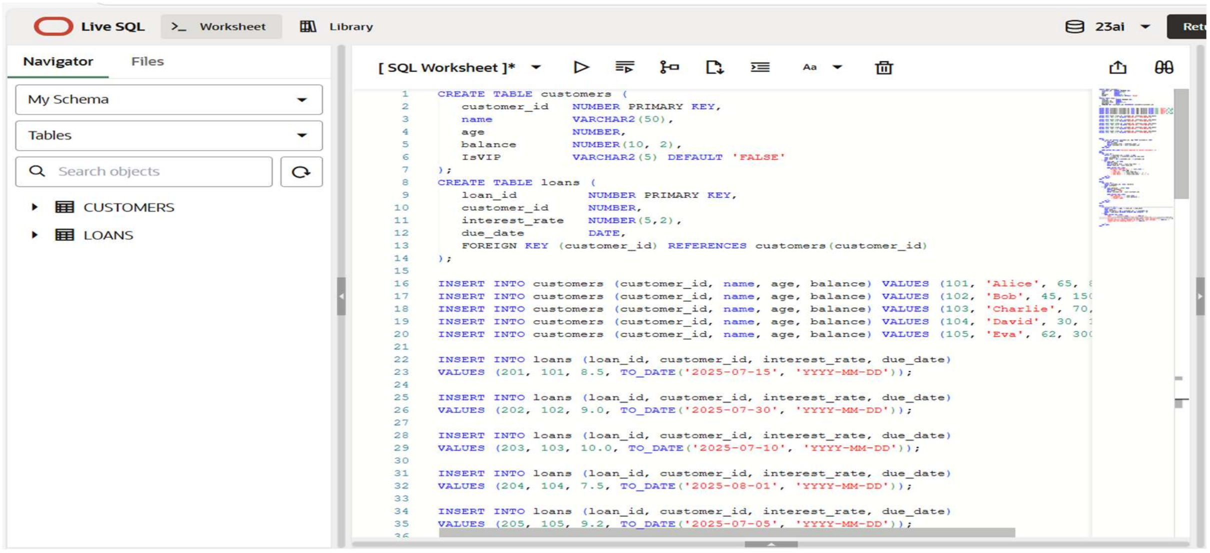
WEEK – 2 - PL/SQL

Exercise 1: Control Structures

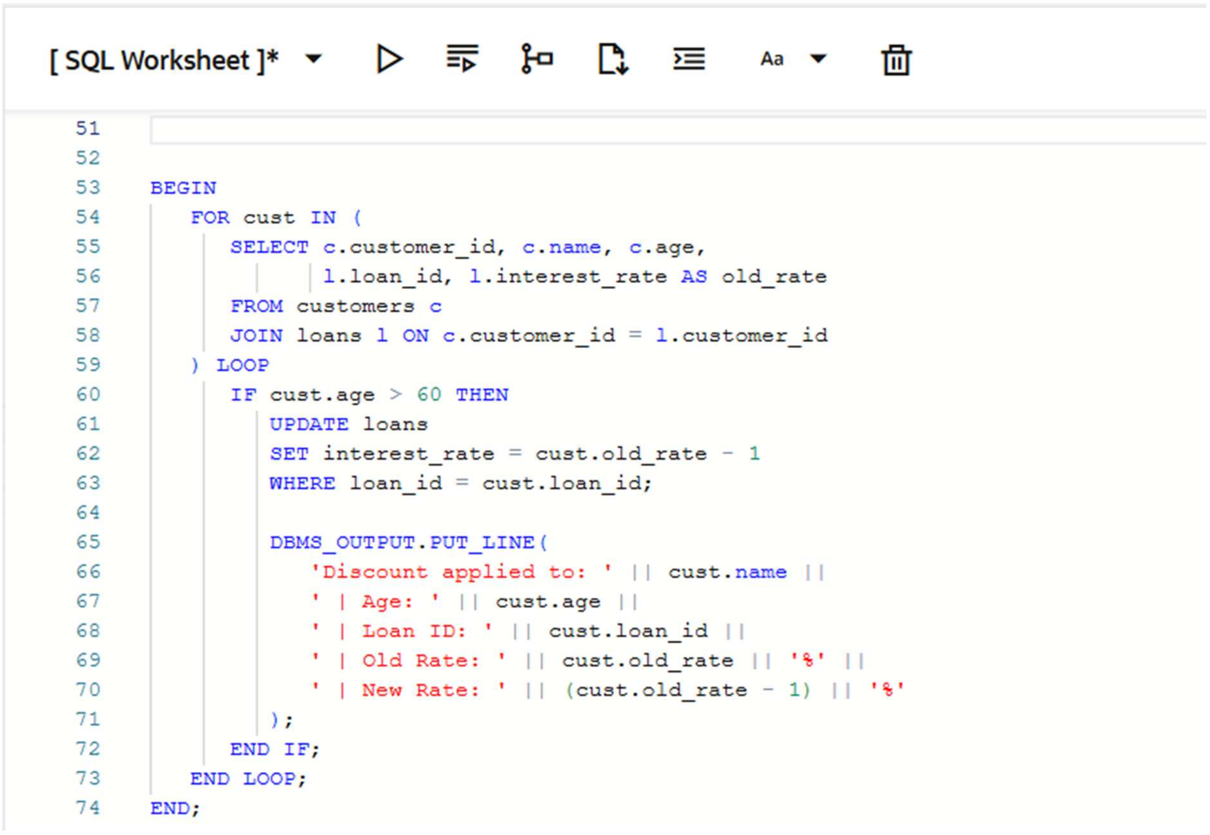
Table created and inserted the value



```sql
CREATE TABLE customers (
   customer_id   NUMBER PRIMARY KEY,
   name          VARCHAR2(50),
   age           NUMBER,
   balance       NUMBER(10, 2),
   IsVIP         VARCHAR2(5) DEFAULT 'FALSE'
);
CREATE TABLE loans (
   loan_id         NUMBER PRIMARY KEY,
   customer_id     NUMBER,
   interest_rate   NUMBER(5,2),
   due_date        DATE,
   FOREIGN KEY (customer_id) REFERENCES customers(customer_id)
);

INSERT INTO customers (customer_id, name, age, balance) VALUES (101, 'Alice', 65,
INSERT INTO customers (customer_id, name, age, balance) VALUES (102, 'Bob', 45, 15
INSERT INTO customers (customer_id, name, age, balance) VALUES (103, 'Charlie', 70,
INSERT INTO customers (customer_id, name, age, balance) VALUES (104, 'David', 30,
INSERT INTO customers (customer_id, name, age, balance) VALUES (105, 'Eva', 62, 30

INSERT INTO loans (loan_id, customer_id, interest_rate, due_date)
VALUES (201, 101, 8.5, TO_DATE('2025-07-15', 'YYYY-MM-DD'));

INSERT INTO loans (loan_id, customer_id, interest_rate, due_date)
VALUES (202, 102, 9.0, TO_DATE('2025-07-30', 'YYYY-MM-DD'));

INSERT INTO loans (loan_id, customer_id, interest_rate, due_date)
VALUES (203, 103, 10.0, TO_DATE('2025-07-10', 'YYYY-MM-DD'));

INSERT INTO loans (loan_id, customer_id, interest_rate, due_date)
VALUES (204, 104, 7.5, TO_DATE('2025-08-01', 'YYYY-MM-DD'));

INSERT INTO loans (loan_id, customer_id, interest_rate, due_date)
VALUES (205, 105, 9.2, TO_DATE('2025-07-05', 'YYYY-MM-DD'));
```

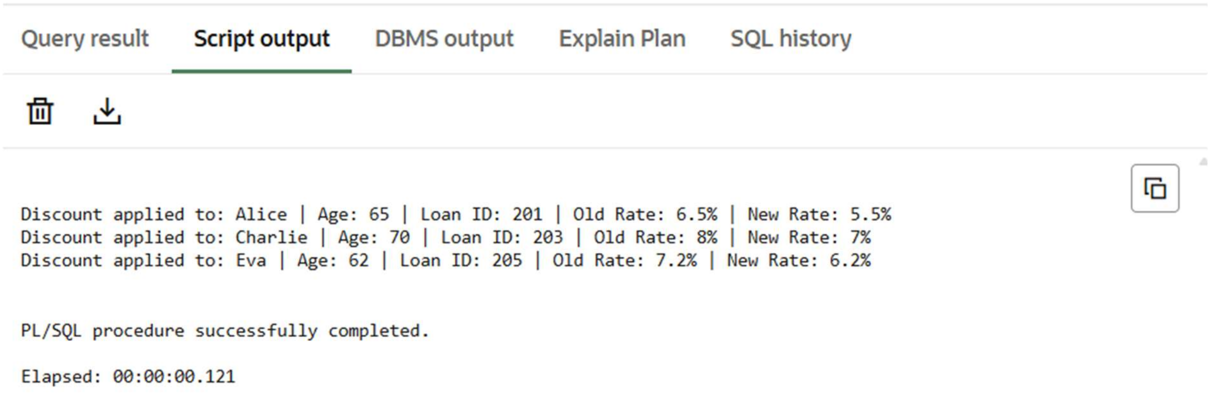
i) Scenario 1:

Write a PL/SQL block that loops through all customers, checks their age, and if they are above 60, apply a 1% discount to their current loan interest rates.



```sql

BEGIN
   FOR cust IN (
      SELECT c.customer_id, c.name, c.age,
             l.loan_id, l.interest_rate AS old_rate
      FROM customers c
      JOIN loans l ON c.customer_id = l.customer_id
   ) LOOP
      IF cust.age > 60 THEN
         UPDATE loans
         SET interest_rate = cust.old_rate - 1
         WHERE loan_id = cust.loan_id;

         DBMS_OUTPUT.PUT_LINE(
            'Discount applied to: ' || cust.name ||
            ' | Age: ' || cust.age ||
            ' | Loan ID: ' || cust.loan_id ||
            ' | Old Rate: ' || cust.old_rate || '%' ||
            ' | New Rate: ' || (cust.old_rate - 1) || '%'
         );
      END IF;
   END LOOP;
END;
```

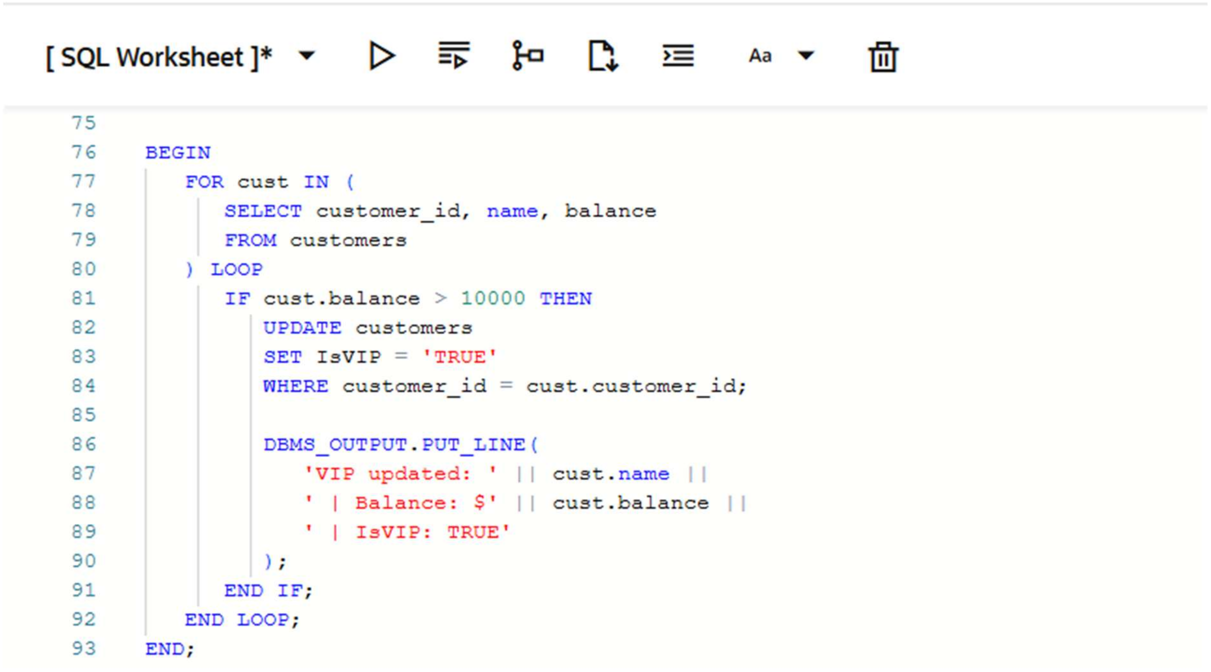
Output:



```
Discount applied to: Alice | Age: 65 | Loan ID: 201 | Old Rate: 6.5% | New Rate: 5.5%
Discount applied to: Charlie | Age: 70 | Loan ID: 203 | Old Rate: 8% | New Rate: 7%
Discount applied to: Eva | Age: 62 | Loan ID: 205 | Old Rate: 7.2% | New Rate: 6.2%


PL/SQL procedure successfully completed.

Elapsed: 00:00:00.121
```

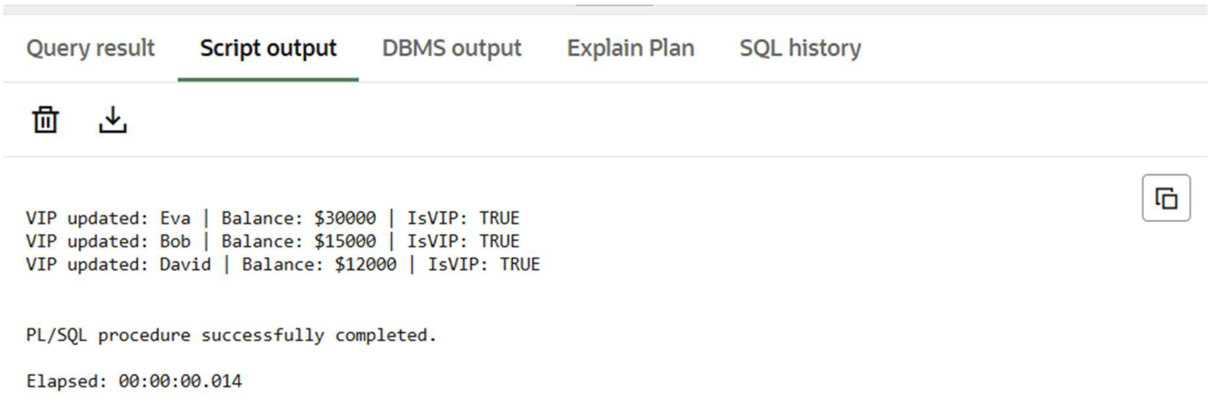
ii) Scenario 2:

Write a PL/SQL block that iterates through all customers and sets a flag IsVIP to TRUE for those with a balance over $10,000.



```

BEGIN
   FOR cust IN (
      SELECT customer_id, name, balance
      FROM customers
   ) LOOP
      IF cust.balance > 10000 THEN
         UPDATE customers
         SET IsVIP = 'TRUE'
         WHERE customer_id = cust.customer_id;

         DBMS_OUTPUT.PUT_LINE(
            'VIP updated: ' || cust.name ||
            ' | Balance: $' || cust.balance ||
            ' | IsVIP: TRUE'
         );
      END IF;
   END LOOP;
END;
```

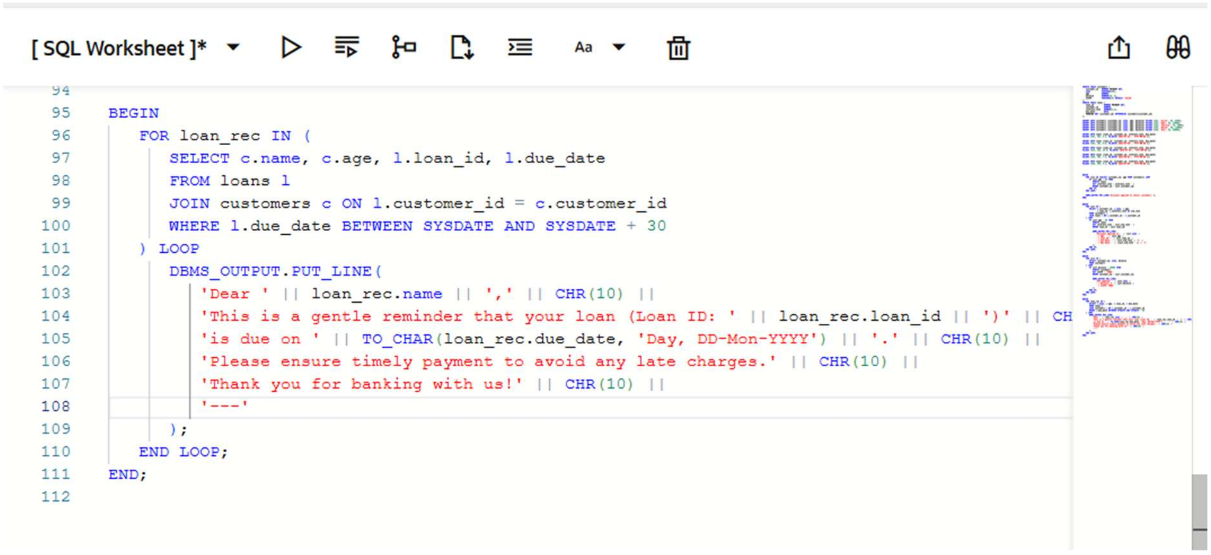
Output :



```
VIP updated: Eva | Balance: $30000 | IsVIP: TRUE
VIP updated: Bob | Balance: $15000 | IsVIP: TRUE
VIP updated: David | Balance: $12000 | IsVIP: TRUE


PL/SQL procedure successfully completed.

Elapsed: 00:00:00.014
```

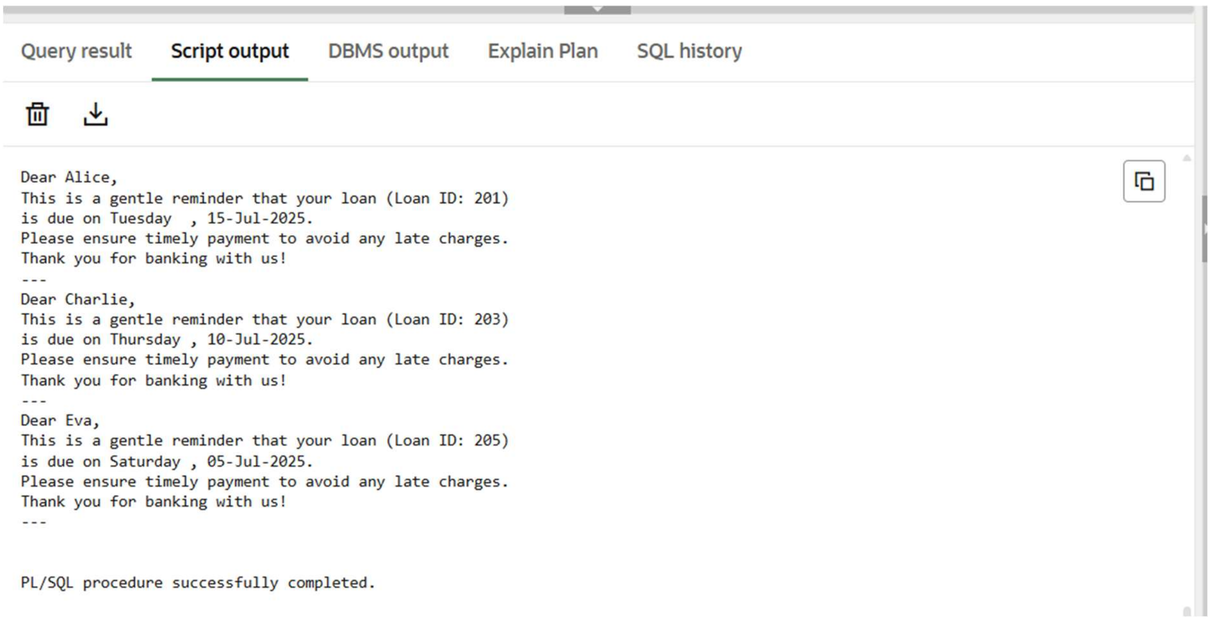
ii) Scenario 3:

Write a PL/SQL block that fetches all loans due in the next 30 days and prints a reminder message for each customer



```
BEGIN
   FOR loan_rec IN (
      SELECT c.name, c.age, l.loan_id, l.due_date
      FROM loans l
      JOIN customers c ON l.customer_id = c.customer_id
      WHERE l.due_date BETWEEN SYSDATE AND SYSDATE + 30
   ) LOOP
      DBMS_OUTPUT.PUT_LINE(
         'Dear ' || loan_rec.name || ',' || CHR(10) ||
         'This is a gentle reminder that your loan (Loan ID: ' || loan_rec.loan_id || ')' || CH
         'is due on ' || TO_CHAR(loan_rec.due_date, 'Day, DD-Mon-YYYY') || '.' || CHR(10) ||
         'Please ensure timely payment to avoid any late charges.' || CHR(10) ||
         'Thank you for banking with us!' || CHR(10) ||
         '---'
      );
   END LOOP;
END;
```

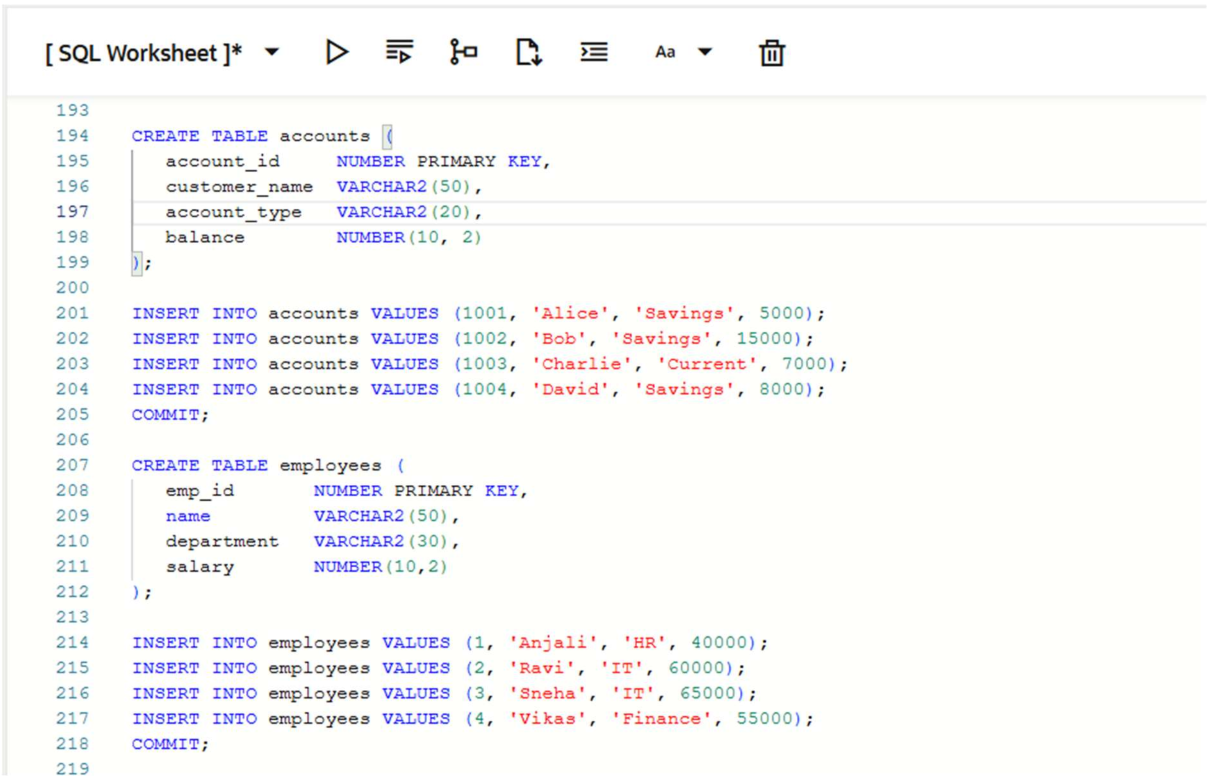
Output:



```
Dear Alice,
This is a gentle reminder that your loan (Loan ID: 201)
is due on Tuesday  , 15-Jul-2025.
Please ensure timely payment to avoid any late charges.
Thank you for banking with us!
---
Dear Charlie,
This is a gentle reminder that your loan (Loan ID: 203)
is due on Thursday , 10-Jul-2025.
Please ensure timely payment to avoid any late charges.
Thank you for banking with us!
---
Dear Eva,
This is a gentle reminder that your loan (Loan ID: 205)
is due on Saturday , 05-Jul-2025.
Please ensure timely payment to avoid any late charges.
Thank you for banking with us!
---


PL/SQL procedure successfully completed.
```

Exercise 3: Stored Procedures

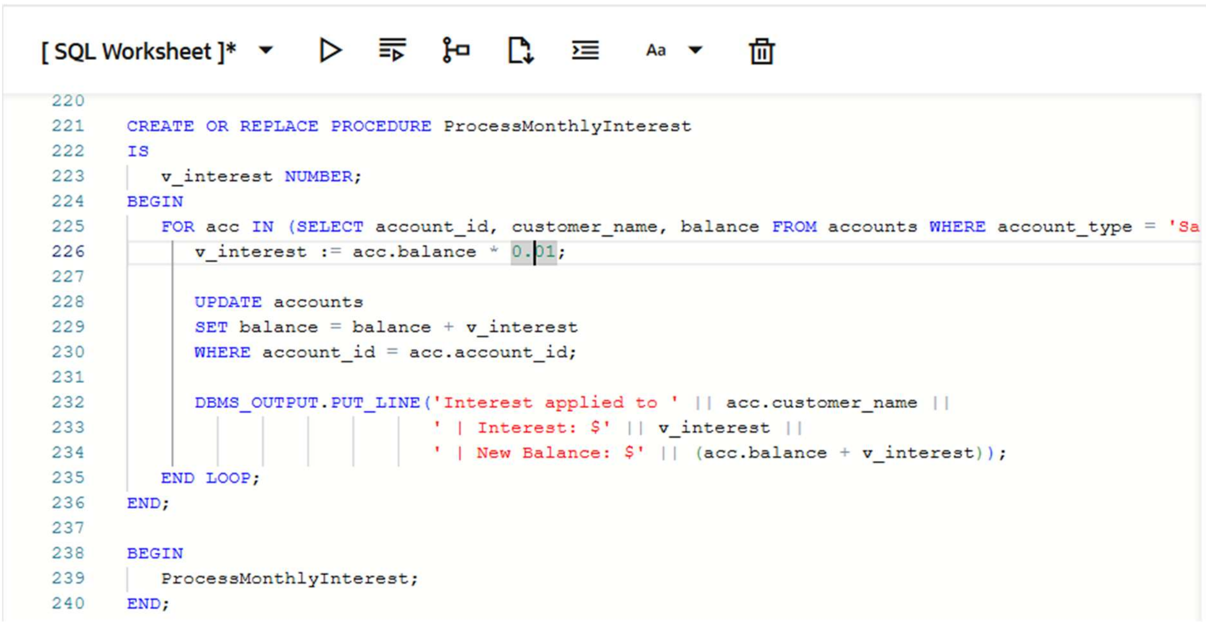
Table Created and Row inserted



```sql
CREATE TABLE accounts (
    account_id     NUMBER PRIMARY KEY,
    customer_name  VARCHAR2(50),
    account_type   VARCHAR2(20),
    balance        NUMBER(10, 2)
);

INSERT INTO accounts VALUES (1001, 'Alice', 'Savings', 5000);
INSERT INTO accounts VALUES (1002, 'Bob', 'Savings', 15000);
INSERT INTO accounts VALUES (1003, 'Charlie', 'Current', 7000);
INSERT INTO accounts VALUES (1004, 'David', 'Savings', 8000);
COMMIT;

CREATE TABLE employees (
    emp_id      NUMBER PRIMARY KEY,
    name        VARCHAR2(50),
    department  VARCHAR2(30),
    salary      NUMBER(10,2)
);

INSERT INTO employees VALUES (1, 'Anjali', 'HR', 40000);
INSERT INTO employees VALUES (2, 'Ravi', 'IT', 60000);
INSERT INTO employees VALUES (3, 'Sneha', 'IT', 65000);
INSERT INTO employees VALUES (4, 'Vikas', 'Finance', 55000);
COMMIT;
```

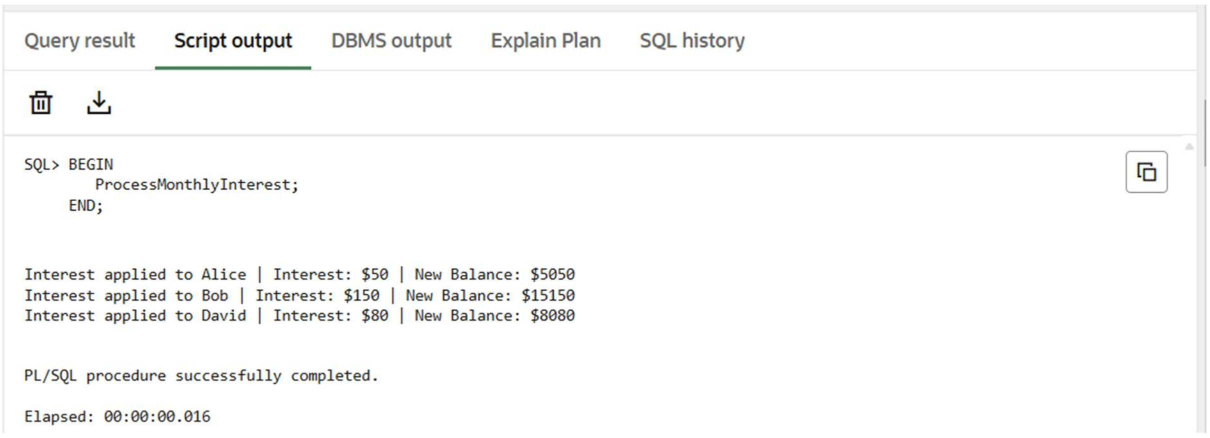
i)Scenario 1:

Write a stored procedure **ProcessMonthlyInterest** that calculates and updates the balance of all savings accounts by applying an interest rate of 1% to the current balance.



```sql
CREATE OR REPLACE PROCEDURE ProcessMonthlyInterest
IS
    v_interest NUMBER;
BEGIN
    FOR acc IN (SELECT account_id, customer_name, balance FROM accounts WHERE account_type = 'Sa
        v_interest := acc.balance * 0.01;

        UPDATE accounts
        SET balance = balance + v_interest
        WHERE account_id = acc.account_id;

        DBMS_OUTPUT.PUT_LINE('Interest applied to ' || acc.customer_name ||
                             ' | Interest: $' || v_interest ||
                             ' | New Balance: $' || (acc.balance + v_interest));
    END LOOP;
END;

BEGIN
    ProcessMonthlyInterest;
END;
```

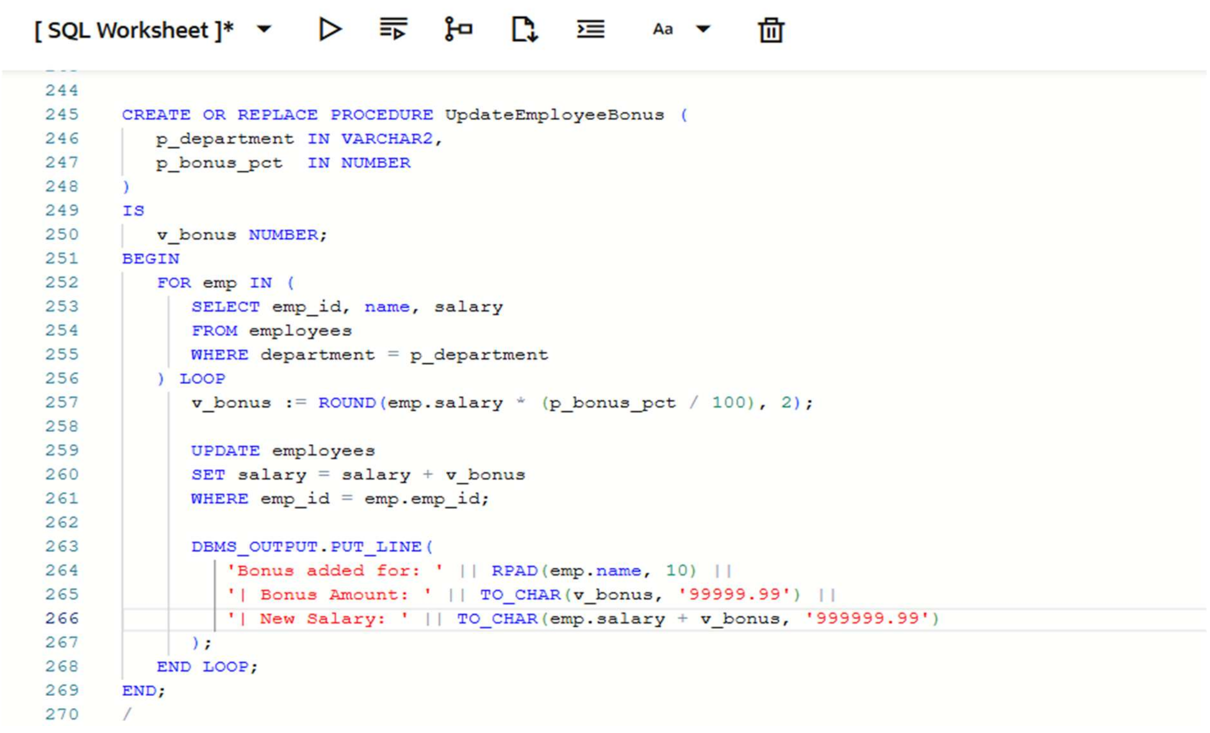
Output



```
SQL> BEGIN
        ProcessMonthlyInterest;
     END;


Interest applied to Alice | Interest: $50 | New Balance: $5050
Interest applied to Bob | Interest: $150 | New Balance: $15150
Interest applied to David | Interest: $80 | New Balance: $8080


PL/SQL procedure successfully completed.

Elapsed: 00:00:00.016
```

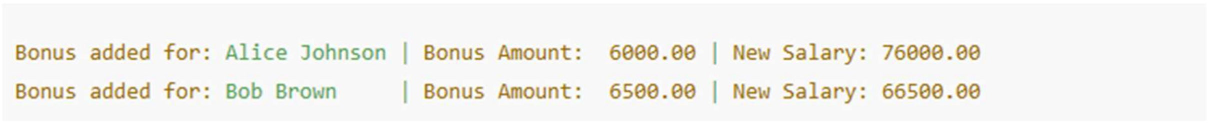
ii)Scenario 2:

Write a stored procedure **UpdateEmployeeBonus** that updates the salary of employees in a given department by adding a bonus percentage passed as a parameter



```
CREATE OR REPLACE PROCEDURE UpdateEmployeeBonus (
    p_department IN VARCHAR2,
    p_bonus_pct  IN NUMBER
)
IS
    v_bonus NUMBER;
BEGIN
    FOR emp IN (
        SELECT emp_id, name, salary
        FROM employees
        WHERE department = p_department
    ) LOOP
        v_bonus := ROUND(emp.salary * (p_bonus_pct / 100), 2);

        UPDATE employees
        SET salary = salary + v_bonus
        WHERE emp_id = emp.emp_id;

        DBMS_OUTPUT.PUT_LINE(
            'Bonus added for: ' || RPAD(emp.name, 10) ||
            '| Bonus Amount: ' || TO_CHAR(v_bonus, '99999.99') ||
            '| New Salary: ' || TO_CHAR(emp.salary + v_bonus, '999999.99')
        );
    END LOOP;
END;
/
```

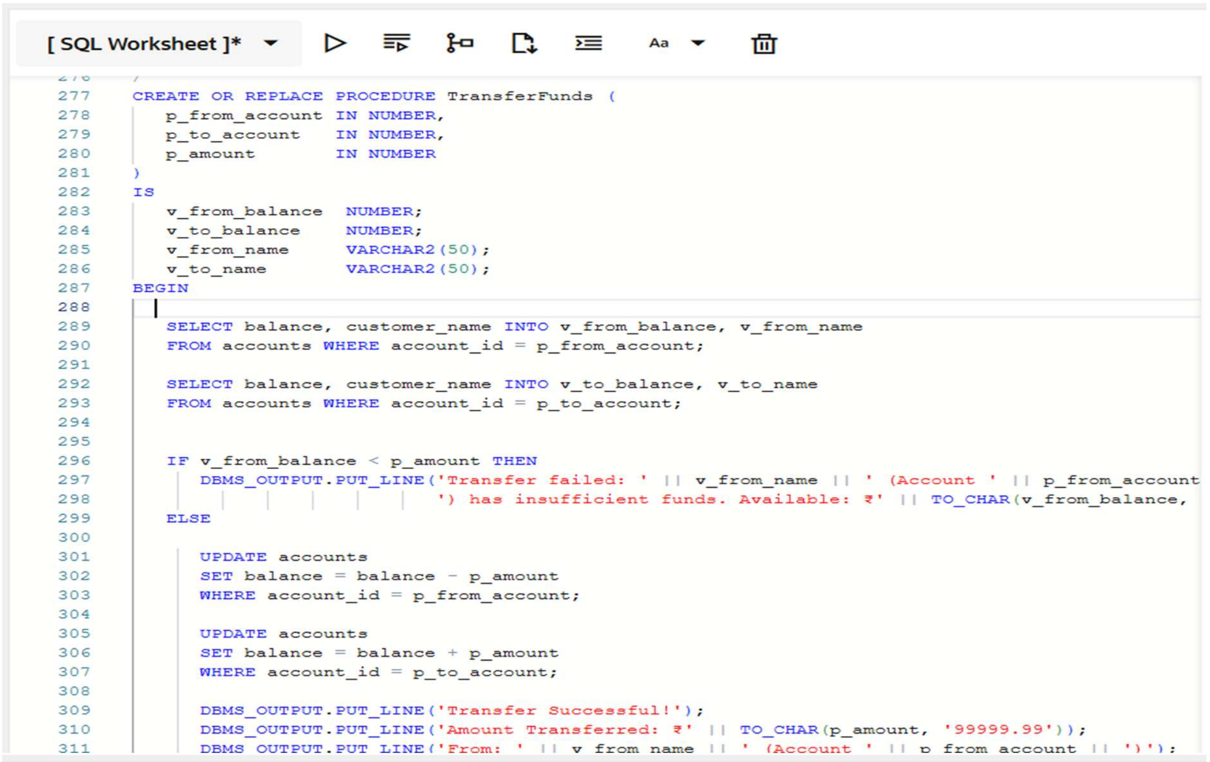
Output



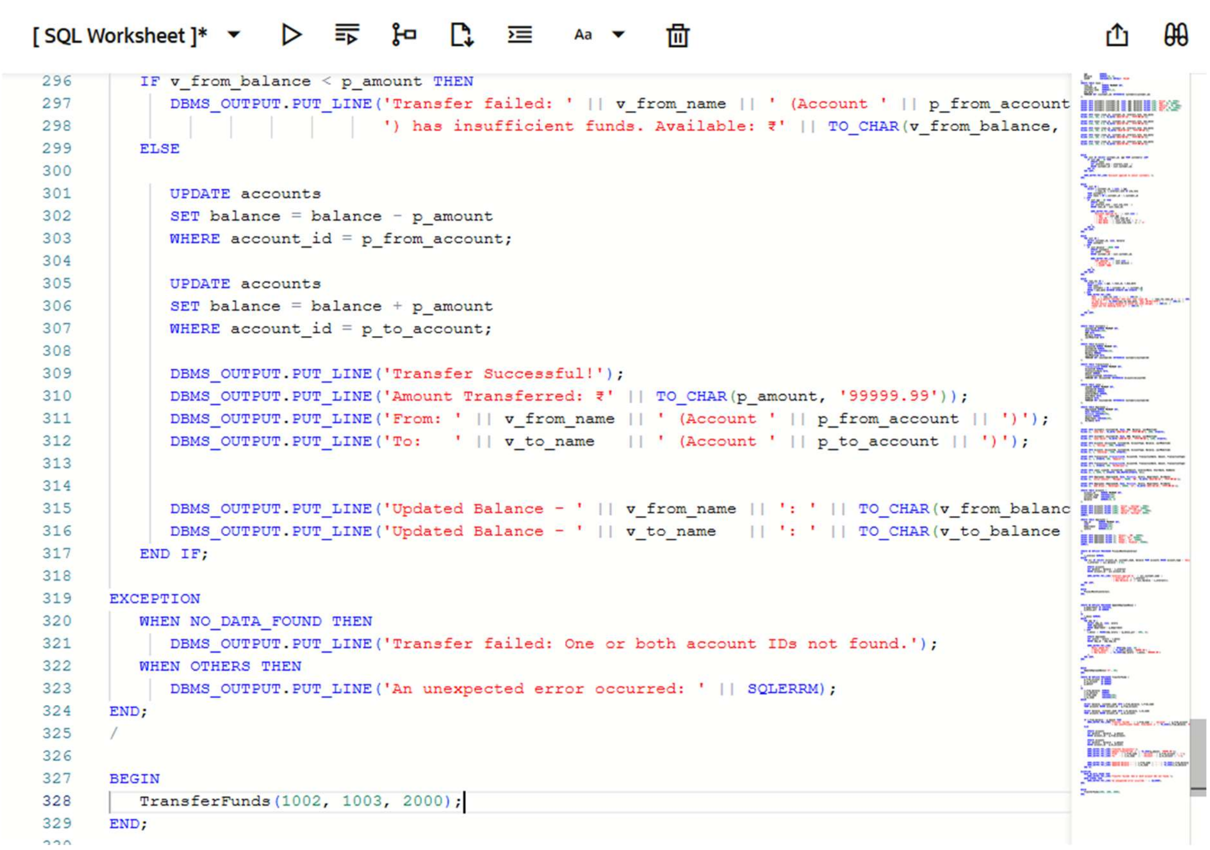
```
Bonus added for: Alice Johnson | Bonus Amount:  6000.00 | New Salary: 76000.00
Bonus added for: Bob Brown      | Bonus Amount:  6500.00 | New Salary: 66500.00
```

iii)Scenario 3:

Write a stored procedure **TransferFunds** that transfers a specified amount from one account to another, checking that the source account has sufficient balance before making the transfer.

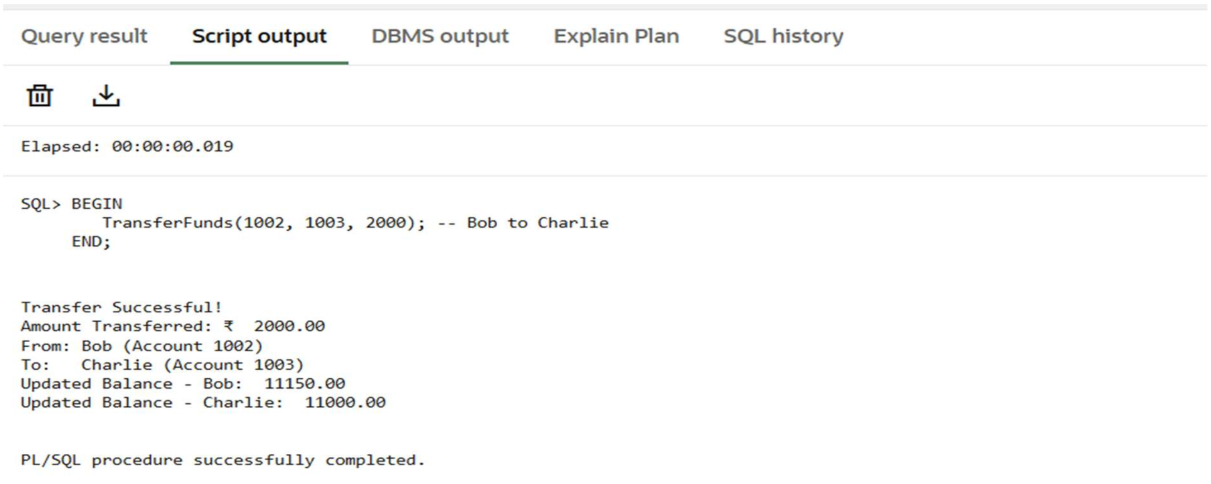


```
CREATE OR REPLACE PROCEDURE TransferFunds (
    p_from_account  IN NUMBER,
    p_to_account    IN NUMBER,
    p_amount        IN NUMBER
)
IS
    v_from_balance   NUMBER;
    v_to_balance     NUMBER;
    v_from_name      VARCHAR2(50);
    v_to_name        VARCHAR2(50);
BEGIN

    SELECT balance, customer_name INTO v_from_balance, v_from_name
    FROM accounts WHERE account_id = p_from_account;

    SELECT balance, customer_name INTO v_to_balance, v_to_name
    FROM accounts WHERE account_id = p_to_account;


    IF v_from_balance < p_amount THEN
        DBMS_OUTPUT.PUT_LINE('Transfer failed: ' || v_from_name || ' (Account ' || p_from_account
                             ') has insufficient funds. Available: ₹' || TO_CHAR(v_from_balance,
    ELSE

        UPDATE accounts
        SET balance = balance - p_amount
        WHERE account_id = p_from_account;

        UPDATE accounts
        SET balance = balance + p_amount
        WHERE account_id = p_to_account;

        DBMS_OUTPUT.PUT_LINE('Transfer Successful!');
        DBMS_OUTPUT.PUT_LINE('Amount Transferred: ₹' || TO_CHAR(p_amount, '99999.99'));
        DBMS_OUTPUT.PUT_LINE('From: ' || v_from_name || ' (Account ' || p_from_account || ')');
```



```
    IF v_from_balance < p_amount THEN
        DBMS_OUTPUT.PUT_LINE('Transfer failed: ' || v_from_name || ' (Account ' || p_from_account
                             ') has insufficient funds. Available: ₹' || TO_CHAR(v_from_balance,
    ELSE

        UPDATE accounts
        SET balance = balance - p_amount
        WHERE account_id = p_from_account;

        UPDATE accounts
        SET balance = balance + p_amount
        WHERE account_id = p_to_account;

        DBMS_OUTPUT.PUT_LINE('Transfer Successful!');
        DBMS_OUTPUT.PUT_LINE('Amount Transferred: ₹' || TO_CHAR(p_amount, '99999.99'));
        DBMS_OUTPUT.PUT_LINE('From: ' || v_from_name || ' (Account ' || p_from_account || ')');
        DBMS_OUTPUT.PUT_LINE('To:   ' || v_to_name   || ' (Account ' || p_to_account || ')');


        DBMS_OUTPUT.PUT_LINE('Updated Balance - ' || v_from_name || ': ' || TO_CHAR(v_from_balanc
        DBMS_OUTPUT.PUT_LINE('Updated Balance - ' || v_to_name   || ': ' || TO_CHAR(v_to_balance
    END IF;

EXCEPTION
    WHEN NO_DATA_FOUND THEN
        DBMS_OUTPUT.PUT_LINE('Transfer failed: One or both account IDs not found.');
    WHEN OTHERS THEN
        DBMS_OUTPUT.PUT_LINE('An unexpected error occurred: ' || SQLERRM);
END;
/

BEGIN
    TransferFunds(1002, 1003, 2000);
END;
```

Output



```
Elapsed: 00:00:00.019

SQL> BEGIN
        TransferFunds(1002, 1003, 2000); -- Bob to Charlie
     END;


Transfer Successful!
Amount Transferred: ₹  2000.00
From: Bob (Account 1002)
To:   Charlie (Account 1003)
Updated Balance - Bob:  11150.00
Updated Balance - Charlie:  11000.00


PL/SQL procedure successfully completed.
```