**Exercise 1: Control Structures**

**Scenario 1:** The bank wants to apply a discount to loan interest rates for customers above 60 years old.

* + **Question:** 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.

SELECT \* FROM CUSTOMERS;

SELECT \* FROM LOANS;

SET SERVEROUTPUT ON;

DECLARE

CURSOR CUSTOMER\_CURSOR IS

SELECT CUSTOMERID, EXTRACT(YEAR FROM SYSDATE) - EXTRACT(YEAR FROM DOB) AS AGE

FROM CUSTOMERS;

VAR\_CUSTOMER\_ID CUSTOMERS.CUSTOMERID%TYPE;

VAR\_AGE NUMBER;

BEGIN

FOR CUSTOMER\_RECORD IN CUSTOMER\_CURSOR LOOP

VAR\_CUSTOMER\_ID := CUSTOMER\_RECORD.CUSTOMERID;

VAR\_AGE := CUSTOMER\_RECORD.AGE;

IF VAR\_AGE > 60 THEN

UPDATE LOANS

SET INTERESTRATE = INTERESTRATE - 1

WHERE CUSTOMERID = VAR\_CUSTOMER\_ID;

ELSE

DBMS\_OUTPUT.PUT\_LINE('CUSTOMER WITH CUSTOMER ID : ' || VAR\_CUSTOMER\_ID || ' IS OF AGE : ' || VAR\_AGE);

DBMS\_OUTPUT.PUT\_LINE('NO CHANGE IN LOAN');

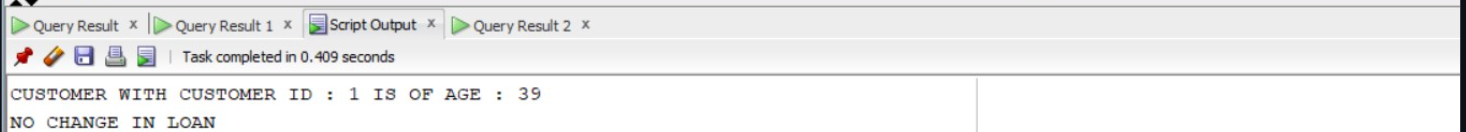
END IF;

END LOOP;

COMMIT;

END;

/



**Scenario 2:** A customer can be promoted to VIP status based on their balance.

* + **Question:** 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.

DESC CUSTOMERS;

ALTER TABLE CUSTOMERS ADD ISVIP CHAR(10) CONSTRAINT CHK1 CHECK(ISVIP IN ('TRUE','FALSE')) ;

SELECT \* FROM CUSTOMERS;

SET SERVEROUTPUT ON;

DECLARE

CURSOR CUSTOMER\_CURSOR IS

SELECT CUSTOMERID, BALANCE

FROM CUSTOMERS;

VAR\_CUSTOMER\_ID CUSTOMERS.CUSTOMERID%TYPE;

VAR\_BALANCE CUSTOMERS.BALANCE%TYPE;

BEGIN

FOR CUSTOMER\_RECORD IN CUSTOMER\_CURSOR LOOP

VAR\_CUSTOMER\_ID := CUSTOMER\_RECORD.CUSTOMERID;

VAR\_BALANCE := CUSTOMER\_RECORD.BALANCE;

IF VAR\_BALANCE > 10000 THEN

DBMS\_OUTPUT.PUT\_LINE('CUSTOMER ID : ' || VAR\_CUSTOMER\_ID || ' HAS BALANCE GREATER THAN 10000');

UPDATE CUSTOMERS

SET ISVIP = 'TRUE'

WHERE CUSTOMERID = VAR\_CUSTOMER\_ID;

ELSE

DBMS\_OUTPUT.PUT\_LINE('CUSTOMER ID : ' || VAR\_CUSTOMER\_ID || ' HAS BALANCE LESSER THAN 10000');

UPDATE CUSTOMERS

SET ISVIP = 'FALSE'

WHERE CUSTOMERID = VAR\_CUSTOMER\_ID;

END IF;

END LOOP;

COMMIT;

END;

/

SELECT \* FROM CUSTOMERS;



**Scenario 3:** The bank wants to send reminders to customers whose loans are due within the next 30 days.

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

SET SERVEROUTPUT ON;

DECLARE

CURSOR CUR\_LOANS IS

SELECT L.LOANID, L.CUSTOMERID, C.NAME, L.ENDDATE

FROM LOANS L

JOIN CUSTOMERS C ON L.CUSTOMERID = C.CUSTOMERID

WHERE L.ENDDATE BETWEEN SYSDATE AND SYSDATE + 30;

V\_LOAN\_ID LOANS.LOANID%TYPE;

V\_CUSTOMER\_ID LOANS.CUSTOMERID%TYPE;

V\_CUSTOMER\_NAME CUSTOMERS.NAME%TYPE;

V\_END\_DATE LOANS.ENDDATE%TYPE;

V\_FOUND BOOLEAN := FALSE;

BEGIN

OPEN CUR\_LOANS;

LOOP

FETCH CUR\_LOANS INTO V\_LOAN\_ID, V\_CUSTOMER\_ID, V\_CUSTOMER\_NAME, V\_END\_DATE;

EXIT WHEN CUR\_LOANS%NOTFOUND;

V\_FOUND := TRUE;

DBMS\_OUTPUT.PUT\_LINE('Reminder: Loan ' || V\_LOAN\_ID || ' for customer ' || V\_CUSTOMER\_NAME || ' (ID: ' || V\_CUSTOMER\_ID || ') is due on ' || TO\_CHAR(V\_END\_DATE, 'YYYY-MM-DD'));

END LOOP;

CLOSE CUR\_LOANS;

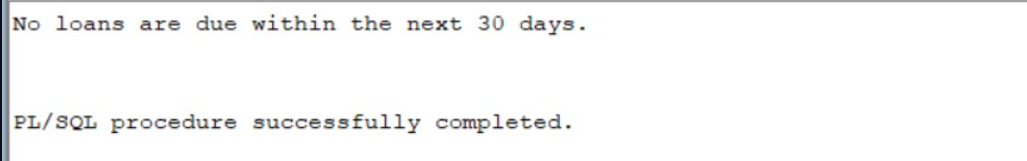
IF NOT V\_FOUND THEN

DBMS\_OUTPUT.PUT\_LINE('No loans are due within the next 30 days.');

END IF;

END;

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**Exercise 3: Stored Procedures**

**Scenario 1:** The bank needs to process monthly interest for all savings accounts.

* + **Question:** 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.

SELECT \* FROM ACCOUNTS;

SET SERVEROUTPUT ON;

CREATE OR REPLACE PROCEDURE PROCESSMONTHLYINTEREST AS

BEGIN

UPDATE ACCOUNTS

SET BALANCE = BALANCE \* 1.01,

LASTMODIFIED = SYSDATE

WHERE ACCOUNTTYPE = 'Savings';

COMMIT;

DBMS\_OUTPUT.PUT\_LINE('Monthly interest processed for all savings accounts.');

EXCEPTION

WHEN OTHERS THEN

ROLLBACK;

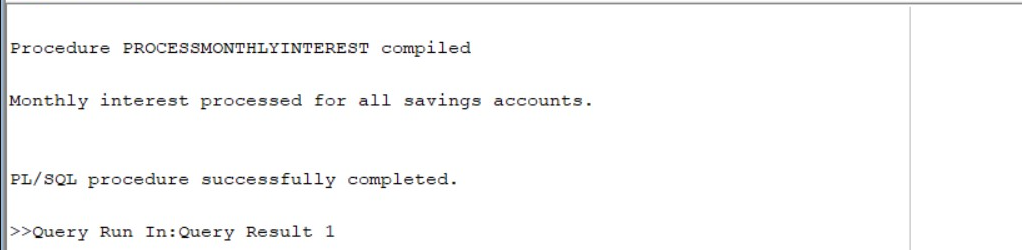
DBMS\_OUTPUT.PUT\_LINE('Error processing monthly interest: ' || SQLERRM);

END PROCESSMONTHLYINTEREST;

/

EXEC PROCESSMONTHLYINTEREST();

SELECT \* FROM ACCOUNTS;



**Scenario 2:** The bank wants to implement a bonus scheme for employees based on their performance.

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

SELECT \* FROM EMPLOYEES;

SET SERVEROUTPUT ON;

CREATE OR REPLACE PROCEDURE UPDATEEMPLOYEEBONUS(

P\_DEPARTMENT IN EMPLOYEES.DEPARTMENT%TYPE,

P\_BONUS\_PERCENTAGE IN NUMBER

) AS

BEGIN

UPDATE EMPLOYEES

SET SALARY = SALARY \* (1 + P\_BONUS\_PERCENTAGE / 100),

HIREDATE = SYSDATE

WHERE DEPARTMENT = P\_DEPARTMENT;

COMMIT;

DBMS\_OUTPUT.PUT\_LINE('Bonus applied to employees in the ' || P\_DEPARTMENT || ' department.');

EXCEPTION

WHEN OTHERS THEN

ROLLBACK;

DBMS\_OUTPUT.PUT\_LINE('Error updating employee bonuses: ' || SQLERRM);

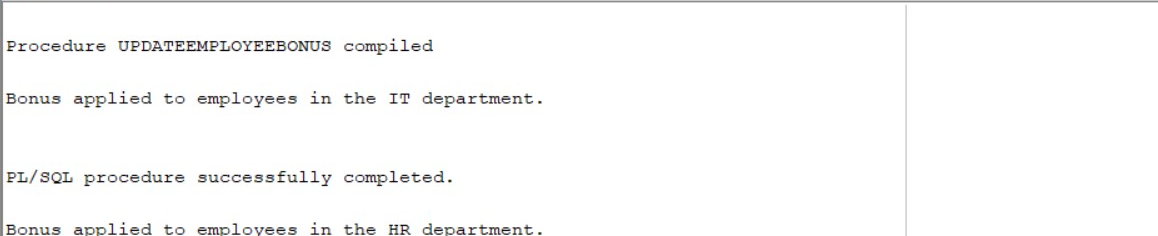
END UPDATEEMPLOYEEBONUS;

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EXEC UPDATEEMPLOYEEBONUS('IT',5);

EXEC UPDATEEMPLOYEEBONUS('HR',3);

SELECT \* FROM EMPLOYEES;



**Scenario 3:** Customers should be able to transfer funds between their accounts.

* + **Question:** 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.

SELECT \* FROM ACCOUNTS;

SET SERVEROUTPUT ON;

CREATE OR REPLACE PROCEDURE TRANSFERFUNDS(

P\_FROM\_ACCOUNT\_ID IN ACCOUNTS.ACCOUNTID%TYPE,

P\_TO\_ACCOUNT\_ID IN ACCOUNTS.ACCOUNTID%TYPE,

P\_AMOUNT IN NUMBER

) AS

V\_FROM\_BALANCE ACCOUNTS.BALANCE%TYPE;

BEGIN

SELECT BALANCE INTO V\_FROM\_BALANCE

FROM ACCOUNTS

WHERE ACCOUNTID = P\_FROM\_ACCOUNT\_ID

FOR UPDATE;

-- Check for sufficient funds

IF V\_FROM\_BALANCE < P\_AMOUNT THEN

RAISE\_APPLICATION\_ERROR(-20001, 'Insufficient funds in the source account.');

END IF;

-- Perform the transfer

UPDATE ACCOUNTS

SET BALANCE = BALANCE - P\_AMOUNT,

LASTMODIFIED = SYSDATE

WHERE ACCOUNTID = P\_FROM\_ACCOUNT\_ID;

UPDATE ACCOUNTS

SET BALANCE = BALANCE + P\_AMOUNT,

LASTMODIFIED = SYSDATE

WHERE ACCOUNTID = P\_TO\_ACCOUNT\_ID;

COMMIT;

DBMS\_OUTPUT.PUT\_LINE('Transfer of ' || P\_AMOUNT || ' from account ' || P\_FROM\_ACCOUNT\_ID || ' to account ' || P\_TO\_ACCOUNT\_ID || ' completed successfully.');

EXCEPTION

WHEN OTHERS THEN

ROLLBACK;

DBMS\_OUTPUT.PUT\_LINE('Transfer failed: ' || SQLERRM);

END TRANSFERFUNDS;

/

EXEC TRANSFERFUNDS(1,2,100);

SELECT \* FROM ACCOUNTS;

