**Exercise 5: Triggers**

**Scenario 1:** Automatically update the last modified date when a customer's record is updated.

* + **Question:** Write a trigger **UpdateCustomerLastModified** that updates the LastModified column of the Customers table to the current date whenever a customer's record is updated.

**Scenario 2:** Maintain an audit log for all transactions.

* + **Question:** Write a trigger **LogTransaction** that inserts a record into an AuditLog table whenever a transaction is inserted into the Transactions table.

**Scenario 3:** Enforce business rules on deposits and withdrawals.

**Question:** Write a trigger **CheckTransactionRules** that ensures withdrawals do not exceed the balance and deposits are positive before inserting a record into the Transactions table

**Scenario 1**

CREATE OR REPLACE TRIGGER UpdateCustomerLastModified

BEFORE UPDATE ON Customers

FOR EACH ROW

BEGIN

:NEW.LastModified := CURRENT\_TIMESTAMP;

END UpdateCustomerLastModified;

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**Scenario 2**

CREATE TABLE AuditLog (

AuditID NUMBER GENERATED ALWAYS AS IDENTITY PRIMARY KEY,

TransactionID NUMBER,

AccountID NUMBER,

TransactionDate TIMESTAMP,

Amount NUMBER,

TransactionType VARCHAR2(10),

LogDate TIMESTAMP

);

CREATE OR REPLACE TRIGGER LogTransaction

AFTER INSERT ON Transactions

FOR EACH ROW

BEGIN

INSERT INTO AuditLog (

TransactionID,

AccountID,

TransactionDate,

Amount,

TransactionType,

LogDate

) VALUES (

:NEW.TransactionID,

:NEW.AccountID,

:NEW.TransactionDate,

:NEW.Amount,

:NEW.TransactionType,

CURRENT\_TIMESTAMP

);

END LogTransaction;

/

**Scenario 3**

CREATE OR REPLACE TRIGGER CheckTransactionRules

BEFORE INSERT ON Transactions

FOR EACH ROW

DECLARE

v\_Balance NUMBER;

BEGIN

IF :NEW.TransactionType = 'Withdrawal' THEN

SELECT Balance INTO v\_Balance

FROM Accounts

WHERE AccountID = :NEW.AccountID;

IF :NEW.Amount > v\_Balance THEN

RAISE\_APPLICATION\_ERROR(-20001, 'Insufficient funds for withdrawal.');

END IF;

ELSIF :NEW.TransactionType = 'Deposit' THEN

IF :NEW.Amount <= 0 THEN

RAISE\_APPLICATION\_ERROR(-20002, 'Deposit amount must be positive.');

END IF;

ELSE

RAISE\_APPLICATION\_ERROR(-20003, 'Invalid transaction type.');

END IF;

END CheckTransactionRules;

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