**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.

Here are the PL/SQL triggers for the given scenarios:

**Scenario 1: Update Last Modified Date for Customers**

CREATE OR REPLACE TRIGGER UpdateCustomerLastModified

BEFORE UPDATE ON customers

FOR EACH ROW

BEGIN

:NEW.LastModified := SYSDATE;

END UpdateCustomerLastModified;

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**Scenario 2: Maintain an Audit Log for All Transactions**

CREATE OR REPLACE TRIGGER LogTransaction

AFTER INSERT ON transactions

FOR EACH ROW

BEGIN

INSERT INTO AuditLog (

transaction\_id,

account\_id,

transaction\_type,

amount,

transaction\_date,

created\_at

) VALUES (

:NEW.transaction\_id,

:NEW.account\_id,

:NEW.transaction\_type,

:NEW.amount,

:NEW.transaction\_date,

SYSDATE

);

END LogTransaction;

/

**Scenario 3: Enforce Business Rules on Deposits and Withdrawals**

CREATE OR REPLACE TRIGGER CheckTransactionRules

BEFORE INSERT ON transactions

FOR EACH ROW

DECLARE

v\_balance NUMBER;

BEGIN

-- Check if the transaction is a withdrawal

IF :NEW.transaction\_type = 'Withdrawal' THEN

SELECT balance INTO v\_balance

FROM accounts

WHERE account\_id = :NEW.account\_id

FOR UPDATE;

IF :NEW.amount > v\_balance THEN

RAISE\_APPLICATION\_ERROR(-20001, 'Error: Insufficient balance for withdrawal.');

END IF;

ELSIF :NEW.transaction\_type = 'Deposit' THEN

IF :NEW.amount <= 0 THEN

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

END IF;

END IF;

END CheckTransactionRules;

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These triggers handle the specified scenarios by automatically updating relevant fields, maintaining an audit log, and enforcing business rules before allowing transactions to be inserted into the database.