**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.

**Procedure:**

CREATE OR REPLACE TRIGGER UpdateCustomerLastModified

BEFORE UPDATE ON Customers

FOR EACH ROW

BEGIN

:NEW.LastModified := SYSDATE;

END;

UPDATE Customers

SET Name = 'Jane Doe'

WHERE CustomerID = 1001;

SELECT CustomerID, Name, LastModified

FROM Customers

WHERE CustomerID = 1;

**Output:**

1 John Doe 06-AUG-24

**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.

**Procedure:**

CREATE TABLE AuditLog (

AuditID NUMBER PRIMARY KEY,

TransactionID NUMBER,

ChangeDate DATE,

ChangeType VARCHAR2(50)

);

CREATE SEQUENCE AuditLogSeq

START WITH 1

INCREMENT BY 1

NOCACHE

NOCYCLE;

CREATE OR REPLACE TRIGGER LogTransaction

AFTER INSERT ON Transactions

FOR EACH ROW

BEGIN

INSERT INTO AuditLog (AuditID, TransactionID, ChangeDate, ChangeType)

VALUES (AuditLogSeq.NEXTVAL, :NEW.TransactionID, SYSDATE, 'INSERT');

END;

INSERT INTO Transactions (TransactionID, AccountID, Amount, TransactionType) VALUES (2001, 3001, 500, 'Deposit');

SELECT \* FROM AuditLog;

**Output:**

AuditID | TransactionID | ChangeDate |

1 | 2001 | 06-AUG-24|

**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.

**Procedure:**

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 v\_balance< :NEW.Amount THEN

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

END IF;

END IF;

IF :NEW.TransactionType = 'Deposit' THEN

IF :NEW.Amount<= 0 THEN

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

END IF;

END IF;

END;

INSERT INTO Transactions (TransactionID, AccountID, Amount, TransactionType) VALUES (2003, 3003, 5000, 'Withdrawal');

**Output:**

ORA-20001: Insufficient funds for withdrawal