**Exercise 7: Packages**

**Scenario 1:** Group all customer-related procedures and functions into a package.

**Question:** Create a package **CustomerManagement** with procedures for adding a new customer, updating customer details, and a function to get customer balance.

**CODE**

**Package specification**

CREATE OR REPLACE PACKAGE CustomerManagement AS

PROCEDURE AddNewCustomer(p\_CustomerID NUMBER, p\_Name VARCHAR2, p\_DOB DATE, p\_Balance NUMBER);

PROCEDURE UpdateCustomerDetails(p\_CustomerID NUMBER, p\_Name VARCHAR2, p\_Balance NUMBER);

FUNCTION GetCustomerBalance(p\_CustomerID NUMBER) RETURN NUMBER;

END CustomerManagement;

/

**Package Body**

CREATE OR REPLACE PACKAGE BODY CustomerManagement AS

PROCEDURE AddNewCustomer(p\_CustomerID NUMBER, p\_Name VARCHAR2, p\_DOB DATE, p\_Balance NUMBER) IS

BEGIN

INSERT INTO Customers (CustomerID, Name, DOB, Balance, LastModified)

VALUES (p\_CustomerID, p\_Name, p\_DOB, p\_Balance, SYSDATE);

EXCEPTION

WHEN DUP\_VAL\_ON\_INDEX THEN

DBMS\_OUTPUT.PUT\_LINE('Customer ID already exists.');

WHEN OTHERS THEN

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

END AddNewCustomer;

PROCEDURE UpdateCustomerDetails(p\_CustomerID NUMBER, p\_Name VARCHAR2, p\_Balance NUMBER) IS

BEGIN

UPDATE Customers

SET Name = p\_Name, Balance = p\_Balance, LastModified = SYSDATE

WHERE CustomerID = p\_CustomerID;

EXCEPTION

WHEN NO\_DATA\_FOUND THEN

DBMS\_OUTPUT.PUT\_LINE('Customer not found.');

WHEN OTHERS THEN

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

END UpdateCustomerDetails;

FUNCTION GetCustomerBalance(p\_CustomerID NUMBER) RETURN NUMBER IS

v\_Balance NUMBER;

BEGIN

SELECT Balance INTO v\_Balance

FROM Customers

WHERE CustomerID = p\_CustomerID;

RETURN v\_Balance;

EXCEPTION

WHEN NO\_DATA\_FOUND THEN

RETURN NULL; -- Or handle as needed

WHEN OTHERS THEN

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

RETURN NULL;

END GetCustomerBalance;

END CustomerManagement;

/

**Scenario 2:** Create a package to manage employee data.

**Question:** Write a package **EmployeeManagement** with procedures to hire new employees, update employee details, and a function to calculate annual salary.

**CODE**

**Package Specification**

CREATE OR REPLACE PACKAGE EmployeeManagement AS

PROCEDURE HireNewEmployee(p\_EmployeeID NUMBER, p\_Name VARCHAR2, p\_Position VARCHAR2, p\_Salary NUMBER, p\_Department VARCHAR2, p\_HireDate DATE);

PROCEDURE UpdateEmployeeDetails(p\_EmployeeID NUMBER, p\_Name VARCHAR2, p\_Salary NUMBER);

FUNCTION CalculateAnnualSalary(p\_EmployeeID NUMBER) RETURN NUMBER;

END EmployeeManagement;

/

**Package Body**

CREATE OR REPLACE PACKAGE BODY EmployeeManagement AS

PROCEDURE HireNewEmployee(p\_EmployeeID NUMBER, p\_Name VARCHAR2, p\_Position VARCHAR2, p\_Salary NUMBER, p\_Department VARCHAR2, p\_HireDate DATE) IS

BEGIN

INSERT INTO Employees (EmployeeID, Name, Position, Salary, Department, HireDate)

VALUES (p\_EmployeeID, p\_Name, p\_Position, p\_Salary, p\_Department, p\_HireDate);

EXCEPTION

WHEN DUP\_VAL\_ON\_INDEX THEN

DBMS\_OUTPUT.PUT\_LINE('Employee ID already exists.');

WHEN OTHERS THEN

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

END HireNewEmployee;

PROCEDURE UpdateEmployeeDetails(p\_EmployeeID NUMBER, p\_Name VARCHAR2, p\_Salary NUMBER) IS

BEGIN

UPDATE Employees

SET Name = p\_Name, Salary = p\_Salary

WHERE EmployeeID = p\_EmployeeID;

EXCEPTION

WHEN NO\_DATA\_FOUND THEN

DBMS\_OUTPUT.PUT\_LINE('Employee not found.');

WHEN OTHERS THEN

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

END UpdateEmployeeDetails;

FUNCTION CalculateAnnualSalary(p\_EmployeeID NUMBER) RETURN NUMBER IS

v\_Salary NUMBER;

BEGIN

SELECT Salary INTO v\_Salary

FROM Employees

WHERE EmployeeID = p\_EmployeeID;

RETURN v\_Salary \* 12; -- Assuming salary is monthly

EXCEPTION

WHEN NO\_DATA\_FOUND THEN

RETURN NULL; -- Or handle as needed

WHEN OTHERS THEN

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

RETURN NULL;

END CalculateAnnualSalary;

END EmployeeManagement;

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**Scenario 3:** Group all account-related operations into a package.

**Question:** Create a package **AccountOperations** with procedures for opening a new account, closing an account, and a function to get the total balance of a customer across all accounts.

**CODE**

**Package specification**

CREATE OR REPLACE PACKAGE AccountOperations AS

PROCEDURE OpenNewAccount(p\_AccountID NUMBER, p\_CustomerID NUMBER, p\_AccountType VARCHAR2, p\_Balance NUMBER);

PROCEDURE CloseAccount(p\_AccountID NUMBER);

FUNCTION GetTotalBalance(p\_CustomerID NUMBER) RETURN NUMBER;

END AccountOperations;

/

**Package Body**

CREATE OR REPLACE PACKAGE BODY AccountOperations AS

PROCEDURE OpenNewAccount(p\_AccountID NUMBER, p\_CustomerID NUMBER, p\_AccountType VARCHAR2, p\_Balance NUMBER) IS

BEGIN

INSERT INTO Accounts (AccountID, CustomerID, AccountType, Balance, LastModified)

VALUES (p\_AccountID, p\_CustomerID, p\_AccountType, p\_Balance, SYSDATE);

EXCEPTION

WHEN DUP\_VAL\_ON\_INDEX THEN

DBMS\_OUTPUT.PUT\_LINE('Account ID already exists.');

WHEN OTHERS THEN

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

END OpenNewAccount;

PROCEDURE CloseAccount(p\_AccountID NUMBER) IS

BEGIN

DELETE FROM Accounts

WHERE AccountID = p\_AccountID;

EXCEPTION

WHEN NO\_DATA\_FOUND THEN

DBMS\_OUTPUT.PUT\_LINE('Account not found.');

WHEN OTHERS THEN

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

END CloseAccount;

FUNCTION GetTotalBalance(p\_CustomerID NUMBER) RETURN NUMBER IS

v\_TotalBalance NUMBER;

BEGIN

SELECT SUM(Balance) INTO v\_TotalBalance

FROM Accounts

WHERE CustomerID = p\_CustomerID;

RETURN v\_TotalBalance;

EXCEPTION

WHEN NO\_DATA\_FOUND THEN

RETURN NULL; -- Or handle as needed

WHEN OTHERS THEN

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

RETURN NULL;

END GetTotalBalance;

END AccountOperations;

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