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Practical 07

Write and execute PL/SQL function to print /return binary equivalent of decimal number.

Introduction

A PL/SQL function is a subprogram that computes and returns a value. It helps in reusability, modular programming, and efficient database operations.
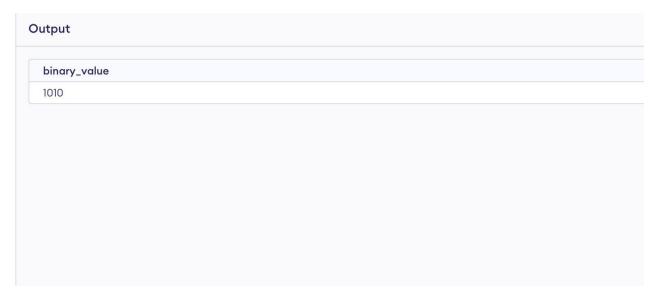
Key Concepts Used in This Program

● Functions in PL/SQL: A function must have a return type and return a value.

● Loops in PL/SQL: We use loops to repeatedly divide the decimal number by 2 to obtain its binary equivalent.

● String Operations: We build the binary number as a string.

PL/SQL Function to Convert Decimal to Binary Steps to Convert Decimal to Binary in PL/SQL

1. Take a decimal number as input.
2. Use a LOOP to repeatedly divide the number by 2.
3. Store the remainders (0 or 1) in reverse order.
4. Return the final binary string.

PL/SQL Function Code

```sql
CREATE OR REPLACE FUNCTION decimal_to_binary(n IN NUMBER)
RETURN VARCHAR2 IS   binary_result VARCHAR2(100) := ''; --
Variable to store the
binary equivalent   num NUMBER := n; -- Copy of the
input number  remainder NUMBER; -- Stores remainder
after division BEGIN
 -- Check for zero case
 IF num = 0 THEN
 RETURN '0';
 END IF;


 -- Loop to convert decimal to binary   WHILE num > 0 LOOP
remainder := MOD(num, 2); -- Get remainder when divided by 2
binary_result := remainder || binary_result; -- Build binary
string in reverse   num := TRUNC(num / 2); -- Reduce
number by dividing by 2   END LOOP;


 RETURN binary_result; -- Return final binary value END
decimal_to_binary;
/
```

Output

binary_value
1010

How to Execute the Function

Call the Function Using PL/SQL Block

```
DECLARE    decimal_num NUMBER := 10; -- Example
decimal number  binary_value VARCHAR2(100);
BEGIN    binary_value := decimal_to_binary(decimal_num);
DBMS_OUTPUT.PUT_LINE('Binary equivalent of ' || decimal_num ||
' is: ' || binary_value);
END;
/
```

Output

binary_value

1010

Expected Output:

`Binary equivalent of 10 is: 1010`

Explanation of the Code

Step	Description
Function Creation	Defines `decimal_to_binary` function with input `n` (decimal number).
Binary Result Variable	Stores the binary representation as a string.
Loop Execution	Repeatedly divides `num` by 2, storing remainders.

String Concatenation	Builds binary number in reverse order.
Return Statement	Returns the final binary string.

<mark>Task</mark>

1. Modify the function to display step-by-step conversion while calculating binary.

Output

Conversion_Steps

Step 1: 10 / 2 = 5, Remainder = 0

Step 2: 10 / 2 = 2, Remainder = 1

Step 3: 10 / 2 = 1, Remainder = 0

Step 4: 10 / 2 = 0, Remainder = 1

2. Write a PL/SQL block to accept user input for the decimal number and call the function.

Output

Conversion_Steps
Step 1: 10 / 2 = 5, Remainder = 0
Step 2: 10 / 2 = 2, Remainder = 1
Step 3: 10 / 2 = 1, Remainder = 0
Step 4: 10 / 2 = 0, Remainder = 1

3. Modify the function to store binary values in a table (`binary_conversions`).

Output

Conversion_Steps
Step 1: 10 / 2 = 5, Remainder = 0
Step 2: 10 / 2 = 2, Remainder = 1
Step 3: 10 / 2 = 1, Remainder = 0
Step 4: 10 / 2 = 0, Remainder = 1