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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

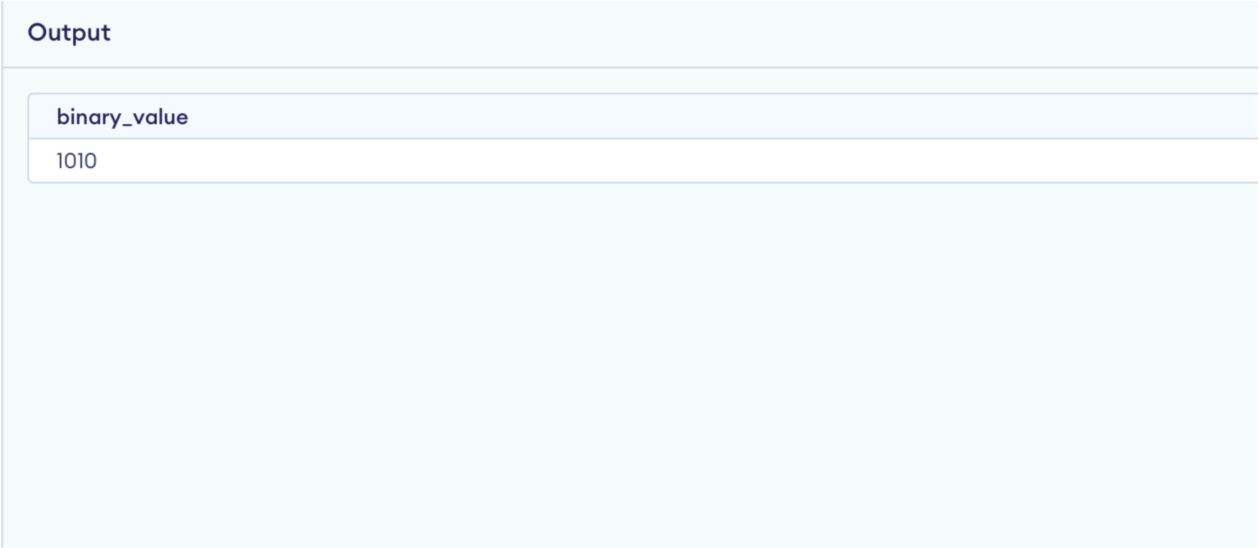
1. Take a decimal number as input.
2. Use a LOOP to repeatedly divide the number by 2.
3. Store the remainders (0 or 1) in reverse order.
4. Return the final binary string.

PL/SQL Function Code

```
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;
/
```



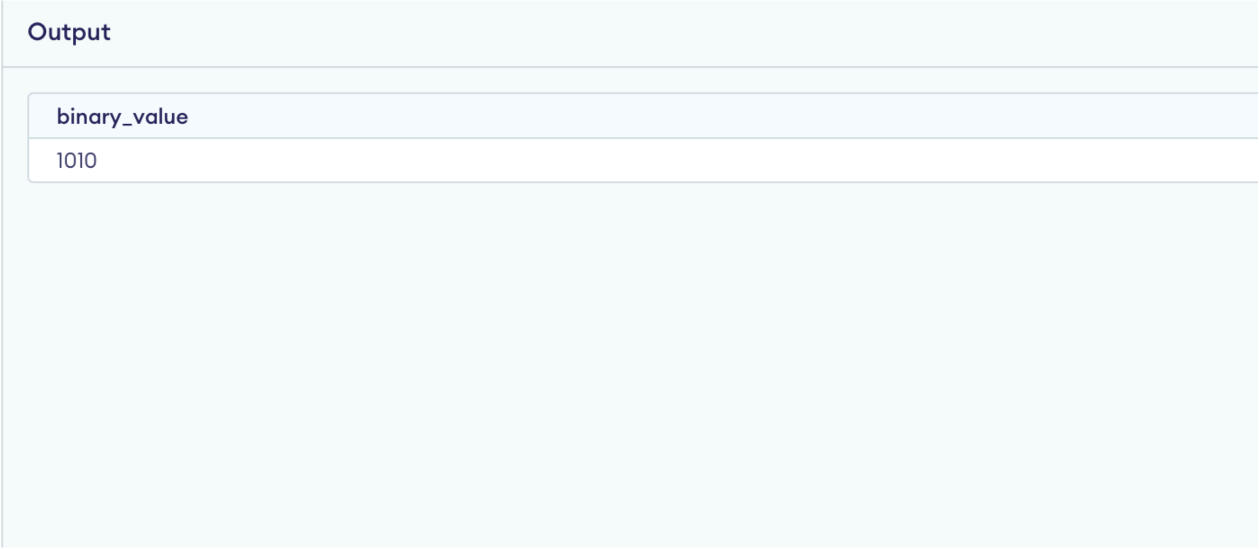
Output

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
```

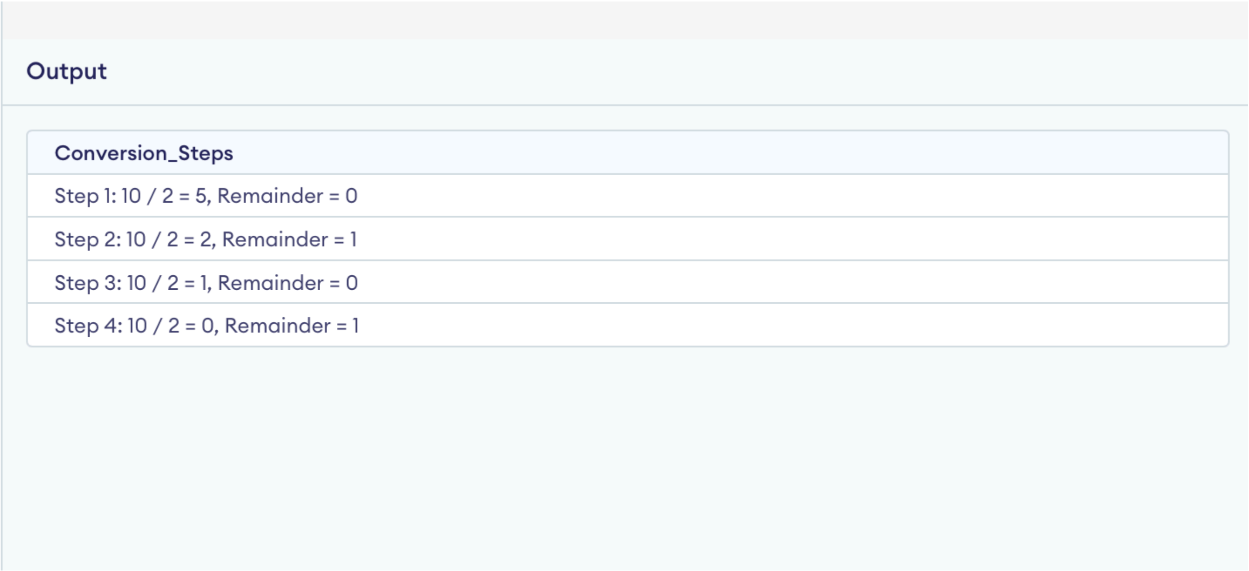
Explanation of the Code

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.

Task

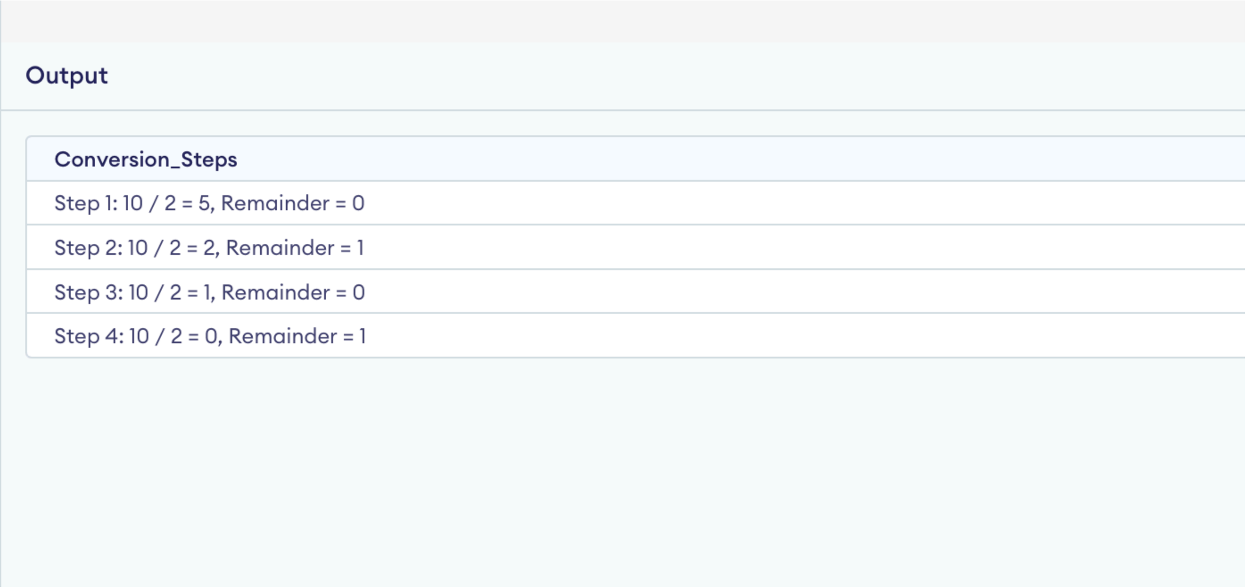
1. Modify the function to display step-by-step conversion while calculating binary.



Output

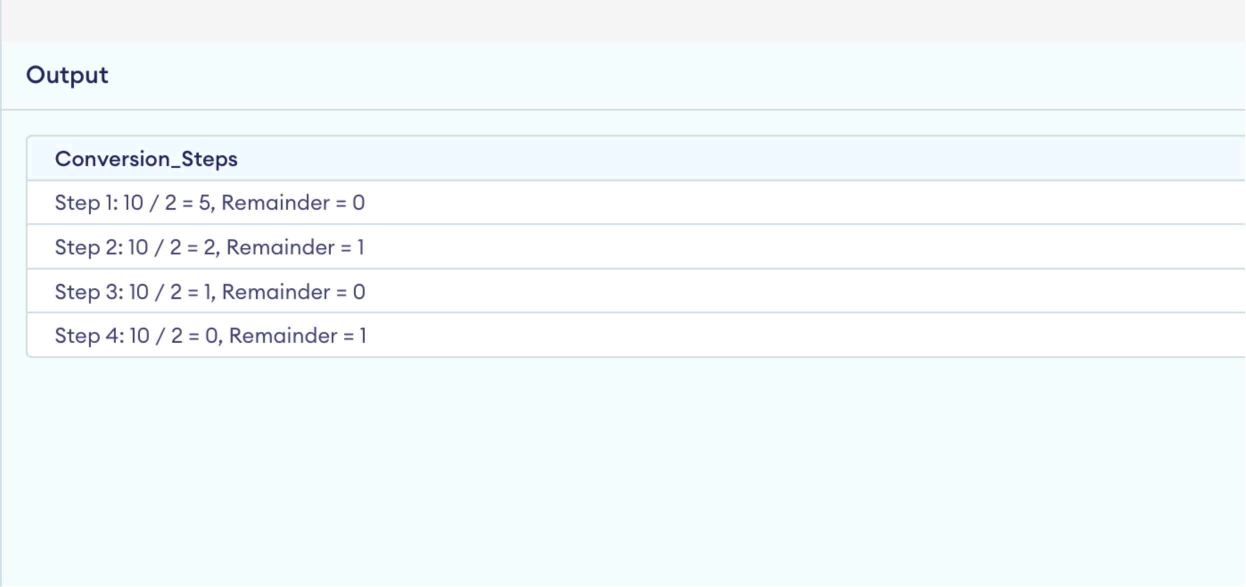
Conversion_Steps
Step 1: 10 / 2 = 5, Remainder = 0
Step 2: 10 / 2 = 2, Remainder = 1
Step 3: 10 / 2 = 1, Remainder = 0
Step 4: 10 / 2 = 0, Remainder = 1

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



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`).



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