Process Documentation

Title:

Automation of Octal Number System Conversions

Objective:

To automate the process of converting a number in Octal form to Hexadecimal, Binary, and Decimal formats.

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Inputs:

• An Octal number (base 8).

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Process Steps:

1. Octal → Decimal Conversion

• Each digit of the octal number is multiplied by 8^n, where n is the position of the digit from right to left (starting at 0).

• Sum all values to get the decimal equivalent.

Example:

(237)8 = (2 \times 8^2) + (3 \times 8^1) + (7 \times 8^0) = 128 + 24 + 7 = (159){10}.

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2. Octal → Binary Conversion

• Replace each octal digit with its 3-bit binary equivalent.

Example:

(237)\_8 = 010 011 111 = (10011111)\_2.

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3. Octal → Hexadecimal Conversion

• Method 1: Convert Octal → Binary → Hexadecimal

• Group binary digits into 4 bits.

• Convert each 4-bit group into a hexadecimal digit.

• Method 2: Convert Octal → Decimal → Hexadecimal.

Example:

(237)8 = (159){10} = (9F)\_{16}.

Program Documentation

Program Name:

Octal Number Converter

Programming Language:

Python (clear and simple for number conversions).

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Program Description:

This program takes an octal number as input and automatically converts it into:

• Decimal

• Binary

• Hexadecimal

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Algorithm:

1. Accept octal input from the user.

2. Convert octal to decimal using int(octal, 8).

3. Convert decimal to binary using bin(decimal).

4. Convert decimal to hexadecimal using hex(decimal).

5. Display all results.

# Program: Octal Number System Converter

# Step 1: Input octal number

octal\_num = input("Enter an Octal number: ")

# Step 2: Convert Octal to Decimal

decimal\_num = int(octal\_num, 8)

# Step 3: Convert Decimal to Binary

binary\_num = bin(decimal\_num)[2:]

# Step 4: Convert Decimal to Hexadecimal

hexadecimal\_num = hex(decimal\_num)[2:].upper()

# Step 5: Display Results

print(f"Octal: {octal\_num}")

print(f"Decimal: {decimal\_num}")

print(f"Binary: {binary\_num}")

print(f"Hexadecimal: {hexadecimal\_num}")