AI ASSISTED CODING

LAB ASSIGNMENT 3.5

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BATCH 04

Platform Used: Git hub co-poilot

ZERO SHOT

ONE SHOT FEW

SHOT

Question 1: Zero-Shot Prompting (Leap Year Check)

Write a zero-shot prompt to generate a Python function that checks whether a given year is a leap year.

Task:

• Record the AI-generated code.

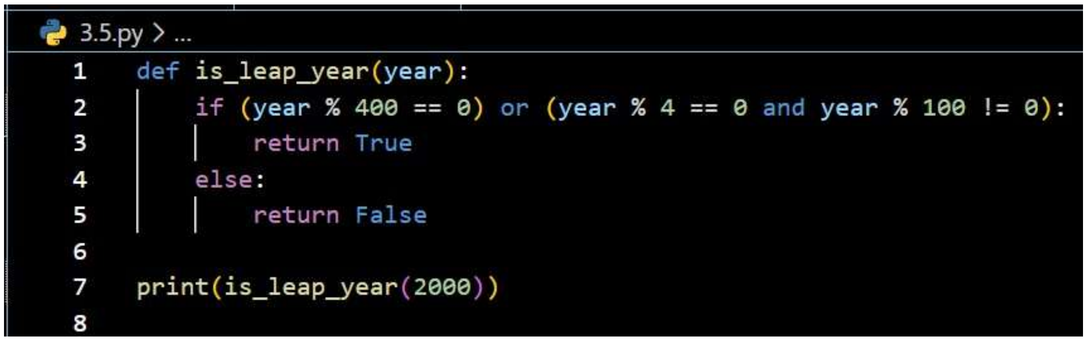
• Test with years like 1900, 2000, 2024.

• Identify logical flaws or missing conditions.

PROMPT

Write a Python function that checks whether a given year is a leap year. The function should return True if it is a leap year and False otherwise.

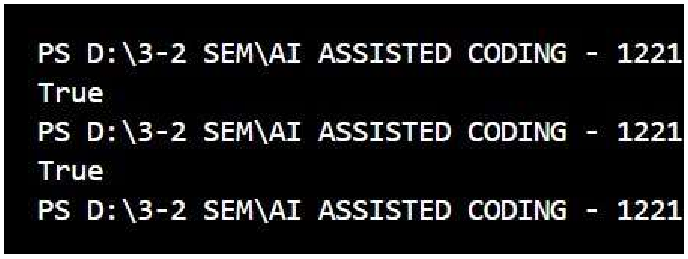
CODE



```python
def is_leap_year(year):
    if (year % 400 == 0) or (year % 4 == 0 and year % 100 != 0):
        return True
    else:
        return False

print(is_leap_year(2000))
```

OUTPUT



```
PS D:\3-2 SEM\AI ASSISTED CODING - 1221
True
PS D:\3-2 SEM\AI ASSISTED CODING - 1221
True
PS D:\3-2 SEM\AI ASSISTED CODING - 1221
```

EXPLANATION

A leap year is divisible by 400, or divisible by 4 but not by 100.
The function checks these conditions and returns the appropriate boolean value.

Question 2: One-Shot Prompting (GCD of Two Numbers)

Write a one-shot prompt with one example to generate a Python function

that finds the Greatest Common Divisor (GCD) of two numbers.

Example:

Input: 12, 18 → Output: 6 Task:

• Compare with a zero-shot solution.

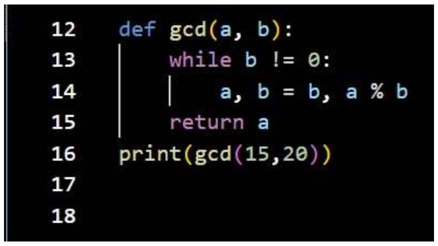
• Analyze algorithm efficiency

PROMPT

Write a Python function to find the Greatest Common Divisor (GCD) of two numbers.

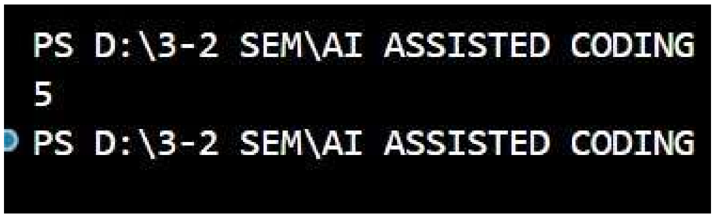
Example:
Input: 12, 18
Output: 6

CODE



```python
def gcd(a, b):
    while b != 0:
        a, b = b, a % b
    return a
print(gcd(15,20))
```

OUTPUT


```
PS D:\3-2 SEM\AI ASSISTED CODING
5
PS D:\3-2 SEM\AI ASSISTED CODING
```

EXPLANATION

This function uses the **Euclidean Algorithm**, which repeatedly replaces the larger number with the remainder until the remainder becomes zero. The last non-zero value is the GCD.

Question 3: Few-Shot Prompting (LCM Calculation)

Write a few-shot prompt with multiple examples to generate a Python function

that computes the Least Common Multiple (LCM).

Examples:

• Input: 4, 6 → Output: 12

• Input: 5, 10 → Output: 10

• Input: 7, 3 → Output: 21

Task:

• Examine how examples guide formula selection.

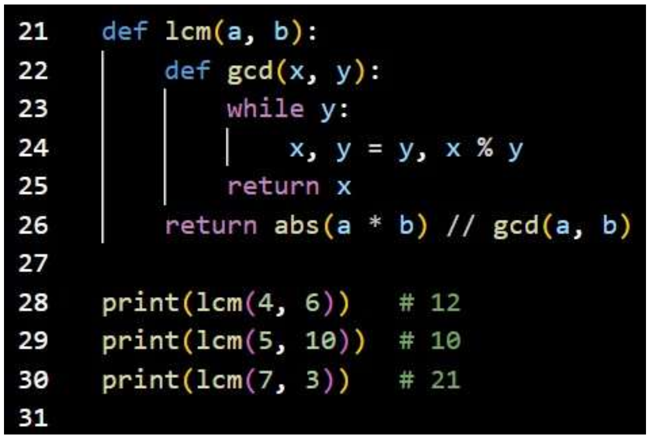
• Test edge cases.

PROMPT

Write a Python function to compute the Least Common Multiple (LCM) of two numbers

Examples:
Input: 4, 6 → Output: 12
Input: 5, 10 → Output: 10
Input: 7, 3 → Output: 21

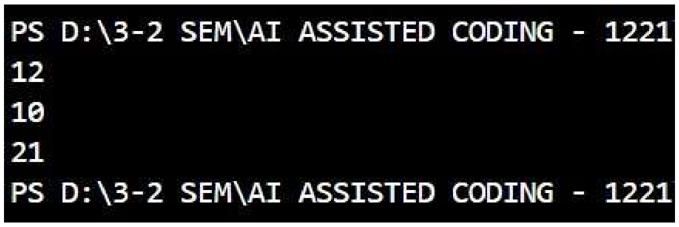
CODE



```python
def lcm(a, b):
    def gcd(x, y):
        while y:
            x, y = y, x % y
        return x
    return abs(a * b) // gcd(a, b)

print(lcm(4, 6))   # 12
print(lcm(5, 10))  # 10
print(lcm(7, 3))   # 21
```

OUTPUT



```
PS D:\3-2 SEM\AI ASSISTED CODING - 1221
12
10
21
PS D:\3-2 SEM\AI ASSISTED CODING - 1221
```

EXPLANATION

LCM is calculated using the formula:
LCM(a, b) = (a × b) / GCD(a, b).
The examples guide the AI to choose this mathematical formula.

Question 4: Zero-Shot Prompting (Binary to Decimal Conversion)

Write a zero-shot prompt to generate a Python function that converts a binary

number to decimal.

Task:

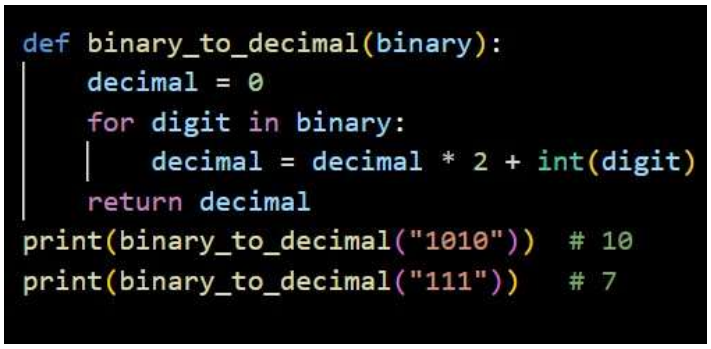
• Test with valid and invalid binary inputs.

• Identify missing validation logic.

PROMPT

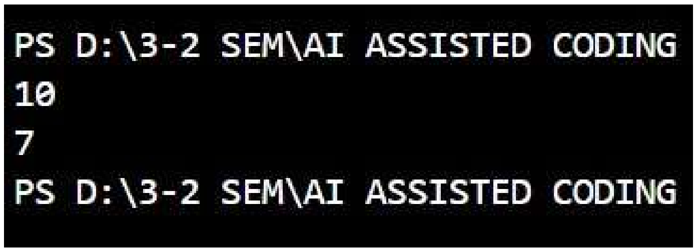
Write a Python function that converts a binary number into its decimal equivalent.

CODE



```python
def binary_to_decimal(binary):
    decimal = 0
    for digit in binary:
        decimal = decimal * 2 + int(digit)
    return decimal
print(binary_to_decimal("1010"))  # 10
print(binary_to_decimal("111"))   # 7
```

OUTPUT



```
PS D:\3-2 SEM\AI ASSISTED CODING
10
7
PS D:\3-2 SEM\AI ASSISTED CODING
```

EXPLANATION

Each binary digit is processed from left to right.
The current value is multiplied by 2 and the digit is added, converting binary to decimal.

Question 5: One-Shot Prompting (Decimal to Binary Conversion)

Write a one-shot prompt with an example to generate a Python function that

converts a decimal number to binary.

Example:

Input: 10 → Output: 1010

Task:

• Compare clarity with zero-shot output.

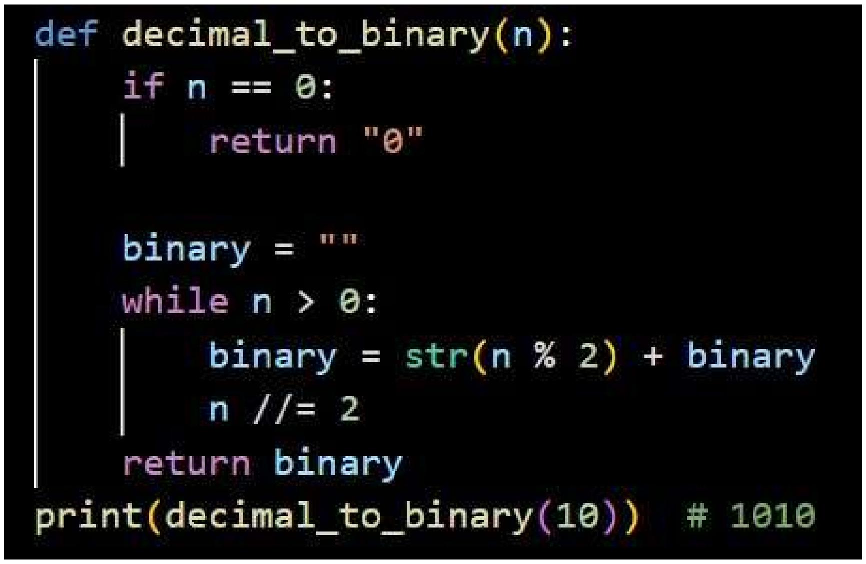
• Analyze handling of zero and negative numbers.

PROMPT

Write a Python function to convert a decimal number to binary.

Example:
Input: 10 Output:
1010

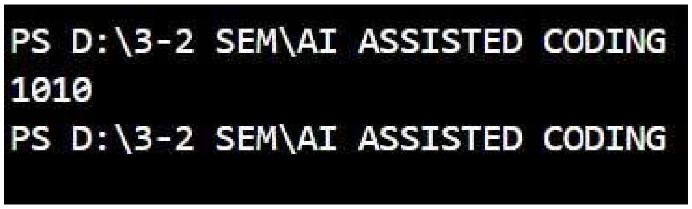
CODE



```python
def decimal_to_binary(n):
    if n == 0:
        return "0"

    binary = ""
    while n > 0:
        binary = str(n % 2) + binary
        n //= 2
    return binary
print(decimal_to_binary(10))  # 1010
```

OUTPUT



```
PS D:\3-2 SEM\AI ASSISTED CODING
1010
PS D:\3-2 SEM\AI ASSISTED CODING
```

EXPLANATION

The decimal number is repeatedly divided by 2.
The remainders are collected in reverse order to form the binary representation.

Question 6: Few-Shot Prompting (Harshad Number Check)

Write a few-shot prompt to generate a Python function that checks whether

a number is a Harshad (Niven) number.

Examples:

• Input: 18 → Output: Harshad Number

• Input: 21 → Output: Harshad Number • Input: 19 → Output: Not a Harshad Number

Task:

• Test boundary conditions.

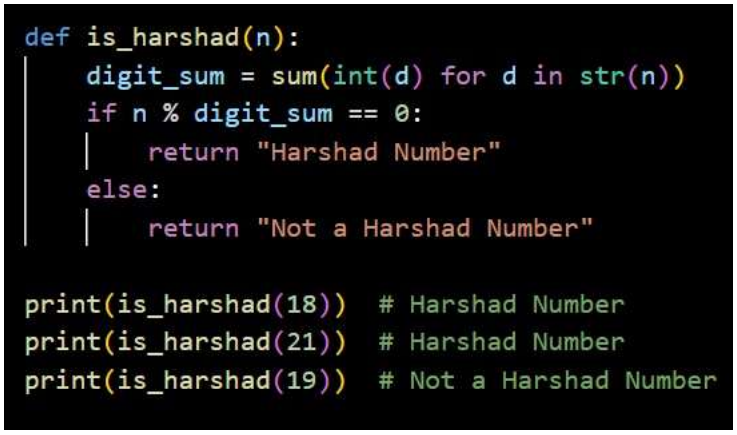
• Evaluate robustness

PROMPT

Write a Python function to check whether a number is a Harshad (Niven) number.

Examples:
Input: 18 → Output: Harshad Number
Input: 21 → Output: Harshad Number
Input: 19 → Output: Not a Harshad Number

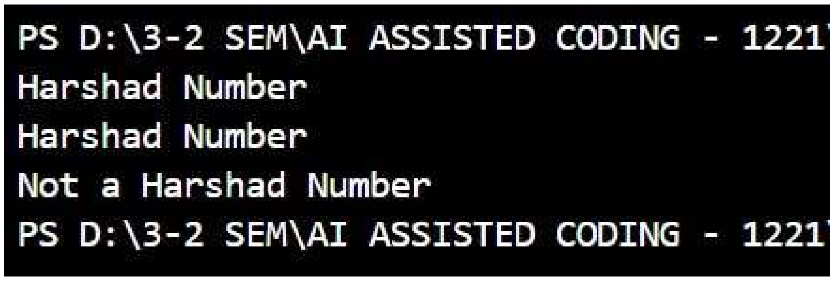
CODE



```python
def is_harshad(n):
    digit_sum = sum(int(d) for d in str(n))
    if n % digit_sum == 0:
        return "Harshad Number"
    else:
        return "Not a Harshad Number"

print(is_harshad(18))  # Harshad Number
print(is_harshad(21))  # Harshad Number
print(is_harshad(19))  # Not a Harshad Number
```

OUTPUT



```
PS D:\3-2 SEM\AI ASSISTED CODING - 1221
Harshad Number
Harshad Number
Not a Harshad Number
PS D:\3-2 SEM\AI ASSISTED CODING - 1221
```

EXPLANATION

A Harshad number is divisible by the sum of its digits.

The function calculates the digit sum and checks divisibility.