LAB ASSIGNMENT 3.5

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.

PROMPT:

Write a Python function to check if a year is a leap year

CODE:

```
def is_leap_year(year):
    if (year % 4 == 0 and year % 100 != 0) or (year % 400 == 0):
        return True
    else:
        return False
test_years = [1900, 2000, 2024]
for y in test_years:
    print(f"{y}: {is_leap_year(y)}")
```

OUTPUT:

```
PS C:\Users\adars> & C:/Users/adars/AppData/Local/Programs/Python/Python312/python.exe "c:/Users/adars/OneDrive/New folder/HTML/AI & AC.py"
1900: False
2000: True
2024: True
```

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.

PROMPT: Write a Python function to calculate the greatest common divisor (GCD) of two numbers

CODE:

```python
def gcd(a, b):
    while b != 0:
        a, b = b, a % b
    return a
# Example usage
print(gcd(12, 18))
```

OUTPUT:

```
PS C:\Users\adars> & C:/Users/adars/AppData/Local/Programs/Python/Python312/python.exe
6
```

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)

PROMPT:

Write a Python function to calculate the least common multiple (LCM) of two numbers

CODE:

```python
# Write a Python function to calculate the least common multiple (LCM) of two numbers
def gcd(a, b):
    while b != 0:
        a, b = b, a % b
    return a

def lcm(a, b):
    return abs(a * b) // gcd(a, b)

# Example usage
print(lcm(4, 6))
print(lcm(5, 10))
print(lcm(7, 3))
```

OUTPUT:

```
PS C:\Users\adars> & C:/Users/adars/AppData/Local/Programs/Python/Python312/python.exe
12
10
21
```

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.

PROMPT:

Write a Python function that converts a binary number (string input) into its decimal equivalent.

CODE:

```python
# Write a Python function that converts a binary number (string input) into its decimal equivalent.
def binary_to_decimal(binary_str):
    if not binary_str or any(ch not in "01" for ch in binary_str):
        raise ValueError("Invalid binary input: must contain only 0s and 1s")
    return int(binary_str, 2)

print(binary_to_decimal("1010"))
print(binary_to_decimal("111"))
```

OUTPUT:

```
PS C:\Users\adars> & C:/Users/adars/AppData/Local/Programs/Python/Python312/python.exe
10
7
```

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.

PROMPT:

Write a function that converts a decimal integer into its binary representation as a string.

CODE:

```python
# Write a function that converts a decimal integer into its binary representation as a string.
def decimal_to_binary(n):
    if n == 0:
        return "0"
    is_negative = n < 0
    n = abs(n)
    binary = ""
    while n > 0:
        binary = str(n % 2) + binary
        n //= 2
    return "-" + binary if is_negative else binary

# Example usage
print(decimal_to_binary(10))   # Output: 1010
```

OUTPUT:

```
PS C:\Users\adars> & C:/Users/adars/AppData/Local/Programs/Python/Python312/python.exe
1010
```

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

PROMPT:

Write a function that checks whether a given integer is a Harshad (Niven) number.

CODE:

```python
# Write a function that checks whether a given integer is a Harshad (Niven) number.
def is_harshad(n):
    if n == 0:
        return "Not a Harshad Number"
    digit_sum = sum(int(d) for d in str(abs(n)))
    if digit_sum == 0:
        return "Not a Harshad Number"
    return "Harshad Number" if n % digit_sum == 0 else "Not a Harshad Number"

# Example usage
print(is_harshad(18))
print(is_harshad(21))
print(is_harshad(19))
```

OUTPUT:

```
PS C:\Users\adars> & C:/Users/adars/AppData/Local/Programs/Python/Python312/python.exe "c:/Users
Harshad Number
Harshad Number
Not a Harshad Number
```