ASSIGNMENT-3.5

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Batch-23

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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.

CODE and Output:

```python
Python > DAA > AIAC.py > ...
1   #write a program to check whether a given year is a leap year or not
2
3   year = int(input("Enter a year: "))
4
5   if (year % 4 == 0 and year % 100 != 0) or (year % 400 == 0):
6       print(f"{year} is a leap year.")
7   else:
8       print(f"{year} is not a leap year.")
```

PROBLEMS   OUTPUT   DEBUG CONSOLE   **TERMINAL**   PORTS   POSTGRESQL QUERY RESULTS   AUGM

```
PS C:\Users\NITHIN\OneDrive\Desktop\Python>  c:; cd 'c:\Users\NITHIN\OneDrive\
thon\pythoncore-3.14-64\python.exe' 'c:\Users\NITHIN\.vscode\extensions\ms-pyt
\launcher' '63341' '--' 'c:\Users\NITHIN\OneDrive\Desktop\Python\DAA\AIAC.py'
Enter a year: 2025
2025 is not a leap year.
PS C:\Users\NITHIN\OneDrive\Desktop\Python>  c:; cd 'c:\Users\NITHIN\OneDrive\
thon\pythoncore-3.14-64\python.exe' 'c:\Users\NITHIN\.vscode\extensions\ms-pyt
\launcher' '63359' '--' 'c:\Users\NITHIN\OneDrive\Desktop\Python\DAA\AIAC.py'
Enter a year: 2020
2020 is a leap year.
PS C:\Users\NITHIN\OneDrive\Desktop\Python>
```

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.

CODE and Output :

```python
Python > DAA >  AIAC.py > ...
1    def gcd(a, b):
2        while b:
3            a, b = b, a % b
4        return a
5
6    num1 = 12
7    num2 = 18
8
9    print(f"The GCD of {num1} and {num2} is {gcd(num1, num2)}")
10
```

PROBLEMS   OUTPUT   DEBUG CONSOLE   TERMINAL   PORTS   POSTGRESQL QUERY RESULTS

```
PS C:\Users\NITHIN\OneDrive\Desktop\Python>  c:; cd 'c:\Users\NITHIN\OneD
thon\pythoncore-3.14-64\python.exe' 'c:\Users\NITHIN\.vscode\extensions\m
\launcher' '51945' '--' 'c:\Users\NITHIN\OneDrive\Desktop\Python\DAA\AIAC
The GCD of 12 and 18 is 6
PS C:\Users\NITHIN\OneDrive\Desktop\Python> 
```

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.

```python
Python > DAA >  AIAC.py > ...
1    def lcm(a, b):
2        def gcd(x, y):
3            while y:
4                x, y = y, x % y
5            return x
6        return abs(a * b) // gcd(a, b)
7
8    num1 = int(input("Enter first number: "))
9    num2 = int(input("Enter second number: "))
10
11   print(f"The LCM of {num1} and {num2} is {lcm(num1, num2)}")
12
```

PROBLEMS   OUTPUT   DEBUG CONSOLE   TERMINAL   PORTS   POSTGRESQL QUERY RESULTS

```
● PS C:\Users\NITHIN\OneDrive\Desktop\Python>  c:; cd 'c:\Users\NITHIN\One
  thon\pythoncore-3.14-64\python.exe' 'c:\Users\NITHIN\.vscode\extensions\
  \launcher' '55021' '--' 'c:\Users\NITHIN\OneDrive\Desktop\Python\DAA\AIA
  Enter first number: 4
  Enter second number: 6
  The LCM of 4 and 6 is 12
● PS C:\Users\NITHIN\OneDrive\Desktop\Python>  c:; cd 'c:\Users\NITHIN\One
  thon\pythoncore-3.14-64\python.exe' 'c:\Users\NITHIN\.vscode\extensions\
  \launcher' '55042' '--' 'c:\Users\NITHIN\OneDrive\Desktop\Python\DAA\AIA
  Enter first number: 2
  Enter second number: 6
  The LCM of 2 and 6 is 6
○ PS C:\Users\NITHIN\OneDrive\Desktop\Python> |
```

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.

Python > DAA > 🐍 AIAC.py > ...

```python
1    binary_num = input("Enter a binary number: ")
2
3    decimal_num = int(binary_num, 2)
4
5    print(f"The decimal equivalent of binary {binary_num} is {decimal_num}")
6
```

PROBLEMS   OUTPUT   DEBUG CONSOLE   **TERMINAL**   PORTS   POSTGRESQL QUERY RESULTS   AUGMENT

```
PS C:\Users\NITHIN\OneDrive\Desktop\Python>  c:; cd 'c:\Users\NITHIN\OneDrive\Desktop
thon\pythoncore-3.14-64\python.exe' 'c:\Users\NITHIN\.vscode\extensions\ms-python.deb
\launcher' '55634' '--' 'c:\Users\NITHIN\OneDrive\Desktop\Python\DAA\AIAC.py'
Enter a binary number: 1010
The decimal equivalent of binary 1010 is 10
PS C:\Users\NITHIN\OneDrive\Desktop\Python>  c:; cd 'c:\Users\NITHIN\OneDrive\Desktop
thon\pythoncore-3.14-64\python.exe' 'c:\Users\NITHIN\.vscode\extensions\ms-python.deb
\launcher' '52700' '--' 'c:\Users\NITHIN\OneDrive\Desktop\Python\DAA\AIAC.py'
Enter a binary number: 1101
The decimal equivalent of binary 1101 is 13
PS C:\Users\NITHIN\OneDrive\Desktop\Python> ▮
```

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.

```python
Python > DAA > 🐍 AIAC.py > ...
1    decimal_num = int(input("Enter a decimal number: "))
2
3    binary_num = bin(decimal_num).replace("0b", "")
4
5    print(f"The binary equivalent of decimal {decimal_num} is {binary_num}")
6
```

PROBLEMS   OUTPUT   DEBUG CONSOLE   TERMINAL   PORTS   POSTGRESQL QUERY RESULTS   AUGMENT

```
● PS C:\Users\NITHIN\OneDrive\Desktop\Python>  c:; cd 'c:\Users\NITHIN\OneDrive\Deskto
  thon\pythoncore-3.14-64\python.exe' 'c:\Users\NITHIN\.vscode\extensions\ms-python.de
  \launcher' '64946' '--' 'c:\Users\NITHIN\OneDrive\Desktop\Python\DAA\AIAC.py'
  Enter a decimal number: 101
  The binary equivalent of decimal 101 is 1100101
● PS C:\Users\NITHIN\OneDrive\Desktop\Python>  c:; cd 'c:\Users\NITHIN\OneDrive\Deskto
  thon\pythoncore-3.14-64\python.exe' 'c:\Users\NITHIN\.vscode\extensions\ms-python.de
  \launcher' '64961' '--' 'c:\Users\NITHIN\OneDrive\Desktop\Python\DAA\AIAC.py'
  Enter a decimal number: 1101
  The binary equivalent of decimal 1101 is 10001001101
○ PS C:\Users\NITHIN\OneDrive\Desktop\Python> █
```

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

```
Python > DAA > 🐍 AIAC.py > ...
  1    num = int(input("Enter a number: "))
  2
  3    sum_of_digits = sum(int(digit) for digit in str(num))
  4
  5    if num % sum_of_digits == 0:
  6        print(f"{num} is a Harshad Number")
  7    else:
  8        print(f"{num} is Not a Harshad Number")
  9
```

PROBLEMS   OUTPUT   DEBUG CONSOLE   TERMINAL   PORTS   POSTGRESQL QUERY RESULTS

```
PS C:\Users\NITHIN\OneDrive\Desktop\Python>  c:; cd 'c:\Users\NITHIN\On
thon\pythoncore-3.14-64\python.exe' 'c:\Users\NITHIN\.vscode\extensions
\launcher' '50386' '--' 'c:\Users\NITHIN\OneDrive\Desktop\Python\DAA\AI
Enter a number: 18
18 is a Harshad Number
PS C:\Users\NITHIN\OneDrive\Desktop\Python>  c:; cd 'c:\Users\NITHIN\On
thon\pythoncore-3.14-64\python.exe' 'c:\Users\NITHIN\.vscode\extensions
\launcher' '50404' '--' 'c:\Users\NITHIN\OneDrive\Desktop\Python\DAA\AI
Enter a number: 46
46 is Not a Harshad Number
PS C:\Users\NITHIN\OneDrive\Desktop\Python> ▮
```