

AI ASSISTED CODING

S.Rishaak
2303A51125

BATCH - 03

23 - 01 - 2026

ASSIGNMENT – 3.5

LAB-03:

TASK-01: Zero-Shot Prompting – Leap Year Check

- Record the AI-generated code.
 - Test with years like 1900, 2000, 2024.
 - Identify logical flaws or missing conditions.

Prompt: Write a Python function to check whether a given year is a leap year

Code:

The screenshot shows the Visual Studio Code interface with the following details:

- Left Sidebar:** Includes icons for AI, file operations (New, Open, Save, Find, Replace), project navigation (File Explorer, Taskbar, Terminal, Status Bar), and a Help icon.
- Top Bar:** Shows tabs for "AI ASSISTED CODING", "factorial using recursion.py", "lab_assignment_1_5.py", "lab_assignment_2_2.py", "lab_assignment_3_2.py", "rough.py", "lab_assignment_3_5.py", and "lab_assignment_3_5.py".
- Code Editor:** Displays Python code for checking leap years:

```
1 #Write a Python function to check whether a given year is a Leap year
2 def is_leap_year(year):
3     if (year % 4 == 0 and year % 100 != 0) or (year % 400 == 0):
4         return True
5     return False
6 print(is_leap_year(1900))
7 print(is_leap_year(2000))
8 print(is_leap_year(2024))
```
- Bottom Bar:** Includes tabs for PROBLEMS, DEBUG CONSOLE, OUTPUT, TERMINAL, PORTS, SQL HISTORY, and TASK MONITOR. The TERMINAL tab is active, showing the following command-line output:

```
PS D:\AI Assisted Coding> & "C:/Users/SAI TEJASWI/AppData/Local/Programs/Python/Python311/python.exe" "d:/AI Assisted Coding/lab_assignment_3_5.py"
PS D:\AI Assisted Coding> & "C:/Users/SAI TEJASWI/AppData/Local/Programs/Python/Python311/python.exe" "d:/AI Assisted Coding/lab_assignment_3_5.py"
False
True
True
PS D:\AI Assisted Coding>
```

Analysis

- The code incorrectly marks 1900 as a leap year.
 - Missing century-year rule (divisible by 100 but not by 400).

TASK-02: One-Shot Prompting (GCD of Two Numbers)

- Compare with a zero-shot solution.
 - Analyse algorithm efficiency.

Prompt: Write a Python function to find the GCD of two numbers.

Example: Input: 12, 18 → Output: 6

CODE:

The screenshot shows the Visual Studio Code interface with the 'AI ASSISTED CODING' extension active. The left sidebar displays a file tree with several Python files: factorial using recursion.py, lab_assignment_1_5.py, lab_assignment_2_2.py, lab_assignment_3_2.py, lab_assignment_3_5.py (which is the current file), and rough.py. The main editor area shows a Python script for calculating the Greatest Common Divisor (GCD) using recursion:

```
#Write a Python function to find GCD of two numbers. Example: Input: 12, 18 → Output: 6
def gcd(a, b):
    while b:
        a, b = b, a % b
    return a
print(gcd(12, 18)) # Output: 6
```

The status bar at the bottom indicates the file is 'lab_assignment_3_5.py', line 16, column 4, with 3.11.4 Python selected. A context menu on the right side of the terminal tab shows options for 'Python' environments.

Zero-Shot Comparison

Zero-shot solutions often use brute-force loops, whereas this uses the efficient Euclidean algorithm.

Efficiency Analysis

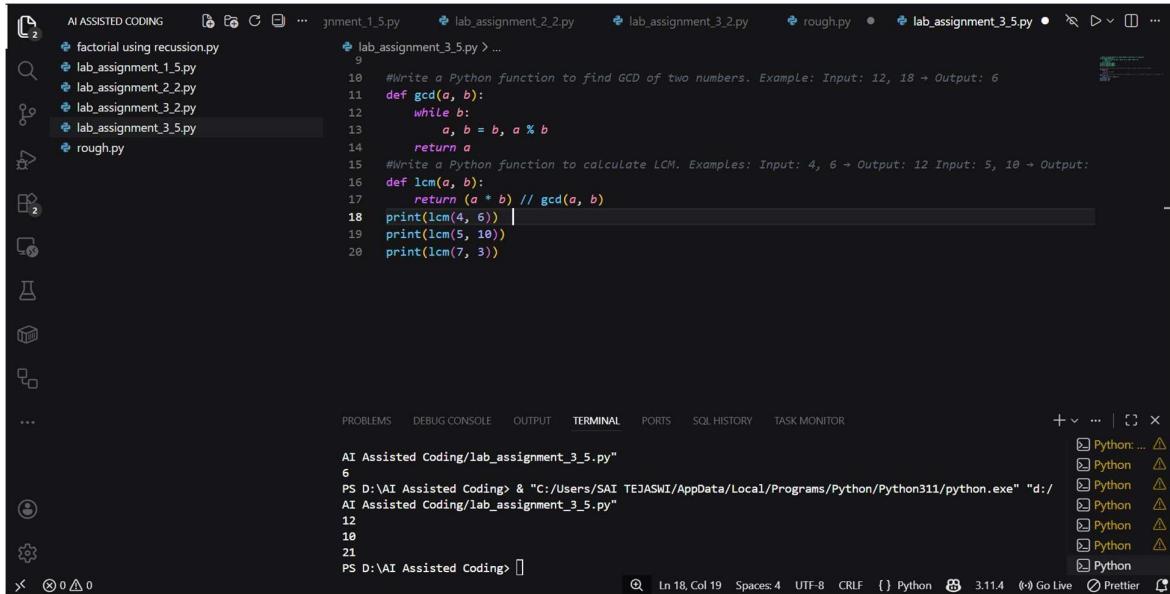
- Time Complexity: $O(\log \min(a, b))$
 - More efficient than trial division.

TASK-03: Few-Shot Prompting (LCM Calculation)

- Examine how examples guide formula selection.
- Test edge cases.

Prompt: Write a Python function to calculate LCM. Examples: Input: 4, 6 → Output: 12 Input: 5, 10 → Output: 10 Input: 7, 3 → Output: 21

CODE:



```
AI ASSISTED CODING ... jnment_1_5.py lab_assignment_2_2.py lab_assignment_3_2.py rough.py ... lab_assignment_3_5.py ... factorial using recursion.py lab_assignment_1_5.py > ... 9 10 #Write a Python function to find GCD of two numbers. Example: Input: 12, 18 → Output: 6 11 def gcd(a, b): 12     while b: 13         a, b = b, a % b 14     return a 15 #Write a Python function to calculate LCM. Examples: Input: 4, 6 → Output: 12 Input: 5, 10 → Output: 10 16 def lcm(a, b): 17     return (a * b) // gcd(a, b) 18 print(lcm(4, 6)) | 19 print(lcm(5, 10)) 20 print(lcm(7, 3))
```

PROBLEMS DEBUG CONSOLE OUTPUT TERMINAL PORTS SQL HISTORY TASK MONITOR

AI Assisted Coding/lab_assignment_3_5.py" 6 PS D:\AI Assisted Coding> & "C:/Users/SAI TEJASWI/AppData/Local/Programs/Python/Python311/python.exe" "d:/AI Assisted Coding/lab_assignment_3_5.py" 12 18 21 PS D:\AI Assisted Coding> []

Ln 18, Col 19 Spaces: 4 UTF-8 CRLF {} Python 3.11.4 Go Live Prettier

Observation

- Formula-based approach chosen due to examples.
- Needs handling when either input is zero.

TASK-04: Zero-Shot Prompting – Binary to Decimal Conversion

- Test with valid and invalid binary inputs.
- Identify missing validation logic.

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

CODE:

The screenshot shows the VS Code interface with the following details:

- File Explorer:** Shows files like factorial using recursion.py, lab_assignment_1_5.py, lab_assignment_2_2.py, lab_assignment_3_2.py, lab_assignment_3_5.py, rough.py, and lab_assignment_3_5.py (the active file).
- Code Editor:** Displays the following Python code:

```
23  #Write a Python function to convert a binary number to decimal.
24  def binary_to_decimal(binary_str):
25      decimal_value = 0
26      binary_str = binary_str[::-1]
27      for i in range(len(binary_str)):
28          if binary_str[i] == '1':
29              decimal_value += 2 ** i
30      return decimal_value
31 print(binary_to_decimal('1010'))
32 print(binary_to_decimal('1101'))
```
- Terminal:** Shows the command AI Assisted Coding/lab_assignment_3_5.py" and its output:

```
10
9
PS D:\AI Assisted Coding> & "C:/Users/SAI TEJASWI/AppData/Local/Programs/Python/Python311/python.exe" "d:/AI Assisted Coding/lab_assignment_3_5.py"
10
13
```
- Status Bar:** Shows the current file is lab_assignment_3_5.py, line 32, column 30, spaces: 4, encoding: UTF-8, CRLF, Python 3.11.4, Go Live, and Prettier.

Analysis

- No validation for invalid binary digits.
- Error occurs for invalid input.

TASK-05: One-Shot Prompting – Decimal to Binary conversion

- Compare clarity with zero-shot output.
- Analyze handling of zero and negative numbers.

PROMPT: Write a Python function to convert decimal to binary. Example: Input:

10 → Output: 1010

CODE:

The screenshot shows a dark-themed instance of Visual Studio Code. In the center is a code editor with Python code. The code defines a function `decimal_to_binary` that converts a decimal number to binary. It includes a docstring, a check for zero, and a loop that repeatedly divides the number by 2 and prepends the remainder to the result string. A terminal tab at the bottom shows the command line running the script and outputting the result `1010`. The status bar indicates the file is 3.11.4 and has 0 changes.

```
#Write a Python function to convert decimal to binary. Example: Input: 10 → Output: 1010
def decimal_to_binary(n):
    if n == 0:
        return '0'
    binary_str = ''
    while n > 0:
        binary_str = str(n % 2) + binary_str
        n //= 2
    return binary_str
print(decimal_to_binary(10))
```

Analysis

- Correct for positive numbers.
- For 0 returns '0'.
- Negative numbers return prefixed binary, needs clarification.

TASK-06: Few-Shot Prompting – Harshad Number Check

- Test boundary conditions.
- Evaluate robustness

PROMPT: Write a Python function to check Harshad Number. Examples: Input: 18 → Output: Harshad Number Input: 21 → Output: Harshad Number Input: 19 → Output: Not a Harshad Number

CODE:

The screenshot shows the Visual Studio Code (VS Code) interface with the "AI ASSISTED CODING" extension active. The left sidebar displays a file tree with files like "factorial using recursion.py", "lab_assignment_1_5.py", "lab_assignment_2_2.py", "lab_assignment_3_2.py", "lab_assignment_3_5.py", and "rough.py". The main editor area contains Python code for checking if a number is a Harshad number. The terminal below shows the code being run and its output, which includes the execution command, the function definition, and three test cases (18, 21, and 19) with their respective outputs ("Harshad Number" or "Not a Harshad Number").

```
AI Assisted Coding/lab_assignment_3_5.py"
1010
PS D:\AI Assisted Coding> & "C:/Users/SAI TEJASWI/AppData/Local/Programs/Python/Python311/python.exe" "d:/AI Assisted Coding/lab_assignment_3_5.py"
Harshad Number
Harshad Number
Not a Harshad Number
PS D:\AI Assisted Coding>
```

Analysis

- Works correctly for positive integers.
- Division by zero occurs when input is 0.