

ASSIGNMENT - 3.5

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Batch - 03

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.

Week2 - Task:

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

The screenshot shows a code editor interface with a dark theme. The top menu bar includes File, Edit, Selection, View, Go, Run, Terminal, Help, and a search bar. On the right side, there are various icons for file operations like copy, paste, and search, along with a 'CHAT' button and a message icon.

The main code area displays the following Python function:

```
# generate a python function that checks whether a given year is leap year or not
def is_leap_year(year):
    """Check if a given year is a leap year.

    A year is a leap year if it is divisible by 4,
    except for end-of-century years, which must be divisible by 400.

    Args:
        year (int): The year to check.

    Returns:
        bool: True if the year is a leap year, False otherwise.
    """
    if (year % 4 == 0 and year % 100 != 0) or (year % 400 == 0):
        return True
    else:
        return False

# Example usage:
year = 1900
if is_leap_year(year):
    print(f"{year} is a leap year.")
else:
    print(f"{year} is not a leap year.")
```

The output window below shows the results of running the code with different years:

```
2024 is a leap year.

[Done] exited with code=0 in 0.449 seconds

[Running] python -u "C:\Users\naksh\AppData\Local\Temp\tempCodeRunnerFile.python"
2000 is a leap year.

[Done] exited with code=0 in 0.397 seconds

[Running] python -u "C:\Users\naksh\AppData\Local\Temp\tempCodeRunnerFile.python"
1900 is not a leap year.

[Done] exited with code=0 in 0.41 seconds
```

A sidebar on the right is titled 'Ask about your code' with a speech bubble icon. It includes a note that responses may be inaccurate and a link to 'Generate Agent Instructions'.

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.

The screenshot shows a code editor interface with a dark theme. In the top bar, there are tabs for 'File', 'Edit', 'Selection', 'View', 'Go', 'Run', 'Terminal', 'Help', and 'Search'. A 'CHAT' tab is also present. The main area contains the following Python code:

```
1  """
2  num = 12,18
3  gcd = 6
4  """
5  def compute_gcd(a, b):
6      while b:
7          a, b = b, a % b
8      return a
9  if __name__ == "__main__":
10     a = 12
11     b = 18
12     print("num =", (a, b))
13     print("gcd =", compute_gcd(a, b))
```

Below the code, the 'OUTPUT' tab is selected, showing the terminal output of the script running:

```
[Running] python -u "C:\Users\naksh\AppData\Local\Temp\tempCodeRunnerFile.py"
num = (12, 18)
gcd = 6

[Done] exited with code=0 in 0.427 seconds
```

On the right side of the interface, there is a sidebar with the heading 'Ask about your code' and a message: 'AI responses may be inaccurate. Generate Agent Instructions to onboard AI onto your codebase.'

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.

The screenshot shows a code editor interface with a dark theme. In the center, there is a code editor window containing the following Python code:

```
1 ...
2 num = 4,6
3 lcm = 12
4 num = 5,6
5 lcm = 30
6 num = 7,3
7 lcm = 21
8 ...
9 def lcm (a, b):
10     if a > b:
11         greater = a
12     else:
13         greater = b
14
15     while True:
16         if greater % a == 0 and greater % b == 0:
17             lcm = greater
18             break
19         greater += 1
20
21     return lcm
```

Below the code editor, the status bar shows the following information:

- PROBLEMS
- OUTPUT
- DEBUG CONSOLE
- TERMINAL
- PORTS

The OUTPUT tab is selected, displaying the following output:

```
[Running] python -u "C:\Users\naksh\AppData\Local\Temp\tempCodeRunnerFile.py"
LCM of 4 and 6 is 12

[Done] exited with code=0 in 0.473 seconds
```

In the top right corner, there is a "CHAT" button and a sidebar with the heading "Ask about your code".

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.**

The screenshot shows a code editor interface with a dark theme. In the center, there is a code editor window containing the following Python code:

```
1 #generate a python function that converts a binary number to decimal
2 def binary_to_decimal(binary_str):
3     decimal_value = 0
4     binary_str = binary_str[::-1] # Reverse the string to process from least significant bit
5     for index, digit in enumerate(binary_str):
6         if digit == '1':
7             decimal_value += 2 ** index
8
9 # Example usage:
10 binary_number = "1101"
11 decimal_number = binary_to_decimal(binary_number)
12 print(f"The decimal value of binary {binary_number} is {decimal_number}")
```

Below the code editor, the status bar shows the following information:

- PROBLEMS
- OUTPUT
- DEBUG CONSOLE
- TERMINAL
- PORTS

The OUTPUT tab is selected, displaying the following output:

```
[Running] python -u "C:\Users\naksh\AppData\Local\Temp\tempCodeRunnerFile.py"
The decimal value of binary 1101 is 13

[Done] exited with code=0 in 0.383 seconds
```

In the top right corner, there is a "CHAT" button and a sidebar with the heading "Ask about your code".

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.

The screenshot shows a code editor interface with a dark theme. In the center, there is a code editor window containing the following Python code:

```
# generate a python function that converts a decimal number to binary
num = 10
binary_number = 1010
def decimal_to_binary(n):
    if n > 1:
        decimal_to_binary(n // 2)
        print(n % 2, end='')
num = 10
decimal_to_binary(num)
```

Below the code editor, there is a terminal window showing the output of running the script:

```
[Running] python -u "C:\Users\naksh\AppData\Local\Temp\tempCodeRunnerFile.py"
1010
[Done] exited with code=0 in 0.446 seconds
```

On the right side of the interface, there is a sidebar with a message bubble icon and the text "Ask about your code". Below it, smaller text reads "AI responses may be inaccurate." and "Generate Agent Instructions to onboard AI onto your codebase."

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**
- **Test boundary conditions.**
- **Evaluate robustness**

The screenshot shows a code editor interface with a dark theme. In the top-left corner, there's a search bar with the placeholder "Search". Below it is a tab bar with several tabs: "Untitled-4", "Untitled-5", "Untitled-6", "#generate a python fuction that converts", "Untitled-7", "Untitled-1", "Untitled-2", and "Untitled-3". On the far right of the tab bar, there are icons for "CHAT", "New", "Save", "Print", and "Close".

The main area contains the following Python code:

```
4 num = 21
5 print num is Harzard number
6 num = 19
7 print num is not Harzard number
8 """
9 def is_harshad_number(num):
10     digit_sum = sum(int(digit) for digit in str(num))
11     return num % digit_sum == 0
12 if __name__ == "__main__":
13     test_numbers = [18, 21, 19]
14     for num in test_numbers:
15         if is_harshad_number(num):
16             print(f"{num} is Harshad number")
17         else:
18             print(f"{num} is not Harshad number")
19 """
```

Below the code editor is a "PROBLEMS" tab, followed by "OUTPUT", "DEBUG CONSOLE", "TERMINAL", and "PORTS". The "OUTPUT" tab is active, showing the following terminal output:

```
[Running] python -u "C:\Users\naksh\AppData\Local\Temp\tempcodeRunnerFile.python"
18 is Harshad number
21 is Harshad number
19 is not Harshad number
```

At the bottom of the screen, there's a status bar with the text "[Done] exited with code=0 in 0.416 seconds".

In the bottom right corner, there's a small sidebar titled "Untitled-2" with the sub-instruction "Explore and understand your code".