

AI ASSISTED CODING ASSIGNMENT – 3.5

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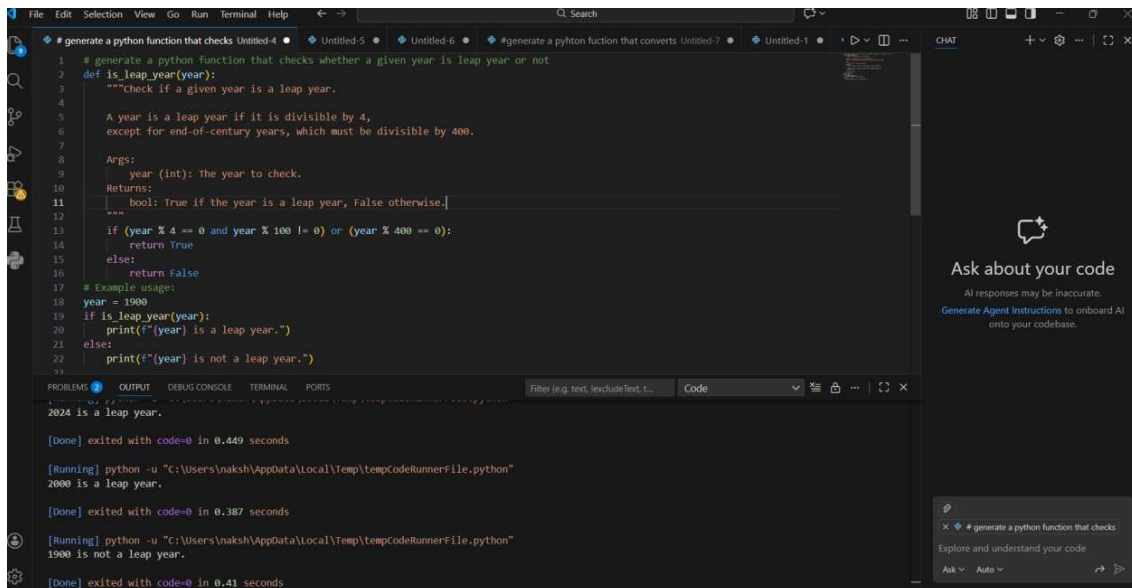
BATCH-03

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 with a Python function `is_leap_year` and its execution results. The function checks if a year is a leap year based on the following logic: a year is a leap year if it is divisible by 4, except for end-of-century years, which must be divisible by 400. The execution results show that the function correctly identifies 2024 as a leap year, 2000 as a leap year, and 1900 as not a leap year.

```
1 # generate a python function that checks whether a given year is leap year or not
2 def is_leap_year(year):
3     """Check if a given year is a leap year.
4
5     A year is a leap year if it is divisible by 4,
6     except for end-of-century years, which must be divisible by 400.
7
8     Args:
9         year (int): the year to check.
10    Returns:
11        bool: True if the year is a leap year, False otherwise.
12    """
13    if (year % 4 == 0 and year % 100 != 0) or (year % 400 == 0):
14        return True
15    else:
16        return False
17
18 # Example usage:
19 year = 1900
20 if is_leap_year(year):
21     print(f"{year} is a leap year.")
22 else:
23     print(f"{year} is not a leap year.")
24
```

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 0.387 seconds

[Running] python -u "C:\Users\naksh\AppData\Local\Temp\tempCodeRunnerFile.python"

1900 is not a leap year.

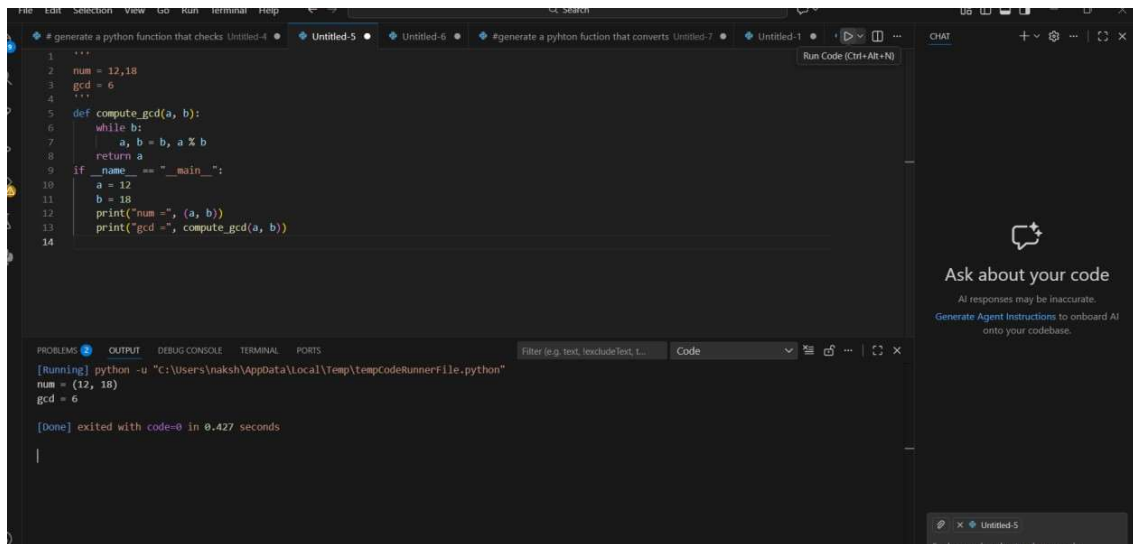
[Done] exited with code=0 in 0.41 seconds

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 with a Python script and its execution output. The script defines a `compute_gcd` function using a while loop and prints the GCD of 12 and 18. The output window shows the successful execution of the script, confirming the GCD is 6.

```
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))
14
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
[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

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.

```
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
```

[Running] python -u "C:\Users\naksh\AppData\Local\Temp\tmpCodeRunnerFile.python"
LCM of 4 and 6 is 12
[Done] exited with code=0 in 0.473 seconds

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.

```
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     return decimal_value  
9  
10 # Example usage:  
11 binary_number = "1101"  
12 decimal_number = binary_to_decimal(binary_number)  
13 print(f"The decimal value of binary {binary_number} is {decimal_number}")
```

[Running] python -u "C:\Users\naksh\AppData\Local\Temp\tmpCodeRunnerFile.python"
The decimal value of binary 1101 is 13
[Done] exited with code=0 in 0.383 seconds

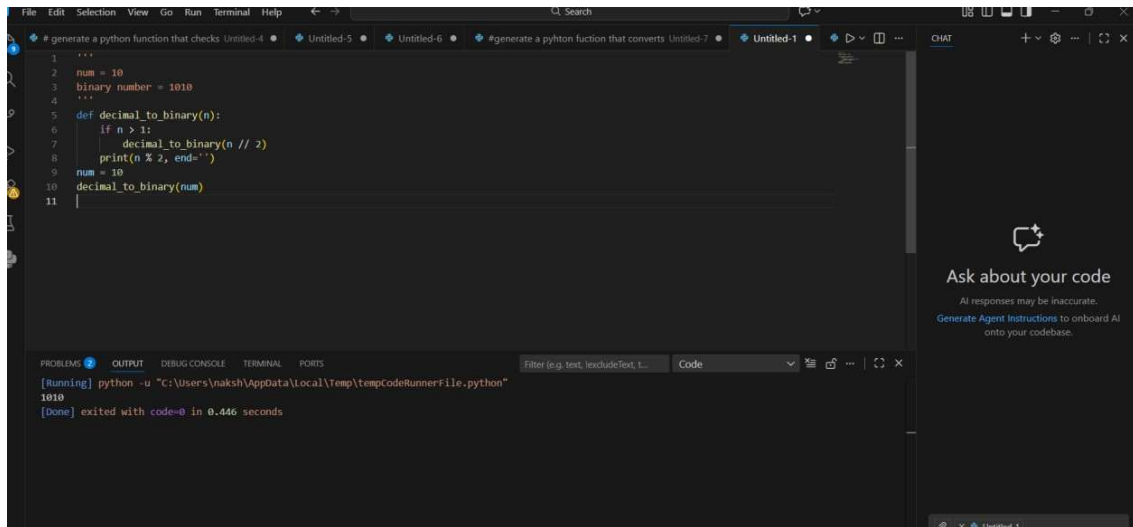
Question 5: One-Shot Prompting (Decimal to Binary Conversion)

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 VS Code editor with a Python file named 'Untitled-1'. The code defines a function 'decimal_to_binary(n)' that recursively converts a decimal number to binary. The function prints the binary digits as they are calculated. Below the code, the 'OUTPUT' panel shows the execution of the function with the input '10', resulting in the output '1010'. The 'TERMINAL' panel shows the command 'python -u "C:\Users\naksh\AppData\Local\Temp\tempCodeRunnerFile.py"' and the output '1010'.

```
1 """
2 num = 10
3 binary number = 1010
4 """
5 def decimal_to_binary(n):
6     if n > 1:
7         decimal_to_binary(n // 2)
8     print(n % 2, end='')
9 num = 10
10 decimal_to_binary(num)
11
```

OUTPUT

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

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

