LAB ASSSIGMENT-4.2

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COURSE : AI ASSISTED CODING
DATE : 26-08-2025
BATCH : 01

TASK DESCRIPTION #1

- Zero-shot: Prompt AI with only the instruction — Write a Python function to

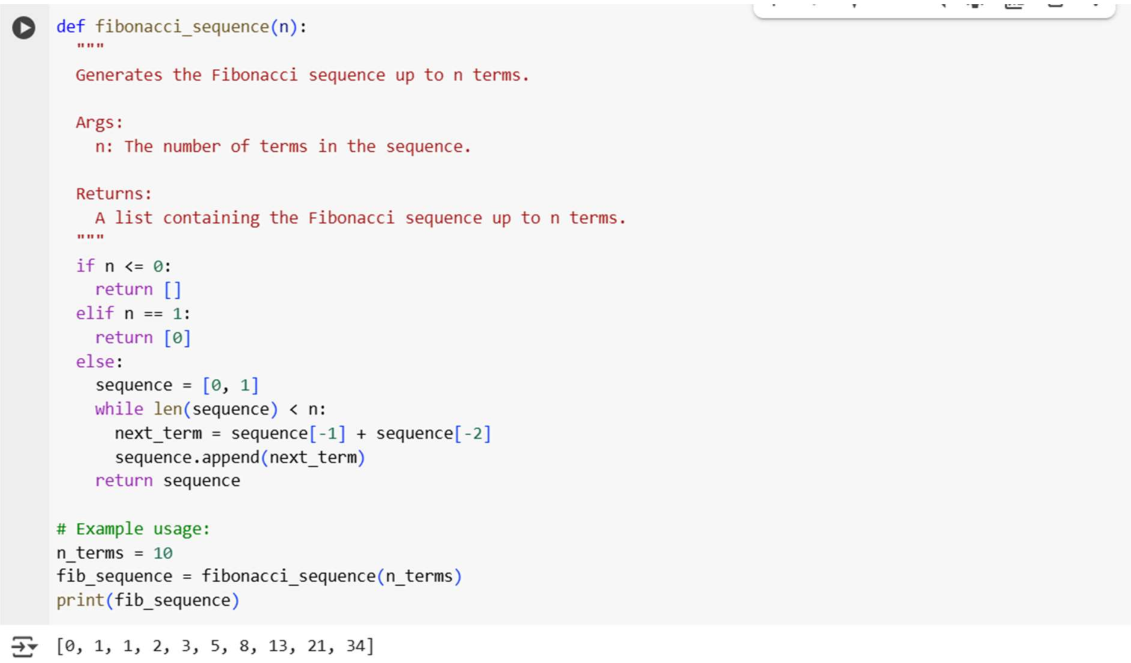
generate the Fibonacci sequence up to n term

PROMPT:

Develop a code to generate Zero-shot: Prompt AI with only the instruction — Write a Python function to generate the Fibonacci sequence up to n terms

EXPECTED OUTPUT:

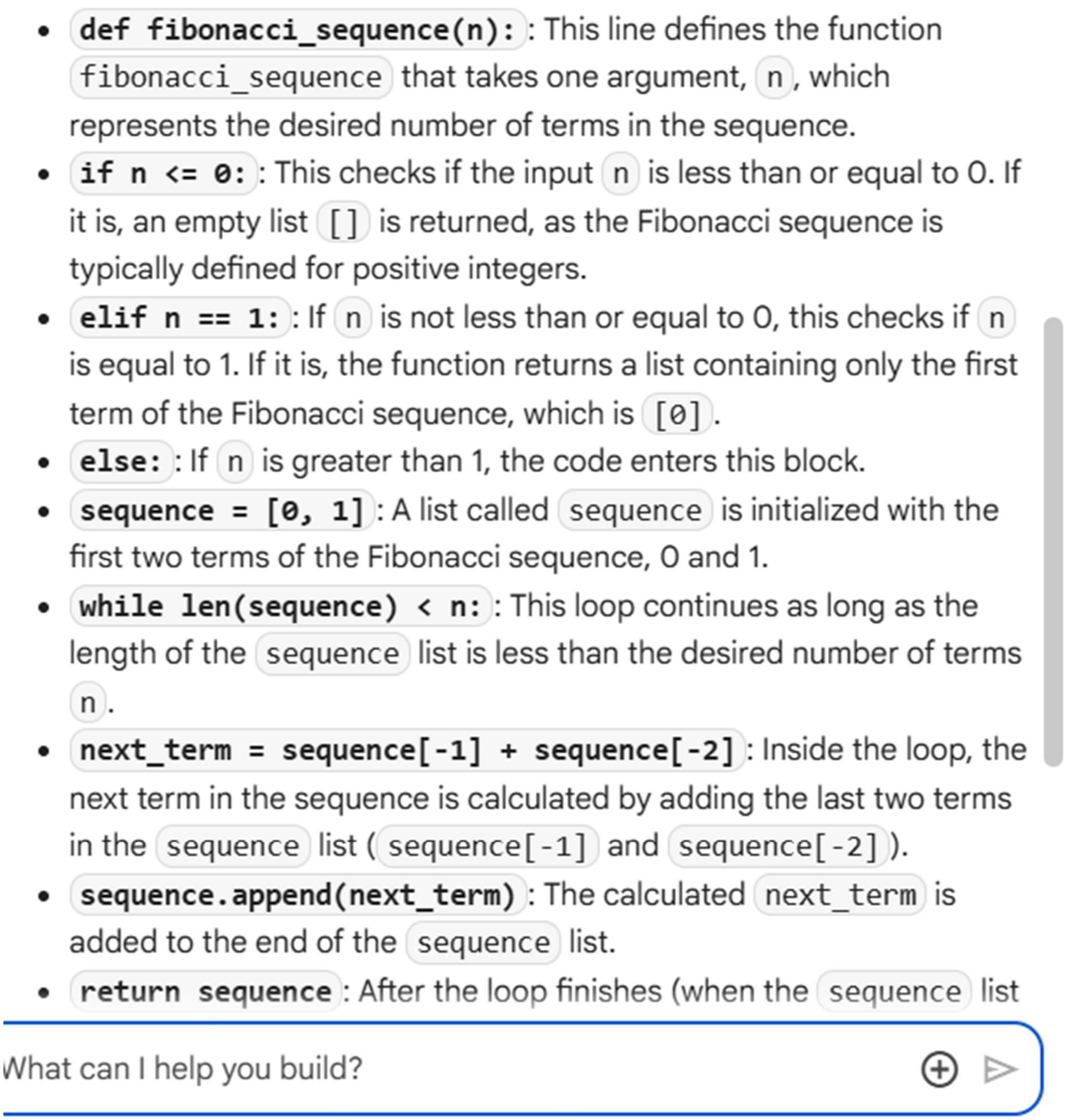
A working function without using any sample inputs/outputS



```python
def fibonacci_sequence(n):
  """
  Generates the Fibonacci sequence up to n terms.

  Args:
    n: The number of terms in the sequence.

  Returns:
    A list containing the Fibonacci sequence up to n terms.
  """
  if n <= 0:
    return []
  elif n == 1:
    return [0]
  else:
    sequence = [0, 1]
    while len(sequence) < n:
      next_term = sequence[-1] + sequence[-2]
      sequence.append(next_term)
    return sequence

# Example usage:
n_terms = 10
fib_sequence = fibonacci_sequence(n_terms)
print(fib_sequence)
```

```
[0, 1, 1, 2, 3, 5, 8, 13, 21, 34]
```

EXPLANATION:



- `def fibonacci_sequence(n):`: This line defines the function `fibonacci_sequence` that takes one argument, `n`, which represents the desired number of terms in the sequence.
- `if n <= 0:`: This checks if the input `n` is less than or equal to 0. If it is, an empty list `[]` is returned, as the Fibonacci sequence is typically defined for positive integers.
- `elif n == 1:`: If `n` is not less than or equal to 0, this checks if `n` is equal to 1. If it is, the function returns a list containing only the first term of the Fibonacci sequence, which is `[0]`.
- `else:`: If `n` is greater than 1, the code enters this block.
- `sequence = [0, 1]`: A list called `sequence` is initialized with the first two terms of the Fibonacci sequence, 0 and 1.
- `while len(sequence) < n:`: This loop continues as long as the length of the `sequence` list is less than the desired number of terms `n`.
- `next_term = sequence[-1] + sequence[-2]`: Inside the loop, the next term in the sequence is calculated by adding the last two terms in the `sequence` list (`sequence[-1]` and `sequence[-2]`).
- `sequence.append(next_term)`: The calculated `next_term` is added to the end of the `sequence` list.
- `return sequence`: After the loop finishes (when the `sequence` list

What can I help you build?

TASK DESCRIPTION#2

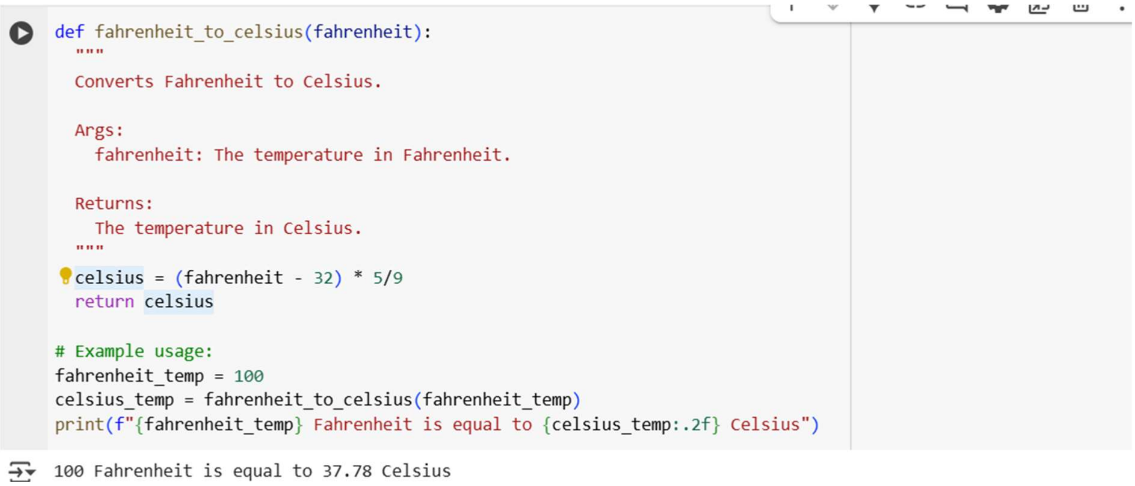
- One-shot: Provide one example: Input: 100, Output: 37.78 to help AI generate a function that converts Fahrenheit to Celsius

PROMPT:

Generate a code to develop One-shot: Provide one example: Input: 100, Output: 37.78 to help AI generate a function that converts Fahrenheit to Celsius

EXPECTED OUTPUT:

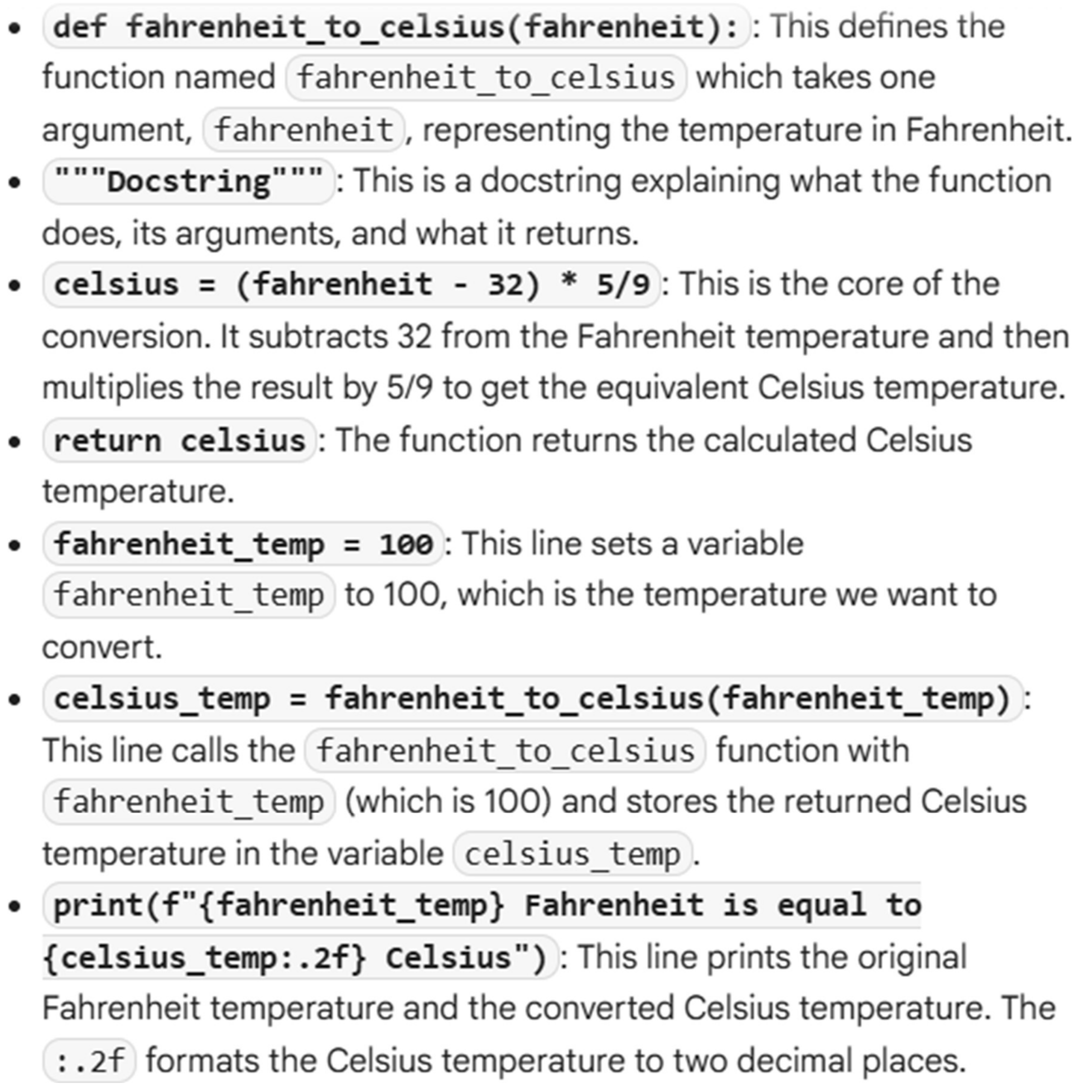
A correct conversion function guided by the single example



```python
def fahrenheit_to_celsius(fahrenheit):
  """
  Converts Fahrenheit to Celsius.

  Args:
    fahrenheit: The temperature in Fahrenheit.

  Returns:
    The temperature in Celsius.
  """
  celsius = (fahrenheit - 32) * 5/9
  return celsius

# Example usage:
fahrenheit_temp = 100
celsius_temp = fahrenheit_to_celsius(fahrenheit_temp)
print(f"{fahrenheit_temp} Fahrenheit is equal to {celsius_temp:.2f} Celsius")
```

```
100 Fahrenheit is equal to 37.78 Celsius
```

EXPLANATION:



- `def fahrenheit_to_celsius(fahrenheit):`: This defines the function named `fahrenheit_to_celsius` which takes one argument, `fahrenheit`, representing the temperature in Fahrenheit.
- `"""Docstring"""`: This is a docstring explaining what the function does, its arguments, and what it returns.
- `celsius = (fahrenheit - 32) * 5/9`: This is the core of the conversion. It subtracts 32 from the Fahrenheit temperature and then multiplies the result by 5/9 to get the equivalent Celsius temperature.
- `return celsius`: The function returns the calculated Celsius temperature.
- `fahrenheit_temp = 100`: This line sets a variable `fahrenheit_temp` to 100, which is the temperature we want to convert.
- `celsius_temp = fahrenheit_to_celsius(fahrenheit_temp)`: This line calls the `fahrenheit_to_celsius` function with `fahrenheit_temp` (which is 100) and stores the returned Celsius temperature in the variable `celsius_temp`.
- `print(f"{fahrenheit_temp} Fahrenheit is equal to {celsius_temp:.2f} Celsius")`: This line prints the original Fahrenheit temperature and the converted Celsius temperature. The `:.2f` formats the Celsius temperature to two decimal places.

TASK DESCRIPTION#3

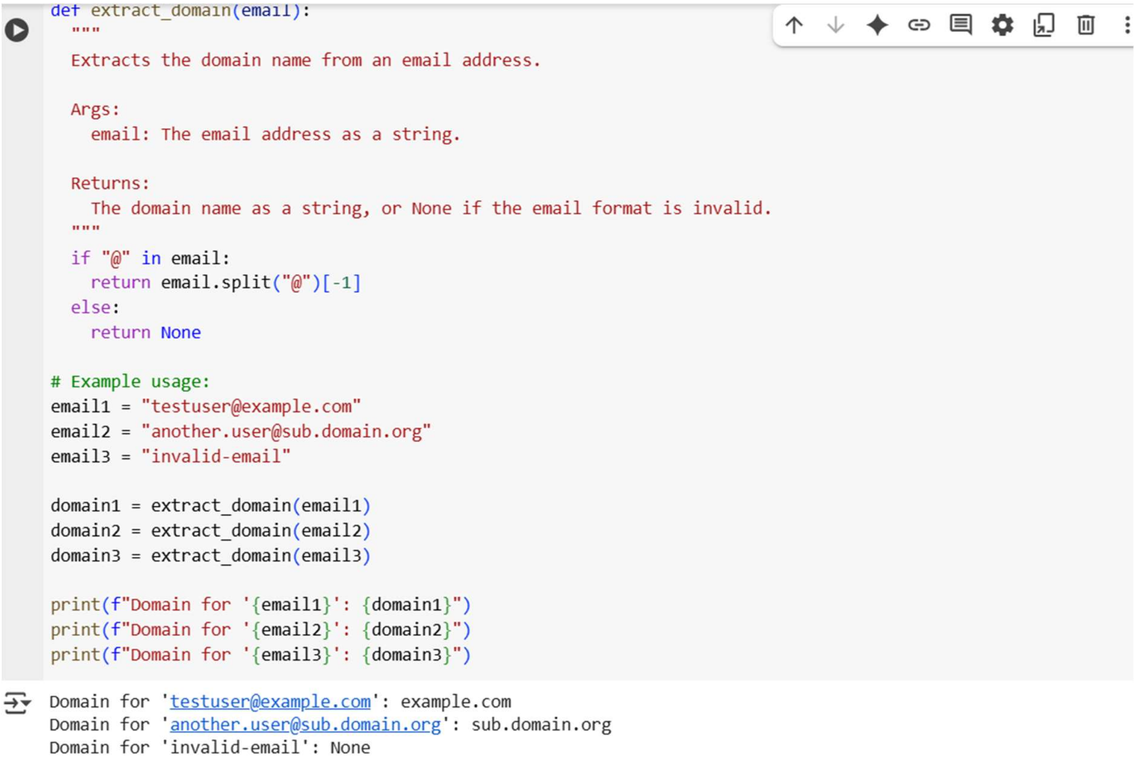
Few-shot: Give 2–3 examples to create a function that extracts the domain name from an email address

PROMPT:

Generate a code that developesFew-shot: Give 2–3 examples to create a function that extracts the domain name from an email address

EXPECTED OUTPUT:

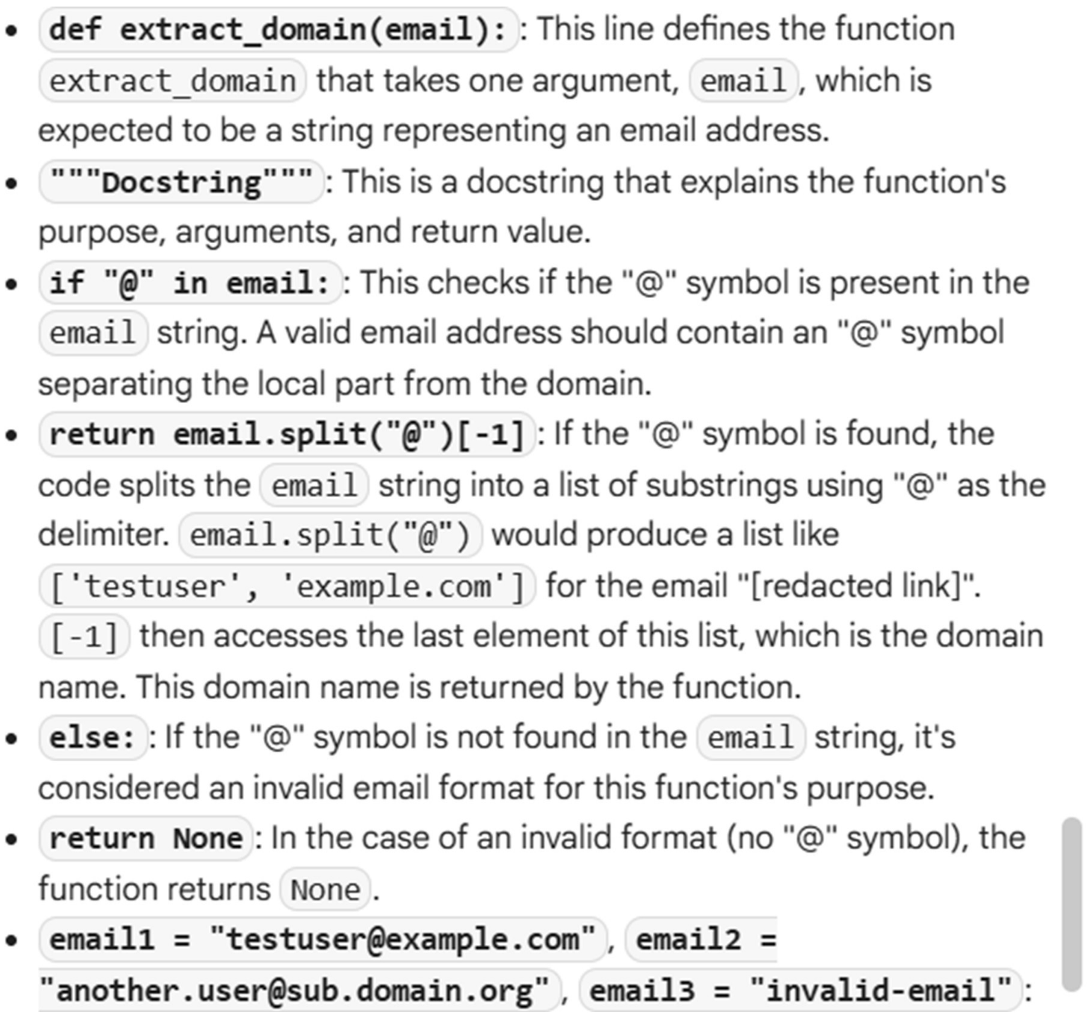
Accurate function that returns only the domain portion of an email (e.g.,@gmail.com)



```python
def extract_domain(email):
  """
  Extracts the domain name from an email address.

  Args:
    email: The email address as a string.

  Returns:
    The domain name as a string, or None if the email format is invalid.
  """
  if "@" in email:
    return email.split("@")[-1]
  else:
    return None

# Example usage:
email1 = "testuser@example.com"
email2 = "another.user@sub.domain.org"
email3 = "invalid-email"

domain1 = extract_domain(email1)
domain2 = extract_domain(email2)
domain3 = extract_domain(email3)

print(f"Domain for '{email1}': {domain1}")
print(f"Domain for '{email2}': {domain2}")
print(f"Domain for '{email3}': {domain3}")
```

```
Domain for 'testuser@example.com': example.com
Domain for 'another.user@sub.domain.org': sub.domain.org
Domain for 'invalid-email': None
```

EXPLANATION:



- **`def extract_domain(email):`**: This line defines the function `extract_domain` that takes one argument, `email`, which is expected to be a string representing an email address.
- **`"""Docstring"""`**: This is a docstring that explains the function's purpose, arguments, and return value.
- **`if "@" in email:`**: This checks if the "@" symbol is present in the `email` string. A valid email address should contain an "@" symbol separating the local part from the domain.
- **`return email.split("@")[-1]`**: If the "@" symbol is found, the code splits the `email` string into a list of substrings using "@" as the delimiter. `email.split("@")` would produce a list like `['testuser', 'example.com']` for the email "[redacted link]". `[-1]` then accesses the last element of this list, which is the domain name. This domain name is returned by the function.
- **`else:`**: If the "@" symbol is not found in the `email` string, it's considered an invalid email format for this function's purpose.
- **`return None`**: In the case of an invalid format (no "@" symbol), the function returns `None`.
- **`email1 = "testuser@example.com"`**, **`email2 = "another.user@sub.domain.org"`**, **`email3 = "invalid-email"`**:

TASK DESCRIPTION#4

Compare zero-shot vs few-shot prompting for generating a function that checks whether a word is a palindrome, ignoring punctuation and case

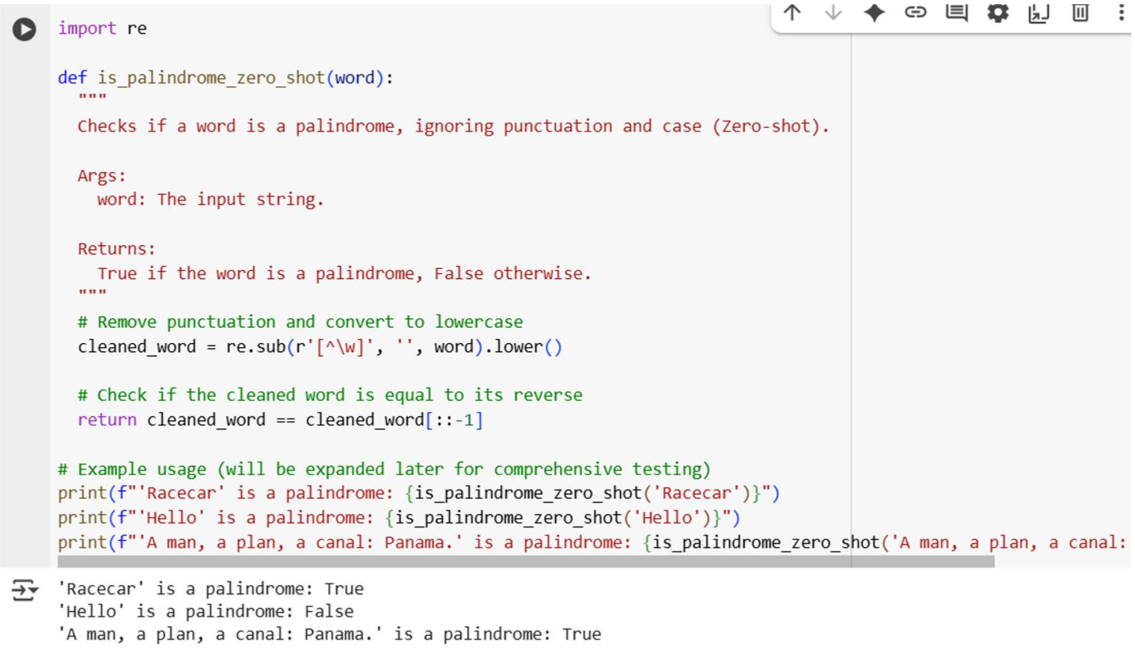
PROMPT:

Generate a code that develops Compare zero-shot vs few-shot prompting for generating a function that

checks whether a word is a palindrome, ignoring punctuation and case

Expected Output#4

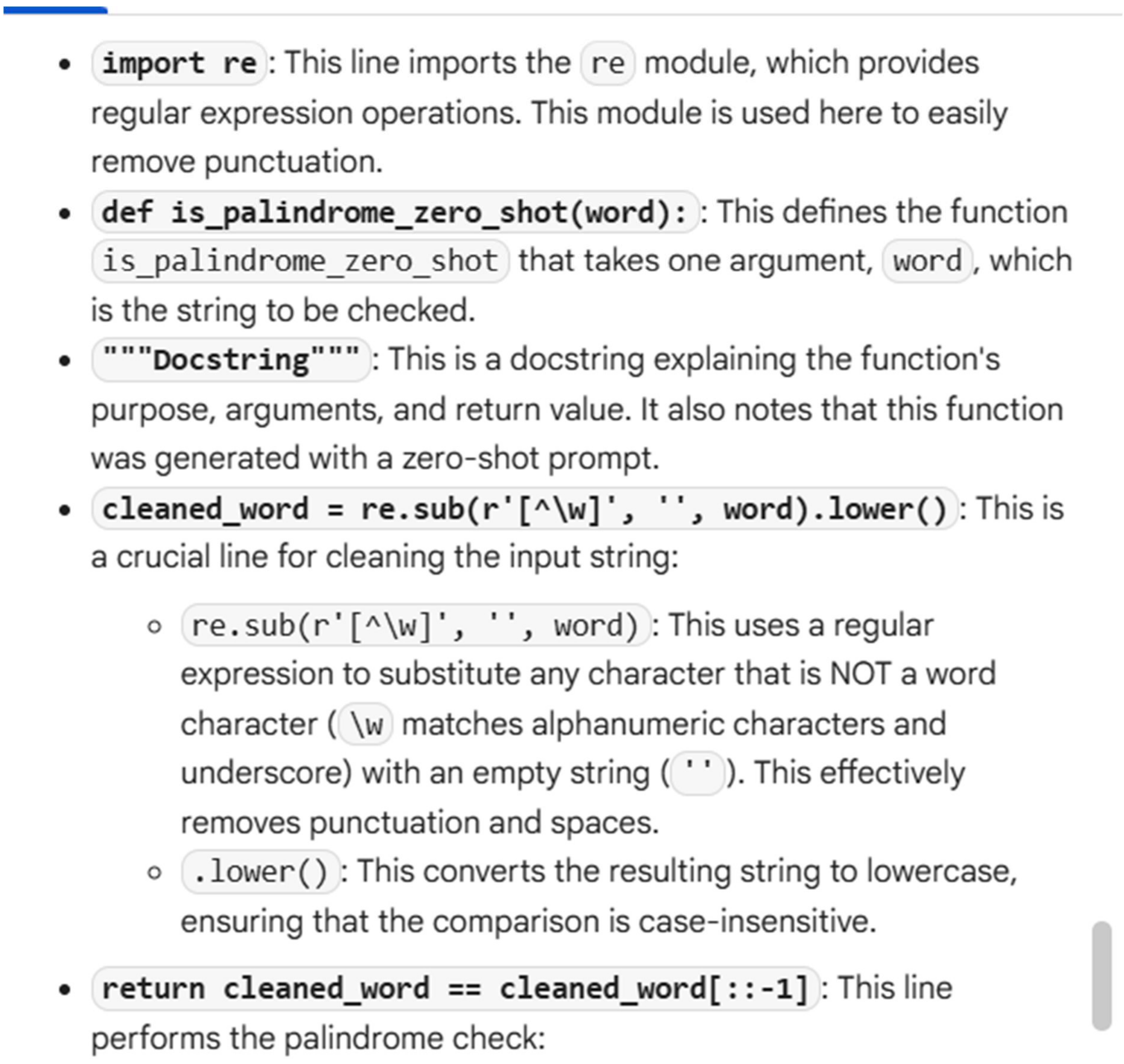
- Output comparison + student explanation on how examples helped the model



```python
import re

def is_palindrome_zero_shot(word):
  """
  Checks if a word is a palindrome, ignoring punctuation and case (Zero-shot).

  Args:
    word: The input string.

  Returns:
    True if the word is a palindrome, False otherwise.
  """
  # Remove punctuation and convert to lowercase
  cleaned_word = re.sub(r'[^\w]', '', word).lower()

  # Check if the cleaned word is equal to its reverse
  return cleaned_word == cleaned_word[::-1]

# Example usage (will be expanded later for comprehensive testing)
print(f"'Racecar' is a palindrome: {is_palindrome_zero_shot('Racecar')}")
print(f"'Hello' is a palindrome: {is_palindrome_zero_shot('Hello')}")
print(f"'A man, a plan, a canal: Panama.' is a palindrome: {is_palindrome_zero_shot('A man, a plan, a canal:
```

```
'Racecar' is a palindrome: True
'Hello' is a palindrome: False
'A man, a plan, a canal: Panama.' is a palindrome: True
```

EXPLANATION:



- `import re`: This line imports the `re` module, which provides regular expression operations. This module is used here to easily remove punctuation.
- `def is_palindrome_zero_shot(word):`: This defines the function `is_palindrome_zero_shot` that takes one argument, `word`, which is the string to be checked.
- `"""Docstring"""`: This is a docstring explaining the function's purpose, arguments, and return value. It also notes that this function was generated with a zero-shot prompt.
- `cleaned_word = re.sub(r'[^\w]', '', word).lower()`: This is a crucial line for cleaning the input string:
  - `re.sub(r'[^\w]', '', word)`: This uses a regular expression to substitute any character that is NOT a word character (`\w` matches alphanumeric characters and underscore) with an empty string (`''`). This effectively removes punctuation and spaces.
  - `.lower()`: This converts the resulting string to lowercase, ensuring that the comparison is case-insensitive.
- `return cleaned_word == cleaned_word[::-1]`: This line performs the palindrome check:

TASK DESCRIPTION#5

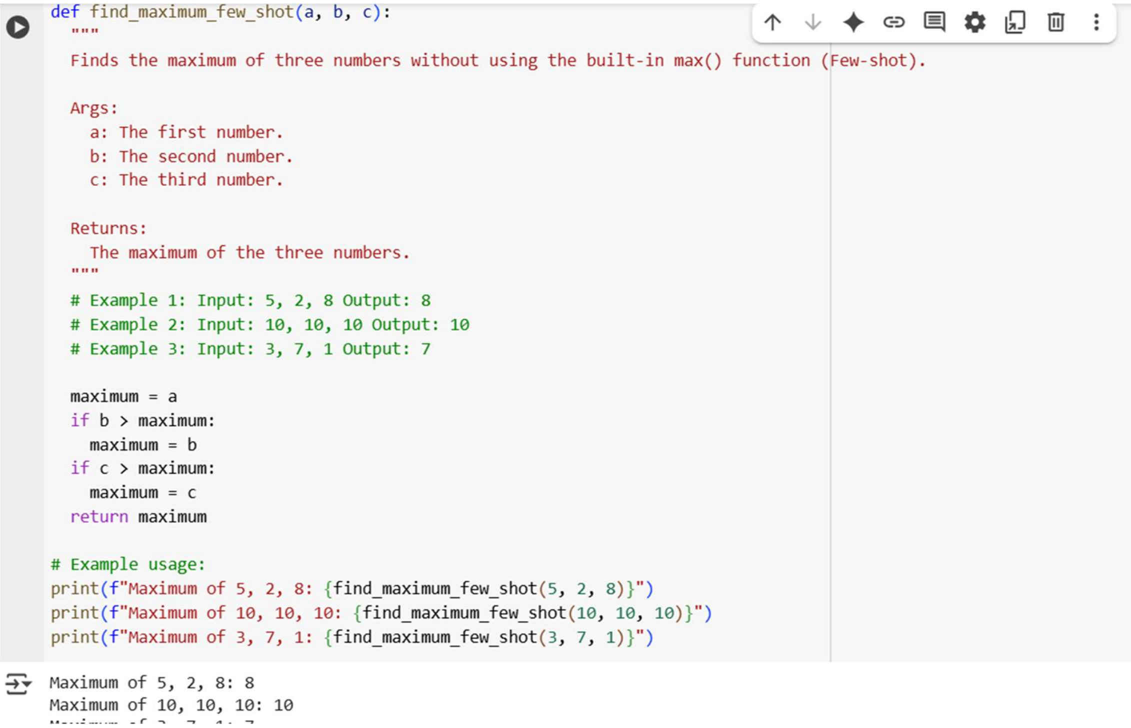
▪ Use few-shot prompting with 3 sample inputs to generate a function that determines the maximum of three numbers without using the built-in max() function

PROMPT:

Develop a code to generate Use few-shot prompting with 3 sample inputs to generate a function that determines the maximum of three numbers without using the built-in max() function

Expected Output#5

- A function that handles all cases with correct logic based on example patterns



```python
def find_maximum_few_shot(a, b, c):
  """
  Finds the maximum of three numbers without using the built-in max() function (Few-shot).

  Args:
    a: The first number.
    b: The second number.
    c: The third number.

  Returns:
    The maximum of the three numbers.
  """
  # Example 1: Input: 5, 2, 8 Output: 8
  # Example 2: Input: 10, 10, 10 Output: 10
  # Example 3: Input: 3, 7, 1 Output: 7

  maximum = a
  if b > maximum:
    maximum = b
  if c > maximum:
    maximum = c
  return maximum

# Example usage:
print(f"Maximum of 5, 2, 8: {find_maximum_few_shot(5, 2, 8)}")
print(f"Maximum of 10, 10, 10: {find_maximum_few_shot(10, 10, 10)}")
print(f"Maximum of 3, 7, 1: {find_maximum_few_shot(3, 7, 1)}")
```

```
Maximum of 5, 2, 8: 8
Maximum of 10, 10, 10: 10
```

EXPLANATION:

- **`def find_maximum_few_shot(a, b, c):`**: This defines the function named `find_maximum_few_shot` that accepts three arguments: `a`, `b`, and `c`.
- **`"""Docstring"""`**: This is a docstring explaining the function's purpose, arguments, and return value. It also indicates that this function was developed with a few-shot prompt.
- **`# Example 1: Input: 5, 2, 8 Output: 8`**, **`# Example 2: Input: 10, 10, 10 Output: 10`**, **`# Example 3: Input: 3, 7, 1 Output: 7`**: These lines are comments providing the few-shot examples that were used to guide the generation of this function.
- **`maximum = a`**: This line initializes a variable `maximum` with the value of the first input number, `a`. This assumes `a` is the maximum until proven otherwise.
- **`if b > maximum:`**: This checks if the second number, `b`, is greater than the current `maximum`.
- **`maximum = b`**: If `b` is indeed greater than `maximum`, the value of `maximum` is updated to `b`.
- **`if c > maximum:`**: This checks if the third number, `c`, is greater than the current `maximum`.
- **`maximum = c`**: If `c` is greater than the current `maximum`, the value of `maximum` is updated to `c`.