

SCHOOL OF COMPUTER SCIENCE AND ARTIFICIAL INTELLIGENCE		DEPARTMENT OF COMPUTER SCIENCE ENGINEERING	
Program Name: B. Tech	Assignment Type: Lab		Academic Year:2025-2026
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CourseCode	23CS002 PC304	Course Title	AI Assisted Coding
Year/Sem	III/II	Regulation	R23
Date and Day of Assignment	Week2	Time(s)	23CSBTB01 To 23CSBTB52
Duration	2 Hours	Applicable to Batches	All batches
Assignment Number: 3.4 (Present assignment number)/24(Total number of assignments)			

	Question	Expected Time to complete

		<i>mpl ete</i>
1	<p>Lab 4: Advanced Prompt Engineering – Zero-shot, One-shot, and Few-shot Techniques</p> <p>Task 1: Zero-shot Prompt – Fibonacci Series Generator</p> <p>Task Description #1</p> <ul style="list-style-type: none"> Without giving an example, write a single comment prompt asking GitHub Copilot to generate a Python function to print the first N Fibonacci numbers. <p>Expected Output #1</p> <ul style="list-style-type: none"> A complete Python function generated by Copilot without any example provided. Correct output for sample input $N = 7 \rightarrow 0 1 1 2 3 5 8$ Observation on how Copilot understood the instruction with zero context. <p>Prompt :</p> <p>Write a Python function that prints the first N Fibonacci numbers.</p>	Wee k2

The screenshot shows the Visual Studio Code interface with the AI 3.4 extension active. In the top right corner, there's a sidebar titled "GENERATING FIBONACCI NUMBERS" with the instruction: "Write a Python function that prints the first Fibonacci numbers." Below this, a message says "I have added a function `print_fibonacci`". At the bottom of the sidebar, it says "1 file changed +19 -1".

Code Editor:

```

1 def print_fibonacci(n):
2     """
3         Prints the first N Fibonacci numbers.
4
5     Args:
6         n (int): The number of Fibonacci numbers to print.
7
8     if n <= 0:
9         print("Please enter a positive integer.")
10    return
11
12    a, b = 0, 1
13    for _ in range(n):
14        print(a, end=" ")
15        a, b = b, a + b
16    print() # For a new line after printing the sequence
17
18 # Example usage
19 print_fibonacci(10)

```

Terminal:

```

● PS C:\Users\PC\Documents\web projects\CC\AI ASST\AI 3.4> & C:/Python312/python.exe "c:/Users/PC/Documents/web projects/CC/AI ASST/AI 3.4/t1.py"
0 1 1 2 3 5 8 13 21 34
○ PS C:\Users\PC\Documents\web projects\CC\AI ASST\AI 3.4>

```

Observation

In zero-shot prompting, no example was provided. GitHub Copilot correctly understood:

- Fibonacci logic
- Loop structure
- Output formatting

This shows Copilot can generate functional code even with **minimal instructions**.

Task 2: One-shot

Prompt – List Reversal Function

Task Description #2

- Write a comment prompt to reverse a list and provide one example below the comment to guide Copilot.

Expected Output #2

- Copilot-generated function to reverse a list using slicing or loop.
 - Output: [3, 2, 1] for input [1, 2, 3]
 - Observation on how adding a single example improved Copilot's accuracy.

Prompt

Write a Python function to reverse a list.

Example:

Input: [1, 2, 3]

Output: [3, 2, 1]

```
PS C:\Users\PC\Documents\web projects\CC\AI ASST\AI 3.4> & C:/Pyd  
exe "c:/Users/PC/Documents/web projects/CC/AI ASST/AI 3.4/t1.py"  
0 1 1 2 3 5 8 13 21 34  
PS C:\Users\PC\Documents\web projects\CC\AI ASST\AI 3.4>
```

Observation

Adding **one example** helped Copilot:

- Choose slicing instead of complex logic
- Produce shorter and cleaner code

One-shot prompting improves **accuracy and simplicity**.

Task 3: Few-shot Prompt – String Pattern Matching

Task Description #3

- Write a comment with 2–3 examples to help Copilot understand how to check if a string starts with a capital letter and ends with a period.

Expected Output #3

- A function `is_valid()` that checks the pattern.
- Output: True or False based on input.
- Students reflect on how multiple examples guide Copilot to generate more accurate code.

Prompt

Write a function `is_valid(s)` that checks whether:

Example 1: "Hello." → True

Example 2: "hello." → False

Example 3: "Hello" → False

A valid string starts with a capital letter and ends with a period.

The screenshot shows a code editor interface with a Python file named `t1.py`. The code defines a function `is_valid(s)` that checks if a string starts with a capital letter and ends with a period. The function uses `s[0].isupper()` and `s.endswith('.')` to perform this check. The code also includes examples of how to use the function and prints the first 10 Fibonacci numbers.

```
def is_valid(s):
    """
    Checks whether a string is valid.
    A valid string starts with a capital letter and ends with a period.

    Args:
        s (str): The string to check.

    Returns:
        bool: True if the string is valid, False otherwise.
    """
    return s[0].isupper() and s.endswith('.')

# Example usage
print(fibonacci(10))
```

The terminal window below shows the output of running the script, which prints the first 10 Fibonacci numbers (0, 1, 1, 2, 3, 5, 8, 13, 21, 34) followed by three calls to the `is_valid` function with the values "True", "False", and "False".

```
PS C:\Users\PC\Documents\web projects\CC\AI ASST\AI 3.4> & C:/Python312/python.exe "c:/Users/PC/Documents/web projects/CC/AI ASST/AI 3.4/t1.py"
0 1 1 2 3 5 8 13 21 34
PS C:\Users\PC\Documents\web projects\CC\AI ASST\AI 3.4> & C:/Python312/python.exe "c:/Users/PC/Documents/web projects/CC/AI ASST/AI 3.4/t1.py"
0 1 1 2 3 5 8 13 21 34
True
False
False
```

Task 4: Zero-shot vs Few-shot – Email Validator

Task Description #4

- First, prompt Copilot to write an email validation function using zero-shot (just the task in comment).
- Then, rewrite the prompt using few-shot examples.

Expected Output #4

- Compare both outputs:

Zero-shot may result in basic or generic validation.

Few-shot gives detailed and specific logic (e.g., @ and domain checking).

- Submit both code versions and note how few-shot improves reliability.

Zero-shot Prompt

```
# Write a Python function to validate an email address.
```

The screenshot shows a Microsoft Visual Studio Code (VS Code) interface. On the left, the Explorer sidebar shows an open project with files '11.py' and 'AI 3.4'. The main editor area displays a Python script for validating email addresses. The script includes a regular expression for email validation and several test cases. To the right of the editor, a floating 'GENERATING FIBONACCI NUMBERS IN PYTHON' window is open, containing the text 'Write a Python function to validate email address.' Below the editor, the status bar indicates 'PS C:\Users\PC\Documents\web projects\CC\AI ASST\AI 3.4>'. At the bottom right, a small 'Keep' button is visible. The overall theme is dark.

Comparison Observation

Aspect	Zero-shot	Few-shot
Logic	Very basic	Detailed & reliable
Accuracy	Low	High
Validation	Weak	Strong

Few-shot prompting clearly **improves reliability**.

Task 5: Prompt Tuning – Summing Digits of a Number

Task Description #5

- Experiment with 2 different prompt styles to generate a function that returns the sum of digits of a number.

Style 1: Generic task prompt

Style 2: Task + Input/Output example

Expected Output #5

- Two versions of the `sum_of_digits()` function.
- Example Output: `sum_of_digits(123) → 6`
- Short analysis: which prompt produced cleaner or more optimized code and why?

Note: Report should be submitted a word document for all tasks in a single document with prompts, comments & code explanation, and output and if require d, screenshots

Style 1: Generic Prompt

```
# Write a Python function to return the sum of digits  
of a number.
```

The screenshot shows a code editor interface with several windows:

- Code Editor (t2.py):** Displays the following Python code:

```
def sum_of_digits(number):
    """
    Returns the sum of the digits of a given number.

    Args:
        number (int): The number whose digits will be summed.

    Returns:
        int: The sum of the digits.

    """
    return sum([int(digit) for digit in str(abs(number))])

# Example usage
print(sum_of_digits(123)) # 6
print(sum_of_digits(-456)) # 15
```
- Terminal:** Shows the command: `PS C:\Users\PC\Documents\web projects\CC\AI ASST\AI 3.4> & C:/Python312/python.exe "c:/Users/PC/Documents/web projects/CC/AI ASST/AI 3.4/t2.py"`. The output is: `6` and `15`.
- Chat Window:** A sidebar titled "GENERATING FIBONACCI NUMBERS IN PYTHON" contains the prompt: "Write a Python function to return the sum of digits of a number." Below it, a message from the AI says: "I have created a new file t2.py and added a function sum_of_digits to calculate the sum of the digits of a number, along with example usage. Let me know if you need further assistance!"

Analysis

Style-2 prompt produced:

- Cleaner code
- One-line optimized solution
- Better readability

👉 **Prompt tuning improves code quality.**

Final Conclusion

- **Zero-shot** → Works but may be basic
- **One-shot** → Improves clarity
- **Few-shot** → Best accuracy and logic
- **Prompt tuning** → Produces optimized code

GitHub Copilot responds better when **examples are included**.