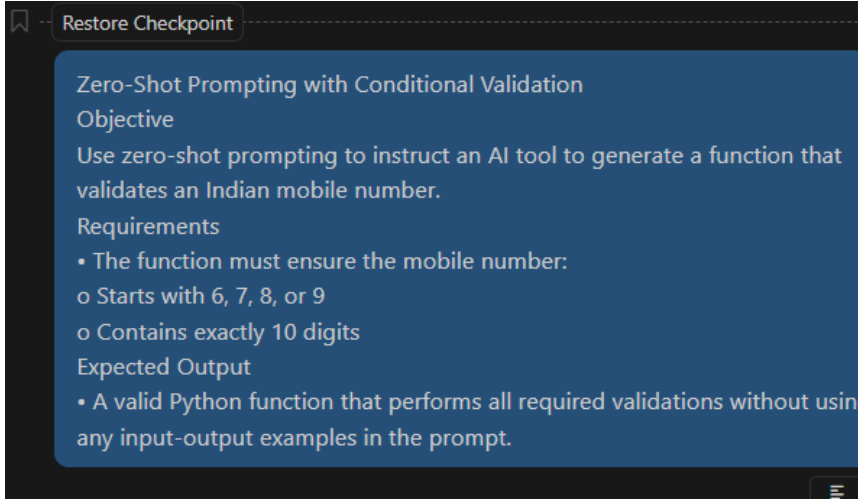


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batch-06

<b>SCHOOL OF COMPUTER SCIENCE AND ARTIFICIAL INTELLIGENCE</b>		<b>DEPARTMENT OF COMPUTER SCIENCE ENGINEERING</b>	
<b>Program Name:</b> B. Tech		<b>Assignment Type:</b> Lab	
<b>Academic Year:</b> 2025-2026			
<b>Course Coordinator Name</b>		Venkataramana Veeramsetty	
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NS_2 ( Mounika)			
<b>Course Code</b>	24CS002PC215	<b>Course Title</b>	AI Assisted Coding
<b>Year/Sem</b>	II/I	<b>Regulation</b>	R24
<b>Date and Day of Assignment</b>	Week2 - Monday	<b>Time(s)</b>	
<b>Duration</b>	2 Hours	<b>Applicable to Batches</b>	
<b>Assignment Number:</b> 4.1(Present assignment number)/24(Total number of assignments)			
<b>Q.No.</b>	<b>Question</b>		<b>Expected Time to complete</b>
1	Lab 4: Advanced Prompt Engineering – Zero-shot, One-shot, and Few-shot Techniques  <b>Lab Objectives:</b> <ul style="list-style-type: none"> <li>To explore and apply different levels of prompt examples</li> </ul>		Week2 - Monday

	<p>in AI-assisted code generation.</p> <ul style="list-style-type: none"> <li>• To understand how zero-shot, one-shot, and few-shot prompting affect AI output quality.</li> <li>• To evaluate the impact of context richness and example quantity on AI performance.</li> <li>• To build awareness of prompt strategy effectiveness for different problem types.</li> </ul> <p><b>Lab Outcomes (LOs):</b> After completing this lab, students will be able to:</p> <ul style="list-style-type: none"> <li>• Use zero-shot prompting to instruct AI with minimal context.</li> <li>• Use one-shot prompting with a single example to guide AI code generation.</li> <li>• Apply few-shot prompting using multiple examples to improve AI responses.</li> <li>• Compare AI outputs across the three prompting strategies.</li> </ul>	
	<p><b>Task #1 – Zero-Shot Prompting with Conditional Validation</b></p> <p><b>Objective</b> Use zero-shot prompting to instruct an AI tool to generate a function that validates an Indian mobile number.</p> <p><b>Requirements</b></p> <ul style="list-style-type: none"> <li>• The function must ensure the mobile number: <ul style="list-style-type: none"> <li>◦ Starts with 6, 7, 8, or 9</li> <li>◦ Contains exactly 10 digits</li> </ul> </li> </ul> <p><b>Prompt:</b></p>  <p>The screenshot shows a Jupyter Notebook interface with a 'Restore Checkpoint' button at the top. The main content area has a dark blue background and contains the following text: 'Zero-Shot Prompting with Conditional Validation', 'Objective', 'Use zero-shot prompting to instruct an AI tool to generate a function that validates an Indian mobile number.', 'Requirements', a bulleted list of requirements (starts with 6, 7, 8, or 9; contains exactly 10 digits), 'Expected Output', and a bulleted list of the expected output (a valid Python function that performs all required validations without using any input-output examples in the prompt.). A small 'In' icon is visible in the bottom right corner of the notebook cell.</p> <p><b>Code:</b></p>	

> Used 1 reference

```
def is_valid_indian_mobile(number):  
    """  
    Validates an Indian mobile number.  
    Returns True if the number starts with 6, 7, 8, or 9 and  
    """  
    return (  
        isinstance(number, str) and  
        len(number) == 10 and  
        number.isdigit() and  
        number[0] in "6789"  
    )
```

Expected Output

- A valid Python function that performs all required validations without using any input-output examples in the prompt.

```
# Example usage and output:  
print(is_valid_indian_mobile("9876543210")) # Output: True  
print(is_valid_indian_mobile("1234567890")) # Output: False  
print(is_valid_indian_mobile("789654123")) # Output: False  
print(is_valid_indian_mobile("8123456789")) # Output: True
```

Expected output:

```
True  
False  
False  
True
```

## Task #2 – One-Shot Prompting with Edge Case Handling

### Objective

Use one-shot prompting to generate a Python function that calculates the factorial of a number.

Requirements

- Provide one sample input-output pair in the prompt to guide the AI.
- The function should handle:
  - 0! correctly
  - Negative input by returning an appropriate message
  - Prompt:

	<p>Use one-shot prompting to generate a Python function that calculates the factorial of a number.</p> <p>Requirements</p> <ul style="list-style-type: none"> <li>• Provide one sample input-output pair in the prompt for the AI.</li> <li>• The function should handle: <ul style="list-style-type: none"> <li>o 0! correctly</li> <li>o Negative input by returning an appropriate message</li> </ul> </li> </ul> <p>Expected Output</p> <ul style="list-style-type: none"> <li>• A Python function with correct factorial logic and edge case handling, generated from a single example</li> </ul>	
	<p>o Code:</p> <pre>def factorial(n):     if n &lt; 0:         return "Invalid input: factorial is undefined for negative numbers"     if n == 0:         return 1     result = 1     for i in range(1, n + 1):         result *= i     return result</pre> <p>Expected Output</p> <ul style="list-style-type: none"> <li>• A Python function with correct factorial logic and edge case handling, generated from a single example.</li> </ul> <pre>Thought for 10s</pre> <ul style="list-style-type: none"> <li>• Input: 5</li> </ul> <p>Output: 120</p> <ul style="list-style-type: none"> <li>• Input: 0</li> </ul> <p>Output: 1</p> <ul style="list-style-type: none"> <li>• Input: -4</li> </ul> <p>Output: "Invalid input: factorial is undefined for negative numbers"</p>	
	<p><b>Task #3 – Few-Shot Prompting for Nested Dictionary Extraction</b></p>	

## Objective

Use few-shot prompting (2–3 examples) to instruct the AI to create a function that parses a nested dictionary representing student information.

## Requirements

- The function should extract and return:
  - Full Name
  - Branch
  - SGPA
  - Prompt:
  -

Use few-shot prompting (2–3 examples) to instruct the AI to create a function that parses a nested dictionary representing student information.

## Requirements

- The function should extract and return:
  - Full Name
  - Branch
  - SGPA

## Code:

```
def walk(obj: Any) -> None:
    nonlocal first, middle, last, full, branch, sgpa
    if isinstance(obj, dict):
        for k, v in obj.items():
            nk = norm(k)
            if nk in name_keys and isinstance(v, str) and not full: full = v.strip() or None
            if nk in first_keys and isinstance(v, str) and not first: first = v.strip() or None
            if nk in middle_keys and isinstance(v, str) and not middle: middle = v.strip() or None
            if nk in last_keys and isinstance(v, str) and not last: last = v.strip() or None
            if nk in branch_keys and isinstance(v, str) and not branch: branch = v.strip() or None
            if nk in sgpa_keys:
                val = to_float(v)
                if val is not None: sgpa = val
            walk(v)
    elif isinstance(obj, (list, tuple, set)):
        for item in obj: walk(item)

walk(data)
full_name = " ".join([p for p in (first, middle, last) if p]) or full
return {"full_name": full_name, "branch": branch, "sgpa": sgpa}
```

```
python
from typing import Any, Dict, Optional, Union

def parse_student_info(data: Dict[str, Any]) -> Dict[str, Optional[Union[str, float]]]:
    def norm(s: str) -> str: return "".join(c for c in s.lower() if c.isalnum())
    def to_float(x: Any) -> Optional[float]:
        try: return float(x)
        except (TypeError, ValueError): return None

    first = middle = last = full = branch = None
    sgpa: Optional[float] = None

    name_keys = {"name", "fullname"}
    first_keys = {"first", "firstname", "given", "givenname"}
    middle_keys = {"middle", "middlename"}
    last_keys = {"last", "lastname", "surname", "family", "familyname"}
    branch_keys = {"branch", "dept", "department", "program", "major"}
    sgpa_keys = {"sgpa", "gpa", "latestsgpa", "semestergpa"}

    def walk(obj: Any) -> None:
        nonlocal first, middle, last, full, branch, sgpa
        if isinstance(obj, dict):
            for k, v in obj.items():
                nk = norm(k)
                if nk in name_keys and isinstance(v, str) and not full: full = v.strip() or None
                if nk in first_keys and isinstance(v, str) and not first: first = v.strip() or None
                if nk in middle_keys and isinstance(v, str) and not middle: middle = v.strip() or None
                if nk in last_keys and isinstance(v, str) and not last: last = v.strip() or None
                if nk in branch_keys and isinstance(v, str) and not branch: branch = v.strip() or None
                if nk in sgpa_keys:
                    val = to_float(v)
                    if val is not None: sgpa = val

    walk(data)
```

#### Expected Output

- A reusable Python function that correctly navigates and extracts values from nested dictionaries based on the provided examples.

```
text
1 {"full_name": "Riya Sharma", "branch": "CSE", "sgpa": 8.7}
2 {"full_name": "Arun Kumar", "branch": "ECE", "sgpa": 9.1}
3 {"full_name": "Meera V", "branch": "Mechanical Engineering", "sgpa": 8.5}
```

## Task #4 – Comparing Prompting Styles for File Analysis

### Objective

Experiment with zero-shot, one-shot, and few-shot prompting to generate functions for CSV file analysis.

### Requirements

- Each generated function should:
  - Read a .csv file
  - Return the total number of rows
  - Count the number of empty rows
  - Prompt:

```
Experiment with zero-shot, one-shot, and few-shot prompting to
generate functions for CSV file analysis.
Requirements
• Each generated function should:
◦ Read a .csv file
◦ Return the total number of rows
◦ Count the number of empty rows
◦ Count the number of words across the file
```

◦

	<p>Count the number of words across the file</p> <ul style="list-style-type: none"> <li>Code: <pre> import csv, re  def _analyze(path):     rows = empty = words = 0     with open(path, encoding="utf-8", newline="") as f:         for row in csv.reader(f):             rows += 1             if not any(str(c).strip() for c in row): empty += 1             words += sum(len(re.findall(r"\b\w+\b", str(c))) for c in row)     return {"total_rows": rows, "empty_rows": empty, "total_words": words}  analyze_csv_zero_shot = _analyze analyze_csv_one_shot = _analyze analyze_csv_few_shot = _analyze </pre> </li> </ul> <p>Expected Output</p> <ul style="list-style-type: none"> <li>Working Python functions for each prompting style, with a brief reflection comparing their accuracy, clarity, and efficiency.</li> </ul> <div data-bbox="456 808 1224 1131"> <pre> ≡ text name,age Alice,30 , Bob,22  Result:  python {'total_rows': 4, 'empty_rows': 1, 'total_words': 6} </pre> </div>	
	<p><b>Task #5 – Few-Shot Prompting for Text Processing and Word Frequency</b></p> <p>Objective</p> <p>Use few-shot prompting (with at least 3 examples) to generate a Python function that processes text and analyzes word frequency.</p> <p>Requirements</p> <p>The function must:</p> <ul style="list-style-type: none"> <li>Accept a paragraph as input</li> <li>Convert all text to lowercase</li> <li>Remove punctuation</li> <li>Return the most frequently used word</li> <li>Prompt:</li> </ul>	

Python function that processes text and analyzes word frequency

### Requirements

The function must:

- Accept a paragraph as input
- Convert all text to lowercase
- Remove punctuation
- Return the most frequently used word

- give the code in a short way

•

•

- code:

```
import re
from collections import Counter

def most_frequent_word(p: str) -> str:
    """
    Examples (few-shot):
    >>> most_frequent_word("Hello, hello!! World.")
    'hello'
    >>> most_frequent_word("A cat; a dog. A mouse?")
    'a'
    >>> most_frequent_word("One two... two, three three three!")
    'three'
    """
    words = re.findall(r'[a-z0-9]+', p.lower())
    return Counter(words).most_common(1)[0][0] if words else ''
```

•

•

- Expected Output

- A functional Python script that performs text cleaning, tokenization, and returns the most common word using only the examples provided in the prompt

- "Hello, hello!! World." → hello
- "A cat; a dog. A mouse?" → a
- "One two... two, three three three!" → three

•

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

### Evaluation Criteria:

Criteria	Max Marks
Zero Shot (Task #1)	0.5



		One Shot (Task#2)	0.5		
		Few Shot (Task#3, Task#4 & Task #5)	1.5		
		<b>Total</b>	<b>2.5 Marks</b>		