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## ASSIGNMENT-4.3

Task 1: Zero-Shot Prompting – Leap Year Check

Scenario

Zero-shot prompting involves giving instructions without providing examples. Task Description

Use zero-shot prompting to instruct an AI tool to generate a Python function that:

- Accepts a year as input
- Checks whether the given year is a leap year
- Returns an appropriate result

#Generate a python function for zero shot an example of leap year check given  
year

Code:

```
def is_leap_year(year):  
    if (year % 400 == 0) or (year % 4 == 0 and year % 100 !=  
        0): return True  
    else:  
        return False
```

Output:

The screenshot shows the VS Code interface. The top bar has 'Go', 'Run', 'Terminal', 'Help' menus, and a search bar 'Q AI Coding'. Below the menu is a code editor window titled 'A4.py' with the following content:

```

1 #generate a python function for zero-shot an example of leap year check given year
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 print(is_leap_year(2020)) # True
20 print(is_leap_year(1900)) # False
21 print(is_leap_year(2000)) # True

```

Below the code editor is a terminal window with the following output:

```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
PS C:\Users\param\Downloads\AI Coding> & C:/Users/param/AppData/Local/Python/pythoncore-3.14-64/python.exe "c:/Users/p
aram/Downloads/AI Coding/A4.py"
True
False
True
PS C:\Users\param\Downloads\AI Coding> & C:/Users/param/AppData/Local/Python/pythoncore-3.14-64/python.exe "c:/Users/p
aram/Downloads/AI Coding/A4.py"
True
False
True

```

Explanation : 1) The function `is_leap_year(year)` takes a **year** as input.

2) `%` (modulus operator) checks divisibility.

3) If the year is:

- divisible by **400**, it is a leap year **OR**
  - divisible by **4** and **not divisible by 100**, it is a leap year
- 4) If the condition is satisfied, the function returns **True**.

5) Otherwise, it returns **False**.

## Task 2: One-Shot Prompting – Centimeters to Inches Conversion

### Scenario

One-shot prompting guides AI using a single example.

### Task Description

Use one-shot prompting by providing one input-output example to generate a Python function that:

- Converts centimeters to inches • Uses the correct mathematical formula Example provided in prompt:

Input: 10 cm → Output: 3.94 inches

PROMPT USED :

#Generate a Python function that converts centimeters to inches.

Code :

```
def cm_to_inches(cm):
    # 1 inch = 2.54 centimeters
    inches = cm / 2.54
    return round(inches, 2)
```

Output :

The screenshot shows a code editor interface with a dark theme. At the top, there's a navigation bar with 'Go', 'Run', 'Terminal', 'Help', and other icons. Below it is a search bar with 'AI Coding'. The main area contains a code editor with the following content:

```
C: > Users > param > OneDrive > Pictures > #Generate a Python function that converts centimeters to inches.
1  #Generate a Python function that converts centimeters to inches.
2  def cm_to_inches(cm):
3      inches = cm / 2.54
4      return inches
5  # Example usage:
6  centimeters = 10
7  inches = cm_to_inches(centimeters)
8  print(f"{centimeters} cm is equal to {inches} inches.")
```

Below the code editor is a terminal window with the following output:

```
PS C:\Users\param\Downloads\AI Coding> & C:/Users/param/AppData/Local/Python/pythoncore-3.14-64/python.exe "c:/Users/param/OneDrive/Pictures/#Generate a Python function that convert.py"
10 cm is equal to 3.937007874015748 inches.
PS C:\Users\param\Downloads\AI Coding>
```

### Explanation:

- The function `cm_to_inches(cm)` takes a value in centimeters.
- The conversion formula used is:
- $\text{inches} = \text{centimeters} / 2.54$
- `round(inches, 2)` rounds the result to 2 decimal places.

### Task 3: Few-Shot Prompting – Name Formatting

Scenario

Few-shot prompting improves accuracy by providing multiple examples.

### Task Description

Use few-shot prompting with 2–3 examples to generate a Python function that:

- Accepts a full name as input
- Formats it as “Last, First” Example formats:
- "John Smith" → "Smith, John"
- "Anita Rao" → "Rao, Anita"

Prompt used : Generate a Python function that accepts a full name as input and formats it in the form “Last, First”.

Code :

```
#def format_name(full_name):    # Split the full name into parts    parts =  
full_name.strip().split()  
  
# First name is the first part, last name is the last part  
first_name = parts[0]    last_name = parts[-1]  
  
# Format as "Last, First"    return  
f'{last_name}, {first_name}'
```

output:

The screenshot shows a code editor interface with a terminal tab below it. The code in the editor is:

```

#Generate a Python function that convert.py
1 #Generate a Python function that accepts a full name as input and formats it in the form "Last, First".
2 def format_name(full_name):
3     # Split the full name into parts
4     name_parts = full_name.split()
5
6     # Check if there are at least two parts (first and last name)
7     if len(name_parts) < 2:
8         return "Invalid input. Please provide a full name with at least a first and last name."
9
10    # Extract the first and last names
11    first_name = name_parts[0]
12    last_name = name_parts[-1]
13
14    # Format the name as "Last, First"
15    formatted_name = f"{last_name}, {first_name}"
16
17    return formatted_name
18
19 # Example usage:
20 print(format_name("John smith")) # Output: "Doe, John"
21 print(format_name("anitha rao"))
22 print(format_name("brown michael"))
23

```

The terminal tab shows the output of running the script:

```

Pictures/#Generate a Python function that convert.py
10 cm is equal to 3.937007874015748 inches.
PS C:\Users\param\Downloads\AI Coding> & C:/Users/param/AppData/Local/Python/pythoncore-3.14-64/python.exe "c:/Users/param/OneDrive/
Pictures/#Generate a Python function that convert.py"
Doe, John
PS C:\Users\param\Downloads\AI Coding> & C:/Users/param/AppData/Local/Python/pythoncore-3.14-64/python.exe "c:/Users/param/OneDrive/
Pictures/#Generate a Python function that convert.py"
smith, John
rao, anitha
michael, brown
PS C:\Users\param\Downloads\AI Coding>

```

Explanation :

### Name Formatting (“Last, First”)

1. The function `format_name(full_name)` takes a **full name string** as input.
2. `strip()` removes any extra spaces at the beginning or end of the name.
3. `split()` divides the name into individual words.
4. The **first word** is treated as the first name.
5. The **last word** is treated as the last name.
6. The function rearranges the name in the format **“Last, First”**.
7. The formatted name is returned as output.

### Task 4: Comparative Analysis – Zero-Shot vs Few-Shot

#### Scenario

Different prompt strategies may produce different code quality.

#### Task Description

- Use zero-shot prompting to generate a function that counts vowels in a string

- Use few-shot prompting for the same problem

- Compare both outputs based on:

- o Accuracy o

- Readability o

- Logical clarity

- Expected Output

- Two vowel-counting functions
- Comparison table or short reflection paragraph
- Conclusion on prompt effectiveness

**Prompt:**

Generate a Python function that accepts a string as input and counts the number of vowels in it.

Code :

```
def count_vowels_zero_shot(text):  
    vowels = "aeiouAEIOU"  
    count = 0  
    for ch in text:  
        if ch in vowels:  
            count += 1  
    return count
```

output :

```

Go Run Terminal Help ← → ⌂ Q AI Coding
❶ #Generate a Python function that convert.py ✎
C: > Users > param > OneDrive > Pictures > #Generate a Python function that convert.py > ...
1  #Generate a Python function that accepts a string as input and counts the number of vowels in it.
2  def count_vowels(input_string):
3      vowels = "aeiouAEIOU"
4      count = 0
5      for char in input_string:
6          if char in vowels:
7              count += 1
8      return count
9  # Example usage:
10 input_str = "Hello, World!"
11 vowel_count = count_vowels(input_str)
12 print(f"The number of vowels in '{input_str}' is: {vowel_count}")
13 input_str = "my name is paramesh"
14 vowel_count = count_vowels(input_str)
15 print(f"The number of vowels in '{input_str}' is: {vowel_count}")
16

```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

PS C:\Users\param\Downloads\AI Coding> & C:/Users/param/AppData/Local/Python/pythoncore-3.14-64/python.exe "c:/Users/param/OneDrive/Pictures/#Generate a Python function that convert.py"

The number of vowels in 'Hello, World!' is: 3  
The number of vowels in 'my name is paramesh' is: 6

PS C:\Users\param\Downloads\AI Coding>

RUN DEV DEPLOY STAGING DEPLOY PRODUCTION Ln 13, Col 34 Spaces: 4 UTF-8 CRLF

Explanation :

### Comparison Table: Zero-Shot vs Few-Shot

Criteria	Zero-Shot Version	Few-Shot Version
Accuracy	Correct	Correct
Readability	Easy to understand (loop-based)	Concise and clean
Logical Clarity	Explicit step-by-step logic	Compact logic using Python features
Code Length	Slightly longer	Shorter

### Task 5: Few-Shot Prompting – File Handling

Scenario

File processing requires clear logical understanding.

Task Description

Use few-shot prompting to generate a Python function that:

- Reads a .txt file
- Counts the number of lines in the file
- Returns the line count.

Code:

```
def count_lines_in_file(file_path):  
    # Open the file in read mode  
    with open(file_path, 'r') as file:  
        # Read all lines from the file  
        lines = file.readlines()  
  
    # Return the number of lines  
    return len(lines)  
  
line_count = count_lines_in_file("python.txt")  
print("The number of lines in the file is:", line_count)
```

```
line_count = count_lines_in_file("python.txt")  
print("The number of lines in the file is:", line_count)
```

Explanation :

- 1) The function `count_lines_in_file()` opens a text file in read mode.
- 2) `readlines()` reads all lines from the file.
- 3) `len()` counts the total number of lines.
- 4) The function returns the line count as output.

Input: Hello World

File handling in Python Counting

number of lines Output:

The number of lines in the file is: 3

