

SCHOOL OF COMPUTER SCIENCE AND ARTIFICIAL INTELLIGENCE		DEPARTMENT OF COMPUTER SCIENCE ENGINEERING	
Program Name: M.Tech. and MCA		Assignment Type: Lab	AcademicYear:2025-2026
Course Coordinator Name		Venkataramana Veeramsetty	
Course Code		Course Title	AI Assisted Problem Solving Using Python
Year/Sem	I/I	Regulation	R24
Date and Day of Assignment	Week3 - Monday	Time(s)	
Duration	2 Hours	Applicable to Batches	M.Tech. and MCA
AssignmentNumber:4.3(Present assignment number)/24(Total number of assignments)			
Q.No.	Question		Expected Time to complete
1	<p>Lab 4: Advanced Prompt Engineering – Zero-shot, One-shot, and Few-shot Techniques</p> <p>Lab Objectives:</p> <ul style="list-style-type: none"> To explore and apply different levels of prompt examples in AI-assisted code generation. To understand how zero-shot, one-shot, and few-shot prompting affect AI output quality. To evaluate the impact of context richness and example quantity on AI performance. To build awareness of prompt strategy effectiveness for different problem types. <p>Lab Outcomes (LOs): After completing this lab, students will be able to:</p> <ul style="list-style-type: none"> Use zero-shot prompting to instruct AI with minimal context. Use one-shot prompting with a single example to guide AI code generation. Apply few-shot prompting using multiple examples to improve AI 		Week3 - Monday

	<p>responses.</p> <ul style="list-style-type: none"> ● Compare AI outputs across the three prompting strategies. <p>Task Description#1</p> <ul style="list-style-type: none"> ● Zero-shot: Prompt AI to write a function that checks whether a given year is a leap year. <p>Expected Output#1</p> <ul style="list-style-type: none"> ● AI-generated function with no examples provided <p>Task Description#2</p> <ul style="list-style-type: none"> ● One-shot: Give one input-output example to guide AI in writing a function that converts centimeters to inches. <p>Expected Output#2</p> <ul style="list-style-type: none"> ● Function with correct conversion logic <p>Task Description#3</p> <ul style="list-style-type: none"> ● Few-shot: Provide 2–3 examples to generate a function that formats full names as “Last, First”. <p>Expected Output#3</p> <ul style="list-style-type: none"> ● Well-structured function respecting the examples <p>Task Description#4</p> <ul style="list-style-type: none"> ● Compare zero-shot and few-shot prompts for writing a function that counts the number of vowels in a string. <p>Expected Output#4</p> <ul style="list-style-type: none"> ● Functional output and comparative reflection <p>Task Description#5</p> <ul style="list-style-type: none"> ● Use few-shot prompting to generate a function that reads a .txt file and returns the number of lines. <p>Expected Output#5</p> <ul style="list-style-type: none"> ● Working file-processing function with AI-guided logic <p>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</p> <p>Evaluation Criteria:</p>	
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	Criteria	Max Marks		
	Zero Shot (Task #1)	2.5		
	One Shot (Task#2)	2.5		
	Few Shot (Task#3 & Task #5)	2.5		
	Comparison (Task#4)	2.5		
	Total	10 Marks		

Task Description#1

- Zero-shot: Prompt AI to write a function that checks whether a given year is a leap year.

PROMPT: Write a program that takes a year from the user and prints whether it is a leap year or not.

```
C: > Users > rimsha > OneDrive > Desktop > Mohammed Farnas Ali Mudabbir > LAB 4 > TASK 1 > TASK 1.py > ...
1  def is_leap(year: int) -> bool:
2      """ Return True if year is a leap year, otherwise False.
3      Leap year rule:
4      - divisible by 4 and not divisible by 100, OR
5      - divisible by 400 """
6      return (year % 4 == 0 and year % 100 != 0) or (year % 400 == 0)
7
8  def get_year_from_user(prompt: str = "Enter a year: ") -> int:
9      """Prompt the user until a valid integer year is entered and return it."""
10     while True:
11         s = input(prompt).strip()
12         try:
13             year = int(s)
14             return year
15         except ValueError:
16             print("Invalid input. Please enter a valid integer year.")
17
18
19  def main():
20     year = get_year_from_user()
21     if is_leap(year):
22         print(f"{year} is a leap year.")
23     else:
24         print(f"{year} is not a leap year.")
25
26
27  if __name__ == "__main__":
28     main()
```

Expected Output#1

- AI-generated function with no examples provided

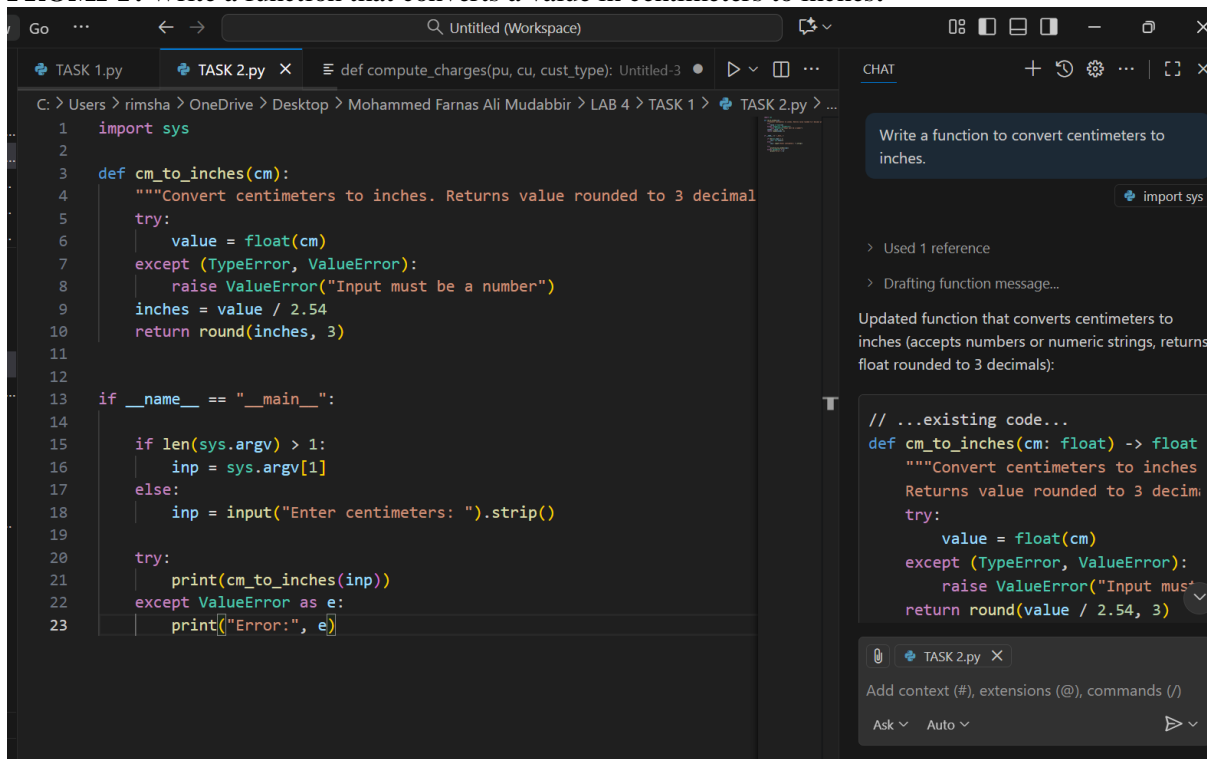
Practical output:

```
Enter a year: 2012
2012 is a leap year.
PS C:\Users\rimsha\OneDrive\Desktop\Mohammed Farnas Ali Mudabbir\LAB1> |
```

Task Description#2

- One-shot: Give one input-output example to guide AI in writing a function that converts centimeters to inches.

PROMPT: Write a function that converts a value in centimeters to inches.



The screenshot shows a code editor with a Python script on the left and a chat interface on the right. The script defines a function `cm_to_inches` that converts centimeters to inches, rounded to 3 decimal places. It includes error handling for `TypeError` and `ValueError`. The chat interface shows a prompt to write a function to convert centimeters to inches, and the response shows the function code.

```
1 import sys
2
3 def cm_to_inches(cm):
4     """Convert centimeters to inches. Returns value rounded to 3 decimal
5     try:
6         value = float(cm)
7     except (TypeError, ValueError):
8         raise ValueError("Input must be a number")
9     inches = value / 2.54
10    return round(inches, 3)
11
12
13 if __name__ == "__main__":
14
15     if len(sys.argv) > 1:
16         inp = sys.argv[1]
17     else:
18         inp = input("Enter centimeters: ").strip()
19
20     try:
21         print(cm_to_inches(inp))
22     except ValueError as e:
23         print("Error:", e)
```

CHAT

Write a function to convert centimeters to inches.

import sys

> Used 1 reference

> Drafting function message...

Updated function that converts centimeters to inches (accepts numbers or numeric strings, returns float rounded to 3 decimals):

```
// ...existing code...
def cm_to_inches(cm: float) -> float
    """Convert centimeters to inches
    Returns value rounded to 3 decimal
    try:
        value = float(cm)
    except (TypeError, ValueError):
        raise ValueError("Input must be a number")
    return round(value / 2.54, 3)
```

TASK 2.py X

Add context (#), extensions (@), commands (/)

Ask Auto

Expected Output#2

- Function with correct conversion logic

Practical output:

```
Enter centimeters: 20
```

```
7.874
```

```
PS C:\Users\rimsha\OneDrive\Desktop\Mohammed Farnas Ali Mudabbir\LAB1> █
```

Task Description#3

Few-shot: Provide 2–3 examples to generate a function that formats full names as “Last, First”.

PROMPT: Write a function that asks for a full name and prints it as ‘Last, First’.

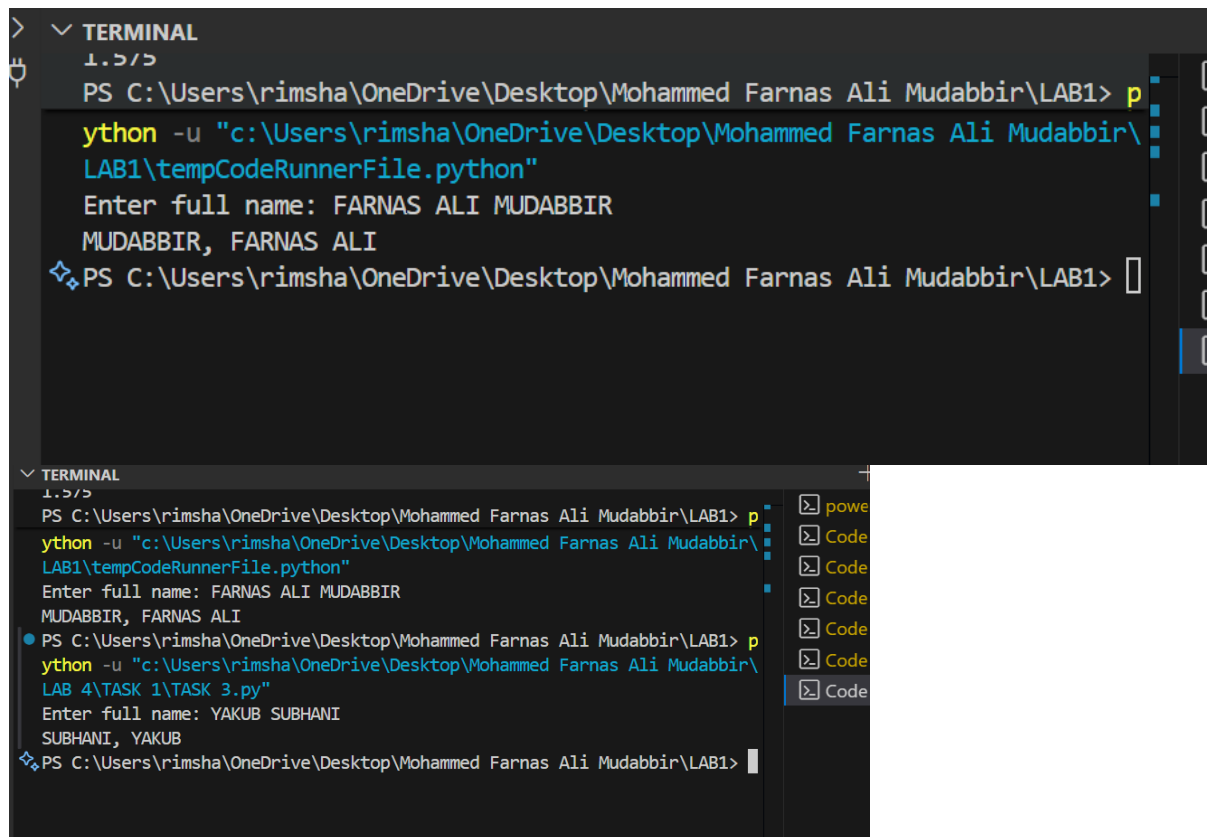
The screenshot shows a code editor with a file named 'TASK 3.py'. The code defines a function `get_formatted_name` that prompts the user for a full name and returns it formatted as 'Last, First'. The function handles the case where only one name is entered by returning it unchanged. The `__main__` block calls the function and prints the result. On the right, a 'CHAT' panel shows a prompt: 'Write a function that asks for a full name and prints it as 'Last, First''. Below the prompt, it shows the AI-generated code for the function, which matches the code in the editor. The chat panel also indicates 'Used 1 reference' and 'Added a function that prompts for a full name and prints it as "Last, First".'

```
1 def get_formatted_name(prompt="Enter full name: "):
2     """
3     Prompts the user for a full name and returns it formatted as "Last,
4     If only one name is entered, it is returned unchanged.
5     """
6     full = input(prompt).strip()
7     if not full:
8         return ""
9     parts = full.split()
10    if len(parts) == 1:
11        return parts[0]
12    last = parts[-1]
13    first = " ".join(parts[:-1])
14    return f"{last}, {first}"
15
16 if __name__ == "__main__":
17     result = get_formatted_name()
18     if result:
19         print(result)
```

Expected Output#3

- Well-structured function respecting the examples

Practical output:



```
> ▼ TERMINAL
1.5/5
PS C:\Users\rimsha\OneDrive\Desktop\Mohammed Farnas Ali Mudabbir\LAB1> p
ython -u "c:\Users\rimsha\OneDrive\Desktop\Mohammed Farnas Ali Mudabbir\
LAB1\tempCodeRunnerFile.python"
Enter full name: FARNAS ALI MUDABBIR
MUDABBIR, FARNAS ALI
❖ PS C:\Users\rimsha\OneDrive\Desktop\Mohammed Farnas Ali Mudabbir\LAB1>

▼ TERMINAL
1.5/5
PS C:\Users\rimsha\OneDrive\Desktop\Mohammed Farnas Ali Mudabbir\LAB1> p
ython -u "c:\Users\rimsha\OneDrive\Desktop\Mohammed Farnas Ali Mudabbir\
LAB1\tempCodeRunnerFile.python"
Enter full name: FARNAS ALI MUDABBIR
MUDABBIR, FARNAS ALI
● PS C:\Users\rimsha\OneDrive\Desktop\Mohammed Farnas Ali Mudabbir\LAB1> p
ython -u "c:\Users\rimsha\OneDrive\Desktop\Mohammed Farnas Ali Mudabbir\
LAB 4\TASK 1\TASK 3.py"
Enter full name: YAKUB SUBHANI
SUBHANI, YAKUB
❖ PS C:\Users\rimsha\OneDrive\Desktop\Mohammed Farnas Ali Mudabbir\LAB1>
```

Task Description#4

Compare zero-shot and few-shot prompts for writing a function that counts the number of vowels in a string.

ZERO-SHOT PROMPT: Write a function that takes a string as input and returns the number of vowels in it.

```
TASK 1.py × TASK 2.py TASK 3.py TASK 4.1.py × def compute_charg
C: > Users > rimsha > OneDrive > Desktop > Mohammed Farnas Ali Mudabbir > LAB 4 > TASK 1 > TASK 4.1.py >
1 def count_vowels(string):
2     # Define vowels
3     vowels = 'aeiouAEIOU'
4
5     # Initialize counter
6     count = 0
7
8     # Loop through each character in string
9     for char in string:
10        # If character is a vowel, increment counter
11        if char in vowels:
12            count += 1
13
14    return count
15
16 # Get input from user
17 user_string = input("Enter a string: ")
18 |
19 # Print the result
20 print(f"Number of vowels: {count_vowels(user_string)}")
```

FEW-SHOT PROMPT: Write a user input function that reads a string and prints how many vowels it has.

```
TASK 3.py TASK 4.1.py TASK 4.2.py X def compute_charges(pu, D, v, c, t, s, r, m, n, p, q, u, w, x, y, z, A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z, AA, AB, AC, AD, AE, AF, AG, AH, AI, AJ, AK, AL, AM, AN, AO, AP, AQ, AR, AS, AT, AU, AV, AW, AX, AY, AZ, BA, BB, BC, BD, BE, BF, BG, BH, BI, BJ, BK, BL, BM, BN, BO, BP, BQ, BR, BS, BT, BU, BV, BW, BX, BY, BZ, CA, CB, CC, CD, CE, CF, CG, CH, CI, CJ, CK, CL, CM, CN, CO, CP, CQ, CR, CS, CT, CU, CV, CW, CX, CY, CZ, DA, DB, DC, DD, DE, DF, DG, DH, DI, DJ, DK, DL, DM, DN, DO, DP, DQ, DR, DS, DT, DU, DV, DW, DX, DY, DZ, EA, EB, EC, ED, EE, EF, EG, EH, EI, EJ, EK, EL, EM, EN, EO, EP, EQ, ER, ES, ET, EU, EV, EW, EX, EY, EZ, FA, FB, FC, FD, FE, FF, FG, FH, FI, FJ, FK, FL, FM, FN, FO, FP, FQ, FR, FS, FT, FU, FV, FW, FX, FY, FZ, GA, GB, GC, GD, GE, GF, GG, GH, GI, GJ, GK, GL, GM, GN, GO, GP, GQ, GR, GS, GT, GU, GV, GW, GX, GY, GZ, HA, HB, HC, HD, HE, HF, HG, HH, HI, HJ, HK, HL, HM, HN, HO, HP, HQ, HR, HS, HT, HU, HV, HW, HX, HY, HZ, IA, IB, IC, ID, IE, IF, IG, IH, II, IJ, IK, IL, IM, IN, IO, IP, IQ, IR, IS, IT, IU, IV, IW, IX, IY, IZ, JA, JB, JC, JD, JE, JF, JG, JH, JI, JJ, JK, JL, JM, JN, JO, JP, JQ, JR, JS, JT, JU, JV, JW, JX, JY, JZ, KA, KB, KC, KD, KE, KF, KG, KH, KI, KJ, KK, KL, KM, KN, KO, KP, KQ, KR, KS, KT, KU, KV, KW, KX, KY, KZ, LA, LB, LC, LD, LE, LF, LG, LH, LI, LJ, LK, LL, LM, LN, LO, LP, LQ, LR, LS, LT, LU, LV, LW, LX, LY, LZ, MA, MB, MC, MD, ME, MF, MG, MH, MI, MJ, MK, ML, MM, MN, MO, MP, MQ, MR, MS, MT, MU, MV, MW, MX, MY, MZ, NA, NB, NC, ND, NE, NF, NG, NH, NI, NJ, NK, NL, NM, NN, NO, NP, NQ, NR, NS, NT, NU, NV, NW, NX, NY, NZ, OA, OB, OC, OD, OE, OF, OG, OH, OI, OJ, OK, OL, OM, ON, OO, OP, OQ, OR, OS, OT, OU, OV, OW, OX, OY, OZ, PA, PB, PC, PD, PE, PF, PG, PH, PI, PJ, PK, PL, PM, PN, PO, PP, PQ, PR, PS, PT, PU, PV, PW, PX, PY, PZ, QA, QB, QC, QD, QE, QF, QG, QH, QI, QJ, QK, QL, QM, QN, QO, QP, QQ, QR, QS, QT, QU, QV, QW, QX, QY, QZ, RA, RB, RC, RD, RE, RF, RG, RH, RI, RJ, RK, RL, RM, RN, RO, RP, RQ, RR, RS, RT, RU, RV, RW, RX, RY, RZ, SA, SB, SC, SD, SE, SF, SG, SH, SI, SJ, SK, SL, SM, SN, SO, SP, SQ, SR, SS, ST, SU, SV, SW, SX, SY, SZ, TA, TB, TC, TD, TE, TF, TG, TH, TI, TJ, TK, TL, TM, TN, TO, TP, TQ, TR, TS, TT, TU, TV, TW, TX, TY, TZ, UA, UB, UC, UD, UE, UF, UG, UH, UI, UJ, UK, UL, UM, UN, UO, UP, UQ, UR, US, UT, UY, UZ, VA, VB, VC, VD, VE, VF, VG, VH, VI, VJ, VK, VL, VM, VN, VO, VP, VQ, VR, VS, VT, VU, VV, VW, VX, VY, VZ, WA, WB, WC, WD, WE, WF, WG, WH, WI, WJ, WK, WL, WM, WN, WO, WP, WQ, WR, WS, WT, WU, WV, WW, WX, WY, WZ, XA, XB, XC, XD, XE, XF, XG, XH, XI, XJ, XK, XL, XM, XN, XO, XP, XQ, XR, XS, XT, XU, XV, XW, XX, XY, XZ, YA, YB, YC, YD, YE, YF, YG, YH, YI, YJ, YK, YL, YM, YN, YO, YP, YQ, YR, YS, YT, YU, YV, YW, YX, YY, YZ, ZA, ZB, ZC, ZD, ZE, ZF, ZG, ZH, ZI, ZJ, ZK, ZL, ZM, ZN, ZO, ZP, ZQ, ZR, ZS, ZT, ZU, ZV, ZW, ZX, ZY, ZZ, AA, AB, AC, AD, AE, AF, AG, AH, AI, AJ, AK, AL, AM, AN, AO, AP, AQ, AR, AS, AT, AU, AV, AW, AX, AY, AZ, BA, BB, BC, BD, BE, BF, BG, BH, BI, BJ, BK, BL, BM, BN, BO, BP, BQ, BR, BS, BT, BU, BV, BW, BX, BY, BZ, CA, CB, CC, CD, CE, CF, CG, CH, CI, CJ, CK, CL, CM, CN, CO, CP, CQ, CR, CS, CT, CU, CV, CW, CX, CY, CZ, DA, DB, DC, DD, DE, DF, DG, DH, DI, DJ, DK, DL, DM, DN, DO, DP, DQ, DR, DS, DT, DU, DV, DW, DX, DY, DZ, EA, EB, EC, ED, EE, EF, EG, EH, EI, EJ, EK, EL, EM, EN, EO, EP, EQ, ER, ES, ET, EU, EV, EW, EX, EY, EZ, FA, FB, FC, FD, FE, FF, FG, FH, FI, FJ, FK, FL, FM, FN, FO, FP, FQ, FR, FS, FT, FU, FV, FW, FX, FY, FZ, GA, GB, GC, GD, GE, GF, GG, GH, GI, GJ, GK, GL, GM, GN, GO, GP, GQ, GR, GS, GT, GU, GV, GW, GX, GY, GZ, HA, HB, HC, HD, HE, HF, HG, HH, HI, HJ, HK, HL, HM, HN, HO, HP, HQ, HR, HS, HT, HU, HV, HW, HX, HY, HZ, IA, IB, IC, ID, IE, IF, IG, IH, II, IJ, IK, IL, IM, IN, IO, IP, IQ, IR, IS, IT, IU, IV, IW, IX, IY, IZ, JA, JB, JC, JD, JE, JF, JG, JH, JI, JJ, JK, JL, JM, JN, JO, JP, JQ, JR, JS, JT, JU, JV, JW, JX, JY, JZ, KA, KB, KC, KD, KE, KF, KG, KH, KI, KJ, KK, KL, KM, KN, KO, KP, KQ, KR, KS, KT, KU, KV, KW, KX, KY, KZ, LA, LB, LC, LD, LE, LF, LG, LH, LI, LJ, LK, LL, LM, LN, LO, LP, LQ, LR, LS, LT, LU, LV, LW, LX, LY, LZ, MA, MB, MC, MD, ME, MF, MG, MH, MI, MJ, MK, ML, MM, MN, MO, MP, MQ, MR, MS, MT, MU, MV, MW, MX, MY, MZ, NA, NB, NC, ND, NE, NF, NG, NH, NI, NJ, NK, NL, NM, NN, NO, NP, NQ, NR, NS, NT, NU, NV, NW, NX, NY, NZ, OA, OB, OC, OD, OE, OF, OG, OH, OI, OJ, OK, OL, OM, ON, OO, OP, OQ, OR, OS, OT, OU, OV, OW, OX, OY, OZ, PA, PB, PC, PD, PE, PF, PG, PH, PI, PJ, PK, PL, PM, PN, PO, PP, PQ, PR, PS, PT, PU, PV, PW, PX, PY, PZ, QA, QB, QC, QD, QE, QF, QG, QH, QI, QJ, QK, QL, QM, QN, QO, QP, QQ, QR, QS, QT, QU, QV, QW, QX, QY, QZ, RA, RB, RC, RD, RE, RF, RG, RH, RI, RJ, RK, RL, RM, RN, RO, RP, RQ, RR, RS, RT, RU, RV, RW, RX, RY, RZ, SA, SB, SC, SD, SE, SF, SG, SH, SI, SJ, SK, SL, SM, SN, SO, SP, SQ, SR, SS, ST, SU, SV, SW, SX, SY, SZ, TA, TB, TC, TD, TE, TF, TG, TH, TI, TJ, TK, TL, TM, TN, TO, TP, TQ, TR, TS, TT, TU, TV, TW, TX, TY, TZ, UA, UB, UC, UD, UE, UF, UG, UH, UI, UJ, UK, UL, UM, UN, UO, UP, UQ, UR, US, UT, UY, UZ, VA, VB, VC, VD, VE, VF, VG, VH, VI, VJ, VK, VL, VM, VN, VO, VP, VQ, VR, VS, VT, VU, VV, VW, VX, VY, VZ, WA, WB, WC, WD, WE, WF, WG, WH, WI, WJ, WK, WL, WM, WN, WO, WP, WQ, WR, WS, WT, WU, WV, WW, WX, WY, WZ, XA, XB, XC, XD, XE, XF, XG, XH, XI, XJ, XK, XL, XM, XN, XO, XP, XQ, XR, XS, XT, XU, XV, XW, XX, XY, XZ, YA, YB, YC, YD, YE, YF, YG, YH, YI, YJ, YK, YL, YM, YN, YO, YP, YQ, YR, YS, YT, YU, YV, YW, YX, YY, YZ, ZA, ZB, ZC, ZD, ZE, ZF, ZG, ZH, ZI, ZJ, ZK, ZL, ZM, ZN, ZO, ZP, ZQ, ZR, ZS, ZT, ZU, ZV, ZW, ZX, ZY, ZZ
```

Difference Between Zero-Shot and Few-Shot Prompts

- Zero-Shot Prompt:
The model is given only the instruction (no examples).
Example: Write a function to count vowels.
- Few-Shot Prompt:
The model is given one or more examples along with the instruction.
Example: Showing sample input-output before asking to write the function.

Expected Output#4

- Functional output and comparative reflection

Practical output:

ZERO-SHOT:

```
● ython -u "c:\Users\rimsha\OneDrive\Desktop\Mohammed Farnas Ali Mudabbir\LAB1\tempCodeRunnerFile.python"  
Enter a string: FARNAS ALI MUDABBIR  
Number of vowels: 7  
❖❖ PS C:\Users\rimsha\OneDrive\Desktop\Mohammed Farnas Ali Mudabbir\LAB1>
```

FEW-SHOT:

```
'Hello, World!' -> 3  
'AEIOU aeiou' -> 10  
' ' -> 0  
'Python Programming' -> 4  
None -> 0  
❖❖ PS C:\Users\rimsha\OneDrive\Desktop\Mohammed Farnas Ali Mudabbir\LAB1>
```

Task Description#5

- Use few-shot prompting to generate a function that reads a .txt file and returns the number of lines.

```
TASK 1.py task 5.py x TASK 5.py # ...existing code... Untitled-6 # ...existing code... Untitled CHAT
C: > Users > rimsha > OneDrive > Desktop > Mohammed Farnas Ali Mudabbir > LAB 4 > TASK 1 > task 5.py > count_lines_in_file
1 # ...existing code...
2 def _count_lines_in_file(path: str) -> int:
3     """Return the number of lines in the given file path."""
4     with open(path, "r", encoding="utf-8") as f:
5         return sum(1 for _ in f)
6
7 def count_lines_in_file(path: str) -> int:
8     """
9     Return the number of lines in the given .txt file path.
10    Appends '.txt' if the extension is omitted and raises exceptions on error.
11    """
12    if not path:
13        raise ValueError("path must be a non-empty string")
14    path = path.strip().strip(['\\', '/'])
15    if not path.lower().endswith(".txt"):
16        path += ".txt"
17    return _count_lines_in_file(path)
18
19 def count_lines_from_user_input(prompt: str = "Enter path to a .txt file: ") -> int:
20     """
21     Prompt the user for a .txt filename (or path), open it and return the number of lines.
22     The function will append '.txt' if the user omits the extension and will retry on errors
23     """
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```
TASK 1.py X task 5.py X TASK 5.py # ...existing code... Untitled-6 # ...existing code... Untitled
C: > Users > rimsha > OneDrive > Desktop > Mohammed Farnas Ali Mudabbir > LAB 4 > TASK 1 > task 5.py > count_lines_in_file
19 def count_lines_from_user_input(prompt: str = "Enter path to a .txt file: ") -> int:
20     print(f"File not found: {user_input}")
21     except IsADirectoryError:
22         print(f"Path is a directory, not a file: {user_input}")
23     except Exception as e:
24         print(f"Error opening file: {e}")
25
26 if __name__ == "__main__":
27     try:
28         count = count_lines_from_user_input()
29         print(count)
30     except Exception:
31         print("Operation cancelled or failed.")
32 # ...existing code...
```

Expected output:

```
Enter path to a .txt file: "C:\Users\rimsha\OneDrive\Desktop\SAMPLE_txt.txt"
\ Desktop\Mohammed Farnas Ali Mudabbir\LAB1\tempCodeRunnerFile.python"
Enter path to a .txt file: "C:\Users\rimsha\OneDrive\Desktop\SAMPLE_txt.txt"
Enter path to a .txt file: "C:\Users\rimsha\OneDrive\Desktop\SAMPLE_txt.txt"
7
PS C:\Users\rimsha\OneDrive\Desktop\Mohammed Farnas Ali Mudabbir\LAB1>
```