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## ***ASSIGNMENT – 3.2***

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### **LAB 3: PROMPT ENGINEERING – IMPROVING PROMPTS AND CONTEXT MANAGEMENT**

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#### **Task Description-1**

- Progressive Prompting for Calculator Design: Ask the AI to design a simple calculator program by initially providing only the function name. Gradually enhance the prompt by adding comments and usage examples.

#### **Expected Output-1**

- Comparison showing improvement in AI-generated calculator logic and structure.
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#### **Task Description-2**

- Refining Prompts for Sorting Logic: Start with a vague prompt for sorting student marks, then refine it to clearly specify sorting order and constraints.

```

assignment.py > ...
1 # Task: Sort students by marks (Descending), then by Name (Ascending)
2 students = []
3     {"name": "Varshith", "marks": 92},
4     {"name": "sprusheeth", "marks": 85},
5     {"name": "akshith", "marks": 92},
6     {"name": "shushanth", "marks": 88}
7 ]
8
9 # The refined prompt ensures the AI uses a tuple key for multi-level sorting
10 sorted_list = sorted(students, key=lambda x: (-x['marks'], x['name']))
11
12 print("Sorted Student List:")
13 for student in sorted_list:
14     print(f" - {student['name']}: {student['marks']}")

```

## Expected Output-2

- AI-generated sorting function evolves from ambiguous logic to an accurate and efficient implementation.

```

top\ai\assignment.py
Sorted Student List:
- Varshith: 92
- akshith: 92
- shushanth: 88
- sprusheeth: 85
PS C:\Users\hp\OneDrive\Desktop\ai>

```

## Task Description-3

- Few-Shot Prompting for Prime Number Validation: Provide multiple input-output examples for a function that checks whether a number is prime. Observe how few-shot prompting improves correctness.

```

assignment.py > ...
1 def is_prime(n):
2     # Prompting with examples (Input: 1 -> Output: False)
3     # ensures these guards are included.
4     if n <= 1:
5         return False
6     if n <= 3:
7         return True
8     if n % 2 == 0 or n % 3 == 0:
9         return False
10
11     i = 5
12     while i * i <= n:
13         if n % i == 0 or n % (i + 2) == 0:
14             return False
15         i += 6
16     return True
17
18 # Testing cases
19 test_values = [-5, 1, 2, 11, 25]
20 for val in test_values:
21     print(f"Is {val} prime? {is_prime(val)}")

```

## Expected Output-3

- Improved prime-checking function with better edge-case handling.

```
PS C:\Users\hp\OneDrive\Desktop\ai> c;; cd 'c:\Users\hp\OneDrive\Desktop\ai'; & 'c:\Users\hp\AppData\Local\Microsoft\WindowsApps\python3.13.exe' 'c:\Users\hp\.vscode\extensions\ms-python.debugpy-2025.18.0-win32-x64\bundled\libs\debugpy\launcher' '52292' '--' 'C:\Users\hp\OneDrive\Desktop\ai\assignment.py'
Is -5 prime? False
Is 1 prime? False
Is 2 prime? True
Is 11 prime? True
Is 25 prime? False
PS C:\Users\hp\OneDrive\Desktop\ai>
```

## Task Description-4

- Prompt-Guided UI Design for Student Grading System: Create a user interface for a student grading system that calculates total marks, percentage, and grade based on user input.

```
1 def student_grading_ui():
2     print("\n" + "="*40)
3     print("      STUDENT GRADING SYSTEM UI")
4     print("="*40)
5
6     try:
7         name = input("Enter Student Name: ")
8         scores = []
9         subjects = ["Python", "Java", "DevOps", "SE", "AI"]
10
11        for sub in subjects:
12            score = float(input(f"Enter marks for {sub} (0-100): "))
13            scores.append(score)
14
15        total = sum(scores)
16        avg = total / len(subjects)
17
18        # Grading Logic
19        if avg >= 90: grade = "A+"
20        elif avg >= 80: grade = "A"
21        elif avg >= 70: grade = "B"
22        else: grade = "C/Pass"
23
24        print("\n--- PERFORMANCE REPORT ---")
25        print(f"Student Name : {name}")
26        print(f"Total Marks : {total}/500")
27        print(f"Percentage : {avg}%")
28        print(f"Final Grade : {grade}")
29        print("="*40)
30
31    except ValueError:
32        print("Error: Please enter numeric values for marks.")
33
34    if __name__ == "__main__":
35        student_grading_ui()
```

## Expected Output-4

- Well-structured UI code with accurate calculations and clear output display.

```

PS C:\Users\hp\OneDrive\Desktop\ai> c::; cd 'c:\Users\hp\OneDrive\Desktop\ai'; & 'c:\Users\hp\AppData\Local\Microsoft\WindowsApps\python3.13.exe' 'c:\Users\hp\.vscode\extensions\ms-python.debugpy-2025.18.0-win32-x64\bundle\libs\debugpy\launcher' '56742' '--' 'c:\Users\hp\OneDrive\Desktop\ai\assignment.py'

--- PERFORMANCE REPORT ---
Student Name : sai varshith

--- PERFORMANCE REPORT ---
Student Name : sai varshith
--- PERFORMANCE REPORT ---
Student Name : sai varshith
Total Marks : 424.0/500
Percentage : 84.8%
Final Grade : A
Total Marks : 424.0/500
Percentage : 84.8%
Final Grade : A
Final Grade : A
=====
PS C:\Users\hp\OneDrive\Desktop\ai>

```

## Task Description-5

- Analyzing Prompt Specificity in Unit Conversion Functions: Improving a Unit

Conversion Function (Kilometers to Miles and Miles to Kilometers) Using Clear

Instructions.

```

assignment.py > ...
1 def unit_converter(value, mode):
2     """
3     Mode 1: KM to Miles
4     Mode 2: Miles to KM
5     """
6     KM_TO_MILE_FACTOR = 0.621371
7
8     if mode == 1:
9         result = value * KM_TO_MILE_FACTOR
10        return f"{value} KM = {result:.4f} Miles"
11    elif mode == 2:
12        result = value / KM_TO_MILE_FACTOR
13        return f"{value} Miles = {result:.4f} KM"
14    else:
15        return "Invalid Mode Selected"
16
17 print(unit_converter(10, 1)) # Precise Conversion

```

Expected Output-5

- Analysis of code quality and accuracy differences across multiple prompt variations.

```
PS C:\Users\hp\OneDrive\Desktop\ai> c::; cd 'c:\Users\hp\OneDrive\Desktop\ai'; & 'c:\Users\hp\AppData\Local\Microsoft\WindowsApps\python3.13.e
e' 'c:\Users\hp\.vscode\extensions\ms-python.debugpy-2025.18.0-win32-x64\bundle\libs\debugpy\launcher' '63375' '--' 'C:\Users\hp\OneDrive\Des
top\ai\assignment.py'
10 KM = 6.2137 Miles
PS C:\Users\hp\OneDrive\Desktop\ai> 
```

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