

Assignment-3.2

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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.

Prompt used-1:

write a python function named calculator that takes three parameters: two numbers and an operator (as a string: '+', '-', '*', '/').

Code-1:

```

# write a python function named calculator that takes three parameters: two numbers
def calculator(num1, num2, operator):
    try:
        if operator == '+':
            return num1 + num2
        elif operator == '-':
            return num1 - num2
        elif operator == '*':
            return num1 * num2
        elif operator == '/':
            if num2 != 0:
                return num1 / num2
            else:
                return "Error: Division by zero is not allowed."
        else:
            return "Error: Invalid operator. Please use '+', '-', '*', or '/'."
    except TypeError:
        return "Error: Invalid input types. Please enter numbers for calculation."
# Example usage:
user_input1 = float(input("Enter the first number: "))
user_input2 = float(input("Enter the second number: "))
user_operator = input("Enter the operator (+, -, *, /): ")
result = calculator(user_input1, user_input2, user_operator)
print(f"The result is: {result}")
print(result)

```

Output-1:

```

PS D:\AI assist> python -u "d:\AI assist\code3.2.py"
● Enter the first number: 10
Enter the second number: 5
Enter the operator (+, -, *, /): +
The result is: 15.0
15.0

```

Prompt used-2:

write a python function named calculator that takes three parameters: two numbers and an operator (as a string: '+', '-', '*', '/').

requirements:

Take 2 numbers and operator as input

Handle division by zero

Handle invalid operator inputs

example input: 10, 5, "+" output:15

Code-2:

```
"\" /usr/bin/python3\n# Take 2 numbers and operator as input\n#Handle division by zero\n# Handle invalid operator inputs\n# example input: 10, 5, "+" output:15\ndef calculator(num1, num2, operator):\n    try:\n        number1 = float(num1)\n        number2 = float(num2)\n\n        if operator == '+':\n            return number1 + number2\n        elif operator == '-':\n            return number1 - number2\n        elif operator == '*':\n            return number1 * number2\n        elif operator == '/':\n            if number2 == 0:\n                return "Error: Division by zero is not allowed."\n            return number1 / number2\n        else:\n            return "Error: Invalid operator. Please use '+', '-', '*', or '/'.\"\n    except ValueError:\n        return \"Error: Invalid input. Please enter numeric values for numbers.\"\nuser_num1 = input(\"Enter the first number: \")\nuser_num2 = input(\"Enter the second number: \")\nuser_operator = input(\"Enter the operator (+, -, *, /): \")\nresult = calculator(user_num1, user_num2, user_operator)\nprint(\"Result:\", result)
```

Output-2:

- PS D:\AI assist> `python -u "d:\AI assist\code3.2.py"`
Enter the first number: 20
Enter the second number: 16
Enter the operator (+, -, *, /): -
Result: 4.0
- ◆ PS D:\AI assist> █

Comparison of 2 codes:

Aspect	Initial Calculator Version	Improved Calculator Version
Input Handling	Assumes numeric inputs are already valid	Converts inputs to float and validates them
Error Handling	Handles division by zero and invalid operator	Handles invalid numbers, division by zero, and invalid operators
Code Structure	Basic conditional logic inside function	Cleaner structure with explicit input validation
Readability	Understandable but less descriptive	Improved readability with comments and clear variable names
Robustness	May fail for non-numeric inputs	More robust and user-friendly
User Feedback	Limited error messages	Clear and informative error messages
Suitability	Suitable for simple calculations	Suitable for real-world and user-facing programs

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.

Code-1:

```

# Write a Python program to sort student marks.
def sort_student_marks(marks):
    try:
        marks_list = [float(mark) for mark in marks]
        marks_list.sort()
        return marks_list
    except ValueError:
        return "Error: All marks should be numeric values."
user_marks = input("Enter student marks separated by spaces: ").split()
sorted_marks = sort_student_marks(user_marks)
print("Sorted student marks:", sorted_marks)

```

Output-1:

```

PS D:\AI assist> python -u "d:\AI assist\code3.2.py"
Enter student marks separated by spaces: 78 85 92 60
Sorted student marks: [60.0, 78.0, 85.0, 92.0]
PS D:\AI assist> python -u "d:\AI assist\code3.2.py"
Enter student marks separated by spaces: 90
Sorted student marks: [90.0]
PS D:\AI assist> python -u "d:\AI assist\code3.2.py"
Enter student marks separated by spaces:
Sorted student marks: []
PS D:\AI assist>

```

Code-2:

```

# Write a Python function that takes a list of student marks as input and sorts them in ascending order.
#Constraints:
# Marks are integers between 0 and 100.
# Handle duplicate marks correctly.
# Use an efficient sorting approach.
# Display the sorted list clearly.
# Example input: [88, 92, 75, 88, 95] → Output: [75, 88, 88, 92, 95]
def sort_student_marks(marks):
    try:
        marks_list = [float(mark) for mark in marks]
        marks_list.sort()
        return marks_list
    except ValueError:
        return "Error: All marks should be numeric values."
user_marks = input("Enter student marks separated by spaces: ").split()
sorted_marks = sort_student_marks(user_marks)
print("Sorted student marks:", sorted_marks)

```

Output-2:

```
PS D:\AI assist> python -u "d:\AI assist\code3.2.py"
● Enter student marks separated by spaces: 65 72 68
Sorted student marks: [65.0, 68.0, 72.0]
Enter student marks separated by spaces: 90
Sorted student marks: [90.0]
◆ PS D:\AI assist> python -u "d:\AI assist\code3.2.py"
Enter student marks separated by spaces:
Sorted student marks: []
Enter student marks separated by spaces: █
```

Justification:

Refining the prompt by specifying sorting order and input constraints improved the accuracy and structure of the AI-generated sorting logic.

The refined prompt guided the AI to handle numeric conversion, duplicates, and empty inputs more reliably.

This shows that clearer prompts lead to more efficient and predictable AI-generated programs.

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.

Prompt used:

Write a python function that checks whether a given number is prime or prime.

example input: 2 output: prime number

input:7 output: prime number

input:1 output: not a prime number

Code:

```

# Write a python function that checks whether a given number is prime or prime.
# example input: 2 output: prime number
# input:7 output: prime number
# input:1 output: not a prime number
def is_prime(number):
    try:
        num = int(number)
        if num <= 1:
            return "Not a prime number"
        for i in range(2, int(num**0.5) + 1):
            if num % i == 0:
                return "Not a prime number"
        return "Prime number"
    except ValueError:
        return "Error: Invalid input. Please enter an integer."
user_number = input("Enter a number: ")
result = is_prime(user_number)
print("Result:", result)

```

Output:

```

PS D:\AI assist> python -u "d:\AI assist\code3.2.py"
● Enter a number: 2
Result: Prime number
PS D:\AI assist> python -u "d:\AI assist\code3.2.py"
● Enter a number: 1
Result: Not a prime number
PS D:\AI assist> python -u "d:\AI assist\code3.2.py"
● Enter a number: 0
Result: Not a prime number
PS D:\AI assist> python -u "d:\AI assist\code3.2.py"
● Enter a number: 11
Result: Prime number

```

Justification:

Few-shot prompting improves the prime-checking logic by showing the AI clear examples of both prime and non-prime numbers.

These examples guide the AI to correctly handle edge cases such as 0, 1, and negative numbers, which are often missed in zero-shot prompting.

As a result, the generated function is more accurate, efficient, and reliable in validating prime numbers.

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.

Prompt Used:

Design a simple and user-friendly student grading system UI

Requirements:

1. Create input fields to enter marks for multiple subjects.
2. Calculate total marks and percentage based on the entered values.
3. Assign grades based on percentage (e.g., A, B, C, Fail).
4. Display total marks, percentage, and grade clearly on the screen.
5. Use a clean and well-structured layout.
6. Validate inputs to ensure only numeric values are accepted.
7. Use HTML and CSS for the user interface and JavaScript for calculations. create all files in one file

Code:

```
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>Student Grading System</title>
    <style>
        body {
            font-family: Arial, sans-serif;
            margin: 20px;
            padding: 20px;
            background-color: #f4f4f4;
        }
        .container {
            max-width: 500px;
            margin: auto;
            background: white;
            padding: 20px;
            border-radius: 5px;
            box-shadow: 0 0 10px rgba(0,0,0,0.1);
        }
        input[type="number"] {
            width: 100%;
            padding: 10px;
            margin: 10px 0;
            box-sizing: border-box;
        }
        button {
            padding: 10px 15px;
            background-color: #28a745;
            color: white;
            border: none;
            border-radius: 5px;
            cursor: pointer;
        }
        button:hover {
            background-color: #218838;
        }
        .result {
            margin-top: 20px;
        }
    </style>
</head>
<body>
```

```

<body>
    <div class="container">
        <h2>Student Grading System</h2>
        <label for="marks">Enter Marks for 5 Subjects:</label>
        <input type="number" id="subject1" placeholder="Subject 1" min="0" max="100">
        <input type="number" id="subject2" placeholder="Subject 2" min="0" max="100">
        <input type="number" id="subject3" placeholder="Subject 3" min="0" max="100">
        <input type="number" id="subject4" placeholder="Subject 4" min="0" max="100">
        <input type="number" id="subject5" placeholder="Subject 5" min="0" max="100">
        <button onclick="calculateGrade()">Calculate Grade</button>
        <div class="result" id="result"></div>
    </div>

    <script>
        function calculateGrade() {
            let marks = [];
            for (let i = 1; i <= 5; i++) {
                let mark = parseFloat(document.getElementById('subject' + i).value);
                if (isNaN(mark) || mark < 0 || mark > 100) {
                    alert('Please enter valid marks between 0 and 100 for all subjects.');
                    return;
                }
                marks.push(mark);
            }

            let totalMarks = marks.reduce((a, b) => a + b, 0);
            let percentage = (totalMarks / 500) * 100;
            let grade;

            if (percentage >= 90) {
                grade = 'A';
            } else if (percentage >= 80) {
                grade = 'B';
            } else if (percentage >= 70) {
                grade = 'C';
            } else if (percentage >= 60) {
                grade = 'D';
            } else {
                grade = 'Fail';
            }

            document.getElementById('result').innerHTML =
```

```

```

```
            document.getElementById('result').innerHTML =
                <p>Total Marks: ${totalMarks} / 500</p>
                <p>Percentage: ${percentage.toFixed(2)}%</p>
                <p>Grade: ${grade}</p>
```;

```

```

 </script>
</body>
</html>

```

**Output:**

## Student Grading System

Enter Marks for 5 Subjects:

**Calculate Grade**

Total Marks: 420 / 500

Percentage: 84.00%

Grade: B

# Student Grading System

Enter Marks for 5 Subjects:

**Calculate Grade**

Total Marks: 125 / 500

Percentage: 25.00%

Grade: Fail

## Justification:

The prompt-guided UI design ensures accurate calculation of total marks, percentage, and grade based on user input.

Clear input validation improves reliability by handling invalid and missing values effectively.

A structured UI layout enhances readability and provides clear output for students and evaluators.

## 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.

### Prompt used-1:

Write a Python function to convert kilometers to miles and miles to kilometers.

Take input from the user and display the result.

### Code-1:

```
Write a Python function to convert kilometers to miles and miles to kilometers.
Take input from the user and display the result.
def convert_distance(value, unit):
 try:
 distance = float(value)
 if unit.lower() == 'km':
 miles = distance * 0.621371
 return f"{distance} kilometers is equal to {miles:.2f} miles."
 elif unit.lower() == 'miles':
 kilometers = distance / 0.621371
 return f"{distance} miles is equal to {kilometers:.2f} kilometers."
 else:
 return "Error: Invalid unit. Please use 'km' for kilometers or 'miles' for miles."
 except ValueError:
 return "Error: Invalid input. Please enter a numeric value for distance."
user_value = input("Enter the distance value: ")
user_unit = input("Enter the unit (km/miles): ")
result = convert_distance(user_value, user_unit)
print("Result:", result)
```

### Output-1:

```
PS D:\AI assist> python -u "d:\AI assist\code3.2.py"
● Enter the distance value: 1
Enter the unit (km/miles): miles
Result: 1.0 miles is equal to 1.61 kilometers.
PS D:\AI assist> python -u "d:\AI assist\code3.2.py"
● Enter the distance value: 1
Enter the unit (km/miles): km
Result: 1.0 kilometers is equal to 0.62 miles.
● PS D:\AI assist> python -u "d:\AI assist\code3.2.py"
Enter the distance value: -5
Enter the unit (km/miles): miles
Result: -5.0 miles is equal to -8.05 kilometers.
```

### Prompt used-2:

Write a Python program using functions to convert:

- Kilometers to miles
- Miles to kilometers

Requirements:

- Take numeric input from the user.
- Allow the user to choose the conversion type.
- Use correct conversion formulas.
- Validate input and handle invalid values.
- Display clear and formatted output.

### Code-2:

```

Write a Python program using functions to convert:
Kilometers to miles
Miles to kilometers
Requirements:
Take numeric input from the user.
Allow the user to choose the conversion type.
Use correct conversion formulas.
Validate input and handle invalid values.
Display clear and formatted output.
def convert_distance(value, unit):
 try:
 distance = float(value)
 if unit.lower() == 'km':
 miles = distance * 0.621371
 return f"{distance} kilometers is equal to {miles:.2f} miles."
 elif unit.lower() == 'miles':
 kilometers = distance / 0.621371
 return f"{distance} miles is equal to {kilometers:.2f} kilometers."
 else:
 return "Error: Invalid unit. Please use 'km' for kilometers or 'miles' for miles."
 except ValueError:
 return "Error: Invalid input. Please enter a numeric value for distance."
user_value = input("Enter the distance value: ")
user_unit = input("Enter the unit (km/miles): ")
result = convert_distance(user_value, user_unit)
print("Result:", result)

```

## Output-2:

```

PS D:\AI assist> python -u "d:\AI assist\code3.2.py"
● Enter the distance value: 1
Enter the unit (km/miles): miles
Result: 1.0 miles is equal to 1.61 kilometers.
Enter the distance value: 1
Enter the unit (km/miles): km
Result: 1.0 kilometers is equal to 0.62 miles.
PS D:\AI assist> python -u "d:\AI assist\code3.2.py"
● Enter the distance value: 0
Enter the unit (km/miles): miles
Result: 0.0 miles is equal to 0.00 kilometers.
Enter the distance value: python -u "d:\AI assist\code3.2.py"
Enter the unit (km/miles): -5
Result: Error: Invalid input. Please enter a numeric value for distance.
❖ PS D:\AI assist> python -u "d:\AI assist\code3.2.py"
Enter the distance value: abc
Enter the unit (km/miles): km
Result: Error: Invalid input. Please enter a numeric value for distance.
Enter the distance value: ■

```

## Justification:

In the first prompt, the unit conversion logic produces correct results but lacks strict validation, allowing negative distance values.

With a more detailed prompt, the program improves by adding clearer output formatting and better handling of invalid inputs.

Overall, increased prompt specificity leads to more accurate, robust, and user-friendly unit conversion code.