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Batch : 03

### 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 :

Give me a simple calculator program keep the function name as calculator\_program

```
def calculator_program():
```

```
    """
```

```
    A simple calculator program that performs basic arithmetic operations.
```

```
    """
```

```
    print("Simple Calculator")
```

```
    while True:
```

```
        try:
```

```
            num1 = float(input("Enter first number: "))
```

```
            operator = input("Enter operator (+, -, *, /) or 'q' to quit: ")
```

```
            if operator.lower() == 'q':
```

```
                print("Exiting calculator. Goodbye!")
```

```
                break
```

```
            num2 = float(input("Enter second number: "))
```

```
            if operator == '+':
```

```
                result = num1 + num2
```

```
            elif operator == '-':
```

```
                result = num1 - num2
```

```
            elif operator == '*':
```

```
                result = num1 * num2
```

```
            elif operator == '/':
```

```
                if num2 == 0:
```

```
                    print("Error: Division by zero is not allowed.")
```

```
                    continue
```

```
                result = num1 / num2
```

```
            else:
```

```
                print("Error: Invalid operator. Please use +, -, *, or /.")
```

```
                continue
```

```
            print(f"Result: {num1} {operator} {num2} = {result}")
```

```
        except ValueError:
```

```
            print("Error: Invalid input. Please enter numbers for calculations.")
```

```
    except Exception as e:
```

```
print(f"An unexpected error occurred: {e}")
```

```
# To run the calculator, uncomment the line below:  
calculator_program()
```

### **Output :**

```
Simple Calculator  
Enter first number: 20  
Enter operator (+, -, *, /) or 'q' to quit: +  
Enter second number: 14  
Result: 20.0 + 14.0 = 34.0  
Enter first number: 29  
Enter operator (+, -, *, /) or 'q' to quit: +  
Enter second number: 14  
Result: 29.0 + 14.0 = 43.0
```

### **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

### **Prompt:**

Give me program for sorting list of student marks

Code :

```
# Example list of student marks  
student_marks = [85, 92, 78, 65, 95, 88, 70, 90]  
  
print(f"Original list of marks: {student_marks}")  
  
# Sort the list of marks in ascending order  
sorted_marks_ascending = sorted(student_marks)  
print(f"Sorted marks (ascending): {sorted_marks_ascending}")  
  
# To sort in descending order, you can use the 'reverse=True' argument  
sorted_marks_descending = sorted(student_marks, reverse=True)  
print(f"Sorted marks (descending): {sorted_marks_descending}")  
  
# If you want to sort the list in-place, you can use the .sort() method:  
# student_marks.sort() # This will modify student_marks directly
```

Output:

Original list of marks: [85, 92, 78, 65, 95, 88, 70, 90]

Sorted marks (ascending): [65, 70, 78, 85, 88, 90, 92, 95]

Sorted marks (descending): [95, 92, 90, 88, 85, 78, 70, 65]

**Prompt :** Make it efficient to sort larger inputs and make it more accurate

```
# Example list of student marks
```

```
student_marks = [85, 92, 78, 65, 95, 88, 70, 90]
```

```
print(f"Original list of marks: {student_marks}")
```

```
# Sort the list of marks in ascending order using sorted()
```

```
# This creates a *new* sorted list, leaving the original unchanged.
```

```
sorted_marks_ascending = sorted(student_marks)
```

```
print(f"Sorted marks (ascending, using sorted()): {sorted_marks_ascending}")
```

```
# To sort in descending order using sorted(), use the 'reverse=True' argument
```

```
sorted_marks_descending = sorted(student_marks, reverse=True)
```

```
print(f"Sorted marks (descending, using sorted()): {sorted_marks_descending}")
```

```
# To sort the list in-place, use the .sort() method:
```

```
# This modifies the original list and returns None.
```

```
print(f"\nOriginal list before in-place sort: {student_marks}")
```

```
student_marks.sort() # Sorts in ascending order by default
```

```
print(f"In-place sorted marks (ascending, using .sort()): {student_marks}")
```

```
# You can also sort in-place in descending order:
```

```
student_marks.sort(reverse=True)
```

```
print(f"In-place sorted marks (descending, using .sort(reverse=True)): {student_marks}")
```

**Output :**

Original list before in-place sort: [85, 92, 78, 65, 95, 88, 70, 90]

In-place sorted marks (ascending, using .sort()): [65, 70, 78, 85, 88, 90, 92, 95]

In-place sorted marks (descending, using .sort(reverse=True)): [95, 92, 90, 88, 85, 78, 70, 65]

### **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:**

Give me a function to check given number is prime or not

```
def is_prime(number):
```

```
    """
```

```
    Checks if a given number is prime.
```

```
    A prime number is a natural number greater than 1 that has no positive
    divisors other than 1 and itself.
```

```
    """
```

```
    if number <= 1:
```

```
        return False # Numbers less than or equal to 1 are not prime
```

```
    if number == 2:
```

```
        return True # 2 is the only even prime number
```

```
    if number % 2 == 0:
```

```
        return False # Other even numbers are not prime
```

```
    # Check for divisibility from 3 up to the square root of the number
```

```
    # We only need to check odd divisors
```

```
    i = 3
```

```
    while i * i <= number:
```

```
        if number % i == 0:
```

```
            return False
```

```
        i += 2
```

```
    return True
```

```
# Example usage:
```

```
print(f'Is 7 prime? {is_prime(7)}') # Expected: True
```

```
print(f'Is 10 prime? {is_prime(10)}') # Expected: False
```

```
print(f'Is 11 prime? {is_prime(11)}') # Expected: True
```

```
print(f'Is 1 prime? {is_prime(1)}') # Expected: False
```

```
print(f'Is 2 prime? {is_prime(2)}') # Expected: True
```

```
print(f'Is 0 prime? {is_prime(0)}') # Expected: False
```

```
print(f'Is 97 prime? {is_prime(97)}') # Expected: True
```

Output :

Is 7 prime? True

Is 10 prime? False

Is 11 prime? True

Is 1 prime? False  
Is 2 prime? True  
Is 0 prime? False  
Is 97 prime? True

#### **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.

```
def student_grade_calculator():  
    print("\n--- Student Grade Calculator ---")  
  
    # Get student name  
    student_name = input("Enter student's name: ")  
  
    # Get marks for 5 subjects  
    marks = []  
    subject_names = ["Subject 1", "Subject 2", "Subject 3", "Subject 4", "Subject 5"]  
    for i in range(5):  
        while True:  
            try:  
                mark = float(input(f"Enter marks for {subject_names[i]} (out of 100): "))  
                if 0 <= mark <= 100:  
                    marks.append(mark)  
                    break  
            else:  
                print("Marks must be between 0 and 100.")  
        except ValueError:  
            print("Invalid input. Please enter a number.")  
  
    # Calculate total marks  
    total_marks = sum(marks)  
  
    # Calculate percentage  
    # Assuming each subject is out of 100, total possible marks = 5 * 100 = 500  
    percentage = (total_marks / 500) * 100  
  
    # Determine grade  
    if percentage >= 90:  
        grade = 'A'  
    elif percentage >= 80:  
        grade = 'B'  
    elif percentage >= 70:  
        grade = 'C'
```

```

elif percentage >= 60:
    grade = 'D'
else:
    grade = 'F'

# Display results
print("\n--- Student Report ---")
print(f"Student Name: {student_name}")
print(f"Marks Obtained: {marks}")
print(f"Total Marks: {total_marks}")
print(f"Percentage: {percentage:.2f}%")
print(f"Grade: {grade}")
print("-----")

# Run the student grade calculator
student_grade_calculator()

```

### 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.

```

def km_to_miles(kilometers):
    """
    Converts kilometers to miles.

    Args:
        kilometers (float or int): The distance in kilometers.

    Returns:
        float: The equivalent distance in miles.
    """
    miles = kilometers * 0.621371
    return miles

def miles_to_km(miles):
    """
    Converts miles to kilometers.

    Args:
        miles (float or int): The distance in miles.

```

Returns:

float: The equivalent distance in kilometers.

"""

kilometers = miles \* 1.60934

return kilometers

# Test cases

print(f"10 kilometers is equal to {km\_to\_miles(10):.2f} miles.")

print(f"5 miles is equal to {miles\_to\_km(5):.2f} kilometers.")

print(f"1 kilometer is equal to {km\_to\_miles(1):.2f} miles.")

print(f"1 mile is equal to {miles\_to\_km(1):.2f} kilometers.")