

AI ASSISTED CODING

ASSIGNMENT 2.1

Task Description #1

- Use Google Gemini in Colab to write a Python function that reads a list of numbers and calculates the mean, minimum, and maximum values

```
[1] def calculate_stats(numbers):  
    """  
    Calculates the mean, minimum, and maximum values of a list of numbers.  
  
    Args:  
        numbers: A list of numbers.  
  
    Returns:  
        A tuple containing the mean, minimum, and maximum values.  
        Returns (None, None, None) if the input list is empty.  
    """  
    if not numbers:  
        return None, None, None  
  
    mean = sum(numbers) / len(numbers)  
    minimum = min(numbers)  
    maximum = max(numbers)  
  
    return mean, minimum, maximum
```

```
[1] # Example usage:  
my_list = [10, 20, 30, 40, 50]  
mean_val, min_val, max_val = calculate_stats(my_list)  
  
if mean_val is not None:  
    print(f"List: {my_list}")  
    print(f"Mean: {mean_val}")  
    print(f"Minimum: {min_val}")  
    print(f"Maximum: {max_val}")  
else:  
    print("The list is empty.")  
  
empty_list = []  
mean_val, min_val, max_val = calculate_stats(empty_list)  
  
if mean_val is not None:  
    print(f"List: {empty_list}")  
    print(f"Mean: {mean_val}")  
    print(f"Minimum: {min_val}")  
    print(f"Maximum: {max_val}")  
else:  
    print(f"List: {empty_list}")  
    print("The list is empty.")
```

```
⇒ List: [10, 20, 30, 40, 50]  
Mean: 30.0  
Minimum: 10  
Maximum: 50  
List: []  
The list is empty.
```

Task Description #2

- Compare Gemini and Copilot outputs for a Python function that checks whether a number is an Armstrong number. Document the steps, prompts, and outputs.

```
[30] def is_armstrong_number(number):  
    """  
    Checks if a number is an Armstrong number.  
  
    An Armstrong number (or narcissistic number) is a number that is the sum  
    of its own digits each raised to the power of the number of digits.  
  
    Args:  
        number: The number to check.  
  
    Returns:  
        True if the number is an Armstrong number, False otherwise.  
    """  
    # Convert the number to a string to easily get the number of digits and individual digits  
    num_str = str(number)  
    num_digits = len(num_str)  
    sum_of_powers = 0  
  
    for digit in num_str:  
        sum_of_powers += int(digit) ** num_digits  
  
    return sum_of_powers == number  
  
    # Example usage:  
    num_to_check = 153 # Example of an Armstrong number  
    if is_armstrong_number(num_to_check):  
        print(f"{num_to_check} is an Armstrong number.")  
    else:  
        print(f"{num_to_check} is not an Armstrong number.")
```

```
[30] num_to_check_2 = 123 # Example of a non-Armstrong number  
if is_armstrong_number(num_to_check_2):  
    print(f"{num_to_check_2} is an Armstrong number.")  
else:  
    print(f"{num_to_check_2} is not an Armstrong number.")
```

153 is an Armstrong number.
123 is not an Armstrong number.

Task Description #3

- Ask Gemini to explain a Python function (e.g., is_prime(n) or is_palindrome(s)) line by line.
- Choose either a prime-checking or palindrome-checking function and document the explanation provided by Gemini

```
import math

def is_prime(n):
    """
    Checks if a number is a prime number.

    Args:
        n: An integer.

    Returns:
        True if the number is prime, False otherwise.
    """
    if n < 2:
        return False
    for i in range(2, int(math.sqrt(n)) + 1):
        if n % i == 0:
            return False
    return True

# Example usage
print(f"Is 2 prime? {is_prime(2)}")
print(f"Is 10 prime? {is_prime(10)}")
print(f"Is 17 prime? {is_prime(17)}")
```

```
✓ [10] print(f"Is 10 prime? {is_prime(10)}")
Os      print(f"Is 17 prime? {is_prime(17)}")
        print(f"Is 1 prime? {is_prime(1)}")
        print(f"Is 0 prime? {is_prime(0)}")
```

```
⇒ Is 2 prime? True
   Is 10 prime? False
   Is 17 prime? True
   Is 1 prime? False
   Is 0 prime? False
```

EXPLANATION:

Data Analysis Key Findings

- A Python function `is_prime(n)` was successfully created to check if a number is prime. The function correctly handles edge cases like numbers less than 2 and utilizes an optimized approach by checking for divisors only up to the square root of `n`.
- A prompt was constructed to request a line-by-line explanation of the `is_prime` function from Gemini.
- A simulated line-by-line explanation of the `is_prime` function, as if provided by Gemini, was documented.

Insights or Next Steps

- The documented explanation can be directly used as documentation for the `is_prime` function, improving code readability and understanding.

Task Description #4

- Install and configure Cursor AI. Use it to generate a Python function (e.g., sum of the first N natural numbers) and test its output.

```
def sum_of_natural_numbers(n):  
    """  
    Calculates the sum of the first N natural numbers.  
  
    Args:  
        n: An integer representing the number of natural numbers.  
  
    Returns:  
        The sum of the first N natural numbers. Returns 0 for n < 1.  
    """  
    if n < 1:  
        return 0  
    else:  
        return n * (n + 1) // 2  
  
# Test cases  
print(f"Sum of first 5 natural numbers: {sum_of_natural_numbers(5)}")  
print(f"Sum of first 10 natural numbers: {sum_of_natural_numbers(10)}")  
print(f"Sum of first 0 natural numbers: {sum_of_natural_numbers(0)}")  
print(f"Sum of first 1 natural number: {sum_of_natural_numbers(1)}")
```

```
⇒ Sum of first 5 natural numbers: 15  
   Sum of first 10 natural numbers: 55  
   Sum of first 0 natural numbers: 0  
   Sum of first 1 natural number: 1
```

Task Description #5

- Students need to write a Python program to calculate the sum of odd numbers and even numbers in a given tuple.
- Refactor the code to improve logic and readability

```
class Student:
    """
    Represents a student.
    """
    def __init__(self, name):
        """
        Initializes a new Student object.

        Args:
            name: The name of the student.
        """
        self.name = name

    def __str__(self):
        """
        Returns a string representation of the Student object.
        """
        return self.name

def manage_students():
    """
    A simple program to manage a list of students.
    """
    students = []

    while True:
        print("\nStudent Management Menu:")
        print("1. Add Student")
        print("2. View Students")
        print("3. Exit")
```

```
➡ Student Management Menu:
1. Add Student
2. View Students
3. Exit
Enter your choice: 2

Student List:
- nandini

Student Management Menu:
1. Add Student
2. View Students
3. Exit
Enter your choice: 3
Exiting Student Management.
```