AI ASSISTANT CODING ASSIGNMENT-3.2

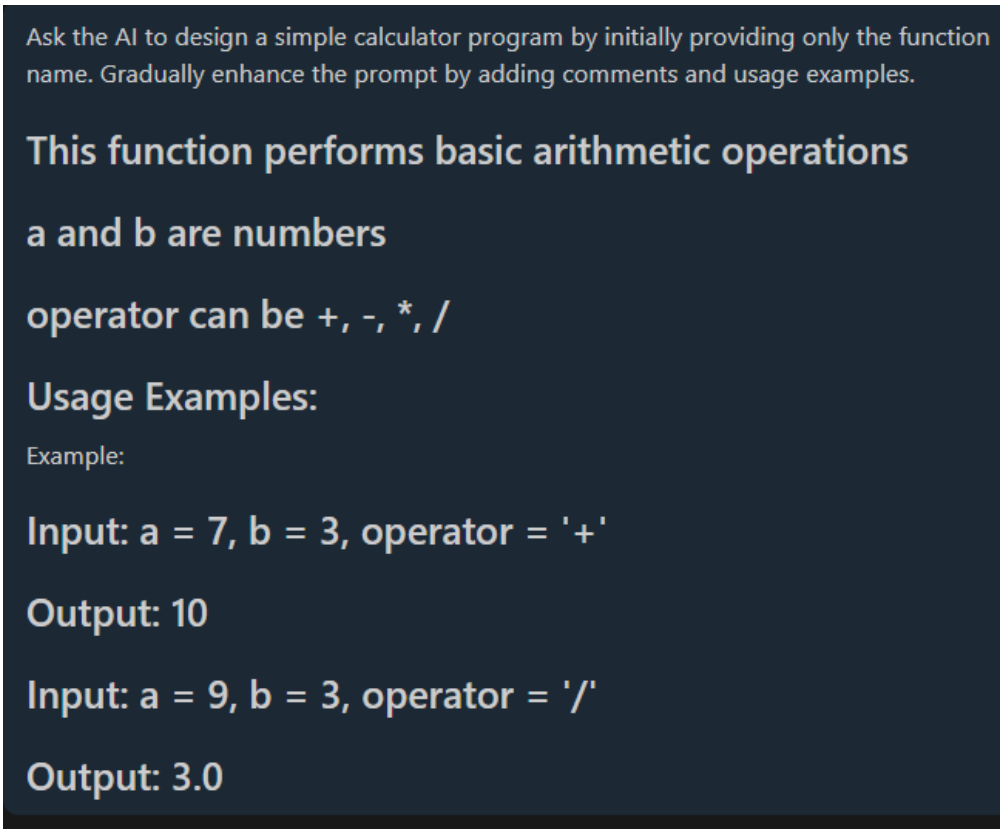
Task Description-1

- 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.

PROMPT:



CODE:

calculater.py

```python

def calculator(a, b, operator):
    if operator == '+':
        return a + b
    if operator == '-':
        return a - b
    if operator == '*':
        return a * b
    if operator == '/':
        if b == 0:
            raise ZeroDivisionError('division by zero')
        return a / b
    raise ValueError(f"Invalid operator: {operator}")

if __name__ == "__main__":
    try:
        a = float(input("Enter a: "))
        b = float(input("Enter b: "))
        operator = input("Enter operator (+, -, *, /): ").strip()
        result = calculator(a, b, operator)
    except ValueError as e:
        print("Error:", e)
    except ZeroDivisionError as e:
        print("Error:", e)
    else:
        print("Result:", result)
```

OUTPUT:

```
PS C:\Users\mahee\OneDrive\Documents\Ai_coding> & C:/Users/
/mahee/OneDrive/Documents/Ai_coding/calculater.py
Enter a: 2
Enter b: 3
Enter operator (+, -, *, /): +
Result: 5.0
PS C:\Users\mahee\OneDrive\Documents\Ai_coding> & C:/Users/
/mahee/OneDrive/Documents/Ai_coding/calculater.py
Enter a: 2
Enter b: 3
Enter operator (+, -, *, /): -
Result: -1.0
PS C:\Users\mahee\OneDrive\Documents\Ai_coding> & C:/Users/
/mahee/OneDrive/Documents/Ai_coding/calculater.py
Enter a: 2
Enter b: 3
Enter operator (+, -, *, /): *
Result: 6.0
PS C:\Users\mahee\OneDrive\Documents\Ai_coding> & C:/Users/
/mahee/OneDrive/Documents/Ai_coding/calculater.py
Enter a: 2
Enter b: 3
Enter operator (+, -, *, /): /
Result: 0.6666666666666666
```

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.

Expected Output-2

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

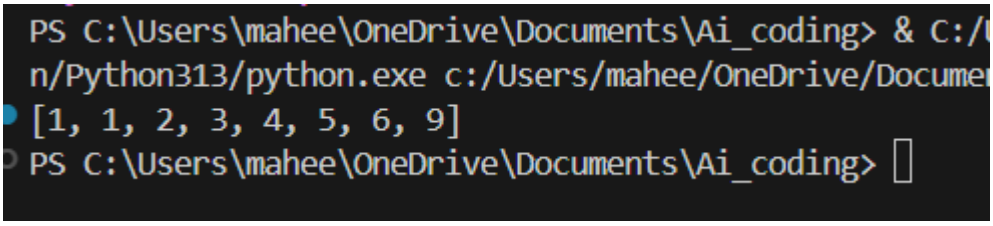
PROMPT:

Start with a vague prompt for sorting student marks, then refine it to clearly specify sorting order and constraints.and sorting function evolves from ambiguous logic to an accurate and efficient implementation

CODE:

```
"""Simple integer array sorter.

Provides `sort_array(arr)` which returns a new list with the integers
sorted in ascending order.
"""

from typing import List


def sort_array(arr: List[int]) -> List[int]:
    """Return a new list containing the elements of `arr` sorted ascending.

    Example:
        sort_array([3, 1, 2]) -> [1, 2, 3]
    """
    return sorted(arr)


if __name__ == '__main__':
    print(sort_array([3, 1, 4, 1, 5, 9, 2, 6]))
```

OUTPUT:



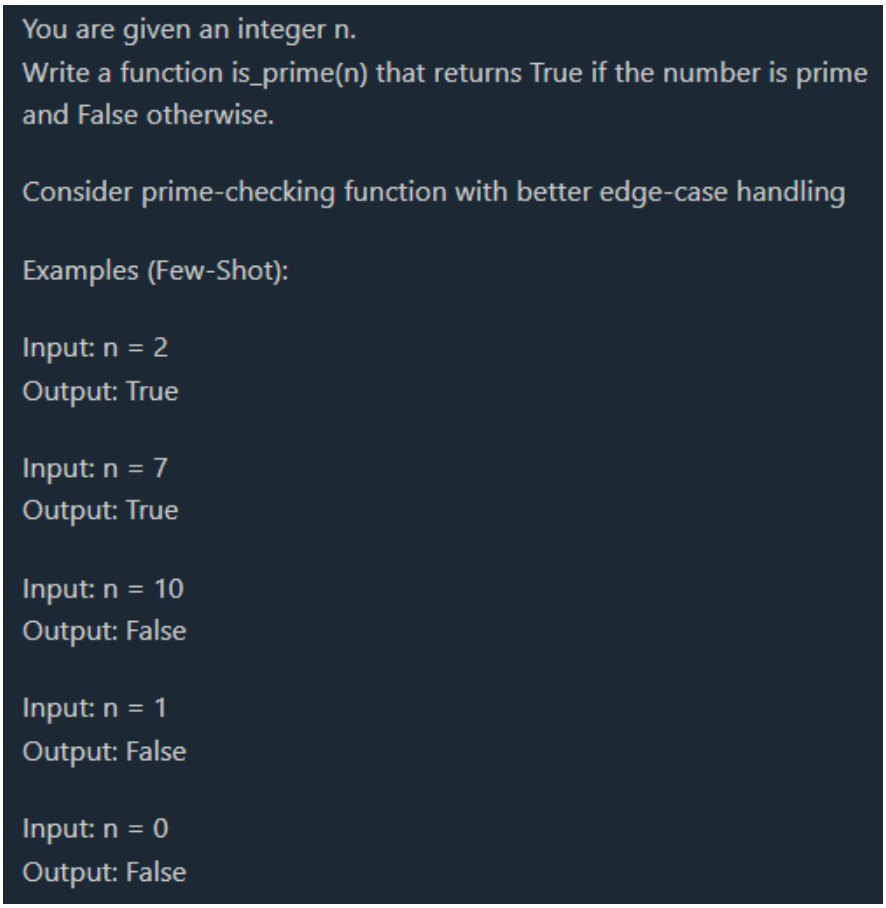
Task Description-3

- 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.

Expected Output-3

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

PROMPT:



CODE:

```python
def is_prime(n):
    # Reject booleans (bool is subclass of int in Python)
    if isinstance(n, bool):
        return False

    # Accept integer-valued floats, else require int
    if not isinstance(n, int):
        if isinstance(n, float) and n.is_integer():
            n = int(n)
        else:
            raise TypeError("n must be an integer (or integer-valued float)")

    if n < 2:
        return False
    if n in (2, 3):
        return True
    if n % 2 == 0 or n % 3 == 0:
        return False

    i = 5
    # check divisors of form 6k-1 and 6k+1
    while i * i <= n:
        if n % i == 0 or n % (i + 2) == 0:
            return False
        i += 6
    return True


if __name__ == '__main__':
    tests = [2, 7, 10, 1, 0, -3, 17, 25, 97]
    for t in tests:
        print(t, is_prime(t))
```

OUTPUT:

```
PS C:\Users\mahee\OneDrive\Documents\Ai_coding> & C
thon.exe c:/Users/mahee/OneDrive/Documents/Ai_codin
2 True
7 True
10 False
1 False
0 False
-3 False
17 True
25 False
97 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.

Expected Output-4

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

PROMPT:

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.and also UI code with accurate calculations and clear output display.

CODE:

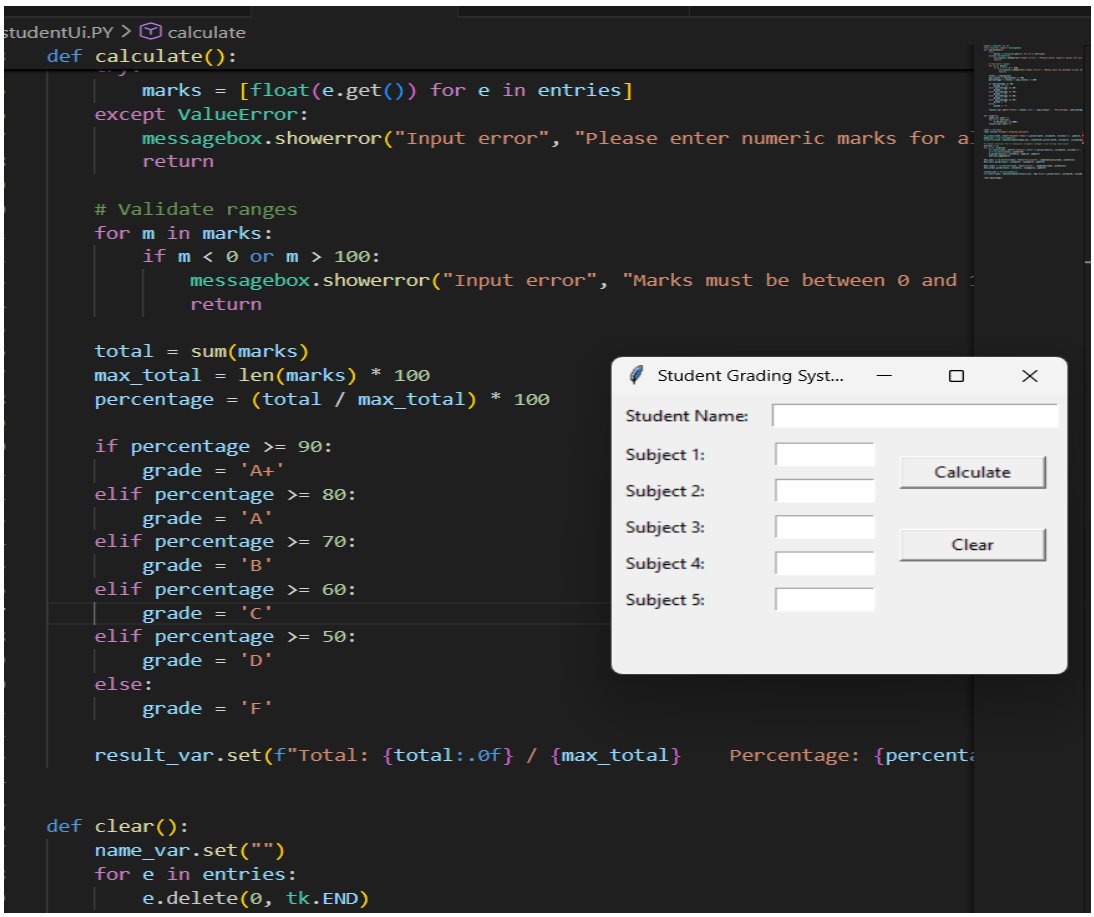
studentUi.PY

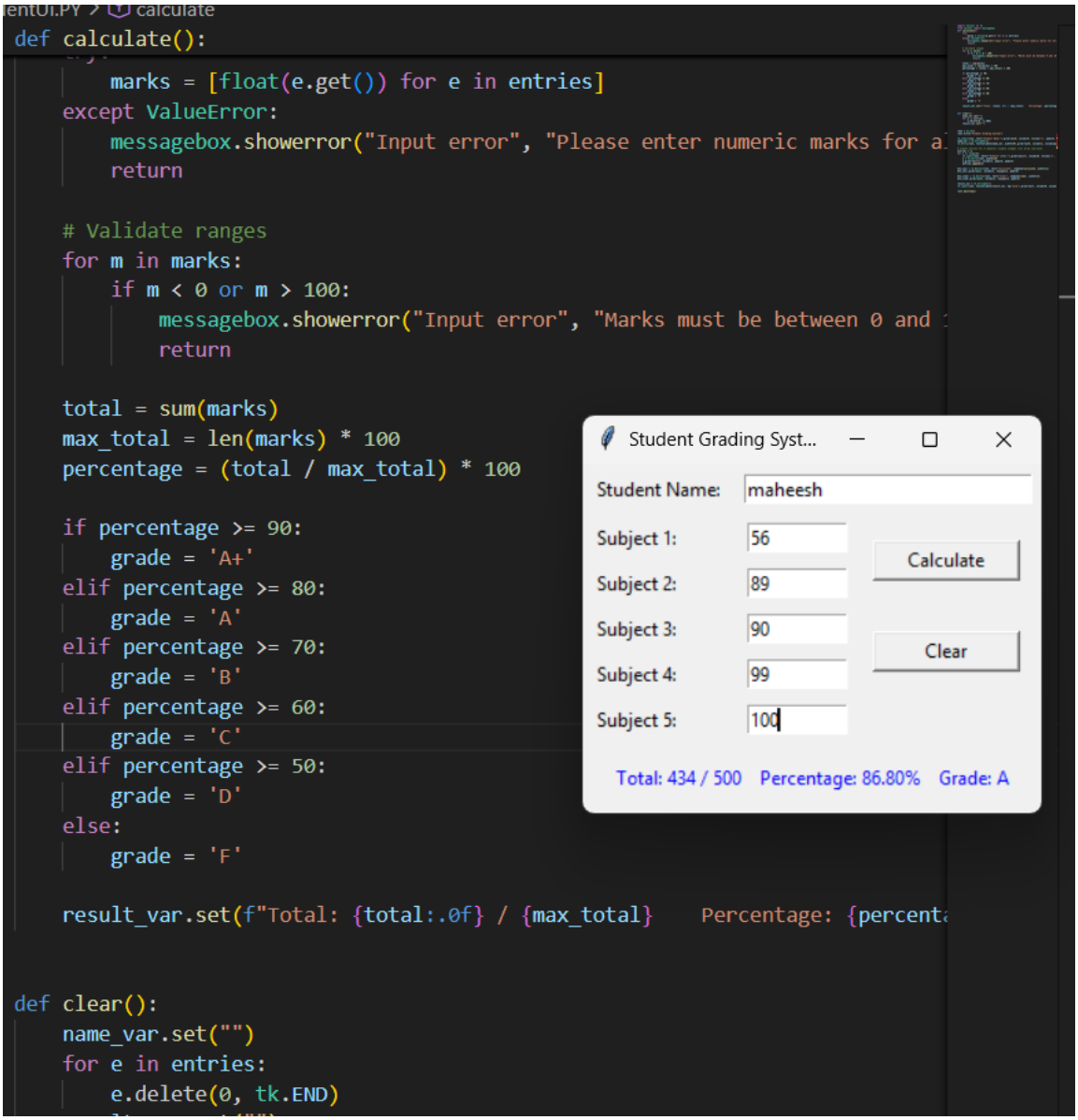
```python
import tkinter as tk
from tkinter import messagebox
def calculate():
    try:
        marks = [float(e.get()) for e in entries]
    except ValueError:
        messagebox.showerror("Input error", "Please enter numeric marks for all subjects.")
        return

    # Validate ranges
    for m in marks:
        if m < 0 or m > 100:
            messagebox.showerror("Input error", "Marks must be between 0 and 100.")
            return

    total = sum(marks)
    max_total = len(marks) * 100
    percentage = (total / max_total) * 100

    if percentage >= 90:
        grade = 'A+'
    elif percentage >= 80:
        grade = 'A'
    elif percentage >= 70:
        grade = 'B'
    elif percentage >= 60:
        grade = 'C'
    elif percentage >= 50:
        grade = 'D'
    else:
        grade = 'F'

    result_var.set(f"Total: {total:.0f} / {max_total}    Percentage: {percentage:.2f}%    Grade: {grade}")


def clear():
    name_var.set("")
```

Ln 2, Col 31 Spaces: 4 UTF-8 CRLF { } Python

```
    result_var.set(f"Total: {total:.0f} / {max_total}    Percentage: {percentage:.2f}%    Grade: {grade}")


def clear():
    name_var.set("")
    for e in entries:
        e.delete(0, tk.END)
    result_var.set("")


root = tk.Tk()
root.title("Student Grading System")

tk.Label(root, text="Student Name:").grid(row=0, column=0, sticky='w', padx=6, pady=6)
name_var = tk.StringVar()
tk.Entry(root, textvariable=name_var, width=30).grid(row=0, column=1, columnspan=3, padx=6, pady=6)

# Create entries for 5 subjects (simple integer list array use-case)
entries = []
for i in range(5):
    tk.Label(root, text=f"Subject {i+1}:").grid(row=i+1, column=0, sticky='w', padx=6, pady=4)
    e = tk.Entry(root, width=10)
    e.grid(row=i+1, column=1, padx=6, pady=4)
    entries.append(e)

btn_calc = tk.Button(root, text="Calculate", command=calculate, width=12)
btn_calc.grid(row=1, column=2, rowspan=2, padx=6)

btn_clear = tk.Button(root, text="Clear", command=clear, width=12)
btn_clear.grid(row=3, column=2, rowspan=2, padx=6)

result_var = tk.StringVar()
tk.Label(root, textvariable=result_var, fg='blue').grid(row=7, column=0, columnspan=4, padx=6, pady=12)

root.mainloop()
```

OUTPUT:





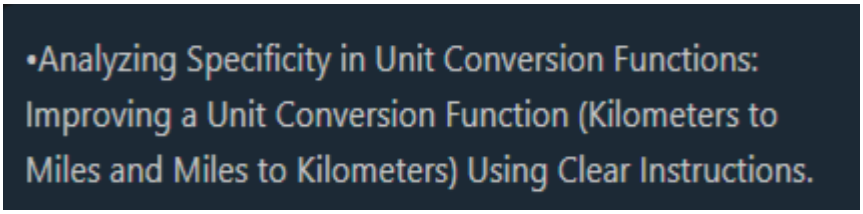
Task Description-5

- Analyzing Prompt Specificity in Unit Conversion Functions: Improving a Unit Conversion Function (Kilometers to Miles and Miles to Kilometers) Using Clear Instructions.

Expected Output-5

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

PROMPT:



CODE:

```
MILES_PER_KM = 1.0 / KM_PER_MILE
def _to_numeric(value, name="value"):
    if isinstance(value, bool):
        raise TypeError(f"{name} must be a numeric type, not bool")
    try:
        return float(value)
    except Exception:
        raise TypeError(f"{name} must be numeric (int/float or numeric-string)")


def km_to_miles(km, precision=None):
    val = _to_numeric(km, "km")
    miles = val * MILES_PER_KM
    return round(miles, precision) if precision is not None else miles


def miles_to_km(miles, precision=None):
    val = _to_numeric(miles, "miles")
    km = val * KM_PER_MILE
    return round(km, precision) if precision is not None else km


if __name__ == '__main__':
    # Simple demo and a few sanity checks.
    examples = [0, 1, 5, 42]
    print("Kilometres -> Miles")
    for k in examples:
        print(f"{k} km = {km_to_miles(k, precision=6)} miles")

    print('\nMiles -> Kilometres')
    for m in examples:
        print(f"{m} miles = {miles_to_km(m, precision=6)} km")
```

OUTPUT:

```
PS C:\Users\mahee\OneDrive\Documents\Ai_coding> & C:/Users/mahe
on/Python313/python.exe c:/Users/mahee/OneDrive/Documents/Ai_co
Kilometres -> Miles
0 km = 0.0 miles
1 km = 0.621371 miles
5 km = 3.106856 miles
42 km = 26.09759 miles

Miles -> Kilometres
0 miles = 0.0 km
1 miles = 1.609344 km
5 miles = 8.04672 km
42 miles = 67.592448 km
PS C:\Users\mahee\OneDrive\Documents\Ai_coding>
```