Python Lab Exercises

Problem Statement 2: Climate Change Data Analyzer Scientists track daily temperatures as a string of values separated by spaces (e.g., "30.5 32.1 29.8"). Write a python program that extracts the temperatures, converts them into float values, and finds the highest, lowest, and average temperature.

Rules & Constraints:

• Input is a string of space-separated float values (e.g., "30.5 31.2").

• All values must be valid floating-point numbers.

• The list must have at least two values.

• Temperatures must be within a realistic range: -100.0°C to 60.0°C.

• The program should round the average to two decimal places.

• If the input is invalid (non-numeric, empty, out-of-range), return an error message.

Input Format:

A single string with space-separated temperature readings (e.g., "25.4 27.8 26.5")

Output Format:

Highest:

Lowest:

Average:

Algorithm

1. Start
2. Read input string of space-separated temperature values
3. Split the string into a list
4. If list size is less than 2, display error and stop
5. Convert each value in the list to a float rounded to 2 decimal places
6. If any value is not a number, display error and stop
7. Check if all values are in the range -100.0°C to 60.0°C
8. If any value is out of range, display error and stop
9. Display all temperature values
10. Initialize total, min, and max to the first temperature
11. Loop through the list from index 1 to end:
    - Update min if current value is smaller
    - Update max if current value is greater
    - Add current value to total
12. Compute average as total divided by count
13. Display min, max, average using both manual and built-in methods
14. End

Pseudo Code

```
BEGIN
   PROMPT user to enter space-separated temperatures
   SPLIT input into temps_list

   IF length of temps_list < 2 THEN
      PRINT "Please give at least two values"
      EXIT
   END IF

   FOR each index i in temps_list DO
      TRY
         CONVERT temps_list[i] to float rounded to 2 decimal places
      CATCH ValueError
         PRINT "Invalid value at index i"
         EXIT
      END TRY
   END FOR

   FOR each temp in temps_list DO
      IF temp < -100.0 OR temp > 60.0 THEN
         PRINT "Value out of range"
         EXIT
      END IF
   END FOR

   PRINT all temperatures in order

   SET min_temp = max_temp = total = temps_list[0]

   FOR i from 1 to length(temps_list) - 1 DO
      IF temps_list[i] < min_temp THEN
         min_temp = temps_list[i]
```

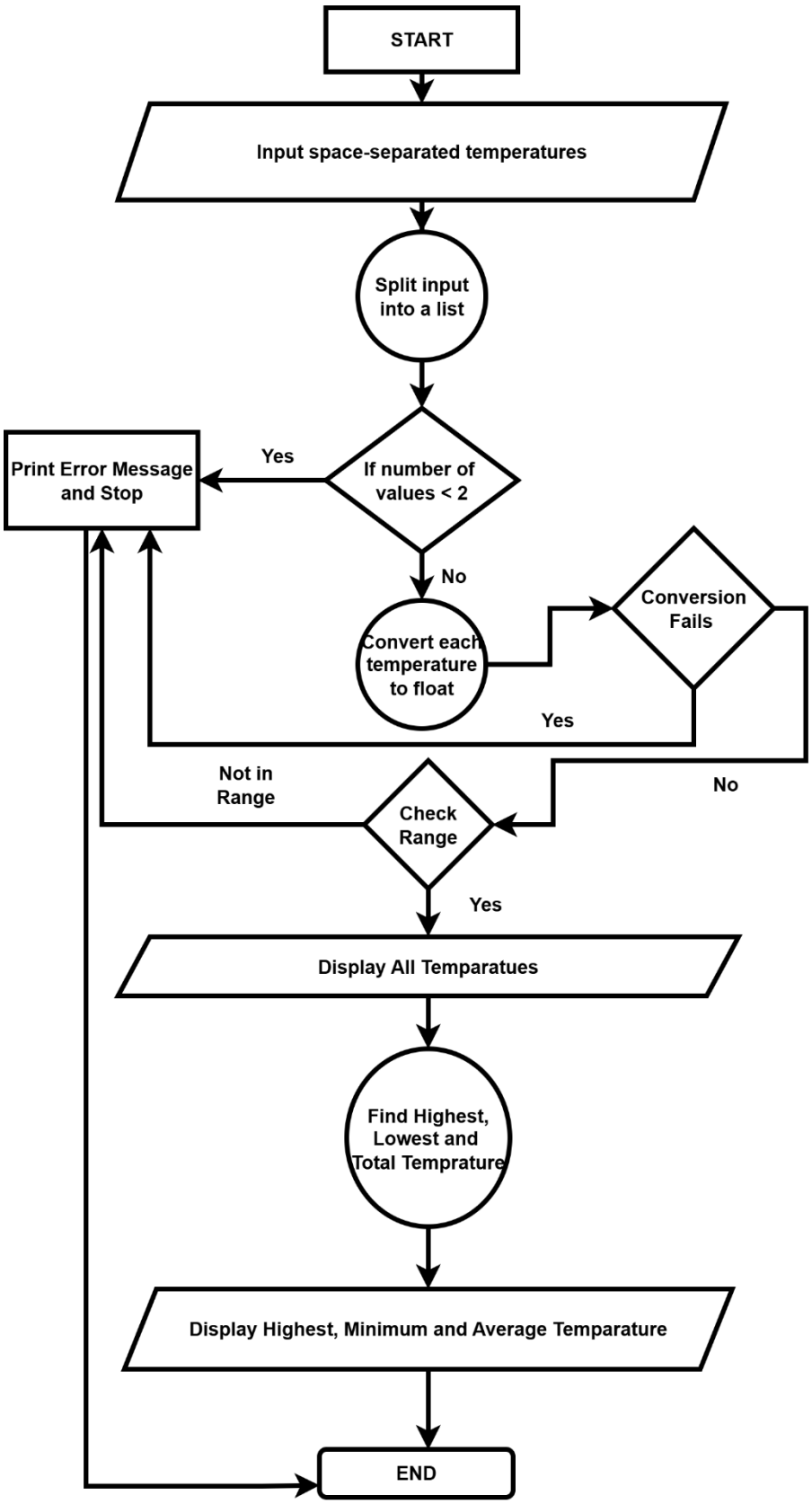
```
        END IF
        IF temps_list[i] > max_temp THEN
            max_temp = temps_list[i]
        END IF
        total = total + temps_list[i]
    END FOR

    avg = total / length of temps_list

    PRINT "Highest: ", max_temp
    PRINT "Lowest: ", min_temp
    PRINT "Average: ", avg (rounded to 2 decimal places)

    PRINT using built-in functions: max(), min(), sum()/len()
END
```

Flowchart


START
Input space-separated temperatures
Split input into a list
If number of values < 2
Yes
Print Error Message and Stop
No
Convert each temperature to float
Conversion Fails
Yes
No
Not in Range
Check Range
Yes
Display All Temparatues
Find Highest, Lowest and Total Temprature
Display Highest, Minimum and Average Temparature
END

Source Code

```
# Will convert all the temparature in a list
temps = input('Enter Temparature as Space Separated:').split(' ')
if len(temps)<2:
    print('Please give atleast two values...')
else:
    # To convert each temparature to floating-point vlaues with 2-decimal place
    for i in range(0, len(temps)):
        try:
            temps[i] = round(float(temps[i]),2)
        except ValueError:
            print(f"Invalid entry at index {i}: '{temps[i]}' is not a valid number.")
            print('Enter all neumeric values')
            exit(0)

    # Logic to check all tempratures all fall in a range or not
    for i in range(0, len(temps)):
        if temps[i] <-100.0 or temps[i] > 60.0:
            print('Please give all the values in range (-100, +60)')
            print(temps)
            exit(0)

    # Get display all tempratures
    for i in range(0,len(temps)):
        print(f"{temps[i]}", end=' ')
    print()

    #Find the highest and lowest temparature
    total_temp = min_temp = max_temp = temps[0]
    for i in range(1, len(temps)):
        if min_temp > temps[i]:
```

```
        min_temp = temps[i]
    if max_temp < temps[i]:
        max_temp = temps[i]
    total_temp += temps[i]
print(f"Highest: {max_temp}")
print(f"Lowest: {min_temp}")
print(f"Average: {total_temp/len(temps):.2f}")

#using Python in-built functions
print(f"Max = {max(temps)}, Min = {min(temps)}, Avg ={sum(temps)/len(temps):.2f}")
```