CSF101- Programming Methodology

Assignment 1 (15 Marks)

Instruction:

This assignment has two parts. You are required to submit your work in a GitHub repository with the following naming structure (folder name): StudentName_studentNumber_A1

Eg: DarshanSubedi_02190108_A1

Additionally, you are required to submit your work in a GitHub repository with the following naming structure (folder name): StudentName_studentNumber_A1

Eg: DarshanSubedi_02190108_A1

Your Python file submissions must be inside the above-mentioned repository. For each part, you must have **two separate Python files**, their names must be as follows:

StudentName_studentNumber_A1_PA.py (for Part A)
StudentName_studentNumber_A1_PB.py (for Part B)

Eg:
DarshanSubedi_02190108_A1_PA.py
DarshanSubedi_02190108_A1_PB.py

Please also submit a report in .doc format for assignment grading on VLE with your complete python code and include screenshots of the outputs for each part in the assignment.

Your report assignment will be subject to Turnitin plagiarism checker, and your GitHub code submissions will be checked for functionality.

Part A: *Python Functions Assignment (10 Marks)*

Create a command-line program in a single Python file that implements 5 mathematical and string-processing functions. The program should:

Program Flow

1. Display a menu showing the available functions (1-5)
2. Prompt the user to select a function by entering a number from 1-5
3. Based on the selection, prompt for and collect the required input
4. Execute the selected function and display the result
5. Allow the user to continue with another calculation or exit

Required Functions

1. Prime Number Sum Calculator
- Input: Two integers (start and end range)
- Output: Sum of all prime numbers within the given range (inclusive)
- Example: Range 10 to 20 should return 60 (11 + 13 + 17 + 19)

2. Length Unit Converter
- Input:
  - A numeric value
  - Direction of conversion ('M' for meters to feet, 'F' for feet to meters)
- Output: Converted length value rounded to 2 decimal places
- Example: 5 meters = 16.40 feet

3. Consonant Counter
- Input: A text string
- Output: Number of consonants in the string
- Note: Should handle both uppercase and lowercase letters
- Example: "Hello World" contains 7 consonants

4. Min-Max Number Finder
- Input: A series of numbers (let the user specify how many numbers they want to enter)
- Output: The largest and smallest numbers from the input
- Example: Input [5, 2, 9, 1, 7] returns "Smallest: 1, Largest: 9"

5. Palindrome Checker
- Input: A text string
- Output: Boolean result indicating if the string is a palindrome
- Note: Should ignore spaces and be case-insensitive
- Example: "Race car" should return "True"

6. Word Counter
Find the number of words from this list [“the”, “was”, “and”] used in the sample text file.
- Input: A text file
https://gist.github.com/konrados/a1289ade329ac6f4598ebf5ee3dbcb3c
- Output: Number of words for each word

Technical Requirements
1. All input validation must be implemented
2. Invalid inputs should be handled gracefully with appropriate error messages
3. Each function should be properly documented with docstrings
4. The program should continue running until the user chooses to exit

Sample Program Output

```
Select a function (1-6):
1. Calculate the sum of prime numbers
2. Convert length units
```

```
3. Count consonants in string
4. Find min and max numbers
5. Check for palindrome
6. Word Counter
0. Exit program

Enter your choice: 3
Enter a string: Hello World
Number of consonants: 7

Would you like to try another function? (y/n):
```

Part B: *Games (5 Marks)*

1. Guess number game
Write a guess number game for a range of numbers.
- Input: User guesses
- Output: User guesses validated to be correct or not

2. Rock paper scissors game
Write a text-based rock paper scissors game with a randomized computer opponent.
- Input: User guesses
- Output: Information on user round win or loss

Sample Program Output

```
Select a function (1-3):
1. Guess Number game
2. Rock paper scissors game
3. Exit program

Enter your choice: 1
Guess a number:
```