CS 105 – Introduction to Scientific Computing

Assignment 10 – String Manipulation and Custom Functions

Objectives

After completing this assignment you should be able to:

1. Process strings to extract information
2. Create custom functions
3. Use custom functions in your scripts

Part I: Processing a CSV line

Introduction

String processing and manipulation is an important part of scientific computing. Many data sources store their information in *plaintext* which can be read in as strings. The data is separated by *delimiters*. For example a CSV (comma separated values) file may have entries like:

```
Name, Age, ID
```

where `Age` and `ID` are written into the file as text versions of numbers and the data is separated by commas.

Todo

Write a program that gets a CSV line from a user (via the command line). Compute the sum of the numeric tokens and display that sum to the command line.

For example:

```
Input:    4, 5, 6, 0
Output:   15

Input:    4, dkf, 8, fff.0
Output:   12

Input:    a b c 5
Output:   0
```

Part II: Custom Functions

Overview

There are certain tasks that we want to do often. To write the same set of commands to complete these tasks every time is a waste of time and space, especially as the tasks become complicated.

For example, we often want to get data in from a user. The code to do this is not trivial. However, to do this we have been using a built-in function *input* to which we pass parameters and which gives us back an output. Functions allow us to "code once, reuse often" and we would like to be able to write our own custom function as often as possible.

To do

Section 5.9

1. #5.1
2. #5.4
    - Don't work about handling invalid arguments and/or help information
3. #5.9
    - Ignore the hint. Instead consider the floor/ceil, etc.. functions
4. #5.11
    - Use the Matlab help to find out how to use/get the value *e*
    - Your solution should contain 4 files:
        i. Your sinh function
        ii. Your cosh function
        iii. Your tanh function
        iv. A script that plots sinh, cosh, tanh using the functions you made. You may display them all on the same graph or as separate graphs but they should be well labeled. You should come up with the interval over which to plot so that you get a good look at the graphs.

Submission

Submit a single zip file consisting of

- A PDF that contains:
  - A description of what you did for Part 1, including example tests and results
  - Your answer to Part 2 #5.1
  - A description of what you did for Part 2 problems #5.4 and #5.9
  - A description of what you did for Part 2 problem #5.11 including your figures.
- Your scripts for Part 1 and Part 2 #5.4, 5.9, and 5.11

As always in your report add any additional things you tried, discoveries you made, and/or issues you had.