



School of Advanced Sciences
Department of Mathematics
M.Sc. Data Science
PMDS508P - Python Programming Lab
Slot: L19+L20+L29+L30
Lab Assignment #03

Assignment #03 - Functions

Due-date to Upload of the Assignment Records to VTOP is **24-Sep-2024**¹

Exercise 1. Write a Python function named `ConvertToArray(str)` which takes a string of numbers separated by commas and colon. The function should then convert this string into a array of numbers and return it to the user. For converting the string into array use the following rules:

- (i) The colon distinguishes the elements by row i.e., all the values before the colon should be placed in single row of the array.
- (ii) The comma distinguishes the elements by column i.e., all the values separated by comma will be placed in columns in the same row of the array.

For example, if the input is '1, 2, 3; 4, 5, 6; 7, 8, 9' then the output should be

$$\begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}.$$

Similarly, if the input is '1.1, 2, 3; 4, 5.55, 6; 7, 8, 9.09' then the output should be

$$\begin{bmatrix} 1.1 & 2.0 & 3.0 \\ 4.0 & 5.55 & 6.0 \\ 7.0 & 8.0 & 9.09 \end{bmatrix}.$$

Hint: You can use the string operations and the list comprehension technique.

Exercise 2. Write a function named `ArraySize(array)` which accepts a list of numbers and returns its dimension (i.e., number of rows and columns). For example, if the array = [1, 2, 3, 4] then the output should be (1, 4). If the array = [[1, 2, 3, 4], [5, 6, 7, 8]] then the output should be (2, 4).

Hint: You can use the `len()` function to obtain the number of elements.

Exercise 3. Write a function named `NonZeroEntries(array)` which accepts an array and returns True if all the entries in that array are non-zero else returns. False.

Hint: Use list comprehension, map, and any.

Exercise 4. Write a function `ArrayOperations(array1, array2, operation)` where the operation is either add, subtract, dotproduct and dotdivide. Then the function should perform the operations of addition, subtraction, and element-wise multiplication, division respectively on the arrays array1 and array2.

Remark 1: Please note that, for the specified operations to be performed both arrays should have same dimension and to check this, you can use the above function `ArraySize`.

Remark 2:s While doing the operation of dotdivide, the function should check all the entries in the array2 are non-zero and then only perform element-wise division. If any entry zero then it should return an Error "Element-wise Division is not possible as at least one of the entries in the Array-2 is Zero".

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Exercise 5. *Extend the above function's functionality to accept variable number of arrays and perform the given operation on all of them.*