

**SEIS 763 Machine Learning**  
**Assignment 1**  
**Due: midnight 9/29/20 on Canvas**

**Individual effort**

Create a jupyter notebook called **Assign1.ipynb**. Write code for each of the following questions by having a separate cell for every question. Copy the actual question in a markdown cell and right below that you should have a code cell as shown below.

**1) Create a vector of size 15 having third element (i.e. position 2) set to 1 and rest of the elements should be zero.**

```
In [ ]: # your code here
```

Import the **numpy** package using the alias **np** and write commands for the following questions. To get credit, you should not be using any loops in your code.

- 1) Create a vector of size 15 having third element (i.e. position 2) set to 1 and rest of the elements should be zero.
- 2) Create a vector with values ranging from 21 to 30
- 3) Reverse the order of elements in the vector in question 2. That is, the previous last element should be the first one now.
- 4) Define a vector with values ranging from 1 to 12. Now define a 4x3 matrix to store elements from the vector you have defined. That is, first 3 elements of the vector should be row 1 of the matrix, next 3 should be row 2, and so on.
- 5) Consider the 4x3 matrix from question 4. Add 100 to all values that are greater than equal to 3 and less than equal to 8.
- 6) Consider the vector  $x = [1, 0, 6, 9, 10, 0]$ . Print the indices of non-zero elements.
- 7) Define a 6x3 matrix with random values. Normalize this matrix by subtracting the mean (of the column) and dividing by the standard deviation (of the column).
- 8) Define a 3x4 matrix with random values. Define a 4x3 matrix with random values. Multiply the two matrices.
- 9) Define a 3x3 identity matrix.
- 10) Define a 3x3 matrix A with random values. Invert the matrix A, let's call this B. Multiply matrices A and B.

**Submission:**

- Make sure each of the cells have been run with the output shown right below. Now, export the notebook as .html file.
- Submit the **.html** file and **.ipynb** notebook on Canvas.