CS410P

LAB 14L

Purpose

This assignment will be a tutorial on NumPy. One of the goals is to learn how to use additional packages & libraries that are available in Python distributions by looking up relevant information and applying it to what you need.

Pre-requisites

You need to have NumPy as part of your Python libraries. This library does come with the Anaconda distribution but other distributions might not have it by default. If this is the case you need to download it from: http://sourceforge.net/projects/numpy/files/

Problem

Let's get familiar with NumPy by doing a tutorial. You can create these sequence of instructions as part of one program, by printing out the result of each step (or wherever appropriate) to the output. Note that your output may differ from mine wherever random numbers are used.

No loops, no if statements allowed, since the whole point of using NumPy is to make use of the functions that come with the package. You also cannot use Python lists but just NumPy arrays.

For every one of these items set a Python variable equal to the result and print out the variable value.

Import the numpy package under the name np

1) Print the numpy version

2) Create a null vector of size 10 (single dimensional array with 10 elements all set to zero). Print the array. Using array slicing and set the fifth through the seventh elements to 5 (you must use slicking and not set individual elements one by one). Print the array again.

3) Create a one dimensional array whose elements go from 10 to 99

4) Create a one dimensional array of 10 elements with random values from 10 to 99

5) Create a 3x3 matrix with values ranging from 0 to 8

6) Initialize an array with [1,2,0,0,4,0]. Find the indices of non-zero elements (cannot use if statements, cannot look for these elements one at a time).

7) Create a 3x3 identity matrix

8) Create a 5x5 matrix with all zeroes to begin with. Print the matrix. Now fill the elements in the first column to 5, fill all the elements in the last row to 5 (you can only use slicing, cannot change element values one at a time). Print the matrix again.

9) Declare a 8x8 matrix and fill it with a checkerboard pattern

10) Create a random array of size 25, print it. Sort it and print it again

Output

Sample output is available in the public folder. Your output will differ from mine because of random numbers.

Grade Key

A	Items 1 through 10 worth 10 points each	**100**