

CS112 : Introduction to Python Programming

Week 10: lab practice

Practice 1

- Create a random 3×5 array using the `np.random.rand(3, 5)` function and compute: the sum of all the entries, the sum of the rows and the sum of the columns:

Practice 2

- Create a 5×5 array with its (i, j) -entry equal to $i+j$ using array broadcasting:

```
The generated array is  
[[0 1 2 3 4]  
 [1 2 3 4 5]  
 [2 3 4 5 6]  
 [3 4 5 6 7]  
 [4 5 6 7 8]]
```

Practice 3

- From 2 numpy arrays, extract the indexes in which the elements in the 2 arrays match
- - a = np.array([1,2,3,4,5])
 - b = np.array([1,3,2,4,5])

Practice 4

Write a program that can place 3 ones randomly into a 4x4 array of zeros (each position has the same probability).

```
[[0. 0. 0. 0.]  
 [0. 0. 0. 0.]  
 [0. 0. 0. 0.]  
 [0. 0. 0. 0.]
```



```
[[0. 1. 0. 0.]  
 [0. 0. 0. 0.]  
 [0. 0. 1. 0.]  
 [1. 0. 0. 0.]
```

Practice 5

Solve the following equation with SciPy/Numpy

$$8x_1 + 3x_2 - 3x_3 = 14$$

$$-2x_1 - 8x_2 + 5x_3 = 5$$

$$3x_1 + 5x_2 + 10x_3 = -8$$