

CS Homework #28: NUMPY

Deadline: 5/15/2021, 9:00 pm

Save your code as `lastname_homework28.py` and submit on Google Classroom.

Task 1

Examine the numpy `.array()` function. Check the examples at the bottom of this page: <https://numpy.org/doc/stable/reference/generated/numpy.array.html>

Using `np.array()`, manually create a numpy array that looks like this:

5	0
7	1

Task 2

Using either `np.zeros()` or `np.ones()`, create a two-dimensional numpy array that has 3 rows and 4 columns. The data type of the array should be `np.int32`.

Task 3

Using the array from Task 2, change all values in the array to 9 (use element-wise math).

Task 4

Once again create a 3 by 4 array with all values equal to 9. However, this time use `np.repeat(x, y)` function, where `x` is the value that you repeat, and `y` is how many times you repeat it.

Task 5

Create a 5 by 5 array with integer values randomly drawn between 4 and 8 (included). Print the value of the cell located in the second row and third column of the array.

Task 6

Create a 5 by 5 array with values randomly drawn between 0.1 and 0.2. Print all values located in the fourth row of the array.

Task 7

Using `np.arange()`, create a 4 by 4 array that looks like this (notice that we start with 1, not 0!):

1	2	3	
4	5	6	
7	8	9	

Let's call the array `X`. What is `np.sum(X)`? What is `np.sum(X, 0)`? What is `np.sum(X, 1)`?

Task 8

What is `np.mean(X)`? What is `np.mean(X, 0)`? What is `np.mean(X, 1)`?

Task 9

Using for loops, create a 4 by 4 identity matrix (consisting of integer values):

1	0	0	0
0	1	0	0
0	0	1	0
0	0	0	1

Do not do this manually. Do not use `np.identity()` since we did not study this command. Use for loops to assign values above. Hint: the value is 1 when the row number is equal to the column number.

Task 10

Create a deep copy of the identity matrix from Task 9 and transform the matrix to the following:

0	2	2	2
2	0	2	2
2	2	0	2
2	2	2	0

There are many different ways to complete this task. Try to do this using element-wise operations such as addition and multiplication.