

NumPy Assignment

Guidelines:

- i. *This Assignment is mandatory for everyone.*
- ii. *Use the below sample table to solve the below queries.*
- iii. *It is mandatory to submit the answer with the screen shot of the output you have received. Otherwise, no marks will be given.*
- iv. *If anyone fails to submit the assignment within the last date. His/her assignment submission will not be evaluated and will be allotted minus marks also.*

Questions:

1. Import the numpy package under the name np
2. Print the numpy version and the configuration
3. Create a null vector of size 10
4. How to find the memory size of any array
5. How to get the documentation of the numpy add function from the command line?
6. Create a null vector of size 10 but the fifth value which is 1
7. Create a vector with values ranging from 10 to 49
8. Reverse a vector (first element becomes last)
9. Create a 3x3 matrix with values ranging from 0 to 8
10. Find indices of non-zero elements from [1,2,0,0,4,0]
11. Create a 3x3 identity matrix
12. Create a 3x3x3 array with random values
13. Create a 10x10 array with random values and find the minimum and maximum values
14. Create a random vector of size 30 and find the mean value
15. Create a 2d array with 1 on the border and 0 inside
16. How to add a border (filled with 0's) around an existing array?
17. What is the result of the following expression?

```
print(0 * np.nan) print(np.nan ==  
np.nan) print(np.inf > np.nan)  
print(np.nan - np.nan) print(np.nan  
in set([np.nan])) print(0.3 == 3 * 0.1)
```

18. Create a 5x5 matrix with values 1,2,3,4 just below the diagonal
19. Create a 8x8 matrix and fill it with a checkerboard pattern

20. Consider a (6,7,8) shape array, what is the index (x,y,z) of the 100th element?
21. Create a checkerboard 8x8 matrix using the tile function
22. Normalize a 5x5 random matrix
23. How to find the most frequent value in an array?
24. Multiply a 5x3 matrix by a 3x2 matrix (real matrix product)
25. Given a 1D array, negate all elements which are between 3 and 8, in place.
26. What is the output of the following script?

```
print(sum(range(5),-1))  
from numpy import *  
print(sum(range(5),-1))
```

27. Consider an integer vector Z, which of these expressions are legal?

```
Z**Z  
2 << Z >> 2 Z  
<- Z  
1j*Z Z/1/1  
Z<Z>Z
```

28. What are the result of the following expressions?

```
print(np.array(0) / np.array(0)) print(np.array(0) //  
np.array(0)) print(np.array([np.nan]).astype(int).astype(float))
```

29. How to round away from zero a float array ?
30. How to find common values between two arrays?
31. How to sort an array by the nth column?
32. Is the following expression true?

```
np.sqrt(-1) == np.emath.sqrt(-1)
```

33. How to get the dates of yesterday, today and tomorrow?
34. How to get all the dates corresponding to the month of July 2020?
35. How to compute $((A+B)*(-A/2))$ in place (without copy)?
36. Extract the integer part of a random array using 5 different methods
37. Create a 5x5 matrix with row values ranging from 0 to 4
38. Consider a generator function that generates 10 integers and use it to build an array
39. Create a vector of size 10 with values ranging from 0 to 1, both excluded
40. Create a random vector of size 10 and sort it

- 41. How to sum a small array faster than np.sum?
- 42. Consider two random array A and B, check if they are equal
- 43. Make an array immutable (read-only)
- 44. Consider a random 10x2 matrix representing cartesian coordinates, convert them to polar coordinates
- 45. Create random vector of size 10 and replace the maximum value by 0
- 46. Given two arrays, X and Y, construct the Cauchy matrix C ($C_{ij} = 1/(x_i - y_j)$)
- 47. How to read the following file?

```
1, 2, 3, 4, 5
6, , , 7, 8
, , 9, 10, 11
```

- 48. Subtract the mean of each row of a matrix
- 49. How to tell if a given 2D array has null columns?
- 50. How to swap two rows of an array?