Assignment- I

Numpy

Notes

1. For ease, Use Jupyter notebook or Google Collab in order to complete the following tasks in comparison to text editors.
2. For each question, Use a single shell and try the best to comment.
3. Please complete the assignments within the next session and submit.
4. If not given or required, You can input your own input list.
5. At last, I will attach some readings that will be the main core study for the session & help to build the foundation for the topic.

Questions

1. Import the numpy package.
2. Create a row-vector with 10 elements. Also Print its shape and dimension.
3. Create a matrix having 4 rows and 6 columns. Print the dimensions and size of the matrix.
4. Create an identity matrix of order 3.
5. Create a zero matrix of size (3,2) with float datatype.
6. Create a zero vector of length 6.
7. Create an empty matrix with size (3,3).
8. Create a vector of serial numbers starting from 1 and having 24 elements. Reshape the vector into a 3-Dimensional array.
9. Create a sequence of evenly spaced values with the interval 1 to 5 having 20 elements. Reshape the vector into a 2-D array.
10. Generate a vector with random number between interval 0 to 1 having 10 elements.
11. Generate a matrix having random numbers using gaussian distribution consisting of 18 elements.
12. Generate a matrix having random integers between 5 & 8 consisting of 12 elements.

13. Given a vector *[17, 32, 26, 23, 8, 8, 17, 14, 26, 14, 23, 20, 32, 8, 26].* Find the single element using indexing: First, Fifth, Sixth Last, Third Last, Last.
14. From Q no 13, Use the concept of slicing to find:
    a. All Elements
    b. From Beginning to Last Elements
    c. From Second Element to Second Last Element
    d. From Forth Last Element
    e. From Fifth Last Element to Third Last Element
15. Create a matrix of random integers having 6 rows and 7 columns. Use to concept of indexing to find:
    a. First Row Last Column
    b. Last Row Last Column
    c. Second Row Fifth Column
    d. Third Last Row Forth Last Column
16. Using Matrix from Q no 15, Use the Concept of Slicing to Find:
    a. All Third Row Elements
    b. All Fifth Column Elements
    c. First Row to Third Row , Third Column to Last Column
    d. Second Last Row, Third Last Column to Second Last Column
17. Copy the vector from Q no. 13 into a new variable and substitute all elements from fifth to last as 0. Check if both vectors are the same or not.
18. Let a = [3,4] & b = [5,12]. Find the following:
    a. Magnitude of a & b
    b. Dot Product of a & b
    c. Cross Product of a & b
    d. Cos Angle in degrees
    e. Sine Angle in degrees
19. Create a square matrix of order 3 having random integers between 9 to 20.
20. Find the inverse and diagonal elements of the square matrix from Q no. 19
21. Create a diagonal matrix having diagonal elements as [1,4,3].

Readings

ALL FOR ONE

- https://learnpython.com/blog/python-array-vs-list/
- https://becominghuman.ai/an-essential-guide-to-numpy-for-machine-learning-in-python-5615e1758301
- https://www.youtube.com/watch?v=RnZIvCacyF8
- https://www.geeksforgeeks.org/numpy-ndarray/
- https://www.tutorialspoint.com/numpy/index.htm

SERIAL NUMBERS

- https://www.sharpsightlabs.com/blog/numpy-linspace/

RANDOM NUMBERS

- https://medium.com/analytics-vidhya/numpy-random-module-numpy-random-examples-cec1b531c1b8
- http://www.oswego.edu/~srp/stats/z.htm
- https://stackoverflow.com/questions/47240308/differences-between-numpy-random-rand-vs-numpy-random-randn-in-python

LINEAR ALGEBRA

- https://towardsdatascience.com/introduction-to-linear-algebra-with-numpy-79adeb7bc060