

Applied Machine Learning Workshop (CSE 3193)

ASSIGNMENT-2: CRASH COURSE ON NUMPY AND MATPLOTLIB

1. Write a Python program to create an empty array of 3X4 and a full array of 3X3 of integer and float type in Numpy.
2. Write a Python program to test whether none of the elements of a given array is zero.
3. Write a Python program in Numpy to create a matrix of 4 X 6 dimensions where the element at i^{th} row and j^{th} column is the sum of $i+j$.
4. Use arange to create a 2-by-2 array containing the numbers 0–3. Use broadcasting to perform each of the following operations on the original array:
 - a) Cube every element of the array.
 - b) Add 7 to every element of the array.
 - c) Multiply every element of the array by 2.
5. Write a Python program in Numpy to create a multiplication table for numbers 1 to 10.
6. Write a Python program to create an array with zero and non-zero elements using Numpy and count the number of non-zero elements in the array.
7. Write a Python program to generate 50 numbers from 20 to 100 with equally spaced numbers and 20 integer numbers from 20 to 100.
8. Write a Python program to print all the even numbers from 2 to 10, including 2 and 10, with and without using Numpy functions.
9. Write a Python program to input three integer arrays and perform addition, multiplication, subtraction, and division of all elements of the inputted array.
10. Write a Python program to input a random array and find the sum and average of all array elements.
11. Write a Python program to input a dimension 4 X 5 matrix, add 4 to all matrix elements, and reshape the matrix to 2 X 10.
12. Plot a line graph to show the company's sales data and profit for all months using the data given below.
Month=[1,2,3,4,5,6,7,8,9,10,11,12,13,14,15]

Profit=[211000, 183300, 224700, 222700, 209600, 201400, 295500, 361400, 234000, 266700, 412800, 300200]
13. Write a Python program to display the grid and draw line charts of the closing value of a company between October 3, 2017, and October 7, 2017. Customized the grid lines with linestyle -, width .5 and color is blue.
data = ['3 Aug', '4-Aug', '5-Aug', '6-Aug', '7-Aug']
value=[772.559998, 776.429993, 776.859985, 776.859985, 775.080017]
14. Write a Python program to display a bar chart of the popularity of programming languages with a different color for each bar.
Sample data:
Programming languages: ['Java', 'Python', 'PHP', 'JavaScript', 'C Sharp', 'C++']
Popularity: [22.2, 17.6, 8.8, 8, 7.7, 6.7]

15. Write a Python program to create a bar plot of scores by group and gender. Use multiple X values on the same chart for men and women.
Sample Data:
Means (men) = (22, 30, 35, 35, 26)
Means (women) = (25, 32, 30, 35, 29)
16. Write a Python program to draw a scatter plot comparing two Mathematics and Science subject marks. Use marks of 10 students.
Test Data:
math_marks = [88, 92, 80, 89, 100, 80, 60, 100, 80, 34]
science_marks = [35, 79, 79, 48, 100, 88, 32, 45, 20, 30]
marks_range = [10, 20, 30, 40, 50, 60, 70, 80, 90, 100]
17. Plot the temperature extremes in certain regions of India for each month, starting in January, which are given by (in degrees Celsius).
max: 17, 19, 21, 28, 33, 38, 37, 37, 31, 23, 19, 18
min: -62, -59, -56, -46, -32, -18, -9, -13, -25, -46, -52, -58
18. Plot histogram with the number of bins=10 and color to green for the given data below:
data = [32, 96, 45, 67, 76, 28, 79, 62, 43, 81, 70, 61, 95, 44, 60, 69, 71, 23, 69, 54, 76, 67, 82, 97, 26, 34, 18, 16, 59, 88, 29, 30, 66, 23, 65, 72, 20, 78, 49, 73, 62, 87, 37, 68, 81, 80, 77, 92, 81, 52, 43, 68, 71, 86, 87, 98, 95]
19. Plot histograms for the male and female ages in different plots for the following data on male and female age.
male age = [53, 51, 71, 31, 33, 39, 52, 27, 54, 30, 64, 26, 21, 54, 52, 20, 59, 32]
female age = [53, 65, 68, 21, 75, 46, 24, 63, 61, 24, 49, 41, 39, 40, 25, 54, 42, 32, 48, 23, 23]
20. Plot $\sin x$, $x \sin x$, $\cos x$, and $\tan x$ in a single 2 X 2 subplot grid in the range of $x \in [10, 10]$ for 50 values of x.