Lab Assignemnt-5
Cognitive Computing UCS420
NumPy-Introduction-2

Q.1 For the array gfg = np.matrix('[4, 1, 9; 12, 3, 1; 4, 5, 6]'), Find
    i. Sum of all elements
    ii. Sum of all elements row-wise
    iii. Sum of all elements column-wise

Q.2 (a)For the array: array = np.array([10, 52, 62, 16, 16, 54, 453]), find
    i. Sorted array
    ii. Indices of sorted array
    iii. 4 smallest elements
    iv. 5 largest elements
   (b) For the array: array = np.array([1.0, 1.2, 2.2, 2.0, 3.0, 2.0]), find
    i. Integer elements only
    ii. Float elements only

Q.3 You are given a weekly sales dataset and need to perform various operations using NumPy broadcasting.

a) Generate your unique sales dataset:
- Take the sum of the ASCII values of the initials of your first and last name. Call this value X. *(If your initials are A B → ASCII sum = 65 + 66 = 131 → sales = [131, 181, 231, 281, 331].)*
- Create a NumPy array sales with values [X, X+50, X+100, X+150, X+200].

b) Compute your personalized tax rate as $((X \% 5) + 5) / 100$.
- Use broadcasting to apply this tax rate to each sales value.

c) Adjust sales based on discount:
- If sales < X+100, apply a 5% discount.
- If sales >= X+100, apply a 10% discount.

d) Expand sales data for multiple weeks:
- Create a 3×5 matrix representing three weeks of sales by stacking sales three times using broadcasting.
- Increase sales by 2% per week using element-wise broadcasting.

Q4. Generate x values using np.linspace() from -10 to 10 with 100 points. Use each function from the list below and compute y values using NumPy:

- $Y = x^2$
- $Y = \sin(x)$
- $Y = e^x$
- $Y = \log(|x| + 1)$

Plot the chosen function using Matplotlib. Add title, labels, and grid for clarity.