

$$1. \quad M_1 = \begin{bmatrix} 1 & 4 & 3 \\ 2 & 8 & 7 \end{bmatrix}; \quad M_2 = \begin{bmatrix} 2 & 6 & 1 \\ 3 & 4 & 4 \end{bmatrix}$$

$$2. \quad M_1: \begin{cases} \text{mean} = (1+4+3+2+8+7)/6 = 4.16 \\ \text{mode} = \phi \\ \text{median} = 4 \end{cases}$$

$$M_2: \begin{cases} \text{Mean} = (2+6+1+3+4+4)/6 = 3.33 \\ \text{Mode} = 4 \\ \text{Median} = 3 \end{cases}$$

$$3. \quad M_1 + M_2 = \begin{bmatrix} 1 & 4 & 3 \\ 2 & 8 & 7 \end{bmatrix} + \begin{bmatrix} 2 & 6 & 1 \\ 3 & 4 & 4 \end{bmatrix} = \begin{bmatrix} 3 & 10 & 4 \\ 5 & 12 & 11 \end{bmatrix}$$

$$M_1 - M_2 = \begin{bmatrix} -1 & -2 & 2 \\ -1 & 4 & 3 \end{bmatrix}$$

$$S = 3$$

$$M_1 \times S = \begin{bmatrix} 3 & 12 & 9 \\ 6 & 24 & 21 \end{bmatrix}$$

$$\text{transpose } M_1 = \begin{bmatrix} 1 & 2 \\ 4 & 8 \\ 3 & 7 \end{bmatrix}$$

$$\text{transpose } M_2 = \begin{bmatrix} 2 & 3 \\ 6 & 4 \\ 1 & 4 \end{bmatrix}$$

4. Matrix can be used in many domains: like:

- image: Matrices are used to represent images and operations like convolution are applied to matrices to perform tasks such as edge detection and feature extraction in image.

Also matrices used to learn and recognize patterns in images.