Matrix Introduction: A matrix 'A' of size $m \times n$ is a rectangular table (array) of numbers m_{ij}, $i = 1, 2, \ldots m$ and $j = 1, 2, \ldots, n$, arranged in m rows and n columns.

Order of Matrix

$$A = \begin{bmatrix} 5 & 8 & 7 & 2 & 5 \\ 9 & 2 & 3 & 1 & 0 \\ 7 & 2 & 0 & -6 & 4 \\ 4 & -7 & 9 & 5 & 3 \end{bmatrix} \leftarrow \text{4 rows}$$

5 columns

$[A_{4 \times 5}]$

Terminology:-

- It can be represented as $A = [a_{ij}]_{m \times n}$, or more simply $A = [a_{ij}]$
- The element a_{ij} at the intersection of row i and column j is called the (i, j)th element (or entry) of A
- If the number of rows ~~and~~ or columns is 1 we sometimes refer to the matrix as a vector

Date __/__/__

Applications

A digital image is basically a matrix to begin with: the rows and columns of the matrix correspond to rows and columns of pixels, and the numericals entries correspond to the pixels' color values

Decoding digital video requires matrix multiplication
MIT researchers were able to build one of the first chips to implement the new high-efficiency video coding standard for ultra high-deficiency TVs, in part because of patterns they discerned in the matrices

A digital audio signal is basically a sequence of numbers, representing the variation over time of the air pressure of an acoustic audio signal.
Many techniques for filtering or compressing digital audio signals, such as the flourier transform, rely on matrix multiplication.