MATLAB® is a high-performance language for technical computing.
It include

Math and computation

MATLAB System

Development Environment.

- graphical user interfaces

-MATLAB desktop

- Command Window,

-a command history,

-an editor and debugger,

-and browsers for viewing help, the workspace, files, and the search path.

MATLAB System

MATLAB Mathematical Function Library.

- **computational algorithms ranging from elementary functions, like sum, sine, cosine,**

- **complex arithmetic,**

- **sophisticated functions like matrix inverse, matrix eigenvalues, Bessel functions, and fast Fourier transforms.**

MATLAB System

- **The MATLAB Language. high-level matrix/array language with control flow statements, functions,**

- **data structures, input/output,**

- **object-oriented programming features.**

- **to create large and complex application programs**

MATLAB System

- **Graphics.**
- **displaying vectors and matrices as graphs,. functions for two-dimensional and three-dimensional**
- **data visualization, image processing, animation, and presentation graphics**

Prompt >>

- command line, indicated by the prompt (>>).

Matrix 3x3

A(I , j)

	Column 1	Column 2	Column 3
Row 1	A(1,1)	A(1,2)	A(1,3)
Row 2	A(2,1)	A(2,2)	A(2,3)
Row 3	A(3,1)	A(3,2)	A(3,3)

A(1,1) represent first row and first column in matrix A

A(3,1) represent third row and first column in matrix A and so on

A(1,1)and A(2,2) and A(3,3) represent Diagonal in Matrix A

To show content of matrix according I and j A(I,j).

F_x**>> A(1,1) Or**

F_x**>>disp(A(1,1))**

F_x**>>disp(A(1:3,3))**

F_x**>>disp(A(3,1:3))**

Summation Matrices

- **Enter matrix , A=[1 2 3;3 4 5;6 7 8]**
- **The element in row i and column j of A is denoted by A(i,j). I and j is Index of matrix**
- **Sum (matrix,2) summation rows**
- **Sum(matrix) it will summation columns**
- **Sum(diag(A))it will summation diagonal of matrix**
- **sum(diag(fliplr(A))) inverse of diag**

Transpose matrix

- **A' = transpose matrix**
- **Make column row and row column**
- **It will be useful in Multiply Matrices**

Calculating the Determinant

- **For a 2×2 Matrix**

$$A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$$

|A| = ad − bc

For a 3 x 3 Matrix

$$\begin{bmatrix} a & b & c \\ d & e & f \\ g & h & i \end{bmatrix}$$

|A| = a(ei − fh) − b(di − fg) + c(dh − eg)

$$|A| = \begin{vmatrix} 6 & 1 & 1 \\ 4 & -2 & 5 \\ 2 & 8 & 7 \end{vmatrix} = -306$$

Mathematical Expressions

$Y= e^{2x}$ in math

$$Y= \exp(2*x) \text{ in matlab}$$

$$F=(1+\sqrt{5}\,)/2$$

Factoring Quadratics

- $x^2 + 3x - 4$
- $(x+4)(x-1)$
- Roots(x)