LINEAL ALGEBRA

1. Inverse Matrix

In linear algebra, an n-by-n square matrix $\boldsymbol{A}$ is called **invertible** (also **nonsingular** or **nondegenerate**), if there exists an *n*-by-*n* square matrix $\boldsymbol{A^{-1}}$ such that:

$$\boldsymbol{A \cdot A^{-1} = A^{-1} \cdot A = Id_n}$$

The adjoint of a matrix $\boldsymbol{A}$ can be used to find the inverse of $\boldsymbol{A}$ as follows:

If $\boldsymbol{A}$ is an invertible matrix, then:

$$\boldsymbol{A^{-1} = \frac{1}{\det(A)} \cdot adj(A)}$$

The steps we take in the algorithm will be:

1. Import the library
2. Define the functions
    a. Determinant
    b. Adjoint Matrix
    c. Inverse Matrix
3. Define the identity matrix

$$Id_n = \begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$$

4. Define the matrix

$$A = \begin{pmatrix} 2 & 0 & 1 \\ 1 & 1 & -4 \\ 3 & 7 & -3 \end{pmatrix}$$

5. We calculate the inverse
6. Finally, we check if the multiplication of the matrix and its inverse are equal to the Identity