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- Inverse Matrix

A^{-1} : Inverse matrix of square matrix A

$$A^{-1}A = AA^{-1} = I$$

- X: the inverse matrix doesn't alway exist. It could be existed or not.

↳ If square matrix has an inverse matrix,
we call the matrix as 1) Invertible matrix 2) regular matrix.
If it doesn't, we call it as 1) non-invertible 2) singular matrix

- Feature of Inverse matrix

① $(A^T)^{-1} = (A^{-1})^T$

② $(AB)^{-1} = B^{-1}A^{-1}$

③ $(ABC)^{-1} = C^{-1}B^{-1}A^{-1}$

- Inverse matrix calculation

$$A^{-1} = \frac{1}{\det(A)} C^T = \frac{1}{\det(A)} \begin{bmatrix} C_{1,1} & \cdots & C_{N,1} \\ \vdots & \ddots & \vdots \\ C_{1,N} & \cdots & C_{N,N} \end{bmatrix}$$

C = matrix of cofactors or Cofactor matrix or Comatrix

C^T = adjoint matrix or adjugate matrix or adj(A)

↳ If $\det(A) = 0$, the inverse matrix doesn't exist