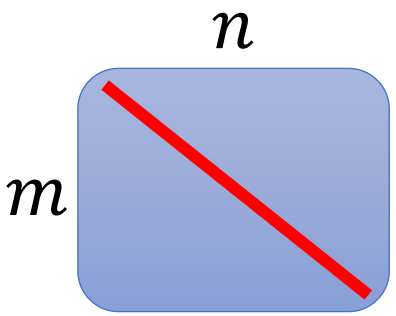
有名有姓的 Matrix

Square matrix



$m = n$

diagonal

$$\begin{bmatrix} 2 & 3 & 5 \\ 0 & 1 & -1 \\ 0 & 0 & 1 \end{bmatrix}$$

Upper Triangular Matrix

$$\begin{bmatrix} 2 & 0 & 0 \\ 3 & 1 & 0 \\ -2 & 1 & 1 \end{bmatrix}$$

Lower Triangular Matrix

有名有姓的 Matrix

Is I_3 a diagonal matrix?

YES

Is $O_{3\times3}$ a diagonal matrix?

YES

- Diagonal Matrix

$$\begin{bmatrix} 2 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 2 \end{bmatrix}$$

All non-diagonal elements are “0”.

- Identity Matrix

$$\mathrm{I}_3 = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

Denoted by I (any size) or I_n

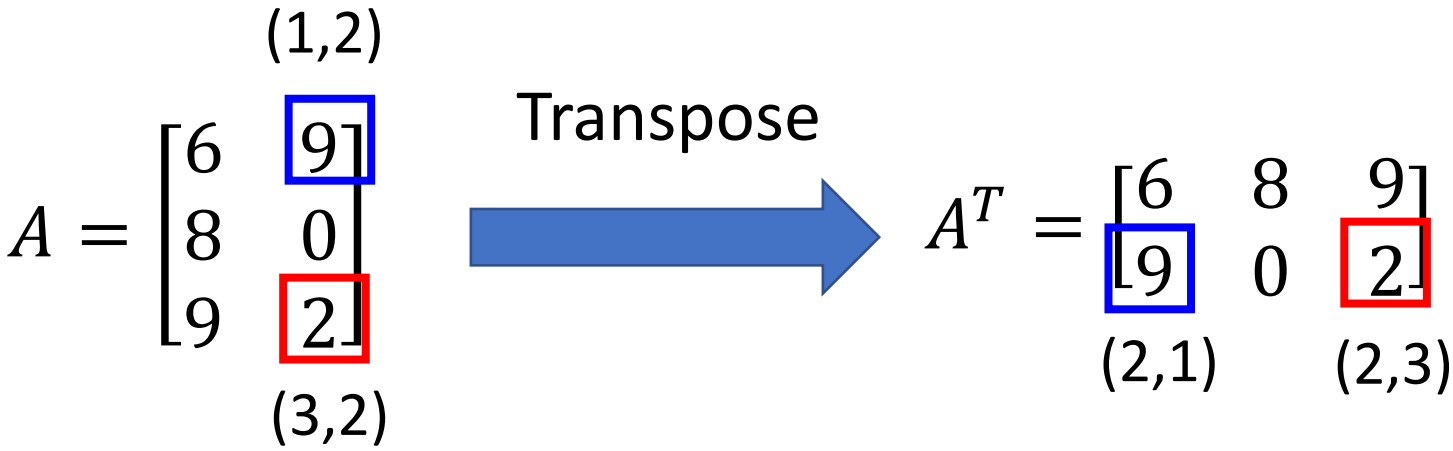
- Zero Matrix

$$O_{2\times3} = \begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$$

Denoted by O (any size) or $O_{m\times n}$

Transpose

- If A is an mxn matrix, A^T (transpose of A) is an nxm matrix whose (i,j)-entry is the (j-i)-entry of A



Column 變成 Row ; Row 變成 Column

Transpose

- A and B are mxn matrices, and s is a scalar
- $(A^T)^T = A$
- $(sA)^T = sA^T$
- $(A + B)^T = A^T + B^T$

} This is a linear system ☺

Symmetric Matrix $A^T = A$

$$A = \begin{bmatrix} 1 & 2 & 4 \\ 2 & 3 & -1 \\ 4 & -1 & 5 \end{bmatrix} = A^T \qquad B = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} \neq B^T$$

致謝

- 感謝羅昱翔同學發現投影片上的錯字