

TUTORIAL3: MATRIX

1) Let all sets are as below:

$$A = \begin{bmatrix} 2 & 1 & 3 \\ 4 & 1 & 2 \end{bmatrix} \quad B = \begin{bmatrix} 0 & 1 \\ 1 & 2 \\ 2 & 3 \end{bmatrix} \quad C = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 2 & 5 \\ 3 & 1 & 2 \end{bmatrix} \quad D = \begin{bmatrix} 3 & 2 \\ 4 & 1 \end{bmatrix} \quad E = \begin{bmatrix} 3 & 2 & 1 \\ 5 & 4 & -3 \\ 0 & 1 & 2 \end{bmatrix}$$

If possible, calculate this:

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|----------------|------------------|---------------------------|----------------|
| a) $C + E$ | b) AB and BA | c) CB | d) $AB + D$ |
| e) $A(BD)$ | f) $AB(D)$ | g) $A(C + E)$ | h) $AC + AE$ |
| i) $D + BA$ | j) $AC + DE$ | k) A^T and $(A^T)^T$ | l) $(C + E)^T$ |
| m) $C^T + E^T$ | n) $(B^T + A)C$ | o) $(BC)^T$ and $C^T B^T$ | p) D^3 |

2) What is the most important point for matrices A and B if

- Summation process has to be done?
- Multiplication process has to be done?

3) **Given Boolean matrices as below:**

$$A = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 1 & 1 & 1 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 1 & 1 & 0 \end{bmatrix} \quad B = \begin{bmatrix} 1 & 1 & 1 & 0 \\ 0 & 0 & 1 & 1 \\ 0 & 1 & 0 & 1 \\ 1 & 1 & 0 & 0 \end{bmatrix} \quad C = \begin{bmatrix} 0 & 0 & 1 & 0 \\ 1 & 0 & 0 & 0 \\ 1 & 1 & 0 & 1 \\ 1 & 1 & 1 & 0 \end{bmatrix} \quad \text{Find:}$$

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|-----------------|-----------------|-----------------|
| a) $A \vee B$ | d) $A \vee C$ | g) $B \vee C$ |
| b) $A \wedge B$ | e) $A \wedge C$ | h) $B \wedge C$ |
| c) $A \odot B$ | f) $A \odot C$ | i) $B \odot C$ |

4) Given sets A and B as below:

$$A = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 1 & 1 & 0 \end{bmatrix} \quad \text{and} \quad B = \begin{bmatrix} 0 & 0 & 1 \\ 0 & 1 & 1 \\ 1 & 0 & 1 \end{bmatrix} \quad \text{Find:}$$

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|-----------------|-----------------|-----------------|
| a) $A \vee B$ | d) $A \vee C$ | g) $B \vee C$ |
| b) $A \wedge B$ | e) $A \wedge C$ | h) $B \wedge C$ |
| c) $A \odot B$ | f) $A \odot C$ | i) $B \odot C$ |