Class 07

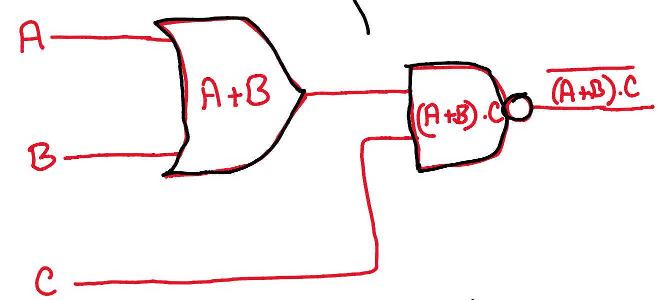
Monday, October 25, 2021 9:01 PM

0 - 9 → 10টি

A - V → 22টি

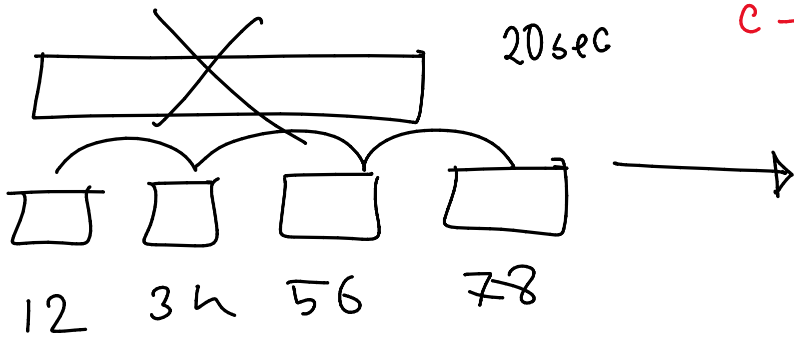
32টি

→ $\overline{(A+B) \cdot C}$



0.1 ms

Java



20sec

— o —

Topic: Matrix

$$\begin{array}{cc|l} & & \\ \left[\begin{matrix} 1 & -2 \\ 0 & 5 \end{matrix}\right] & & \begin{matrix} \to row_0 \\ \to row_1 \end{matrix} \\ col_0 \quad col_1 & & \end{array}$$

Data Structure

Simple datastructure

ARRAY

(r×c)

$$A_{(2\times3)} = \begin{bmatrix} 1 & 0 & 3 \\ 2 & 5 & -3 \end{bmatrix} \quad B_{(2\times3)} = \begin{bmatrix} 3 & 0 & -3 \\ 1 & -2 & 7 \end{bmatrix}$$

$$A + B = \begin{bmatrix} 1+3 & 0+0 & 3-3 \\ 2+1 & 5-2 & -3+7 \end{bmatrix} = \begin{bmatrix} 4 & 0 & 0 \\ 3 & 3 & 4 \end{bmatrix}$$

LINEAR ALGEBRA

$A \times B$

$\boxed{r_1 c_1}$ $\boxed{r_2 c_2}$ यदि, $c_1 == r_2$

$$\underset{2\times 2}{A} \times \underset{2\times 2}{B} = \begin{bmatrix} -2 & 1 \\ 7 & 5 \end{bmatrix} \cdot \begin{bmatrix} 2 & 3 \\ 4 & 5 \end{bmatrix} = \begin{array}{|c|c|} \hline -4+4 & -6+5 \\ \hline 14+20 & 21+25 \\ \hline \end{array}$$

$$= \begin{bmatrix} 0 & -1 \\ 34 & 46 \end{bmatrix}$$

$$\underset{1\times 2}{A} \times \underset{2\times 2}{B} = \begin{bmatrix} -2 & 1 \end{bmatrix} \begin{bmatrix} 2 & 3 \\ 4 & 5 \end{bmatrix}$$

$$= \begin{array}{|c|c|} \hline -4+4 & -6+5 \\ \hline \end{array}$$

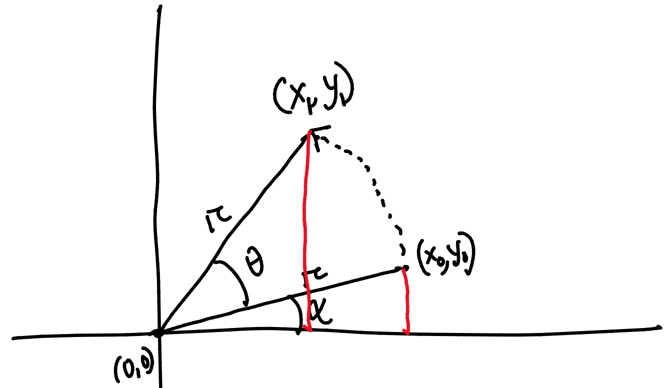
$$= \begin{bmatrix} 0 , & -1 \end{bmatrix} \quad 1\times 2$$

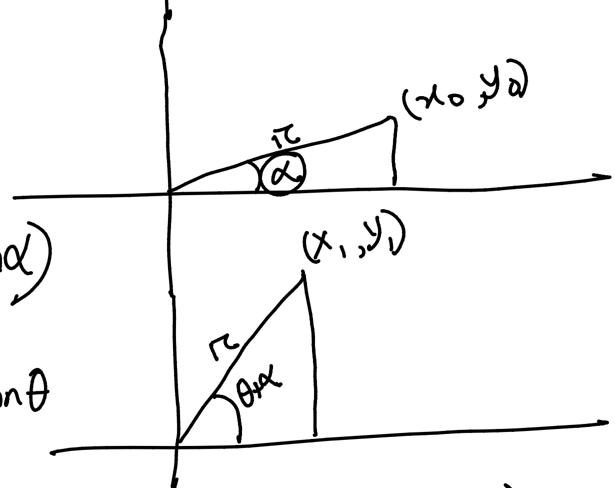
But!

$$\underset{\cancel{2\times 2 \quad 1\times 2}}{B \times A} = \begin{bmatrix} 2 & 3 \\ 4 & 5 \end{bmatrix} \begin{bmatrix} -2 & 1 \end{bmatrix}$$

$=$

$$\begin{bmatrix} 4 & 6 & 2 \\ 2 & 5 & 6 \end{bmatrix} + \begin{bmatrix} 10 & 10 & 10 \\ -20 & -20 & -20 \end{bmatrix}$$





$$\cos\alpha = \frac{x_0}{r}$$

$$\therefore x_0 = r\cos\alpha$$
$$y_0 = r\sin\alpha$$

$$x_1 = r\cos(\theta+\alpha)$$
$$y_1 = r\sin(\theta+\alpha)$$

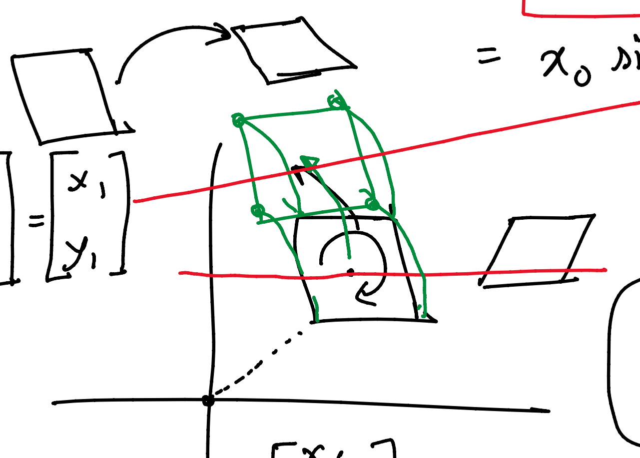
$$x_1 = \boxed{r\cos(\theta+\alpha)}$$
$$= r(\cos\theta\cos\alpha - \sin\theta\sin\alpha)$$
$$= \boxed{r\cos\alpha}\cos\theta - \boxed{r\sin\alpha}\sin\theta$$

$$\boxed{x_1 = x_0\cos\theta - y_0\sin\theta}$$
$$\boxed{y_1 = x_0\sin\theta + y_0\cos\theta}$$

$$y_1 = r\sin(\theta+\alpha)$$
$$= r(\sin\theta\cos\alpha + \cos\theta\sin\alpha)$$
$$= \boxed{r\cos\alpha}\sin\theta + \boxed{r\sin\alpha}\cos\theta$$
$$= x_0\sin\theta + y_0\cos\theta$$

$$\begin{bmatrix}\cos\theta & -\sin\theta\\ \sin\theta & \cos\theta\end{bmatrix}\begin{bmatrix}x_0\\ y_0\end{bmatrix} = \begin{bmatrix}x_1\\ y_1\end{bmatrix}$$

$2\times 2 \quad 2\times 1$



x_c, y_c

Rotational Matrix

$$\begin{bmatrix}x_1\\ y_1\end{bmatrix}$$

$$\begin{bmatrix}\cos\theta_1 & -\sin\theta_1\\ \sin\theta_1 & \cos\theta_1\end{bmatrix}\left(\begin{bmatrix}\cos\theta_0 & -\sin\theta_0\\ \sin\theta_0 & \cos\theta_0\end{bmatrix}\begin{bmatrix}x_0\\ y_0\end{bmatrix}\right) \longrightarrow M_{\theta_1}\cdot M_{\theta_0}\cdot P_0$$

y_1

$$\begin{bmatrix}\cos\theta_1 & -\sin\theta_1\\ \sin\theta_1 & \cos\theta_1\end{bmatrix}\begin{bmatrix}\cos\theta_0 & -\sin\theta_0\\ \sin\theta_0 & \cos\theta_0\end{bmatrix}\begin{bmatrix}x_0\\ y_0\end{bmatrix} \rightarrow M_{\theta_1}\cdot M_{\theta_0}\cdot P_0$$