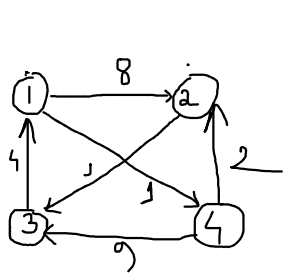


↓  
Matrix  $\rightarrow N \times N \rightarrow$  No. of nodes  
No. of matrices  $\rightarrow N+1 = 4+1 = 5$

starting pt	Destination point.
<u>1</u>	2, 3, 4
<u>2</u>	1, 3, 4
<u>3</u>	1, 2, 4
<u>4</u>	1, 2, 3.



4x4

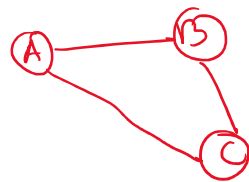
$$D_0 = \begin{matrix} & \begin{matrix} 1 & 2 & 3 & 4 \end{matrix} \\ \begin{matrix} 1 \\ 2 \\ 3 \\ 4 \end{matrix} & \begin{bmatrix} 0 & 8 & \infty & 1 \\ \infty & 0 & 1 & \infty \\ 4 & \infty & 0 & \infty \\ \infty & 2 & 9 & 0 \end{bmatrix} \end{matrix}$$

$\infty$  8

$$D_0 = \begin{matrix} & \begin{matrix} 1 & 2 & 3 & 4 \end{matrix} \\ \begin{matrix} 1 \\ 2 \\ 3 \\ 4 \end{matrix} & \begin{bmatrix} 0 & 8 & \infty & 1 \\ \infty & 0 & 1 & \infty \\ 4 & \infty & 0 & \infty \\ \infty & 2 & 9 & 0 \end{bmatrix} \end{matrix}$$

$$D_1 = \begin{matrix} & \begin{matrix} 1 & 2 & 3 & 4 \end{matrix} \\ \begin{matrix} 1 \\ 2 \\ 3 \\ 4 \end{matrix} & \begin{bmatrix} 0 & 8 & \infty & 1 \\ \infty & 0 & 1 & \infty \\ 4 & 12 & 0 & 5 \\ \infty & 2 & 9 & 0 \end{bmatrix} \end{matrix}$$

$$\begin{aligned} D(2 \text{ to } 3) \text{ via } 1 & \rightarrow \infty \\ &= D(2 \text{ to } 1) + D(1 \text{ to } 3) \\ &= \infty \end{aligned}$$



$$\begin{aligned} D(A \text{ to } C \text{ via } B) &= D(A \text{ to } B) + D(B \text{ to } C) \end{aligned}$$

$$\begin{aligned} 2 \text{ to } 4 &= 2 \text{ to } 1 + 1 \text{ to } 4 = \infty \quad | \quad 3 \text{ to } 2 = 3 \text{ to } 1 + 1 \text{ to } 2 = 4 + 8 = 12. \\ 3 \text{ to } 4 &= 3 \text{ to } 1 + 1 \text{ to } 4 = 4 + 1 = 5 \quad | \quad 4 \text{ to } 2 = 4 \text{ to } 1 + 1 \text{ to } 2 = \infty \quad | \quad \begin{aligned} 4 \text{ to } 3 &= 4 \text{ to } 1 + 1 \text{ to } 3 \\ &= \infty \end{aligned} \end{aligned}$$

$$D_1 = \begin{matrix} & \begin{matrix} 1 & 2 & 3 & 4 \end{matrix} \\ \begin{matrix} 1 \\ 2 \\ 3 \\ 4 \end{matrix} & \begin{bmatrix} 0 & 8 & \infty & 1 \\ \infty & 0 & 1 & \infty \\ 4 & 12 & 0 & 5 \\ \infty & 2 & 9 & 0 \end{bmatrix} \end{matrix}$$

$$D_2 = \begin{matrix} & \begin{matrix} 1 & 2 & 3 & 4 \end{matrix} \\ \begin{matrix} 1 \\ 2 \\ 3 \\ 4 \end{matrix} & \begin{bmatrix} 0 & 8 & 9 & 1 \\ \infty & 0 & 1 & \infty \\ 4 & 12 & 0 & 5 \\ \infty & 2 & 3 & 0 \end{bmatrix} \end{matrix}$$

$$\begin{aligned} 1 \text{ to } 3 \text{ via } 2 &= 1 \text{ to } 2 + 2 \text{ to } 3 \\ &= 8 + 1 = 9. \end{aligned}$$

$$\begin{aligned} 1 \text{ to } 4 &= 1 \text{ to } 2 + 2 \text{ to } 4 = 8 + \infty = \infty \quad | \quad 3 \text{ to } 1 = 3 \text{ to } 2 + 2 \text{ to } 1 = 12 + \infty = \infty \\ 3 \text{ to } 4 &= 3 \text{ to } 2 + 2 \text{ to } 4 = 12 + \infty = \infty \quad | \quad 4 \text{ to } 1 = 4 \text{ to } 2 + 2 \text{ to } 1 = 2 + \infty = \infty. \\ 4 \text{ to } 3 &= 4 \text{ to } 2 + 2 \text{ to } 3 = 2 + 1 = 3. \end{aligned}$$

$$D_2 = \begin{matrix} & \begin{matrix} 1 & 2 & 3 & 4 \end{matrix} \\ \begin{matrix} 1 \\ 2 \\ 3 \\ 4 \end{matrix} & \begin{bmatrix} 0 & 8 & 9 & 1 \\ \infty & 0 & 1 & \infty \\ 4 & 12 & 0 & 5 \\ \infty & 2 & 3 & 0 \end{bmatrix} \end{matrix}$$

$$D_3 = \begin{matrix} & \begin{matrix} 1 & 2 & 3 & 4 \end{matrix} \\ \begin{matrix} 1 \\ 2 \\ 3 \\ 4 \end{matrix} & \begin{bmatrix} 0 & 8 & 9 & 1 \\ 5 & 0 & 1 & 6 \\ \infty & 2 & 3 & 0 \end{bmatrix} \end{matrix}$$

$$D_2 = \begin{matrix} & \begin{matrix} 1 & 2 & 3 & 4 \end{matrix} \\ \begin{matrix} 1 \\ 2 \\ 3 \\ 4 \end{matrix} & \begin{bmatrix} 0 & 8 & 9 & 1 \\ \infty & 0 & 1 & \infty \\ 4 & 12 & 0 & 5 \\ \infty & 2 & 3 & 0 \end{bmatrix} \end{matrix}$$

$$D_3 = \begin{matrix} & \begin{matrix} 1 & 2 & 3 & 4 \end{matrix} \\ \begin{matrix} 1 \\ 2 \\ 3 \\ 4 \end{matrix} & \begin{bmatrix} 0 & 8 & 9 & 1 \\ 5 & 0 & 1 & 6 \\ 4 & 12 & 0 & 5 \\ 7 & 2 & 3 & 0 \end{bmatrix} \end{matrix}$$

$$\begin{array}{l} 1 \text{ to } 2 \text{ via } 3 = 1 \text{ to } 3 + 3 \text{ to } 2 \\ \quad \quad \quad = 9 + 12 = 21 \end{array} \quad \left| \quad \begin{array}{l} 1 \text{ to } 4 = 1 \text{ to } 3 + 3 \text{ to } 4 \\ \quad \quad \quad = 9 + 5 = 14 \end{array} \right| \quad \begin{array}{l} 2 \text{ to } 1 = 2 \text{ to } 3 + 3 \text{ to } 1 \\ \quad \quad \quad = 1 + 4 = 5. \end{array}$$

$$\begin{array}{l} 2 \text{ to } 4 = 2 \text{ to } 3 + 3 \text{ to } 4 = 1 + 5 = 6 \end{array} \quad \left| \quad \begin{array}{l} 4 \text{ to } 1 = 4 \text{ to } 3 + 3 \text{ to } 1 \\ \quad \quad \quad = 3 + 4 = 7. \end{array} \right| \quad \begin{array}{l} 4 \text{ to } 2 = 4 \text{ to } 3 + 3 \text{ to } 2 \\ \quad \quad \quad = 3 + 12 = 15 \end{array}$$

$$D_3 = \begin{matrix} & \begin{matrix} 1 & 2 & 3 & 4 \end{matrix} \\ \begin{matrix} 1 \\ 2 \\ 3 \\ 4 \end{matrix} & \begin{bmatrix} 0 & 8 & 9 & 1 \\ 5 & 0 & 1 & 6 \\ 4 & 12 & 0 & 5 \\ 7 & 2 & 3 & 0 \end{bmatrix} \end{matrix}$$

$$D_4 = \begin{matrix} & \begin{matrix} 1 & 2 & 3 & 4 \end{matrix} \\ \begin{matrix} 1 \\ 2 \\ 3 \\ 4 \end{matrix} & \begin{bmatrix} 0 & 3 & 4 & 1 \\ 5 & 0 & 1 & 6 \\ 4 & 7 & 0 & 5 \\ 7 & 2 & 3 & 0 \end{bmatrix} \end{matrix}$$

$$\begin{array}{l} 1 \text{ to } 2 \text{ via } 4 = 1 \text{ to } 4 + 4 \text{ to } 2 = 1 + 2 = 3 \end{array} \quad \left| \quad \begin{array}{l} 1 \text{ to } 3 = 1 \text{ to } 4 + 4 \text{ to } 3 = 1 + 3 = 4 \end{array} \right.$$

$$\begin{array}{l} 2 \text{ to } 1 = 2 \text{ to } 4 + 4 \text{ to } 1 = 6 + 7 = 13 \end{array} \quad \left| \quad \begin{array}{l} 2 \text{ to } 3 = 2 \text{ to } 4 + 4 \text{ to } 3 = 6 + 3 = 9 \end{array} \right.$$

$$\begin{array}{l} 3 \text{ to } 1 = 3 \text{ to } 4 + 4 \text{ to } 1 = 5 + 7 = 12 \end{array} \quad \left| \quad \begin{array}{l} 3 \text{ to } 2 = 3 \text{ to } 4 + 4 \text{ to } 2 = 5 + 2 = 7 \end{array} \right.$$