

Step-1

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

We easily see that every row contains the numbers 0, 1, 2, and 3

It is not symmetric while 1,2th entry 1 and 2,1th entry is 2 such that both are not equal.

The determinant of this matrix is
$$-1 \begin{vmatrix} 2 & 3 & 1 \\ 1 & 3 & 2 \\ 3 & 0 & 1 \end{vmatrix} + 2 \begin{vmatrix} 0 & 2 & 3 \\ 1 & 3 & 1 \\ 2 & 3 & 2 \end{vmatrix}$$

$$\begin{aligned} &= (-1)(3) \begin{vmatrix} 3 & 1 \\ 3 & 2 \end{vmatrix} + (-1)(1) \begin{vmatrix} 2 & 3 \\ 1 & 3 \end{vmatrix} + 2(-1) \begin{vmatrix} 2 & 3 \\ 3 & 2 \end{vmatrix} + 2(2) \begin{vmatrix} 2 & 3 \\ 3 & 1 \end{vmatrix} \\ &= -3(6-3) - 1(6-3) - 2(4-9) + 4(2-9) \\ &= -9 - 3 + 10 - 28 \\ &= -29 \\ &\neq 0 \end{aligned}$$

So, the matrix is invertible and its inverse is

$$\begin{bmatrix} -1 & -\frac{7}{6} & \frac{11}{6} & \frac{1}{2} \\ 2 & \frac{17}{6} & -\frac{25}{6} & -\frac{1}{2} \\ 1 & \frac{11}{6} & -\frac{13}{6} & -\frac{1}{2} \\ -1 & -\frac{13}{6} & \frac{17}{6} & \frac{1}{2} \end{bmatrix}$$