

## Step-1

Consider the following equations:

$$a + b = p$$

$$c + d = q$$

$$a + c = r$$

$$b + d = s$$

In such case, we cannot solve these equations uniquely, and therefore, we cannot obtain a unique matrix  $A$ , by using only these four equations.

## Step-2

As an example, consider the following matrix:

$$\begin{bmatrix} .. & .. \\ .. & .. \end{bmatrix} \begin{matrix} 3 \\ 7 \end{matrix}$$
$$\begin{matrix} 4 & 6 \end{matrix}$$

The numbers 3, 4, 6, 7 refer to the sum along the rows and columns. Note that we can write two distinct matrices, which have row sums 3, 7 and column sums 4, 6. The matrices are as shown below:

$$\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} \text{ and } \begin{bmatrix} 2 & 1 \\ 2 & 5 \end{bmatrix}$$

## Step-3

Therefore, it is not possible to recover the original matrix, if only the row sums and column sums are known.