Step-1

Matrix *A* can be factorized into product of lower and upper triangular matrices.

$$A = LU$$

Here, matrix *L* is a lower triangular matrix with 1 at the diagonal position and matrix *U* is the upper triangular matrix with pivots at the diagonal position.

Step-2

Consider the following matrices:

$$A = \begin{bmatrix} x & x & x & x \\ x & x & x & 0 \\ 0 & x & x & x \\ 0 & 0 & x & x \end{bmatrix}$$

$$B = \begin{bmatrix} x & x & x & 0 \\ x & x & 0 & x \\ x & 0 & x & x \\ 0 & x & x & x \end{bmatrix}$$

Here, nonzero positions are marked by *x*. Determine which zeros will be still zero in their factors *L* and *U*.

Step-3

First take matrix *A*.

$$A = \begin{bmatrix} x & x & x & x \\ x & x & x & 0 \\ 0 & x & x & x \\ 0 & 0 & x & x \end{bmatrix}$$

It can be seen that a part (3×3) of the (4×4) matrix is already in lower triangular form. Now recall that if a row of matrix *A* starts with zeros, so does that row of matrix *L* and if a column starts with zero so does that column of matrix *U*.

Therefore, matrix *L* will contain three zeros at the position $\boxed{a_{31}, a_{41}, a_{42}}$ however matrix *U* may not contain zero at the position $\boxed{a_{24}}$.

Step-4

Similarly, in the case of matrix *B*, bottom left side zero will be in matrix *L* and top right side zero will be in matrix *U*. Rest zeros may be filled in by the non zeros.

Therefore, matrix *L* will contain one zero at the position $\boxed{a_{41}}$ and matrix *U* will contain zero at the position $\boxed{a_{14}}$.