Step-1

We have to find that for which numbers c is $A = LU$ impossible with three pivots.

Given matrix $A = \begin{pmatrix} 1 & 2 & 0 \\ 3 & c & 1 \\ 0 & 1 & 1 \end{pmatrix}$

Subtracting 3 times row 1 from row 2 gives

$$= \begin{pmatrix} 1 & 2 & 0 \\ 0 & c-6 & 1 \\ 0 & 1 & 1 \end{pmatrix}$$

Step-2

Now if $c = 6$, then the second pivot becomes 0.

We know that if any element in the pivot position is zero then LU factorization is not possible, so if $c = 6$ then LU is impossible.