

## Step-1

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(a) Let  $A = LDU$  with 1s on the main diagonals of  $L$  and  $U$ .

We have to find the corresponding factorization of  $A^T$ .

## Step-2

Since  $A = LDU$  where  $L, D$  are permutation matrices consists 1s on the diagonal

Now

$$A = LDU$$

Taking transpose on the both sides gives

$$(A)^T = (LDU)^T$$
$$A^T = U^T D^T L^T \quad \left( \text{Since } (AB)^T = B^T A^T \right)$$

$$A^T = U^T D L^T \quad \left( \text{Since } D^T = D \right)$$

Hence  $\boxed{A^T = U^T D L^T}$

## Step-3

(b) We have to explain what triangular systems will give the solution to  $A^T y = b$ .

The upper triangular systems give the solution to the system  $A^T y = b$  since the product becomes upper triangular matrices.