

Q.

A:

$$PA = LU \quad P^T PA = P^T LU$$

$$IA = P^T LU$$

$$\det(P^T LU) = \det(P^T) \det(L) \det(U)$$

$$= \det(P^T) \cdot 1 \det(U)$$

$$= \det(P^T) \cdot \prod_{i=1}^n u_{ii}$$

$\therefore P$ is permutation matrix

$$\therefore \det(P) = (-1)^k \quad \det(P^T) = \det(P) = 1^n = 1$$

$$\therefore \det(P^T LU) = 1 \cdot \prod_{i=1}^n u_{ii} = \prod_{i=1}^n u_{ii} = \det(A)$$

B

$\therefore \det(P)$ is known LU is computed

\Rightarrow we just compute $1 \cdot \det(U)$

$$\rightarrow 1 + n - 1 = n \text{ flops}$$