BACKWARD SUBSTITUTION

$$[U]\{x\} = \{b\} \xrightarrow{O(n^2)} \{x\}$$

FORWARD SUBSTITUTION

$$[L]\{x\} = \{b\} \xrightarrow{O(n^2)} \{x\}$$

GAUSS ELIMINATION

$$[A]\{x\} = \{b\} \xrightarrow[\text{Row Operations}]{O(n^3)} [U]\{x\} = \{b\} \xrightarrow[\text{Backward Substitution.}]{O(n^2)} \{x\}$$

LU DECOMPOSITION

$$[A]\{x\} = \{b\} \xrightarrow{O(n^3)} [A] = [L][U] \xrightarrow{O(n^2)} \begin{cases} [U]\{z_1\} = \{b_1\} \\ [L]\{x_1\} = \{z_1\} \end{cases}$$

$$[A] = [L][U] \xrightarrow{O(n^2)} \begin{cases} [U]\{z_2\} = \{b_2\} \\ [L]\{x_2\} = \{z_2\}. \end{cases}$$

$$[A] = [L][U] \xrightarrow{O(n^2)} \begin{cases} [U]\{z_3\} = \{b_3\} \\ [L]\{x_3\} = \{z_3\} \end{cases}$$

Forward Substitution followed by Backward Substitution