

input : $n \times n$ matrix $[A]$, right-hand side $\{b\}$

output: solution $\{x\}$ of $[A]\{x\} = \{b\}$

// forward elimination

for $c \leftarrow 1$ **to** $n - 1$ **do**

 // find the largest entry in column c

$p \leftarrow \operatorname{argmax}(\operatorname{abs}(A[c:n, c])) + c - 1$

 // swap that row into the pivot position

$A[c, :] \leftrightarrow A[p, :]$

$b[c] \leftrightarrow b[p]$

for $r \leftarrow c + 1$ **to** n **do**

$f \leftarrow A[r, c] / A[c, c]$

$A[r, c:n] \leftarrow A[r, c:n] - f \cdot A[c, c:n]$

$b[r] \leftarrow b[r] - f \cdot b[c]$

end

end

// back substitution

for $r \leftarrow n, n - 1, \dots, 1$ **do**

$s \leftarrow b[r]$

for $j \leftarrow r + 1$ **to** n **do**

$s \leftarrow s - A[r, j] \cdot x[j]$

end

$x[r] \leftarrow s / A[r, r]$

end