double LU[1:n,1:n]; int ps[1:n]; # see Figure 11.16
double sum, x[1:n], b[1:n];

# forward substitution to solve \( L y = b \), storing \( y \) in \( x \)
for [i = 1 to n] {
    sum = 0.0;
    for [j = 1 to i-1]
        sum = sum + LU[ps[i],j] * x[j];
    x[i] = b[ps[i]] - sum;
}

# backward substitution to solve \( U x = y \) for \( x \)
for [i = n to 1 by -1] {
    sum = 0.0;
    for [j = i+1 to n]
        sum = sum + LU[ps[i],j] * x[j];
    x[i] = (x[i] - sum) / LU[ps[i],i];
}

\textbf{Figure 11.17} Solving \( Ax = b \) given an LU decomposition of \( A \).

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