Algorithm 7 Symbolic Full-Pivoting Strategy.

Require: A $m \times n$ matrix $\mathbf{A}$.
The k-th pivoting stage.
procedure SymbolicPivoting($\mathbf{A}$, k) ▷ Symbolic pivoting procedure for the k-th pivot
  $\mathbf{d}^r,\ \mathbf{d}^c \leftarrow$ ComputeDegrees($\mathbf{A}$) ▷ Calculate the row and column degrees of $\mathbf{A}$
  for i **from** k **to** m **do** ▷ Iterate over the rows
    for j **from** k **to** n **do** ▷ Iterate over the columns
      $D_{ij} \leftarrow \infty$ ▷ Set the combined degree matrix to infinity
      if $A_{ij} \neq 0$ **then** $D_{ij} \leftarrow d_i^r \max(0,\ d_j^c - 1) + d_j^c \max(0,\ d_i^r - 1)$ ▷ The combined degree
    end for
  end for
  $\mathcal{P} \leftarrow$ Sort($\mathbf{D}$) ▷ Find the permutation that sorts the pivots list by degree cost
  $q,\ l \leftarrow 0,\ 0$ ▷ Initialize the temporary pivot row and column indices
  $p,\ p_c,\ p_n \leftarrow \infty,\ \infty,\ \infty$ ▷ Initialize the temporary pivot value, complexity and numerical value
  for all (i, j) **in** $\mathcal{P}$ **do** ▷ Iterate on the permutation set
    if $p_c \neq \infty$ **and** $D_{ij} > D_{ql}$ **then break** ▷ No more good pivots to check
    $t \leftarrow A_{ij}$ ▷ Get the pivot value
    if Signature(t) $= 0$ **then continue** ▷ Skip the next pivot
    $t \leftarrow$ Simplify(t) ▷ Try to simplify the pivot expression
    $t_c \leftarrow$ ExpressionComplexity(t) ▷ Calculate the computational cost of the pivot
    $t_n \leftarrow \infty$ ▷ Set the default numerical value of the pivot to infinity
    if t is numeric **then** $t_n \leftarrow \max(1,\ \mathrm{abs}(t))$ ▷ Set the numerical value of the pivot
    if $t_c < p_c$ **or** ($t_c = p_c$ **and** $t_n > p_n$) **then** ▷ If the pivot is better than the current one
      $q,\ l \leftarrow i,\ j$ ▷ Update the best pivot row and column indices
      $p,\ p_c,\ p_n \leftarrow t,\ t_c,\ t_n$ ▷ Update the best pivot value, complexity and numerical value
    end if
  end for
return $p,\ q,\ l$ ▷ The k-th pivot and its position
end procedure