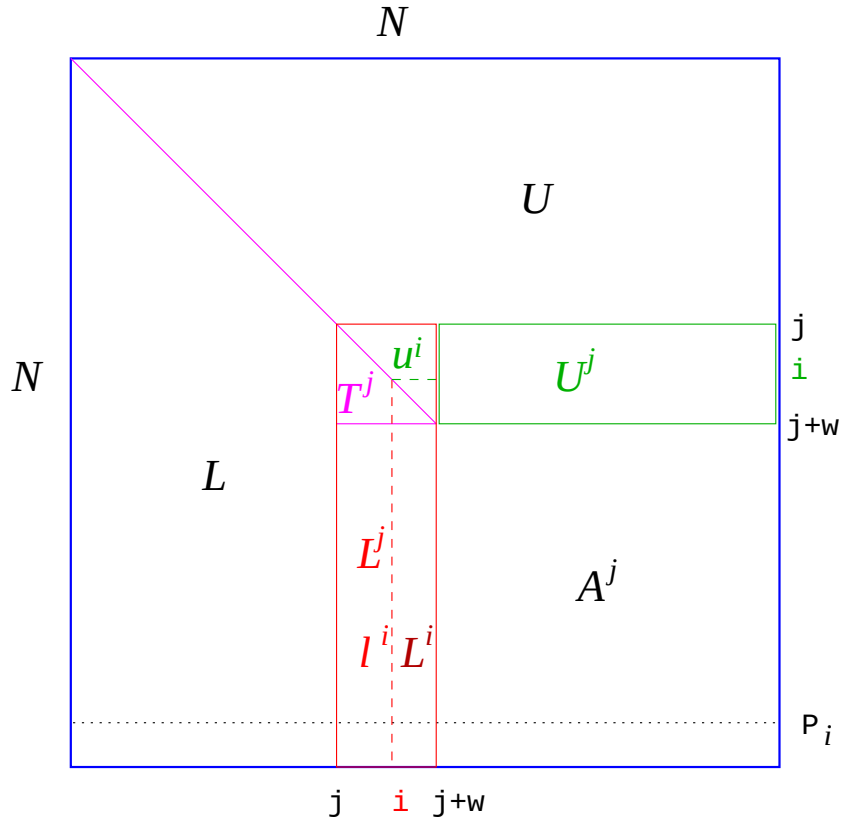
Blocked LU Factorization Algorithm

- uses Gaussian elimination with partial pivoting on an $N \times N$ matrix A ($w \equiv NB$)

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for (j=0; j < N; j+=w)
  for (i=j; i < j+w; i++)
    find P[i] s.t. |A_{P[i], i}| ≥ |A_{i:N-1, i}|
    A_{i, j:j'-1} ↔ A_{P[i], j:j'-1}   (j' = j + w)
    l^i ← l^i / A_{i,i}
    L^i ← L^i − l^i u^i
  for (i = j; i < j+w; i++)
    A_{i,:} ↔ A_{P[i],:}   (outside L^j)
  U^j ← (T^j)^{-1} U^j
  A^j ← A^j − L^j U^j
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- $l^i = A_{i+1:N-1,\, i}$; $u^i = A_{i,\, i+1:j'-1}$; $L^i = A_{i+1:N-1,\, i+1:j'-1}$
- $(T^j) = A_{j:j'-1,\, j:j'-1}$ (lower triangular matrix, with unit diagonal)
- $L^j = A_{j':N-1,\, j:j'-1}$; $U^j = A_{j:j'-1,\, j':N-1}$; $A^j = A_{j':N-1,\, j':N-1}$