SEQUENTIAL LU FACTORIZATION CODE

```
   DO 20 J = 1, MIN( M, N ), NB
      JB = MIN( MIN( M, N )-J+1, NB )


      Factor diagonal and subdiagonal blocks and test for exact
      singularity.

      CALL DGETF2( M-J+1, JB, A( J, J ), LDA, IPIV( J ),
  $                IINFO )

      Adjust INFO and the pivot indices.

      IF( INFO.EQ.0 .AND. IINFO.GT.0 ) INFO = IINFO + J - 1
      DO 10 I = J, MIN( M, J+JB-1 )
         IPIV( I ) = J - 1 + IPIV( I )
10    CONTINUE

      Apply interchanges to columns 1:J-1.

      CALL DLASWP( J-1, A, LDA, J, J+JB-1, IPIV, 1 )


      IF( J+JB.LE.N ) THEN

         Apply interchanges to columns J+JB:N.

         CALL DLASWP( N-J-JB+1, A( 1, J+JB ), LDA, J, J+JB-1,
  $                   IPIV, 1 )

         Compute block row of U.

         CALL DTRSM( 'Left', 'Lower', 'No transpose', 'Unit',
  $                  JB, N-J-JB+1, ONE, A( J, J ), LDA,
  $                  A( J, J+JB ), LDA )
         IF( J+JB.LE.M ) THEN

            Update trailing submatrix.

            CALL DGEMM( 'No transpose', 'No transpose',
  $                     M-J-JB+1, N-J-JB+1, JB, -ONE,
  $                     A( J+JB, J ), LDA, A( J, J+JB ), LDA,
  $                     ONE, A( J+JB, J+JB ), LDA )
         END IF
      END IF
20 CONTINUE
```

PARALLEL LU FACTORIZATION CODE

```
   DO 10 J = JA, JA+MIN(M,N)-1, DESCA( 4 )
      JB = MIN( MIN(M,N)-J+JA, DESCA( 4 ) )
      I = IA + J - JA

      Factor diagonal and subdiagonal blocks and test for exact
      singularity.

      CALL PDGETF2( M-J+JA, JB, A, I, J, DESCA, IPIV, IINFO )


      Adjust INFO and the pivot indices.

      IF( INFO.EQ.0 .AND. IINFO.GT.0 )
  $      INFO = IINFO + J - JA



      Apply interchanges to columns JA:J-JA.

      CALL PDLASWP( 'Forward', 'Rows', J-JA, A, IA, JA, DESCA,
  $                 J, J+JB-1, IPIV )

      IF( J-JA+JB+1.LE.N ) THEN

         Apply interchanges to columns J+JB:JA+N-1.

         CALL PDLASWP( 'Forward', 'Rows', N-J-JB+JA, A, IA,
  $                    J+JB, DESCA, J, J+JB-1, IPIV )

         Compute block row of U.

         CALL PDTRSM( 'Left', 'Lower', 'No transpose', 'Unit',
  $                   JB, N-J-JB+JA, ONE, A, I, J, DESCA, A, I,
  $                   J+JB, DESCA )
         IF( J-JA+JB+1.LE.M ) THEN

            Update trailing submatrix.

            CALL PDGEMM( 'No transpose', 'No transpose',
  $                      M-J-JB+JA, N-J-JB+JA, JB, -ONE, A,
  $                      I+JB, J, DESCA, A, I, J+JB, DESCA,
  $                      ONE, A, I+JB, J+JB, DESCA )
         END IF
      END IF
10 CONTINUE
```