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DATE 10-02-2025 13 46 32
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                         USER FRTRN90 JOB BNCHMRK
PROGRAM LID DRIVEN CAVITY
  IMPLICIT NONE
  INTEGER, PARAMETER N 50 GRID SIZE NXN GRID GRID SPACING, TIME STEP, REYNOLDS NUMBER
         UN, N, VN, N, PN, N
  REAL
                                    VELOCITY AND PRESSURE FIELDS
  INTEGER I, J, STEP
  REAL
         START TIME, END TIME, ELAPSED TIME
   PARAMETERS
                      GRID SPACING IN X DIRECTION
  \mathsf{D}\mathsf{X}
      1.0 / N-1
      1.0 / N-1
                      GRID SPACING IN Y DIRECTION
                      TIME STEP SIZE
  DT
      0.001
  RE
                      REYNOLDS NUMBER
      100
   INITIALIZE ARRAYS
     0.0
     0.0
  P
    0.0
   INITIALIZE THE TOP BOUNDARY LID VELOCITY
  U N.
           1.0
   START TIMING
  CALL CPU TIME START TIME
   MAIN LOOP FOR TIME STEPPING
  DO STEP 1, 1000
     CALL COMPUTE VELOCITY U, V, P, DX, DY, DT, RE
     CALL UPDATE PRESSURE P. DX. DY
       OUTPUT OR CHECK CONVERGENCE
     IF MOD STEP, 100 0 THEN
        PRINT *, STEP , STEP
     END IF
  END DO
    STOP TIMING
  CALL CPU TIME END TIME
  ELAPSED TIME END TIME - START TIME
  PRINT *, ELAPSED TIME FOR CFD SIMULATION , ELAPSED TIME, SECONDS
CONTAINS
   FUNCTION TO UPDATE THE VELOCITY AND PRESSURE FIELDS SIMPLIFIED
  SUBROUTINE COMPUTE VELOCITY U, V, P, DX, DY, DT, RE
   REAL, DIMENSION , , INTENT INOUT
                                      U. V. P
    REAL, INTENT IN
                       DX, DY, DT, RE
    INTEGER
              I, J
      SIMPLE EXPLICIT METHOD FOR VELOCITY SIMPLIFIED
   DO I 2, N-1
       DO J 2, N-1
           U I, J U I, J - DT *
                                       U I, J * U I+1, J - U I-1, J
                                                                         / 2*DX
                                       V I, J * U I, J+1 - U I, J-1
                                                                            2*DY
        END DO
   END DO
```

SIMPLE VELOCITY UPDATE FOR V SIMILAR

DO I 2, N-1

DO J 2, N-1

END PROGRAM LID DRIVEN CAVITY