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11 BNCHMRK FRTRN90

12 BNCHMRK FRTRN90 SYSID ACID SYSUSER ACID

13 BNCHMRK FRTRN90

14 BNCHMRK FRTRN90 FORM SMALL

15 BNCHMRK FRTRN90

16 BNCHMRK FRTRN90 CHAR FONT1403

17 BNCHMRK FRTRN90

18 BNCHMRK FRTRN90 PRT1403 VERSION 1.5.PRE-RELEASE

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22 FFFFFFFF RRRRRRRR TTTTTTTT RRRRRRRR N NN 9999999 00000

23 FFFFFFFF RRRRRRRR TTTTTTTT RRRRRRRR NN NN 999999999 0000000

24 FF RR RR TT RR RR NNN NN 99 99 00 00

25 FF RR RR TT RR RR NNNN NN 99 99 00 00

26 FFFFFFFF RRRRRRRR TT RRRRRRRR NN NN NN 999999999 00 00

27 FFFFFFFF RRRRRRRR TT RRRRRRRR NN NN NN 99999999 00 00

28 FF RR RR TT RR RR NN NNNN 99 00 00

29 FF RR RR TT RR RR NN NNN 99 00 00

30 FF RR RR TT RR RR NN NN 99999999 0000000

31 FF RR RR TT RR RR NN N 9999999 00000

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34 BBBB BBBB N NN CCCCCC HH HH M M RRRRRRRR KK KK

35 BBBB BBBB NN NN CCCCCCCC HH HH MM MM RRRRRRRR KK KK

36 BB BB NNN NN CC CC HH HH MMM MMM RR RR KK KK

37 BB BB NNNN NN CC HH HH MMM MMM RR RR KK KK

38 BBBB BBBB NN NN NN CC HHHHHHHHHH MM MM MM RRRRRRRR KKKKK

39 BBBB BBBB NN NN NN CC HHHHHHHHHH MM M MM RRRRRRRR KK KK

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42 BBBB BBBB NN NN CCCCCCCC HH HH MM MM RR RR KK KK

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1 PROGRAM LID DRIVEN CAVITY
2 IMPLICIT NONE
3 INTEGER, PARAMETER N = 50 GRID SIZE NXN GRID
4 REAL DX, DY, DT, RE GRID SPACING, TIME STEP, REYNOLDS NUMBER
5 REAL U N, N, V N, N, P N, N VELOCITY AND PRESSURE FIELDS
6 INTEGER I, J, STEP
7 REAL START TIME, END TIME, ELAPSED TIME
8
9 PARAMETERS
10 DX 1.0 / N-1 GRID SPACING IN X DIRECTION
11 DY 1.0 / N-1 GRID SPACING IN Y DIRECTION
12 DT 0.001 TIME STEP SIZE
13 RE 100 REYNOLDS NUMBER
14
15 INITIALIZE ARRAYS
16 U 0.0
17 V 0.0
18 P 0.0
19
20 INITIALIZE THE TOP BOUNDARY LID VELOCITY
21 U N, 1.0
22
23 START TIMING
24 CALL CPU TIME START TIME
25
26 MAIN LOOP FOR TIME STEPPING
27 DO STEP 1, 1000
28 CALL COMPUTE VELOCITY U, V, P, DX, DY, DT, RE
29 CALL UPDATE PRESSURE P, DX, DY
30
31 OUTPUT OR CHECK CONVERGENCE
32 IF MOD STEP, 100 0 THEN
33 PRINT *, STEP, STEP
34 END IF
35 END DO
36
37 STOP TIMING
38 CALL CPU TIME END TIME
39 ELAPSED TIME END TIME - START TIME
40 PRINT *, ELAPSED TIME FOR CFD SIMULATION, ELAPSED TIME, SECONDS
41
42 CONTAINS
43
44 FUNCTION TO UPDATE THE VELOCITY AND PRESSURE FIELDS SIMPLIFIED
45 SUBROUTINE COMPUTE VELOCITY U, V, P, DX, DY, DT, RE
46 REAL, DIMENSION, , INTENT INOUT U, V, P
47 REAL, INTENT IN DX, DY, DT, RE
48 INTEGER I, J
49
50 SIMPLE EXPLICIT METHOD FOR VELOCITY SIMPLIFIED
51 DO I 2, N-1
52 DO J 2, N-1
53 U I, J = U I, J - DT * ( U I, J * U I+1, J - U I-1, J / 2*DX
54 V I, J = V I, J - DT * ( V I, J * V I, J+1 - V I, J-1 / 2*DY
55 END DO
56 END DO
57
58 SIMPLE VELOCITY UPDATE FOR V SIMILAR
59 DO I 2, N-1
60 DO J 2, N-1
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1      V I, J      V I, J - DT *      U I, J * V I+1, J - V I-1, J      / 2*DX
2      V I, J * V I, J+1 - V I, J-1      / 2*DY
3      END DO
4      END DO
5      END SUBROUTINE COMPUTE VELOCITY
6
7      FUNCTION TO SOLVE FOR PRESSURE SIMPLIFIED POISSON EQUATION SOLVER
8      SUBROUTINE UPDATE PRESSURE P, DX, DY
9      REAL, DIMENSION , , INTENT INOUT      P
10     REAL, INTENT IN      DX, DY
11     INTEGER      I, J
12
13     SIMPLE PRESSURE POISSON EQUATION JACOBI ITERATION
14     DO I      2, N-1
15         DO J      2, N-1
16             P I, J      0.25 *      P I+1, J + P I-1, J + P I, J+1 + P I, J-1
17         END DO
18     END DO
19     END SUBROUTINE UPDATE PRESSURE
20
21 END PROGRAM LID DRIVEN CAVITY
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