```
 1:
 2: ****************************************
 3: ./part1.f90
 4:
 5: PROGRAM classproj1
 6: !*** Program to multiply together two matrices mat1 & mat2 and store
 7: !*** the result in mat3.
 8:
 9:   IMPLICIT NONE
10:
11:   INTEGER, PARAMETER :: m=2,n=3,k=2 !** Need to be PARAMETER type as used
12:                                     !** to declare array sizes.
13:   INTEGER :: matno,i,j,p
14:   INTEGER, PARAMETER, DIMENSION(2) :: row=(/m,n/)
15:
16:   REAL, DIMENSION(m,n) :: mat1
17:   REAL, DIMENSION(n,k) :: mat2
18:   REAL, DIMENSION(m,k) :: mat3,mat4
19:
20:
21:   !**** Input the two matrices from the keyboard
22:   !**** Press return after each element
23:   !**** matrix one then matrix two
24:   !**** NOTE you could read each matrix is separately if you prefer!
25:
26:   DO matno=1,2 !** Number of matrices to be input from terminal
27:     DO i=1,row(matno)
28:       PRINT*,"Enter matrix",matno," row",i
29:         IF (matno==1) THEN
30:           READ*,mat1(i,:)
31:         ELSE
32:           READ*,mat2(i,:)
33:         ENDIF
34:     ENDDO
35:   ENDDO
36:
37:   PRINT*,SIZE(mat1,1)
38:   PRINT*,SIZE(mat1,2)
39:   PRINT*,SIZE(mat1)
40:
41:   !**** Perform the matrix multiplication
42:   !**** using three DO loops
43:
44:   DO i=1,m   !** rows in result matrix
45:     DO j=1,k !** cols in result matrix
46:       mat3(i,j)=0 !** Make sure summation variable is initially zero
47:       DO p=1,n
48:         !** Along row "i" of mat1 and down col "j" of mat2
49:         mat3(i,j)=mat3(i,j)+mat1(i,p)*mat2(p,j)
50:       ENDDO
51:     ENDDO
52:   ENDDO
53:
54:   !**** Perform the matrix multiplication
55:   !**** using Fortran's C=MATMUL(A,B) function.
56:
57:   mat4=MATMUL(mat1,mat2)
58:
59:   !**** Print out each matrix to the screen in turn
60:
61:   PRINT*,"Matrix One"
62:   PRINT*,""
63:   DO i=1,m
64:     PRINT*,mat1(i,:)
65:   ENDDO
66:
67:   PRINT*,""
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68:   PRINT*,"Matrix Two"
69:   PRINT*,""
70:
71:   DO i=1,n
72:     PRINT*,mat2(i,:)
73:   ENDDO
74:
75:   PRINT*,""
76:   PRINT*,"Matrix1 * Matrix2 (My Answer)"
77:   PRINT*,""
78:
79:   DO i=1,m
80:     PRINT*,mat3(i,:)
81:   ENDDO
82:
83:
84:   PRINT*,""
85:   PRINT*,"Matrix1 * Matrix2 (Fortran Answer)"
86:   PRINT*,""
87:
88:   DO i=1,m
89:     PRINT*,mat4(i,:)
90:   ENDDO
91:
92: END PROGRAM classproj1
93: ****************************************
94:
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