

Final Exam (A)

Thursday, February 05, 2009

Time: 120 minutes

NAME

Key Solution

ID #

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SECTION

EL-ARIYAN	Sat & Mon 9:00 am					
AL-HASHIM	Sat & Mon 8:00 am					
MLAIH	Sat & Mon 1:00 pm					
AL-YOUSEF	Sat & Mon 11:00 am	Sat & Mon 1:00 pm	Sun & Tue 8:00 am	Sun & Tue 9:00 am	Sun & Tue 11:00 am	Sun & Tue 1:00 pm

Please circle your section

Question #	Points	Grade
1 .	8	
2 .	6	
3 .	10	
4 .	8	
5 .	6	
6 .	9	
7 .	8	
8 .	15	
9 .	15	
10 .	15	
Total	100	

Good Luck

Question # 1 (8 points)

What is the output of the following program?

```

INTEGER M(4),N(4),K
READ*, (M(K),K=1,4)
READ*, (N(K),K=1,4)
CALL FUN(M,N,4)
DO 15 K=1,4,2
15  PRINT *, M(K),N(K)
END
SUBROUTINE FUN (A,B,N)
INTEGER K,N,T,A(N),B(N)
DO 10 K = 1,N
    T = A(K)+1
    A(K) = B(N+1-K)-1
    B(N+1-K) = T
10  CONTINUE
RETURN
END

```

Input:

```

1  2  12  3
4  12  14  17

```

16	4
11	3

Question # 2 (6 points)

What is the output of the following program?

```

INTEGER A(3,4),I,J,M
READ*, ((A(I,J),J=1,4),I=1,3)
J = 1
DO WHILE (J.LE.4)
    M = 999
    DO 10 I = 1,3
        IF(A(I,J).LT.M) M = A(I,J)
10  CONTINUE
    PRINT *, M
    J = J + 1
END DO
END

```

Input:

```

5  11  13  15  10  14
8  19  6  18  15  12

```

5
11
8
12

Question # 3 (10 points)

What is the output of the following program?

```

C = -72.2978
M = -412
PRINT 5, C, M, 'ICS101'
5  FORMAT (1X, F6.3, 3X, I6, A)
   PRINT 15, M, C, 'KFUPM'
15  FORMAT ('0', I4, 4X, F10.6, A7)
   PRINT 25, C, M, 'ICS101KFUPM'
25  FORMAT (' ', F10.3, I3, A8)
END

```

1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
*	*	*	*	*	*						-	4	1	2	I	C	S	1	0	1									
-	4	1	2					-	7	2	.	2	9	7	8	0	0			K	F	U	P	M					
			-	7	2	.	2	9	8	*	*	*	I	C	S	1	0	1	K	F									

Question 4 (8 points)

What will be the values of array X after executing the following program?

```

INTEGER X(2,4)
OPEN (UNIT=10, FILE = 'INPUT1.DAT', STATUS= 'OLD')
OPEN (UNIT=20, FILE = 'INPUT2.DAT', STATUS= 'OLD')
READ (10, *) ((X(J,I), I=1,4,2), J=1,2)
READ (20, *) ((X(I,J), I=1,2), J=2,4,2)
DO 1 I = 1,2
1  PRINT*, (X(I,J), J=1,4)
END

```

INPUT1.DAT file

8
9
11
13

INPUT2.DAT file

14
16
15
19

Output

8	14	9	15
11	16	13	19

Question 5 (6 points)

```

INTEGER J, K, M
OPEN(UNIT = 6, FILE = 'INPUT.DAT', STATUS = 'OLD')
DO 30 J = 1, 20
30   READ (6, *, END = 50) (M, K = 1, N)
50  PRINT*, J, K, M
END

```

The contents of the file 'INPUT.DAT' are:

10	37	46	54	23	22
24	85	34	35	56	31

Output when the limit of the **implied loop** **N = 7**

2	1	24
----------	----------	-----------

Output when the limit of the **implied loop** **N = 14**

1	13	31
----------	-----------	-----------

Question # 6 (9 points)

What will be the values of array A after executing the following program?

```

INTEGER A(3,3), I, J
OPEN(UNIT=2, FILE='INPUT.DAT', STATUS='OLD')
DO 10 I=3,1,-1
  DO 10 J=I,1,-1
    IF(I.EQ.J) THEN
      READ(2,*) A(I,J)
    ELSE
      READ(2,*) A(I,J), A(J,I)
    ENDIF
10  CONTINUE
DO 20 I=1,3
20  PRINT *, (A(I,J), J = 1,3)
END

```

Output

19	12	18
21	5	13
17	14	22

INPUT.DAT file

22	4
14	13
17	18
5	16
21	12
19	14

Question # 7 (8 points)

Assume that **Z** is defined as `INTEGER Z(2,0:4)` and the storage of array **Z** in the memory is shown below. What is the output of the following code?

```
PRINT*, ((Z(K,J), J = 1,4,4), K = 1,2)
PRINT*, (Z(2, J/2), J = 0,9,5)
```

Memory
7
1
5
6
10
8
1
9
3
4

5	6
1	8

Question # 8 (15 points)

Given a data file NUMS.DAT that contains unknown number of lines. Each line has a positive integer number. Write a program that reads the data from the above file and writes in another file DIVSUM.DAT in each line the number and the sum of its divisors.

Complete the following program by filling the underlined area:

```

INTEGER N, SUM

OPEN (UNIT=1, FILE='NUMS.DAT', STATUS='OLD')

OPEN (UNIT=2, FILE='DIVSUM.DAT', STATUS='UNKNOWN')

44 READ (1, *, END = 100) N

SUM = 0

DO 10 K = 1, N

    IF (MOD(N,K).EQ.0) SUM = SUM + K

10 CONTINUE

WRITE(2, *) N, SUM

GOTO 44

100 STOP

END
```

Question # 9 (15 points)

Complete the program that creates and initializes the two-dimensional array shown below. The values 0,1, and 2 have to be assigned to the elements of the array using nested loops (a loop inside another loop). Declare all your variables. Then your program will print the values of the array row-wise one row per line.

0	1	1	1
2	0	1	1
2	2	0	1
2	2	2	0
2	2	2	2
2	2	2	2

```

INTEGER X(6,4), I, J

DO 10 I = 1, 6

    DO 10 J = 1, 4

        IF (I.GT.J) THEN

            X(I,J) = 2

        ELSEIF (I.EQ.J) THEN

            X(I,J) = 0

        ELSE

            X(I,J) = 1

        ENDIF

    10 CONTINUE

DO 20 I = 1, 6

    20 PRINT *, (X(I,J), J=1, 4)

END

```

Question # 10 (15 points)

Complete the subroutine CALC that receives a 2-D array of real values of size 4x5. The subroutine returns 2 values SUMPOS and SUMNEG. SUMPOS represents the sum of positive values in the array and SUMNEG represents the sum of negative values in the array.

```
SUBROUTINE CALC (A, SUMPOS, SUMNEG)
```

```
REAL A (4, 5), SUMPOS, SUMNEG
```

```
INTEGER I, J
```

```
SUMPOS = 0.0
```

```
SUMNEG = 0.0
```

```
DO 10 I = 1, 4
```

```
    DO 10 J = 1, 5
```

```
        IF (A (I, J) .GT. 0) THEN
```

```
            SUMPOS = SUMPOS + A (I, J)
```

```
        ELSEIF (A (I, J) .LT. 0) THEN
```

```
            SUMNEG = SUMNEG + A (I, J)
```

```
        ENDIF
```

```
10 CONTINUE
```

```
    RETURN
```

```
END
```