

KING FAHD UNIVERSITY OF PETROLEUM AND MINERALS
Information and Computer Science Department

2009/2010 Second Semester (Term 092)
ICS101 Computer Programming (2-3-3)

FINAL EXAM

SUNDAY, 20 JUNE 2010, 07:30 AM
120 MINUTES

EXAM INSTRUCTIONS

- Use of Calculator in this exam is NOT allowed.
- If you go outside the exam hall for any reason (including going to toilet or bathroom), you will NOT be allowed to return back to the exam.
- Cheating in the exam will result in an F grade and other serious consequences.
- For multiple choice questions, bubble the correct choice for every question in the answer form in page 2. Only the answer form will be graded, so make sure that your bubbling is EXACTLY matching your selection.
- Pay attention to the differences between INTEGER and REAL values, Expressions, operations and variables.
- For multiple choice questions, a single choice might be the correct answer for multiple questions.
- To save time, solve every multiple choice question first and find the result before looking at the choices, then try to find your answer among the choices. If you try to match every choice with a given question without solving the question first, then you might end up running out of time.

Student Information

Name:						
KFUPM ID:						

AL-HASHIM	UT 02:10-3:00				
AL-MULHEM	SM 11:00-11:50	SM 01:10-02:00			
MLAIH	SM 07:00-07:50	SM 09:00-09:50			
ASLAM	SM 08:00-08:50	SM 10:00-10:50			
BAQAIS	UT 07:00-07:50	UT 09:00-09:50			
AL-YOUSEF	UT 07:00-07:50	UT 08:00-08:50	UT 10:00-10:50	UT 11:00-11:50	UT 01:10-02:00

Pls. Circle Your Section

Scored Marks

Question No.	Maximum Mark	Score
01 - 10	5	
11 - 23	13	
24	1.5	
25	1.5	
26	9	
TOTAL	30	

~ GOOD LUCK! ~

ANSWER FORM

Bubble the correct choices for questions 1-23. If you bubble more than one choice for the same question then you will get zero for that question.



01	A	B	C	D	E	F	G	H	I	J	K	L
02	A	B	C	D	E	F	G	H	I	J	K	L
03	A	B	C	D	E	F	G	H	I	J	K	L
04	A	B	C	D	E	F	G	H	I	J	K	L
05	A	B	C	D	E	F	G	H	I	J	K	L
06	A	B	C	D	E	F	G	H	I	J	K	L
07	A	B	C	D	E	F	G	H	I	J	K	L
08	A	B	C	D	E	F	G	H	I	J	K	L
09	A	B	C	D	E	F	G	H	I	J	K	L
10	A	B	C	D	E	F	G	H	I	J	K	L



11	A	B	C	D	E	F	G	H
12	A	B	C	D	E	F	G	H
13	A	B	C	D	E	F	G	H
14	A	B	C	D	E	F	G	H
15	A	B	C	D	E	F	G	H
16	A	B	C	D	E	F	G	H
17	A	B	C	D	E	F	G	H
18	A	B	C	D	E	F	G	H
19	A	B	C	D	E	F	G	H
20	A	B	C	D	E	F	G	H
21	A	B	C	D	E	F	G	H
22	A	B	C	D	E	F	G	H
23	A	B	C	D	E	F	G	H



FOR GRADING PURPOSE ONLY				
Part	# Not Answered	# Wrong	# Invalid	Score
01-10				
11-23				

Question 11-12 (2 points)

Assume that A is defined as:

INTEGER A(2, 0:4)

Assume also that the storage of array A in the memory is as shown below.

MEMORY
2
5
1
3
6
8
7
9
10
4

Question Table

<p>11.</p> <p>What is the output of the following print statements?</p> <p>PRINT*, (A(K, J), J = 1, 2, 2), K = 1, 2)</p> <p>PRINT*, (A(2, J), J = 0, 3, 2)</p>	<p>12.</p> <p>What is the output of the following print statements?</p> <p>PRINT*, A(1, 1), (A(1, J), J = 0, 2, 3)</p> <p>PRINT*, A(2, 3), (A(2, J), J = 1, 2, 3)</p>
---	--

Answer Table

<p>A.</p> <p>1 3</p> <p>5 8</p>	<p>B.</p> <p>2 5</p> <p>3 8</p>	<p>C.</p> <p>1 6</p> <p>5 3</p>	<p>D.</p> <p>2 6</p> <p>3 9</p>
<p>E.</p> <p>1 2</p> <p>9 3</p>	<p>F.</p> <p>2 1</p> <p>8 5</p>	<p>G.</p> <p>1 6</p> <p>9 5</p>	<p>H.</p> <p>2 6</p> <p>8 3</p>

Question 13-14 (2 points)

What is the output of the following FORTRAN programs?

Question Table

<p>13.</p> <pre> INTEGER A(6), B(3), J, K READ*, (A(K), K = 2, 7, 2) READ*, B DO 10 K = 1, 5, 2 A(K) = B(1) B(1) = B(1) + 5 10 CONTINUE PRINT*, (A(K), K = 2, 6, 2) PRINT*, B END </pre>	<p>14.</p> <pre> INTEGER A(3,4), K, J, M READ*, A J = 1 DO WHILE (J.LE.4) M = 0 DO 10 K = 1, 3 IF (A(K,J).GT.M) M = A(K,J) 10 CONTINUE PRINT*, M J = J + 1 END DO END </pre>
<p>INPUT:</p> <pre> 4 5 6 19 3 7 8 </pre>	<p>INPUT:</p> <pre> 1 14 7 18 9 11 16 19 5 6 18 22 </pre>

Answer Table

<p>A.</p> <pre> 4 5 6 18 7 8 </pre>	<p>B.</p> <pre> 14 18 19 22 </pre>	<p>C.</p> <pre> 4 8 6 3 7 8 </pre>	<p>D.</p> <pre> 3 4 5 8 7 18 </pre>
<p>E.</p> <pre> 14 11 16 22 </pre>	<p>F.</p> <pre> 3 5 6 18 8 7 </pre>	<p>G.</p> <pre> 1 9 5 6 </pre>	<p>H.</p> <pre> 7 11 19 18 </pre>

Question 15-18 (4 points)

Consider the following integer 2D array, G:

	Column # 1	Column # 2	Column # 3
Row # 1	4	6	19
Row # 2	20	28	33
Row # 3	59	1	12

What is the output of each of the following **PRINT** statements?

15.	<pre> DO 20 M=1,3 PRINT*, (G(N,M), N=1,3) </pre>	16.	<pre> DO 10 J=1,3 DO 10 K=1,3 PRINT*, G(J,K) </pre>
17.	<pre> DO 30 K=1,3 PRINT*, (G(N,K), N=K,3) </pre>	18.	<pre> PRINT*, ((G(L,I),L=1,3),I=1,3) </pre>

Answer Table

A.	4	6	19	20	28	33	59	1	12
B.	4	20	59	6	28	1	19	33	12
C.	4	6	19	20	28	33	59	1	12
D.	4	20	59	6	28	1	19	33	12
E.	4	6	19	20	28	33	59	1	12
F.	4	20	59	6	28	1	19	33	12
G.	4	6	19	28	33	12			
H.	4	20	59	28	1	12			

Question 19 (1 point)

Consider the following subroutine:

```

SUBROUTINE CNT (M, C, N, R)
REAL M(12,12), C(N)
R = 6
IF (N.LT.12) PRINT*, M(N,N)
RETURN
END

```

Assume the following declaration statements in the main program:

```

REAL A(12,12), C(13), N
INTEGER R

```

Which of the following statements is a correct call to the above subroutine?

- A. **CALL** CNT (A, C, 13, R)
- B. **CALL** CNT (A, C(13), R)
- C. **CALL** CNT (A(12,12), C(13), N, R)
- D. **CALL** CNT (A(12,12), C, N, R)
- E. **CALL** CNT (A, C(R), N)
- F. **CALL** CNT (A, C, N, R)
- G. **CALL** CNT (A, C, R, C(13))
- H. None of the above

Question 20 (1 point)

Consider the following function:

```

INTEGER FUNCTION IDEF (X, Y)
INTEGER X, Y, N, D
N = X-Y
D = N**2
IDEF = N/D
RETURN
END

```

Assume the following declaration statements in the main program:

```

INTEGER IDEF, X, Y, N, D

```

Which of the following statement functions is the correct equivalence to the above function?

- A. **INTEGER FUNCTION** IDEF (X, Y) = (X-Y) / (X-Y) **2
- B. **INTEGER FUNCTION** IDEF = (X-Y) / (X-Y) **2
- C. **FUNCTION** IDEF (X, Y) = (X-Y) / (X-Y) **2
- D. **FUNCTION** IDEF = (X-Y) / (X-Y) **2
- E. IDEF = **FUNCTION** ((X-Y) / (X-Y) **2)
- F. IDEF (X, Y) = (X-Y) / (X-Y) **2
- G. IDEF = (X-Y) / (X-Y) **2
- H. None of the above

Question 21 (1 point)

To convert $S = \sqrt{|X-Y|}$ to FORTRAN expression, we write:

- A. `S = ABS (SQRT (X-Y))`
- B. `S = SQRT (-1 * (X-Y))`
- C. `S = SQRT (ABS (X-Y))`
- D. `S = CALL SQRT (CALL ABS (X-Y))`
- E. `S = CALL ABS (CALL SQRT (X-Y))`
- F. `S = CALL (SQRT (ABS (X-Y)))`
- G. `S = CALL (CALL (SQRT (ABS (X-Y))))`
- H. None of the above

Question 22 (1 point)

To define a 2D integer array with 3 columns and 4 rows implicitly, we write:

- A. `INTEGER L(4,3)`
- B. `INTEGER L(3,4)`
- C. `DIMENSION K(3,4)`
- D. `DIMENSION K(4,3)`
- E. `M(4,3)`
- F. `M(3,4)`
- G. `DIMENSION X(4,3)`
- H. `DIMENSION X(3,4)`

Question 23 (1 point)

How many lines will be printed by the following FORTRAN program?

```

      DO 10 M=1,14,2
        DO 10 N=10,1,-2
          PRINT*, 'ICS 101'
10    CONTINUE
      END

```

Answer Table

A.	35	B.	5	C.	7	D.	34
E.	36	F.	38	G.	27	H.	19

Question 24 (1.5 points)

What are the values of the elements of the array **X** after executing the following program?

```

INTEGER X(2,3)
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=2,4,3)
END

```

INPUT1.DAT

1
3
5
7

INPUT2.DAT

2
4
6
8

The values of the elements of the array **X** are:

Question 25 (1.5 points)

What are the values of the elements of the array **A** after executing the following program?

```

INTEGER A(3,2), K, J
OPEN(UNIT=10, FILE='INPUT.DAT', STATUS='OLD')
READ(10,*,END=20) A
20 STOP
END

```

INPUT.DAT

1	3	5
2	4	6

The values of the elements of the array **A** are:

Question 26 (09 points)

Write a FORTRAN program that reads a two dimensional integer array **X** of 3 columns and **N** rows (fixed number of columns and variable number of rows) from the file "INPUT.TXT" row-wise. Each line in the file "INPUT.TXT" has three integer values, and we don't know how many lines in the file. After reading the contents of **X** from the file, your program should store the number of rows of **X** in an integer variable **N**. Then, your program should call a subroutine **TRANS** that takes **X** and **N** as arguments, and returns a two dimensional array **Y** that is the transpose of **X** (rows of **X** become columns in **Y**, and columns of **X** become rows in **Y**). Finally, the program should print **Y** row-wise with every row in a single line.

EXAMPLE OF TRANSPOSE: (THIS IS JUST AN EXAMPLE; DON'T LIMIT YOUR PROGRAM TO IT)

X		
1	2	3
4	5	6

Transpose of X	
1	4
2	5
3	6

NOTE: Assume the maximum number of rows in **X** is 10.

```

INTEGER X (---, ---), Y (---, ---), N, ROW, COL
OPEN (UNIT = 10, -----)
ROW = 1
20 READ (-----) (X (ROW, COL), -----)
ROW = -----
-----
50 N = -----
CALL TRANS (-----)
DO 100 -----
100 PRINT*, (Y (ROW, COL), -----)
END

```

```

SUBROUTINE TRANS (-----)
INTEGER X (---, ---), Y (---, ---), N, ROW, COL
DO 200 ROW = -----
DO 200 COL = -----
200 Y (ROW, COL) = -----
RETURN
END

```