King Mongkut's University of Technology Thonburi

Problem	Points
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
Total	

Midterm Exam
Academic Year 2017

CVE 100: Computer Programming for Civil Engineers

Date: 29th September 2017   Time 9:00 – 12:00

Student Name	Student ID number	Seat No.

Instructions:

- There are 8 questions with marks written in the problem definition. Total number of points for this exam is 40. You are strongly advised to attempt all questions.
- This examination paper consists of 12 pages (including this one).
- Read each question carefully, and answer the problems efficiently. Disobedience of the instruction will result in 0 mark
- No textbooks or written materials are allowed in the examination room.
- A calculator is allowed.
- Write your name and student ID number on each page.

Examiner: Dr. Anatoli Loutsiouk
Tel. 02-470-9319

This examination paper has been approved by the Department of Civil Engineering

Assoc. Prof. Dr. Sutat Leelataviwat
Head of the Civil Engineering Department

Student Name:_____ Student ID Number:_____

1. (5 points) Answer the following questions:

a) What are intrinsic types of data in Fortran?

_____

_____

_____

_____

_____

_____

b) In which section of a Fortran program must the variables and constants be declared?

_____

_____

_____

_____

_____

_____

c) What is the difference between variables and constants in Fortran?

_____

_____

_____

_____

_____

_____

d) How can the variables be initialized in a Fortran program?

_____

_____

_____

_____

_____

_____

2. (5 points) Answer which of these variables have legal FORTRAN names. If they are legal, write what data type of variables they are according to the Implicit Variable Typing. If a name is illegal explain why it is illegal. Write the answer in the table.

No.	Variable Name	Answer: (legal or illegal)	If the name is legal, write the type of the variable by implicit rule. If the name is illegal, explain why it is illegal.
1.	$50		
2.	president_bank		
3.	b2_λf7		
4.	you+me		
5.	ex_plication-		
6.	c22_%2		
7.	iamavariable_3		
8.	Guns and_roses		
9.	almost_legal_name_1		
10.	a1_once_upon_a_year		
11.	sin(x)		
12.	feasiBiLIty4And_26		

3) (5 points) Convert the decimal integer 86 into binary form, octal form, and hexadecimal form . Do the same for the integer -86 by using the two's compliment representation of negative integers with respect to 2-bytes word.

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4. (5 points) Write the following mathematical expressions in FORTRAN arithmetic expressions statements (or arithmetic assignment). Write the answer in the table.

Mathematical expressions	FORTRAN arithmetic expressions statements
$y = \dfrac{\sqrt{\sqrt{a} - \sqrt{b}}}{a+b}$	
$z = \dfrac{1 + \cos^3 a}{2 + 3\sin 4a}$	
$z = \dfrac{2}{\sqrt[3]{b^2 + 1} + \sqrt[3]{b^2 - 1}}$	
$y = \left(\dfrac{\sqrt{b}}{2} - \dfrac{1}{2\sqrt{b}}\right)^3 \left(\dfrac{\sqrt{b}+1}{b-1} - \dfrac{\sqrt{b}+1}{\sqrt{b}-1}\right)$	
$F = 5 + 3\cos\phi\,(1 + 3\cos 3.5\phi)^3\,\tan^{-1}\left(\dfrac{\sqrt{b}}{\log^3(b+c)}\right)$	

5. (5 points) Evaluate the following expressions.

FORTRAN expressions	Result from the expression
36/7/5	
4**2**2	
5*87/3	
MOD(7/2+1,3)	
2**2>5.OR..TRUE..AND.'a'<='x'.EQV..NOT.4<5	

6. (5 points) Consider the following 3 Fortran programs with loops. What will be their ouput for j?

```fortran
PROGRAM cycleexprog1
IMPLICIT NONE
INTEGER :: i,j
j=1
DO i=21,35,3
  j=j+1
  IF (i<=33) EXIT
END DO
WRITE(*,*) j
END PROGRAM cycleexprog1
```

   a) The result for j in PROGRAM cycleexprog1 is equal to:_____

```fortran
PROGRAM cycleexprog2
IMPLICIT NONE
INTEGER :: i,j
j=1
DO i=21,35,3
  IF (i>33) EXIT
  j=j+1
END DO
WRITE(*,*) j
END PROGRAM cycleexprog2
```

   b)   The result for j in PROGRAM cycleexprog2 is equal to:_____

```fortran
PROGRAM cycleexprog3
IMPLICIT NONE
INTEGER :: i,j
j=1
DO i=21,35,3
  j=j+1
  IF (i>=33) EXIT
END DO
WRITE(*,*) j
END PROGRAM cycleexprog3
```

   c)   The result for j in PROGRAM cycleexprog3 is equal to:_____

7. (5 points) Write a Fortran program that will convert the phrase ("Fortran is great.", said Dara.) to the phrase (Dara said, "FORTRAN IS GREAT.".) . (The Brackets are not parts of the phrases, but the quotation marks " " are parts of the phrases.

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8. (5 points) Given real variables with values am=-4.0, ba=5.0, and strings of characters

        well='seventy',

        brief='seazon'.

        Evaluate the values of the following 4 logical expressions:

        26.**(1./3)==-am   Give your answer here: _____

        26**(1/3)==am   Give your answer here:_____

        .NOT.well>brief   Give your answer here:_____

        well(1:3)>=brief(1:3) .OR. am<=ba   Give your answer here: _____

ASCII and EBCDIC Coding Systems

Each character in the default Fortran character set is stored in one byte of memory, so there are 256 possible values for each character variable. The table shown below contains the characters corresponding to each possible decimal, octal, and hexadecimal value in both the ASCII and the EBCDIC coding systems. Where characters are blank, they either correspond to control characters or are not defined.

Decimal	Octal	Hex	ASCII Character	EBCDIC Character
0	0	0	NUL	NUL
...		...	...	...
32	40	20	space	
33	41	21	!	
34	42	22	"	
35	43	23	#	
36	44	24	$	
37	45	25	%	
38	46	26	&	
39	47	27	'	
40	50	28	(	
41	51	29	)	
42	52	2A	*	
43	53	2B	+	
44	54	2C	,	
45	55	2D	-	
46	56	2E	.	
47	57	2F	/	
48	60	30	0	
49	61	31	1	
50	62	32	2	
51	63	33	3	
52	64	34	4	
53	65	35	5	
54	66	36	6	

(continued)

Decimal	Octal	Hex	ASCII Character	EBCDIC Character
55	67	37	7	
56	70	38	8	
57	71	39	9	
58	72	3A	:	
59	73	3B	;	
60	74	3C	<	
61	75	3D	=	
62	76	3E	>	
63	77	3F	?	
64	100	40	@	blank
65	101	41	A	
66	102	42	B	
67	103	43	C	
68	104	44	D	
69	105	45	E	
70	106	46	F	
71	107	47	G	
72	110	48	H	
73	111	49	I	
74	112	4A	J	¢
75	113	4B	K	.
76	114	4C	L	<
77	115	4D	M	(
78	116	4E	N	+
79	117	4F	O	|
80	120	50	P	&
81	121	51	Q	
82	122	52	R	
83	123	53	S	
84	124	54	T	
85	125	55	U	
86	126	56	V	
87	127	57	W	
88	130	58	X	
89	131	59	Y	
90	132	5A	Z	!
91	133	5B	[	$
92	134	5C	\	*
93	135	5D	]	)
94	136	5E	^ (or ↑)	;
95	137	5F	_	¬
96	140	60	`	-
97	141	61	a	/

(continued)

Decimal	Octal	Hex	ASCII Character	EBCDIC Character
98	142	62	b	
99	143	63	c	
100	144	64	d	
101	145	65	e	
102	146	66	f	
103	147	67	g	
104	150	68	h	
105	151	69	i	
106	152	6A	j	
107	153	6B	k	'
108	154	6C	l	%
109	155	6D	m	_
110	156	6E	n	>
111	157	6F	o	?
112	160	70	p	
113	161	71	q	
114	162	72	r	
115	163	73	s	
116	164	74	t	
117	165	75	u	
118	166	76	v	
119	167	77	w	
120	170	78	x	
121	171	79	y	
122	172	7A	z	:
123	173	7B	{	#
124	174	7C			@
125	175	7D	}	'
126	176	7E	~	=
127	177	7F	DEL	"
128	200	80		
129	201	81		a
130	202	82		b
131	203	83		c
132	204	84		d
133	205	85		e
134	206	86		f
135	207	87		g
136	210	88		h
137	211	89		i
...	...	...	...	...
145	221	91		j
146	222	92		k

(continued)