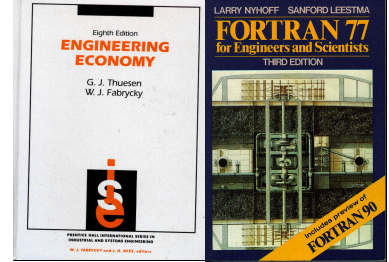




University of Maryland at College Park
Department of Civil and Environmental Engineering
ENCE 202 – Computation Methods in Civil Engineering I



QUIZ 4 Solutions
Closed Book & Notes for 50 minutes
May 8, 2000

Instructor: Dr. I. Assakkaf

Student Name: _____ SAMPLE _____

SSN: _____ 123-xx.xxxx _____

Grade: _____ 100 _____

PART 1: TRUE or FALSE (30 points)

1. The value of a constant never changes T
2. The English meaning of the variable name determines how the variable is used in the program F
3. There are other types of data besides REAL and INTEGER. T
4. In FORTRAN, the equal sign means that the quantities to its left and right are identical. F
5. A high-level language is more like English than is machine language. T
6. Only a variable name can appear on the left side of an assignment statement. T
7. You must leave room for minus sign in an output field. T
8. The condition in an IF statement must be a relationship that can be evaluated as either true or false. T
9. The condition in an IF statement must consist of two variables. F
10. DO 1000 I = 2500, 5000, 2500 is a valid DO statement. T
11. To set an array of 500 elements to zero, 500 assignment statements are required. F
12. Function subprograms are called with a CALL statement. F
13. A function normally returns a single value. T
14. A subroutine subprogram can call a second subprogram, which can call a third subprogram, which can call a fourth subprogram,..... T
15. A GO TO statement may only jump forward in the program. F

PART 2: Multiple Choice (35 points)

1. Choose the correct output for the following program:

```

      I = 1
10   J = I**I
      PRINT *, J
      I = I + 1
      IF (I .LE. 3) GO TO 10
      END

```

Answer: a

- | | | | |
|-------|-------|-------|-------|
| (a) 1 | (b) 2 | (c) 2 | (d) 1 |
| 4 | 16 | 4 | 2 |
| 27 | 36 | 8 | 3 |

2. What is the output of this program segment?

```

      I = 0
      IF (I .GT. 0) THEN
      PRINT *, ` AB `
      ELSE
      PRINT *, ` BA `
      END IF

```

Answer: b

- | | | | |
|--------|--------|----------|----------|
| (a) AB | (b) BA | (c) ABAB | (d) ABBA |
|--------|--------|----------|----------|

3. After the assignment statement $A = 2**2 / 2$ is executed, the value of A will be

Answer: c

- | | | | |
|-------|-------|-------|-------|
| (a) 4 | (b) 8 | (c) 2 | (d) 1 |
|-------|-------|-------|-------|

4. Which of the following are valid words in FORTRAN Language?

- I. GO TO
- II. READ
- III. END

Answer: d

- | | | | |
|------------|-------------|--------------|--------------------|
| (a) I only | (b) II only | (c) III only | (d) I, II, and III |
|------------|-------------|--------------|--------------------|

5. Which FORTRAN line does not affect program execution?

Answer: c

- | | | |
|---------------|-----------------|-------------|
| (a) statement | (b) declaration | (c) comment |
|---------------|-----------------|-------------|

6. The last statement in the array T(3,5) is

Answer: _____ c _____

(a) T(3,3)

(b) T(5,3)

(c) T(3,5)

(d) T(5,5)

7. The statements in the following program segment result in reading X column-wise. If we read 3, 4, 8, 9, 10, 5, the result will be the following matrix:

```
INTEGER X(2,3)
READ *, X
```

Answer: _____ b _____

(a) $\begin{bmatrix} 10 & 8 & 3 \\ 5 & 9 & 4 \end{bmatrix}$

(b) $\begin{bmatrix} 3 & 8 & 10 \\ 4 & 9 & 5 \end{bmatrix}$

(c) $\begin{bmatrix} 3 & 9 \\ 4 & 10 \\ 8 & 5 \end{bmatrix}$

(d) $\begin{bmatrix} 9 & 3 \\ 10 & 4 \\ 5 & 8 \end{bmatrix}$

PART 3: Problems

Problem 1 (15 points)

The single payment compound amount factor (SPCAF) and the present worth compound amount factor (PWCAF) can be expressed in functional forms, respectively, as

$$(1 + i)^n = \left(\frac{F}{P}, i, n \right)$$

and

$$\frac{1}{(1 + i)^n} = \left(\frac{P}{F}, i, n \right)$$

where P = present value, F = future value, i = interest rate, and n = number of periods. Write a program in FORTRAN to construct an interest table of values for n and the corresponding values for the factors F/P and P/F for a specified i . Use an increment of 1 for n . The program must prompt the user to input the interest i in percentage (%), and the maximum value of the period n . (i.e., n should take values from 1 to max).

12345	6	7890.....	72
C		This program construct an interest table of values for n	
C		and the corresponding values of the factors F/P and P/F	
C		The program will prompt to input i and the max value of n	
C ***	*	*****	
		PROGRAM INTEREST	
		REAL F_P, P_F, i	
		INTEGER n, nmax	
		PRINT*, 'Enter the interest i (%)and n max?'	
		READ*, i, nmax	
		i = i /100	
		n=1	
		PRINT*, ' n F/P P/F'	
		DO 100 J=1,nmax	
		F_P = (1+i)**n	
		P_F = 1 / F_P	
		PRINT 10, n, F_P, P_F	
		n = n + 1	
100		CONTINUE	
10		FORMAT(1x,I4, 2x, F14.8, 2x, F14.8x)	
		END	

Problem 2 (20 points)

- (1) A friend offers to double your money in 6 years if you invest in his venture. What annual rate of interest will you receive if you invest and your friend's prediction is correct?
- (2) What is the present value of the following series of prospective receipts (cash in)? \$1,500 a year for 16 years at 14% compounded annually.
-

(1)

$$F = 2P$$

$$F = P(1+i)^n$$

$$2 = (1+i)^6$$

$$1+i = \sqrt[6]{2} \Rightarrow i = 1.122462$$

or

$$i = 12.25\%$$

(2)

$$(P/A, 14, 16)$$

From Interest Table :

$$P = \$1500(6.2651) = \$9,398 \text{ Ans.}$$

Using Formula:

$$P = A \left[\frac{(1+i)^n - 1}{i(1+i)^n} \right] = 1500 \left[\frac{(1+0.14)^{16} - 1}{0.14(1+i)^{16}} \right] = \$9,398 \text{ Ans.}$$