

OLLSCOIL NA hÉIREANN, GAILLIMH
NATIONAL UNIVERSITY OF IRELAND, GALWAY

Semester II Examinations 2002 - 2003

.....

1BI1: First Year Industrial Engineering & Information Systems

1BJ1: First Year Management Engineering with Language

IE109: Computing and Information Systems

Examiners:

Dr. E. J. Wright

Prof. Sheil

Mr. G. Lupton

Mr. K. O'Toole

Answer **two** questions from Section A

And

four questions from Section B

Time allowed: **Three** hours

No. Pages: Cover + 5

Department: Industrial Eng

Section A

A1

- (a) The following terms arise when describing typical PC hardware characteristics – write definitive/explanatory notes on each one: *Motherboard, Expansion Cards, Ports, Bus, Memory* [8 marks]
- (b) Describe briefly the following hardware components, stating their purpose within networks:- *repeaters, bridges, routers* [8 marks]

A2

- (a) Protocols are used to enable communication. What is a protocol? [1 marks]
- (b) Carrier Sense Multiple Access/ Collision Detection (CSMA/CD) is the protocol for accessing the transmission medium in the Ethernet. Describe the operation of CSMA/CD. [5 marks]
- (c) Token passing is the protocol for accessing the transmission medium in Token Ring networks. Describe how token passing operates. [6 marks]
- (d) What is a *Firewall* and what purpose does it serve? [2 marks]
- (e) What is a *Proxy Server* and what purpose does it serve? [2 marks]

A3

- (a) Broadly speaking, why use Spreadsheet programs? [1 marks]
Explain, verbally, or by means of a sketch, what the following terms represent:
Workbook, worksheet, chart sheet, cells, rows, columns [5 marks]
- (b) The following is an Excel worksheet.

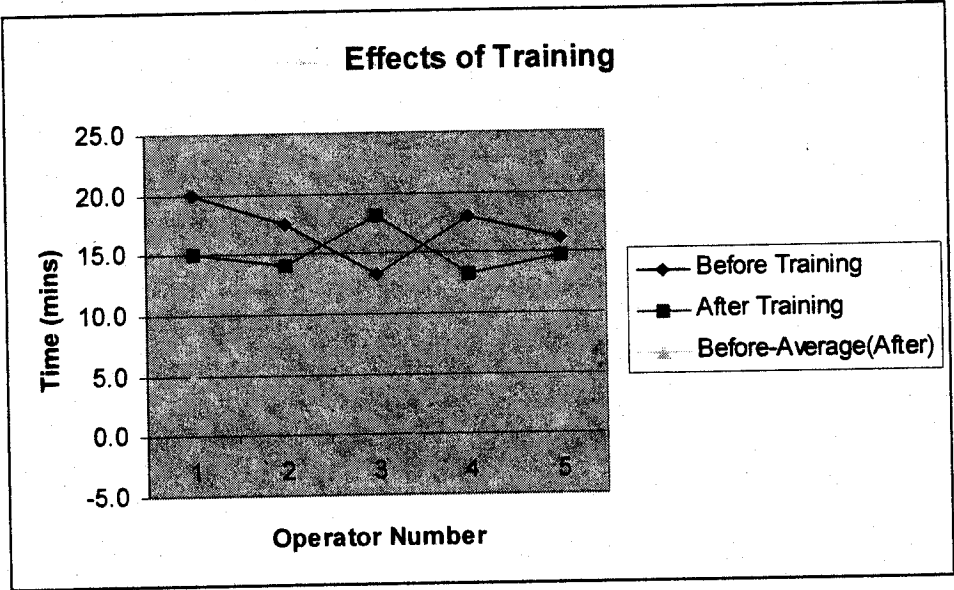
Data on the effects of training on operator cycle times is as follows:

Operator Number	Cycle Time Before Training	Cycle Time After Training
1	20	15.1
2	17.5	14
3	15.34	18.23
4	18	13.2
5	16.2	16.7

Outline the steps which you would undertake (in Excel) to:

- (i) produce the edited version of the sheet shown overleaf. [5 marks]
- (ii) employ the Chart Wizard to develop the chart shown overleaf. [5 marks]

Effects of Training			
Operator Number	Cycle Times (Mins)		Difference (Mins)
	Before Training	After Training	Before-Average(After)
1	20.0	15.1	4.95
2	17.5	14.0	2.45
3	13.3	18.2	-1.75
4	18.0	13.2	2.95
5	16.2	14.7	1.15
Average	17.0	15.0	
Std.Dev	2.5	1.9	



Section B

B1

- (i) List the key stages in the “six step” program development procedure. [2 marks]

Outline the benefits of following such an approach. [2 marks]

Construct an algorithm and flowchart to determine if a number is negative, positive, or zero. Clearly show logic flow. [5 marks]

- (ii) List the FORTRAN arithmetic operators and state the precedence rules associated with them. [2 marks]

What are the values of the following FORTRAN expressions:
 $8+3*4$, $7+14/2+5$, $2**3+4*(3+2)/5$ [3 marks]

List the FORTRAN relational and logical operators. [3 marks]

B2

- (i) State the general form of the following FORTRAN statements:
- DO statement [2 marks]
 - Logical IF statement [2 marks]
 - BLOCK IF statement [2 marks]
 - ELSE IF statement [2 marks]

- (ii) The Fibonacci sequence is a famous sequence that dates back to the thirteenth century. It takes the following form:

1,1,2,3,5,8,13,21,34.....

where the first two terms in the sequence are 1 and 1, but every term after that is the sum of the previous two terms.

Write a FORTRAN program to generate a Fibonacci sequence. The program is to prompt the user for the number of terms they wish to generate and should print the results to the users screen. [9 marks]

B3

(i) Describe the concept of modularity in FORTRAN programming. [2 marks]

What are the advantages (list 3) of following the modular approach to programming. [2 marks]

Outline the syntax for the function subprogram. [2 marks]

Give an example of an inbuilt FORTRAN function that is a sub program. [1 mark]

(ii) Outline the syntax for the subroutine [2 marks]

What is the main advantage of a subroutine compared to a subprogram. [1 mark]

Write a computer program that computes the area and circumference of a circle. The user is to be prompted for the radius. A subroutine is called from the main program to work out the area and circumference. The subroutine then returns calculated values to the main program. Show the code for the main program and the subroutine. [7 marks]

B4

(i) Following are lines taken from a FORTRAN program. In your answer book show clearly how it would be printed on the users screen.

A = 7.12345

B = 6.719

PRINT 10, A, B

10 FORMAT(' Value of A = ', F5.2, 25X, ' Value of B = ', F5.1) [2 marks]

What change would you make to the FORMAT statement to print the outputs, Value of A = and Value of B =, on separate lines. [1 mark]

(ii) Write a FORTRAN program that will accept the name and price of an article, calculate the VAT (value added tax) associated with the article and calculate the overall cost. The percentage VAT is based on the following:

- anything costing upto 5.0 Euro has 0% VAT.
- Between 5.0 and 10.0 Euro has VAT is charged at 12.5%
- Anything above 10.0 Euro has VAT charged at 21%

The program is to clearly explain requirements to the user. N.B The output is to be printed to the screen under the following headings with suitable spacing between each heading. Set the name to a maximum of 8 characters long. [14 marks]

Article Name	Article cost	VAT rate	Cost of VAT	Overall cost
--------------	--------------	----------	-------------	--------------

B5

Differentiate between direct and sequential datafile access.

[2 marks]

What is the general form of the OPEN statement. Explain what each element of the statement is.

[3 marks]

Write a program that calculates the $\log(x)$ for $x = 1, 1.5, 2, 2.5 \dots 10$

The program is to send its output to a new file called EXAM. The output is to be in a tabular format with suitable headings for each column of data, e.g. a column for x and a column for its log.

[12 marks]