

OLLSCOIL NA hÉIREANN, GAILLIMH
THE NATIONAL UNIVERSITY OF IRELAND, GALWAY

SUMMER EXAMINATIONS 1999

FIRST YEAR EXAMINATION IN FINANCIAL MATHEMATICS AND ECONOMICS

CS103 – COMPUTER SCIENCE

Professor J. Wiegold
Professor T. C Hurley
Dr. M. McGettrick

Time allowed: *Two* hours
Full marks for *Three* questions

1.
 - (a) Explain the following: declaration, assignment, data type, header file, preprocessor command. Give an example of each.
 - (b) Give examples to illustrate the differences (i) between & and &&, (ii) between + and ++, (iii) between = and == as they are used in C.
 - (c) Given the declarations/initializations
`int p = 1, q = -1, r = 4;`
calculate the value of
(i) `p && (r + 4 * q)`
(ii) `r *= (p + q)`
(iii) `(p--) - (--q)`
2.
 - (a) Explain the difference between local and global variables in C.
 - (b) Write down the code for a function in C which will calculate the factorial $n! = n.(n - 1) \dots 3.2.1$ for a positive integer n using (i) Recursion, (ii) Iteration.
 - (c) Compare Recursion and Iteration by listing some advantages/disadvantages of each.

p.t.o.

3. (a) Write a C code fragment to calculate the product AB of the matrices

$$A = \begin{pmatrix} 2 & 1 \\ -1 & 0 \end{pmatrix} \quad B = \begin{pmatrix} -5 & 1 \\ 2 & 1 \end{pmatrix}$$

- (b) Explain what is meant by command line arguments. Write a short program which will detect its own name and print it on the screen.

4. (a) Explain what is meant by dynamic memory allocation.
- (b) What is a structure in C? Give an example of a structure which could be used to represent a card in a deck of 52 cards.
- (c) Using the structure from (b), write a function, which shuffles the deck of cards.