

NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY
FACULTY OF APPLIED SCIENCE
COMPUTER SCIENCE DEPARTMENT
JUNE EXAMINATIONS 2004

SUBJECT: PROGRAMMING AND PROGRAM DESIGN
CODE: SCS1201

INSTRUCTION TO CANDIDATES

Answer all questions in Section A and any two questions from Section B.
Total marks 100

Time: 3 hours

SECTION A

QUESTION ONE

A file consists of Companies sorted within City. Each company is either Industrial or Commercial. You are required to produce a print-out showing the following:

<u>No. of Companies in each City</u>		
<u>City Name</u>	<u>No. of Industries</u>	<u>No. of Companies</u>

- a) Draw the input data structure [4]
- b) Draw the output data structure [4]
- c) Show correspondences between the two data structures [2]
- d) Draw the consolidated data structure [4]
- e) Identify operations [5]
- f) Merge the operations with the consolidated data structure [5]
- g) Produce pseudocode to the structure [6]

QUESTION TWO

A T-file consists of deletion records no longer required on the M-file. Both M-File and T-file are sorted in ascending M-key and T-key consecutively. All matching records are deleted from the M-file. The undeleted records are written to an output Mstr file. If a non-matching record is read from the T-file ignore it.

- a) Draw a Nassi Schnerdeiman diagram to the problem. [10]
- b) Produce the pseudocode to the problem. [5]
- c) Produce a corresponding C program. [5]

QUESTION THREE

There are a hundred numbers, all of which are non-zero. For each number determine whether it is negative or positive. At the end, display the total number of positive ones, and the total number of negative ones.

- a) Draw a flowchart to the problem. [10]
- b) Produce the pseudocode to the problem. [5]
- c) Produce a corresponding C program. [5]

SECTION B

QUESTION FOUR

- a) For each of the following loop draw a corresponding flowchart and a subroutine in C.
 - i) Do.....While [4]
 - ii) While.....Do [4]
 - iii) The Nested loop [4]
- b) Describe the three different and commonly used constructs in any program design methodology. [3]

QUESTION FIVE

- a) Define and explain giving the advantages and disadvantages of each of the following programming techniques.
 - i) Top-down analysis [4]
 - ii) Bottom-up analysis [4]
 - iii) Modularisation [4]
- b) What is structured programming and what are its advantages? [3]

QUESTION SIX

- a) What criteria is used to identify a programming language for a particular project. [8]
- b) Define the characteristics of a good program. [7]

END OF QUESTION PAPER