

Ollscoil na hÉireann, Gaillimh
National University of Ireland, Galway
Semester Two Examinations 1999/2000

Higher Diploma in Systems Analysis
(Business Systems Development)

Programming Languages II (MS867)

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Time allowed: TWO hours

Candidates should answer *THREE* questions

All questions carry EQUAL marks

Q.1. A clothing company requires an application to read the Customer Master File and print a report of all the customer records which have an account balance of greater than zero.

The customer master file contains the customer number, customer name, and the account balance. The printed report should show all the customers' details as indicated below. There should be a maximum of 35 detail lines per page of the report.

Glad Rags Clothing Company

Customer Number	Customer Number	Page: xx
		Balance
xxxxxx	xxxxxxxxx	xx.xx
xxxxxx	xxxxxxxxx	xx.xx
..
..

You are required to develop the solution algorithm for the above problem using pseudocode.

(33 marks)
(cont'd)

Q.2.(a). The C Standard Libraries provide you with a number of string handling functions. Describe, using examples, these functions.
(15 marks)

(b). You are required to write a program in C to implement the following functionality:

A text file contains a number of instances of a user's password. You are required to ask the user for their password and then read the data in from the file one string at a time and, if it is not the password, write it out to a second file, with one string per line in the file. If the string is the password, you should write the string "*****" to the output file.

You should get the names of the input and output files from the user.
(18 marks)

Q.3.(a). Describe, using examples, the selection constructs available in C.
(15 marks)

(b). Write a program that will calculate and print bills for the power company. The rates payable depend on whether the customer is residential or commercial.

The program should prompt the user to enter an account number (an integer), a character code indicating customer type (R = residential, C = commercial), and the consumption in kilowatt-hours (an integer).

You should calculate and display the amount owed based on the following rates:

Residential rate -> £0.06 per kilowatt-hour

Commercial -> £40 for the first 1000 kilowatt-hours and £0.045 for each additional kilowatt-hour.

(18 marks)

(cont'd)

Q.4.

A bank keeps information on its customers' non-resident accounts in a number of parallel arrays.

The first array is an array of integers containing the account numbers, the second is an array of strings containing the corresponding names and the third is an array of doubles containing the account balance.

The arrays are set up so that the contents of the i^{th} element in each array all relate to the same person. That is, the i^{th} element of the account number array will contain the account number of the person whose name is at the i^{th} element of the names array with the balance being held at the i^{th} element of the balance array.

You are required to implement the following functionality in C:

Write a function of type void called `find_balance` with the following parameters:

`account` – an array of integers

`names` – an array of strings

`balance` – an array of doubles

`num_occ` – an integer indicating how many elements are occupied
 in each array

You should ask the user do they wish to search for the balance by name or account number. Read in the name or number from the user and search through the appropriate array for that name or number. If the name or number is found, print it and the corresponding balance. If it is not found, print an error message.

(33 marks)

(cont'd)

Q.5.(a). Describe, using examples, the use of user-defined structures in C. You should consider how they are defined and initialised as well as how to access the components.

(15 marks)

(b). Numeric addresses for computers on the Internet are composed of 4 parts, separated by periods, of the form:

xx.yy.zz.mm

where xx, yy, zz, and mm are positive integers. Locally, computers are known by a nickname as well. You are required to write a program in C to process a list of Internet addresses, identifying all computers with the same xx code.

Create a structure called `address_t` with components for the 4 integers of the address and a fifth component in which to store an associated nickname of up to 10 characters.

Your program should read a list of up to 100 addresses and nicknames from the user and put the details into an array of structures. The user should indicate there are no more addresses by a sentinel address of all zeroes and a sentinel nickname of `ZZZ`.

You should then ask the user for the xx identifier and search through the array for computers with the same xx address. You should print out the full address and nickname of each computer whose xx component is the same.

(18 marks)