DUNMAN HIGH SCHOOL (SENIOR HIGH)

YEAR 6 PRELIMINARY EXAMINATION 2012

H2 Computing

9754/01

Paper 1

Thursday 13 September 2012
0930-1230
3 hours

Additional materials:
Answer Paper

INSTRUCTIONS TO CANDIDATES

Write your Center number, index number and name on all the work you hand in..

Write in dark blue or black pen on both sides of the paper.

You may use a soft pencil for any diagrams, graphs, tables or rough working.

Do not use staples, paper clips, highlighters, glue or correction fluid.

Answer all questions. Total marks is 120.

At the end of the examination, fasten all your work securely together.

The number of marks is given in brackets[] at the end of each question or part question.

1 Give **one** example of each of the following and explain its purpose:

a. System software

b. Application software

c. Utility software

[6]

2 The processor is a vital component of a computer system.

a. Name the components of the processor and explain their role. [3]

b. In the fetch-execute cycle, explain the function of the respective registers. [4]

c. Name **two** main communications hardware in the processor and state their function. [2]

d. What can be done to the processor to enhance its processing power? [2]

3 Developing software as a collection of modules is emphasized regularly in the software development life cycle.

a. Explain the importance of reliability, clarity and efficiency in software development. [3]

b. State **two** advantages of developing software in a modular manner. [2]

c. Describe the types of testing that should take place when a module is completed. [6]

d. Describe how debugging tools help in software development. [3]

4 Data is held about the following companies:

Microsoft IBM Caterpillar Volvo Sushi Teh Marina Bay Sands Resorts World Old Chang Kee

a. Draw a binary search tree of the companies by taking Microsoft as the root and inserting from left to right. [3]

b. Describe an algorithm that will traverse the binary search tree to produce a list of companies in alphabetical order. [3]

There are about 20,000 new companies registered in a year.

c. Which sorting method should be used to sort the company names in alphabetical order efficiently? Write down the algorithm of the chosen sort. [8]

d. If a binary search tree is used to store all the new company names, what is the minimum and maximum number of searches required before the name of a new company can be found? [3]

It is decided to use a database to manage the information of the companies.

e. Give the advantages of using a database over using a number of flat files. [6]

5 An organization has a local area network with a file server. Employees can save work-related files on this file server in their own home directories. The HR department also stores personal information about the employees in the same file server. All data have to be protected from accidental loss and malicious damage.

a. Explain, giving a suitable example in each case, what is meant by the terms accidental loss and malicious damage. [4]

b. Describe **two** methods which the IT Department can use to prevent malicious damage to data on the file server. [4]

c. Describe the meaning of the terms
i. Data integrity
ii. Data security
[2]

d. Describe a sensible procedure that employees could adopt to back up their data files. [4]

Employee names and payroll numbers are stored as elements in a linked list in alphabetical order of employee name. There is a free space pointer which acts as the head of the free space list. A new employee has joined the organization and has been allocated a payroll number.

e. Describe, with diagrams, an algorithm to add the new employee's payroll number to the linked list. [8]

6 A programmer has to develop a program to process payroll data for the employees of a large business.

a. State three elementary data types the programmer will need to use in the program, giving an example of the use of each. [6]

b. Explain what is meant by 'composite data type'. Give two examples of composite data type that might be used in this program. [4]

The programmer implements code using procedures and functions. Two features to be included in the program are:

- calculating the total tax payable
- outputting a list of employees in alphabetical order

c. explain the difference between procedures and functions. [2]

d. For each of the two features described above state whether a procedure or function would be used. Justify your answers. [4]

Parameters can be passed to a procedure or function by using pass-by-value or pass-by-reference.

e. Explain the difference between these two methods of parameter passing. [4]

7 Describe each of the following types of user interface and give an example of an application where it might be used. Justify your answer for each of the interface.

a. graphical user interface [3]

b. form-based interface [3]

8 The manual system of managing a car park system is inefficient. It is proposed to automate the car park system to control the cars going into the car park as well as to charge the car park users appropriately for the amount of time their cars are in the car park. Assume only one entry and one exit point for the car park.

a. State the hardware equipment required for the car park control system to work. [4]

b. Write an algorithm to allow the cars to enter the car park if there are available parking lots. [4]

c. Modify your algorithm in (b) to allow the system to charge parking fees by deducting the fees through the cash card in the Identification Unit (IU) in each car. State any assumptions needed. [6]

d. What other precautions need to be incorporated to ensure the smooth operation of the automated car park control system? [4]

END OF PAPER