



NANYANG JUNIOR COLLEGE
General Certificate of Education Advanced Level
Higher 2
JC2 Preliminary Examination

COMPUTING

9754/02

Paper 2

Sep 2008

2½ hours

Additional Materials: Answer Paper

READ THESE INSTRUCTIONS FIRST

Write your Centre 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.

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.

Answer **all** questions.

A bowling alley has a number of lanes, each of which can accommodate a number of players. There is also a central area where the booking of lanes is done and refreshments are sold.

1 The staff dealing with bookings have a computer linked to a network using a star network topology.

- (a) Explain the benefits of having a star network topology instead of a bus network. [6]
- (b) Describe a star network topology and the necessary hardware needed to operate the network. [6]
- (c) Whenever a customer calls to do a booking, the receptionist will check the availability of the lane from the computer system. If available he will write the details on a booking form. The booking forms are stored in a manual file. He will then enter the system to update the lane availability. Draw the data flow diagram of the above processes. [6]

The bowling alley is part of a national chain of bowling alleys. Communication between all the bowling alleys and the chain's head office is via an intranet.

- 2 (a) Explain the difference between the Internet and an intranet. [6]
- (b) Explain why the bowling alley chain uses an intranet for communications rather than the Internet. [4]
- (c) Explain what extra security risks can occur if the system is linked up to the Internet. [4]

3 The company maintains a file of customers, organized as a linked list in alphabetic order of customer names.

- (a) Describe, with the aid of a diagram, the state of this linked list when the following customer names have been inserted as test data.

Howard Mary David Solomon

- (b) State three operations other than Insert for the linked list ADT. [4]
- [3]

Information about the customers is stored on the computer system. This file of information is known as the customer file. This file is used to store personal data about the customers and is arranged as a sequential file.

Each week a transaction file is created which contains amendments that need to be made to records on the customer file. These amendments are placed on the transaction file in the order in which they arrive.

- 4 (a) Describe amendments on the transaction file which would give rise to the following of the customer file:
 - (i) an addition of a new record;
 - (ii) the deletion of a record;
 - (iii) an alteration of a record.
- (b) Describe how the transaction file is used to produce an updated copy of the customer file. [3]
- [6]

- (c) (i) Data kept about the customers can be misused. Describe three features of the Data Protection Act that are meant to prevent abuse of personal data. [6]
- (ii) Describe steps that the company can take to secure the data on the computer system. [6]
- (d) (i) Explain what is meant by a serial file. [2]
- (ii) Describe how a serial file may be used in this computer system. [2]

5 (a) The bowling alley offers discounts to their customers:

- 10% is given if the customer spends over \$50.
- Another 5% is given if the customer is a member.
- Discounts are not given if it is a public holiday.

Draw a decision tree showing clearly the different conditions and the actions. [6]

The records of customers held in the transaction file need to be sorted into numerical order of key field (a four digit customer number) before the transaction file is used.

- (b) Explain how a quicksort can be used to sort the customer numbers into order, smallest first, using the following numbers as an example.

5342 2111 1345 9022 7333

[5]

- (c) Two methods were considered to sort the transaction file, a bubble sort or a quicksort. With reference to the nature of the file to be sorted explain how a decision can sensibly be made. [2]

The company is looking to build an online booking system for all the bowling alleys owned by the chain. A system analyst is hired to take charge of this project.

- 6 (a) The system analyst uses the Software Development Life Cycle methodology. Explain why this methodology is an iterative process. [4]
- (b) Suggest the hardware and software requirements of the new system. [4]
- (c) A technical manual and user manual are produced as part of this process. Explain the differences between these two documentations. [3]

7 The system analyst has to decide what type of Operating System the software must run on.

- (a) Explain the purpose of an Operating System. [3]
- (b) Describe the main functions of an Operating System. [6]
- (c) Describe additional features of a Network Operating System. [3]