



**SERANGOON JUNIOR COLLEGE  
JC2 PRELIMINARY EXAMINATION 2009**

**COMPUTING**

**9754/02**

**Higher 2**

Paper 2

**Tuesday  
25 August 2009**

**2.5 hours**

Additional materials : Answer paper

**INSTRUCTIONS TO CANDIDATES:**

Write your name and CT group in the spaces provided on this cover sheet.

Answer **all** questions.

Write your answers on the separate answer paper provided.

If you use more than one sheet of paper, fasten the sheets together.

**INFORMATION FOR CANDIDATES:**

The number of marks is given in brackets [ ] at the end of each question or part question. You are reminded of the need for good English and clear presentation in your answers.

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Name: \_\_\_\_\_

CT\_Group: \_\_\_\_\_

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This question paper consists of 5 printed pages (including this page).

1 GreenDIY is a small company selling garden tools and equipment by mail order. Four of the employees in the business have their own stand-alone computers.

- Kelly takes the order and enters it into her computer. She records the customer's name and address, plus the item(s) ordered. She prints out a copy and gives it to Janet.
- Janet takes the items off the shelves and packs the order. She records, on her computer, the customer's name and address, and the items despatched. She notes any item that is out of stock; these will have to follow in a later despatch. She prints off a copy of these details to give to Samad.
- Samad produces the invoice. He records, on his computer, the customer's name and address and the items despatched with prices. He adds a handling charge and puts the invoice into an envelope ready for posting to the customer. He gives a copy of the invoice to Kim Teck.
- Kim Teck is the accountant. He records, on his computer, the customer's name and address, the invoice amount and whether it has been paid or not.

a) Draw a data flow diagram to describe the above system. [6]

b) Give **one** advantage and **one** disadvantage of the current set-up to the company. [2]

c) Give **one** advantage and **one** disadvantage of the current set-up to the customer. [2]

2 a) Describe **two** steps the company can undertake, as part of the computerization process to promote the company's products. [4]

b) If sales were to go up, how can the company's management be certain that the increase in sales were due to the above steps. [4]

c) State, giving reasons, **three** application software that the company would purchase in order for the staff to do their job. [3]

3 A consultant has been tasked to carry out a feasibility study.

a) Describe **three** factors that should be considered in the feasibility study. [6]

b) State **three** different sections usually found in user documentation. [3]

- 4 The company's director would like to create a database to store all the data and information about the business. The consultant decides to store the data in a relational database.

- a) Describe how a relational database is different from your typical file structure. [3]
- b) The consultant initially identified the following three tables for the database.

Customer, Stock and Orders.

- i) Identify some attributes for each table. [6]
- ii) Draw an Entity Relationship (ER) diagram for the above tables and describe why it does **not** satisfy the requirement of a good relational database design. [3]
- iii) How can the ER diagram be modified to solve the above limitation. [4]
- iv) A customer telephoned the company to inform them, that he has misplaced his latest order and he could not remember what he had ordered. Describe how the database can be queried to provide the customer with his latest order. [3]
- 5 The company would also like to have a computerised stock control system. Each stock item is identified by an item code.

The format of the item code is LL999, where:

L – is a capital letter (A, B, C, D....Z)

9 – is a digit (0, 1, 2, 3....9)

- a) Describe **three** different methods that could be used to validate the item code. [6]
- b) State what data type the consultant would use for each data item below. [3]
- i) Average overtime hours worked by each employee.
- ii) Whether or not the employee are willing to work overtime.
- iii) The number of customer complaints received.

6 Details about customers are stored in a linked list, indexed by the customers' names in alphabetic order.

a) Draw a diagram to show the following names in the list. [4]

David          Ahmad          Mala          Kumaran

b) Explain how to search the linked list for a particular customer's details when all the customers have been added. [5]

c) Provide the specifications for the link-list ADT in this particular scenario, so that it can handle the addition of new customers into this list. [3]

d) Besides the name of the customer, an order from a customer need to be dated and timestamped, so that the order can be processed in sequence.

i) Why is the current ADT **not** suitable to do the above. [2]

ii) Explain how this can be done by using another ADT, when a customer makes an order. [5]

7 The consultant would like to sort each customer's purchase amount using the following sorting algorithm, intended to sort the real numbers array Amount[1...n] in descending order.

```
repeat
  done = 1
  for i = 1 to n-1
    while x[i] >= x[i+1]
      temp = x[i+1]
      x[i+1] = x[i]
      x[i] = temp
      done = 0
    endwhile
  endfor
until done = 1
```

Assume that a set of  $n$  real numbers is input to the algorithm. The algorithm will fail under certain circumstances. State what these circumstances are and the manner in which the algorithm will fail. Show how the algorithm can be altered to solve this problem. [4]

- 8 Apart from the database, the system would also be created using an object-oriented (OO) approach.
- a) Discuss the similarities and differences between designing a database and designing through an object-oriented approach. [4]
  - b) Using the context of the company's business, describe the following OOP features
    - i) Abstraction
    - ii) Inheritance
    - iii) Polymorphism [6]
- 9 The company would like to diversify their business to other countries in the region.
- a) State two differences between a local area network and a wide area network. [2]
  - b) Explain the difference between a hub and a switch when used in a star network. [2]
  - c) State one extra piece of hardware and one extra piece of software necessary if it is decided to connect the network to the Internet. [2]
  - d) Why is a protocol required when connecting to the internet? Give an example of a protocol used, when browsing the web. [3]

----- **END OF PAPER** -----