

THE BRITISH COMPUTER SOCIETY

THE BCS PROFESSIONAL EXAMINATIONS BCS Level 5 Diploma in IT

SYSTEMS ANALYSIS

26th April 2007, 10.00 a.m.-12.00 p.m.

QUESTION 1 is mandatory and receives 50% of the total marks available for this paper.
Candidates may select TWO of the remaining FOUR questions.
Time: TWO hours.

*The marks given in brackets are **indicative** of the weight given to each part of the question.*

Calculators are NOT ALLOWED in this examination.
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1. Parklands Garden Supplies (PGS) grow plants and supplies them to shops. Plants are grown in greenhouses (large buildings often found in countries with cooler climates, where temperature and humidity can be controlled). PGS has a number of greenhouses, under the supervision of a Greenhouse Manager, and an office area where administrative staff maintain records of orders and of stock. A new Information System is to be implemented to help the administrative staff with the maintenance of order and stock control records.

Each plant species may have a number of varieties (e.g. if 'Rose' is a plant species, 'Summer Blush' and 'Yellow Sunburst' are varieties of Rose). PGS allocates a plant code to each plant species and keeps details of both its botanical name (e.g. 'Lilium') and its common name (e.g. 'lily'), together with a description. The varieties are grown by PGS in batches; each batch is of one variety but each variety may be grown in more than one batch. Each batch is grown in one greenhouse. A greenhouse can house many batches, or could be empty (for example, while maintenance is undertaken). Greenhouses are identified by their number, and notes about the atmosphere inside each of them (e.g. temperature, humidity) are kept.

The Greenhouse Manager notifies the office when new plant species and varieties are grown. The office administrative staff record these new items, including a selling price for each variety and notes on how varieties should be grown. The Greenhouse Manager also advises the office daily on the quantity of each variety that is available for sale, so that stock records can be updated. Likewise, the Greenhouse Manager provides the office with details of each batch planted and administrative staff record a unique batch number, the date it was planted and in which greenhouse it is located.

Records are maintained of the name, address and telephone number of each shop that buys the PGS plants. When an order is received from a shop the administrative staff check the availability of the varieties that have been ordered. If there is insufficient stock, an alternative is offered. Once an order has been agreed, it is allocated a unique order number and details are noted of the date of receipt, the varieties ordered and the quantity required of each variety.

Once recorded, the order is passed to the Greenhouse Manager who supervises the making up of orders ready for despatch. The Greenhouse Manager notifies the office when orders have been fulfilled; the office administrative staff then prepare an invoice which is sent to the shop and update the order status to show that it has been invoiced. On receipt of payment from the shop, the order status is updated to 'paid'.

- a) Draw a Top Level Current Logical Data Flow Diagram for the above scenario. **(16 marks)**
- b) Produce an Entity Relationship Diagram (Logical Data Structure) and a set of normalised tables for the above scenario. **DO NOT** show evidence of the normalisation process. **(20 marks)**

More Question 1 questions over the page

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- c) An alternative to developing a set of levelled Data Flow Diagrams is to develop a Use Case Diagram to model the functionality of a system.
- i) Explain what is meant by an 'Actor' on a Use Case Diagram. **(3 marks)**
 - ii) Give an example of ONE Actor from the Parklands Garden Supplies scenario. Identify TWO Use Cases that this Actor carries out, and show how these would be modelled in UML notation. **(6 marks)**
 - iii) To support the Use Case Diagram, a Use Case Description is developed. Explain what a Use Case Description should include. **(5 marks)**

2. a) Avison and Fitzgerald present a range of systems analysis techniques and classify them as either 'process techniques', 'data techniques' or 'holistic techniques'. The techniques they list under these headings include:

Rich Pictures	Data Flow Diagrams	Entity Modelling
Conceptual Models	Structured Walkthroughs	Action Diagrams
Normalisation	Decision Tables	Cognitive Mapping
Structure Diagrams	Root Definitions	Matrices

From the techniques listed above, identify those that would be classified as 'holistic techniques' and those that would be classified as 'process techniques'. **(10 marks)**

- b) Explain how an Activity Diagram is used to describe processes. Illustrate your answer with a suitably labelled diagram using UML notation. **(15 marks)**
3. a) Based on the scenario outlined in Question 1 briefly describe the main fact-finding techniques that may be used during systems analysis and evaluate their usefulness in supporting the fact-finding stage of the development. **(10 marks)**
- b) When seeking to identify 'user interface requirements' the systems analyst may use a 'structured approach', an 'ethnographic approach' or a 'scenario based approach'. Explain EACH of these approaches and assess their appropriateness for use in supporting the development outlined in Question 1. **(15 marks)**
4. a) Briefly explain how each of the following can be used during systems analysis:
- i) Organisation charts **(4 marks)**
 - ii) Historical documents **(4 marks)**
 - iii) Feasibility Study Report **(4 marks)**
- b) Describe the contents of a Requirements Specification and explain how it differs from a Feasibility Study Report. **(13 marks)**
5. a) What are the main criticisms of the traditional Information Systems Development Life Cycle? **(10 marks)**
- b) Explain the main features of EITHER Dynamic Systems Development Methodology (DSDM) OR Extreme Programming (XP) and describe how it may help overcome some of the problems outlined in your response to Question 5 a). **(15 marks)**