THE BRITISH COMPUTER SOCIETY

THE BCS PROFESSIONAL EXAMINATION
Diploma

SYSTEMS ANALYSIS

25th April 2002, 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.*

1. New Straights Video and DVD Rentals

The following information was gained during an initial interview with Mr. Toukai, the owner of New Straights Video and DVD Rentals. What follows is a summary of the meeting:

"We are only concerned with the hiring and return of videos and DVDs. We are not concerned with creating new stock, deleting old stock, etc. We are aiming at providing the best video and DVD rental service possible. Stock levels are currently just over 3000 VHS videos and 4000 DVDs. We rent items for any period of up to one week with a nightly charge. If an item is rented for a week then a 10% discount is provided on the total hire charge. Videos cost $5, $8 or $10 per night and DVDs are charged at a standard rate of $12 per night. Customers are not allowed to have on loan at any one time more than six items. We want the system to record a standard hire that occurs in the following way:

- check if the item is in stock;
- check that the customer is registered with us using their customer number on their card;
- check that they have not exceeded the maximum loan number;
- create a new hire agreement for the item(s) being hired;
- calculate and record the total charge;
- accept payment and finalise the rental.

The system must also be able to provide details of when an item that is currently out of stock is due to be returned and record an advanced booking for it. Once an item is returned the system should prompt the counter assistant that a reservation exists for the item so that we can find out which customer has made the reservation. The counter assistant will telephone customers informing them that the item is now available for loan."

a) Produce a Top Level Current Logical Data Flow Diagram for the above scenario. **(20 marks)**

b) Produce an Entity Relationship Diagram (Logical Data Structure) and a set of normalised tables for the above scenario. **(20 marks)**

c) Explain how Data Flow Diagrams and Entity Relationship Diagram (Logical Data Structure) can be used in a Structured Walkthrough to assist a quality assurance process. **(10 marks)**

[Turn over

2. *a)* Define what is meant by the 'traditional waterfall systems development lifecycle (SDLC)' and explain the disadvantages associated with its use. **(10 marks)**

b) Discuss the alternatives to the traditional waterfall SDLC that have been proposed and explain how they overcome the disadvantages that you have identified in your answer to part *a)*. **(15 marks)**

3. a) Identify the key document that you would expect to be the output of the systems analysis phase of a systems development project, and describe what you would expect it to contain. **(11 marks)**

b) Explain the role that a Computer Assisted Software Engineering (CASE) tool can play in the preparation of systems analysis documentation. **(14 marks)**

4. 'The claims for the soft systems approach are that a true understanding of complex problem situations is more likely using this approach.' (Avison and Fitzgerald, 1995).

Describe the techniques used by Soft Systems Methodology and explain how they can help systems analysts acquire a 'true understanding' of the problem domain. **(25 marks)**

5. Class Diagrams and Use Cases are both Unified Modelling Language (UML) models that may be prepared during the analysis phase of a project using an object-oriented methodology.

a) Describe, using diagrams, the components of each of these models. **(12 marks)**

b) Explain the purpose of each model and the role that each plays during the systems analysis phase and during later phases of a development project. **(13 marks)**