THE BRITISH COMPUTER SOCIETY

THE BCS PROFESSIONAL EXAMINATIONS
BCS Level 5 Diploma in IT

SYSTEMS ANALYSIS

18th October 2007, 2.30 p.m.-4.30 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.

1. A Community Arts Centre has a 500-seat auditorium that holds a variety of events such as film, theatre and music. A new Information System is required to manage the records of performances held and the bookings made for them.

    Anything put on by the Arts Centre is called an 'event'. When the Arts Centre management agree to hold an event, a record is made of the event title, the type of event (e.g. 'film'), a brief description of it, the start date, end date and approximate running time (e.g. for a film this might be 1.5 hours, for a theatre performance 2 hours). Some events have just one 'performance' (e.g. a live entertainer might appear for just one evening), but others may have several performances (e.g. a film could be shown every night for a week). The date and time of each performance is recorded. The price of available tickets for each performance is then decided; as the auditorium is small, the price for all tickets for one performance is the same, but the Arts Centre management usually decide to charge more for performances held on Friday and Saturday nights, and less for afternoon performances. Each available ticket corresponds to one of the Centre's seats, which each have an aisle and number (e.g. A12, J44). A note is kept of which seats are more suitable for disabled customers.

    The majority of bookings are made over the telephone, with the internet as an option once the new system has been installed. When a customer wants to make a booking, a check is made to see whether there are enough available tickets for the required performance. If the customer's request can be satisfied, the Centre staff take the customer's details and check whether they are an existing customer. If not, their name, address and telephone number are recorded. Customers are also asked whether they would like to go on the mailing list to receive information about forthcoming events. The booking is then given a unique booking number and the date of the booking, which available tickets it is for and the method of payment are noted. Tickets are then printed and either mailed to the customer or kept for them to collect at the Arts Centre, according to the customer's preference.

    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)**

    c)
        i)   Name the diagram that can be used to model the third (time, or dynamic) view of the system. **(2 marks)**

ii) Explain, using examples from your answers to Question 1 parts a) and b), how the three views of the system may be checked against each other to ensure the consistency and completeness of the analysis models. **(12 marks)**

2. a) Describe the 'Hard', 'Soft', 'Hybrid' and 'Prototyping' approaches to systems development. **(16 marks)**

   b) Propose and justify the approach that you would use for the development of the Community Arts Centre system outlined in question 1. **(9 marks)**

3. a) Define the term 'software quality' and describe THREE techniques or strategies that can be used during systems analysis to assure the quality of a software system. **(15 marks)**

   b) How do Computer Assisted Software Engineering (CASE) tools assist in assuring software quality? **(10 marks)**

4. The systems models developed in response to question 1 represent a structured approach to systems analysis.

   a) Describe the process of systems analysis and the systems models that you would produce if an object oriented (OO) approach had been used. **(10 marks)**

   b) Support your answer with examples of THREE UML systems analysis diagrams using the scenario outlined in question 1. **(15 marks)**

5. Explain with examples where appropriate EACH of the following terms:

   i) Joint Applications Development (JAD) **(5 marks)**
   ii) Systems and subsystems **(5 marks)**
   iii) Legacy systems **(5 marks)**
   iv) Critical success factors **(5 marks)**
   v) Socio-technological analysis **(5 marks)**