

THE BRITISH COMPUTER SOCIETY

THE BCS PROFESSIONAL EXAMINATION Diploma

SYSTEMS ANALYSIS

30th April 2004, 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.*

1. National Surfing Association - Competitions Information System

The Surfing Association (SA) is responsible for running 10 competitions each year. A competition is made up of 'rounds' and 'heats'. A 'heat' is a competition between 2, 3 or 4 competitors of which only the winner will progress to the next round. A 'round' is a set of heats at a given level of the competition. So, for example, if there are 64 competitors in a competition we have a first round with 16 heats. The 16 heat winners progress to the semi-final round which has 4 heats and the winners of the semi-final heats progress to the final which is made up of a single heat of up to 4 competitors.

The SA has approved the development of a Competitions Information System to support the processing of competitions data. Following an initial interview, the project manager described the manual system as follows:

- When an application arrives we check that the applicant is a member of the SA, that they are insured and that the correct fee is enclosed.
 - If an application is valid we record the application and send the competitor notification that their application has been recorded.
 - If an application is not valid we record only the name and address in the system and send a letter to applicants explaining why their applications cannot be processed or why it was rejected.
 - Once the closing date for applications arrives the competitions organiser:
 - a) Creates a heat structure for the competition according to the number of competitors entered.
 - b) Allocates up to 4 competitors to each heat.
 - c) Allocates judges to heats. There are between 2 and 4 judges per heat.
 - Judges require a printed form for each heat on which they record the scores they award each competitor.
 - We keep a record of who judged each heat.
 - At the end of each heat, scores are recorded and the competitor with the highest score progresses to the next round. This continues until the last heat is run with up to 4 competitors and the eventual winner is identified.
- a) Draw a Top Level (i.e. the level below a Context Diagram) Current Logical Data Flow Diagram for the above scenario. **(15 marks)**
- b) Produce an Entity Relationship Diagram (Logical Data Structure) and a set of normalised tables for the above scenario. You **DO NOT** have to show evidence of the normalisation process. **(20 marks)**
- c) i) Create a Use Case diagram for the above scenario. **(7 marks)**
- ii) Define with an example from your Use Case Diagram <<extends>> and <<includes>> use case associations. **(8 marks)**

Turn over]

2. Dynamic Systems Development Methodology (DSDM) provides a framework to enable the rapid delivery of information systems that address business requirements.

Explain how each of the following concepts helps a DSDM project to deliver a successful business information system:

- a) timeboxing (8 marks)
- b) prototyping (8 marks)
- c) user participation (9 marks)

3. Soft Systems Methodology (SSM) takes into account the fact that the people in an organisation for whom an information system is to be developed, *'may have different and conflicting objectives, perceptions, and attitudes'* (Avison and Fitzgerald, 2003).

Identify TWO techniques that are used in SSM to help highlight the conflicting ideas of the people involved in a problem situation and explain how each of them achieves this purpose. (25 marks)

4. Explain, with the aid of a diagram where appropriate, FIVE of the following terms in the context of the Unified Modelling Language (UML):

- a) Use Case (5 marks)
 - b) Actor (5 marks)
 - c) Object (5 marks)
 - d) Association (5 marks)
 - e) Inheritance (5 marks)
 - f) Aggregation (5 marks)
 - g) Operation (5 marks)
- (5 x 5 marks)

5. a) Briefly define what is meant by a Computer Aided Systems (or Software) Engineering (CASE) tool. (2 marks)
- b) Identify FIVE ways in which a CASE tool may aid the Systems Analysis phase of an information systems development project. (10 marks)
- c) Discuss the extent to which a CASE tool aids quality during the Systems Analysis phase of a project. (13 marks)