

# THE BRITISH COMPUTER SOCIETY

## THE BCS PROFESSIONAL EXAMINATIONS Professional Graduate Diploma

### SYSTEMS DESIGN METHODS

24th April 2006, 10.00 a.m.-1.00 p.m.

Answer THREE questions out of FIVE. All questions carry equal marks.

Time: THREE hours.

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

1. a) The classical approach to systems development recommends that the current/existing system should be investigated and modelled first, and this should be followed by an investigation and modelling of the required/new system.

Many methods (e.g. SSADM) are based on this approach, but not everyone agrees that a detailed investigation of the current system is necessary.

- i) Give at least three arguments for investigating the current system,
- ii) Give at least two arguments for not investigating the current system,
- iii) Give an example of a project/situation which should be based on the 'classical' approach,
- iv) Give an example of a project/situation which should not be based on the 'classical' approach.
- v) Under what circumstances could the current logical model and the new logical model for a system be the same? **(16 marks)**

- b) Component Based Systems Development (CBSD) methods place a lot of emphasis on component reuse when

developing a new system and on developing ('fabrication') of new reusable components. Identify the main stages which should be provided by a typical CBSD method. **(9 marks)**

2. a) Systems modelling techniques can be used to model different aspects of information systems. Consider:

- i) the following 'aspects' of a typical system:
  - User-system interactions/external communications
  - Functionality of a system
  - Structure of a system (e.g. systems data)
  - System dynamics (behavioural aspect)
- ii) the following modelling techniques:
  - Sequence diagram
  - Context DFD (Data Flow Diagram)
  - Class diagram
  - Use Case diagram
  - Entity Life History (ELH)

Which modelling technique(s) would you use to model the above aspects? Justify your answers.

**(12 marks)**

- b) Consider a simple order processing system which allows customers to place and cancel orders.

- i) Draw a DFD and a Use Case Diagram modelling this situation. **(2 marks)**
- ii) Discuss similarities and differences between both diagrams. **(6 marks)**
- iii) Which modelling technique in your opinion is semantically 'richer' and why? **(5 marks)**

**Turn over]**

3. a) The software house for which you work has recently begun to develop safety critical applications. You have been asked to introduce a systems design method for the development of safety critical applications. Discuss what type of method you would implement, and how you would go about introducing such a systems design method into your software house. **(15 marks)**
- b) Discuss the situations in which reverse engineering may be appropriate and those in which it may not be appropriate. **(10 marks)**
4. a) Compare the benefits and drawbacks of using object oriented and structured design methods for e-commerce systems. **(10 marks)**
- b) There are a large number of different types of systems design methods in existence, ranging from socio-technical methods that cover the social as well as the technical aspects of systems development; through engineering based methods that concentrate on the technical design of systems; to formal methods that adopt mathematical language to express designs in a more formal and less ambiguous manner. Discuss THREE possible reasons why such a large variety of systems design methods exist. **(15 marks)**
5. a) Outline THREE ways in which an organisation could attempt to assess the benefits obtained through introducing a new systems design method. **(10 marks)**
- b) Outline the types of software tools that could be used to support systems design activities, explaining the potential benefits that they could provide. **(15 marks)**