

BCS THE CHARTERED INSTITUTE FOR IT

BCS HIGHER EDUCATION QUALIFICATIONS
BCS Level 6 Professional Graduate Diploma in IT

SYSTEM DESIGN METHODS

Monday 16th November 2020 – Afternoon

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

Time: THREE hours

**Answer any Section A questions you attempt in Answer Book A
Answer any Section B questions you attempt in Answer Book B**

For all questions illustrate your answers with diagrams where appropriate

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

Calculators are NOT allowed in this examination.

Section A
Answer Section A questions in Answer Book A

Basic Elements of System Design Methods

A1.

Explain the purpose of the following systems design activities:

- a) Data modelling; **(8 marks)**
- b) Process modelling; **(8 marks)**
- c) Event modelling. **(9 marks)**

Construction of a Method

A2.

- a) A geographical information system typically contains different types of geo-coded data (data associated with given geographical locations) that is processed to produce map based and report based output.

Discuss what design techniques might be suitable for designing a geographical information system, justifying your answer.

(10 marks)

- b) The *Swift* method (see **Appendix**) specifies the development process, but it does not force a method 'user' (i.e. developer) to use a prescribed set of systems modelling techniques. Assume that you are required to use the Swift method in your project. Your task is to decide which structured modelling techniques you would use in the different stages of the method. Briefly justify your decisions.

(15 marks)

Selecting a Method

A3.

- a) When amending an information system, two different approaches to undertaking amendments could include:
- i) Using the whole systems design method, or
 - ii) Using a subset of the systems design method dependent upon the amendment required.

Discuss the suitability of these **TWO** approaches.

(10 marks)

- b) The *Swift* method (see **Appendix**) is suitable for projects and applications/systems which have certain characteristics.

Suggest **FIVE** such characteristics and justify your suggestions. State types of applications which are **NOT** suitable for this method.

(15 marks)

[Turn Over]

Section B
Answer Section B questions in Answer Book B

Introducing a Method

B4.

- a) An organisation has recently decided to introduce a new systems design method. Discuss how the organisation could compare the effectiveness of the new systems design method with the existing systems design method used.

(10 marks)

- b) Every organisation that wants to introduce a RAD/Agile method has an existing culture and accepted working practices. Therefore, the introduction of the new method (e.g. Swift method – see **Appendix**) must be carefully planned and managed to achieve a successful outcome.

Suggest a plan of action for introducing Swift method. Your plan should include at least **FIVE** 'actions'.

(15 marks)

Evaluation and tuning of a method

B5.

- a) Explain the difference between verification and validation.

(4 marks)

- b) Outline different techniques that could be used for verification / validation of a sales analysis system.

(11 marks)

- c) NIMSAD (Normative Information Model-based Systems Analysis and Design) is a well-known framework for comparing and evaluating systems design methods. NIMSAD recommends that evaluation of a method should involve evaluation of the Method Context (the problem situation), the Method User (the intended problem solver), and the Method itself (the problem-solving process).

Why is the evaluation of all three aspects necessary?

Give **THREE** criteria that may be used to evaluate the Method Context and **THREE** to evaluate the Method itself (i.e. the problem-solving process).

(10 marks)

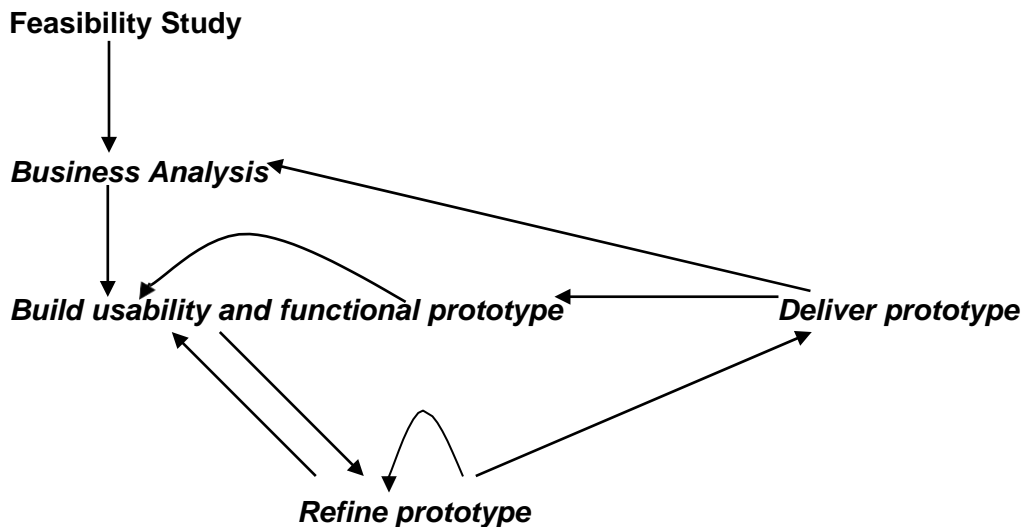
End of Examination

APPENDIX (for use in Questions A2b, A3b, B4b)

Swift is a RAD/Agile method.

The method includes the following stages: Feasibility study, Business analysis, Build usability and functional prototype, Refine prototype, Deliver prototype.

The development process is as follows (see Figure below).



The stages are briefly described below.

Feasibility Study. Scope the development in terms of proposed solutions and produce both a business case and first-cut project plan. Find out who/what the system will interact with. Examine the suitability of the method for your project.

Business Analysis. Examine the business processes to be automated, their information needs, the user groups involved and their respective needs and wishes. Prioritize requirements and plan prototypes to deliver.

Build usability and functional prototype. Develop the usability and functional prototypes as well as system models. The developed prototypes are reviewed by different user groups.

Refine prototype. Engineer the prototype to a sufficiently high standard. The prototype should meet various non-functional requirements (e.g. efficiency, maintainability, etc.).

Deliver prototype. The prototype is installed in the live environment and (if applicable) integrated with previously developed prototypes. If the system is not completed, then go back to Build usability and functional prototype (or in some situations to Business Analysis).