BCS THE CHARTERED INSTITUTE FOR IT

BCS HIGHER EDUCATION QUALIFICATIONS
BCS Level 5 Diploma in IT

SOFTWARE ENGINEERING 1

Tuesday 19th April 2011 - Afternoon
Answer **any** FOUR questions out of SIX. All questions carry equal marks.
Time: TWO hours.

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

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

A1. A company supplies a Tax Returns Automation process to its clients, visiting their sites and inspecting their revenues for a given year, giving advice and completing the necessary forms for Tax Returns purposes. Once the forms have been completed, they are saved as paper copies; one is kept by the client, the other is filed locally within the company's paper-based archives. The corresponding electronic copies are also saved in a word-processor format and saved on a local computer.
The company is seeking to develop a more fully automated process: the tax consultant visiting the client's premises periodically would log-in to an on-line application (within the company website) and input the data to an on-line form. The data collected would be used to keep the clients informed of the results of the consultant's visits and the date of the next visit.

Considering the above scenario:

a) List and describe at least **THREE** possible risks that the company faces in its current, paper-based business process.

(9 marks)

b) List and describe at least **THREE** possible risks that the company will be likely to face when the new more fully automated system has been implemented.

(9 marks)

c) Analytically select and describe **ONE** technique for estimating the effort and the costs associated with the project of building the more fully automated on-line system.

(6 marks)

A2. a) Define the following three types of UML relationships:

1. g*eneralisation*

2. a*ssociation*

3. *dependency*

In each case, give an illustrative example of the relationship in the form of an UML diagram.

(12 marks)

b) Define the concepts of “abstract class” and “interface” within the UML notation. Give examples of both concepts within a single UML diagram.

(8 marks)

c) Explain how polymorphism is implemented via the use of an interface.

(5 marks)

A3. a) In the context of *software reuse*, describe the differences between *design for reuse* and *design with reuse. O*utline the main steps for achieving each.

(10 marks)

b) Provide and comment on at least **TWO** scenarios where *software reuse* would not be appropriate and could not be recommended.

(10 marks)

c) In the context of *software reuse*, explain why access to the source code may be desirable and in some cases necessary for the validation of the reusability of a component.

(5 marks)

Section B

Answer Section B questions in Answer Book B

B4. a) In the context of Software Engineering, define the two terms: *validation* and v*erification* giving examples of each; and discuss the importance of these two activities in the Software Life Cycle.

(8 marks)

b) Discuss the roles that the customer(s) and the software development team play in software validation.

(12 marks)

c) Discuss the feasibility of certifying that a software product is error-free.

(5 marks)

B5. a) Explain what CASE tools are and give an illustrative examples of ONE of such tools, classifying it by the *function*, *activity*, and *breadth of support* parameters.

(10 marks)

b) Discuss the use of a common *repository* within a software company that uses different CASE tools, describing the advantages and disadvantages of such approach, and by depicting a diagram exemplifying the interaction of such CASE tools and the named repository.

(15 marks)

B6. a) Distinguish between the following: *unit testing*, *system testing* and *user acceptance testing*, and give illustrative examples of each.

(15 marks)

b) Describe the use of “test drivers” and “test stubs” in the phase of Integration Testing. Explain how they are used in the top-down and bottom-up approaches to integration testing, and provide an example for each approach.

(10 marks)