BCS THE CHARTERED INSTITUTE FOR IT

BCS HIGHER EDUCATION QUALIFICATIONS
BCS Level 5 Diploma in IT

Software Engineering 1

Friday 27th March 2015 - 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. The IT manager of a sports and fitness company has asked you about Internet Security. The company has an e-commerce website hosted externally by an Internet Services Provider whose staff read orders and other customer inputs from the website prior to storing them in an electronic folder for the company to download. The company also uses a Virtual Private Network (VPN) link with the engineering consultancy which supplies designs for new products. The company also uses email with other businesses in its supply chain.

Consider the above scenario and:

a) Identify and analyse **THREE** risks that cover the manufacturer's use of the Internet. **(9 marks)**
b) Rank the identified risks in priority order. **(4 marks)**
c) Choose some mitigation action that is appropriate for each risk, giving your reasons. **(12 marks)**

A2. A process model for large software development is the Incremental and Iterative development model.

a) Provide one definition for Incremental development and one for Iterative development, describing why they are different but complementary. **(9 marks)**

b) Define **TWO** advantages of using increments and iterations in software development, as opposed to using a traditional mode of development. **(6 marks)**

c) A software specification contains 3 requirements (R1, R2 and R3), and the creation of 4 components (C1, C2, C3 and C4). The requirements and components are linked as follows:

- R1 requires C1, C2
- R2 requires C1, C3
- R3 requires C3, C4

Using an incremental approach, and **THREE** iterations, describe how the components will be built, integrated and released in a product for each iteration. **(10 marks)**

A3.

a) In the context of software reuse, give an example of a reusable component. **(4 marks)**

b) Discuss the practice of software reuse within the software life cycle and describe at least **THREE** of its benefits. **(9 marks)**

c) Identify three possible risks that can occur when a system is built using reusable components and explain how these risks could be reduced. **(6 marks)**

d) 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. **(6 marks)**

Section B
Answer Section B questions in Answer Book B

B1. A client wishes to set up an internet shopping application. Requirements include the ability of a customer to register with a name, address, payment details and be assigned a unique customer identification. A customer should be allowed to order any item from the site. When an order is completed by a customer the items are either dispatched from stock or placed on back order from a supplier, in either case the customer is notified. Items dispatched from stock are debited to the customer, items on back order are debited when they are eventually dispatched.

a) Draw suitable UML class diagrams clearly showing a static view of the individual elements and their relationships. **(15 marks)**

b) Identify the dynamic organisation of objects and messages within the system and draw a UML sequence diagram. The diagram should clearly show the sequence of message flow. **(10 marks)**

B2.

a) Briefly outline the software testing methods used in:

1) 'White-box' testing.
2) 'Black-box' testing. **(8 marks)**

b) Outline the difference between software verification and software validation. **(5 marks)**

c) Describe and give examples of the processes involved within integration testing. **(12 marks)**

B3.

a) One of the many ways in which software can be reused is in the deployment of a complete software application as a 'commercial off the shelf package' (COTS) . Outline design considerations and possible problems in integrating a multiple COTS system. **(10 marks)**

b) Component Based Software Engineering(CBSE) is a way of constructing a software system by reuse of software components. Describe the factors to be considered with development activities associated with:

1) Component qualification
2) Component adaptation **(8 marks)**

c) Outline the key architectural requirements needed to satisfy component composition in a CBSE development context. **(7 marks)**