BCS THE CHARTERED INSTITUTE FOR IT

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

SOFTWARE ENGINEERING 2

Wednesday 5th May 2021 – Morning

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

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) State **FOUR** of Lehman's laws of software evolution and explain their implication for software life cycle management.

(12 marks)

b) Organisations that have legacy systems make a periodic assessment of these systems to decide for each system whether it should be scrapped, replaced by a new system, re-engineered or its maintenance should be continued.

To assess a legacy system from a technical perspective it is necessary to consider both the legacy system itself and the environment in which the system operates.

Identify and discuss technical factors used in the legacy system assessment.

(13 marks)

A2.

a) Explain what is meant by *assertions* in software design. Outline **THREE** reasons why *assertions* are useful in software design.

(10 marks)

b) Develop formal specifications (e.g. using Object-Constraint Language i.e. OCL) for an integer counter.

The counter should hold an integer number whose value is not negative.

You may assume that the counter has the following operations:

i) Reset – to set the counter to 0;
ii) Increment – to increase the current value of counter by 1;
iii) Decrement – to decrease the current value of counter by 1;
iv) Get – to retrieve the current value of counter.

Your answer should include pre- and post- conditions and possible invariants. State all assumptions made.

(15 marks)

Section B
Answer Section B questions in Answer Book B

B3.

a) Identify and describe the practices in many open source software projects that play a significant role in Open Source Software Engineering.

(15 marks)

b) Evaluate the impact of open source collaborative development tools on the practice of software engineering. Give examples of these tools.

(10 marks)

B4.

a) Briefly discuss and contrast the following requirement engineering activities:

i) Elicitation;
ii) Analysis;
iii) Management.

Illustrate your discussion using examples.

(15 marks)

b) Discuss the view that producing a requirements document is a waste of time as changes are too frequent and therefore unreliable.

(10 marks)

B5.
Consider a company that is seeking to develop a web-based system for managing customer complaints online.

a) As a Software Engineer employed by the company, provide a brief discussion and evaluation of the **TWO** architectural styles client server, and hierarchical layering, as potential software solutions for such a system.

(15 marks)

b) Briefly discuss how service-oriented architecture, and microservices, are used and their impact on software development today.

(10 marks)

End of Examination