THE BRITISH COMPUTER SOCIETY

THE BCS PROFESSIONAL EXAMINATIONS
BCS Level 6 Professional Graduate Diploma in IT

SOFTWARE ENGINEERING 2

18th October 2007, 2.30 p.m.-5.30 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.*

Calculators are **NOT** allowed in this examination.

1. a) Show how the steps of Risk Management interact with a Design-Build-Test development cycle for software development. **(12 marks)**

b) In you view, is there any one area of software development that would benefit from Risk Management? Give your reasons fully. **(3 marks)**

c) You are asked to create a company standard for Risk Management. Giving your reasons, derive the type of standard you would create and show the design of THREE of its elements in detail. **(10 marks)**

2. You are asked to create a software quality training programme for a software company of 20 people who use Open Source tools. Your observation of their processes shows them to be between Level 1 and Level 2 on the SEI maturity scale, that is, they have some procedures and plans but these are mainly about configuration control and testing because their development model is Build-and-Synchronize. Mainly they react to events.

a) Giving your reasons fully, explain how you would create this Training Programme. **(5 marks)**

b) Giving you reasons fully, identify in outline what it would contain, how the material would be sequenced, and how long it would run. **(20 marks)**

3. You are engaged to consult on the software testing of an Engine Management System (EMS) for diesel engines, consisting of the Engine control unit (ECU) with software and algorithms as well as a set of input-output sensors.

The aim of your testing is the Smoke Limitation map as shown in the Figure 1 below. This is a data map used by the EMS software to decide how much fuel to inject into the engine. It is controlled by two inputs – charge-air pressure and engine speed. The output is the maximum permissible injected fuel quantity.

The fuel quantities are measured in millilitres, from 0.1 to 2.0 ml.
The air pressure is measured in BAR, from 0.5 to 10.0
The engine speed is measured in revolutions/minute, 800 to 4800.
The map surface is partitioned into 99 unequally-sized segments in a 9 by 11 grid.

a) What testing strategy would you employ to test the Smoke Limitation map? Give your reasons. **(5 marks)**

b) Give examples of three different types of test you would design to check the Smoke Limitation mapping. **(20 marks)**

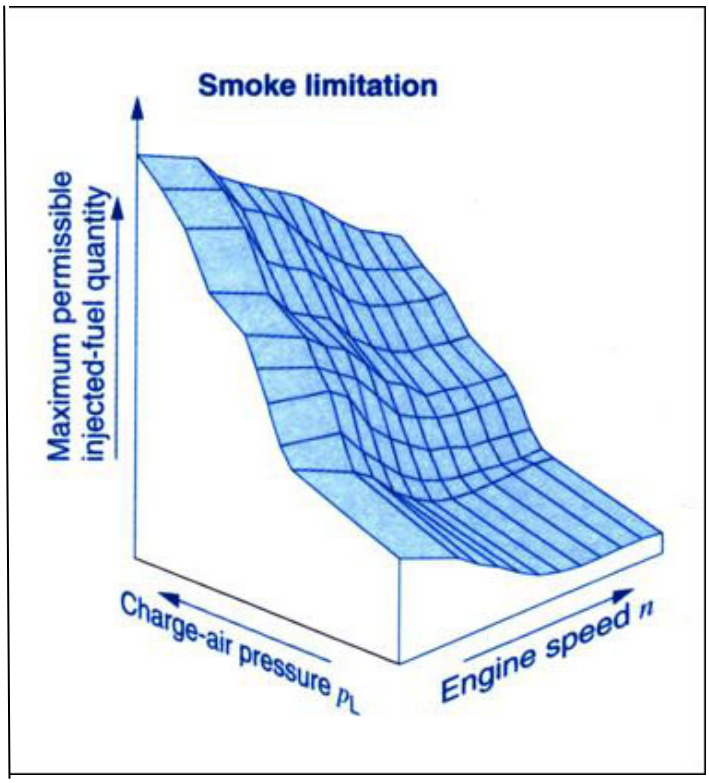

FIGURE 1. Engine Management Systems software map

4. A Media company has asked you to develop a web application for supporting collaborative working, with the proviso that their existing legacy systems will remain fully operational until the new system has been proven by its users and customers.

Discuss and justify the software development toolset, which you might usefully employ in this project from the initial stages, through to the commissioning of the new system itself. **(25 marks)**

5. A local government office requires an integrated web-enabled bill payment system for its residents. Discuss and evaluate the suitability of the RAD and Spiral process models, in terms of their approach and potential for success in delivering the system requested. **(25 marks)**