

THE BRITISH COMPUTER SOCIETY

**THE BCS PROFESSIONAL EXAMINATIONS
BCS Level 5 Diploma in IT**

SOFTWARE ENGINEERING 1

3rd May 2007, 2.30 p.m.-4.30 p.m.

Answer FOUR questions out of SIX. All questions carry equal marks.

Time: TWO 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.
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1.
 - a) Discuss how a design method encourages teamwork by breaking down a problem into many smaller parts. Illustrate your answer by describing how a design method assists reviews, interoperability and maintenance. You may choose any design method known to you, and discuss how reviews, interoperability and maintenance are aided by your method. **(12 marks)**
 - b) Outline an ethical approach to communication within a software engineering project team. **(5 marks)**
 - c) A recurring problem in teamwork is variable, individual productivity. Discuss how you would manage this variation for the benefit of the whole team. **(8 marks)**

2. Suggest an appropriate generic software process model or models that might be used as a basis for managing the development of the following systems:
 - a) an e-auction system which will run over the web,
 - b) a modification to a computer game,
 - c) a system to control radiation therapy administered to patients in a hospital,
 - d) a new virtual learning environment for a college or school, and
 - e) an interactive web-based system that allows customers to review films available and book tickets for a cinema.

In each case, justify your choice by giving reasons that take into account the type of system that is to be developed. **(25 marks)**

3.
 - a) Explain what CASE is in the context of Software Engineering. **(5 marks)**
 - b) Give examples of two CASE tools that are relevant to software project managers. **(4 marks)**
 - c) Give examples of two CASE tools that are relevant to software developers during the design, implementation, or testing phases. **(4 marks)**
 - d) In the case of each of the tools described in your answers to b) and c) above, classify the tool according to:
 - its main functions, and
 - the phase(s) of the software life and particular activities where it is applicable. **(12 marks)**

Turn over]

4. a) Many writers assert that quality processes during development reduce the cost of software maintenance. Give your reasons for accepting, rejecting or modifying this view. **(10 marks)**
- b) Discuss how Software Quality Assurance interacts with the people who perform formal technical reviews, configuration management, and testing. **(15 marks)**

5. a) Explain how the different types of testing are related to the phases of the Software Development Life Cycle. **(10 marks)**
- b) Discuss the role that software documentation plays throughout the software life cycle and its importance in supporting both development and testing. **(8 marks)**
- c) “Software testing can only detect errors present in a software system; it is not possible to show through testing that a system is 100% error free”.
- Discuss the validity of this statement with respect to modern software engineering testing practices. **(7 marks)**

6. Consider the following outline specification for a Car Alarm project.

The car alarm system is to be capable of:

- Taking input from an array of sensors that can include switches, pressure sensors and motion detectors
- Operating a siren, able to create a variety of sounds so that a distinctive sound can be picked by the user
- Wireless on/off control, particularly from a key fob
- There will be an auxiliary battery so that the alarm can operate even if the main battery gets disconnected

A microprocessor computer control unit will monitor the sensors and operate the alarm. Your O-O documentation is to guide the developers of the microprocessor code.

- a) Identify the objects you would select for a first level of refinement. **(5 marks)**
- b) Define an initial selection of two operations that act on the objects identified in a). **(10 marks)**
- c) What extra information would you need to develop the system? **(10 marks)**