THE BRITISH COMPUTER SOCIETY

THE BCS PROFESSIONAL EXAMINATION Diploma

SOFTWARE ENGINEERING 1

29th April 2004, 10.00 a.m.-12.00 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.

- 1. The cost of maintenance for the development and deployment of a software product has often been linked with the cost of quality. Give your reasons for this link with the cost of quality. (25 marks)
- b) Explain the purpose of each of the following in the software engineering process. Give an explanation for a SUCCESSFUL outcome and also an UNSUCCESSFUL outcome. What are the consequences of a successful outcome? What are the consequences of an unsuccessful outcome?
 i) Review

 (8 marks)
 (8 marks)
 (8 marks)

Explain what is meant by the phrase *paradigms of software engineering*.

- **3**. *a)* In the context of software design, define what is meant by the following design principles and illustrate each with an example piece of design:
 - *i*) transparency, also known as information hiding
 - ii) abstraction, and
 - iii) modularity

2.

a)

b) Explain what is meant by the concept of *requirements traceability* with respect to software design.

(4 marks)

(21 marks)

(9 marks)

- **4.** *a)* Describe the features and capabilities of a CASE tool with which you are familiar. Give an example of a CASE tool with which you are familiar and describe how some of the features and capabilities are exhibited. (10 marks)
 - *b)* Give TWO examples where this CASE tool has shifted the engineering emphasis of the development paradigm in which it is used. (15 marks)

5. *a)* Because software is so easy to change, for example by a few keystrokes, software configuration management is often made difficult.

Explain why software is so easy to change, and give TWO examples of your interpretation with reference to software development and maintenance. (10 marks)

b) The following is an outline specification for a small project. Discuss the criteria you would use to determine the life cycle model that this project should follow, and make a recommendation about selecting a suitable life cycle model. You should assume you would have high-productivity development tools. (15 marks)

"This project is about developing visual and graphical web-presentations to show the client what graphical effects are possible with a web site.

"The client owns some houses for renting, preferably to contractors such as consultants and other 'long-stay' business managers for durations of 3-6 months at a time. More and better views of the houses and their interiors will increase the number of rentings.

"The client also wants to develop other lines of business to increase his income. He has an idea to start workshop events about teaching skills such as making glass models or knitting complex designs. He suggests the website should also have ways to illustrate and promote this with such things as downloads of patterns, diagrams, hints-and-tips or other knowledge-intensive 'free' giveaways as part of rewarding visitors to come to the site and be told about – frequently refreshed – dates for workshop events."

6. *a)* Briefly describe TWO issues of product quality that should be considered during the planning process of a software development for EACH of the following, with your reasons.

i)	stable requirements, low productivity development tools ¹	(9 marks)
ii)	unstable requirements, high productivity development tools ²	(9 marks)

Notes

¹ Low productivity means tools that require intensive hand-crafting, like assembly language and 3GL programming systems without specific support for requirements engineering.

² High productivity means tools that provide specific support for requirements engineering, or software generator environments.

b) For the situation in *ii*) above, identify the roles for two other people whose skills complement those of a software engineer. Give your reasons. (7 marks)