THE BRITISH COMPUTER SOCIETY

THE BCS PROFESSIONAL EXAMINATIONS
BCS Level 5 Diploma in IT

SOFTWARE ENGINEERING 1

25th April 2008, 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.*

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

1.

a) Explain why configuration management is a necessary practice for
    software engineers. Your answer should give TWO examples, one
    relevant to software development and another relevant to maintenance as
    support for your explanation.

    (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.

    (15 marks)

*This project is for a company that specializes in health-and-safety training with
chemical process companies. Their contracts include facilities maintenance,
repair, supervision, risk assessment, and provision of health and safety training.
The company's business model relies heavily on open and honest dealing in
order to establish a culture of safety and trust when negotiating with potential
customers.*

This project is about creating a suitable web site for the company.

*The project should analyse and create suitable images and text to promote the
culture and capability of the company. It is highly likely that a database will be
required to support the quality of web site that is required.*

Turn over]

2.

    a)   Describe the features and capabilities of a CASE tool with which you are familiar.

                      (10 marks)

    b)   Give TWO examples where CASE tools have shifted the engineering focus of the development model in which they are used.

                      (15 marks)

3.

    a)   You are asked to manage a development project for a major company. You know that the company has a strong ethical stance. What THREE rules would you broadcast to your project team to ensure they behaved ethically on this project?

                      (10 marks)

    b)   Compare Function Points with Lines of Code as techniques to estimate the cost of a software project. In your opinion, which method is more reliable, and how would you make its reliability even better?

                      (15 marks)

4.

    a)   In the context of object oriented design and programming, explain the meaning of each of the following terms and give an example of each using either UML or any programming language of your choice:

        i)   Abstraction
        ii)   Encapsulation
        iii)   Modularisation
        iv)   Inheritance

                      (10 marks)

    b)   Consider the domain of libraries, identify five classes of objects and define attributes for each class and operations that apply to it. In the case of each class, provide an instantiation of an object belonging to it.

                      (15 marks)

5.

a)   State three major factors that influence the cost of software development.

(3 marks)

b)   Describe a cost estimation model, showing the formulation of the model and state any assumptions on which it is based.

(8 marks)

c)   In the process of project planning, define the following terms:

i)   Activity
ii)   Milestone
iii)   Critical Path

(6 marks)

d)   Draw a simple Gantt chart for a project following the classic waterfall model for software development and state any assumptions on which your chart is based. On your chart you should identify all major milestones and activities.

(8 marks)

6.

a)   Consider error messages found in any software application and suggest ways in which these might be improved.

(6 marks)

b)   Three principles of user interface design are *consistency*, *minimal surprise*, and *recoverability*. Explain what is meant by each of these principles and give an illustrative example of each?

(9 marks)

c)   What considerations are relevant when designing a user interface in order to make it more accessible for use by people with impaired vision?

(4 marks)

d)   Discuss the business case for giving consideration to usability and accessibility when designing software applications for a worldwide market, e.g. web-based applications.

(6 marks)