THE BRITISH COMPUTER SOCIETY

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

SOFTWARE ENGINEERING 2

25th April 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)* Compare three different approaches to project planning using these three metric styles: size, function and algorithmic. Make clear the principles in your answer.   **(15 marks)**

  b) Discuss the practical limitations of these metric styles. Discuss how they might be adapted for practical use.
  (10 marks)

2. *a)* Discuss the underlying principles of a standard for a software process and a standard for a software product. In your answer, you may refer to any of the international standards that exist.   **(10 marks)**

  b) You are asked to create a company standard for software configuration management. Giving your reasons, choose THREE elements of configuration management that you would use in your standard.   **(15 marks)**

3. As a member of the development team for a new production control system, you have been allocated the task of designing the software module that picks items of a production line, inspects their quality of manufacture, and place these components into appropriate collection bins. The collection bins are labelled "PASS", "REWORK", "SCRAP", and "UNDECIDED".

  a) Give a broad overview of both the Object-Oriented and Structured Design approach to developing this software module, highlighting their similarities and differences using suitable diagrams and annotation based on the scenario described.   **(15 marks)**

  b) Write a detailed process specification for the system described above that exhibits good reusability characteristics.   **(10 marks)**

4. *a)* Compare the types of testing that would be performed for the following three phases of the software development life cycle. Comment critically on the way they overlap with each other.

- requirements
- design
- validation **(12 marks)**

b) A mobile phone company is designing new software for automatic processing of upgrade requests on its website. You are assigned to design the tests. The application accepts data in the form:

Phone number = All numbers used by this company begin 07973 followed by 6 digits.
Account number = 6 digits not beginning with 0 or 1
Password = 6 alphanumeric characters
Selected upgrade model = 4-digit number
Payment plan = "monthly", "pay-as-you-go", "business"

The input conditions associated with each element are:

Data element	Input condition1	Input condition 2
Phone number	*Boolean* 07973 may be absent	*Range* 000100 and 800999
Account number	*Range* – 200000 to 999999	*Range* – 6-digit number
Password	*Boolean* may be absent	Length – 6 alpha-numerics
Selected upgrade model	*value* – 4-digits	
Payment plan	*set* – one of the types listed above.	

Derive test cases for each of the input domains where each test exercises the largest number of input attributes at the same time. **(13 marks)**

5. Software engineering, as a systematic, disciplined, and quantifiable approach to application development and maintenance, is considered by many today to have made significant progress in meeting the needs of users and the budgetary requirements of managers.

Write a report that clearly defines the concept of software engineering and provide a general discussion of the progress made in the industry in terms of the expectation, adoption, and successful application of engineering practice. **(25 marks)**