

THE BRITISH COMPUTER SOCIETY

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

PROGRAMMING PARADIGMS

24th April 2007, 10.00 a.m.-1.00 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) Language standardisation is often a lengthy and laborious process, taking up to 10 years to complete in some cases. Discuss why a standard for each language is needed and what might be the consequences of not having one. (13 marks)
 - b) Discuss how the concepts of objects, classes and inheritance support the development of 'good' software. Illustrate your answer with either code or diagrams. (12 marks)

2. Structured programming changed the way programmers developed software systems in the 1970s and these changes were reflected in the style of the programming languages that were used. Since then there have been many other changes in the way in which programs are developed and these changes too have been reflected in new programming paradigms.

Choose TWO different programming paradigms and discuss how they reflect changes in the development of software, indicating any disadvantages that may be associated with the changes. (25 marks)

3.
 - a) Discuss the role of constructors, pattern matching and recursion, when using compound types within an applicative (functional) programming language. Provide illustrative examples of their role within a functional programming language. (15 marks)
 - b) Distinguish between lazy and eager evaluation in the implementation of applicative (functional) programming languages. (10 marks)

4.
 - a) Discuss the suitability of pure logic programming for the development of interactive machine control systems such as an aircraft fly-by-wire system. (12 marks)
 - b) There are two common approaches to the concurrent execution of logic programming clauses, namely *and-parallelism* and *or-parallelism*. Compare and contrast these approaches. (13 marks)

5. To what extents are the issues of concurrency and distribution addressed by languages following the object oriented, functional and logic-based paradigms? Illustrate your answer with suitably annotated examples of each system, pointing out the relevant parts of the paradigm referred to in each instance. (25 marks)