

THE BRITISH COMPUTER SOCIETY

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

PROGRAMMING PARADIGMS

21st April 2008, 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
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1.

a) Describe the features an Interactive Development Environment (IDE) should have to support a team of software developers.

(10 marks)

b) Discuss the advantages and disadvantages of using such an IDE, evaluating how it aids productivity and improves the quality of the code produced.

(15 marks)

2. A software company currently uses conventional (procedural) programming languages for its systems development. It is now considering moving to an object-oriented programming language. Discuss the effects of changing from a conventional to an object-oriented paradigm. Within your answer consider the benefits, overheads and disadvantages of this approach. Illustrate your answer with appropriate examples.

(25 marks)

3.

a) Discuss the role of higher-order functions within the implementation of applicative (functional) programming languages.

(12 marks)

b) In a functional programming language, an expression is evaluated within the context of an *environment*. Discuss this statement, commenting upon any similarities, or otherwise, that might exist between functional and imperative programming languages.

(13 marks)

Turn over]

4.

- a) What are the two major abstractions that characterise logic programming, and how are these compromised within the implementation of a practical logic programming language?

(12 marks)

- b) Many languages have attempted to combine the advantages of logic programming with other programming paradigms such as object-oriented programming and functional programming. Present arguments for and against this integration.

(13 marks)

5. For a programming language to support concurrency, solutions to the problems of *process synchronisation* and *communication* are required. Elaborate on these problems, and describe the range of solutions that are available. In your answer, discuss the relative strengths and weaknesses of each solution.

(25 marks)