THE BRITISH COMPUTER SOCIETY

THE BCS PROFESSIONAL EXAMINATION
Professional Graduate Diploma

PROGRAMMING PARADIGMS

14th May 2003, 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.*

1. *a)* Describe the tools typically found in an Interactive Development Environment (IDE). **(10 marks)**

b) IDEs aim to improve the productivity of a programmer or programming team. Discuss how these tools can achieve this and how they affect the quality of the code produced. **(15 marks)**

2. Recently language design has focused on *"Programming in the Large"*. What concepts are found in object-oriented programming languages to support the development of large-scale applications? Include suitable examples. **(25 marks)**

3. "Every language is designed to solve a particular set of problems at a particular time according to the understanding of a particular group of people." Bjarne Stroustrup, *The Design of C++*.

Choose two different programming paradigms and evaluate their strengths and weaknesses, illustrating your answer with examples from suitable programming languages. Within your discussion explain what particular set of problems they aim to address. **(25 marks)**

4. *a)* What are the two major abstractions that characterise logic programming? How are these compromised within the implementation of a practical logic programming language?

(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)**

5. *a)* Why are process synchronisation and communication important activities within programming languages that support concurrency? **(13 marks)**

b) A sequential program terminates when it has executed its last statement. What is the problem of program termination within the context of concurrent programming? Describe two solutions to this problem.

(12 marks)