

BCS Higher Education Qualification

Profession Graduate Diploma

May 2021

EXAMINERS' REPORT

Programming Paradigms

General comments

Overall, the exam was attempted well by a majority of the candidates. The pass rate was lower than recent years, but it is noted that there were fewer candidates due to the ongoing pandemic.

More candidates attempted questions in Part B, which is a change from recent sittings for this module. Whilst there were some good answers, a number of students need to spend more time studying logic programming and functional programming. It was clear that some concepts were understood but there were answers that could not provide much detail. We encourage candidates to prepare for that part of the syllabus by trying to write some programs in Prolog and in a functional language such as Haskell.

As candidates prepare for this paper in future, we recommend that they not only focus on the knowledge of what the topics about, but consider how they could critically evaluate, compare, and contrast different topics in in the syllabus. This would help more candidates improve their marks.

Question number: A1

Syllabus area: Object Orientation and Language Standardisation

Total marks allocated: 25

Examiners' Guidance Notes

Part a was about issues with object orientation. This part of the question was answered well, with reasonable examples provided. Some of the examples could be more detailed for this level of paper. Further, the discussion of encapsulation mostly focused on using access levels (public, private, protected), rather than the main idea of bringing data and operations together.

Part b was about language standardisation. Answers were OK, but some would have been improved with more detail for the discussion. There was general awareness that there were standards for some languages, but more could be said about the benefits of having the standards.

Question number: A2

Syllabus area: Interactive development tools and Compilers and interpreters

Total marks allocated: 25

Examiners' Guidance Notes

Part a was about interactive development tools. This part of the question was generally answered well with candidates discussing different features found in IDEs. The part of the question about a critical evaluation of the benefits of the features was answered less well.

Part b was about compilers and interpreters. The answers should a general understanding of compilers and their differences and the benefits for developers. The answers were better at the key differences between the two general styles. Answers would have been improved with more discussion about the possible benefits.

Question number: A3

Syllabus area: Scripting languages and Data-oriented languages

Total marks allocated: 25

Examiners' Guidance Notes

This question asked about scripting languages and data-oriented languages. This question was much less popular than the others, which suggests less awareness amongst this year's candidates of these styles of languages. Whilst the candidates who attempted the question had some knowledge of one or both styles, the answers were sometimes brief and didn't include much discussion for the marks available. It would be good for future candidates to have more awareness of examples and use of these styles of languages.

Question number: B4

Syllabus area: Other Issues

Total marks allocated: 25

Examiners' Guidance Notes

Part a was about the meaning of concurrency. This was answered well.

Part b was about resource sharing in concurrent systems. There were some good answers that showed an understanding of the key issues and an appreciation of some solutions that can be used. Some answers talked generally about the Dining Philosophers' problem, but didn't discuss solutions in detail. A number of answers would have been improved with a specific example, e.g. talking about the use of synchronisation in Java.

Part c was about problems in concurrent systems. Answers would typically identify the issue of Deadlock, but there could have been more detail to discuss what that was and why it was possible.

Question number: B5

Syllabus area: Nature of Programming Languages, Logic Programming and Functional Programming

Total marks allocated: 25

Examiners' Guidance Notes

Part a was about Logic Programming. There were some good answers, but some answers did not demonstrate much knowledge about logic programming.

Part b was about recursion. This was generally answered OK, although some answers didn't say much about similarities or differences with iteration.

Part c was about writing a recursive function in a functional language. Most answers made an attempt at this, but only a few used a true functional language such as Haskell. It was more common to see examples using Python, which has some functional aspects, but it is not a pure functional language. Further, a number of examples used iteration to perform the calculation. The question specifically asked for a recursive function.