National College of Ireland

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Higher Diploma in Science in Computing (Software Development) – Part-time – Year 1 – HDCSDEV

Autumn/Repeat Examinations – 2014/15

Wednesday 19th August 2015
2.00pm – 4.00pm

Advanced Programming

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Answer Question A and answer either Question B or Question C

Duration of exam: 120 minutes
Attachments: None

Question A [60 Marks]
Answer <u>all</u> parts of this question. Each part carries 10 marks.

1. What is meant by the term NP-Hard and describe one approach to dealing with NP-Hard problems.

[10 Marks]

2. The Java thread state Runnable has two sub states. Describe what they are and the process that would cause a thread to switch between them.

[10 Marks]

3. Explain the concept of Serialisation and Deserialisation. Your answer should include a descrioption of the basic steps required to make a class serialisable in Java.

[10 Marks]

4. Describe the key simplifications involved in the Big O method for analyzing algorithms. In your answer explain how these simplications can be justified.

[10 Marks]

5. Describe the key steps involved in the Merge sort algorithm. Illustrate your answer by showing a step-by-step sort for the following collection of numbers – {38, 27, 43, 3, 9, 82, 10}.

[10 Marks]

6. Explain, using an example, the concept of Garbage Collection as used by Java.

[10 Marks]

Answer *either* Question B or Question C.

Question B – Sorting Algorithms [40 marks]

1. Explain the key elements of the Quick Sort algorithm. Your answer should include Pseudo code or Java code for the Quick Sort algorithm.

[20 Marks]

2. Explain the Best Case and Worst Case performance for the Quick Sort algorithm. Your answer should show an understanding of how these performance numbers are arrived at, as well as describing scenarios in which both cases would be achieved.

[20 Marks]

Question C – Exceptions [40 Marks]

1. Describe the exception handling process in Java

[20 Marks]

2. Describe 4 best practices when using exceptions in Java. Your answer should be illustrated with code fragments that highlight either good or bad examples.

[20 Marks]