National College of Ireland

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

Semester Two Examinations – 2014/15

Saturday 16th May 2015
10.00am – 12.00noon

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. Write the pseudo code or Java code for the Bubble sort algorithm. Assume the existence of a swap() method that can swap two elements.

[10 Marks]

2. Explain the concept of exception handling. In your answer include an overview of how exceptions are dealt with in Java.

[10 Marks]

3. Explain the concept of thread priorities in Java. Your answer should address what thread priority is used for and how it can be changed.

[10 Marks]

4. What is the Big O complexity of the following code fragment? Show your computation.

```
for (i = 0; i < N; i++) {
        for (j = 0; j < N; j++) {
                myTotal = myTotal + (i*j);
        }
 }
for (k = 0; k < N; k++) {
        myFactorial = myFactorial * k;
}
```

[10 Marks]

5. Describe the key steps involved in the Insertion sort algorithm. Illustrate your answer by showing a step-by-step sort for the following collection of numbers - {7, 6, 1, 9, 3, 5} .

[10 Marks]

6. Explain the concepts of Serialisation and Deserialisation. In your answer you should include a description of the main uses for serialisation.

[10 Marks]

Answer *either* Question B or Question C

Question B – Sorting Algorithms [40 marks]

1. Explain how recursion can be used in certain sorting algorithms. In your answer you should include pseudo code to illustrate a recusive solution to one particular sorting algorithm.

[10 Marks]

2. What are both the best/average and worst case Big O performace of Quick Sort? What type of input would produce the worst case performace?

[10 Marks]

3. Explain the key elements of the Quick Sort algorithm.

[20 Marks]

Question C – Sockets [40 Marks]

1. What is a socket?

[10 Marks]

2. What are some advantages and disadvantages of sockets?

[10 Marks]

3. Provide java code for a Sockets Server Application on port 8080 that simply prints out every line it receives from a client.

[20 Marks]