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Higher Diploma in Science in Computing – Part-time – Year 1 – HDCSDEV, HDCSDEVJAN16,
HDCSDEVJAN16B

Autumn/ Repeat Examinations – 2015/16

Saturday 20th August 2016
10.00am – 12.00pm

Advanced Programming

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Answer Question A and **one** other Question

Duration of exam: 2 hours

Attachments: None

Question A [60 Marks in total]

1. a) What is the worst-case complexity of each of the following for loops and the worst case complexity of the overall method?

```
private void method() {  
    for (i = 0; i < N; i++) {  
        for (j = 0; j < N; j++) {  
            //sequence of statements  
        }  
    }  
}
```

[10 marks]

- b) Describe what is meant by a heuristic. Give at least two examples of heuristics.

[10 marks]

2. Where are objects stored in Java, and how does Garbage Collection work? Describe Garbage collection using a diagram.

[15 marks]

3. Write Java code to cover the following lines of code with exception handling.

```
int num = 10;  
int denom = 0;  
int answer = num/denom;
```

[10 marks]

4. Explain what is meant by the term Thread Sleep in Java. Give a code example how one would sleep a thread.

[5 marks]

Write the Java code for increasing the priority of a thread to the maximum

[10 marks]

Answer Question B or C

Question B [40 Marks in total]

1. Explain the basic steps using an example which are followed when using a socket in java. Eg, what is opened and closed, and in what order?
[10 marks]
2. Give at least 3 example of where sockets are used. Provide a short server side application for one of these examples.
[20 marks]
3. Give 2 advantages and 2 disadvantages of sockets.
[10 marks]

Question C [40 marks]

1. What are the three classifications of design patterns from the Gang of Four (GOF)?
[5 marks]
2. Provide the Definition, where it is used and benefits of a Behavioural Pattern of your choice.
[15 marks]
3. Provide Java code for the pattern you selected for the previous question i.e. Question C, 2.
[20 marks]