

2005 Paper 4 Question 8

Concurrent Systems and Applications

- (a) Java includes support for converting between objects and a stream of bytes.
- (i) Describe the Java serialization mechanism. [4 marks]
 - (ii) What circumstances can cause exceptions to be thrown during serialization? [2 marks]
 - (iii) What is the effect of the `transient` modifier? To which components of a class is it legal to apply the `transient` modifier? [3 marks]
 - (iv) Why do some programmers prefer to use `Externalizable` instead of `Serializable`? [1 mark]
- (b) Java includes support for converting a stream of bytes into a class definition. Describe the facilities that provide this functionality and ensure that the type-safety of the Java Virtual Machine cannot be compromised. [4 marks]
- (c) What are *native methods* and why might they be useful? [2 marks]
- (d) What are *reference objects*? How does a *ReferenceQueue* provide a means to release resources when they are no longer needed? Explain how reference objects can be used to construct data structures that permit the garbage collector to release memory when the Java Virtual Machine might otherwise run out of memory. [4 marks]