

Review Questions

Instructions: You are not required to turn in answers to these review questions, but you should do them on your own after you read this section's papers to test your knowledge. Use Piazza or the TAs if you have questions or get stuck on any of these.

Spring System

- 1) What are the pros and cons of object orientation in the context of designing an Operating System? Explain the approach taken in Spring.
- 2) Explain the basic abstractions supported by the nucleus of Spring. Compare the microkernel in Spring with Liedtke's recommendation on microkernel construction.
- 3) What is the role played by subcontract in the Spring system? Explain with example scenarios (such as singleton and replicated implementation of servers).
- 4) Explain the security model of Spring. How does this facilitate secure object invocation?
- 5) What is the relation between the address space, pager, cache, and memory objects in the Spring system? How do they work together to provide the virtual memory support in Spring?
- 6) Discuss the Spring File System (SFS) and its relationship to the virtual memory system. What is semantically different about SFS compared to NFS?

Distributed Object Model for Java

- 1) Summarize the similarities and differences between the Java object model and its distributed counterpart.
- 2) Explain with justification the difference in the semantics for the default implementations for some of the methods of the "Object class" for remote objects.
- 3) Explain with justification the difference in the semantics of parameters passing for remote Java objects compared to local ones.
- 4) What are the transport level abstractions in the RMI system? Explain the choice of these abstractions with respect to the RMI semantics.
- 5) Explain how garbage collection works in Java in the presence of remote objects.
- 6) Compare the Java remote object model to CORBA.

Enterprise Java Beans

- 1) Explain the term "Java Beans". What are N-tier applications? How are Java Beans useful in constructing such applications?
- 2) What is reflection as it pertains to Java Beans? How is this useful in building complex web applications? Illustrate with an example.
- 3) The paper describes 5 different implementation methods for an EJB application. Discuss qualitatively the pros and cons of each method.
- 4) From the qualitative discussion in question 3, hypothesize the expected performance of each of the implementation choices.
- 5) At a high level compare your hypothesis with the actual performance results presented in the paper.