The University of Melbourne

Cloud Computing and Distributed Systems Laboratory Department of Computer Science and Software Engineering

433-652: Distributed Systems

Examination

Semester 1 or 2, 20XY - Model Question Paper

Exam Duration: 3 hours Reading Time: 15 minutes

This paper has 2 pages, including this cover page.

Authorized Materials:

• There is NO special authorized material for this examination.

Instructions to Invigilators:

- Please provide students with standard script books.
- Please collect the exam paper from students once they finished answering.

Instructions to Students:

- This examination is worth of 60% of your final mark.
- Answer any 6 out of 8 questions. **Please note only first 6 answers will be marked.**
- Each question carries 10 marks.
- The numbers in square bracket after each sub-question represents marks allocated to it.
- Start your answer to each question on a new page.
- Make sure your answers are readable. Any unreadable parts will be deemed incorrect.

This paper will NOT be held at the Baillieu Library.

Question 1:

- A) Identify various types of resources that can usefully be shared in computer networks. Give examples of their sharing as it occurs in distributed systems. [5]
- B) Discuss briefly key challenges that one needs to address in the design and development of distributed applications. [5]

Question 2:

- A) Discuss peer-to-peer architectural model for construction of distributed systems. [5]
- B) Identify main types of security threats that might occur in the Internet with an example. [5]

Question 3:

- A) Discuss difference between TCP/IP and UDP protocols for Socket-based communication. [5]
- B) Write a multithreaded Java program that responds to remote clients' requests for meaning of words stored in a Dictionary. If a client program sends a message "King" to the server, the server program responds back with the meaning of word "King" by retrieving it from the dictionary (as a string). Use Java Sockets for communication between clients and the server. [5]

Question 4:

- A) Write a simple CORBA program that demonstrates the invocation of remote object services. For example, when a client sends a message "Hello", the server responds with "Hi There!". [5]
- B) Write a simple RMI program that demonstrates the invocation of remote object services. For example, when a client sends a message "Ping", the server responds with "Pong". [5]

Question 5:

- A) Discuss important operating systems services that are essential for supporting the development of concurrent and scalable distributed systems. [5]
- B) Discuss architecture of Layered operating system. Comment on how well it supports the development of extensible operating systems. [5]

Question 6:

- A) Discuss techniques for achieving high-performance in distributed file systems. [5]
- B) Discuss model architecture of distributed file system and its components. [5]

Question 7:

- A) Discuss asymmetric (public/private key pair-based) cryptography technique and how it can be used in supporting security in distributed systems. [5]
- B) Discuss secure socket layer (SSL) architecture and its components. [5]

Question 8:

- A) Discuss the role of naming services in distributed systems. List two navigation schemes that can be used for name resolution in domain name systems. [5]
- B) Discuss operation of a typical domain name server (DNS) with suitable example. [5]