KENYATTA UNIVERSITY

UNIVERSITY EXAMINATIONS 2011/2012

SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE

SCT 403: DISTRIBUTED SYSTEMS

DATE: Wednesday 18th April, 2012 **TIME:** 8.00 a.m. – 10.00 a.m.

Instructions: ***Answer question ONE and Any other TWO questions***

Question 1

(a) Define the following in relation to distributed systems:

(i) Distributed System [2 Marks]

(ii) Communication [2 Marks]

(b) Briefly explain the role of middleware in a distributed system. [3 Marks]

(c) Briefly discuss the characteristics of a Distributed system. [3 marks]

(d) Why is naming so important in Distributed systems? Briefly explain the following in relation to naming: names, Identifiers and addresses. [8 marks]

(e) Classify the protocols IP, TCP, and FTP, and HTTP according to the ISO OSI hierarchy. [4 marks]

(f) With examples discuss any the design goals of a Distributed system. [8 marks]

Question 2

(a) What is an open distributed system? Discuss the benefits the openness provides? [4 Marks]

(b) If a client and a server are placed far apart, we may see network latency dominating overall performance. Explain how you would tackle this problem? [4 marks]

(c) Differentiate between the following:

(i) Process and Thread [4 marks]

(ii) Multithreaded client and multithreaded server. [4 marks]

Question 3

(a) Using appropriate illustrations, differentiate between the following interconnection network:

(i) Bus architecture [4 marks]

(ii) Switched architecture [4 marks]

(b) Discuss the models of communication used in distributed systems. [8 marks]

(c) What are the mechanisms that can be used in a distributed system to enforce security? [4 marks]

Question 4

(a) What is Inter-Process Communication (IPC)? Explain its role in communication. [7 marks]

(b) What is idempotency? Briefly explain how Idempotent operations differ from nonidempotent operations. [5 marks]

(c) Discuss the three types of group communication. [3 marks]

(d) Define and briefly discuss the properties of a transaction. [5 marks]

Question 5

(a) Describe how connectionless communication between a client and a server proceeds when using sockets. [8 marks]

(b) With examples explain the difference between iterative name resolution and recursive name resolution. [4 marks]

(c) What are the major differences between:

(i) A stateless server and a stateful server [4 marks]

(ii) External clock synchronization and Internal clock synchronization [4 marks]