WOMEN'S UNIVERSITY IN AFRICA

Addressing gender disparity and fostering equity in University Education

FACULTY OF MANAGEMENT AND ENTREPRENEURIAL SCIENCES

BSc HONOURS DEGREE IN COMPUTER SCIENCE

MAIN PAPER

HCS324: DISTRIBUTED SYSTEMS

INTAKE 1: THIRD YEAR SECOND SEMESTER

TIME: 2 HOURS MORNING

INSTRUCTIONS TO CANDIDATES

Answer any **four** questions.

Question 1

a) Differentiate Para-virtualization and full-virtualization. [9]

b) Discuss the benefits and challenges of virtualization. [7]

c) Explain the role of a hypervisor in virtualization. [9]

Question 2

a) Name any challenges faced by distributed systems designers. [4]

b) Explain the advantages of distributed systems over centralized systems. [9]

c) Discuss the CAP Theorem. [12]

Question 3

a) Discuss deployment models of cloud computing [9]

b) Discuss any major features of cloud computing [6]

c) Discuss Map reduce [10]

Question 4

a) Define the following terms as they are used in distributed systems

   i. Replication; [2]

   ii. Concurrency; [2]

   iii. Thread; and [2]

   iv. Synchronization [2]

b) Differentiate synchronous and asynchronous distributed system models [6]

c) How can we achieve failure detection in distributed system? [6]

d) Explain mutual exclusion [5]

Question 5

a) Discuss the chord protocol in peer to peer systems [9]

b) With the aid of an example explain the client-server model [6]

c) Discuss Fault tolerance [10]

Question 6

a) F1.Middleware, mobile code and virtual machines are examples of achieving heterogeneity in distributed systems. Explain the implementation of each of them. [9]

b) A naïve representation of concurrency in distributed systems can be presented as: *I do my work on my computer; you do your work on your computers, while sharing resources when necessary.*

From this narration describe the dining philosophers problem in relation to distributed systems. [4]

c) From your answer above, describe the major problem(s) which might result from uncontrolled concurrency. [5]

d) What do you understand by marshalling? [3]

e) Differentiate asynchronous and synchronous distributed systems. [4]

END