TECHNICAL UNIVERSITY OF KENYA

FACULTY OF APPLIED SCIENCES AND TECHNOLOGY

SCHOOL OF COMPUTING AND INFORMATION TECHNOLOGIES

END OF SEMESTER EXAMINATION SERIES.

SEMESTER EXAMINATIONS 2019/2020

FOURTH YEAR EXAMINATIONS FOR THE DEGREE IN INFORMATION TECHNOLOGY

ECII 4104: DISTRIBUTED SYSTEMS.

TIME: 2 Hours

Instructions to candidates:

This paper consists of FIVE Questions.
Answer Question ONE [30 Marks] and any other TWO Questions [20 Marks Each].
Write your college number on the answer sheet.
This paper consists of 2 printed pages

Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.

QUESTION ONE (30 MARKS) COMPULSORY

(a)Many distributed algorithms require the use of coordinating process. Interpret to what extent such Algorithms can be considered distributed. [3marks]

(b)With an aid of a diagram, describe the file service architecture in a distributed system. [6marks]

(c) Fault tolerance improves the system availability and reliability in a distributed systems

Environment. Use **THREE** overheads involved in the system to support its complexity. [6marks]

(d)Using examples, illustrate the following terms as used in distributed systems.

(i)Migration transparency [2marks]

(ii)Fault tolerance [2marks]
(iii) Concurrency [2marks]
(e) Illustrate **TWO** services provided by computing distributed systems. [4marks]

(f)Use a sketch to describe the process of a system call in a distributed systems. [5marks]

QUESTION TWO (20 MARKS)

(a)Explain **THREE** main reasons why there is need for synchronization mechanisms in distributed systems. [6marks]

(b)Draw an example of distributed system architecture, outlining three areas of focus. [6marks]

(c)Discuss four methods of system conversion, stating one advantage and one disadvantage of each.
[8marks]

QUESTION THREE (20 MARKS)

(a)Discuss alternative approaches to creating unique names for objects in large scale distributed systems or applications. [5Marks]

(b) Describe the support for naming and name resolution in the following:

(i) The Internet [3Marks]

(ii) Object-oriented middleware [3Marks]

(iii) Message-oriented middleware. [3Marks]

(c) With reasons, give **TWO** examples of distributed applications which require total (logical) ordering of events.
[6Marks]

QUESTION FOUR (20 MARKS)

(a)With a sketch, show all the operations that take place during a Remote Procedure Call [6marks]

b) Interpret the **FOUR** properties commonly denoted by the acronym ACID in reference to transactions.

[6marks]

(c)File replication is a feature in distributed systems. Explain **FOUR** benefits aiding the functions in a distributed computing system environment. [8marks]

QUESTION FIVE (20 MARKS)

(a)Illustrate with relevant examples, **FIVE** desirables components of a good distributed file system.

[10marks]

(b)The concept of distributed computing is one of the most effective way to achieve resource output optimization. Demonstrate **FIVE** applications of distributed computing. [10marks]