



MACHAKOS UNIVERSITY

University Examinations for 2021/2022

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

FOURTH YEAR SECOND SEMESTER EXAMINATION FOR

BACHELOR OF SCIENCE (INFORMATION TECHNOLOGY)

SIT 411: DISTRIBUTED SYSTEMS

DATE: 15/12/2021

TIME: 8:30 – 10:30 AM

INSTRUCTIONS:

Answer question ONE and any other TWO questions

QUESTION ONE (COMPULSORY) (30 MARKS)

- a) Define Multicast communication (2 marks)
- b) Diagnose two drawbacks of synchronous communication (4 marks)
- c) Describe the functions of Low-level layers in distributed systems (6 marks)
- d) By the use of well labeled diagrams, discuss how Asynchronous RPCs is accomplished. (6 marks)
- e) Process-to-resource binding is a technique used in distributed systems for managing local resources. explain three categories of these techniques (6 marks)
- f) It is possible to interrupt a server once it has accepted or is in the process of accepting a service request. Explain how to accomplish this and argue how it is done. (6 marks)

QUESTION TWO (20 MARKS)

- a) Explain “ a Message Broker” as used in Message-Oriented Communication in distributed systems (2 marks)
- b) Explain how to specify the Quality of Service of streams of data transmission in distributed systems. (4 marks)
- c) Event-based distributed system architecture supports several communication styles. describe three of these styles (6 marks)
- d) Discuss how Remote Procedure Call is achieved using Parameter passing (8 marks)

QUESTION THREE (20 MARKS)

- a) Describe the Scaling Techniques employed in distributed systems. (6 marks)
- b) Edge-server architectures are instances of Client-server combined with P2P and often are used for Content Delivery Networks. Using well labeled diagrams, evaluate the concept behind this analogy. (7 marks)
- c) Middleware is invented to provide common services and protocols that can be used by many different applications. Explain the components of the Middleware. (7 marks)

QUESTION FOUR (20 MARKS)

- a) Define “Stateless servers” (2 marks)
- b) Explain the characteristics of (a) above (2 marks)
- c) Describe the concept of strong and weak mobility in distributed systems (6 marks)
- d) Analyse the common characteristics that can be used to assess distributed systems. (10 marks)

QUESTION FIVE (20 MARKS)

- a) Discuss the functions of Stream-oriented communication (6 marks)
- b) Distribution is often less transparent to servers than to clients. Evaluate how this is achieved in the Client-Side Software (8 marks)
- c) Describe how resource-to-machine binding is accomplished in distributed systems. (6 marks)