JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

School of Informatics and Innovative Systems

Academic Year: 2020/2021
Year Three Semester One

Course Code: IIT 3312

Course Title: Distributed Systems

SPECIAL RESIT TWO

TIME: 2 H0URS

Instructions:

This paper contains FIVE questions

Question one is compulsory

Answer any other two questions

Question 1

a) State the two main advances in technology that fueled the move towards distributed systems. **(2 marks)**

b) What are the goals of distributed systems? **(4 marks)**

c) With the aid of well labelled diagrams show the five alternative that may be used in a client-server organization based on the multi-tiered architecture. **(5 marks)**

d) Generally, many client-server applications are targeted toward supporting user access to databases. Consequently many people have advocated a distinction between three levels. State the levels and describe them clearly. **(6 marks)**

e) With respect to code migration, differentiate between weak mobility and strong mobility. **(2 marks)**

f) Timing is a crucial aspect in the transmission of continous data streams. To capture the timing aspect, a distinction is made between different transmission modes. Enumerate the three transmission modes. **(3 marks)**

g) In Network Time Protocol, the machines synchronize in one of four modes. Enumerate the four modes. **(4 marks)**

h) Give three reasons for using names in a distributed environment. **(3 marks)**

Question 2

a) Clearly define the following terms.
  i) Distributed system. **(1 mark)**
  ii) Open distributed system. **(1 mark)**
  iii) Cluster Computing. **(1 mark)**
  iv) Grid Computing. **(1 mark)**

b) State and explain the three types of communication middleware that exist **(6 marks)**

c) Enumerate the steps taken in performing a remote procedure call between a client and a server. **(6 marks)**

d) Enumerate the four types of architectural styles that may be used in distributed systems. **(4 marks)**

Question 3

a) State and describe five types of transparencies. **(5 marks)**

b) With the aid of a suitable diagram, explain the working of light weight processes as used in thread implementation. **(8 marks)**

c) What are the two main reasons for performing code migration. **(2 marks)**

d) With the aid of well labelled diagrams show the five alternative that may be used in a client-server organization based on the multi-tiered architecture. **(5 marks)**

Question 4

a) The basic idea behind a message queueing system is that application communicate by inserting messages in specific queues. Using diagrams, show the four combinations for loosely-coupled communication using queues. **(8 marks)**

b) Virtualization can take place in two different ways. Highlight them with the aid of suitable diagrams. **(4 marks)**

c) What are the three properties of a name that is a true identifier? **(3 marks)**

d) Briefly state five reasons for the popularity of distributed systems **(5 marks)**

Question 5

a) Enumerate the two basic approaches used to implement thread packages. **(2 marks)**

b) Explain the following as pertains to client-centric consistency models.

    a. Read-your writes. **(2 marks)**

    b. Write-follows-reads. **(2 marks)**

c) Highlight the difference between a stateless and a stateful server. **(2 marks)**

d) Using diagrams, show clearly the difference between interaction between client and server in a traditional RPC and the same interaction using asynchronous RPC. **(8 marks)**

e) Explain the two types of replicate-write protocols. **(4 marks)**