TECHNICAL UNIVERISTY OF MOMBASA

Faculty of Engineering & Technology

DEPARTMENT OF COMPUTER SCIENCE & INFORMATION TECHNOLOGY

UNIVERSITY EXAMINATION FOR:
BACHELOR OF TECHNOLOGY IN INFORMATION TECHNOLOGY
(BTIT 11M)

EIT 4312: DISTRIBUTED SYSTEMS

END OF SEMESTER EXAMINATION
SERIES: DECEMBER 2013
TIME: 2 HOURS

Instructions to Candidates:
You should have the following for this examination
- *Answer Booklet*

This paper consists of **FIVE** questions. Attempt question **ONE** and any other **TWO** questions
Maximum marks for each part of a question are as shown
This paper consists of **FOUR** printed pages

Question One (Compulsory)

a) Define the following terms: **(5 marks)**
  (i)   Distributed systems
  (ii) RPC mechanism
  (iii) CORBA
  (iv) Asynchronous communication
  (v)   Dynamic loading

b) With examples, describe what are multi-computers   **(4 marks)**

c) In message-based communication systems, what are the differences between persistent messaging and transient messaging?   **(4 marks)**

d) List and explain FOUR goals for distributed system to make them worth building **(4 marks)**

e) Distributed systems can either be homogenous or heterogeneous. Explain the difference.
(2 marks)

f) Describe the THREE levels of software in a client server model with a help of a suitable diagram.
(5 marks)

g) Explain any TWO types of failure in distributed systems **(2 marks)**

Question Two

a) Discuss the following distributed systems architectures **(8 marks)**
   (i) Client server
   (ii) Multi Tier
   (iii) Peer to peer
   (iv) Hybrid

b)

A

NOTE:

X:Y send before receive, local order with process yields 1, 2, 3, 4

The above diagram is a message sequence chart answer the following questions

(i) What happens when Receiver (2) does not get the message? **(2 marks)**

(ii) By the help of the diagram explain in details the streams involved in group communication.
(8 marks)

(iii) How can you determine a global event ordering? **(4 marks)**

(iv) To initiate clocks and timing in the message sequence chart, explain only THREE problems that the distributed system will. **(6 marks)**

Question Three

a) Explain the following approaches in a distributed system:
   (i) Shared memory
   (ii) Message passing **(2 marks)**

b) State any FOUR key challenges of distributed systems that apply to DF5 **(5 marks)**

c) List the THREE main software components that may fail when a client process involves a method in a server object, giving an example of a failure in each case. Suggest how the components can be made to tolerate one another's failures **(8 marks)**

d) Explain any FOUR difficulties and threats for distributed systems. **(4 marks)**

e) Explain why there is no explicit data typing in CORBA COR **(4 marks)**

Question Four

a) Compare connectionless (UDP) and connection oriented (TCP) communication for the implementation of each of the following application level on presentation level protocols:
(10 marks)
  (i) Virtual terminal access
  (ii) File Transfer
  (iii) User location
  (iv) Information browsing
  (v) Remote procedure call

b) Outline the design of a scheme that users messages retransmission with IP multicast to overcome the problem of dropped messages. Your scheme should take the following points into account.
  (i) There may be multiple senders
  (ii) Generally on a small proportion of messages are dropped
  (iii) Recipient may not necessary send a message within any particular time limit.

  NOTE: Assume that messages that are not dropped arrive in sender order. **(5 marks)**

c) Explain the difference between a tightly coupled or loosely coupled system and give an example in each. **(4 marks)**

d) Differentiate between Broadcast communication and multicast communication.

Question Five

a) Briefly discuss the economical and technical reasons that make distributed systems more attractive than their centralized counterparts. **(4 marks)**

b)

AC

The above diagram is a GNS directory tree and value tree for user Peter Smith.
 (i)   How can we integrate the database rooted at EC directory with another database for North America. Explain with a suitable diagram. **(5 marks)**

 (ii) With a suitable diagram explain how you can merge trees under a new root by using the key directories below. **(5 marks)**

   # 599 = # 633/EC
   # 642 = #633/ NORTH AMERICA

c) Implementing security solutions has been a critical challenge in distributed system. Explain briefly any THREE security solutions that can safe guard all the systems in a distributed system interconnection. **(3 marks)**

d) Discuss the networking and internetworking under the following topics:

   (i) PAN_5
   (ii) WAN_5
   (iii) $WLAN_5$ **(3 marks)**