INSTITUTE OF TECHNOLOGY BLANCHARDSTOWN

Year	Year 3
Semester	2
Date of Examination	Wednesday 14th May 2014
Time of Examination	9.30am – 11.30am

Programme Title	Bachelor of Science in Computing in Information Technology
Programme Code	BN302
Module Title	Network Distributed Computing
Banner Module Code	COMP H3031

Programme Title	Bachelor of Science in Computing in Information Technology
Programme Code	BN013
Module Title	Network Distributed Computing
Banner Module Code	COMP H3031

Programme Title	Bachelor of Science (honors) in Computing
Programme Code	BN104
Module Title	Network Distributed Computing
Banner Module Code	COMP H3031

Internal Examiner(s): *Dr. Anthony Keane*

External Examiner(s): *Dr Tom Lunney*
Mr. Michael Barrett

Instructions to candidates:

1) To ensure that you take the correct examination, please check that the module and programme which you are following is listed in the tables above.
2) **Answer question 1 and *any two* of the other questions.**
3) Question 1 is worth 40 marks and all other questions are worth 30 marks each.

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Question 1: **Total 40 marks**

(a) Explain the difference between ***Distributed Computing Applications*** and ***Networked Distributed Computing Systems***? In each case, explain the advantages of using such systems and give examples.

(8 marks)

(b) The World Wide Web is celebrating its 25th birthday this year. Describe the ***Internet protocols*** that contributed to its success as the largest distributed system? In each case, give an example of how the protocol operates in practice and highlight any security vulnerability with the protocol.

(8 marks)

(c) Briefly describe ***each*** the following characteristics of distributed systems:

- Resource sharing
- Concurrency
- Fault Tolerance
- Transparency

(8 marks)

(d) Describe how NTP operates and explain why it is a necessary service for distributed systems.

(8 marks)

(e) Compare and contrast Cloud Computing with Distributed Systems?

(8 marks)

Question 2: **Worth 30 marks**

(a) Give a definition of a ***Client-Server*** system and a ***Peer-to-Peer*** system. Illustrate your answer with an example of each type of system.

(8 marks)

(b) Describe the advantages of Peer-to-Peer systems over ***client-server architecture*** and in your answer, explain how the servers would co-operate in providing a service.

(12 marks)

(c) Consider a simple server that carries out client requests without accessing other servers.

(i) How would it be possible to set a limit on the time taken by such a server to respond to a client request? (6 marks)

(ii) What kind of systems requires a time resolution of seconds, milliseconds, microseconds and nanoseconds? (4 marks)

Question 3: **Worth 30 marks**

(a) What are the main challenges in developing applications for ***mobile and ubiquous wireless devices***? Give examples in your answer.

(8 marks)

(b) Explain how to synchronise devices on a mobile network with other devices on a fixed line network to give a temporal consistency for a distributed application?

(14 marks)

(c) What are the main concerns with Bring Your Own Device (BOYD) to work?

(8 marks)

Question 4: **Worth 30 marks**

(a) What are the main system requirements that are particular to the needs of distributed multimedia applications but are less an issue with other types of distributed systems.

(6 marks)

(b) Explain how an audio and video streaming networked distributed application could achieve acceptable quality of service (QoS) when resource reservation or quality of service management facilities does not exist? In your answer, explain any terms used such as burstiness, rate of message passing and the LBAP algorithm.

(14 marks)

(c) List the component parts in a *distributed multimedia home entertainment and security system*. Outline the challenges to designing such as system.

(10 marks)