INSTITUTE OF TECHNOLOGY BLANCHARDSTOWN

Year	Year 3
Semester	2
Date of Examination	Wednesday 27 August 2014
Time of Examination	10:00am – 12:00pm

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

Programme Title	Bachelor of Science in Computing in Information Technology
Programme Code	BN302
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.

DO NOT TURN OVER THIS PAGE UNTIL YOU ARE TOLD TO DO SO

Question 1: Attempt ALL parts of this question.

Each part is worth 8 marks. Total question is worth 40 marks

(a) Give four major advantages of distributed computing applications over standalone applications and give examples to illustrate your answer.

(8 marks)

(b) What the main differences between client-server applications and peer-to-peer applications in terms of availability and security.

(8 marks)

(c) Describe each of the following areas and give examples of their application;

i. wearable computing

ii. context-aware computing

(8 marks)

(d) Describe the following issues of distributed systems:

i. Lack of a global clock

ii. Independent failure of components

(8 marks)

(e) Discuss the use of NTP in synchronizing time on computers across the Internet. In your answer outline the features and services provided by NTP.

(8 marks)

Question 2: Worth 30 marks.

(a) Explain the terms and give examples of ***mobile computing*** and ***ubiquitous computing***

(6 *marks)*

(b) The company is very interested in having the *IT systems accessed* with *mobile devices*. Describe how each of the following issues should be handled:

i. connectivity

ii. security and privacy

iii. discovery of resources

(16 *marks*)

(c) Describe the advantages and disadvantages of connecting personal devices like mobile smart phones and other smart devices into the corporate network.

(8 marks)

Question 3: Worth 30 marks.

(a) Name four different Peer-to-Peer (P2P) applications on the Internet and explain what services they supply.

(8 *marks)*

(b) How does the following work in P2P systems?

- Guarantee of availability / dependability
- Load distribution
- Wide distribution – global scalability
- Persistence of material

(12 *marks)*

(c) Describe the potential advantages that a *P2P search engine* technology would have over centralized search engines.

(10 *marks*)

Question 4: Worth 30 marks.

(a) Identify any issues for distributed applications when using ***time clocks*** on a computer to tell time?

(6 marks)

(b) Describe how the synchronizing of clocks on an internal and external synchronous system and how is this different to an asynchronous system.

(12 marks)

(c) A client attempts to ***synchronise with a time server***. It records the round-trip times and timestamps returned by the server in the table below.

(i) Which of these times should it use to set the clock?

(ii) To what time should the clock be set?

(iii) Estimate the accuracy of the setting with respect to the server's clock.

(iv) If the min time between sending and receiving a message is 2 ms, will your answer change?

(v) If the system is required to synchronise a file server's clock to within 0.1 ms, what is the required roundtrip time?

(vi) If the time server was unavailable, what time should I set my clock to?

Round-trip(ms)	Time (hr:min:sec)
5	04:07:04.678
8	04:05:06.123
11	04:06:07.245
12	04:05.09.321

(12 marks)