LIMERICK INSTITUTE OF TECHNOLOGY

SUMMER EXAMINATIONS 2017/2018

MODULE: COMP08024-DISTRIBUTED ALGORITHMS

PROGRAMME(S):

LC_KSODM_KTH   Bachelor of Science (Honours) Computing (Software Design and Development)

LC_KGDDM_KTH   Bachelor of Science (Honours) Computing (Games Design and Development)

YEAR OF STUDY: 4

EXAMINER(S):

Eugene Kenny   (Internal)

Mr. Derek O'Reilly   (External)

TIME ALLOWED: **2 HOURS**

INSTRUCTIONS: **Answer 4 questions. All questions carry equal marks.**

PLEASE DO NOT TURN OVER THIS PAGE UNTIL YOU ARE INSTRUCTED TO DO SO.
The use of programmable or text storing calculators is expressly forbidden.
Please note that where a candidate answers more than the required number of questions, the examiner will mark all questions attempted and then select the highest scoring ones.

Requirements for this paper:
1. Calculators

QUESTION 1   **[25 Marks]**

(a)   Discuss the goals of a distributed system.   **[10 marks]**

(b)   Outline the common architectural styles found in distributed systems.   **[15 marks]**

QUESTION 2   **[25 Marks]**

(a)   What is code migration? Explain the difference between strong and   **[10 marks]**
          weak mobility.

(b)   Stream-oriented communication offers support for continuous media.   **[15 marks]**
          How is this achieved?

QUESTION 3   **[25 Marks]**

(a)   Outline how Distributed Hash Tables (DHT) work.   **[15 marks]**

(b)   Outline how a Remote Procedure Call (RPC) operates.   **[10 marks]**

QUESTION 4   **[25 Marks]**

(a)   Describe two straightforward solutions for implementing sequential   **[10 marks]**
          consistency.

(b)   Explain how Lamport's logical clocks work.   **[10 marks]**

(c)   Give an example where using only client-centric consistency will lead   **[5 marks]**
          to a conflict between update operations.

QUESTION 5   **[25 Marks]**

(a)   Discuss, with examples, why replication is necessary in distributed   **[10 marks]**
          systems.

(b)   Describe the notion of a consistency unit or *conit*.   **[5 marks]**

(c)   Compare sequential and causal consistency.   **[10 marks]**