

# PLYMOUTH UNIVERSITY

**MODULE CODE: CNET343SL**

**TITLE OF PAPER: Distributed Systems**

**TIME ALLOWED**

**THREE HOURS**

**DATE**

**xx May 2017**

**TIME**

**9:00 – 12:00**

**FACULTY**

**SCIENCE AND TECHNOLOGY**

**SCHOOL**

**COMPUTING AND MATHEMATICS**

**ACADEMIC YEAR**

**2016/17**

**STAGE**

**THREE**

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## INSTRUCTIONS TO CANDIDATES:

**Section A:** Answer ALL questions. This section is worth 40 marks in total.

**Section B:** Choose and answer TWO questions from the four available. Each question is worth 30 marks.

This exam is worth 60% of the total module score.

The marks given in brackets are indicative of the weight given to each part of the question.

**Candidates are not permitted to look at the examination paper until instructed to do so.**

**Release to library? Yes**

**Summer Exam**

## Section A: Answer all questions

Q1. Define a Distributed System. Explain the following features of Distributed Systems

- I. Scalability
- II. Openness
- III. Fault Tolerance

**(12 marks)**

Q2. Briefly explain what is a Content Delivery Network (CDN)? What is meant by the “flash crowd” problem?

**(8 marks)**

Q3. Explain the two phase commit protocol mechanism in a distributed transaction. Use a diagram to illustrate the process

**(10 marks)**

Q4. With the help of a diagram describe the terms marshal/de-marshal, client stub/proxy and server skeleton/proxy in related to the mechanism of an RPC call.

**(10 marks)**

## Section B: Choose TWO questions to answer

Q1.

(a) Describe what middleware is in relation to distributed systems. List two advantages of using a middleware to develop a distributed system

**(10 marks)**

(b) Explain the following terms in related to RMI

- I. Remote Object
- II. RMI Registry
- III. Remote Reference Layer (RRL)

**(12 marks)**

(c) Explain the responsibility of the Object Adapter in CORBA

**(4 marks)**

(d) Explain what is meant by Message Oriented Middleware (MOM)

**(4 marks)**

Q2.

(a) Explain the difference between stateful and stateless services in distributed file systems

**(5 marks)**

(b) Describe the principle “Autonomic Computing” involved in the Google File System

- (c) Explain client-server model by referring to an appropriate example (6 marks)  
(7 marks)
- (d) What is meant by mobile code architecture? Provide two suitable examples (5 marks)
- (e) Replication is the key for high availability. Explain the High Availability Data Replication (HDR) mechanism (7 marks)

Q3.

- a) Using an example explain what is meant by Platform Virtualization (4 marks)
- b) List and describe four advantages of server virtualization (8 marks)
- c) In relation to security of a distributed systems explain the following two terms
- a. Encryption
  - b. Authentication (4 marks)
- d) List and describe four purposes of cryptographic techniques. (8 marks)
- e) Illustrate the challenge response protocol using a diagram and explain what security assurances it provides. (6 marks)

Q4)

- a) Describe what is meant by Service Orientation (4 marks)
- b) Explain the terms *service provider*, *service broker* and *service users* in relation to Service Oriented Architecture (SOA) (9 marks)
- c) Compare and contrast RESTful web services and SOAP based web services (8 marks)
- d) Describe the following terms
- i. WSDL
  - ii. UDDI
  - iii. Windows Communication Foundation (WCF) (9 marks)