PLYMOUTH UNIVERSITY

MODULE CODE: CNET343SL

TITLE OF PAPER: Distributed Systems

TIME ALLOWED	**THREE HOURS**
DATE	**16 May 2021**
TIME	**13:30 ~ 16:30**
SCHOOL	**COMPUTING**
ACADEMIC YEAR	**2020/21**
STAGE	**THREE**

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. Briefly explain the following terms with examples. **(12 marks)**

i. Web Architecture
ii. Mobile Code Architecture
iii. Storage Area Network

Q2. Explain the following two transparencies in relation to Distributed Systems. **(08 marks)**

i. Access Transparency
ii. Concurrency Transparency

Q3. Explain the purpose of different layers in RMI for invoking a method of a remote object. Supply a suitable architectural diagram in your answer. **(12 marks)**

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Q4. Explain the terms in relation to SOA. **(08 marks)**

i. UDDI
ii. WSDL
iii. SOAP
iv. RESTful web services

Section B: Choose TWO questions to answer

Q1.

i. Describe two essential characteristics of a Distributed System. **(04 marks)**
ii. With an aid of a diagram, describe the main components of the architecture of a Distributed System. **(08 marks)**
iii. Middleware delivers an abstract layer of support that acts as a building block for the construction of the target application(s). What is meant by this statement? **(06 marks)**
iv. Replication is the key for high availability. Discuss the High Availability Data Replication (HDR) mechanism. **(06 marks)**
v. Explain the terms Availability and Redundancy. **(06 marks)**

Q2.

i. Answer the following in relation to the Google File System (GFS).
   a. Describe the purpose of an operation log which is maintained by master server of the GFS. **(04 marks)**
   b. What is the purpose of the chunk server? **(04 marks)**
   c. Describe the principle of Autonomic Computing involved in the Google File System. **(06 marks)**

ii. What is the difference between a thick-client client-server system and a thin-client client-server system? Discuss one advantage and a disadvantage of both by referring to an appropriate example. **(6 marks)**

iii. Describe the responsibilities of each tier in 3-tier architecture. **(7 marks)**

iv. Briefly explain what is meant by scaling in Distributed Systems. **(3 marks)**

Q3.

i. Explain the term “atomic.” **(03 marks)**

ii. Explain how a distributed transaction based on two phase commit protocol mechanism is faithful to the atomicity principle using a proper diagram. **(10 Marks)**

iii. Describe the concept of full-virtualization. **(05 Marks)**

iv. Describe three advantages of virtualization for a business IT center. **(06 Marks)**

v. What is MOM (Message Oriented Middleware)? Explain the term message broker in relation to MOM. **(06 marks)**

Q4.

i. Enterprise Application Integration is the process of bringing data or a function from one application program together with that of another application program. Explain three reasons why enterprise integration is essential **(06 Marks)**

ii. Using a practical example explain how to use the file transfer approach in enterprise integration. Also discuss two issues concerning the files that must be addressed for this approach to work. **(07 Marks)**

iii. What is meant by EAI (Enterprise Application Integration) middleware? **(05 Marks)**

iv. What is meant by multi-factor authentication? **(06 Marks)**

v. List and describe four purposes of cryptographic techniques. **(06 marks)**