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MAIN EXAMINATION

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MAY – AUGUST 2021

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DEPARTMENT OF COMPUTER AND INFORMATION SCIENCE

REGULAR PROGRAMME

CMT 308 - DISTRIBUTED SYSTEMS

Date: AUGUST 2021	Duration: 2 Hours
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INSTRUCTIONS: 1. SECTION A [Answer 1 Question- Compulsory]
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2. SECTION B [Answer 2 Questions]

SECTION A

Question 1

(a) Giving one example of each, describe the following types of Operating Systems.

- (i) Network operating System
- (ii) Distributed Operating System

[5 Marks]

(b) By use a diagrams, differentiate between tightly coupled and loosely coupled computer architectures consisting of interconnected, multiple processors.

[5 Marks]

(c) Explain three (3) desirable features of a good distributed file system.

[6 Marks]

(d) Users trust systems only if the resources are protected against destruction / unauthorized access. Describe four (4) common goals of computer security.

[4 Marks]

(e) Account for four (4) reasons why process migration is desirable in distributed computing.

[12 Marks]

SECTION B

Question 2

- (a) Define the term mutual exclusion in the context of distributed systems. [2 Marks]
- (b) Describe the three basic approaches for implementing distributed mutual exclusion. [9 Marks]
- (c) Describe three properties that a mutual exclusion algorithm should satisfy. [9 Marks]

Question 3

- (a) Briefly describe three types of distributed computing models (DMC). [6 Marks]
- (b) Describe seven aspects of distributed systems that the concept of transparency can be applied to. [14 Marks]

Question 4

- (a) Discuss the five main motivations for distributed systems. [10 Marks]
- (b) Discuss the five issues that systems designers encounter in distributed operating systems. [10 Marks]

Question 5

- (a) To build a robust distributed system, you must know what kinds of failures can occur.
- (i) Describe three possible types of failure in a distributed system. [6 Marks]
- (ii) Specify which of the entries in your list also are applicable to a centralized system. [2 Marks]
- (b) You have recently been contracted by a county government to design a data network for the County Head Quarters. You have three topologies to choose from. These are the Star, Bus and Ring. Contrast the three (3) network topologies in terms of the following attributes:
- (i) Reliability
- (ii) Available bandwidth for concurrent communications
- (iii) Installation cost
- (iv) Load balance in routing responsibilities [12 Marks]