

**UNIVERSITY COLLEGE TATI (UCTATI)****FINAL EXAMINATION QUESTION BOOKLET**

COURSE CODE	: BCS 3863
COURSE	: DISTRIBUTED SYSTEM
SEMESTER/SESSION	: 1 - 2023/2024
DURATION	: 3 HOURS

Instructions:

1. This booklet contains 5 questions. Answer ALL questions.
2. All answers should be written in answer booklet.
3. Write legibly and draw sketches wherever required.
4. If in doubt, rise up your hands and ask the invigilator.

**DO NOT OPEN THIS BOOKLET UNTIL YOU ARE TOLD TO DO SO**

**THIS BOOKLET CONTAINS 4 PRINTED PAGE INCLUDING COVER PAGE**

**QUESTION 1**

a) Based on Figure 1 below, give the definition of Distributed System Architecture. (2 marks)

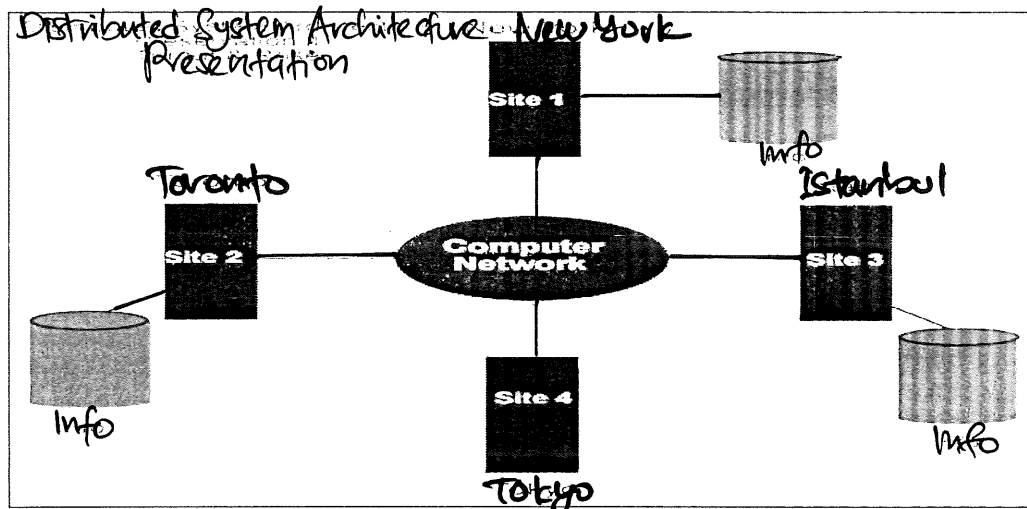


Figure 1: Distributed System Architecture

b) Companies are preferring their system decentralized and distributed, because Distributed System allows companies to have better customer services. Specify **THREE (3)** advantages of Distributed System Architecture. (6 marks)

c) Dropbox, OneDrive, and Google Drive are all popular distributed storage services that offer similar functionalities but may have some differences in terms of features, integration, and pricing. Briefly explain the characteristics of distributed system in each of the modern distributed system above. (9 marks)

**QUESTION 2**

a) Express on each description related to synchronization in Distributed Systems below:

- i. Physical Clock (4 marks)
- ii. Logical Clock (4 marks)

b) What is a thread in Distributed System? Define all **FOUR (4)** categories of thread implementation. (10 marks)

**QUESTION 3**

- a) There are **THREE (3)** primary objectives for Distributed System Optimization (DSO). Define all of them. (6 marks)
- b) The goal of WAN optimization is to increase performance of data transfer over wide area networks. Explain in detail the processes of "*Compression*" and "*Web Caching*" in the web server. Draw suitable figures to illustrate the activities. (8 marks)
- c) List all **THREE (3)** types of web server. (3 marks)
- d) A proxy server and a reverse proxy server are both intermediaries that sit between clients and servers to handle requests and responses. Describe the difference features offered by reverse proxy server in Distributed System. (6 marks)

**QUESTION 4**

- a) Define the meaning of the "*Fault*", "*Error*", "*Failure*" and "*Fault Tolerance*" from difference perspectives. (8 marks)
- b) Faults fall on **THREE (3)** types. Express and explain all of them. (6 marks)
- c) Elaborate how "*load balance*" operate in distributed system. Use suitable diagram to support your answer. (6 marks)
- d) Explain the major differences between following activities in the distributed system:
- i. Load balancing approach. (4 marks)
  - ii. Load sharing approach. (4 marks)

## QUESTION 5

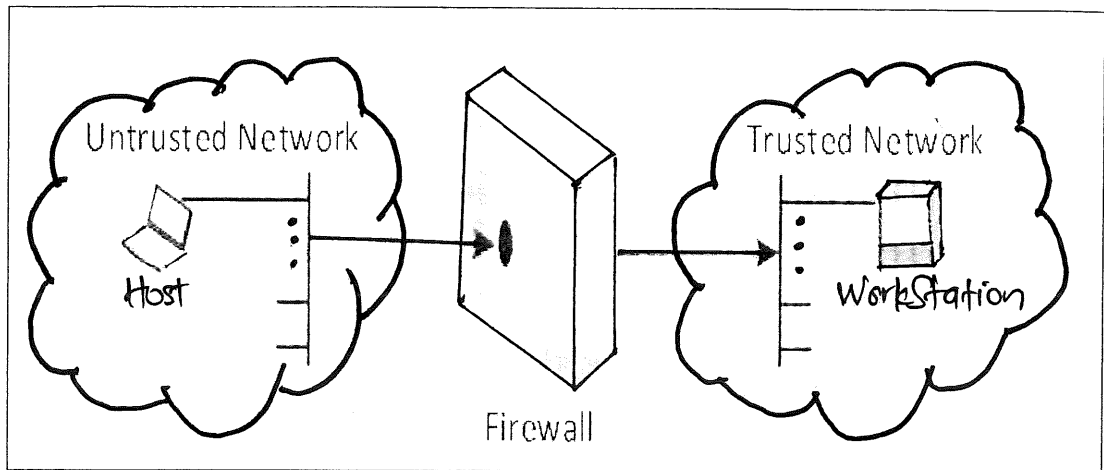


Figure 2: Distributed Firewall

- a) Based on the Figure 2 above, describe the firewall concepts on the distributed system that runs on the network environment. (8 marks)
- b) Several technologies have been tapped on the distributed system. Justify **THREE (3)** ways how the technology on the IOT system tapped to the distributed system. (6 marks)

-----END OF QUESTIONS-----