VIGNAN'S NIRULA
INSTITUTE OF TECHNOLOGY & SCIENCE FOR WOMEN
(Approved by AICTE, New Delhi & Affiliated to JNTU Kakinada)
Vignan Avenue, Peda Palakaluru, Guntur - 522009
Department of Information Technology

Innovative Teaching Practice

Faculty Name : Mrs.E.Amrutha Varshini
Course Name : Distributed Systems
Class : IV B. Tech I Semester
Academic Year : 2022-2023
Title of the Topic : Models of Process Communication Networks
Activity Name : Collaborative Learning
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Objective:
Students will explore and compare different models of process communication in networks, focusing on message-passing and shared-memory models, to understand their applications and limitations in distributed systems. This will enhance their ability to analyze and implement efficient communication strategies in real-world networked environments.

Steps to Implement Collaborative Learning for "Models of Process Communication Networks":

Assign Problems:

- Divide the class into small groups
- Provide each group with a specific problem related to process communication models in networks.

Problems for Students Related to Models of Process Communication Networks:

1. **Message-Passing Model:**

   Problem:

   - You are designing a distributed system where processes need to communicate by sending and receiving messages over a network.
   - **Task:** Explain the key steps involved in sending a message from one process to another, including the use of message queues, communication protocols, and error handling.
   - **Question:** How would you handle message loss or delays in a real-time distributed system?
2. **Shared-Memory Model:**

   Problem:

   - You are tasked with designing a system where multiple processes share a common memory space and need to access shared variables for coordination.
   - **Task:** Describe how you would implement synchronization in a shared-memory system using semaphores or mutexes.

- **Question:** What are the challenges of using shared memory for communication in a multi-core system, and how would you address race conditions?

3. **Client-Server Model:**

   Problem:

   - Consider a network-based system where a client sends a request for data, and a server processes and responds with the requested information.
   - **Task:** Explain how the client-server communication process works in a network, including how sockets are used to establish connections and transmit data.
   - **Question:** What potential security risks arise in client-server communication, and how can you secure the data transmission?

4. **Publish-Subscribe Model:**

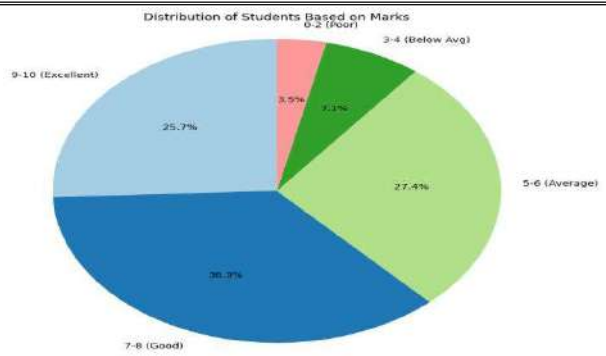
   Problem:

   - In a messaging system, publishers send data updates that are consumed by multiple subscribers.
   - **Task:** Illustrate how the publish-subscribe communication model works in a network, and explain the role of message brokers in this model.
   - **Question:** How would you design a system that ensures subscribers only receive messages they are interested in without overwhelming the network?

Screenshots of the Practice

Assessment Summary

Marks Range	Number of Students	Percentage
9-10 (Excellent)	29	25.66%
7-8 (Good)	41	36.28%
5-6 (Average)	31	27.43%
3-4 (Below Avg)	8	7.08%
0-2 (Poor)	3	3.54%
Total	113	100%



Conclusion:

The study of communication network models provides a clear framework for understanding the flow of data, ensuring efficient, reliable, and secure interactions across diverse systems.

Signature of the Faculty **Head of the Department**