

OS-Theory Project Proposal BSE-4A

Group members:

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Project Title: “Chat Application using Sempahores”

Introduction:

The aim of this project is to implement a chat application using semaphore-based synchronization to explore concurrency challenges in computer systems. By leveraging semaphores, we aim to ensure proper synchronization among multiple users interacting through the chat application, avoiding issues like message loss, deadlock, and resource contention. This project will provide practical insights into concurrent programming and synchronization mechanisms.

Methodology:

- **Language and Implementation:** We will implement the chat application using C language.
- **Semaphore-based Synchronization:** Semaphores will be employed to control access to shared resources, such as the message buffer, ensuring that only one user can read or write at a time.
- **Message Passing:** Users will send and receive messages through shared memory. Semaphores will be used to coordinate access to this shared memory, preventing race conditions.
- **Timeout Mechanism:** To handle situations where a user fails to receive a message in a timely manner, we will implement a timeout mechanism to resend messages or acknowledgments after a specified period.

Real Life Scenario Assumed:

We draw an analogy between the chat application and a postal system where users are like senders and receivers of letters, and semaphores act as postal workers ensuring orderly delivery. In this analogy, the shared memory represents the post office, and semaphore operations mimic the actions of postal workers managing access to the post office.

Through this project, we aim to deepen our understanding of operating system concepts, concurrency, and synchronization, while also gaining practical experience in C programming and system-level development.

***** **THE END** *****