

EG 301 Operating Systems – Mini Project

Title: Design and Implementation of an Online Library Management System

Abstract:

In the contemporary digital age, efficient management systems are crucial for the smooth functioning of libraries. This mini project aims to design and develop an Online Library Management System (OLMS) that not only provides basic functionalities of a library but also ensures data security and concurrency control. The system employs socket programming to enable multiple clients to access the library database concurrently. Additionally, system calls are utilized extensively for various operations such as process management, file handling, file locking, multithreading, and interprocess communication, ensuring optimal performance and resource utilization.

Introduction:

The proliferation of digital technologies has revolutionized the way libraries operate, necessitating the adoption of robust management systems to streamline processes and enhance user experience. The Online Library Management System (OLMS) proposed in this project is designed to address these needs by offering a user-friendly interface coupled with advanced functionalities.

Objective:

The primary objective of this project is to develop an efficient and secure Online Library Management System that caters to the needs of both library administrators and users. Specific objectives include:

1. Implementation of user authentication mechanisms to ensure secure access to member accounts.
2. Incorporation of password-protected administrative access to prevent unauthorized usage.
3. Development of functionalities for adding, deleting, modifying, and searching book and member details.
4. Implementation of file-locking mechanisms using system calls to ensure data consistency and concurrency control.
5. Utilization of socket programming to facilitate concurrent access to the library database by multiple clients.

Functionalities:

The Online Library Management System (OLMS) is equipped with the following functionalities:

1. **User Authentication:** Members are required to pass through a login system to access their accounts, ensuring data privacy and security.
2. **Administrative Access:** Password-protected administrative access is provided to librarians, enabling them to manage book transactions and member information.
3. **Book Management:** Administrators can add, delete, modify, and search for specific book details, ensuring efficient management of library resources.

4. **File-Locking Mechanisms:** Proper file-locking mechanisms are implemented using system calls to protect critical data sections and ensure data consistency.
5. **Concurrent Access:** The system employs socket programming to service multiple clients concurrently, facilitating seamless access to library resources.

Implementation Details:

The Online Library Management System (OLMS) is implemented using system calls for various operations, including process management, file handling, file locking, multithreading, and interprocess communication. Socket programming is utilized for client-server communication, allowing multiple clients to access the library database simultaneously.