

Academia Course Registration Portal - Documentation

Design Document

System Overview

The Academia Course Registration Portal is a client-server application designed to manage academic course registrations for educational institutions. The system supports three types of users: Administrators, Faculty, and Students, each with specific roles and permissions.

Architecture

The system follows a client-server architecture with the following components:

1. **Server:** Maintains the database and serves multiple clients concurrently. It handles authentication, data management, and business logic.
2. **Client:** Provides a text-based user interface for interacting with the server.
3. **File-based Database:** All data (students, faculty, courses, etc.) is stored in files with appropriate locking mechanisms for concurrent access.

Data Model

The system stores the following entities:

1. **User:** Base entity with common attributes for all user types:
 - a. ID
 - b. Username
 - c. Password
 - d. Name
 - e. Type (Admin/Faculty/Student)
 - f. Status (Active/Inactive)
2. **Student:** Extends User with:
 - a. Enrolled courses list

- b. Enrolled count
- 3. **Faculty:** Extends User with:
 - a. Department information
- 4. **Course:**
 - a. ID
 - b. Course ID (e.g., CS101)
 - c. Name
 - d. Faculty ID (instructor)
 - e. Maximum seats
 - f. Available seats
 - g. Status (Active/Inactive)

Key Features

1. **User Authentication:** Secure login system for all user types
2. **Role-based Access Control:** Different menus and permissions for each user type
3. **Concurrent Access:** Multiple users can access the system simultaneously
4. **Data Integrity:** File locking mechanisms to prevent data corruption
5. **Course Management:** Add, remove, and update courses
6. **Enrollment Management:** Students can enroll and unenroll from courses

Technical Implementation

The system is implemented in C and uses the following system calls and techniques:

1. **Process Management:** For handling server operations
2. **File Management:** For storing and retrieving data
3. **File Locking:** Read/write locks to handle concurrent access
4. **Socket Programming:** For client-server communication
5. **Multithreading:** For handling multiple client connections
6. **IPC Mechanisms:** For inter-process communication

Directory Structure

```
academia/
    └── server/
        ├── include/      # Header files
        └── src/          # Source files
```

```
|- Makefile    # Build script for server  
|  \_ data/      # Data storage files  
|  \_ client/  
|     \_ include/   # Header files  
|     \_ src/       # Source files  
|     \_ Makefile    # Build script for client
```

Installation Guide

Prerequisites

To compile and run the Academia Course Registration Portal, you need:

- A Unix-like operating system (Linux, macOS)
- GCC compiler
- Make build utility
- Basic network connectivity for client-server communication

Compilation Steps

1. Compile the server:

```
cd server  
mkdir -p obj    # Create object file directory  
mkdir -p data    # Create data storage directory  
make clean      # Clean any previous builds  
make           # Compile the server
```

2. Compile the client:

```
cd ..\client  
mkdir -p obj    # Create object file directory  
make clean      # Clean any previous builds
```

```
make      # Compile the client
```

Initial Setup

1. When you start the server for the first time, it automatically creates an admin account:
 - a. Username: admin
 - b. Password: admin123
2. This admin account can be used to create additional users (students and faculty).

Running the System

1. **Start the server:**

```
cd server  
./server
```

You should see: "Academia server started on port 8080..."

2. **Start the client** (in a separate terminal):

```
cd client  
./client
```

3. The client will connect to the server, and you'll see the login prompt.

User Manual

Getting Started

1. Start the client application
2. You'll be presented with a login screen:Welcome Back to Academia ::
Course Registration.....Login TypeEnter Your Choice { 1.Admin , 2.Faculty,
3.Student };

3. Select your user type, then enter your username and password

Administrator Guide

Administrators can manage users and view system information.

Login

Enter Your Choice { 1.Admin , 2.Faculty, 3. Student }: 1

Username: admin

Password: admin123

Admin Menu Options

..... Welcome to Admin Menu

1. Add Student
2. View Student Details
3. Add Faculty
4. View Faculty Details
5. Activate Student
6. Block Student
7. Modify Student Details
8. Modify Faculty Details
9. Logout and Exit

Key Tasks

1. **Adding a Student** (Option 1):
 - a. Enter name, username, and password
 - b. System will create the account and assign an ID
2. **Adding Faculty** (Option 3):
 - a. Enter name, department, username, and password
 - b. System will create the account and assign an ID
3. **Managing User Status** (Options 5 & 6):
 - a. Activate or deactivate student accounts
 - b. Students cannot log in if their account is inactive

4. **Updating User Details** (Options 7 & 8):
 - a. Modify names and other user information
5. **Viewing User Information** (Options 2 & 4):
 - a. See list of all students or faculty with their details

Faculty Guide

Faculty members can manage courses and view enrollments.

Login

Enter Your Choice { 1.Admin , 2.Faculty, 3. Student }: 2

Username: [your username]

Password: [your password]

Faculty Menu Options

..... Welcome to Faculty Menu

1. View Offering Courses
2. Add New Course
3. Remove Course from Catalog
4. Update Course Details
5. Change Password
6. Logout and Exit

Key Tasks

1. **Adding a New Course** (Option 2):
 - a. Enter course ID (e.g., CS101)
 - b. Enter course name
 - c. Specify maximum seats
 - d. System will create the course and assign it to you
2. **Removing a Course** (Option 3):
 - a. Select a course to remove from your offerings
 - b. Course will be marked as inactive
3. **Updating Course Details** (Option 4):

- a. Modify course name or maximum seats
 - b. Note: You cannot reduce seats below current enrollment
4. **Viewing Course Enrollments** (Option 1):
- a. See all courses you're offering
 - b. View details including available seats and status

Student Guide

Students can browse courses, enroll, and manage their registrations.

Login

Enter Your Choice { 1.Admin , 2.Faculty, 3. Student }: 3

Username: [your username]

Password: [your password]

Student Menu Options

..... Welcome to Student Menu

- 1. View All Courses
- 2. Enroll (pick) New Course
- 3. Drop Course
- 4. View Enrolled Course Details
- 5. Change Password
- 6. Logout and Exit

Key Tasks

1. **Viewing Available Courses** (Option 1):
 - a. See all active courses in the system
 - b. View details like course ID, name, and available seats
2. **Enrolling in a Course** (Option 2):
 - a. Browse available courses
 - b. Select a course to enroll in
 - c. System will check seat availability and add you to the course
3. **Dropping a Course** (Option 3):

- a. View your enrolled courses
 - b. Select a course to drop
 - c. System will remove you from the course and free up a seat
4. **Viewing Your Enrollments (Option 4):**
 - a. See all courses you're currently enrolled in
 - b. View detailed information about each course
 5. **Changing Your Password (Option 5):**
 - a. Enter a new password for your account

Troubleshooting

Common Issues

1. **"Connection Failed. Server might be down."**
 - a. Ensure the server is running
 - b. Check that the client and server are using the same port (8080)
 - c. Verify no firewall is blocking the connection
2. **"Invalid username or password. Please try again."**
 - a. Double-check your credentials
 - b. If you're a student, ensure your account is active
 - c. If you've forgotten the admin password, restart the server with fresh data files
3. **"Your account is inactive. Please contact the administrator."**
 - a. Contact an administrator to activate your account
 - b. Admin needs to use the "Activate Student" option
4. **Menu options not responding**
 - a. Press Enter if the screen appears stuck
 - b. Ensure you're entering a valid option number
 - c. Try restarting the client application
5. **Data inconsistency issues**
 - a. If data appears corrupted, you may need to reset the data files: cd serverrm - f data/*.dat
 - b. Restart the server to recreate the initial admin account

Technical Support

For additional support, please contact the system administrator or refer to the source code documentation for more detailed technical information.

This documentation provides a comprehensive overview of the Academia Course Registration Portal, including its design, installation instructions, and user guides for all three types of users. The troubleshooting section addresses common issues that may arise during system usage.