

SYSC3303 Project - Real Time Concurrent Systems

Elevator Control System

Section A3, Group #1:

David Sedarous

Ralph Joseph

Emmanuel Adekoya

Ohioarena Ajayi-Isuku

Khooshav Bundhoo

Project Overview

The SYSC3303 project involves the development of a real-time concurrent system to simulate the operation of an elevator control system. The system consists of three main subsystems: Elevator, Floor, and Scheduler. Each subsystem plays a crucial role in managing elevator operations, handling floor requests, and scheduling tasks efficiently.

Project Iteration 1: Basic Subsystem Setup

In Iteration 1, we focused on setting up the basic framework for the Elevator Control System. This involved creating classes for the Elevator, Floor, Scheduler, and SystemMsg to model the system's operation and communication.

Files:

- Elevator.java
- Scheduler.java
- Floor.java
- SystemMsg.java
- Main.java

Diagrams

- UML class diagram
- UML sequence diagram

Project Iteration 2: Adding State Machines

In Iteration 2, we implemented state machines for the Scheduler and Elevator subsystems.

Additionally, we assumed the presence of only one elevator and focused on handling elevator movement and communication with the Scheduler.

Files

- ElevatorStateMachine.java
- Time.java

Project Iteration 3: Enhancing Communication with RPCs

In Iteration 3, we enhanced communication efficiency between subsystems by implementing Remote Procedure Calls (RPCs) over UDP. This iteration also expanded the system to handle multiple elevators within a building.

Files

- ElevatorClient.java
- FloorSubsystem.java
- SystemFault.java

Project Iteration 4: Adding Error Detection and Correction

In Iteration 4, we introduced fault detection mechanisms to handle various elevator malfunctions such as door stuck and elevator stuck scenarios. We implemented fault detection for both hard and soft faults to ensure system reliability.

Project Iteration 5: GUI Implementation

In Iteration 5, we developed a graphical user interface (GUI) for the Elevator Control System.

The GUI displays the status of elevators, including their current floor and direction, and provides visual feedback for floor requests.

Responsibilities:

Each team member contributed to different aspects of the project, including implementation, testing, and documentation. Responsibilities were divided based on expertise and availability.

Conclusion

The SYSC3303 project involved the development of a complex real-time concurrent system to simulate elevator operations. Through multiple iterations, we refined and expanded the system's functionality while ensuring robustness and reliability. Each team member played a crucial role in contributing to different aspects of the project, resulting in a successful implementation of the Elevator Control System. The project demonstrates our ability to work collaboratively on a challenging software engineering task and showcases our skills in Java programming, system design, and testing methodologies.