Railway Management System Problem

Problem: Railway Management System

You are tasked with developing a PyQt5 application to manage a railway system. The application should allow users to view train schedules, book tickets, and manage train routes. The system must handle real-time updates and provide a user-friendly interface.

Requirements

1. **Train Schedule Management (10 Marks)** - Implement a ‘QTableWidget‘ to display train schedules (columns: Train ID, Departure Time, Arrival Time, Route). - Allow users to add, edit, and delete train schedules. - Use ‘QTimer‘ to update the schedule in real-time (e.g., simulate delays).

2. **Ticket Booking System (10 Marks)** - Implement a form for users to book tickets (fields: Train ID, Passenger Name, Seat Number). - Validate user input and display error messages for invalid data. - Use ‘QMessageBox‘ to confirm successful bookings.

3. **Route Management (10 Marks)** - Implement a ‘QTreeWidget‘ to display train routes hierarchically (e.g., Station A → Station B → Station C). - Allow users to add, edit, and delete routes. - Use ‘QGraphicsView‘ to visualize the route map.

4. **Real-Time Updates (5 Marks)** - Use ‘QThread‘ to simulate real-time updates (e.g., train delays, cancellations). - Display notifications in a ‘QStatusBar‘.

5. **User Authentication (5 Marks)** - Implement a login system using ‘QDialog‘. - Store user credentials securely using ‘QSettings‘.

Deliverables

- A fully functional PyQt5 application. - Source code with comments explaining key components. - A report detailing your design decisions and implementation challenges.

Total Marks: 40

- Train Schedule Management: 10 Marks - Ticket Booking System: 10 Marks - Route Management: 10 Marks - Real-Time Updates: 5 Marks - User Authentication: 5 Marks

Estimated Duration: 3 Hours

This problem is designed to test your ability to design and implement a complex PyQt5 application. Good luck!