UIT2501 – Principles of Software Engineering and Practices

Assignment -1

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Class : IT – 'B'

Software Requirements Specification (SRS Document)- Railway Tracking and Arrival Time Prediction System (RTATPS)

1. Introduction

1.1 Purpose

This document outlines the requirements for the Railway Tracking and Arrival Time Prediction System (RTATPS). The system's purpose is to provide real-time train scheduling information, including estimated arrival and departure times, as well as delay alerts, enhancing travel planning for passengers and streamlining operational processes at railway stations.

1.2 Scope

The Railway Tracking and Arrival Time Prediction System (RTATPS) will:

- Provide up-to-date train schedule information, including arrival times and delays.
- Enable administrators to update train schedules and inform users of delays.
- Allow station masters to make location-specific adjustments to train arrival times.
- Offer passengers easy access to information via an intuitive interface.

1.3 Definitions, Acronyms, and Abbreviations

- **Admin**: Manages train schedules and sends delay notifications.
- **Station Master**: Station staff authorized to update station-specific arrival times.
- **User**: Any individual accessing train schedule information.
- **RTATPS**: Railway Tracking and Arrival Time Prediction System.

1.4 Overview

This document details the requirements for RTATPS, including its functionality, performance goals, and interface design. The structure is as follows:

1. System overview and user requirements.
2. Detailed functional and non-functional requirements.
3. External interfaces and system features.

2. Overall Description

2.1 Product Perspective

RTATPS is a standalone system accessible via web and mobile platforms. It connects admins, station masters, and passengers to a central server, which processes and distributes real-time train scheduling data, including delay notifications.

2.2 Product Functions

The main functions supported by RTATPS include:

1. **Admin Functions**:
    - Add, update, and delete train schedules.
    - Announce departure times and delays.
2. **Station Master Functions**:
    - Secure login for updating train arrival times specific to each station.
    - Provide users with station-specific train schedule information.
3. **User Functions**:
    - Access real-time train schedules, including arrival and departure times.
    - Receive notifications for delays and schedule changes.
    - Subscribe to updates for selected stations or trains.

2.3 User Characteristics

- **Admin**: Familiar with train scheduling, responsible for managing delays and announcements.
- **Station Master**: Authorized personnel for updating station-specific train arrival times.
- **User**: Passengers looking for real-time train schedule information.

2.4 Constraints

- The system requires stable internet connectivity for real-time data updates.
- It must handle high data loads without significant delays in retrieving information.

2.5 Assumptions and Dependencies

- The system will primarily be accessed on internet-connected devices.
- Admins and station masters will use unique, secure login credentials.

3. Specific Requirements

3.1 Functional Requirements

3.1.1 Admin Module

- **FR-1**: Enable admins to add, update, and remove train schedules.
- **FR-2**: Allow admins to broadcast delay notifications.
- **FR-3**: Notify relevant stations of schedule changes.

3.1.2 Station Master Module

- **FR-4**: Provide secure login for station masters.
- **FR-5**: Allow station masters to update arrival times specific to their station.
- **FR-6**: Ensure stations display only relevant train information.

3.1.3 User Module

- **FR-7**: Allow users to view real-time arrival and departure schedules.
- **FR-8**: Notify users of delays and schedule changes.
- **FR-9**: Enable users to subscribe to notifications for specific trains.

3.1.4 Notifications and Alerts

- **FR-10**: Send real-time alerts to users for delays and schedule changes.
- **FR-11**: Enable users to customize alerts for specific trains or stations.

3.1.5 Authentication and Access Control

- **FR-12**: Restrict specific functionalities to authorized admins and station masters.
- **FR-13**: Require secure login credentials for all users.

3.2 Non-Functional Requirements

3.2.1 Performance Requirements

- **NFR-1**: Support up to 500 concurrent users.
- **NFR-2**: Update the system within 3 seconds of any schedule change.

3.2.2 Reliability Requirements

- **NFR-3**: Ensure system uptime of 99.9%.
- **NFR-4**: Maintain consistent and accurate data across all modules.

3.2.3 Usability Requirements

- **NFR-5**: Design an intuitive, user-friendly interface for all users.
- **NFR-6**: Support multiple languages to enhance accessibility.

3.2.4 Security Requirements

- **NFR-7**: Encrypt all login credentials.
- **NFR-8**: Implement strict role-based access controls.

3.2.5 Maintainability Requirements

- **NFR-9**: Structure the system to support modular updates with minimal downtime.
- **NFR-10**: Provide comprehensive documentation for troubleshooting.

3.2.6 Scalability Requirements

- **NFR-11**: Enable easy addition of new stations.
- **NFR-12**: Accommodate an increasing number of users and stations while preserving performance.

4. System Features

4.1 Real-Time Data Propagation

- Display and continuously update train status information, ensuring synchronized information at all stations.

4.2 Role-Based Access Control

- Restrict update privileges to authorized admins and station masters only.

4.3 Mobile and Web Accessibility

- Offer a responsive web interface and mobile-compatible application for user convenience.

5. External Interface Requirements

5.1 User Interfaces

- **Admin Panel**: Web interface for admins to manage train schedules.
- **Station Master Interface**: Web or desktop interface for station-specific schedule updates.
- **User Interface**: Mobile and web platforms for users to access schedules and receive notifications.

5.2 Hardware Interfaces

- High-availability servers to process and distribute data.
- User devices with internet access.

5.3 Software Interfaces

- REST API for communication between admin, station master, and user modules.
- Database for managing train schedules, delay notifications, and user preferences.