

OOAD & DSA - MINI PROJECT

Name	: Railway Crossing Status
Time Duration	: 8 hours Programming
Language	: Java

Project Objective:

- To Develop an Application using OOAD and DSA, using the Java programming language. Concepts of UML, Multi-threading, Collections Framework, File IO to be used.

Prerequisites:

- Java
- OOPS
- Data Structures & Algorithms
- Multi-threading
- Collections Framework
- File IO
- UML

Problem Statement:

Company James Tech Pvt. Ltd. hired you as a Full Stack Developer. They have been given a project by the Government to Digitize the Railway Crossing Status for the Public. Government aims to communicate the status of a Railway Crossing to the public well in advance i.e. a railway crossing is open, closed etc. You're asked to develop a prototype of the application. The prototype of the application will be then presented to the relevant stakeholders for the budget approval. Your manager has set up a meeting where you're asked to present the following in the next 15 working days (3 weeks):

- Specification document - Application capabilities, appearance, and user interactions
- Java Concepts being used in the project
- Implement Model View Controller Architecture to develop the Application
- Implement the below two operations in the Project

○ **Features and Operations for Public:**

- Create a Menu Driven Application for Public
- User can create an Account i.e. Register and Login Operations for public
- Fetching the details of the Railway Crossings and display them on the Front End for the public.
- Display status of the railway crossing eg: open or closed.
- Option to search railway crossings
- Option to sort railway crossings based on Time

○ **Government-Level Operations:**

- Create a Menu Driven Application for Admin
- Admin should login with account details to access a dashboard
- Option to add a Railway Crossing to the application
- Option to delete a Railway Crossing from the application
- Option to search a specific Railway Crossing
- Option to Update the Status of Railway Crossing i.e. open and close

The goal of the company is to deliver a high-end quality product as early as possible.

Expected Result:

- The first option is a Menu Driven Application for the public. Below are some of the points to be considered:
 - It must provide an option to authenticate the user by creating an account with basic details like name, email and password and also to login if account exists.
 - It should fetch the details of Railway Crossings for the public
 - With each Railway crossing listed, it must display the status for the railway crossing eg: open or closed
 - An option to search should be implemented eg: search a railway crossing by name.
 - You must implement an option to sort the railway crossings as per the scheduled time of their opening or closing.

- The second option is used by the Railway Department to manage railway crossings and it must have the options displaying the following:
 - A Menu driven application where an official can use email and password created already in the database to navigate to the dashboard for Government
 - Add a Railway Crossing to the application
 1. Ask certain details from the User to create a Railway Crossing Object
 2. Consider the Railway Crossing Model to have below attributes
 - name
 - address (can have latitude and longitude as well)
 - landmark
 - train schedules (probably the timings)
 - railway crossing incharge person along with details
 - status
 - Delete a Railway Crossing from the application
 - You can show a list of railway crossings along with Action to Delete in the Table View
 - Return a suitable message upon successful deletion of the railway crossing
 - Option to Update the Status of Railway Crossing must be provided
 - It can have the default state as open
 - The state can be updated to closed, when a train is approaching nearby
 - Exceptions should be handled for invalid input
 - Use Collections FW and FileIO for effective database management

Implement the appropriate concepts such as exception handling, collections, and searching techniques for source code optimization and increased performance