

# **IS2901 – Software Development Project**

## **Public Transport Management System**

### **Initial Document**



235091X	R.M.D.N.O.Rathnayaka
235086L	L.M.C.J. Pitawala
235071L	O.P.N.Liyanage
235056V	P.M.A.L.Jayathissa
235019L	M.A.P Bhagya

Bachelor of Science Honors in Information Technology & Management

Group 20: Code\_Crafters

Faculty of Information Technology

University of Moratuwa

# Initial Requirements

Passenger	Driver	Admin Panel
Login/Register	Login/Register	Handle reports, complaints
<p>Normal bus tracking and locating</p> <ul style="list-style-type: none"> <li>• Bus details and bus routes</li> <li>• Inside bus details and bus routes, option for live tracking and locating of buses</li> <li>• Customized notification system about live locations (Optional)</li> <li>• Time estimations for destinations based on bus speed and traffic (on time, late, ahead, estimated time of arrival)</li> <li>• Customized map for all the above functions (bus icon, passenger location icon, traffic highlights)</li> </ul>	<p>Driver dashboard</p> <ul style="list-style-type: none"> <li>• Driver profile</li> <li>• Notification receiving (Seat booking, bus booking etc.)</li> <li>• Seat booking enable/disable (total no of seats, available no of seats for booking)</li> <li>• Bus booking enable/disable (bus details, payment methods, price per km)</li> <li>• Bus booking msg handling</li> <li>• Receive feedback, ratings</li> </ul>	
<p>Seat booking</p> <ul style="list-style-type: none"> <li>• View option to view available seats for booking/ total seats</li> <li>• Bus category filter (AC/Non-AC)</li> <li>• Total seats, booking available seats, remaining spots</li> <li>• When booking, show the booking option, after that navigate to</li> </ul>		

<p>payment gateway for online payment</p> <ul style="list-style-type: none"> <li>• Send notifications to driver after booking</li> </ul>		
<p>Bus booking</p> <ul style="list-style-type: none"> <li>• Select bus category (AC/Non-AC)</li> <li>• Complete bus details</li> <li>• Select start and ending destination, no of days etc.</li> <li>• Show estimated price for journey + conditions</li> <li>• Show contact details before payments to negotiate (call, msg via system)</li> <li>• Once confirmed, navigate to payment gateway</li> </ul>		
<p>Feedback and rating system</p> <ul style="list-style-type: none"> <li>• Driver ratings</li> <li>• Bus ratings</li> <li>• Journey feedback</li> <li>• File a complaint (msg), navigate to admin</li> </ul>		

## Scope Distribution

MEMBER 01	Authentication and user profile management
MEMBER 02	Real time bus tracking and map integration
MEMBER 03	Seat booking and Bus booking system
MEMBER 04	Notification and in-app communication
MEMBER 05	Driver dashboard, feedback and admin panel

## Detailed Distribution

### Member 1: Authentication & User Profile Management

<b>Frontend</b>	<ul style="list-style-type: none"><li>• Login/Register screens for both Passenger &amp; Driver apps</li><li>• Social login (Google, Facebook OAuth)</li><li>• Profile management screens (view/edit profile)</li><li>• Password reset and forgot password screens</li><li>• Splash screen and onboarding flow</li><li>• Settings screen (preferences, theme)</li></ul>
<b>Backend</b>	<ul style="list-style-type: none"><li>• User registration and login APIs</li><li>• JWT token generation and validation</li><li>• Password encryption (bcrypt/hashing)</li><li>• OTP generation and verification APIs</li><li>• Session management</li><li>• Role-based authorization middleware</li></ul>

<b>Database</b>	<ul style="list-style-type: none"> <li>• Users table (id, name, email, phone, password_hash, role, created_at)</li> <li>• Sessions table (session_id, user_id, token, device_info, expires_at)</li> <li>• OTP_verification table (user_id, otp, expires_at, verified)</li> <li>• User_profiles table (user_id, profile_pic, address, preferences)</li> </ul>
<b>Further Add-ons</b>	<ul style="list-style-type: none"> <li>• Biometric authentication (fingerprint/face ID)</li> <li>• Multi-device session management</li> <li>• User verification badges (verified drivers)</li> <li>• Multi-language support</li> </ul>

## Member 2: Real-Time Bus Tracking & Map Integration

<b>Frontend</b>	<ul style="list-style-type: none"><li>Interactive map screen in Passenger app (bus locations, routes)</li><li>Live tracking interface with bus icons and user location</li><li>Route selection and bus details display</li><li>Traffic visualization on map</li><li>ETA display and time estimation UI</li><li>Filter options (bus type, route)</li><li>Share live location feature</li></ul>
<b>Backend</b>	<ul style="list-style-type: none"><li>Real-time location update APIs (WebSocket/Socket.io)</li><li>GPS coordinate processing and storage</li><li>Route calculation APIs</li><li>Traffic data integration (Google Maps API)</li><li>ETA calculation algorithm (based on speed, traffic)</li></ul>
<b>Database</b>	<ul style="list-style-type: none"><li>Buses table (bus_id, registration_no, type, capacity, driver_id, status)</li><li>Routes table (route_id, route_name, start_point, end_point, stops)</li><li>Bus_locations table (bus_id, latitude, longitude, speed, heading, timestamp)</li><li>Bus_stops table (stop_id, stop_name, latitude, longitude, route_id)</li><li>Traffic_data table (route_id, segment, traffic_level, timestamp)</li></ul>
<b>Further Add-ons</b>	<ul style="list-style-type: none"><li>Offline map caching</li><li>Favorite routes and stops</li><li>Nearby bus finder</li></ul>

	<ul style="list-style-type: none"> <li>• Historical route analysis</li> <li>• Geofencing for bus stops</li> </ul>
--	-------------------------------------------------------------------------------------------------------------------

### Member 3: Seat booking and Bus booking system

<b>Frontend</b>	<ul style="list-style-type: none"> <li>• Seat selection screen (AC/Non-AC filter)</li> <li>• Bus booking flow screens (destination, date, passenger count)</li> <li>• Available seats/buses display</li> <li>• Booking summary and confirmation screen</li> <li>• Payment gateway integration UI (PayHere)</li> <li>• Booking history and active bookings screen</li> <li>• Ticket display with QR code with download option</li> <li>• Multi-seat booking option</li> </ul>
<b>Backend</b>	<ul style="list-style-type: none"> <li>• Seat availability checking APIs</li> <li>• Seat booking creation and validation</li> <li>• Bus booking APIs (full bus rental)</li> <li>• Price calculation engine</li> <li>• Payment gateway integration (PayHere API)</li> <li>• Booking confirmation and ticket generation</li> <li>• Booking cancellation processing APIs (with conditions-displayed in the front end for the passenger)</li> </ul>
<b>Database</b>	<ul style="list-style-type: none"> <li>• Seat_bookings table (booking_id, passenger_id, bus_id, seat_no, route_id, booking_date, journey_date, amount, status)</li> <li>• Bus_bookings table (booking_id, passenger_id, bus_id, start_location, end_location, start_date, end_date, total_amount, status)</li> </ul>

	<ul style="list-style-type: none"> <li>• Payments table (payment_id, booking_id, amount, payment_method, transaction_id, status, timestamp)</li> <li>• Seats table (seat_id, bus_id, seat_number, is_available, booking_id)</li> <li>• Pricing table (route_id, bus_type, base_price, per_km_rate)</li> </ul>
<b>Further Add-ons</b>	<ul style="list-style-type: none"> <li>• Promo codes and discounts system</li> <li>• Recurring bookings for regular commuters</li> <li>• Booking modification options</li> <li>• Digital wallet integration</li> <li>• Selection based on visual seat selection</li> <li>• Refund option</li> </ul>

## Member 4: Notifications & In-App Communication

<b>Frontend</b>	<ul style="list-style-type: none"><li>Notification center in both apps</li><li>Push notification handling</li><li>Notification preferences screen</li><li>Booking alerts and journey reminders UI</li><li>Emergency SOS button and screen</li></ul>
<b>Backend</b>	<ul style="list-style-type: none"><li>Push notification service</li><li>SMS notification integration (Twilio)</li><li>Email notification service</li><li>Notification scheduling system</li><li>Emergency alert broadcasting</li><li>Notification preference management APIs</li></ul>
<b>Database</b>	<ul style="list-style-type: none"><li>Notifications table (notification_id, user_id, type, title, message, read_status, created_at)</li><li>Messages table (message_id, sender_id, receiver_id, booking_id, message_text, timestamp, read_status)</li><li>Notification_preferences table (user_id, push_enabled, sms_enabled, email_enabled, notification_types)</li><li>Emergency_alerts table (alert_id, user_id, location, timestamp, status)</li></ul>
<b>Further Add-ons</b>	<ul style="list-style-type: none"><li>Voice message support in chat</li><li>Image sharing in chat</li><li>Read receipts and typing indicators</li><li>Notification analytics (delivery rate)</li><li>Scheduled notification templates</li></ul>

- |  |                                                                                                         |
|--|---------------------------------------------------------------------------------------------------------|
|  | <ul style="list-style-type: none"> <li>• In-app chat screen (passenger-driver communication)</li> </ul> |
|--|---------------------------------------------------------------------------------------------------------|

## Member 5: Driver Dashboard, Feedback & Admin Panel

<b>Frontend</b>	<ul style="list-style-type: none"> <li>• Driver app dashboard (earnings, trips, bookings)</li> <li>• Driver profile management in driver app</li> <li>• Seat/bus booking enable/disable controls</li> <li>• Incoming booking notifications and acceptance screen</li> <li>• Trip history and earnings screen</li> <li>• Feedback and ratings screen (both apps)</li> <li>• Complaint filing screen in passenger app</li> <li>• Rating/review submission UI</li> </ul>
<b>Backend</b>	<ul style="list-style-type: none"> <li>• Driver dashboard data APIs</li> <li>• Booking acceptance/rejection APIs</li> <li>• Seat/bus availability toggle APIs</li> <li>• Feedback and rating submission APIs</li> <li>• Complaint management APIs</li> <li>• Driver performance analytics</li> <li>• Admin panel APIs (user management, reports, complaint handling)</li> <li>• Revenue calculation and reporting</li> </ul>
<b>Database</b>	<ul style="list-style-type: none"> <li>• Driver_profiles table (driver_id, license_no, experience, rating, total_trips, earnings, status)</li> <li>• Ratings table (rating_id, booking_id, passenger_id, driver_id, rating, review_text, timestamp)</li> </ul>

	<ul style="list-style-type: none"> <li>• Complaints table (complaint_id, user_id, booking_id, complaint_type, description, status, admin_response, created_at)</li> <li>• Driver_earnings table (driver_id, booking_id, amount, commission, net_earnings, date)</li> <li>• Admin_users table (admin_id, name, email, role, permissions)</li> <li>• Reports table (report_id, report_type, generated_by, data, created_at)</li> </ul>
<b>Further Add-ons</b>	<ul style="list-style-type: none"> <li>• Driver analytics dashboard (peak hours, popular routes)</li> <li>• Automated complaint categorization</li> <li>• Bus maintenance tracking</li> <li>• Admin web dashboard (separate web interface)</li> </ul>

