National University of Computer & Emerging Sciences Karachi Campus

# TRANSPORT MANAGEMENT SYSTEM

## Project Report

## Introduction to Software Engineering (ISE)

Section: BSE-2A


## Group Members

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# Stakeholder's Analysis

Stakeholders involved in the process are:

- Administrators
- Drivers
- Users
- Maintenance Body
- Developer or IT Team
- Any other local

Now let's discuss the role of each in the project one by one;

## 1. Administrator

Administrator is the one who is responsible for managing the system. The role of adding the vehicle, removing it, adding new routes or removing route, managing the drivers and user data. In a nutshell; overseeing the process.

## 2. Drivers

Drivers are responsible for the vehicles operating in the system. Therefore; requires access to route details and also vehicle status (whether available or not).

## 3. Users

The users include all those using the software. The users may include drivers and passengers. Passenger is the one who is actually utilizing the system. It requires route details, vehicle details, booking seats and notification for necessary updates (whether the vehicle is on time or late)

## 4. Maintenance Body

The maintenance body includes those who are responsible for the maintenance of vehicles. Therefore: requires access to maintenance schedules, vehicles conditions and alert situations.

## 5. Developer or IT Team

The team is responsible for the development, maintenance, and improving the system capabilities. Thus, require complete and clear requirements. They are also responsible to cater the bugs and fix them.

## 6. Any other Local

Include all those who are not currently associated with the system but could become the part in near future (like the people currently not aware about the existence and the capabilities of the system).

# Functional Requirements

The functional requirements of the system include;

- **User sign-up**
- **Admin/User Login**
- **Adding/Removing Vehicle**
- **Adding/Removing Routes**
- **Managing Users**
- **Managing Drivers**
- **Routes Details**
- **Vehicle Status**
- **Seat Reservation** (Pre-booking)
- **Seat Booking**
- **Notification updates**
- **Maintenance Schedule**
- **Vehicle Conditions**
- **Alert Status**

Now let's discuss each functional requirement one by one;

## 1. User sign-up

The driver/user will have to sign-up into the system to carry the desires.

## 2. Admin/Driver/User login

The administrator/driver/user will login into the system to carry the desires.

## 3. Adding/Removing Vehicle

The administrator will have access of adding/ removing the vehicle to/from the system.

## 4. Adding/Removing Routes

The administrator will have access of adding/ removing the routes to/from the system.

## 5. Managing Users

The administrator will have access to manage the user's data.

## 6. Managing Drivers

The administrator will have access to manage driver's data.

## 7. Routes Details

The administrator, drivers, users will have access to the route details.

## 8. Vehicles Status

The administrator, drivers, users, maintenance body will have access to the vehicle status.

## 9. Seat Reservation

The users will have access to reserve the seat in advance for booking in order to protect the seat.

## 10. Seat Booking

The users will have access to book the seat after placing the required data or may provide the seat code (issued after reservation).

## 11. Notification Updates

The users will receive notification updates regarding their bookings.

## 12. Maintenance Schedule

The maintenance body will be alerted for the schedules.

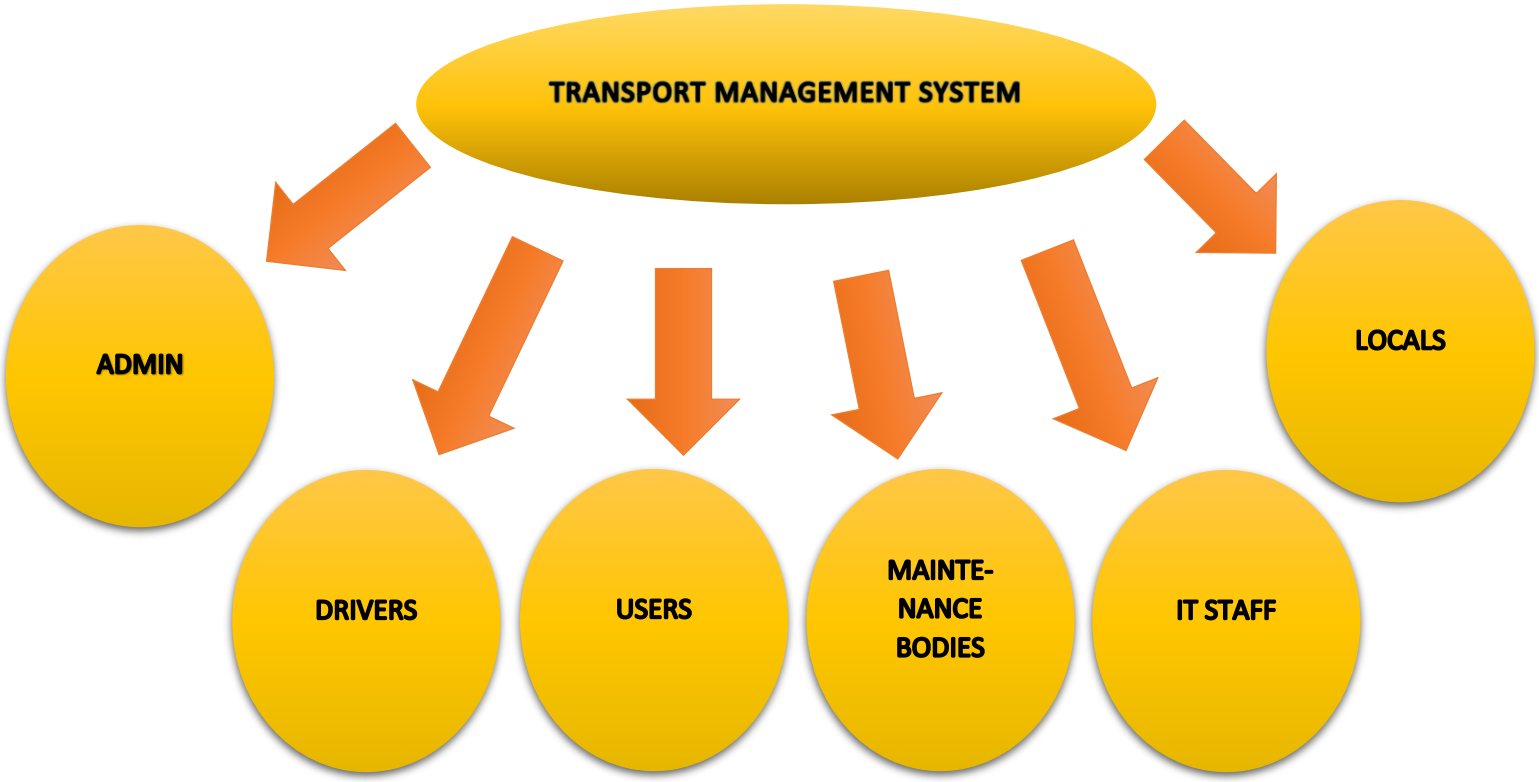
## 13. Vehicles Conditions

The maintenance body will receive notifications regarding the maintenance condition of the vehicles.

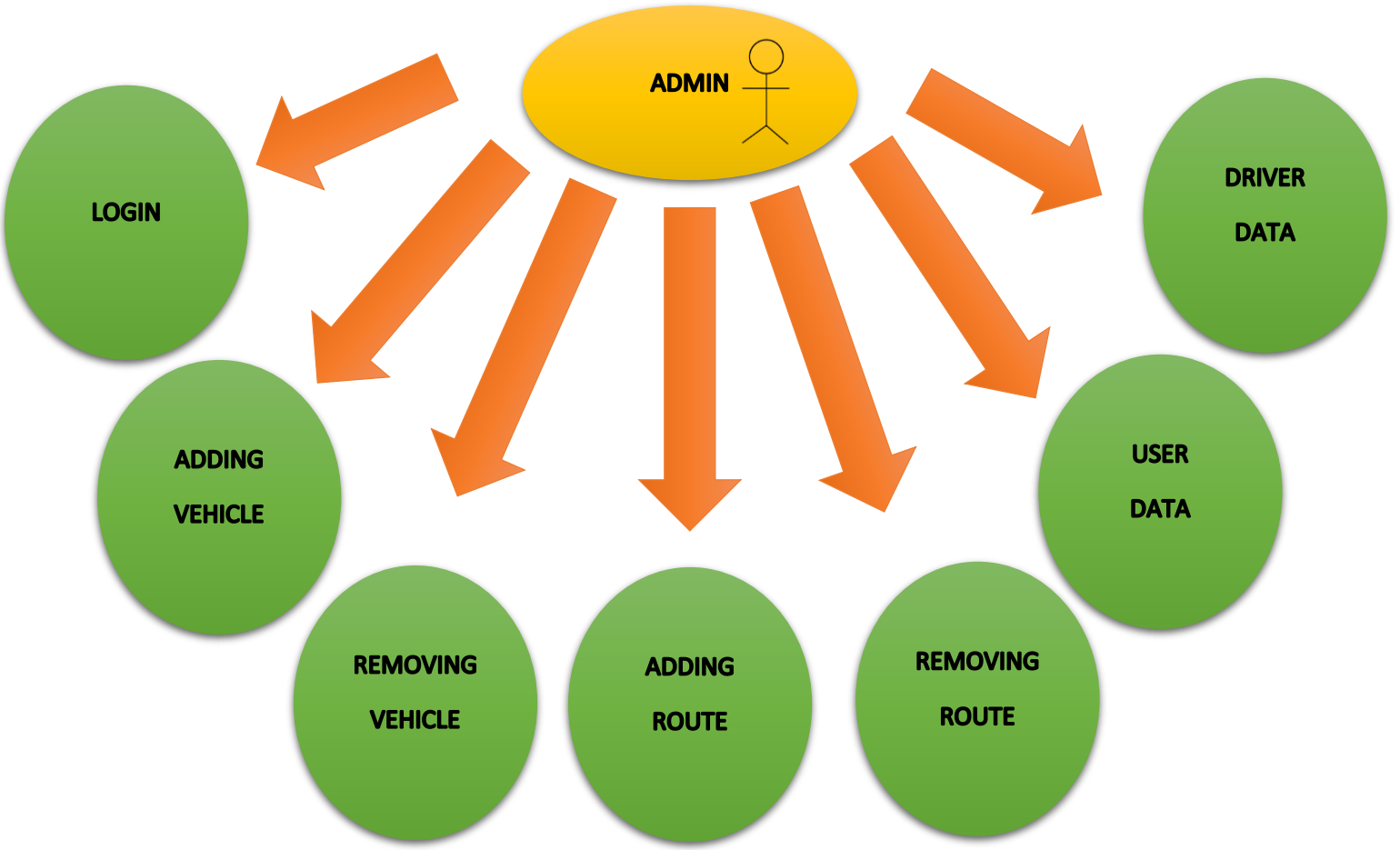
## 14. Alert Status

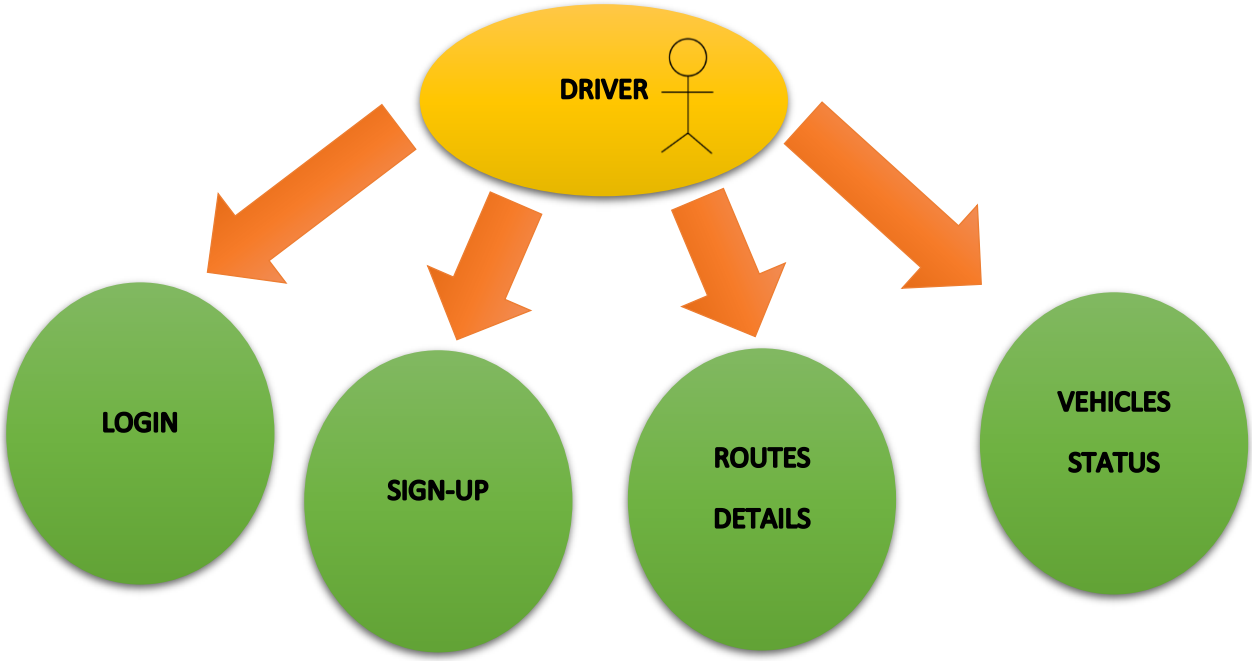
The maintenance body will receive alerts regarding urgent vehicle maintenance.

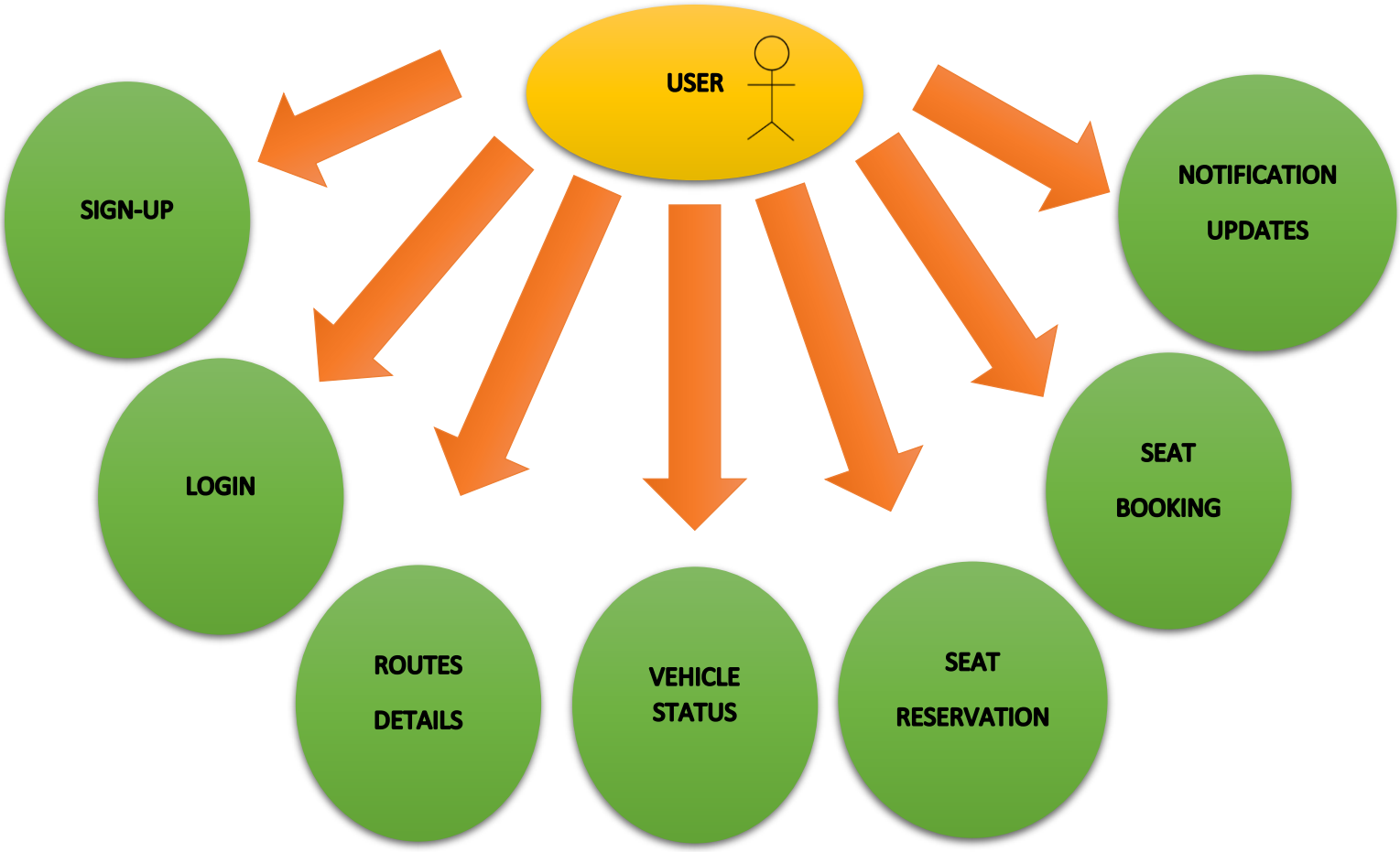
Now, let's configure the system;




Viewing one-by-one;




DRIVER
LOGIN
SIGN-UP
ROUTES
DETAILS
VEHICLES
STATUS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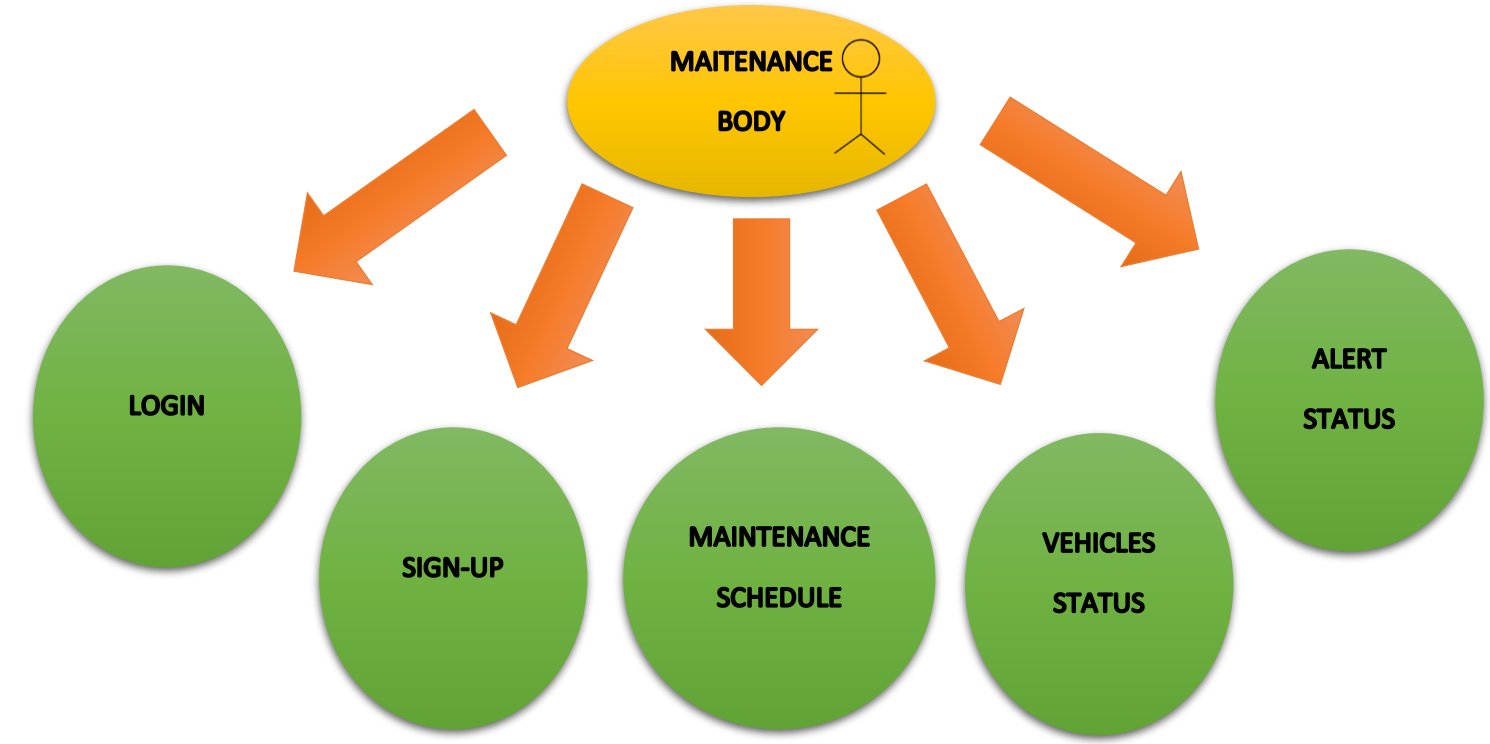
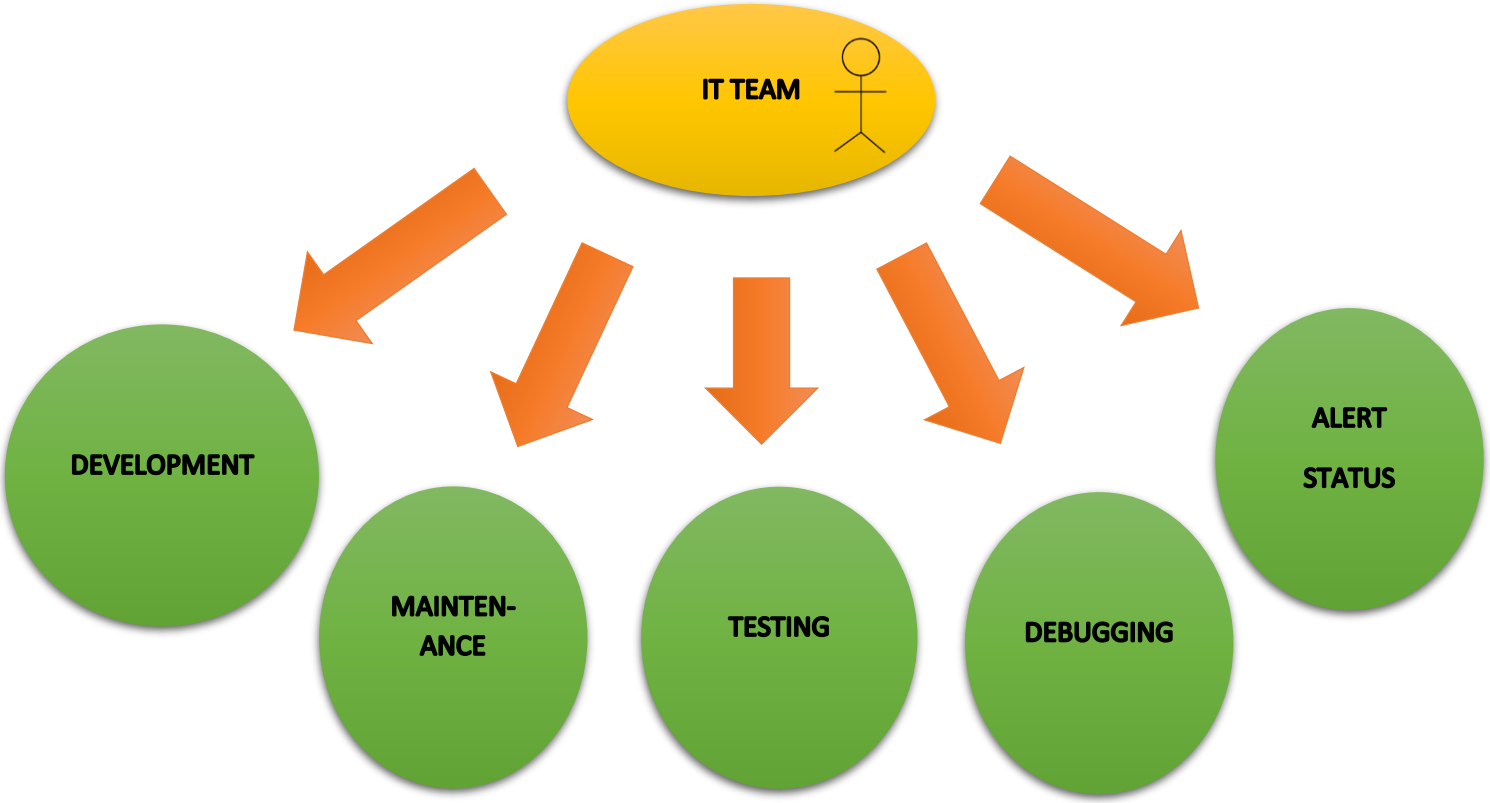
SIGN-UP
NOTIFICATION
UPDATES
LOGIN
SEAT
BOOKING
ROUTES
DETAILS
VEHICLE
STATUS
SEAT
RESERVATION


MAITENANCE BODY
LOGIN
SIGN-UP
MAINTENANCE SCHEDULE
VEHICLES STATUS
ALERT STATUS


IT TEAM
DEVELOPMENT
MAINTEN-ANCE
TESTING
DEBUGGING
ALERT STATUS

# Non-Functional Requirements

The non-functional requirements of the system include;

- **Authentication and Authorization**
- **Performance**
- **Reliability**
- **Usability**
- **Maintainability**
- **Backup and Recovery**

Now let's discuss each non-functional requirements **(NFR's)** one by one;

## 1. Authentication and Authorization

Authenticate users then provide access based upon their roles and permissions.

## 2. Performance

The response-time of the system due to user interaction.

## 3. MMTF-MTTR

The mean time to recover from failure should be as minimum as possible contrary mean time to failure (the gap between failures) should me greater.

## 4. Reliability

Ensuring the system is available at specified times (most importantly).

## 5. Learnability

User-friendly interface that itself depicts of how to use the software.

## 6. Maintainability

How easy it is to bring changes to the system and to keep it working smoothly.

## 7. Backup and Recovery

Data backup and recovery to avoid data loss and to keep things smooth.

**NFR's** when implemented into the system seems like functional requirement.

The above mentioned NFR's when implemented into the system would result in user-friendly system. Learnability would enable the user to get familiarized with the system on a quick pace thus, leading to good user experience. Maintainability and

reliability ensures that the system is change accepting and full fills the needs specially on specified schedule. The good performance of the system retains the user to proceed with the system. Authentication and Authorization are very important because its decided that the administrator would have the access to manage the system (add/remove vehicles/routes etc.) while user would have access to view the details of the vehicles and the routes. If, user also gets the access that administrator has than then system would be ambiguous (anyone could do everything).

# Assumptions and Constraints

The assumptions and constraints of the desired project are:

- **Assumptions:**
  - **System Environment**

    The system assumes stable internet connection also the user is logged in in-order to receive notifications and updates.

  - **User Behavior**

    It is assumed that the user will follow the intended path for seat reservation and booking and route information without any deviation.

- **Constraints:**
  - **Time**

    The limitation of time; project is to be delivered within the set time duration

  - **Money**

    The budget is fixed and limited and all requirements are must to be implemented (dependent on each other thus, refusal not possible).

  - **Technology**

    Since the budget is fixed there is limitation on the tools therefore free tools preference.

# Requirements Validation

In-order to validate the requirements the following steps were taken;

- **Meeting**

  Meetings to review and refine requirements to emit misunderstandings.

- **Prototyping**

  After requirement elicitation prototype was initiated in order to present the look and to get feedback in-order to validate the requirements that were put up.

### Effectiveness of Requirement Validation

- **Involvement of Stakeholders:**

  The stakeholders were actively involved in requirement validation through meetings to ensure that requirements accurately match their interests.

- **Early Issues**

  Prototype was designed to remove early misunderstandings and validate requirement before implementation of the system.

- **Aimed Goals**

  The validation process checks that requirements effectively align with goals and objectives of the project.

# Conclusion

## Key findings and Insights

- The project involves various stakeholders each having specific interests and requirements.
- Functional Requirements (FR's) were highlighted like seat booking, route details, vehicle status, alarm status etc.
- Non-Functional Requirements (NFR's) were highlighted which include user authentication and authorization, reliability and maintainability, usability, learnability etc.
- Assumptions made for the system and the constraints were also listed.
- Appropriate steps were taken to show FR's and validate the requirements through meetings and prototyping.

## ➢ Importance of thorough requirements gathering in Software Engineering Process

The success of the project **"Transport Management System"** stands upon thorough requirement gathering as it provides a clear mind-set of actually what to do. Identification of the stakeholders getting their interests and requirements, making list of functional requirements of the system then providing an overview of how the project may look like through prototyping and validating the requirements. Thus, it leads to a system which **meets the interests of the stakeholders** and march on the road to success.