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Problem-id:11

Project: Vehicle Management

Technical Components:

Component	Tech Stack
Frontend	React
Backend	Node.js Express.js
Database	MongoDB
API	RestFul

Problem Statement:

Designing a Vehicle Management System specifically for college faculty use. This system will facilitate the reservation of vehicles for various purposes such as industrial visits (IV), guest pick-up, and medical usage. The system will enable users to check vehicle availability, submit booking requests, receive confirmation notifications, and manage their bookings efficiently. Upon confirmation, users will also be informed about the driver allotted for the vehicle for that particular trip.

Overview:

The System aims to enable college faculty to manage their transportation needs effectively by providing a platform to book vehicles based on availability. The system will also help administrators to manage vehicle details, booking requests, and driver assignments efficiently.

Requirements:

- **User Authentication:**
  - The system will provide secure login functionality exclusively for college faculty members. Faculty members must use their credentials to access the booking system.
- **Vehicle Management:**
  - The system will manage vehicle details including type (e.g., 2-seater, 7-seater), availability status, and maintenance schedules
- **Booking Management:**

  Administrators will be able to:
  - View booking requests along with faculty details.
  - Approve or reject booking requests based on vehicle availability.
  - Provide reasons for any rejection.
  - Assign driver details for approved bookings.

Features:
- **Notification System:**
  - Confirmation notifications upon booking approval.
  - Reminders for upcoming bookings.
  - Notifications about assigned drivers for the trips.
- **Admin Side:**
  - Manage vehicle details and maintenance schedules.
  - Track and manage booking requests.
  - Allocate drivers for approved bookings.
  - Provide reasons for booking rejections.
  - Change booking details if necessary.
  - Search for a faculty member and access their booking history.
- **User Side:**
  - Secure log in using college credentials.
  - Submit booking requests specifying date, time, vehicle type, and purpose.
  - View booking history and upcoming trips.
  - Receive notifications about booking confirmations, reminders, and driver details.

- **Booking Workflow:**
  - Faculty member logs in and submit a booking request.
  - Admin reviews the request and checks vehicle availability.
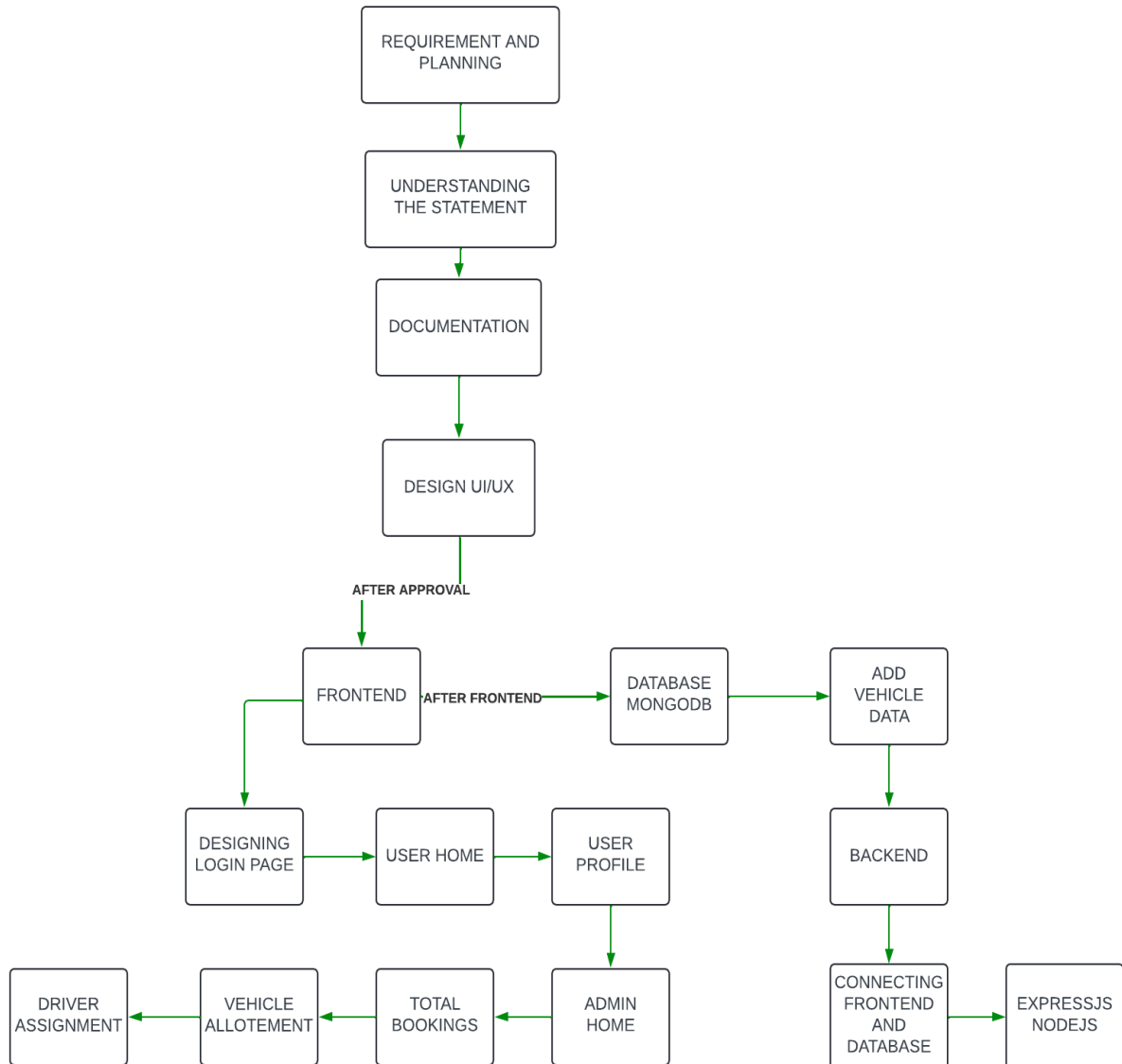
- Admin approves or rejects the request and provides reasons if rejected.
- Upon approval, the faculty member receives a confirmation notification with driver details.
- Faculty member receives reminders for upcoming bookings.

- **Driver Assignment:**
  - Admin assigns a driver for each approved booking.
  - Faculty member receives driver details along with booking confirmation.
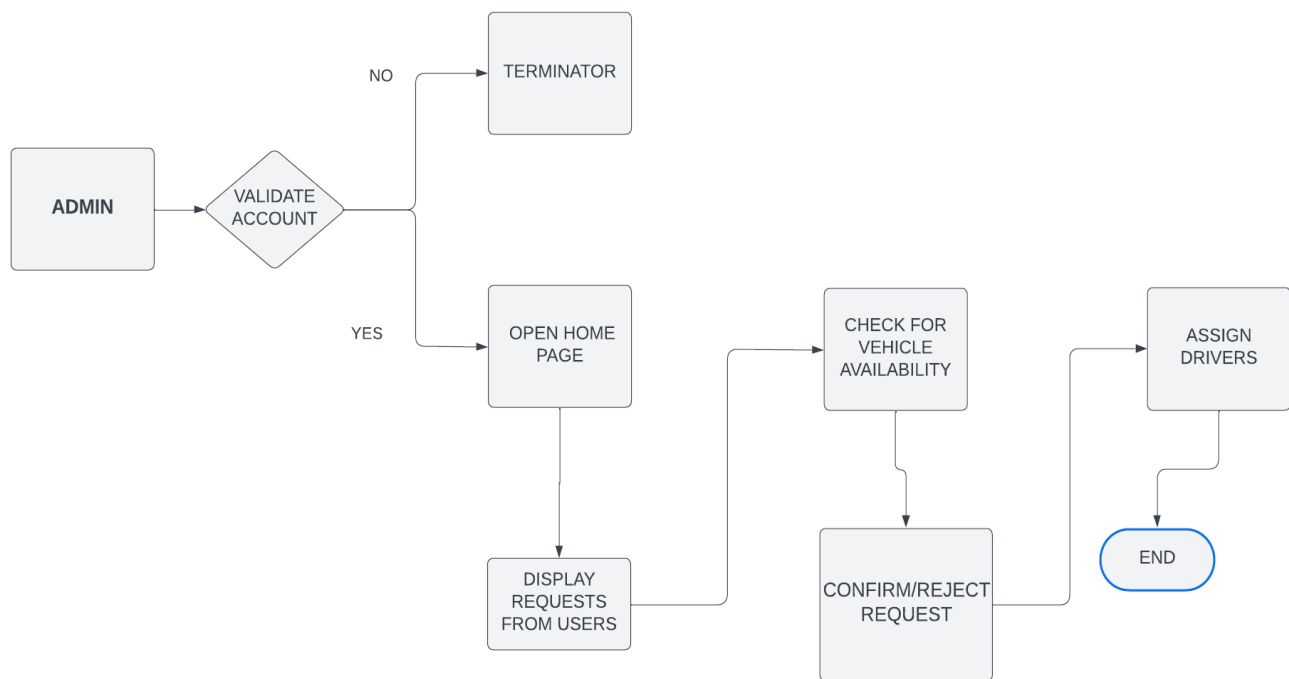
Work Flow:

WORK FLOW

```
┌─────────────────────┐
│  REQUIREMENT AND     │
│     PLANNING         │
└─────────────────────┘
           │
           ▼
┌─────────────────────┐
│   UNDERSTANDING      │
│   THE STATEMENT      │
└─────────────────────┘
           │
           ▼
┌─────────────────────┐
│   DOCUMENTATION      │
└─────────────────────┘
           │
           ▼
┌─────────────────────┐
│    DESIGN UI/UX      │
└─────────────────────┘
           │
   **AFTER APPROVAL**
           │
           ▼
```

```
┌──────────┐  AFTER FRONTEND   ┌──────────┐      ┌──────────┐
│ FRONTEND │ ────────────────▶ │ DATABASE │ ───▶ │   ADD    │
│          │                   │ MONGODB  │      │ VEHICLE  │
└──────────┘                   └──────────┘      │  DATA    │
      │                                          └──────────┘
      ▼                                               │
┌──────────┐   ┌──────────┐   ┌──────────┐            ▼
│ DESIGNING│ ▶ │USER HOME │ ▶ │  USER    │       ┌──────────┐
│LOGIN PAGE│   │          │   │ PROFILE  │       │ BACKEND  │
└──────────┘   └──────────┘   └──────────┘       └──────────┘
                                   │                  │
                                   ▼                  ▼
┌──────────┐ ┌──────────┐ ┌──────────┐ ┌──────┐ ┌──────────┐   ┌──────────┐
│  DRIVER  │◀│ VEHICLE  │◀│  TOTAL   │◀│ADMIN │ │CONNECTING│ ▶ │EXPRESSJS │
│ASSIGNMENT│ │ALLOTEMENT│ │ BOOKINGS │ │ HOME │ │FRONTEND  │   │ NODEJS   │
└──────────┘ └──────────┘ └──────────┘ └──────┘ │AND       │   └──────────┘
                                                │DATABASE  │
                                                └──────────┘
```

Flow Chart:

● Admin Interface:

ADMIN → VALIDATE ACCOUNT → NO → TERMINATOR

VALIDATE ACCOUNT → YES → OPEN HOME PAGE → DISPLAY REQUESTS FROM USERS → CHECK FOR VEHICLE AVAILABILITY → CONFIRM/REJECT REQUEST → ASSIGN DRIVERS → END

- **User Interface:**