SYSTEM REQUIREMENT SPECIFICATION FOR INDOOR LOCATION TRACKING APP FOR BIT CAMPUS

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PROJECT ID	**26**
PROJECT TITLE	**INDOOR LOCATION TRACKING APP FOR BIT CAMPUS NAVIGATION**

FULL STACK COMPONENTS:

FRONTEND	**React.js**
BACKEND	**Node.js with Express.js**
DATABASE	**MongoDB(NOSQL Databse)**
API	**Open API**

1. INTRODUCTION:

1.1. PURPOSE:

This Software Requirements Specification (SRS) document aims to give a thorough overview of the specifications needed to create an indoor mapping system specifically for the

college. The purpose of this document is to provide a clear understanding of the goals, features, and limitations related to the indoor mapping project. This document provides the development team with guidelines for creating a solution that satisfies the needs of visitors, faculty, staff, and students on the college campus by precisely defining the requirements.

1.2. DOCUMENT CONVENTIONS:

This document adheres to the following conventions specific to the indoor mapping project for BIT:

MAP	Refers to the digital representation of indoor spaces within the college campus.
POI	Stands for Points of Interest, indicating specific locations within the campus, such as classrooms, offices, restrooms, and amenities
UI	Represents the User Interface, including web and mobile interfaces for accessing the indoor mapping system.
GIS	Stands for Geographic Information System, utilized for spatial data management and visualization within the indoor mapping solution.
API	Refers to Application Programming Interface, enabling integration with external systems or services for data exchange.
NAVIGATION	Denotes the functionality allowing users to find optimal routes between different points within the college premises.

1.3. INTENDED AUDIENCE:

This document is tailored for students, faculty, staff, parents, and visitors to BIT. Students will efficiently navigate campus facilities, faculty and staff will locate resources; and visitors will explore the campus layout.

1.4. SCOPE:

The scope of the indoor mapping system encompasses all indoor areas on campus, including dining facilities, academic buildings, administrative offices, and recreational spaces, in addition to any other pertinent locations. The system will enable users to find particular rooms, offices, or facilities, move through these indoor spaces with efficiency, and get more details about different points of interest on campus. The indoor mapping system is designed to meet the various needs of various user groups. It provides a smooth navigation experience that improves accessibility, convenience, and user satisfaction in the college setting.

2. OVERALL DESCRIPTION:

2.1 PRODUCT PERSPECTIVE:

The indoor mapping system is a software solution designed to provide efficient navigation and location-based services within the college campus. It operates within the college's existing IT infrastructure and interfaces with relevant systems, such as student databases and facility management systems, to access necessary data. While the system primarily serves the college community, including students, faculty, staff, and visitors, it may integrate with external services or platforms for enhanced functionality, such as transportation apps or event calendars.

2.2 PRODUCT FEATURES:

The indoor mapping system offers a range of features tailored to meet the diverse needs of its users:

- **Map Creation and Editing:** Admins are allowed to create, edit, and update indoor maps, including buildings, rooms, corridors, and points of interest (POIs).
- **Search and Navigation:** Users can search for specific locations or POIs within the campus and receive navigational assistance to reach their destinations.
- **POI Information:** Detailed information about POIs, including descriptions, operating hours, and contact information, is available to users.
- **User Authentication:** Secure user authentication and role-based access control ensure that only authorized users can access certain features or data.

- **Integration:** The system integrates with existing college systems and external services through APIs for data exchange and interoperability.
- **Feedback and Ratings:** Users can provide feedback, ratings, and reviews for POIs or navigation experiences to improve system usability and quality.
- **Accessibility:** The system is accessible to users with disabilities, adhering to accessibility standards and guidelines for inclusive design.
- **Offline Mode:** Offline access to maps and navigation features is available for users in areas with limited or no internet connectivity.

2.3 USER CLASSES AND CHARACTERISTICS:

The primary user classes for the indoor mapping system include:

- **Students:** Students navigate campus facilities, locate classrooms, labs, and other resources, and access information about campus events and amenities.
- **Faculty and Staff:** Faculty and staff members find offices, meeting rooms, and campus facilities, manage their schedules, and access relevant administrative information.
- **Parents and Visitors:** Parents visiting the campus for meetings, events, or tours, as well as other visitors, explore the campus layout and locate points of interest with ease.

Each user class has specific characteristics and requirements, which influence the design and functionality of the indoor mapping system.

3. FUNCTIONAL REQUIREMENTS:

- **User Authentication and Management:**
    - The system allows users to register accounts securely.
    - The system provides users with role-based access control for different user categories (e.g., students, faculty, administrators).
- **Map Creation and Editing:**
    - The system allows admins to create, update, and manage indoor maps.

- The system gives administrators the means to add new buildings, hallways, buildings, and other spatial elements.

- **Search and Navigation:**
  - The system allows users to search for specific locations, amenities, or services within the campus.
  - The system gives users access to navigation features that can compute and show the best routes between various points.
  - The system provides up-to-date information on any changes, closures, or restrictions to the route.

- **Integration with External Systems:**
  - The system allows API support for third-party integrations, such as transportation services or emergency alerts.
  - The system integrates with existing college systems, such as student information systems or facility management databases, to access relevant data.

- **Accessibility and Usability:**
  - The system should be accessible via web browsers and mobile applications (iOS and Android).

- **Security and Privacy:**
  - The system implements measures to ensure data security and user privacy.
  - To safeguard user data and system integrity, the system puts strong security measures in place, such as authorization, authentication, and encryption.
  - The system encompasses protection against unauthorized access, data breaches, and malicious activities.
- **User feedback and ratings:**
  - The system allows users to provide feedback on map accuracy, usability, or suggested improvements.

- **Offline Mode and Data Synchronization:**
    - The system offers offline maps and cached data for limited functionality during network disruptions.

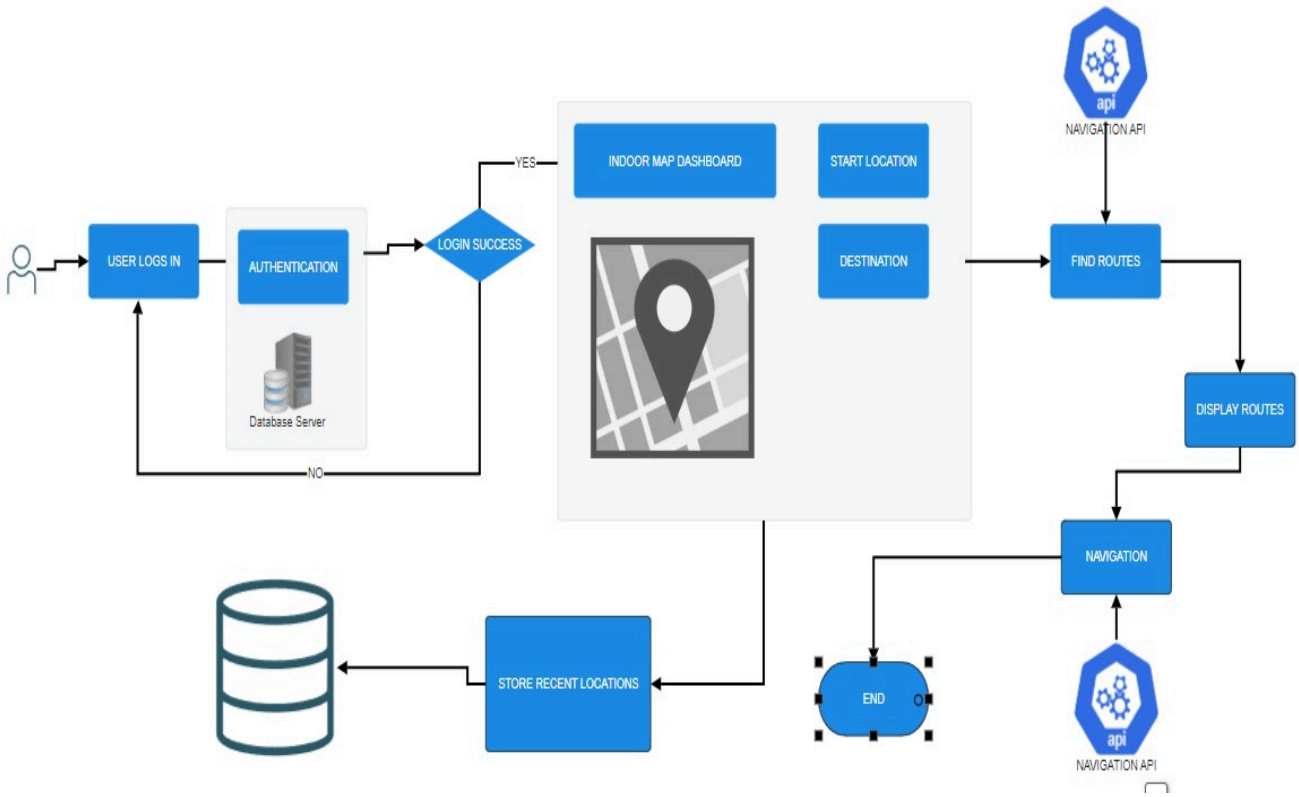
4. NON-FUNCTIONAL REQUIREMENTS:

- **Performance:** The system should load maps and respond to user interactions quickly, with minimal latency. Navigation calculations should be efficient, providing route suggestions in real-time.
- **Reliability:** The system should have high availability, with minimal downtime for maintenance or upgrades.
  It should be resilient to failures, with mechanisms in place for data backup and disaster recovery.
- **Scalability:** The system should be able to handle increasing numbers of users and data volume without degradation in performance.
- **Security:** Data transmission should be encrypted using secure protocols (e.g., HTTPS) to protect user privacy and prevent unauthorized access.
  Access controls should be implemented to restrict administrative privileges and prevent unauthorized modifications to maps or data.
- **Usability:** The user interface should be intuitive and easy to navigate, requiring minimal training for users to understand and use effectively.
  It should be accessible to users with disabilities, adhering to accessibility standards such as WCAG.
- **Compatibility:** The system should be compatible with a wide range of devices and web browsers to ensure broad accessibility.
  It should support interoperability with common operating systems and platforms, including iOS, Android, Windows, and macOS.
- **Scalability:** The system should be able to handle concurrent requests from multiple users without experiencing performance degradation.

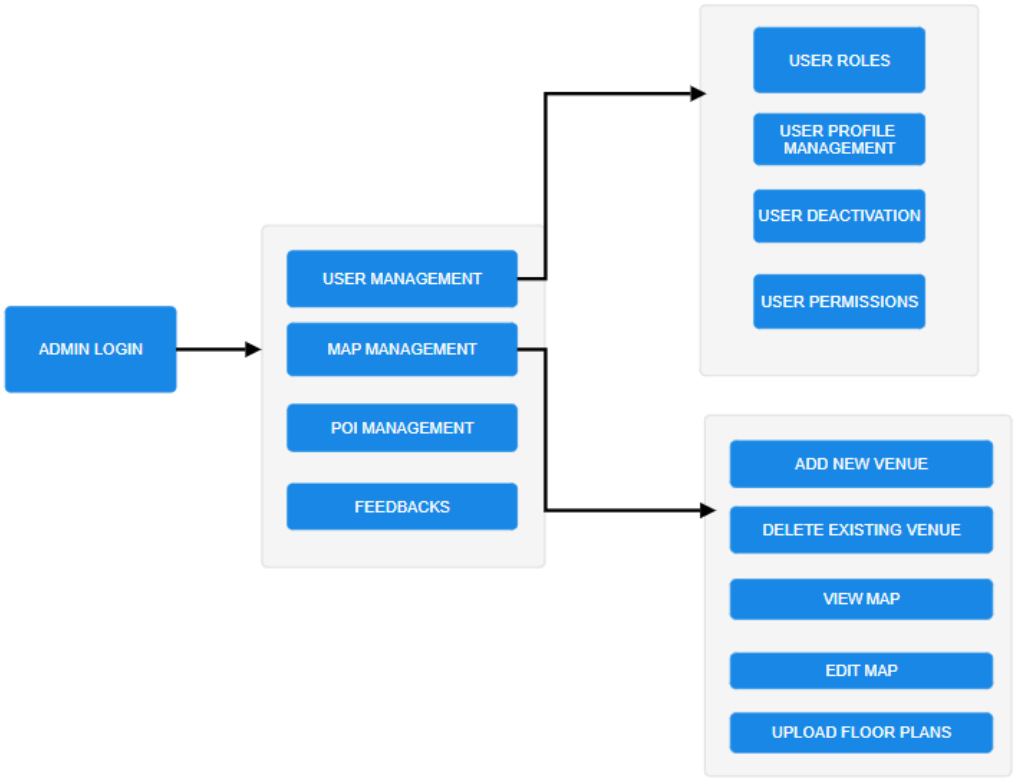
It should be scalable to accommodate future expansion and enhancements without significant architectural changes.

- **Maintainability:** The system should be modular and well-documented, facilitating ease of maintenance, updates, and enhancements by developers.
  Code should follow best practices and coding standards to ensure readability and extensibility.
- **Compliance:** The system should comply with relevant regulations and standards, such as GDPR for data privacy and security. It should adhere to college policies and guidelines regarding IT infrastructure and data management.

5. PROCESS FLOW



6. ADMIN INTERFACE



7. ER DIAGRAM