SOFTWARE REQUIREMENT SPECIFICATION FOR THE PROJECT TITLE INDOOR NAVIGATION SYSTEM FOR COLLEGE USING MEAN STACK

PREPARED BY

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PROJECT ID	**26**
PROBLEM STATEMENT	**INDOOR NAVIGATION APP**

PROBLEM STATEMENT

Our college campus is large and complex, making it difficult for students, faculty, and visitors to navigate efficiently. Traditional maps and signage may not always provide sufficient guidance, leading to frustration and wasted time. Additionally, indoor navigation can be particularly challenging due to factors like multiple floors, varying building layouts, and restricted access areas.

PURPOSE OF THE PROJECT

The Indoor Navigation System aims to provide a seamless navigation experience within the college premises, helping students, faculty, and parents, external students efficiently locate various facilities and points of interest(ATM, Canteen, Reprographic center, vehicle stand). This document outlines the requirements and specifications for developing the system using the MEAN (MongoDB, Express.js, AngularJS, Node.js) stack.

SCOPE OF THE PROJECT

The Indoor Navigation System will include a web-based interface accessible via browsers and mobile devices. Users can search for specific locations, view interactive maps, and receive turn-by-turn directions to their destination within the college campus. This project is a little

complex to build, making it the important one in this era to navigate indoors within large complexes/universities/shopping malls, etc.

IDEA OF THE PROJECT

1. Customizable User Experience: Implementing user roles with personalized dashboards for students, staff, and parents, providing tailored navigation, alerts, and location-based information relevant to their specific needs.
2. Real-Time Map Updates: Developing a system that syncs with the college's database to automatically update maps and routes in real-time, reflecting changes in the campus environment, such as construction or new facilities.
3. Interactive POI (Points of Interest) Features: Enhancing the navigation experience by integrating detailed information about Points of Interest (POIs), such as classrooms, labs, libraries, and canteens, allowing users to explore and find essential amenities easily.
4. Offline Navigation Support: Including an offline mode that allows users to access maps and navigate the campus even without an internet connection, ensuring continuous assistance in areas with weak signals.
5. Advanced Search and Filtering: Implementing a robust search functionality that allows users to find locations and routes quickly, with advanced filtering options such as accessibility routes, shortest paths, or preferred facilities.

PRELIMINARY SCHEDULE

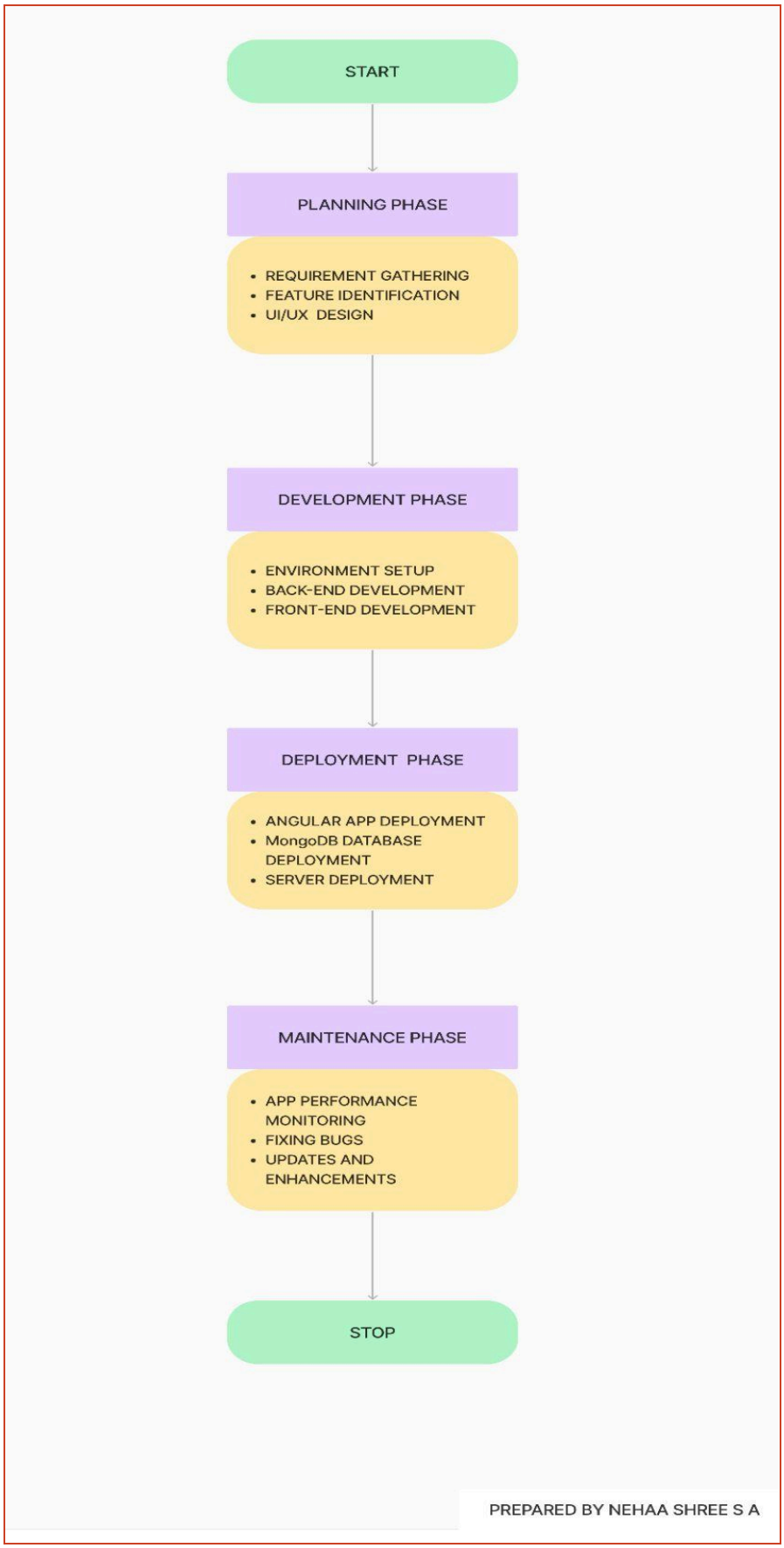
S.NO	PROJECT WORKFLOW	TIME TAKEN
1	Requirements Gathering and Analysis	10 DAYS
2	System Design and Architecture	1 MONTH
3	Development and Testing	2 MONTHS
4	Deployment and Launch	1 MONTH

PROJECT WORKFLOW (FLOW CHART)

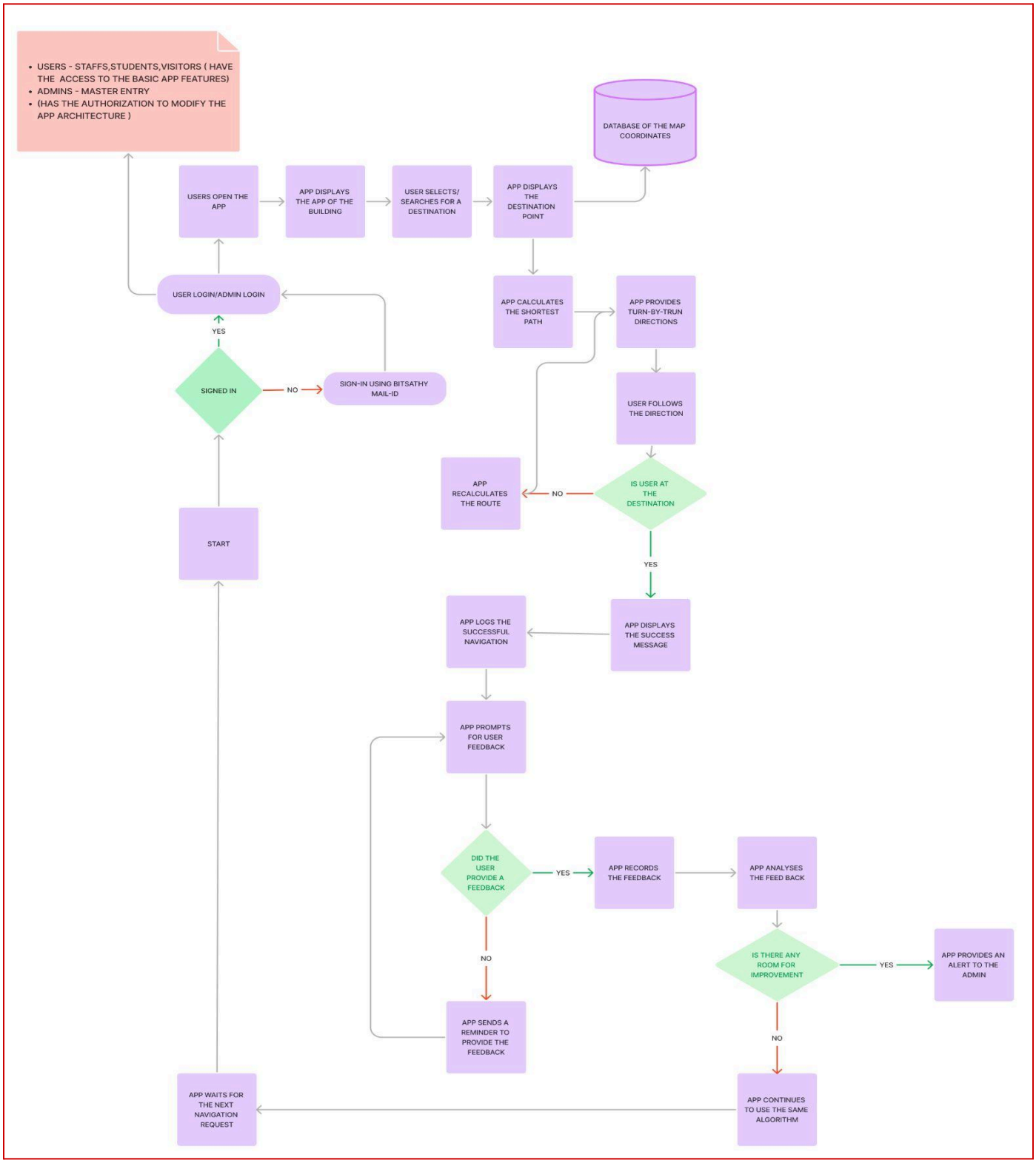
1. **PLANNING PHASE**
    - **Requirement Analysis**: Gather and document detailed functional and non-functional requirements by engaging with stakeholders, including students, staff, and administrators.
    - **Technology Stack Selection**: Decide on the appropriate technologies and frameworks for the project, ensuring compatibility with the existing college infrastructure and databases.
    - **Project Timeline**: Develop a detailed project timeline outlining milestones, deliverables, and deadlines to ensure the project stays on track.
    - **Resource Allocation**: Assign roles and responsibilities to the development team, ensuring that all necessary skills and resources are in place.
    - **Risk Assessment**: Identify potential risks and challenges, and develop mitigation strategies to address them proactively during the development process.
2. **DEVELOPMENT PHASE**
    - Designing MongoDB database, to store map data, building layouts, points of interest, and other relevant information.
    - Setting up a Node.js server using Express.js framework to handle HTTP requests.
    - Implementing APIs to interact with the MongoDB database for CRUD operations on map data, user profiles, and navigation routes.
    - We are integrating authentication and authorization mechanisms for user access control.
    - Developing a user-friendly web interface using the Angular framework for the front end.
    - Implementing interactive maps, search functionality, route planning, and navigation instructions.
    - Implementing responsiveness for various devices like desktops, laptops, and mobile devices.
    - Developing algorithms to calculate the shortest path between two points within the indoor environment. (Dijkstra algorithm)

- Consider factors like obstacles, accessibility, and user preferences during route planning.
- Implementing turn-by-turn navigation instructions for users to follow easily.

3. **DEPLOYMENT PHASE**
    - Deploying the MEAN stack application on an Android System
    - Setting up the necessary infrastructure for hosting MongoDB database, Node.js server, and Angular frontend.
    - Configuring domain, SSL certificates, and security measures for a secure deployment.
4. **MAINTENANCE PHASE**
    - **Bug Fixing**: Regularly identify and resolve any issues or errors that arise in the system to ensure smooth navigation and functionality.
    - **System Updates**: Continuously update the application's libraries, frameworks, and dependencies to maintain compatibility and security.
    - **Feature Enhancements**: Add new features or improve existing functionalities based on user feedback and technological advancements.
    - **Performance Optimization**: Monitor and optimize the system's performance to ensure efficient load times and minimal latency.
    - **User Support and Training**: Provide ongoing support and training to users, ensuring they can effectively use the system and navigate the college campus.


START
PLANNING PHASE
REQUIREMENT GATHERING
FEATURE IDENTIFICATION
UI/UX DESIGN
DEVELOPMENT PHASE
ENVIRONMENT SETUP
BACK-END DEVELOPMENT
FRONT-END DEVELOPMENT
DEPLOYMENT PHASE
ANGULAR APP DEPLOYMENT
MongoDB DATABASE DEPLOYMENT
SERVER DEPLOYMENT
MAINTENANCE PHASE
APP PERFORMANCE MONITORING
FIXING BUGS
UPDATES AND ENHANCEMENTS
STOP
PREPARED BY NEHAA SHREE S A

APP ARCHITECTURE



TECHNOLOGY STACK

S.NO	PROJECT-FEATURES	TECHNOLOGY STACK
1.	DATABASE MANAGEMENT	MongoDB
2.	BACK-END	NODE(.JS) & EXPRESS(.JS)
3.	FRONT-END	ANGULAR
4.	TECHNOLOGY	IPS(INDOOR POSITIONING SYSTEM)