PROJECT HUB

(A Web Based Project Management Application)

BY

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TU Roll Number: 12661/20

TU Registration Number: 7-2-559-29-2020

Oxford College, Butwal

A Summer Proposal Report Submitted to

Faculty of Management, Tribhuvan University

in partial fulfillment of the requirement for the degree of

Bachelor of Information Management

Butwal

May, 2024

STUDENT DECLARATION

This is to certify that I have completed the Summer Project entitled "**Project Hub**" under the guidance of **Lalit Ashok Gurung** in partial fulfillment of the requirements for the degree of Bachelor of Information Management at Faculty of Management, Tribhuvan University. This is my original work and I have not submitted it earlier elsewhere.

Date: 2024/05/16

Signature:……

Name: Subash Pandey

CERTIFICATE FROM THE SUPERVISOR

This is to certify that the summer project entitled "**Project Hub**" is an academic work done by "**Subash Pandey**" submitted in the partial fulfillment of the requirements for the degree of **Bachelor of Information Management** at Faculty of Management, Tribhuvan University under my guidance and supervision. To the best of my knowledge, the information presented by him/her in the summer project report has not been submitted earlier.

_____

Signature of the Supervisor

Name: Lalit Ashok Gurung

Designation: Head of BIM Department

Date: 2024/05/16

ACKNOWLEDGEMENT

This project, **"Project Hub"** has been an invaluable journey, allowing me to delve into the depths of my knowledge and skills. The success achieved and the outcomes realized owe a great deal to the guidance and support of numerous individuals, and I am sincerely grateful for their contributions to the completion of this project. The magnitude of what I have accomplished is a direct reflection of the assistance and supervision provided by these remarkable individuals, and their impact will not be forgotten.

Special gratitude is extended to the **Faculty of Management, TU** for incorporating such a task into the **BIM** curriculum. I am deeply thankful to **Oxford College** for fostering an environment conducive to learning and for supporting every stage of this project.

I extend my heartfelt gratitude to my project supervisor, **Lalit Ashok Gurung**, and the Head of BIM Department, for their exceptional guidance, supervision, and invaluable insights that were instrumental in the successful completion of this project.

My sincere thanks go out to all individuals who provided direct and indirect assistance at various stages of the project. Their unwavering support and encouragement have been instrumental in bringing this project to fruition.

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EXECUTIVE SUMMARY

"Project Hub" is a pioneering web-based project management application tailored to revolutionize project management within **Somarjun Pratisthan**. It addresses critical challenges, such as the lack of clarity in user progress tracking, inefficient task monitoring, and the absence of a centralized platform for project-related information.

The core objectives of "Project Hub" is to optimize user progress tracking, streamline task monitoring, and establish a centralized efficiency hub, elevating project management practices The project follows an Iterative Waterfall Model methodology, combining iterative development cycles with structured waterfall phases to ensure continuous improvement and alignment with stakeholder needs. Through rigorous testing and iteration, "Project Hub" aims to deliver a comprehensive solution that enhances collaboration, transparency, and efficiency in project management.

The findings reveal a transformative tool that fosters transparency, efficiency, and collaboration, positioning Somarjun Pratisthan for enhanced project success and operational excellence.

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ABBREVIATIONS

Admin	Administration
API	Application Programming Interface
BIM	Bachelor of Information Management
CSS	Cascading Style Sheet
DB	Database
ERD	Entity-Relationship Diagram
IT	Information Technology
JWT	JSON Web Tokens
Js	Javascript
MERN	MongoDB, Express, React, and Node.js
MVC	Model View Controller
SP	Summer Project
TS	TypeScript
UC	Use Case

CHAPTER I: INTRODUCTION

1.1. Background

The culmination of a Summer Project report is a crucial requirement for graduation from the Faculty of Management at Tribhuvan University. This project serves as an off-the-classroom and field-based study, allowing students to reflect on and integrate their learning from previous semesters of study. Tribhuvan University's mission is to nurture proficient IT professionals capable of utilizing computers and computational techniques to develop effective information systems, addressing real-life problems within organizational contexts.

The project is a gateway to understanding real-life working scenarios, qualitative data, and organizational information, providing invaluable insights into the operational and functional mechanisms of an organization. In the ever-evolving technological landscape, this summer project equips students to enhance efficiency and prepares them for the dynamic nature of the professional world, contributing to their readiness for internships.

The main goal of the Summer Project is to enable students to gain new ideas and innovations applicable to the real world, fostering critical thinking and problem-solving skills. It creates a platform for self-development in communication skills and offers a hands-on experience of the working environment.

This report stems from an organization visit to Oxford College, Butwal. It is developed based on requirements gathered and observations made during the visit.

The identified needs are addressed through web application development, technology stack chosen for the development of "Project Hub" is the robust MERN stack, encompassing MongoDB, Express (TypeScript), React (TypeScript), and Node.js. This strategic selection ensures a scalable, efficient, and modern foundation for the project.

"Project Hub" is poised to be more than just a solution; it is an innovation catalyst, set to redefine project management paradigms within Somarjun Pratisthan. This background lays the foundation for a project driven by the pursuit of efficiency, collaboration, and the seamless execution of tasks.

1.2. Introduction of the Organization

Somarjun Pratisthan stands as a dynamic entity in the realm of technology, dedicated to innovation, cutting-edge solutions, and unparalleled service. Founded by Mr. Arjun Pathak in 2023 with a vision to transcend technological boundaries, the company has become a hub for forward-thinking professionals striving to make a lasting impact in the digital landscape. With a commitment to excellence and a passion for pushing the boundaries of what is possible, Somarjun Pratisthan is at the forefront of driving technological advancements. (Pratisthan, 2023)

1.3. Current Situation of the Organization

At present, Somarjun Pratisthan operates in a competitive and ever-evolving market, where staying ahead of technological trends is crucial for sustained success. The organization faces challenges in optimizing its project management processes. The current project management

system exhibits limitations, including a lack of clarity in user progress tracking, inefficiencies in task progress monitoring, and the absence of a centralized platform for managing project-related information. Recognizing these challenges, the organization is poised to embark on a transformative journey with the implementation of "Project Hub." This innovative solution aims to address the current limitations, ushering in a new era of efficiency, collaboration, and streamlined project management.

1.4. Problems in the Organization

Here are the specific problems faced by Somarjun Pratisthan that the project aims to address:

- Inefficient mechanisms for monitoring task progress in the traditional project management system, leading to delays, missed deadlines, and disruptions to project timelines.
- Decentralized nature of project-related information, hindering collaboration, decision-making, and overall efficiency.
- Lack of a centralized platform for accessing and managing project data, resulting in cumbersome and time-consuming processes.
- Difficulty in tracking project status and progress due to the absence of real-time visibility into project activities.

1.5. Objectives of the Project

The objectives of "Project Hub" are strategically defined to address the key challenges faced by Somarjun Pratisthan and elevate practices to new heights:

- To enhance project visibility by providing real-time access to critical project information.
- To centralize task management processes for streamlined workflows and improved collaboration.
- To facilitate accurate reporting through intuitive dashboards for comprehensive project insights.
- To optimize resource allocation and utilization across projects.
- To improve decision-making by providing data-driven insights and analytics.

1.6. Scope and Limitations

Scope defines the broader parameters and boundaries of the project, while limitations are the factors and variables not included in the project. Here is the description of scope and limitation of the system.

1.6.1. Scope

The scope of "Project Hub" within Somarjun Pratisthan encompasses the project management domain, focusing on enhancing project planning, execution, and monitoring. It includes robust record-keeping functionality for efficient management of project-related information.

1.6.2. Limitation

The system currently lacks certain features such as comprehensive notification systems and detailed report generation capabilities. These limitations may require future development and enhancements to meet evolving organizational needs effectively.

1.7. Methodology

To gather the necessary data and information for the development of "Project Hub" at Somarjun Pratisthan, a systematic approach involving both primary and secondary data collection methods have been employed:

1.7.1. Primary Data Collection Method

i) Formal Interviews:

Structured interviews with key stakeholders, including project managers, team members, and company executives, to gather insights into their project management processes, challenges, and requirements.

ii) Informal Interviews:

Informal discussions and interviews with various members of the organization, including team leads and staff, supplement the formal interviews. This conversation provides additional context and perspectives on project management practices and pain points.

1.7.2. Secondary Data Collection Method

i) Observation:

Direct observation of ongoing project management activities within the organization helped to gain firsthand insights into workflow processes, communication dynamics, and task management practices.

ii) Interviews with Experts:

Interviews with Mr. Neerajan K.C CEO of Lanceme Up and other industry experts who are professionals and familiar with project management software and its best practices conducted to gather insights and recommendations for "Project Hub" development.

iii) Internet Research:

Extensive research on online to explore existing project management software solutions, their features, functionalities, and their user feedback. This research informed me to the design and develop "Project Hub" by identifying best practices and areas for improvement.

1.7.3. Tools Used

In order to build the system, a combination of industry-standard and cutting-edge software development tools have been carefully selected.

Table 1.1: Technologies used in Project Hub

Technologies	**Description**
MongoDB	Database for storing project and members records.
Express (TypeScript)	Backend framework for building APIs, written in TypeScript.
React (TypeScript)	Frontend library for building user interfaces, written in TypeScript.
Node.js	Backend runtime environment, allowing JavaScript to be executed server-side.
Tailwind CSS	Utility-first CSS framework used for styling the frontend of the application.
Other libraries	Libraries like Mantine, Zod and JWT are used to enhance the project's functionality and user experience.

CHAPTER II: TASKS AND ACTIVITIES PERFORMED

2.1. Analysis of Tasks, Activities, Problems, and Issues

The analysis of tasks, activities, problems, and issues within Somarjun Pratisthan reveals several key areas where "Project Hub" can provide significant solutions and improvements:

i) Task Management Challenges:

There is lack of clarity in task assignments, progress tracking, and prioritization leads to confusion and delays.

ii) Communication Bottlenecks:

Inefficient communication channels hinder collaboration among team members and project-related information often gets lost or overlooked, impacting productivity and project outcomes.

iii) Data Fragmentation:

Project-related data is scattered across various systems and platforms, making it challenging to access and hampers in decision-making and leads to inefficiencies in information retrieval.

iv) Ineffective Progress Tracking:

There is a lack of visibility into user progress on assigned tasks, making it difficult for project managers to monitor and assess project status accurately.

v) Workflow Inefficiencies:

The absence of automated task assignment, and status updates leads to redundant tasks and wasted resources.

vi) Limited Reporting Capabilities:

The current system lacks robust reporting capabilities, making it challenging to generate meaningful insights and performance metrics.

By addressing these challenges, "Project Hub" aims to streamline task management, improve communication and collaboration, centralize project-related data, enhance progress tracking, automate workflows, and provide comprehensive reporting capabilities.

2.2. Analysis of Possible Solutions

In response to the identified challenges, "Project Hub" proposes the effective and revolutionize project management practices within the organization.

2.2.1. Functional Requirement

This requirement defines the desired output of a system and how it must behave under varying circumstances (Indeed, 2023). These requirements make clear base for both client and the developer.

It also describes the behavior of the system under some circumstances. For this system, the specified functional requirements are:

1) Registration

i) User: New member (employee) of Somarjun Partisthan is required to register their details to the system.

2) Login and Logout

i) User: User (Admin, Project Manager, and Member) is required to enter their email and password to enter the system. Also able to logout themselves from the system.

3) Manage Member

i) Admin: Admin is able to change the role of user and view/delete the users.

ii) Project Manager: Project Manager can add/view/update/delete the members from the project.

4) Manage Project

i) Admin: Admin can add/view/update/delete the projects from the system.

ii) Project Manager: Project Manager can add/view/update/delete the projects from the system

5) Manage Issues

i) Admin: Admin can add/view/update/delete the issues of the projects.

ii) Project Manager: Project Manager can add/view/update/delete the issues of the project.

iii) Member: Member can add/view/update/delete the issues of the project.

6) Update Profile

i) Admin: Admin can update their profile on the system.

ii) Project Manager: Project Manager can update their profile on the system.

iii) Member: Member can update their profile on the system.

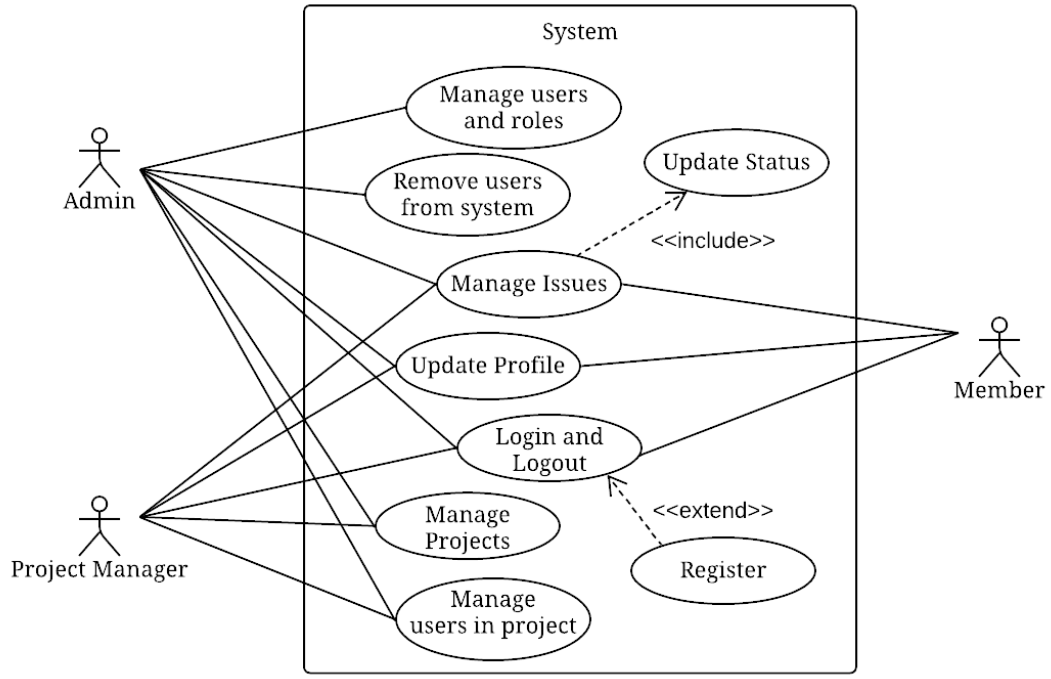

Figure 2.1: Usecase Diagram of Project Hub

2.1.2. Non-Functional Requirement

These are basically the requirements that outline how well the system operates, including things like speed, security, reliability and data integrity (Altexsoft, 2023). The essential non-functional requirements required for “Project Hub” are:

i) Simplicity: The system represents simple outlook and function that could be used properly by our users (admin, project manager and members).

ii) Reliability: There is less possibility of error and no chances of redundant data in the database.

iii) Maintainability: Admin could maintain regarding the projects, and user details.

iv) Security: Only the authorized credentials could penetrate the system otherwise, it would not provide access.

v) Usability: This system is simple to use for admin, project managers and the members. There would not be any technical term or error causing difficulty to use in the system.

2.3. Feasibility Study

After conducting a thorough feasibility study and analyzing all existing and required functionalities of the system, it is concluded that 'Project Hub' is deemed feasible, provided that Somarjun Pratisthan has access to unlimited resources and an indefinite timeframe.

The proposed solution will satisfy all the user requirements and would be flexible enough so that future changes can be easily done based on the future upcoming requirements.

2.3.1. Economic Feasibility

Economic feasibility was a primary concern in developing "Project Hub." We opted for cost-effective solutions, leveraging open-source software to minimize expenses. Despite this, our analysis indicates that the benefits of the system will far exceed both the initial and ongoing costs. To ensure database security, we chose MongoDB as the database system, a reliable and cost-effective solution.

2.3.2. Technical Feasibility

By selecting widely adopted technologies with extensive community support, the MERN (MongoDB, Express.js, React.js, Node.js) stack, we ensured that any technical challenges could be promptly addressed through readily available resources and assistance from the robust developer community. This strategic approach guarantees the technical feasibility of "Project Hub" and enables efficient implementation of all proposed features within the system.

2.3.1. Operational Feasibility

Operational feasibility is a key aspect of our proposed system, which is entirely GUI-based for user-friendliness. All inputs are designed to be self-explanatory, even for laymen.

Extensive training can be conducted to familiarize users with the system, ensuring their comfort and confidence in using it. Our study indicates that clients will feel comfortable and happy with the system, as it has significantly reduced their workload and streamlined operations.

2.4. System Design

Design is the process of defining the architecture, interfaces, and data for a system that satisfies specific requirements. It consists of different interfaces of components and the data that goes through the system. This design meets the needs of organization through coherent and efficient systems. To implement the system design in this report, system flowchart and system architecture are included.

2.4.1. System Architecture

System architecture conceptually defines the views, structure, and behavior of the system. MVC is popular as it isolates the application logic from the user interface layer and supports separation of concerns (Pressman, 2010).

Here the Controller receives all requests for the application and then works with the Model to prepare any data needed by the View. The View then uses the data prepared by the Controller to generate a final presentable response. The MVC abstraction can be graphically represented as follows.

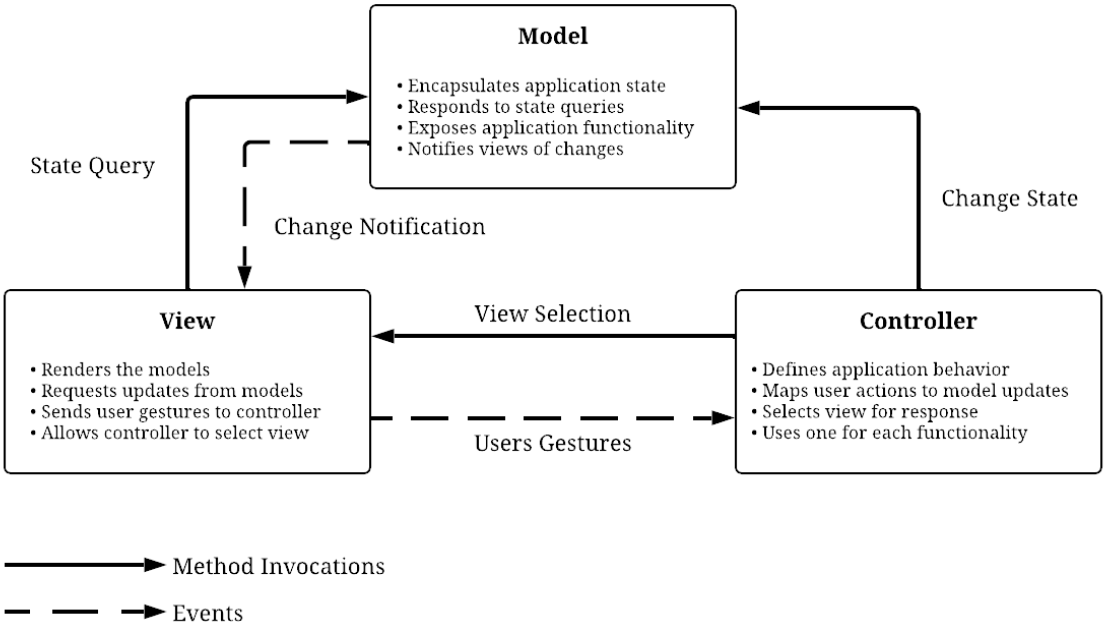

Figure 2.2: MVC (Model View Controller Flow) Diagram

2.4.2. Data Modeling

Data modeling involves visually representing the communication system to illustrate the interaction between data points and structures in the “Project Hub”. This process is essential for understanding the requirements of the system and specifying how data is linked, handled, and stored within the system.

2.4.2.1. Entity Relational Diagram

This diagram serves as a visual representation of how entities, such as users, projects, and issues, relate to each other within the “Project Hub”. Using defined symbols such as rectangles, diamonds, and ovals, the ERD clearly showcases the relationships and dependencies between these entities. It helps to establish how various components of the system are interconnected and how the logical structure of the database is linked to user interactions and system functionality.

Ultimately, the ERD plays a crucial role in designing and implementing the database schema for "Project Hub," ensuring efficient data management and seamless user experiences.

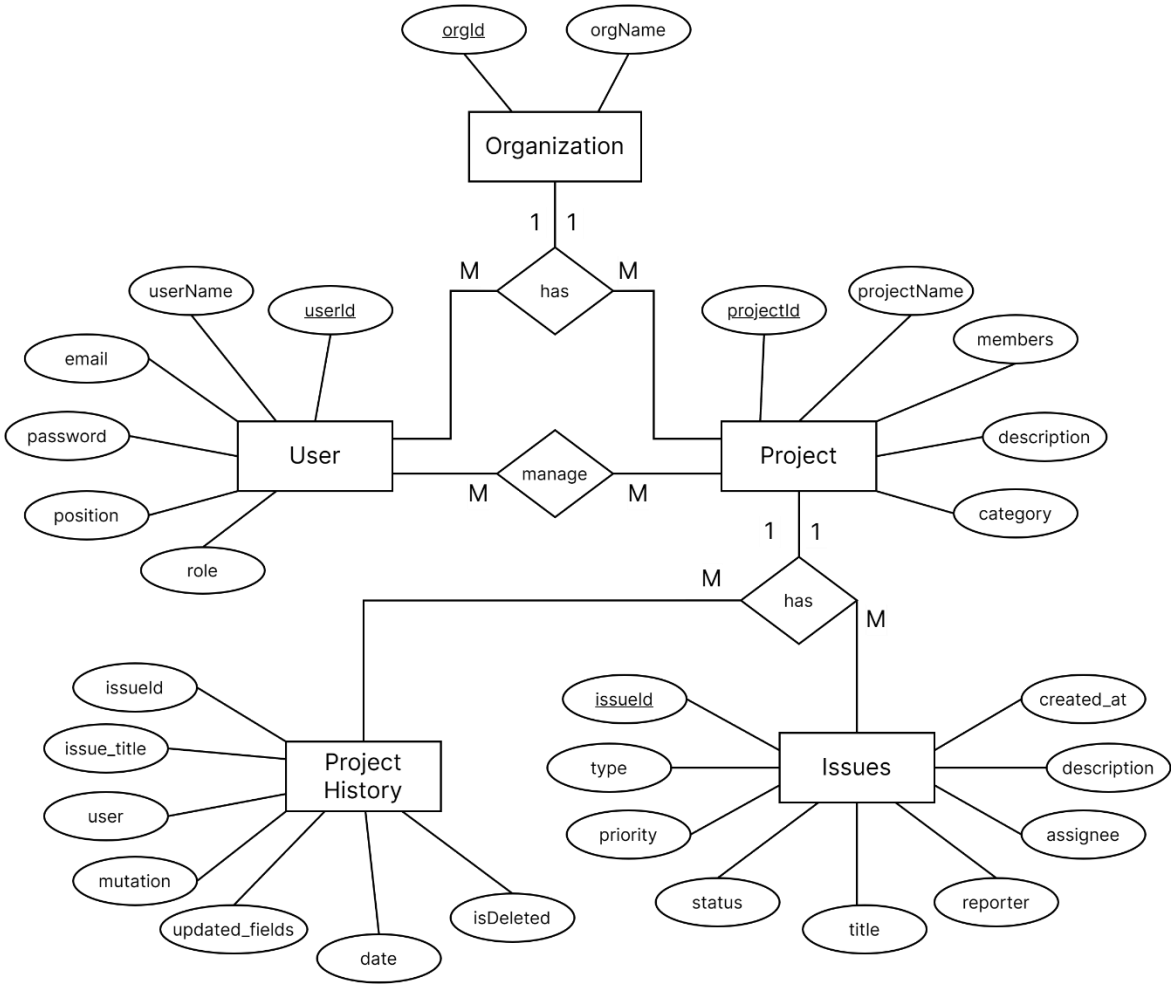

Figure 2.3: ER Diagram of Project Hub

2.4.2.2. Activity Diagram

The activity diagram for "Project Hub" depicts the flow of activities for users, including Admins, Project Managers, and Members, from login to logout. Here's a description of the activities illustrated in the diagram:

i) Users (Admin, Project Manager, or Member) initiate the process by logging into the "Project Hub" platform using their credentials.

ii) The system authenticates the user's credentials to verify their identity and grant access to the dashboard.

iii) Upon successful authentication, users are directed to their respective dashboards based on their roles.

iv) Each user role is granted access to specific features and functions within the dashboard tailored to their responsibilities and permissions.

v) Users interact with the dashboard to perform various actions such as creating projects, assigning issues, and updating issues statuses.

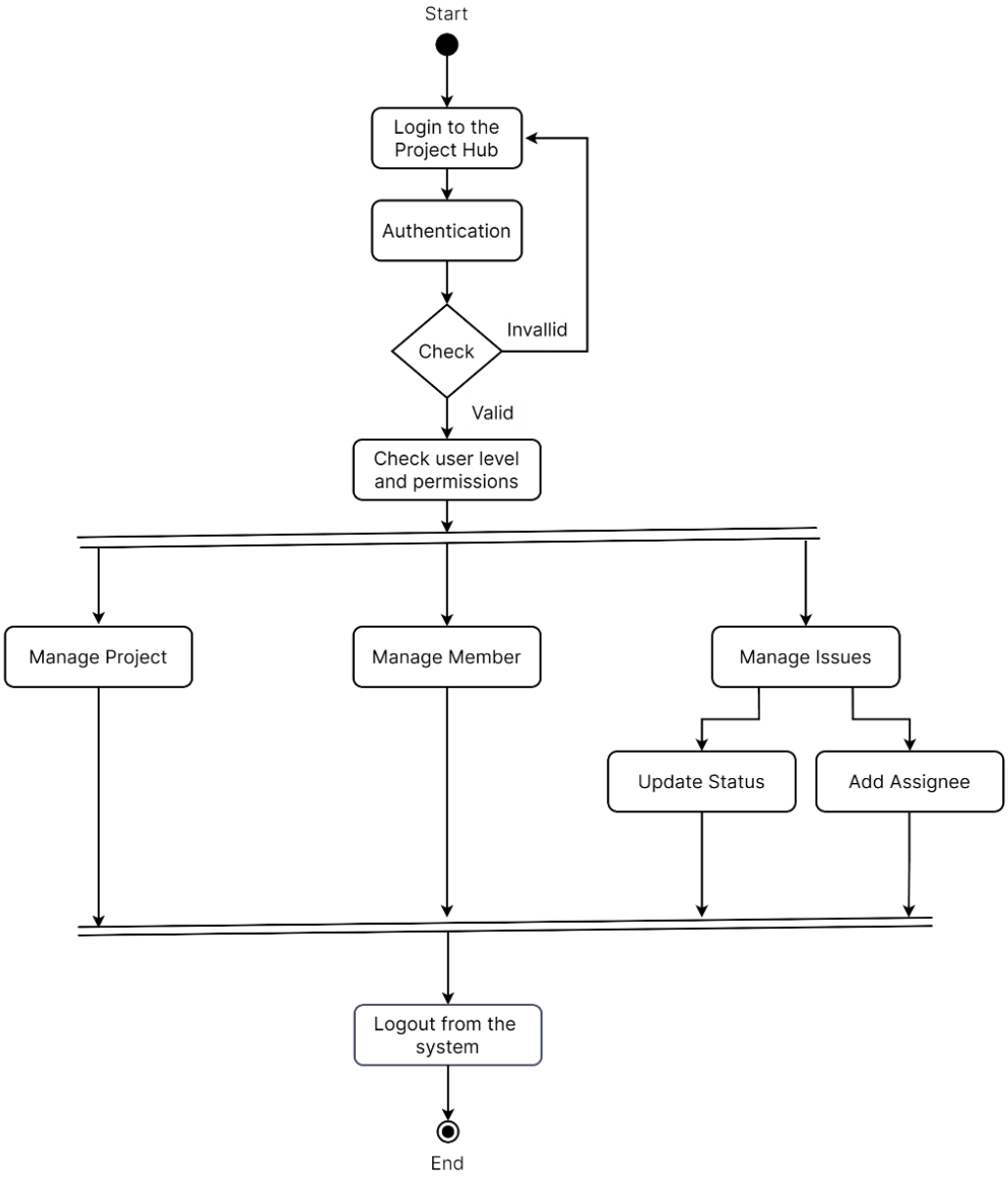

Figure 2.4: Activity Diagram of Project Hub

2.4.2.3. Development Methodology

The Iterative Waterfall Model has been implemented in the development process of "Project Hub". Iterative Waterfall Model is a software development approach that combines the sequential steps of the traditional Waterfall Model with the flexibility of iterative design.

It allows for improvements and changes to be made at each stage of the development process, instead of waiting until the end of the project.

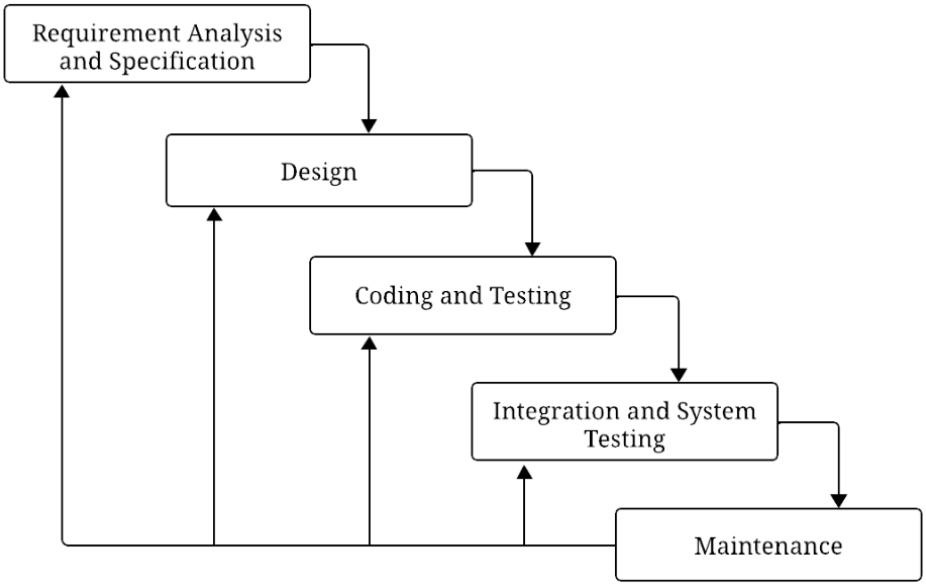

Figure 2.5: Iterative Waterfall Model

2.4.2.4. Sequence Diagram

Sequence diagrams play a vital role to depict the exchange of messages and interactions between different components of the system, such as members, issues, and projects. This visualization aids in understanding the sequence of actions and collaborations among these entities, facilitating the development and optimization of the project management system.

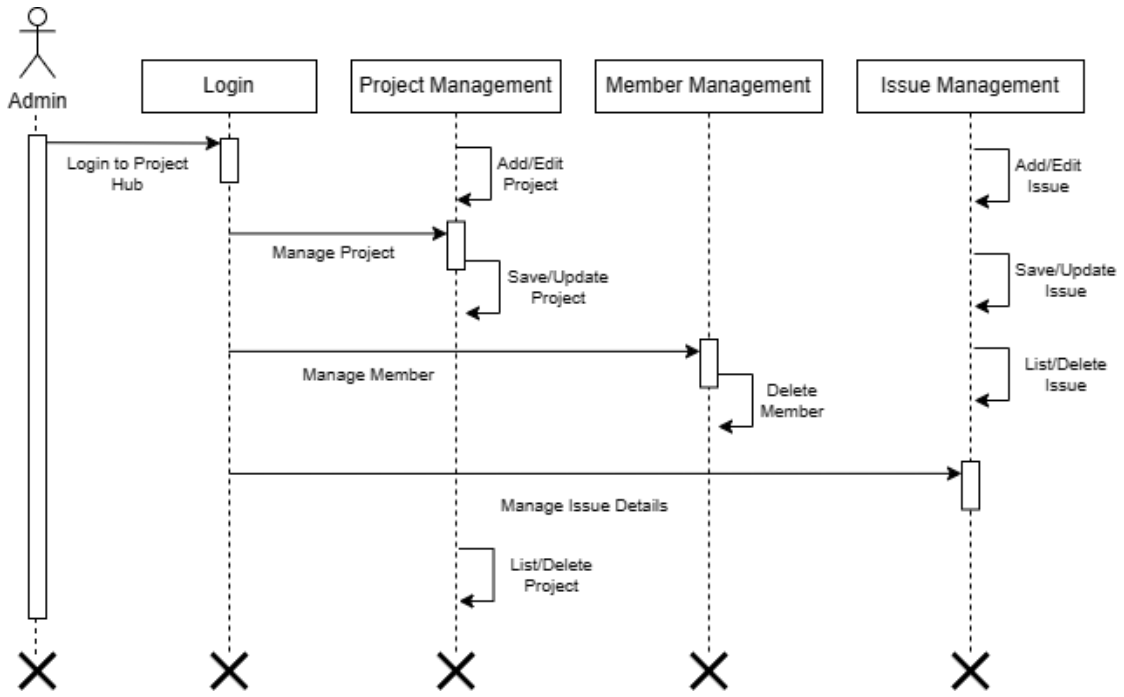

Figure 2.6: Sequence Diagram of Admin

2.5. Testing

Here, every component of an application is examined to make sure that they work as a complete and unified whole. It evaluates the overall functionality and performance of a complete and fully integrated system. Unit-testing method is used for the test case of the system.

Table 2.1: Test Case Login

Project Name: Project Hub						
Test Case ID: TC-001						
Test Case Type: Functional Test Case			**Test Designed Date:** 2024-05-04			
Module Name: Login			**Test Executed By:** Shreesha Attreya			
Test Title: Login Function Test			**Test Execution Date:** 2024-05-06			
Severity: Critical						
Summary: To check the login module						
Pre-condition: Required Registration						
Post-condition: Able to access the dashboard						
S.N.	**Description**	**Test Data**	**Expected Result**	**Actual Result**	**Status**	**Comment**
1	Go to the Login		Login page is displayed	As expected	Pass	-
2	Enter correct values for “email” and “password”	“shreeshatterya @gmail.com” and “Sreesha123”	Login successful	As expected	Pass	-
3	Enter the incorrect email format.	“test@123”	Invalid email address	As expected	Pass	-
4	Submit empty password		Enter your password	Incorrect email or password	Fail	Validate the password field.

Table 2.2: Test Case Member Management

Project Name: Project Hub	
Test Case ID: TC-002	
Test Case Type: Functional Test Case	**Test Designed Date:** 2024-05-04
Module Name: Member Management	**Test Executed By:** Ila Adhikari
Test Title: Member Management Function Test	**Test Execution Date:** 2024-05-07
Severity: Medium	

Summary: To manage member role and delete module						
Pre-condition: Required Access Permission (Only admin can change the role and delete the member)						
Post-condition: Able to change the role and delete the member						
S.N.	**Description**	**Test Data**	**Expected Result**	**Actual Result**	**Status**	**Comment**
1	Go to the Admin Setting		Admin setting page is displayed	As expected	Pass	-
2	Change the current role of the member	"Member" to "Project Manager"	Role changes successful	As expected	Pass	-
3	Delete the member from list.	Delete	Member removed from the member list of system.	Deleted from the org list only.	Fail	Member should be deleted from the entire system.

CHAPTER III: DISCUSSION AND CONCLUSION

3.1. Discussion

The development of "Project Hub" revolves around addressing the needs of both the organization and its users. It began with thorough research and site visits, gathering data and insights to inform the system's features and functionalities. Through discussions, interviews, and observations, requirements were identified and solutions were proposed. The selection of appropriate tools and technologies was a result of careful consideration and consultation with mentors and peers.

Ultimately, "Project Hub" emerged as a web-based application, providing a solution accessible to both members and the organization, streamlining project management processes and enhancing record-keeping capabilities.

3.2. Conclusion

The journey of developing "Project Hub" was not without its challenges, including selecting the right tools and modules. However, through research, discussions, and guidance from mentors and peers, these challenges were overcome. The resulting system incorporates features tailored for administrators and members alike, reflecting the knowledge gained from academic studies and practical experiences.

3.3. Lessons Learned

Throughout the project, valuable lessons were learned, both technical and non-technical. From approaching and researching organizations to system development and report preparation, every step provided opportunities for growth. Communication skills were honed through field visits, presentations, and interactions with teachers and peers.

Along with the system, the report preparation also has to tag along. Again, through time-to-time observation and mentoring of supervisor helped me to standardize the report according to guidance of TU. Technical challenges, such as addressing system errors and limitations, also contributed to the learning process.

3.4. Future Recommendations

While "Project Hub" currently caters to the needs of small-scale organizations, there is potential for expansion and additional features. Future recommendations include the addition of modules or units to accommodate organizational changes and growth. By staying adaptable and responsive to evolving needs, "Project Hub" can continue to serve as an effective project management solution for organizations of varying sizes and structures.

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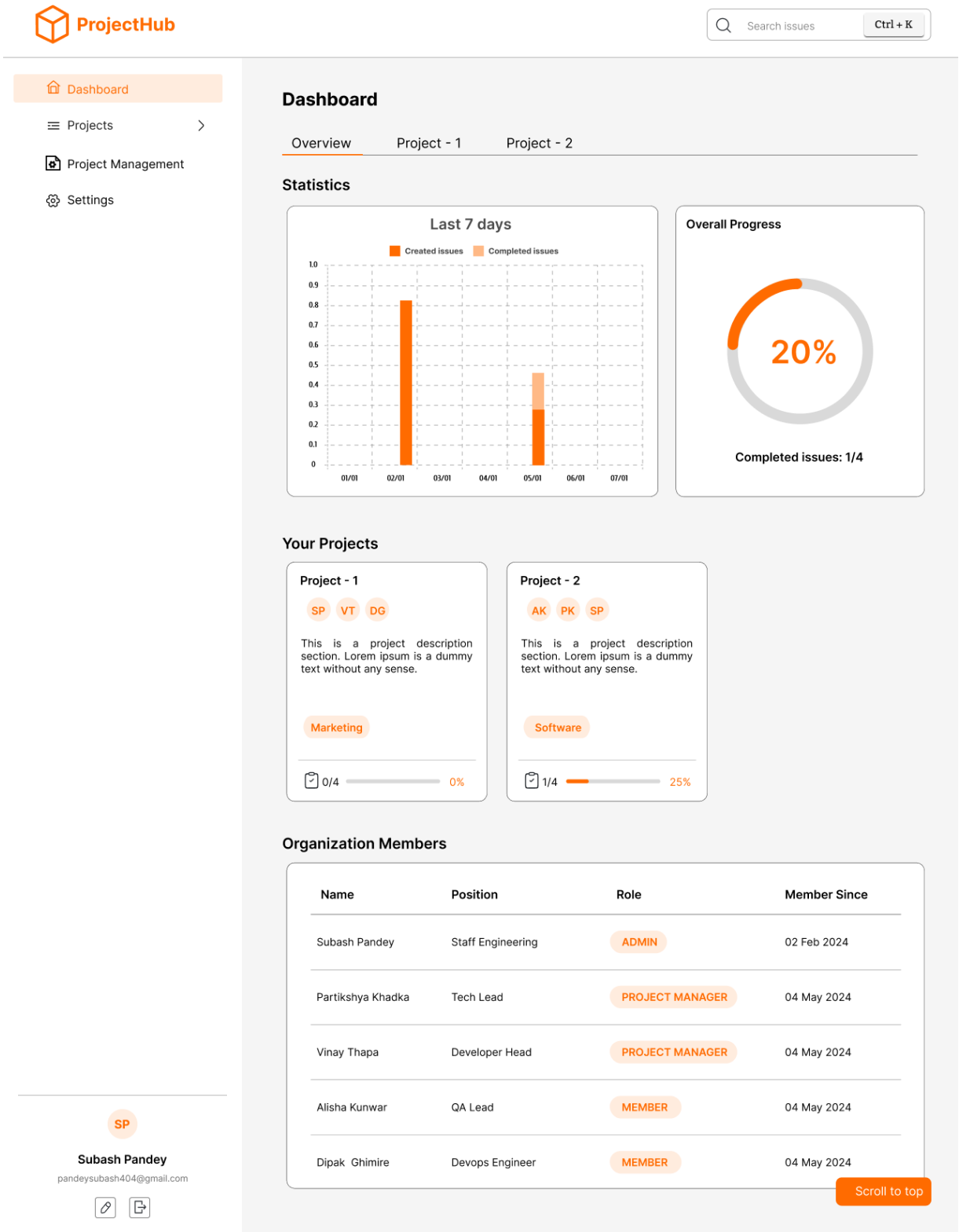
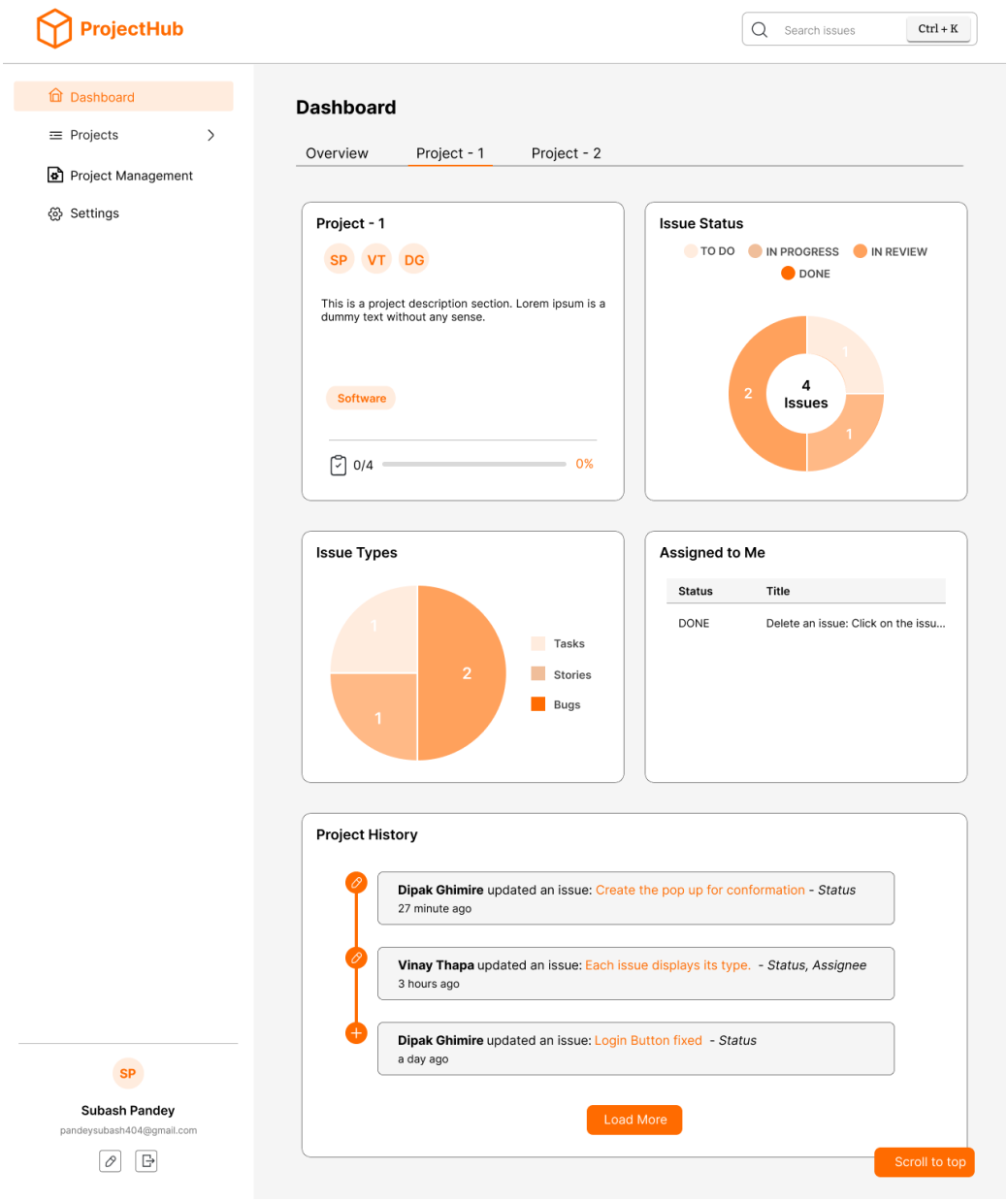
APPENDICES

Appendix 1: Snapshots of the system




ProjectHub
Search issues
Ctrl + K
Dashboard
Projects
Project Management
Settings
Dashboard
Overview
Project - 1
Project - 2
Project - 1
SP
VT
DG
This is a project description section. Lorem ipsum is a dummy text without any sense.
Software
0/4
0%
Issue Status
TO DO
IN PROGRESS
IN REVIEW
DONE
4
Issues
Issue Types
Tasks
Stories
Bugs
Assigned to Me
Status
Title
DONE
Delete an issue: Click on the issu...
Project History
Dipak Ghimire updated an issue: Create the pop up for conformation - Status
27 minute ago
Vinay Thapa updated an issue: Each issue displays its type. - Status, Assignee
3 hours ago
Dipak Ghimire updated an issue: Login Button fixed - Status
a day ago
Load More
Scroll to top
SP
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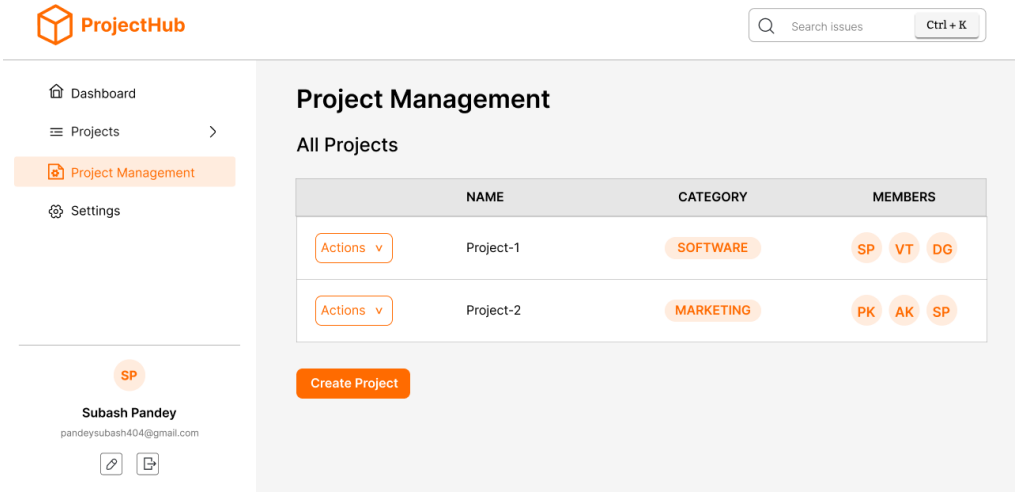
ProjectHub
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Project Management
All Projects
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CATEGORY
MEMBERS
Actions
Project-1
SOFTWARE
SP VT DG
Actions
Project-2
MARKETING
PK AK SP
Create Project
SP
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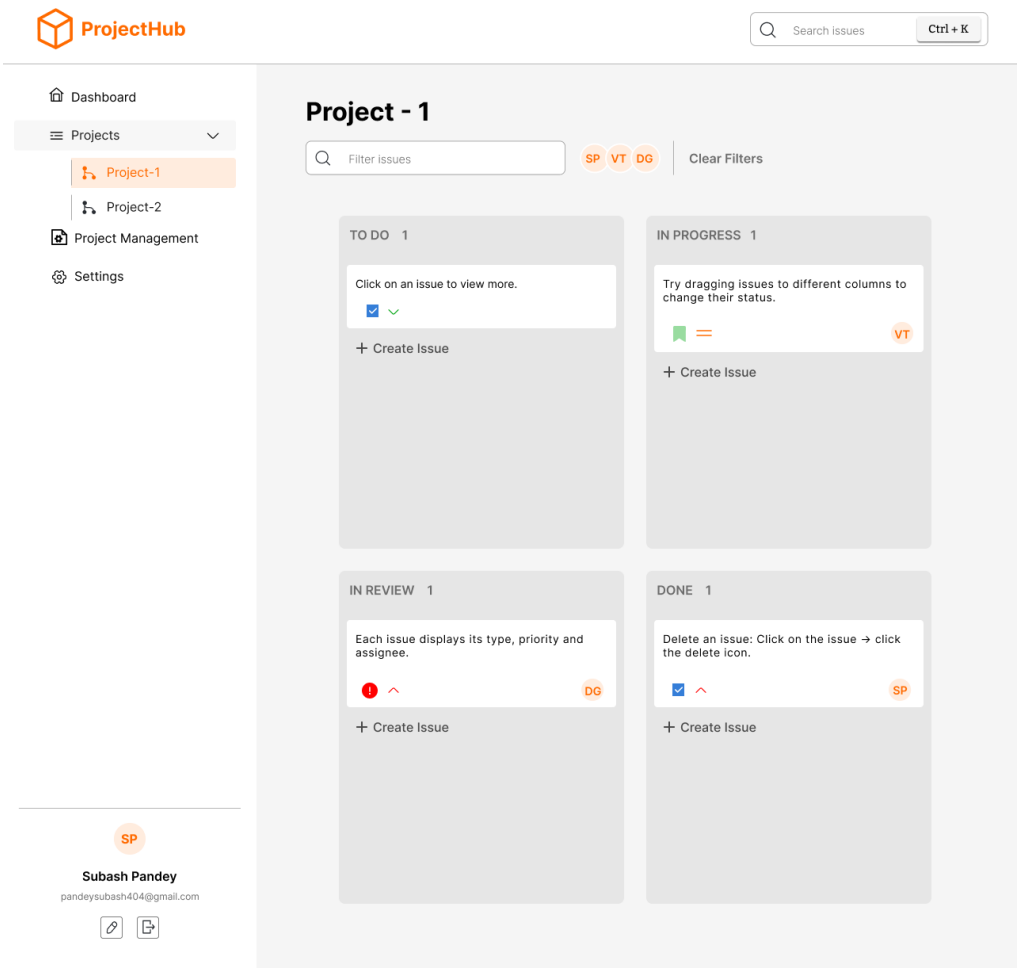
ProjectHub
Search issues
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Projects
Project-1
Project-2
Project Management
Settings
Project - 1
Filter issues
SP VT DG
Clear Filters
TO DO 1
Click on an issue to view more.
Create Issue
IN PROGRESS 1
Try dragging issues to different columns to change their status.
VT
Create Issue
IN REVIEW 1
Each issue displays its type, priority and assignee.
DG
Create Issue
DONE 1
Delete an issue: Click on the issue → click the delete icon.
SP
Create Issue
SP
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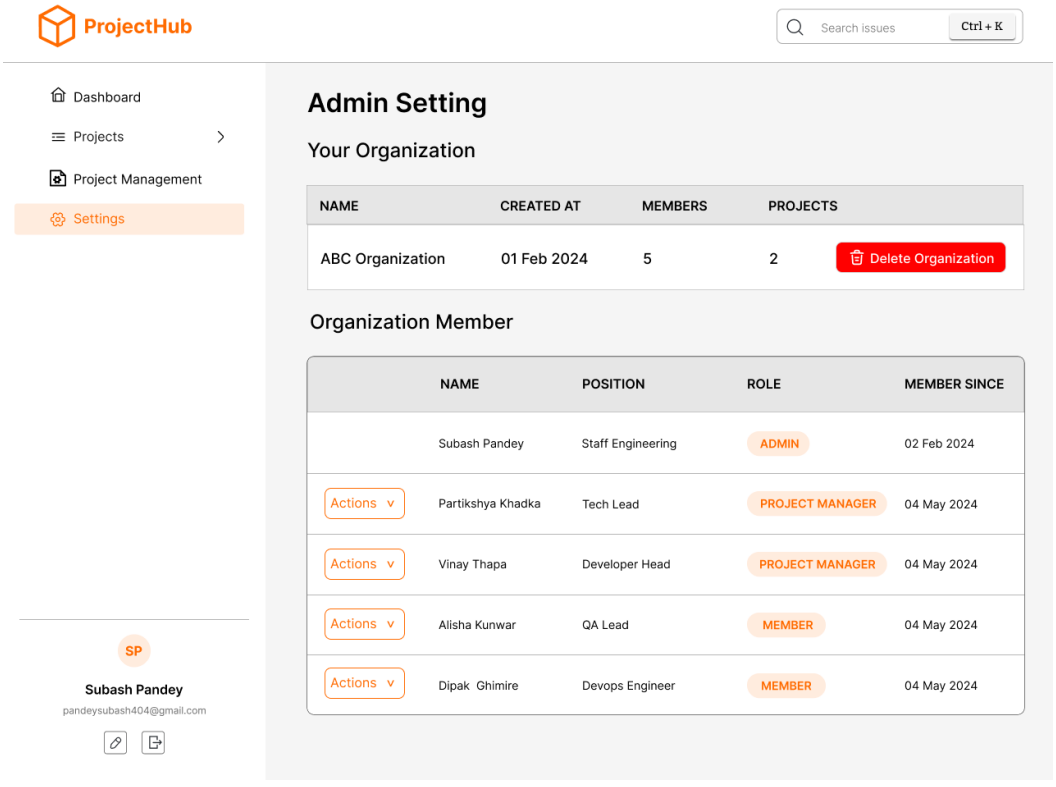
ProjectHub
Search issues
Ctrl + K
Dashboard
Projects
Project Management
Settings
Admin Setting
Your Organization
NAME
CREATED AT
MEMBERS
PROJECTS
ABC Organization
01 Feb 2024
5
2
Delete Organization
Organization Member
NAME
POSITION
ROLE
MEMBER SINCE
Subash Pandey
Staff Engineering
ADMIN
02 Feb 2024
Actions
Partikshya Khadka
Tech Lead
PROJECT MANAGER
04 May 2024
Actions
Vinay Thapa
Developer Head
PROJECT MANAGER
04 May 2024
Actions
Alisha Kunwar
QA Lead
MEMBER
04 May 2024
Actions
Dipak Ghimire
Devops Engineer
MEMBER
04 May 2024
SP
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