

INDUSTRY INSTITUTE INTERFACE (ICUBE)

**UCS503 Software Engineering
Project Report End-Semester Evaluation**

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OF ENGINEERING & TECHNOLOGY
(Deemed to be University)**

Software Requirements Specification Document

Version 1.0

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1. Introduction:

1.1 Purpose

The purpose of this Software Requirements Specification (SRS) document is to provide a detailed description of the functionalities and requirements for the development of the iCube platform. This document outlines the intended features, behavior, and interactions of the system, serving as a guide for developers, stakeholders, and end-users to understand the scope and expectations of the project.

1.2 Scope

The iCube platform aims to bridge the gap between industries and educational institutes by providing a collaborative online environment where industries can submit real-world environmental problems, and educational institutes can propose viable solutions. The platform facilitates effective communication, collaboration, and project management between the two parties, promoting innovation and practical learning experiences.

Key Objectives:

Enable industries to post detailed descriptions of environmental challenges they are facing. Allow educational institutes to browse, discuss, and propose solutions to these problems.

Provide tools for collaboration, project tracking, and communication between industry and institute representatives.

Incorporate feedback mechanisms to assess solution effectiveness and collaboration quality.

Ensure secure and user-friendly access to all platform functionalities.

Out of Scope:

Direct implementation of proposed solutions by the platform.

Financial transactions and budgeting for solution implementation.

Legal agreements and contracts between industries and institutes.

3.7 Definitions, Acronyms, and Abbreviations

Definitions:

Industry User: Representative from a company or organization seeking solutions to environmental problems.

Institute User: Representative from an educational institution (e.g., universities, colleges) offering solutions.

Admin User: Platform administrator responsible for managing users, content, and system maintenance.

Problem Statement: Detailed description of an environmental issue submitted by an industry user.

Solution Proposal: Detailed plan or approach proposed by an institute user to address a submitted problem.

Collaboration Workspace: Dedicated online space for industry and institute users to communicate and work together on a problem.

Acronyms:

SRS: Software Requirements Specification

UI: User Interface

API: Application Programming Interface

SSL: Secure Sockets Layer

HTTP: HyperText Transfer Protocol

HTTPS: HyperText Transfer Protocol Secure

DBMS: Database Management System

REST: Representational State Transfer

3.7 References

IEEE Std 830-1998, "IEEE Recommended Practice for Software Requirements Specifications."

Agile Software Development Principles

ISO/IEC 27001 Information Security Management

Web Content Accessibility Guidelines (WCAG) 2.1

1.5 Overview

This SRS document is organized into three main sections following the introduction:

Overall Description: Provides a general perspective of the iCube platform, including its context, user characteristics, and high-level features.

Specific Requirements: Details all functional and non-functional requirements, external interfaces, and quality attributes necessary for the development of the platform.

Supporting Information: Includes change history and document approval information.

2. Overall Description

2.1 Product Perspective

The iCube platform is a standalone web-based application designed to facilitate collaboration between industries and educational institutes. It serves as an intermediary platform where industries can present environmental issues, and educational institutes can contribute by offering researched and innovative solutions.

System Context:

The platform will be accessible via standard web browsers over the internet.

It will integrate with email services for notifications and communications.

May interface with third-party collaboration tools (e.g., video conferencing, document sharing services) through APIs.

High-Level Architecture:

Frontend: User interface developed using modern web technologies (e.g., HTML5, CSS3, JavaScript frameworks like React or Angular).

Backend: Server-side application managing business logic, user authentication, and data processing (e.g., developed using Node.js, Django, or similar frameworks).

Database: Robust and scalable DBMS (e.g., PostgreSQL, MySQL) to store user data, problem statements, solution proposals, and collaboration records.

Security: Implementation of SSL for secure data transmission, user authentication protocols (e.g., OAuth 2.0), and adherence to data protection regulations.

Relation to Other Systems:

The platform operates independently but can be integrated with existing enterprise systems used by industries and institutes for seamless data exchange.

Integration with calendar and scheduling services (e.g., Google Calendar) for meeting coordination.

Potential integration with learning management systems (LMS) for educational institutes.

Figure 2.1: High-Level System Architecture Diagram (Note: Diagram to be developed during design phase)

2.2 Product Functions

The iCube platform will provide the following core functions:

User Registration and Authentication:

Secure signup and login processes for industry, institute, and admin users.

Role-based access control ensuring users have appropriate permissions.

Problem Submission:

Industries can create and post detailed descriptions of their environmental issues.

Ability to attach relevant documents, images, and data supporting the problem statement.

Solution Proposal:

Educational institutes can browse available problems and submit comprehensive solution proposals.

Provision to attach supporting research, documents, and multimedia content.

Collaboration Tools:

Dedicated workspaces for each problem-proposal pair enabling communication via messaging, discussion forums, and document sharing.

Scheduling and conducting meetings through integrated or external conferencing tools.

Project Tracking and Management:

Tools to monitor progress of solution development and implementation.

Task assignment, milestones tracking, and timeline management features.

Feedback and Rating System:

Post-collaboration feedback mechanisms allowing industries to rate and review the solutions and collaboration experience.

Institutes can also provide feedback on the collaboration process.

Notification System:

Real-time and email notifications for important events such as new problem postings, proposal submissions, messages, and deadlines.

Administrative Controls:

Admin users can manage user accounts, monitor platform activity, and oversee compliance with platform policies.

Reporting and analytics tools to assess platform usage and performance.

2.3 User Characteristics

Industry Users:

Roles: Environmental managers, sustainability officers, operational heads.

Characteristics:

Basic to advanced computer literacy.

Familiarity with environmental challenges and industry-specific regulations.

Require straightforward interfaces to submit and manage problems effectively.

Institute Users:

Roles: Professors, researchers, students, academic coordinators.

Characteristics:

Proficient in using digital platforms for research and collaboration.

Strong background in environmental studies, engineering, and related fields.

Need comprehensive tools to develop and present detailed solutions.

Admin Users:

Roles: Platform administrators, moderators.

Characteristics:

Advanced technical skills for system management and troubleshooting.

Understanding of platform policies, data security, and user support protocols.

Require access to detailed system metrics and user management tools.

2.4 General Constraints

Security and Privacy: The system must comply with data protection regulations such as GDPR to ensure user data confidentiality and integrity.

Performance: The platform should support simultaneous access by multiple users without significant degradation in performance.

Availability: The system should ensure high availability, targeting 99.9% uptime except during scheduled maintenance.

Scalability: The architecture should support scalability to accommodate increasing numbers of users and data volume.

Usability: The user interface should be intuitive and accessible, adhering to WCAG 2.1 standards to support users with disabilities.

Compatibility: The platform should be compatible with major web browsers (Chrome, Firefox, Safari, Edge) and adaptable to various device screen sizes.

2.5 Assumptions and Dependencies

Assumptions:

Users have access to stable internet connections and modern web browsers.

Industries and institutes are willing to collaborate and share necessary information openly on the platform.

Necessary third-party integrations (e.g., email services, conferencing tools) provide reliable APIs for seamless interaction.

Dependencies:

Reliance on third-party services for notifications, communication, and data storage may affect platform functionality based on their availability and performance.

Compliance with evolving data protection and industry-specific regulations may necessitate periodic updates to system functionalities and policies.

User adoption and engagement are critical for the platform's success; marketing and outreach efforts are essential but outside the scope of this system's technical development.

3. Specific Requirements

3.1 External Interface Requirements

3.1.1 User Interfaces

Login/Registration Pages:

Clean and straightforward forms for user authentication.

Options for password recovery and multi-factor authentication.

Dashboard:

Personalized dashboard displaying relevant information such as active collaborations, notifications, and recent activities.

Easy navigation through menus and quick access to core functionalities.

Problem Submission Form:

Structured form allowing industries to input detailed problem information.

Ability to attach files and specify problem categories, urgency levels, and expected outcomes.

Solution Proposal Form:

Institutes can submit structured proposals with sections for methodology, expected results, timelines, and resource requirements.

Support for rich text formatting and multimedia attachments.

Collaboration Workspace:

Integrated messaging system for real-time communication.

Discussion forums for threaded conversations.

Document repository for sharing and managing files.

Calendar view for scheduling and tracking milestones.

Admin Panel:

Comprehensive interface for managing users, content moderation, and system settings.

Dashboard displaying system metrics and reports.

Design Considerations:

Consistent and responsive design across all pages.

Use of clear typography, color schemes, and icons to enhance usability.

Inclusion of tooltips and help sections to assist users.

3.1.2 Hardware Interfaces

Server-Side Hardware:

Web servers with adequate processing power, memory, and storage to handle expected user load.

Redundant systems for failover support.

Client-Side Hardware:

Users can access the platform via desktops, laptops, tablets, and smartphones with standard specifications.

No specialized hardware requirements on the client-side.

3.1.3 Software Interfaces

Database Management System:

Utilize relational DBMS like PostgreSQL or MySQL.

Support for ORM (Object-Relational Mapping) for efficient database interactions.

External APIs:

Email service APIs (e.g., SendGrid, MailChimp) for notification delivery.

Video conferencing APIs (e.g., Zoom, Microsoft Teams) for integrating meeting functionalities.

Authentication services (e.g., OAuth providers) for secure login options.

Web Services:

RESTful APIs to support frontend-backend communication and potential third-party integrations.

Adherence to standard HTTP methods and response codes.

3.1.4 Communication Interfaces

Protocols:

HTTP/HTTPS protocols for all web communications.

WebSocket protocol for real-time features like messaging and notifications.

Data Formats:

JSON format for data exchange between client and server.

Support for XML where necessary.

Security Measures:

SSL/TLS encryption for all data transmission.

Implementation of secure authentication and authorization mechanisms.

3.2 Functional Requirements

3.2.1 User Registration and Authentication

Description:

Provide secure and efficient mechanisms for users to create accounts and access the platform based on their roles.

Requirements:

User Registration:

The system shall allow users to register by providing necessary information such as name, email, organization, and role (industry, institute, admin).

The system shall verify the provided email address through a confirmation link.

The system shall allow admins to approve or reject new registrations to maintain platform integrity.

User Login:

The system shall allow users to log in using their registered email and password.

The system shall support password recovery through email verification.

The system shall support multi-factor authentication (e.g., SMS, authenticator apps) for enhanced security.

Profile Management:

Users shall be able to view and edit their profiles, including contact information and organizational details.

Users shall be able to upload a profile picture and relevant credentials or certifications.

Role-Based Access Control:

The system shall assign permissions based on user roles, restricting or granting access to specific functionalities accordingly.

Admin users shall have the ability to modify user roles and permissions as needed.

3.2.2 Problem Submission by Industries

Description:

Enable industry users to submit detailed descriptions of environmental problems they seek solutions for.

Requirements:

Problem Creation:

The system shall provide a form for industry users to create new problem statements, including fields for title, description, category, location, urgency level, and expected outcomes.

The system shall allow users to attach supporting documents, images, and data files to the problem statement.

The system shall support saving drafts of problem statements for later completion and submission.

Problem Management:

Industry users shall be able to view, edit, and delete their submitted problem statements.

The system shall track the status of each problem (e.g., open, in progress, resolved).

Industry users shall be notified when a new solution proposal is submitted for their problem.

Search and Filter:

All users shall be able to search and filter problem statements based on categories, keywords, urgency levels, and submission dates.

Visibility Settings:

Industry users shall be able to set visibility preferences for their problem statements (e.g., public, invite-only, specific institutes).

3.2.3 Solution Proposal by Institutes

Description:

Allow institute users to browse available problems and submit comprehensive solutions.

Requirements:

Browsing Problems:

Institute users shall be able to browse and search for problem statements using various filters and keywords.

The system shall display detailed information about each problem, including all attached documents and data.

Proposal Submission:

The system shall provide a structured form for institutes to submit solution proposals, including sections for methodology, resource requirements, timelines, and expected outcomes.

Users shall be able to attach supporting documents, research papers, and multimedia content to their proposals.

The system shall allow saving drafts of proposals for later completion and submission

Proposal Management:

Institute users shall be able to view, edit, and withdraw their submitted proposals.

The system shall notify institute users when their proposal is accepted, rejected, or requires modifications.

Proposal Review and Acceptance:

Industry users shall be able to review submitted proposals, provide feedback, request revisions, or accept/reject proposals.

Upon acceptance, a dedicated collaboration workspace shall be created for the project.

3.2.4 Collaboration and Communication

Description:

Provide tools and features facilitating effective collaboration between industry and institute users on accepted projects.

Requirements:

Collaboration Workspace:

The system shall automatically create a collaboration workspace upon proposal acceptance.

The workspace shall be accessible only to authorized users involved in the project.

Messaging and Discussion:

The workspace shall include a messaging system for real-time communication between users.

Discussion forums shall be available for structured, topic-based conversations.

Document Sharing and Management:

Users shall be able to upload, download, and manage documents within the workspace.

The system shall support version control, allowing users to track changes and maintain document history.

Task Management:

The workspace shall provide tools for creating and assigning tasks, setting deadlines, and tracking progress.

Users shall receive notifications for task assignments and upcoming deadlines.

Meeting Scheduling and Conferencing:

Users shall be able to schedule meetings, with integration to calendar services for reminders.

The system shall support or integrate with video conferencing tools for virtual meetings.

Activity Logging:

The system shall maintain logs of all activities within the workspace for transparency and accountability.

3.2.5 Project Tracking and Management

Description:

Enable effective monitoring and management of ongoing projects to ensure timely and successful completion.

Requirements:

Progress Tracking:

The system shall provide visual representations (e.g., Gantt charts) of project timelines and milestones.

Users shall be able to update the status of tasks and milestones as work progresses.

Reporting:

The system shall generate periodic reports summarizing project status, completed tasks, upcoming deadlines, and any issues or blockers.

Reports shall be downloadable in common formats (e.g., PDF, Excel).

Issue Management:

Users shall be able to report and track issues or challenges encountered during project execution.

The system shall allow assigning issues to responsible parties and tracking their resolution.

Time Tracking:

The system shall allow logging of time spent on various tasks and activities for accountability and performance assessment.

3.2.6 Feedback and Rating System

Description:

Implement mechanisms for users to provide feedback and rate the collaboration experience and outcomes.

Requirements:

Post-Project Feedback:

Upon project completion, industry users shall be prompted to provide feedback on the solution effectiveness, collaboration process, and overall satisfaction.

Institute users shall be able to provide feedback on the collaboration experience and support received from the industry partner.

Rating System:

Users shall be able to rate each other on predefined criteria (e.g., communication, professionalism, responsiveness) using a standardized scale (e.g., 1 to 5 stars).

Feedback Management:

Feedback and ratings shall be stored and accessible to users within their profiles.

Admin users shall monitor feedback for compliance with platform policies and address any disputes or issues.

Public Testimonials:

With consent, exemplary feedback can be showcased publicly on the platform to promote successful collaborations.

3.2.7 Notification System

Description:

Provide timely and relevant notifications to users regarding important events and updates.

Requirements:

Notification Types:

The system shall send notifications for events such as new problem postings, proposal submissions, message receipts, task assignments, approaching deadlines, and system updates.

Delivery Channels:

Notifications shall be delivered through in-app alerts and emails.

Users shall have the option to customize notification preferences and frequencies.

Real-Time Updates:

The system shall support real-time notifications for critical and time-sensitive events.

Notification Management:

Users shall be able to view and manage their notification history within the platform.

3.2.8 Administrative Functions

Description:

Provide administrators with comprehensive tools to manage the platform effectively.

Requirements:

User Management:

Admins shall be able to view, add, edit, suspend, and delete user accounts.

Ability to reset passwords and modify user roles and permissions.

Content Moderation:

Admins shall monitor and moderate problem statements, proposals, discussions, and shared content to ensure compliance with platform policies.

System Monitoring:

Admins shall have access to dashboards displaying system metrics such as user activity, number of active projects, and resource utilization.

Reporting and Analytics:

The system shall generate detailed reports on platform usage, collaboration success rates, and user engagement.

Reports shall assist in identifying areas for improvement and strategic planning.

Policy and Settings Management:

Admins shall be able to configure system settings, update platform policies, and manage integration settings with external services.

Security Management:

Tools for monitoring and responding to security incidents, managing access controls, and ensuring data protection compliance.

3.3 Performance Requirements

Response Time:

The system shall respond to user requests within 2 seconds under normal load conditions.

Page loading times shall not exceed 3 seconds for standard content pages.

Scalability:

The system shall support up to 10,000 concurrent users without performance degradation.

Architecture shall allow for horizontal and vertical scaling to accommodate growing user base.

Throughput:

The system shall handle at least 100 transactions per second, including data retrieval and storage operations.

Availability:

The system shall maintain 99.9% uptime, excluding scheduled maintenance periods.

Implement redundant systems and failover mechanisms to ensure continuous availability.

Data Consistency:

All data transactions shall maintain ACID properties to ensure consistency and reliability.

Real-time synchronization between distributed systems where applicable.

3.4 Design Constraints

Standards Compliance:

The system shall adhere to relevant web development standards (e.g., HTML5, CSS3, ECMAScript).

Follow accessibility standards as per WCAG 2.1 guidelines.

Technology Stack:

Use open-source technologies where possible to reduce costs and increase flexibility.

Ensure compatibility with existing systems used by target user groups.

Security:

Implement robust security measures including input validation, encryption, and regular security audits.

Comply with data protection regulations such as GDPR and HIPAA where applicable.

Internationalization:

Design the system to support multiple languages and regional formats for date, time, and numbers.

Ensure ease of localization for expanding into different geographical markets.

3.5 Quality Attributes

Usability:

Intuitive and user-friendly interface design minimizing learning curve for new users.

Provide comprehensive help documentation and support resources.

Reliability:

The system shall function correctly under defined conditions, handling errors gracefully without data loss.

Implement comprehensive testing procedures including unit, integration, and user acceptance tests.

Maintainability:

Codebase shall follow clean coding practices and be well-documented to facilitate easy maintenance and updates.

Modular architecture enabling easy addition or modification of features.

Portability:

The application shall be deployable on various operating systems and cloud platforms.

Client-side application shall function seamlessly across different browsers and devices.

Efficiency:

Optimize resource usage to ensure fast performance and minimal server load.

Implement caching strategies to reduce redundant data retrievals.

3.6 Other Requirements

Backup and Recovery:

Implement regular automated backups of all critical data.

Develop and document disaster recovery procedures to restore system functionality in case of failures.

Logging and Monitoring:

Maintain comprehensive logs of system activities for auditing and troubleshooting purposes.

Implement real-time monitoring tools to detect and alert on system anomalies or performance issues.

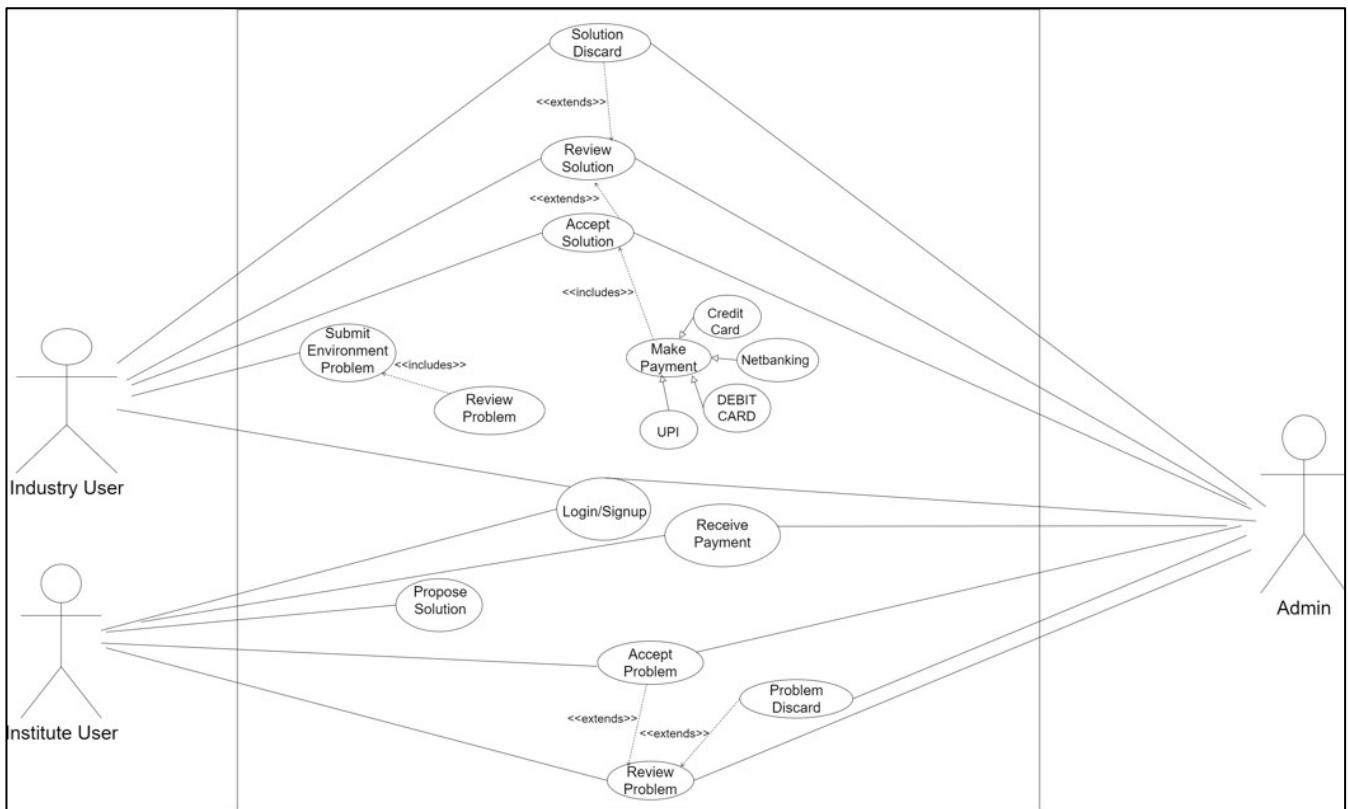
Legal and Ethical Compliance:

Ensure all platform activities and data handling practices comply with relevant laws and ethical standards.

Establish clear terms of service and privacy policies accessible to all users.

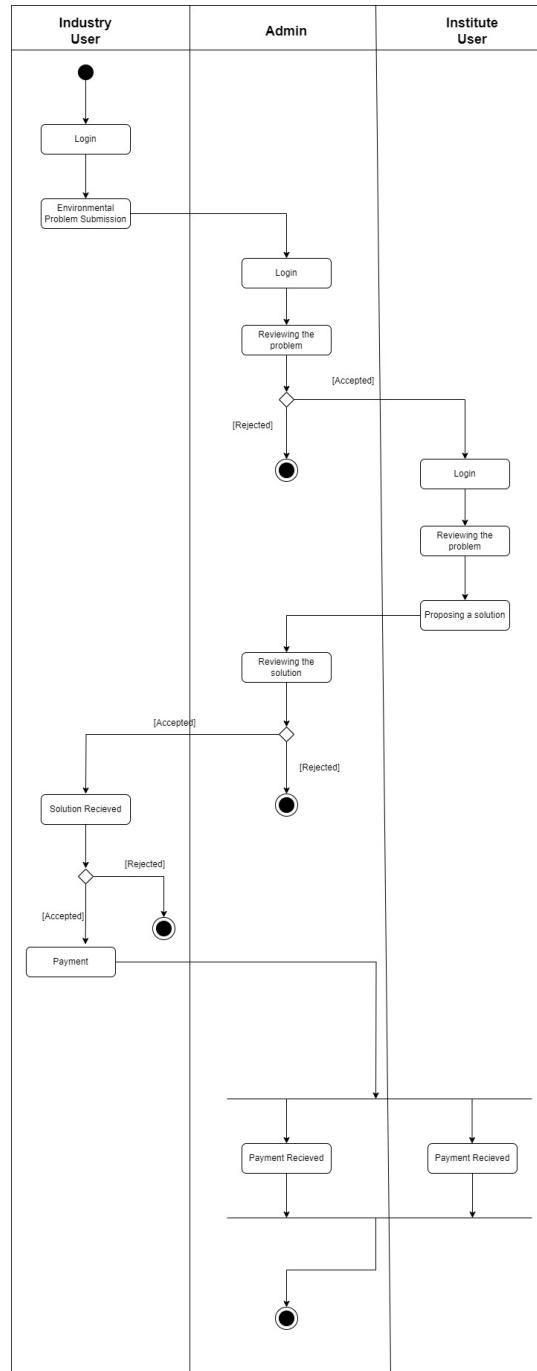
3.7 Analysing Phase

USER CASE DIAGRAM



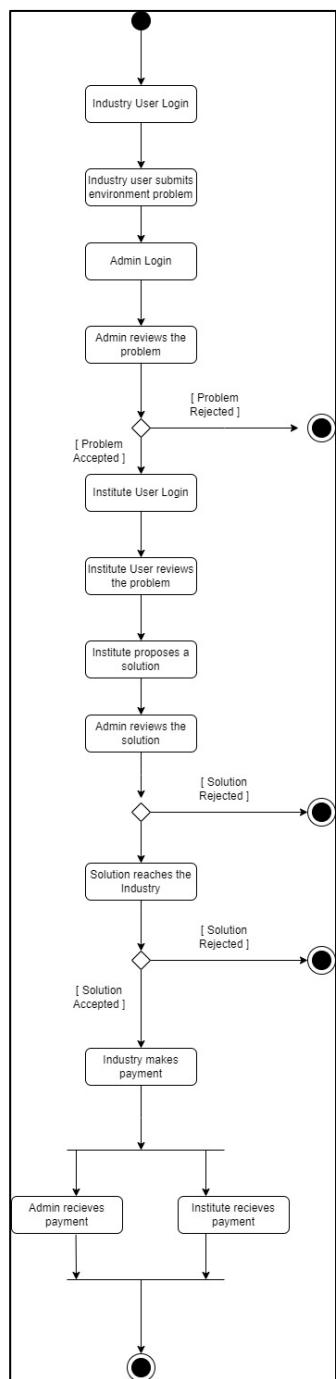
(Fig 3.7.1- Use Case Diagram)

SWIMLANE DIAGRAM



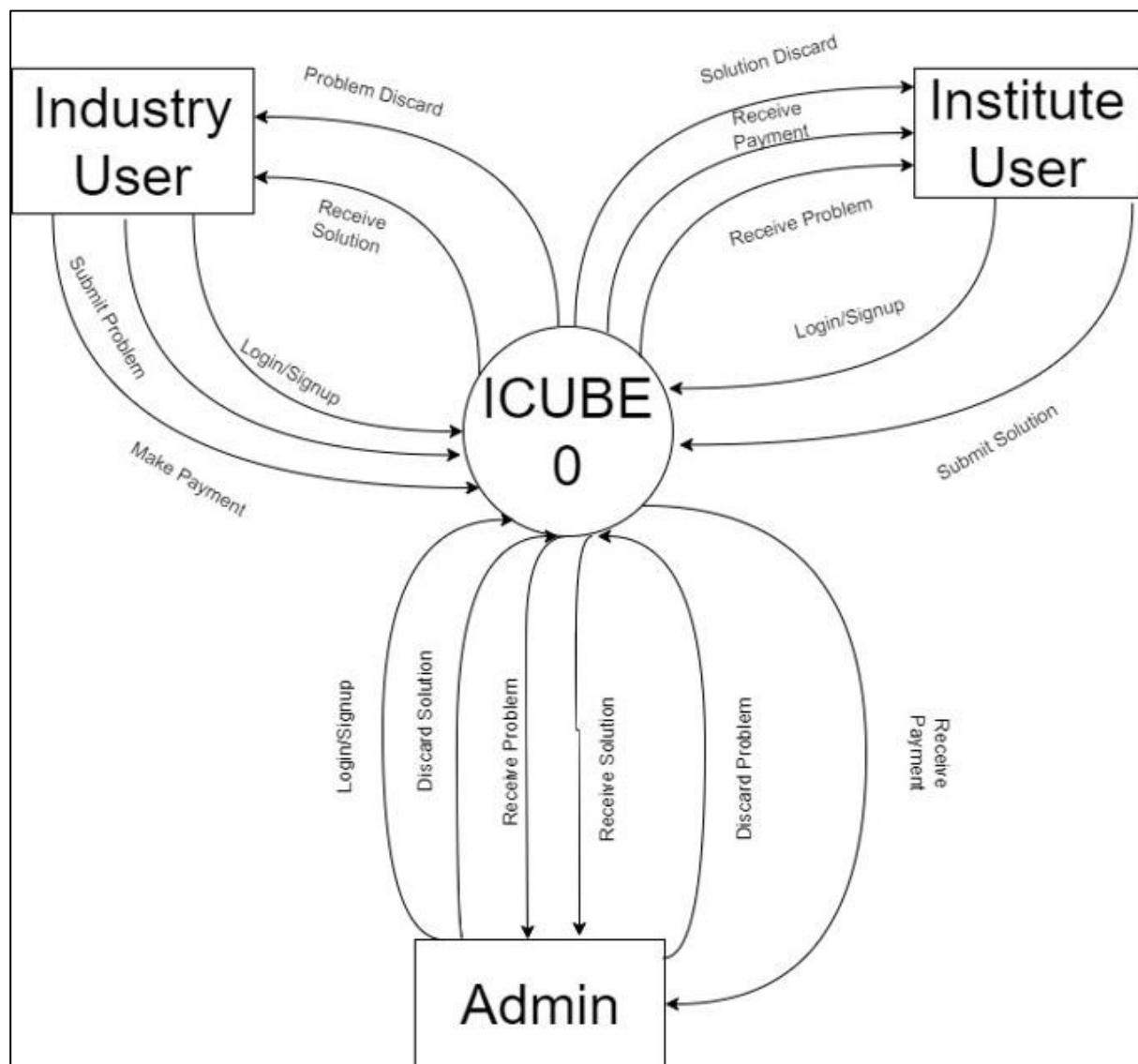
(Fig 3.7.2- Swimlane Diagram)

ACTIVITY DIAGRAM



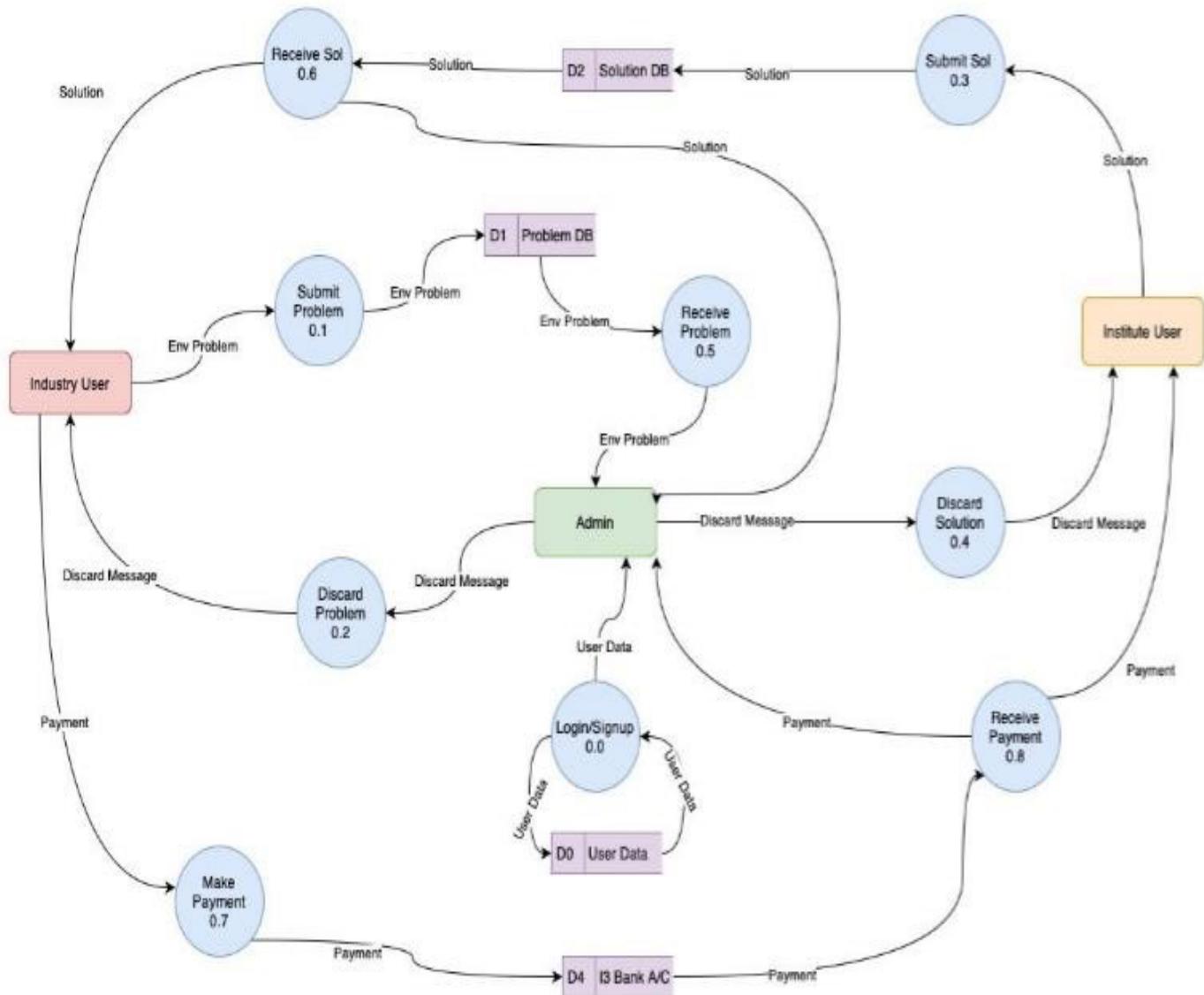
(Fig 3.7.3- Activity Diagram)

DFD LEVEL 0



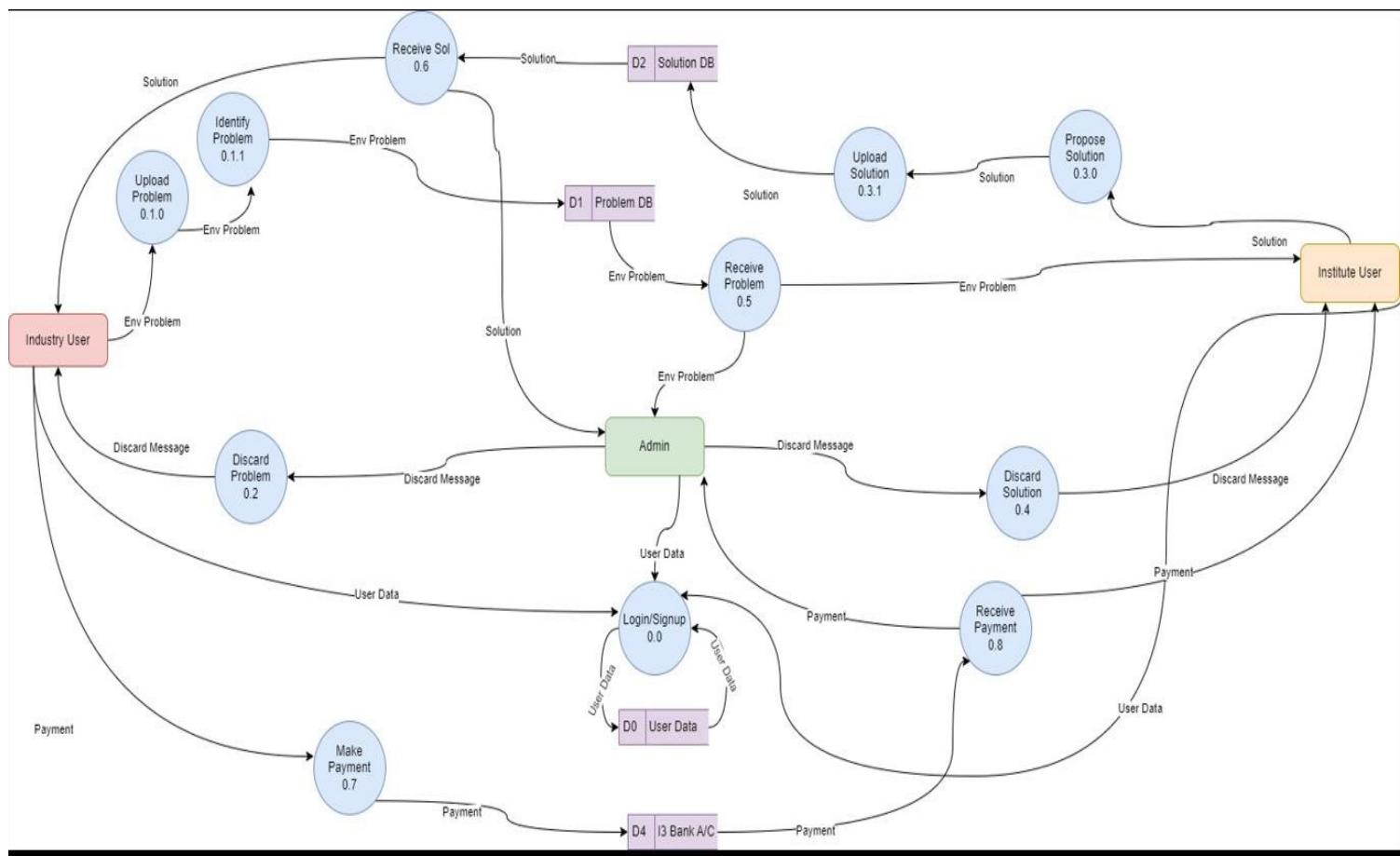
(Fig 3.7.4- Data Flow Diagram Level-0)

DFD LEVEL 1



(Fig 3.7.5- Data Flow Diagram Level-1)

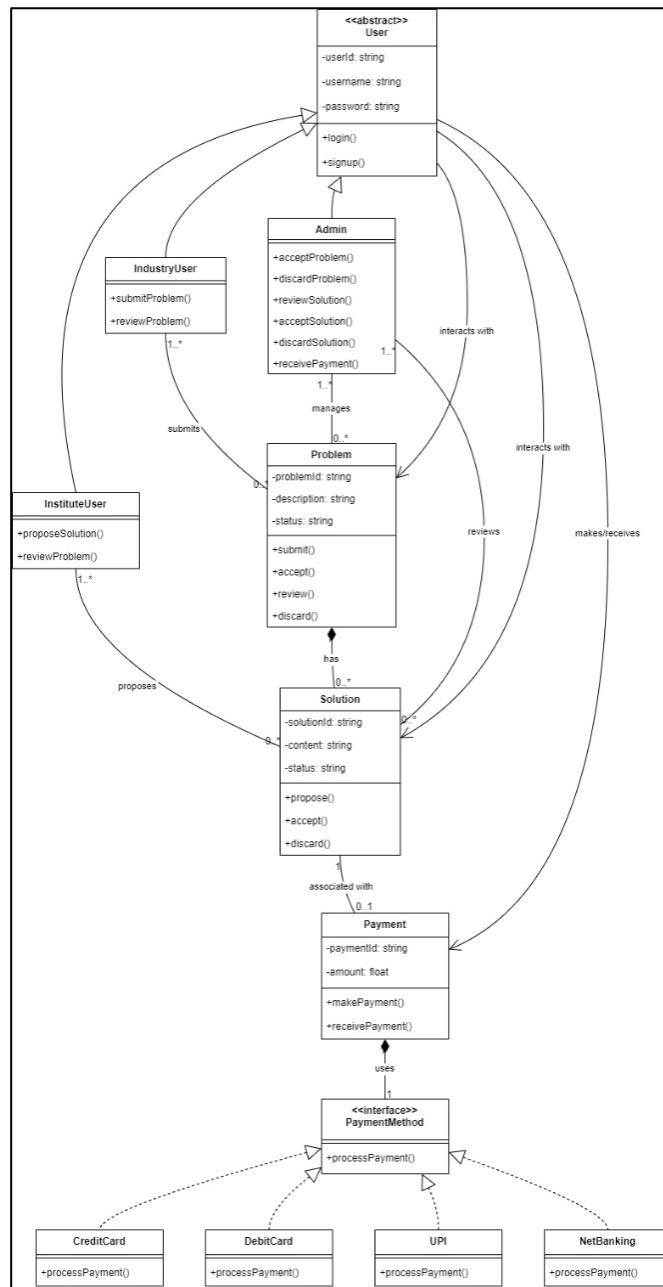
DFD LEVEL 2



(Fig 3.7.6- Data Flow Diagram Level-2)

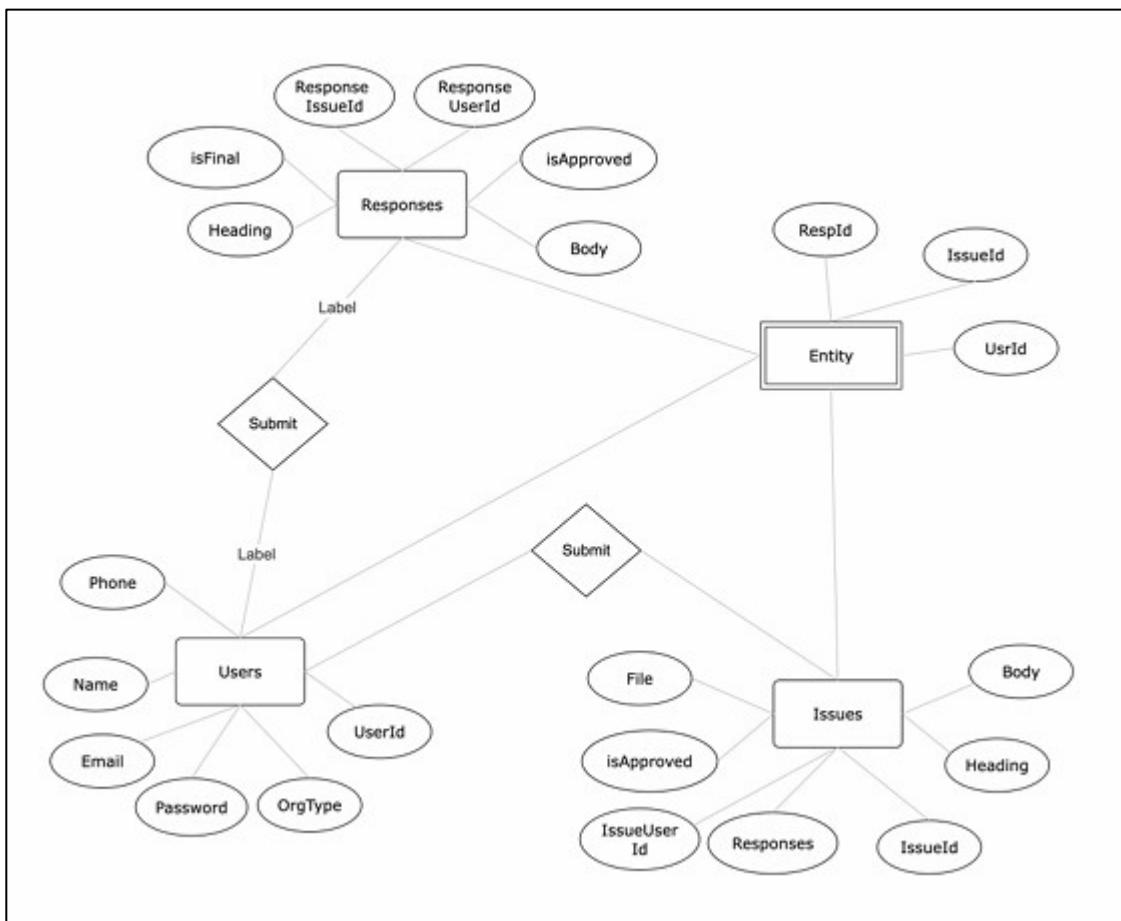
3.8 DESIGNING PHASE

CLASS DIAGRAM



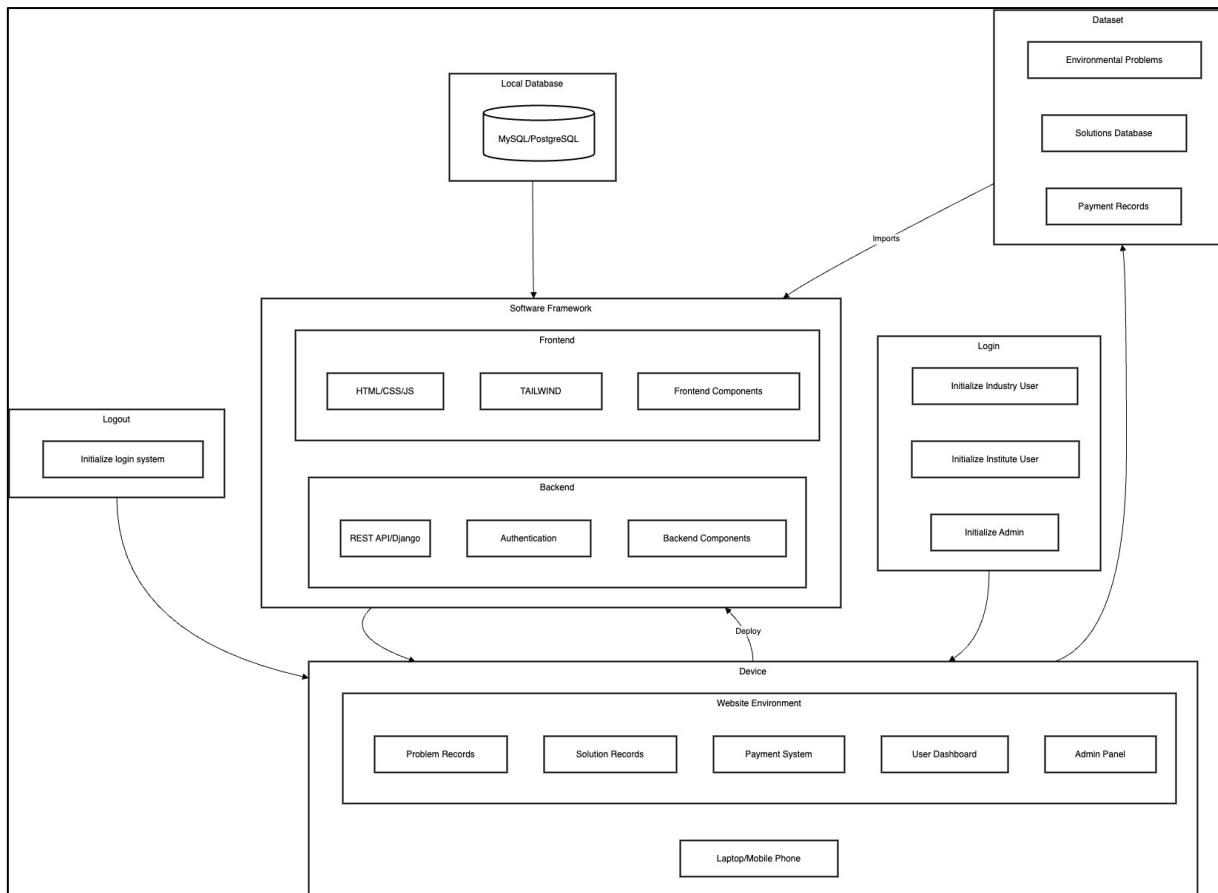
(Fig 3.8.1- Class Diagram)

ER DIAGRAM



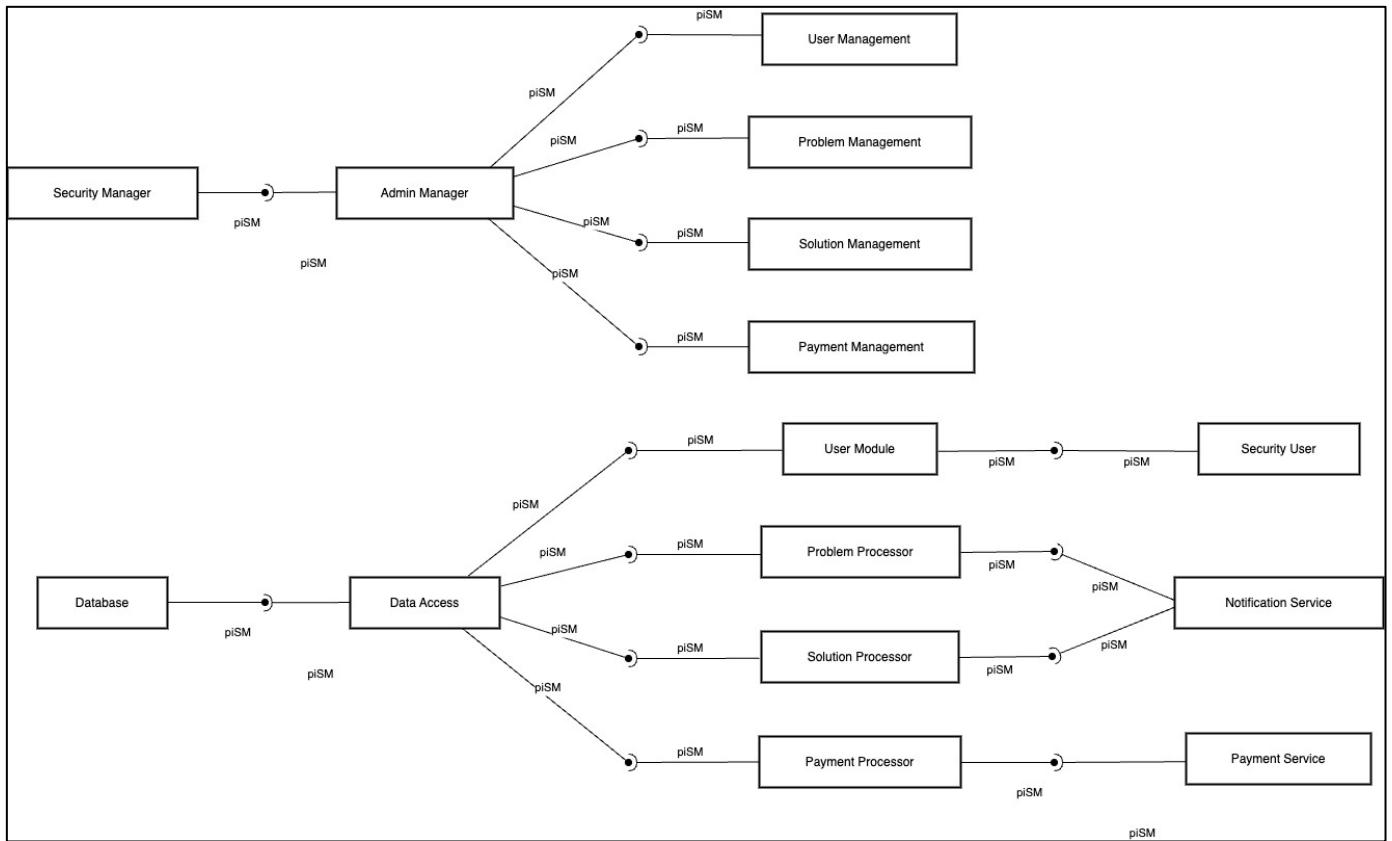
(Fig 3.8.2- Entity Relation Diagram)

DEPLOYMENT DIAGRAM



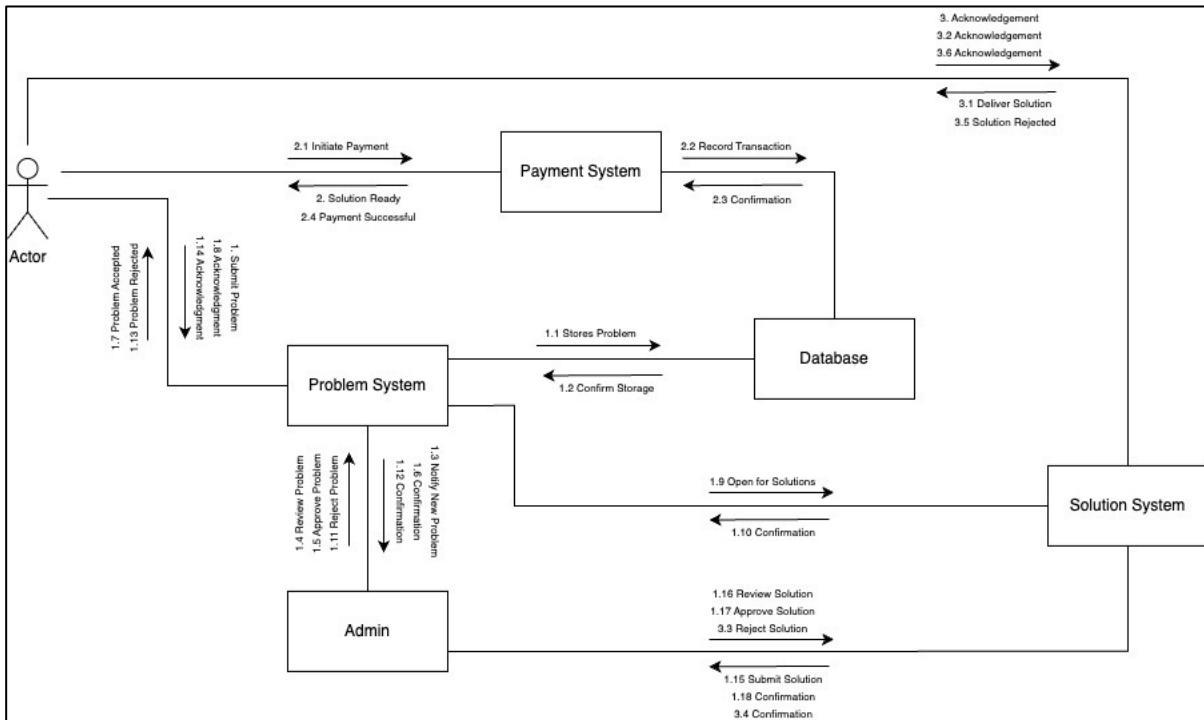
(Fig 3.8.3- Deployment Diagram)

COMPONENT DIAGRAM



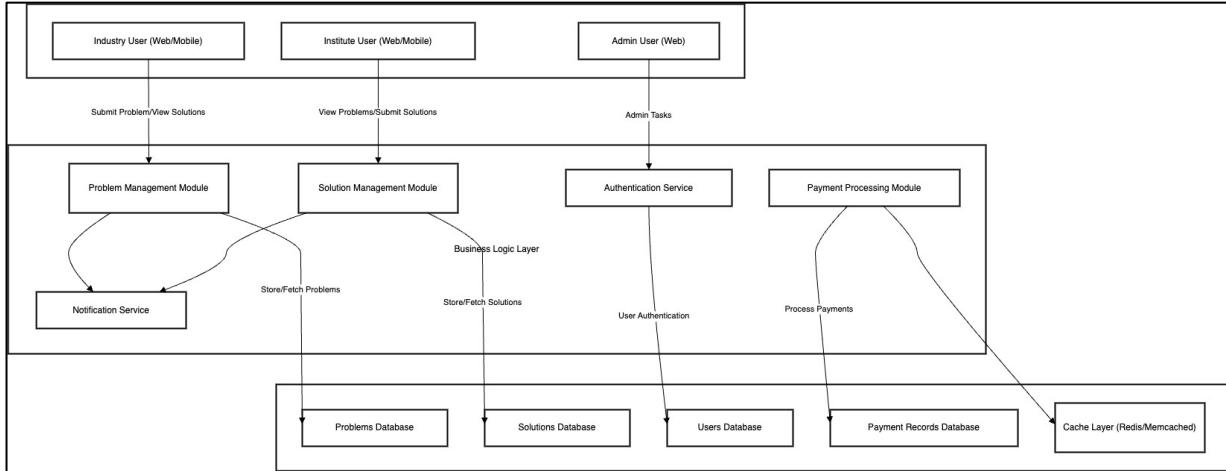
(Fig 3.8.4- Component Diagram)

COLLABORATION DIAGRAM



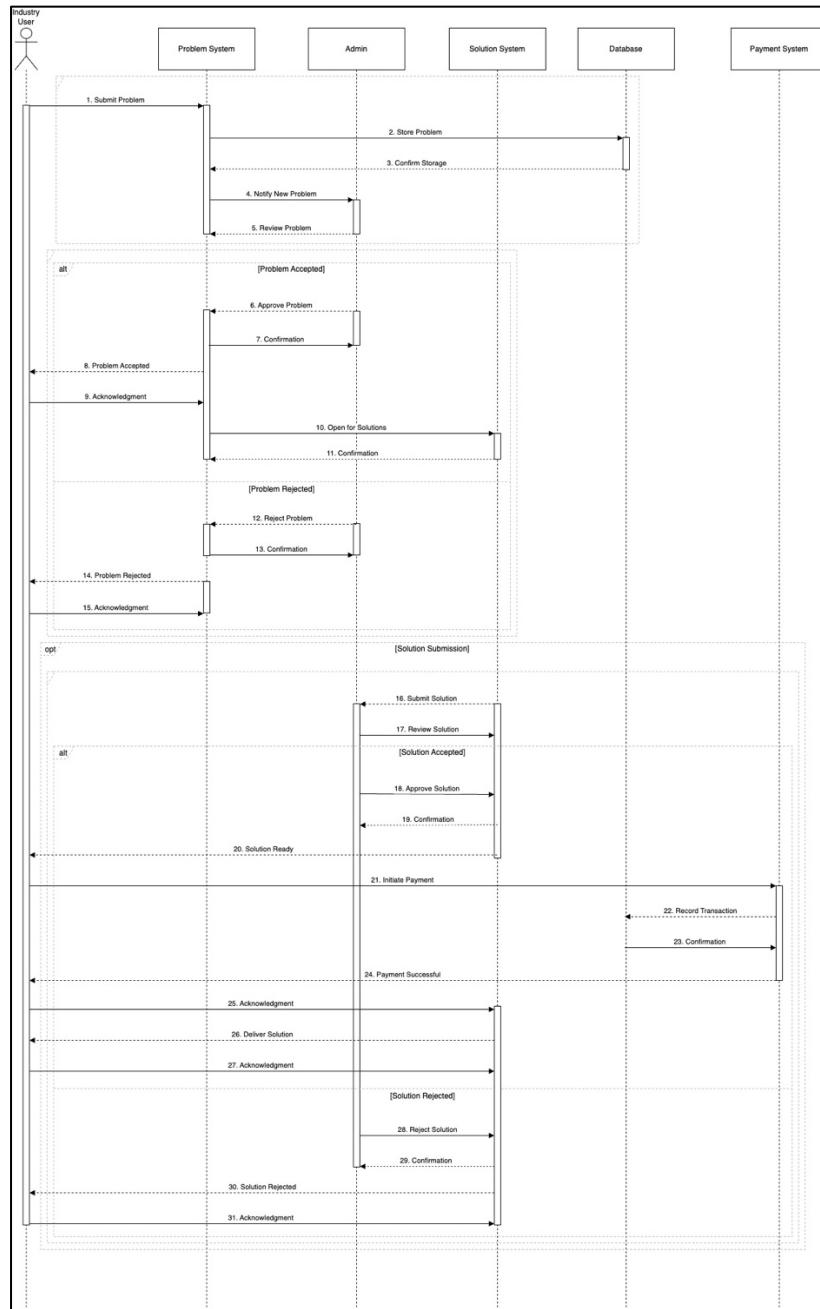
(Fig 3.8.5- Collaboration Diagram)

ARCHITECTURAL DIAGRAM



(Fig 3.8.6- Architectural Diagram)

SEQUENCE DIAGRAM



(Fig 3.8.7- Sequence Diagram)

Black-Box Test Cases

Test Case 1.1

Text Case# : 1.1

System : Industry-Institute Interface

Designed by :

Executed by :

Short Description: Verify that a newly registered industry account requires admin approval before activation.

Test Case Name: Industry Signup Verification

Page: 2 of 21

Subsystem: User Management

Design Date: 11/11/2024

Execution Date:

Pre-conditions

The admin panel is accessible, and the industry user registration form is available.

Step	Action	Expected System Response	Pass/ Fail	Comment
1	Industry submits registration details.	System stores details and displays "Pending Admin Approval".	P	
2	Admin logs in to the admin panel.	System displays list of pending registrations.	P	
3	Admin approves the industry registration request.	System sends email notification to the industry and activates it	P	

Post-conditions

The industry account is activated and can log in.

Test Case 1.2

Text Case# : 1.2

System : Industry-Institute Interface

Designed by :

Executed by :

Short Description: Verify that a newly registered institute account requires admin approval before activation

Test Case Name: Institute Signup Verification

Page: 3 of 21

Subsystem: Requirement Management

Design Date:11/11/2024

Pre-conditions

The admin panel is accessible, and the institute user registration form is available.

Step	Action	Expected System Response	Pass/ Fail	Comment
1	Institute submits registration details.	System stores details and displays "Pending Admin Approval"	P	
2	Admin logs in to the admin panel.	System displays list of pending registrations.	P	
3	Admin approves the institute registration request.	System sends email notification to the institute and activates its registration request.	P	

Post-conditions

The institute account is activated and can log in.

Test Case 1.3

Text Case# : 1.3

System : Industry-Institute Interface

Designed by :

Executed by :

Short Description: Verify that a problem posted
by an industry requires admin verification before
it becomes available.

Test Case Name: Industry Post Problem Verification

Page: 4 of 21

Subsystem: Problem Posting

Design Date: 11/11/2024

Execution Date:

Pre-conditions

Industry account is approved and logged in.

Step	Action	Expected System Response	Pass/ Fail	Comment
1	Industry posts a problem with all required details.	System saves the problem as "Pending Admin Approval"	P	
2	Admin logs in to the admin panel.	System displays the list of pending problems.	P	
3	Admin verifies and approves the problem.	Problem becomes visible to institutes in the industry portal	P	

Post-conditions

The problem is visible to institutes for response.

Test Case 1.4

Text Case# : 1.4

System : Industry-Institute Interface

Designed by :

Executed by :

Short Description :Verify that a solution submitted by an institute requires admin approval before becoming visible

Test Case Name: Institute Submit Solution Verification

Page: 5 of 21

Subsystem: Solution Submission

Design Date:11/11/2024

Pre-conditions

Institute account is approved and logged in.

Step	Action	Expected System Response	Pass/ Fail	Comment
1	Institute submits a solution for a problem.	System saves the solution as "Pending Admin Approval"	P	
2	Admin logs in to the admin panel.	System displays the list of pending solutions.	P	
3	Admin verifies and approves the solution	Solution becomes visible to the industry that posted the problem	P	

Post-conditions

The solution is visible to the relevant industry.

Test Case 1.5

<p>Text Case# : 1.5</p> <p>System : Industry-Institute Interface</p> <p>Designed by :</p> <p>Executed by :</p> <p>Short Description : Verify that the admin can reject a problem posted by an industry.</p>	<p>Test Case Name: Admin Reject Problem Post</p> <p>Subsystem: Problem Posting</p> <p>Design Date: 11/11/2024</p>	<p>Page: 6 of 21</p>
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Pre-conditions	
Industry account is approved and has posted a problem awaiting approval.	

Step	Action	Expected System Response	Pass/ Fail	Comment
1	Industry posts a problem with all required details.	System saves the problem as "Pending Admin Approval"	P	
2	Admin logs in to the admin panel.	System displays the list of pending problems.	P	
3	Admin rejects the problem.	Problem is removed from the pending list; industry notified of rejection	P	

Post-conditions	
The problem is not visible to institutes, and industry is informed.	

Test Case 1.6

<p>Text Case# : 1.6</p> <p>System : Industry-Institute Interface</p> <p>Designed by :</p> <p>Executed by :</p> <p>Short Description : Verify that the admin can reject a solution submitted by an institute.</p>	<p>Test Case Name: Admin Reject Solution Submission</p> <p>Subsystem :Solution Submission</p> <p>Design Date:11/11/2024</p>	<p>Page: 7 of 21</p> <p>PASS</p>
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Pre-conditions	
Institute account is approved and has submitted a solution awaiting approval.	

Step	Action	Expected System Response	Pass/ Fail	Comment
1	Institute submits a solution.	System saves the solution as "Pending Admin Approval"	P	
2	Admin logs in to the admin panel.	System displays the list of pending solutions.	P	
3	Admin rejects the solution.	Solution is removed from the pending list; institute notified of rejection	P	

Post-conditions	
The solution is not visible to the industry, and institute is informed.	

Test Case 1.7

Text Case# : 1.7	Test Case Name: Industry View Approved Solutions Only	Page: 8 of 21
System : Industry-Institute Interface	Subsystem : Solution Viewing	
Designed by :		
Executed by :	Design Date: 11/11/2024	
Short Description : Verify that industry can		

Pre-conditions	
At least one solution is approved and at least one is pending.	

Step	Action	Expected System Response	Pass/ Fail	Comment
1	Industry navigates to problem solutions.	System displays only solutions approved by admin.	P	

Post-conditions	
Industry can see only approved solutions.	

Test Case 1.8

<p>Text Case# : 1.8</p> <p>System : Industry-Institute Interface</p> <p>Designed by :</p> <p>Executed by :</p> <p>Short Description: Verify that institutes can only view problems approved by the admin.</p>	<p>Test Case Name: Institute View Problem Post Only After Approval</p> <p>Subsystem : Problem Viewing</p> <p>Design Date: 11/11/2024</p> <p>Execution Date:</p>	<p>Page: 9 of 21</p>
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Pre-conditions	
At least one problem is approved and at least one is pending.	

Step	Action	Expected System Response	Pass/ Fail	Comment
1	Institute navigates to industry problems.	System displays only problems approved by admin.	P	

Post-conditions	
Institute can see only approved problems.	

Test Case 1.9

<p>Text Case# : 1.9</p> <p>System : Industry-Institute Interface</p> <p>Designed by :</p> <p>Executed by :</p> <p>Short Description: Ensure that the status of a posted problem changes to "Approved" and becomes visible to institutes once the admin</p>	<p>Test Case Name: Verify Problem Status Change after Admin Approval</p> <p>Subsystem : Problem Management</p> <p>Design Date: 11/11/2024</p> <p>Execution Date:</p>	<p>Page: 10 of 21</p>
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Pre-conditions	
A problem has been submitted by an industry and is in "Pending" status.	

Step	Action	Expected System Response	Pass/ Fail	Comment
1	Admin logs in and navigates to the list of pending problems.	Admin sees the list of all problems marked as "Pending."	P	
2	Admin approves the problem.	Problem status changes to "Approved" and becomes visible to institutes in the problem listings.	P	

Post-conditions	
The approved problem is available for institutes to view and propose solutions.	

Test Case 1.10

<p>Text Case# : 1.10</p> <p>System : Industry-Institute Interface</p> <p>Designed by :</p> <p>Executed by :</p> <p>Short Description: Ensure that the status of a posted problem changes to "Rejected" and is removed from public listings if the admin rejects</p>	<p>Test Case Name: Verify Problem Status Change after Admin Rejection</p> <p>Subsystem : Problem Management</p> <p>Design Date: 11/11/2024</p> <p>Execution Date:</p>	<p>Page: 1 of 21</p>
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Pre-conditions	
A problem has been submitted by an industry and is in "Pending" status.	

Step	Action	Expected System Response	Pass/ Fail	Comment
1	Admin logs in and navigates to the list of pending problems.	Admin sees the list of all problems marked as "Pending."	P	
2	Admin rejects the problem.	Problem status changes to "Rejected" and is no longer visible to institutes in the problem listings.	P	

Post-conditions	
The rejected problem is removed from public listings and is not visible to institutes.	

White-Box Test Cases

Test Case 2.1

<p>Text Case# : 2.1</p> <p>System : Industry-Institute Interface</p> <p>Designed by :</p> <p>Executed by :</p> <p>Short Description: Check that a new problem posted by an industry is correctly stored in the database with a "Pending" status.</p>	<p>Test Case Name: Verify Database Insertion for New Problem Post</p> <p>Subsystem : Problem Posting</p> <p>Design Date: 11/11/2024</p> <p>Execution Date:</p>	<p>Page: 12 of 21</p>
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Pre-conditions	
The database connection is active.	

Step	Action	Expected System Response	Pass/ Fail	Comment
1	Industry posts a new problem.	System inserts a new row in the problems table with status "Pending"	P	
2	Query the problems table for the new entry.	Problem entry exists with all details and "Pending" status.	P	

Post-conditions	
The problem entry is correctly inserted with a "Pending" status.	

Test Case 2.2

<p>Text Case# : 2.2</p> <p>System : Industry-Institute Interface</p> <p>Designed by :</p> <p>Executed by :</p> <p>Short Description: Check that the admin approval changes the problem status from "Pending" to "Approved."</p>	<p>Test Case Name: Verify Admin Approval Flow for Problem Post</p> <p>Subsystem : Problem Approval</p> <p>Design Date: 11/11/2024</p> <p>Execution Date:</p>	<p>Page: 13 of 21</p>
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Pre-conditions	
A problem is already posted and stored in the database with status "Pending."	

Step	Action	Expected System Response	Pass/ Fail	Comment
1	Admin approves the problem in the admin panel.	System updates the problem status in the problems table to "Approved".	P	
2	Query the problems table for the problem status.	Status of the problem is now "Approved".	P	

Post-conditions	
The status of the problem is successfully updated to "Approved."	

Test Case 2.3

<p>Text Case# : 2.3</p> <p>System : Industry-Institute Interface</p> <p>Designed by :</p> <p>Executed by :</p> <p>Short Description: Verify that an admin rejection updates the solution status to "Rejected."</p>	<p>Test Case Name: Verify Admin Rejection Flow for Solution Submission</p> <p>Subsystem : Solution Submission</p> <p>Design Date: 11/11/2024</p> <p>Execution Date:</p>	<p>Page: 14 of 21</p>
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Pre-conditions	
A solution is submitted by an institute and has a "Pending" status.	

Step	Action	Expected System Response	Pass/ Fail	Comment
1	Admin rejects the solution in the admin panel	System updates the solution status to "Rejected".	P	
2	Query the solutions table for the solution status..	Status of the solution is now "Rejected".	P	

Post-conditions	
The solution is marked as "Rejected" in the database.	

Test Case 2.4

<p>Text Case# : 2.4</p> <p>System : Industry-Institute Interface</p> <p>Designed by :</p> <p>Executed by :</p> <p>Short Description: Ensure that the count of available solutions for a problem is incremented after a solution is approved by the admin.</p>	<p>Test Case Name: Check Solution Count Update After Approval</p> <p>Subsystem : Solution Viewing</p> <p>Design Date: 11/11/2024</p> <p>Execution Date:</p>	<p>Page: 15 of 21</p>
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Pre-conditions	
An institute has submitted a solution, awaiting admin approval.	

Step	Action	Expected System Response	Pass/ Fail	Comment
1	Admin approves the solution in the admin panel.	Solution count for the respective problem increments by 1.	P	
2	Query the problems table to verify solution count.	Solution count reflects the addition of the approved solution.	P	

Post-conditions	
The solution count is accurately updated in the database.	

Test Case 2.5

Text Case# : 2.5

System : Industry-Institute Interface

Designed by :

Executed by :

Short Description: Test that each field in the problem posting form has appropriate validation.

Test Case Name: Verify Field-Level Validation for Problem Posting

Page: 16 of 21

Subsystem : Problem Posting

Design Date:11/11/2024

Execution Date:

Pre-conditions

Industry user is logged in and on the problem posting form.

Step	Action	Expected System Response	Pass/ Fail	Comment
1	Leave required fields blank and submit.	System displays validation error for each empty required field.	P	
2	Enter invalid data types in specific fields.	System displays appropriate error messages.	P	

Post-conditions

The system enforces field-level validation properly.

Test Case 2.6

<p>Text Case# : 2.6</p> <p>System : Industry-Institute Interface</p> <p>Designed by :</p> <p>Executed by :</p> <p>Short Description: Verify that when a solution is approved, its status in the database is correctly updated from "Pending" to "Approved."</p>	<p>Test Case Name: Verify Database Update for Solution Approval</p> <p>Subsystem : Solution Approval</p> <p>Design Date: 11/11/2024</p> <p>Execution Date:</p>	<p>Page: 17 of 21</p>
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Pre-conditions	
Solution is submitted by an institute and has a "Pending" status.	

Step	Action	Expected System Response	Pass/ Fail	Comment
1	Admin approves the solution.	Database reflects an update with the status set to "Approved".	P	
2	Query the database to confirm the solution status.	Status of the solution is "Approved" in the solutions table.	P	

Post-conditions	
Solution status in the database is correctly updated to "Approved."	

Test Case 2.7

Text Case# : 2.7

System : Industry-Institute Interface

Designed by :

Executed by :

Short Description: Ensure the system prevents
duplicate problem entries from being
submitted.

**Test Case Name: Verify Error Handling for Duplicate
Problem Submissions**

Page: 18 of 21

Subsystem : Problem Posting

Design Date:11/11/2024

Execution Date:

Pre-conditions

A problem with similar details already exists in the database.

Step	Action	Expected System Response	Pass/ Fail	Comment
1	Industry tries to submit a duplicate problem.	System displays an error message and prevents the submission.	P	
2	Verify that no new row is inserted in the database for the duplicate problem.	No duplicate entry is added to the problems table.	P	

Post-conditions

System prevents duplicate problem entries in the database.

Test Case 2.8

<p>Text Case# : 2.8 System : Industry-Institute Interface Designed by : Executed by : Short Description: Ensure that the visibility flag in the database is correctly updated to allow industries to view a solution only after admin</p>	<p>Test Case Name: Solution Approval Changes Visibility Flag in Database Subsystem : Solution Management Design Date: 11/11/2024 Execution Date:</p>	<p>Page: 19 of 21</p>
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Pre-conditions	
A solution submitted by an institute is recorded in the database with a "Pending" status and a visibility flag	

Step	Action	Expected System Response	Pass/ Fail	Comment
1	Admin approves the pending solution.	Solution status in the database updates to "Approved," and the visibility flag changes to true.	P	
2	Verify database record for the solution.	Status shows "Approved" and visibility flag is true, allowing visibility to industries.	P	

Post-conditions	
Status shows "Approved" and visibility flag is true, allowing visibility to industries.	

Test Case 2.9

Text Case# : 2.9

System : Industry-Institute Interface

Designed by :

Executed by :

Short Description: Ensure that when a solution is rejected, the notification function is correctly triggered to inform the institute of the rejection.

Test Case Name: Verify Notification Trigger on Solution Rejection

Page: 20 of 21

Subsystem : Solution Management

Design Date: 11/11/2024

Execution Date:

Pre-conditions

A solution is submitted by an institute and is pending in the database.

Step	Action	Expected System Response	Pass/ Fail	Comment
1	Admin rejects the pending solution.	System triggers notification function, marking a "Rejection" notification to be sent to the institute.	P	
2	Check the notifications table in the database.	A notification record exists with a message about rejection and the solution ID.	P	

Post-conditions

Notification is correctly triggered and stored in the database, notifying the institute of the rejection.

Test Case 2.10

<p>Text Case# : 2.9 System : Industry-Institute Interface Designed by : Executed by : Short Description: Verify that when a solution is deleted, all references to it in related tables are removed or updated to maintain database</p>	<p>Test Case Name: Verify Database Cleanup on Solution Deletion Page: 21 of 21 Subsystem : Solution Management Design Date: 11/11/2024 Execution Date:</p>
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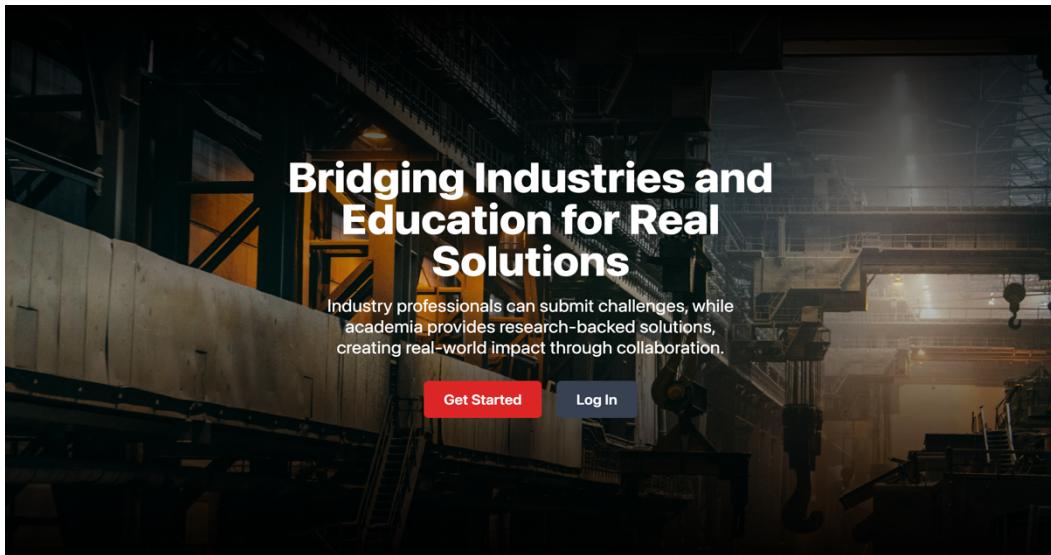
Pre-conditions	
A solution is present in the database and is linked to records in the notifications and problem tables.	

Step	Action	Expected System Response	Pass/ Fail	Comment
1	Admin deletes the solution.	Solution is removed from the main solutions table.	P	
2	Query related tables to check for orphaned records (e.g., in notifications and problem)	No orphaned records or broken references are found related to the deleted solution.	P	

Post-conditions	
Database maintains referential integrity, with no orphaned records or broken references after solution deletion.	

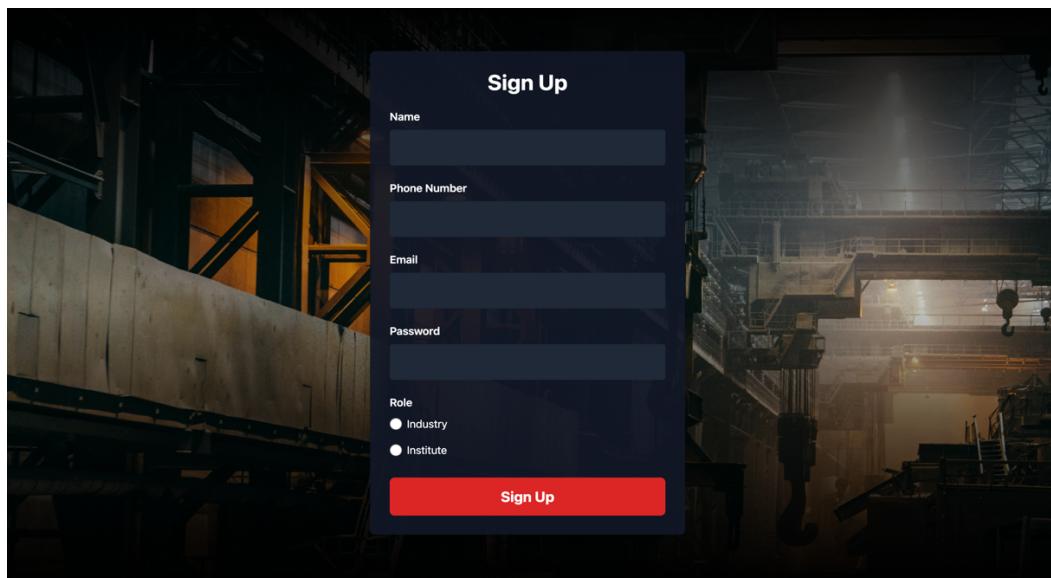
5. SCREENSHOTS

ICUBE Home



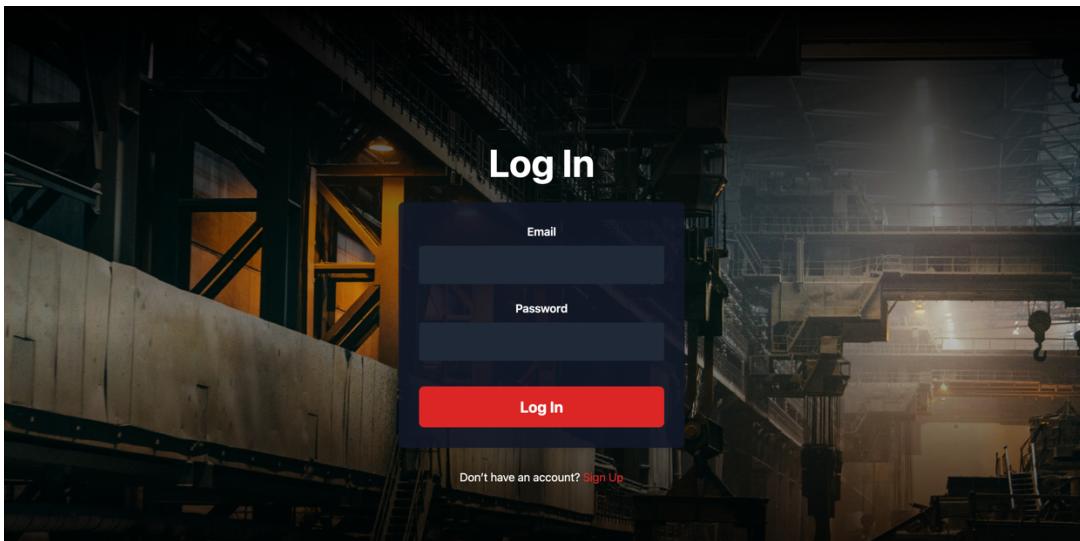
(Fig 5.1- ICUBE Home Page)

Sign Up



(Fig 5.2 - ICUBE SignUp Page)

Login



(Fig 5.3- ICUBE Login Page)

Industry Home

A screenshot of the Industry Home page. The header features the brand name "Zyphoria" on the left and a user profile icon with the name "harry" and title "Industry Professional" on the right. The main content area is divided into two sections: "Previously Submitted Queries" on the left and "Submit Your Query" on the right. The "Previously Submitted Queries" section lists four items, each with a title, submission date, status, and a "View Details" button. The titles are: 1 | Assembly Line Bottlenecks Impacting Efficiency, 2 | Frequent Equipment Failures Affecting Production, 3 | High Customer Drop-Off Rates in E-Commerce, and 4 | Overstocking and Stockouts in Inventory Management. All four items show a submission date of Nov. 21, 2024, and a status of Pending. The "Submit Your Query" section contains two input fields: "Query Title" and "Description", both with placeholder text. A large red "Submit Query" button is positioned at the bottom of this section.

(Fig 5.4- Industry Home Page – Submit Query/View Previous Query)

Industry Responses

The screenshot shows the 'Responses' section of the Zephyria platform for an industry professional named Harry. The background is a dark industrial scene with steel structures and pipes. The 'Responses' section header is 'Responses'. It lists two items: 'Advanced Workflow Optimization System' and 'AI-Driven Optimization System', both submitted on Nov. 21, 2024. Each item has a 'View Details' button.

Response Type	Submitted On	Action
Advanced Workflow Optimization System	Nov. 21, 2024	View Details
AI-Driven Optimization System	Nov. 21, 2024	View Details

(Fig 5.5- Industry View Responses Page)

Institute Home

The screenshot shows the 'Previously Submitted Responses' and 'Available Queries' sections of the Zephyria platform for the Harry Institute. The background is a dark industrial scene. The 'Previously Submitted Responses' section includes 'Advanced Workflow Optimization System' and 'Predictive Maintenance Framework', both submitted on Nov. 21, 2024. The 'Available Queries' section includes 'High Customer Drop-Off Rates in E-Commerce', 'Overstocking and Stockouts in Inventory Management', 'Delayed Diagnostics in Critical Healthcare Cases', and 'Inefficient Crop Management Due to Unmonitored Health', all submitted on Nov. 21, 2024. Each item has a 'View Details' button.

Category	Item	Submitted On	Action
Previously Submitted Responses	Advanced Workflow Optimization System	Nov. 21, 2024	View Details
	Predictive Maintenance Framework	Nov. 21, 2024	View Details
Available Queries	High Customer Drop-Off Rates in E-Commerce	Nov. 21, 2024	View Details
	Overstocking and Stockouts in Inventory Management	Nov. 21, 2024	View Details
	Delayed Diagnostics in Critical Healthcare Cases	Nov. 21, 2024	View Details
	Inefficient Crop Management Due to Unmonitored Health	Nov. 21, 2024	View Details

(Fig 5.6- Institute Home / View Query Page)

Institute Query Page

The screenshot shows a dark-themed web page with a central query card. The card has a blue header with the title "High Customer Drop-Off Rates in E-Commerce". Below the title is a detailed description of the issue, mentioning a decline in repeat customer visits, challenges in retaining existing customers, and proposed solutions like a personalized engagement system and dynamic pricing. At the bottom of the card is a red "Respond to Query" button. The background of the page features a large, dimly lit industrial photograph of a factory floor.

(Fig 5.7- Institute View Query Page)

Institute Response Page

The screenshot shows a dark-themed web page with a central response card. The card has a blue header with the title "Query: 'Assembly Line Bottlenecks Impacting Efficiency'". Below the title is a detailed description of the manufacturing plant's issue with assembly line inefficiencies, mentioning frequent slowdowns and increased costs. The response suggests a comprehensive analysis of the workflow and the introduction of automation to address these bottlenecks. At the bottom of the card is a "Response Details" section, which includes the response title "Advanced Workflow Optimization System" and a brief description of how it can address the identified inefficiencies. The background of the page features a large, dimly lit industrial photograph of a factory floor.

(Fig 5.8- Institute View My Response Page)

Admin Home Page

The screenshot shows the Admin Home Page with a dark theme. On the left, under the heading 'Responses', there are two items: 'Advanced Workflow Optimization System' (submitted by harry on Nov. 21, 2024) and 'Predictive Maintenance Framework' (submitted by harry on Nov. 21, 2024). Each item has a 'View Details' button. On the right, under the heading 'Queries', there are three items: 'Overstocking and Stockouts in Inventory Management' (submitted by harry on Nov. 21, 2024), 'Delayed Diagnostics in Critical Healthcare Cases' (submitted by harry on Nov. 21, 2024), and 'Inefficient Crop Management Due to Unmonitored Health' (submitted by harry on Nov. 21, 2024). Each item also has a 'View Details' button. The background features a blurred image of an industrial facility.

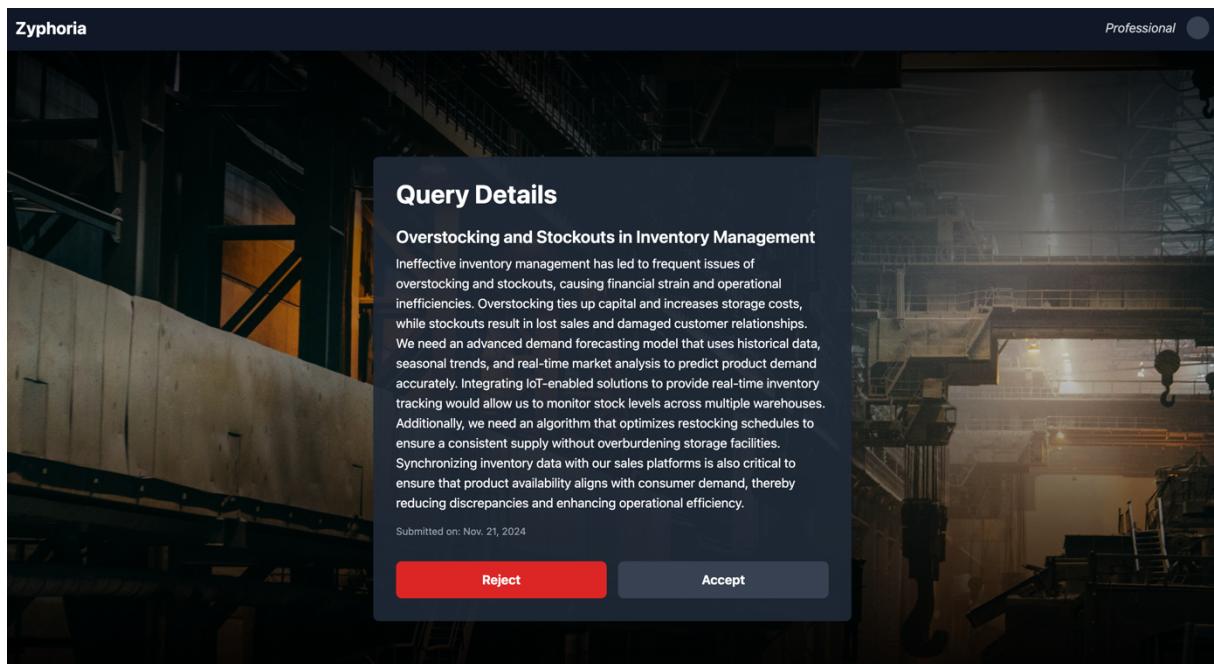
(Fig 5.9- Admin Home Page – View all queries and responses)

Admin Accepted Queries and Response Details

The screenshot shows the Admin History Page with a dark theme. On the left, under the heading 'All Queries', there are three items: '1 | Assembly Line Bottlenecks Impacting Efficiency' (submitted by harry on Nov. 21, 2024, Status: Approved), '2 | Frequent Equipment Failures Affecting Production' (submitted by harry on Nov. 21, 2024, Status: Approved), and '3 | High Customer Drop-Off Rates in E-Commerce' (submitted by harry on Nov. 21, 2024, Status: Approved). Each item has a 'View Responses' button. On the right, under the heading 'Responses', there is one item: '1 | Advanced Workflow Optimization System' (submitted by harry on Nov. 21, 2024, Status: Approved). It has a 'View Details' button. The background features a blurred image of an industrial facility.

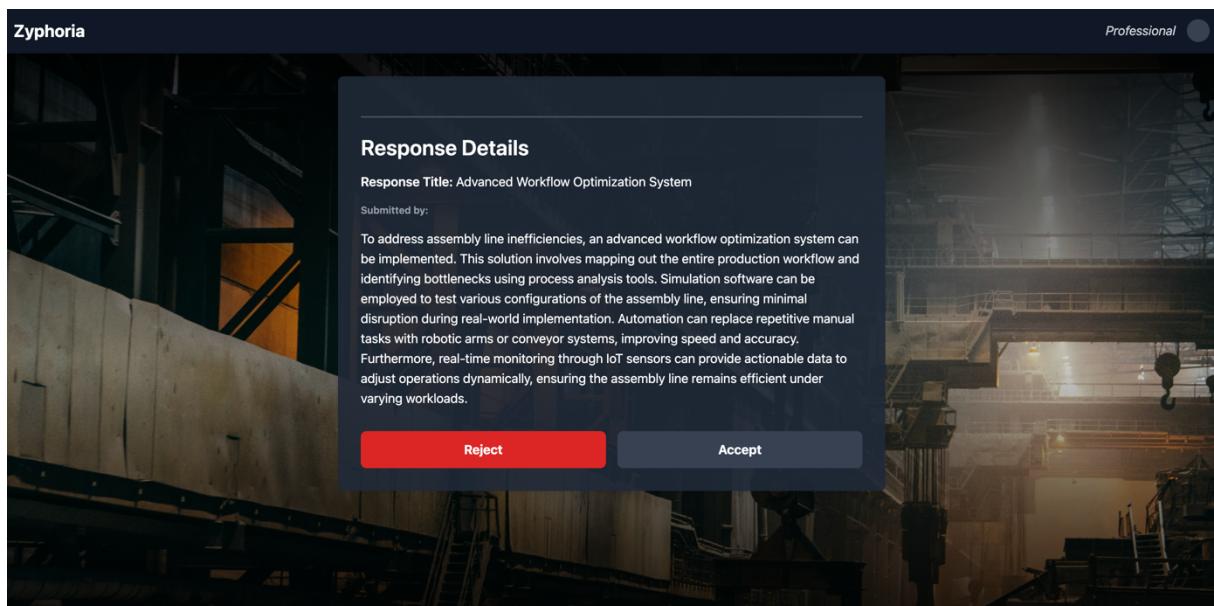
(Fig 5.10- Admin History Page – View all Responded queries and responses)

Admin Query Page



(Fig 5.11- Admin Query Page – View query in detail)

Admin Response Page



(Fig 5.12- Admin Response Page – View response in detail)

6. CHANGE HISTORY

Version	Date	Description	Author
1.0	19-10-2024	Initial draft of SRS for ICUBE TEAM: ZYPHORIA	

7. Document Approvals

Name Title Signature Date
[] Project Manager

[] Technical Lead

[] Quality Assurance Lead