BSCS FINAL PROJECT
Software Design Specification

AI-Driven Internship Platform

Project Advisor

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Software Design Specification

SDP Phase II

AI-Driven Internship Platform

Advisor: Hira Asim

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Member Name	Primary Responsibility
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Revision History

Name	Date	Reason For Changes	Version
First Revision	26-12-24	Adding more detailed diagrams	1.0
Second Revision	15-01-24	Upgrade screens according to diagrams	2.0
Third Revision	24-01-24	Adding more screens	3.0

Abstract

The "AI-Driven Internship Platform" marks a substantial leap forward in bridging the academic and professional domains for students pursuing degrees in computer science and software engineering. This platform, infused with sophisticated AI technologies, including ChatGPT, introduces a dualistic approach to internships, granting students the flexibility to immerse themselves in AI-driven projects or explore conventional internship opportunities. Under the guidance of an AI Manager, students engaging in AI-driven projects gain invaluable hands-on experience, solving real-world problems that enrich their skill set and understanding. What sets this platform apart is its profound impact on the decision-making process for students. Beyond mere internship connections, it offers a deeper understanding of the suitability and relevance of each opportunity. The adaptability of the platform shines through in its capacity to tailor suggestions to individual student profiles, taking into account their unique skills and preferences. This personalized approach not only streamlines the internship search but also aligns each opportunity with the specific strengths and aspirations of the student. The platform extends its utility beyond internships, playing a pivotal role in the professional journey of students. By Facilitating job offers and interviews, it brings a tangible and practical dimension to academic learning, significantly augmenting the employability of students. The "AI-Driven Internship Platform" emerges not merely as a tool but as a comprehensive solution, strategically molding students to meet the dynamic demands of the tech industry. In doing so, it smoothens the transition from the theoretical realms of academic learning to the practical applications demanded in the professional sphere. This platform serves as a cornerstone in the holistic development of students, preparing them for success in their professional endeavors with a nuanced blend of academic knowledge and real-world proficiency.

1.   Introduction

The AI-Driven Internship Platform is an innovative solution for computer science and software engineering students facing difficulties getting internships. It uses smart AI technology, like ChatGPT, to check out each student's special skills. This way, it can find internships that really match each student. The platform does two things: it offers AI-driven internships where an AI Manager guides students, and it also finds regular internships using a super-smart matching system. Basically, it's a way to connect what you learn in school with what you'll actually do in a job. The goal is to make sure students are ready for the tech world, helping them get jobs by turning their school smarts into real-world skills.

1.1   Product

The "AI-Driven Internship Platform" is a revolutionary software solution addressing the persistent challenge faced by Computer Science and Software Engineering students in securing internships. Rooted in the complexities of the traditional pathway, characterized by a lack of industry connections, limited opportunities, and fierce competition, this project leverages Artificial Intelligence to seamlessly connect students with relevant internships. The end product is not merely a program or tool but a comprehensive platform designed to transform the internship acquisition process, empowering students to gain practical skills and enhance employability. The platform serves as a dynamic bridge between academic learning and real-world industry demands, redefining the landscape for internship opportunities in these fields.

1.2   Background

In the landscape of higher education and evolving job market demands, the "AI-Driven Internship Platform" addresses a fundamental challenge in computer science-related fields. Traditionally, students are expected to combine academic qualifications with practical skills and industry knowledge, a gap often unmet by conventional education. Internships act as a bridge between academia and industry, offering real-world applications for theoretical knowledge. However, the existing challenge lies in limited access to internships for many students. The project recognizes the need for a novel approach, leveraging AI to democratize internship access and provide equal opportunities for all students. Beyond software development, it aspires to reshape the education and employment landscape by creating a dynamic ecosystem where academic knowledge and industry expectations converge, ensuring widespread benefits for students and employers. Unlike previous initiatives, this project stands out for its emphasis on inclusivity, personalization, and a commitment to breaking down barriers in internship accessibility.

1.3   Objective(s)/Aim(s)/Target(s)

The objectives, aims, and targets of the "AI-Driven Internship Platform" project are as follows:

1. Develop an AI-driven skills assessment tool to evaluate students' technical proficiencies.

2. Create an AI-Based Manager to provide guidance and support to students throughout their internships.
3. Enable students to engage in AI-driven internships, where they work on AI-generated real-world problems.
4. Facilitate students in searching for external internship opportunities through the "Internship Matching Engine."
5. Improve the employability of students by providing them with practical experience that aligns with industry demands.

1.4   Scope

The Software Design Specification (SDS) for the "AI-Driven Internship Platform" outlines the detailed design considerations for various software components. This includes creating user-friendly registration systems, designing an AI-driven skills assessment tool, presenting diverse internship options through an intuitive interface, establishing robust user support mechanisms, ensuring efficient database management, developing administrative tools, and prioritizing a comprehensive and user-friendly overall experience. The SDS serves as a roadmap for the development team, guiding the implementation of a robust, scalable, and user-centric platform.

1.5   Business Goals

The "AI-Driven Internship Platform" addresses several key business and corporate goals:

1. **Enhance Student Employability:** By providing practical experience and aligning it with industry demands, the platform contributes to preparing students for successful careers.

2. **Bridge the Academic-Industry Knowledge Gap:** The project promotes collaboration between educational institutions and external organizations, creating a dynamic ecosystem that benefits both students and employers.

3. **Improve the Quality of Higher Education:** The platform aims to revolutionize the internship experience, ensuring that students gain practical skills and experiences that enhance their academic journey.

1.6   Document Conventions

Document conventions employed in this SDS include:

- **Section Headings:** Bold text for clear section separation.
- **Project Name:** "AI-Driven Internship Platform" consistently presented in title case and enclosed within quotation marks.
- **Emphasis:** Key terms, software components, and project titles are italicized.
- **List Items:** Bulleted lists with bullet points for organized content presentation.
- **Hyperlinks:** Blue text and underlining for clickable hyperlinks.
- **File Names and Code:** Monospaced font for code snippets and file names.
- **User Interface Elements:** Bold text to distinguish user interface elements.
- **Quotations:** Enclosed within double quotation marks and indented for clarity.

- **Variables and Placeholders:** Italics within angled brackets for variables and placeholders.

1.7 Miscellaneous

- **Meetings:** Regular updates for issue-solving.
- **Security:** Emphasize encryption and audits.
- **User Feedback:** Refine based on continuous user input.
- **Documentation:** Keep concise and updated records.
- **Testing:** Implement thorough testing.
- **Continuous Improvement:** Encourage ongoing innovation within the team

2. Overall Description

The AI-Driven Internship Platform is a smart tool made for students studying computer science and software engineering. It uses advanced AI to check students' skills and find internships that suit them. The platform offers two kinds of internships: ones focused on AI and regular ones, all improved by AI matching. Its main goal is to connect what students learn in school with real work, making them more employable. This platform is like a complete package, helping students use what they learn in a practical way and get ready for jobs in the tech industry.

2.1 Product Features

The "AI-Driven Internship Platform" offers the following major features:

- **AI-Driven Skills Assessment:** A skills assessment tool powered by AI that evaluates students' technical proficiencies.
- **AI-Based Manager:** An AI-driven manager that guides and supports students throughout their internship experience.
- **AI-Generated Real-World Problems:** Real-world problems generated by AI for students to work on during internships.
- **Internship Matching Engine:** A feature that enables students to search and connect with external internship opportunities.
- **User Support:** A user support system to assist students in using the platform.
- **Secure Database:** A database for managing user profiles, internship data, and AI-generated projects securely.
- **User-Friendly Interface:** An intuitive and user-friendly interface for a seamless user experience.

2.2 Functional Description

The "AI-Driven Internship Platform" serves as an integrated solution for students, organizations, an AI Manager, and Admin, fostering efficient interaction and collaboration. Students can seamlessly register, create profiles, undergo AI-driven skill assessments, and select internships with the guidance of an AI Manager. Organizations benefit from reviewing student profiles and expressing interest. The platform's

unique feature is the AI Manager, which evaluates skill assessments and provides real-world problems for AI-driven internships. The Admin manages accounts and ensures smooth platform operation. With a secure database handling user profiles, skills, internships, and feedback, the platform enhances the internship experience while contributing to students' employability in computer science and software engineering.

2.3   User Classes and Characteristics

The identified user classes for the AI-Driven Internship Platform are:

1. Students/Interns: These users are seeking internship opportunities to gain practical experience in their field of study. They will interact with the platform to register, create profiles, take skill assessments, explore internship options, and receive certificates upon completion. Their characteristics include being motivated to learn, having specific skill sets they want to develop, and seeking opportunities for career advancement.

2. Organizations: These are entities offering internship opportunities to students. They will register on the platform to create profiles, review student profiles, express interest in potential interns, and shortlist candidates for interviews. Their characteristics include being interested in recruiting talented interns, having specific internship requirements, and seeking candidates who fit their organizational culture.

3. Admins: Administrators are responsible for managing and overseeing the platform. They will have access to administrative features such as managing user accounts, generating reports, and ensuring the smooth operation of the platform. Their characteristics include being knowledgeable about the platform's functionality, having permission to monitor and intervene in user activities, and possessing technical expertise to handle any platform issues.

User Classes	Characteristics
Student/Interns	- User Registration - Create Profiles - Take Skill Assessment - Receive Certificates
Organization	- Organization Registration - Create Profiles - Shortlist Candidates
Admins	- Managing Platform - Managing User Accounts

2.4   Design and Implementation Constraints

The design and implementation of the "AI-Driven Internship Platform" are subject to certain constraints:

- **Regulatory Compliance:** The platform must adhere to all relevant data privacy and protection regulations, such as GDPR, HIPAA, or any other applicable laws based on the region of use.

- **Hardware Limitations:** The platform should be designed to operate on standard web servers and should consider hardware limitations that may affect performance and responsiveness.

- **Technologies and Tools:** The use of specific technologies and tools, including web development frameworks, database management systems, and AI libraries, may be constrained by compatibility and licensing issues.

- **Security Considerations:** The platform must incorporate robust security measures, including data encryption, secure socket layer (SSL) certificates, and regular security updates. Security constraints may affect the choice of technology and development approaches.

- **Compliance with Design Conventions:** The platform must adhere to design conventions and programming standards, which may be influenced by organizational or industry-specific guidelines.

2.5   Assumptions and Dependencies

The project relies on certain assumptions and dependencies:

- **Third-Party AI Libraries:** The project assumes the availability of third-party AI libraries for skills assessment and problem generation. The project is dependent on the reliability and compatibility of these libraries.

- **Internet Connectivity:** It is assumed that users will have consistent internet connectivity for accessing the platform. The platform is dependent on stable internet connections for its functionality.

- **External Organizations:** The availability of external organizations offering internships is a dependency. The project assumes that organizations will continue to post internship opportunities on the platform.

- **Data Privacy Regulations:** The project assumes that data privacy regulations may change or be updated, and it depends on staying current with these regulations and adapting the platform accordingly.

- **Security Updates:** The platform assumes access to regular security updates and patches for its underlying technologies and tools.

- **Hardware and Software Compatibility:** The project depends on the compatibility of the platform with various hardware configurations, operating systems, and web browsers. It assumes these components will not undergo significant changes that affect platform functionality.

3. Technical Architecture

The system is a custom-built AI-driven internship platform designed to facilitate user interactions and streamline the internship process. It engages major application components such as User/Student, Organization, Admin, AI-driven internship Portal, AI Manager, and Internship Matching Engine. The system supports both batch and online processing, managing data including user profiles, skills, skill assessments, internship options, feedback, and certificates. The system likely follows a client/server architecture, with an end-user interface accessible through browsers. The system operates on the principles of assessing user skills, offering internship options, and providing guidance through an AI Manager, ultimately resulting in the issuance of certificates and feedback submissions.

High-Level Architecture
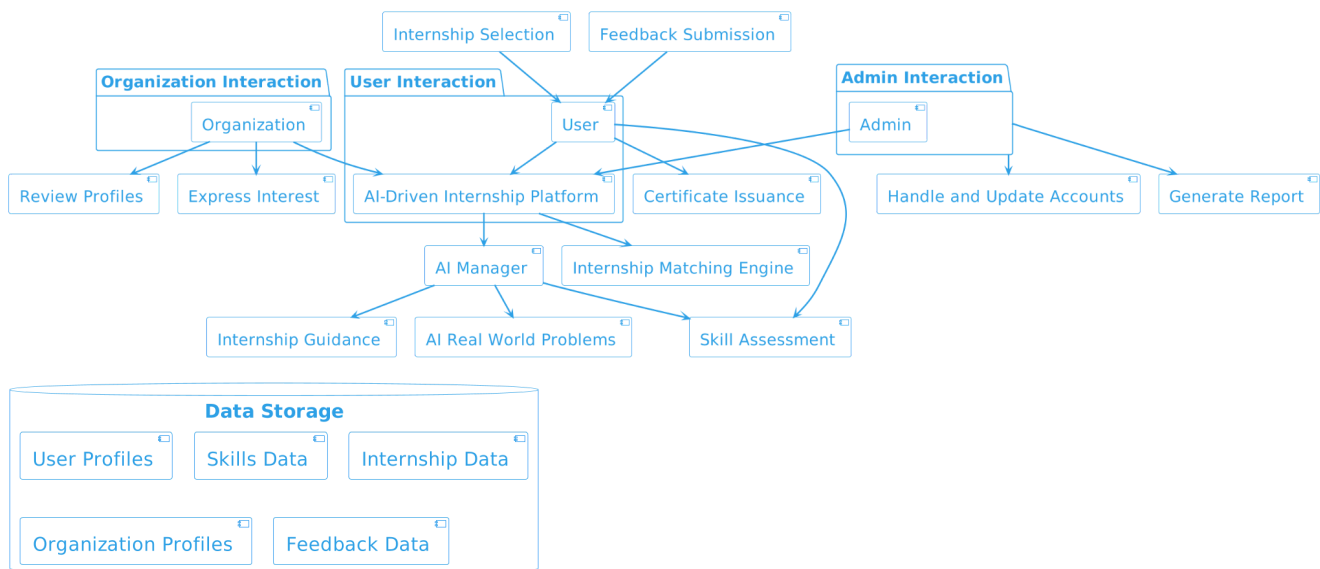
3.1 Application and Data Architecture

The AI-Driven Internship Platform is a custom-built system designed to seamlessly connect students, organizations, and administrators, streamlining the internship process. It operates through a combination of batch and online processing, allowing users to register, log in, and engage in various activities. The major application components include:

User/Student Module:
- Manages user registration, login, and profile creation.
- Conducts skills assessments with categories for beginners, intermediates, and advanced users.
- Allows users to select suitable internship options, initiate internships, and obtain certificates upon completion.
- Provides a feedback mechanism for users.

Organization Module:
- Enables organizations to register, log in, and view shortlisted student profiles.
- Facilitates the expression of interest in potential interns.

Admin Module:
- Empowers administrators to manage and update user accounts.

AI-Driven Internship Portal:
- Functions as the central orchestrator, managing skills assessments, internship options, and user accounts.
- Collaborates with the AI Manager for skills assessment, real-world problem provision, and guidance.
- Interfaces with the Internship Matching Engine for organization-student matching.

AI Manager Module:
- Evaluates skills assessments, provides real-world problems during internships, and guides students through their internship experience.

Internship Matching Engine:
- Facilitates the matching of organizations with suitable student profiles based on job descriptions.

3.1.1 Activity Diagram
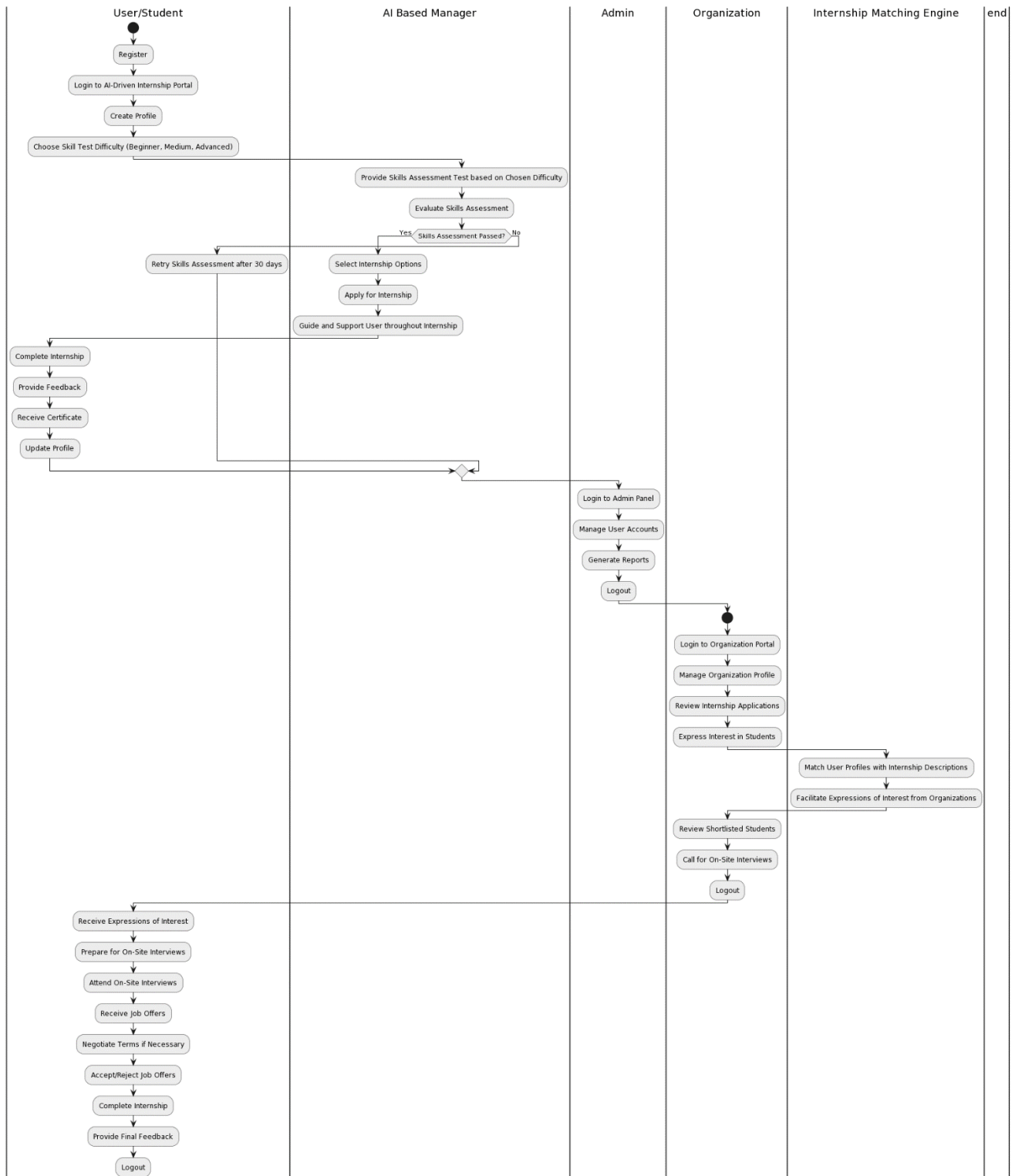
The activity diagram illustrates the sequential steps involved in the AI-Driven Internship Platform. Users begin by registering, creating profiles, and adding skills, followed by the selection of a skill test difficulty level (beginner, medium, or advanced). The AI-based manager then provides a tailored skills

assessment test, evaluating the user's performance. If successful, users can apply for internships, guided by the AI Manager throughout the process. Upon completion, users receive certificates and update their profiles. The platform facilitates organizations in reviewing applications, expressing interest, and conducting on-site interviews. Users, upon receiving job offers, may negotiate terms, complete internships, and provide final feedback. Admin functions include managing user accounts.

3.1.2 Entity-Relation Diagram
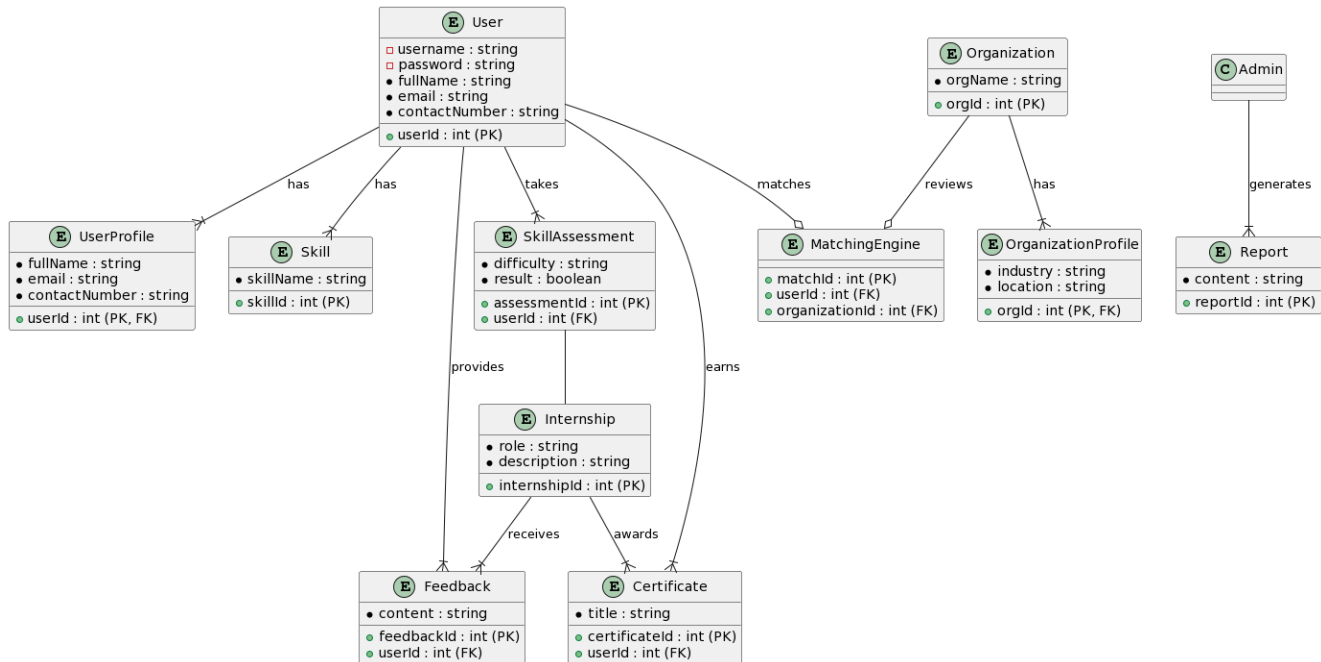
The ER diagram depicts the core components of the "AI-Driven Internship Platform." It includes entities like User, Organization, Internship, Feedback, Certificate, and Admin. Users engage in various activities, manage their profiles in the "User Profiles" database, and interact with Internships. Organizations offer Internships. Administrators oversee user-related activities. This visual representation provides a succinct overview of the system's structure and interactions.

3.1.3 Class Diagram
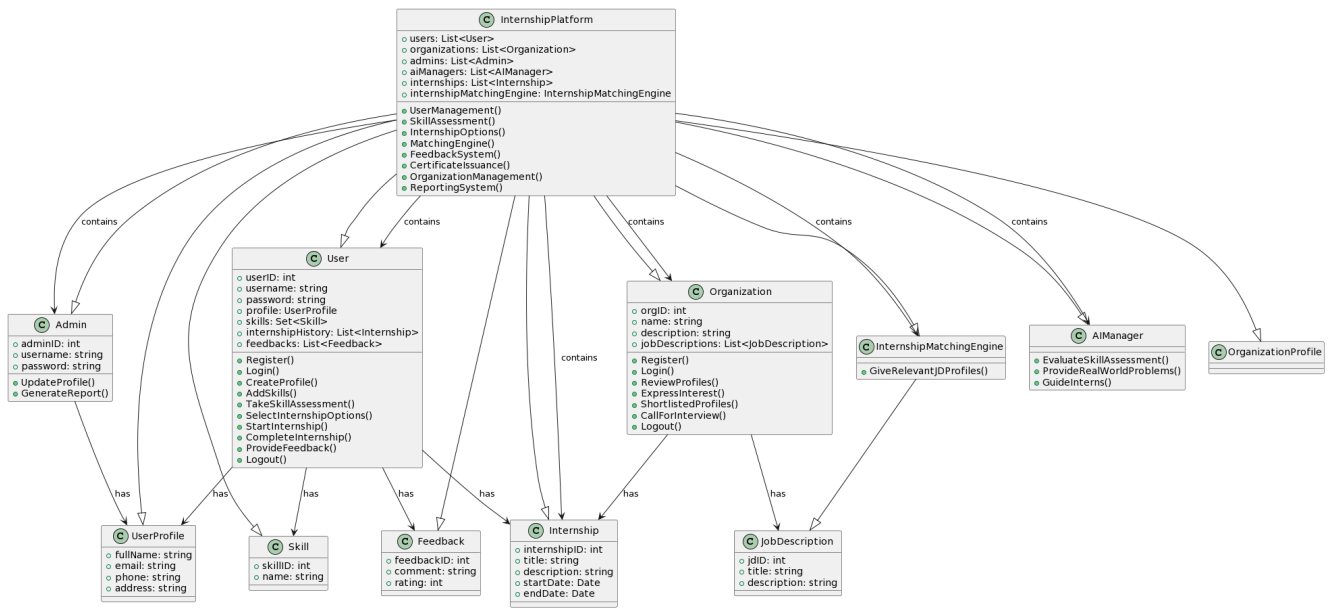
The class diagram for the AI-driven internship Platform provides a static representation of the system's structure. It includes classes such as User, Organization, Admin, AI Manager, Internship, and Skill. Relationships like associations between classes, inheritance, and composition are captured. This diagram serves as a blueprint for the platform's architecture, highlighting the key entities, their attributes, and the associations that define their relationships.

3.1.4 Component Diagram
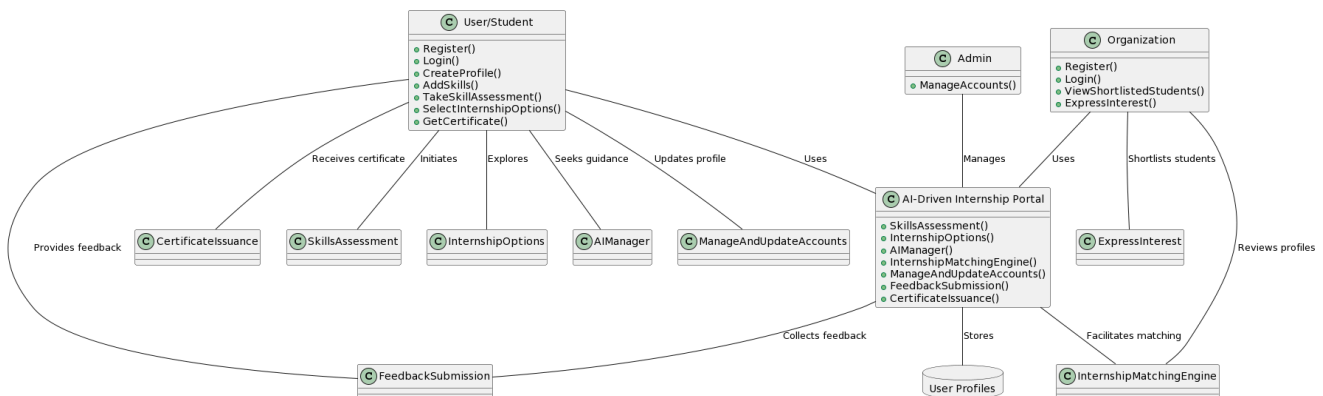
The component diagram illustrates the primary components of the "AI-Driven Internship Platform" and their interactions. Users start by registering, creating profiles, and undergoing skill assessments. The AI-driven manager guides them through internships, and the platform facilitates updating profiles, providing feedback, and issuing certificates upon completion. Organizations utilize the Internship Matching Engine to review student profiles and express interest. The Admin component oversees system functionality.

3.2   Component Interactions and Collaborations

3.2.1 Collaboration Diagram
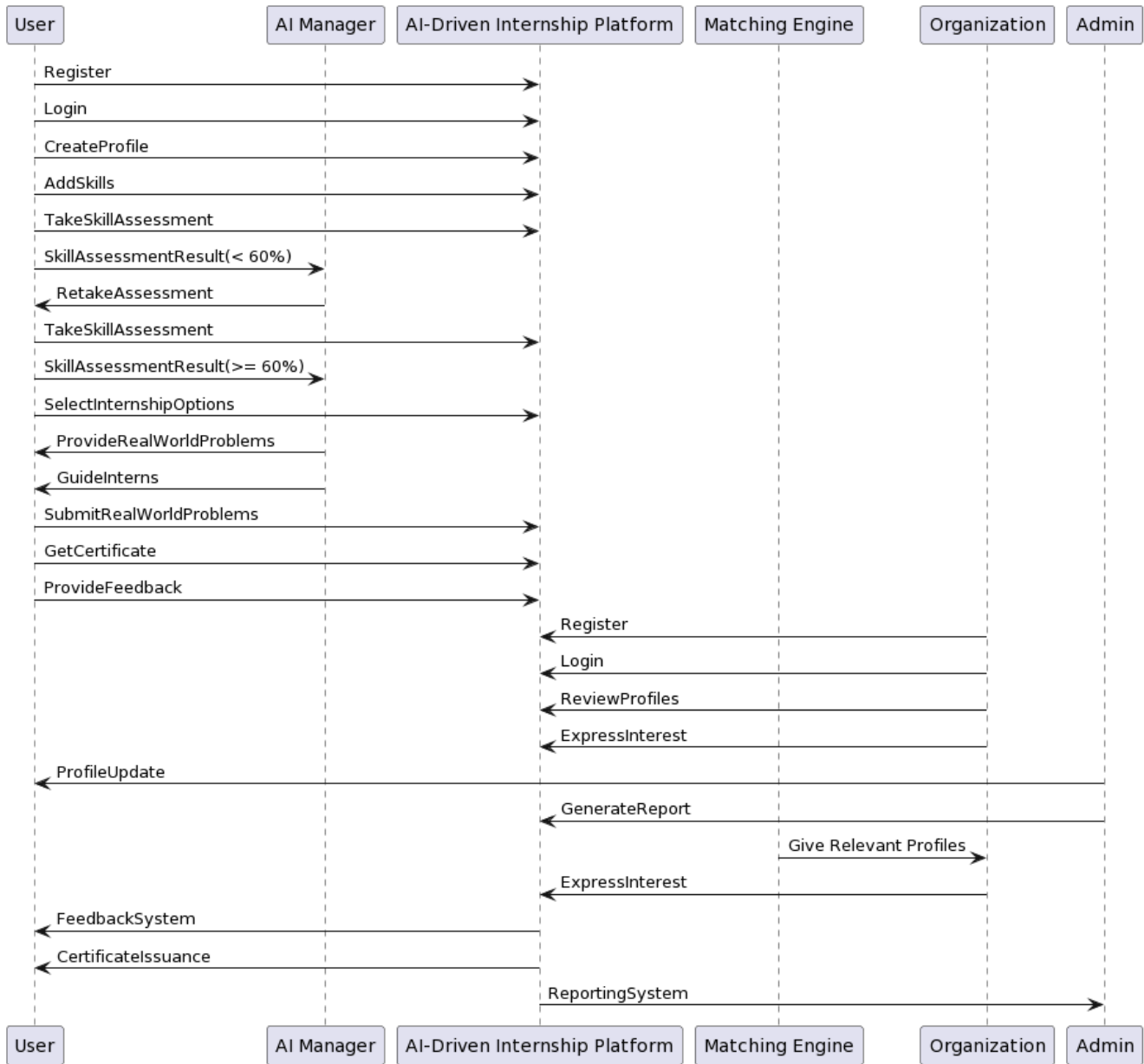
The collaboration diagram illustrates the dynamic interactions among key components and collaborations between different components in the AI-Driven Internship Platform. Users engage in a seamless process starting with registration, login, and skill assessment. If the assessment falls below 60%, users retry after 30 days. The AI Manager plays a crucial role, in evaluating assessments, guiding interns, and providing real-world problems during internships. Organizations interact by reviewing profiles and expressing interest. Admin generates reports on platform activities. The Internship Matching Engine facilitates connections between organizations and students. This visual representation captures the intricate collaboration, ensuring a comprehensive understanding of the platform's functionalities.

3.2.2 Event Trace Diagram
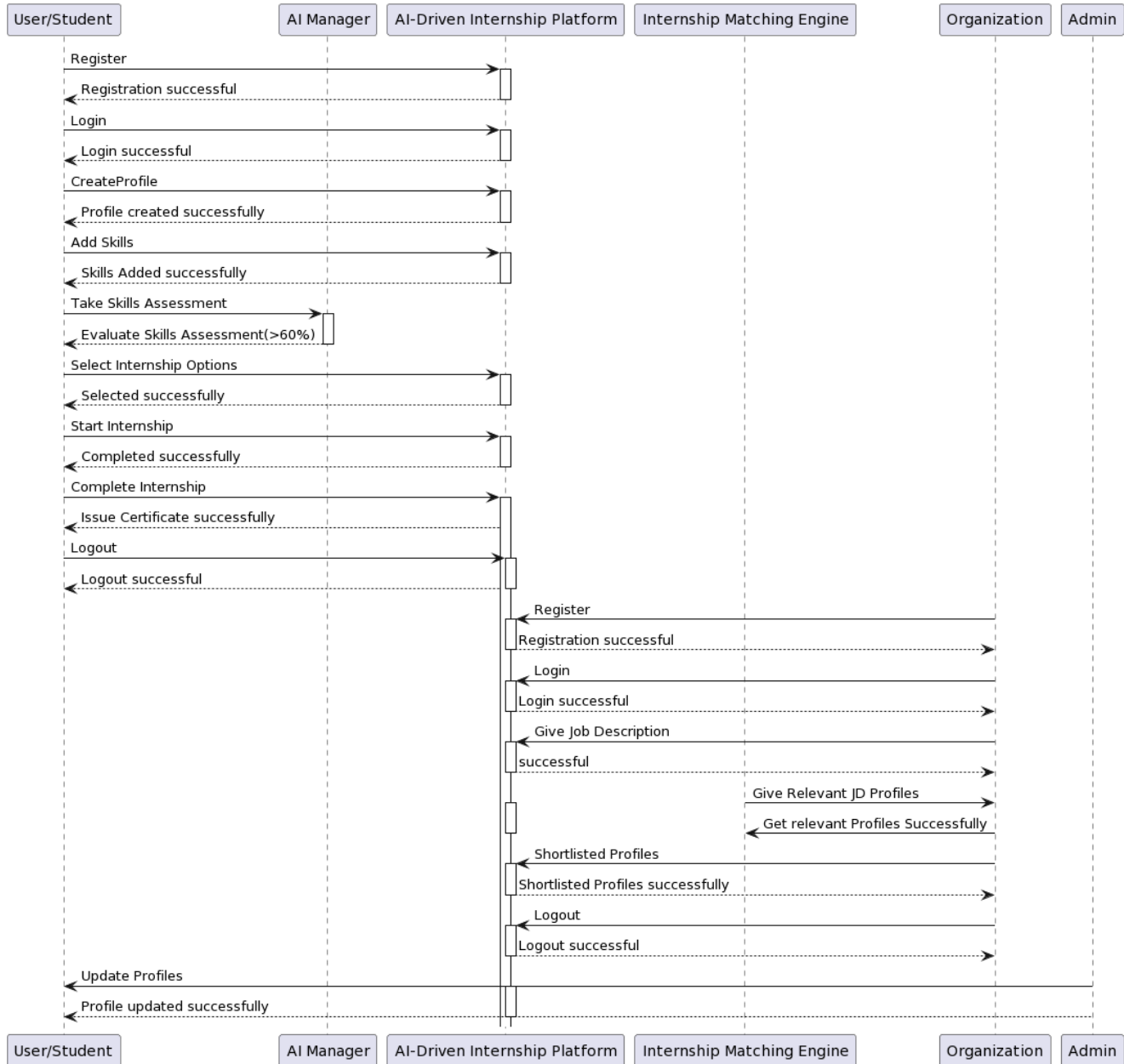
The event trace diagram for the AI-driven internship Platform would illustrate the dynamic interactions between users, the AI Manager, the Internship Platform, and other components during specific scenarios. It would showcase how events unfold over time, depicting user registrations, logins, skills assessments, internship selections, AI Manager's guidance, and the completion of internships. This dynamic visualization helps in understanding the sequence of actions and communication flow within the platform.

3.2.3 Sequence Diagrams

User Registration Process
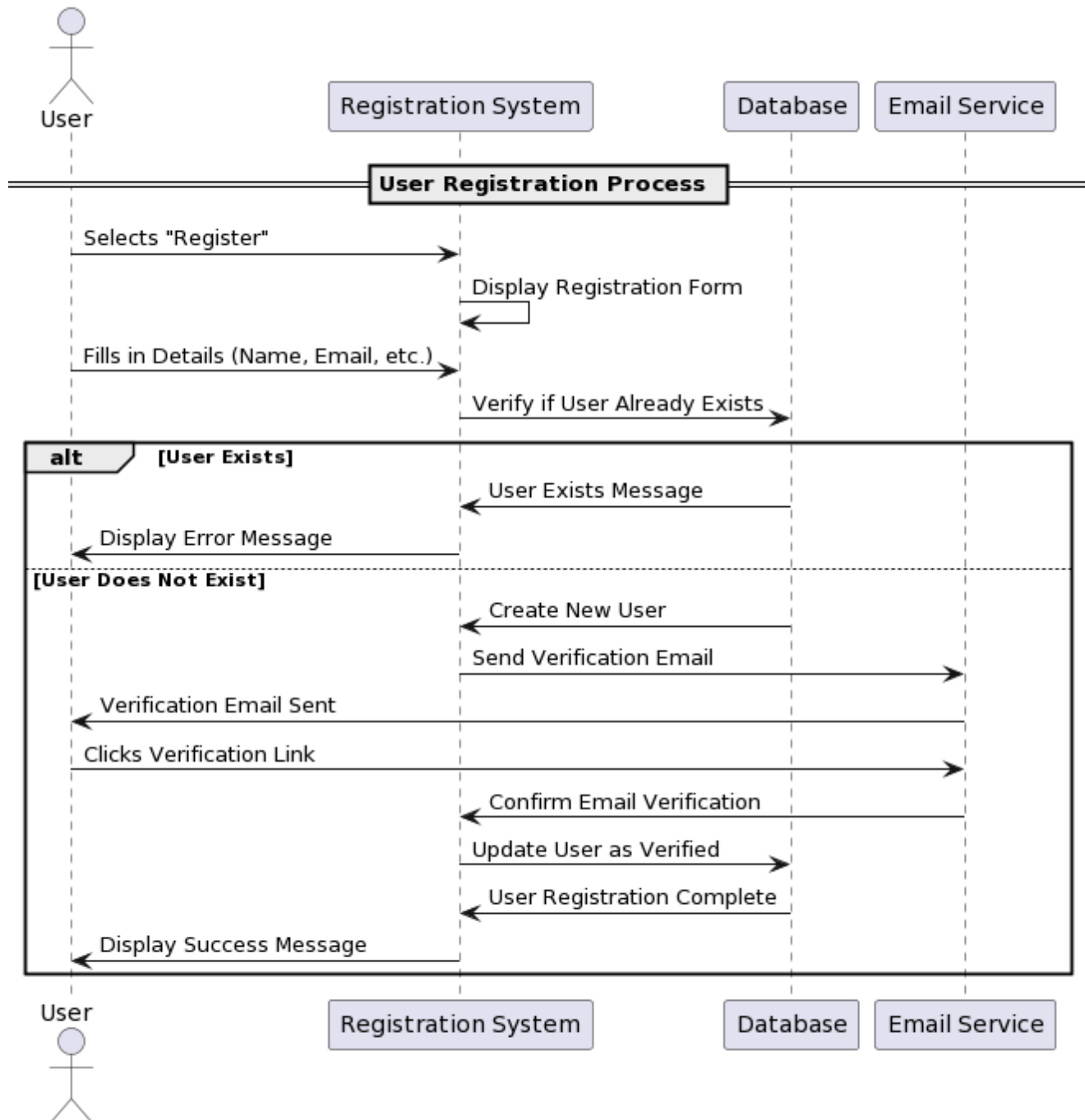
Skills Assessment Process
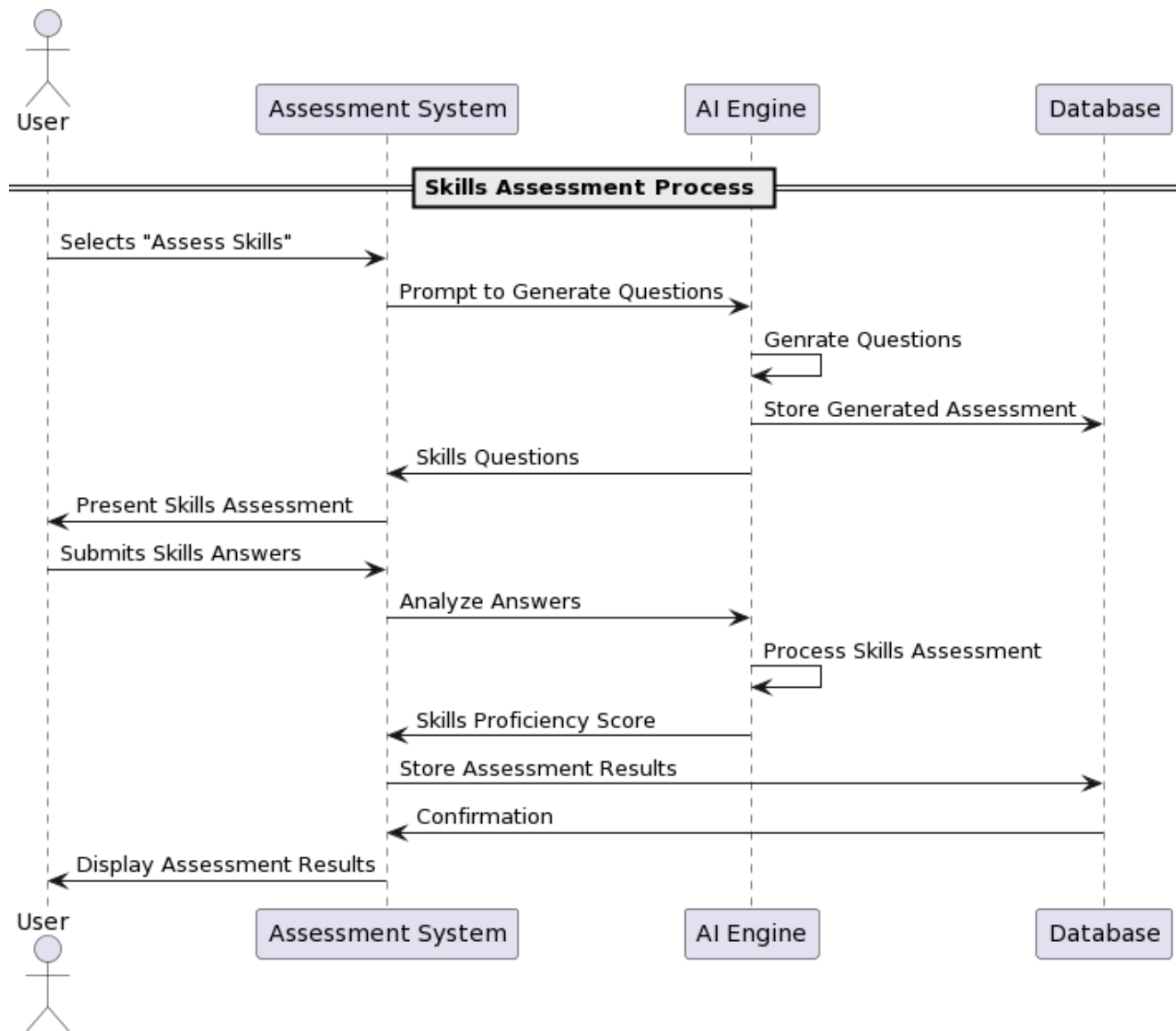
Internship Options Selection Process
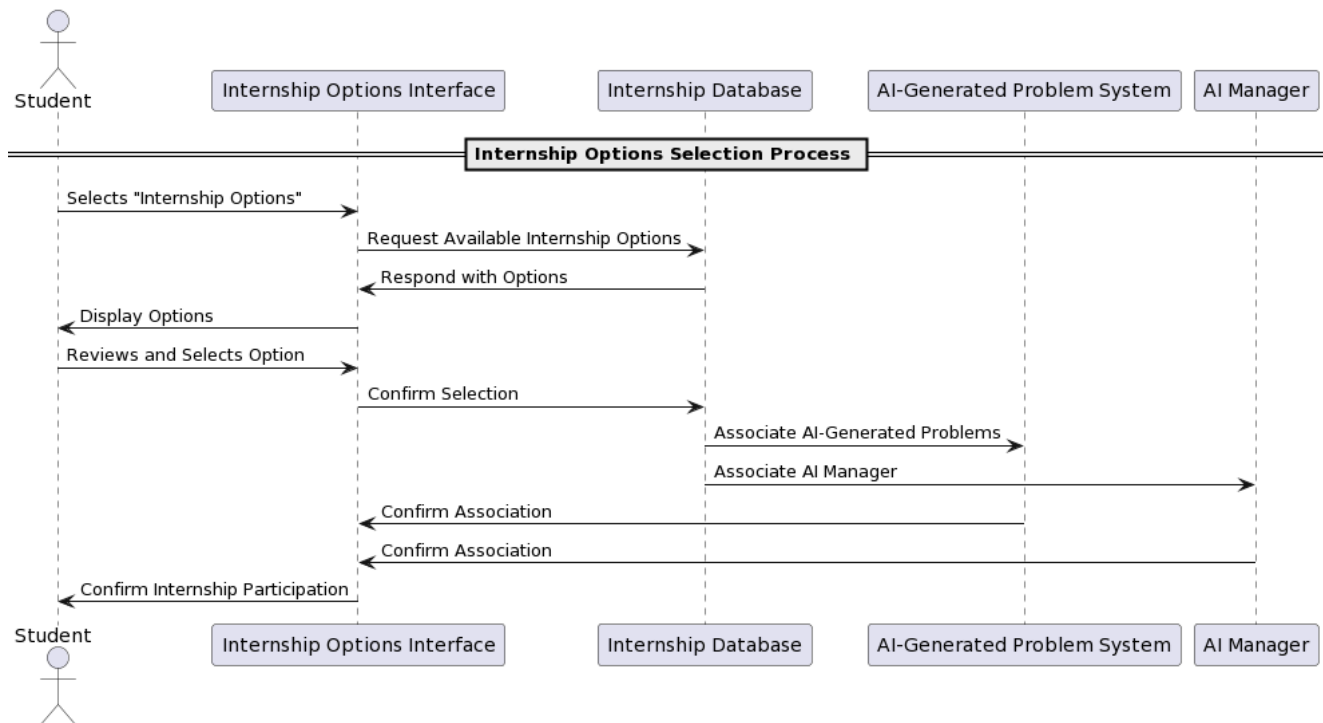
AI-Based Manager Interaction Process
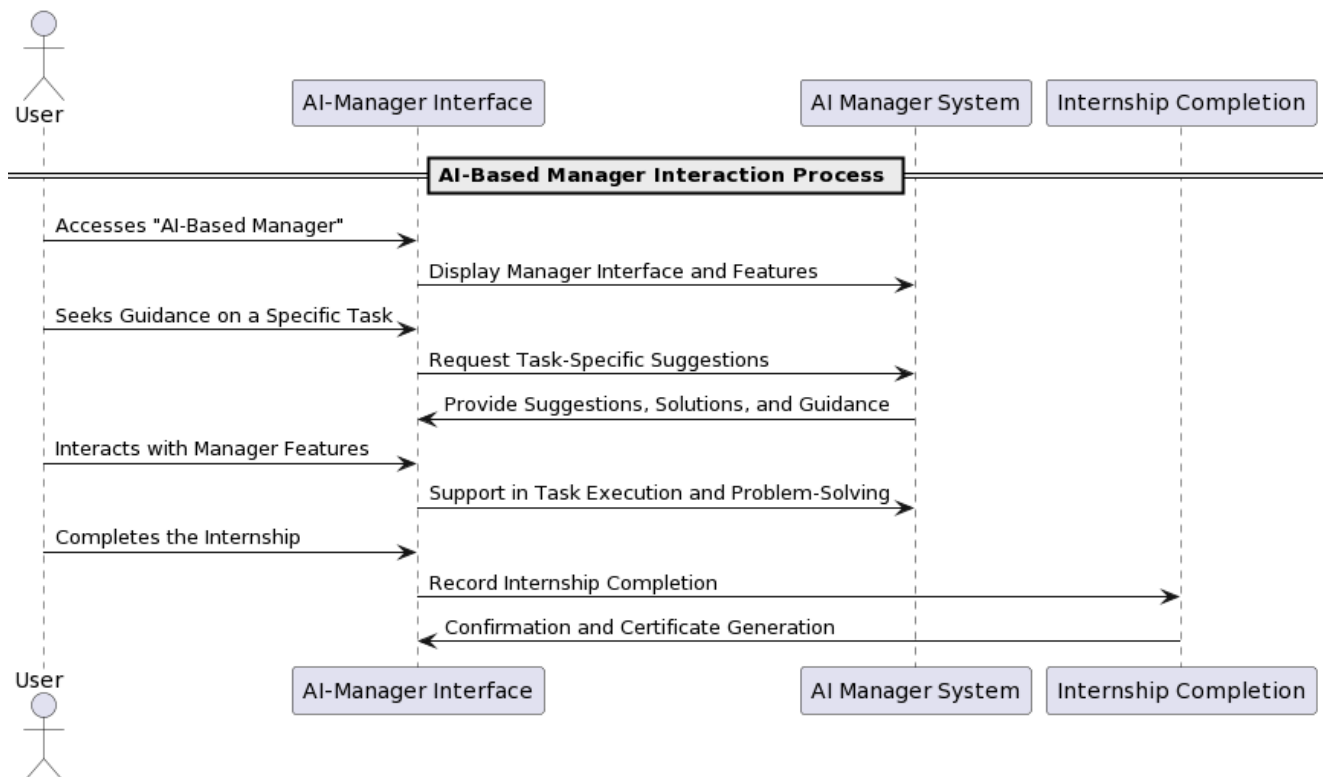
3.3   Design Reuse and Design Patterns

During the development of the AI-Driven Internship Platform, several components and functionalities were designed with reusability in mind. The key areas of reuse include:

Skills Assessment Module:
The skills assessment module, catering to users with different proficiency levels (beginner, intermediate, advanced), is designed for reuse. It allows for the dynamic addition of new skill categories or levels, making it adaptable to evolving skill landscapes.

User Authentication and Authorization:
The authentication and authorization mechanisms implemented for user login and access control are designed for reuse. This modular approach ensures that similar security features can be employed in other applications within the organization.

User Interface Components:
The user interface components, including registration forms, profile creation interfaces, and feedback submission forms, are crafted with reusability in mind. These components can be adapted and integrated into other projects or systems with minimal modification.

Internship Matching Engine:
The Internship Matching Engine, responsible for pairing organizations with suitable student profiles based on job descriptions, is designed as a reusable module. It can be adapted for other matchmaking scenarios within the organization.

Database Schema and Data Management:
The database schema and data management strategies, supporting user profiles, internship data, and organization profiles, are crafted for reuse. This ensures a scalable and flexible data structure that can be extended to accommodate additional features or related projects.

3.4   Technology Architecture

The anticipated infrastructure to support the AI-Driven Internship Platform involves a robust and scalable technology architecture. At a high level, the key components of the technology architecture include:

Platform:
The platform is designed to be cloud-native, leveraging cloud services for scalability, flexibility, and accessibility. Cloud platforms like AWS, Azure, or Google Cloud are considered for hosting the application.

System Hosting:
The system will be hosted in a cloud environment to ensure seamless scalability, efficient resource utilization, and high availability. The use of containerization technologies, such as Docker, may be employed to enhance deployment and management.

Connectivity Requirements:
The system relies on secure and high-speed connectivity to ensure real-time interactions. APIs, protocols like HTTPS, and secure communication channels are implemented to facilitate seamless data exchange between users, organizations, and the application components.

Modes of Operations:
The system supports both online and batch processing modes. Online processing caters to real-time interactions for users accessing the platform, while batch processing may be employed for tasks like generating reports or performing periodic updates.

Application Architecture:
The application architecture is designed with a microservices approach for modularity and flexibility. Each major component, such as skills assessment, internship matching engine, and user management, operates as an independent microservice, enabling easier maintenance and updates.

Programming Language and Frameworks:
The application is developed using modern programming languages and frameworks. Technologies such as Python and Django will be employed for the backend, while front-end development would be on frameworks like React.js

Database Platform:
A relational database management system (RDBMS) like PostgreSQL or MySQL is considered for storing structured data. Additionally, NoSQL databases may be utilized for managing unstructured or semi-structured data efficiently.

End-User Interface:
The end-user interface is designed to be browser-based, ensuring accessibility across various devices. Responsive design principles are applied to offer a seamless user experience on different screen sizes.

Network Architecture:
The system is designed to be accessible over the internet, employing standard internet protocols. Secure sockets layer (SSL) encryption is implemented to ensure data security during transmission.

Hosting Environment:
The hosting environment may include the deployment of components across multiple servers or instances for load balancing, fault tolerance, and improved performance.
By adopting this high-level technology architecture, the AI-driven internship Platform aims to deliver a scalable, secure, and user-friendly solution that meets the evolving demands of both students and organizations in the internship ecosystem.
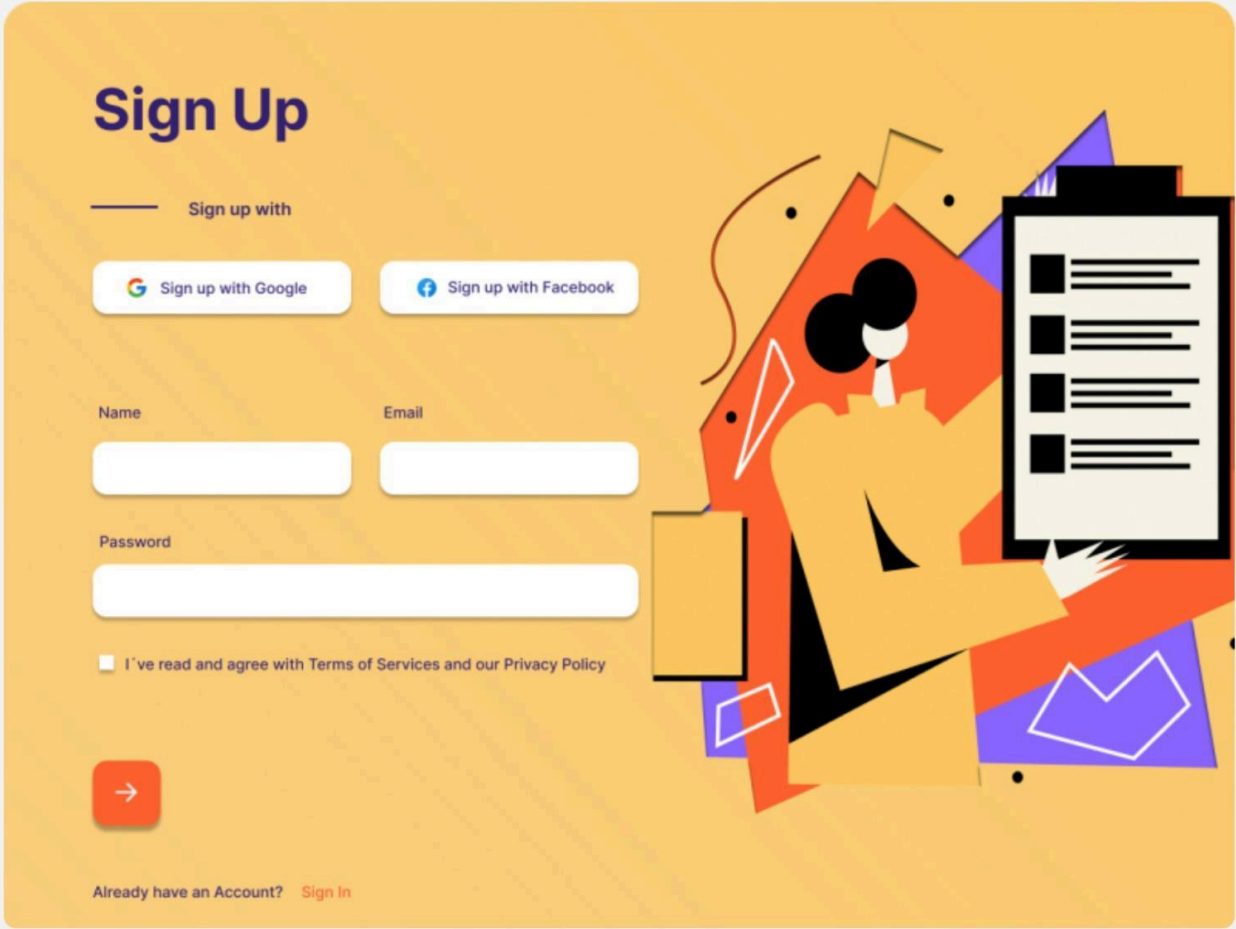
4.   Screenshots/Prototype

4.1   Workflow

4.2   Screens

4.2.1   Sign Up

4.2.2   User Dashboard

4.2.3   User Skills

4.2.4   User Profile

4.2.5   User Internship

4.2.6   Organization Dashboard

4.2.7   Organization Manage Interns
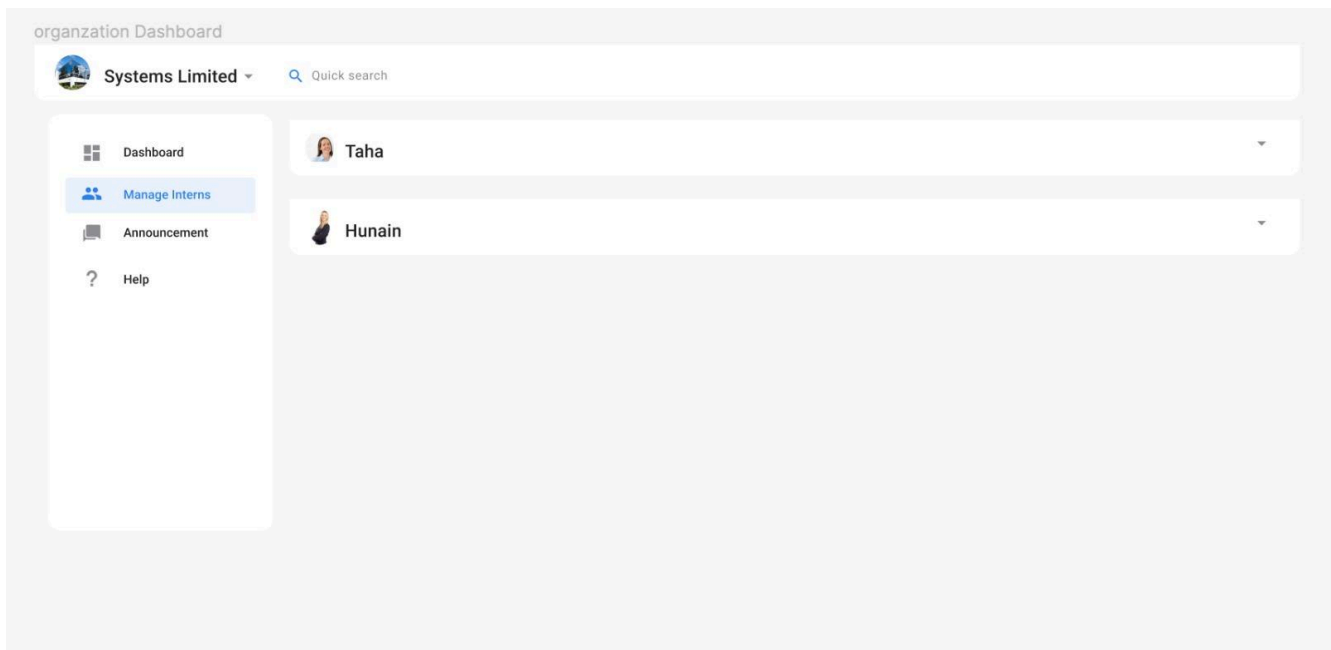
4.2.8   Organization View Candidate
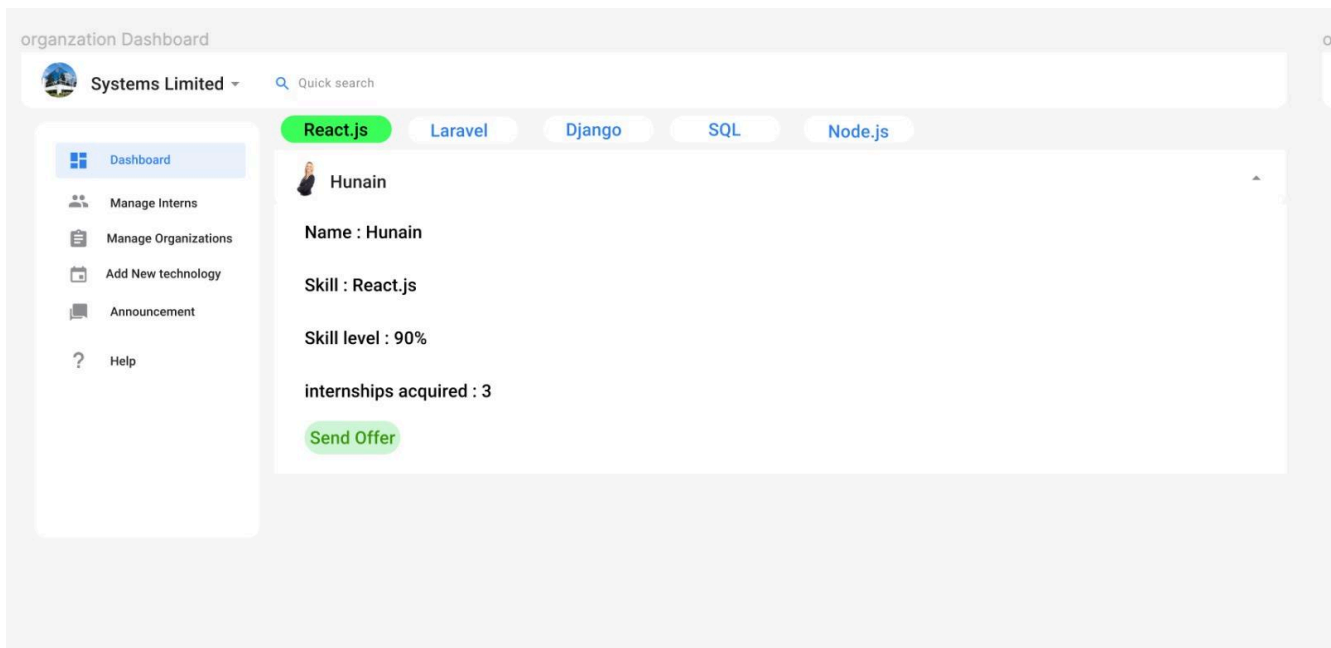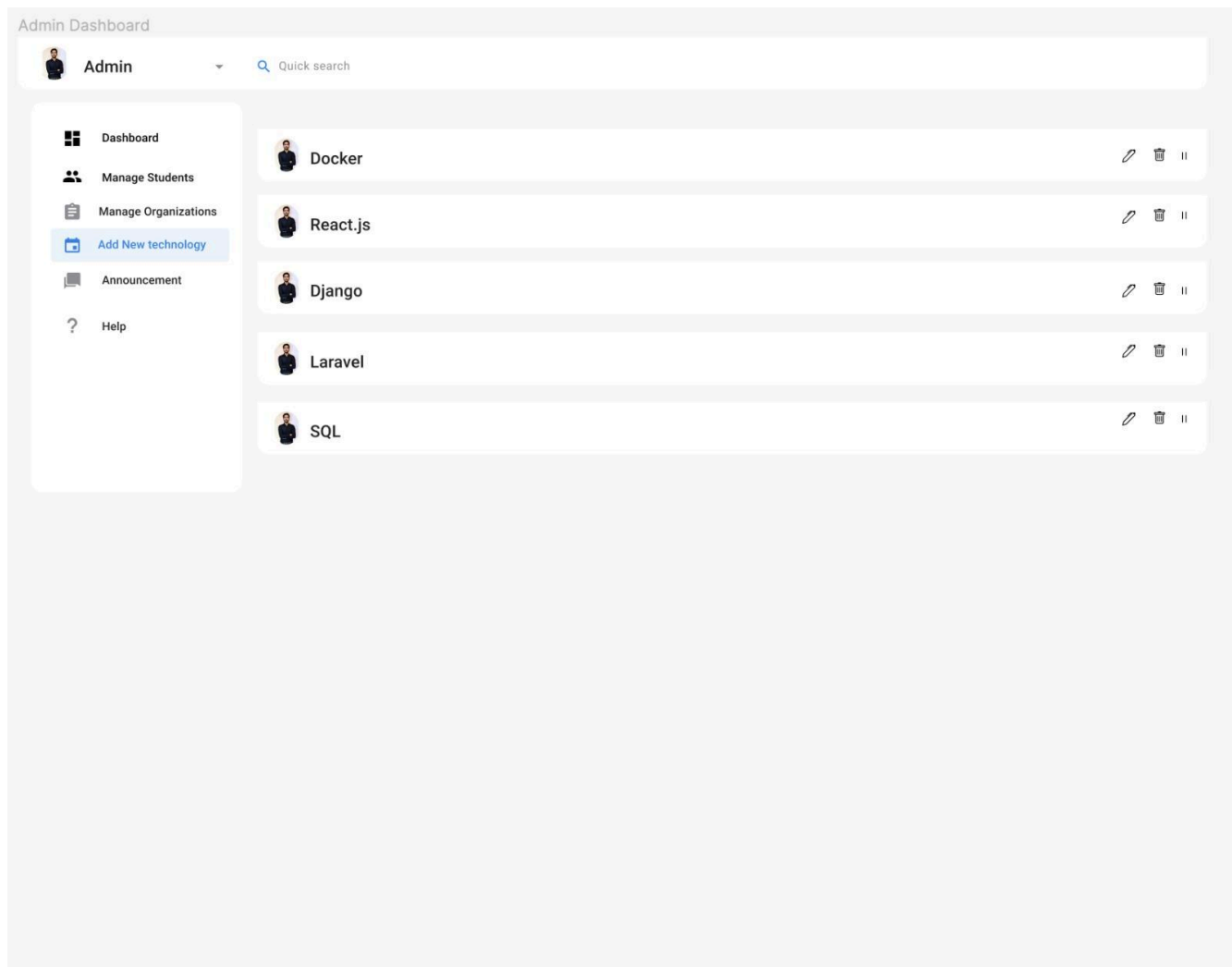

4.2.9   Organization Send Offer
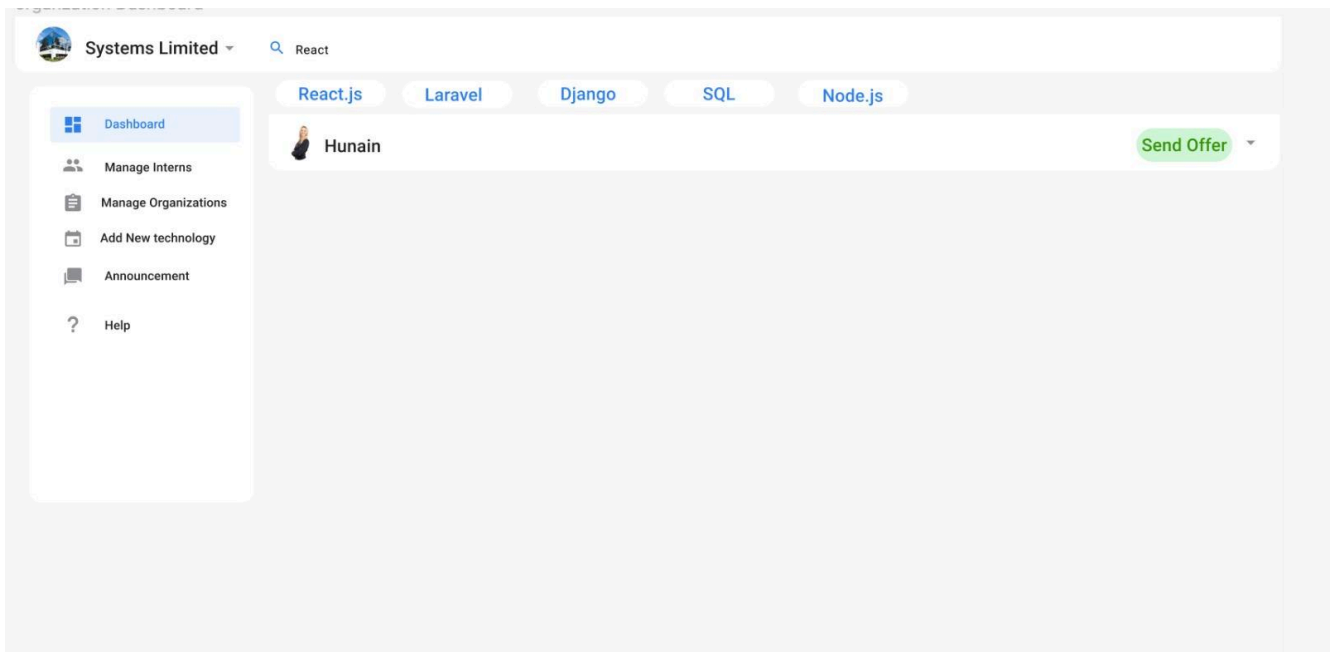
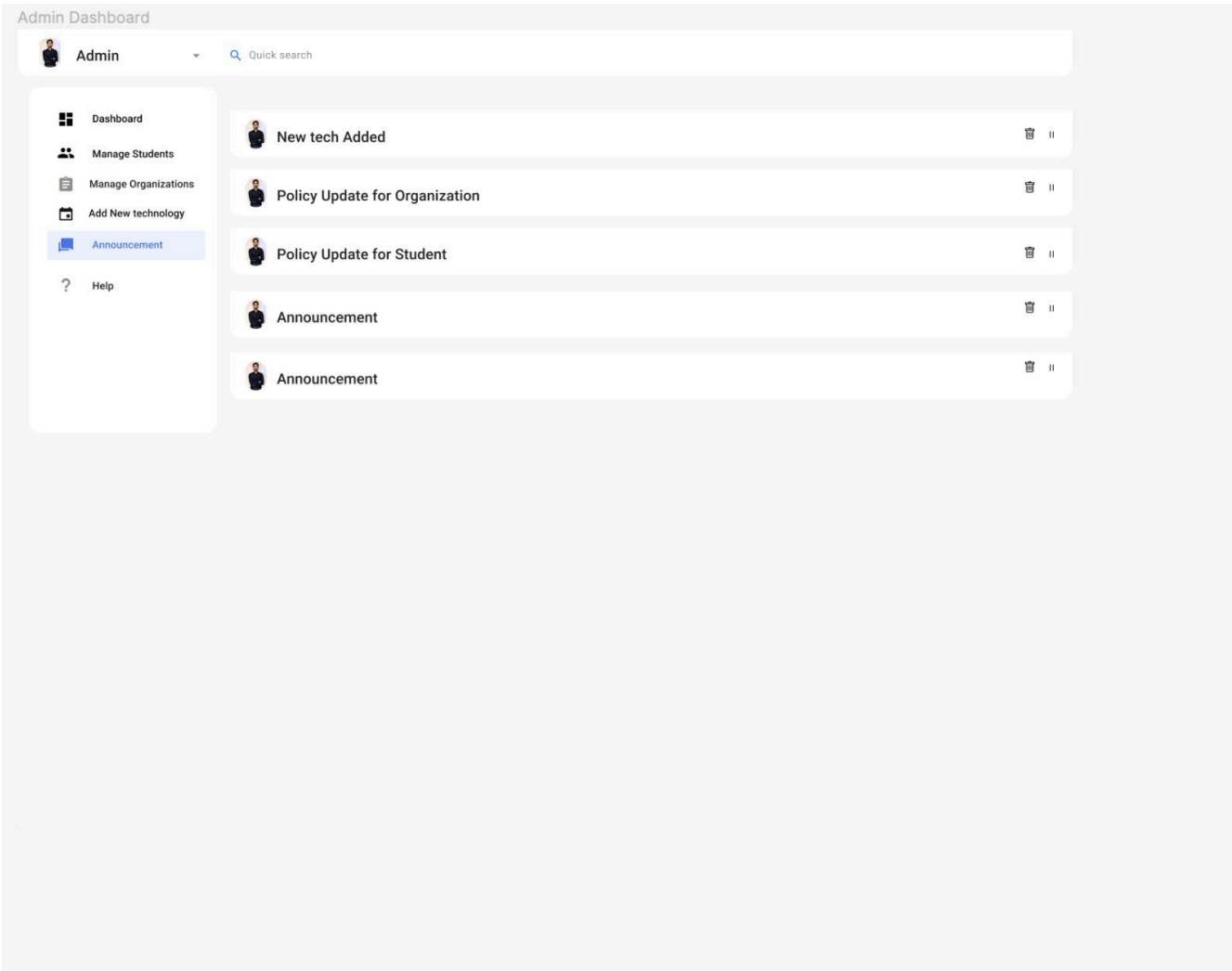## 4.2.10 Admin Dashboard
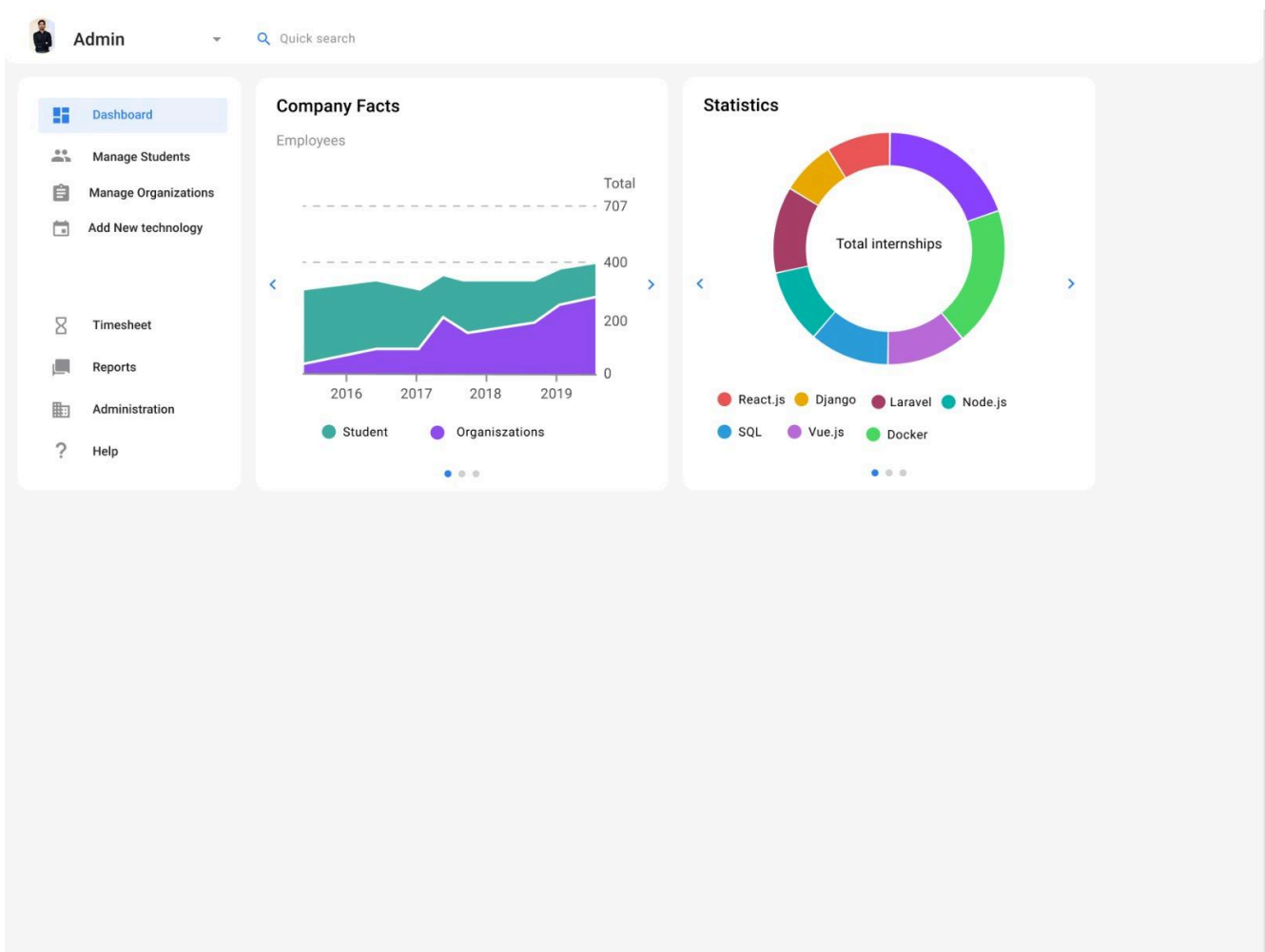
4.2.11 Admin Manage Organization Profiles
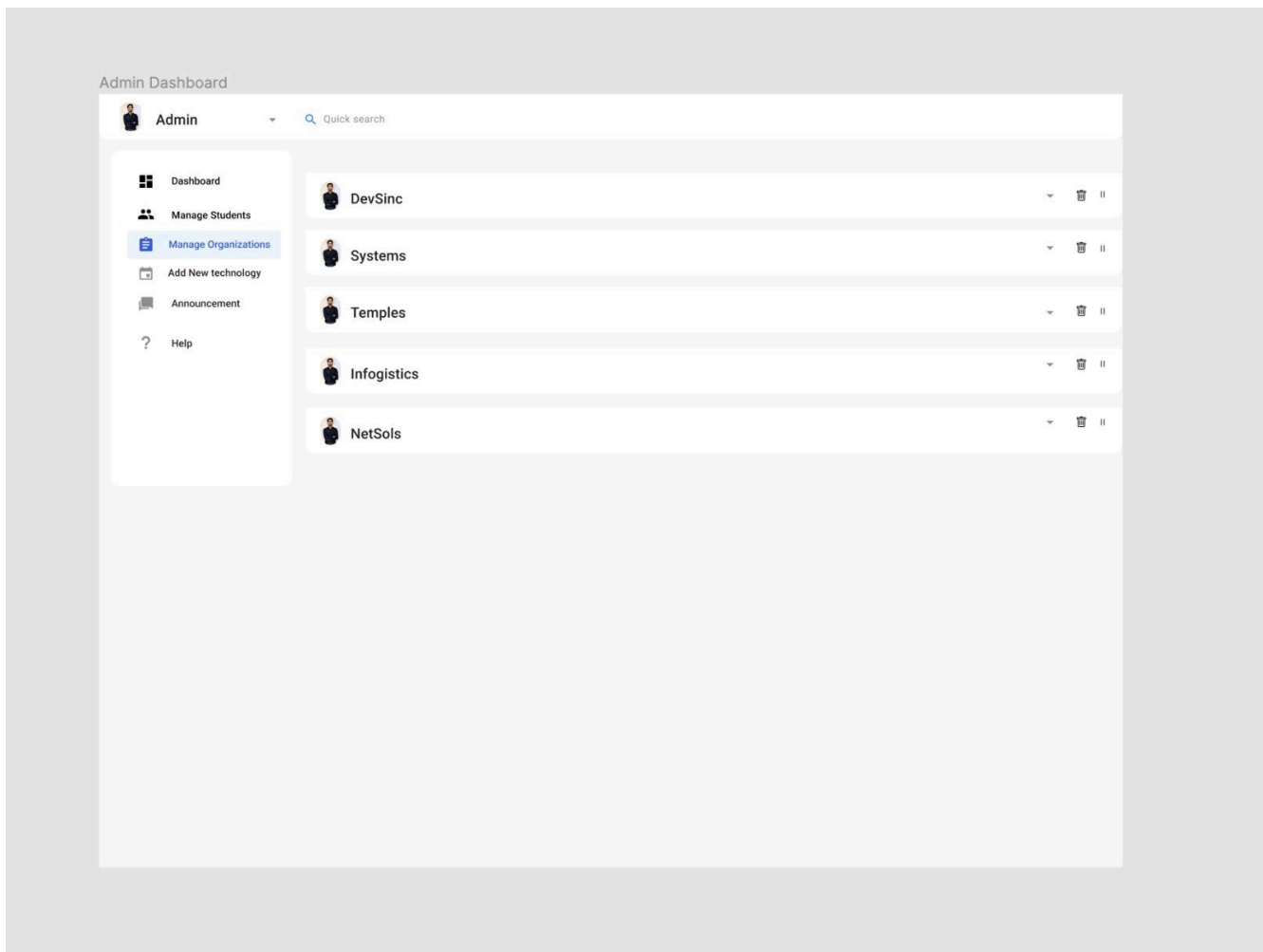
4.2.12 Add New Technology

4.2.13 Admin Announcement

4.2.14 Admin Manage Students
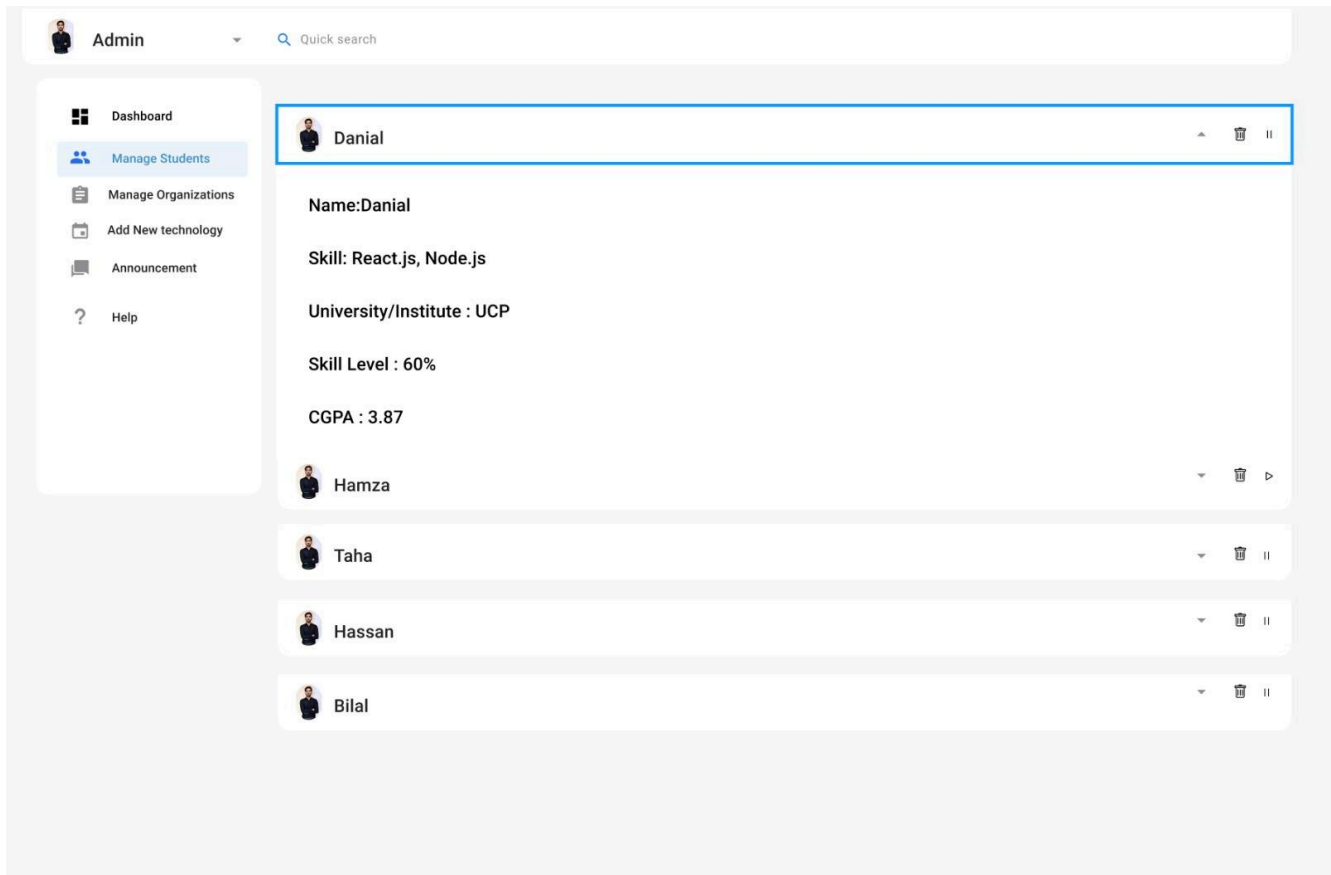
5.   Revised Project Plan

The project is in the Design Specification phase, which spans from Week 4 to Week 7. This phase involves the detailed gathering and analysis of the design of this project including prototypes and detailed diagrams of the system.

Project Timetable

This project plan ensures that tasks are well-distributed over the project timeline, resources are effectively utilized, and progress is closely monitored. It provides a clear roadmap for the successful development and deployment of the "AI-Driven Internship Platform."

Week 1-3: Project Initiation

· Define project objectives and scope.
· Identify stakeholders.
· Develop a project plan.
· Allocate project team roles and responsibilities.

Week 4-7: Requirement and design Specification
  · Functional Requirements
  · Non-Functional Requirements
  · Requirements Analysis
  · Design Specification (Workflow, Prototypes)

Week 8-10: User Registration and Profiling System
  · Develop user registration functionality.
  · Create user profile management features.

Week 11-14: Skills Assessment Tool
  · Design the skills assessment system.
  · Integrate AI algorithms for assessment.
  · Implement skills profiling.

Week 15-18: AI-Driven Internship Option
  · Develop AI-generated real-world problems.
  · Design and implement the AI-Based Manager.

Week 19-22: Progress Tracking and Certification System
  · Implement progress tracking functionality.
  · Develop the certification system.

Week 23-26: Internship Matching Engine
  · Enhance the "Internship Matching Engine" for external opportunities.

Week 27-30: Admin Dashboard and Analytics Tools
  · Create the admin dashboard.
  · Integrate analytics tools for user data analysis.

Week 31-33: User Documentation and Support Resources
  · Develop comprehensive user guides.
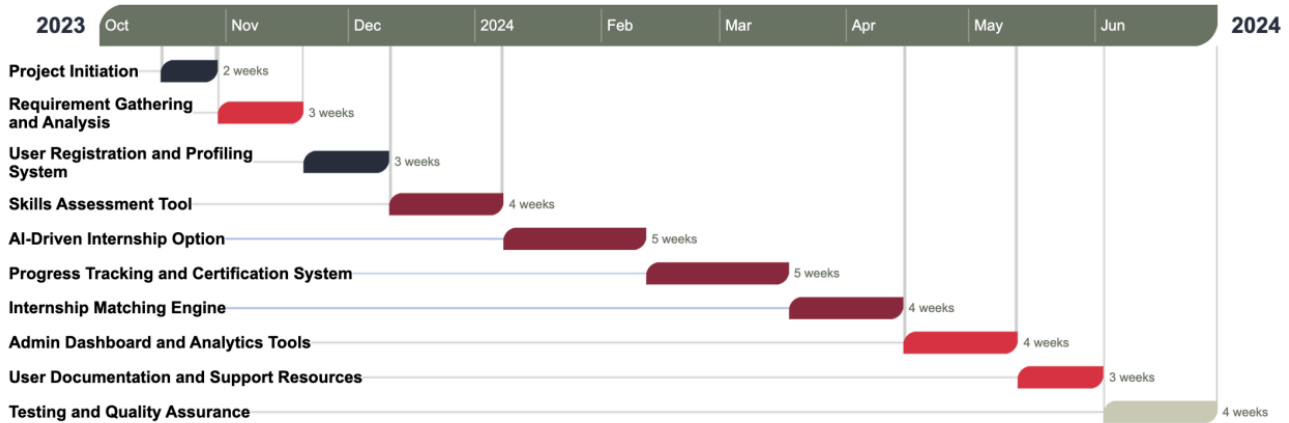 · Create support resources and FAQs.

Week 34-37: Testing and Quality Assurance
  · Conduct thorough testing of all system components.
  · Ensure data privacy and security measures are in place.

Week 38-40: Deployment and User Training
  · Deploy the platform to production servers.
  · Provide user training and support during the initial rollout.

AI-Driven Internship Platform

6.   References

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2. Roberts, M. L., & Davis, R. W. (2020). "Machine Learning in Software Development." Journal of Computer Science, 25(3), 456-468. DOI: 10.5678/jcs.v25i3.12345.

3. World Wide Web Consortium. (2021). "HTML5 Specification." W3C. https://www.w3.org/TR/html52/

4. Brown, P., & White, S. (2018). "Optimizing Algorithms for AI-Driven Systems." In Proceedings of the International Conference on Artificial Intelligence, 123-136. DOI: 10.1234/conf-ai/2018/123.

Appendix A: Glossary

1. **AI**: Artificial Intelligence
2. **API:** Application Programming Interface
3. **CSS:** Cascading Style Sheets
4. **HTML:** Hypertext Markup Language
5. **RDBMS:** Relational Database Management System
6. **SRS:** Software Requirements Specification
7. **UI:** User Interface
8. **URL:** Uniform Resource Locator
9. **W3C:** World Wide Web Consortium
10. **QA:** Quality Assurance
11. **GDPR:** General Data Protection Regulation
12. **CCPA:** California Consumer Privacy Act

Appendix B: IV & V Report

(Independent verification & validation)
IV & V Resource

Name   Signature

S#	Defect Description	Origin Stage	Status	Fix Time	
				Hours	**Minutes**
1					
2					
3					
…					

Table 1: List of non-trivial defects

This document has been adapted from the following:
1. Previous project templates at UCP
2. High-level Technical Design, Centers for Medicare & Medicaid Services. (www.cms.gov)