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**SCUOLA DI INGEGNERIA INDUSTRIALE  
E DELL'INFORMAZIONE**

# Requirement Analysis and Specification Document (RASD)

**Students & Companies Problem**

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# 1 | Introduction

For university students finding the right internship that match their interest and their skills can sometimes be hard. At the same time companies sometimes suffers to clearly defines their projects and what they are looking for from the students. For almost 60% of United States students, not knowing how to find an internship was the main reason for not taking one [1].

The number of internships available for students has plunged by 30%, with only 3,817 opportunities in October 2024 being advertised compared to almost 5,500 a year ago [2]. Also the estimated number of American college students take up formal work experience is 21.5% while only 8.7% of UK students take this path. Even among students studying at the top ten universities, the rate is only 19% [2].

While platforms like LinkedIn offer a broad range of job opportunities, they are not tailored specifically to internships, thus make it difficult for students to find internships that align with their skills and interests. Furthermore, companies may struggle to clearly define their projects and requirements, leading to mismatches and inefficiencies in the recruitment process.

Before COVID-19 in the United States, internship rates were between 50% and 60%. However, recent research indicates a much lower number of 21.5% [1].

Even if in the United States, students on average reported being very satisfied with their internship experiences, there are still many students (1 in 4 reported) that had less than satisfactory experiences showing the needs of both students and companies to clearly define what they are looking for from the internships experience. [1].

## 1.1. Purpose

*Students&Companies* is imagined to be a platform dedicated solely to internships searching that can implement sophisticated matching algorithms to facilitate the interaction of students with the companies offering an internship and leading to more successful internship experiences.

The scope of the platform is to facilitate the matching between students and companies by assessing the student experiences, skills and attitudes (available in his/her CVs) and the projects and terms offered by the companies.

S&C can be used by the companies, who want to attract students with internships and by the students who are looking to work for a company by actively searching for an internship

or which receives a recommendation from a system implemented in the platform.

If both the student and the company have a mutual interest in each other then a contact is established, followed by a selection process during which the student is interviewed, S&C also support the selection process by helping managing the interview and finalize the selections.

If the student and the company agree, the platform can collect various kind of informations (such as feedback and suggestions), additionally S&C provides suggestions both to companies and to students on how to improve the company and student appearance on the platform (in terms of project descriptions for companies and CVs for students).

Lastly, S&C monitors the internship and the outcomes of the matchmaking process by allowing students and company to complain, communicate problems and more. Universities can also use the platform to monitor the situation of internships and handle complains.

The main goals of the platform "Student&Companies" are reported in subsection 1.1.1.

### 1.1.1. Goals

- **G1:** Students would like to find and be matched with internships that align with their skills, experiences and professional interest.
- **G2:** Companies would like to reach and attract students who have the right profile and are interested in their internship offering.
- **G3:** Companies would like to advertise their internship opportunities.
- **G4:** Students would like to proactively search for and apply to internships that fit their interest and skills.
- **G5:** Students would like to receive personalized internship recommendations based on their CVs and profiles.
- **G6:** Students, companies and universities would like to have a clear communication to ensure a collaborative environment.
- **G7:** Companies would like to manage their selection process efficiently and tracking the status of applications and selections.
- **G8:** Universities would like to monitor their students' internships and to address complains or issues that might arise.
- **G9:** All stakeholders (students, companies and universities) would like the platform to gather statistical data to improve recommendations and platform features.
- **G10:** All stakeholders (students, companies and universities) would like their personal data on the platform to be securely stored and treated with confidentiality.

## 1.2. Scope

**Students & Companies (S&C)** platform aims to facilitate meaningful connections between students, companies and universities. One of the scope of S&C platform is to manage the internship life cycle, from posting offers to evaluating completed experiences while being at the same time alignment with the goals of all stakeholders.

Students should use the platform to explore and apply for internship opportunities that match their interests and profiles. They can receive personalized notifications about relevant offers and access tools that help them improve their resumes, making their profiles more attractive to companies. The platform also should allow students to track their applications, engage in meaningful communication with stakeholders and receive updates on their internship progress.

Companies should use the platform to create and manage internship postings, review applications and oversee the selection process. They can access detailed student profiles, invite suitable candidates for interviews and evaluate students' performance. To attract the best talent, companies receive feedback from the system on how to refine their job descriptions and improve their outreach. By streamlining recruitment and enhancing the visibility of their postings, the platform helps companies identify candidates who align with their organizational needs.

Universities use the platform to monitor internships and support students throughout their professional development. They ensure that internships meet academic and institutional standards, intervene when issues arise and provide additional guidance to students if needed. For example, if a student struggles with assigned tasks, the university can coordinate with the company to adapt the workload or provide additional support. This oversight ensures that internships are meaningful, beneficial and aligned with students' educational goals.

Following the definition originally proposed by M. Jackson and P.Zave in 1995 [3], in Section 1.2.1 and Section 1.2.2 are listed the World phenomena and the Shared phenomena respectively. World and Machine communicate with shared phenomena, they could events controlled by the world and observed by the machine or events controlled by the machine and observed by the world.

### 1.2.1. World Phenomena

World phenomena are events that occur in the real, external context, outside the platform and thus are not observed or controlled by the machine. They include:

- **[WP1]** Students create their resumes with information about experiences, skills and attitudes.
- **[WP2]** Company tutors define internship offers with details about tasks, technologies used and required qualifications.
- **[WP3]** Company tutors set the terms for internship offers, including salary details, working hours, work type (full-remote, smart-working, office-only) and schedule.

- [WP4] University tutors provide guidelines for internships, such as minimum required hours, student placement areas and the requirement for at least one company tutor.
- [WP5] Company and Universities collaborate to establish internship requirements and objectives.
- [WP6] Universities will notify students through their institutional email addresses that they can search for internships using the S&C platform.
- [WP7] Universities manage student complaints by taking concrete actions against companies (reminders via messages/calls, legal actions, etc.).
- [WP8] Students search and identify relevant internship offers through external resources (e.g., job boards, company websites, or social media platforms).
- [WP9] Students communicate with their university tutors outside the platform for advice on internship selection or preparation.

### 1.2.2. Shared Phenomena

Shared phenomena involve both the external world and the machine, requiring direct interactions between the system and users. These phenomena are crucial for the correct execution of system functionalities and represent the point of contact between the machine and the world. Shared phenomena are usually classified in two subcategories: World controlled and Machine controlled.

#### World controlled

- [SP-1]: The student creates a profile for himself/herself.
- [SP-2]: The company tutor creates a profile for himself/herself.
- [SP-3]: The university tutor creates a profile for himself/herself.
- [SP-4]: The student uploads their resume.
- [SP-5]: The company tutor uploads a profile document.
- [SP-6]: The university tutor uploads academic documents.
- [SP-7]: The student logs into the platform.
- [SP-8]: The company tutor logs into the platform.
- [SP-9]: The university tutor logs into the platform.
- [SP-10]: The student changes the platform language.
- [SP-11]: The company tutor changes the platform language.
- [SP-12]: The university tutor changes the platform language.
- [SP-13]: The student recovers their password.
- [SP-14]: The company tutor recovers their password.

- [SP-15]: The university tutor recovers their password.
- [SP-16]: The student interacts with the chat-bot.
- [SP-17]: The company tutor interacts with the chat-bot.
- [SP-18]: The university tutor interacts with the chat-bot.
- [SP-19]: The student searches for internships using filters.
- [SP-20]: The student browses internship offers without filters.
- [SP-21]: The student uses recommendations for internship search.
- [SP-22]: The student views and selects internship offers.
- [SP-23]: The student submits an internship application, demonstrating interest in an internship.
- [SP-24]: The student accepts an invitation from a company.
- [SP-25]: The student rejects an invitation from a company.
- [SP-26]: The student schedules an interview with the company.
- [SP-27]: The student accepts an internship offer.
- [SP-28]: The student rejects an internship offer.
- [SP-29]: The student views active internships.
- [SP-30]: The student tracks internship progress.
- [SP-31]: The student completes the final internship evaluation.
- [SP-32]: The student views upcoming events in the calendar.
- [SP-33]: The student sets reminders for important events.
- [SP-34]: The company tutor creates a company profile for their company.
- [SP-35]: The company tutor searches for students using filters (e.g. field, skills, location) within the platform.
- [SP-36]: The company tutor searches for students based on recommendations.
- [SP-37]: The company tutor searches for students by browsing public profiles.
- [SP-38]: The company tutor invites students to apply for an internship.
- [SP-39]: The company tutor accepts a student's application.
- [SP-40]: The company tutor rejects a student's application.
- [SP-41]: The company tutor moves students to the next phase of selection.
- [SP-42]: The company tutor finalizes the selection and offers an internship.
- [SP-43]: The company tutor creates a new internship position on the platform.

- [SP-44]: The company tutor manages internship drafts (edits, publishes, deletes).
- [SP-45]: The company tutor completes questionnaires for internship feedback.
- [SP-46]: The company tutor manages events through the calendar (creates, edits, deletes events).
- [SP-47]: The company tutor schedules meetings using the calendar.
- [SP-48]: The company tutor views and tracks internship-related deadlines on the calendar.
- [SP-49]: The company tutor uses the messaging system to communicate with students.
- [SP-50]: The company tutor uses the messaging system to communicate with university tutors.
- [SP-51]: The company tutor sends messages to students regarding selection progress.
- [SP-52]: The university tutor creates a university profile on the platform.
- [SP-53]: The university tutor monitors internship progress for assigned students.
- [SP-54]: The university tutor reviews applications submitted by students.
- [SP-55]: The university tutor communicates with students about internship progress.
- [SP-56]: The university tutor communicates with company tutors regarding issues or progress.
- [SP-57]: The university tutor provides feedback on internship quality.
- [SP-58]: The university tutor resolves issues reported by students or company tutors.
- [SP-59]: The university tutor completes a questionnaire about internship academic alignment.
- [SP-60]: The university tutor schedules monitoring meetings through the calendar.
- [SP-61]: The university tutor tracks deadlines and reports using the calendar.
- [SP-62]: The university tutor reviews student feedback submitted via questionnaires.
- [SP-63]: The university tutor reviews company feedback submitted via questionnaires.
- [SP-64]: The university tutor communicates with students and companies through messaging.
- [SP-65]: The university tutor uses the platform to approve or deny internship opportunities.
- [SP-66]: The university tutor requests modifications to internship offers based on academic standards.

- [SP-67]: The university tutor reviews and updates student records after an internship.
- [SP-68]: The university tutor uses the platform to monitor and report compliance with institutional policies.

### Machine controlled

- [SP-69]: The system sends notifications to students about new internship offers matching their profiles.
- [SP-70]: The system sends notifications to company tutors about new student candidates matching their criteria.
- [SP-71]: The system delivers student applications to company tutors for review.
- [SP-72]: The system matches students with internships based on skills, experience and preferences.
- [SP-73]: The system matches company tutors with students based on internship requirements and student profiles.
- [SP-74]: The system recommends internships to students using machine learning algorithms.
- [SP-75]: The system recommends students to companies using machine learning algorithms.
- [SP-76]: The system extracts key information from student resumes to improve matching accuracy.
- [SP-77]: The system extracts key information from internship descriptions uploaded by company tutors.
- [SP-78]: The system provides students with feedback on their resumes to improve alignment with internship offers.
- [SP-79]: The system provides company tutors with feedback on their internship postings to attract better candidates.
- [SP-80]: The system generates reminders for students about application deadlines.
- [SP-81]: The system generates reminders for company tutors about pending student applications.
- [SP-82]: The system facilitates scheduling of interviews between students and company tutors using the calendar.
- [SP-83]: The system generates video call links for interviews scheduled on the platform.
- [SP-84]: The system collects feedback from students, company tutors and university tutors through questionnaires.

- [SP-85]: The system analyzes feedback from questionnaires to improve internship recommendations.
- [SP-86]: The system tracks the progress of active internships and generates status updates for students and tutors.
- [SP-87]: The system automatically flags overdue tasks or issues in internships for review by university tutors.
- [SP-88]: The system syncs calendar events with external platforms (e.g., Google Calendar, Outlook).
- [SP-89]: The system displays a consolidated view of calendar events for students, company tutors and university tutors.
- [SP-90]: The system enables automated messaging to notify users about changes in internship statuses.
- [SP-91]: The system provides users to filter and search messages by keywords, sender, or date.
- [SP-92]: The system generates and updates dashboards for students, company tutors and university tutors to reflect real-time data.
- [SP-93]: The system calculates statistics on platform usage for reporting and analysis.
- [SP-94]: The system encrypts and secures user data to maintain privacy and comply with data protection regulations.
- [SP-95]: The system verifies uploaded documents (e.g., resumes, contracts) for format, validity and size.
- [SP-96]: The system provides automated suggestions for meeting times based on calendar availability.
- [SP-97]: The system detects potential conflicts in schedules and suggests resolutions.
- [SP-98]: The system provides chatbot assistance for answering frequently asked questions and guiding users through processes.
- [SP-99]: The system escalates unresolved issues reported in messaging to relevant university or company stakeholders.
- [SP-100]: The system monitors and logs all interactions for accountability and auditing purposes.

## 1.3. Definitions, Acronyms, Abbreviations

### 1.3.1. Definitions

- **User/actor:** A generic person who uses the platform. Can be either a student, company tutor or a professor.
- **Use Case:** A table outlining how an actor interacts with the system to achieve a specific goal. Each use case is typically structured to include entry conditions, a sequence of events, potential exceptions and the conditions under which the use case concludes.
- **Sequence Diagram:** A type of UML diagram that visualizes the interactions between actors and the system over time. It illustrates the flow of messages and actions required to complete a use case.
- **Student:** A primary actor representing a user who interacts with the platform to search for internships, submit applications and communicate with other types of users.
- **Company Tutor:** A primary actor representing a user who interacts with the platform to post internships, evaluate candidates and communicate with students and university tutors.
- **University Tutor/Academic Tutor:** A primary actor representing a user who monitors internship progress, evaluates reports and ensures alignment between the internship and university goals. He also has the ability to communicate with students and company tutors
- **Responsible Tutor:** a company or university tutor who is responsible for creating the profile either for the company or for the university, but not both.
- **Internship/Stage0 :** A professional opportunity offered by a company to provide practical work experience to students.
- **Platform/Product:** The Students & Companies (S&C) system that facilitates communication, application management and monitoring of internships among students, companies and universities.
- **World Phenomena:** Events that occur in the external environment and are not directly observed or controlled by the system but influence its behavior.
- **Shared Phenomena:** Events or interactions that involve both the external world (actors) and the system. These phenomena can be categorized as machine-controlled or world-controlled.
- **Machine-Controlled Phenomena:** Events or processes initiated and managed by the system, such as sending notifications, analyzing data, or providing recommendations.
- **World-Controlled Phenomena:** Events or processes initiated and managed by external actors, independent of the system's direct control. Examples include user

decisions, environmental changes, or actions taken by other systems that affect the system's behavior.

- **Dashboard/Widget:** A user interface component that provides an overview of relevant information and actions for a specific actor (e.g., a student's list of internships or a company tutor's candidate applications).
- **Questionnaire:** A structured form used to collect feedback from students, company tutors and university tutors regarding internship performance and experience.
- **Notification:** An automated alert sent by the system to inform users about relevant events, deadlines, or updates (e.g., new internships, application status changes).
- **Calendar:** A feature of the platform that allows users to view, schedule and manage internship-related events such as interviews, feedback meetings, or submission deadlines.
- **Resume (CV):** A document uploaded by students to showcase their skills, experiences and qualifications to potential companies offering internships.
- **Recommendation System:** An automated functionality that uses algorithms to suggest internships to students or candidates to companies based on matching criteria such as skills, preferences and experiences.
- **Application Status:** The current state of a student's application for an internship (e.g., submitted, shortlisted, rejected, accepted).
- **Chatbot:** A LLM-based assistant integrated into the platform to help users by answering queries, providing guidance and resolving basic issues.
- **Feedback:** Qualitative or quantitative information provided by users (students, company tutor, or university tutor) about the performance or experience of an internship.
- **Matching Algorithm:** A computational method used to align student profiles with internship opportunities or company requirements, improving the efficiency and accuracy of the selection process.
- **Register/Sign Up:** process that involves the creation of a profile on the platform.
- **Log in/Sign In:** process that involves connecting on the platform to a profile created before (when a user is not inside a profile anymore). Is mandatory to first complete successfully the registration on the platform.

### 1.3.2. Acronyms and abbreviations

- **w.r.t.:** with respect to
- **i.e.:** *Id est*, that is
- **e.g.:** *Exempli gratia*, for example
- **CV:** Curriculum Vitae

- **RASD**: Requirements Analysis & Specification Document
- **S&C**: Students & Companies
- **WP**: World Phenomena
- **SP**: Shared Phenomena
- **LLM**: Large Language Model
- **RAG**: Retrieval Augmented Generation
- **UI**: User Interface
- **API**: Application Programming Interface
- **AI**: Artificial Intelligence
- **NLP**: Natural Language Processing
- **HTTPS**: Hypertext Transfer Protocol Secure
- **UML**: Unified Modeling Language
- **PMI**: Piccole e Medie Imprese, Small and Medium-sized Enterprises
- **FR**: Functional Requirements
- **UC**: Use Case
- **PK**: Primary Key
- **FK**: Foreign Key

## 1.4. Revision History

This document has undergone multiple revisions to improve and update its content. A complete list of document versions along with detailed explanations of the updates can be found in the GitHub repository at this link. The repository includes PDF files for intermediate versions, each documented with changes in the "RASD\_Drafts explanation" file.

The following intermediate versions have been documented:

- RASD VERSION 1.pdf
- RASD VERSION 2 (Zipped latex)
- RASD VERSION 3.pdf
- RASD VERSION 4.pdf
- RASD VERSION 5.pdf
- RASD VERSION 6.pdf
- RASD VERSION 7.pdf

- RASD VERSION 8.pdf
- RASD VERSION 9.pdf
- RASD VERSION 10.pdf
- RASD VERSION 11.pdf
- RASD VERSION 12.pdf
- RASD VERSION 13.pdf
- RASD VERSION 14.pdf
- RASD VERSION 15.pdf
- RASD VERSION 16.pdf
- RASD VERSION 17.pdf
- RASD VERSION 18.pdf
- RASD VERSION 19.pdf
- RASD VERSION 20.pdf
- RASD VERSION 21.pdf
- RASD VERSION 22.pdf
- RASD VERSION 23.pdf
- RASD VERSION 24.pdf
- RASD VERSION 25.pdf
- RASD VERSION 26.pdf
- RASD FINAL VERSION

Each version addresses specific enhancements and corrections as part of our ongoing effort to provide accurate and useful documentation.

## 1.5. Reference Documents

The document is based on the following materials:

- The specification of the RASD and DD assignment of the Software Engineering II course a.a. 2024/2025
- Slides of the course on WeBeep
- Course book created from notes: <https://drive.google.com/drive/u/1/folders/1dH-0IdPxUwhFMTnOr7UGTCkolvEL6g15>
- IEEE Standard for RASD, ISO/IEC/IEEE 29148 (Nov 2018) <https://doi.org/10.1109/IEEESTD.2018.8559686>

## 1.6. Document Structure

This document is structured to provide a comprehensive and systematic approach to the specification of the software system. Below is an outline of the document's structure and the primary focus of each section:

1. **Introduction 1:** Outlines the project's objectives, scope and definitions relevant to the document. It also includes the phenomena, revision history, a list of abbreviations, definitions used throughout the document.
  - (a) **Purpose 1.1:** Details the objectives and goals of the project.
  - (b) **Scope 1.2:** Describes the scope of the application, its application domain, user interactions and high-level software capabilities.
  - (c) **Definitions, Acronyms, Abbreviations 1.3:** Provides definitions of terms and acronyms used.
  - (d) **Revision History 1.4:** Records changes and updates made to the document.
  - (e) **Reference Documents 1.5:** Lists documents and sources referenced in the preparation of this document.
  - (f) **Document Structure 1.6:** Describes the layout and content of the document.
2. **Overall Description 2:** Discusses the general factors that affect the product. This section also contains all the assumptions, dependencies and constraints in order to get the platform functional.
  - (a) **Product Perspective 2.1:** Includes scenarios, class diagrams and state diagrams to provide context for the product.
  - (b) **Product Functions 2.2:** Describes the primary functions of the product.
  - (c) **User Characteristics 2.3:** Identifies the users of the product and their needs.
  - (d) **Assumptions, Dependencies and Constraints 2.4:** States any assumptions and constraints that could affect the platform.
3. **Specific Requirements 3:** In-depth analysis of the specific requirements.
  - (a) **External Interface Requirements 3.1:** Specifies the interfaces of the software with other hardware, software and communication protocols.
  - (b) **Functional Requirements 3.2:** Describes all the interactions that the users will have with the software.
  - (c) **Performance Requirements 3.3:** Outlines the quantitative aspects of the system which must be met.
  - (d) **Design Constraints 3.4:** Specifies constraints on the system design imposed by standards or hardware limitations.
  - (e) **Software System Attributes 3.5:** Discusses attributes such as reliability, security and maintainability.

4. **Formal Analysis Using Alloy 4:** Describes the formal analysis methods used to validate the requirements of the system.
5. **Effort Spent 5:** Documents the effort in hours for the creation of this document, detailed by each contributor.

# 2 | Overall Description

This section provides a general overview of the Students & Companies (S&C) system, describing its operational context and interaction with users and the external environment. This part of the document is essential to understand the system's structure, its main actors and how it fulfills user requirements. Specifically, it covers:

- The product perspective, offering a detailed analysis of usage scenarios.
- Conceptual diagrams representing the main domain entities and their interactions.
- The lifecycle of states for key system functionalities.

## 2.1. Product Perspective

The Students & Companies (S&C) system is a platform designed to facilitate interactions among students, companies and universities in the context of internships. This subsection provides an overview of the system's scope and purpose, highlighting how it addresses key challenges in managing internships effectively.

The Product Perspective section is structured into the following subsections:

- **Scenarios:** Describes typical use cases for the system, illustrating how students, companies and universities interact with its functionalities.
- **Domain Class Diagram:** Provides a conceptual representation of the main entities within the system and their relationships.
- **State Diagram:** Outlines the lifecycle of the system's core processes, detailing the transitions between different states.

These subsections collectively define the operational context of the system, offering insights into how its components work together to meet user requirements.

### 2.1.1. Scenarios

The purpose of this section is to illustrate the operational contexts in which S&C platform would function. It explains how the system's functionalities should be designed to meet user requirements by presenting a detailed exploration of the entire operational cycle of the software from the perspective of all user types.

To improve readability a narrative style is used to describe these scenarios. Each scenario

tells a story that depicts a possible real-life situations within the S&C software. This aims to provide transparency from both theoretical and practical viewpoints, ensuring clarity not only about what happens but also about how users interact with the system to make it happen.

The protagonists of the following scenarios are:

- **Lorenzo:** Lorenzo is a university student who pursues a Bachelor's degree in Artificial Intelligence at the University of Pavia. As part of his academic program, he is required to complete an internship which he also intends to use as the basis for his thesis. After not receiving positive responses to his CV submissions through various company websites, Lorenzo decides to explore the S&C platform.
- **David:** David works at *AISent*, a small and medium-sized company (PMI). He is looking for a student to collaborate on a Computer Vision project, making him an ideal example of a Company Tutor who benefits from the S&C platform.
- **Claudio:** Claudio is a professor at the University of Pavia. Lorenzo, after finding an internship, contacts Claudio to request that he serve as his academic tutor. In this capacity, Claudio will act as a liaison between the company and the intern, oversee the internship's progress.

The interaction lifecycle between these three stakeholders and the S&C platform will be analyzed in detail through the following stages:

1. Student's (Lorenzo) scenarios.
2. Company Tutor (David) scenarios.
3. University tutor (Claudio) scenarios.

Although there are common user scenarios, it was decided to present everything separately in order to make the process clear from start to finish for each type of user.

## Stage A: Student's Scenarios

### **Scenario [A-1]: *The Student Opens the S&C Application***

The first interaction between the student Lorenzo and the S&C application focuses on accessing the platform, see Figure 3.1. Upon entering, Lorenzo is presented with the following options on the access page which features the system's logo:

- **Login:** If Lorenzo already has an account, he can log in to access his profile and continue using the platform.
- **Registration:** If Lorenzo is a new user, he may choose to create an account, allowing him to explore the platform and assess how his profile aligns with available internships.
- **Language Change:** Lorenzo can switch the system language via a dropdown menu to suit his preference. See Figure 3.41.

- **Assistant:** If Lorenzo encounters issues or has questions, he can open a chat to receive support from the platform's LLM with RAG. See Figure 3.40.

This scenario focuses solely on the student's access. The subsequent four points will now be analyzed in detail as individual scenarios. The analysis will proceed with scenarios spanning from the student's initial application access to the internship's conclusion.

### **Scenario [A-2]: *Student Registration***

Upon choosing to register on the Students & Companies (S&C) platform, Lorenzo is presented with a registration form, visible in Figure 3.4, that requires filling out various fields. He has the option to upload his CV (see Figure 3.3), which the system can use to auto-fill these fields. If he does not upload a CV, he must enter his information manually:

- *Profile Photo*
- *Personal Data:* Name and Surname.
- *Contacts:* Phone Number, LinkedIn profile.
- *Institutional Email*
- *Department and Role*
- *Professional Biography*
- *Certifications, Awards, Recognitions*
- *Languages Spoken*
- *Security Questions and Security Answers*
- *Password*

The institutional email is very important for verifying a user's student status and university affiliation on a platform. It requires university staff to include all relevant email domains during the university profile setup, as outlined in section C-3, *University Profile Generation*. An LLM feature called *Information Improvement* at the end of the registration form helps improve the clarity and quality of entered information. Once revised, the user, like Lorenzo, can confirm their profile creation. There are four potential outcomes after confirming registration.

#### **Subscenario [A2-1] Mandatory fields incomplete:**

Lorenzo will be prompted to complete any missing fields.

#### **Subscenario [A2-2] All fields completed, domain registered:**

If the email domain matches one registered by his university, Lorenzo is directed to his new homepage to start using the application.

#### **Subscenario [A2-3] Fields complete, domain not registered:**

If Lorenzo's email domain is not recognized, he is put in contact with a support operator. Together, they discover that although he is part of a registered university, his specific email has not yet been added to the system. The university's profile creator, typically

an administrative staff member like Claudio, is then requested to add Lorenzo's specific email to the list of recognized emails. Once this addition is made, Lorenzo will receive an email confirmation allowing him to proceed with his registration. See Figure 3.5.

**Subscenario [A2-4] Domain and university not registered:**

If Lorenzo's email domain is not recognized, he is put in contact with a support operator. They determine that his university does not have an institutional profile on the platform. Consequently, registration cannot proceed until an administrative member or academic tutor from the university registers the institution and includes all potential institutional email. Lorenzo can opt to be notified via email once his university is registered, allowing him to complete his registration afterward.

**Scenario [A-3]: *The Student Login in the S&C Application***

Lorenzo proceeds to log in using the credentials obtained during the registration process. From the initial page, the student navigates to the dedicated login page with the intent of accessing the functionalities of the S&C platform (see Figure 3.7). To complete the login process, Lorenzo must enter his username (that is the email) and password into the designated fields for student credentials. Once authenticated, he gains access to the platform.

**Scenario [A-4]: *The Student Credential Recovery***

Despite having created a profile, Lorenzo has forgotten his password. Using the credential recovery feature, Lorenzo provides the answers to the security questions he selected during registration. The S&C system validates his responses, retrieves the email associated with his profile and sends a temporary password to his email. Lorenzo can then use the provided credentials to regain access to his account and reset his password.

**Scenario [A-5]: *The Student and the Chatbot Interaction***

Lorenzo is uncertain about the detailed functionalities of the S&C platform and wants to understand how his data will be used before providing his information. To address this and other doubts, Lorenzo interacts with the platform's chatbot. The chatbot offers clear explanations, providing information about data usage and the platform's features. If Lorenzo requires further clarification, the chatbot sends his query to a human representative for additional support.

**Scenario [A-6]: *Student Language Change***

Whenever Lorenzo wishes to change the platform's language, he can easily do so without navigating away from his current activity. A flag icon representing the current language is visible on every page of the S&C platform. By clicking on this icon, Lorenzo is presented with a dropdown menu featuring other available languages, each represented by its respective flag. He selects his preferred language, such as *Italian, English, French, Spanish, or German*. The platform instantly updates to his chosen language.

**Scenario [A-7]: *The Student Enters the S&C Homepage***

After successfully logging into the Students & Companies S&C platform, Lorenzo is imme-

dately presented with a homepage tailored to support his needs as a student navigating internship opportunities. The platform welcomes him with a personalized interface designed to streamline his academic and professional journey. The homepage is visible in Figure 3.8.

Lorenzo's profile is prominently displayed on the left side of the screen. Here, he can see his profile picture, his full name and his role at the university (student). A settings option allows him to adjust his account details and preferences, ensuring the platform aligns with his personal requirements. At any moment, Lorenzo can switch the platform's language to suit his preference and he has access to a LLM with RAG chatbot, which provides guidance whenever he encounters doubts or difficulties.

In the main section of the homepage, Lorenzo can quickly orient himself using two essential tools: the *Calendar Widget* and the *Notifications Widget*. The calendar helps him stay organized, showing upcoming events and allowing easy access to a more detailed planning view. Notifications ensure Lorenzo stays informed, highlighting key updates about internships or administrative matters. These updates are color-coded, so he can immediately distinguish between calendar events, internship updates and urgent issues.

Lorenzo's navigation experience is further simplified by a bar at the bottom of the page, which provides direct links to vital sections of the platform. He can explore internship opportunities through the *Matchmaking* section, track his progress in the *Monitoring* area, manage his schedule in the *Calendar* and communicate with companies or administrators in the *Messages* section. These tools are strategically designed to empower Lorenzo, giving him control and clarity over his internship journey.

### **Scenario [A-8]: *The Student Searches for an Internship***

After successfully logging into the S&C platform and viewing his homepage, Lorenzo is ready to embark on his search for internships. This search process includes all preliminary actions before establishing contact between Lorenzo and potential employers. Contact occurs when there is mutual interest from both the company and the student concerning a position.

The contact can be classified into two main categories:

- The first is related to Lorenzo's applications (i.e., the search part that starts from the student via the matchmaking page). From here, two sub-scenarios derive: A8.1 and A8.2.
- The second category of internship search focuses on the possibility that contact occurs not because of initial interest from the student followed by the company's response, but the opposite—where the company sends a request for participation in the selection process. This category of contact will be explored in Scenario 11.

In the two following scenarios, we analyze the initial part of potential contacts from CATEGORY 1, namely those that begin with Lorenzo's applications, which can occur in the two following ways:

### **Subscenario [A8-1]: *Recommendation List in Matchmaking***

In the *Recommendation List* section of the matchmaking interface (visible in Figure 3.11), Lorenzo is presented with internship opportunities that the system believes are aligned with the qualifications and career aspirations detailed in his profile during registration. This recommendation system is designed to provide him with curated opportunities directly at his fingertips, offering personalized suggestions that match his preferences and requirements. The *Recommendation List*, centrally positioned on the matchmaking page, includes:

- **Title and Details:** Clicking on an internship title, Lorenzo can access a detailed description of the role, outlining the expectations, responsibilities and required qualifications.
- **Engagement Options:** Each listing provides Lorenzo with options to apply directly, save for later review, or decline. This adaptability helps him tailor the recommendations over time according to his changing preferences. Being a recommendation-based scenario, what Lorenzo selects in the engagement options can influence the system's future suggestions, enhancing the relevancy of future presented opportunities.

If Lorenzo decides to refine the list further, he can use tags recommended by the system to filter positions by job type or category.

If Lorenzo applies for a job, the application moves from the matchmaking page to the Monitoring page, where he can monitor the progress of his application as described in detail in Scenario 9.

### **Subscenario [A8-2]: *Custom Search in Matchmaking***

If the recommendation system fails to meet Lorenzo's preferences, he has the option to perform a custom search. By utilizing the Search Bar, located at the top right of the matchmaking interface (visible in Figure 3.11), Lorenzo can input specific keywords related to his desired internships. This search functionality enhances his ability to uncover roles that might not be immediately visible through default filters. Using the comprehensive search engine of the platform, Lorenzo explores all available positions listed on the platform. This approach gives him the ultimate flexibility to find opportunities that perfectly align with his specific interests and career goals, ensuring that he does not miss out on potential matches that could be hidden beyond immediate recommendations.

### **Scenario [A-9]: *The Student Navigates the Monitoring Page***

After navigating the matchmaking page, Lorenzo moves on to the subsequent Monitoring Page (visible in Figure 3.11). This section allows him to manage various aspects of his internship process, organized into three distinct tabs, each with its unique purpose.

The first tab, *Selection Process*, is dedicated to managing all activities from the initial matchmaking phase to the start of an internship. It enables Lorenzo to track applications, respond to company invitations and take necessary actions before an internship begins. The second tab, *Active Stage*, focuses on internships that are currently ongoing, allowing him to monitor progress and address issues during this phase. The third tab,

*Questionnaire*, provides access to feedback forms completed during two critical phases of the internship: after the first meeting and at its conclusion. Navigation within this tab is organized into sub-sections, one for each questionnaire.

The *Selection Process* tab contains a detailed table listing all internships Lorenzo is currently managing. Each row in the table represents a specific internship and includes several fields. The *Company* field displays the company name, which Lorenzo can click to view additional details. Similarly, the *Company Tutor* field shows the tutor's first and last name, with clickable access to their profile. A *Tag* indicates the origin of the application.

The *Academic Tutor* field reflects the current status of tutor assignment. If no tutor has been selected, the field shows *Not Defined*, prompting Lorenzo to make a choice. Once a professor agrees to take on the role, their name appears in the field and is clickable for further information. The *Associated Internship* field lists the title of the internship, also clickable, allowing Lorenzo to quickly review its details.

A particularly useful column, *Process Status*, summarizes the current state of each internship application, such as *Not Yet Seen* or *Accepted*. This status guides Lorenzo's actions for each application. For instance, if edits are needed, the *Modify Internship* option allows him to open a pre-filled form to make changes. If he decides to withdraw from an application, the *Remove* button enables him to terminate the process, automatically notifying the company of the rejection.

Through this organized interface, Lorenzo can efficiently manage his applications and monitor the progress of each internship. The Monitoring Page serves as a central hub, providing him with the tools and insights needed to navigate the different stages of his academic and professional development with confidence and ease.

#### **Scenario [A-10]: *The Student Monitors the Progress of his Applications***

As mentioned in Scenario A-8, the applications sent by the student are tracked in the Monitoring Page (visible in Figure 3.11) , specifically within the first tab named *Selection Process* described in detail in the A-9 Scenario. These kind of application applications can be recognized as they are the ones marked with the *Sent* tag in the *Tag* column of the table.

Within this tag, the status of these internships can be specifically identified as follows:

- **Not yet seen:** The company has not yet responded to the sent application.
- **Seen but no response:** The company has viewed the application but has not responded.
- **Rejected:** The company has rejected the sent application; this terminates the selection process.
- **Accepted:** The company has accepted the sent application.

This setup allows Lorenzo to efficiently track the status of each application and respond accordingly.

### **Scenario [A-11]: *The Student Monitors the Status of Requests Sent to Him***

As mentioned in Scenario A-8, contact occurs when there is mutual interest. In the previous scenario, we have seen scenarios related to Category 1 (where Lorenzo initiates contact by demonstrating interest). This paragraph now explores Category 2, which occurs when companies express interest in Lorenzo.

To view the companies that have invited him to participate in their selection process for specific positions, Lorenzo navigates within the *Monitoring Page* tab and looks at entries where the tag column is marked *Received*. Specifically, the student can accept or reject these positions, changing the status to:

- **Rejected:** The student has rejected the received offer; this terminates the selection process.
- **Accepted:** The student has accepted the received offer.

This mechanism allows Lorenzo to effectively manage the incoming requests from companies. He can swiftly navigate through his options, making decisions that best align with his career goals.

### **Scenario [A-12]: *A Contact is Established - Selection Process (Student Overview)***

Once a connection between a student and a company is made, the system sends a notification (includes key details) to inform Lorenzo and the company of the successful match. This notification is stored in the message section of the application, allowing Lorenzo to review it at any time. This ensures that Lorenzo remains informed about new opportunities and can easily keep track of his connections as they arise, supporting effective engagement with companies.

Once a contact is established between Lorenzo and a company, the selection process (visible in Figure 3.13) unfolds in a structured and interactive manner. The process is designed to guide Lorenzo through each step, ensuring he has all the tools and information necessary to make informed decisions.

After a meeting has been scheduled, an icon appears on the platform that allows Lorenzo to access a dedicated chat. This feature facilitates direct communication between him and the company tutor, enabling immediate discussion about the internship. Following the meeting, the company tutor is required to complete a questionnaire evaluating Lorenzo. He/she have three days to submit this evaluation, during which Lorenzo receives a notification on his homepage reminding him of the deadline. Once completed, the questionnaire is stored in a specific section for later reference.

After reviewing the questionnaire, Lorenzo has one week to make a decision regarding the internship. He can use a dedicated icon to confirm his decision and the system provides a notification to remind him of the deadline. At this stage, Lorenzo communicates his final decision, which could take one of several paths. If he chooses to reject the internship, the selection process is terminated. Alternatively, if he requires additional information or discussion, Lorenzo can request another meeting with the company tutor. The company selects a new date and a pop-up notification is generated in the existing chat. Lorenzo

has three days to respond to this meeting without the possibility of scheduling another. A reminder notification ensures he is kept informed of the deadline.

If Lorenzo decides to accept the internship, the process advances to the next stage. This transition does not require a specific icon but is automatically reflected in the system, moving to stage 6, which involves assigning an academic tutor. Lorenzo then selects a professor to act as his tutor by entering his/her institutional email address. A notification is sent to the professor, who has three days to accept or decline the role. If the professor rejects the role, the system updates the status with an icon change, allowing Lorenzo to select a new tutor. This process repeats until a tutor is successfully assigned, activating the selection process.

The final step in the selection process involves the company tutor making its decision. The company has three days to finalize their decision, during which they can either reject the internship, terminating the process, or accept it, activating the internship. Upon acceptance, the internship is moved to the next screen and all other selection processes associated with Lorenzo are automatically rejected. The system also creates a history of states for the newly activated internship, starting with the status *Internship Started*.

Throughout the process, Lorenzo receives timely notifications on his homepage, keeping him informed of deadlines and key updates. This structured approach ensures that Lorenzo can efficiently navigate and manage each step of the selection process, making it clear and straightforward for him to progress toward securing an internship.

#### **Scenario [A-13]: *Lorenzo Monitors Active Stages***

After accessing the monitoring section, Lorenzo navigates to the *Active Stages* tab (visible in Figure 3.13), where he can track his ongoing internships and manage any issues reported by his academic or company tutors. Upon entering the tab, Lorenzo is presented with a list of his active internships. Each entry in the list prominently displays the name of the assigned company tutor, the academic tutor and the current status of the internship, which might be labeled as *In Progress*, *Suspended*, or *Completed*. These statuses are accompanied by color-coded icons, allowing Lorenzo to quickly identify the state of each internship. As Lorenzo reviews the list, he notices that any reported issues are clearly highlighted in red. Clicking on an issue opens a dedicated chat window where Lorenzo can discuss the matter directly with the relevant tutor, ensuring immediate communication to resolve the problem. The platform also provides useful tools to help Lorenzo stay on top of his internship activities. He can initiate direct chats with his tutors via quick-access buttons, enabling him to ask questions or provide updates about his progress. Real-time updates ensure that Lorenzo is always aware of any changes in the internship's status, such as schedule adjustments or new deadlines communicated by his tutors. This section of the platform empowers Lorenzo to stay informed and proactively manage his internship experience. The clarity of the displayed information and the ability to engage directly with tutors make monitoring an efficient and straightforward process.

#### **Scenario [A-14]: *The Student Completes the Final Evaluation Form***

At the conclusion of his internship, Lorenzo reflects on his experience by completing the *Final Evaluation form* (visible in Figure ??). He accesses this form through *Questionnaire*

*Tab* of the monitoring page, where it is prominently available as part of the closing phase of the internship. The form allows him to share his perspective on various aspects of the internship, providing valuable input for future improvements.

Lorenzo begins by rating the support he received from his company tutor, assessing how well the objectives and responsibilities were communicated and evaluating whether the internship contributed to his professional growth. Beyond these quantitative ratings, Lorenzo takes time to provide qualitative feedback by describing what he enjoyed most about the experience and offering suggestions for improvement.

Once he has answered all the questions, Lorenzo submits the form, ensuring his feedback is included in the overall evaluation of the internship. His responses, along with those of the company and academic tutors, contribute to a comprehensive assessment that helps refine future internship opportunities. This step marks the final action in Lorenzo's internship process, allowing him to conclude the experience with meaningful input that supports both his personal growth and the system's continual improvement.

#### **Scenario [A-15]: *The Student Navigates the Calendar Page***

To stay organized and manage his internship commitments effectively, Lorenzo accesses the *Calendar page* visible in Figure 3.29. This tool helps him keep track of all scheduled activities, ensuring he is prepared for upcoming events and deadlines.

Lorenzo uses the calendar to view his schedule in various timeframes, such as daily (Figure 3.29), weekly (Figure 3.30), or monthly (Figure 3.31) formats, depending on his needs. Key events related to his internship, including feedback meetings, monitoring sessions and deadlines, are clearly displayed. The calendar's structure makes it easy for Lorenzo to understand the nature of each event at a glance, thanks to its intuitive layout.

Although Lorenzo cannot create new events, he can modify certain details where allowed, such as adding personal notes or setting reminders for meetings with tutors or company representatives. Additionally, the platform provides notifications to help him stay informed, ensuring he does not miss important deadlines or appointments.

To further simplify his planning, Lorenzo can integrate the internship calendar with his personal tools, such as *Google Calendar* or *Outlook*. This synchronization allows him to have all his commitments in one place, making it easier to manage both academic and personal tasks. When needed, Lorenzo can also search for specific events, quickly finding relevant details without manually scrolling through the calendar.

By relying on the *Calendar page*, Lorenzo ensures that he remains organized and proactive, effectively balancing the demands of his internship with other responsibilities.

#### **Scenario [A-16]: *The Student Interacts with the Messaging System***

To manage communication during his internship, Lorenzo uses the platform's messaging system (visible in Figure 3.32). This tool provides him with a convenient way to stay connected with company tutors, academic tutors and other stakeholders. Whether he needs to coordinate meetings, seek clarifications, or report issues, Lorenzo can rely on this system for efficient and organized communication.

The messaging system notifies Lorenzo of new messages and organizes conversations by context, allowing him to quickly find relevant discussions. Through this feature, Lorenzo maintains effective communication with everyone involved in his internship, ensuring he can address concerns and stay aligned with expectations.

#### **Subscenario [A16-1]: *The Student Files a Complaint via Messaging***

During his internship, Lorenzo might encounter a situation that requires formal intervention. Using the messaging system's dedicated to complaint (see Figure 3.36), Lorenzo submits a detailed message explaining the issue he is facing. The platform ensures that his complaint reaches the appropriate parties, such as his academic tutor or the university administration, depending on the nature of the issue.

Once the complaint is submitted, Lorenzo receives confirmation and the system allows him to monitor the status of the complaint as it progresses (see Figure 3.35). Through follow-up messages, the responsible parties communicate with Lorenzo to provide updates and solutions. This process ensures that Lorenzo's concerns are addressed in a structured and timely manner, helping him feel supported throughout his internship.

### **Stage B: Company Tutor's Scenarios**

#### **Scenario [B-1]: *The company tutor Opens the S&C Application***

When David, a company tutor from AISent, accesses the S&C application, his first interaction is with the access page. He is faced with several options visible in Figure 3.1:

- **Login:** David can log in using his existing credentials to manage internship postings and review applications. (see Figure 3.7).
- **Registration:** new company tutors can register their account to start using the platform.
- **Language Change:** David can modify the system's language through a drop-down menu, facilitating communication in his preferred language. (see Figure 3.41).
- **Assistant:** for any assistance or queries, David can access immediate support through the chat feature powered by the platform's LLM with RAG.

This scenario outlines the initial access steps for the Company Tutors. Further scenarios will detail each action individually as they relate to the company tutor's interaction with the S&C platform.

#### **Scenario [B-2]: *Company Tutor Registration***

David decides to register to the S&C platform and is directed to complete a registration form specifically designed for Company Tutors. The information required includes (see Figure 3.4):

- *Profile Photo*
- *Personal Data:* Name and Surname.

- *Contacts*: Phone Number, LinkedIn profile.
- *Institutional Email*
- *Department and Role*
- *Professional Biography*
- *Certifications, Awards, Recognitions*
- *Languages Spoken*
- *Security Question*
- *Password*

At the bottom of the registration form, David can use the *Improve Content* button, which employs an LLM to analyze and suggest improvements to the clarity and quality of the information provided.

Once the form is completed and refined, David can proceed to confirm the creation of his Company Tutor profile. Depending on the information provided, the following subscenarios may occur:

**Subscenario [B2-1]: Mandatory fields incomplete.**

David will be prompted to complete them if any required fields are left unfilled.

**Subscenario [B2-2]: All fields completed, domain registered.**

If the email domain matches one already registered with the platform and associated with his company, David is directed to his new homepage to start managing internship postings and reviewing applications.

**Subscenario [B2-3]: Domain not registered.**

If David's email is not recognized, he is put in contact with a support operator. Together, they discover that while his company is registered with the platform, his specific email has not yet been added to the system. David is then instructed to contact a company administrator to add his specific email to the list of recognized emails. Once this addition is made, David will receive an email confirmation allowing him to proceed with his registration.

**Subscenario [B2-4]: Domain and company not registered.**

If David's email domain is not recognized, he is put in contact with a support operator. Together, they determine that his company does not have a profile on the platform. Consequently, registration cannot proceed until a company administrator registers the institution and includes all potential company email domains. David will be prompted to initiate the company profile setup as described in scenario [B-3]. He can also opt to be notified via email once his company is registered if he does not want to create the company profile.

### **Scenario [B-3]: *Company Profile Creation***

As said in Scenario B2-4, If a Company Tutor like David finds that his company's domain is not registered on the S&C platform, he is put in contact with a support operator. Together, they verify that the company does not have a profile on the platform. Following this verification, a link is sent to David's mail for the profile creation page. This page allows him to establish a complete profile for his company with the following required fields:

- *Logo*
- *Name*
- *Contacts*
- *Office Address*
- *Operational Sector*
- *Size*
- *Description*
- *Certifications, Awards, Recognitions*
- *Tutor Domain(s)*

Once the profile is submitted, it undergoes a verification process. If it meets the platform's standards, it is activated and David receives an email with a link to his company's homepage. If the profile is not approved, he will receive detailed feedback with a link to revise and resubmit the profile.

### **Scenario [B-4]: *tutor Login***

David (or any other tutor) proceeds to log in using the credentials obtained during the registration process. From the homepage, David navigates to the login page (see Figure 3.7), intending to access the S&C platform to manage internship opportunities and applications. To log in, David must enter his username (his institutional email) and password into the fields designated for company tutor credentials. Upon successful authentication, he gains access to the platform.

### **Scenario [B-5]: *The company tutor Credential Recovery***

David (or any other company tutor) encounters a situation where he has forgotten his password. Using the credential recovery feature, David answers the security questions he set up during registration. Upon verifying his responses, the S&C system provides him with the email linked to his account and sends a temporary password to that email address. With these credentials, David can log in and reset his password for continued access.

### **Scenario [B-6]: *The company tutor and the Chatbot Interaction***

David has questions about how to use specific features of the S&C application, such as creating an internship posting or reviewing student profiles. To resolve his doubts, David

interacts with the platform's chatbot (see Figure 3.40). The chatbot provides step-by-step guidance and answers frequently asked questions. If David's concerns are not fully addressed, the chatbot sends his query to a human representative for further assistance.

**Scenario [B-7]: *Company Tutor Language Change***

David can change the platform's language at any time during his session by interacting with the flag icon displayed on every page. This icon opens a dropdown menu (visible in Figure 3.41) containing options like *Italian*, *English*, *French*, *Spanish* and *German*, each accompanied by its national flag. Selecting a new language from this menu immediately updates the interface, allowing David to continue his recruitment activities in the language of his choice.

**Scenario [B-8]: *The Company Tutor Enters the S&C Homepage***

When David, acting as a company tutor, logs into the Students & Companies (S&C) platform, he is greeted by a personalized homepage tailored to his responsibilities (see Figure 3.9).

On the left side of the page, David's profile is prominently displayed, including his name, role and profile picture. This section also provides him with options to adjust account settings, switch the platform's language, or access support through an integrated assistant. These features ensure that the platform is adaptable to David's preferences and needs.

In the central area of the homepage there are two widgets that keep him informed and organized. The *calendar widget* highlights upcoming events, offering a quick way to view his schedule or jump to the full calendar for detailed planning. The *notifications widget* provides updates on critical matters, such as internship progress and reported issues. These notifications are color-coded, allowing David to quickly identify and prioritize tasks, from reviewing calendar events to resolving urgent problems flagged in red.

At the bottom of the homepage, David finds a navigation bar that simplifies access to the platform's main sections. This includes a *matchmaking area*, where he can explore recommended student profiles and a *monitoring section*, where he can manage internships. Within the monitoring area, David can track internships he has created, review their selection processes and oversee active engagements with students. The navigation bar also connects him to tools for managing meetings, events and communications.

**Scenario [B-9]: *The Company Tutor Searches for Candidates***

After logging into the S&C platform, David navigates to the Matchmaking section (see Figure 3.12) to explore potential candidates for his company's internship positions. The platform provides him with a personalized interface, offering recommendations based on a detailed analysis of the skills, experiences and interests of students compared to the requirements of the internships posted by David's company.

Through this section, David can efficiently search for candidates using tailored recommendations or by conducting a more specific search. The system is designed to assist him in identifying the most suitable students, streamlining the candidate selection process and saving time.

### **Subscenario [B-9.1]: Recommendation List in Matchmaking .**

David begins by reviewing a curated list of students (see Figure 3.12) whose profiles closely match the internships he has posted. Each recommendation is accompanied by key details, including the student's name, the relevant internship title and a match percentage that indicates how well the student aligns with the position. If David finds a profile particularly relevant, he can view more details and send a direct offer to the student, initiating the selection process.

To refine the recommendations further, David can apply filters to narrow down the list based on specific criteria, such as required skills or language proficiency. He can also sort the list by relevance, ensuring the most suitable candidates appear at the top. If he feels the recommendations do not fully meet his needs, David has the option to provide feedback on the suggestions, helping improve future results.

### **Subscenario [B9-2]: Custom Search in Matchmaking .**

If the recommended profiles do not fully satisfy his requirements, David switches to a custom search. Using keywords or specific criteria, he can locate students whose profiles might not appear in the default list. This approach provides David with the flexibility to search for highly specific qualifications or specific skills that align with the unique needs of his company.

Once David identifies a suitable candidate, he sends an invitation to initiate the selection process. The system automatically transfers this interaction to the *Monitoring section*, where David can track the progress of his applications and manage follow-up actions as needed.

### **Scenario [B-10]: *The Company Tutor Navigates the Monitoring Page* .**

After exploring potential candidates in the matchmaking section, David moves on to the *Monitoring Page* (see Figure 3.12) to manage ongoing applications and internships. This page serves as a central hub for overseeing all stages of the internship process, from the initial selection phase to active internships and feedback evaluations.

The *Monitoring Page* is divided into three main tabs, each addressing a specific aspect of internship management. In the *Selection Process* tab, David tracks applications and interactions with students before an internship officially begins. This includes reviewing candidate details, monitoring application statuses and making decisions about proceeding to the next steps. The *Active Stages* tab focuses on managing internships that are currently in progress, enabling David to address any issues or updates during this phase. Finally, the *Questionnaires* tab provides access to feedback forms, which are completed at key moments, such as after the first meeting or at the conclusion of the internship.

In the *Selection Process* tab, David sees a table summarizing all the internships he is managing. Each row represents a specific internship, displaying details about the student, including their name and the origin of the application—whether the student applied directly or was invited by the company. David can also review the associated academic tutor for each internship, if one has already been selected, or follow up if this step is still pending.

The table also highlights the title of the internship, providing a quick link to review or modify its details if needed. The current process status is clearly displayed, guiding David on what actions are required next, whether it's scheduling an interview, updating application details, or removing an application entirely. For any adjustments, David can open the internship creation screen to edit pre-filled fields or terminate the process if necessary, automatically updating the status for the student.

#### **Scenario [B-11]: *The Company Tutor Monitors the Progress of Applications Sent to Students***

As mentioned in Scenario B-9, the applications sent by the company to students are tracked in the Monitoring Page (see Figure 3.16), specifically within the first tab named *Selection Process*. These applications can be recognized as they are the tables marked with the *Sent* tag in the Tag column.

Within this tag, the status of these applications can be specifically identified as follows:

- **Not yet seen:** the student has not yet responded to the sent application.
- **Seen but no response:** the student has viewed the application but has not responded.
- **Rejected:** the student has rejected the sent application; this terminates the selection process.
- **Accepted:** the student has accepted the sent application.

This setup allows David to efficiently track the status of each application and respond accordingly. The design of the *Monitoring Page* ensures that David is kept up-to-date with real-time updates regarding the applications he has sent, enabling him to manage the selection process effectively and plan next steps based on the feedback from students.

#### **Scenario [B-12]: *The Company Tutor Monitors the Status of Requests Sent by Students***

As mentioned in Scenario B-9, contact occurs when there is mutual interest. Until now, we have seen scenarios related to Category 1, where the company initiates contact by demonstrating interest. This paragraph explores Category 2, which occurs when students express interest in the company's positions.

To view the students who have applied to participate in their selection process for specific positions, David navigates within the *Monitoring Page* tab and looks at entries where the Tag column is marked *Received*. Specifically, the tutor can accept or reject these applications, changing the status to:

- **Rejected:** the company has rejected the received application; this terminates the selection process.
- **Accepted:** the company has accepted the received application.

This mechanism allows David to effectively manage incoming applications from students. He can swiftly navigate through the options, making decisions that best align with the

company's goals. This proactive engagement ensures that David remains in control of the selection process, effectively managing and responding to the opportunities presented by students.

**Scenario [B-13]: *Selection Process (Company Tutor Overview)*** .

Once David establishes contact with a student, he begins the detailed selection process to finalize the internship. Each step is designed to guide David through his responsibilities and ensure efficient communication and decision-making.

The process starts when the student accepts the initial contact, enabling David to schedule a meeting directly through the calendar. Once the meeting is arranged, David can initiate a dedicated chat with the student, allowing for seamless communication to discuss internship details and address any questions or clarifications.

After the meeting, David completes a questionnaire to evaluate the student's suitability for the role. He has three days to finalize this task and the platform provides reminders to ensure timely submission. The completed questionnaire is stored for future reference, contributing to the decision-making process.

Following the evaluation, the student reviews the feedback and has one week to decide whether to accept the internship. If further clarification is needed, David can schedule another meeting with the student, ensuring all doubts are resolved. Once the student makes their decision—whether to accept, request modifications, or decline the internship—the process advances accordingly. If the student accepts, they proceed to select an academic tutor, a step that involves notifying the professor and awaiting their confirmation.

At the final stage, David reviews all aspects of the process and has three days to make the company's decision. If the internship is approved, the selection process transitions to the active internship phase, automatically rejecting other pending applications from the student. The platform logs the decision and creates a history of the internship's progress, starting with the status *Internship Started*.

**Scenario [B-14]: *The Company Tutor Monitors Active Internships*** .

After logging into the Monitoring section, David navigates to the Active Stages tab to oversee the internships currently in progress. This section provides him with a clear and organized view of all active internships, enabling him to manage ongoing tasks and address any issues that arise.

David begins by reviewing a table that summarizes key details for each active internship. For every student, he can see their name, which he can click to access their profile for additional information. The table also displays the name of the academic tutor assigned to the internship, providing David with a direct communication link if needed. The status of each internship is clearly indicated, using icons to show whether it is *In Progress*, *Suspended*, or *Completed*. If any issues have been flagged, they are highlighted in red, allowing David to quickly identify and address them. Clicking on an issue reveals further details and provides access to a dedicated chat feature for resolution.

Beyond monitoring, David has the ability to actively manage the internships. He can

update the status of an internship to reflect changes, such as marking it as *Suspended* if a problem arises. If David identifies a new issue, he can report it using the problem reporting field, ensuring that all parties involved are informed. Additionally, he can use the built-in chat system to contact the academic tutor or the student directly, facilitating quick communication and resolution of any concerns.

Through the *Active Stages tab*, David remains in control of all active internships, ensuring that any challenges are addressed promptly and that the process continues smoothly. This feature supports David in maintaining oversight and fostering collaboration among all participants involved in the internships.

**Scenario [B-15]: *The Company Tutor Creates a New Internship***

David, acting as a company tutor, accesses the *Monitoring* section of the platform to create a new internship opportunity. This task allows him to define a position that aligns with his company's needs while attracting suitable candidates from the student community. David navigates to the *New Internship Creation* screen, where he can either start from scratch or simplify the process by using predefined templates.

If David opts for a template, he can quickly populate key fields such as the title, category and basic requirements for the position, saving time and ensuring consistency with common internship structures. For a more customized approach, David manually fills out mandatory fields, such as the title and description of the internship, specific skills or qualifications required and the duration of the internship. He also specifies whether the position is remote, in-person, or hybrid and includes details about compensation, the application deadline and the operational languages needed for the role.

To ensure clarity and attractiveness, David can use the platform's built-in content optimization feature, which leverages an LLM to refine the internship description. This tool helps him present the opportunity in a professional and engaging manner, increasing the likelihood of attracting well-suited candidates.

Once the details are finalized, David has several options to manage the internship posting. He can save it as a draft to review later, publish it immediately to make it visible to students, or save it as a reusable template for similar positions in the future. If needed, David can also return to the previous screen without saving his changes.

Through this streamlined process, David creates an internship that clearly communicates the company's expectations and provides students with a comprehensive understanding of the opportunity. The platform's tools and intuitive design support David in efficiently completing this task, ensuring that the internship meets both company needs and student expectations.

**Scenario [B-16]: *The Company Tutor Manages Internship Drafts***

David, acting as a company tutor, accesses the *Draft Management* screen to review and manage the internship drafts he previously saved. This section provides him with a clear overview of all draft positions and the tools needed to finalize or remove them based on his current requirements.

On the screen, David sees a list of all saved drafts displayed in a central table. Each draft includes essential details, such as the internship title, the date and time of the last modification and the status of the draft—indicating whether it is complete and ready for publication or if mandatory fields are still missing. This summary helps David quickly identify which drafts need further attention before they can be published.

To manage a draft, David can choose from several actions. If a draft requires updates, he can open it in the *New Internship Creation* screen, where he can make modifications to fields such as the description or required skills. Once satisfied with the content, David has the option to publish the internship, making it visible to students on the platform. Alternatively, if a draft is no longer needed, he can delete it permanently, with the system prompting him to confirm the action to avoid accidental removal.

To streamline his workflow, David can use filters and sorting tools to organize drafts by their completion status, category, last modification date, or title. This functionality ensures that David can efficiently locate and prioritize drafts, saving time and effort when managing multiple internship positions.

**Scenario [B-17]: *The Questionnaire Functionality (Company Tutor Perspective)*** .

David, a company tutor, uses the *Questionnaires* section within the *Monitoring page* to provide evaluations at different stages of a student's internship. This section is divided into two tabs, each dedicated to a specific phase: the first meeting and the final evaluation. Each tab guides David in providing structured feedback tailored to the internship's progress.

**Subscenario [B17-1]: *First Meeting Questionnaire*** .

At the start of the internship, David navigates to the first meeting questionnaire to assess the student's initial performance. This tab prompts David to evaluate key aspects, such as the student's clarity in communication, their understanding of the internship requirements and their enthusiasm for the role. Using multiple-choice and scale questions, David provides ratings and feedback on the student's suitability for the position.

In addition to structured questions, the tab includes open-ended fields where David can highlight the student's strengths and note areas that may require improvement. At the end of the process, David can save the completed questionnaire, ensuring the feedback is recorded for future reference. This step is essential in shaping the student's development and aligning expectations for the rest of the internship.

**Subscenario [B17-2]: *Final Evaluation Questionnaire*** .

As the internship concludes, David accesses the final evaluation questionnaire to provide a comprehensive review of the student's performance. This tab allows David to assess areas such as the student's ability to meet deadlines, their problem-solving skills and their overall contribution to the internship objectives. The questionnaire also includes open-ended fields for David to highlight the student's key strengths and suggest areas for growth.

The final evaluation gathers input not only from David but also from the student and the academic tutor, creating a complete overview of the internship. David can view feedback submitted by the other parties, which helps contextualize his own observations. Once completed, the evaluations are saved in the system, contributing to a detailed summary of the internship experience.

**Scenario [B-18]: *The Company Tutor Manages Events Through the Calendar*** .  
David, acting as a company tutor, accesses the *Calendar Events* section to navigate, manage and create events related to internships. This tool provides him with a comprehensive overview of all scheduled activities, ensuring effective organization and coordination with students, academic tutors and other stakeholders.

**Subscenario [B18-1]: *Navigating Events in the Calendar*** .

David begins by exploring the calendar to review upcoming deadlines and scheduled activities. Switching between daily (Figure 3.29), weekly (Figure 3.30), or monthly (Figure 3.31) views, he gets a clear picture of his commitments. Events are visually organized and color-coded based on their category, such as meetings in purple, feedback sessions in green and project submissions in blue. This layout allows David to quickly identify the type and priority of each event.

When David selects an event, a detailed view opens, showing all relevant information. He can see the event's title, category, date, time and description, along with the list of participants and their roles. If the event is virtual, David can access the video call link directly from the event details, along with a shortcut to the associated chat for quick communication. David also confirms his attendance using the available options, which automatically updates his status for the event.

**Subscenario [B18-2]: *Creating and Managing Events*** .

When David needs to schedule a new event, he uses the calendar's creation functionality. He specifies key details such as the title, date and time and selects participants, including students, academic tutors, or other company representatives. For virtual events, David includes a video call link, which automatically generates an associated chat to facilitate communication before and after the meeting.

David categorizes the event using a dropdown menu, assigning a color-coded category such as *Meeting* or *Feedback*. If the event marks the end of an internship, David flags it as the *Final Event*, prompting the system to send final evaluation forms to all participants. Once all details are finalized, David saves the event and notifications are sent to all invited users to ensure they are informed.

For events already scheduled, David can make modifications, such as updating the time or participants, or canceling the event entirely. These changes trigger updated notifications to all involved, keeping everyone aligned.

**Scenario [B-19]: *The Company Tutor Manages Communications Through Messaging*** .

David, acting as a company tutor, accesses the *Messaging* section to manage his communications with students and academic tutors. This centralized platform simplifies the process of tracking and organizing conversations, ensuring effective communication and timely follow-ups.

Upon entering the messaging screen, David begins by selecting the type of user he wants to communicate with using the options at the top left of the interface. For example, he can choose to view conversations exclusively with students, companies, or university representatives. In cases where a conversation overlaps multiple categories, such as group discussions or video calls, the messages appear in each relevant category, ensuring they are easy to locate.

To refine his view further, David uses the filtering tools available at the top right. These tools allow him to search for messages by user name, date, type of message (e.g., text or video call), or specific keywords. If David needs to focus on conversations related to problem resolution, he can activate the *Problematic Messages* filter, which highlights issues flagged in red and places them at the top of his inbox.

In the central area of the screen, all messages are displayed in a unified view, organized based on David's preferences. Messages related to specific issues are emphasized, helping David quickly identify and address urgent concerns. When a video call is scheduled via the calendar, a dedicated chat is automatically generated for the invited participants, allowing seamless communication before and after the meeting.

The integration of video calls and automatic message summaries further enhances David's ability to manage discussions. By generating concise overviews of lengthy conversations, the system ensures that David can keep track of key points and follow-up actions without needing to review entire chat histories.

## Stage C: University Tutor's Scenarios

### Scenario [C-1]: *The University Tutor Opens the S&C Application* .

Claudio, a university professor, upon entering the S&C application, is greeted with the access page that provides:

- **Login:** Claudio can log in to manage his monitoring duties and oversee his students' internships. Figure 3.1.
- **Registration:** new university tutor can create accounts to connect with their students and manage internship affairs.
- **Language Change:** Claudio has the option to switch the system's language via a dropdown menu to ensure comprehension. See Figure 3.41.
- **Assistant:** for any technical support or questions, Claudio can utilize the chat feature to receive guidance from the LLM with RAG. Figure 3.40.

This scenario introduces the access options available to university tutors. It sets the stage for further detailed analysis of each option as individual scenarios, covering the full spectrum of the tutor's interactions with the S&C platform.

### **Scenario [C-2]: University Tutor Registration .**

When Claudio, a professor from the University of Pavia, decides to register on the S&C platform, he follows a registration process tailored for academic staff. The form he fills out includes:

- *Profile Photo*
- *Personal Data:* Name and Surname.
- *Contacts:* Phone Number, LinkedIn profile.
- *Institutional Email*
- *Department and Role*
- *Professional Biography*
- *Certifications, Awards, Recognitions*
- *Languages Spoken*
- *Security Questions and Security Answers*
- *Password*

At the bottom of the registration form (see Figure 3.4), Claudio can use the *Improve Content* button, which employs an LLM to analyze and suggest improvements to the clarity and quality of the information provided.

Once the form is completed and refined, Claudio can proceed to confirm the creation of his university tutor profile. Depending on the information provided, the following subscenarios may occur:

**Subscenario [C2-1]: Mandatory fields incomplete.** If any required fields are left unfilled, Claudio will be prompted to complete them.

**Subscenario [C2-2]: All fields completed, domain registered.**

If the email domain matches one already registered by his university, Claudio is directed to his new homepage to start utilizing the application for his academic and administrative duties.

**Subscenario [C2-3]: Domain not registered.**

If Claudio's email is not recognized, he is put in contact with a support operator. Together, they determine that although his university is registered, his specific email has not yet been added to the system. Claudio is then instructed to contact a university administrator to add his specific email to the list of recognized emails. Once this addition is made, Claudio will receive an email confirmation allowing him to proceed with his registration.

**Subscenario [C2-4]: Domain and university not registered.**

If Claudio finds that his email domain is not recognized, he is put in contact with a support operator. They determine that his university does not have a profile on the platform. Consequently, Claudio is prompted to initiate the university profile setup (see

Figure 3.6). This process must be completed before he can finalize his registration, as will be detailed in Scenario [C-3].

**Scenario [C-3]: *University Profile Creation*** .

Similarly, if a university tutor like Claudio discovers that the university's domain is not registered, he receives an email with a link to a profile creation page for educational institutions (see Figure 3.6). Claudio must fill out the following mandatory fields to complete the university profile:

- *Logo*
- *Name*
- *Contacts*
- *Office Address*
- *Operational Sector*
- *Size*
- *Description*
- *Certifications, Awards, Recognitions*
- *Student Domain(s)*
- *Tutor Domain(s)*

The profile is then reviewed by the platform's team. If it complies with the platform's standards, it is activated and Claudio is notified with a link to his new homepage. If there are issues, he will receive feedback and a link to adjust and resubmit the profile.

**Scenario [C-4]: *The academic tutor Login in the S&C Application*** .

Claudio (or any other academic tutor) proceeds to log in using the credentials obtained during the registration process. From the homepage, Claudio navigates to the login page, intending to access the S&C platform for overseeing and managing internships. To complete the login process, Claudio enters his username and password into the fields designated for tutor credentials. Once successfully authenticated he gains access to the platform.

**Scenario [C-5]: *The academic tutor Credential Recovery*** .

Claudio forgets his password to log in on the platform. To recover it, Claudio uses the credential recovery feature and submits answers to the security questions he chose during registration. After validating his responses, the S&C system provides Claudio with the email associated with his profile and sends a temporary password to that email. This enables Claudio to log in and update his password as necessary.

**Scenario [C-6]: *The academic tutor and the Chatbot Interaction*** .

While navigating the platform, Claudio encounters a situation requiring assistance, such as a doubt about how to manage student evaluations (see Figure 3.40). To resolve his query,

Claudio interacts with the platform's chatbot. The chatbot offers automated assistance, providing answers to common questions or guiding Claudio step by step through the issue. If Claudio's problem requires further support, the chatbot sends the query to a human representative who contacts him directly.

**Scenario [C-7]: *University Tutor Language Change***

Claudio has the flexibility to switch the operating language of the platform directly from any page he is working on. The visible flag icon at the top of every page reveals a dropdown menu with various language options (see Figure 3.41), each denoted by a flag. Claudio selects his preferred language from this menu, ensuring that the platform instantly reflects this change. This immediate update allows Claudio to manage his tasks in a language he is most comfortable with, supporting his administrative and academic duties.

**Scenario [C-8]: *The University Staff Member Enters the S&C Homepage***

When Claudio, a university staff member, logs into the S&C platform, he is greeted by a personalized homepage designed to streamline his responsibilities (see Figure 3.10). This dashboard provides Claudio with an overview of critical updates and quick access to tools that support his academic and administrative duties.

On the left side of the homepage, Claudio sees his profile section, which prominently displays his name, role and profile picture. This area also provides options to adjust account settings, change the platform's language, or access support via an integrated assistant. These features ensure the platform can be tailored to Claudio's preferences and needs.

The central part of the homepage highlights two key widgets that keep Claudio informed and organized. The calendar widget offers a snapshot of upcoming events, such as meetings, deadlines and evaluations, with shortcuts to the full calendar for detailed planning. The notifications widget organizes important updates into categories. Claudio can easily identify calendar events, internship status updates, or reported issues, which are color-coded to prioritize urgent matters. For example, red-highlighted notifications alert Claudio to problems requiring immediate attention, with direct links to chats for resolving them.

At the bottom of the homepage, Claudio finds a navigation bar that connects him to the platform's core functionalities. He can access the monitoring section to track the progress of internships, review academic evaluations and manage questionnaires. The calendar section helps him plan events and meetings, while the messaging system ensures effective communication with students, companies and other staff members.

By leveraging these tools, Claudio efficiently manages his responsibilities, ensuring smooth oversight of academic processes and proactive resolution of issues. The intuitive layout of the homepage helps Claudio stay focused and organized, allowing him to dedicate more time to meaningful academic support.

**Scenario [C-9]: *The University Staff Member Navigates the Monitoring Page***

After navigating the homepage, Claudio moves on to the *Monitoring Page*. To understand

the upcoming scenarios, it is essential to comprehend the structure of this page, where Claudio can perform various academic and administrative tasks. Let's explore what Claudio sees upon entering the Monitoring Page.

This page is divided into three different subsections (tabs), each with unique features that allow the university staff member to perform various actions:

- The first tab, *Selection Process*, manages the processes where students explicitly request Claudio's supervision as an academic tutor.
- The second tab, *Active Stages*, focuses on scenarios related to ongoing internships where Claudio is actively involved.
- The third tab, *Questionnaires*, provides access to evaluation forms completed during key phases of the internship process: the first meeting and the end of the internship.

Since the next scenarios are focused on what Claudio does in the first tab, let's analyze its structure to clarify the actions available in this and the upcoming scenarios. In the case of the university staff member, the tab contains a list of internships through tables (one per internship), with:

- **Student:** name and surname of the student, clickable for detailed profiles.
- **Company Tutor:** name and surname of the company tutor, clickable for details.
- **Associated Internship:** title of the internship the student is involved in, clickable for more information.
- **Process Status:** current state of the process, with associated and clickable icons representing specific stages and actions.
- **Remove:** button to remove the selection process, which automatically updates the company tutor's status to rejected.

The key feature of these tables is the **Process Status**, which represents the situation for each stage and enables specific actions to be taken as described in the upcoming scenario.

**Scenario [C-10]: *The University Staff Member Manages the Selection Process***  
After navigating the homepage, Claudio proceeds to the *Monitoring section* to oversee the selection process for internships. This process involves evaluating and responding to student requests for academic supervision and monitoring the overall progress of the selection stages.

#### **Subscenario [C-10.1]: *Tutor Selection***

In this stage, Claudio is notified when a student nominates him as their academic tutor by submitting their email. Claudio can perform the following actions:

- **Accept:** by accepting the request, Claudio confirms his role as the tutor. The system updates the status and displays Claudio's name in the relevant table row for the internship.

- **Reject:** by rejecting the request, the selection process for the specific student and internship is terminated and the entry is removed from the table.

Claudio has three days to make a decision, during which the process status is displayed with a *Tutor* icon to indicate the pending action.

#### **Subscenario [C-10.2]: Final Decision by the Company .**

Once Claudio has made his decision (and he accepted to be a tutor), the company has three days to finalize the selection process. The company's options are:

- **Accept:** the internship is activated and moved to the *Active Stages* tab. The system creates a history log marking *Stage Started* as the initial state.
- **Reject:** the selection process is terminated and the entry is removed from the table.

The system notifies Claudio of the company's decision through the homepage, ensuring they are informed of the outcome.

#### **Subscenario [C-10.3]: Process Status Indicators .**

The Monitoring section provides icons to represent the current state of the selection process, helping Claudio track progress and take necessary actions. Key icons include:

- **Tutor:** indicates that the student has nominated Claudio as their tutor and is awaiting a response.
- **Accepted:** confirms that Claudio has accepted the tutor role and the process is progressing.
- **Rejected:** indicates that Claudio or the company has declined the request, terminating the process.
- **Meeting Scheduled:** appears when the company is organizing a meeting with the student.
- **Active Internship:** displays once the internship is officially started and moved to the *Active Stages* tab.

#### **Subscenario [C-10.4]: Notifications and Deadlines .**

The platform ensures that Claudio remains updated by providing:

- **Notifications:** alerts about pending tutor requests and company decisions.
- **Reminders:** automated reminders of deadlines for responding to tutor nominations or tracking company decisions.

The Monitoring section equips Claudio with the tools and information needed to efficiently manage the selection process, ensuring clarity and accountability at every stage.

#### **Scenario [C-11]: *The University Tutor Reviews Active Internships* .**

When the University tutor accesses the *Monitoring section*, he navigate to the *Active Stages* tab to supervise and manage ongoing internships. This tab provides a structured

view of all active internships, helping the tutor stay informed and address any issues efficiently.

At a glance, the academic tutor can see a table summarizing key details for each internship. For every student, their name is displayed and clickable, allowing the tutor to access the student's profile for additional information. The name of the company tutor is also included, with a direct link to initiate communication if needed. Each internship's current status is visually represented with descriptive icons, while any flagged issues are highlighted in red, drawing attention to matters requiring immediate action.

The academic tutor uses this section to take several critical actions. When issues are flagged, the tutor can contact the student or the company tutor to resolve them directly. They can also review feedback provided by the company tutor, ensuring that the internship is progressing as expected. If necessary, the academic tutor can update the internship's status to reflect changes, such as marking it as *Suspended* or *Completed*. For unresolved problems, the tutor can escalate them through internal university channels, ensuring appropriate follow-up and resolution.

This system ensures that the academic tutor has full oversight of ongoing internships, fostering clear communication and proactive management. By keeping all stakeholders informed, the platform helps ensure that internships are successfully guided to completion.

#### **Scenario [C-12]: *The Academic Tutor Completes the Final Evaluation Questionnaire***

At the conclusion of an internship, the academic tutor reflects on the program's effectiveness by completing the *Final Evaluation* questionnaire. This form is accessed through the *Questionnaire Tab* within the Monitoring page, where it is prominently available as part of the closing phase of the internship. The form enables the tutor to provide insights into the internship's academic value and alignment with educational objectives.

The academic tutor begins by assessing whether the internship met its intended learning goals, rating this aspect on a six-point scale. This evaluation reflects how well the internship supported the student's academic development and provided meaningful learning experiences. In addition to this quantitative feedback, the tutor provides a detailed written assessment of the internship, highlighting its strengths, identifying areas for improvement and offering suggestions to enhance its academic relevance in the future.

Once all questions are completed, the academic tutor submits the form, ensuring their input becomes part of the overall evaluation. These responses, combined with feedback from the student and company tutor, contribute to a comprehensive review of the internship. This process ensures that all perspectives are considered, fostering continuous improvement in the structure and execution of future internships.

By completing the *Final Evaluation*, the academic tutor plays a vital role in maintaining the quality and academic relevance of the internship program. Their feedback not only supports the student's growth but also helps refine and enhance opportunities for future participants.

**Scenario [C-13]: *The Academic Tutor Interacts with the Messaging System*** .

To manage communication during internships, the academic tutor uses the platform's messaging system. This tool allows the tutor to stay connected with students, company tutors and university staff, ensuring effective coordination and support throughout the internship process. Whether following up on flagged issues, providing feedback, or addressing administrative queries, the academic tutor relies on the messaging system for efficient and organized communication.

The messaging system notifies the tutor of new messages and organizes conversations based on context, making it easy to locate and respond to relevant discussions. This functionality helps the academic tutor maintain clear and timely communication with all stakeholders, ensuring that any concerns are promptly addressed and that the internships remain on track.

**Subscenario [C13-1]: *The Academic Tutor Resolves an Issue via Messaging***.

During an internship, the academic tutor may be contacted by a student or company tutor regarding an issue requiring academic guidance. Using the messaging system, the tutor reviews the detailed message outlining the concern and provides appropriate advice or instructions to address the situation. In cases where additional input is needed, the tutor can coordinate with other parties, such as the university administration or the company tutor, to ensure the issue is resolved effectively.

Once the tutor's response is sent, the platform keeps a record of the conversation for future reference, allowing all parties to track the resolution process. The system's structured approach ensures that the academic tutor can support the stakeholders involved and uphold the quality of the internship experience.

### 2.1.2. Domain Class Diagram

The domain class diagram was initially developed as a comprehensive representation of the entire system, defining all classes with their attributes and methods to accurately capture the interactions and relationships within the system, reflecting the object-oriented design. This process provided a clear understanding of the functional scope, covering all areas of our system. However, due to the diagram's large size, the software used to create it faced limitations in rendering the entire structure correctly, truncating parts of the diagram. To resolve this, the diagram was divided into three subsections: *Authentication*, *Matching and Monitoring* and *Messaging and Calendar*.

A key aspect of the diagram is its detailed representation of cardinalities and the types of relationships between entities. Relationships like *User–Notification* are modeled as strong aggregations, emphasizing that a notification cannot exist without its associated user. Similarly, the *Institution–Domain* relationship highlights a strong dependency, as domains are inherently tied to their institution. The diagram also captures classic associations where entities, while logically connected, can exist independently. Enumerations play a vital role in the design, allowing for specialization without the need for complex inheritance structures. Attributes such as ‘role’ in the User class (enum student, academicTutor, companyTutor) or ‘status’ in other entities define specific behaviors and states while maintaining simplicity. This choice to avoid inheritance for user roles and instead rely on an enumerated attribute ensures simplicity and coherence within the model, reducing unnecessary class proliferation.

The use of Primary Key (PK) and Foreign Keys (FK) is central to ensuring referential integrity. Fields like '*userId [PK]*' or '*institutionId [FK]*' establish clear dependencies between entities, making the relationships explicit. Additionally, entities like Selection-Process or ActiveStage often use multiple foreign keys to reflect the various roles users play within the same process, such as students, academic tutors and company tutors. Some entities, such as PasswordRecoveryRequest, AssistantChat and Notification, function as service objects rather than core domain entities. Their inclusion in the diagram provides a complete view of the system’s workflows and dependencies, even if their behavior is more utility-focused. The diagram also emphasizes flexibility by incorporating cardinalities like (0..) to handle scenarios where entities may or may not exist or may exist in multiples (for example, CalendarEvent can have multiple participants, reflecting real-world collaborative needs).

The authentication subsection focuses on capturing the interactions and dependencies related to user identities and their connection with institutions. It highlights foundational processes like login and registration while showcasing strong relationships such as *User–Notification*. The matching and monitoring subsection depicts processes linking students with internships and tracking progress. It focuses on workflows, such as the relationship between offers, active stages and evaluations, ensuring traceability and fairness. The messaging and calendar subsection visualizes communication and scheduling tools. It emphasizes key functionalities like the integration of video conferencing and participant management within events. Notifications are central to this section, ensuring timely updates for users and prioritization.

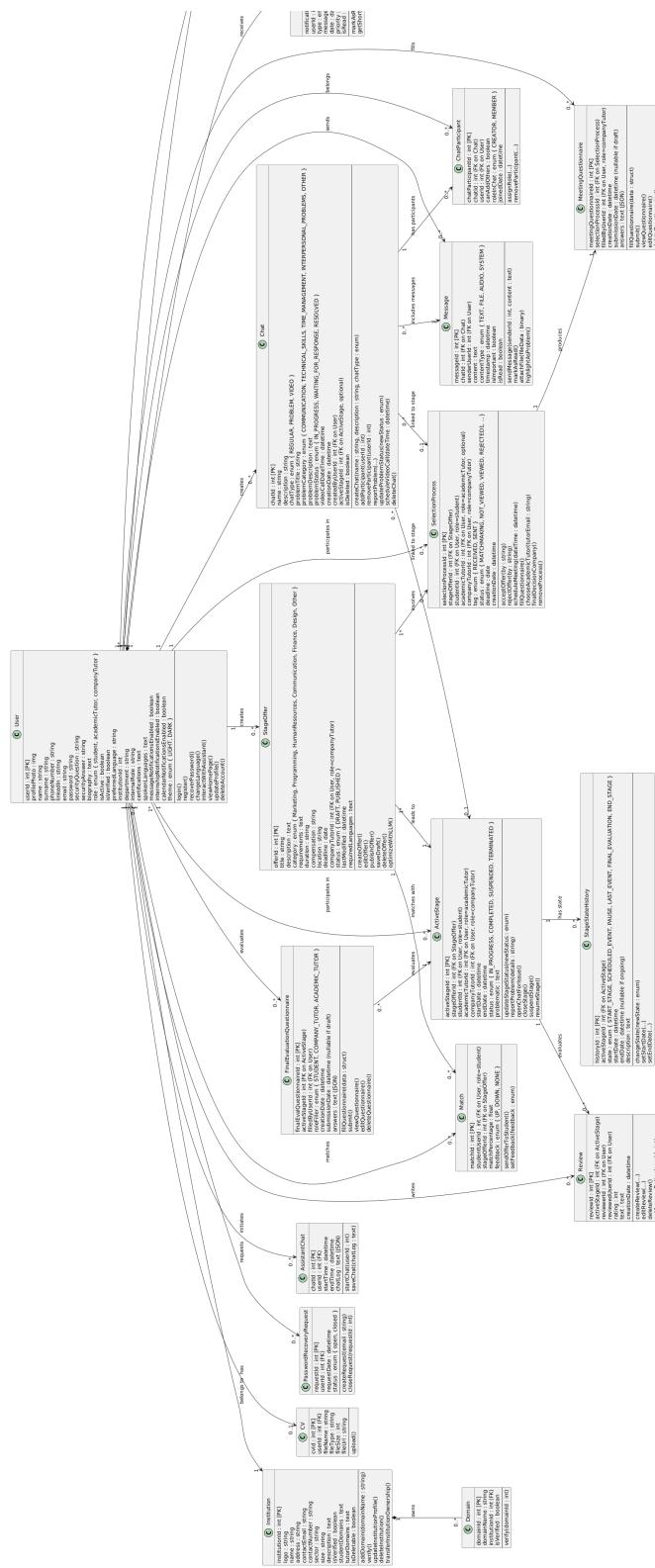


Figure 2.1: Complete Domain Class Diagram, but Cutted

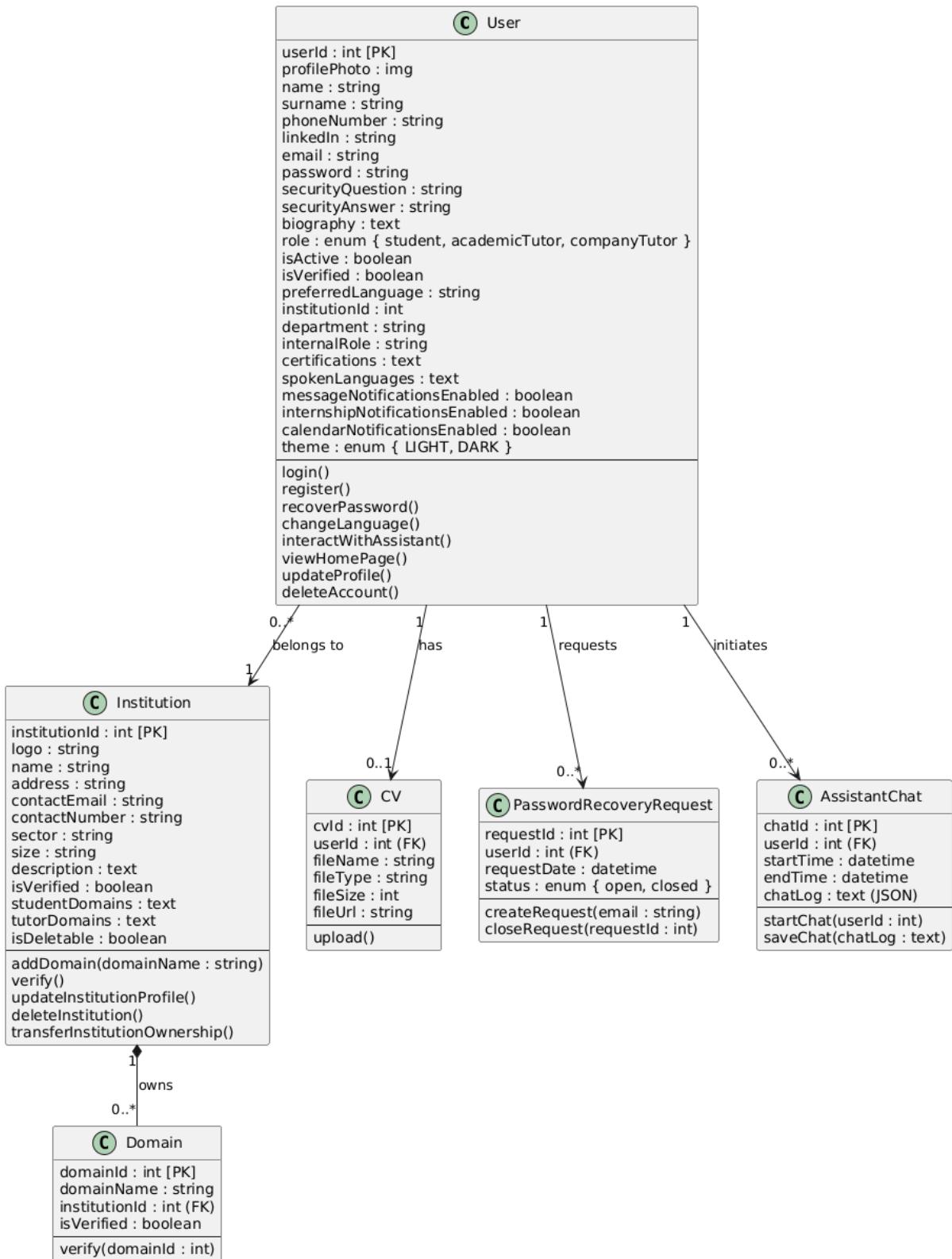


Figure 2.2: Domain Class Diagram for Authentication

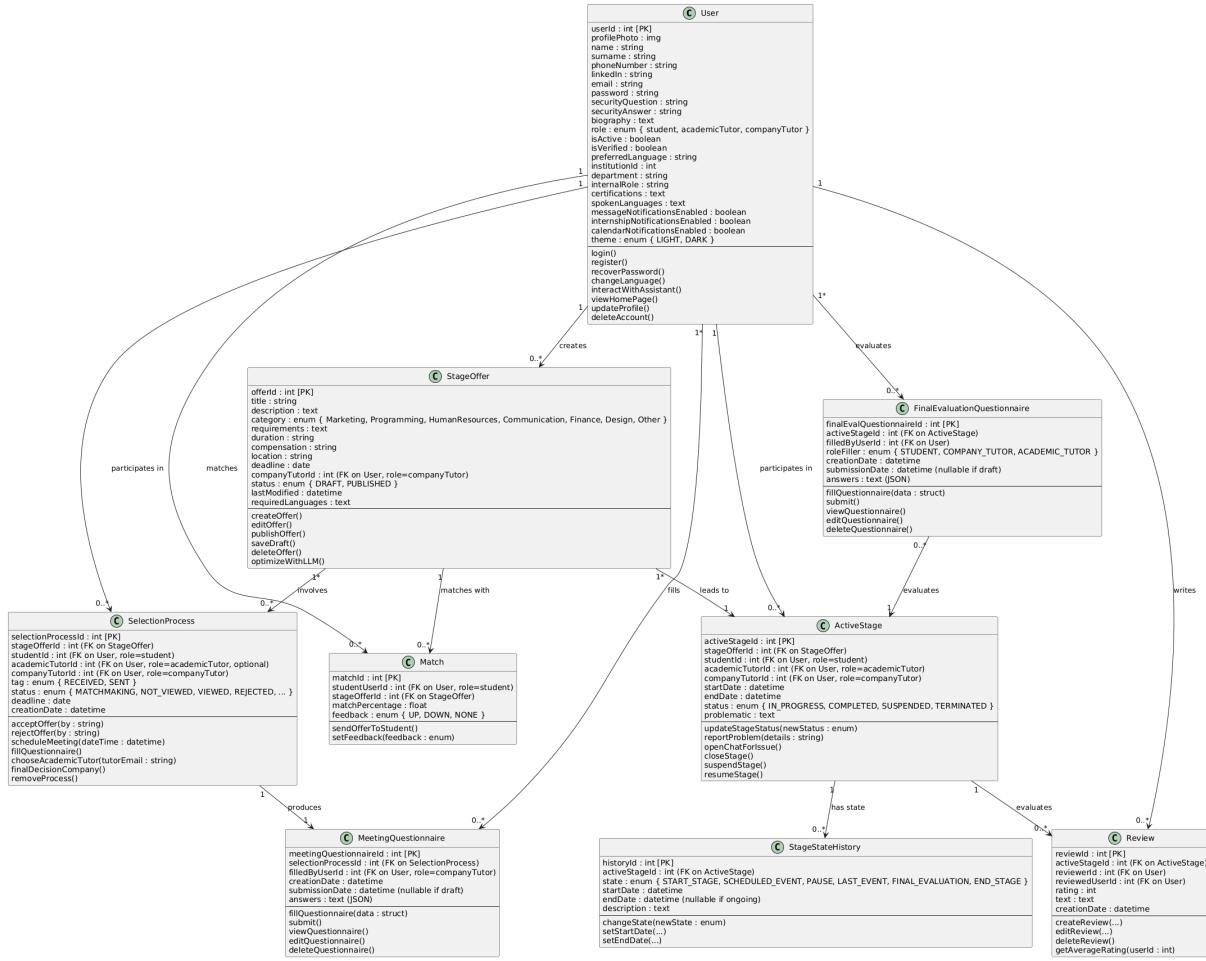


Figure 2.3: Domain Class Diagram for Matching and Monitoring

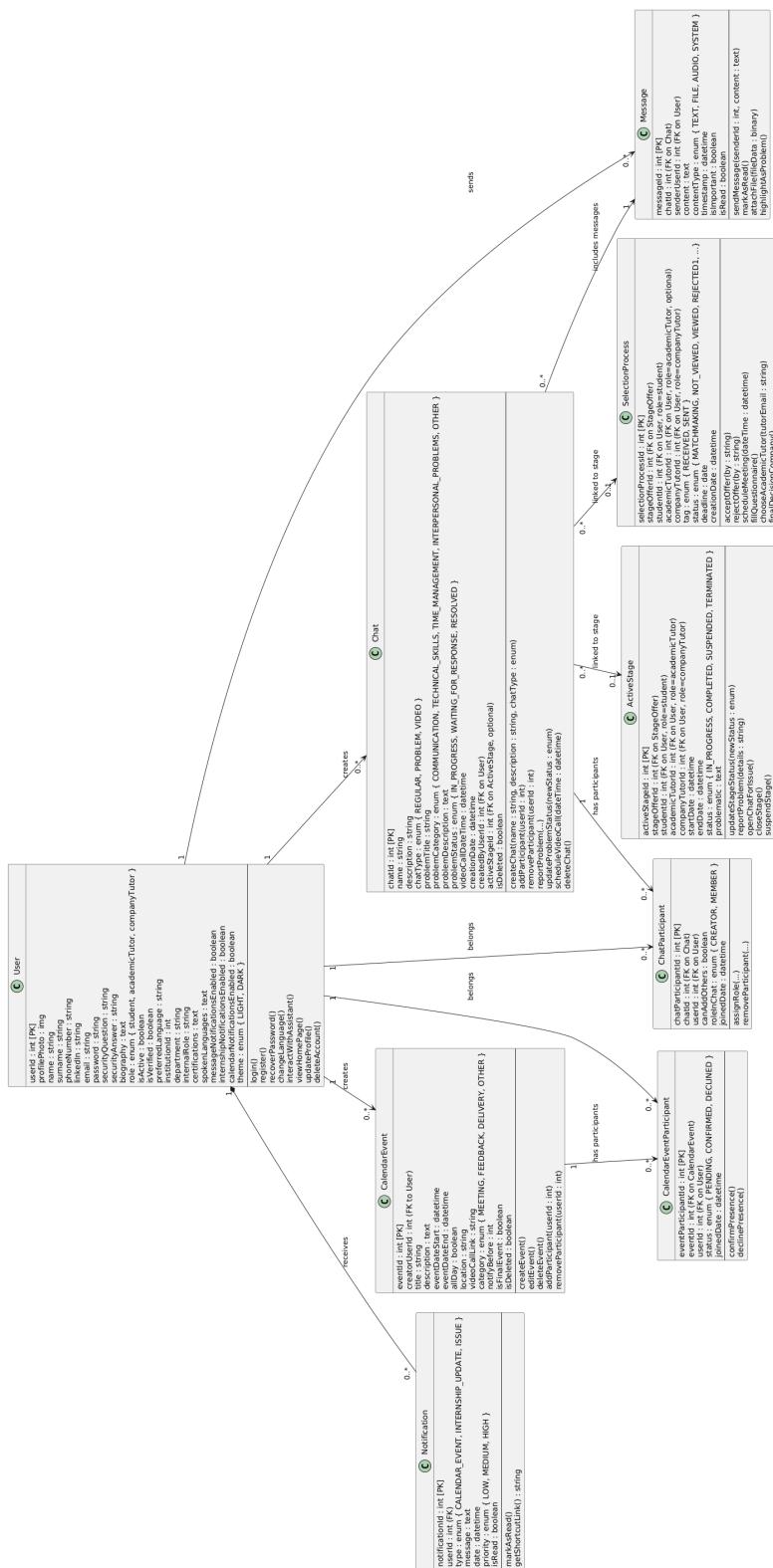


Figure 2.4: Domain Class Diagram for Calendar and Messaging

### 2.1.3. State Diagram

The state diagrams presented offer a dynamic view of the system by illustrating how objects transition through various states based on events and actions. These diagrams complement the domain model, which represents the static structure of entities and their relationships, by detailing how processes evolve over time. The diagrams were developed using *PlantUML*, allowing precise definition and visualization of the states and transitions directly through code (available on our GitHub code).

In the "Domain Association" diagram, the process begins with "No User," while in "Active Stage" it starts with "Stage Created." Each state transition is triggered by a specific event or action, such as register or publishOffer. These triggers correspond to methods or user actions defined in the domain class model, ensuring coherence between the static and dynamic perspectives of the system. Intermediate states, such as "In Progress" in "Active Stage" or "Draft" in "Offer Creation," represent actionable moments in the process where specific tasks or decisions are required. Final states are reached when a specific condition is met and are indicated by a black dot, marking the logical conclusion of a process.

The "Domain Association" diagram focuses exclusively on the process of verifying and associating a user with a domain. It begins with the "No User" state, to pass then to the "RegistrationInProgress" step, where the new user initiates the registration process by uploading the CV and providing general information. This triggers the system to check the domain's status. If the domain is already known and verified, the process moves directly to associating the user with the institution. However, for new domains, the process transitions to "Pending Verification," where an administrator or tutor must validate the domain. Once verification is completed, the user is marked as active and verified, reaching the final state of "Domain Verified."

The "Stage Lifecycle" diagram, shown in its "Stage Lifecycle" image, focuses on the lifecycle of an offer, starting with "Offer Creation" and progressing through "Draft", "Published", or "Deleted," indicates the save of the offer as draft, the publication of it, or the removal of it from the system. The workflow can terminate only if the offer, even in draft form, is deleted or published.

The "Selection Process" diagram, highlights the iterative nature of matching and evaluation. States such as "MeetingSet" and "FirstQuestionnaire" emphasize collaborative steps between tutors and students. The process concludes in "Process Concluded" or "Refused," depending on the decisions made by the participants.

The "Active Stage" diagram, depicts the lifecycle of an active internship. States such as "In Progress," "Suspended," and "Final Evaluation" illustrate the dynamic nature of the process. The final states, "Completed" and "Terminated," represent the two possible outcomes, depending on whether the stage is successfully completed or forcibly ended.

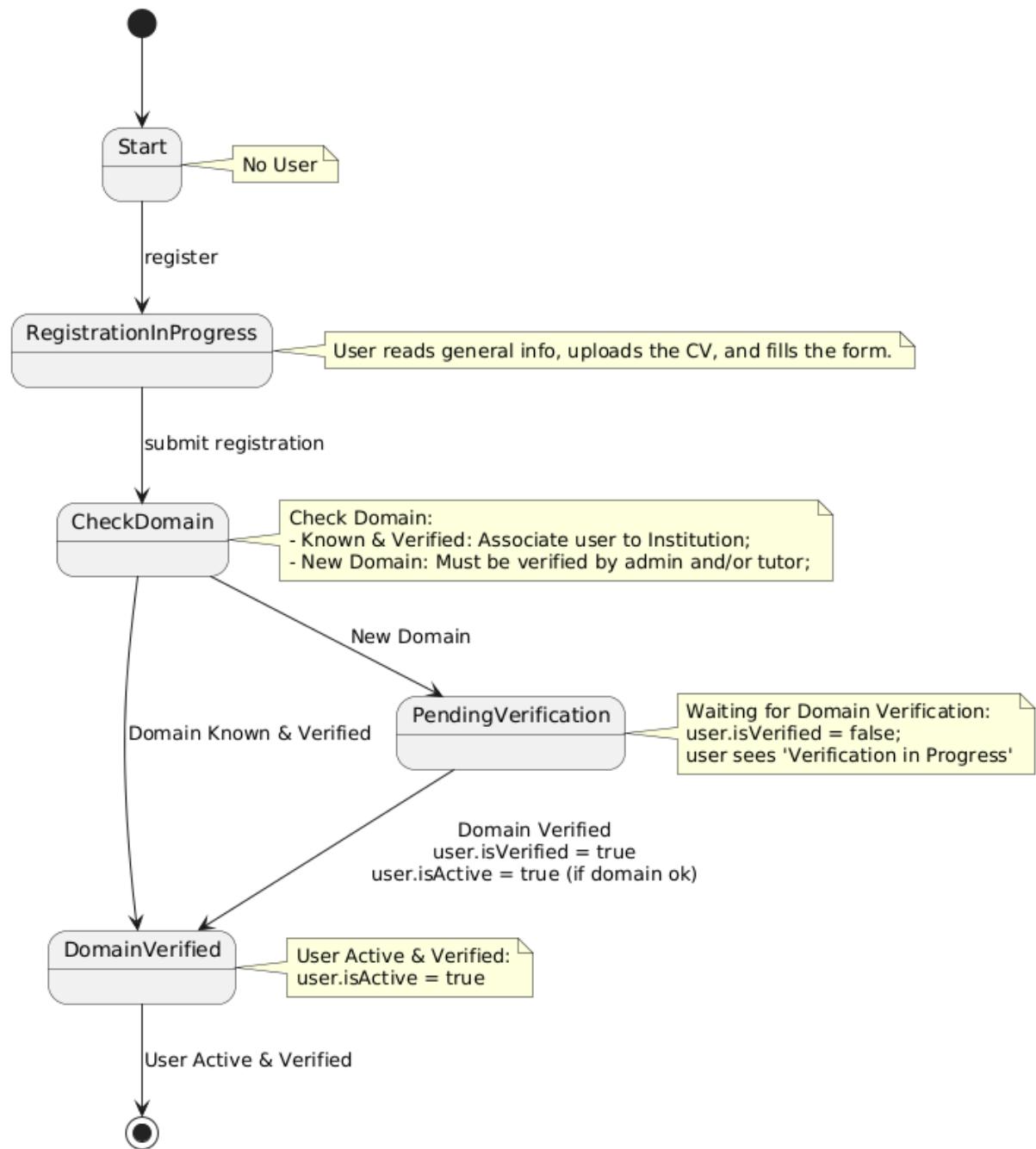


Figure 2.5: State Diagram for Domain Association during Registration

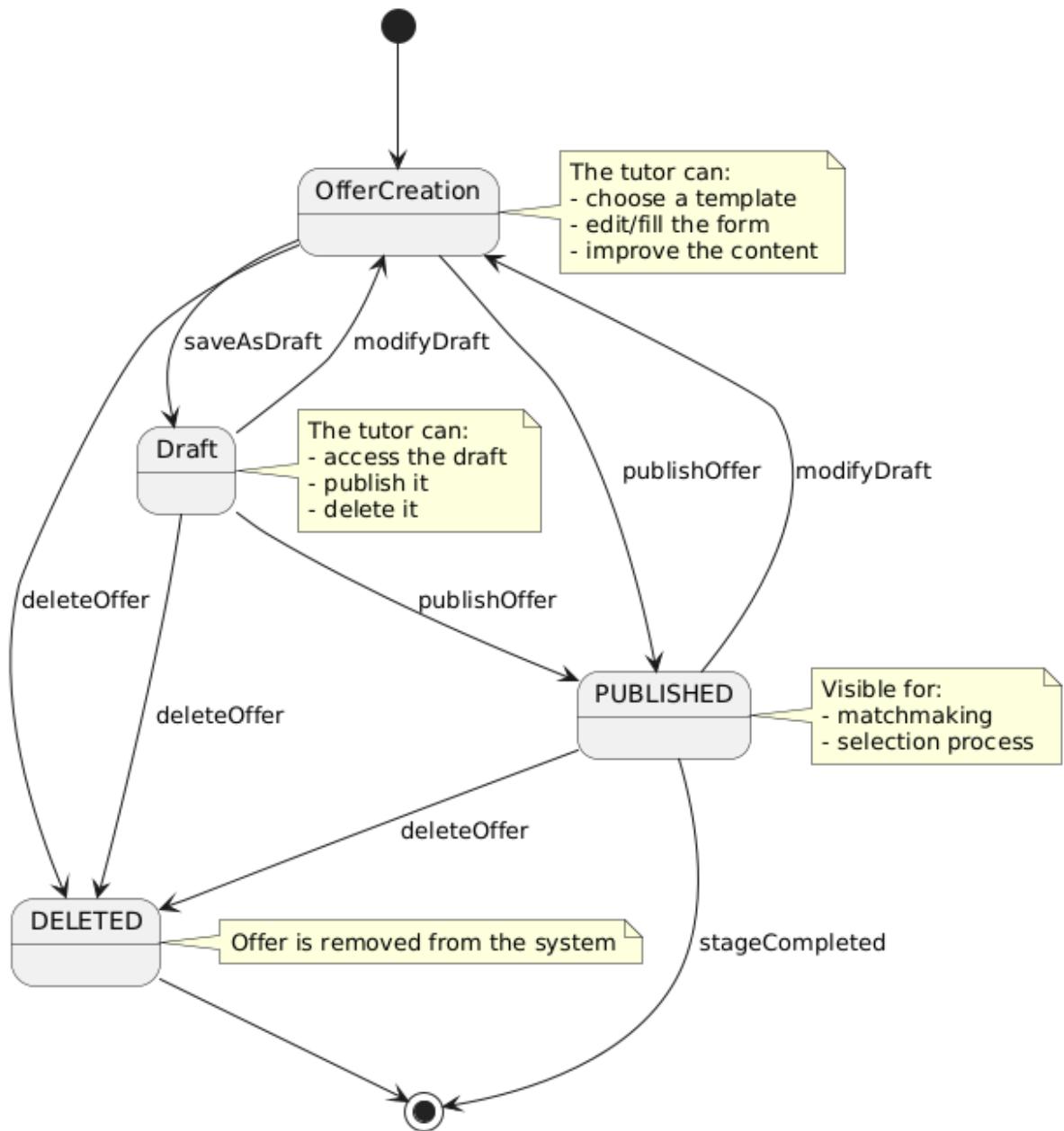


Figure 2.6: State Diagram for Internship Lifecycle

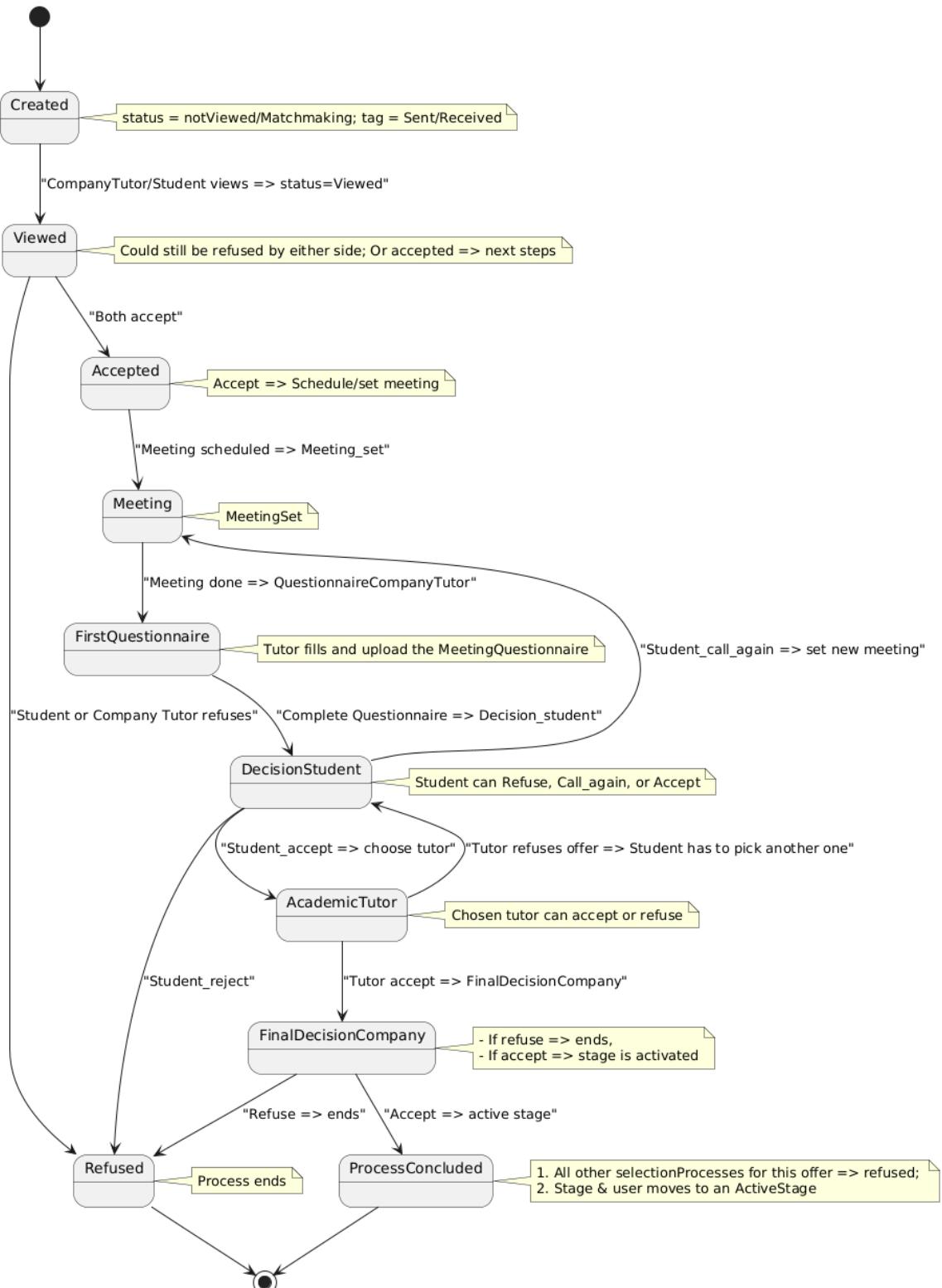


Figure 2.7: State Diagram for Selection Process

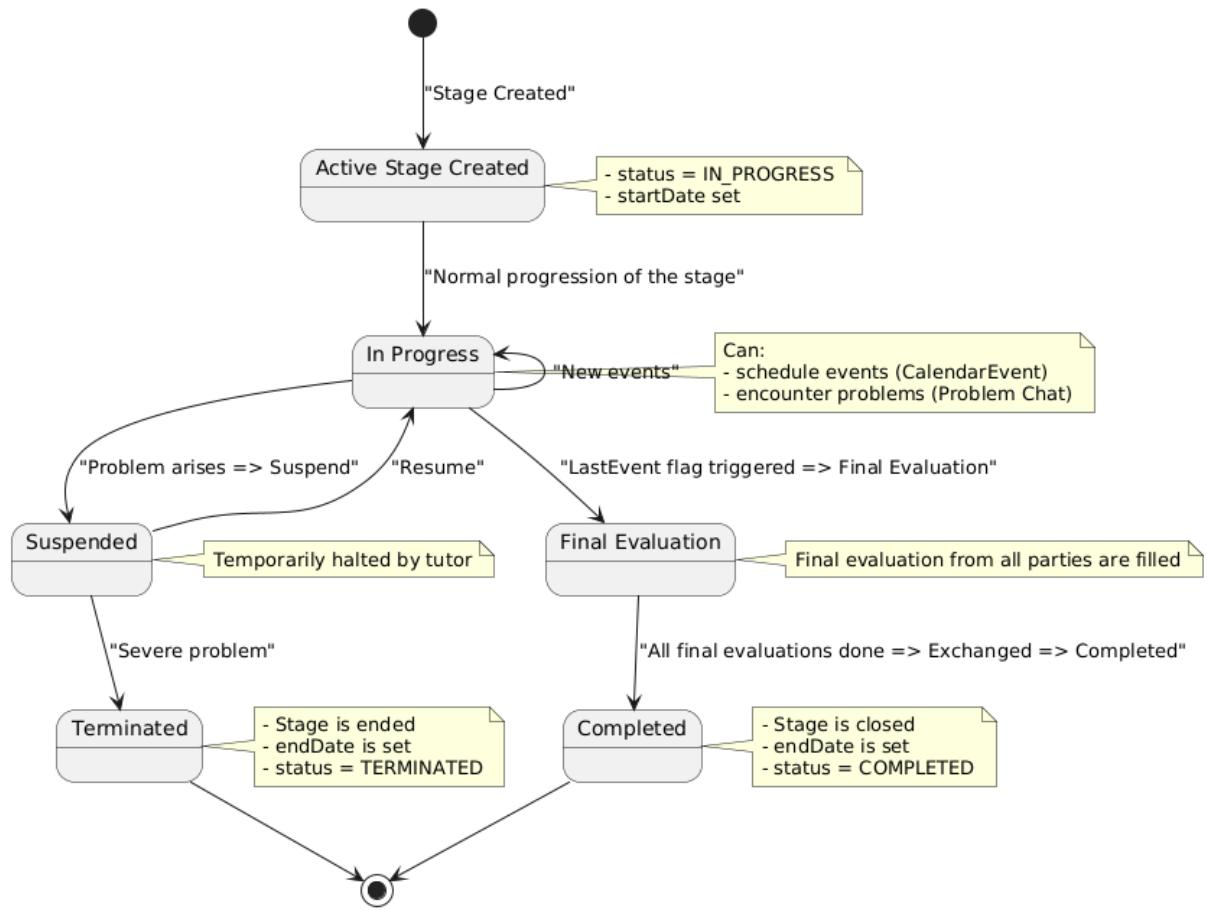


Figure 2.8: State Diagram for Active Stages

## 2.2. Product Functions

**Sign Up (Upload CV)** *Target Users:* All potential users of the platform.

This feature allows new users to register on the *Students & Companies* platform. During the registration process, users can upload their CV, which the system uses to pre-fill parts of their profile. This accelerates the account creation process and improves the accuracy of profile information.

**Log In** *Target Users:* All registered users.

This function enables all users that have successfully complete the Sign Up process to enter the system using their established credentials (email and password). It verifies user identity and ensures that given the user status, only the expected functions of that class of users are shown.

**Edit Profile Information** *Target Users:* All registered users.

This functionality allows users to modify their profile information after registration. Users can update details such as address, contact information, work experience and education to keep their profile current and relevant.

**Chatbot Communication** *Target Users:* All users.

This feature provides an automated communication system through a chatbot, offering immediate assistance to users for frequently asked questions, guidance in using the system and real-time support for technical or procedural issues.

**Change Language** *Target Users:* All users.

This functionality allows users to select their preferred language for the user interface of the system. This ensures that users can use the platform in the most comfortable way.

**Create Internships** *Target Users:* Company Tutor.

This feature allows company tutors to create new internship listings on the platform. Company tutors can enter details such as job title, description, required qualifications, duration of the internship and compensation, if applicable. This functionality is designed to make it straightforward for company tutors to outline the roles they are offering, specifying the skills and experiences they are seeking in candidates. The creation process includes options for setting application deadlines and choosing whether the internship will be remote, on-site, or hybrid.

**Save Internship Draft** *Target Users:* Company Tutors.

This functionality allows company tutors to save their internship listings as drafts before finalizing and publishing them. This is particularly useful for obtaining additional approvals within the company or making sure that all necessary information has been included before the internship goes live. Drafts can be revisited, edited and adjusted as needed, providing flexibility in managing internship offers and ensuring that all details are correct prior to publication.

**Internship Search** *Target Users:* Students.

Students can search for internships using various methods provided by the platform. These include browsing through a list of available internships, using filters such as location, field of interest and required skills, or utilizing a recommendation system that suggests internships based on the student's profile and past applications. Students can also receive alerts for new postings that match their preferences.

**Application for Internship** *Target Users:* Students.

This function allows students to apply for internships. Students can submit their applications through the platform, which typically include their CV, a cover letter and sometimes answers to specific questions posted by the hiring company. This initiates their participation in the selection process.

**Search for Students** *Target Users:* Company Tutors.

Company tutors can search for potential candidates among the student users of the platform. They can use filters such as academic performance, skills, previous internship experiences and geographical preferences. Company tutors can also view recommendations provided by the system, which are based on the alignment of student profiles with the company's internship requirements.

**Accept/Reject Participation in the Selection Process** *Target Users:* Company Tutors.

Company tutors can review applications from students and decide whether to accept or reject their participation in the selection process. This decision can be based on the student's qualifications, the quality of the application and the fit between the student's profile and the internship role.

**Accept or Reject Participation to the Selection Process** *Target Users:* Students.

Students can receive requests from companies to participate in the selection process. Students have the possibility to either accept or reject these requests. Accepting the request moves them further into the selection process, while rejecting it removes them from consideration for that particular internship.

**Communication** *Target Users:* All users.

This functionality facilitates direct communication among users within the platform, enabling students, company tutors and university tutors to interact with each other. The system supports various forms of communication, including messaging and email notifications. This feature is designed to ensure seamless exchange of information, clarify the requirements and statuses of internships and provide a channel for real-time feedback and discussions.

**Accept to be a Tutor** *Target Users:* University tutors.

University tutors have the option to accept requests to become tutors for specific internships. This feature allows them to review the details of the internship and the responsibilities involved before making a decision. Accepting to be a university tutor for a specific

internship involves overseeing the academic aspects of the internship, mentoring students and ensuring that the internship meets educational standards and objectives.

**Create and Manage Events** *Target Users:* Company Tutors and University Tutors. This functionality enables company tutors and university tutors to create and manage events related to internships. The system provides tools to set up event details, invite participants and scheduling and reminders.

**Compilation of the First Questionnaire** *Target Users:* Company tutors. After an internship application process begins, company tutors are required to compile a first questionnaire to assess the suitability of applicants. This questionnaire typically includes questions regarding the candidate's skills, experiences and fit with the company culture. The results are used to screen candidates effectively and decide who will proceed to the next stage of the selection process. This initial assessment is crucial in narrowing down the pool of applicants to those who best match the internship's requirements.

**Monitor Active Internships** *Target Users:* All users. This feature allows all users—students, company tutors and university tutors—to monitor ongoing internships. It provides real-time updates on the status of active internships, including progress reports, upcoming deadlines and any deliverables due. This monitoring tool is essential for keeping all parties informed about the internship's progression and ensuring that milestones are met on schedule.

**Report an Issue** *Target Users:* Students and company tutors. Students and university tutors can use this feature to report any issues they encounter during an internship. This could include problems with meeting internship requirements, conflicts within the workplace, or other concerns that may affect the quality or success of the internship. Reporting an issue triggers a process to address and resolve the matter as best and as fast as possible.

**Resolve Issues** *Target Users:* University tutors. University tutors are responsible for resolving issues reported by students during internships. This functionality includes accessing reported issues, investigating the circumstances and taking appropriate actions to resolve them. Resolutions may involve mediating between the student and the company, providing additional support to the student, or making changes to internship arrangements to better suit the educational goals.

**Compilation of the Final Questionnaire** *Target Users:* All users. At the end of an internship, all users are required to complete a final questionnaire. This questionnaire assesses the overall success and effectiveness of the internship experience from multiple perspectives. Students, company tutors and university tutors provide feedback on various aspects such as the achievement of learning objectives, the adequacy of support provided and the quality of the professional and academic experience. The information gathered is crucial for evaluating the internship program and implementing improvements for future iterations.

### **Real-Time Notifications** *Target Users:* All users.

This feature provides immediate updates to users through real-time notifications, enhancing the responsiveness and engagement of the platform. Notifications alert users about important events such as new internship postings, changes in application status, upcoming deadlines, interview schedules and responses to reported issues.

## **2.3. User Characteristics**

The S&C platform is designed to serve three primary user groups: students, company tutor and university tutor. Each group has unique characteristics that influence the system's design, functionality and accessibility requirements. All users need to register their account in order to access the S&C platform.

### **Student Characteristics**

Students are the main users of the platform, primarily seeking internships related to their studies. They typically have moderate to high digital literacy, but the platform is designed to be user-friendly for all digital literacy levels. Students are expected to use the platform sporadically, usually during academic breaks or close to application deadlines. They benefit from features like timely notifications about tasks and opportunities. The platform aims to streamline its functions to accommodate students' busy schedules, allowing them to quickly complete essential tasks.

### **Company Tutor Characteristics**

Company tutors are another important class of platform users, they are involved in recruitment tasks like posting jobs, tracking applications and interviewing. They usually have moderate to advanced technical skills. The platform is designed for easy onboarding and efficient task management, offering intuitive navigation and straightforward instructions. Their main goal is to recruit top talent, supported by the system's advanced filtering, smart recommendations and streamlined communication tools. Company tutors typically engage with the platform during work hours to handle tasks such as posting internships and managing applications. Features like draft saving, reminders and real-time notifications support asynchronous workflows. Due to their busy schedules, the platform focuses on time-efficient features to simplify and speed up key tasks like job postings and candidate reviews.

### **University Tutor Characteristics**

University tutors oversee student internships and ensure academic alignment. These professionals, associated with academic institutions, play a critical role in supporting students' practical learning experiences. They generally exhibit moderate technical expertise in using academic and administrative platforms and the system provides a user-friendly interface to ensure seamless interaction. Their primary motivation is to ensure that internships deliver meaningful educational and professional experiences aligned with institutional goals. University tutors interact with the platform intermittently, focusing on

specific tasks such as reviewing internships or addressing issues.

## 2.4. Assumptions, Dependencies and Constraints

### 2.4.1. Regulatory policies

Since the S&C platforms needs to handle sensitive personal data (such as names, academic affiliations and contact information) it must comply with all the relevant legal frameworks and regulations about data protection and data privacy such as General Data Protection Regulation (GDPR) in Europe.

Also the platform might be required to respect some specific guidelines set forth by universities and companies for handling internship details and evaluation. Lastly the platform must also comply to possible institutional and corporate communication standards.

### 2.4.2. Domain Assumptions

- **D1:** The platform assumes that all user inputs conform to the required types, formats and size limitations. If users provide incorrect data that do not match the truth, the system still works.
- **D2:** The platform assumes that users accurately represent their real-world roles. Universities and companies are responsible for ensuring that only authorized individuals use their institutional email domains and are assigned appropriate roles within the platform.
- **D3:** All companies and universities registered on the platform are legitimate entities operating within the bounds of local laws and regulations.
- **D4:** Companies are assumed to provide genuine internship opportunities.
- **D5:** Universities are assumed to offer academic support and oversight for students during their internships.
- **D6:** The platform assumes that internship policies, job criteria and academic requirements remain stable over time without significant modifications.
- **D7:** Each user belongs to only one category at a time; for example, a student cannot simultaneously be a professor or a company tutor.
- **D8:** Every user has unique credentials to access the platform.
- **D9:** Each user meets the legal age requirement to register on the platform, in compliance with applicable laws and regulations.
- **D10:** Each student meets the legal age requirement to commence an internship, in accordance with applicable labor laws.
- **D11:** The platform assumes that feedback provided by users (students, company tutors and university tutors) is honest and accurate.



# 3 | Specific Requirements

This chapter outlines the technical specifications necessary for the successful implementation and verification of the Students & Companies platform. It is divided into the following key sections:

This chapter addresses the following key aspects:

- **External Interface Requirements (Section 3.1):** These include user interfaces, hardware interfaces, software dependencies and communication protocols essential for seamless interaction between the system, its users and external systems.
- **Functional Requirements (Section 3.2):** Detailing the core interactions between the system and its environment, these requirements specify the behaviors and functionalities the system must exhibit, such as user authentication, profile management, CV creation and internship tracking.
- **Performance Requirements (Section 3.3):** Establishes expectations for responsiveness, reliability and scalability under various load conditions.
- **Design Constraints (Section 3.4):** Highlights applicable standards, hardware limitations and any special conditions that influence system design and development.
- **Software System Attributes (Section 3.5):** Identifies important quality attributes such as security, availability, maintainability and portability, ensuring the system's long-term robustness.

## 3.1. External Interface Requirements

The external interfaces are categorized as follows:

- **User Interfaces (Subsection 3.1.1):** This includes visual representations, such as wireframes or mockups, to clarify how each users (students, company tutors and academic tutors) will interact with the system. While UI design is not the primary focus, these visuals help convey the intended user experience.
- **Hardware Interfaces (Subsection 3.1.2):** Describes the hardware component needed to access the platform and how the server should be set up.
- **Software Interfaces (Subsection 3.1.3):** This covers interactions between the S&C platform and external software components, such as APIs, third-party applications, or services integrated into the system.

- **Communication Interfaces (Subsection 3.1.4):** This details the protocols and mechanisms used for data exchange.

### 3.1.1. User Interfaces

The purpose of this section is to define the User Interfaces (UIs) of the S&C platform. User interfaces serve as the primary interaction points between the system and its users (students, company tutors and academic tutors). This subsection outlines the structure, elements and functionalities of these interfaces, ensuring they align with the requirements. Each interface detailed below corresponds to specific functionalities. This section ensures the interfaces meet the needs of the users and support the operational goals of the platform.

#### Structure of Interfaces:

- **Authentication Interfaces (Subsection 3.1.1):** Interfaces for authentication, registration and login. These are common to the three main users of the system.
- **Homepage Interface (Subsection 3.1.1):** Almost equal to all three main users of the system.
- **Matchmaking Interface (Subsection 3.1.1):** Almost the same for both students and company tutors.
- **Monitoring Interfaces (Subsection 3.1.1):** The three tabs for monitoring the selection process, the active stages in which the user is involved and all the questionnaires produced in these two processes.
- **Calendar Interfaces (Subsection 3.1.1):** Common to the three users of the system.
- **Messaging Interfaces (Subsection ??):** Common to the three users of the system.
- **Complaints Interfaces (Subsection 3.1.1):** Both the interface to signal an issue and to handle it.
- **General Interfaces (Subsection 3.1.1):** The common interfaces for all three users for settings, the assistant and language setup.

## Authentication Interfaces Description

The Authentication Interfaces ensure secure and user-friendly access to the platform, guiding users through various processes necessary for account creation or login. Each screen includes the ability to interact with a chatbot (LLM with RAG) for support and to change the platform's language. Both these two interfaces are described in the *General Interfaces*.

**Authentication Interface** The process begins at the *Authentication Screen* visible in Figure 3.1, which provides users with options to either log in (sign in) or register. This interface serves as the entry point for all authentication-related actions, ensuring accessibility even for new users.

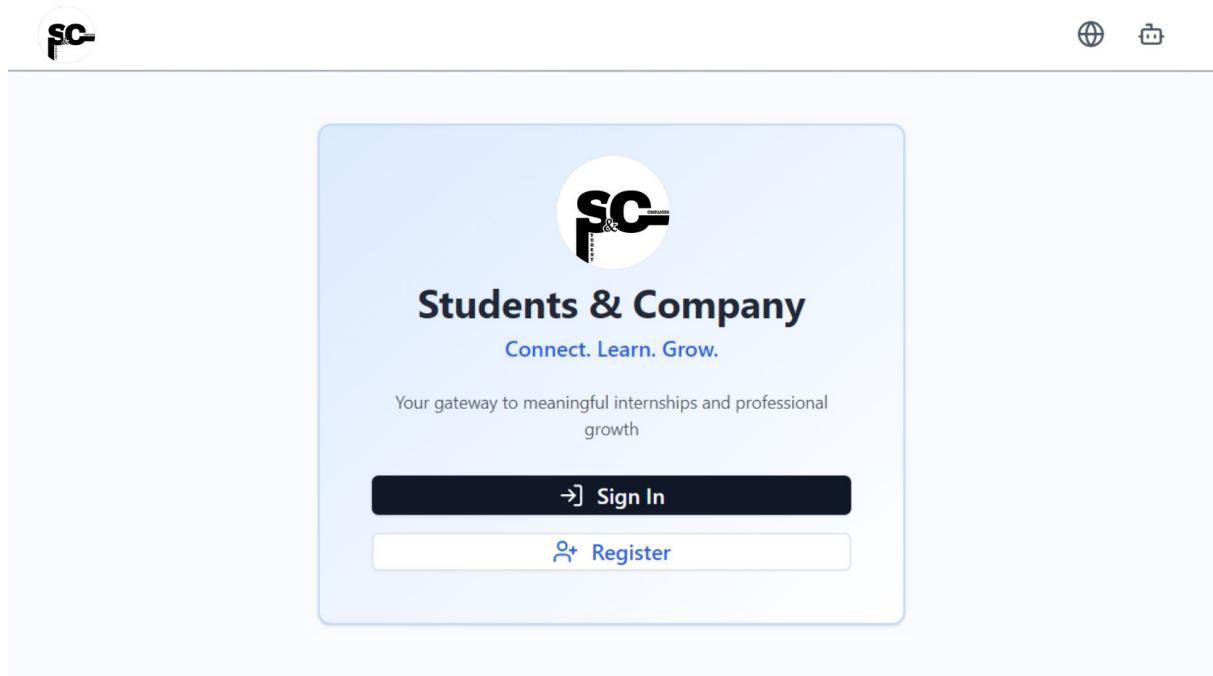


Figure 3.1: Authentication Interface of the Students & Companies platform.

**Registration Interfaces** The registration process ensures smooth onboarding by guiding users through multiple screens to configure their profiles.

- **Introduction Screen:** Welcomes users and provides an overview of the platform's purpose and main functionalities, including internship management, application tracking and candidate selection. It outlines the user types—students, university tutors and company tutors and prompts users to start the registration process. (see Figure 3.2).
- **CV Upload and Profile Creation:** Users upload their CV (see Figure 3.3), which the system analyzes to pre-fill profile fields. Users can review and edit these fields and add critical information such as security questions, institutional email, password and accept the terms of the platform. An information improvement tool leverages

an LLM to suggest profile enhancements. Users without a CV can manually enter all required information. (see Figure 3.4).

- **Institutional Affiliation:** The system determines user affiliation based on their institutional email domain:

- *Registered Domain:* Automatically links the user's profile to the existing institution and the type of account is determined.
- *Unrecognized Domain:* Directs users to a Verification in Progress screen, notifying them that their domain is under review by administrators. (see Figure 3.5).
- *New Institution:*
  - \* **Students:** Notified that their account is pending verification and advised to contact their institution's administrators.
  - \* **Tutors:** Prompted to create an Institution Profile (see Figure 3.6) by uploading the institution's logo, contact details, defining email domains and describing the institution's mission and specializations. Upon approval, the institution profile becomes active, allowing automatic affiliation for future users with the same domain.

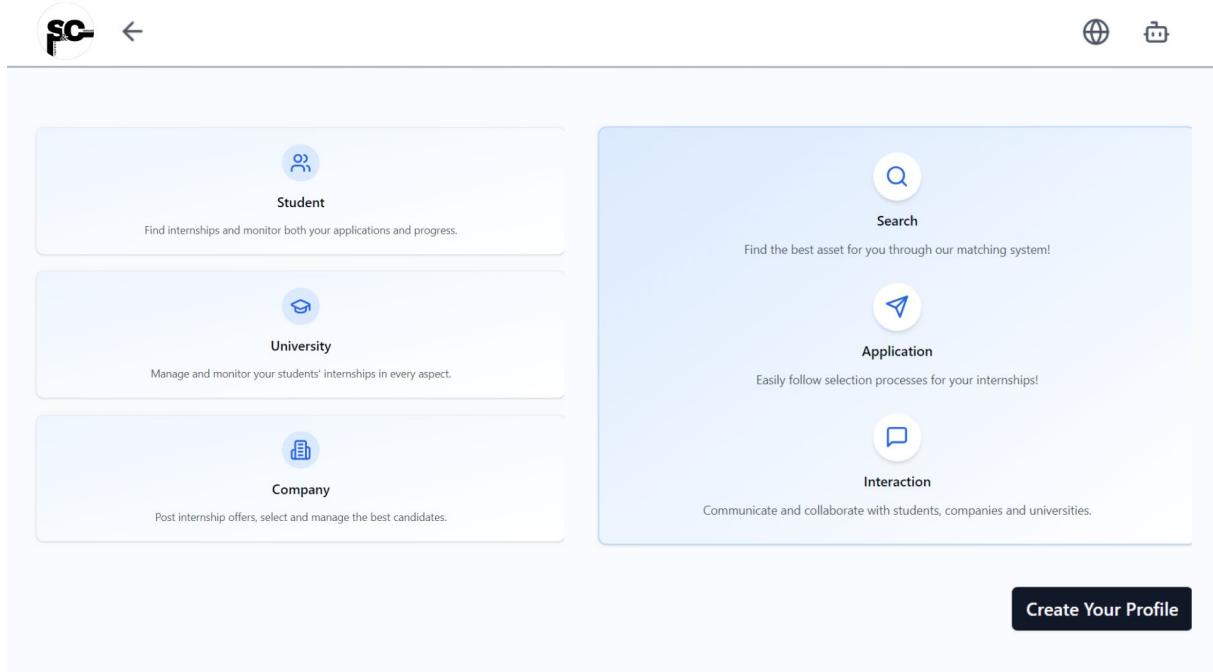


Figure 3.2: Introduction Screen.



## Upload Your CV

Upload your CV to facilitate profile creation. If you don't have a CV ready, you can proceed with manual registration.



Drag and drop your CV here

or

Browse Files

ⓘ Accepted formats: PDF, DOC, DOCX. Maximum file size: 5MB

Continue with CV

Continue without CV

Figure 3.3: Interface to Upload the CV.




## Create Your Profile

Fill in your profile details



### Personal Information

<b>First Name</b>	<b>Last Name</b>
<input type="text" value="Enter your first name"/>	<input type="text" value="Enter your last name"/>

### Contact Information

<b>Phone Number</b>
<input type="text" value="Enter your phone number"/>
<b>LinkedIn Profile</b>
<input type="text" value="Enter your LinkedIn URL"/>
<b>Institutional Email</b>
<input type="text" value="Enter your institutional email"/>

### Professional Information

<b>Department</b>	<b>Role</b>
<input type="text" value="Select department"/>	<input type="text" value="Select role"/>
<b>Professional Biography</b>	
<input type="text" value="Describe your professional background and interests"/>	
<b>Certifications &amp; Awards</b>	
<input type="text" value="List your certifications, awards, and recognitions"/>	
<b>Languages</b>	
<input type="text" value="Enter languages (comma separated)"/>	

### Security Settings

<b>Security Question</b>	
<input type="text" value="Choose a security question"/>	
<b>Security Answer</b>	
<input type="text" value="Enter your answer"/>	
<b>Password</b>	<b>Confirm Password</b>
<input type="text" value="Enter password"/>	<input type="text" value="Confirm password"/>

I accept the terms and conditions

 Improve Content

**Continue**

Figure 3.4: Personal Profile Creation Screen.

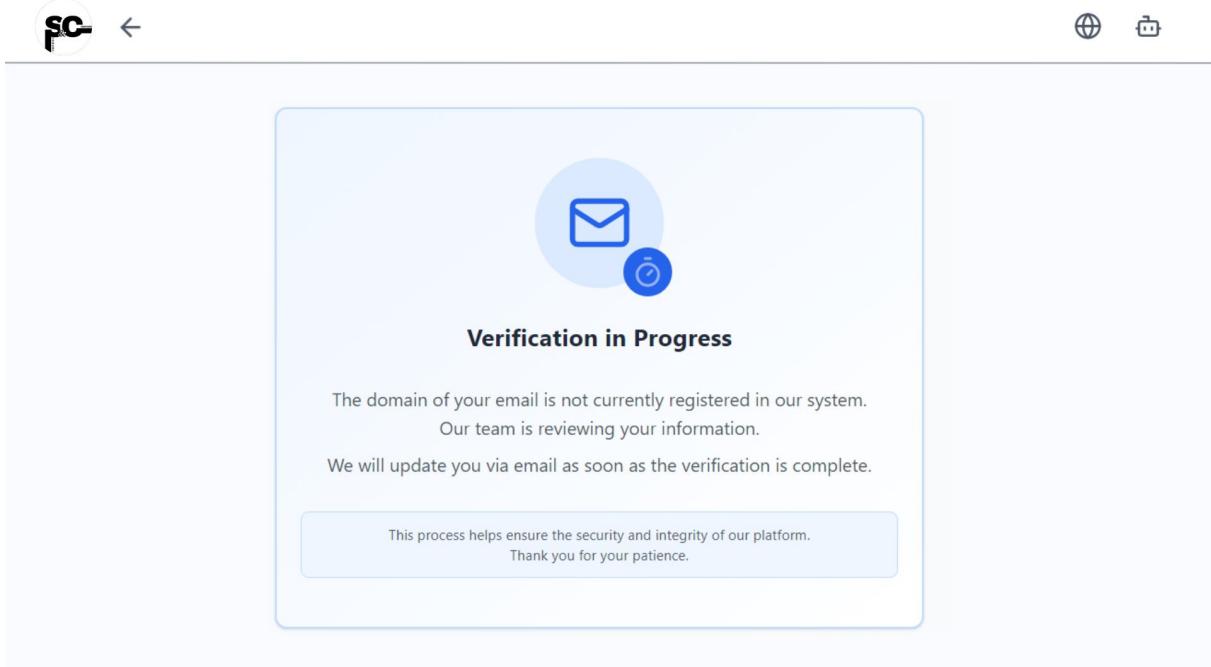


Figure 3.5: Ongoing Verification Notification Screen.

**Create Institution Profile**

Complete the information below to register your institution

CAMERA
  
RECORD

**Basic Information**

Institution Name

**Contact Information**

Phone Number	Email
<input type="text" value="Enter phone number"/>	<input type="text" value="Enter administrative email"/>
Website	LinkedIn
<input type="text" value="Enter website URL"/>	<input type="text" value="Enter LinkedIn URL (optional)"/>

**Address**

Street Address

City

 ZIP Code 

Country

**Institution Details**

Sector	Size
<input type="text" value="Select sector"/>	<input type="text" value="Select size"/>

Description

**Certifications & Awards**

**Domain Management**

Tutor Domains


Student Domains

✖ Improve Content

Figure 3.6: Institution Profile Creation Screen.

**Login and Password Recovery Interfaces:** The Login Screen (see Figure 3.7) allows users to securely access their accounts following successful registration and verification. This interface also handles situations where users have previously accessed the platform in incognito mode or after a prolonged period of inactivity. The process is seamless, offering a straightforward pathway back into the system, ensuring security and session integrity and accommodating all user roles (students, company staff and university tutors). This interface includes also a convenient link to reset forgotten passwords, maintaining accessibility for all.

The Password Recovery interface ensures that users who have forgotten their password can regain access through a secure process. To initiate recovery, users must correctly answer the security question that was set up during the registration of the profile. This step acts as the first layer of verification. Once validated, the system sends a detailed email with step-by-step instructions to reset the password, guaranteeing both security and ease of use.

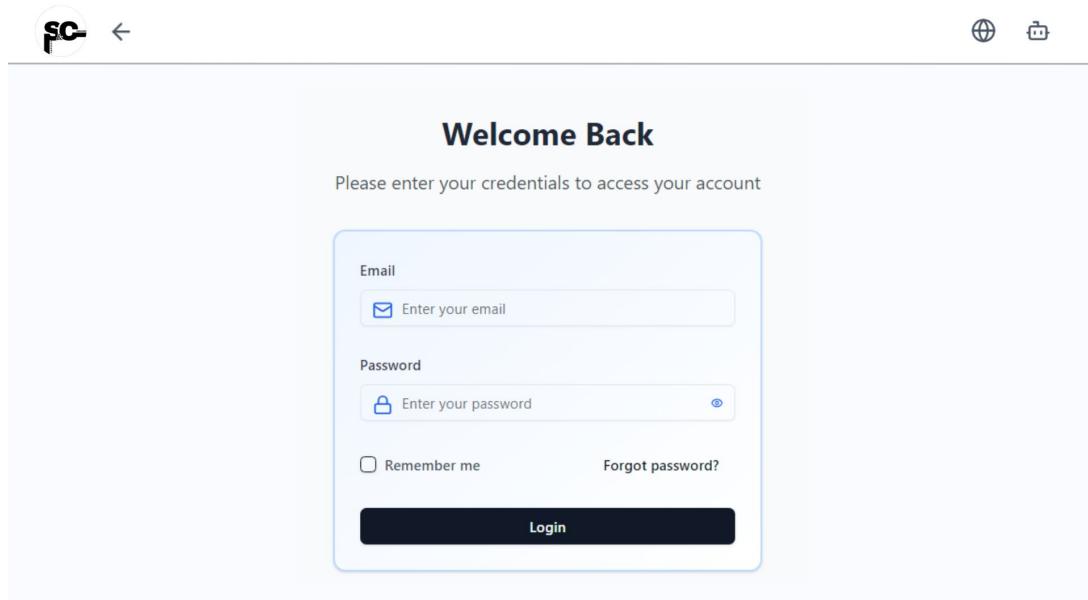


Figure 3.7: Log In Interface of the Students & Companies platform.

## Homepage Interfaces

The homepages of the various users (student Figure 3.8, company tutor Figure 3.9 and academic tutor Figure 3.10) share a common structure designed to provide intuitive navigation and quick access to key features. Each homepage is tailored to ensure a personalized experience, with central elements that cater to the specific needs of the user's role.

The left-hand side of the homepage is dedicated to the user profile, which includes the personal image, name, role and personalization options such as settings, language change and a chatbot assistant. These buttons, if selected, they bring to the relative interface (defined in the paragraph *General Interfaces*). This section acts as an immediate reference point for the user, facilitating access to essential functions.

In the central and right-hand parts of the homepage there are the calendar and notifications. The calendar displays upcoming events, such as meetings or interviews while the notifications keep the user updated on relevant activities or potential issues. The information displayed in these sections is adapted to the specific role of the user: for example, a student will see events related to his/her interviews, while company and academic tutors will receive updates on the management and supervision of internships.

The bottom navigation bar connects the platform's main features, allowing quick access to sections such as matchmaking (not available for the university tutor), monitoring, calendar and messages. This cohesive organization ensures that every user can interact with the platform efficiently and intuitively, maintaining a uniform experience across roles. This navigation bar is accessible from any screen (not just the homepage), enabling users to move quickly between sections and primary functions in a simple and intuitive manner.

Thanks to its flexibility, the homepage not only provides a personalized starting point but also ensures that each user can quickly access the key functionalities to maximize their productivity within the platform.

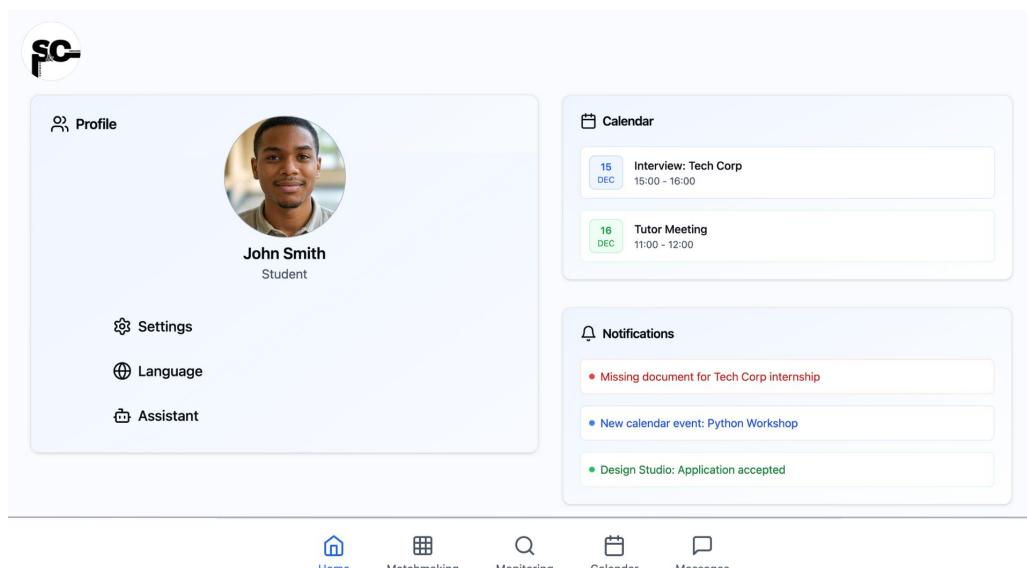


Figure 3.8: Homepage for a Student in S&C platform.

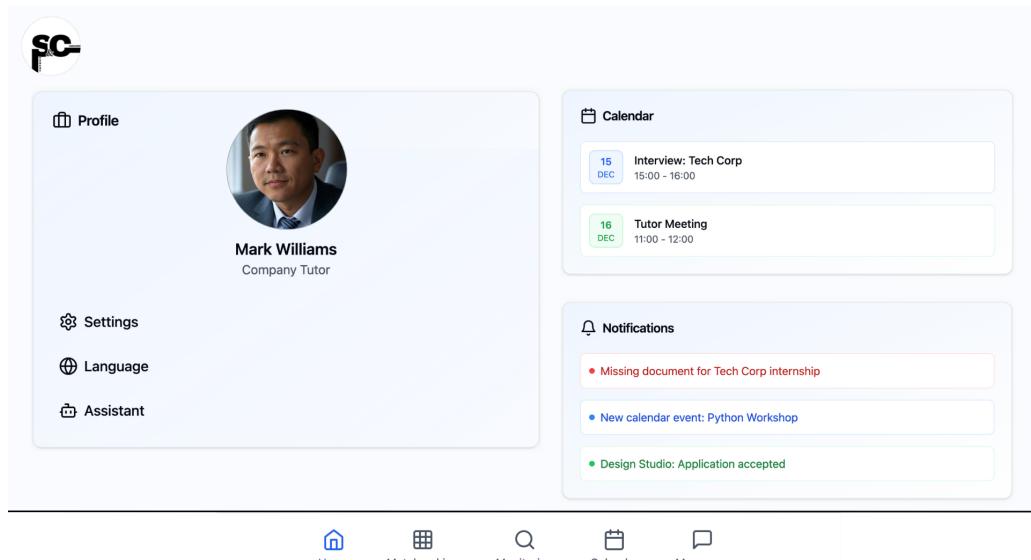


Figure 3.9: Homepage for a Company Tutor in S&C platform.

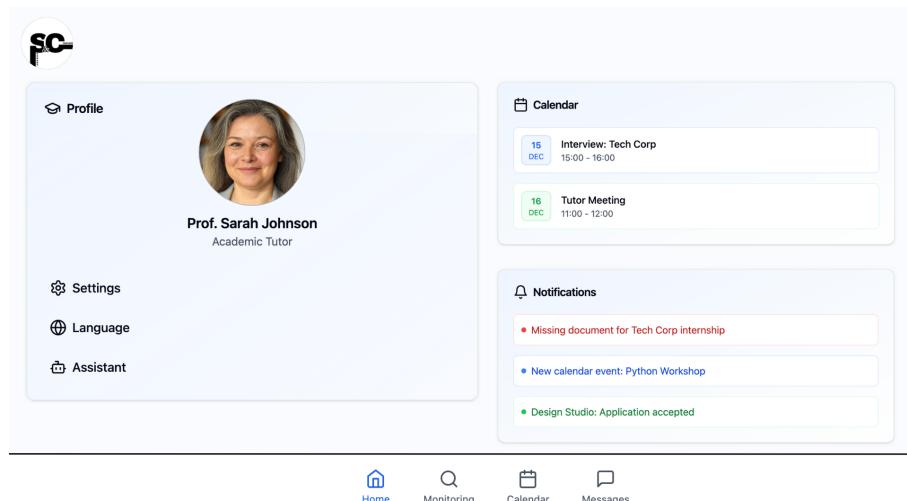


Figure 3.10: Homepage for an Academic Tutor in S&C platform.

## Matchmaking Interface

The Matching interface is an important component of the platform, facilitating internship recommendations for students and candidate identification for company tutors. Academic tutors do not access this functionality, since they instead focus on overseeing academic aspects. Students focus on discovering internships, while company tutors concentrate on identifying and connecting with suitable candidates.

At the top, filtering and sorting tools are prominently displayed alongside an advanced search bar and a *Clear All* button to reset filters, the bottom navigation bar instead provides access to core functionalities like the home page, monitoring, calendar and messaging.

**For Students:** The *Matching interface* (see Figure 3.11) presents internships aligned with their profile data, including languages, descriptions and departments. Students can refine their search using filters such as required skills, languages, or match percentage. Each internship listing includes the title, company, category, duration, compensation, location and working mode (on-site, online, hybrid). Titles are clickable, leading to detailed views. Students can send predefined messages to companies and provide feedback using thumbs-up/down icons to enhance future recommendations.

**For Company Tutors:** The *Matching interface* (see Figure 3.12) displays recommended students for specific internship postings. Tutors can filter and sort candidates based on skills, languages, or match percentage. Each student entry includes their name (linking to the full profile), matched internship title (modifiable), educational background, certifications and match percentage. Company tutors can initiate contact through predefined messages and offer feedback to improve future matches.

The screenshot shows the 'Matching' interface for a student. At the top right are buttons for 'Clear All' and 'Sort'. Below is a search bar with placeholder text 'Search internships...'. Three internship listings are displayed in cards:

- Frontend Developer Intern** at Tech Solutions Inc. Match 95%
  - Programming
  - 6 months
  - 1000€/month
  - Milan • Hybrid
- UX Design Intern** at Creative Studio Match 88%
  - Design
  - 3 months
  - 800€/month
  - Rome • In-person
- Data Analysis Intern** at Data Insights Corp. Match 82%
  - Finance
  - 4 months
  - No compensation
  - Remote • Online

At the bottom are navigation icons: Home, Matchmaking (highlighted), Monitoring, Calendar, and Message.

Figure 3.11: Matching Interface for a Student in S&C platform.

The screenshot shows the 'Matching' screen for a company tutor. At the top right are buttons for 'Clear All' and 'Sort'. Below is a search bar with placeholder text 'Search internships...'. Three student profiles are listed in cards:

- Marco Rossi** Recommended for: Frontend Developer Intern Match 95%
  - Computer Science and Engineering
  - AWS Certified Cloud Practitioner
  - Politecnico di Milano
  - Italian, English
- Laura Bianchi** Recommended for: UX Design Intern Match 88%
  - Digital Communication
  - Adobe UX Certification
  - Università di Bologna
  - Italian, Spanish
- Giuseppe Verdi** Recommended for: Data Analysis Intern Match 82%
  - Mathematics and Statistics
  - Microsoft Data Analyst
  - Università di Torino
  - Italian, German

At the bottom are navigation icons: Home, Matchmaking (highlighted), Monitoring, Calendar, and Message.

Figure 3.12: Matching Screen for a Company Tutor in S&C platform.

## Monitoring Interfaces

The *Monitoring section* is divided into three main tabs, each tailored to specific functionalities: managing the selection process, tracking active stages and accessing questionnaires related to these phases.

**Selection Process:** The "Selection Process" interface offers a comprehensive platform for monitoring and managing internship selection processes. Each table allows users to track key aspects like participants, the origin of applications and the current status of the selection process through icons. These icons serve as shortcuts for actions such as scheduling meetings, initiating chats and completing questionnaires. Users can also remove applications when necessary, for instance, when a process concludes with the "Rejected" status. Additionally, the interface includes filtering and sorting options, to customize table views based on application status or match percentage.

This tab also provides specific tools to address the unique responsibilities of different user roles. For company tutors, it offers the ability to directly modify existing internships from the table view, simplifying updates and management of offers. Additionally, company tutors have access to two unique functionalities in this tab: a "Create New Stage" button, located at the top right, which links directly to the internship creation screen and a "Drafts" button, also positioned at the top right, providing access to a dedicated section for managing unpublished stage drafts. Academic tutors, on the other hand, have the ability to accept or reject academic tutor requests within a specified deadline using clickable icons. By integrating these role-specific functionalities within a unified platform, the "Selection Process" interface offers a robust and versatile solution for navigating the complexities of internship selection.

The screenshot shows the 'Selection Process' tab in the Monitoring interface. The page title is 'Monitoring' and the sub-tab is 'Selection Process'. Below the tabs are three tables representing different internships:

Frontend Developer Intern				
Company Tutor	Tag	Academic Tutor	Status	Remove
John Smith	Received	Michael Brown	<a href="#">✉️</a>	<a href="#">[trash]</a>

Backend Developer Intern				
Company Tutor	Tag	Academic Tutor	Status	Remove
David Thompson	Sent	Not defined	<a href="#">✖</a>	<a href="#">[trash]</a>

UX Design Intern				
Company Tutor	Tag	Academic Tutor	Status	Remove

At the bottom, there is a navigation bar with icons for Home, Matchmaking, Monitoring (highlighted), Calendar, and Messages.

Figure 3.13: Selection Process Screen for a Student.

Figure 3.14: Selection Process Screen for a Company Tutor.

Figure 3.15: Selection Process Screen for an Academic Tutor.

**Active Stages:** The "Active Stages" enables users to monitor progress, access relevant profiles and manage any arising issues. At its core, the interface is structured around tables, where each row represents a unique active stage. These tables include key information, such as the other users involved and the current status of the stage. Each of these fields is clickable, allowing users to access additional information. A dedicated field highlights potential issues: if no issues exist, the interface displays "None"; otherwise, problematic entries appear in red and clicking on them opens a detailed chat or management screen, with respect to the user interface.

Company Tutor	Academic Tutor	Status	Issues
Emily Davis	Robert Wilson	Final Evaluation	None

Company Tutor	Academic Tutor	Status	Issues
David Thompson	Michael Brown	Stage Start	None

Company Tutor	Academic Tutor	Status	Issues

Figure 3.16: Active Stages Screen for a Student (Equal for a Company Tutor).

Student	Company Tutor	Status	Issues
Alice Johnson	John Smith	Scheduled Event: Weekly Review	Communication

Student	Company Tutor	Status	Issues
Robert Wilson	Sarah Parker	Stage Start	None

Student	Company Tutor	Status	Issues

Figure 3.17: Active Stages Screen for an Academic Tutor.

**Questionnaires:** The "Questionnaires" interface allows users to access and manage feedback forms related to the first meeting and the final evaluation of internships. It is divided into two primary tabs to separate initial assessments from final evaluations,

providing a clear and organized overview of interactions and feedback received during the selection process and the internship lifecycle.

The first tab, "First Meeting Questionnaires", exclusive for students and company tutors, enables them to view questionnaires completed by these latter immediately after their initial meetings with students during the selection process. This tab contains a single table with fields such as the student's name (for company tutors) or the company tutor's name (for students), both of which link to the respective user profiles. Additional columns include the title of the internship, which links to the internship's detailed screen, the date of the meeting and a selectable field to view the completed questionnaire.

The screenshot shows a web-based application interface titled 'Monitoring'. At the top, there are three tabs: 'Selection Process', 'Active Stages', and 'Questionnaires', with 'Questionnaires' being the active tab. Below the tabs, there are two buttons: 'First Meeting Questionnaires' (highlighted in blue) and 'Final Evaluations'. A table follows, displaying two rows of data:

Company Tutor	Internship Title	Meeting Date	Questionnaire
John Smith ↗	Web Development Intern ↗	15/03/2024	<a href="#">View Questionnaire</a>
Sarah Wilson ↗	UX Design Intern ↗	14/03/2024	<a href="#">View Questionnaire</a>

At the bottom of the page, there is a navigation bar with five icons: 'Home' (house icon), 'Matchmaking' (grid icon), 'Monitoring' (magnifying glass icon, highlighted in blue), 'Calendar' (calendar icon), and 'Messages' (speech bubble icon).

Figure 3.18: Tab to View all Questionnaires from the First Meeting.

The second tab, "Final Evaluations", is divided into two sections, presenting questionnaires completed at the conclusion of internships and all reviews received from past internships. The "Questionnaires" section features a table where each row represents an internship, with columns that include the internship's title (linking to its detailed view), the period spanning from the "Start Internship" event to the "Last Event" and links to final evaluations completed by the student, company tutor and academic tutor. The "Reviews" section compiles all reviews received across internships, that are visible in the personal profile page.

The screenshot shows the 'Monitoring' tab selected in the top navigation bar. Below it, three tabs are visible: 'Selection Process', 'Active Stages', and 'Questionnaires', with 'Questionnaires' being the active tab. Under 'Questionnaires', two sub-tabs are shown: 'First Meeting Questionnaires' and 'Final Evaluations', with 'Final Evaluations' being the active tab.

**Final Evaluations**

Internship	Period	Student Evaluation	Company Tutor Evaluation	Academic Tutor Evaluation
Web Development Internship	Jan-Mar 2024	<a href="#">View Evaluation</a>	<a href="#">View Evaluation</a>	<a href="#">View Evaluation</a>
UX Design Internship	Feb-Apr 2024	<a href="#">View Evaluation</a>	<a href="#">View Evaluation</a>	Pending

**Reviews Received**

- John Smith** (Company Tutor) - ★★★★☆  
Shows great initiative and technical aptitude. Quickly adapted to our development workflow and contributed valuable code to the project.  
[Web Development Internship](#)
- Sarah Wilson** (Company Tutor) - ★★★★☆  
Demonstrated strong understanding of UX principles and user research methods. Consistently delivered high-quality design solutions.  
[UX Design Internship](#)
- Dr. Michael Brown** (Academic Tutor) - ★★★★☆  
Excellent integration of academic knowledge with practical skills. The student has shown remarkable

At the bottom, there are five navigation icons: Home, Matchmaking, Monitoring (highlighted in blue), Calendar, and Messages.

Figure 3.19: Tab to View all Questionnaires and Reviews from the Final Evaluations.

**Selection Process - Create or Modify Internships:** The "Create New Stage" interface allows company tutors to efficiently create, modify, or review internship positions. A key feature is the template selection, which allows users to choose from predefined or saved templates tailored for common categories. By using templates, key fields are automatically populated, simplifying the creation process while still offering the ability to customize details as needed.

Mandatory fields include the internship's title, a descriptive summary of the role, specific requirements, duration (expressed in weeks, months, or years), compensation details and the internship's location, whether on-site, remote, or hybrid. Additionally, users must specify the company tutor responsible for the internship, the application deadline and the required languages for the role. This information can be manually entered and then enhanced with the "Improve" button, which leverages LLM technology to refine descriptions and ensure professionalism.

The interface provides multiple options for managing internships. Company tutors can

save positions as drafts for later review, publish them immediately, or save it as customized templates for future use. At any stage, users can navigate back to the previous screen without applying changes using the "Back" button. These tools offer significant flexibility, allowing users to adapt the workflow to their specific needs.

The screenshot shows the 'Monitoring' tab interface for creating internships. The page has a header with the 'Monitoring' logo and a back arrow. The main content area contains several input fields and sections:

- Template Selection (Optional)**: A dropdown menu labeled 'Choose a template'.
- Internship Title \***: A text input field with placeholder 'e.g., Junior Backend Developer Intern'.
- Category \***: A dropdown menu labeled 'Select a category'.
- Description \***: A text area with placeholder 'Describe the internship role and responsibilities...'.
- Requirements \***: A text area with placeholder 'List required skills, qualifications, and experience...'.
- Duration \***: A dropdown menu showing 'months'.
- Compensation \***: A text input field with placeholder 'e.g., 800 EUR/month + benefits'.
- Work Mode \***: A dropdown menu labeled 'Select work mode'.
- Location**: A text input field labeled 'Office address'.
- Application Deadline \***: A date input field with placeholder 'gg/mm/aaaa'.
- Company Tutor \***: A text input field labeled 'Select or enter tutor name'.
- Required Languages**: A section with a '+ Add Language' button.
- Save as template for future use**: A checkbox.

At the bottom are three buttons: 'Improve Content' (with a pencil icon), 'Save Draft' (with a trash bin icon), and 'Publish' (with a checkmark icon). Below the buttons is a navigation bar with icons for Home, Matchmaking, Monitoring (which is highlighted in blue), Calendar, and Messages.

Figure 3.20: Tab to Create Internships.

**Selection Process - Manage Drafts:** The "Manage Drafts" interface provides company tutors with an intuitive and organized environment for handling internship drafts saved during the creation process. At its core, this screen centers on a table displaying all drafts, enabling tutors to review, modify, or finalize these positions. Each draft includes essential details such as the internship title, the date and time of the last modification and a completion status indicator that highlights whether the draft is incomplete or some fields, or "Ready for Publication."

From this interface, tutors can seamlessly transition to the "Create New Stage" screen to edit a draft, with all previously entered details automatically populated for ease of use. When a draft is "Ready for Publication", tutors can publish the internship directly, making it visible to students on the SC platform. For drafts no longer required, a delete option is available, with a confirmation step to prevent accidental removals.

To further streamline draft management, the interface offers filtering and sorting tools. Tutors can filter drafts based on their completion status or category, ensuring they quickly locate the relevant entries. Sorting options allow drafts to be arranged by modification date, title, or completion status, providing flexibility in organizing the view.

Internship Title	Last Modified	Status	Category	Actions
Frontend Developer Intern	Mar 20, 2024, 02:30 PM	Ready to Publish	Programming	
UX Research Assistant	Mar 19, 2024, 09:15 AM	Incomplete	Design	
Digital Marketing Specialist	Mar 18, 2024, 04:45 PM	Ready to Publish	Marketing	

Below the table are navigation icons: Home, Matchmaking, Monitoring (highlighted in blue), Calendar, and Messages.

Figure 3.21: Tab to Manage Drafts.

**Active Stages - Stage State History:** The "Stage State History" interface provides a comprehensive view of the lifecycle of a specific internship, organizing its progression through past, current and future planned states. A central timeline visualizes these stages, with black-filled dots representing past states, each labeled with start and end dates. The current state is marked with a blue-filled dot and includes a brief description of ongoing actions. Future planned states, shown with empty blue dots, outline the next steps in the internship process.

State transitions occur automatically based on user actions within the system. The internship begins with the "Start Internship" state, initiated after the selection process. During the internship, states update dynamically, such as when a new event is created, shifting the current state to reflect the closest upcoming event. Unique occurrences, like a pause initiated by the academic tutor due to issues or the "Last Event" designation by the company tutor, are also reflected in the timeline. The last 2 states are the final evaluation state, which includes access to questionnaires and reviews for all involved parties and the "End Internship" state, triggered by either unresolved issues or submission of final evaluations by all participants. Each state transition generates automatic notifications for relevant users, ensuring transparency and timely communication.

The screenshot shows the 'Monitoring' tab interface. At the top, there's a header with the 'Monitoring' tab selected. Below the header, a vertical timeline lists several stages:

- Stage Start** (Solid black dot): September 10, 2024. Description: Stage started after company selection and student approval.
- Planned Event: Progress Meeting** (Blue dot): December 20, 2024. Description: Next scheduled event. A callout box labeled 'Current state - Actions in progress' points to this item.
- Last Event** (Open blue circle): Expected January 2025. Description: Final stage meeting.
- Final Evaluation** (Open blue circle): Expected January 2025. Description: Final assessment and questionnaires.
- Stage End** (Open blue circle): Expected January 2025. Description: Stage completion.

At the bottom of the timeline, there's a section titled 'Status Change Information' with the following text:

States change automatically based on user actions in the system. An automatic notification is sent to all involved users when a state change occurs.

At the very bottom, there's a navigation bar with icons for Home, Matchmaking, Monitoring (selected), Calendar, and Messages.

Figure 3.22: Tab to View all Stages States (Past, Present and Future).

### **Questionnaires - Creation/Visualization of the 1st Meeting Questionnaire:**

The "First Meeting Questionnaire" section encompasses two distinct interfaces: one for company tutors to create and submit evaluations following their initial meeting with students and another for both tutors and students to view the completed feedback.

For company tutors, the creation interface offers a structured questionnaire designed to provide detailed and objective insights into the student's performance and suitability for the internship. The questionnaire includes multiple-choice questions evaluating aspects such as clarity in communication, understanding of internship requirements and level of motivation. Tutors are also prompted to rate the student's overall suitability on a scale of 1 to 5 and provide open-ended feedback on the student's strengths and areas for improvement. Once completed, tutors can submit the questionnaire using the "Save" button, ensuring secure storage of the data, or return to the previous screen without saving via the "Back" button. Once the questionnaire is saved, it can't be modified.

The viewing interface organizes the completed questionnaire into a clear, list-based format for easy reference by both company tutors and students. Responses to multiple-choice questions, numerical ratings and open-ended feedback are presented in a structured manner, mirroring the layout of the original questionnaire. Moreover, a "Back" button allows users to navigate to the previous page as needed.



## Monitoring



### ✓ First Meeting Evaluation

- Complete the following questionnaire to evaluate the candidate. All responses will be kept confidential and used exclusively for the selection process.

General impression of the student

Poor

Fair

Good

Excellent

Did the student show interest and motivation for the role?

Poor

Fair

Good

Excellent

Would you recommend this student for the internship?

Poor

Fair

Good

Excellent



Home



Matchmaking



Monitoring



Calendar



Messages

Figure 3.23: Tab to Compile the Questionnaire of the Selection Process.



## Monitoring



Was the student clear in communicating their experience and skills?

Poor

Fair

Good

Excellent

Did the student understand the internship requirements?

Poor

Fair

Good

Excellent

What are the student's key strengths?

Enter your observations here...

What areas need improvement?

Enter your observations here...

How suitable is the student for this role?

1 - Not at all

2 - Slightly

3 - Moderately

4 - Very much

5 - Perfectly

Save Evaluation



Home



Matchmaking



Monitoring



Calendar



Messages

Figure 3.24: Tab to Compile the Questionnaire of the Selection Process.



## Monitoring



### Student Evaluation Results

First meeting evaluation results for the student's internship application.

General impression of the student

Excellent

Was the student clear in communicating their experience and skills?

Good

Did the student understand the internship requirements?

Excellent

Did the student show interest and motivation for the role?

Excellent

Would you recommend this student for the internship?

Good

How suitable is the student for this role?

4 - Very much

Student's key strengths

Strong technical background in relevant technologies. Shows great enthusiasm for learning and adapting to new challenges. Excellent problem-solving approach demonstrated during the discussion.

Areas needing improvement

Could benefit from more practical experience in team projects.  
Communication skills are good but could be more concise.



Home



Matchmaking



Monitoring



Calendar



Messages

Figure 3.25: Tab to View the Questionnaire of the First Meeting.

**Questionnaires - Creation/Visualization of the Final Evaluation:** The "Final Evaluation" section integrates two interfaces: one for completing the evaluation process for internships and another for viewing the feedback provided by all participants.

In the evaluation interface, each participant (student, company tutor and academic tutor) completes a dedicated questionnaire assessing various aspects of the internship and the other participants. The interface includes detailed stage information at the top, such as the internship title, names of the participants and the start and end dates. The questionnaire's central section is tailored to each role, with questions designed to capture specific insights. For students, the questions evaluate the clarity of objectives, the support received and the professional growth achieved during the internship, along with open-ended prompts for feedback and improvement suggestions. Company tutors assess the student's performance, timeliness, proactivity and problem-solving skills, while academic tutors focus on whether the internship met its educational objectives and provide an overall assessment. Once completed, participants can submit their responses, which remain private and accessible only to those involved in the internship. Moreover, participants complete a review section where they leave feedback on the competencies, behaviors and qualities of other participants. These reviews are visible in the recipient's profile, encouraging thoughtful and constructive contributions.

The viewing interface organizes all responses in a structured, list-based format, presenting the detailed feedback submitted by each participant. The section titled "Final Evaluation Results" provides context, while the responses, including multiple-choice answers, open-ended feedback and numerical ratings, are clearly displayed for easy reference. Additionally, a dedicated review section allows users to view the reviews left by the author of the questionnaire about them, emphasizing key competencies, behaviors and qualities observed during the internship.



## Monitoring



### ⌚ Final Stage Evaluation

Internship Title

**Web Development Intern**

Company Tutor

**John Smith**

Student

**Alice Johnson**

Duration

**Jan 15, 2024 - Apr 15, 2024**

⌚ Your responses to this questionnaire will be private and visible only to the parties involved in the internship.

How would you rate the support received from your company tutor during the internship?

1 - Very Poor

2 - Poor

3 - Fair

4 - Good

5 - Very Good

6 - Excellent

Were your objectives and responsibilities clearly defined?

1 - Very Poor

2 - Poor

3 - Fair

4 - Good

5 - Very Good

6 - Excellent



Home



Matchmaking



Monitoring



Calendar



Messages

Figure 3.26: Tab to Compile the Final Evaluation.



## Monitoring



Has the internship contributed to your professional growth?

1 - Very Poor

2 - Poor

3 - Fair

4 - Good

5 - Very Good

6 - Excellent

Which aspects of the internship did you enjoy the most?

Share your positive experiences...

Do you have any suggestions for improving the internship?

Share your suggestions for improvement...

- ⓘ This review will be visible on the user's profile. Please ensure your feedback accurately reflects your experience.

Rate your overall experience



Write a review for your company tutor

Share your thoughts about their competencies, behavior, and qualities...

Submit Final Evaluation



Home



Matchmaking



Monitoring



Calendar



Messages

Figure 3.27: Tab to Compile the Final Evaluation.



### ⌚ Final Evaluation Results

Internship Title

Web Development Intern

Company Tutor

John Smith

Student

Alice Johnson

Duration

Jan 15, 2024 - Apr 15, 2024

How would you rate the support received from your company tutor during the internship?

5 - Very Good

Were your objectives and responsibilities clearly defined?

6 - Excellent

Has the internship contributed to your professional growth?

5 - Very Good

Which aspects of the internship did you enjoy the most?

The hands-on experience with modern web development technologies was invaluable. The team was very welcoming and I had the opportunity to work on real projects. The regular feedback sessions with my tutor were particularly helpful in understanding my progress and areas for improvement.

Do you have any suggestions for improving the internship?

It would be beneficial to have more structured documentation about the initial setup process. Perhaps a welcome package for new interns with all the necessary information would streamline the onboarding process.

### Company Tutor Review



John has been an exceptional mentor throughout my internship. His expertise and patience in guiding me through complex technical challenges helped me grow significantly as a developer. He consistently provided constructive feedback and was always available when I needed support. His approach to mentoring fostered both my technical skills and professional development.



Figure 3.28: Tab to View the Final Evaluation from One Actor.

## Calendar Interfaces

The *Calendar interface* is a fundamental feature of the platform, providing all user types with tools to manage and visualize events. Designed for consistency across students, company tutors and academic tutors, the interface supports seamless organization of activities related to internships and associated processes.

The interface comprises three primary components:

- **Main Calendar View:** Offers daily (Figure 3.29), weekly (Figure 3.30) and monthly (Figure 3.31) views, allowing users to manage immediate tasks, medium-term planning and long-term deadlines effectively.
- **Event Creation Functionality:** Accessible via the "+" button, this feature enables users to schedule and customize activities by defining details such as date, time, category and participants. The same interface is used for editing events, pre-filled with existing details for consistency.
- **Event Visualization Feature:** Allows users to explore individual events in detail, with options to confirm attendance and access additional tools. Event creators can modify or delete events, while participants can view comprehensive event information.

**Integration and Customization:** The Calendar interface integrates with external calendars like *Google Calendar* and *Outlook*, enabling synchronization of professional and personal commitments. A filtering function allows users to narrow down visible events by keywords, dates, or event types, enhancing navigation and focus.

**Event Categorization:** Events are color-coded for quick differentiation:

- **Meetings:** Purple — Videoconferences or in-person sessions.
- **Feedback Sessions:** Green — Performance reviews and guidance.
- **Deliverables:** Blue — Project submissions or completions.
- **Other:** Various colors as needed.

### Role-Based Functionalities:

- **Event Creators:** Can edit or delete their events and manage event details.
- **Participants:** Can view event details, confirm attendance and access associated resources.

By combining structured layouts, customizable views and advanced functionalities, the Calendar interface ensures efficient organization and coordination across all user roles, enhancing the platform's overall usability and effectiveness.

The screenshot shows a calendar interface for December 20, 2024. At the top, there are navigation arrows for 'December 2024' and buttons for 'Day', 'Week', and 'Month'. The 'Day' button is highlighted. Below the date, three events are listed:

- Stage Progress Meeting** (10:00 - 11:00) - Monthly progress review meeting. This event is color-coded purple and has initials 'J' and 'S' in circles at the top right.
- Mid-stage Feedback** (14:30 - 15:30) - Performance evaluation and feedback session. This event is color-coded green and has an initial 'D' in a circle at the top right.
- Project Submission** (16:00 - 16:30) - This event is color-coded blue and has an initial 'S' in a circle at the top right.

At the bottom of the screen, there are navigation icons for Home, Matchmaking, Monitoring, Calendar (which is blue), and Messages.

Figure 3.29: Detailed view of events for a single day, for precise scheduling.

The screenshot shows a weekly calendar view from December 18 to December 24, 2024. At the top, there are navigation arrows for 'December 2024' and buttons for 'Day', 'Week' (which is highlighted), and 'Month'. The days of the week are labeled 18 (Monday) through 24 (Sunday). Below the days, three events are listed for each day:

- Stage Progress Meeting** (10:00 - 11:00) - This event is color-coded purple and appears on all days from Monday to Friday.
- Mid-stage Feedback** (14:30 - 15:30) - This event is color-coded green and appears on all days from Monday to Friday.
- Project Submission** (16:00 - 16:30) - This event is color-coded blue and appears on all days from Monday to Friday.

At the bottom of the screen, there are navigation icons for Home, Matchmaking, Monitoring, Calendar (which is blue), and Messages.

Figure 3.30: Scheduled events for the current week, supporting mid-term planning.

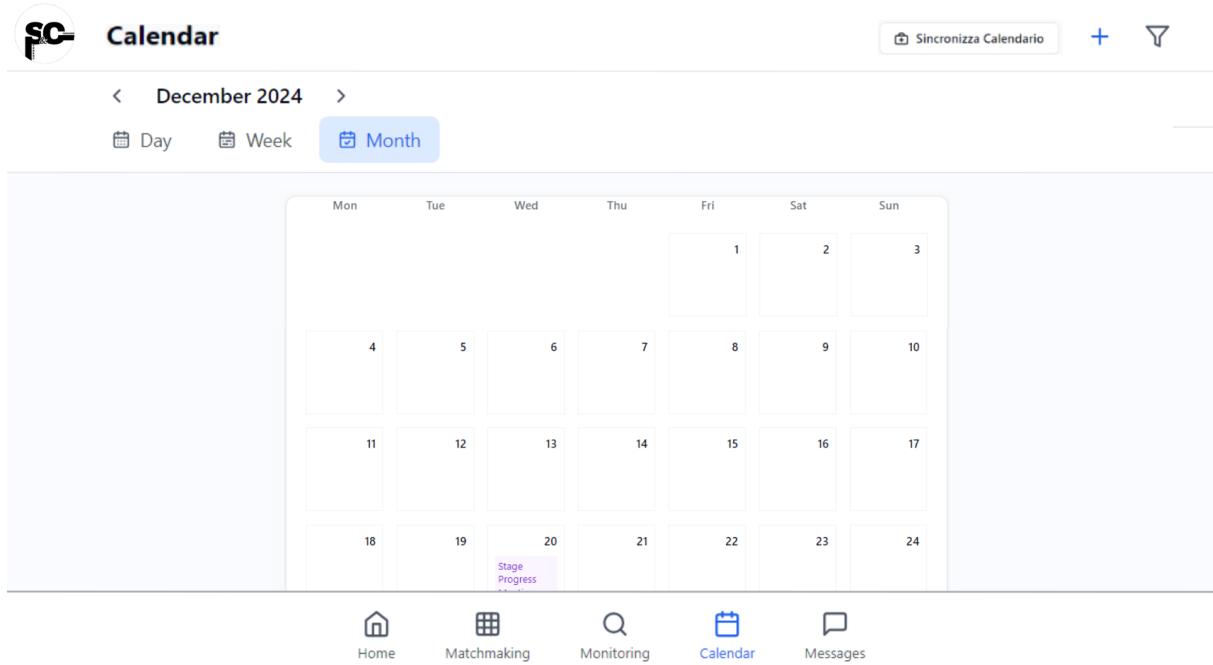


Figure 3.31: Overview of events for the selected month, enabling long-term planning.

**Events Planning and Visualization:** The calendar offers two interconnected interfaces for managing events: the creation/modification screen and the visualization screen. These interfaces are designed for intuitive usability, enabling users to efficiently schedule, edit and review event details while ensuring seamless coordination among all participants in the internship process.

**Event Creation and Modification Interface** allows users to input and adjust event details:

- *Event Title:* Define a concise and descriptive name for the activity.
- *Date and Time:* Specify the exact day and start/end times for precise scheduling.
- *Participants:* Select stakeholders such as students, company tutors, academic tutors and administrators.
- *Description:* State the event's purpose, objectives, or planned activities.
- *Location:* For physical meetings, provide the address; for virtual events, indicate a video call, which automatically generates an associated chat.
- *Event Type:* Choose from predefined categories using a dropdown menu:
  - *Meetings* (purple): Videoconferences or in-person sessions.
  - *Feedback Sessions* (green): Performance reviews and guidance.
  - *Deliverables* (blue): Project submissions or completions.
  - *Other*: Events outside predefined categories.

- *Notifications*: Enable alerts via platform notifications or emails for upcoming events.
- *Last Event Flag*: Activate for concluding internships, triggering final evaluation forms to all participants.
- *Confirmation Button*: Finalize and save the event, notifying all participants immediately.

**Event Visualization Interface** provides a comprehensive view of selected events:

- *Event Title and Category*: Displayed prominently with color-coding.
- *Detailed Information*: Includes date, time, participants with roles and an extended description.
- *Location*: For virtual events, includes a clickable video conferencing link and a shortcut to the associated chat.
- *Attendance Tracking System*: Shows confirmation status of each participant as *Present*, *Pending*, or *Absent*. Users can confirm attendance via a dedicated button.
- *Edit Event Option*: Available for event creators, redirecting to the creation/modification interface with pre-filled details for efficient updates.

By integrating structured layouts, customizable views and advanced functionalities, the Calendar interface ensures efficient organization and coordination across all user roles, enhancing the platform's overall usability and effectiveness.

The screenshot shows a messaging interface with the following details:

- Header:** SC Messages, Report Issue, +, and a search icon.
- Filter Buttons:** Students, Companies, Universities.
- Messages:**
  - James Wilson:** Technical Skills, 10:30 AM
  - Tech Company Ltd.:** Internship Program Discussion, 2:00 PM
  - Sarah Johnson:** Documentation update for the new semester, 9:15 AM
- Bottom Navigation:** Home, Matchmaking, Monitoring, Calendar, Messages.

Figure 3.32: Messaging Screen to See all the Messages.

**Create Chats** : The "Create Chat" interface provides a streamlined environment for users to set up new conversations by defining key details and selecting participants. At the top of the screen, the interface displays the title "Create a New Chat," clearly indicating the purpose of the page and guiding users through the process seamlessly.

Users can search for participants using a search bar, which allows filtering by name, role, or category. Below the search bar, a list of suggested participants is displayed, complete with names, roles and category icons. Each suggested participant can be selected and added to the chat. Those selected appear in a designated area, where users also have the option to remove participants if needed. To further customize the chat's configuration, users can set whether only the chat creator or all members can add new participants. The interface also allows users to define a name for easy recognition and a description, to elaborate on the chat's purpose or context, offering clarity and alignment for all participants. To finalize the setup, the interface offers the "Create Chat" button, to save the chat configuration and redirects users to the newly created chat interface, while the "Cancel" button clears all entered details and returns to the previous screen.

The screenshot shows the "Create a New Chat" interface. At the top, there is a header with the SC logo and the title "Create a New Chat". A back arrow icon is on the right. Below the header, there are two main sections: "Chat Participants" and "Chat Details".

**Chat Participants:** This section includes a search bar labeled "Search users by name, role, or category...". Below it is a list titled "Suggested Users" with three entries:

- John Smith (Company Tutor • Tech Corp) with an "Add" button
- Dr. Sarah Wilson (Academic Tutor • University) with an "Add" button
- Alice Johnson (Student • Computer Science) with an "Add" button

Below the suggested users, there is a question "Who can add participants?" with two radio button options:  
 Only the creator  
 All members

**Chat Details:** This section contains fields for "Chat Name \*": "Enter chat name" and "Description (Optional)": "Add a brief description...".

At the bottom right of the main form are "Cancel" and "Create Chat" buttons. At the very bottom of the page are navigation icons for Home, Matchmaking, Monitoring, Calendar, and Messages.

Figure 3.33: Screen to Create Chats.

**Specialized Chats** : The chat functionality within the platform is a key component for communication, offering users an intuitive and dynamic space for collaboration. Each chat is structured to enhance interaction, featuring a detailed header bar, a messaging area and a message creation panel. The header bar displays the participant's name along with their category icon for easy identification. If the conversation involves multiple categories, all relevant icons are shown.

In the central messaging area, users can view the chat history with each message timestamped and marked as read or unread. Automatic updates are also generated to notify users of significant changes, such as rescheduled video calls or participation confirmations. Users can also mark messages as actions by holding them, assigning a deadline for completion. For convenience, a side panel lists participants, pending actions and shared files, ensuring comprehensive management of communication.

The message creation bar, located at the bottom of the chat, provides tools for composing and sending messages. It includes a text field with formatting options, an attachment button for sharing files like documents and images and an audio button for sending voice messages. These tools ensure that users have versatile and efficient methods to communicate effectively.

While these features are common to all chats, the platform also supports two specialized chat types, that are *videocall chats* (see Figure 3.34) and *issue-related chats* (see Figure 3.35), to address those specific scenarios.

*Chats for video calls* are automatically generated whenever a video call is scheduled through the calendar. These chats act as a centralized hub for all discussions linked to the scheduled meeting. At the top of the chat interface, a persistent pop-up displays key details of the video call, such as the date, time and list of participants, along with a button to join the call directly. Messages can be exchanged freely before, during and after the video call, with the interface supporting file sharing and task management to facilitate collaboration. Additionally, after the video call concludes, the system generates an AI-driven summary that highlights the key discussion points, agreements and follow-up actions, ensuring that all participants remain aligned and informed about the outcomes.

*Chats for issues* are automatically initiated whenever a user, either a student or a company tutor, reports a problem using the dedicated issue-reporting feature. These chats always include the academic tutor as a participant, along with the user who reported the issue and other relevant stakeholders. The chat header features an interactive pop-up summarizing the issue's title, category and description, ensuring all participants are fully aware of the problem at hand. A status indicator tracks the resolution progress, displaying labels such as *In Progress*, *Awaiting Response*, or *Resolved*. Besides these unique functionalities, issue-related chats retain all standard chat features, allowing users to manage issue resolution effectively within a familiar interface.

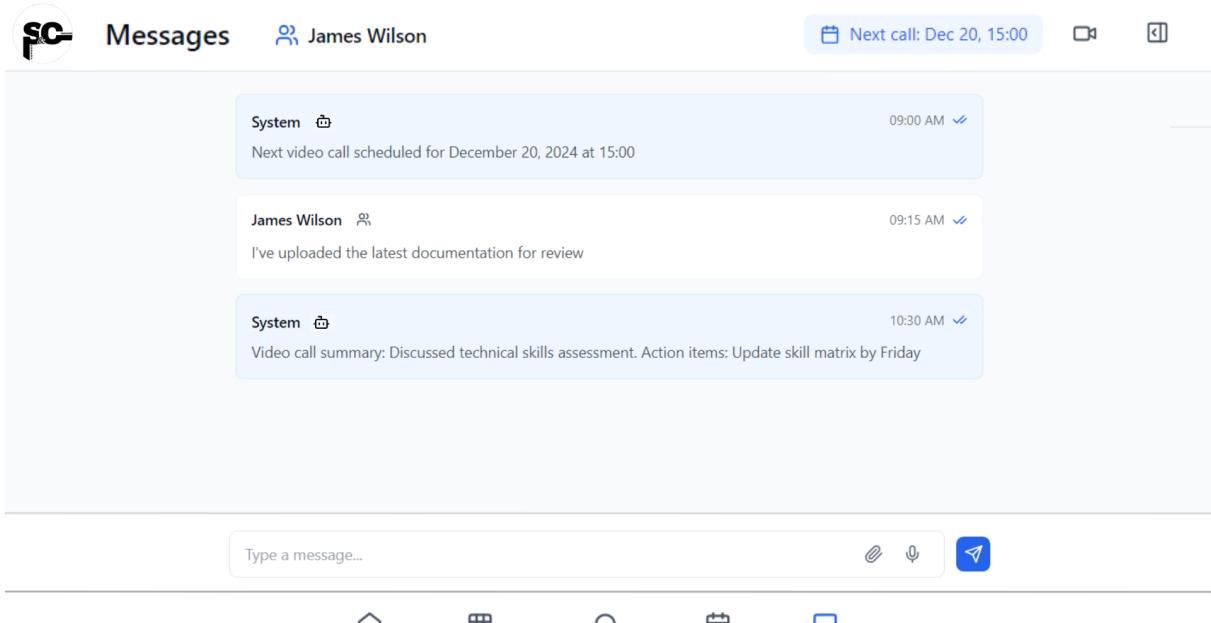


Figure 3.34: Specialized Videocall Chat with Call details and Post-Call Summary.

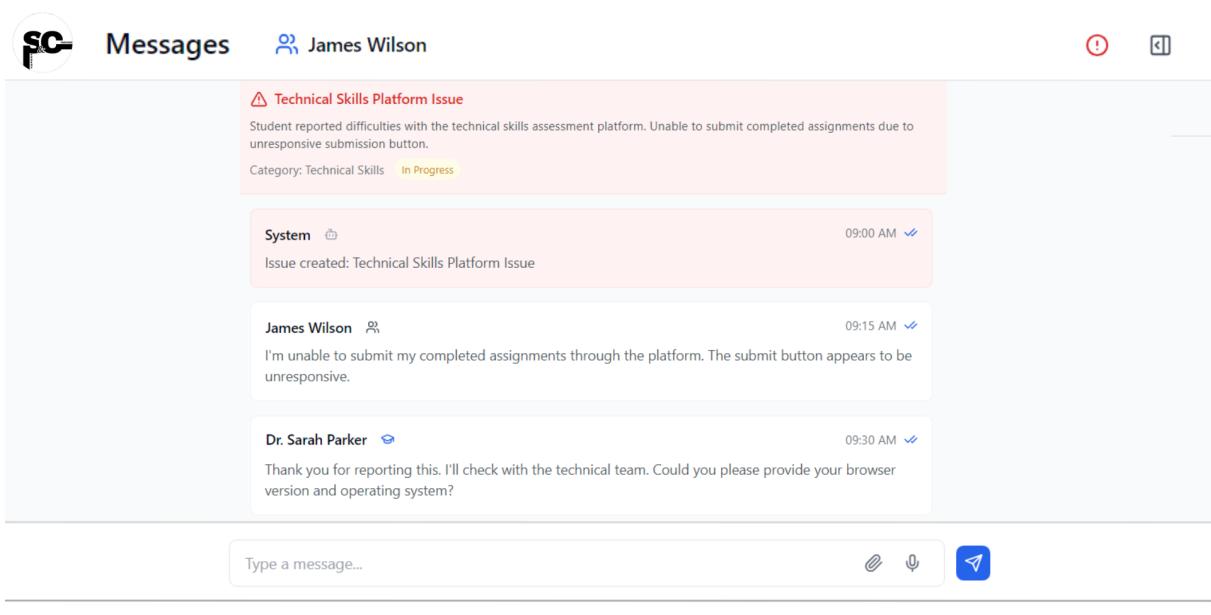


Figure 3.35: Chat for tracking and discussing about complaints.

## Complaints Interfaces

The *Complaints Interfaces* section (see Figure 3.36) is designed to efficiently handle issues that may arise during internships managed through the S&C platform. It provides tools for both reporting and resolving problems, ensuring a structured and transparent process.

Students and company tutors can accurately describe and communicate the issues they encounter, while academic tutors are equipped to analyze these reports, assess their severity and take appropriate action. This system ensures clear communication, supports effective problem resolution and safeguards the smooth progress of internships.

**Signaling Issues** : The *Signaling Issues* Figure 3.36 interface is exclusively accessible to company tutors and students, providing them with a structured mechanism for reporting and classifying problems encountered during internships. This functionality ensures that all critical information related to an issue are reported.

When a user reports a problem, they are required to provide a clear and concise *Title*, summarizing the core of the issue. To enable precise classification and prioritization, the system mandates the selection of a *Severity Category*, which allows for a comprehensive understanding of the problem type and urgency. The available options ensure clarity in classification and are detailed as follows:

- *Communication Issues*: These involve misunderstandings, lack of clarity, or difficulties in establishing effective communication between the involved parties.
- *Technical Competencies*: This category addresses challenges resulting from inadequate technical skills or the inability to resolve specific technical problems.
- *Time Management*: Problems in this category pertain to delays, missed deadlines, or difficulties in adhering to the agreed-upon timeline.
- *Interpersonal Conflicts*: These include conflicts, tensions, or relational difficulties among participants that negatively impact collaboration and productivity.
- *Other*: This allows for the classification of issues that do not fall under the predefined categories but still require attention.

In addition to categorization, users must provide a *Detailed Description of the Problem*. This description is expected to include specific examples, contextual information and an explanation of the impact the issue has on the internship's progress or outcomes. Such detailed documentation ensures that the nature of the problem is fully understood and addressed appropriately.

Once all required fields are completed, the user can utilize the *Save and Submit* function. This action records the problem in the system and forwards it to the relevant parties, including academic tutors, for evaluation and follow-up actions. The structured process supports transparency, fosters accountability and enhances the resolution process, ultimately contributing to a better internship experience for company tutors and students.

**Issue Details**

**Issue Title \***

Enter a clear and concise title

**Category \***

- Communication**  
Issues related to misunderstandings, lack of clarity, or communication difficulties between parties
- Technical Skills**  
Difficulties encountered due to lack of technical skills or inability to solve specific technical problems
- Time Management**  
Issues related to missed deadlines, delays, or difficulties in meeting established timelines
- Interpersonal Problems**  
Conflicts or friction between participants, personal relationship difficulties that affect collaboration effectiveness
- Other**  
For any other category not listed above

**Detailed Description \***

Describe the issue in detail, including specific examples and context

Minimum 50 characters      0 characters

**Save and Submit**

---

**Home**    **Matchmaking**    **Monitoring**    **Calendar**    **Messages**

Figure 3.36: Interface for reporting issues with detailed categorization.

**Managing Issues:** The *Managing Issues* interface in Figure 3.37 is designed to provide academic tutors with a comprehensive overview of the selected problems reported by company tutors or students. This interface ensures that all relevant details are accessible to facilitate informed decision-making and effective resolution of the reported issues.

Upon selecting an issue from the table, the system displays the active problem, along with detailed information about the nature of the issue, its severity and the date it was reported. This clear presentation enables the academic tutor to understand the context and urgency of the problem at hand.

To address the issue, the interface offers actionable controls categorized as follows:

- *Suggested Actions:* Quick-access buttons to initiate communication with the involved parties, including:
  - Calling the company tutor.
  - Chatting with the company tutor.
  - Calling the student.
  - Chatting with the student.
- *Stage Management Actions:* Options to manage the internship based on the severity and resolution of the problem:
  - Terminate: Used when the situation is too severe to continue the internship.
  - Suspend: Allows for a temporary pause to gather additional details or attempt a resolution.
  - Resume: Indicates that the problem has been resolved and the internship can proceed as planned.

Each action triggers automatic notifications to both the company tutors and the students involved, ensuring transparency and keeping all stakeholders informed of the decisions taken. This structured approach promotes accountability and facilitates the smooth resolution of issues, safeguarding the quality of the internship experience.

The screenshot shows a web-based application for managing internships. At the top, there's a navigation bar with icons for Home, Monitoring (which is highlighted in blue), Calendar, and Messages. Below the navigation, a specific issue is displayed in a card format. The card header reads "Unclear Project Requirements" and includes a "Technical Skills" badge. It shows the issue was reported by "John Smith" on "2024-03-15". The main content area is divided into sections for "Description" and "Company Contact" and "Student Contact". The "Description" section contains a paragraph about difficulties understanding technical requirements. The "Company Contact" section features two buttons: "Call" and "Chat". The "Student Contact" section also features two buttons: "Call" and "Chat". At the bottom of the card, there are three large buttons for managing the issue: a red "Terminate" button, a grey "Suspend" button, and another grey "Resume" button. The overall design is clean and modern, using a light color palette and clear typography.

Figure 3.37: Interface for managing issues with resolution actions.

## General Interfaces

The *General Interfaces* section serves as the backbone of user interaction and system customization within the platform. These interfaces ensure that both individual users and institutional representatives can navigate the platform efficiently.

From the ability to refine personal and institutional details in the settings interface (Figure 3.38) to leveraging the power of a fine-tuned language model for real-time assistance (Figure 3.40), these tools empower users to make the most of the platform's capabilities. The integration of multilingual support further enhances accessibility, allowing users to switch between languages effortlessly, whether during registration, login, or throughout their engagement with the platform. Moreover, the detailed profile interfaces, whether for users, institutions, or internships, provide a comprehensive view of essential information, facilitating processes such as matchmaking and monitoring and ensuring that all stakeholders remain informed and connected.

Collectively, the *General Interfaces* underscore the platform's commitment to delivering a highly personalized and efficient user experience, while fostering seamless collaboration and adaptability for all users involved.

**Settings:** The *Settings* interface (Figure 3.38 and Figure 3.39) serves as a centralized hub for users to manage their profiles and, only for responsible tutors, the details of their affiliated institutions. By integrating all customization options into a single interface, the platform ensures that users can efficiently update and control their personal and institutional information with ease.

For individual users, the interface allows for the management of personal details, ensuring their profile remains accurate and up to date. Users can upload or update their profile picture and modify fields such as their name, phone number and LinkedIn profile. The institutional email address, while visible for reference, remains fixed to maintain consistency. Furthermore, users can modify their department and role within their organization, crafting a clear representation of their professional identity. A dedicated section for biography enables users to update the information for their career, experiences and interests, while a flexible space is provided for listing new certifications, awards and other achievements. This dynamic structure ensures that profiles are both comprehensive and reflective of the changing user's expertise. Users can also manage a list of languages they speak, adding a personal dimension to their profile.

Responsible tutors, who are designated individuals responsible for managing the institutional profile, are granted specific functionalities to ensure the institution's details are accurate and comprehensive. They have the ability to update the organization's logo, official name and administrative contact details, including phone number, email and LinkedIn profile. Address fields are provided to maintain accurate location information, covering street, city, postal code and country. Additionally, responsible tutors can manage domains associated with their institution, ensuring the correct mapping of email accounts. In particular for academic tutors, they can also manage student domains, since this type of user cannot be associated to a company. The interface further supports updates to the institution's sector of operation and size through dropdown menus, simplifying the selection

process. A descriptive field allows tutors to change the institution's mission, specializations and notable collaborations. Just like user profiles, the institutional section includes a space for listing new certifications and recognitions, ensuring the organization's accomplishments are properly highlighted. These tools collectively empower responsible tutors to maintain an up-to-date and detailed institutional profile, reflecting the organization's identity and scope accurately.

System preferences are designed to provide all users with the ability to customize their interaction with the platform. Notifications can be tailored to individual needs, allowing users to enable or disable updates for messages, internship changes and calendar events. Additionally, the interface includes an option to switch between light and dark themes, enhancing usability across diverse environments and preferences.

To facilitate smooth interaction, the interface includes key actions such as saving changes to confirm updates and a reset option to revert notifications, theme and language preferences to their original settings. Users can also delete their account if necessary, with responsible tutors receiving clear warnings about the implications, such as the transfer of institutional management to another collaborator. For institutions, the interface provides options to delete or transfer control of the organization, ensuring flexibility while maintaining accountability.

The screenshot displays a user interface for managing profiles, divided into two main sections: Personal Information and Institution Profile.

### Personal Information

Manage your profile information visible to other users

**Profile Picture:** A placeholder circular image with dimensions 100x100. It includes a camera icon for uploading.

**First Name:** [Input field]

**Last Name:** [Input field]

**Administrative Phone:** [Input field with phone icon]

**Administrative Email:** [Input field with envelope icon]

**LinkedIn Profile URL:** [Input field with LinkedIn icon]

**Department:** [Input field]

**Role:** [Input field]

**Biography:** [Text area] Tell us about your career, experiences, and interests...

**Certifications & Awards:** [List] + Add New

- Teaching Certificate (2023)

**Languages:** [List] + Add Language

- \* English
- \* Italian

### Institution Profile

Manage your institution information visible to users

**Institution Logo:** A placeholder circular image with dimensions 100x100. It includes a camera icon for uploading.

**Official Name:** [Input field] Enter institution name

**Administrative Phone:** [Input field with phone icon]

**Administrative Email:** [Input field with envelope icon]

Figure 3.38: Interface for managing personal and institutional profiles.


←
⊕
✖

LinkedIn Profile URL

Street Address	City	
<input type="text"/>	<input type="text"/>	
Postal Code	Country	
<input type="text"/>	<input type="text"/>	
Operating Sector	Size (Employees/Students)	
<input type="text"/> University	<input type="text"/> 1-50 employees	
Description		
<input type="text" value="Describe your institution's mission, specializations, and collaborations..."/>		
Certifications & Awards <span>+ Add New</span>		
<input type="text"/> ISO 9001 (2023) <span>×</span>		
<input type="text"/> Excellence in Education (2022) <span>×</span>		
Student Domains <span>+ Add New</span>		
<input type="text"/> student.university.edu <span>×</span>		
Tutor Domains <span>+ Add New</span>		
<input type="text"/> staff.university.edu <span>×</span>		
<span>Profile</span>	<span>Institution</span>	<span>Preferences</span>

Figure 3.39: Interface for editing institution details and system preferences.

**Chatbot:** The *Assistant* interface (see Figure 3.40) provides users with a dedicated virtual assistant powered by a fine-tuned Large Language Model (LLM) enhanced with Retrieval-Augmented Generation (RAG) techniques. This design ensures the delivery of precise and contextually relevant responses, significantly reducing hallucinations and enabling the assistant to provide accurate and helpful information tailored to the platform's data and functionalities. The interface is crafted to offer seamless support, addressing user queries and enhancing their overall experience on the platform.

At the core of the interface lies the conversation area, which displays the complete message history from the current session. This central area ensures continuity and allows users to review prior interactions for reference. Positioned at the bottom of the screen is the input section, where users can type messages to pose questions or request assistance. The input field is accompanied by a send button, facilitating the submission of queries directly to the virtual assistant. To further enhance usability, the interface provides clickable suggestions for frequently asked questions. These pre-defined categories help users quickly find answers to common issues without needing to formulate specific questions.

The header of the interface includes two key features. A back button allows users to navigate seamlessly to the previous screen, ensuring an uninterrupted workflow. Additionally, a language change option is available, granting users the flexibility to switch the system's language through a specific interface. This feature emphasizes the platform's commitment to accessibility and user-centric design.

By integrating these functionalities into a cohesive interface, the *Assistant* ensures that users can efficiently seek support, access relevant information and resolve queries, all while benefiting from the advanced capabilities of the LLM tailored to the platform's unique requirements.

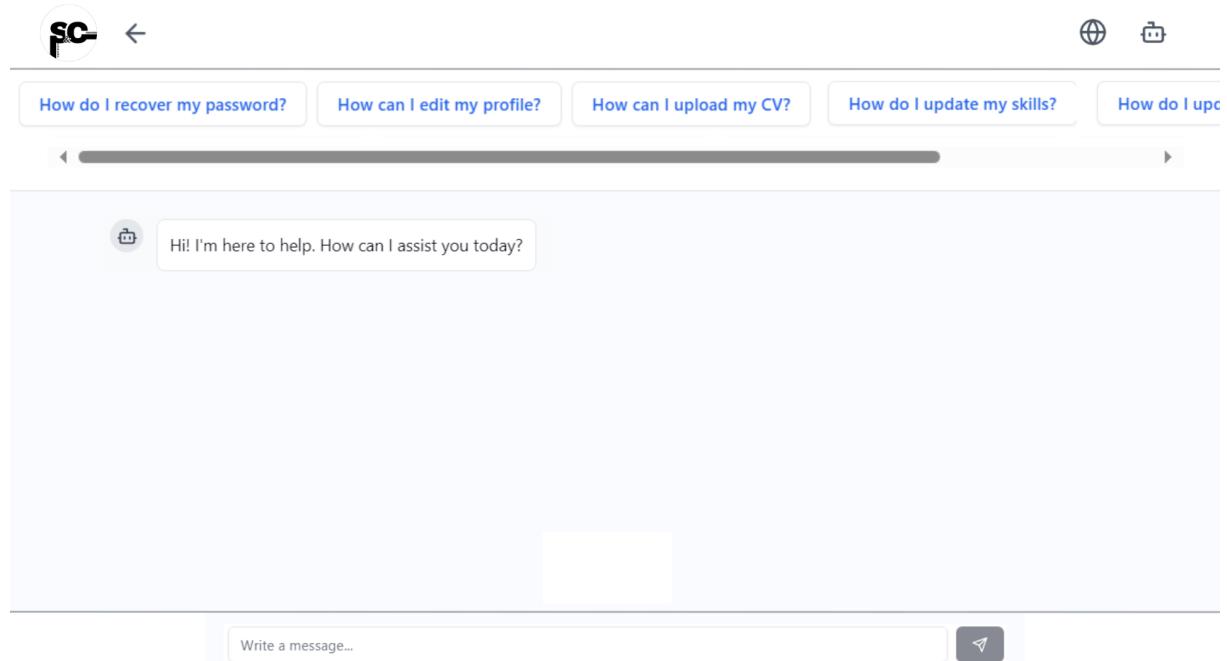


Figure 3.40: Virtual assistant interface supporting user queries and assistance.

**Changing Language:** The *Language Selection* (see Figure 3.41), designed for simplicity and accessibility, ensures that users can effortlessly choose their preferred language, enhancing the overall usability of the platform.

Upon accessing the interface, users are presented with a dropdown menu that overlays the current screen. This menu allows them to select from a list of available languages, including *Italian*, *English*, *French*, *Spanish* and *German*. Each language is visually represented with its respective national flag, providing an intuitive and aesthetically pleasing selection process. The original screen remains partially visible in the background, maintaining context and ensuring a seamless experience.

Once a language is selected, users can confirm their choice by clicking the *Save Language* button. This action immediately updates the platform's interface to reflect the new language setting, providing a responsive and dynamic customization experience. For added convenience, the interface includes a *Close* button marked with "x", allowing users to return to the previous screen without making changes. Additionally, the interface features an option to access the virtual assistant powered described before.

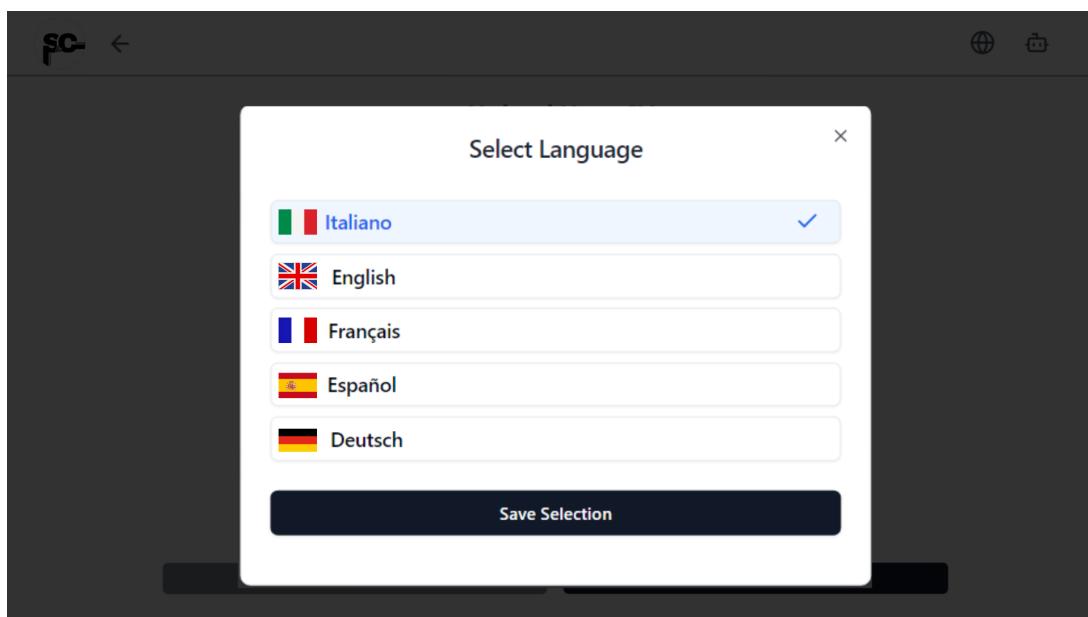


Figure 3.41: Language selection interface for customizing platform settings.

**Profiles:** The *Profile Interfaces* provide users with detailed views of institutional, user and internship profiles, presenting relevant information clearly to support transparency and informed decision-making during matchmaking and monitoring.

The *institutional profile* (see Figure 3.43) interface displays the organization's logo and name, along with administrative contacts such as phone, email, website and LinkedIn. The address section details the headquarters' location. Dropdown menus specify the sector and size, while a descriptive area outlines the mission, specializations, collaborations and achievements. A list of certifications and awards highlights the institution's credibility. A back button allows easy navigation to the previous screen.

The *user profile interface* (see Figure 3.42) showcases an individual's professional and academic background with their photo, name and contact information, including phone, institutional email and LinkedIn. Affiliation is clickable to access the institutional profile and department and role fields clarify their position. A biography section details career and academic experiences, complemented by lists of certifications, awards and languages spoken. Uploaded CVs are accessible and reviews from students and tutors provide qualitative feedback. A back button facilitates navigation.

The *internship profile interface* (see Figure 3.44) presents all essential details of an internship, including the title and category in the header. The main section describes the role's objectives, responsibilities and requirements such as skills and qualifications. Information on duration, compensation and execution mode (in-person, remote, hybrid) is clearly outlined, along with the physical location if applicable. Operational details feature the responsible company tutor's name with a profile link and the application deadline. Required languages are listed to set communication expectations. A back button enables users to return to the previous screen effortlessly.

**Prof. Robert Anderson**

University of Technology  
Computer Science • Academic Tutor

### Contact Information

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- m.rossi@university.edu
- [LinkedIn Profile](#)

### Biography

Professor of Computer Science with 15 years of experience in academic research and teaching. Specialized in Artificial Intelligence and Machine Learning, with a strong focus on mentoring graduate students and leading research projects.

### Certifications & Awards

- Advanced Machine Learning Certification (Stanford University, 2023)
- Best Paper Award - AI Conference 2023 (International AI Society, 2023)

### Languages

- Italian (Native)
- English (C1)
- French (B2)

### Curriculum Vitae

[View CV](#)

### Reviews

**5/5** Excellent mentor, very knowledgeable and supportive  
by Student (15/01/2024)

**5/5** Exceptional teaching methods and deep knowledge of the subject matter. Always available for consultation.  
by Graduate Student (20/01/2024)

Figure 3.42: User profile interface.

 Monitoring



Tech Solutions International  
 Information Technology

Contact Information

 +1 (555) 123-4567

 admin@techsolutions.com

 www.techsolutions.com

 LinkedIn Profile

Location

 123 Innovation Avenue  
Silicon Valley, 94025  
United States

Institution Size

 500-1000 employees

About

Tech Solutions International is a leading provider of innovative software solutions, specializing in enterprise applications and cloud services. With a strong focus on research and development, we collaborate with top universities and have established ourselves as pioneers in AI-driven solutions.

Achievements

 ISO 27001 Information Security  
Certification 2024

 Best Workplace Innovation  
Award 2023

 Top 50 Tech Companies  
Recognition 2023

 Home

 Matchmaking

 Monitoring

 Calendar

 Messages

Figure 3.43: Institution profile interface.

The screenshot shows a detailed view of an internship listing. At the top, there's a header with a logo and the word "Monitoring". Below the header, the job title "Junior Backend Developer Intern" is displayed, along with a "Programming" category badge. The listing includes the company "Tech Solutions Ltd" and the location "Milan, Italy". Key details like "Duration" (6 months), "Compensation" (800 EUR/month), and "Work Mode" (Hybrid (2 days remote)) are listed in separate boxes. The "Description" section invites applicants to join the backend development team and gain experience with Node.js and PostgreSQL. The "Requirements" section lists qualifications such as a Computer Science degree, basic Node.js knowledge, Git familiarity, database concepts, and problem-solving skills. The "Company Tutor" is identified as Marco Bianchi, a Senior Backend Developer. "Required Languages" include Italian (B2 Required) and English (B2 Required). The "Application Deadline" is set for August 15, 2024. A prominent "Apply Now" button is located at the bottom of the listing.

**Junior Backend Developer Intern**

Tech Solutions Ltd • Milan, Italy

**Duration**  
6 months

**Compensation**  
800 EUR/month

**Work Mode**  
Hybrid (2 days remote)

**Description**

Join our backend development team and gain hands-on experience in building scalable web applications. You'll work with modern technologies like Node.js and PostgreSQL, participating in the development of REST APIs and microservices architecture.

**Requirements**

- Computer Science or related field student
- Basic knowledge of Node.js and REST APIs
- Familiarity with Git version control
- Understanding of database concepts
- Good problem-solving skills

**Company Tutor**

Marco Bianchi  
Senior Backend Developer

**Required Languages**

Italian (B2 Required) English (B2 Required)

**Application Deadline**

August 15, 2024

**Apply Now**

**Monitoring**

Home Matchmaking Monitoring Calendar Messages

Figure 3.44: Internship profile interface.

### 3.1.2. Hardware Interfaces

S&C platform is designed to a web-based application that is accessible from a variety of devices. As such, it should not require any specialized hardware beyond standard computing devices.

A user that want to access the platform must have a reliable connection (either Wi-Fi or mobile data) and it should be able to access the platform using any desktop or laptop computer regardless of the operating system (Windows, MAC or Linux). Additionally, any user should be able to access the platform from smartphones and tables running on iOS or Android operating system.

The platform must also be compatible with the most used web browsers such as Google Chrome, Microsoft Edge or Safari without massive differences in terms of performance.

Lastly the platform should be hosted on cloud-based servers that ensure scalability and reliability. There should be also data redundancy on different servers to be used as backup and to deal with some errors that might happens.

S&C should also posses all the ACID properties to ensure Atomicity, Consistency, Isolation and Durability.

**Atomicity** ensure that a transaction is completed fully or not at all. The idea behind atomicity is that if a transaction fails midway, the system will acknowledge that the transaction was not completed and it will either undo all intermediate changes or retry the operation. As an example, if a student applies for an internship, the system must ensure that all relevant updates either happen entirely or are completely rolled back if an error occurs.

**Consistency** state that a transaction must transform the system from one valid state to another while preserving the data integrity. For example, consistency ensure that there can not be two students with same email, or a professor can not work for two universities. Consistency guarantees the correctness of the data: if the data is consistent before a transaction it will be consistent after a transaction too.

**Isolation** ensure that two transactions do not interfere with one another. This is fundamental since in a platform such as S&C multiple transactions may occur simultaneously, like as two or more students applying for an internships at the same time. The idea behind isolation is that a transaction is not affected by the behavior of other concurrent transactions and so it avoid inconsistency to be propagated.

**Durability** guarantees that once a transaction is successfully completed the changes produced by the transaction are permanent and stored reliably even if there are failures (such as a crash of the system). Durability with redundancy of data ensure that the data is not lost if a server fails. The effect of a transaction that has successfully committed will last “forever” independent of any system fault.

Of course, there is a trade-off since the implementation of the ACID properties require complex database mechanism that may increase operational costs.

### **3.1.3. Software Interfaces**

S&C platform needs to interact with different external software systems and services. It is mandatory to ensure that all integrations comply with security and they include encryption of data with secure authentication mechanism. Also the APIs of the services that interact with S&C needs to handle increasing numbers of users without performance degradation.

**Email Service API:** used to facilitate communication. It uses a service to send email such as registration confirmations, interview invitations and other notifications about new opportunities or updates.

**Calendar integration APIs:** used to synchronize internship-related events with user's personal calendars. S&C integrates popular calendar services, such as *Google Calendar* or *Apple Calendar*, through the respective APIs. This is needed so that the user can add interview schedules, deadlines and other important events on his personal calendar.

**Video Conferencing API:** to enable seamless online interviews and virtual meetings between the users of the platform. The integration with Google Meet APIs should facilitate the automatic generation of meeting links, accessible directly from calendar events and related chats, while leveraging the existing platform for conducting the video calls themselves.

Since S&C platform is expected to operate primarily in Europe, where the majority of students seeking internships and companies looking to hire interns are expected to be located, it must comply with EU data protection regulations. Those rules apply to both companies in the EU and those based outside the EU who offer goods or services in the EU. The *General Data Protection Regulation* (GDPR), describe different situations where a company is allowed to collect or reuse personal information. It is important to implement mechanisms to obtain explicit consent from users for data processing activities and to provide functionalities that allow users to access their data and request deletion.

### **3.1.4. Communication Interfaces**

To ensure a secure data transmission between the user and the server, S&C must obey the HTTPS protocol. All the data exchanged must be encrypted to guarantee privacy and protect sensitive information (credentials, personal information, company data,...) from unauthorized access. Also is important to perform regular security updates and monitoring to maintain compliance with the standards and to address any emerging threats. Lastly, S&C must follow up with relevant legal and regulatory requirements, such as GDPR or other data protection laws. The platform should regularly review and update its policies and security measures to stay aligned with any changes in legislation. In the event of legal updates or new regulations, S&C must adapt its systems and processes as soon as possible to remain compliant and protect user data effectively.

## 3.2. Functional Requirements

### 3.2.0 Functional Requirements

This section encapsulates all the functional requirements associated with the product functionalities defined in Section 2.2.

#### Sign Up

- **FR1:** The system must allow users to register by providing a profile photo, personal data (name and surname), contacts (phone number, LinkedIn profile), institutional email with registered domain, password, department and role, professional biography, certifications, awards, recognitions, languages spoken and a security question.
- **FR2:** The system must provide a feature for users to upload their Curriculum Vitae (CV) in formats such as PDF or DOCX during the registration.
- **FR3:** The system could extract key information from the uploaded CV (e.g., name, contact information, education, work experience) to pre-fill the user's profile.
- **FR4:** The system must allow users to edit and confirm the accuracy of the pre-filled information in their profile before final submission.
- **FR5:** The system must store uploaded CVs securely and ensure that all personal information is handled in compliance with applicable data protection regulations (GDPR).
- **FR6:** The system must provide clear and helpful error messages if the CV upload fails due to an unsupported format or if the file size exceeds the allowed limit.
- **FR7:** The system should offer step-by-step guidance during the sign-up process to assist users in completing their registration and profile setup.

#### Log In

- **FR8:** The system must allow users to log in by entering their registered email address and password.
- **FR9:** The system must authenticate the user's credentials against the stored data securely.
- **FR10:** The system must offer a password reset feature, where users can initiate a password reset through a link sent to their registered email address.
- **FR11:** The system must require users to verify their identity via a security question or email verification during the password reset process.
- **FR12:** The system must log all login attempts, successful or failed and provide an administrative view for monitoring purposes.
- **FR13:** The system must redirect users to their respective dashboard based on their role (student, company tutor, university tutor) upon successful login.

- **FR14:** The system must provide error messages that are clear and instructive if the login fails due to incorrect credentials or other issues.

## Edit Profile Information

- **FR15:** The system must allow all registered users to access and edit their profile information.
- **FR16:** The system must ensure that users can update critical profile fields such as contact information, professional biography, department and role and certifications.
- **FR17:** The system must save changes made by users to their profile information immediately upon confirmation.
- **FR18:** The system must require users to re-authenticate (e.g., password confirmation) before allowing access to edit sensitive information such as email and password.
- **FR19:** The system should provide users with a preview of changes before final submission to ensure accuracy.

## Chatbot Communication

- **FR20:** The system must offer a chatbot feature that is accessible from all main interfaces of the platform.
- **FR21:** The system must ensure that the chatbot can handle frequently asked questions related to platform navigation, user account issues and general inquiries.
- **FR22:** The system must allow the chatbot to guide users through common tasks such as resetting passwords, searching for internships and navigating to help sections.
- **FR23:** The system should enable the chatbot to escalate issues to a human agent when it cannot provide a sufficient solution or answer.

## Change Language

- **FR24:** The system must support multiple languages, allowing users to select their preferred language from a predefined list available within the platform settings.
- **FR25:** The system must apply the selected language to all user interface elements, including menus, dialogues and help messages, without requiring a restart of the application.
- **FR26:** The system must remember the user's language preference for subsequent logins across different devices.

## Create Internships

- **FR27:** The system must allow company tutors to create new internship listings via a dedicated interface within the platform.

- **FR28:** The system must require that all necessary fields, such as internship title, description, required qualifications, duration, compensation and application deadline, be completed before an internship can be published.
- **FR29:** The system must provide templates and guidelines to assist company tutors in creating detailed and effective internship descriptions.
- **FR30:** The system must validate the information entered by the user to ensure that it meets format and content standards before the internship is saved or published.
- **FR31:** The system must allow company tutors to preview the internship listing as it will appear to potential applicants before finalizing the publication.

### **Save Internship Draft**

- **FR32:** The system must allow company tutors to save their internship listings as drafts before final publication.
- **FR33:** The system must ensure that drafts can be saved automatically at regular intervals while the company tutor is creating or editing the internship.
- **FR34:** The system should provide an option for company tutors to manually save the current state of the internship as a draft at any point during the creation or editing process.
- **FR35:** The system must allow company tutors to access, review and continue editing their saved drafts from the draft storage area within the platform.
- **FR36:** The system must ensure that only authorized company personnel can access and edit saved drafts.

### **Internship Search**

- **FR37:** The system must provide a search interface for students to find internships using various filters such as location, field, duration and required skills.
- **FR38:** The system must offer a recommendation engine that suggests internships based on the student's profile, past searches and application history.
- **FR39:** The system should allow students to save their search criteria or specific internship listings for future reference.
- **FR40:** The system must update the list of available internships in real-time as new opportunities are posted by companies.

### **Application for Internship**

- **FR41:** The system must allow students to apply for internships directly through the platform by submitting required documents and information specified by the internship posting.

- **FR42:** The system must confirm receipt of the application to the student via email or platform notification.
- **FR43:** The system should allow students to track the status of their applications within the platform.

## Search for Students

- **FR44:** The system must enable companies to search for potential candidates.
- **FR45:** The system should provide companies with tools to organize and manage the list of candidates based on their search parameters.
- **FR46:** The system must allow companies to view detailed profiles of students, including their application history and feedback from previous internships.

## Accept/Reject Participation in the Selection Process (for Companies)

- **FR47:** The system must allow companies to accept or reject applications from students for internships and notify students of the decision through the platform.
- **FR48:** The system must enable companies to provide feedback or reasons for rejection when declining a student's application, optionally.

## Accept/Reject Participation in the Selection Process (for Students)

- **FR49:** The system must allow students to accept or reject participation offers in the selection process from companies.
- **FR50:** The system should notify companies of the student's decision regarding their participation in the selection process.

## Communication

- **FR51:** The system must provide a robust communication platform that supports messaging, forums and email notifications between all users (students, company tutors and university tutors).
- **FR52:** The system should ensure secure and private communication channels for all users.
- **FR53:** The system must allow users to customize notification settings to manage the frequency and type of notifications they receive.

## Accept to be a Tutor

- **FR54:** The system must allow university tutors to receive and respond to requests from companies or the university administration to become a tutor for specific internship programs.
- **FR55:** The system must provide university tutors with details about the internship (responsibilities, duration, expectations) before they accept or decline the tutor role.

- **FR56:** The system should notify the requesting party (company or university administration) about the tutor's decision.

## Create and Manage Events

- **FR57:** The system must allow company tutors and university tutors to create and schedule events related to internships, such as interviews and deadlines.
- **FR58:** The system must provide tools for managing event attendees, including invitations, tracking and automatic reminders.
- **FR59:** The system should integrate with common calendar applications to synchronize event schedules and notify participants accordingly.

## Compilation of the First Questionnaire

- **FR60:** The system must enable company tutors to compile and customize a questionnaire for initial candidate screening during the internship application process.
- **FR61:** The system should automate the distribution of the questionnaire to applicants as soon as they apply or are shortlisted.
- **FR62:** The system must collect and organize responses from the questionnaire for review by company tutors to assist in the decision-making process.

## Monitor Active Internships

- **FR63:** The system must provide real-time monitoring capabilities for all active internships, allowing users (students, company tutors, university tutors) to view current status, upcoming deadlines and progress updates.
- **FR64:** The system must allow users to receive alerts and updates about any changes or milestones reached in the internships they are involved in.

## Report an Issue

- **FR65:** The system must provide a feature for students and company tutors to report issues related to internships directly through the platform.
- **FR66:** The system should allow users to categorize the type of issue (e.g., administrative, ethical, logistical) and provide a detailed description.

## Resolve Issues

- **FR67:** The system must enable university tutors to access reported issues, review details and work on resolving them.
- **FR68:** The system should provide mechanisms for communication between the reporter (student or tutor) and the resolver (university tutor) to discuss and clarify the issue.

- **FR69:** The system must log all actions taken in the issue resolution process and notify the reporting party upon resolution.

### Compilation of the Final Questionnaire

- **FR70:** The system must allow for the compilation of a final questionnaire to be completed by students, company tutors and university tutors at the end of each internship.
- **FR71:** The system should automate the distribution of the final questionnaire and collect responses to evaluate the overall success and areas of improvement for the internship program.

### Real-Time Notifications

- **FR72:** The system must provide real-time notifications for critical updates, such as changes in internship status, new messages or documents and upcoming deadlines.
- **FR73:** The system should allow users to customize the types of notifications they receive and the mediums (e.g., email, SMS, platform alerts).

### Calendar Integration

- **FR74:** The system must integrate with major calendar services (Google Calendar, Outlook) to facilitate scheduling and tracking of internship-related events.
- **FR75:** The system should ensure that all events created within the platform are automatically synchronized with the user's personal or professional calendar.
- **FR76:** The system must provide an option for users to view all internship-related events within an integrated calendar on the platform.



### 3.2.1 Use Case Diagram

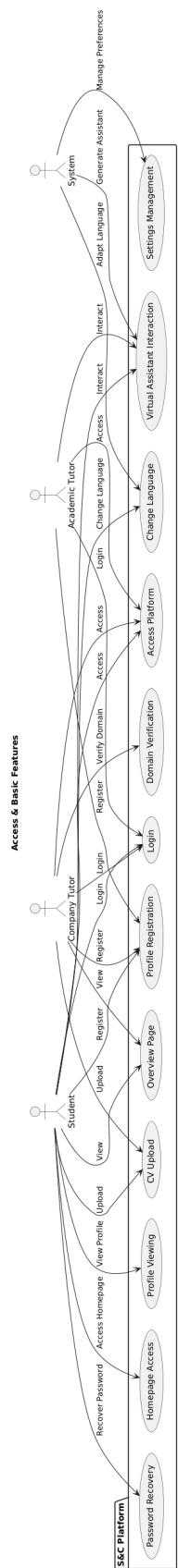


Figure 3.45: Use Case Diagram: Access and Basic Features

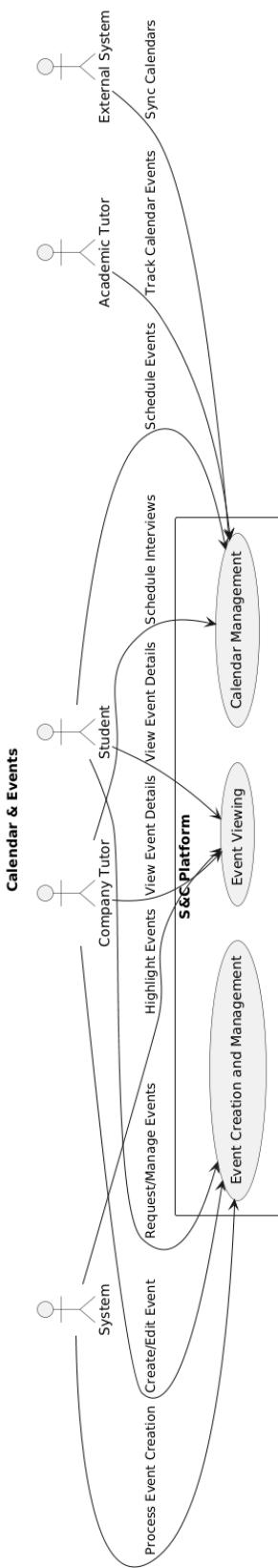


Figure 3.46: Use Case Diagram: 2.2 Calendar and Events

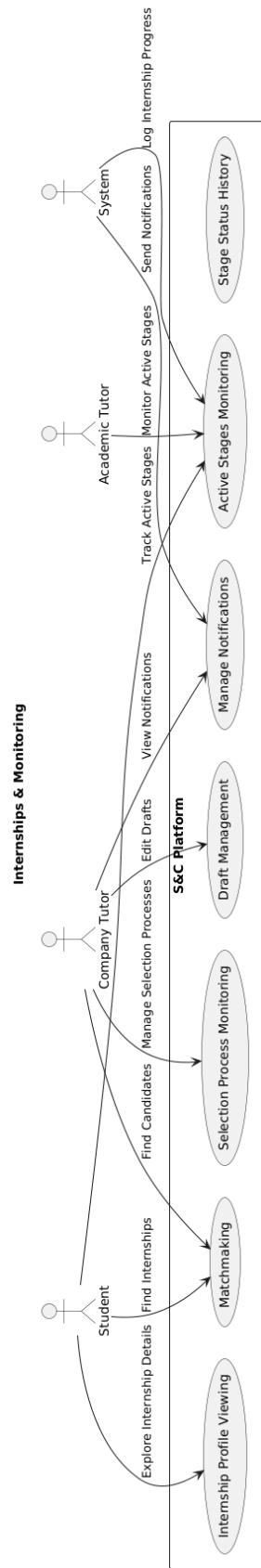


Figure 3.47: Use Case Diagram: Internships and Monitoring

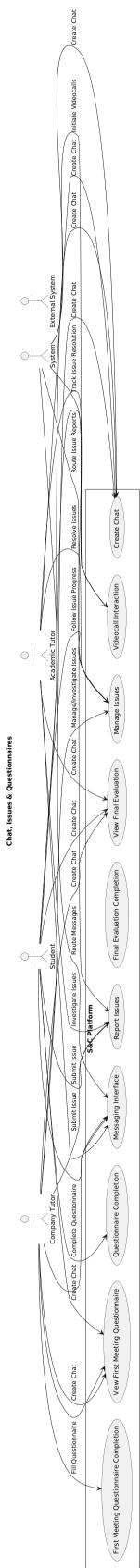


Figure 3.48: Use Case Diagram: Internships and Monitoring

### 3.2.2 Use Cases

#### [UC1]: Access the S&C Platform

<b>Name</b>	Access the S&C Platform
<b>Actors</b>	<ul style="list-style-type: none"> <li>• User</li> <li>• System</li> </ul>
<b>Entry Condition</b>	The user has navigated to the S&C platform website.
<b>Event flow</b>	<p>(a) The user accesses the S&amp;C platform through a web browser.</p> <p>(b) The system displays the platform's access page, providing the following options:</p> <ul style="list-style-type: none"> <li>- Login: Redirects to the login interface.</li> <li>- Registration: Redirects to the registration interface.</li> <li>- Language Change: Opens the interface for changing the platform's language.</li> <li>- Assistant: Opens the chat interface to interact with the platform's LLM-based assistant.</li> </ul> <p>(c) The user performs one of the following actions:</p> <ul style="list-style-type: none"> <li>- Selects "Login" to initiate the authentication process.</li> <li>- Selects "Registration" to begin creating a new account.</li> <li>- Selects "Language Change" to adjust the platform's interface to their preferred language.</li> <li>- Selects "Assistant" to receive guidance or support via the LLM-based assistant.</li> </ul> <p>(d) The system processes the user's selection and loads the corresponding interface or service.</p>
<b>Exit Condition</b>	The user selects an option and accesses the corresponding interface or service.
<b>Exception</b>	If the system encounters an error (e.g., page not found or server issue), an error message is displayed and the user remains on the access page.

Table 3.1: Use Case: Access the S&C Platform

## [UC2]: Overview Page

<b>Name</b>	Overview Page
<b>Actors</b>	<ul style="list-style-type: none"> <li>• User</li> <li>• System</li> </ul>
<b>Entry Condition</b>	The user has accessed the registration section of the S&C platform and reached the overview page.
<b>Event flow</b>	<p>(a) The system displays the overview page, presenting information about the types of users and their roles.</p> <p>(b) The user reviews the information presented.</p> <p>(c) The user performs one of the following actions:</p> <ul style="list-style-type: none"> <li>- Click the "Create Your Profile" button to proceed to the next screen.</li> <li>- Open the screen to change language via the "Change Language" option.</li> <li>- Opening the assistant interface for support through the "Assistant" button.</li> <li>- Returning to the previous screen by clicking "Go Back".</li> </ul> <p>(d) Based on the user's action, the system:</p> <ul style="list-style-type: none"> <li>- Redirects the user to the profile creation page upon clicking "Create Your Profile."</li> <li>- Redirects the user to the corresponding screen (for language change, assistant support, or the previous screen).</li> </ul>
<b>Exit Condition</b>	The user proceeds to the profile creation page, navigates to another section via the navigation options, or remains on the current screen.
<b>Exception</b>	If the system encounters an error (e.g., page not accessible), an error message is displayed and the user remains on the overview page.

Table 3.2: Use Case: Overview Page

### [UC3]: CV Upload

<b>Name</b>	CV Upload
<b>Actors</b>	<ul style="list-style-type: none"> <li>● User</li> <li>● System</li> </ul>
<b>Entry Condition</b>	The user has clicked the "Create Your Profile" button on the previous interface and reached the CV upload page.
<b>Event flow</b>	<p>(a) The system displays the CV upload page.</p> <p>(b) The user performs one of the following actions:</p> <ul style="list-style-type: none"> <li>- Uploads a CV, by clicking on the "Browse Files" button or drags and drops a file into the upload area.</li> <li>- Continues without uploading a CV, so the user clicks the "Continue without CV" button.</li> <li>- Changes the system language using the "Change Language" option.</li> <li>- Opens the assistant interface for guidance through the "Assistant" button.</li> <li>- Returns to the previous screen by clicking "Go Back" .</li> </ul> <p>(c) Based on the user's action, the system:</p> <ul style="list-style-type: none"> <li>- Skips the upload process and redirects the user to the next screen.</li> <li>- Redirects the user to the appropriate interface (for language change, assistant support, or the previous screen)</li> <li>- Validates and processes the uploaded CV, so it checks if the file meets the format and size requirements (PDF, DOC, DOCX with max size 5MB).</li> </ul> <p>(d) According to the result of the validation:</p> <ul style="list-style-type: none"> <li>- If the CV is valid, the system uploads the file, displays a confirmation message and automatically redirects the user to the next screen.</li> <li>- If invalid, the system displays an error message prompting the user to upload a valid file.</li> </ul>
<b>Exit Condition</b>	The user uploads a CV or continues without it, proceeding to the next screen, or navigates to a different screen using additional functionalities.
<b>Exception</b>	If the uploaded file fails validation (incorrect format or exceeds size limit), the system displays an error message, prompting the user to upload a valid file.

Table 3.3: Use Case: CV Upload

## [UC4]: User Profile Registration

<b>Name</b>	User Profile Registration
<b>Actors</b>	<ul style="list-style-type: none"> <li>• User</li> <li>• System</li> </ul>
<b>Entry Condition</b>	The user has either uploaded a CV in the previous step or chosen to proceed without a CV.
<b>Event flow</b>	<p>(a) The system displays a registration form with fields for completing the user's profile, pre-filled if a CV was uploaded.</p> <p>(b) The user can perform different actions:</p> <ul style="list-style-type: none"> <li>- Fills out or modifies the required fields.</li> <li>- Uses the Information Improvement feature to receive LLM's suggestions for clarity and quality.</li> <li>- Select "Change Language" to go to this page.</li> <li>- Select "Assistant" to go to this page.</li> <li>- Returns to the previous screen by clicking "Go Back".</li> </ul> <p>(c) The system determines the account type based on the institutional email provided:</p> <ul style="list-style-type: none"> <li>- If the email domain is already registered: <ul style="list-style-type: none"> <li>* The system displays a message indicating the account type associated with the domain.</li> <li>* The user is automatically linked to the institution corresponding to the domain.</li> </ul> </li> <li>- If the email domain is new: <ul style="list-style-type: none"> <li>* The system sends a verification email to the user.</li> <li>* Platform administrators review the domain to determine its validity.</li> </ul> </li> </ul> <p>(d) The user confirms profile creation by clicking "Continue":</p> <ul style="list-style-type: none"> <li>- If the domain is registered, the system redirects the user to their homepage.</li> <li>- If the domain is new, the system redirects the user to a page indicating that verification is in progress.</li> <li>- If the user clicks on any navigation options, the system redirects the user to the corresponding interface.</li> </ul> <p>(e) If any mandatory fields are incomplete or invalid, the system displays an error message and prevents submission.</p>
<b>Exit Condition</b>	The user successfully registers their profile and is redirected to his homepage, or navigates to another screen using other options.
<b>Exception</b>	If mandatory fields are incomplete or invalid, the system displays an error message and prevents submission until all issues are addressed.

Table 3.4: Use Case: User Profile Registration

## [UC5]: Domain Verification

<b>Name</b>	Domain Verification
<b>Actors</b>	<ul style="list-style-type: none"> <li>• User</li> <li>• System</li> </ul>
<b>Entry Condition</b>	The user has completed the registration form and the provided email domain is not yet registered in the system.
<b>Event flow</b>	<p>(a) The system displays a status message and visual indicator, notifying the user that the email domain is under verification.</p> <p>(b) The user can perform additional actions while viewing the verification message:</p> <ul style="list-style-type: none"> <li>- Access the "Change Language" option to modify the system's language.</li> <li>- Open the assistant chat interface for support using the platform's LLM-based assistant.</li> <li>- Use the "Go Back" button to return to the previous screen.</li> </ul> <p>(c) The system redirects the user to the relevant interface, such as the assistant chat or language selection screen.</p>
<b>Exit Condition</b>	The user views the verification status message and waits for follow-up email communication or navigates to another screen using the available options.
<b>Exception</b>	If the system fails to display the verification message, an error is shown and the user is redirected to the previous screen.

Table 3.5: Use Case: Domain Verification

## [UC6]: Institution Profile Registration

<b>Name</b>	Institution Profile Registration
<b>Actors</b>	<ul style="list-style-type: none"> <li>• Tutor (Academic or Company)</li> <li>• System</li> </ul>
<b>Entry Condition</b>	The tutor has accessed the institution profile creation page via the link provided in the verification email.
<b>Event flow</b>	<p>(a) The system displays a registration form with fields to complete the institution's profile. These include sections for uploading the logo, setting contact details, defining institutional domains and providing a description.</p> <p>(b) The tutor interacts with the form by:</p> <ul style="list-style-type: none"> <li>- Entering all necessary details, such as the institution's logo, contact information and descriptive text.</li> <li>- Changing the system language through the "Change Language" option, if desired.</li> <li>- Accessing the assistant interface for guidance using the "Assistant" button.</li> </ul> <p>(c) Depending on the action selected in the previous step:</p> <ul style="list-style-type: none"> <li>- The system redirects the tutor to the appropriate interface, such as the assistant or language settings.</li> <li>- If the tutor continues filling out the form, they can optionally use the "Information Improvement" feature, which utilizes an LLM to suggest ways to enhance the clarity and quality of the text fields.</li> </ul> <p>(d) The tutor clicks the "Continue" button to submit the completed profile.</p> <p>(e) The system processes the submission:</p> <ul style="list-style-type: none"> <li>- If the profile passes verification, the system sends a confirmation email with a link to the tutor's homepage.</li> <li>- If the profile is rejected, the system sends an email detailing the issues and provides a link to retry the registration process.</li> </ul> <p>(f) If any mandatory fields are incomplete or invalid, the system displays an error message and prevents submission until all issues are resolved.</p>
<b>Exit Condition</b>	The tutor successfully submits the profile for verification, navigates to another screen, or cancels the operation.
<b>Exception</b>	If mandatory fields are incomplete or invalid, the system displays an error and the tutor cannot proceed until the issues are corrected.

Table 3.6: Use Case: Institution Profile Registration

## [UC7]: User Login

<b>Name</b>	User Login
<b>Actors</b>	<ul style="list-style-type: none"> <li>● User</li> <li>● System</li> </ul>
<b>Entry Condition</b>	The user has accessed the login page from the initial page.
<b>Event flow</b>	<p>(a) The system displays a login interface with the following components:</p> <ul style="list-style-type: none"> <li>- A text field for entering the email address linked to the account.</li> <li>- A text field for entering the corresponding password.</li> <li>- A "Remember Me" checkbox to allow the user to remain logged in across sessions.</li> </ul> <p>(b) The user interacts with the login interface by:</p> <ul style="list-style-type: none"> <li>- Clicking "Forgot Password?" to navigate to the password recovery page.</li> <li>- Using the "Change Language" option to modify the system's language.</li> <li>- Accessing the "Assistant" to open a chat for support.</li> <li>- Clicking the "Go Back" button to go to the previous screen.</li> <li>- Completing the login form by entering their email and password and optionally selecting "Remember Me".</li> </ul> <p>(c) Upon completing the login form, the user clicks "Login".</p> <p>(d) Based on the user's action, the system responds as follows:</p> <ul style="list-style-type: none"> <li>- Redirects the user to the appropriate interface.</li> <li>- Validates the login credentials: <ul style="list-style-type: none"> <li>* If the credentials are correct, the system redirects the user to their homepage.</li> <li>* If the credentials are invalid, the system displays an error message and prompts the user to re-enter their credentials.</li> </ul> </li> </ul>
<b>Exit Condition</b>	The system must redirect the user to their role-based homepage, navigates to another screen, or interacts with additional functionalities.
<b>Exception</b>	If the credentials are invalid, the system displays an error message, prompting the user to retry the login process.

Table 3.7: Use Case: User Login

## [UC8]: Password Recovery

<b>Name</b>	Password Recovery
<b>Actors</b>	<ul style="list-style-type: none"> <li>• User</li> <li>• System</li> </ul>
<b>Entry Condition</b>	The user has navigated to the password recovery screen from the login page.
<b>Event flow</b>	<p>(a) The system displays a form with the following elements:</p> <ul style="list-style-type: none"> <li>- A text field for entering the institutional email associated with the user's account.</li> <li>- A pre-defined security question and a text field for providing the corresponding answer.</li> </ul> <p>(b) The user can perform different actions:</p> <ul style="list-style-type: none"> <li>- Changes the system language via the "Change Language" option.</li> <li>- Opens the assistant interface for support through the LLM-based assistant.</li> <li>- Uses the "Go Back" button to return to the login page.</li> <li>- Completes the form by entering their institutional email and providing an answer to the security question.</li> </ul> <p>(c) According to the different actions of the user, the system can:</p> <ul style="list-style-type: none"> <li>- Redirect the user to the proper interface.</li> <li>- Validate the inputs: If the inputs are correct, the system sends an email with instructions to reset the password; If the inputs are invalid, the system displays an error message and prompts the user to try again.</li> </ul> <p>(d) The system sends an email containing the password reset instructions to the user if the validation is successful.</p> <p>(e) The system redirects the user to the login page after successfully processing the recovery request.</p>
<b>Exit Condition</b>	The user submits the recovery request and receives an email with reset instructions, or they navigate to another screen via additional functionalities.
<b>Exception</b>	If the email or answer provided is invalid, the system displays an error message prompting the user to try again.

Table 3.8: Use Case: Password Recovery

### [UC9]: Homepage Access

<b>Name</b>	Homepage Access
<b>Actors</b>	<ul style="list-style-type: none"> <li>• User</li> <li>• System</li> </ul>
<b>Entry Condition</b>	The user has successfully logged in and accessed the homepage, or through the navigation bar or through the "Go back" button.
<b>Event flow</b>	<p>(a) The system displays the personalized homepage, with:</p> <ul style="list-style-type: none"> <li>- The profile section with the user's picture, name, role, institution, settings, language change and assistant.</li> <li>- A calendar widget showing upcoming events with a shortcut to the full calendar view.</li> <li>- A notifications widget, with different kinds of notifications.</li> </ul> <p>(b) The user performs one of the following actions:</p> <ul style="list-style-type: none"> <li>- Clicks on the profile section to access settings, change language, or assistant.</li> <li>- Interacts with the calendar widget to view the full calendar or upcoming events.</li> <li>- Interacts with the notifications widget to address calendar events, internship updates, or issues.</li> <li>- Uses the navigation bar to switch to a different section: <ul style="list-style-type: none"> <li>* Matchmaking: For exploring internships (not available for academic tutors).</li> <li>* Monitoring: For tracking applications, ongoing internships, or completed evaluations.</li> <li>* Calendar: To manage events and planning.</li> <li>* Messages: To communicate with other users.</li> </ul> </li> </ul> <p>(c) The system processes the user's interaction by:</p> <ul style="list-style-type: none"> <li>- Displaying the respective page or widget details.</li> <li>- Highlighting the current section in the navigation bar.</li> </ul>
<b>Exit Condition</b>	The user navigates to another section via the navigation bar or clicks inside a widget.
<b>Exception</b>	If the homepage fails to load due to a system error, an error message is displayed and the user remains on the current screen.

Table 3.9: Use Case: Homepage Access

## [UC10]: Change Language

<b>Name</b>	Change Language
<b>Actors</b>	<ul style="list-style-type: none"> <li>● User</li> <li>● System</li> </ul>
<b>Entry Condition</b>	The user has accessed the "Change Language" screen from any stage of registration, login, assistant, or homepage.
<b>Event flow</b>	<p>(a) The system overlays the language selection menu on the current screen, leaving the original screen visible in the background (dimmed) and displaying a list of available languages with their respective flags.</p> <p>(b) The user interacts with the menu by:</p> <ul style="list-style-type: none"> <li>- Selecting a desired language from the options displayed.</li> <li>- Clicking the "Save Selection" button to confirm their choice.</li> <li>- Using the "Go Back" option to return to the previous screen without saving changes.</li> <li>- Accessing the "Assistant" feature to ask for further help or clarifications.</li> </ul> <p>(c) The system processes the user's actions by:</p> <ul style="list-style-type: none"> <li>- Updating the platform's interface to reflect the selected language if the "Save Selection" button is clicked.</li> <li>- Redirecting the user to the previous screen if "Go Back" is chosen.</li> <li>- Opening the assistant chat interface if the "Assistant" option is accessed.</li> </ul>
<b>Exit Condition</b>	The user updates the platform's language or clicks one of the navigation options, leading to the corresponding screen.
<b>Exception</b>	If the system encounters an error while saving the selected language, an error message is displayed and the user remains on the current screen.

Table 3.10: Use Case: Change Language

## [UC11]: Virtual Assistant Interaction

<b>Name</b>	Virtual Assistant Interaction
<b>Actors</b>	<ul style="list-style-type: none"> <li>• User</li> <li>• System</li> </ul>
<b>Entry Condition</b>	The user has accessed the virtual assistant screen from any stage of registration, login, change language, or homepage.
<b>Event flow</b>	<p>(a) The system displays the virtual assistant interface, which includes:</p> <ul style="list-style-type: none"> <li>- A conversation area showing messages exchanged during the current session.</li> <li>- A message input field at the bottom of the screen, allowing the user to type a message.</li> <li>- A "Send Message" button to submit the message to the virtual assistant.</li> <li>- A list of clickable suggested questions for frequently asked topics.</li> </ul> <p>(b) The user interacts with the assistant by:</p> <ul style="list-style-type: none"> <li>- Typing a custom question in the message input field and clicking "Send Message."</li> <li>- Clicking on a suggested question to receive an immediate response.</li> <li>- Uses "Go Back" to return to the previous screen</li> <li>- Uses "Change Language" to switch the platform's language.</li> </ul> <p>(c) The system processes the user's input by:</p> <ul style="list-style-type: none"> <li>- Generating a response using the virtual assistant powered by an LLM fine-tuned with RAG techniques to ensure accurate and context-aware answers.</li> <li>- Redirecting the user to the previous screen if "Go Back" is selected.</li> <li>- Redirect the user to the "Change Language" interface.</li> </ul>
<b>Exit Condition</b>	The user completes their interaction with the assistant or clicks one of the navigation options, leading to the corresponding screen.
<b>Exception</b>	If the assistant fails to generate a response due to a system error, a fallback message is displayed to inform the user and suggest trying again.

Table 3.11: Use Case: Virtual Assistant Interaction

## [UC12]: Settings Management

<b>Name</b>	Settings Management
<b>Actors</b>	<ul style="list-style-type: none"> <li>• User</li> <li>• Tutor (Academic and Company)</li> <li>• System</li> </ul>
<b>Entry Condition</b>	The user (student, academic tutor, or company tutor) has accessed the settings screen from the homepage.
<b>Event flow</b>	<p>(a) The system displays the unified settings interface with sections for personal information, institutional details (for tutors) and system preferences.</p> <p>(b) The user interacts with the settings interface and performs one or more of the following actions:</p> <ul style="list-style-type: none"> <li>- Modifies personal information.</li> <li>- Updates institutional data (for responsible tutors).</li> <li>- Configures system preferences.</li> <li>- Deletes their account. If the user is a tutor, the system warns about transferring the institution profile.</li> <li>- Deletes the institution (for responsible tutors only).</li> <li>- Transfers institution management to another tutor.</li> <li>- Resets changes by using the "Cancel" option.</li> <li>- Open the screen to change the platform language.</li> <li>- Opens the assistant chat for support.</li> <li>- Returns to the previous screen using "Go Back."</li> </ul> <p>(c) The system validates all input changes and ensuring mandatory fields are complete.</p> <p>(d) Saving valid changes to the database and applying updates in real time.</p> <p>(e) Sending notifications, such as warnings for account deletion or confirmation of management transfers.</p> <p>(f) Reflecting updated preferences immediately, such as notification or theme adjustments.</p> <p>(g) Redirecting users to the appropriate screen based on the action performed.</p>
<b>Exit Condition</b>	The user saves changes, navigates to another screen or cancels the operation, returning to the homepage for account deletion.
<b>Exception</b>	If required fields are incomplete or invalid, the system displays an error message, preventing changes from being saved.

Table 3.12: Use Case: Settings Management

### [UC13]: Matchmaking

<b>Name</b>	Matchmaking
<b>Actors</b>	<ul style="list-style-type: none"> <li>• Student</li> <li>• Company Tutor</li> <li>• System</li> </ul>
<b>Entry Condition</b>	The user (student or company tutor) has accessed the matchmaking screen via the navigation bar.
<b>Event flow</b>	<p>(a) The system displays personalized recommendations based on the user's profile. For students, the system shows internships, while for company tutors it suggests student profiles.</p> <p>(b) The user interacts with the displayed recommendations and navigates the interface:</p> <ul style="list-style-type: none"> <li>- Filters results by criteria like skills, languages, or match percentage.</li> <li>- Sorts results by match percentage, suggestion date, or category.</li> <li>- Uses the advanced search feature or resets the criteria to return to default recommendations.</li> <li>- Selects a recommendation to access the detailed profile page.</li> <li>- Provides feedback (positive or negative) to improve the accuracy of future recommendations.</li> <li>- Selects an icon in the navigation bar for quick access to key sections.</li> </ul> <p>(c) The system processes the user's input by:</p> <ul style="list-style-type: none"> <li>- Updating the displayed recommendations based on the applied filters, sorting options, or search criteria.</li> <li>- Redirecting the user to the selected detailed profile when chosen.</li> <li>- Recording feedback provided by the user to adjust future recommendations.</li> <li>- Displaying the page related to the selected navigation bar icon.</li> </ul>
<b>Exit Condition</b>	The user selects or interacts with an internship or student profile, refines the displayed results, or navigates to another screen via the navigation bar.
<b>Exception</b>	If the recommended internships or profiles fail to load due to a system error, an error message is displayed and the user remains on the current screen.

Table 3.13: Use Case: Matchmaking

## [UC14]: Calendar Management

<b>Name</b>	Calendar Management
<b>Actors</b>	<ul style="list-style-type: none"> <li>• User</li> <li>• System</li> </ul>
<b>Entry Condition</b>	The user has accessed the calendar screen via the navigation bar.
<b>Event flow</b>	<p>(a) The system displays the calendar interface, allowing the user to view scheduled events with key details and distinct category colors. The interface includes options to switch between daily, weekly, or monthly views for different levels of detail.</p> <p>(b) The user performs one or more of the following actions:</p> <ul style="list-style-type: none"> <li>- Filters for specific events by name, date, or category.</li> <li>- Navigates through the different views to explore events.</li> <li>- Selects a scheduled event to view detailed information or modify it (if they are the creator).</li> <li>- Clicks the "+" button to open the event creation form, where they enter event details, assign participants and set notifications.</li> <li>- The user enables calendar synchronization with external systems (e.g., Google Calendar or Outlook) to integrate schedules across platforms.</li> <li>- Selects an icon in the navigation bar, for quick access to key sections (seen in homepage).</li> </ul> <p>(c) The system processes the user's input by:</p> <ul style="list-style-type: none"> <li>- Displaying filtered results for specific events matching the user's search criteria.</li> <li>- Highlighting the selected daily, weekly, or monthly view for better navigation of events.</li> <li>- Displaying detailed information about the selected event, including participants, category and description.</li> <li>- Saving new events or modifications, updating the calendar interface and sending notifications or reminders to participants.</li> <li>- Synchronizing the platform's calendar with external systems, ensuring all events and updates are reflected.</li> <li>- Displaying the page related to the selected icon.</li> </ul>
<b>Exit Condition</b>	The user completes event-related actions or navigates to another screen via the navigation bar.
<b>Exception</b>	If the calendar fails to load due to a system error, an error message is displayed and the user remains on the current screen.

Table 3.14: Use Case: Calendar Management

## [UC15]: Event Viewing

<b>Name</b>	Event Viewing
<b>Actors</b>	<ul style="list-style-type: none"> <li>• User</li> <li>• System</li> </ul>
<b>Entry Condition</b>	The user has accessed the event viewing screen by selecting an event from the calendar interface.
<b>Event flow</b>	<p>(a) The user selects an event from the calendar interface.</p> <p>(b) The system loads the event's details, including the title, category, date, time, location, description and participant list with their attendance status ("Present," "Waiting," or "Not Present"). If the event is virtual, the system provides links to the video call and chat.</p> <p>(c) The user performs one of the following actions:</p> <ul style="list-style-type: none"> <li>- Confirms their attendance by marking their presence or absence.</li> <li>- Accesses the automatically generated chat for virtual events.</li> <li>- Selects an icon in the navigation bar, for quick access to key sections (seen in the homepage).</li> <li>- If the user is the event creator, they press "Edit Event," redirecting them to the event editing screen.</li> </ul> <p>(d) The system processes the user's actions by:</p> <ul style="list-style-type: none"> <li>- Updating the participant status and reflecting changes in the calendar and notifications.</li> <li>- Redirecting the user to the chat of the meeting.</li> <li>- Displaying the page related to the selected icon in the navigation bar.</li> <li>- Redirecting the user to the editing page for the event.</li> </ul>
<b>Exit Condition</b>	The user navigates back to the calendar, accesses a different feature, or closes the event viewing screen.
<b>Exception</b>	If the event details fail to load, an error message is displayed and the user is redirected to the calendar screen.

Table 3.15: Use Case: Event Viewing

## [UC16]: Event Creation and Management

<b>Name</b>	Event Creation and Management
<b>Actors</b>	<ul style="list-style-type: none"> <li>• User</li> <li>• System</li> </ul>
<b>Entry Condition</b>	The user has accessed the event creation or management screen by clicking the "+" button in the Calendar interface or by selecting "Edit Event" from an existing event screen.
<b>Event flow</b>	<p>(a) The system provides a form for event creation or editing, where the user can specify key event details, such as the title, timing, description and category. Users may also mark the event as the final one of the internship, triggering the automatic distribution of evaluation forms to all participants.</p> <p>(b) The user inserts or edits existing details (if they are the creator) in the different fields.</p> <p>(c) The user performs one or more of the following actions:</p> <ul style="list-style-type: none"> <li>- Confirms the event, saving it to the calendar and notifying all participants.</li> <li>- Cancels changes, discarding unsaved modifications.</li> <li>- Deletes the event, removing it from the calendar (if they are the creator).</li> <li>- Edits existing details (if they are the creator).</li> <li>- Selects an icon in the navigation bar for quick access to key sections (seen in the homepage).</li> </ul> <p>(d) The system processes the user's input by:</p> <ul style="list-style-type: none"> <li>- Saving the event and displaying it on the calendar with a color-coded category indicator.</li> <li>- Sending notifications to all participants with relevant details.</li> <li>- Creating a dedicated chat channel if a virtual meeting link is included.</li> <li>- Discarding changes when the user cancels the operation.</li> <li>- Removing the event from the calendar if it is deleted by the creator.</li> <li>- Displaying the page related to the selected icon in the navigation bar.</li> </ul>
<b>Exit Condition</b>	The user completes the creation or modification of an event, navigates to another screen, or cancels the operation.
<b>Exception</b>	If the system encounters an error while saving the event, an error message is displayed and the user is prompted to retry.

Table 3.16: Use Case: Event Creation and Management

## [UC17]: Messaging Interface

<b>Name</b>	Messaging Interface
<b>Actors</b>	<ul style="list-style-type: none"> <li>• User</li> <li>• System</li> </ul>
<b>Entry Condition</b>	The user has accessed the messaging interface from navigation bar.
<b>Event flow</b>	<p>(a) The system loads the messaging interface with:</p> <ul style="list-style-type: none"> <li>- A set of buttons to filter conversations by user type.</li> <li>- A "Filter" button to refine displayed messages based on criteria like name, date, type, or keyword.</li> <li>- A centralized list of messages, with problematic messages highlighted in red and shown at the top.</li> <li>- A "Create Message" button to start a new conversation.</li> <li>- A "Report Problem" button to flag and describe specific issues, opening the related interface.</li> </ul> <p>(b) The user interacts with the interface by performing one or more of the following actions:</p> <ul style="list-style-type: none"> <li>- Selecting a category button to view messages related to specific user types.</li> <li>- Clicking the "Filter" button and applying search criteria to narrow down visible messages.</li> <li>- Viewing a specific message by selecting it from the list.</li> <li>- Clicking "Create Message" to start a new conversation.</li> <li>- Clicking "Report Problem" to flag and describe an issue, leading to the problem-reporting screen.</li> <li>- Selects an icon in the navigation bar for quick access to key sections (seen in the homepage).</li> </ul> <p>(c) Based on the user's actions, the system processes the request:</p> <ul style="list-style-type: none"> <li>- Updates the displayed messages according to the selected filters or user type.</li> <li>- Opens the relevant interface for message creation, problem reporting, or the selected conversation.</li> <li>- Displaying the page related to the selected icon in the navigation bar.</li> </ul>
<b>Exit Condition</b>	The user interacts with a specific conversation, navigates to the message creation or problem-reporting interface, or leaves the messaging section.
<b>Exception</b>	If the system encounters an error while loading messages or applying filters, an error message is displayed and the user remains on the messaging interface.

Table 3.17: Use Case: Messaging Interface

## [UC18]: Videocall Chat Interaction

<b>Name</b>	Videocall Chat Interaction
<b>Actors</b>	<ul style="list-style-type: none"> <li>• User</li> <li>• System</li> </ul>
<b>Entry Condition</b>	The user has opened the chat by selecting it from the messaging interface, or from the related event.
<b>Event flow</b>	<p>(a) The system displays the chat interface, which includes:</p> <ul style="list-style-type: none"> <li>- A header bar showing the recipient's name, category icon and details of the scheduled videocall.</li> <li>- A central area with all messages, including text messages, automatic updates, with the status read/unread.</li> <li>- A bottom message creation bar with options for text input, file attachment and audio message recording.</li> <li>- A side panel icon for additional options, such as participants list, follow-up actions and shared files.</li> </ul> <p>(b) The user interacts with the chat by:</p> <ul style="list-style-type: none"> <li>- Sending a text, file, or audio message using the respective input options.</li> <li>- Opening the side panel to: <ul style="list-style-type: none"> <li>* View and manage participants (for group chats).</li> <li>* Access and download shared files.</li> </ul> </li> <li>- Selects an icon in the navigation bar for quick access to key sections (seen in the homepage).</li> <li>- Initiating a videocall directly from the header bar or clicking on the pop-up for a scheduled videocall.</li> </ul> <p>(c) The system processes user actions by:</p> <ul style="list-style-type: none"> <li>- Updating the chat interface to reflect new messages, file uploads, audio recordings, or tab opening.</li> <li>- Displaying the page related to the selected icon in the navigation bar.</li> <li>- Redirecting the user to the videocall when started.</li> </ul> <p>(d) After the call ends, an LLM generates a summary highlighting key topics and actionable points.</p> <p>(e) The system saves and displays the videocall summary after the call concludes.</p>
<b>Exit Condition</b>	The user initiates a videocall, or navigates to another interface.
<b>Exception</b>	If the chat interface fails to load or an action cannot be performed (e.g., invalid file format or connectivity issues), the system displays an error message and prompts the user to retry.

Table 3.18: Use Case: Videocall Chat Interaction

## [UC19]: Complaints Chat Interaction

<b>Name</b>	Complaints Chat Interaction
<b>Actors</b>	<ul style="list-style-type: none"> <li>• User</li> <li>• System</li> </ul>
<b>Entry Condition</b>	The user has accessed a problematic chat from the messaging interface or via the notification of a reported issue.
<b>Event flow</b>	<p>(a) The system displays the problematic chat interface, with:</p> <ul style="list-style-type: none"> <li>- A bar with recipient's name, category and issues icon.</li> <li>- A pop-up at the top summarizing the problem details, such as the title, category, description and status.</li> <li>- A central area with all messages, including text messages, automatic updates, with the status read/unread.</li> <li>- A bottom message creation bar with options for text input, file attachment and audio message recording.</li> <li>- A side panel icon for additional options, such as participants list, follow-up actions and shared files.</li> </ul> <p>(b) The user interacts with the chat by:</p> <ul style="list-style-type: none"> <li>- Sending a text, file, or audio message using the available input options.</li> <li>- Opening the side panel to: <ul style="list-style-type: none"> <li>* View and manage participants (including academic tutors always being part of the chat).</li> <li>* Access and download shared files.</li> </ul> </li> <li>- Selecting an icon in the navigation bar for quick access to other platform sections.</li> </ul> <p>(c) The system processes user actions by:</p> <ul style="list-style-type: none"> <li>- Updating the chat interface to reflect new messages, file uploads, audio recordings, or tab opening.</li> <li>- Displaying the page related to the selected icon in the navigation bar.</li> <li>- Updating the problem's status for tracking purposes.</li> </ul> <p>(d) The system ensures that the pop-up summary is updated in real-time based on the latest information in the chat.</p>
<b>Exit Condition</b>	The user resolves the problem, or navigates to another interface.
<b>Exception</b>	If the chat fails to load or an action cannot be performed (e.g., invalid file upload or system error), the system displays an error message and prompts the user to retry.

Table 3.19: Use Case: Complaints Chat Interaction

## [UC20]: Report Issues

<b>Name</b>	Report Issues
<b>Actors</b>	<ul style="list-style-type: none"> <li>• Student</li> <li>• Company Tutor</li> <li>• System</li> </ul>
<b>Entry Condition</b>	The user has accessed the "Report Issues" screen from the messaging interface.
<b>Event flow</b>	<p>(a) The system displays a form to report an issue, with:</p> <ul style="list-style-type: none"> <li>- A title field to summarize the problem.</li> <li>- A category selector, with predefined categories (communication, technical skills, time management, interpersonal problem).</li> <li>- A description field for providing context of the issue.</li> </ul> <p>(b) The user can:</p> <ul style="list-style-type: none"> <li>- Select an icon in the navigation bar for quick access to other platform sections.</li> <li>- Fill all the mandatory fields.</li> </ul> <p>(c) The user reviewing the entered information to ensure accuracy and completeness.</p> <p>(d) The user submits the issue by clicking the "Save and Send" button.</p> <p>(e) The system saves the issue details in the system's database.</p> <p>(f) The system notifies relevant participants of the reported issue for evaluation and discussion.</p> <p>(g) The system generates a dedicated chat to facilitate resolution, involving the academic tutor.</p> <p>(h) If the issue submission is successful, the system redirects the user to the newly created chat interface for further interaction.</p> <p>(i) If the user has selected an icon, the system display the page related to the selected icon in the navigation bar.</p>
<b>Exit Condition</b>	The user successfully submits the issue and is redirected to the corresponding chat interface, or the user navigates to another screen before submitting the issue.
<b>Exception</b>	If any mandatory fields are incomplete or invalid, the system displays an error message, preventing submission until the issues are resolved.

Table 3.20: Use Case: Report Issues

## [UC21]: Manage Issues

<b>Name</b>	Manage Issues
<b>Actors</b>	<ul style="list-style-type: none"> <li>• University Tutor</li> <li>• System</li> </ul>
<b>Entry Condition</b>	The university tutor has accessed the "Manage Issues" screen by selecting an issue from the table in the active stages tab, of the monitoring section, or from the relative notification.
<b>Event flow</b>	<p>(a) The system displays the issue management interface, with:</p> <ul style="list-style-type: none"> <li>- Details of the selected issue, including the description, category and date of identification.</li> <li>- Suggested actions for immediate communication (call or chat with the student or the company tutor)</li> <li>- Buttons for managing the stage based on the severity and resolution of the issue (terminate, suspend, resume).</li> </ul> <p>(b) The university tutor can:</p> <ul style="list-style-type: none"> <li>- Select an icon in the navigation bar for quick access to other platform sections.</li> <li>- Read the issue details, to understand the context and severity.</li> </ul> <p>(c) The university tutor interacts with the interface by:</p> <ul style="list-style-type: none"> <li>- Selecting a suggested action (e.g., calling or chatting) to communicate with the involved parties.</li> <li>- Choosing a stage management action based on the resolution status of the issue.</li> </ul> <p>(d) The system processes the university tutor's actions by:</p> <ul style="list-style-type: none"> <li>- Initiating the chosen communication channel (call or chat) and notifying the corresponding party.</li> <li>- Updating the stage status.</li> </ul> <p>(e) Sending notifications to both the company tutor and the student regarding the chosen stage management action.</p> <p>(f) If the stage is terminated or suspended, the system records the action and updates the issue status accordingly.</p> <p>(g) If the user has selected an icon, the system display the page related to the selected icon in the navigation bar.</p>
<b>Exit Condition</b>	The academic tutor completes an action (e.g., communication or stage management) or navigates away from this screen.
<b>Exception</b>	If the system encounters an error (e.g., inability to initiate communication or process a stage management action), an error message is displayed and the tutor is prompted to retry.

Table 3.21: Use Case: Manage Issues

## [UC22]: Selection Process Monitoring

<b>Name</b>	Selection Process Monitoring
<b>Actors</b>	<ul style="list-style-type: none"> <li>• User</li> <li>• Company Tutor</li> <li>• System</li> </ul>
<b>Entry Condition</b>	The user has accessed the tab in the Monitoring section.
<b>Event flow</b>	<p>(a) The system displays the "Selection Process" interface, which includes:</p> <ul style="list-style-type: none"> <li>- Tables listing ongoing selection processes.</li> <li>- Specific buttons for actions exclusive to company tutors.</li> </ul> <p>(b) The user with the interface can:</p> <ul style="list-style-type: none"> <li>- Select an icon in the navigation bar for quick access to other platform sections.</li> <li>- Filter and sort by status, date, or relevance.</li> <li>- Click on names, titles, or icons to view information.</li> <li>- Remove a selection process, automatically updating the counterpart's status as "Rejected".</li> <li>- For company tutors only: <ul style="list-style-type: none"> <li>* Click the button to go into the page for creating a new internship.</li> <li>* Click the button to access the draft internships page.</li> </ul> </li> </ul> <p>(c) The system processes the user's actions by:</p> <ul style="list-style-type: none"> <li>- Updating filters and sorting preferences in real-time.</li> <li>- Displaying detailed information about tutors, internships, or processes.</li> <li>- Removing the selection process and automatically updating the counterpart's status as "Rejected".</li> <li>- Redirecting the user to the screen selected.</li> <li>- Updating notifications for all involved parties about status changes or actions taken.</li> </ul> <p>(d) Upon finalizing the selection process, the system either:</p> <ul style="list-style-type: none"> <li>- Closes the selection process if rejected by any party.</li> <li>- Activates the internship and moves it to the "Active Stages" tab if all parties agree.</li> </ul>
<b>Exit Condition</b>	The user completes their interaction with the "Selection Process" tab, navigates to another section, or closes the platform.
<b>Exception</b>	If the selection process information fails to load or an action cannot be completed, the system displays an error message and prompts the user to retry.

Table 3.22: Use Case: Selection Process Monitoring

### [UC23]: Active Stages Monitoring

<b>Name</b>	Active Stages Monitoring
<b>Actors</b>	<ul style="list-style-type: none"> <li>● User</li> <li>● System</li> </ul>
<b>Entry Condition</b>	The user has accessed the tab in the Monitoring section.
<b>Event flow</b>	<p>(a) The system displays the "Active Stages" interface, showing:</p> <ul style="list-style-type: none"> <li>- A table listing active internships with columns for student, academic tutor, stage status and problem reports.</li> </ul> <p>(b) The user interacts with the interface by:</p> <ul style="list-style-type: none"> <li>- Click on the profiles names, to go in the relative screen.</li> <li>- Checking the stage status by selecting its icon.</li> <li>- Reviewing problem reports: <ul style="list-style-type: none"> <li>* If no issues exist, "None" is displayed.</li> <li>* If issues are present, clicking it opens the "issue" chat.</li> </ul> </li> <li>- Navigating to other sections via the navigation bar.</li> </ul> <p>(c) The system processes user actions by:</p> <ul style="list-style-type: none"> <li>- Redirecting the user to the relative screen, with respect to the icon/name selected.</li> <li>- Updating the "Problem Reports" column.</li> </ul>
<b>Exit Condition</b>	The user finishes interacting with the tab, navigates to another section, or exits the platform.
<b>Exception</b>	If internship information fails to load or actions cannot be completed, an error is displayed and the user is prompted to retry.

Table 3.23: Use Case: Active Stages Monitoring

## [UC24]: First Meeting Questionnaires Management

<b>Name</b>	First Meeting Questionnaires Management
<b>Actors</b>	<ul style="list-style-type: none"> <li>• Student</li> <li>• Company Tutor</li> <li>• System</li> </ul>
<b>Entry Condition</b>	The user has accessed the tab in the Monitoring section.
<b>Event flow</b>	<p>(a) The system displays the "First Meeting Questionnaires" interface, showing:</p> <ul style="list-style-type: none"> <li>- A table listing questionnaires for the first meeting with columns for student/tutor names, stage title, meeting date and questionnaire access.</li> </ul> <p>(b) The user interacts with the interface by:</p> <ul style="list-style-type: none"> <li>- Clicking on a name in the "Student Name" or "Tutor Name" column to view the respective profile.</li> <li>- Clicking on a stage title to access its detailed screen.</li> <li>- Selecting the questionnaire entry to view the questionnaire content.</li> <li>- Navigating to other sections via the navigation bar.</li> </ul> <p>(c) The system processes user actions by:</p> <ul style="list-style-type: none"> <li>- Redirecting the user to the relative screen, with respect to the icon/name selected.</li> </ul>
<b>Exit Condition</b>	The user completes interactions with the questionnaires, navigates to another section, or closes the platform.
<b>Exception</b>	If the questionnaire data fails to load, the system displays an error message and prompts the user to retry.

Table 3.24: Use Case: First Meeting Questionnaires Management

## [UC25]: Final Evaluations Management

<b>Name</b>	Final Evaluations Management
<b>Actors</b>	<ul style="list-style-type: none"> <li>● User</li> <li>● System</li> </ul>
<b>Entry Condition</b>	The user has accessed the tab in the Monitoring section.
<b>Event flow</b>	<p>(a) The system displays the "Final Evaluations" interface, organized into two sections:</p> <ul style="list-style-type: none"> <li>- A table listing concluded internships with columns for internship title, period and final evaluations by each party.</li> <li>- A section summarizing all reviews from past internships.</li> </ul> <p>(b) The user interacts with the interface by:</p> <ul style="list-style-type: none"> <li>- Clicking on an internship title to view its detailed page.</li> <li>- Accessing the final evaluation provided by the specific user, by selecting his name in the table.</li> <li>- Reviewing past stage reviews in the dedicated "Reviews" section.</li> <li>- Navigating to other sections via the navigation bar.</li> </ul> <p>(c) The system processes user actions by:</p> <ul style="list-style-type: none"> <li>- Redirecting the user to the corresponding detailed screen, with respect to his action.</li> </ul>
<b>Exit Condition</b>	The user completes interactions with the evaluations, navigates to another section, or closes the platform.
<b>Exception</b>	If the evaluation data fails to load, the system displays an error message and prompts the user to retry.

Table 3.25: Use Case: Final Evaluations Management

## [UC26]: Internship Creation and Management

<b>Name</b>	Internship Creation and Management
<b>Actors</b>	<ul style="list-style-type: none"> <li>• Company Tutor</li> <li>• System</li> </ul>
<b>Entry Condition</b>	The interface is accessed from the selection process screen.
<b>Event flow</b>	<p>(a) The system displays the interface, which includes:</p> <ul style="list-style-type: none"> <li>- A menu with predefined or previously saved templates.</li> <li>- Editable fields for required details.</li> </ul> <p>(b) The company tutor interacts with the interface by:</p> <ul style="list-style-type: none"> <li>- Selecting a predefined or custom template to automatically populate fields.</li> <li>- Filling or modifying required fields manually.</li> <li>- Using "Improve" to optimize via an LLM.</li> <li>- Saving the current details as a draft for later editing by clicking the "Save as Draft" button.</li> <li>- Clicking "Save Template" to store the current configuration as a reusable template.</li> <li>- Navigating back to the previous screen without saving changes using the "Back" button.</li> <li>- Publishing the position to make it visible to students.</li> <li>- Delete the position, by clicking the bin button.</li> </ul> <p>(c) The system populates fields when a template is selected.</p> <p>(d) The system enhance the content of the internship.</p> <p>(e) The company tutor modifies the different fields.</p> <p>(f) The system validates and saves data when the "Publish Position" button is clicked.</p> <p>(g) The system publish the internship position.</p> <p>(h) The system sends notifications to students about the new position if published.</p> <p>(i) The system in alternative processes the tutor's actions by:</p> <ul style="list-style-type: none"> <li>- Saving the new template for reuse.</li> <li>- Redirecting the tutor back to the previous interface when the "Back" button is clicked.</li> <li>- Redirecting the tutor to the select page.</li> <li>- Saving the internship as a draft, for later modifications.</li> </ul>
<b>Exit Condition</b>	The company tutor completes the internship creation, saves it as a draft, publishes it, or navigates away from the screen.
<b>Exception</b>	If required fields are incomplete or invalid, the system displays an error message, preventing the draft or publication from proceeding.

Table 3.26: Use Case: Internship Creation and Management

## [UC27]: Draft Management

<b>Name</b>	Draft Management
<b>Actors</b>	<ul style="list-style-type: none"> <li>• Company Tutor</li> <li>• System</li> </ul>
<b>Entry Condition</b>	The company tutor has accessed the "Drafts" interface from the monitoring section.
<b>Event flow</b>	<p>(a) The system displays the "Drafts" interface, which includes:</p> <ul style="list-style-type: none"> <li>- A table listing all saved drafts with columns for title, last modification date and complete status.</li> <li>- Options to filter or sort drafts by completeness, category, title, or modification date.</li> </ul> <p>(b) The company tutor performs one of the following actions:</p> <ul style="list-style-type: none"> <li>- Filters or sorts the draft list to locate specific entries.</li> <li>- Opens a draft for editing by selecting its title or "Edit."</li> <li>- Publishes a draft by clicking "Publish," making it visible.</li> <li>- Deletes a draft by clicking "Delete".</li> <li>- Uses the navigation bar to access another section.</li> </ul> <p>(c) The system processes the company tutor's actions by:</p> <ul style="list-style-type: none"> <li>- Applying filters/sorting criteria to update the list.</li> <li>- Redirecting the tutor to the internship creation screen for edits.</li> <li>- Validating and publishing the draft if fields are complete.</li> <li>- Deleting the draft and updating the list.</li> <li>- Displaying the selected section of the navigation option.</li> </ul> <p>(d) Upon publication, the system:</p> <ul style="list-style-type: none"> <li>- Notifies students about the new internship position.</li> <li>- Removes the draft from the list and updates its status.</li> </ul>
<b>Exit Condition</b>	The tutor edits, publishes, deletes a draft, or navigates to another platform section.
<b>Exception</b>	If required fields are incomplete, the system prevents publication and displays an error message.

Table 3.27: Use Case: Draft Management

### [UC28]: First Meeting Questionnaire Completion

<b>Name</b>	First Meeting Questionnaire Completion
<b>Actors</b>	<ul style="list-style-type: none"> <li>• Company Tutor</li> <li>• System</li> </ul>
<b>Entry Condition</b>	The company tutor has accessed the first meeting questionnaire screen from the monitoring section or a related notification.
<b>Event flow</b>	<p>(a) The system displays the questionnaire interface, including:</p> <ul style="list-style-type: none"> <li>- Instructions describing the purpose and confidentiality of the questionnaire.</li> <li>- A series of questions divided into multiple-choice, open-ended and scale-based formats.</li> <li>- Options to save or return to the previous screen without saving.</li> </ul> <p>(b) The company tutor interacts with the questionnaire by:</p> <ul style="list-style-type: none"> <li>- Answering multiple-choice questions using the predefined four-option format.</li> <li>- Providing detailed responses in open-ended questions for strengths and improvement areas.</li> <li>- Assigning a score on a scale of 1 to 5 for the student's suitability for the role.</li> <li>- Clicking "Save" to submit the completed questionnaire.</li> <li>- Clicking "Back" to return to the previous screen without saving changes.</li> <li>- Uses the navigation bar to access another section.</li> </ul> <p>(c) The system processes the tutor's input by:</p> <ul style="list-style-type: none"> <li>- Redirecting the tutor to the selected section, with respect to the option selected.</li> <li>- Validating that all required fields are completed.</li> </ul> <p>(d) If the system performed the latter option, now it saves the responses and marks the evaluation as complete.</p>
<b>Exit Condition</b>	The tutor successfully submits the questionnaire, navigates back to the previous screen, or closes the platform.
<b>Exception</b>	If any required fields are left incomplete, the system prevents submission and displays an error message.

Table 3.28: Use Case: First Meeting Questionnaire Completion

## [UC29]: Final Evaluation Completion

<b>Name</b>	Final Evaluation Completion
<b>Actors</b>	<ul style="list-style-type: none"> <li>• Student</li> <li>• Company Tutor</li> <li>• University Tutor</li> <li>• System</li> </ul>
<b>Entry Condition</b>	The user has accessed the final evaluation screen from the "Internship States History" or from a notification.
<b>Event flow</b>	<p>(a) The system displays the evaluation interface, including:</p> <ul style="list-style-type: none"> <li>- Stage details (title, participants, dates).</li> <li>- Confidentiality instructions.</li> <li>- A tailored questionnaire and review section.</li> </ul> <p>(b) The user completes the evaluation by:</p> <ul style="list-style-type: none"> <li>- Answering multiple-choice questions (1-6 scale) and open-ended fields.</li> <li>- Writing reviews for other participants.</li> <li>- Using the "Back" button to leave without saving or the navigation bar to switch sections.</li> <li>- Uses the navigation bar to access another section.</li> </ul> <p>(c) The system processes the user's actions by:</p> <ul style="list-style-type: none"> <li>- Redirecting the user to the selected section or back to the previous screen, with respect to the selected option.</li> <li>- Validating responses, associate reviews with participant profiles and saves the evaluation.</li> </ul> <p>(d) The system publishes the final evaluation in the "Questionnaires" tab.</p> <p>(e) The system notifies relevant users once the evaluation is submitted.</p>
<b>Exit Condition</b>	The user submits the evaluation, navigates away, or closes the platform.
<b>Exception</b>	If required fields are incomplete, the system displays an error message and prevents submission.

Table 3.29: Use Case: Final Evaluation Completion

### [UC30]: Viewing First Meeting Questionnaire

<b>Name</b>	Viewing First Meeting Questionnaire
<b>Actors</b>	<ul style="list-style-type: none"> <li>• Company Tutor</li> <li>• Student</li> <li>• System</li> </ul>
<b>Entry Condition</b>	The company tutor or the student has accessed the questionnaire viewing interface from the sub-tab in the tab "Questionnaire" or from a related notification.
<b>Event flow</b>	<p>(a) The system displays the questionnaire interface, which includes:</p> <ul style="list-style-type: none"> <li>- A title and brief description of the tab's purpose.</li> <li>- An organized list of questions and their corresponding answers (multiple-choice, open-ended and scale-based).</li> <li>- A "Back" button to return to the previous screen.</li> </ul> <p>(b) The tutor or the student interacts with the interface by:</p> <ul style="list-style-type: none"> <li>- Reviewing answers for all questions, including multiple-choice, open-ended, scale-based ratings responses.</li> <li>- Clicking the "Back" button to go to the previous screen.</li> <li>- Using the navigation bar to access another section.</li> </ul> <p>(c) The system redirects the tutor to the previous screen or another section, with respect to the option selected.</p>
<b>Exit Condition</b>	The tutor or the student reviews the questionnaire and navigates back to the previous screen or accesses another section.
<b>Exception</b>	If the questionnaire fails to load, the system displays an error message and prompts the tutor to retry.

Table 3.30: Use Case: Viewing First Meeting Questionnaire

### [UC31]: Viewing Final Evaluation

<b>Name</b>	Viewing Final Evaluation
<b>Actors</b>	<ul style="list-style-type: none"> <li>• User</li> <li>• System</li> </ul>
<b>Entry Condition</b>	The user has accessed the interface from the sub-tab in the tab "Questionnaire" or from a related notification.
<b>Event flow</b>	<p>(a) The system displays the final evaluation interface, with:</p> <ul style="list-style-type: none"> <li>- A title and description of the evaluation purpose.</li> <li>- An organized list of questions and their corresponding answers for all users.</li> <li>- The review from one of the participants.</li> <li>- A "Back" button to return to the previous screen.</li> </ul> <p>(b) The user interacts with the interface by:</p> <ul style="list-style-type: none"> <li>- Reviewing final evaluations from the different parties.</li> <li>- Clicking the "Back" button to go to the previous screen.</li> <li>- Using the navigation bar to access another section.</li> </ul> <p>(c) The system redirects the user to the previous screen or another section, with respect to the selected button.</p>
<b>Exit Condition</b>	The user reviews the final evaluation and navigates back to the previous screen or accesses another section.
<b>Exception</b>	If the final evaluation fails to load, the system displays an error message and prompts the user to retry.

Table 3.31: Use Case: Viewing Final Evaluation

## [UC32]: Stage Status History

Name	Stage Status History
<b>Actors</b>	<ul style="list-style-type: none"> <li>● Student</li> <li>● Company Tutor</li> <li>● Academic Tutor</li> <li>● System</li> </ul>
<b>Entry Condition</b>	The user has accessed the stage status history screen via the "Active Stages" tab or through a notification.
<b>Event flow</b>	<p>(a) The system displays:</p> <ul style="list-style-type: none"> <li>- A timeline of past statuses with dates (black dots).</li> <li>- The current status with ongoing actions (blue filled dot).</li> <li>- Planned future statuses (empty blue dots).</li> <li>- A "Back" button to return to the previous screen.</li> </ul> <p>(b) The user interacts by:</p> <ul style="list-style-type: none"> <li>- Reviewing past, current and future statuses.</li> <li>- Clicking statuses to view details.</li> <li>- Returning to the previous screen using the "Back" button or navigating to another section.</li> </ul> <p>(c) The system redirects to detailed screens for clicked statuses.</p> <p>(d) The system changes stage status automatically based on specific actions:</p> <ul style="list-style-type: none"> <li>- Starting the stage after selection.</li> <li>- Scheduling/completing events.</li> <li>- Pausing due to issues.</li> <li>- Flagging the "Last Event."</li> <li>- Completing final evaluations or ending the stage.</li> </ul> <p>(e) The system sends notifications to users on status changes.</p>
<b>Exit Condition</b>	The user accesses details, or exits the screen.
<b>Exception</b>	If the history fails to load, an error prompts the user to retry.

Table 3.32: Use Case: Stage Status History

### [UC33]: User Profile View

<b>Name</b>	User Profile View
<b>Actors</b>	<ul style="list-style-type: none"> <li>● User</li> <li>● System</li> </ul>
<b>Entry Condition</b>	The user has accessed the profile view screen via a clickable name in another interface (e.g., Active Stages, Monitoring, or Messaging).
<b>Event flow</b>	<p>(a) The system displays:</p> <ul style="list-style-type: none"> <li>- Different information about the user.</li> <li>- Reviews received from other parties at the end of completed internships.</li> <li>- A "Back" button to return to the previous screen.</li> </ul> <p>(b) The user interacts with the profile by:</p> <ul style="list-style-type: none"> <li>- Viewing personal, academic and professional details.</li> <li>- Clicking the affiliation link to navigate to the related organization profile.</li> <li>- Accessing uploaded CVs if available.</li> <li>- Reading reviews received from other users.</li> <li>- Returning to the previous screen using the "Back" button or navigating to another section.</li> </ul> <p>(c) The system processes the user's interactions by:</p> <ul style="list-style-type: none"> <li>- Redirecting the user to different screen, with respect to the action performed.</li> <li>- Displaying the CV in a new window or showing a "Not uploaded" message.</li> </ul>
<b>Exit Condition</b>	The user finishes viewing the profile and navigates back to the previous screen or another section.
<b>Exception</b>	If the profile information fails to load, the system displays an error message, prompting the user to retry.

Table 3.33: Use Case: User Profile View

### [UC34]: Institution Profile View

<b>Name</b>	Institution Profile View
<b>Actors</b>	<ul style="list-style-type: none"> <li>● User</li> <li>● System</li> </ul>
<b>Entry Condition</b>	The user has accessed the institution profile view screen via a click-able link from another interface (e.g., User Profile, Monitoring).
<b>Event flow</b>	<p>(a) The system displays:</p> <ul style="list-style-type: none"> <li>- Different information about the institution.</li> <li>- A "Back" button to return to the previous screen.</li> </ul> <p>(b) The user interacts with the profile by:</p> <ul style="list-style-type: none"> <li>- Viewing all details about the institution's operations, size and achievements.</li> <li>- Returning to the previous screen using the "Back" button or navigating to another section..</li> </ul> <p>(c) The system processes the user's interactions by:</p> <ul style="list-style-type: none"> <li>- Redirecting the user to different screen, with respect to the action performed.</li> </ul>
<b>Exit Condition</b>	The user finishes viewing the profile and navigates back to the previous screen or another section.
<b>Exception</b>	If the institution profile fails to load, the system displays an error message, prompting the user to retry.

Table 3.34: Use Case: Institution Profile View

### [UC35]: Internship Profile View

<b>Name</b>	Internship Profile View
<b>Actors</b>	<ul style="list-style-type: none"> <li>• User</li> <li>• System</li> </ul>
<b>Entry Condition</b>	The user has accessed the internship profile view screen via a click-able link from another interface (e.g., Active Stages, Monitoring).
<b>Event flow</b>	<p>(a) The system displays:</p> <ul style="list-style-type: none"> <li>- Comprehensive details about the internship, including its title, category, description, requirements and operational details.</li> <li>- A "Back" button to return to the previous screen.</li> </ul> <p>(b) The user interacts with the profile by:</p> <ul style="list-style-type: none"> <li>- Viewing all relevant details about the internship.</li> <li>- Clicking on company tutor to view their profile.</li> <li>- Returning to the previous screen using the "Back" button or navigating to another section.</li> </ul> <p>(c) The system processes the user's interactions by:</p> <ul style="list-style-type: none"> <li>- Redirecting the user to different screen, with respect to the action performed.</li> </ul>
<b>Exit Condition</b>	The user finishes viewing the profile and navigates back to the previous screen or another section.
<b>Exception</b>	If the internship profile fails to load, the system displays an error message, prompting the user to retry.

Table 3.35: Use Case: Internship Profile View

### [UC36]: Create Chat

<b>Name</b>	Create Chat
<b>Actors</b>	<ul style="list-style-type: none"> <li>• User</li> <li>• System</li> </ul>
<b>Entry Condition</b>	The user has accessed the "Create Chat" screen from the messaging interface.
<b>Event flow</b>	<p>(a) The system displays the "Create Chat" interface, including:</p> <ul style="list-style-type: none"> <li>- Tools to search, filter and select participants.</li> <li>- Fields for defining the chat name, optional description and privacy settings.</li> <li>- Buttons for confirming or canceling the creation process and for returning to the previous screen.</li> </ul> <p>(b) The user interacts with the interface by:</p> <ul style="list-style-type: none"> <li>- Searching, filtering and selecting users as participants.</li> <li>- Filling in required details (e.g., chat name) and setting optional preferences like privacy or description.</li> <li>- Clicking "Create Chat" to finalize the setup or using "Cancel" to discard changes.</li> <li>- Returning to the previous screen using the "Back" button or navigating to another section.</li> </ul> <p>(c) The system processes the user's input by:</p> <ul style="list-style-type: none"> <li>- Redirecting the user to different screen, with respect to the action performed.</li> <li>- Validating the fields and saving the chat configuration.</li> </ul> <p>(d) If the system performed this last option, then it redirects the user to the newly created chat interface.</p>
<b>Exit Condition</b>	The user creates the chat, cancels the process, or navigates back to the previous screen.
<b>Exception</b>	If required inputs are missing, the system prevents chat creation and displays an error message.

Table 3.36: Use Case: Create Chat

### 3.2.3 Sequence Diagrams

In this section, each use case is complemented by a corresponding Sequence Diagram, which visually represents the interactions between actors and the system for achieving the specific goals outlined in the use case. These diagrams provide a step-by-step view of the process, showing how information flows between the actors and the system, as well as the order of operations required to complete the functionality described.

Each use case in this document is accompanied by a sequence diagram to illustrate the described functionality in a dynamic and visual format. The sequence diagrams clarify the interaction patterns, providing an operational view that complements the textual description of the use case. By aligning the diagrams with the use cases, this section ensures that the requirements and workflows are both comprehensible and actionable for all stakeholders involved in the project.

### [UC1] Access the S&C Platform

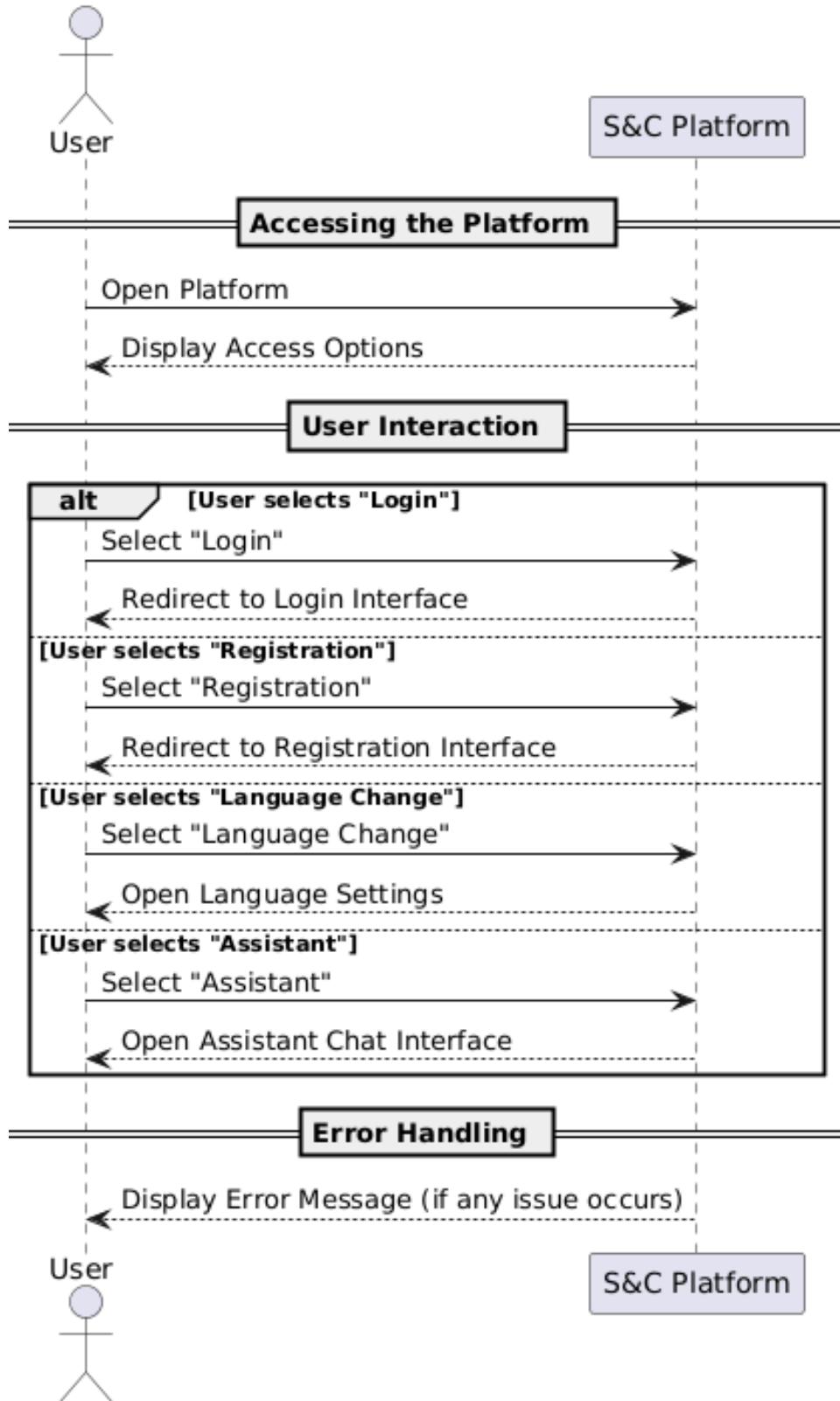


Figure 3.49: Sequence Diagram 1: User Registration

## [UC2] Overview Page

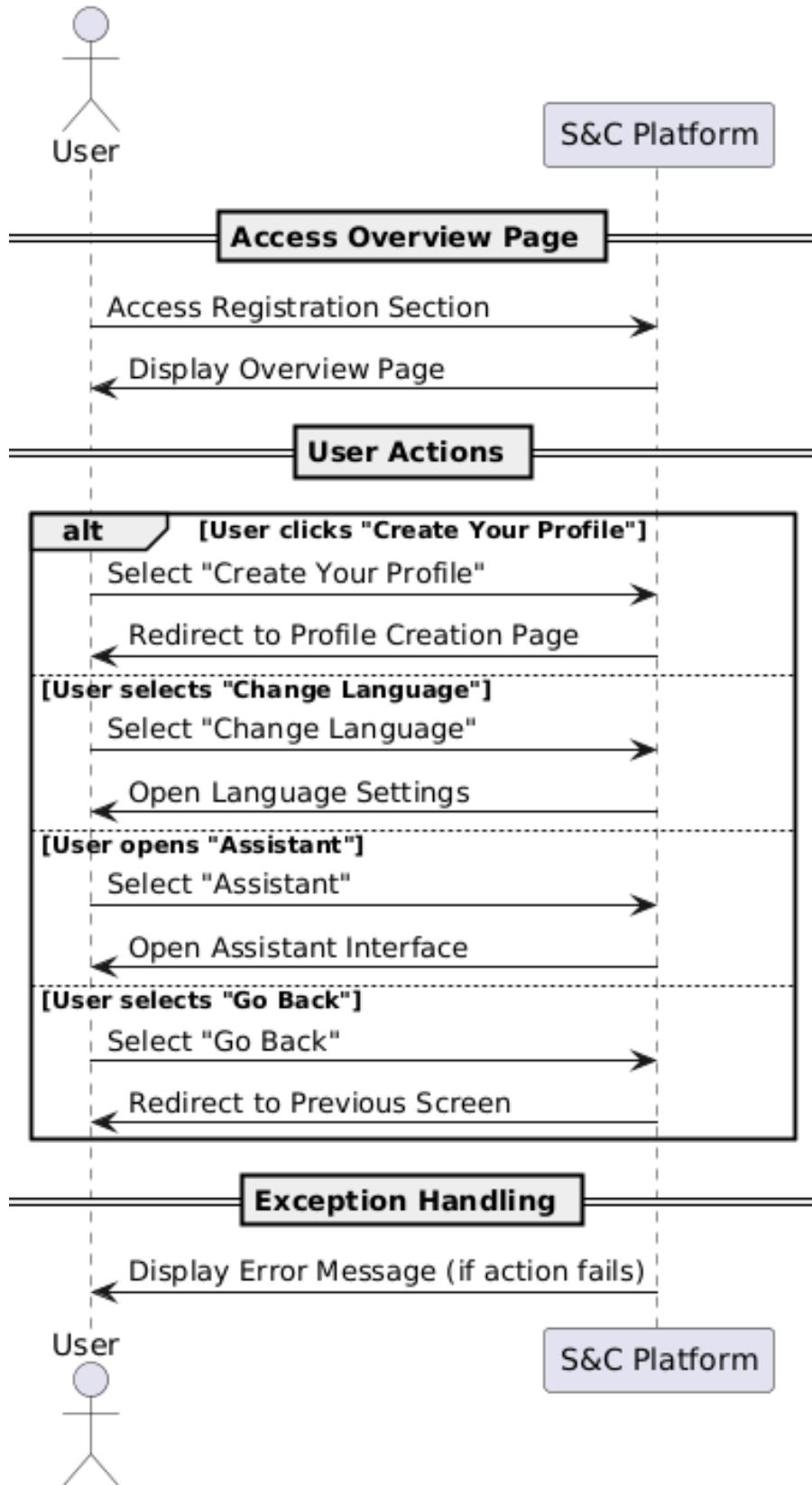


Figure 3.50: Sequence Diagram 2: Company Registration

### [UC3] CV Upload

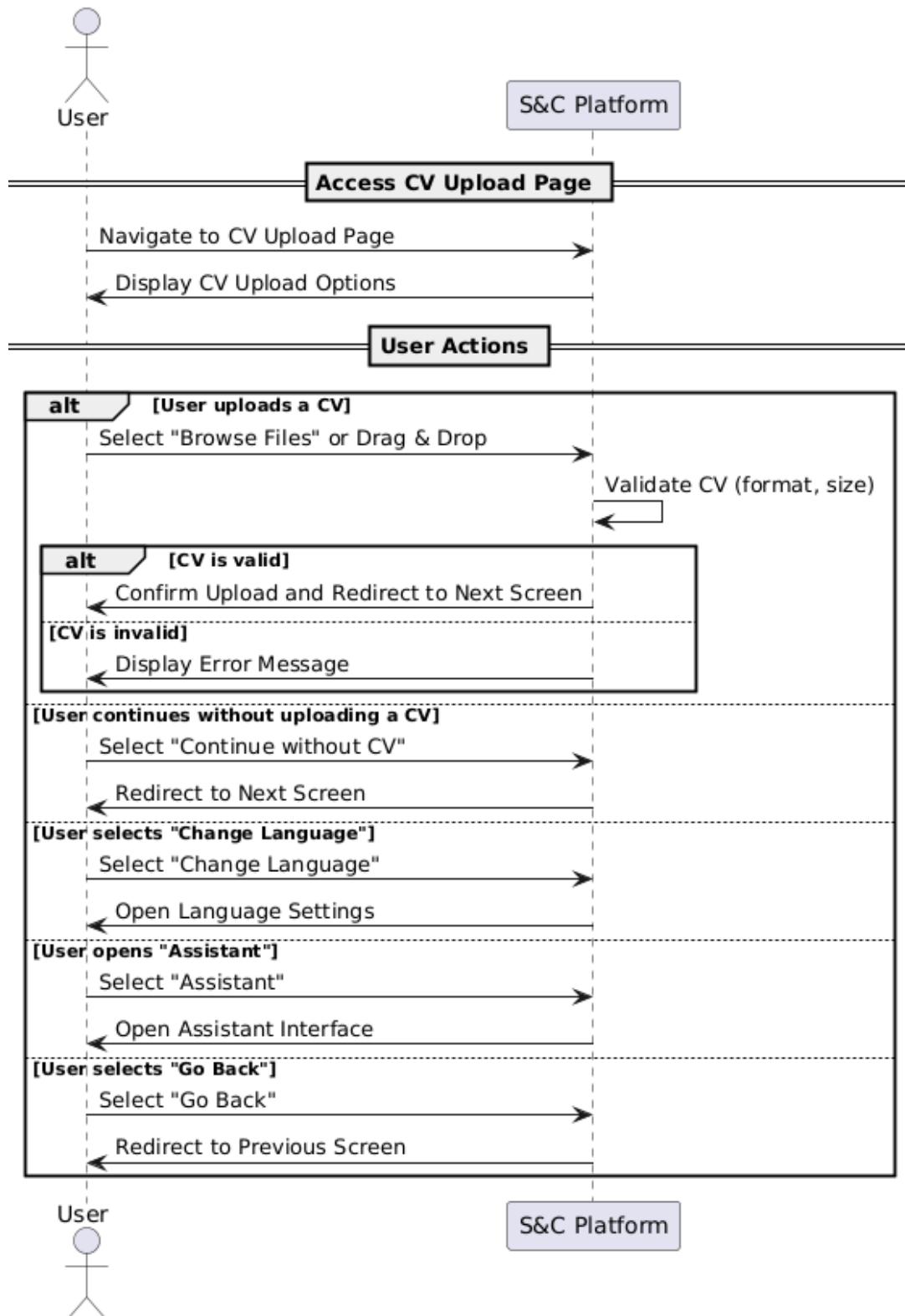


Figure 3.51: Sequence Diagram 3: University Tutor Registration

## **[UC4] User Profile Registration**

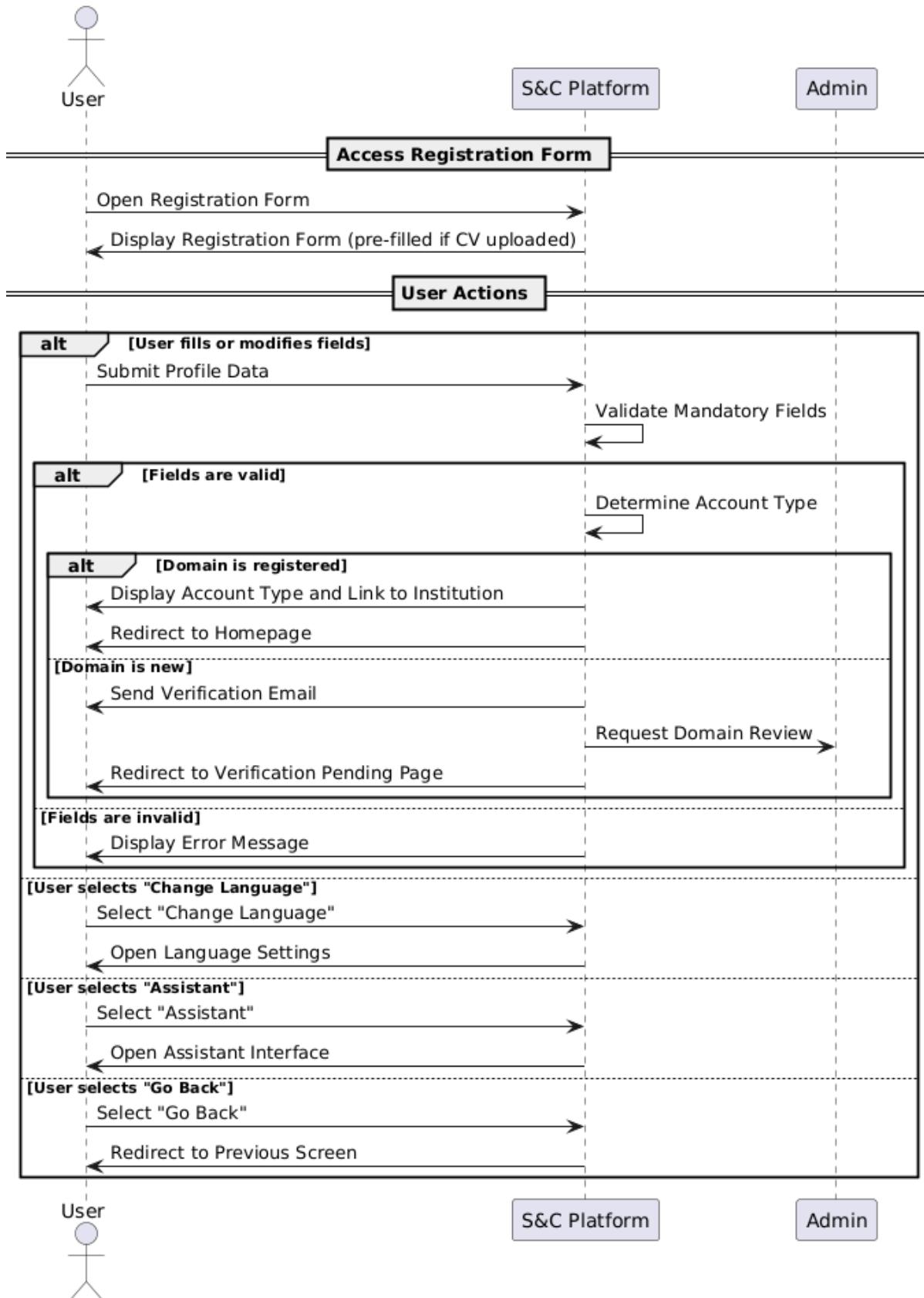


Figure 3.52: Sequence Diagram 4: CV Upload (Student Perspective)

### [UC5] Domain Verification

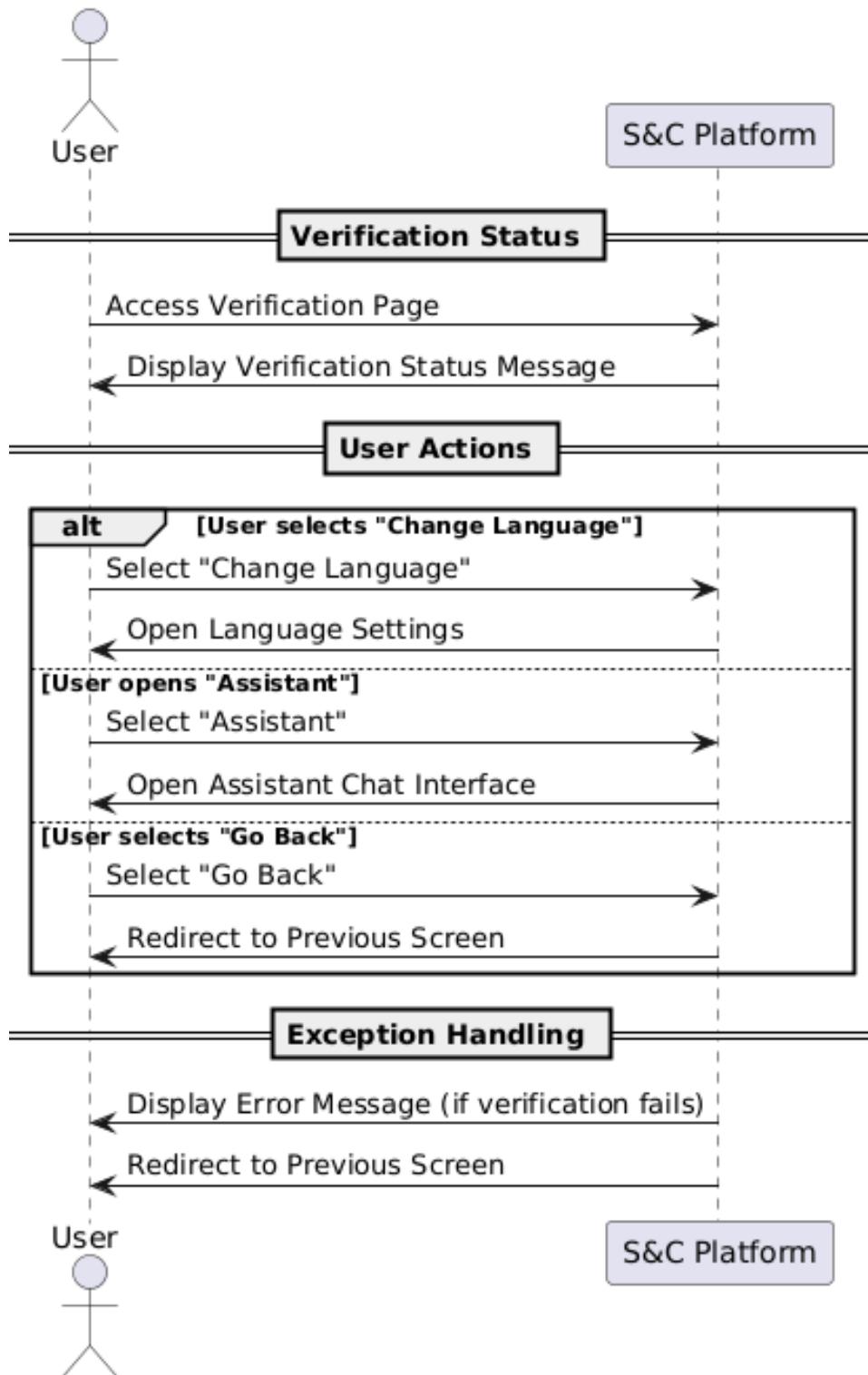


Figure 3.53: Sequence Diagram 5: CV Upload (Company Perspective)

### [UC6] Institution Profile Registration

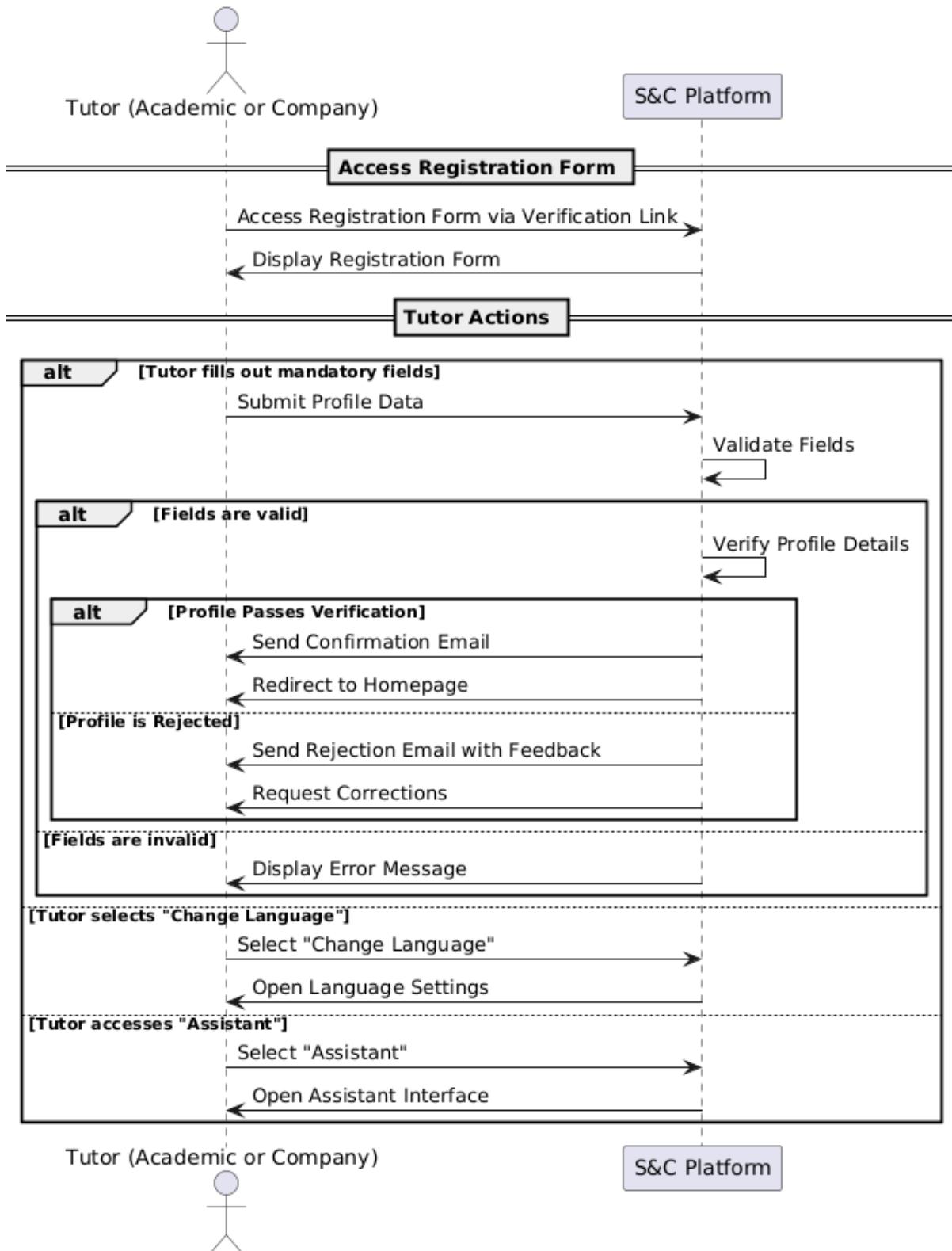


Figure 3.54: Sequence Diagram 6: Login Process (Student)

### [UC7] User Login

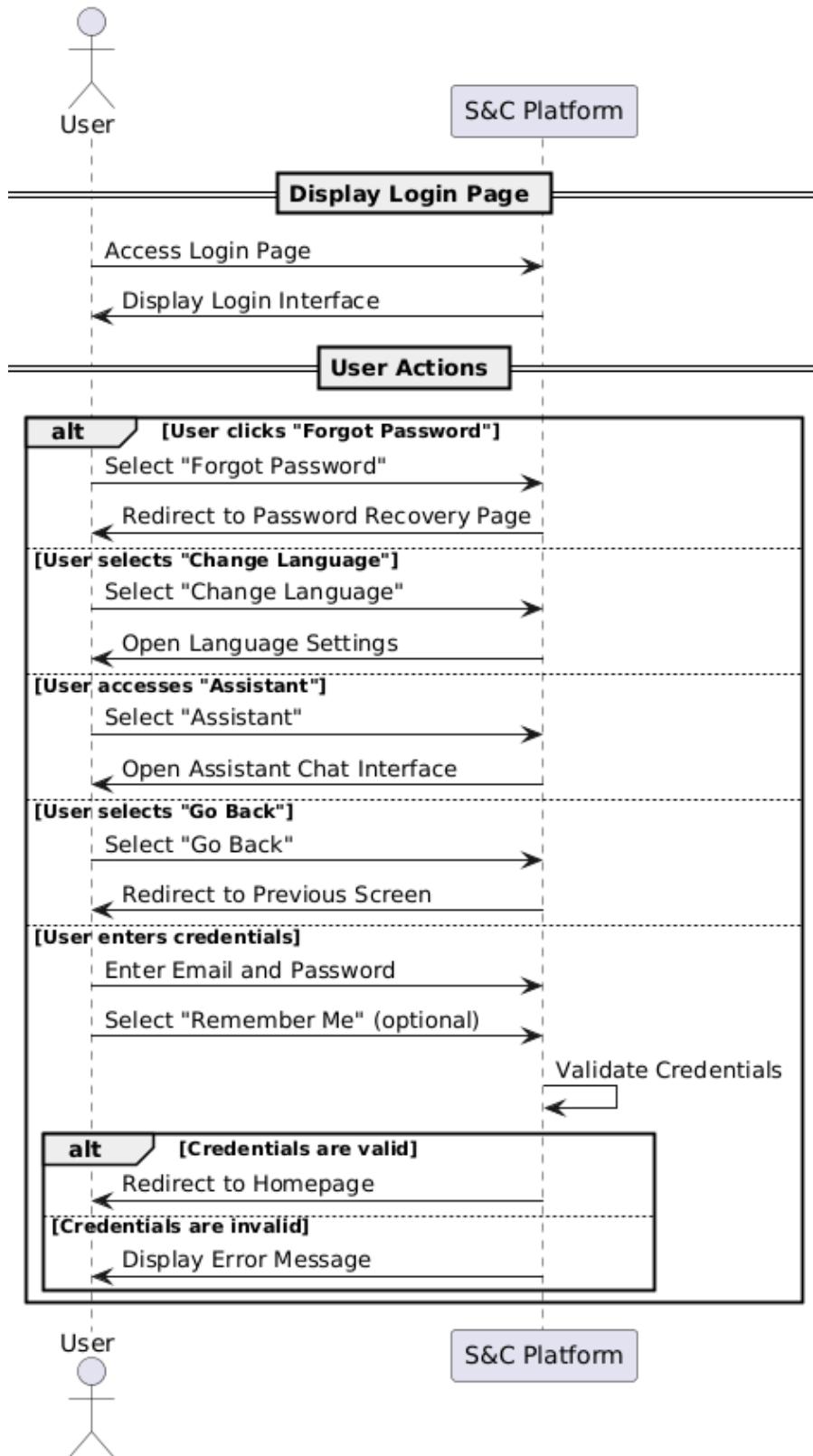


Figure 3.55: Sequence Diagram 7: Password Recovery

### [UC8] Password Recovery

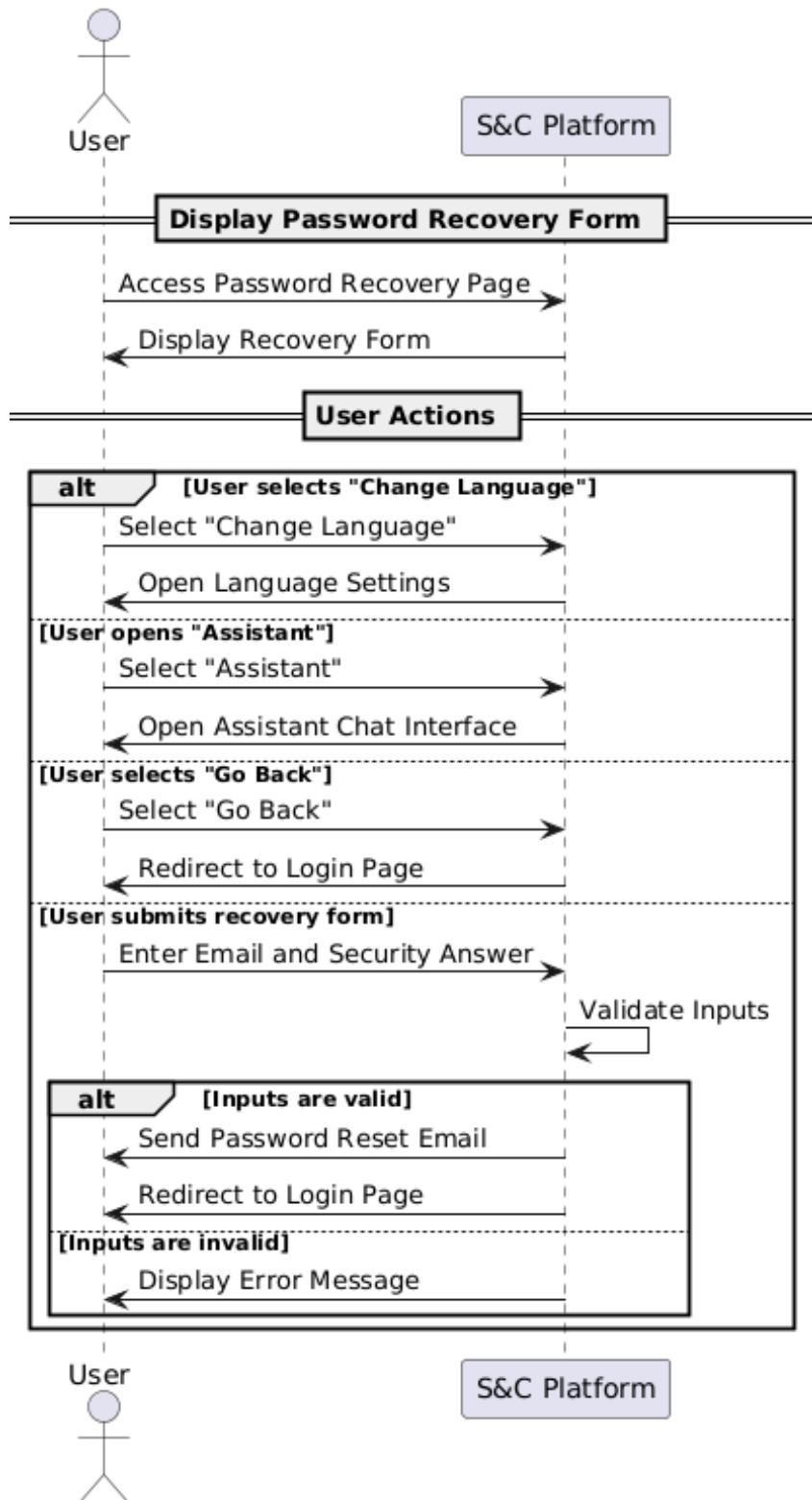


Figure 3.56: Sequence Diagram 8: Homepage Navigation

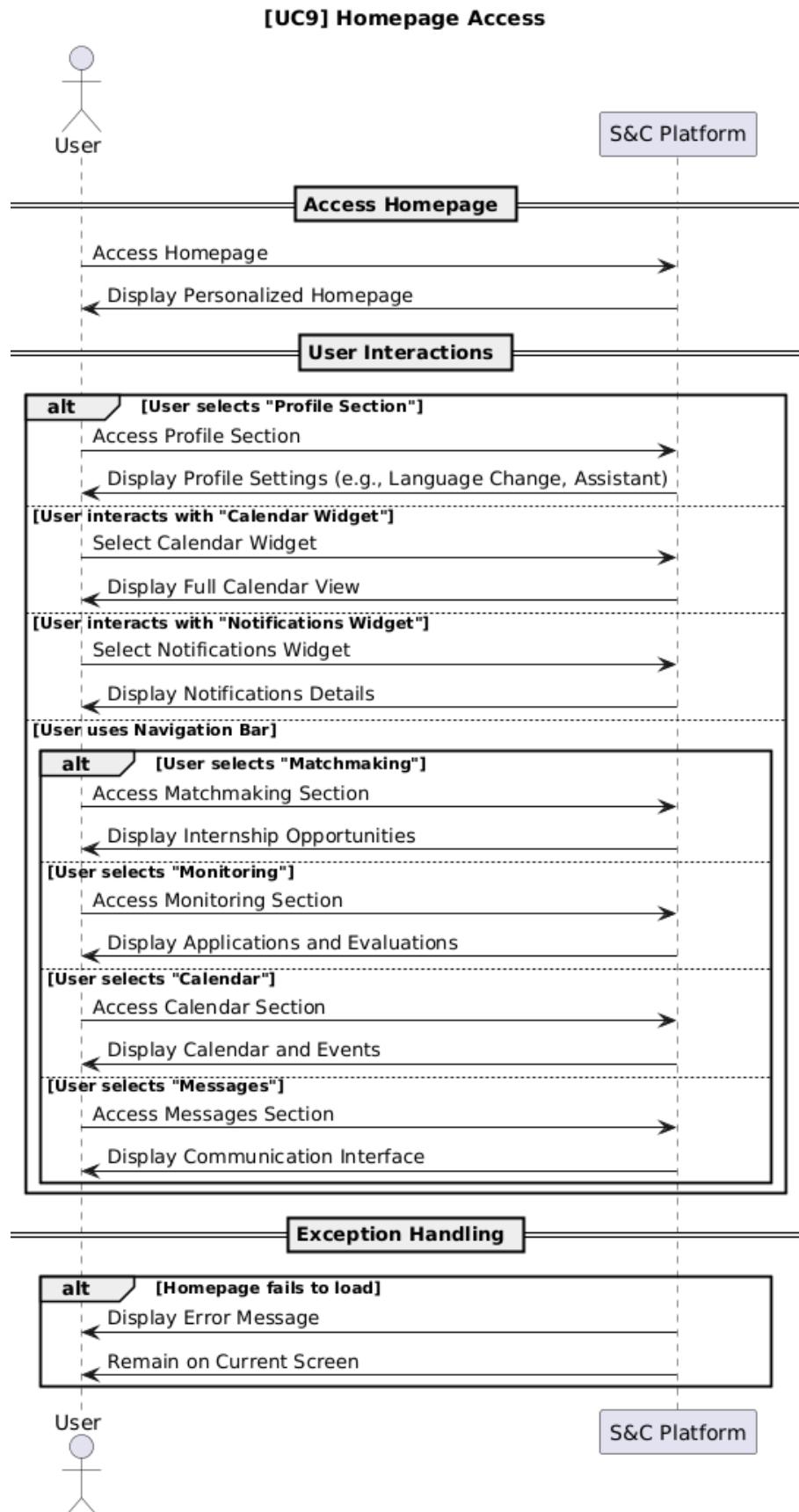


Figure 3.57: Sequence Diagram 9: Change Language

### [UC10] Change Language

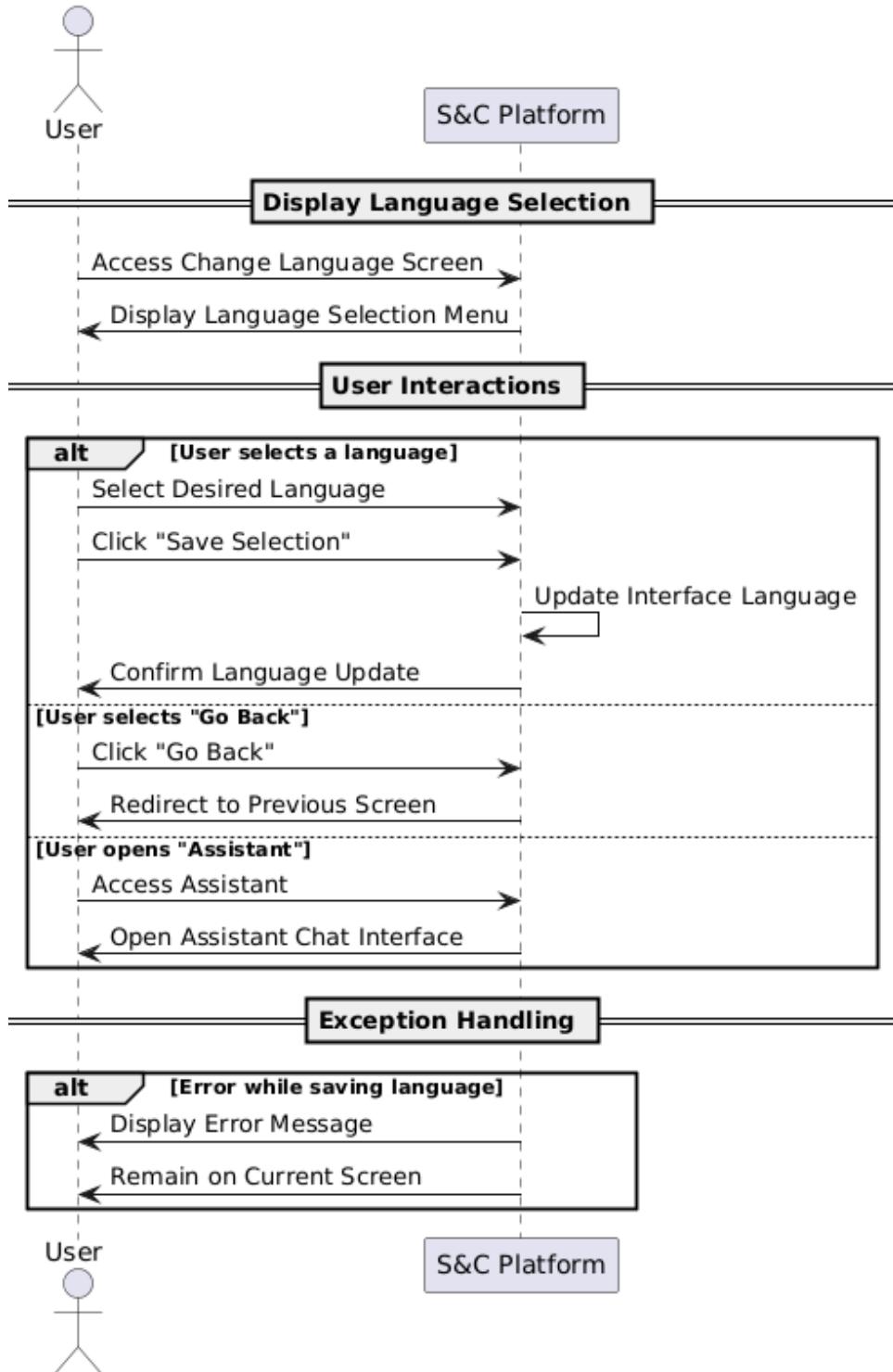


Figure 3.58: Sequence Diagram 10: Virtual Assistant Interaction

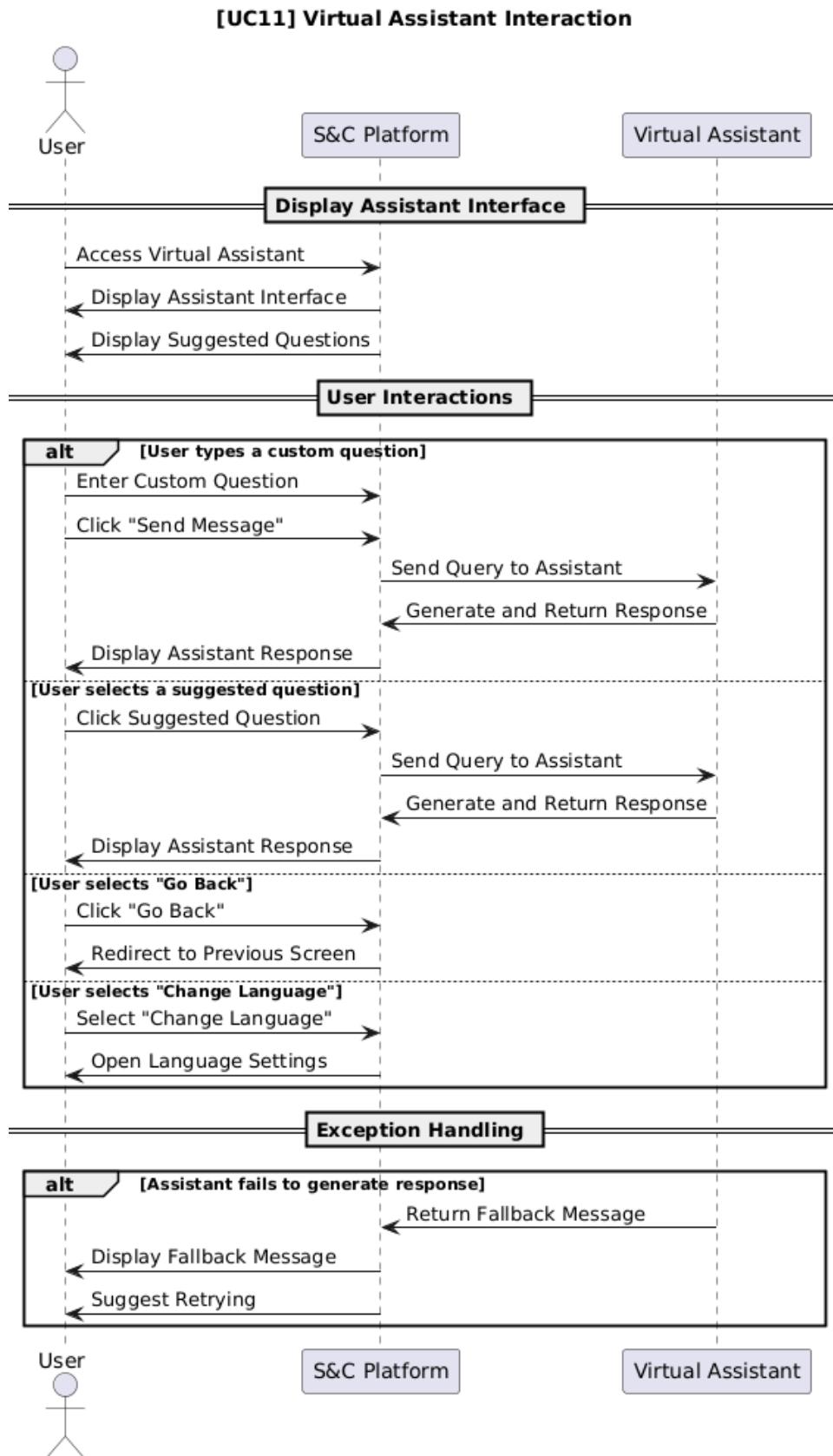


Figure 3.59: Sequence Diagram 11: Settings Management

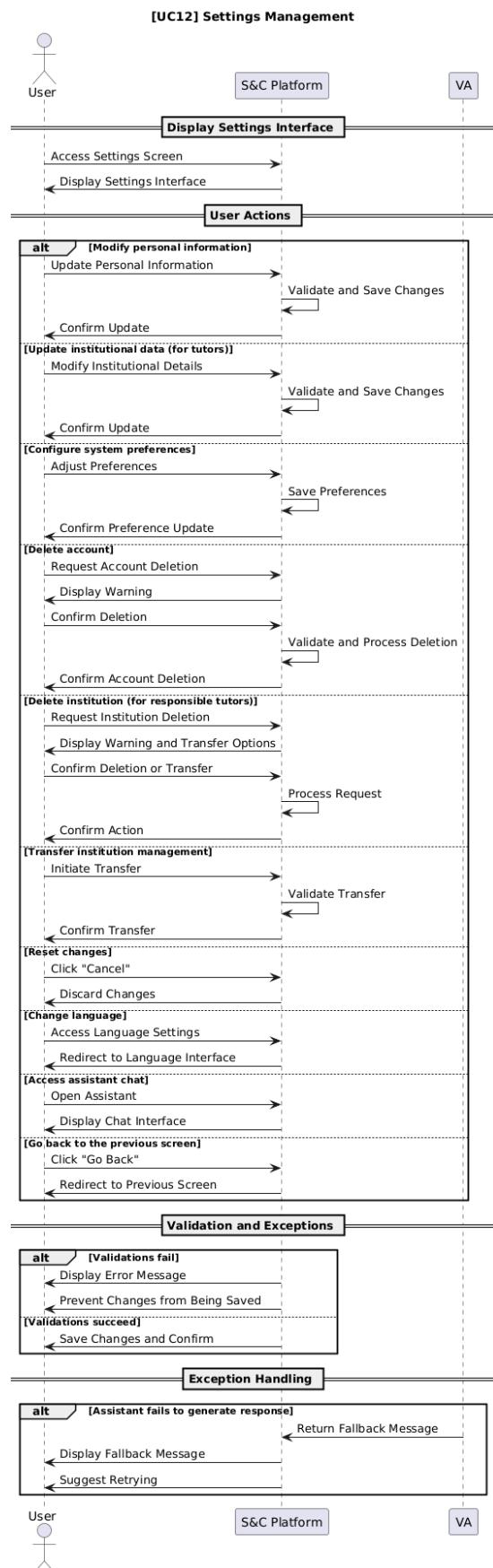


Figure 3.60: Sequence Diagram 12: Matchmaking (Student and Company Perspective)

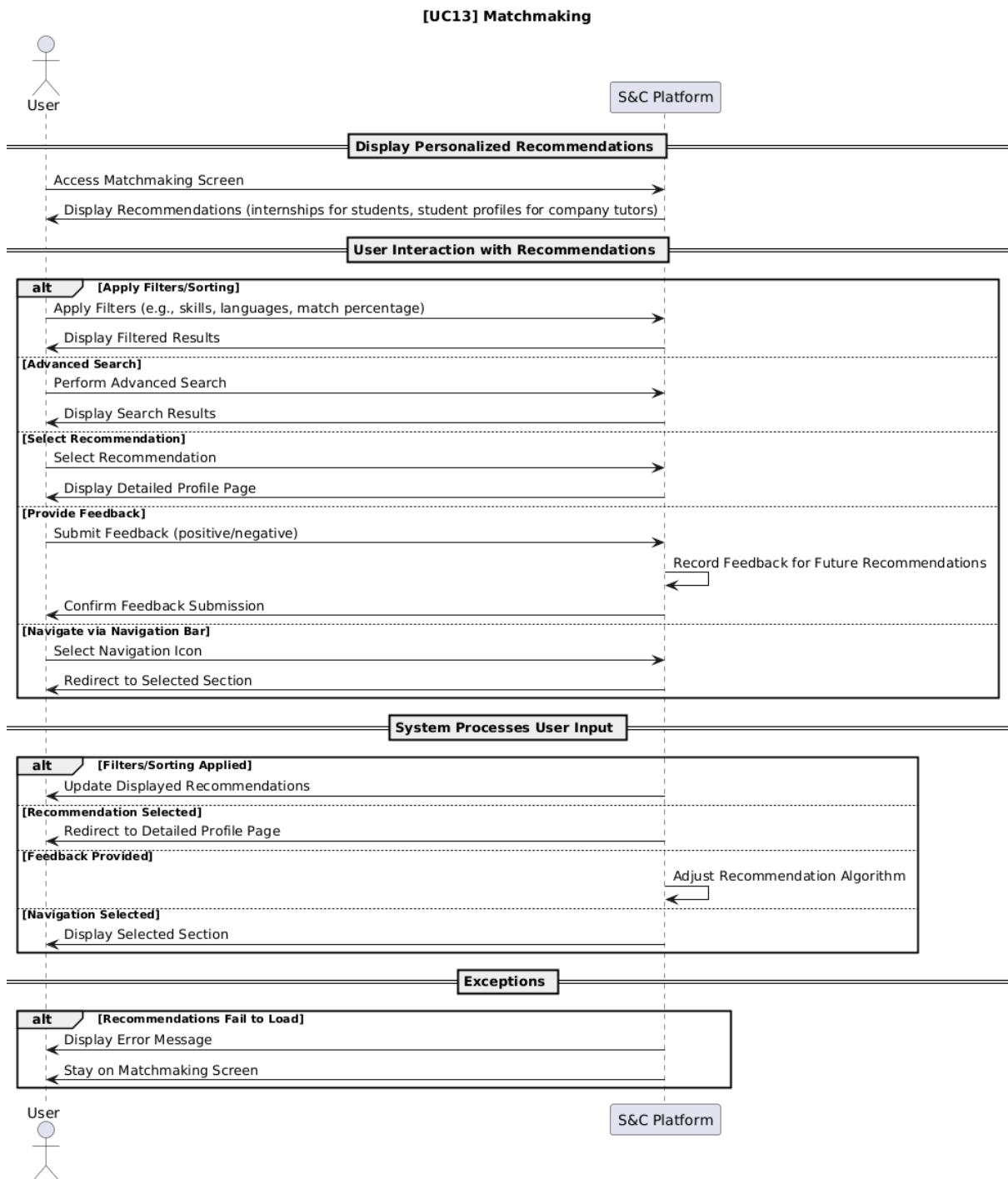


Figure 3.61: Sequence Diagram 13: Calendar Management

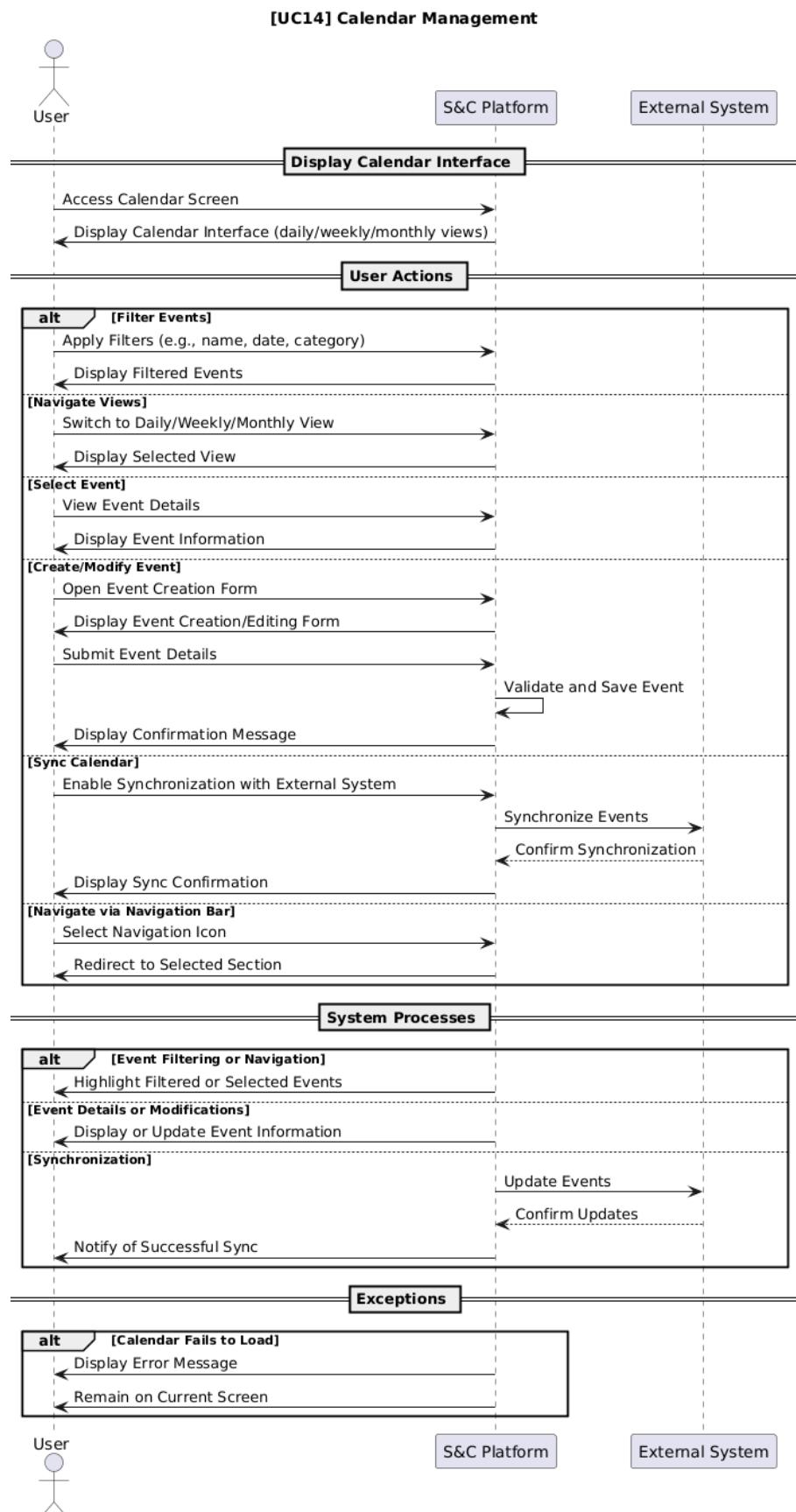


Figure 3.62: Sequence Diagram 14: Event Creation and Management

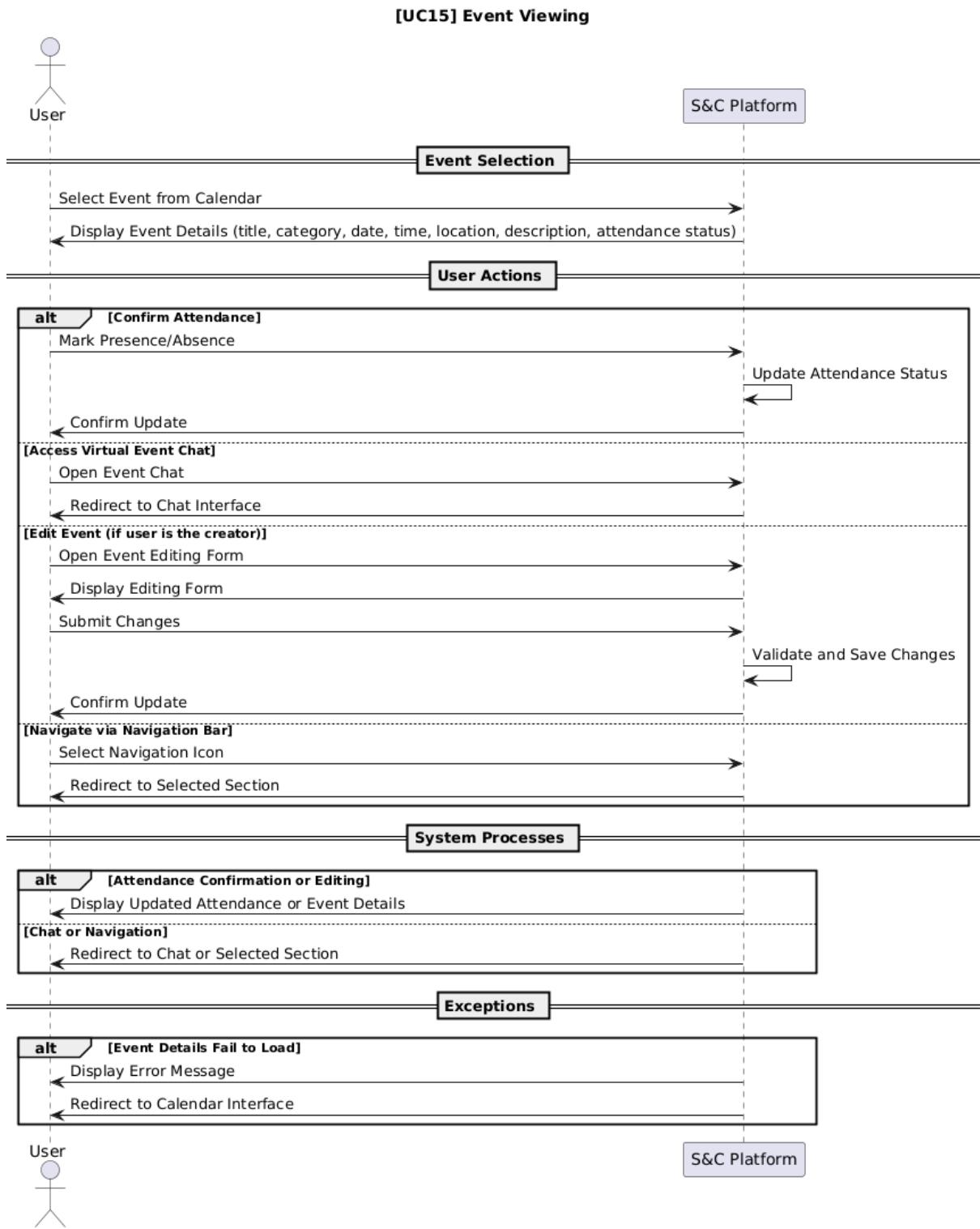


Figure 3.63: Sequence Diagram 15: Messaging Interface

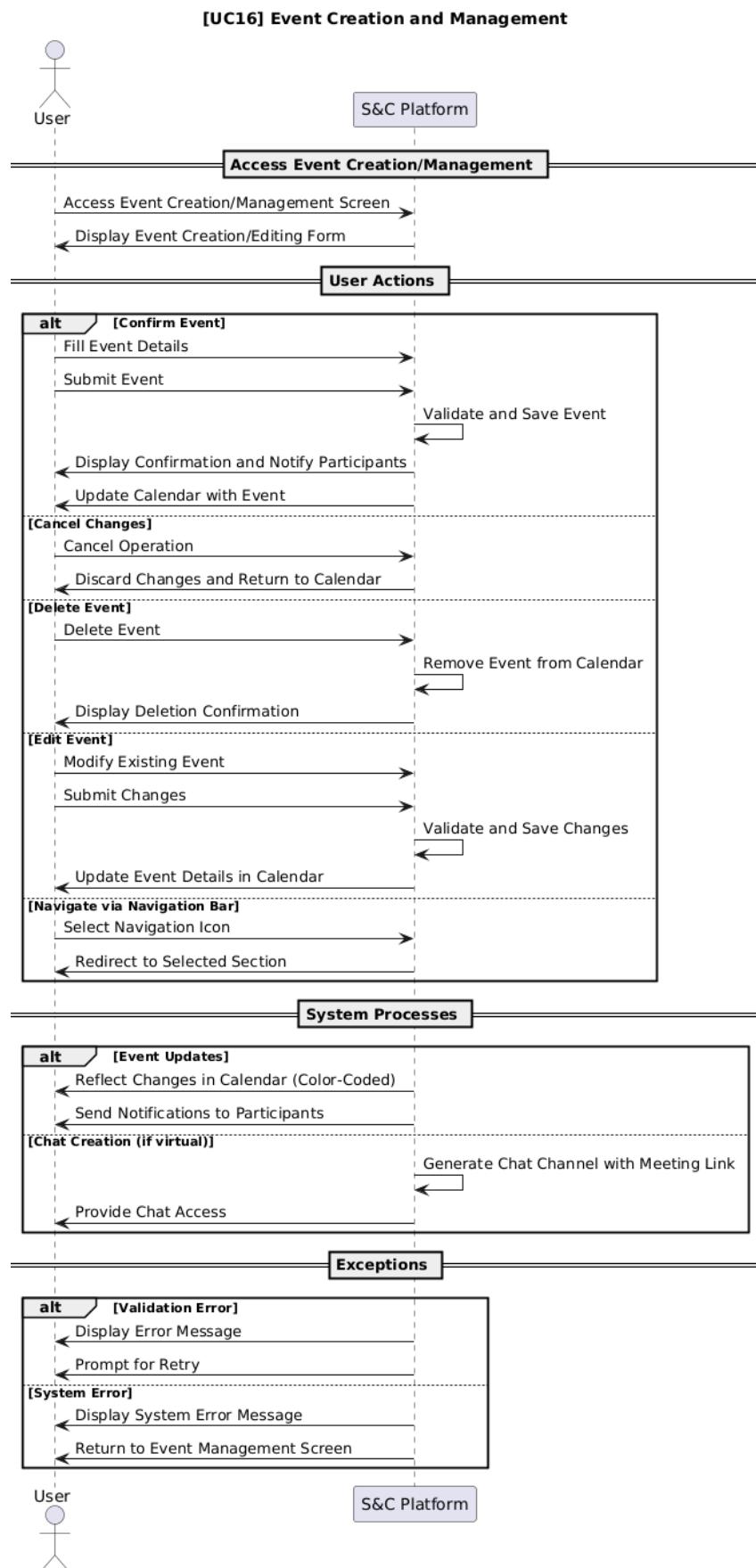


Figure 3.64: Sequence Diagram 16: Videocall Chat Interaction

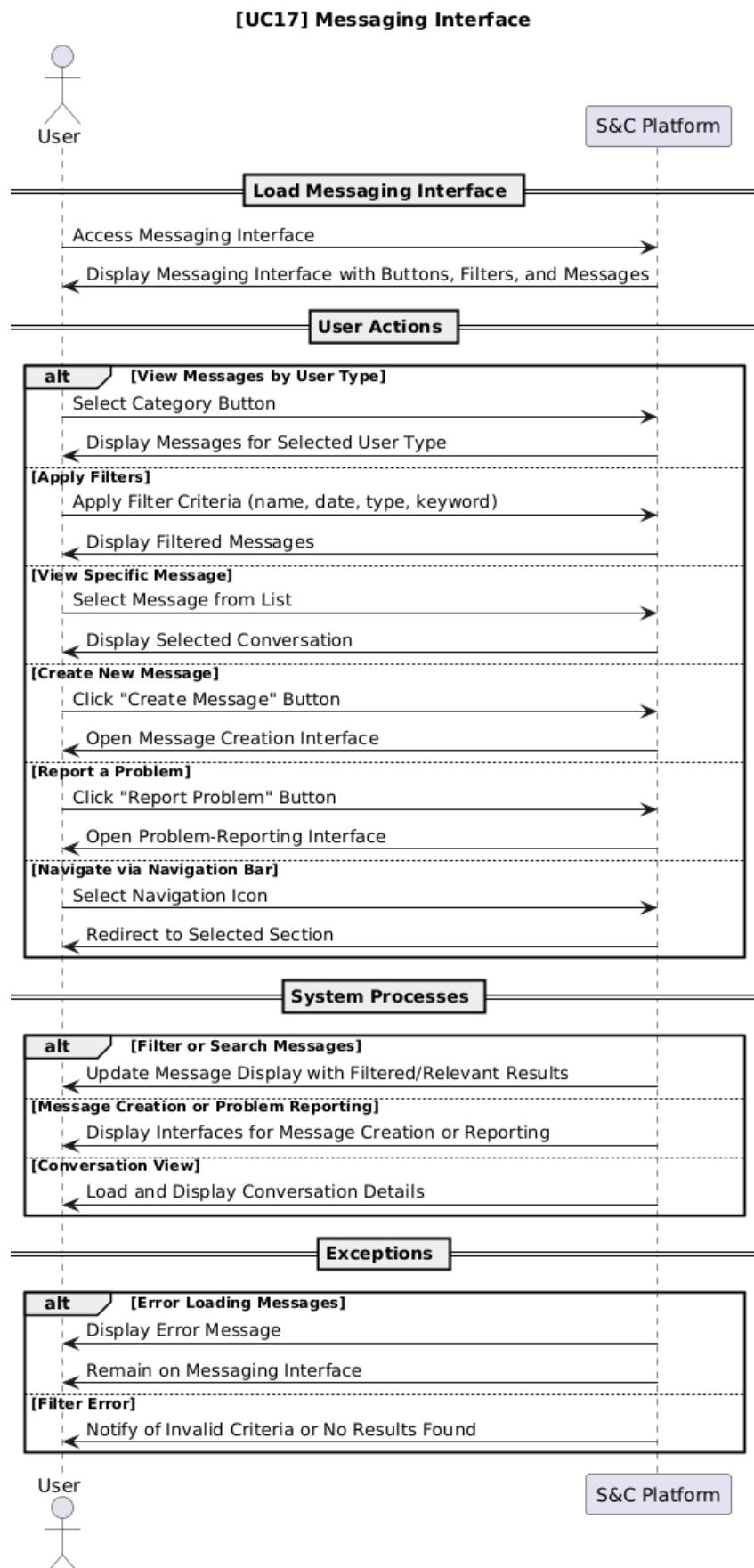


Figure 3.65: Sequence Diagram 17: Complaints Chat Interaction

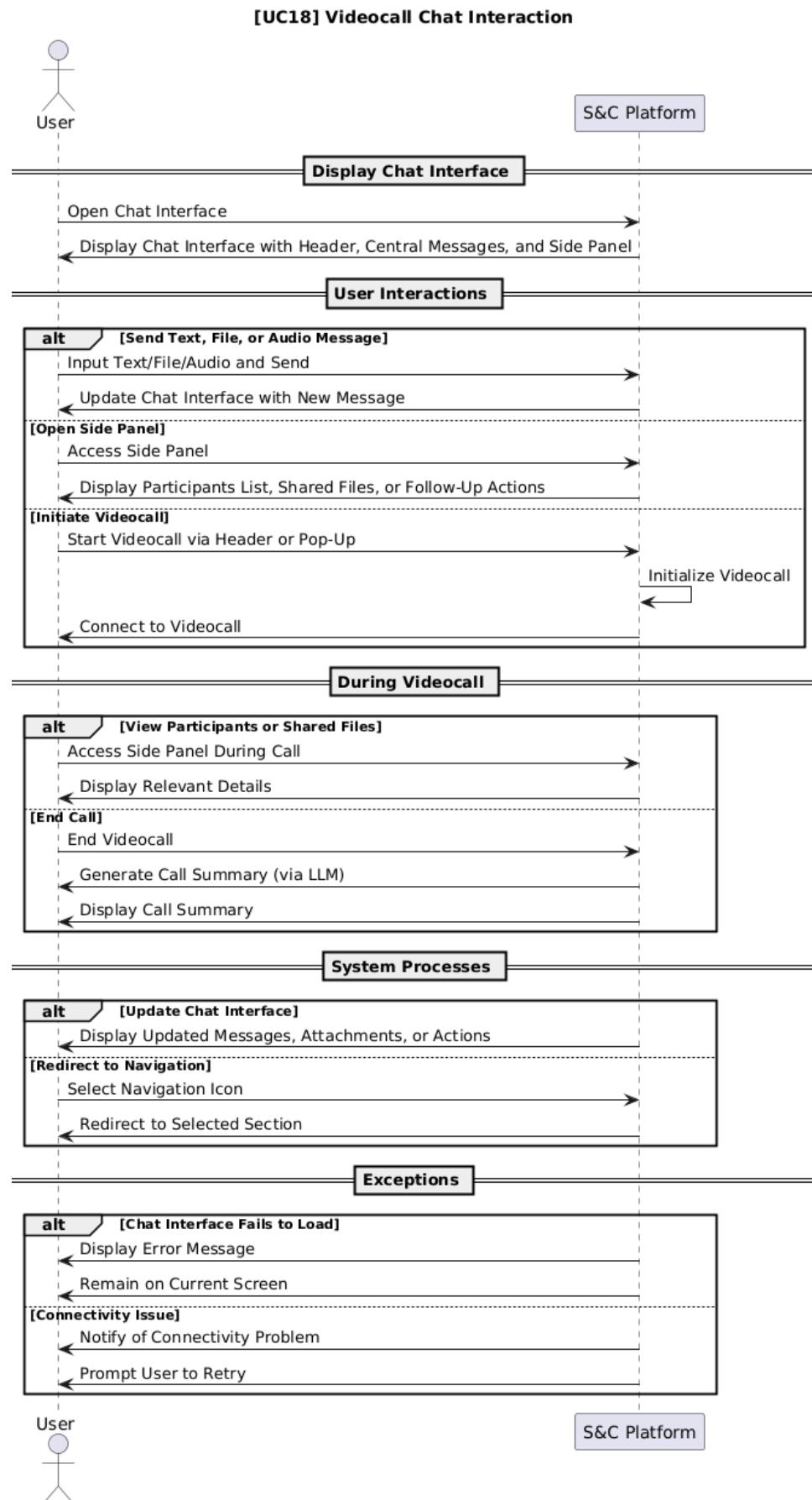


Figure 3.66: Sequence Diagram 18: Manage Issues

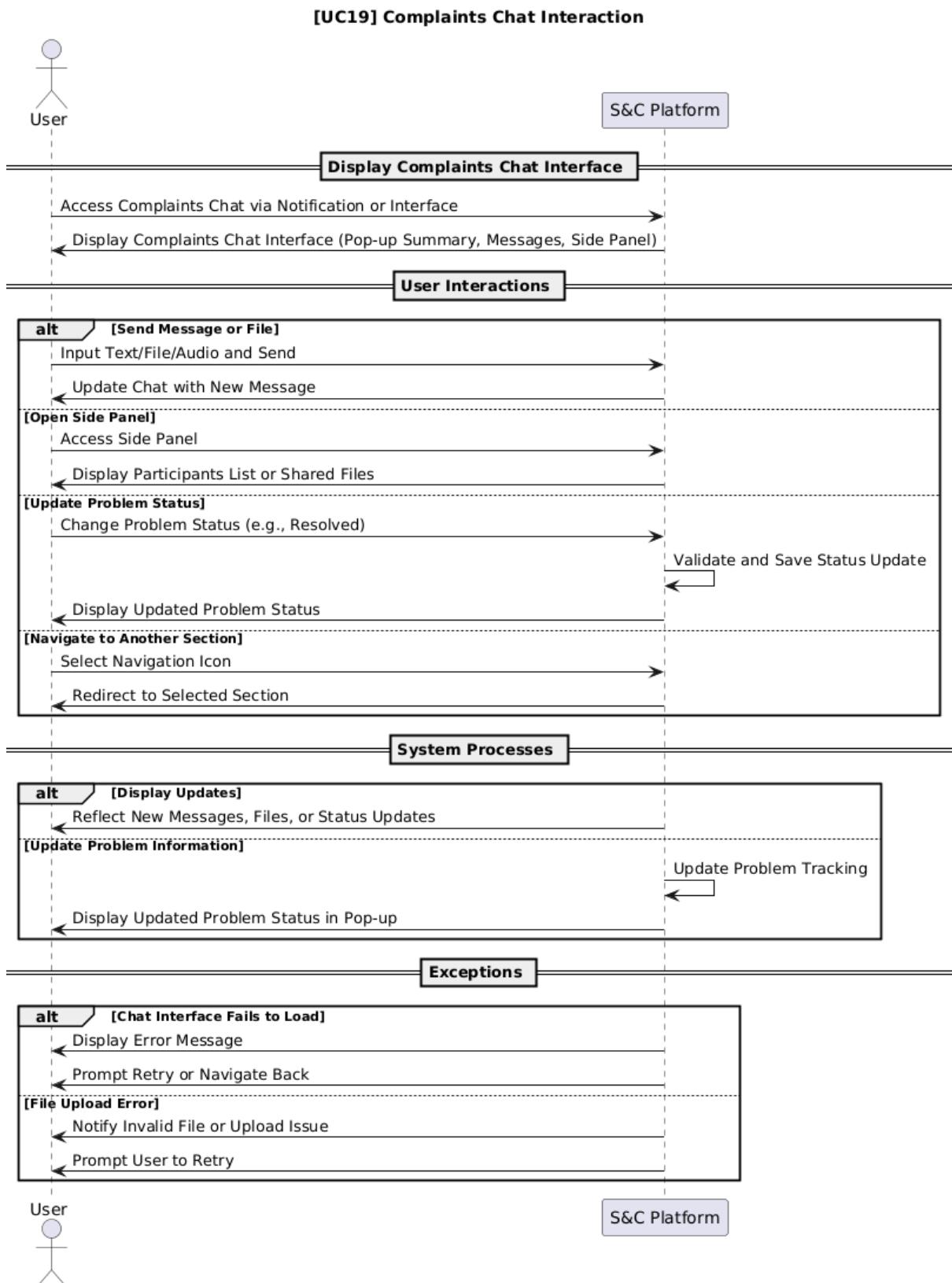


Figure 3.67: Sequence Diagram 19: Notifications Management

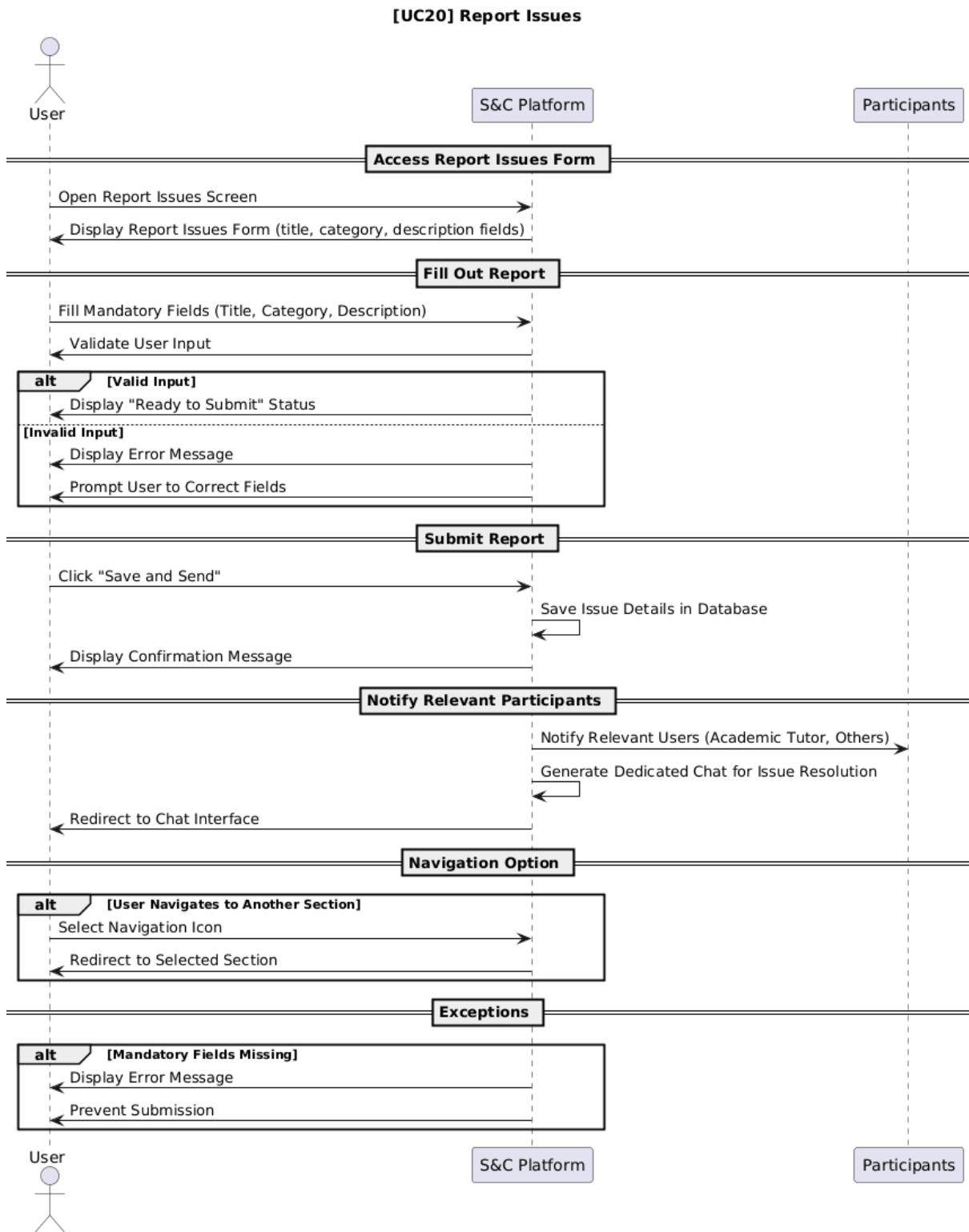


Figure 3.68: Sequence Diagram 20: Review Feedback

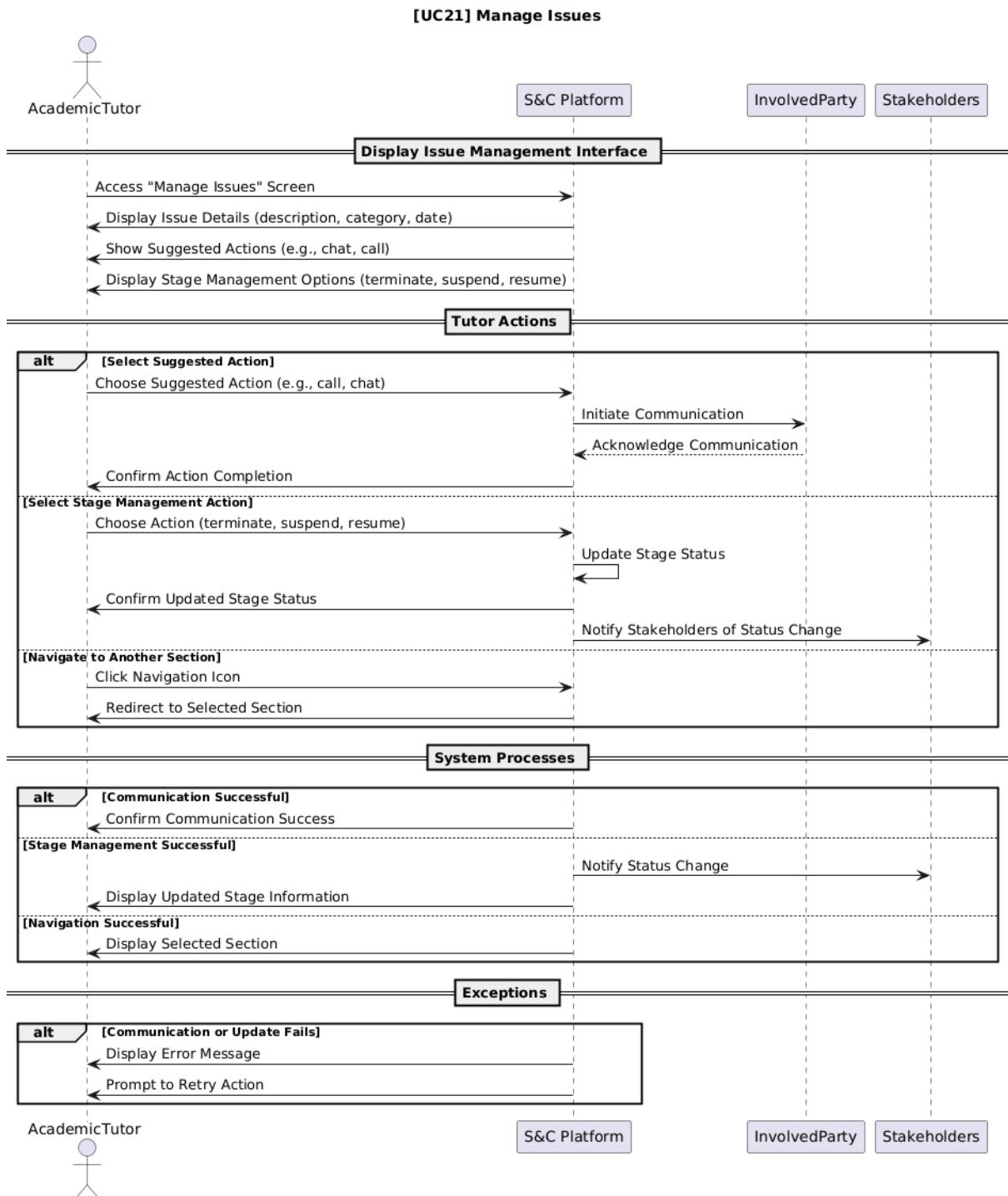


Figure 3.69: Sequence Diagram 21: Final Evaluation Submission

### [UC22] Selection Process Monitoring

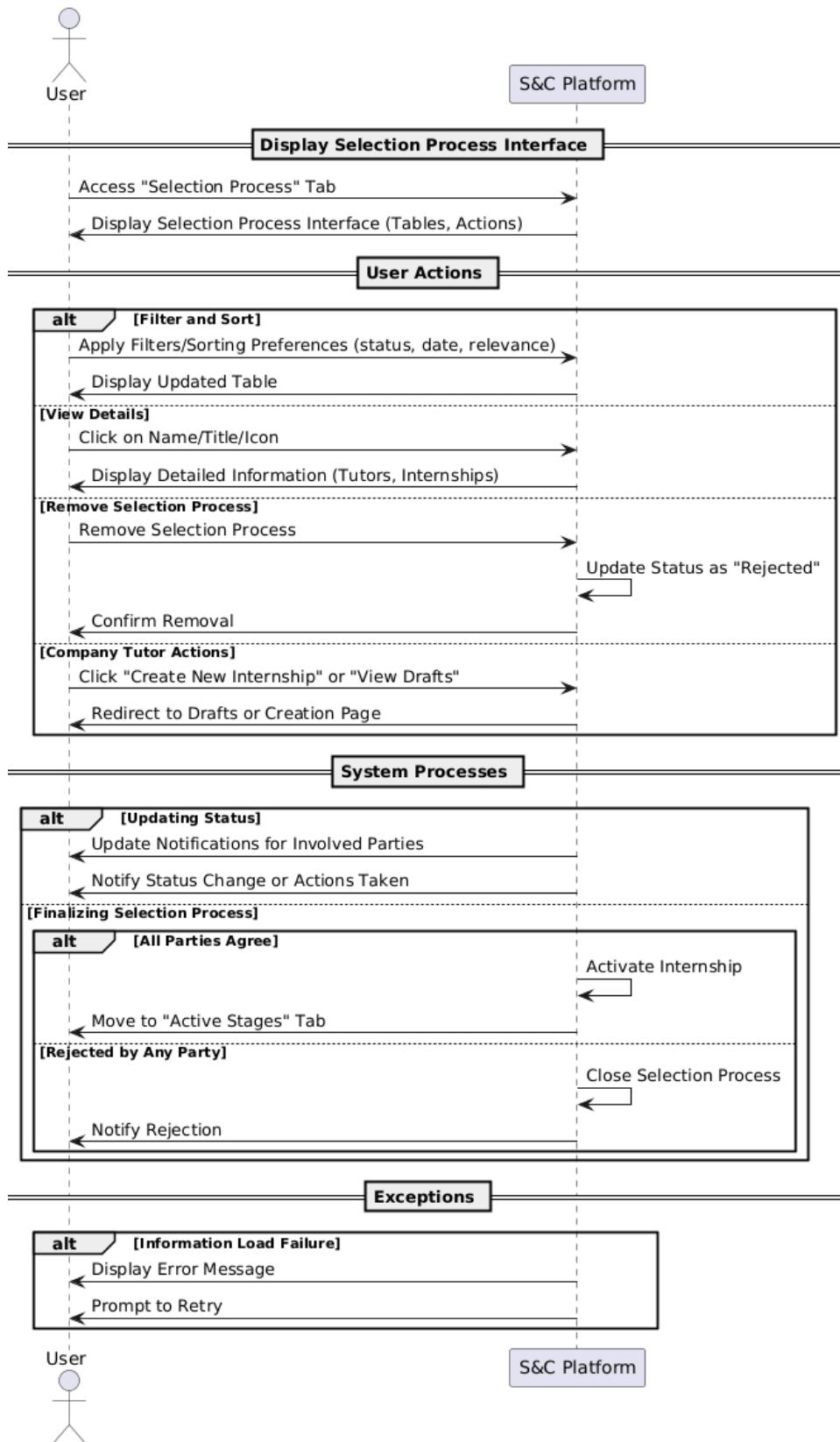


Figure 3.70: Sequence Diagram 22: Selection Process Monitoring

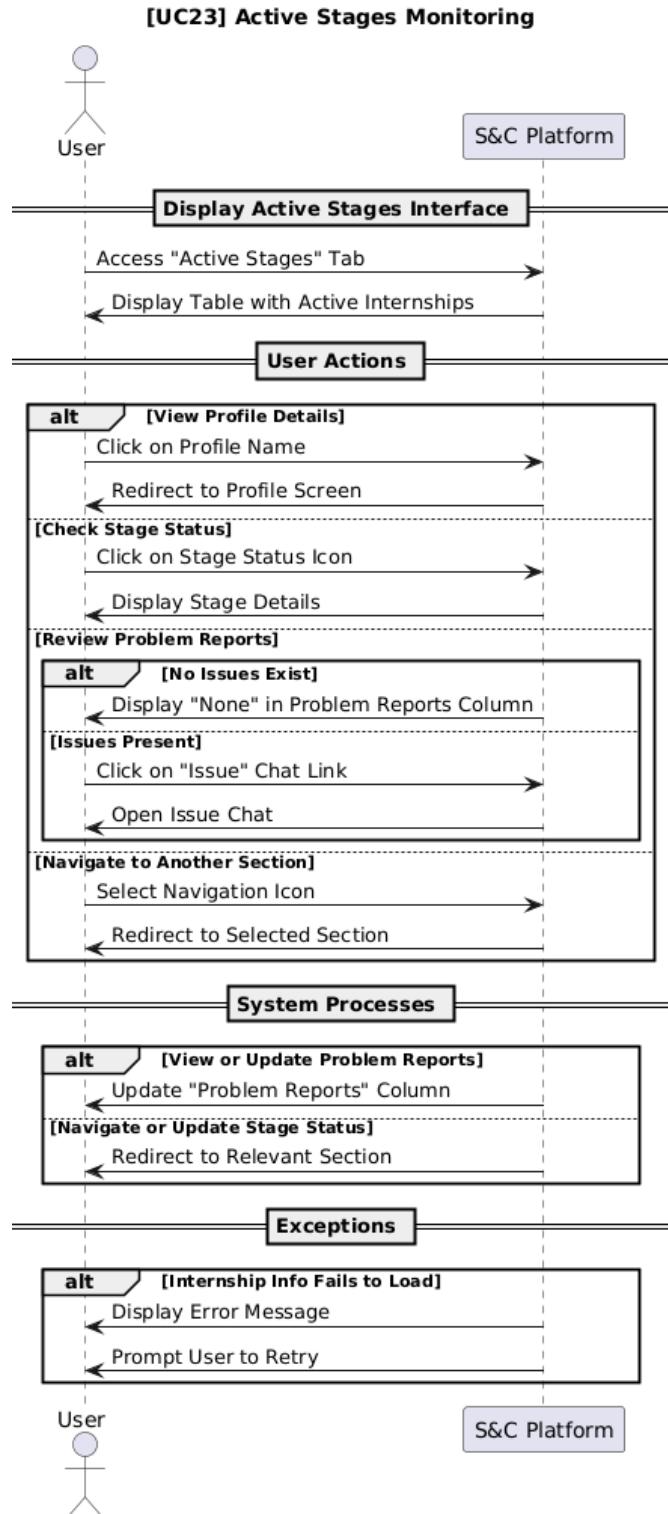


Figure 3.71: Sequence Diagram 23: Active Stages Monitoring

### [UC24] First Meeting Questionnaires Management

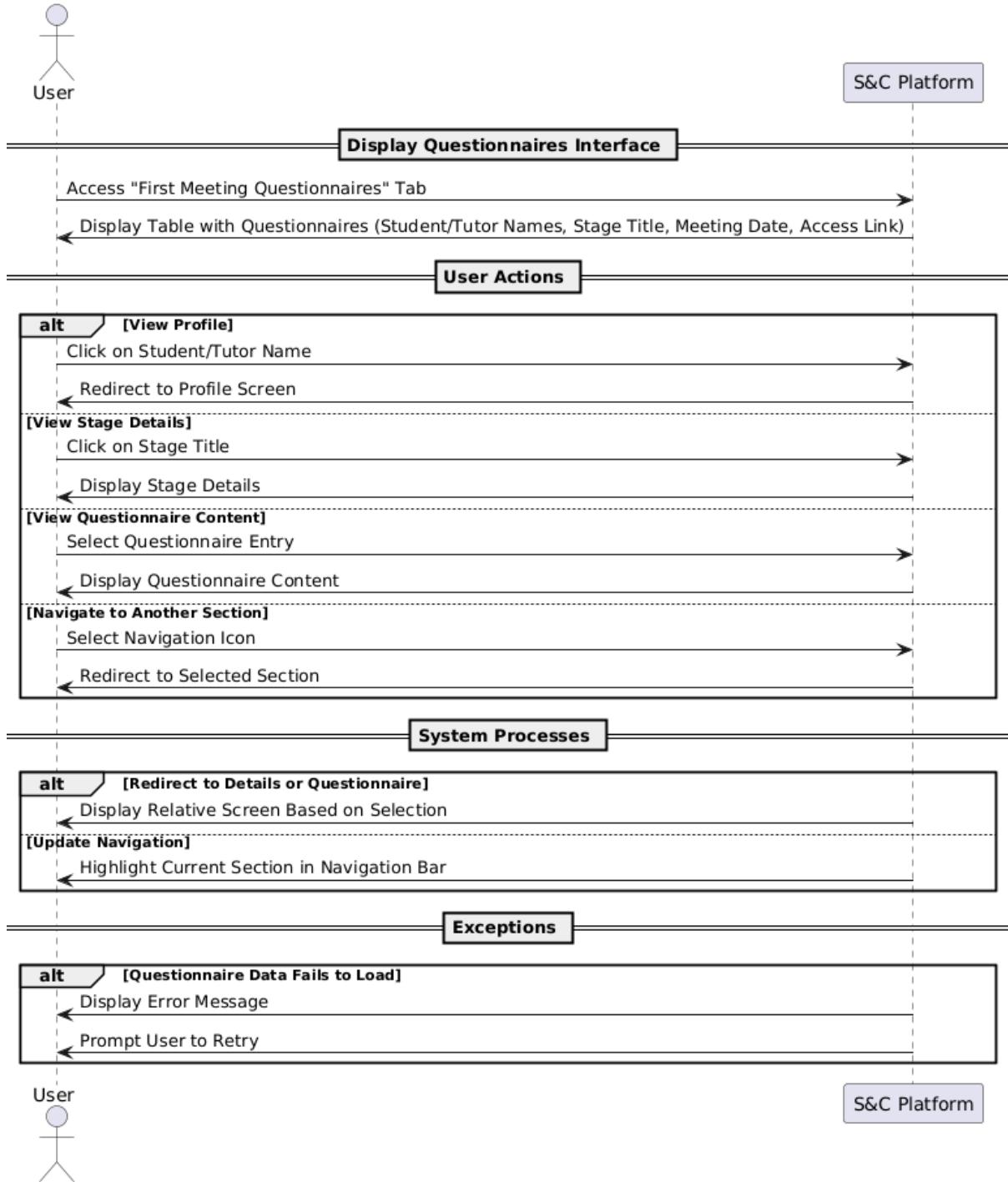


Figure 3.72: Sequence Diagram 24: First Meeting Questionnaires Management

### [UC25] Final Evaluations Management

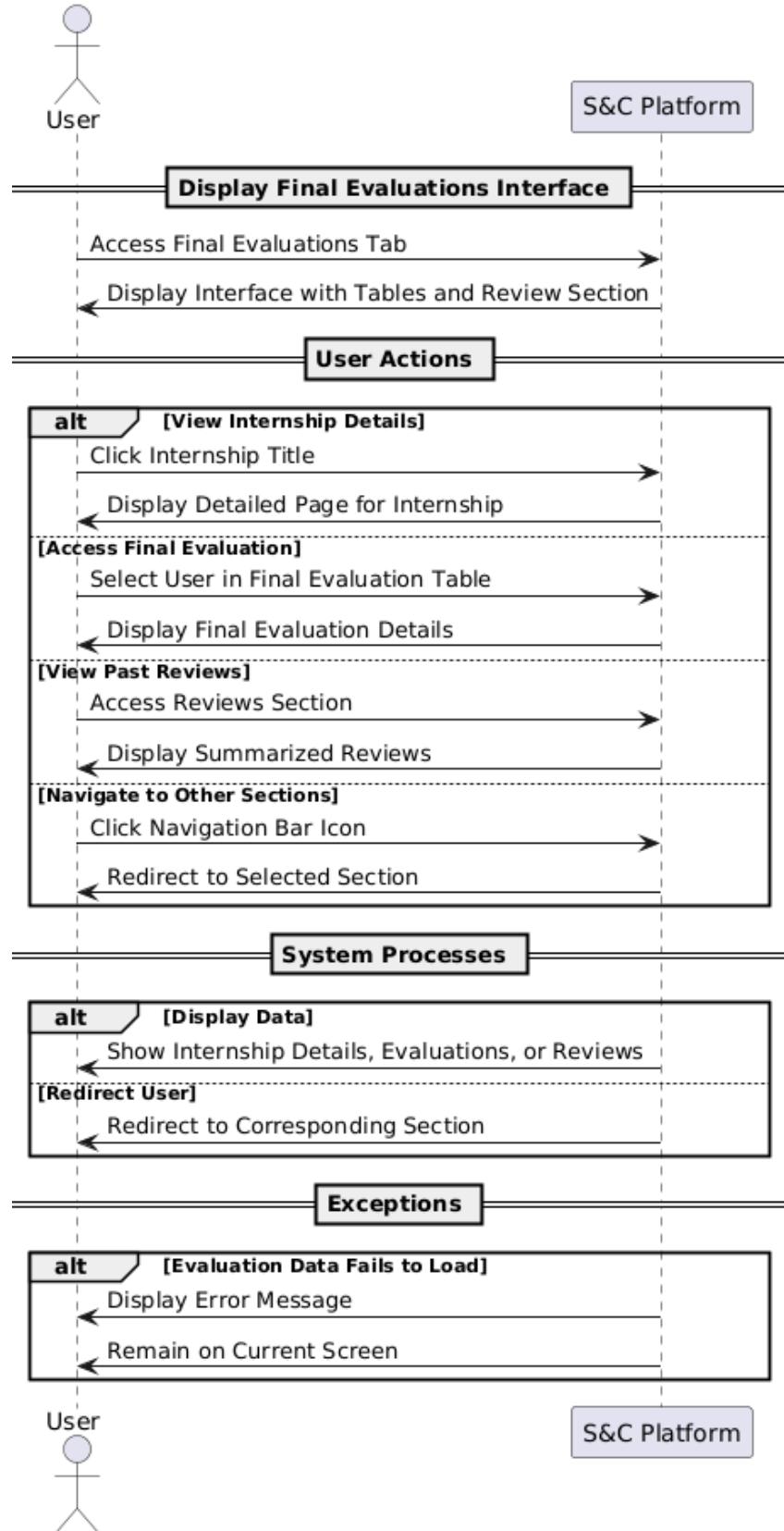


Figure 3.73: Sequence Diagram 25: Final Evaluations Management

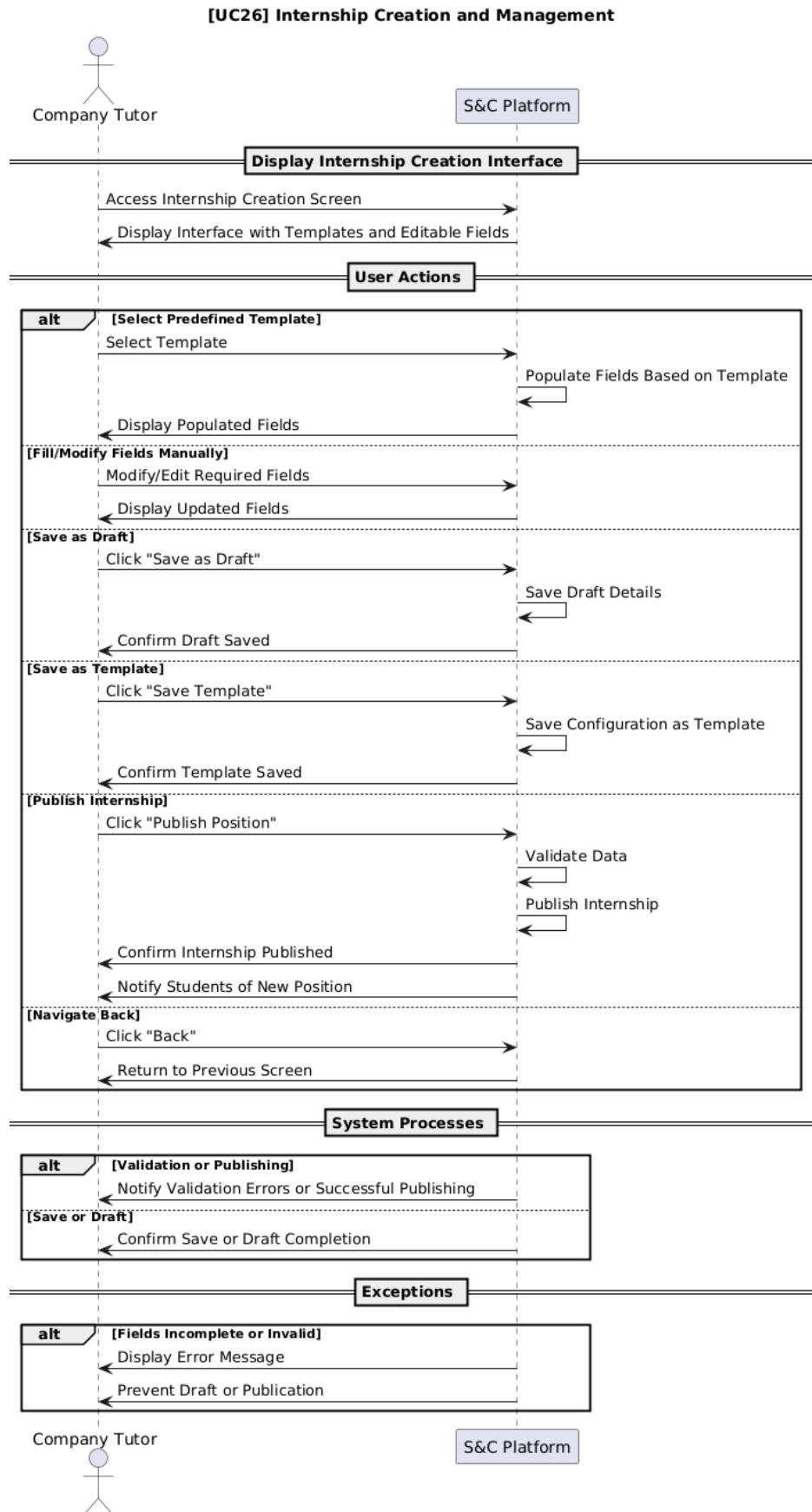


Figure 3.74: Sequence Diagram 26: Internship Creation and Management

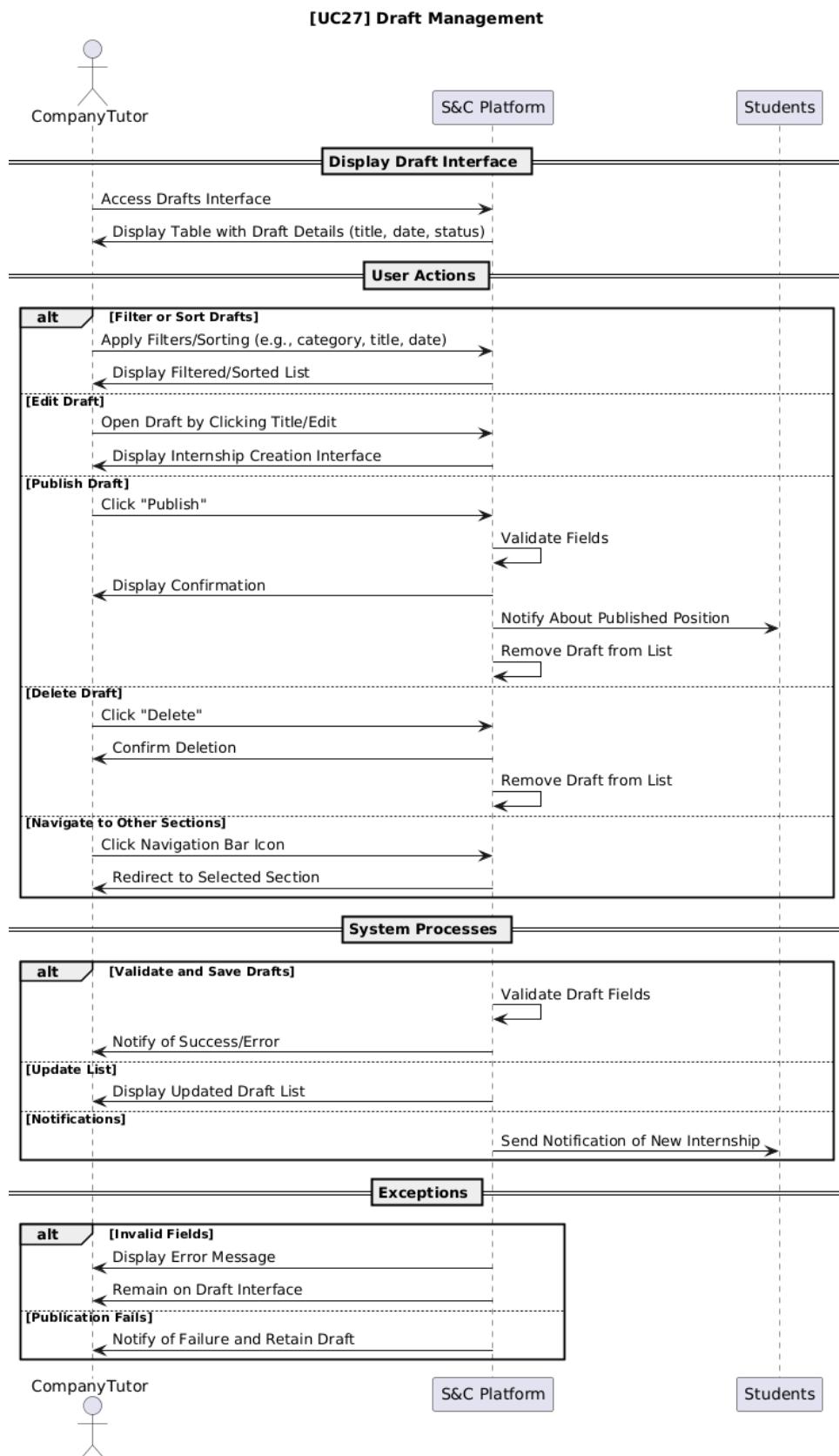


Figure 3.75: Sequence Diagram 27: Draft Management

### [UC28] First Meeting Questionnaire Completion

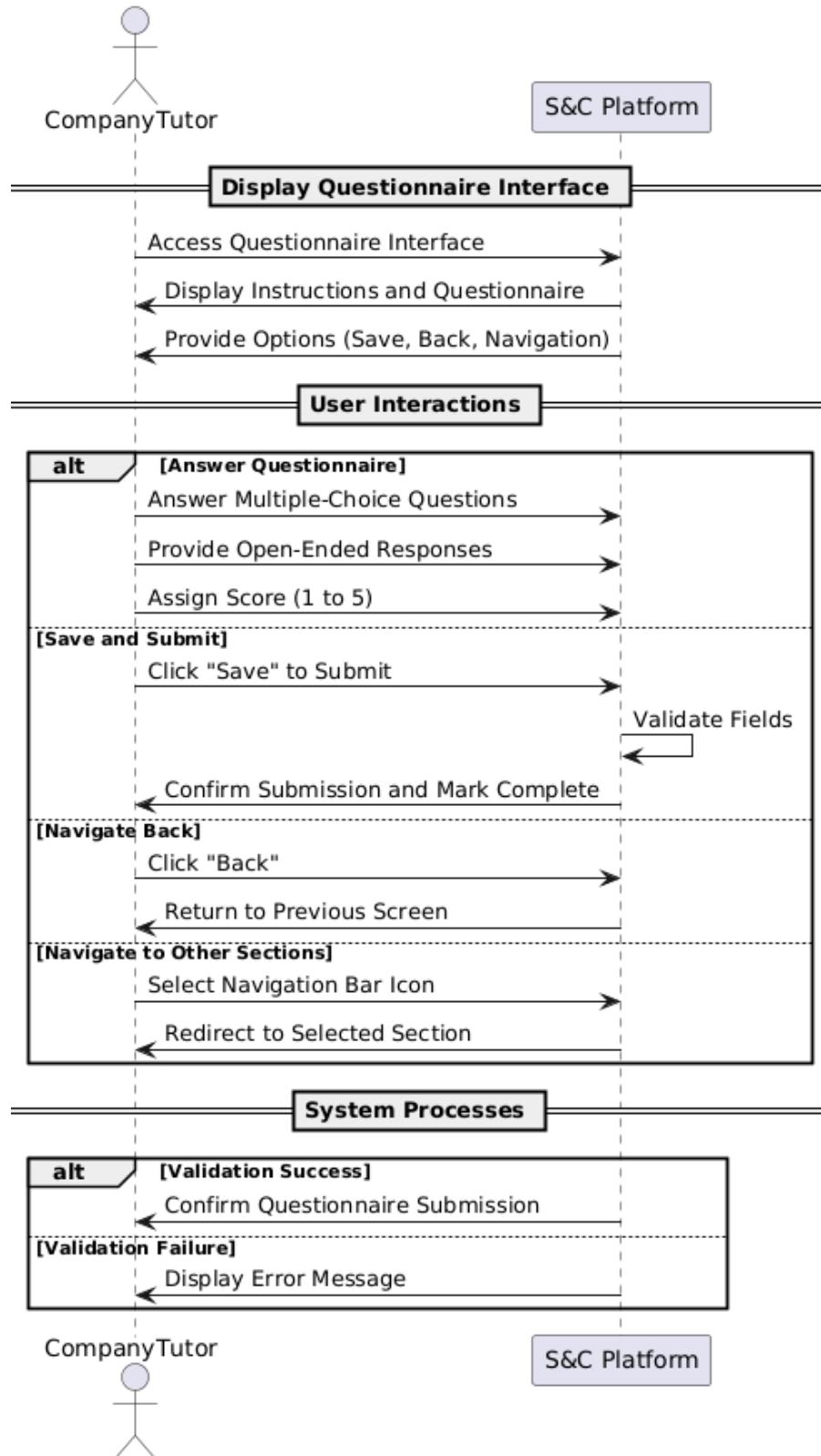


Figure 3.76: Sequence Diagram 28: First Meeting Questionnaire Completion

### [UC29] Final Evaluation Completion

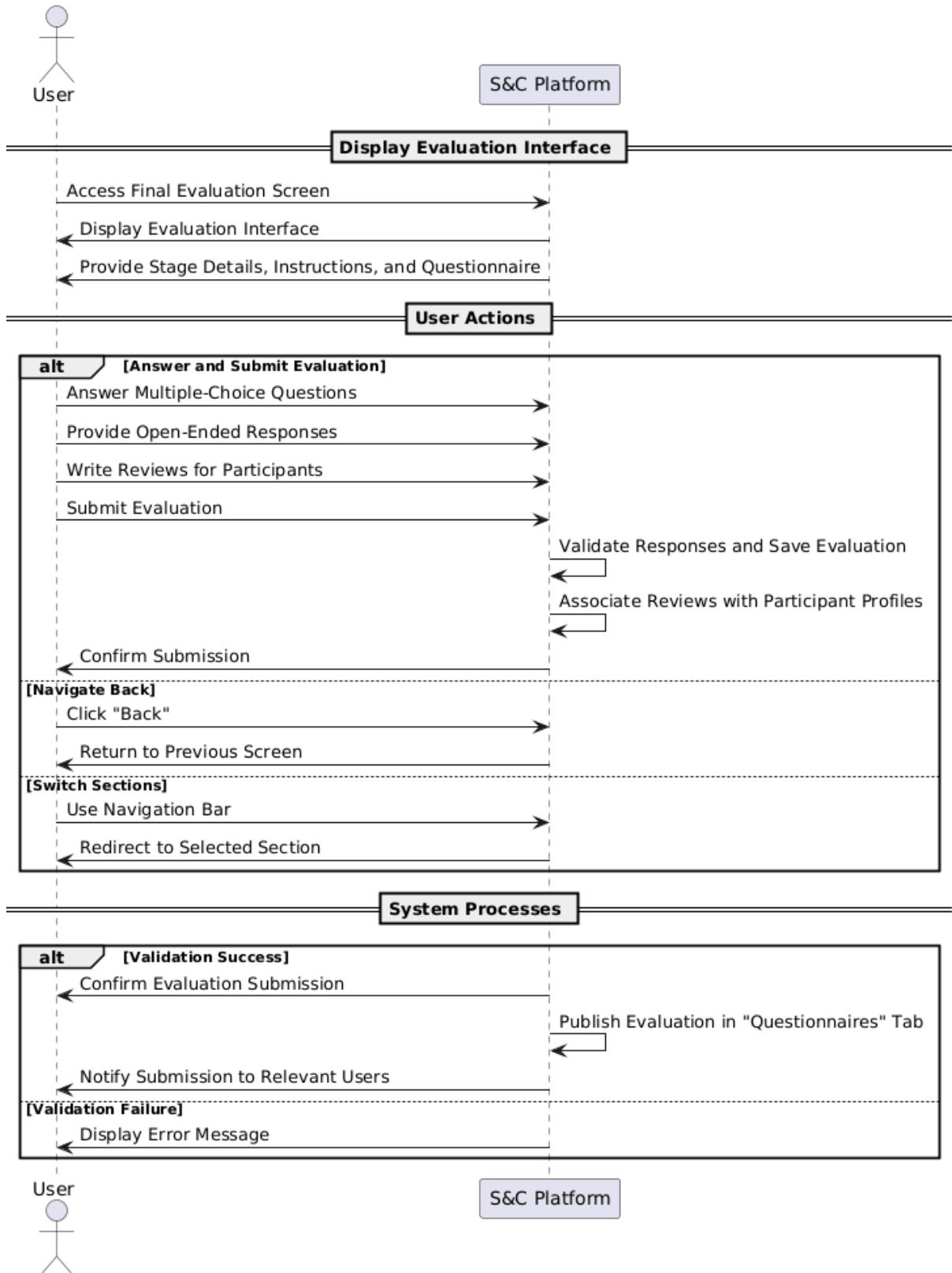


Figure 3.77: Sequence Diagram 29: Final Evaluation Completion

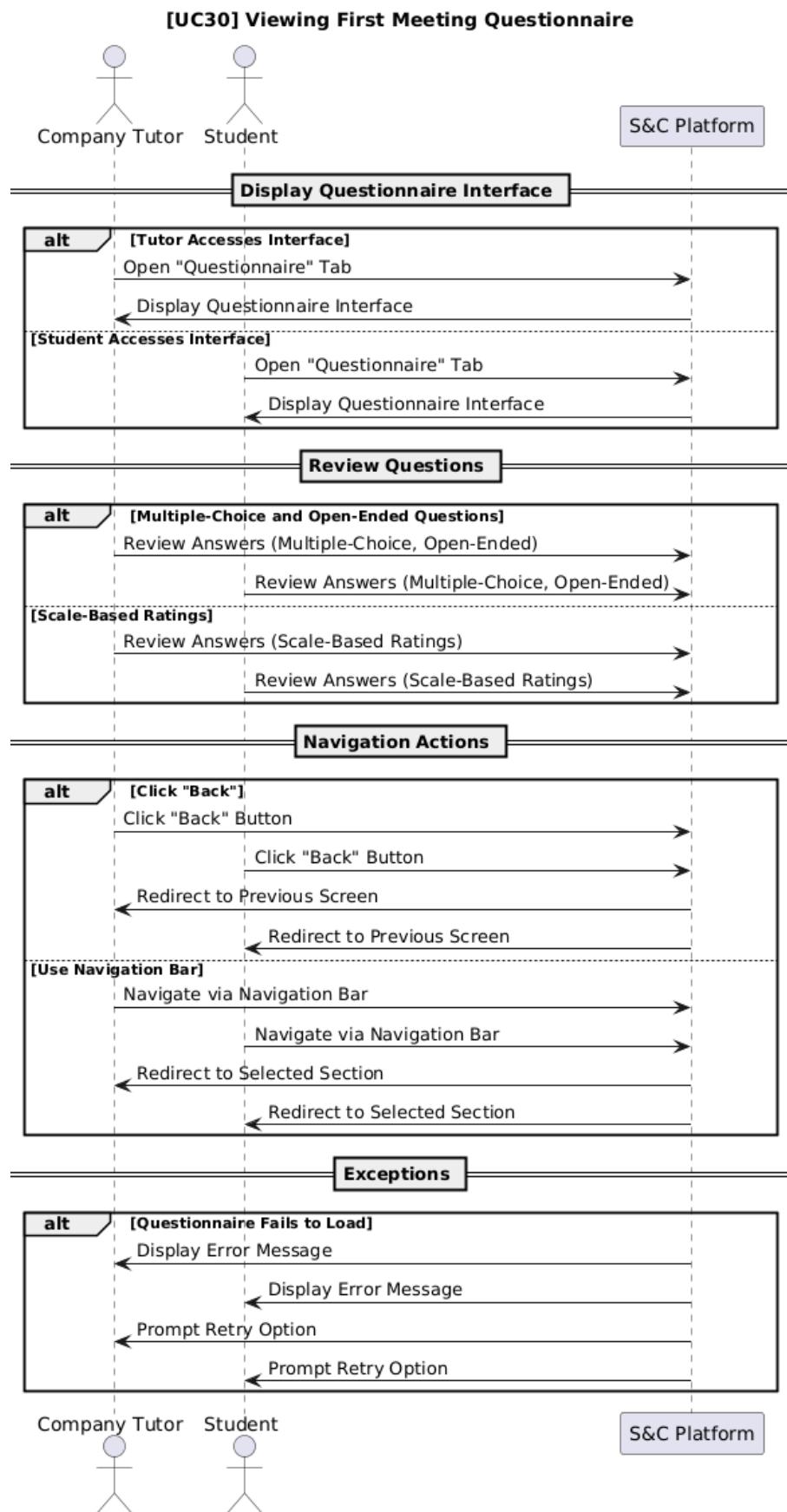


Figure 3.78: Sequence Diagram 30: Viewing First Meeting Questionnaire

### [UC31] Viewing Final Evaluation

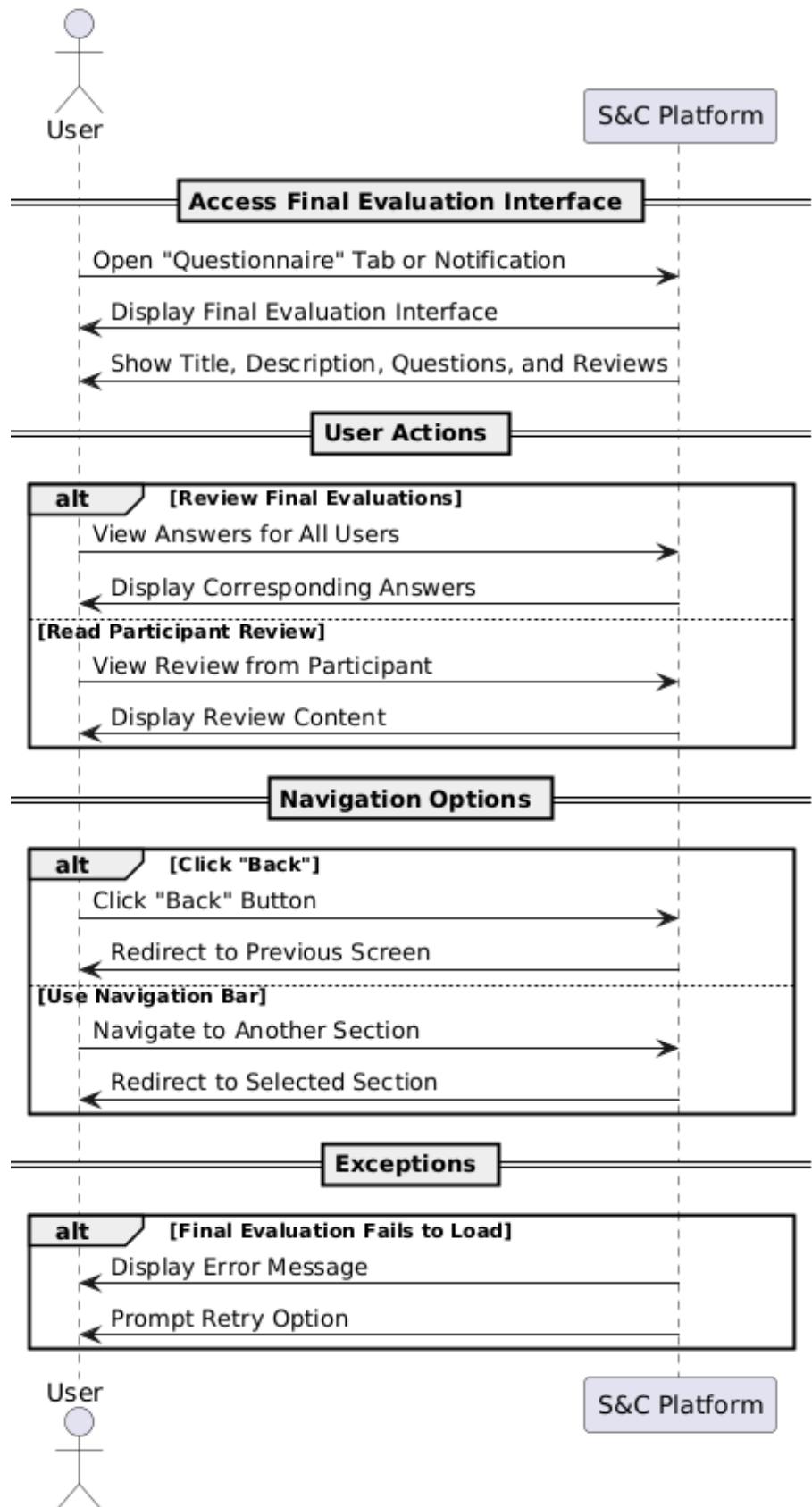


Figure 3.79: Sequence Diagram 31: Viewing Final Evaluation

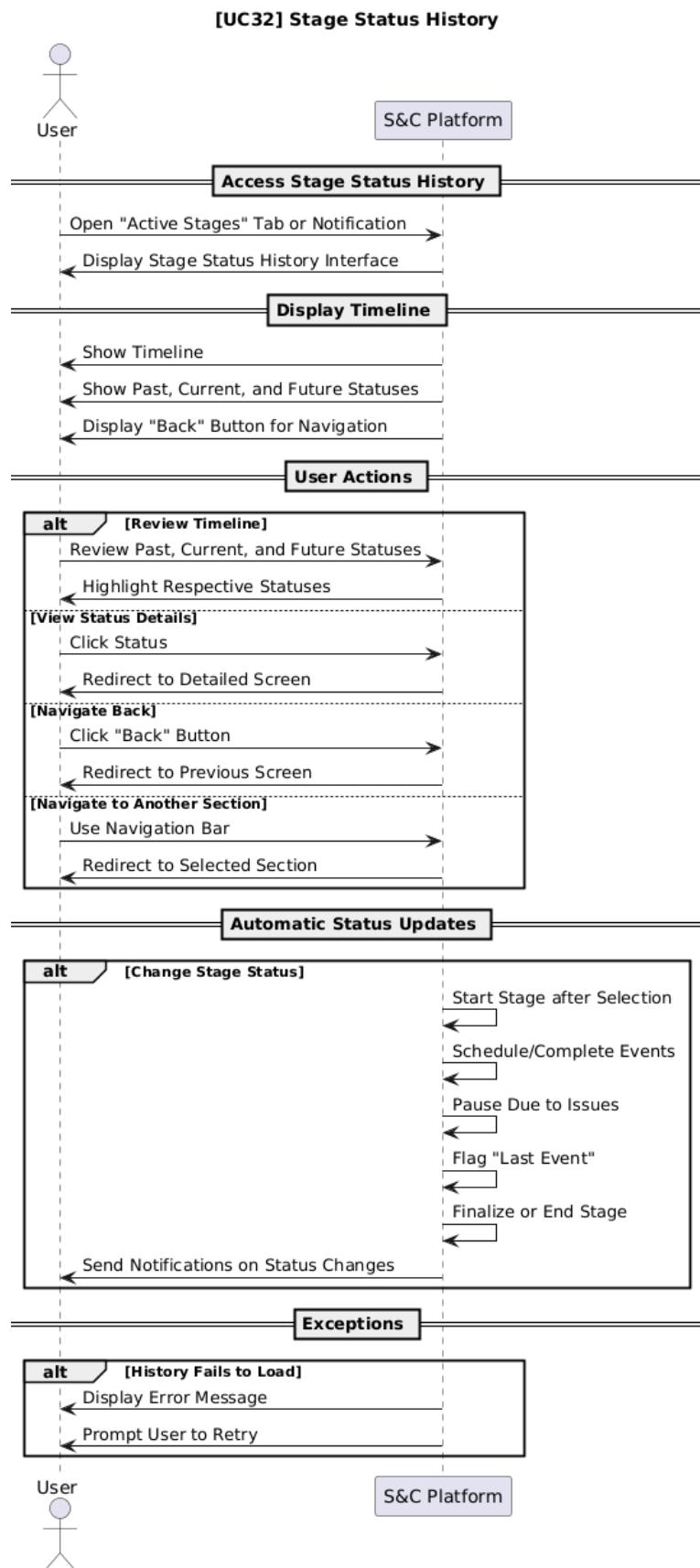


Figure 3.80: Sequence Diagram 32: Stage Status History

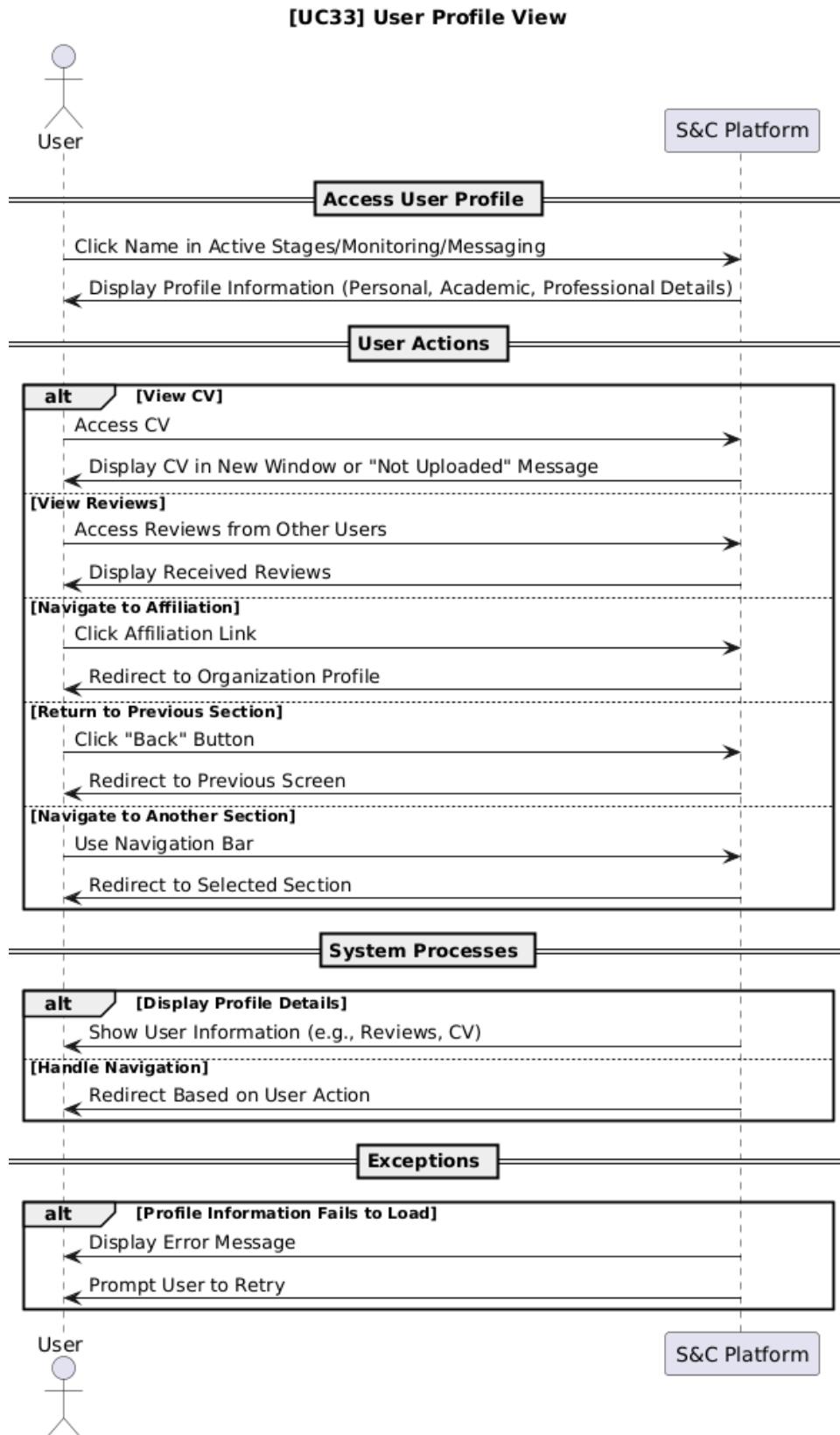


Figure 3.81: Sequence Diagram 33: User Profile View

### [UC34] Institution Profile View

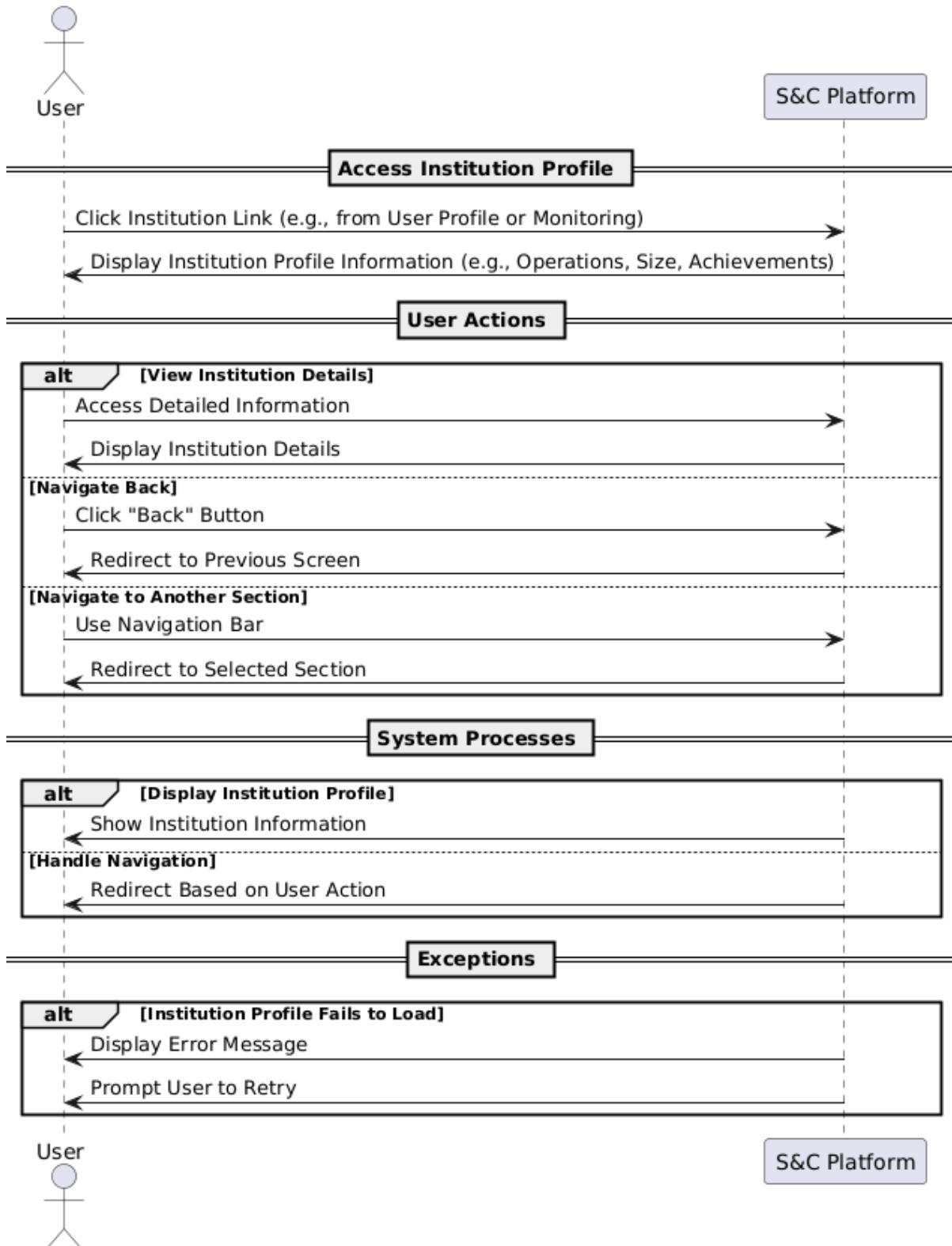


Figure 3.82: Sequence Diagram 34: Institution Profile View

### [UC35] Internship Profile View

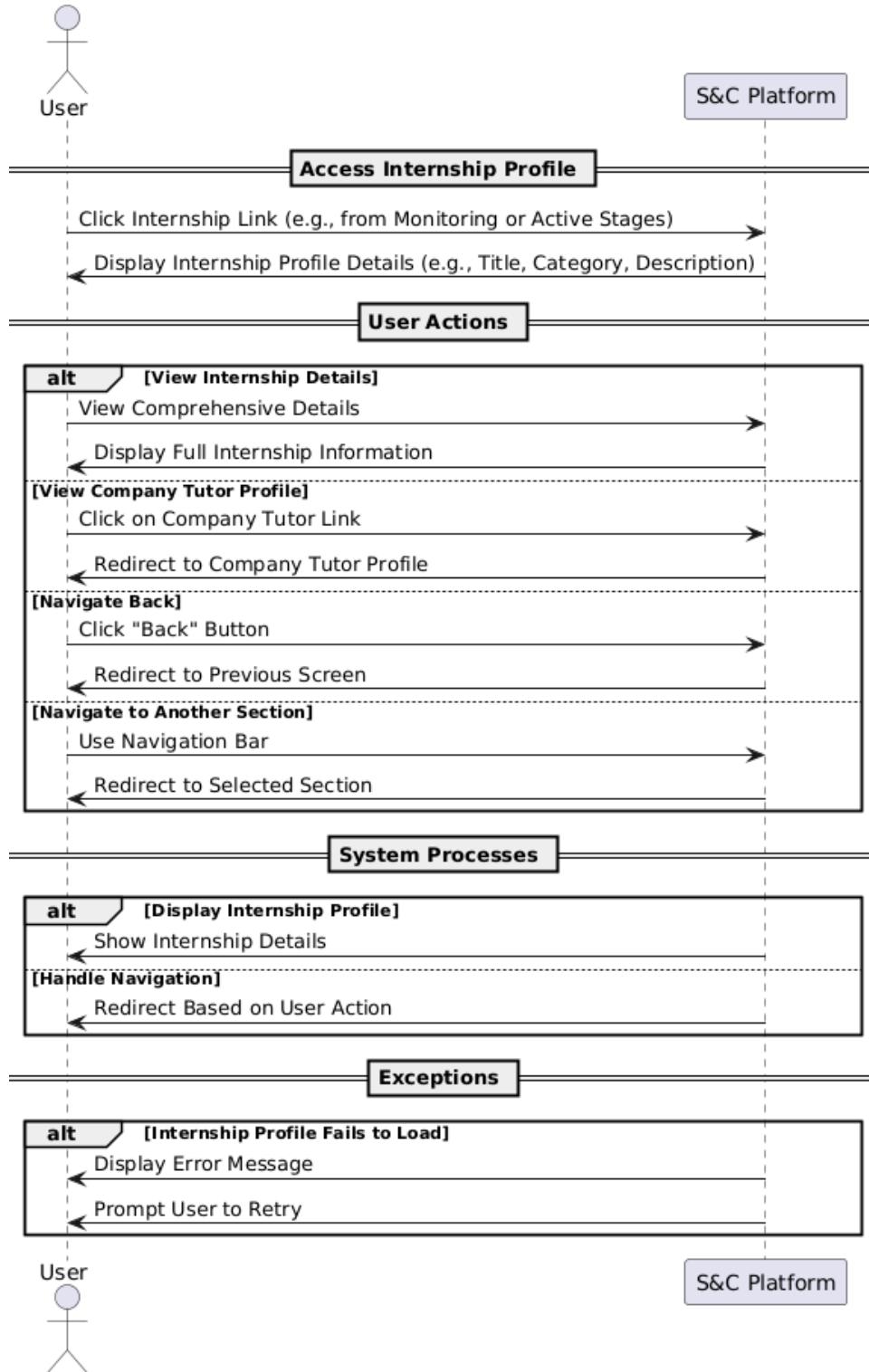


Figure 3.83: Sequence Diagram 35: Internship Profile View

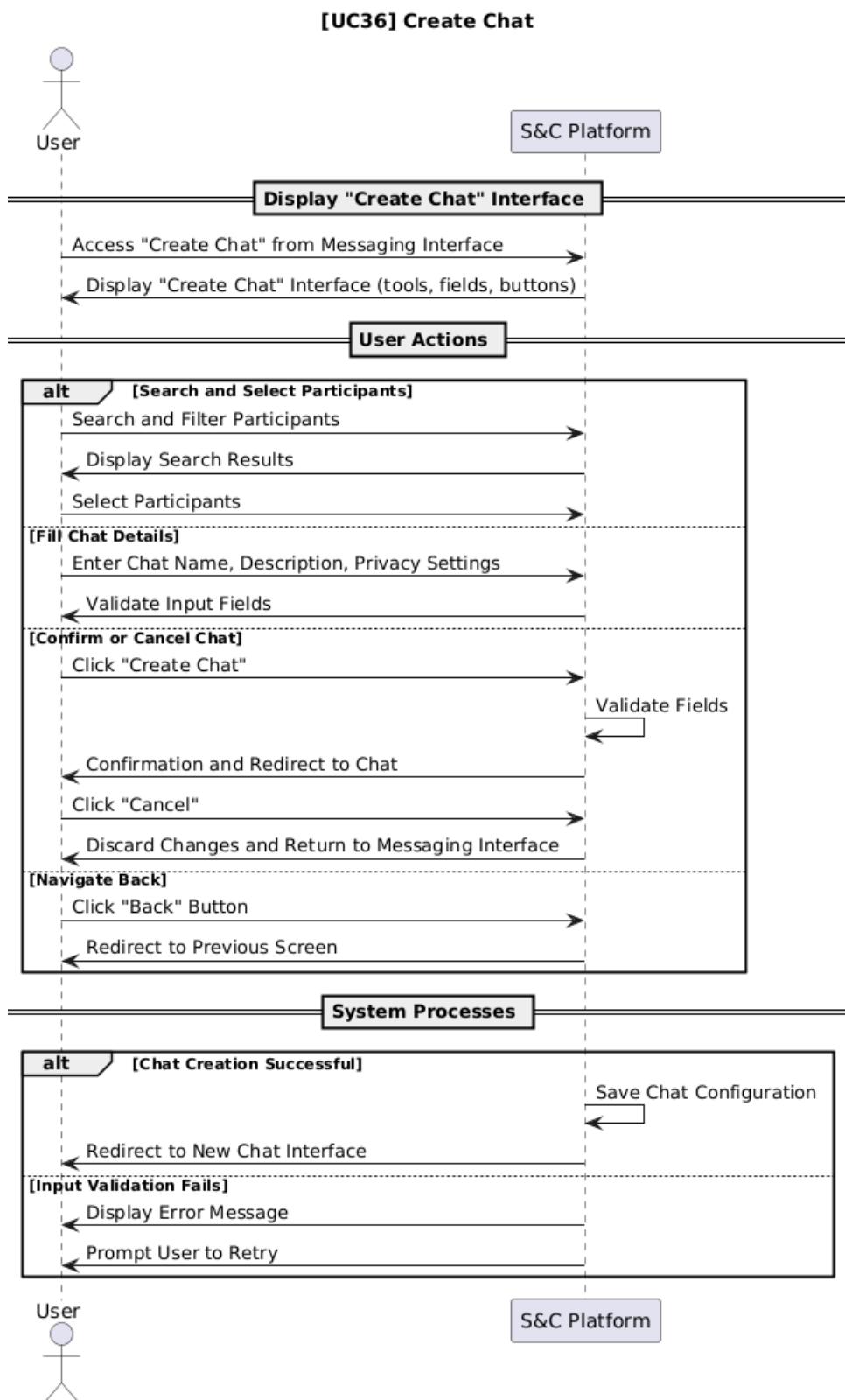


Figure 3.84: Sequence Diagram 36: Create Chat

### 3.2.4 Requirement Mapping

Requirement mapping establishes a structured relationship between the system's goals (Gx), functional requirements (FRx) and domain assumptions (Dx). This process ensures that every goal is adequately addressed through specific functional requirements while also considering the underlying domain assumptions that influence the system's operation.

By mapping goals to their corresponding functional requirements, this section verifies that the system's design and implementation align with its intended objectives. Additionally, connecting these requirements to domain assumptions highlights any contextual or environmental conditions that must be met for the system to function as expected. This systematic approach ensures traceability, clarity and completeness, providing a robust foundation for verifying and validating the system against its original specifications and real-world constraints.

Table 3.37: Requirement Mapping for G1: Students would like to find and be matched with internships that align with their skills, experiences and professional interest.

Functional Requirements (FR)	Domain Assumptions (D)
FR3: The system must extract key information from the uploaded CV (e.g., name, contact information, education, work experience) to pre-fill the user's profile.	D1: The platform assumes that all user inputs conform to the required types, formats and size limitations.
FR37: The system must provide a search interface for students to find internships using various filters such as location, field, duration and required skills.	D6: Assume that there are no massive modifications to internship policies, job criteria and academic requirements over time.
FR38: The system must offer a recommendation engine that suggests internships based on the student's profile, past searches and application history.	D4: Companies are assumed to provide genuine internship opportunities.
FR20: The system must offer a chatbot feature that provides tips and recommendations for improving student submissions and profile quality.	D2: The platform relies on the assumption that user roles reflect real-world statuses.
FR41: The system must allow students to apply for internships directly through the platform by submitting required documents and information specified by the internship posting.	D4: Companies are assumed to provide genuine internship opportunities.
FR43: The system should allow students to track the status of their applications within the platform.	D4: Companies are assumed to provide genuine internship opportunities.

Table 3.38: Requirement Mapping for G2: Companies would like to reach and attract students who have the right profile and are interested in their internship offering.

<b>Functional Requirements (FR)</b>	<b>Domain Assumptions (D)</b>
FR44: The system must enable companies to search for potential candidates using criteria such as academic performance, skills and previous internship experiences.	D3: All companies registered on the platform are legitimate entities operating within the bounds of local laws.
FR45: The system should provide companies with tools to organize and manage the list of candidates based on their search parameters.	D8: Every user has their own credentials.
FR46: The system must allow companies to view detailed profiles of students, including their application history and feedback from previous internships.	D2: The platform relies on the assumption that user roles reflect real-world statuses.
FR27: The system must allow company tutors to create new internship listings via a dedicated interface within the platform.	D4: Companies are assumed to provide genuine internship opportunities.
FR28: The system must require that all necessary fields, such as internship title, description, required qualifications, duration, compensation and application deadline, be completed before an internship can be published.	D1: The platform assumes that all user inputs conform to the required types, formats and size limitations.
FR31: The system must allow company tutors to preview the internship listing as it will appear to potential applicants before finalizing the publication.	D3: All companies registered on the platform are legitimate entities operating within the bounds of local laws.

Table 3.39: Requirement Mapping for G3: Companies would like to advertise their internship opportunities.

<b>Functional Requirements (FR)</b>	<b>Domain Assumptions (D)</b>
FR27: The system must allow company tutors to create new internship listings via a dedicated interface within the platform.	D4: Companies are assumed to provide genuine internship opportunities.
FR28: The system must require that all necessary fields, such as internship title, description, required qualifications, duration, compensation and application deadline, be completed before an internship can be published.	D1: The platform assumes that all user inputs conform to the required types, formats and size limitations.
FR32: The system must allow company tutors to save their internship listings as drafts before final publication.	D7: A user belongs to one category at a time (e.g., a student cannot also be a professor or a company tutor).

**Table 3.40:** Requirement Mapping for G4: Students would like to proactively search for and apply to internships that fit their interest and skills.

Functional Requirements (FR)	Domain Assumptions (D)
FR37: The system must provide a search interface for students to find internships using various filters such as location, field, duration and required skills.	D1: The platform assumes that all user inputs conform to the required types, formats and size limitations.
FR40: The system must update the list of available internships in real-time as new opportunities are posted by companies.	D6: Assume that there are no massive modifications to internship policies, job criteria and academic requirements over time.
FR41: The system must allow students to apply for internships directly through the platform by submitting required documents and information specified by the internship posting.	D2: The platform assumes that users accurately represent their real-world roles.
FR43: The system should allow students to track the status of their applications within the platform.	D8: Every user has unique credentials to access the platform.

**Table 3.41:** Requirement Mapping for G5: Students would like to receive personalized internship recommendations based on their CVs and profiles.

Functional Requirements (FR)	Domain Assumptions (D)
FR3: The system must extract key information from the uploaded CV (e.g., name, contact information, education, work experience) to pre-fill the user's profile.	D1: The platform assumes that all user inputs conform to the required types, formats and size limitations.
FR38: The system must offer a recommendation engine that suggests internships based on the student's profile, past searches and application history.	D4: Companies are assumed to provide genuine internship opportunities.
FR20: The system must offer a chatbot feature that provides tips and recommendations for improving student submissions and profile quality.	D2: The platform assumes that users accurately represent their real-world roles.

**Table 3.42:** Requirement Mapping for G6: Students, companies and universities would like to have a clear communication to ensure a collaborative environment.

<b>Functional Requirements (FR)</b>	<b>Domain Assumptions (D)</b>
FR51: The system must provide a communication platform supporting messaging, forums and email notifications.	D3: All registered companies and universities are legitimate.
FR52: The system should ensure secure and private communication channels.	D3: All registered companies and universities are legitimate.
FR65: The system must provide a feature for students and company tutors to report issues related to internships directly through the platform	D2: Users accurately represent their real-world roles.
FR66: The system should allow users to categorize the type of issue and provide a detailed description.	D7: A user belongs to one category at a time.
FR67: The system must enable tutors to access reported issues and resolve them.	D2: Users accurately represent their real-world roles.
FR68: The system should facilitate communication between the reporter and resolver to clarify issues.	D7: A user belongs to one category at a time.
FR57: The system must allow scheduling of internship-related events like interviews.	D3: All registered companies and universities are legitimate.

**Table 3.43:** Requirement Mapping for G7: Companies would like to manage their selection process efficiently and tracking the status of applications and selections.

<b>Functional Requirements (FR)</b>	<b>Domain Assumptions (D)</b>
FR45: The system should provide companies with tools to organize and manage the list of candidates based on their search parameters.	D4: Companies are assumed to provide genuine internship opportunities.
FR46: The system must allow companies to view detailed profiles of students, including their application history and feedback from previous internships.	D4: Companies are assumed to provide genuine internship opportunities.
FR47: The system must allow companies to accept or reject applications from students for internships and notify students of the decision through the platform.	D4: Companies are assumed to provide genuine internship opportunities.

Table 3.44: Requirement Mapping for G8: Universities would like to monitor their students' internships and to address complains or issues that might arise.

<b>Functional Requirements (FR)</b>	<b>Domain Assumptions (D)</b>
FR63: The system must provide real-time monitoring capabilities for all active internships, allowing users (students, company tutors, university tutors) to view current status, upcoming deadlines and progress updates.	D5: Universities are assumed to offer academic support and oversight for students during their internships.
FR64: The system must allow users to receive alerts and updates about any changes or milestones reached in the internships they are involved in.	D3: All companies and universities registered on the platform are legitimate entities operating within the bounds of local laws.
FR66: The system should allow users to categorize the type of issue (e.g., administrative, ethical, logistical) and provide a detailed description.	D11 The platform assumes that feedback provided by users (students, company tutors and university tutors) is honest and accurate.
FR67: The system must enable university tutors to access reported issues, review details and work on resolving them.	D5: Universities are assumed to offer academic support and oversight for students during their internships.
FR68: The system should provide mechanisms for communication between the reporter (student or tutor) and the resolver (university tutor) to discuss and clarify the issue.	D5: Universities are assumed to offer academic support and oversight for students during their internships.
FR69: The system must log all actions taken in the issue resolution process and notify the reporting party upon resolution.	D5: Universities are assumed to offer academic support and oversight for students during their internships.

**Table 3.45:** Requirement Mapping for G9: All stakeholders (students, companies and universities) would like the platform to gather statistical data to improve recommendations and platform features.

Functional Requirements (FR)	Domain Assumptions (D)
FR38: The system must offer a recommendation engine that suggests internships based on the student's profile, past searches and application history.	D6: The platform assumes that internship policies, job criteria and academic requirements remain stable over time without significant modifications.
FR60: The system must enable company tutors to compile and customize a questionnaire for initial candidate screening during the internship application process.	D4: Companies are assumed to provide genuine internship opportunities.
FR61: The system should automate the distribution of the questionnaire to applicants as soon as they apply or are shortlisted.	D6: Assume that there are no massive modifications to internship policies, job criteria and academic requirements over time.
FR70: The system must allow for the compilation of a final questionnaire to be completed by students, company tutors and university tutors at the end of each internship.	D11: The platform assumes that feedback provided by users (students, company tutors and university tutors) is honest and accurate.

Table 3.46: Requirement Mapping for G10: All stakeholders (students, companies and universities) would like their personal data on the platform to be securely stored and treated with confidentiality.

<b>Functional Requirements (FR)</b>	<b>Domain Assumptions (D)</b>
FR8: The system must allow users to log in by entering their registered email address and password.	D8: Every user has unique credentials to access the platform.
FR9: The system must authenticate the user's credentials against the stored data securely.	D8: Every user has unique credentials to access the platform.
FR12: The system must log all login attempts, successful or failed and provide an administrative view for monitoring purposes.	D8: Every user has unique credentials to access the platform.
FR15: The system must allow all registered users to access and edit their profile information.	D1: The platform assumes that all user inputs conform to the required types, formats and size limitations.
FR16: The system must ensure that users can update critical profile fields such as contact information, professional biography, department and role and certifications.	D8: Every user has unique credentials to access the platform.
FR18: The system must require users to re-authenticate (e.g., password confirmation) before allowing access to edit sensitive information such as email and password.	D8: Every user has unique credentials to access the platform.
FR52: The system should ensure secure and private communication channels for all users.	D2: The platform assumes that users accurately represent their real-world roles.

### 3.3. Performance Requirements

Performance is an important factor for any platform. Student&Companies is no different. In order for S&C to stand out from other possible competing platforms and to create a positive user experience, it is fundamental to have a high standard to increase the number of users and keep them loyal to the platform. Delays or slow interactions are correlated with frustration and a poor user experience. Therefore, it is important to have a responsible and reliable platform where both students, companies and professors can have a positive interaction and thus create a robust and active community.

A fast response time is crucial to improve the user experience: it ensures that a student can efficiently search and apply for an internship or get a timely recommendation for an internship. At the same time, a company can quickly communicate with students and review applications without wasting time waiting for a response from the platform.

Since there are different types of interactions a user can have with the S&C platform, it is useful to categorize them based on their complexity.

For basic interactions such as loading the screen, uploading a resume, navigating through different sections, it would be important to have a target response time of at most one second per request. This is because for actions that seem obvious, the user might expects a very fast response time and if there is a delay, the user may be discouraged from continuing to use the platform.

Instead, for more complex interactions, such as searching for an internship with keywords or receiving personalized generated recommendations, the target response time should be at most three seconds per request. These interactions are more complex and the user may have to wait a little longer than expected because they require more data-intensive operations to complete.

It is also important to remember that the users of the S&C platform may be distributed in different regions, so it is essential to take into account geographical latency to maintain a positive user experience regardless of where the user is located. The servers of the platform should be located in key geographical areas where the traffic can be more intense (close to the main cities and the largest universities).

A problematic period would obviously be when there is a high traffic to the website. An example could be when a company launches a large recruitment campaign or when a university collaborates with companies to promote internships, leading to many students accessing the platform simultaneously. To mitigate the risk of slowing down the response rate of the platform, it would be highly advisable to distribute the traffic across multiple servers, thus preventing a single server from being overwhelmed. In addition, it would be advisable to cache frequently accessed data by using in-memory caching systems.

Scalability is an important performance requirement that should be implemented by S&C. There should be the ability to add more servers to handle increased load without significant downtime and to ensure that the system can scale resources (CPU, memory) on existing servers as needed.

Lastly, to keep the platform in good health, it is important to continually monitor the

platform and to do some performance testing. It is important to track key performance indicators such as response time, CPU usage, memory usage and error rates to assess the health of the system. It is also important to regularly test the performance of the platform under heavy load or traffic to identify and address bottlenecks. By simulating real-world scenarios, you can anticipate potential problems and improve the user experience.

## 3.4. Design Constraints

### 3.4.1. Standards Compliance

The S&C platform manages sensitive user information—such as personal data, academic affiliations and internship details.

Since the platform may be used by users within the European Union and European Economic Area, S&C must comply with GDPR standards. This entails implementing appropriate data processing, consent management and data retention policies.

### 3.4.2. Hardware Limitations

Since a user may access the platform by using a pc, laptop, table or smartphone, the platform should be optimized for devices with varying processing capabilities.

A fast (>2MB/s) and stable internet connection is necessary to ensure that the platform is responsive. The system should handle occasional network latency by providing loading indicators and some information to the user.

No highly specialized hardware is required to access the platform. The device should have at least 4 GB of RAM, standard CPU performance for web browsing, sufficient storage for caching, a process such as i5 or i7 and a display with high resolution (at least HD).

### 3.4.3. Any Other Constraint

The platform must be intuitive and easy to navigate for possibly all users. Use color-coding techniques when needed and clear instructions.

The platform must also deal with scalability, since the amount of data can increase. The design of the platform must allow horizontal and vertical scaling as well as efficient database queries.

## 3.5. Software System Attributes

This section outlines the essential software quality attributes that the S&C platform must have. These attributes ensure that the system is robust, dependable and easy to maintain while providing a secure and accessible environment for all users.

### **3.5.1. Reliability**

The system should be reliable in 99% of the cases. Furthermore the platform has to be fault tolerant in order to prevent the propagation of errors and to guarantee a continuous usability of the system.

### **3.5.2. Availability**

Given the global nature of internships and the continuous interaction between students, companies and universities, the system should ideally be accessible 24 hours a day. Planned maintenance and updates should be scheduled to minimize impact on users and should be planned when it is night time for the vast majority of users. The system must be available the most time possible, with a minimum value of 99.9%.

### **3.5.3. Security**

All communications should use secure protocols (such as SSL protocol) that can be considered a standard on many platforms, also sensitive information (including passwords and personal data) must be encrypted using a public-private key mechanism and stored securely. Every activity performed by a user will be logged to ensure traceability. Lastly different methods aiming to protect the database must be adopted, such as defense against query injections and other potential attacks.

### **3.5.4. Maintainability**

First of all, maintenance is not expected to interfere with normal use of the applications. To facilitate maintainability all the components of the system should be modular which could reduce the effort needed to fix bugs. A clear documentation, both in-code and external is needed (of at least 75% coverage of core functionalities) to ensure that developers can easily understand, maintain and evolve the system.

Also the system must be designed in such a way that permits future addition of functionalities with minimum effort.

### **3.5.5. Portability**

The platform should be fully functional and responsive across major web browsers and devices. It is important to maintain the platform compatible with the future releases of other new operating systems, devices and web browsers that might be launched and used to access the platform by an user.



# 4 | Formal Analysis Using Alloy

This chapter represent an abstract model of the S&C platform and it mainly focus on the structural elements of the platform and the relationships between them. Due to the complexity of the platform and time constraint, it was not possible to express all the functionalities and characteristics. Some components (such as calendars, drafts of internships, direct messaging, questionnaires and meeting managements) are not included.

This code is divided in three subsections:

- **Signatures:** defines all the signatures (Students, Companies, Internships,...).
- **Facts:** impose constraints to ensure that the model reflects valid states of the system.
- **Testing Facts:** contains additional facts for testing the alloy code. They can be commented since they do not directly affects the constraints of the S&C platform.

```

1 // ----- SIGNATURES
2 -----
3
4 // USERS (for people: Student, CompanyTutor and Professor)
5 abstract sig User { // abstract signature
6   communicate: set User // users can communicate with other
7     users
8 }
9
10 // STUDENT
11 sig Student extends User { // a student is an user
12   belongsTo: one University, // must be enrolled in exactly
13     one university
14   haveStudentInformation: one StudentInformation_CV, // must
15     have exactly one studentInformation (that contains also
16     the cv)
17   universityMail: one Email, // must have exactly one
18     university mail
19   visualize: set Internship, // can visualize the internships
20   applies: set Internship, // can apply to internships
21   seeCompanyProblem: set ProblemOfCompany // can see the
22     companyProblem
23 }
```

```

17
18 // COMPANYTUTOR
19 sig CompanyTutor extends User { // a companyTutor is a user
20   workFor: one Company, // must work for exactly one company
21   manages: some Internship, // manage some internships
22   read: set StudentInformation_CV, // can read students'
23     StudentInformation_CV
24   evaluations: set InternshipStatus, // can evaluate students
25   see: set ProblemOfStudent, // can see reported problems of
26     students
27   seeCompanyProblem: set ProblemOfCompany, // can see reported
28     problems of companies
29   manageProblemOfCompany: set ProblemOfCompany // can also
30     manage problems of companies
31 }
32
33 // PROFESSOR
34 sig Professor extends User {
35   worksFor: one University, // must work for exactly one
36     university
37   see: set ProblemOfStudent, // each professor has a set of
38     problemsOfStudents they can see
39   seeCompanyProblem: set ProblemOfCompany, // each professor
40     has a set of problemsOfSComapny they can see
41   manageProblemOfStudent: set ProblemOfStudent // professors
42     manage problems
43 }
44
45 // COMPANIES
46 sig Company {
47   representBy: some CompanyTutor, // is represented by some
48     companyTutor
49   offerInternships: set Internship, // can offers internships
50     on the platform
51   haveCompanyInformation: one CompanyInformation // each
52     company has one and only one CompanyInformation
53 }
54
55 // INTERNSHIPS
56 sig Internship {
57   offeredBy: one CompanyTutor, // each internship is offered
58     by exactly one companyTutor
59   offeredFor: one Company, // each internship is offered for
60     exactly one company
61   haveInternshipInformation: one InternshipInformation, // each
62     internship has one information
63   terminated: lone Positive // each internship will
64     eventually terminate
65 }

```

```

51 // UNIVERSITIES
52 sig University {
53     hasStudents: set Student, // zero or more students belong to
54         the university
55     haveUniversityInformation: one UniversityInformation, // each
56         university has one information
57     associatedToUni: set Professor, // each university employs
58         professors
59     monitor: set Student // university monitor students
60 }
61
62 // INTERNSHIPSTATUS
63 sig InternshipStatus {
64     companyTutor: one CompanyTutor, // an internshipStatus has
65         one companyTutor (who accepts or not the internship)
66     internship: one Internship, // the internshipStatus focuses
67         on one specific internship
68     student: one Student, // each internshipStatus focuses on
69         one specific student
70     result: one EvalResult, // each internshipStatus must have a
71         result
72     universityTutor: lone Professor // zero or one professor is
73         assigned for the internship
74 }
75
76 // FEEDBACK INTERNSHIP
77 sig FeedbackToInternship {
78     feedbackInternshipFor: one Company, // feedback for exactly
79         one company
80     feedbackInternshipOn: one Internship, // feedback on
81         exactly one internship
82     feedbackInternshipAbout: one InternshipInformation // feedback about exactly one internship information
83 }
84
85 // FEEDBACK STUDENT
86 sig FeedbackToStudent {
87     feedbackStudentAbout: one StudentInformation_CV, // one
88         studentInformation_CV being reviewed
89     feedbackStudentFor: one Student // one student receiving the
90         feedback
91 }
92
93 // PROBLEM OF STUDENT
94 sig ProblemOfStudent {
95     reportedBy: one Student, // each problemOfStudent
96         is reported by exactly one student
97     aboutInternship: one Internship, // each problem is about
98         an internship
99 }
```

```

        exactly one internship
86    terminateInternship: one (Positive + Negative) //  

        terminateInternship points to either Positive or Negative
87 }
88
89 // PROBLEM OF COMPANY
90 sig ProblemOfCompany {
91     reportedBy: one CompanyTutor,      // reported by exactly one
92         CompanyTutor
93     aboutInternship: one Internship,      // about exactly one
94         internship
95     terminateInternship: one (Positive + Negative) // the problem
96         leads to a positive or negative termination
97 }
98
99 // ALGORITHM
100 one sig Algorithm { // is the one suggesting all the feedbacks to
101     students and internships
102     suggestsToStudent: set FeedbackToStudent,
103     suggestsToInternship: set FeedbackToInternship
104 }
105
106 // MISCELLANEOUS
107 sig Email {associatedTo: lone University} // an email is related
108     to at most one university (use lone since technically we could
109     have a email not associated to the university (such as a
110     personalMail)
111 sig InternshipInformation {}
112 sig CompanyInformation {}
113 sig UniversityInformation {
114     describesUni: one University
115 }
116 sig StudentInformation_CV {
117     owner: one Student // each haveStudentInformation belongs to
118         one student only
119 }
120 abstract sig EvalResult {}
121 one sig Positive extends EvalResult {} // the result of an
122     evaluation can be positive
123 one sig Negative extends EvalResult {} //      or negative
124
125
126
127
128
129 // ----- FACTS
130 -----
```

```

123 // each CompanyTutor works for exactly one company
124 // and each CompanyTutor manages internships offered by their
125 // company
126 fact OneCompanyTutorToOneCompany {
127     all c: Company | all r: c.representBy | r.workFor = c // for
128         every company, every tutor that represent that company
129         also works for the same company
130     all cr: CompanyTutor | one cr.workFor // each companyTutor
131         worksFor exactly one company
132     all cr: CompanyTutor | cr.manages in
133         cr.workFor.offerInternships // every internship a
134         companyTutor manages is one offered by the company were
135         the companyTutor works
136 }
137 // each internship is offered by the correct company
138 fact companyToInternship { // bidirectionality (part1): if a
139     company offers an internships, the internships is offered for
140     the same company
141     all c: Company | all i: c.offerInternships | i.offeredFor = c
142 }
143 // guarantees that each internship offered for a company is the
144 // same company for which the companyTutor works
145 fact InternshipOfferedByCorrectCompanyTutor { // bidirectionality (part2)
146     all i: Internship | i.offeredFor = i.offeredBy.workFor //
147 }
148 // each internship is managed by the correct companyTutor
149 fact companyRepToInternship { // every internship that a company
150     tutor manage must be offered by the same companyTutor
151     all cr: CompanyTutor | all i: cr.manages | i.offeredBy = cr
152 }
153 // each email is assigned to at most one student and must be the
154 // student's university mail
155 fact EmailsAssignedToOnlyOneStudent {
156     all e: Email | lone s: Student | e = s.universityMail // at
157         most one student with that email
158 }
159 // no student can have the same university mail
160 fact UniqueUniversityMails {
161     all disj s1, s2: Student | s1.universityMail !=
162         s2.universityMail // distinct students have distinct
163         university mails
164 }

```

```

156
157 // every mail is a student's university mail
158 // and university mail are managed by the university to which the
159 // student belongs
160 fact EmailManager {
161     all e: Email | some s: Student | e = s.universityMail
162     all s: Student | s.universityMail.associatedTo = s.belongsTo
163 }
164
165 // each internship has unique information
166 fact UniqueInternshipInformation {
167     all disj i1, i2: Internship | i1.haveInternshipInformation != i2.haveInternshipInformation
168 }
169
170 // there can not exist an InternshipInformation not linked to an
171 // internship
172 fact AllInformationsLinked {
173     all d: InternshipInformation | some i: Internship |
174         i.haveInternshipInformation = d
175 }
176
177 // a student has exactly one StudentInformation_CV and it belong
178 // only to that student
179 fact StudentOwnsTheirStudentInformation_CV {
180     all s: Student | s.haveStudentInformation.owner = s
181     all disj c1, c2: StudentInformation_CV | c1.owner = c2.owner
182         implies c1 = c2
183 }
184
185 // a student first needs to visualize an internship before
186 // applying
187 fact ApplicationRequiresVisualization {
188     all s: Student, i: Internship |
189         i in s.applies implies i in s.visualize // applies
190             implies visualized (but a student could visualize and
191             not apply for an internship)
192 }
193
194 // each university has a unique universityInformation and a
195 // UniveristyInformation describes exactly one university (1-to-1)
196 fact OneToOneUniversityAndUniversityInformation {
197     all disj u1, u2: University | u1.haveUniversityInformation != u2.haveUniversityInformation
198     all d: UniversityInformation |
199         d.describesUni.haveUniversityInformation = d
200 }
201
202 // a professor works for exactly one university and is associated

```

```

    to it
193 fact ProfessorWorksForUniversity {
194     all p: Professor | p.worksFor in University
195     all p: Professor | p in p.worksFor.associatedToUni
196 }
197
198 // each professor is employed by exactly one university
199 fact EachProfessorEmployedByOnlyOneUniversity {
200     all p: Professor | one u: University | p in u.associatedToUni
201 }
202
203 // eventually, every internship application will be evaluated by
204 // the companyTutor
204 fact EventuallyEvaluated {
205     all s: Student, i: Internship |
206         i in s.applies implies
207         eventually (
208             some eval: InternshipStatus |
209                 eval.internship = i and
210                 eval.companyTutor in i.offeredBy and
211                 eval.student = s
212         )
213 }
214
215 // an evaluation for an internship application can be done only
216 // by the companyTutor that manages that internship
216 fact ValidInternshipStatus {
217     all eval: InternshipStatus |
218         eval.internship in eval.companyTutor.manages and
219         eval.internship in eval.student.applies
220 }
221
222 // to evaluate an internship, the companyTutor needs to read the
223 // student's StudentInformation_CV first
223 fact IfEvaluatedThenReadStudentInformation_CV {
224     all eval: InternshipStatus |
225         eval.student.haveStudentInformation in
226             eval.companyTutor.read
227 }
228
228 // every university has at least one professor
229 fact EveryUniversityHasAtLeastOneProfessor { // needed so that
230     if a student is accepted for an internship there can be a
231     universityTutor
232     all u: University | some u.associatedToUni
233 }
232
233 // an evaluation for an internship can either be positive or
234 // negative

```

```

234 fact InternshipStatusResultValidity {
235     all eval: InternshipStatus | eval.result in EvalResult
236 }
237
238 // the companyTutor that evaluates the internship must be the one
239 // who offered the same internship
240 fact InternshipStatusTutorMustBeInternshipOwner {
241     all e: InternshipStatus | e.companyTutor =
242         e.internship.offeredBy
243 }
244
245 // bidirectional between companyTutor and the evaluations
246 fact CompanyTutorInternshipStatussBidirectional {
247     all ct: CompanyTutor | ct.evaluations = { e: InternshipStatus
248         | e.companyTutor = ct }
249 }
250
251 // every internship application of a student must have a
252 // corresponding evaluation (1-to-1)
253 fact EveryApplicationHasInternshipStatus {
254     all s: Student, i: Internship |
255         i in s.applies implies some e: InternshipStatus |
256             e.student = s and e.internship = i
257 }
258
259 // ensures a companyTutor can only read StudentInformation_CVs of
260 // students they have evaluated
261 fact ReadOnlyEvaluatedStudentInformation_CVs {
262     all ct: CompanyTutor | ct.read =
263         ct.evaluations.student.haveStudentInformation
264 }
265
266 // evaluation result is Positive => a professor (from the
267 // student's university) is assigned as univeristyTutor
268 // evaluation result is Negative => no universityTutor is
269 // assigned.
270 fact UniversityTutorAssignment {
271     all eval: InternshipStatus |
272         ((eval.result = Positive) =>
273             (some eval.universityTutor and eval.universityTutor
274                 in eval.student.belongsTo.associatedToUni))
275         and
276         ((eval.result = Negative) => no eval.universityTutor)
277 }
278
279 // define when a University monitors a Student
280 fact UniversityMonitorsStudent {
281     all u: University, s: Student |
282         s in u.monitor iff ( // a university monitor a student

```

```

273         s.belongsTo = u and // if the student belongs to the
274             same university AND
275             some i: Internship | i in s.applies and // if the
276                 student applies for an internship AND
277                 some eval: InternshipStatus | // if there is an
278                     evaluation status
279                     eval.internship = i and // of that internship
280                     eval.student = s and // for that student
281                     eval.result = Positive // with positive evaluation
282     )
283 }
284
285 // internship mentioned in the feedback is actually offered by
286 // the company in "feedbackFor"
287 fact FeedbackMatchesCompanyOffer { // a feedback (from the
288     algorithm) about an internship should be connected also to the
289     company that offers that internship
290     all f: FeedbackToInternship | f.feedbackInternshipOn in
291         f.feedbackInternshipFor.offerInternships
292 }
293
294 // feedbackAbout internship information matches the internship's
295 // information
296 fact FeedbackMatchesInternshipInformation {
297     all f: FeedbackToInternship | f.feedbackInternshipAbout =
298         f.feedbackInternshipOn.haveInternshipInformation
299 }
300
301 // at most one feedback per internship
302 fact AtMostOneFeedbackPerInternship {
303     all disj f1, f2: FeedbackToInternship |
304         f1.feedbackInternshipOn != f2.feedbackInternshipOn
305 }
306
307 // a feedback to student must reference the cv of the student +
308 // each student has exactly one feedback per student
309 fact FeedbackToStudentCorrespondence {
310     all fs: FeedbackToStudent | fs.feedbackStudentAbout =
311         fs.feedbackStudentFor.haveStudentInformation
312     all s: Student | one fs: FeedbackToStudent |
313         fs.feedbackStudentFor = s // a student has exactly one
314             FeedbackToStudent
315 }
316
317 // for each internship at most one positive evaluation
318 fact OnlyOnePositiveInternshipStatusPerInternship { // a company
319     can not accept two students for the same position (note: in
320     some cases this fact might be relaxed, but is not discussed
321     here)

```

```

305     all i: Internship | one e: InternshipStatus | e.internship =
306         i and e.result = Positive
307     }
308 // only students with a positive evaluation for that internship
309 // can report a problem
310 fact OnlyStudentsWithPositiveInternshipStatusCanReportProblem {
311     all p: ProblemOfStudent |
312         some eval: InternshipStatus |
313             eval.student = p.reportedBy and // a problem can be
314                 reported by a student about an internship only if
315                 the student is accepted for that internship
316             eval.internship = p.aboutInternship and
317             eval.result = Positive
318 }
319 // communicate only if the evaluation is positive
320 fact PositiveInternshipStatusCommunications {
321     all eval: InternshipStatus |
322         eval.result = Positive implies (
323             let s = eval.student ,
324                 t = eval.companyTutor ,
325                 p = eval.universityTutor |
326                     // communication between student and companytutor
327                     s in t.communicate and
328                     t in s.communicate and
329                     // communication between student and
330                     // universitytutor
331                     s in p.communicate and
332                     p in s.communicate and
333                     // communication between company tutor and
334                     // universitytutor
335                     t in p.communicate and
336                     p in t.communicate
337             )
338 }
339 // all feedbacks (students and internships ones) are connected to
340 // the single algorithm
341 fact AllFeedbacksConnectedToAlgorithm {
342     Algorithm.suggestsToStudent = FeedbackToStudent
343     Algorithm.suggestsToInternship = FeedbackToInternship
344 }
345 // ensure that every CompanyInformation is linked to exactly one
346 // Company
347 fact AllCompanyInformationsLinked {
348     all ci: CompanyInformation | one c: Company |
349         c.haveCompanyInformation = ci

```

```

345 }
346
347 // ensure that no company shares the same CompanyInformation
348 fact UniqueCompanyInformationPerCompany {
349     all disj c1, c2: Company | c1.haveCompanyInformation != c2.haveCompanyInformation
350 }
351
352 // an internship can have at most one problem (0 or 1) of student
353 fact AtMostOneProblemOfStudentPerInternship {
354     all i: Internship | lone p: ProblemOfStudent |
355         p.aboutInternship = i
356 }
357
358 // restrict communications
359 fact RestrictCommunications {
360     all u, v: User |
361         u in v.communicate implies (
362             some eval: InternshipStatus |
363                 eval.result = Positive and
364                 (
365                     (eval.student = u and eval.companyTutor = v)
366                     or
367                     (eval.companyTutor = u and eval.student = v)
368                     or
369                     (eval.student = u and eval.universityTutor =
370                         v) or
371                     (eval.universityTutor = u and eval.student =
372                         v) or
373                     (eval.companyTutor = u and
374                         eval.universityTutor = v) or
375                     (eval.universityTutor = u and
376                         eval.companyTutor = v)
377                 )
378             )
379 }
380
381 // professor can see reported problems of students they tutor
382 fact ProfessorCanSeeReportedProblems {
383     all p: ProblemOfStudent | {
384         some eval: InternshipStatus | (
385             eval.internship = p.aboutInternship and
386             eval.student = p.reportedBy and
387             eval.result = Positive and
388             p in eval.universityTutor.see
389         )
390     }
391 }
392
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```

386 // a companyTutor can see only the problems reported by the
387   students about an internship they manage
388 fact CompanyTutorSeesOnlyManagedProblems {
389   all p: ProblemOfStudent | {
390     let ct = p.aboutInternship.offeredBy {
391       p in ct.see
392       all otherCT: CompanyTutor - ct | p not in otherCT.see
393     }
394   }
395
396 // companyTutor sees problems of managed internships
397 fact CompanyTutorSeesProblemsOfManagedInternships {
398   all p: ProblemOfStudent |
399     p in p.aboutInternship.offeredBy.see
400 }
401
402 // if a professor sees a problem, then the professor manages that
403   problem
404 fact ProfessorSeesImpliesManagesProblem {
405   all p: Professor, prob: ProblemOfStudent |
406     prob in p.see implies prob in p.manageProblemOfStudent
407 }
408
409 // there can be at most one ProblemOfCompany per internship
410 fact AtMostOneProblemOfCompanyPerInternship {
411   all i: Internship | lone p: ProblemOfCompany |
412     p.aboutInternship = i
413 }
414
415 // only company tutors with a positive evaluation for an
416   internship can report a ProblemOfCompany on that internship
417 fact OnlyCompanyTutorsWithPositiveInternshipStatusCanReportProblemOfCompany
418 {
419   all p: ProblemOfCompany |
420     some eval: InternshipStatus |
421       eval.companyTutor = p.reportedBy and
422       eval.internship = p.aboutInternship and
423       eval.result = Positive
424 }
425
426 // professors, companyTutors and students associated with a
427   positive evaluation see the ProblemOfCompany
428 fact VisibilityOfProblemOfCompany {
429   all p: ProblemOfCompany | {
430     some eval: InternshipStatus | (
431       eval.internship = p.aboutInternship and
432       eval.companyTutor = p.reportedBy and

```

```

428         eval.result = Positive and
429         p in eval.companyTutor.seeCompanyProblem and
430         p in eval.universityTutor.seeCompanyProblem and
431         p in eval.student.seeCompanyProblem
432     )
433 }
434 }
435
436 // if a CompanyTutor sees a company problem, they must also
437 // manage it
438 fact CompanyTutorSeesImpliesManagesProblemOfCompany {
439     all ct: CompanyTutor, prob: ProblemOfCompany |
440         prob in ct.seeCompanyProblem implies prob in
441             ct.manageProblemOfCompany
442 }
443
444 // if there is a problem and that problem requires the end of the
445 // internship
446 // then the internship will end
447 fact ProblemForcesTermination {
448     all ps: ProblemOfStudent |
449         (ps.terminateInternship = Positive) =>
450             (ps.aboutInternship.terminated = Positive)
451     all pc: ProblemOfCompany |
452         (pc.terminateInternship = Positive) =>
453             (pc.aboutInternship.terminated = Positive)
454 }
455
456
457
458 // ----- TESTING FACTS
459 // -----
460
461 // there should be at least one visualization of an internship
462 // made by a student
463 fact AtLeastOneVisualization {
464     some s: Student | some i: Internship | i in s.visualize
465 }
466
467 // there exists at least a student that applies for at least one
468 // internships
469 fact AtLeastOneApplication {
470     some s: Student | some i: Internship | i in s.applies
471 }
```

```

469 // minimum cardinalities for some signatures
470 fact {
471     #Student > 1
472     #Company > 1
473     #CompanyTutor > 1
474     #University > 1
475     #Professor > 1
476     #InternshipStatus >1
477     #ProblemOfStudent >1
478     #FeedbackToStudent > 1
479     #FeedbackToInternship > 1
480     #CompanyInformation > 1
481     #ProblemOfCompany > 1
482 }
483 }

484 // at least one positive evaluation
485 fact AtLeastOnePositiveInternshipStatus {
486     some e: InternshipStatus | e.result = Positive
487 }
488 }

489 //fact AtMostTwoPositiveEvaluations {
490 //    # { i: InternshipStatus | i.result = Positive } <= 2
491 //}
492 //}

493 // Each student can have at most one InternshipStatus with a
494 // Positive result
495 // this fact could be relaxed
496 fact OnePositiveInternshipStatusPerStudent {
497     all s: Student | lone e: InternshipStatus | e.student = s and
498         e.result = Positive
499 }
500

501 // ----- RUN COMMAND
502 -----
503 run {} for 10 // but 2 Company, 4 CompanyTutor, 5 Internship, 5
504     StudentInformation_CV, 2 University, 10 Email, 10
505     InternshipInformation, 4 InternshipStatus, 2 EvalResult

```

**Executing "Run runSI for 10"**  
Solver=sat4j Steps=1,10 Bitwidth=4 MaxSeq=7 SkolemDepth=1 Symmetry=20 Mode=batch  
1,1 steps, 119387 vars, 5311 primary vars, 247245 clauses, 1312ms.  
**Instance** found. Predicate is consistent. 1487ms.

Figure 4.1: Result

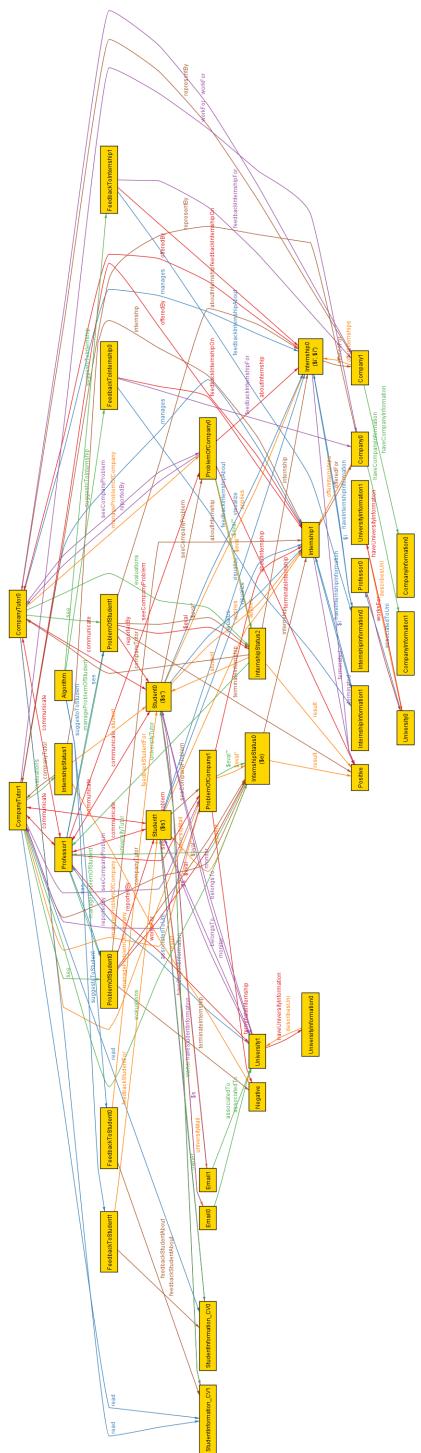


Figure 4.2: General solution.

By modifying the minimum cardinality for more clarity, we can visualize better the result. This is the new fact that overrides the previous one about minimum cardinality.

```

1 fact {
2   #Student = 1
3   #Internship = 1
4   #Company = 1
5   #CompanyTutor = 1
6   #University = 1
7   #Professor = 1
8   #InternshipStatus = 1
9   #ProblemOfStudent = 1
10 }
```

Executing "Run runSI for 10"  
 Solver=sat4j Steps=1.10 Bitwidth=4 MaxSeq=7 SkolemDepth=1 Symmetry=20 Mode=batch  
 1.1 steps. 119153 vars. 5311 primary vars. 246463 clauses. 987ms.  
**Instance** found. Predicate is consistent. 350ms.

Figure 4.3: Reduced result

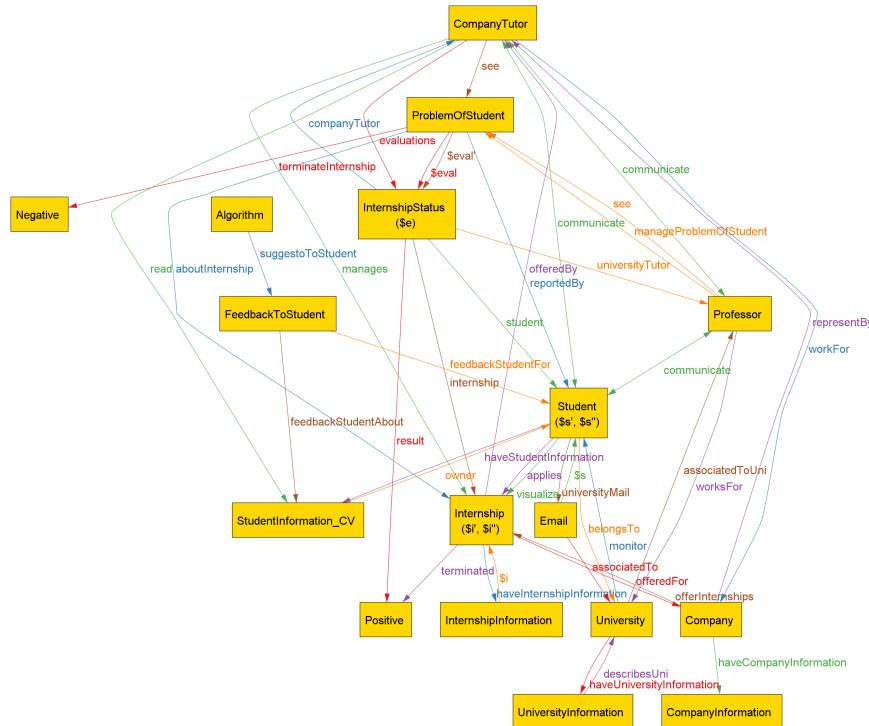


Figure 4.4: Reduced solution.

# 5 | Effort Spent

In this section you will include information about the number of hours each group member has worked for this document.

**Acquadro Patrizio**

chapter	Effort (In hours)
1	5.5
2	25
3	37.5
4	4

**Colosio Giacomo**

chapter	Effort (In hours)
1	5
2	26.5
3	35.5
4	4

**Drugman Tito Nicola**

chapter	Effort (In hours)
1	7.5
2	17.5
3	19
4	27



## Bibliography

- [1] U. o. W.-M. Center for research on College-Workforce Transitions (CCWT). National survey of college internships (nsci) 2021 report, 2021. URL [https://ccwt.wisc.edu/wp-content/uploads/2022/04/CCWT\\_NSCI-2021-Report.pdf](https://ccwt.wisc.edu/wp-content/uploads/2022/04/CCWT_NSCI-2021-Report.pdf).
- [2] T. T. Jane Hamilton. Tougher than ever to secure place on sought after internships, 2024. URL <https://www.thetimes.com/article/tougher-than-ever-to-secure-place-on-sought-after-internships-8rrfj30rm>.
- [3] M. J. . P.Zave. The world and the machine, 1995.



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