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Students&Companies

Requirement Analysis and Specification Document (RASD)

SOFTWARE ENGINEERING II

Computer Science and Engineering
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Authors:

ALMANDOZ FRANCO Rodrigo
Personal Code: 10752609

BRANDI Mattia
Personal Code: 10771744

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1. Introduction

1.1. Purpose

The purpose of this project is to produce the Requirements Analysis and Specification Document (RASD) for the Students&Companies system. This document aims to detail the system by outlining both its functional and non-functional requirements, as well as the constraints it must respect. Moreover, this document is addressed to the developers who will implement the requirements and it is intended as a contractual basis for users. To ensure clarity to all stakeholders, it does not contain any specific terminology if not properly defined.

1.1.1 Goals

The goals of the project are:

- [G1] Companies easily find suitable students for their internships
- [G2] University students easily manage applications for internships matching their skills.
- [G3] Companies and Students have a smooth internship experience

1.2 Scope

Nowadays in the academic and professional landscape, internships play an important role in closing the separation between education and industry. However, despite their importance, the process of finding and ensuring an internship remains a difficult challenge for many students due to scattered information and ineffective platforms. Therefore, the Students&Companies (S&C) platform aims to bridge the gap described above between university students seeking internships and companies offering them. Thanks to recommendation mechanisms and a user-friendly website, S&C simplifies the process by allowing students to show their skills, explore new opportunities, and companies to attract and select the most suitable candidate for a specific role. The platform ensures a productive experience for all parties involved by creating a positive and robust environment.

1.2.1 World Phenomena

Phenomena events that take place in the real world and that cannot be observed by the machine.

The world phenomena found are the following:

- [WP1] University student wants to be part of an internship.
- [WP2] Companies are offering and promoting internships.
- [WP3] Universities want to monitor their students during the internship

1.2.2 Shared Phenomena

World controlled

- [SP1] Students publish their CVs on S&C, including experiences, skills and attitudes.
- [SP2] Companies publish their projects and terms on S&C
- [SP3] Companies advertise the offered internships on S&C
- [SP4] Students proactively look for internships on S&C
- [SP5] Students might accept a suitable recommendation of a Company on S&C
- [SP6] Companies might accept a suitable recommendation of a Student on S&C
- [SP7] Companies interview students collecting answers from them through structured questionnaires
- [SP8] Students and Companies provide feedback and suggestions to S&C.

Machine controlled

- [SP9] S&C eases the matching between Students and Companies
- [SP10] S&C informs Students when a suitable internship is available
- [SP11] S&C informs Companies about the availability of a suitable Student
- [SP12] S&C matches Students with internships through a recommendation mechanism
- [SP13] S&C establishes a contact once the recommendations is accepted
- [SP14] S&C manages the entire selection process once a contact is established
- [SP15] S&C collects information for feeding statistical analysis
- [SP16] S&C provides mechanisms to manage the matchmaking process and the subsequent internship

1.3 Definitions, Acronyms, Abbreviations

1.3.1 Definitions

- **Internship:** the position of a student (intern) who works temporarily in an organization, sometimes without pay, in order to gain work experience.
- **CV:** It stands for Curriculum Vitae, and it is a short written description of your education, qualifications and previous jobs

- **API:** It is a set of functions and procedures allowing the creation of applications that access the features or data of an application
- **SSO:** Single Sign-on (SSO) is an identification method that enables users to log in to multiple applications with one set of credentials.

1.3.2 Acronyms

- **S&C** Students and Companies
- **RASD:** Requirement Analysis and Specification Document.
- **UI :** User interface
- **UML:** Unified Modelling Language

1.3.3 Abbreviations

- [Gn] - the n-th goal of the system
- [WPn] - the n-th world phenomena
- [SPn] - the n-th shared phenomena
- [UCn] - the n-th use case
- [Rn] - the n-th functional requirement

1.4 Revision History

- Version 1

1.5 Reference Documents

This document is based on:

- The specification of the RASD and DD assignment of the Software Engineering 2 course, held by professors Matteo Rossi, Elisabetta di Nitto and Matteo Camilli at the Politecnico di Milano, A.Y 2024/2025
- Slides of course on WeBeep

1.6 Document Structure

The current document is divided into six chapters, which are the following.

1. **Introduction:** it aims to describe the environment and the demands taken into account for this project, in particular, on the reasons and the goals the document wants to achieve.
2. **Overall Description:** it includes scenarios and details on the shared phenomena where the system interacts with the external world, including its assumptions. It contains a high-level description of the system.

3. **Specific Requirements:** it describes in detail the requirements needed to reach goals. Moreover, it contains more details useful for developers.
4. **Formal Analysis using Alloy:** it contains a formal description of the main World aspects by modeling them in Alloy.
5. **Effort Spent:** it contains the time spent to realize the following document per person.
6. **References:** it contains the references to any document and to softwares used in this document.

2. Overall description

2.1 Product Perspective

2.1.1 Scenarios

Student manages his profile on S&C

Student A logs in the platform and he uploads his CV containing all the useful information for a much more personalized experience.

Student A can add the acquired past experience, his/her skills and attitudes.

S&C uses this information to provide Student A with a list of the most suitable internships according to the characteristics found in the CV.

Company advertises its projects and terms

Company A is interested in hiring one or more interns. Therefore, the Human Resources Department of Company A publishes on S&C the projects that this specific Company is hiring for. The publication includes the detailed description of the project (e.g., the application domain, the tasks to be performed, any relevant technologies Students might be interested in) and terms offered by Company A (e.g., paid/unpaid internship and tangible/intangible benefits such as training, mentorship or health insurance).

Student looks for internships

Student B wants to improve his personal and professional knowledge and therefore, he wants to find an internship. He surfs the S&C platform in order to manually see all the available internships published by companies. In fact, he can visit the dashboard of S&C and choose what type of job offers to see. He can see whether recommended internships, accurately chosen by S&C, or all available internships published on the platform. Moreover, he can see the period of time in which a specific company is used to publish internships in order to be prepared when the time comes.

Student receives recommendation for an internship

Student C might receive a recommendation of an internship by a specific Company B. In fact, thanks to an accurate recommendation mechanism employed by S&C, he can receive a notification on his dashboard with a tailored internship offer suggestion based on his skills and experiences stated on his CV and profile. Moreover, S&C updates his Recommendation section by adding a reference to the Company's profile. Under the

Company's name, there is a colored circle, which represents the Company's choice. This button can be green, if the counterpart accepted the recommendation, red, if the counterpart rejected the recommendation, and gray, if the counterpart has not given an answer. If he is available and interested in the internship, he can accept the recommendation and, in the Company's recommendation section, his light becomes green. Moreover, Student C can present a formal complaint to S&C platform if a non pertinent Company is proposed by S&C recommendation mechanism.

Company receives recommendation of a Student

Company C might receive a recommendation of a Student D for a particular advertised internship. In fact, thanks to an accurate recommendation mechanism employed by S&C, Company C can receive a notification on the company's dashboard, to an address specified to S&C, with a tailored candidate based on the skills and experiences they are currently searching for. Moreover, S&C updates its Recommendation section by adding a reference to the Student's profile. Under the Student's name, there is a colored circle, which represents the Student's choice. This button can be green, if the counterpart accepted the recommendation, red, if the counterpart rejected the recommendation, and gray, if the counterpart has not given an answer. If the Company accepts the recommendation, in the Student's recommendation section, its light becomes green. Moreover, Company C can present a formal complaint to S&C platform if a non pertinent candidate is proposed by S&C recommendation mechanism.

Company starts a selection process with a recommended Student

After both Company D1 and the student accept their respective recommendations, both lights described above become green. This action triggers the S&C platform, establishing a contact between parts. In fact, the selection process starts and the Company is invited to schedule an interview.

Company starts a selection process with a not recommended Students

The Company D wants to hire only Students who are mostly aligned with its requirements and terms, specified in the project's description.

The Company sees the list of candidates who have sent an application without being recommended by the S&C platform, but proactively searching for the specific internship. A Company's employee reviews all the applicant's CVs and selects those who deserve an interview.

Companies and Students provide feedback and suggestions

When the internship finishes, both Company E and Student E receive from the S&C platform a form to be compiled to provide feedback and suggestions. Student E provides feedback and suggestions about the internship and the Company E (e.g., quality of the internship, working conditions and skills gained). The Company E provides feedback and suggestions about the Student E (e.g., student's performance, student's strengths and Student's weaknesses). S&C collects this information and integrates it into the statistical analysis database.

Company manages the execution and outcome of the selection process

The Company F can keep track of all candidates who have been selected for an interview and who have not been discarded by the selection process. Company F schedules the interview and keeps track of the outcome of each interview by each candidate, thanks to the structured questionnaire filled.

Student manages the execution and outcome of the selection processes

Thanks to the S&C main tool for the selection process for Students, Student F can keep track of all applications made which have not been discarded by the selection process or turned down or withdrawn by the student. Student F can keep notes of each interview with each Company G.

Company manages the execution and outcome of the ongoing internship

S&C provides a tool to monitor the execution of the ongoing internships. It could happen that Company H experiences an issue with an intern subscribed to the platform (e.g., poor performance, no presence, violations of terms). The Company H can use the tool to report problems and to complain about the issues. The Company H can use the same tool to update the status of the internship (open, scheduled, in progress, finished, paused). If an issue appears S&C notifies both participants.

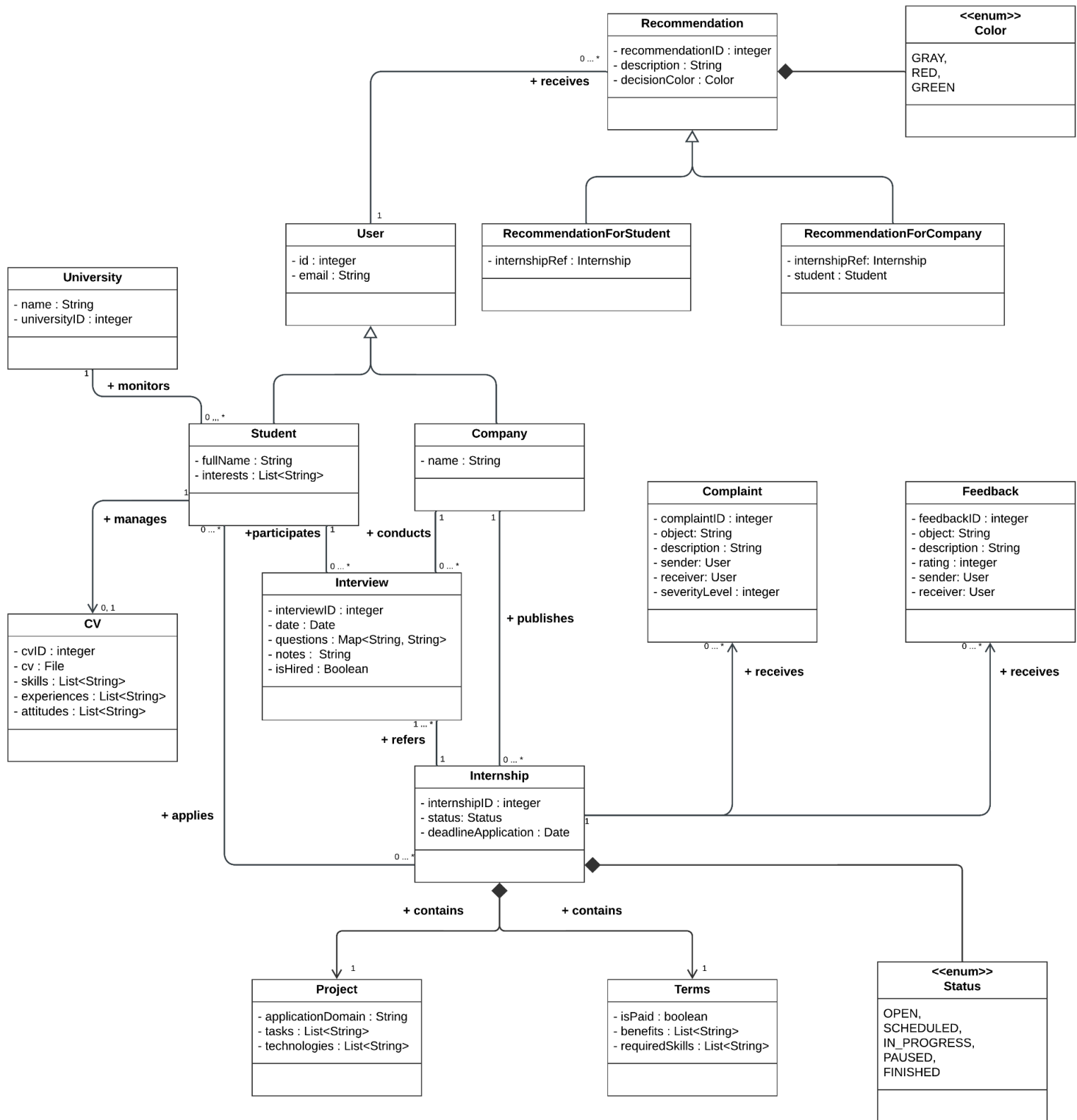
Student manages the execution and outcome of the ongoing internship

S&C provides a tool to monitor the execution of the ongoing internships. It could happen that Student G encounters a problem with the Company I where he is working for(e.g., poor treatment, no correspondence between internship description and work assignment). The Student G can use the tool to report problems and to complain about the issues. The Student G can use the same tool to visualize the status of the internship (scheduled, in progress, finished, paused). If an issue appears S&C notifies both participants.

University monitor the internships situation of their students

University U has the list of its Students who have a valid internship contract in the main Dashboard of their S&C account. University U has two main sections: the first contains all Students who are currently interns thanks to S&C platform; the second contains all Students who signed a valid contract for a future internship thanks to S&C platform.

2.1.2. Domain class diagram



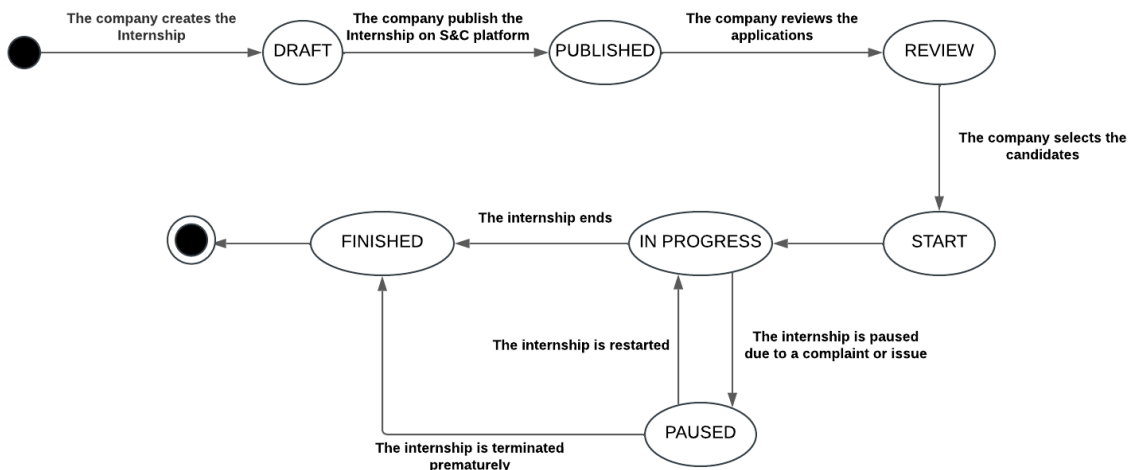
The figure above represents the Domain class diagram referred to S&C. This class diagram describes the core entities in the platform and the relationship between them within the S&C platform. Among the key classes, there is the *User* class and its subclasses *Company* and *Student*. In fact, *User* contains the attributes in common between *Student* and *Company*. The main difference is represented by the mandatory presence of the CV for each *Student*. Another key class of S&C is *Internship*, which contains both *Projects* and *Terms* related to the internship. The *Interview* class is a central class among them, which contains a singular interview between the student and the company for a specific internship. From the *Internship* class, there are *Complaints* class and the *Feedback* class. The former contains the current complaints and, when one complaint is solved, it is eliminated from the complaints. Moreover, it has a *severityLevel* integer which indicates, from a scale 1 to 5, the severity level of the complaint. The latter contains the feedback done after the internship. It has a rating level, going from 1 to 5.

Another core class is *Recommendation* whose instances are sent by the S&C to the accurate users. The static type of the objects is always *Recommendation*, but the dynamic type differs based on the dynamic type of the users. In fact, the *Student* can only receive *RecommendationForStudent* objects and, on the other hand, a *Company* can only receive a *RecommendationForCompany*.

2.1.3 State Diagrams

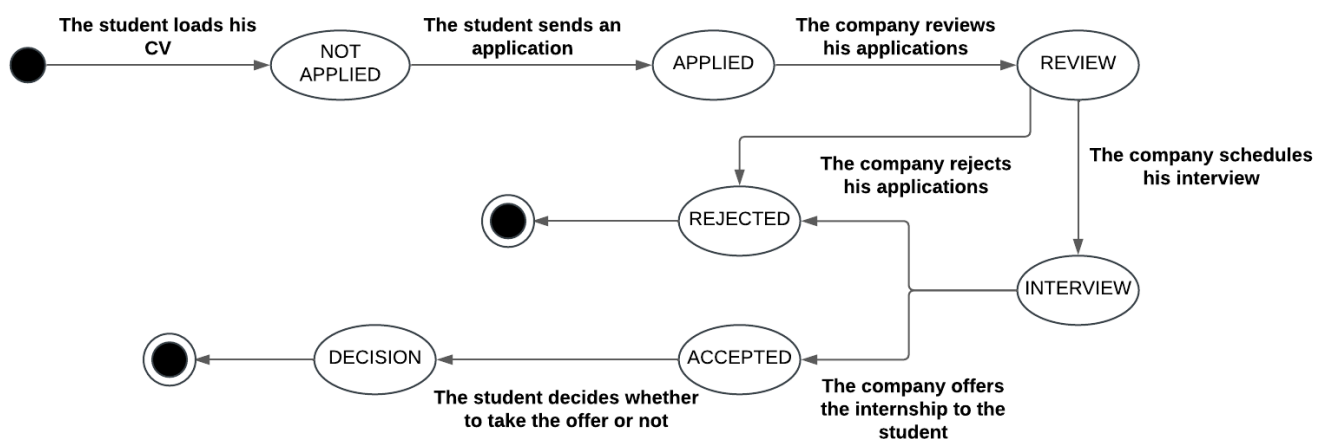
In this subsection, there are three state diagrams explaining in detail the management of the core features of S&C to have a better understanding of the functioning of the platform.

INTERNSHIP MANAGEMENT



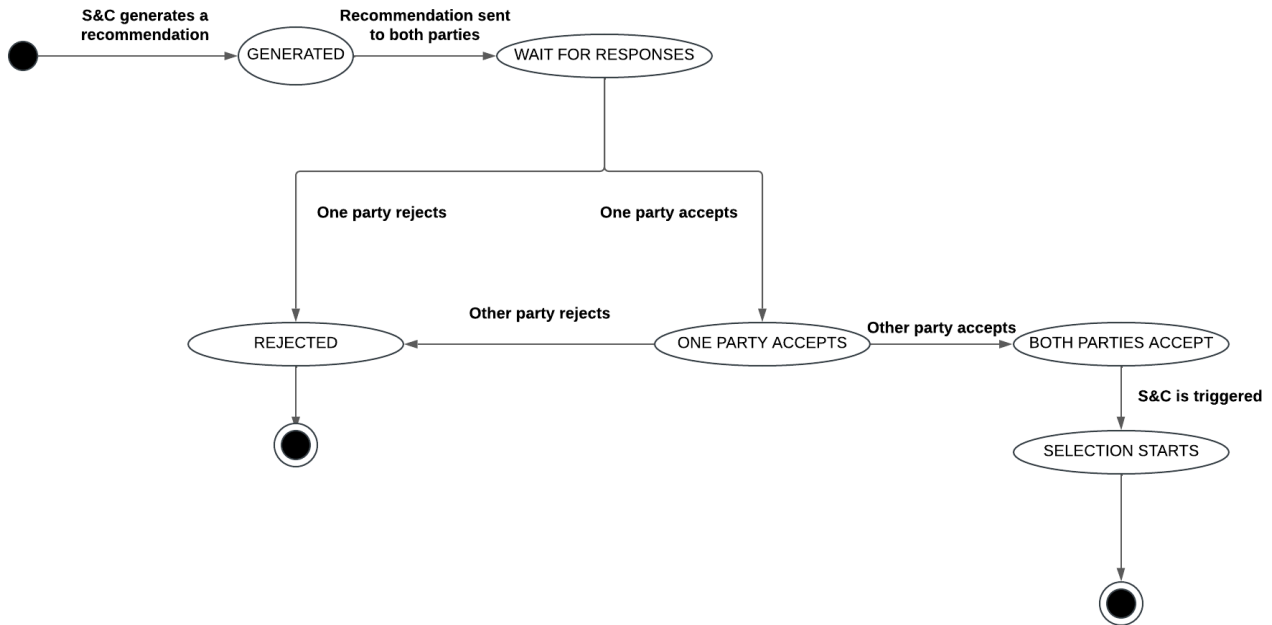
In this state diagram, it's visually explained how the internship management is held and supported by the platform. Once the company creates the internship, the state *Draft* is reached. Afterward, the company shows the internship to the public by publishing it on the platform and the state is on *Published*. At this point, it waits until the deadline for the Student applications' expiration and the reached state is *Review*. Subsequently, the company selects the most suitable candidates by accurately analyzing their CVs and interviewing them, and once this selection process is ended the state is on *Start*. Therefore, the internship starts and, if successful, concludes linearly by passing through the states *In_Progress* and *Finished*, otherwise it could happen that the internship is paused due to a complaint or an issue advanced by one of the two parties and, in this case, the state is on *Paused*. The S&C intervenes trying to mediate the communication between both and once a decision is taken, the state returns *In_Progress* or it becomes *Finished*.

STANDARD APPLICATION MANAGEMENT (NO RECOMMENDATION)



In this state diagram, it is described the standard application management for those Students not recommended. In particular, when a student loads his CV on the platform, the state is on *Not Applied*, however, when a student applies for a job, the state is on *Applied*. Consequently, the company reviews his application, passing on the *Review* state. On one hand, if the application and interview are successful, the company offers the internship to the student, the state is on *Accepted*, then the student might take the offer or not, going into the *Decision* state. On the other hand, if the review or interview are unsuccessful, then, the company rejects the application, which gets the state on *Rejected*.

RECOMMENDATION MANAGEMENT



In this state diagram, the recommendation management process is briefly described. The S&C platform generates a tailored recommendation for an interested party, such as a student or a company, containing a recommendation for a counterpart. Then, the interested party might accept or reject the recommendation based on their choice. If at least one party rejects the recommendation the reached state is *Rejected*. Otherwise, if both parties accepted the recommendation, the state goes to *Both Parties Accepted*. At that point, S&C is triggered and the selection process begins.

2.2 Product Functions

Log-in

This function allows the S&C platform to be restricted to authenticated users only. After an agreement between the S&C platform and a specific University or Company, through proper S&C tools, the platform provides a proper way to login. Inside the S&C login web page, there is a search bar with autocomplete suggestions and users must search their own organization, which can be a Company or University. Afterwards, Single Sign-On (SSO) is done directly inside the organization web page. This ensures a secure authentication process, linking users directly to their organization, without any standalone registration.

Feedback mechanism

The S&C platform includes a robust feedback mechanism to ensure continuous improvement between users. The feedback can be done by students to internships, students to companies and companies to students. There is a proper questionnaire to provide feedback, writing the object, description and rating. The feedback will be published on the receiver profile and it cannot be deleted to ensure transparency between parties.

Complaints mechanism

This function allows both students and companies to complain against a specific target, such as a company or a student, respectively. The user can initiate a complaint by opening a request, filling all the mandatory fields, and submitting it on the platform, inside a private section of the page dedicated to the corresponding internship. The platform is reactive to the publication notifying the counterpart involved. During this process, the internship is interrupted until the parts won't find an agreement. If the agreement is unsuccessful the internship reaches an end. In both cases the complaint is eliminated by the platform's memory.

Notifications mechanism

The S&C platform includes a complete notification system to keep users informed and properly notified. S&C sends a notification to the interested party in the following cases: when new internships matching students preferences are posted; when a new recommendation by S&C is generated; when interview updates are posted (e.g., schedule changes, interview outcome). Moreover, S&C allows users to customize their notification settings.

Manual filtering and search tools mechanism

This function allows a student to proactively browse and find internships that fit with their preferences and skills. Students can search for internships by entering keywords and applying specific filters, such as location, company, required skills, duration and benefits. The result can be ordered based on different parameters such as relevance, and date posted in order to maximize the probability for a student of succeeding in finding a suitable internship.

Interview setup mechanism

This function allows the management of interviews between students and companies as the core part of the selection process. The S&C platform provides companies tools for scheduling, organizing and tracking interviews. The interviews can be scheduled directly

through the platform, with the option to integrate them into Google Calendar if the event is accepted, by inserting details like date, time, mode, specifying the location in the case the interview is in presence. S&C notifies the students ensuring they are informed of the upcoming event. The platform supports the procedure by integrating features like structured questionnaires.

Recommendation mechanism

The S&C platform leverages statistical analysis techniques to provide tailored recommendations for both matching students with internships and matching companies with students. In fact, the algorithm is divided into the following parts. Firstly, the platform analyzes structured data from students' CVs and internship listings. Secondly, a machine learning model is employed, which tries to identify patterns in successful matches, by using appropriate clustering techniques. Both anonymized complaints and feedback are used to weigh the model in order to provide better recommendations in the future.

Matchmaking mechanism for recommended

This function allows the matchmaking process between recommended users. In fact, S&C sends a tailored recommendation through a notification on the dashboard about the counterpart to both users. S&C updates the Recommendation section of the user about the counterpart. If both users accept the recommendation, S&C platform is triggered and the selection process starts.

Matchmaking mechanism for not recommended

This function allows the not recommended Students to send their application for a specific internship. With this same tool a Company's employee can review all the CVs and, after an accurate analysis, he might select the best candidates and schedule an interview with them.

2.3 User Characteristics

There are mainly three kinds of users who interact with S&C platform: students, companies and universities.

2.3.1 Students

The students belong to a university and they are actively seeking internships. In order to use the platform correctly, the needed technical knowledge is basic computer usage. Their

primary needs are to have easy access to internship opportunities, CV submission, application tracking and personalized recommendations.

2.3.2 Companies

The companies are represented through their appointed representatives, who are in charge of posting, filtering candidates and managing internship opportunities. The needed technical knowledge is mainly in web applications. Their primary needs are to simplify the processes for posting internships, receiving applications and allowing them to choose the best candidate.

2.3.3 Universities

The universities are represented through their appointed representatives, who are academic employees responsible for monitoring the internship situation of their own students. The needed technical knowledge is mainly in web applications. Their primary needs are to simplify tracking the students' internships, allowing them to monitor the student-company interaction.

2.4 Assumption, Dependencies and Constraints

2.4.1 Regulatory Policies

The S&C platform will collect personal information from users, such as name, surname, email address. This information is only used for S&C's core functionality, for instance matching students with internships or enabling communication between companies and students. Personal data is processed in full compliance with the General Data Protection Regulation (GDPR) and other applicable data protection laws.

2.4.2 Domain Assumptions

In this subsection, the domain assumptions are listed, which are descriptive assertions assumed to hold in the world. They are properties or conditions that the system will take for granted, mostly because they are out of the system's control. The following assumptions need to be verified to ensure the correct behavior of S&C.

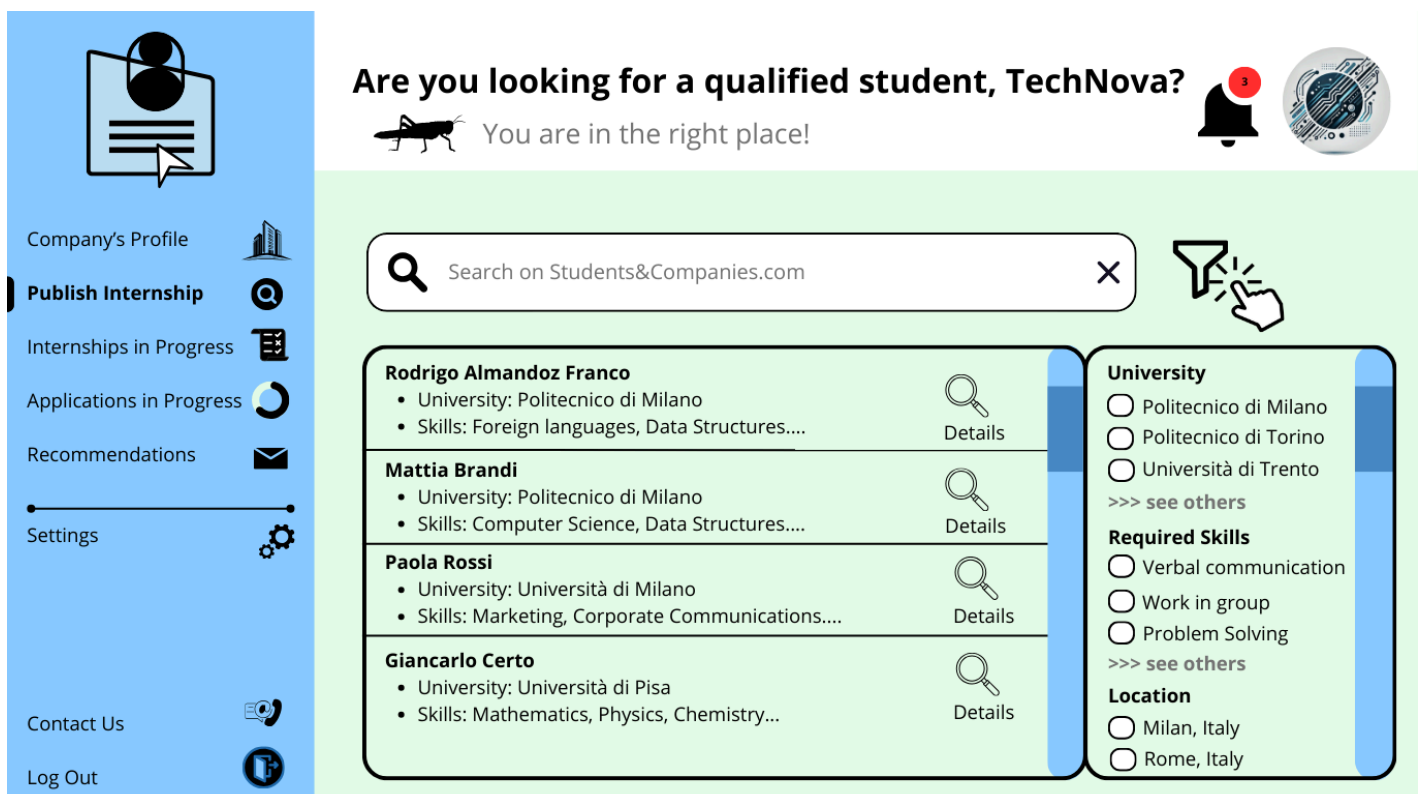
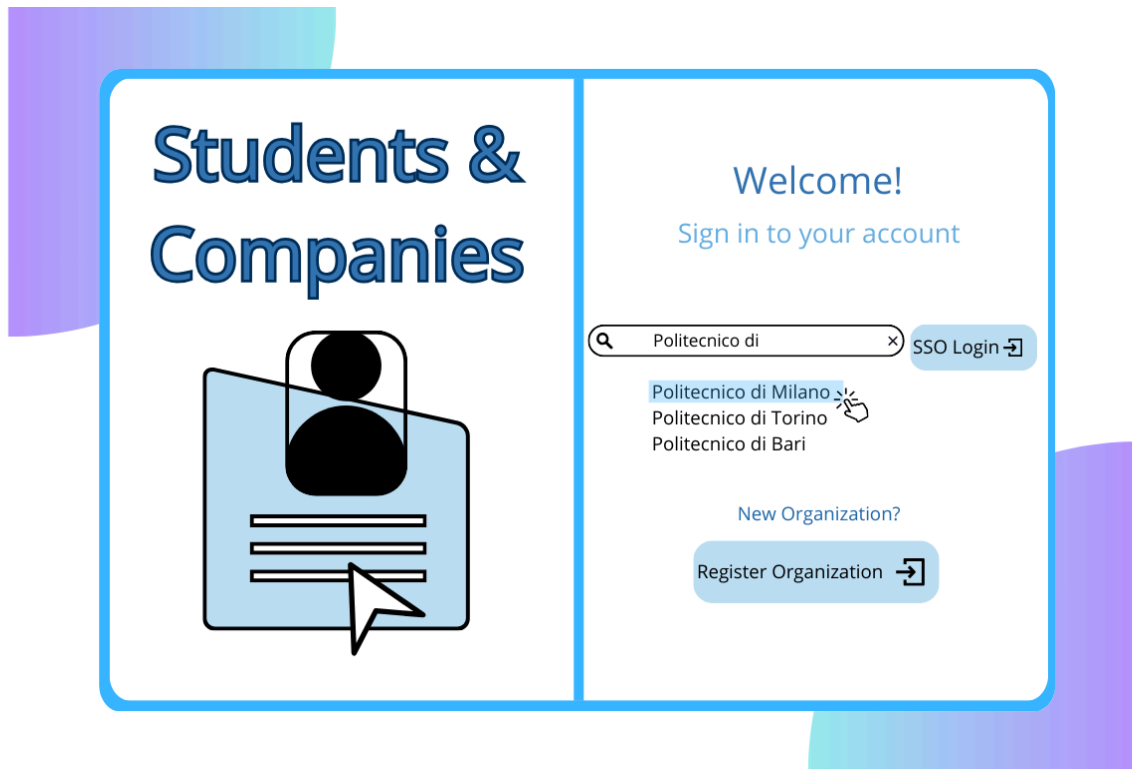
- [D1] Users must have a reliable internet connection.
- [D2] Companies provide accurate and updated internship details.

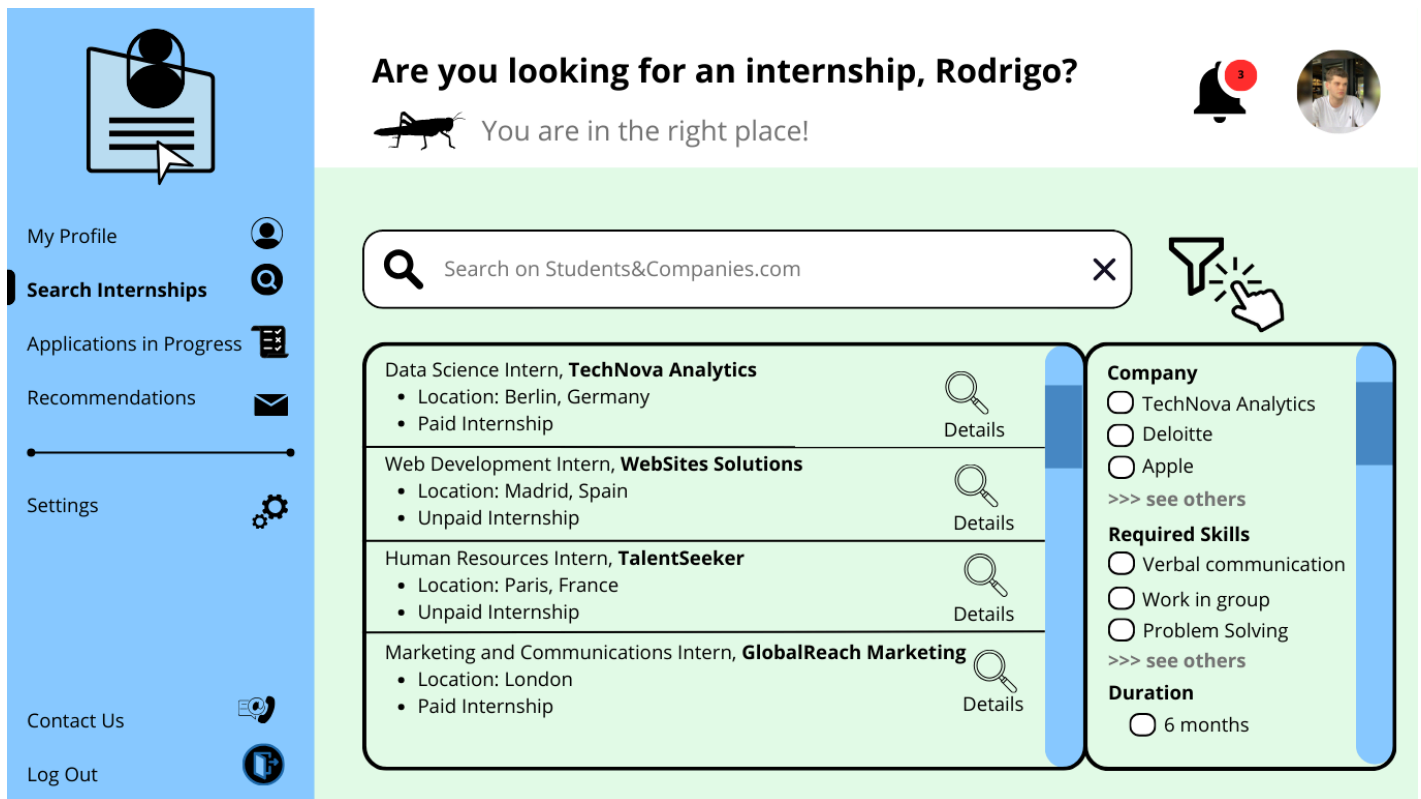
- [D3] Students upload valid and accurate CVs and personal information.
- [D4] Users consent to the collection and processing of personal information
- [D5] Notifications and email communications reach users without significant delays.
- [D6] Users consent to Calendar access by S&C. Moreover, the employees' calendar is always up to date.
- [D7] Feedback and complaints mechanisms are properly and honestly used by all users.
- [D8] Companies conduct interviews and evaluations transparently and fairly.
- [D9] Each university provides support to their students.

3. Specific Requirements

3.1 External Interface Requirements

3.1.1 User Interface





The images above briefly describe the UI for the S&C platform. In particular, the first image shows the Welcome page of the platform, where users can login using SSO or register their specific organization. The other two images describe the dashboard of users. The first dashboard is a company's dashboard, where the employee can surf on the platform using the menu on the left side. On the right side of the screen, he will be able to get details about what he is looking for (in this case, the employee is looking for a qualified student). The second dashboard is a student's dashboard, where the student can surf on the platform using the menu on the left side. On the right side of the screen, he will be able to get details about what he is looking for (in this case, the student is looking for an internship).

3.1.2 Hardware Interfaces

The S&C platform is designed to be accessed through devices with internet connectivity, for instance laptops and smartphones. It does not require any specific hardware interface on the client side. On the other hand, on the server's side, it requires a GPU ecosystem for training the machine learning model for recommendation. It must include sufficient computational resources to support the recommendation analysis.

3.1.3 Software Interfaces

The S&C platform interacts with various software interfaces to ensure efficient functioning and providing great user experiences. From the client side, the platform must support common web browsers for access (e.g., Chrome, Firefox and Safari). On the other side, S&C is integrated with a Calendar API in order to schedule interviews and to have an updated schedule of a particular student for the company's employee. Moreover, due to the necessity of a machine learning model to provide accurate recommendations, the system employs PyTorch, a Python-based machine learning framework.

3.1.4 Communication Interfaces

The user accesses the S&C platform through an internet connection to interact with the system. Therefore, the platform must support secure communication and it must be HTTPS compliant in order to ensure secure access and protect users' sensitive information, guaranteeing privacy and data integrity.

3.2 Functional Requirements

The functional requirements that the system must fulfill are the following.

- [R1] The system allows users to access their private area through SSO.
- [R2] The system allows Universities and Companies to sign an agreement for registering in the S&C platform.
- [R3] The system allows Companies to create and publish the internships (projects and terms) they offer.
- [R4] The system allows Students to manage their CV (skills, experiences, attitudes).
- [R5] The system allows Students to search for internships in the search bar.
- [R6] The system allows Company to see Student CVs
- [R7] The system allows Students to filter and order the internships based on preferences.
- [R8] The system allows Students to apply at most once to a specific internship.
- [R9] The system allows Students to review their specific applications.
- [R10] The system allows to send recommendations to interested parties.
- [R11] The system allows interested parties to manage received recommendations.
- [R12] The system allows to send notifications to interested parties.
- [R13] The system allows Companies to review the applications.

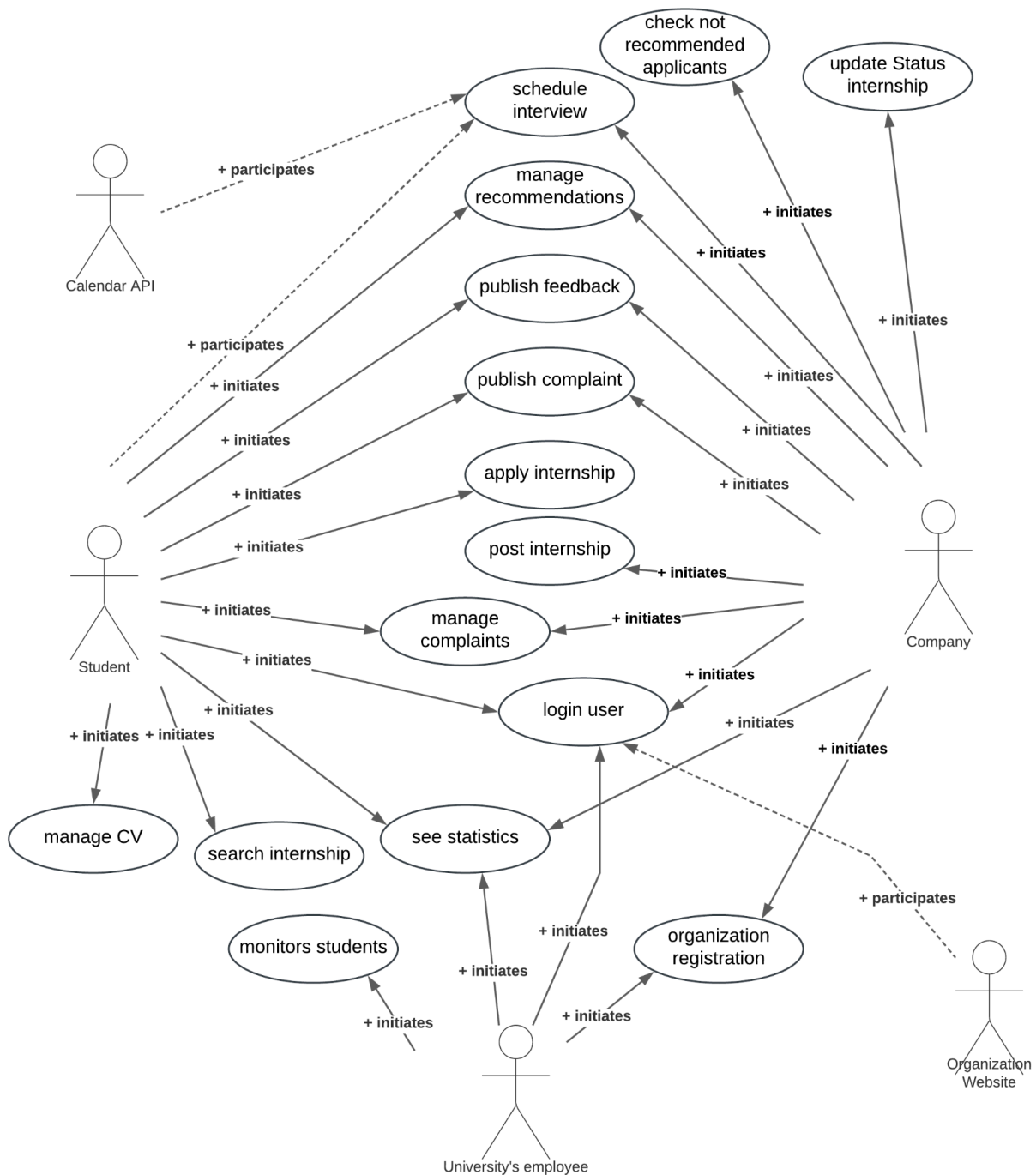
- [R14] The system allows to establish contact between interested parties.
- [R15] The system allows Companies to schedule an interview.
- [R16] The system allows Companies to use structured questionnaires.
- [R17] The system allows interested parties to see the details of an interview.
- [R18] The system allows Companies to finalize the selection of the best candidates.
- [R19] The system allows Companies to offer an internship through proper tools.
- [R20] The system allows Students to manage the offer by the Company.

- [R21] The system allows Companies to pause the internship.
- [R22] The system allows Companies to terminate the internship prematurely.
- [R23] The system allows interested parties to publish complaints about problems during the internship.
- [R24] The system allows interested parties to publish feedback about the internship or the counterpart after the internship.

- [R25] The system allows Universities to track and oversee the progress and status of internships undertaken by their students.
- [R26] The system allows users to see and analyze up to date statistics.

3.2.1 Use Cases Diagrams

The following diagram represents the use cases present in this chapter.



3.2.2 Use Cases

[UC1] - Organization Registration

Actors	<ul style="list-style-type: none">• Organization (University or Company) employee
Entry Condition	An organization wants to get registered on the S&C platform. The employee is on the S&C web page.
Event Flow	<ol style="list-style-type: none">1. The employee presses the button “Register Organization” to register his organization into the S&C2. The system shows the employee the form to compile3. The employee writes the professional information of the organization, such as the name, website and email domain4. The employee presses the button “Register” to finalize the registration5. The system shows a successful message
Exit Condition	The employee has successfully registered the organization to the platform
Exception	<p>5. The organization is already registered inside the platform. S&C shows an error message with details and the system returns to the entry condition.</p> <p>5. The organization employee inserts wrong or invalid information. S&C interrupts the registration procedure and shows an error message with details and the system returns to the entry condition</p>

[UC2] - Login User

Actors	<ul style="list-style-type: none">• Organization (University or Company) employee or Student• Organization website
Entry Condition	The user wants to access his private dashboard on the S&C platform. The user is on the S&C web page.
Event Flow	<ol style="list-style-type: none">1. The user presses the “Login” button2. The system shows the next web page in order to login3. The user searches on the search bar his organization and he presses the “Next” button4. The user accesses his organizational profile using a SSO login5. The system checks the validity of the SSO token received6. The system grants access to the user’s private area and the user sees his private area
Exit Condition	The user can manage his private dashboard provided by S&C
Exception	4. The organization searched is not registered on the S&C

	<p>platform. S&C shows an error message and the system returns to the entry condition.</p> <p>6. The token received is not valid. S&C shows an error message and the system returns to the entry condition.</p>
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[UC3] - Post an Internship

Actors	<ul style="list-style-type: none"> Company's employee
Entry Condition	The employee wants to post a new internship on the platform. The employee is logged in and he has access to the company's dashboard
Event Flow	<ol style="list-style-type: none"> The employee clicks the "Post Internship" button The system displays the appropriate form to be compiled The employee fills the form, reporting the Project and Terms of the internship The employee presses the "Post Internship" button The system checks if all the necessary details are present and it stores the internship inside the database The system shows the employee a successful message
Exit Condition	The internship is successfully posted on the platform and it is visible to students
Exception	5. The necessary details are not present. The system displays an error message and the form remains editable, highlighting the incomplete fields.

[UC4] - Search for Internship

Actors	<ul style="list-style-type: none"> Student
Entry Condition	The student wants to find an internship matching his preferences. He is already logged into the S&C platform.
Event Flow	<ol style="list-style-type: none"> The student clicks the "Browse Internships" button The system shows a web page containing a search bar, filtering options and a list containing all the internships published on S&C The student enters keywords or select filters in order to refine his internship search The system processes the query, applying the filters to all available internships, and retrieves the matching ones The system displays the full list of matching internships. The student clicks on an internship in order to view detailed information of it, in particular Project and Terms
Exit Condition	The student successfully views the list of internships matching his criteria

Exception	5. No internship matches the search criteria. the system notifies the student about the unavailability of any internships
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[UC5] - Apply for Internship

Actors	<ul style="list-style-type: none"> • Student
Entry Condition	The student wants to apply to an interesting internship found on S&C. The student is already logged into his account, seeing the details of the internship
Event Flow	<ol style="list-style-type: none"> 1. The student clicks on the “Apply now” button 2. The system asks the student to confirm the application 3. The student confirms the application by clicking the “Submit Application” button. 4. The application form is sent to the employee
Exit Condition	The student successfully applies for the internship
Exception	2. The student’s profile is incomplete (e.g., CV missing). The system shows an error message and the system returns to the page where the details of the internship can be found.

[UC6] - Manage CV

Actors	<ul style="list-style-type: none"> • Student
Entry Condition	The student wants to manage his profile on S&C. He is already logged in the platform and on his profile
Event Flow	<ol style="list-style-type: none"> 1. The student clicks the “Edit Profile” button 2. The system displays options to Upload/Edit/Delete CV 3. The student can: <ol style="list-style-type: none"> a. upload a CV, choosing from a device’s file b. edit the current uploaded CV c. delete the CV 4. The student can press the “Save Changes” button to save the changes to his profile or press the “Cancel Changes” button to cancel the changes 5. The system successfully applies the changes to the student’s profile and displays a confirmation message
Exit Condition	The student successfully uploads/changes/deletes his CV and the profile reflects the changes
Exception	4. The file uploaded by the student is invalid (e.g., wrong format). The system displays an error message and the system returns to the student’s profile in editable mode

[UC7] - Check Not Recommended Applicants

Actors	<ul style="list-style-type: none">• Company's employee
Entry Condition	The employee wants to check the applicants for a specific posted internship. The employee is already logged in and inside the internship details
Event Flow	<ol style="list-style-type: none">1. The employee clicks the "Check applicants" button2. The system displays the full list of applicants who have applied for it3. The employee can filter the applicants based on skills and experiences on students' CVs4. The employee clicks on a student in order to see his detailed CV
Exit Condition	The employee successfully views the list of applicants matching his criteria
Exception	4. No student matches the search criteria. the system notifies the employee about the unavailability of any students

[UC8] - Schedule Interview

Actors	<ul style="list-style-type: none">• Company's employee• Student• Calendar's API
Entry Condition	The employee wants to schedule an interview for a specific selected Student. The employee is already logged in and inside the schedule interview with student details
Event Flow	<ol style="list-style-type: none">1. The employee must insert the mandatory information, such as date, time, mode and eventually location, and click the "Schedule interview" button.2. The system finds the first availability3. The system schedules the interview, notifying the interested parties4. The student can:<ol style="list-style-type: none">a. accept the schedule<ol style="list-style-type: none">i. The system updates both calendarsii. The system sends a confirmation messageiii. The system prepares the structured questionnaire.iv. An interview is successfully scheduledb. reject the schedule<ol style="list-style-type: none">i. The system invites the student to update his calendarii. The system notifies the employee to restart the Schedule Interview process.

Exit Condition	The parties are successfully mediated by the platform to schedule an interview.
Exception	<ol style="list-style-type: none"> 1. The form request contains invalid or discrepant values. The system returns to the corresponding internship page and displays an error message communicating the incomplete scheduling. 3. The system does not find an availability and shows an error message to the employee

[UC9] - Publish complaint

Actors	<ul style="list-style-type: none"> • User (Student or Company's employee)
Entry Condition	The internship is ongoing and the user is logged in and on the internship page.
Event Flow	<ol style="list-style-type: none"> 1. The User presses the "New Complaint" button on the corresponding internship page 2. The system opens a landing page with a form to be filled with the following information: <ol style="list-style-type: none"> a. Object b. Description c. Severity Level d. Counterpart reference 3. The system checks if all the necessary details are present and publishes it in the platform with OPEN status 4. The system notifies the counterpart about the complaint submission 5. The status of the internship is changed to PAUSED 6. The users communicate with each other 7. IF the agreement is <ol style="list-style-type: none"> a. not reached, the internship is finished prematurely. b. reached, the internship is restarted 8. The system closes the complaint and archives it
Exit Condition	The users can successfully manage complaints
Exception	3. The necessary details are not present. The system displays an error message and the form remains editable, highlighting the incomplete fields.

[UC10] - See statistics

Actors	<ul style="list-style-type: none"> • Organization (University or Company) employee or Student
Entry Condition	All profiles and internship data are updated. The user is logged in and can see his dashboard
Event Flow	<ol style="list-style-type: none"> 1. The user clicks the "See statistics" button

	<ol style="list-style-type: none"> The system shows all available statistics currently on the platform The user can filter the statistics by work field, company, university The system processes the query, applying the filters to statistics, and displays the matching ones The user can click on a specific company to see its details
Exit Condition	The user successfully sees the statistics and details about companies
Exception	5. No statistic matches the search criteria. The system notifies the user about the unavailability of any statistic.

[UC11] - Publish feedback

Actors	<ul style="list-style-type: none"> Student Company's employee
Entry Condition	The internship is concluded and the user is logged in and on the internship page.
Event Flow	<ol style="list-style-type: none"> The User presses the "Leave a feedback" button on the corresponding internship page The system opens a landing page with a form to be filled with the following information: <ol style="list-style-type: none"> Object Description Rating Counterpart reference The user presses the "Post Feedback" button The system checks if all the necessary details are present and it stores the feedback inside the database The system shows the user a successful message
Exit Condition	The feedback is successfully posted on the platform and it is visible to all users
Exception	4. The necessary details are not present. The system displays an error message and the form remains editable, highlighting the incomplete fields.

[UC12] - Update status of the internship

Actors	<ul style="list-style-type: none"> Company's employee
Entry Condition	The internship is published and the Company's employee is logged in on the internship page.
Event Flow	<ol style="list-style-type: none"> The employee views the current status of the internship

	<ol style="list-style-type: none"> 2. The employee opens a dropdown menu "Status" containing only the available status of the internship 3. The employee selects one of the following status options: <ol style="list-style-type: none"> a. Scheduled: to show that the internship has been already published, but has not started yet b. In progress: to show that the internship is still ongoing c. Paused: to show the necessity of temporarily suspending the internship due to a complaint d. Finished: to show that the internship has ended 4. The system updates the internship status with success
Exit Condition	The employee successfully changes the internship status
Exception	<ol style="list-style-type: none"> 2. The employee is not authorized to change the status, the system shows an error message and prevents the update 3. Inconsistent selection. The system shows an error message and prevents the update

[UC13] - Manage Recommendation

Actors	<ul style="list-style-type: none"> • Student • Company's employee
Entry Condition	The platform recommended a counterpart to a user. The user is currently logged in and in the Recommendation section
Event Flow	<ol style="list-style-type: none"> 1. The user clicks on the proposal 2. The system shows a detailed view of the counterpart (details of the internship or detailed CV) 3. The user can: <ol style="list-style-type: none"> a. accept or reject the proposal made by S&C b. see if the counterpart accepted or rejected the respective recommendation. In case of reject, the recommendation of the counterpart will not be visible from the following section access 4. The system updates the platform with the decision of the user
Exit Condition	The user can successfully manage the recommendation
Exception	Not Applicable

[UC14] - University monitors its students

Actors	<ul style="list-style-type: none"> • University's employee
Entry Condition	The employee has to check the internship status of its students. The employee is already logged in and in the dashboard.

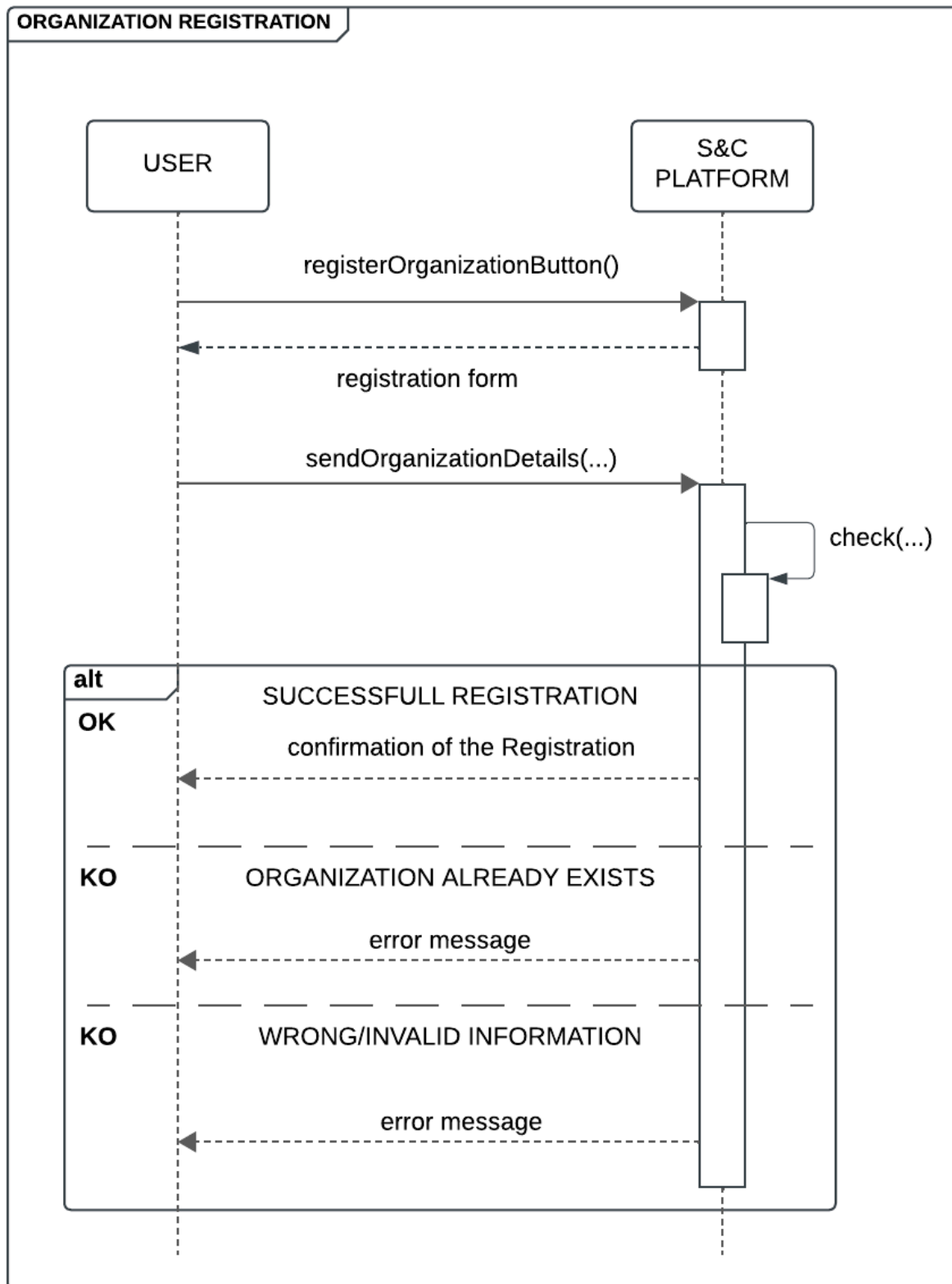
Event Flow	<ol style="list-style-type: none"> 1. The employee clicks on the “Check Students” button 2. The system shows all students currently on an internship or those who have signed a valid contract for a future internship 3. The employee can filter the students by work field, company or internship’s period 4. The system processes the query, applying the filters to all students, and retrieves the matching ones 5. The system displays the full list of matching students 6. The employee can click on a student to see his CV and details
Exit Condition	The employee successfully sees the students and can see their details
Exception	5. No student matches the search criteria. The system notifies the employee about the unavailability of any student.

[UC15] - Manage Complaint

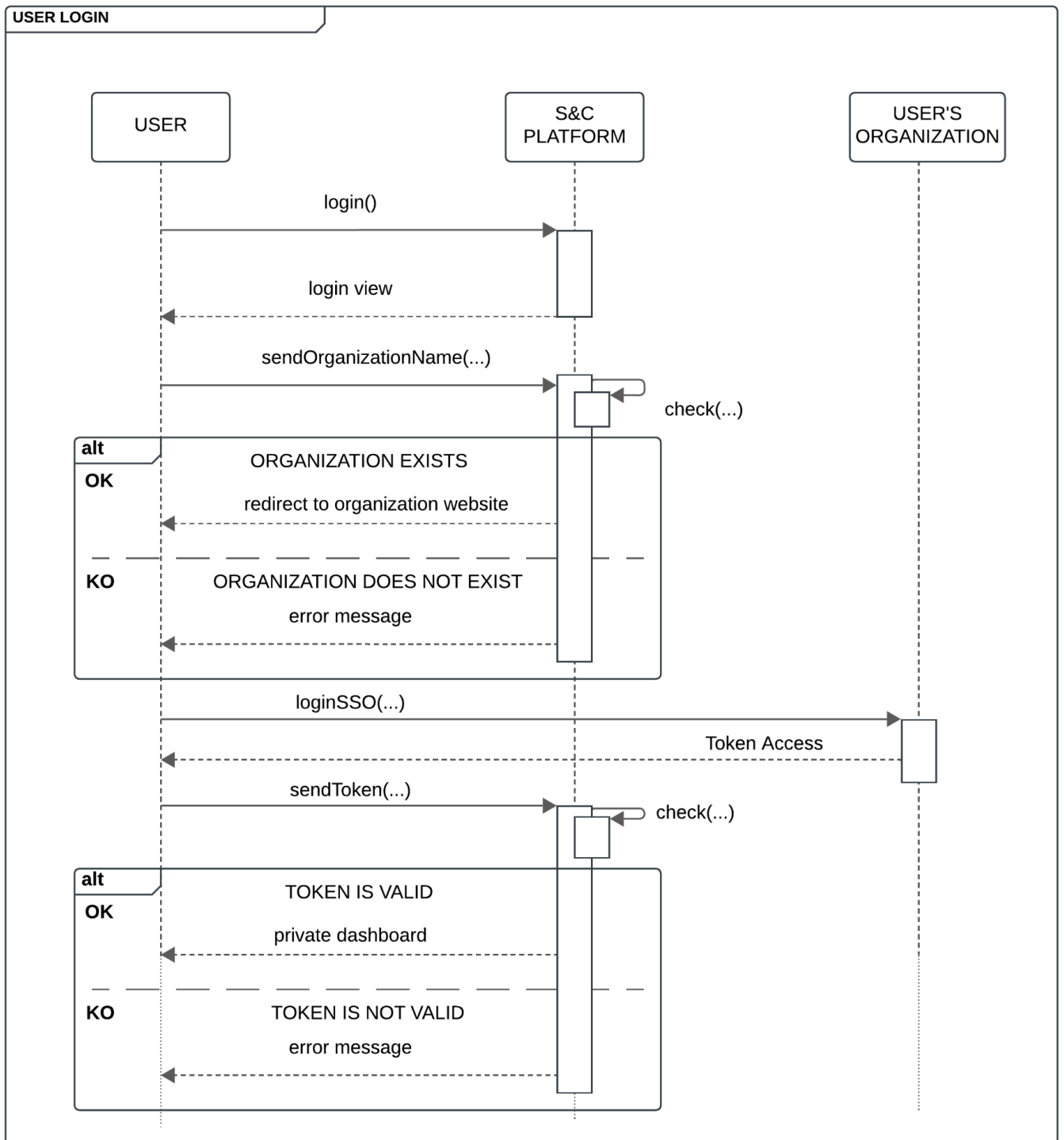
Actors	<ul style="list-style-type: none"> • Company’s employee • Student
Entry Condition	The part has published a complaint about the counterpart. Both the part and the counterpart are logged in the platform and have been informed about the complaint.
Event Flow	<ol style="list-style-type: none"> 1. The system notifies both the part and counterpart about the complaint 2. The part and counterpart communicate 3. If an agreement is reached, both the part and counterpart confirm the resolution to S&C 4. The system closes the complaint and restarts the internship
Exit Condition	The part and the counterpart agreed to close the complaint and continue the internship after a kind resolution
Exception	3. An agreement is not reached. The part informs S&C to terminate the internship immediately. The system

3.2.3 Sequence Diagrams

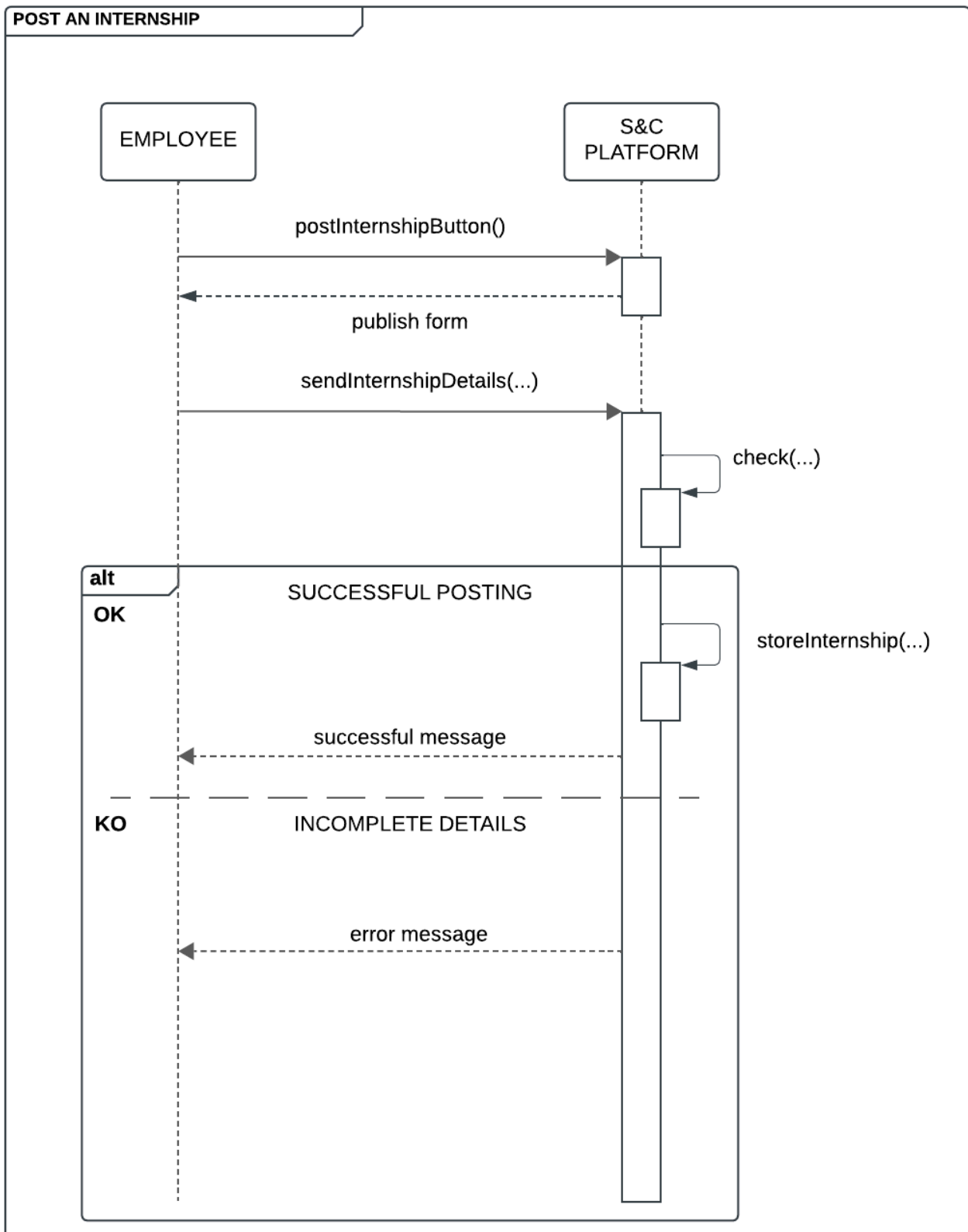
[UC1] - Organization Registration



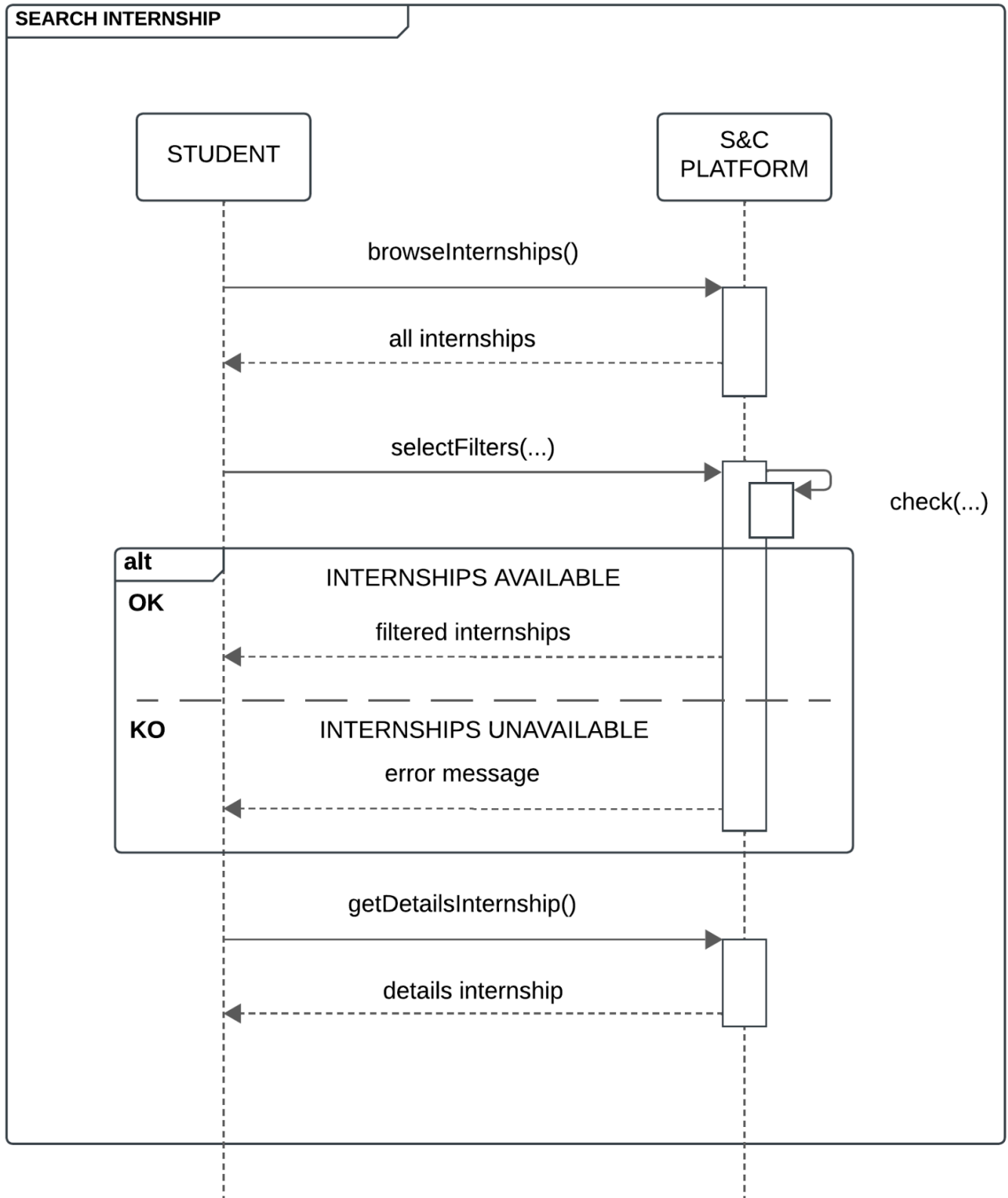
[UC2] - Login User



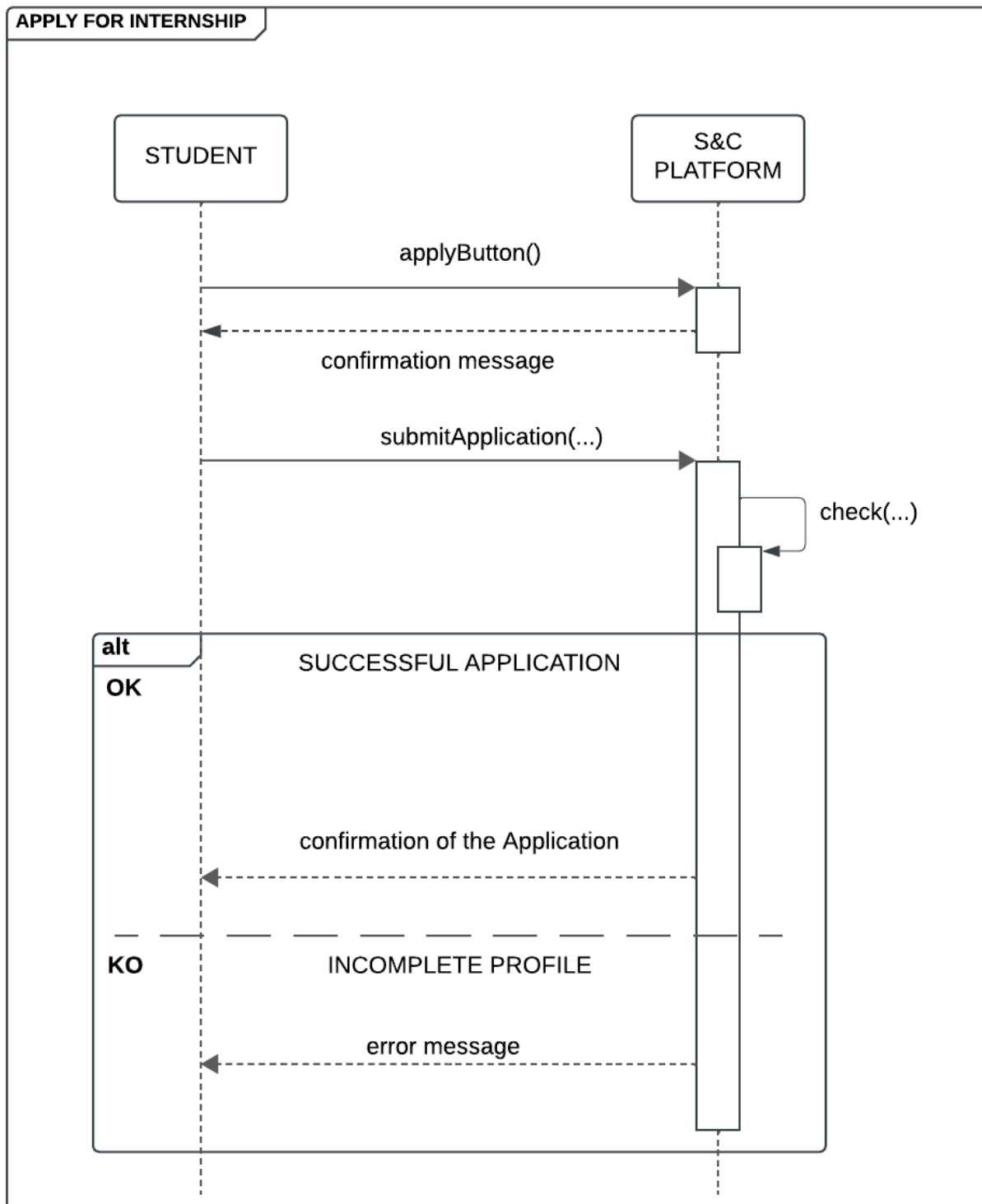
[UC3] - Post an Internship



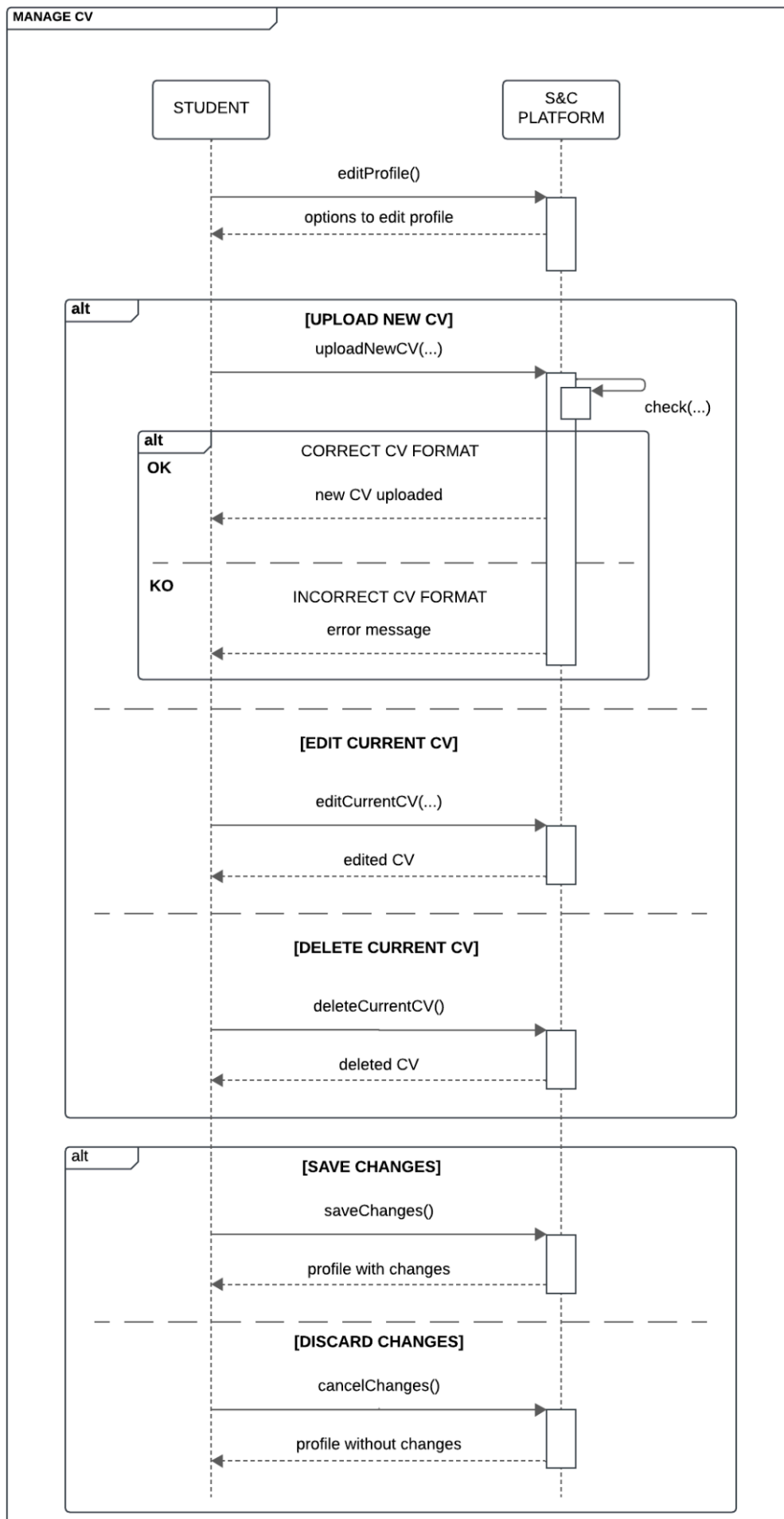
[UC4] - Search for Internship



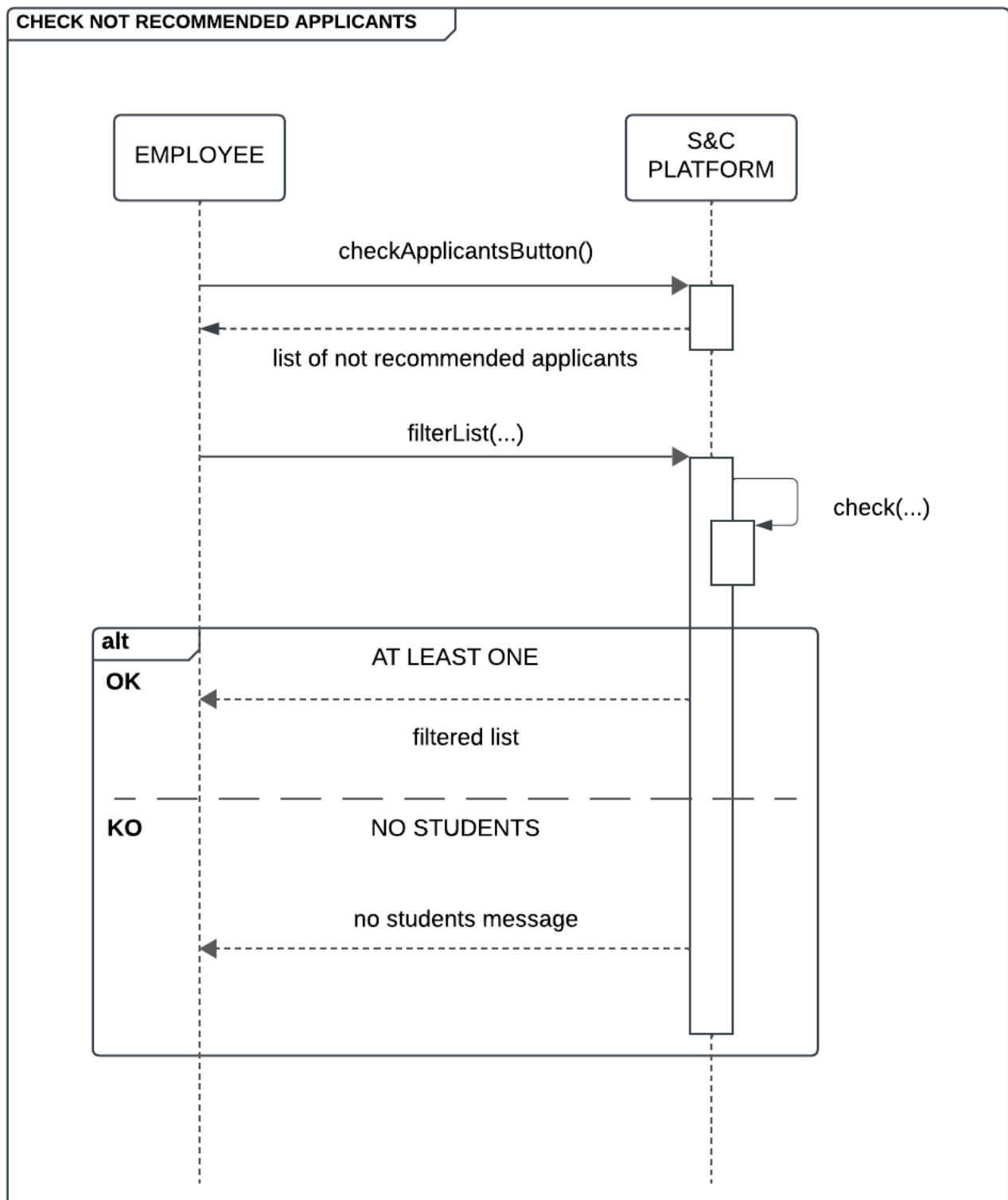
[UC5] - Apply for Internship



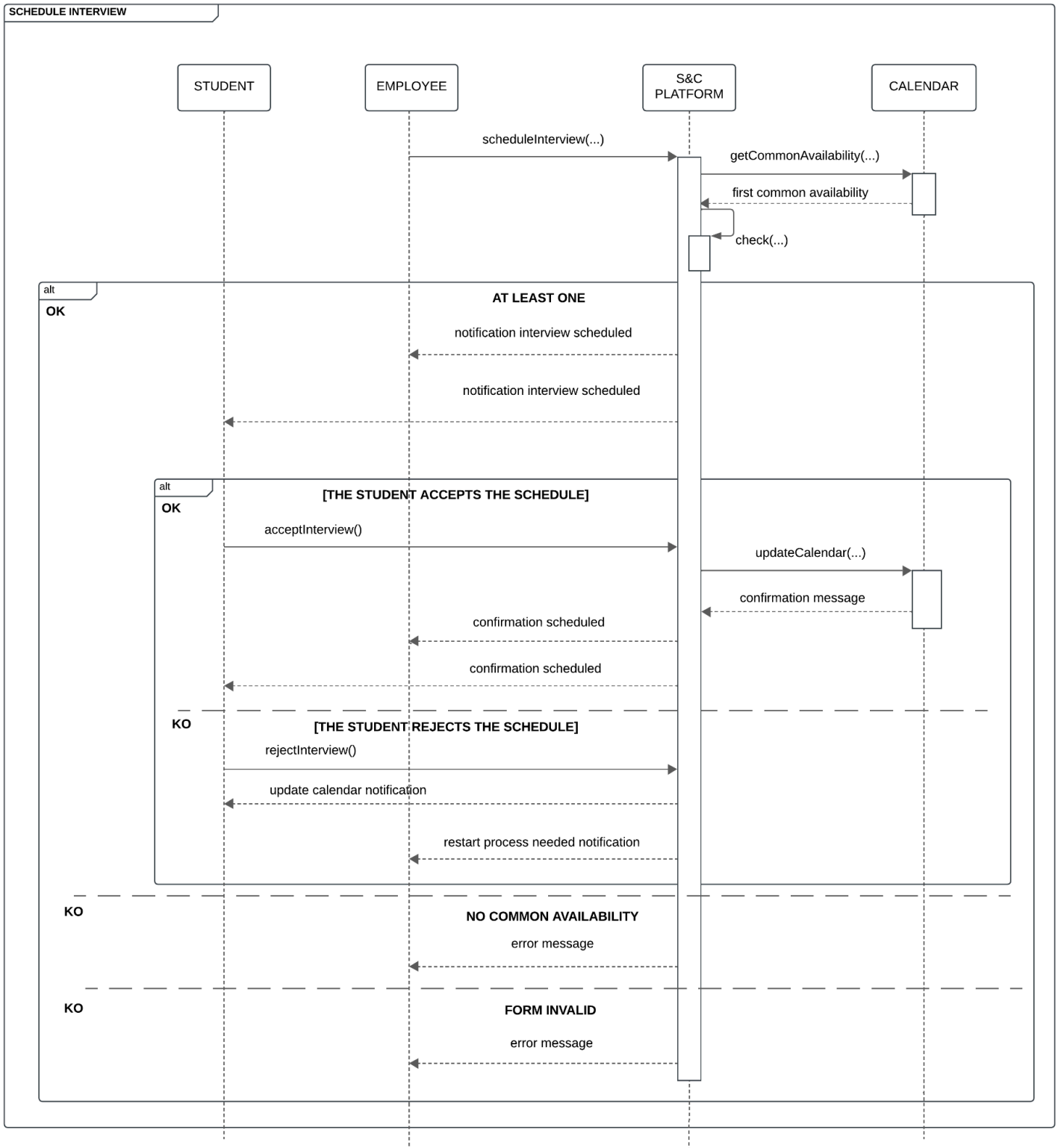
[UC6] - Manage CV



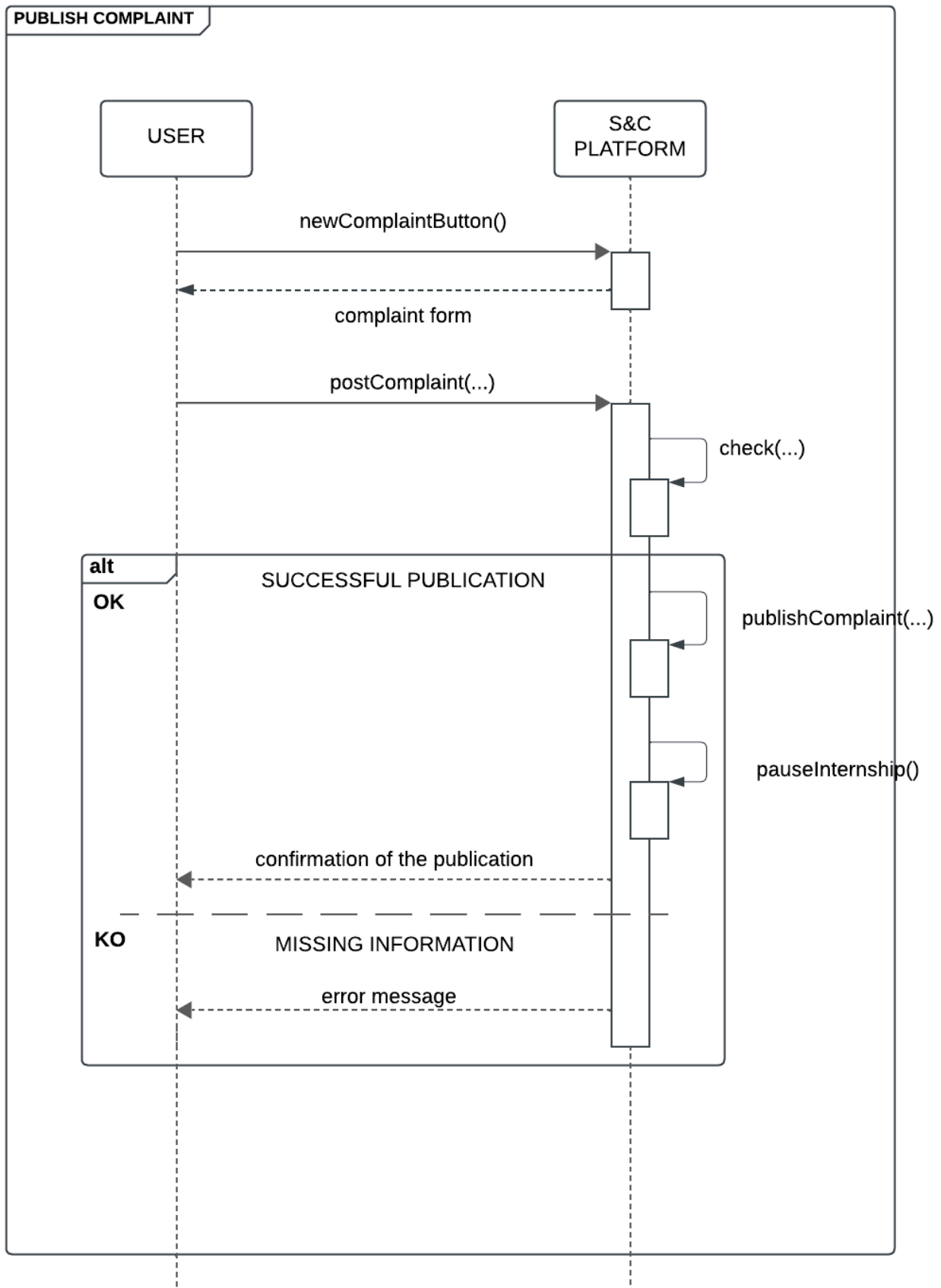
[UC7] - Check Not Recommended Applicants



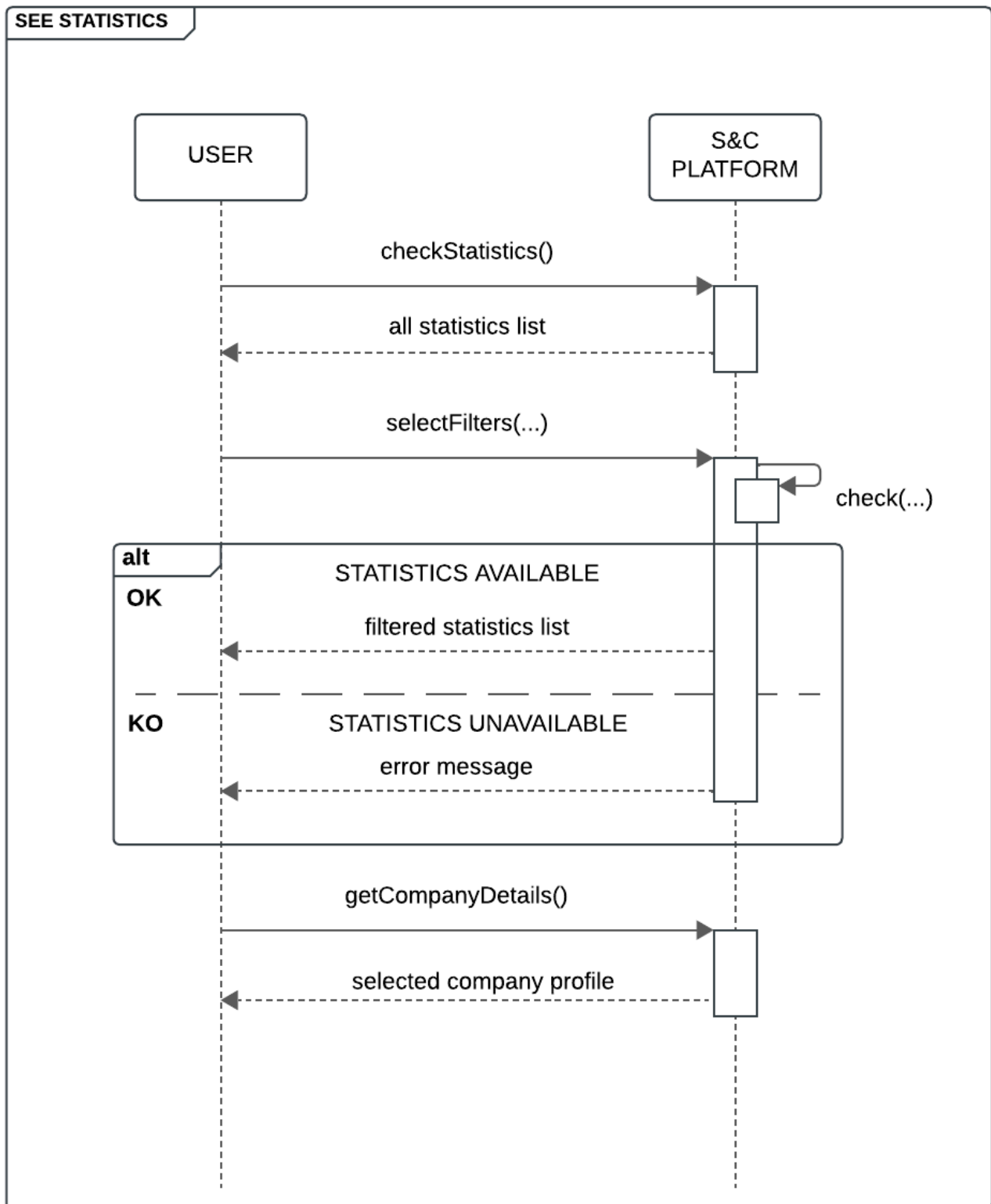
[UC8] - Schedule Interview



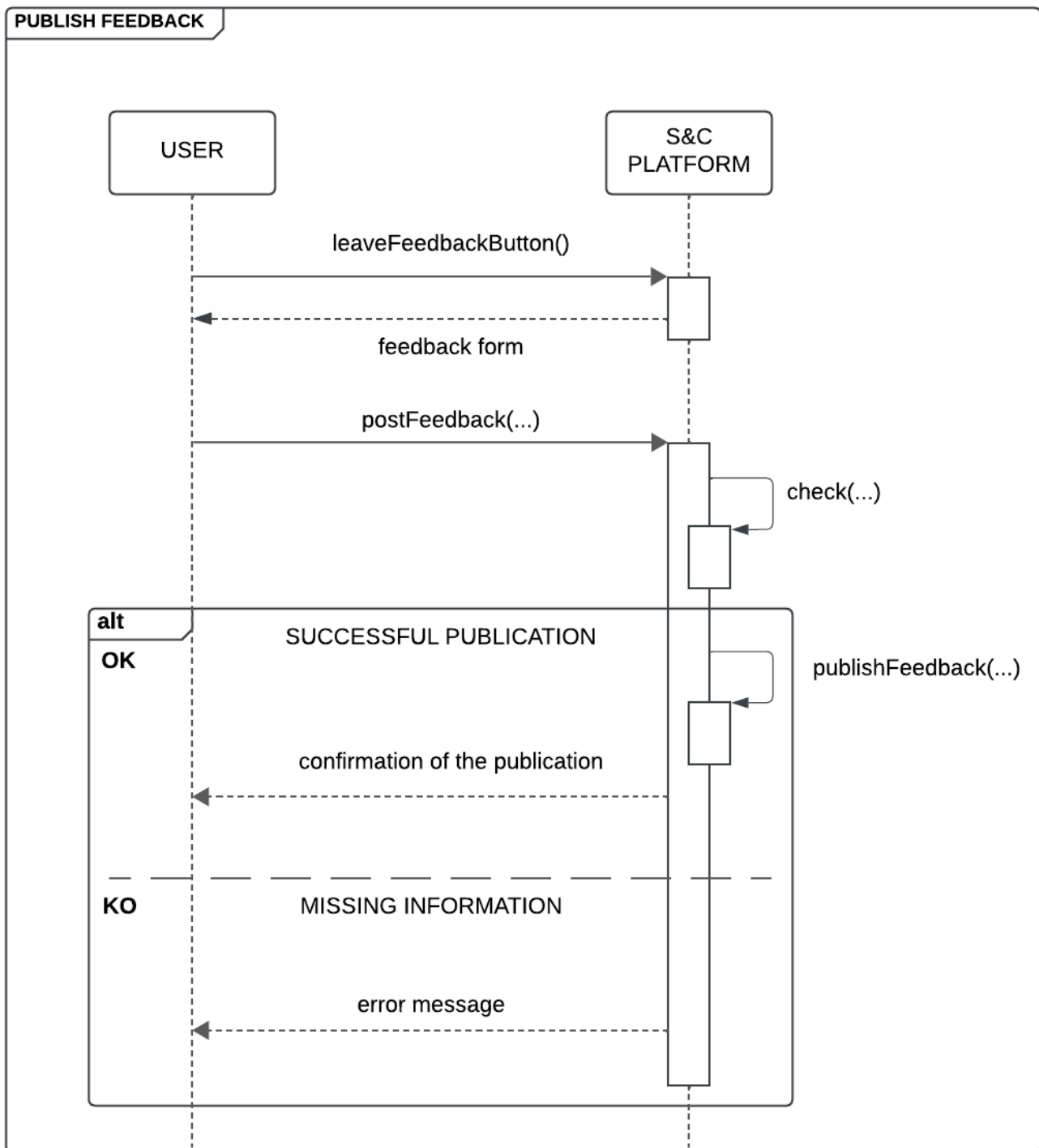
[UC9] - Publish complaint



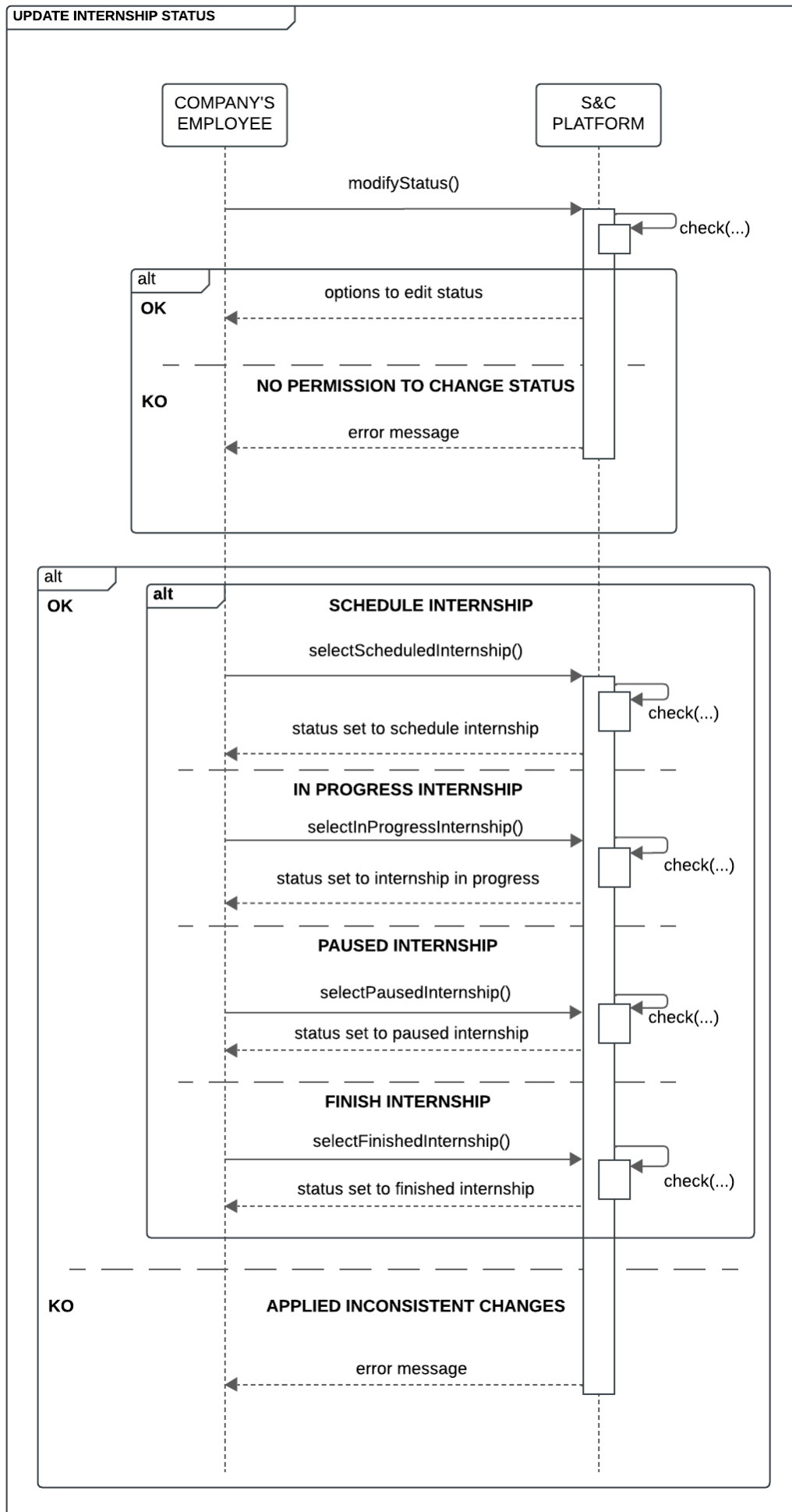
[UC10] - See statistics



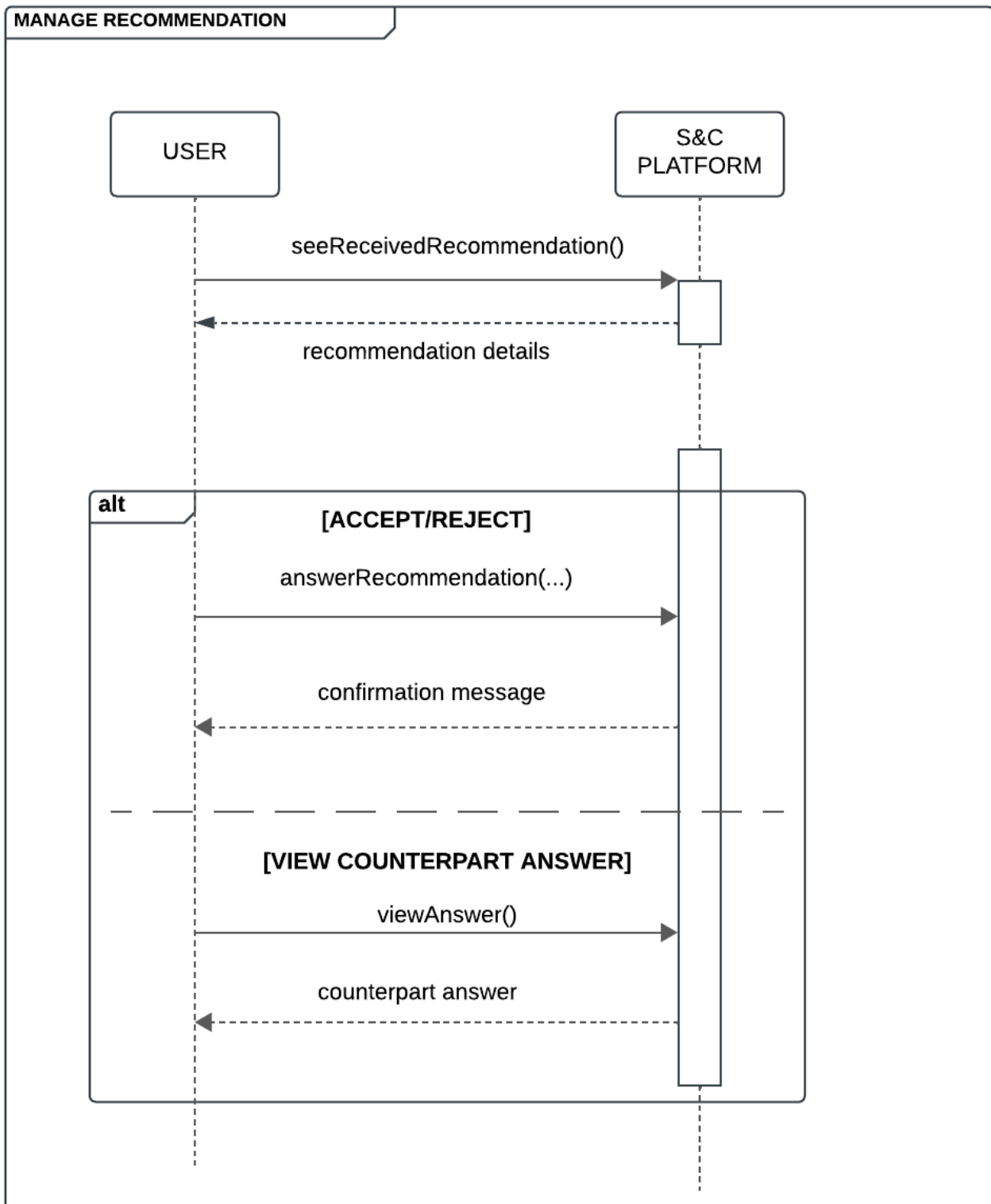
[UC11] - Publish feedback



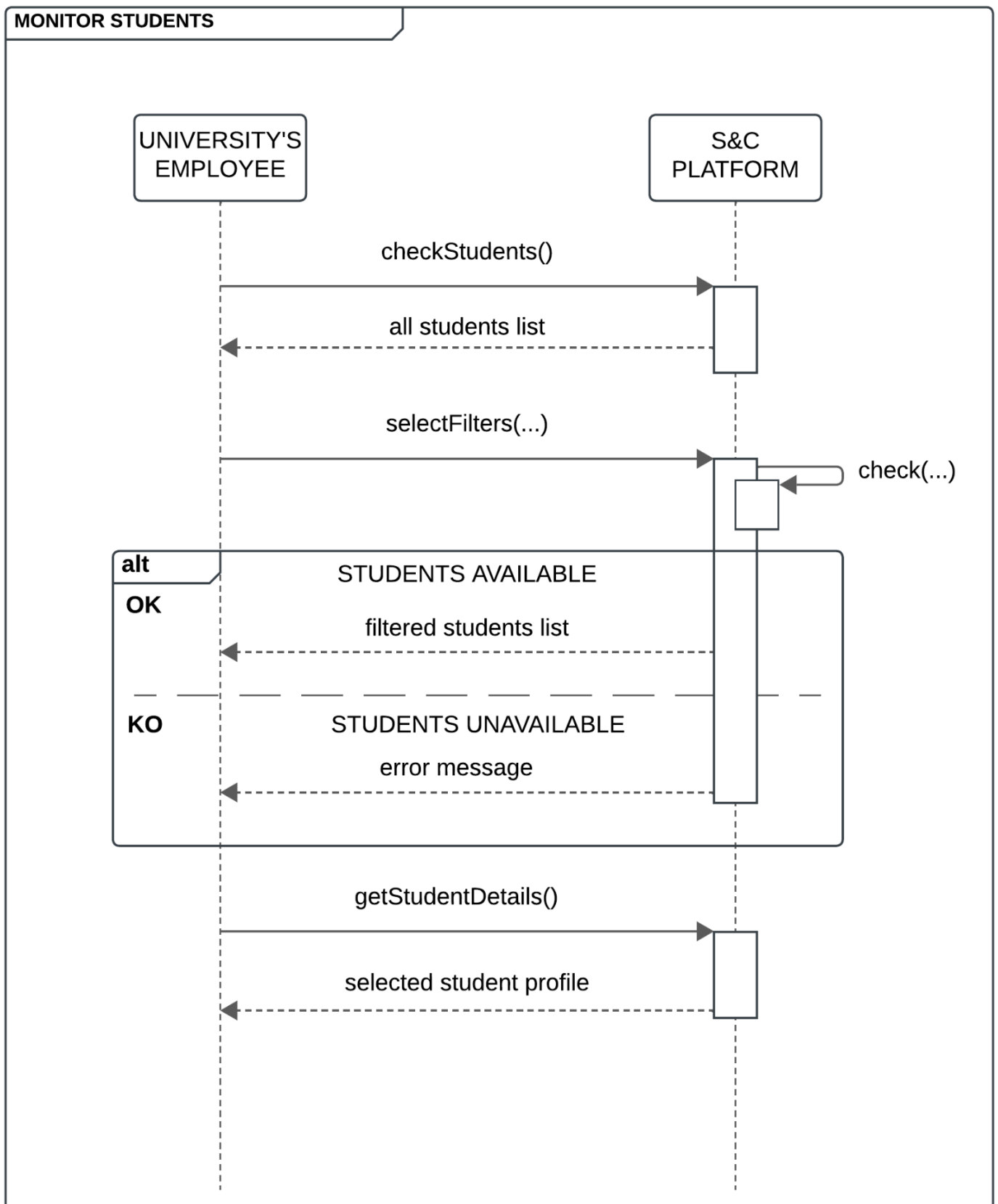
[UC12] - Update status of the internship



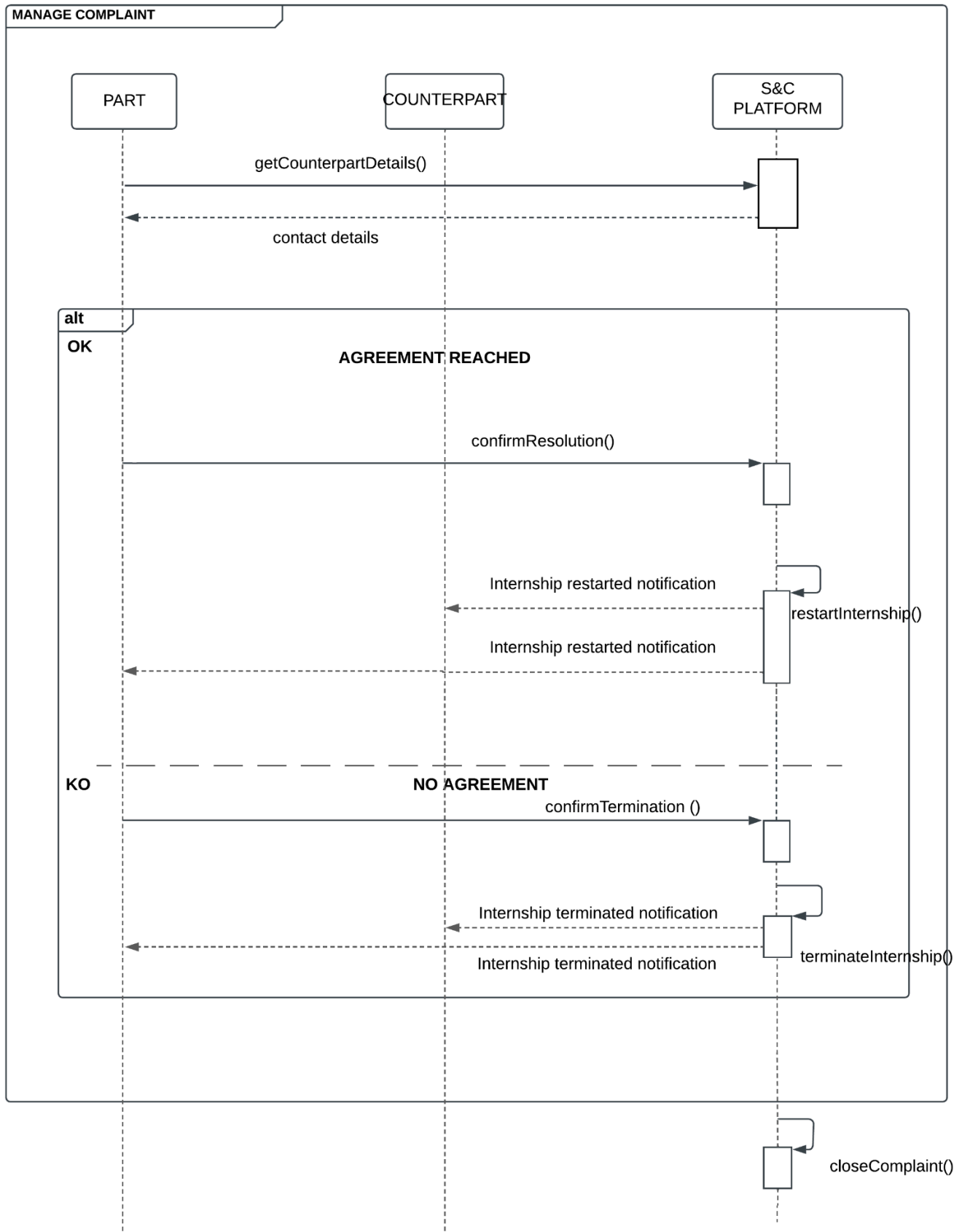
[UC13] - Manage Recommendation



[UC14] - University monitors its students



[UC15] - Manage Complaint



3.2.4. Requirement Mapping

[G1] Companies easily find suitable students for their internships	
<p>[R1] The system allows users to access their private area through SSO.</p> <p>[R2] The system allows Universities and Companies to sign an agreement for registering in the S&C platform.</p> <p>[R3] The system allows Companies to create and publish the internships (projects and terms) they offer.</p> <p>[R4] The system allows Students to manage their CV (skills, experiences, attitudes).</p> <p>[R6] The system allows Company to see Student CVs.</p> <p>[R10] The system allows to send recommendations to interested parties.</p> <p>[R11] The system allows interested parties to manage received recommendations.</p> <p>[R12] The system allows to send notifications to interested parties.</p> <p>[R13] The system allows Companies to review the applications.</p> <p>[R15] The system allows Companies to schedule an interview.</p> <p>[R16] The system allows Companies to use structured questionnaires.</p> <p>[R17] The system allows interested parties to see the details of an interview.</p> <p>[R18] The system allows Companies to finalize the selection of the best candidates.</p> <p>[R19] The system allows Companies to offer an internship through proper tools.</p>	<p>[D1] Users must have a reliable internet connection.</p> <p>[D2] Companies provide accurate and updated internship details.</p> <p>[D3] Students upload valid and accurate CVs and personal information.</p> <p>[D4] Users consent to the collection and processing of personal information</p>

<p>[R24] The system allows interested parties to publish feedback about the internship or the counterpart after the internship.</p> <p>[R26] The system allows users to see and analyze up to date statistics.</p>	
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<p>[G2] University Students easily manage applications for internships matching their skills.</p>	
<p>[R1] The system allows users to access their private area through SSO.</p> <p>[R4] The system allows Students to manage their CV (skills, experiences, attitudes).</p> <p>[R5] The system allows Students to search for internships in the search bar.</p> <p>[R7] The system allows Students to filter and order the internships based on preferences.</p> <p>[R8] The system allows Students to apply at most once to a specific internship.</p> <p>[R9] The system allows Students to review their specific applications.</p> <p>[R10] The system allows to send recommendations to interested parties.</p> <p>[R11] The system allows interested parties to manage received recommendations.</p> <p>[R12] The system allows to send notifications to interested parties.</p> <p>[R17] The system allows interested parties to see the details of an interview.</p> <p>[R20] The system allows Students to manage the offer by the Company.</p>	<p>[D1] Users must have a reliable internet connection.</p> <p>[D2] Companies provide accurate and updated internship details.</p> <p>[D3] Students upload valid and accurate CVs and personal information.</p> <p>[D4] Users consent to the collection and processing of personal information</p>

<p>[R24] The system allows interested parties to publish feedback about the internship or the counterpart after the internship.</p> <p>[R26] The system allows users to see and analyze up to date statistics.</p>	
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[G3] Companies and Students have a smooth internship experience	
<p>[R1] The system allows users to access their private area through SSO.</p> <p>[R8] The system allows Students to apply at most once to a specific internship.</p> <p>[R9] The system allows Students to review their specific applications.</p> <p>[R10] The system allows to send recommendations to interested parties.</p> <p>[R11] The system allows interested parties to manage received recommendations.</p> <p>[R12] The system allows to send notifications to interested parties.</p> <p>[R13] The system allows Companies to review the applications.</p> <p>[R14] The system allows to establish contact between interested parties.</p> <p>[R15] The system allows Companies to schedule an interview.</p> <p>[R16] The system allows Companies to use structured questionnaires.</p> <p>[R17] The system allows interested parties to see the details of an interview.</p> <p>[R18] The system allows Companies to finalize the selection of the best candidates.</p> <p>[R19] The system allows Companies to offer an internship through proper tools.</p>	<p>[D1] Users must have a reliable internet connection.</p> <p>[D4] Users consent to the collection and processing of personal information</p> <p>[D5] Notifications and email communications reach users without significant delays.</p> <p>[D6] Users consent to Calendar access by S&C. Moreover, the employees' calendar is always up to date.</p> <p>[D7] Feedback and complaints mechanisms are properly and honestly used by all users.</p> <p>[D8] Companies conduct interviews and evaluations transparently and fairly.</p> <p>[D9] Each university provides support to their students.</p>

<p>[R20] The system allows Students to manage the offer by the Company.</p> <p>[R21] The system allows Companies to pause the internship.</p> <p>[R22] The system allows Companies to terminate the internship prematurely.</p> <p>[R23] The system allows interested parties to publish complaints about problems during the internship.</p> <p>[R24] The system allows interested parties to publish feedback about the internship or the counterpart after the internship.</p> <p>[R25] The system allows Universities to track and oversee the progress and status of internships undertaken by their students.</p> <p>[R26] The system allows users to see and analyze up to date statistics.</p>	
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3.3 Performance Requirements

The S&C platform must ensure optimal performance to handle a large number of simultaneous users (students, company and university representatives). The response time for any user interaction (e.g., searching for an internship, posting an internship or checking the students in an internship) should not exceed 2 seconds under normal conditions. The platform must be scalable enough to handle peak loads, such as during career fairs or during the periods in which companies are used to post internships, ensuring access for all users. If a user has a slow connection, S&C platform should notify the user and provide feedback assuring that their request is being processed.

3.4 Design Requirements

3.4.1 Standards Compliance

The S&C platform must comply with the General Data Protection Regulation (GDPR) and other relevant data protection laws, ensuring privacy and safety for its users. Any data collected, such as CVs, feedback and complaints, must be stored and processed securely.

All statistics, analytics and feedback data collected must be anonymized before being used for analysis.

3.4.2 Hardware Limitations

The hardware limitations for all users using the platform are the following:

- The device must have a modern web browser (e.g., Chrome, Firefox, Safari) or a corresponding mobile application if using the mobile phone
- The internet connection must be reliable and a minimum 3G connectivity, better if 4G/5G/Wi-Fi, to ensure smooth interactions while using the platform

3.4.3 Any Other Constraint

The S&C platform must be accessible and easy to use for all users, regardless of their technological experience. Therefore, the platform should have a user-friendly interface, with intuitive navigation and clear instructions on how to use it at the beginning of the user experience.

3.5 Software System Attributes

3.5.1 Reliability

The S&C platform must operate continuously without any interruptions for extended periods. In order to guarantee fault tolerance, the platform must have replication and redundancy, allowing it to handle failures effectively, without having a single-point failure. Moreover, the system must implement periodical offline backups for data storage, ensuring possible data restore in case of data loss.

3.5.2 Availability

Although the S&C platform is not a critical emergency service, it must provide a high availability rate of 99.9%. The platform should be designed to minimize service interruptions and ensure that the time between the occurrence of a fault and service recovery has to be contained at 0.365 days per year.

3.5.3 Security

As the S&C platform stores sensitive personal information of all users involved, the system's security must be robust. Therefore, the platform employs advanced security

features. The first is database protection, where all data is stored. The second is communication security, where there is the necessity to ensure privacy and security in all communications over the internet, avoiding traffic sniffing and man-in-the-middle attacks.

3.5.4 Maintainability

The S&C platform must be designed to be highly available and maintainable in order to accommodate future changes and improvements. In fact, the system must follow established software design patterns to enhance scalability. Moreover, the codebase must be well documented, following coding standards to ensure clarity and consistency. In addition, a testing routine must be implemented in order to cover at least 90% of the codebase.

3.5.5 Portability

The S&C platform must be accessible across multiple web applications to ensure that all users can interact with the system. In particular, the web application must be responsive and optimized for different screen sizes and it has to be compatible with multiple operating systems.

4. Formal Analysis using Alloy

The following chapter focuses on modeling the **matchmaking process** in Alloy 6 Modeling Language.

4.1 Signatures

open util/boolean

// Abstract signature representing the general user
abstract sig User {}

// The following signatures are components of the main ones
sig Subject {}
sig Skill {}
sig CV {}
sig Domain {}

// Signature for the University
sig University {
 students: some Student
}

// Signature for the Student with his own data, the set of internships and recommendations
sig Student extends User {
 skills: some Skill,
 cv: one CV,
 interests: some Subject,
 var appliedTo: set Internship,
 recommendation : set RecommendationForStudent
}

// Signature for the Company, which contains its internships and recommendations
sig Company extends User {
 internships: set Internship,
 recommendation: set RecommendationForCompany
}

// Signature for a specific Internship which must be offered exactly by one Company and
// distinguish between appliedStudent (those who have not been recommended),
// recommendedStudent and selectedStudent
sig Internship {
 subject: some Subject,
 requiredSkills: some Skill,
 offeredBy: one Company,

 var appliedStudents: set Student,
 var selectedStudents: set Student,

```

    var recommendedStudents: set Student,
    var interviews: set Interview
}

// Signature for a specific interview, which includes also the boolean value isHired,
// indicating the outcome of the interview
sig Interview {
    student: one Student,
    internship: one Internship,
    var isHired: one Bool
}

// Enum for the current status of the recommendation
enum Status {
    Pending,
    Accepted,
    Rejected
}

// Abstract signature for the Recommendation, which contains the status described above
abstract sig Recommendation {
    var status : Status
}

// Signature for the Recommendation for Company, which extends the abstract one.
sig RecommendationForCompany extends Recommendation {
    student: one Student,
    internship: one Internship
}

// Signature for the Recommendation for Student
sig RecommendationForStudent extends Recommendation {
    internship : one Internship
}

```

4.2 Facts

```

// All CVs belong to exactly one student
fact UniqueCVs {
    all disj s1, s2: Student | s1.cv != s2.cv
}

// No distinct interviews with the same student and the same internship
fact UniqueInterviews {
    no disj i1, i2: Interview |
        i1.student = i2.student and
        i1.internship = i2.internship
}

```

```

// No student cannot belong to different Universities
fact StudentConstraint {
    all s: Student | one u: University | s in u.students
}

// All Students can apply once to a specific Internship
fact UniqueApplications {
    all i: Internship, s: Student |
        lone (s.appliedTo & i) and
        lone (i.appliedStudents & s) and
        (s in i.appliedStudents iff i in s.appliedTo)
}

// This ensures that the recommendation contains a suitable student for the Company
fact ValidRecommendationsForCompanies {
    all c: Company, r: c.recommendation |
        MatchesStudentToInternship[r.student, r.internship] and
        r.internship.offeredBy = c
}

// This ensures that recommendations for students are valid and appropriate
fact ValidRecommendationsForStudent {
    all s: Student, r: s.recommendation |
        MatchesStudentToInternship[s, r.internship]
}

// This ensures the correct managing of the student during the interview process
fact SelectedStudentRules {
    all i: Internship |
        i.selectedStudents in (i.appliedStudents + i.recommendedStudents) and
        i.appliedStudents & i.recommendedStudents = none

    all i: Internship, s: i.appliedStudents + i.recommendedStudents |
        s not in i.selectedStudents and
        lone inv: i.interviews |
            inv.student = s and
            inv.isHired = False

    all i: Internship, s: i.selectedStudents | i.requiredSkills in s.skills
}

fact BothAccepted {
    all i: Internship | all s: i.recommendedStudents |
        one r: s.recommendation |
            r.internship = i and r.status = Accepted and
        one v: i.offeredBy.recommendation |
            v.student = s and v.internship = i and v.status = Accepted
}

```



```

    all i: Internship, s: Student |
      (one r1: s.recommendation | r1.internship = i and r1.status = Accepted) and
      (one r2: i.offeredBy.recommendation | r2.student = s and r2.internship = i and r2.status
        = Accepted)
    implies s in i.recommendedStudents
  }

// This ensures that recommendations are always made in pairs
fact PairedRecommendations {
  all rc: RecommendationForCompany |
    one rs: RecommendationForStudent |
      rs.internship = rc.internship and
      rs in rc.student.recommendation and
      rc in rs.internship.offeredBy.recommendation

  all rs: RecommendationForStudent |
    one rc: RecommendationForCompany |
      rc.internship = rs.internship and
      rc in rs.internship.offeredBy.recommendation and
      rs in rc.student.recommendation
}

// This ensures that if a student is selected, his interview has isHired = True
fact HiredSelected {
  all i: Interview |
    i.isHired = True implies (i.student in i.internship.selectedStudents)
}

// This ensures that the recommendation starts as Pending and then, eventually, it becomes
// whether accepted or rejected
fact RecommendationLifecycle {
  all r: Recommendation |
    r.status' = r.status or
    (r.status = Pending and
     (r.status' = Accepted or r.status' = Rejected))
}

// This ensures correct behaviour between the internship and respective Company
fact InternshipCompanyAssociation {
  all c: Company, i: Internship |
    i in c.internships iff i.offeredBy = c
}

// This ensures all interviewed students have applied or have been successfully
// recommended
fact InterviewConstraints {

```

```

    all inv: Interview |
        inv.student in (inv.internship.appliedStudents +
            inv.internship.recommendedStudents) and
        inv in inv.internship.interviews
}

```

4.3 Predicates and Functions

```

pred applyToInternship[s: Student, i: Internship] {
    s not in i.appliedStudents
    s not in i.recommendedStudents
    i.appliedStudents' = i.appliedStudents + s
    s.appliedTo' = s.appliedTo + i
    i.recommendedStudents' = i.recommendedStudents
}

```

```

pred MatchesStudentToInternship[student: Student, internship: Internship] {
    internship in matchedInternships[student]
}

```

```

fun matchedInternships[s: Student]: set Internship {
    {i : Internship |
        some(s.skills & i.requiredSkills) and
        some(i.subject & s.interests)
    }
}

```

```

pred manageRecommendation[s: Student, i: Internship, status1: Status, status2: Status] {
    s not in i.appliedStudents and
    one r1: s.recommendation |
        r1.internship = i and
        r1.status' = status1
    one r2: i.offeredBy.recommendation |
        r2.student = s and
        r2.internship = i and
        r2.status' = status2
    i.recommendedStudents' = i.recommendedStudents + s iff (status1 = status2 and
                                                                    status1 = Accepted)
}

```

4.4 Examples

```

assert NoSelectionWithoutInterview {
    //all selected students have been interviewed
    all i: Internship, s: i.selectedStudents |
        one inv: i.interviews |
            inv.student = s and
            inv.isHired = True
}

```

check NoSelectionWithoutInterview

Executing "Check NoSelectionWithoutInterview"

Solver=sat4j Steps=1.10 Bitwidth=4 MaxSeq=4 SkolemDepth=1 Symmetry=20 Mode=batch
1.10 steps. 46240 vars. 5095 primary vars. 72843 clauses. 354ms.
No counterexample found. Assertion may be valid. 6ms.

assert NoDuplicateRecommendations {

all s: Student, i: Internship |

{r: RecommendationForCompany | r.student = s and r.internship = i} <= 1

}

check NoDuplicateRecommendations

Executing "Check NoDuplicateRecommendations"

Solver=sat4j Steps=1.10 Bitwidth=4 MaxSeq=4 SkolemDepth=1 Symmetry=20 Mode=batch
1.10 steps. 53066 vars. 5095 primary vars. 91429 clauses. 506ms.
No counterexample found. Assertion may be valid. 3ms.

assert NoSimultaneousApplicationAndRecommendation {

all i: Internship, s: Student |

s in i.appliedStudents implies s not in i.recommendedStudents

}

check NoSimultaneousApplicationAndRecommendation

Executing "Check NoSimultaneousApplicationAndRecommendation"

Solver=sat4j Steps=1.10 Bitwidth=4 MaxSeq=4 SkolemDepth=1 Symmetry=20 Mode=batch
1.10 steps. 52696 vars. 5095 primary vars. 89859 clauses. 519ms.
No counterexample found. Assertion may be valid. 7ms.

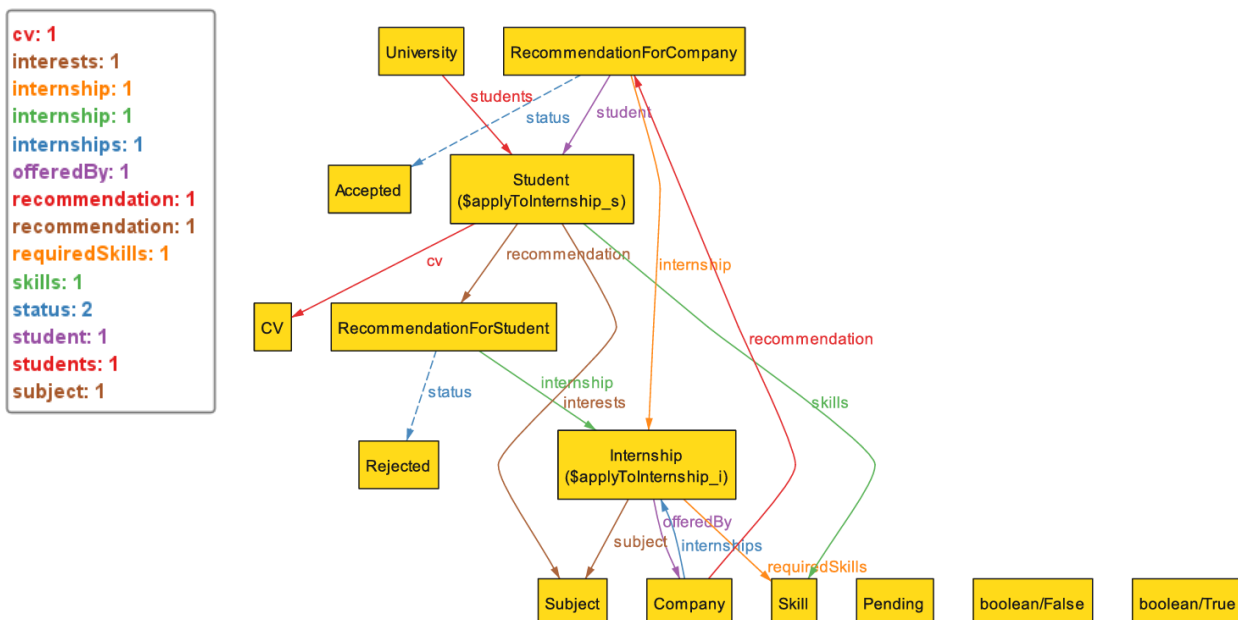
run applyToInternship {

some s: Student, i: Internship |

applyToInternship[s, i]

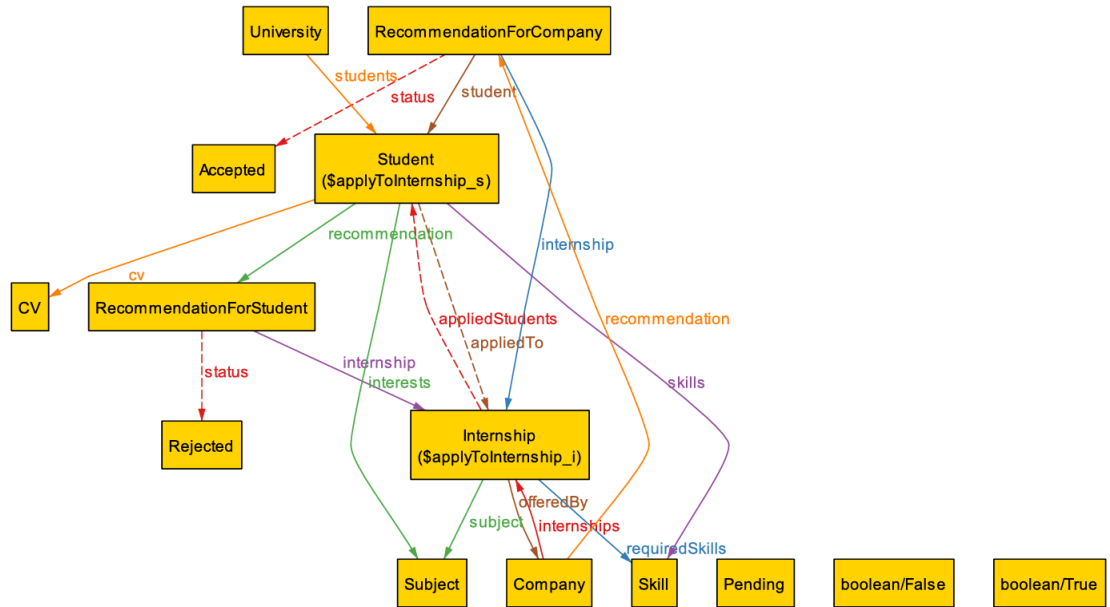
} for 4 but 1 Student, 1 Internship

STEP 0



STEP 1

appliedStudents: 1
 appliedTo: 1
 cv: 1
 interests: 1
 internship: 1
 internships: 1
 internships: 1
 offeredBy: 1
 recommendation: 1
 recommendation: 1
 requiredSkills: 1
 skills: 1
 status: 2
 student: 1
 students: 1
 subject: 1

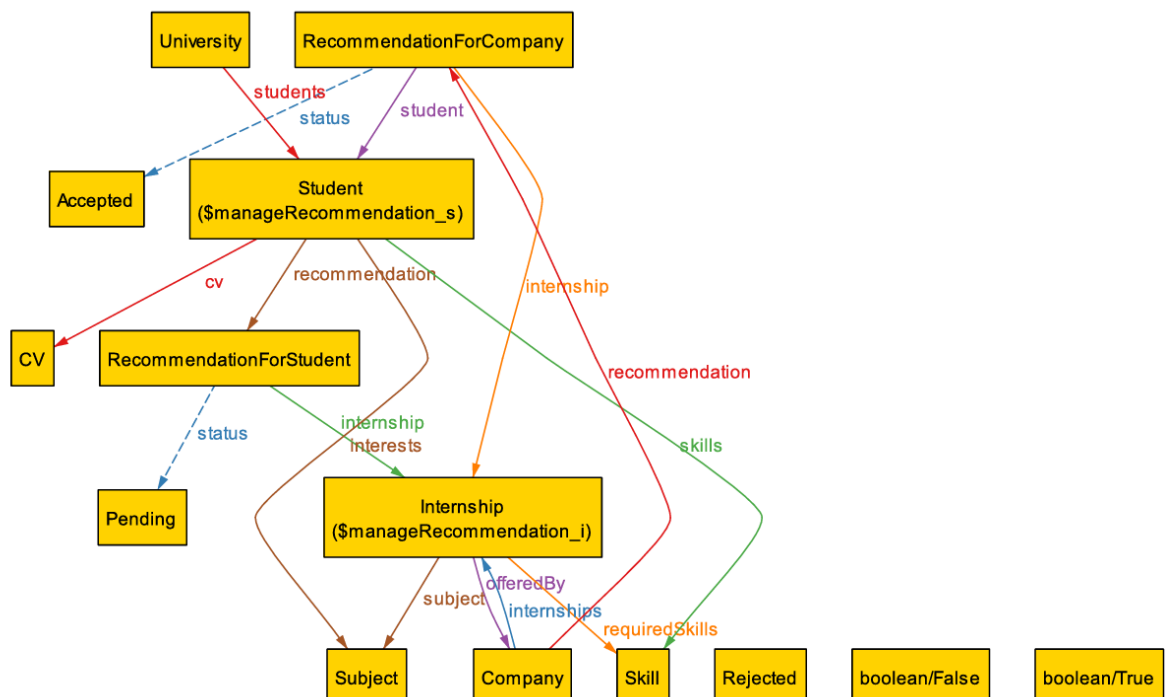


```

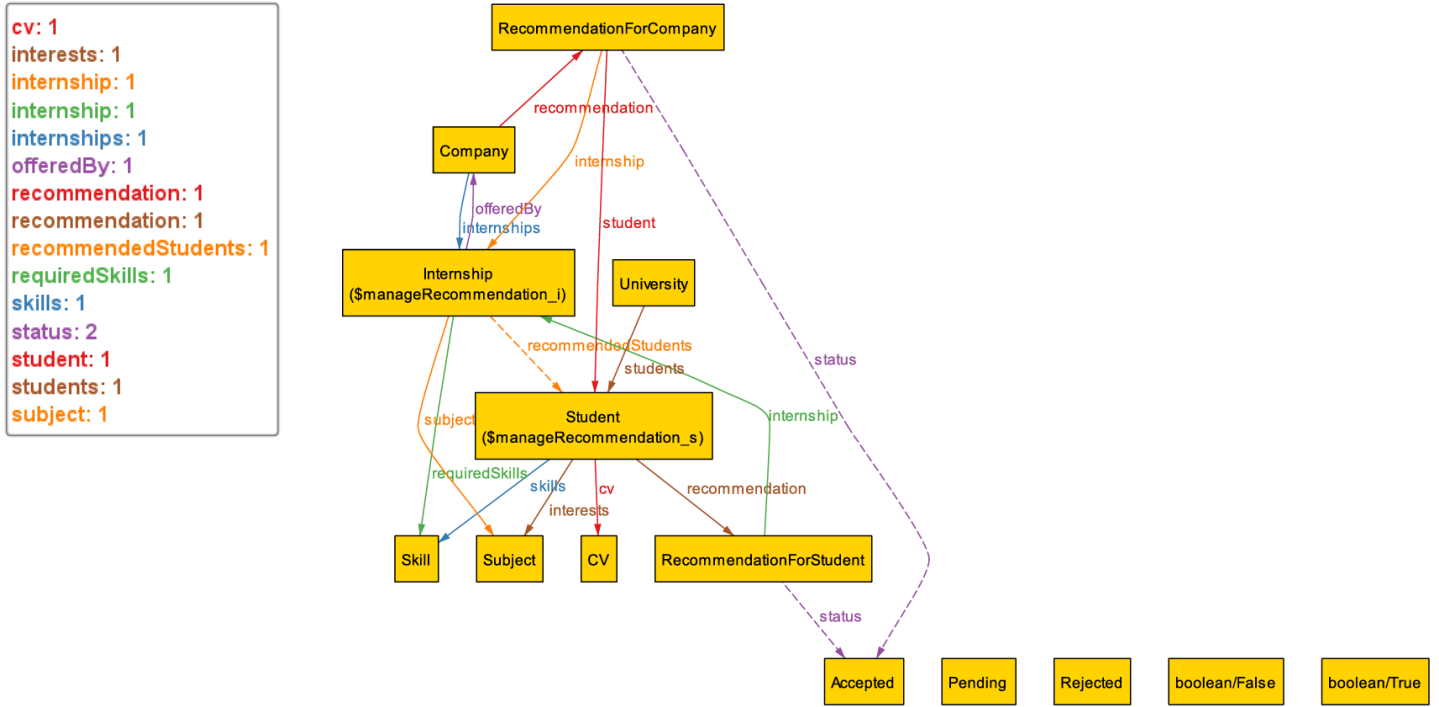
run manageRecommendation {
  some s: Student, i: Internship |
  s not in i.appliedStudents and
  s not in i.recommendedStudents and
  manageRecommendation[s, i, Accepted, Accepted]
} for 4 but 1 Student, 1 Internship
  
```

STEP 0

cv: 1
 interests: 1
 internship: 1
 internship: 1
 internships: 1
 offeredBy: 1
 recommendation: 1
 recommendation: 1
 requiredSkills: 1
 skills: 1
 status: 2
 student: 1
 students: 1
 subject: 1



STEP 1



5. Effort Spent

ALMANDOZ FRANCO Rodrigo

Chapter	Effort (in hours)
1	7
2	22
3	25
4	25

BRANDI Mattia

Chapter	Effort (in hours)
1	7
2	18
3	29
4	25

6. References

- Diagrams made with: <https://lucid.co/>
- User Interface made with: <https://www.canva.com/>
- Alloy models runned and check with: <https://alloytools.org/>