
Software Requirements Specification

for

A Software for Summer Internship

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1 Introduction

1.1 Purpose

Our project has five key objectives.

First, it enables students to easily find internship opportunities in their areas of interest. Instead of manually searching for internships or waiting for connections, students can access a wide range of opportunities from different companies through the system. This ensures they can find suitable internships without difficulty.

In addition, the system allows students to apply directly to companies through the platform. This eliminates the need for email-based applications or visiting different websites, simplifying the application process for students.

Moreover, the platform provides students the opportunity to connect with individuals who have previously completed internships at the same companies. This allows them to gather insights about the internship experience, the company environment, and expectations, helping them make more informed decisions about where to apply.

Additionally, students can enter details about new internships they are undertaking, serving as references for other students who may be interested in similar opportunities. This feature encourages collaboration and shared knowledge within the student community.

As a result, this project offers students the opportunity to find internships easily, apply directly through the platform, connect with former interns to gain valuable insights, and contribute as references for future internships. At the same time, companies can manage their internship programs in one centralized location, making the process more efficient and accessible for both parties.

1.2 Scope

Goal of our project is to make the internship experience easier for computer engineering students at METU NCC by providing online platforms for both the Compulsory Non-Credit course: CNG 300-400 and optional internships. We are creating a user-friendly website for students, companies, student affairs, coordinator, and instructor.

Purpose: Our main aim is to simplify the internship process. We believe that going digital can help users with challenges like registration, tracking, evaluations, and notifications. This means that managing internships can be more straightforward and transparent, making things easier for everyone while still being efficient.

Objectives:

- Convenience: We want students to have a simple experience when filling out registration forms and starting their internships. Our system will help companies and coordinators save time on approving and assessing internships.

- Notifications and Alerts: We will send different emails to students, coordinators, instructors, student affairs, and companies at various stages of the internship process. For example, we will send

informational emails during the approval phase and reminders to companies to complete their evaluation forms at the end of the internship.

- Report Evaluation and Updates: Students can upload their reports to the system, and instructors can review these reports and give feedback without needing to meet in person.

- Statistics and Monitoring: Coordinators will have tools to easily monitor internship registrations, company approvals, and report evaluations.

- Internship Cancellation and Other Functions: Students will be able to cancel their internships before they start, which can be done before the respective classes begin.

Overall, the system will be developed as a web application that can be used on computers, tablets, smartphones, and other devices.

1.3 Related Work

Internship management systems are essential tools for streamlining the process of managing internships for both students and educational institutions. They enable the coordination of students, faculty, and external company supervisors, ensuring that all necessary steps are completed efficiently. Existing systems, such as METU NCC's current internship management system, allow students to fill out internship forms, submit reports, and receive feedback. These systems also provide coordinators with the ability to approve internship placements and monitor student progress. You can see the existing system example in Figure 1.

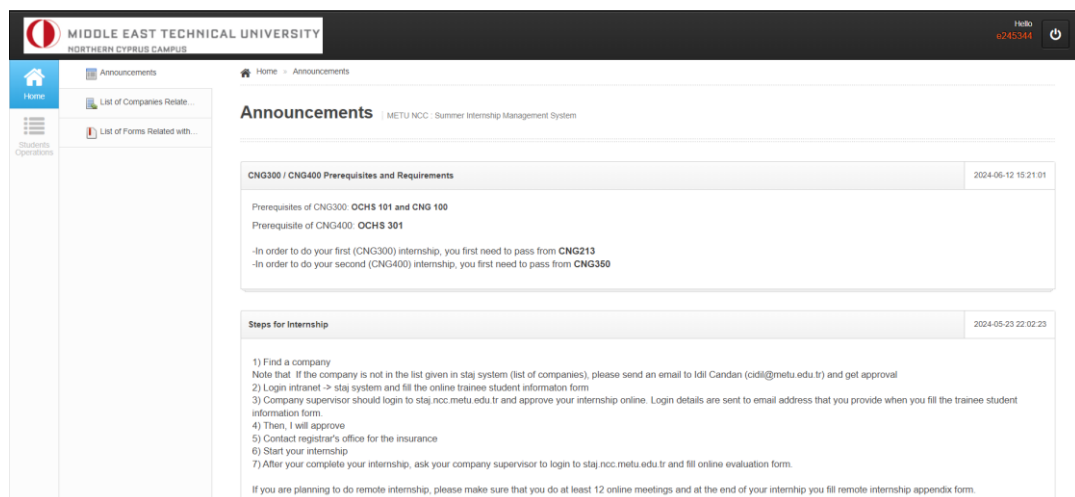


Figure 1: Example of existing system

In our case, we have extended the existing functionality of the internship management system by introducing new features and improving user interactions. For example:

Students can now browse internship opportunities, check companies based on state or country, submit resumes, fill trainee information forms, and apply for internships. They can also manage their internship history, receive notifications, and submit reports.

Coordinator have enhanced role in managing announcements, assigning instructors, setting deadlines, and evaluating reports.

Company supervisors are able to assign supervisors, evaluate students, and give feedback directly through the system.

Student Affairs personnel handle tasks related to approving internships, verifying health insurance, and ensuring the administrative steps are completed.

Compared to traditional systems, which often require manual follow-ups and limited real-time interaction, our system automates key tasks and integrates them with notification services (such as mail alerts). Additionally, features like evaluation feedback and the ability to re-edit reports directly through the system ensure continuous improvement and timely communication.

1.4 Product Overview

1.4.1 Product perspective

Summer Internship System is designed as a standalone platform that integrates with external services, such as Google Mail, to enhance its functionality. It provides a centralized interface for students to find and apply for internships, while also enabling companies to manage and post internship opportunities. The system operates independently but interacts with third-party services to deliver features like automated email notifications, ensuring a seamless experience for both students and companies. You can see the product perspective block diagram from Figure 2.

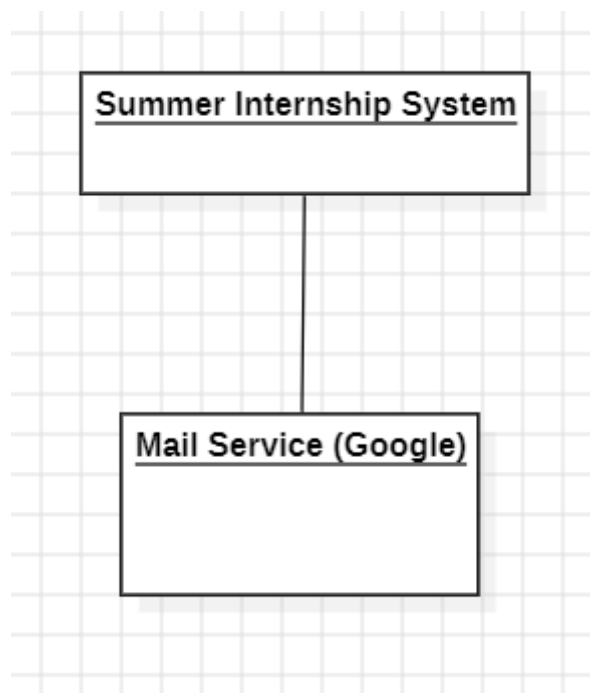


Figure 2: Product Perspective Block Diagram

1.4.1.1 System Interfaces

1. Google Interface

Summer Internship System interfaces with the external Google Mail Service to manage email notifications. This interface enables the system to send automated emails, such as reminders, application confirmations, and important updates related to internships. By using Google's mail service, the system ensures secure and reliable email delivery, which is essential for maintaining effective communication with users and enhancing their overall experience within the platform.

1.4.1.2 User interfaces

1. Welcome Page:

Welcome Page is the homepage of the Internship System, offering students easy access to key sections such as Announcements, My Internships, Forms, and Notifications. The dashboard provides a clear layout for students to quickly navigate to their desired section, creating a cohesive and user-friendly entry point to the internship management system. You can see the welcome page in Figure 3.

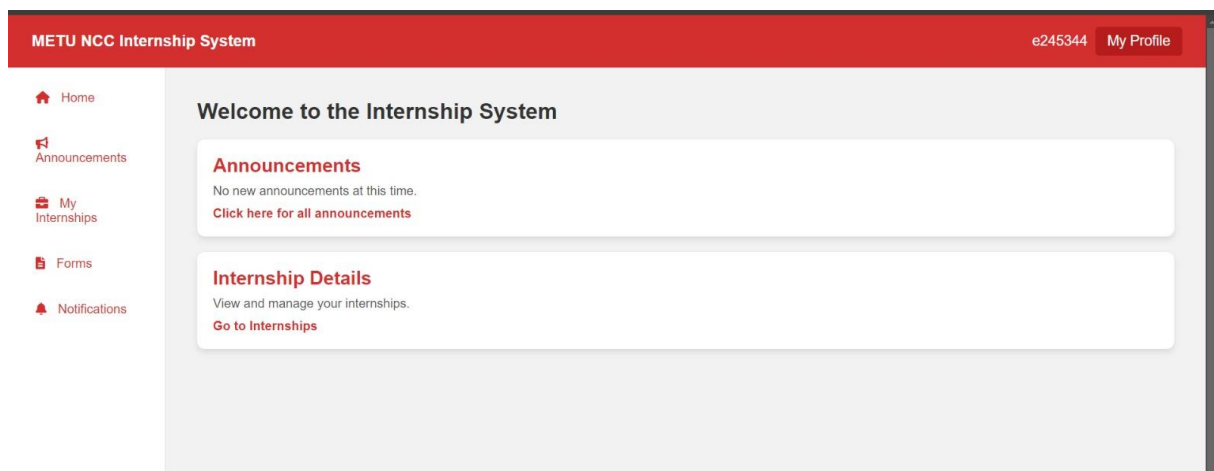


Figure 3: Welcome Page

2. My Internships Page:

My Internships Interface displays a summary of the student's completed internships, along with overall statistics such as total internships and average approval time. Each internship entry includes details like the company name, year, supervisor, and completion status. This layout provides students with quick access to download their reports and view the outcomes, facilitating efficient internship tracking. You can see from Figure 4.

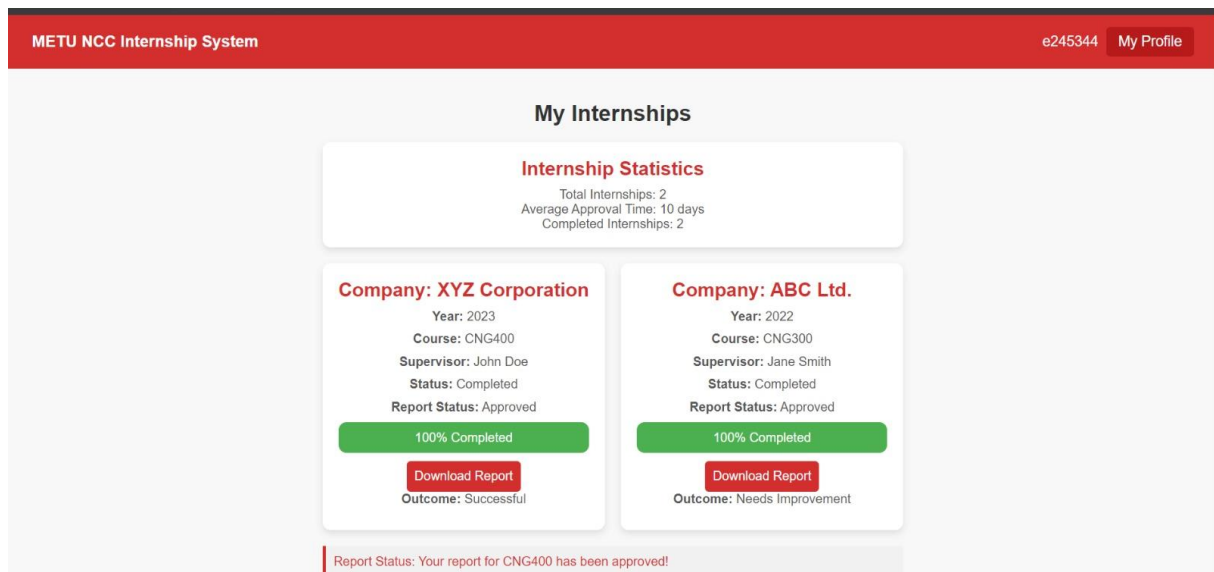


Figure 4: My Internships Page

3. Former Internships Page:

Former Internships Interface provides students with an overview of previous internship placements. Each entry displays information like the company name, country, contact email, and rating. Action buttons allow students to apply to the company, add it to favourites, or view the company profile, ensuring that students can make informed decisions based on their interests and past internship experience. You can see from Figure 5.

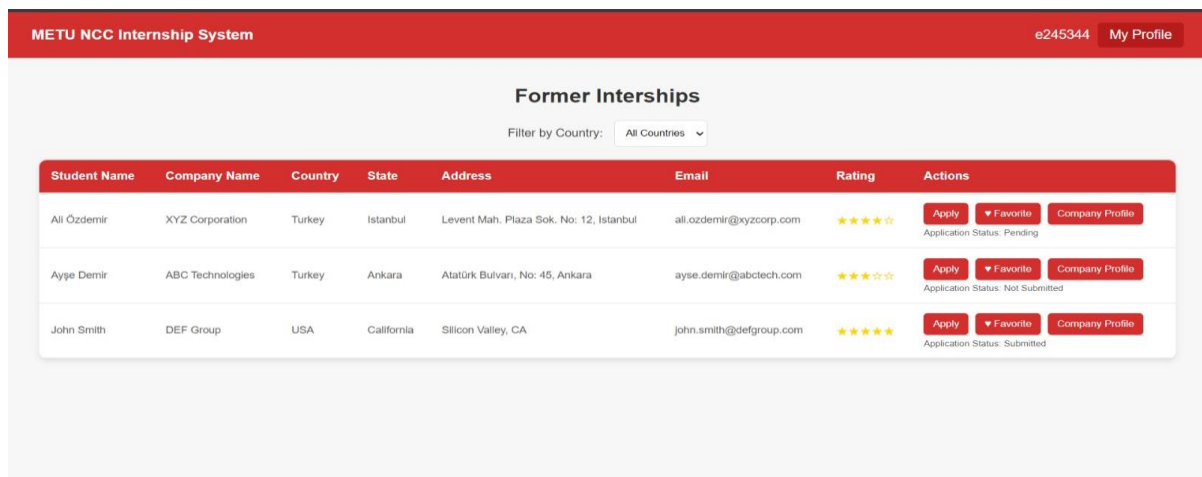


Figure 5: Former Internships Page

Resume Upload Page:

Resume Upload Interface enables students to add their resume to their profile in PDF format. Users can drag and drop their file or browse to select it, making the process flexible and user-friendly. This interface is streamlined for easy resume submission, ensuring that students can upload their documents efficiently. You can see from Figure 6.

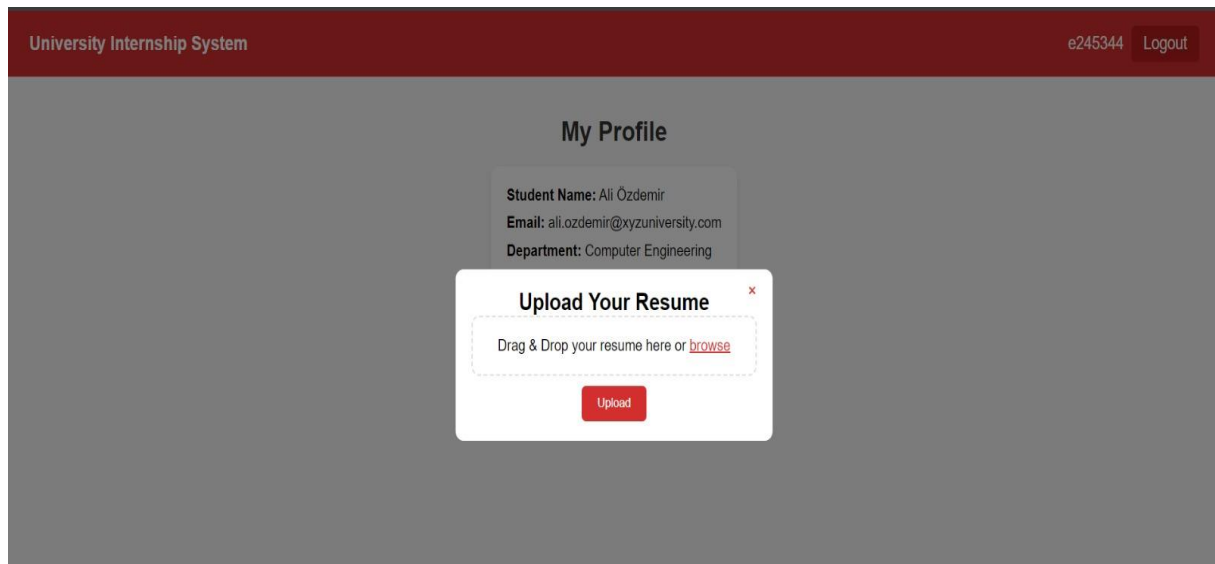


Figure 6: Resume Upload Page

List of Forms Page:

Forms Interface in the Internship System allows students to access, filter, and download relevant documents easily. Users can search for forms by title or filter them by category, making navigation straightforward. Additionally, each form entry includes options to download, add to favourites, and view details, enhancing the user experience by providing direct access to essential resources. You can see from Figure 7.

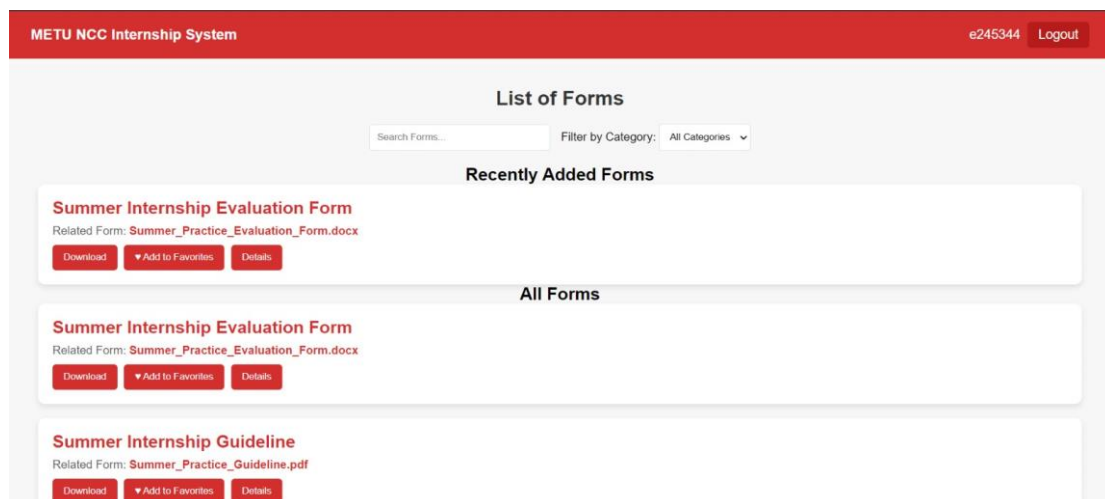


Figure 7: List of Forms Page

Company Page

Company interface is the page companies see when they login to the system. Here the company representative can see the details of the students who are on internship in their organization and can approve or reject their internship. In addition, if they want to check or update the supervisor information of the approved users later, they can use the Supervisor button. They can also evaluate the students accepted for internship with the Evaluate button. You can see from Figure 8.

METU NCC Internship System Company A

Internships

Search...

| Student Name | Email | Start Date | Finish Date | Health Insurance | Action |
|-------------------|---------------------|------------|-------------|------------------|---------------------|
| Ali Firat Özdemir | 2453447@metu.edu.tr | 01/08/2024 | 30/08/2024 | No | Accept Reject |
| Mert Damburacı | 2453108@metu.edu.tr | 01/06/2024 | 30/06/2024 | Yes | Supervisor Evaluate |
| Efekan Uysal | 2585461@metu.edu.tr | 01/07/2023 | 03/08/2024 | Yes | Supervisor Evaluate |
| Umutcan Çelik | 2526200@metu.edu.tr | 30/06/2024 | 28/07/2024 | Yes | Supervisor Evaluate |

« 1 2 3 »

METU NCC Internship System
Copyright © 2024. All Rights Reserved.
If you experience any problems, please contact us at example@edu.tr

Figure 8: Company Page

Intern Acceptance Form Window

If companies click on the Accept button to accept a student's internship, a form will appear where some important information about the internship, including Supervisor information, must be entered to accept the intern. You can see from Figure 9.

METU NCC Internship System Company A

Trainee Supervisor Details for Ali Firat Özdemir

Trainee Supervisor's Name

Trainee Supervisor's Surname

Trainee Supervisor's E-mail

Trainee Supervisor's Telephone

Trainee Supervisor's Fax

Tasks the Trainee will be issued

Benefits and Facilities

Accept Cancel

Search...

| Student Name | Email |
|-------------------|---------------------|
| Ali Firat Özdemir | 2453447@metu.edu.tr |
| Mert Damburacı | 2453108@metu.edu.tr |
| Efekan Uysal | 2585461@metu.edu.tr |
| Umutcan Çelik | 2526200@metu.edu.tr |

Action

Accept Reject

Supervisor Evaluate

Supervisor Evaluate

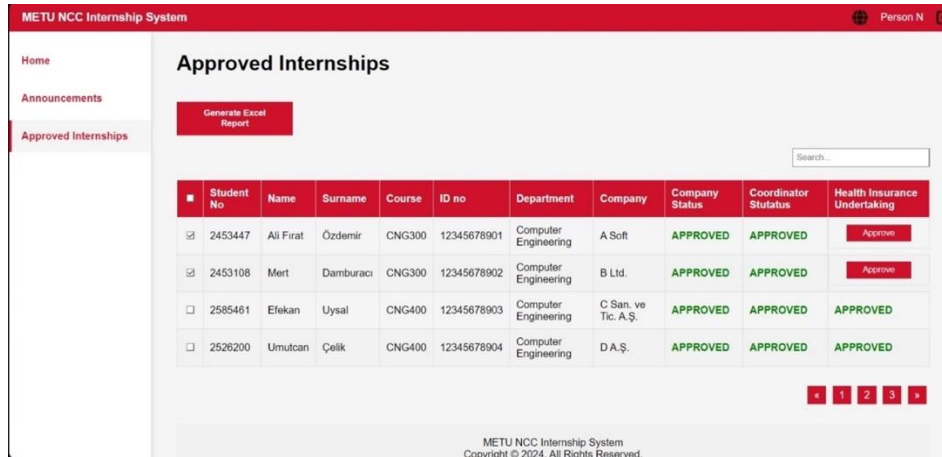
Supervisor Evaluate

« 1 2 3 »

Figure 9: Intern Acceptance Form

Student Affairs Page

Student Affairs Interface is the interface that authorized personnel in student affairs see. Here, staff can see students' details, the company they will be doing their internship with, and the approvals they have received for their internship. Staff can select the internships they want from the checkboxes on the left and create a report using the Generate Excel Report button. Additionally, they can mark the students whose health report has been approved as approved with the Approve button. You can see from Figure 10.



| | Student No | Name | Surname | Course | ID no | Department | Company | Company Status | Coordinator Statutatus | Health Insurance Undertaking |
|-------------------------------------|------------|---------|-----------|--------|-------------|----------------------|---------------------|----------------|------------------------|------------------------------|
| <input checked="" type="checkbox"/> | 2453447 | Ali | Firat | CNG300 | 12345678901 | Computer Engineering | A Soft | APPROVED | APPROVED | Approve |
| <input checked="" type="checkbox"/> | 2453108 | Mert | Damburacı | CNG300 | 12345678902 | Computer Engineering | B Ltd. | APPROVED | APPROVED | Approve |
| <input type="checkbox"/> | 2585461 | Efekan | Uysal | CNG400 | 12345678903 | Computer Engineering | C San. ve Tic. A.Ş. | APPROVED | APPROVED | APPROVED |
| <input type="checkbox"/> | 2526200 | Umutcan | Çelik | CNG400 | 12345678904 | Computer Engineering | D A.Ş. | APPROVED | APPROVED | APPROVED |

Figure 10: Student Affairs Page

1.4.2 Product functions

1. The system shall allow students or coordinator to view the list of internship companies, see the details of companies and internships done there and enable students to apply for internship using their resume.
2. The system shall allow students to fill out Trainee Information Forms and edit them until they have been approved by a coordinator.
3. The system shall allow coordinators to approve, reject or request a re-edit on Trainee Information Forms with their comments in cases of rejection or requested re-edits.
4. The system shall allow students to view their past internships, see their details, upload reports and update their reports.
5. The system shall allow coordinators to add summer training forms.
6. The system shall allow students and coordinators to view summer training forms.
7. The system shall allow students to add and update their resume.
8. The system shall allow coordinators to add announcements.
9. The system shall allow students, instructors, coordinators and student affairs to see announcements.
10. The system shall allow coordinators to set deadline dates.
11. The system shall allow coordinators to assign instructors.
12. The system shall allow instructors to evaluate reports, view company evaluations, ask for a re-edit on reports with comments or grade them.
13. The system shall allow companies to evaluate internships conducted there.
14. The system shall allow companies to assign supervisors for internships conducted there.
15. The system shall allow student affairs to view the list of approved internships and approve or reject a health insurance while checking Trainee Information Form.

1.4.3 User characteristics

1. Our project includes different groups of users, such as students doing internships, companies, coordinator, and instructors who review internship reports.
2. The system is simple enough for anyone who can read to use without difficulty.
3. If users know how to use the internet at a basic level, they can easily navigate the system.
4. The app follows the right accessibility rules to make sure it does not bother the eyes of users with disabilities.
5. The system can be accessed from any device that connects to the internet.

1.4.4 Limitations

Improper use of functions, such as filling out Trainee Information Forms, could impact the work of the coordinators.

Technical factors, such as internet speed, server response times, and server capacity, may limit the website's performance.

The project budget and time limitations may affect the features that will be added.

Compliance with data privacy regulations is crucial. Any mishandling of personal information could lead to legal issues and affect user trust.

The system's dependency on external services, such as Google Mail, means that downtime or connectivity issues with these services could disrupt notifications and important updates to users.

1.4.5 Assumptions and dependencies

1. Students can browse available internships or job positions without needing to view the detailed description. They can also perform searches using keywords such as field, company name, or location to find relevant opportunities.
2. The coordinator does not need to register through the system. Additionally, the coordinator has the authority to manually approve new coordinator for the admin panel. The system will generate and send the necessary login credentials to these new administrators.
3. We assume that only registered students can apply for internships or jobs. Students must log in to submit applications, and once they apply, the system will send confirmation emails and reminders regarding application status through integrated email services like Gmail.
4. We assume that only registered students and companies can report issues on the system. Both the coordinators and instructors can view these reports along with the detailed information provided by the user.
5. When coordinator post a new internship position, they will be able to review and modify the details of the post before final submission. We assume that the validation process will automatically ensure that all necessary fields are completed and no inappropriate content is included.
6. We assume that only the coordinator has the authority to edit job or internship postings. Additionally, only active students who are currently enrolled in the system can apply to the available internship positions. If a student who has completed an internship does not update

their internship information within one year, the email of the supervisor responsible for that company will be automatically removed from the system.

7. The system is assumed to handle sensitive information securely. For instance, companies' contact details and other critical information will be stored only with their permission and in compliance with data privacy regulations.
8. We assume that the system will handle keyword-based search functionality for both students and coordinator, allowing them to easily filter through positions by criteria such as internship duration, required qualifications, or company name.
9. We assume that the system will automatically send notifications to both students and companies regarding important updates, such as application status changes, new internship opportunities, or upcoming deadlines, through email.

1.5 Definitions

N/A

2 Specific requirements

2.1 External interfaces

| System Interface | Functionality | Input | Output |
|------------------|----------------------------|---|--|
| Mail Service | Send Notification Email | Mailing address to be notified Email content | Confirmation Result Code: 0: success 1: unknown problem |

2.2 Functions

2.2.1 Use-Case Diagram

You can reach our use-case diagram from Figure 11.

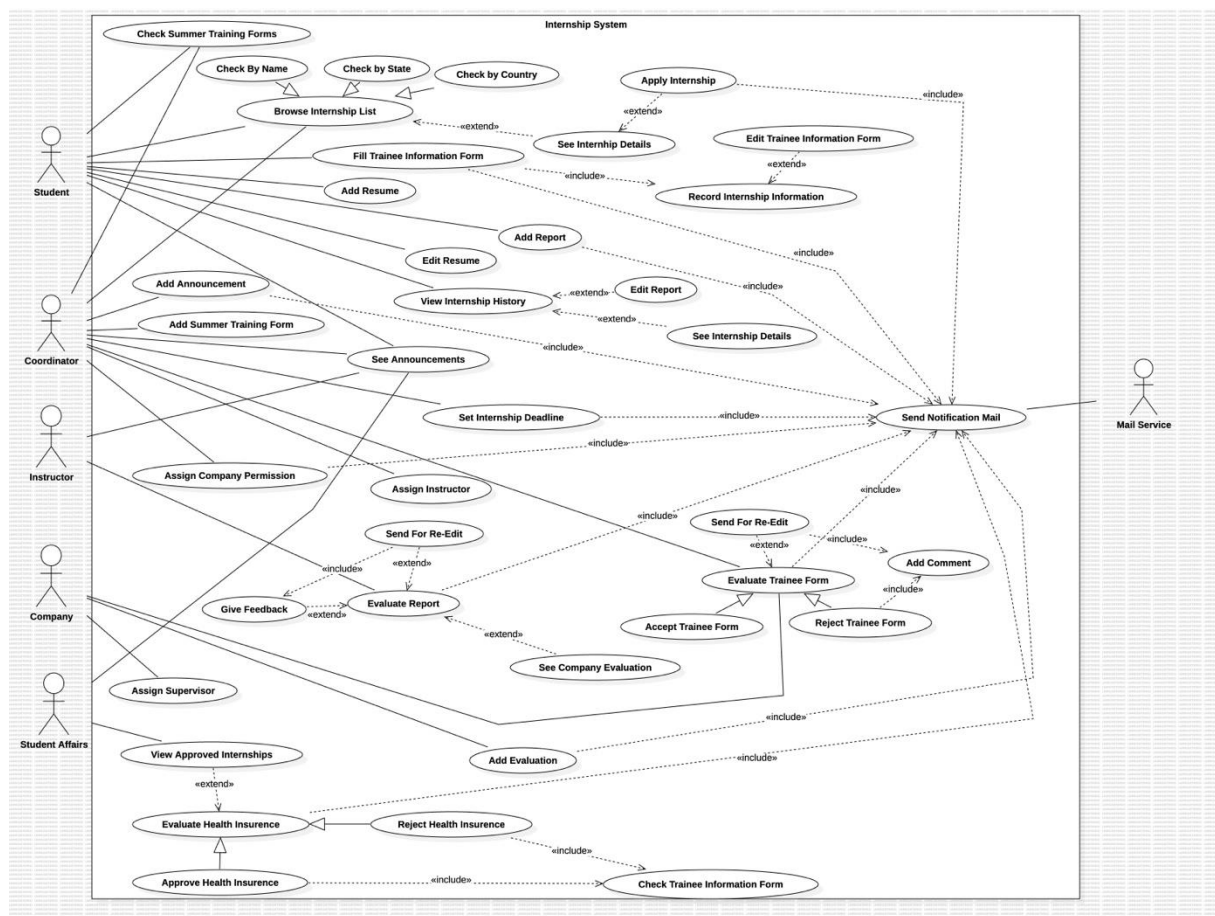


Figure 11: Use Case Diagram

2.2.2 Use-Case Description

You can see the use-case descriptions in the photos below.

| | |
|--|---|
| Use case | Add Resume |
| Actors | Student |
| Cross references | N/A |
| Typical Course of Events | |
| Actor Intentions | System Responsibility |
| 1. Student logs into the website. | |
| 2. Student goes to My Resume page. | |
| | 3. System displays student's resume. |
| 4. Student clicks "add" button for add a new resume. | |
| | 5. System opens a new file upload location. |
| 6. Student uploads new resume pdf file. | |
| | 7. System shows a confirmation message. |
| Alternative Courses | |
| N/A | |

Figure 12: Use-case details of Add Resume

| | |
|--|---|
| Use case | Upload Resume |
| Actors | Student |
| Cross references | N/A |
| Typical Course of Events | |
| Actor Intentions | System Responsibility |
| 1. Student logs into the website. | |
| 2. Student goes to My Resume page. | |
| | 3. System displays student's resume. |
| 4. Student clicks "update" button for update resume. | |
| | 5. System opens a new file upload location. |
| 6. Student uploads new resume pdf file. | |
| | 7. System deletes the old resume pdf file. |
| | 8. System shows a confirmation message. |
| Alternative Courses | |
| N/A | |

Figure 13: Use-case details of Update Resume

| | |
|---|--|
| Use case | See Announcements |
| Actors | Student,Coordinator, Instructor, Student Affairs |
| Cross references | N/A |
| Typical Course of Events | |
| Actor Intentions | System Responsibility |
| 1. Student,Coordinator, Instructor or Student Affairs logs into the website. | |
| 2. Student,Coordinator, Instructor or Student Affairs goes to the announcements page. | |
| | 3. System displays all announcements. |
| Alternative Courses | |
| N/A | |

Figure 14: Use-case details of See Announcements

| | |
|--|---|
| Use case | Evaluate Intern |
| Actors | Company, Mail Service |
| Cross references | N/A |
| Typical Course of Events | |
| Actor Intentions | System Responsibility |
| 1. Company logs into the website. | |
| 2. Company goes to the evaluate form page. | |
| | 3. System shows an evaluation form. |
| 4. Company enters the intern's performance details. | |
| | 5. System checks the informations. |
| | 6. System shows a confirmation message. |
| | 7. System sends a notification e-mail to the student. |
| Alternative Courses | |
| Step 5: Empty information (such as working day), so the evaluate cannot be added to the database. Return step 4. | |

Figure 15: Use-case details of Evaluate Intern

| | |
|---|--|
| Use case | Check Summer Training Forms |
| Actors | Student,Coordinator |
| Cross references | N/A |
| Typical Course of Events | |
| Actor Intentions | System Responsibility |
| 1. Student or coordinator logs into the website. | |
| 2. Student or coordinator goes to the forms page. | |
| | 3. System displays all forms. |
| 4. Student or coordinator selects a form. | |
| | 5. System displays the details of the selected form. |
| Alternative Courses | |
| N/A | |

Figure 16: Use-case details of Check Summer Training Forms

| | |
|---|---|
| Use case | Add Summer Training Form |
| Actors | Coordinator |
| Cross references | |
| Typical Course of Events | |
| Actor Intentions | System Responsibility |
| 1. Coordinator logs in to website. | |
| 2.Coordinator clicks the forms page. | |
| | 3.System will display forms page. |
| 4. Coordinator clicks the "Add" button. | |
| | 5.System will display an upload box. |
| 6.Coordinator uploads necessary forms. | |
| | 7.System will display confirmation message. |
| Alternative Courses | |
| | |

Figure 17: Use-case details of Add Summer Training Forms

| | |
|--|--|
| Use case | Add Report |
| Actors | Student, Mail Service |
| Cross references | N/A |
| Typical Course of Events | |
| Actor Intentions | System Responsibility |
| 1.Student logs in to the website. | |
| 2.Student goes to My Internships page. | |
| | 3. System shows the students profile page. |
| 4. Student selects the finished internship and clicks the "Add" button | |
| | 5. System will display an upload box. |
| 6.Student uploads the report pdf. | |
| | 7.System will display confirmation message. |
| | 8.System will send notification mail to the Coordinator. |
| Alternative Courses | |
| Step 6: Other than PDF files will not be accepted. If so system will display error message and will go | |
| | |
| | |

Figure 18: Use-case details of Add Report

| | |
|---|---|
| Use case | Accept Trainee Form |
| Actors | Coordinator, Company, Mail Service |
| Cross references | Send for Re-Edit |
| Typical Course of Events | |
| Actor Intentions | System Responsibility |
| 1. Coordinator or Company logs into the website. | |
| 2. Coordinator or Company goes to the Trainee Form page. | |
| | 3. System shows Trainee Forms. |
| 4. Coordinator or Company checks Trainee Forms. | |
| 5. Coordinator or Company accepts trainee form | |
| | 6. System shows confirmation message. |
| | 7. System sends notification e-mail to the student. |
| Alternative Courses | |
| Step 4: If there is incorrect information (such as the start date of the internship), the Coordinator or the Company will send the form to the student for re-edit. | |

Figure 19: Use-case details of Accept Trainee Form

| | |
|--|---|
| Use case | Fill Trainee Information Form |
| Actors | Student,Mail Service |
| Cross references | Edit Trainee Information Form |
| Typical Course of Events | |
| Actor Intentions | System Responsibility |
| 1.Student logs into internship portal. | |
| 2.Student enter the details for new Internship of the company. | |
| | 3.System checks that is it on the database. |
| | 4.System notify the user company added on internship database. |
| | 5.System send notification to coordinator new company added on internship database. |
| | |
| | |
| Alternative Courses | |
| Step3: If is that in database system doesn't allow to user to enter name for the company. Return step:2. | |
| | |
| | |

Figure 20: Use-case details of Fill Trainee Information Form

| | |
|---|--|
| Use case | Add Announcement |
| Actors | Coordinator |
| Cross references | N/A |
| Typical Course of Events | |
| Actor Intentions | System Responsibility |
| 1.Coordinator goes to announcement page. | |
| 2.Coordinator makes annocement about internship opportunities & conditions. | |
| | |
| | 3.System logged details for announcement in database content. |
| | 4.System notify students,instructors and student affairs via mail. |
| | |
| | |
| | |
| Alternative Courses | |
| Step2: Coordinator makes modify valid announcement. | |
| Step3: Database Connection Issue: If the announcement is not saved in the database, the system will display an error message saying "Announcement could not be saved" and prompt the coordinator to try again.Return Step:1. | |

Figure 21: Use-case details of Add Announcement

| | |
|--|---|
| Use case | Assign Company Permission |
| Actors | Coordinator,Mail Service |
| Cross references | N/A |
| Typical Course of Events | |
| Actor Intentions | System Responsibility |
| 1.Coordinator check the internship on the list. | |
| | 2.System checks whether(exist on) this login credentials is in the system. |
| 3.Coordinator approve company information. | |
| | 4.System add and give credentials in database. |
| | 5.System sends login information to the company |
| | |
| Alternative Courses | |
| Step 2 : If the system detects that these credentials already exist in the database, the following steps will be taken coordinator is informed with a message These login credentials are already registered in the system. System give options to modify existing company information. Return Step:1. | |
| Step 4 : If there is an issue with the database connection, the system will display an error message and prompt the coordinator to retry the operation. Return Step: 1. | |

Figure 22: Use-case details of Assign Company Permissions

| | |
|--|--|
| Use case | Evaluate Report |
| Actors | Instructor, Student, Mail Service |
| Cross references | Send for Re-Edit, Give Feedback |
| Typical Course of Events | |
| Actor Intentions | System Responsibility |
| 1. Instructor receives the internship report from the student and opens it for evaluation. | |
| | 2. System displays the submitted report to the instructor for review. |
| 3. Instructor evaluates the content of the report and determines whether it meets the required criteria. | |
| | 4. System asks the instructor to confirm their decision (Accept, Reject, Send for Re-Edit). |
| 5. Instructor approves and directs. | |
| | 6. System sends an email to notify the student about the evaluation result (accepted, rejected, or sent for re-edit). |
| | |
| Alternative Courses | |
| Step 6: If the instructor selects Accept: If confirmed, the system updates the report status to accepted and sends an email to the student indicating that the report has been approved. | |
| Step 6: If the instructor selects Reject: If confirmed, the system marks the report as rejected and sends an email to the student providing feedback and reasons for rejection. | |
| Step 6: If the instructor selects Send for Re-Edit: If confirmed, the system sends an email to the student with detailed feedback, asking them to revise and resubmit the report. | |
| Step 6: Instructor give grade for the Internship (passing or fail) conditions. | |
| Step 6: Instructor can see company evolution form. | |

Figure 23: Use-case details of Evaluate Report

| | |
|--|--|
| Use case | View Approved Internships |
| Actors | Student Affairs |
| Cross references | Approve Health Insurance, Reject Health Insurance |
| Typical Course of Events | |
| Actor Intentions | System Responsibility |
| 1. Student Affairs logs into the system to view the approved internships. | |
| | 2. System verifies and displays the list of approved internships. |
| 3. Student Affairs reviews the details of the approved internships. | |
| | 4. System provides the officer with detailed information about the internships with options. |
| 5. Student Affairs evaluates the health insurance status of the student. | |
| | 6. System logs the evaluation in the database. |
| | 7. System notifies the student about the evaluation of their health insurance status. |
| | |
| Alternative Courses | |
| Step 6: If there is an issue with saving the evaluation in the database, the system will display an error message to the Student Affairs officer, indicating that the evaluation could not be logged. The system will then prompt the officer to retry the operation. Return step : 5. | |
| Step 5: If student affairs approve or reject to report add the database and notify to student. Return Step: 7 | |

Figure 24: Use-case details of View Approved Internships

2.3 Usability Requirements

1. Users will already be registered on the internship portal, and they should be able to log in easily using their credentials. The system should include a secure login process, such as multi-factor authentication, to ensure data protection and user privacy.
2. Students should be able to easily search for internships based on their areas of interest or academic background. The search function should be intuitive, allowing users to filter internships by location, field, or company, ensuring efficient navigation.
3. Users should be able to track their application status in real-time, with clear indicators for each stage of the application process (e.g., submitted, under review, accepted, etc.). This will keep students informed without the need for manual inquiries.
4. The system should allow students to directly communicate with former interns through an easy-to-use messaging feature. This will enable them to gather valuable insights from individuals who have previously completed internships, fostering peer-to-peer interaction.
5. The platform should allow students to provide feedback on the internships they have completed. This feedback will be visible to other users, helping them make informed decisions when applying for similar internships in the future.
6. Administrators should be able to easily manage internship listings and applications through a user-friendly dashboard, where they can sort, filter, and categorize applications to streamline the selection process for internships.
7. The platform should provide visual feedback and prompts for users when interacting with key functions, such as applying for internships, submitting reports, or messaging, ensuring that all user actions are clear and easily reversible if necessary.

2.4 Performance requirements

The performance of the internship management system is crucial for ensuring a smooth and efficient experience for all users, including students, coordinators, instructors, company supervisors, and student affairs personnel. The following are the key performance requirements for the system:

- Response Time:

The system must provide a response time of under 3 seconds for all user interactions (e.g., form submissions, page loading, viewing announcements, and uploading reports) under normal load conditions (500 concurrent users).

Justification: Slow response times can frustrate users and cause delays in critical tasks like internship approvals and report submissions. A quick response time ensures a smooth and effective user experience, especially when managing time-sensitive operations such as internship deadlines and feedback loops.

- Scalability:

The system should be able to scale up to handle up to 1000 concurrent users without any significant performance degradation.

Justification: The system will be used by a large number of students, coordinators, and companies, especially during peak times like the start and end of semesters when internship applications, evaluations, and reports are submitted en masse. Scalability ensures the system can manage these peak loads without crashing or slowing down.

- Throughput:

The system must process at least 50 transactions per minute, including form submissions, report uploads, and notifications.

Justification: Throughput is important to ensure that the system can handle multiple simultaneous user actions, such as students submitting internship forms while companies submit evaluations. This ensures that the system is responsive during periods of high activity and can process large amounts of data efficiently.

- System Availability:

The system must maintain an uptime of 99.9%, which translates to no more than 8 hours and 45 minutes of downtime per year.

Justification: The system will be used by students and companies from various time zones, meaning it must be available around the clock. High availability ensures that users can access the system when needed, particularly for critical tasks like meeting submission deadlines or responding to time-sensitive alerts.

- Data Processing Time:

Bulk data operations, such as generating reports or processing multiple student applications, should not exceed 30 seconds.

Justification: Coordinators and instructors may need to generate reports that summarize student data, internship statuses, or evaluation outcomes. Ensuring quick data processing reduces delays in these tasks and improves overall system efficiency.

- Notification Latency:

Notifications (email, SMS, etc.) should be delivered within 5 minutes of the triggering event (e.g., form approval, deadline reminders, report submission).

Justification: Timely notifications are essential to ensure that all stakeholders (students, supervisors, coordinators) are kept informed about critical tasks and deadlines. Delayed notifications could result in missed deadlines or bottlenecks in the approval process.

- Load Testing:

The system should undergo periodic load testing to ensure that it can handle peak usage scenarios without a drop in performance.

Justification: Ensuring optimal performance under high load conditions is essential for maintaining system reliability, especially during the internship application and evaluation periods, when the number of active users can spike.

By meeting these performance requirements, the internship management system will ensure efficient operations, minimal downtime, and a seamless user experience across all stages of the internship process. These requirements are based on the expected volume of users and system transactions, and they are designed to prevent performance bottlenecks or user frustration.

2.5 Logical database requirements

2.5.1 Relational Database Diagram

You can see the relational database diagram of our project in Figure 25.

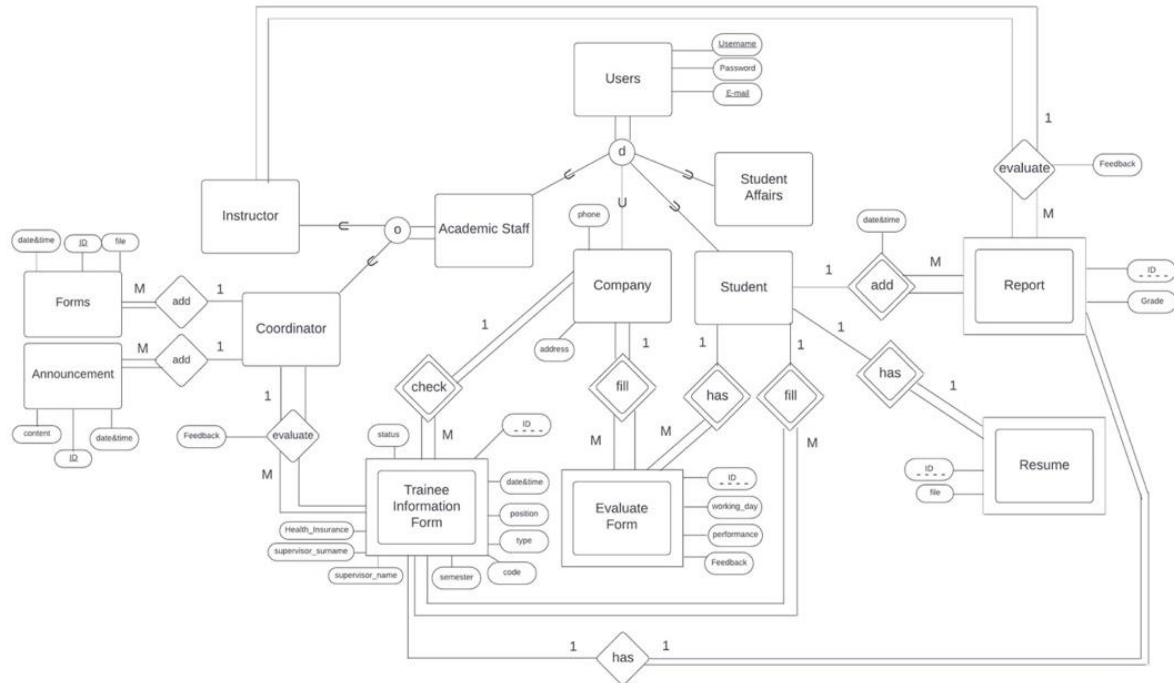


Figure 25: Relational Database Diagram

2.5.2 Relational Database Diagram Assumptions

1. We assume that each user has a unique username.
2. We assume that the coordinator can add multiple forms and announcements.
3. We assume that forms and reports filled out by students can be checked by instructors.
4. We assume that every report has a unique ID and a grade.
5. We assume that each evaluation form contains information about the working days and performance.
6. We assume that all announcements and forms are recorded with date and time information.
7. We assume that each resume uploaded to the system must have a unique ID number.
8. We assume that the relationship between students and the companies where they intern is recorded in the system, and a student can intern with multiple companies but can only intern at the same company once.
9. We assume that all reports and forms uploaded by students are subject to an approval process, and after evaluation, they are either approved or rejected.

2.6 Software system attributes

Reliability:

1. The system will regularly apply software updates to ensure it stays compatible with new technologies and maintains optimal performance.
2. In case of potential errors, the system will prevent data loss by securely storing critical internship and user information.
3. The system will handle high traffic efficiently, ensuring no performance issues arise, even during periods with many active users and multiple ongoing transactions.
4. When incorrect data is entered, the system will allow users to easily correct and re-submit their information.

• Availability:

1. If the system undergoes maintenance, users will be notified, and access will be temporarily restricted. Once maintenance is complete, users can resume their activities without issues.
2. In the event of a system error, a clear and descriptive error message will be displayed to the user, explaining the nature of the issue.
3. After system failures, users will be able to retrieve their previously saved information without any data loss, ensuring continuity through robust data recording mechanisms.
4. The system will aim to minimize downtime, limiting unavailability to no more than 2% annually, to maintain a high level of service availability.

• Security:

1. The system will ensure that users' personal and internship-related data is encrypted and securely stored to prevent unauthorized access.
2. Sensitive actions within the system, such as updating personal details or submitting internship applications, will require an additional layer of confirmation, such as sending a verification code via email.
3. The system will regularly monitor and log user activity, identifying and responding to suspicious behaviour, such as repeated failed actions or unusual access patterns.
4. Users will be periodically prompted to review and update their contact and security information to ensure the system remains up to date and secure.

• Maintainability:

1. Code written for the system will be well-documented with clear comments, ensuring that future developers can easily understand and update the software.
2. The system's modular design will include intermediate safeguards so that if one component fails, the rest of the system will continue to function without disruption.
3. Version control and regular code reviews will be implemented to ensure that updates can be made smoothly, preventing system downtime or malfunction.
4. Developers will adhere to clean coding practices, ensuring that the software is easy to maintain and update over time.

2.7 Supporting information

N/A

3 Software Estimation

COCOMO Estimation Scenario for Summer Internship System

Project Overview: The Summer Internship System is designed to streamline internship application and management for students, coordinators, and companies. The system will include user interfaces, integration with Google Mail for notifications, a secure database, and management features for coordinators.

Project Size Estimation: Based on the required functionality, complexity, and story points from the sprint planning, we estimate the project size at approximately 20 KLOC (thousand lines of code).

Project Type: This system fits the Semi-Detached category in the COCOMO model, as it includes moderate complexity and involves integration with external services like Google Mail. The Semi-Detached model is appropriate for projects requiring a mix of new development and existing component integration.

Original Effort and Schedule Estimation (Before Compression):

According to COCOMO's Basic Model for a Semi-Detached project, we calculate Effort (E) in person-months and Development Time (T) in months as follows:

$$\begin{aligned}\text{Effort (E):} \quad E &= 3.0 \times (\text{KLOC})^{1.12} \\ E &= 3.0 \times (20)^{1.12} \approx 69.4 \text{ person-months}\end{aligned}$$

Development Time (T):

$$\begin{aligned}T &= 2.5 \times (E)^{0.35} \\ T &= 2.5 \times (69.4)^{0.35} \approx 10.7 \text{ months}\end{aligned}$$

The initial COCOMO estimation yields:

Effort: 69.4 person-months

Schedule: 10.7 months

Adjusted Estimation for 8-Month Schedule

To meet the new timeline of 8 months, we need to compress the schedule. According to COCOMO principles, reducing the schedule increases the required effort proportionally.

Compression Factor (CF):

$$CF = (\text{Original Schedule} / \text{Target Schedule})$$

$$(10.7/8) \approx 1.34$$

Adjusted Effort (E'):

$$E' = E \times (CF)^2$$

$$E' = 69.4 \times (1.34)^2 \approx 124.4 \text{ person-months}$$

Final Estimation with Compressed Schedule

To complete the project in 8 months, the adjusted effort is approximately 124.4 person-months.

Feasibility with a 4-Person Team

With a 4-person team aiming to complete 124.4 person-months of work within 8 months, each team member's monthly effort is calculated as follows:

Effort per month per person =

$$(124.4 \text{ person-months} / 8 \text{ months}) = 15.55 \text{ person-months per month}$$

Dividing by the team size:

Effort per person per month =

$$(15.55/4) \approx 3.89 \text{ person-months per person per month}$$

This means each team member needs to dedicate around 155 hours per month (assuming 1 person-month \approx 160 hours).

Conclusion:

With a 4-person team, completing the Summer Internship System in 8 months is feasible but requires a consistent full-time commitment. Each team member would need to work approximately 40 hours per week on the project. Effective task management, regular progress reviews, and contingency planning will be crucial to meet this schedule.

4 References

N/A

5 Appendices

5.1 Acronyms and abbreviations

N/A

5.2 Sprint 1 Overview

5.2.1 Sprint Backlog

In this sprint, the following tasks were completed along with the time allocated for each:

- Part 1- 25 hours: This task had a medium priority and focused on initial setup and foundational work.
- Part 2- 50 hours: A high-priority task that required a significant amount of effort, focusing on critical functionality.
- Part 3- 15 hours: A medium-priority task aimed at implementing specific features that complement core functionality.
- Part 4- 1 hour: A low-priority task with minimal time allocation, likely addressing minor adjustments or auxiliary features.
- Part 5 - 10 hours: Another medium-priority task involving necessary enhancements or fixes.

The total effort spent on this sprint amounted to 101 hours, as shown in the work estimation chart, which tracks story points against the baseline for each week.

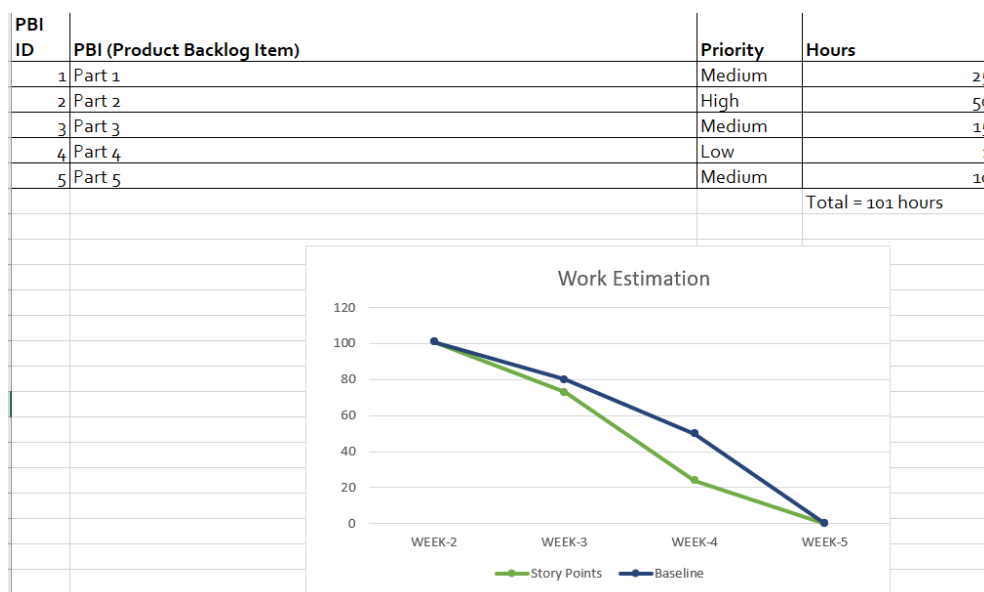


Figure 26: Sprint Backlog Estimation

5.2.2 Sprint Burndown Chart

Sprint Burndown Chart displays the remaining hours of work across each week, providing a clear view of progress. Starting from Week 2 with 101 hours, the remaining hours were reduced to 73 hours in Week 3, 24 hours in Week 4, and ultimately 0 hours by Week 5. This downward trend demonstrates the team's steady work completion rate, aligning with the sprint goals and ensuring all tasks were completed by the end of Week 5.

The baseline line on the chart serves as a reference for expected progress, while the story points line indicates the actual hours of work completed weekly, allowing us to compare the planned versus actual progress. This visual tracking ensures that the sprint stays on track, providing insight into task completion rates and helping the team manage their workload effectively.

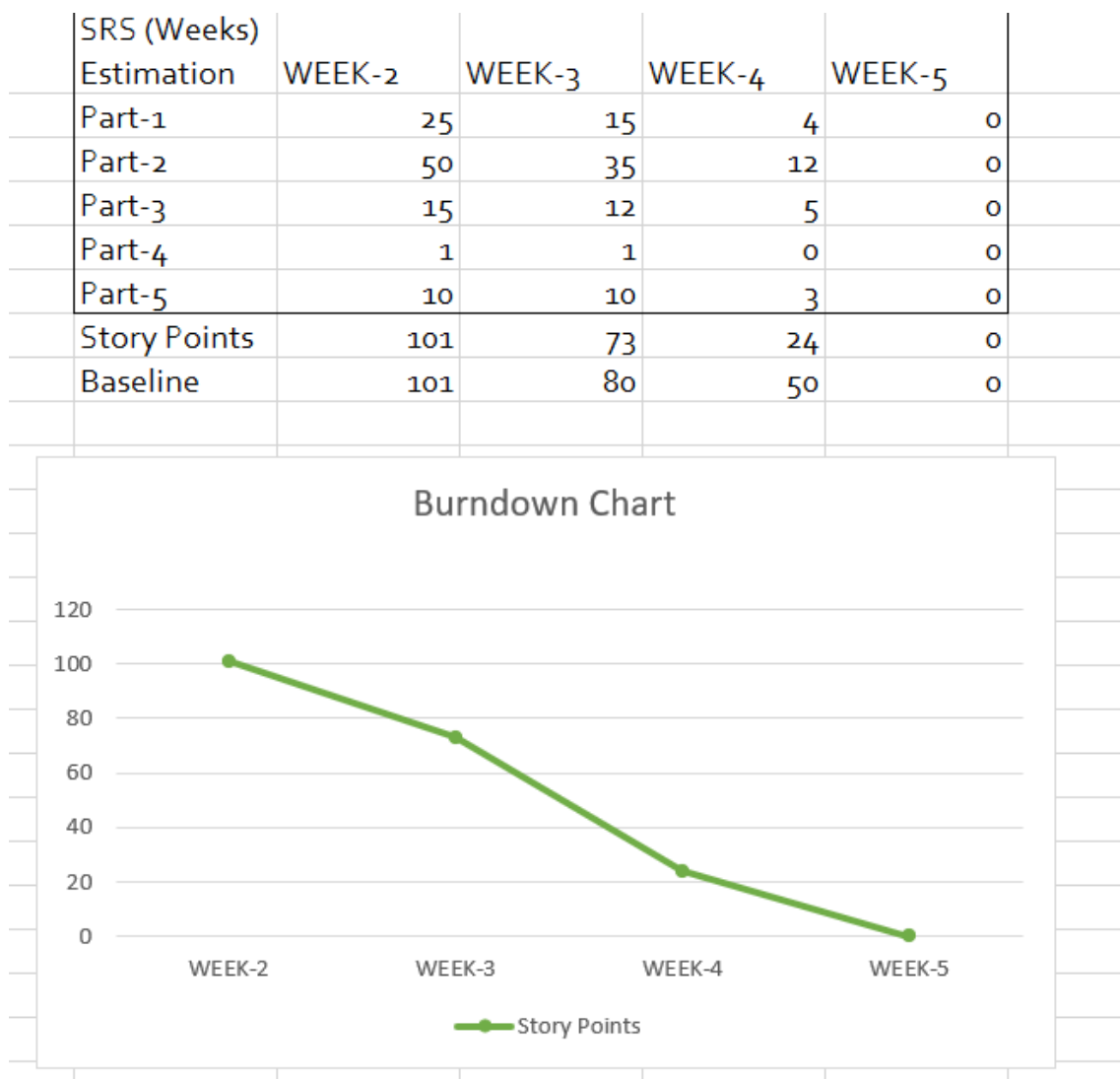


Figure 27: Burndown Chart

5.2.3 Sprint Review

In this sprint, we successfully completed the Software Requirements Specification (SRS) report, achieving our primary goal of finalizing the foundational documentation for the project. This milestone sets the stage for the next phase, the Software Design Document (SDD), where we will delve into the design and architecture of the system. Completing the SRS allowed us to gather and organize all functional and non-functional requirements, ensuring that we have a clear understanding of the project's objectives and the needs of all stakeholders.

During this sprint, we also identified some areas that could benefit from additional detail or clarification. While we managed to meet our targets, we recognized the importance of regularly reviewing requirements to prevent potential ambiguities from affecting later stages. Moving forward, we plan to conduct more frequent requirement reviews to maintain alignment across the team, especially as we progress into the design phase, which relies heavily on a solid foundation in the SRS.

5.2.4 Spring Retrospective

Reflecting on this sprint, we realized that task division among team members could have been more efficient. Some tasks, particularly related to the SRS, were more time-consuming than initially anticipated, which led to bottlenecks in certain areas. To improve our workflow in future sprints, we will aim for a more balanced distribution of responsibilities and consider breaking down larger tasks into smaller, manageable segments.

For the upcoming SDD phase, we plan to parallelize tasks to maximize efficiency. For instance, while some team members focus on establishing the SDD's core structure and defining key components, others can work on final reviews and refinements of the SRS document. This approach will allow us to move seamlessly into the design phase without delays and ensure that we are prepared for any design adjustments based on further insights from the finalized SRS. By implementing these adjustments, we anticipate a smoother workflow and quicker transitions between project phases, ultimately increasing our productivity and project momentum.