University of Jeddah
College of Computer
Science and Engineering

SPARK
(Senior project)

BY

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Supervisor:

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ABSTRACT

In today's era, university education stands as a fundamental cornerstone of one's life, often serving as a prerequisite for numerous professions and forming the bedrock upon which other qualifications are built. Undoubtedly, a capstone project serves as the culmination of a student's academic journey, a tangible manifestation of their learning and accomplishments throughout their university tenure. Regrettably, a significant portion of these projects often face a quiet conclusion post-presentation. Hence, our dedicated team hailing from the esteemed University of Jeddah has embarked on a mission to establish a platform with the primary objective of breathing continued life into these graduation projects. The aim is to showcase them to those in search of fresh investment ideas and to serve as a wellspring of inspiration for fellow students, enabling them to draw valuable insights. Furthermore, we endeavor to foster a competitive spirit among students, highlighting their utmost strengths in their projects. The platform also sets out to entice companies to invest in the talents of these students, offering to adopt graduation projects, imparting ideas, and furnishing the necessary resources for successful project completion.

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1.1 Introduction:

In the dynamic realm of innovation and education, universities stand as the breeding grounds for the next generation of pioneers and entrepreneurs. Graduation projects serve as a tangible manifestation of students' ingenuity, problem-solving prowess, and entrepreneurial spirit. Yet, these projects often lack the essential support and resources needed to transform their potential into concrete realities.

This is where our platform emerges, acting as the catalyst to bridge the chasm between the brilliance of students' graduation projects and the transformative power of investment. Our mission is to establish a comprehensive ecosystem that empowers students to translate their ideas into tangible outcomes and reap the rewards of their unwavering dedication.

Through a meticulously crafted evaluation process spearheaded by esteemed university specialists, we identify projects brimming with exceptional potential. Their expert insights guide us in nurturing a competitive environment that ignites the entrepreneurial spirit within our students, propelling them towards the forefront of innovation.

To further empower these budding entrepreneurs, we forge partnerships with industry leaders, providing them with the tools, equipment, and mentorship they need to bring their visions to life. This synergistic collaboration between academia and industry not only cultivates innovation but also seamlessly transitions students from the classroom to the corporate world, equipping them with the skills and experience necessary to thrive in the ever-evolving business landscape.

Our platform extends its reach beyond the realm of graduation projects, serving as a beacon of inspiration and collaboration. We curate a repository of exemplary projects, showcasing their ingenuity and potential to ignite the entrepreneurial spirit within fellow students. By fostering a culture of knowledge sharing and peer-to-peer learning, we empower students to draw inspiration from their peers' successes, fueling their own entrepreneurial journeys.

In this dynamic ecosystem of creativity and innovation, we envision a future where students' graduation projects transcend academic milestones and transform into the cornerstones of groundbreaking ventures. Our platform is poised to play a pivotal role in this transformation, empowering students to become the driving force behind innovation and shaping a future brimming with boundless possibilities.

1.2 The problem definition

Unlocking the Potential of Graduation Projects: Catalyzing Innovation and Entrepreneurship

Within the hallowed halls of academia, graduation projects stand as beacons of students' intellectual prowess, problem-solving acumen, and entrepreneurial spirit. Yet, despite their inherent promise, a disheartening 75% to 90% of these projects fail to materialize into tangible outcomes, often languishing due to a dearth of support, guidance, and avenues for commercialization.

This vast reservoir of untapped innovation represents a squandered opportunity for students, universities, and society at large. Graduation projects harbor the potential to metamorphose into groundbreaking ventures, revolutionize industries, and usher in a brighter future.

To rectify this predicament, we must cultivate an ecosystem that empowers students to harness the transformative potential of their graduation projects. This necessitates a multi-pronged approach that encompasses:

Nurturing an Innovation-Driven Culture: Universities must foster a culture of innovation and entrepreneurship within their student bodies, instilling in them the mindset to view graduation projects not merely as academic obligations but as springboards for real-world impact.

Providing Holistic Support: Educational institutions and industry partners must forge synergistic partnerships to provide students with the indispensable support, guidance, and resources to develop and commercialize their projects. This entails access to mentorship, expertise, funding, and market opportunities.

Establishing Clear Commercialization Pathways: Well-defined pathways for commercialization must be delineated, enabling students to seamlessly transition their projects into startup companies, partnerships with established businesses, or educational resources.

Promoting Knowledge Sharing and Collaboration: A culture of knowledge sharing, and peer-to-peer learning must be cultivated, allowing students to glean inspiration from one another's successes and gain invaluable insights from seasoned entrepreneurs and industry veterans.

By embracing these strategies, we can unleash the transformative power of graduation projects, transforming them from mere academic endeavors into catalysts for innovation, entrepreneurship, and societal progress. Graduation projects can serve as

the genesis of groundbreaking startup companies, injecting fresh ideas and transformative technologies into the marketplace. They can also lead to the development of innovative products and services for established businesses, boosting their competitiveness and propelling them to new heights. Additionally, graduation projects can be repurposed as valuable educational resources, enriching the learning experience for future generations of students.

By harnessing the potential of graduation projects, we can empower students to become the architects of a brighter future, one marked by innovation, entrepreneurship, and societal progress.

1.3 Project aims and objectives

Project Aims:

-To provide a platform that allows students to display their graduation projects to enable them to search for investors to sell or invest the idea

-To create a competitive environment among students to show their strongest abilities

-Enabling experts to evaluate projects and give their feedback

-To attract companies to invest in students expected to graduate and make them experience the real work environment

-Facilitating the communication process between students and investors

-Highlighting the talents of graduating students so that they have wider opportunities among companies

-Creating a tangible competitive environment among all Saudi university students

- Making the most of graduation projects and not wasting them as a reference for other students

Project Objectives:

-Developing a web application that enables students to present their graduation projects and enable them to view the opinions and suggestions of specialists

-Building a system that presents students' graduation projects to companies and investors interested in new ideas

-Enable companies to submit their workable ideas and have students choose one of these projects

-Allowing specialists to evaluate projects, express their opinions and suggestions, and arrange projects accordingly

- Displaying previous projects for Saudi university students based on specialization and department

1.4 Project Methodology:

Effective project management hinges on the judicious application of methodologies that provide structure, organization, and a clear roadmap for achieving project goals. The SPARK project will leverage a hybrid approach, combining the strengths of the Waterfall and Agile methodologies to deliver the SPARK system with precision and flexibility.

The Waterfall methodology will serve as the foundation for the initial stages of the project, providing a structured framework for requirement analysis, system design, and implementation. This sequential approach ensures that each phase is meticulously completed before transitioning to the next, laying a solid foundation for the SPARK system's development.

Once the fundamental structure is in place, the project will transition to an Agile approach, specifically Extreme Programming (XP), during the implementation phase. XP's emphasis on pair programming and rapid iterations aligns perfectly with the collaborative nature of programming, allowing for continuous improvement and adaptability as the SPARK system takes shape.

This hybrid approach capitalizes on the strengths of both Waterfall and Agile methodologies, ensuring that the SPARK project progresses with a clear plan while maintaining the flexibility to respond to evolving requirements and challenges. By embracing the synergy of these methodologies, we can effectively navigate the complexities of software development and deliver a high-quality, innovative product.

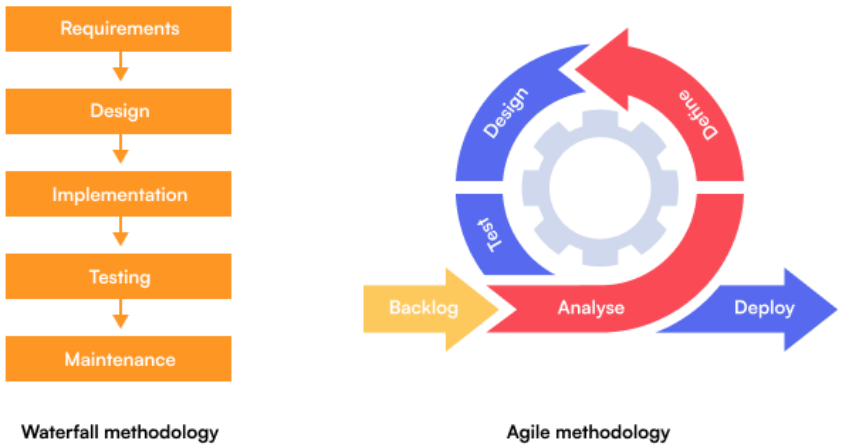
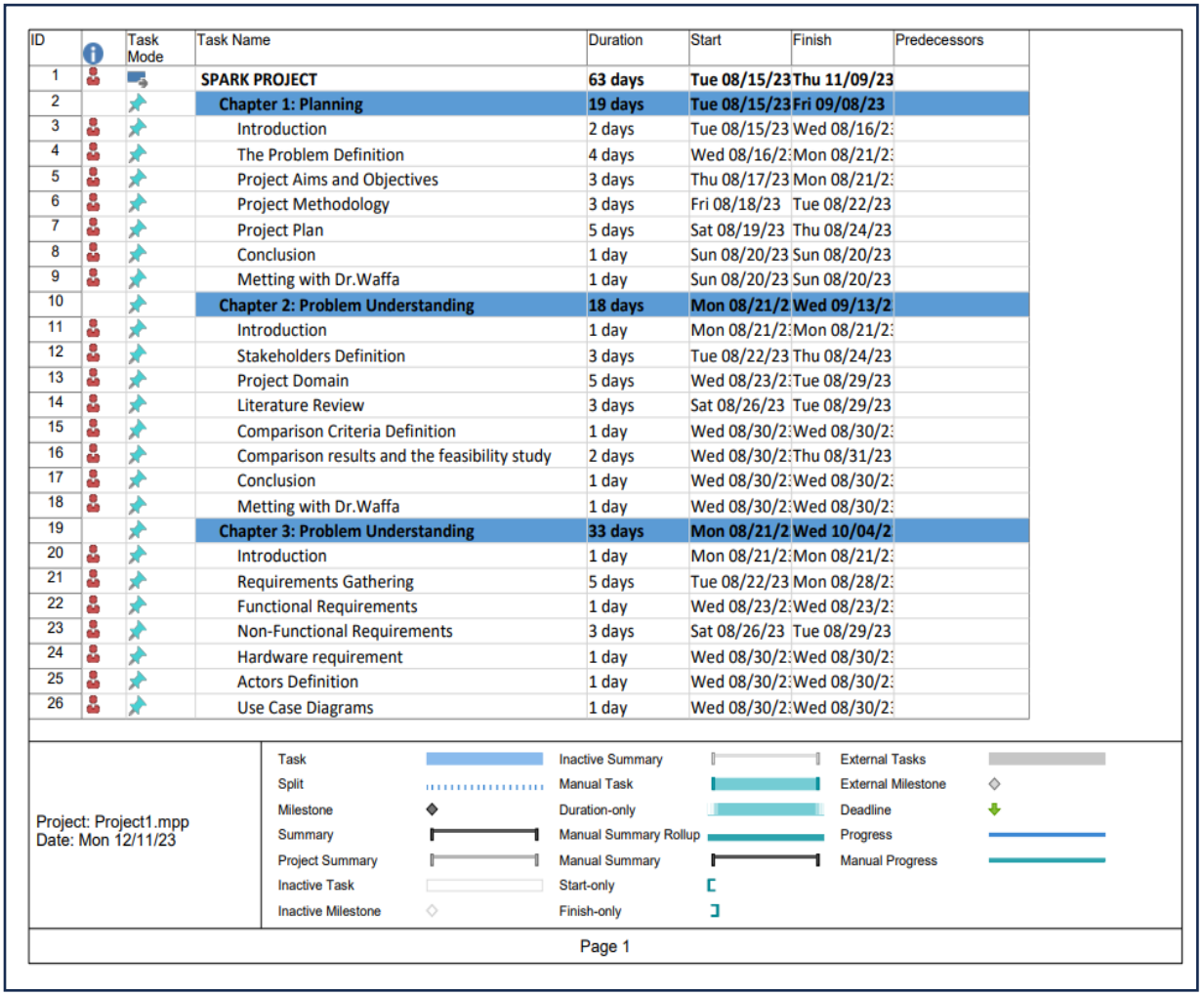


Figure 1-1: Waterfall & Agle models

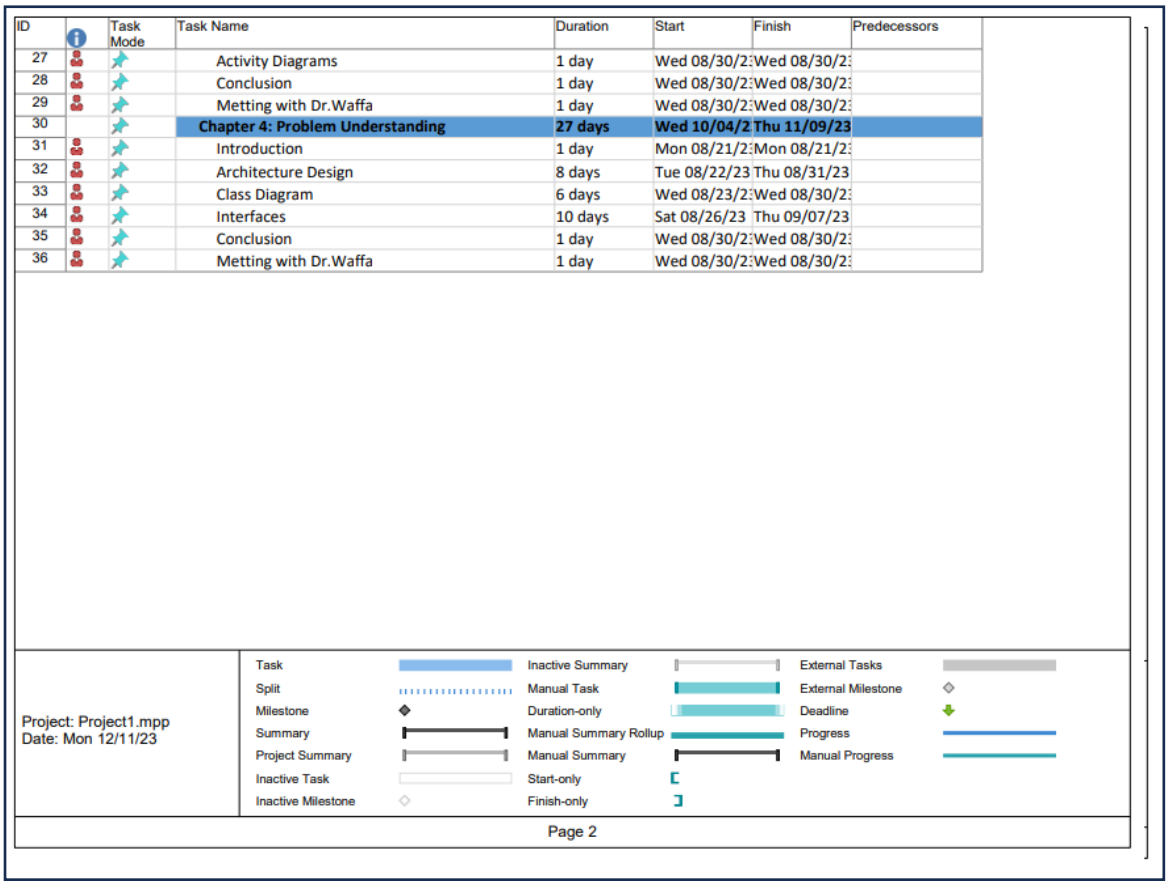
1.5 Project Plan:

Effective project planning is the cornerstone of successful project execution. Project planning involves creating a comprehensive roadmap that outlines the project's scope, objectives, timeline, and resource allocation. MS Project is a widely used project planning tool that facilitates the creation of detailed project plans and enables efficient resource management. By leveraging MS Project's capabilities, we have developed a comprehensive project plan that guides our team's execution and ensures the project's timely completion.



ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors
1		**SPARK PROJECT**	**63 days**	**Tue 08/15/23**	**Thu 11/09/23**	
2		**Chapter 1: Planning**	**19 days**	**Tue 08/15/23**	**Fri 09/08/23**	
3		Introduction	2 days	Tue 08/15/23	Wed 08/16/2	
4		The Problem Definition	4 days	Wed 08/16/2	Mon 08/21/2	
5		Project Aims and Objectives	3 days	Thu 08/17/23	Mon 08/21/2	
6		Project Methodology	3 days	Fri 08/18/23	Tue 08/22/23	
7		Project Plan	5 days	Sat 08/19/23	Thu 08/24/23	
8		Conclusion	1 day	Sun 08/20/23	Sun 08/20/23	
9		Metting with Dr.Waffa	1 day	Sun 08/20/23	Sun 08/20/23	
10		**Chapter 2: Problem Understanding**	**18 days**	**Mon 08/21/2**	**Wed 09/13/2**	
11		Introduction	1 day	Mon 08/21/2	Mon 08/21/2	
12		Stakeholders Definition	3 days	Tue 08/22/23	Thu 08/24/23	
13		Project Domain	5 days	Wed 08/23/2	Tue 08/29/23	
14		Literature Review	3 days	Sat 08/26/23	Tue 08/29/23	
15		Comparison Criteria Definition	1 day	Wed 08/30/2	Wed 08/30/2	
16		Comparison results and the feasibility study	2 days	Wed 08/30/2	Thu 08/31/23	
17		Conclusion	1 day	Wed 08/30/2	Wed 08/30/2	
18		Metting with Dr.Waffa	1 day	Wed 08/30/2	Wed 08/30/2	
19		**Chapter 3: Problem Understanding**	**33 days**	**Mon 08/21/2**	**Wed 10/04/2**	
20		Introduction	1 day	Mon 08/21/2	Mon 08/21/2	
21		Requirements Gathering	5 days	Tue 08/22/23	Mon 08/28/2	
22		Functional Requirements	1 day	Wed 08/23/2	Wed 08/23/2	
23		Non-Functional Requirements	3 days	Sat 08/26/23	Tue 08/29/23	
24		Hardware requirement	1 day	Wed 08/30/2	Wed 08/30/2	
25		Actors Definition	1 day	Wed 08/30/2	Wed 08/30/2	
26		Use Case Diagrams	1 day	Wed 08/30/2	Wed 08/30/2	

Figure 1-2: Project Plan -1



ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors
27		Activity Diagrams	1 day	Wed 08/30/2	Wed 08/30/2	
28		Conclusion	1 day	Wed 08/30/2	Wed 08/30/2	
29		Metting with Dr.Waffa	1 day	Wed 08/30/2	Wed 08/30/2	
30		**Chapter 4: Problem Understanding**	**27 days**	**Wed 10/04/2**	**Thu 11/09/23**	
31		Introduction	1 day	Mon 08/21/2	Mon 08/21/2	
32		Architecture Design	8 days	Tue 08/22/23	Thu 08/31/23	
33		Class Diagram	6 days	Wed 08/23/2	Wed 08/30/2	
34		Interfaces	10 days	Sat 08/26/23	Thu 09/07/23	
35		Conclusion	1 day	Wed 08/30/2	Wed 08/30/2	
36		Metting with Dr.Waffa	1 day	Wed 08/30/2	Wed 08/30/2	

Project: Project1.mpp
Date: Mon 12/11/23

Task, Split, Milestone, Summary, Project Summary, Inactive Task, Inactive Milestone, Inactive Summary, Manual Task, Duration-only, Manual Summary Rollup, Manual Summary, Start-only, Finish-only, External Tasks, External Milestone, Deadline, Progress, Manual Progress

Page 2

Figure 1-3: Project Plan -2

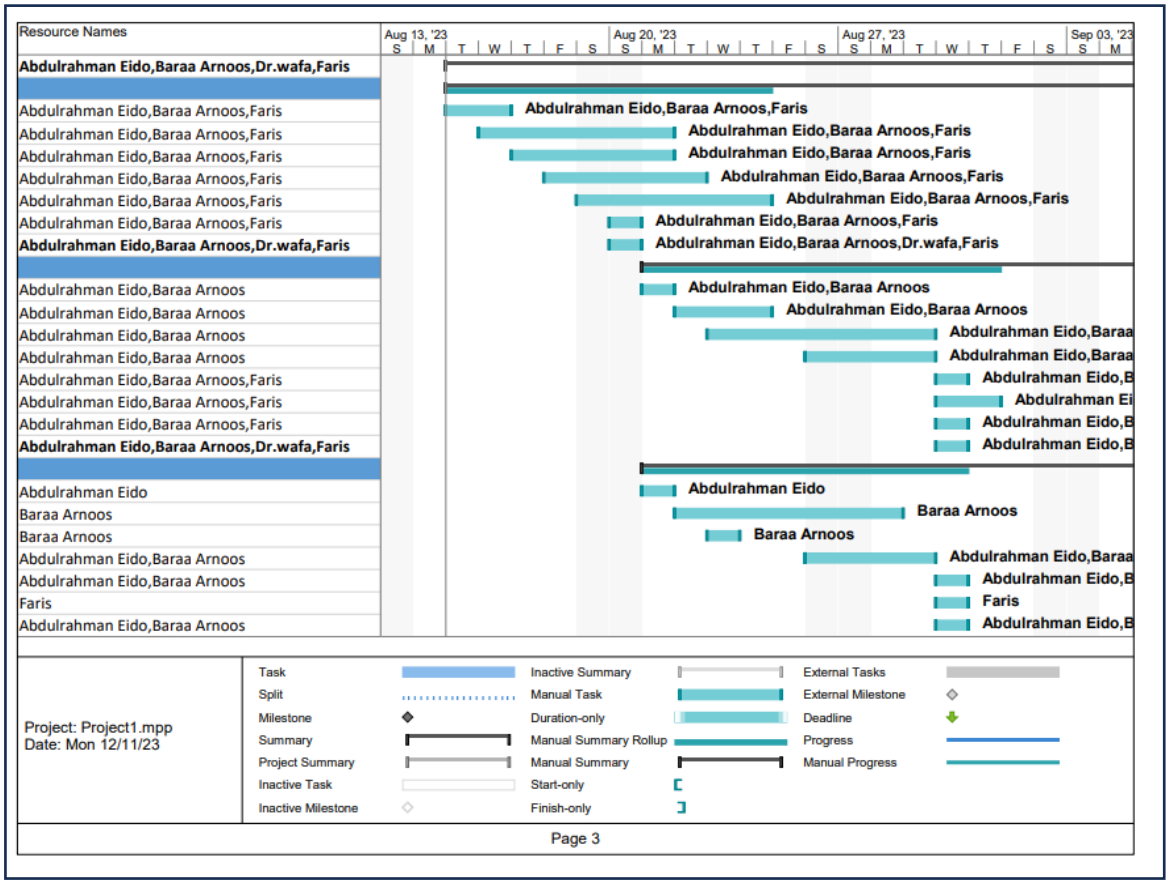


Figure 1-4: Project Plan -3

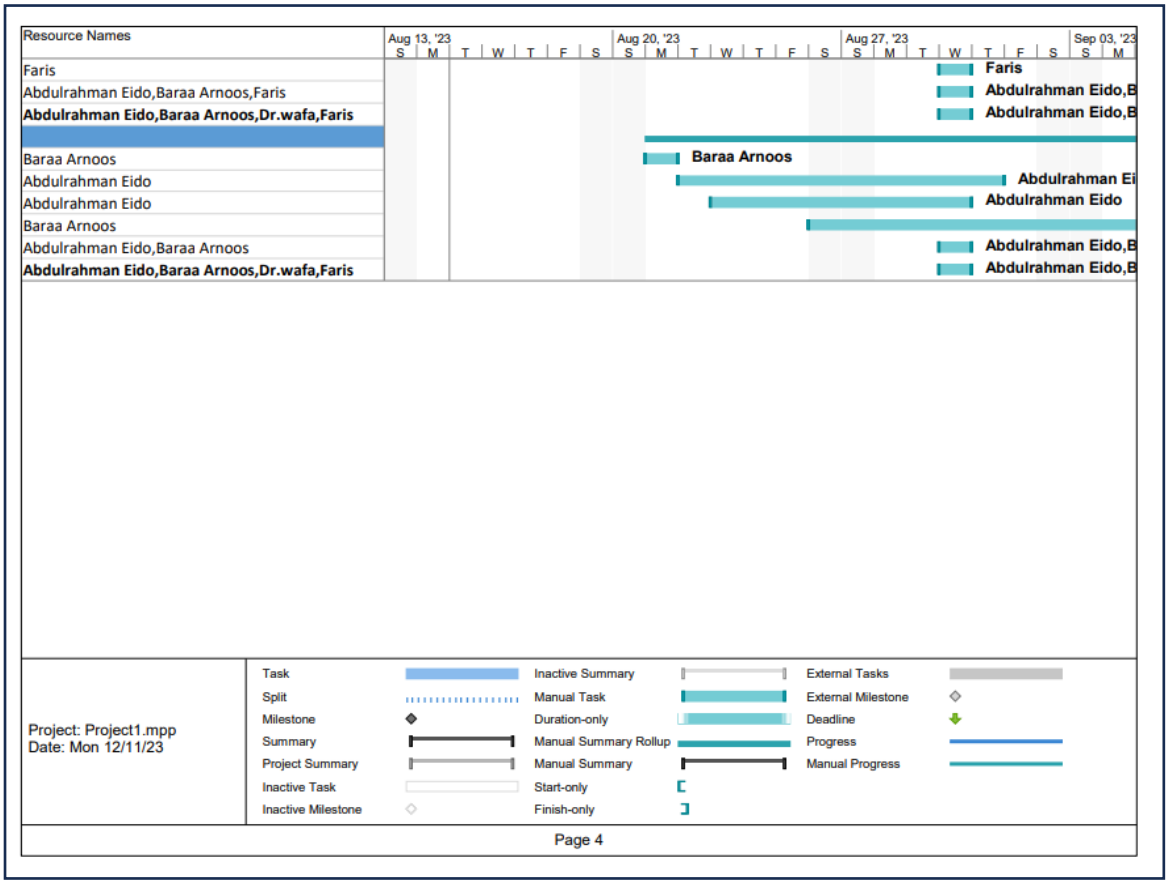


Figure 1-5: Project Plan -4

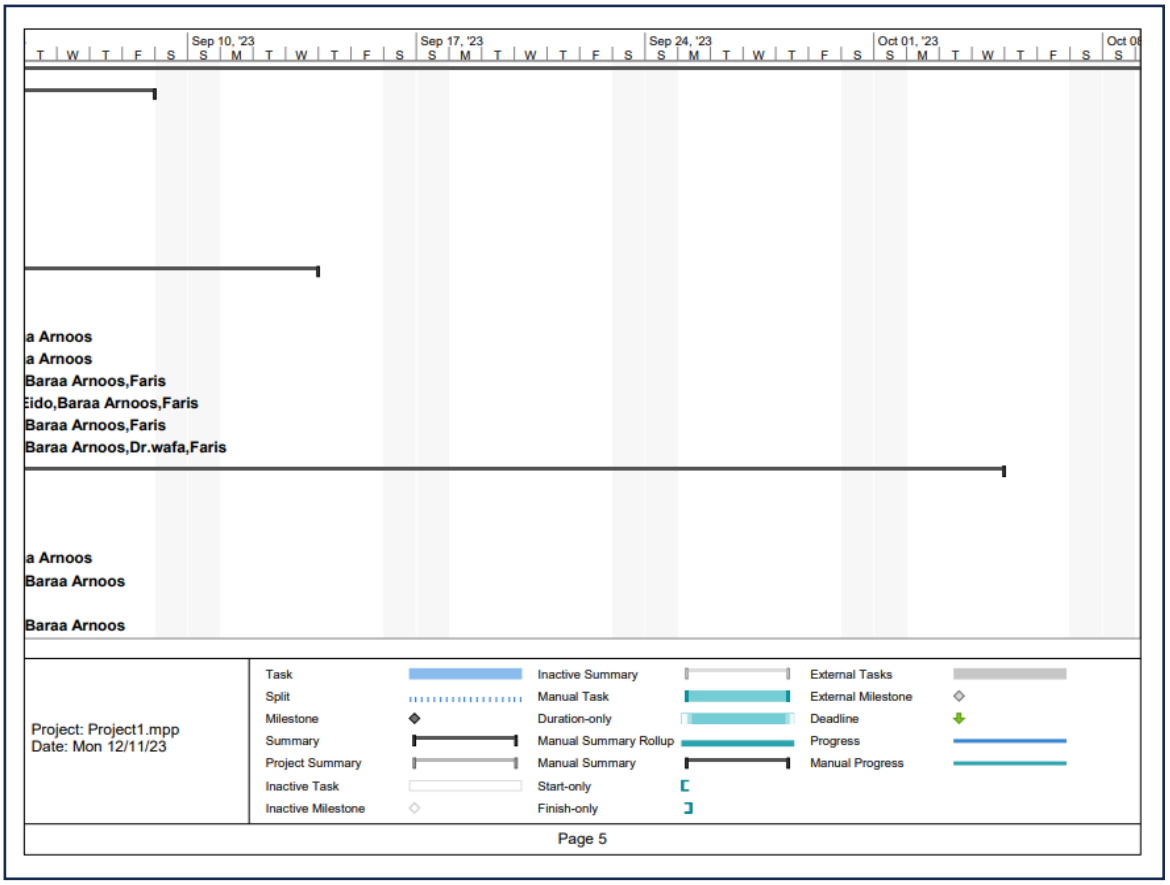


Figure 1-6: Project Plan -5

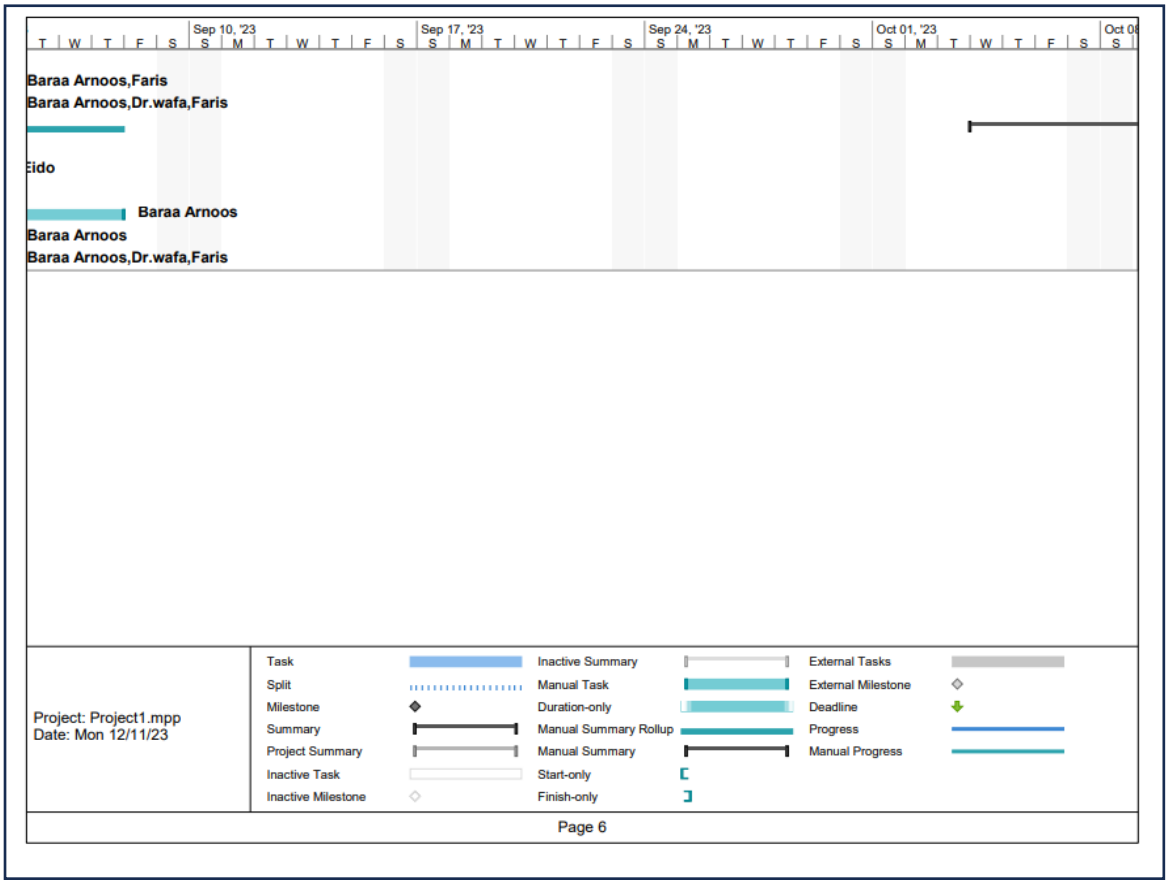


Figure 1-7: Project Plan -6

1.6 Conclusion

In this pivotal chapter, we elucidated the compelling motivations propelling the inception of our groundbreaking project, laying bare the formidable challenges confronting both users and developers alike. Furthermore, we expounded upon the lofty aspirations and objectives that underscore the essence of our undertaking, elucidating a meticulously crafted methodology and project plan poised to catapult us into the initiation of our ambitious venture. As we culminate this chapter, our resolute vision and unwavering motivation propel us forward with unwavering determination, heralding the imminent transition into the next phase – the formidable realm of problem understanding.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

In this chapter, we will discuss and determine the project stakeholders as well as explain our project domain and the services that we will cover. In addition, a literature review will be presented to understand what is covered in other web sites that have similar ideas to us. Finally, a comparison study will be discussed at the end of this chapter comparing our proposed system with others.

2.2 Stakeholders Definition

Stakeholder	Importance	Influence	Discerption
Software Engineering team (our team_ owners)	5	5	Critical project owner with substantial financial and strategic investment, wielding authority to make decisions, set priorities, and shape the project's ultimate success.
supervisor (Dr. Waff Ghonim)	5	4	In overseeing the project, this role ensures alignment with organizational goals, providing impactful guidance to team members and influencing the project's direction. Decision-making authority, while crucial, may be constrained compared to the owner.
Evaluation Committee	4	4	Evaluators contribute feedback on the thoroughness, precision, and feasibility of software system requirements. Their significance lies in ensuring the comprehensive, testable, and viable nature of these requirements.
Project Manager (Abdulrahman)	4	5	Abdulrahman plays a pivotal role in project success, overseeing scheduling, resource allocation, and team management. His effective decision-making authority directly impacts project outcomes.
Developers (Abdulrahman, Baraa, Faris)	2	5	Commands tasks, functionalities, and technical facets. Lurking pitfalls wield the potential to halt and imperil the project, a pivotal factor until its triumphant realization, akin to code under his hands.
Testers (Abdulrahman, Baraa, Faris)	2	5	Testers bear the crucial responsibility of rigorously testing software, ensuring it aligns with requirements and functions seamlessly. Their potent influence lies in detecting and reporting defects, a pivotal role in ensuring software excellence.

Maintenance providers	3	3	Maintenance providers are essential partners in the software development lifecycle, ensuring the ongoing performance, stability, and security of software products. They play a crucial role in addressing technical issues, enhancing user experience, and adapting to changing technologies. Their expertise and support contribute to the overall profitability, reputation, and sustainability of software products and the organizations behind them.
Users (student, doctor, Investors)	5	2	Users, the dynamic force interacting with a software system, embody both consumers and providers. While their direct influence on the project is limited, ensuring their utmost satisfaction is paramount. The project's success hinges on meticulously incorporating all services essential to their contentment.
Investors (in project)	4	2	Investors, the financial architects of a software system, may align with or differ from users. Although their direct influence on the project is constrained, guaranteeing their satisfaction is of paramount importance for project success.
Admin	2	2	The administrator, the linchpin of daily project management, shoulders diverse responsibilities, from furnishing technical support to users to vigilantly overseeing system performance and security. Neglecting their interests is an oversight that cannot be entirely dismissed. So you can call it as super user that have all roles with his hands

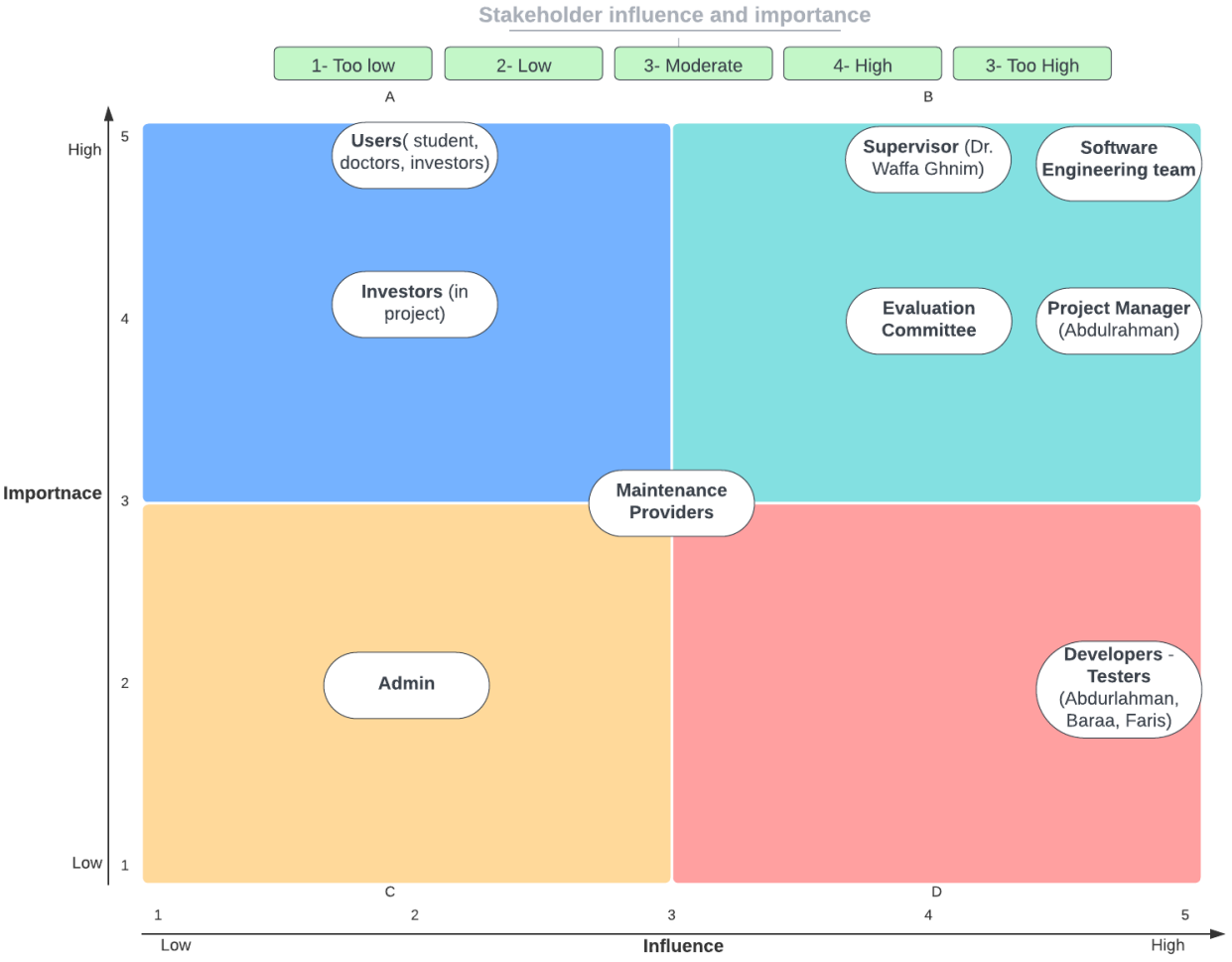


Figure 2-1: Stakeholder's influence and Importance map

2.3 Project Domain

Our website focuses on students who are in the final year of their university journey, specifically on graduation projects, and with the help of specialized evaluators within their university, the student uploads his final project (user manual, image presentation … not source code). After that, the specialist doctor gives an evaluation of the final project out of five, and the projects are arranged accordingly. On this assessment within a competitive environment for students to be motivated. The university provides some information to verify the identity of the student or doctor being evaluated. The site presents these projects to companies and investors to facilitate the search for talent and give students a strong opportunity to obtain an incubator environment to support and guide them. Companies can buy ideas from students or invest in them to continue their journey. Projects that do not receive attention from investors or companies serve as a source of inspiration for other students in the future to take some ideas, learn from their mistakes, and benefit from the opinions of experienced residents.

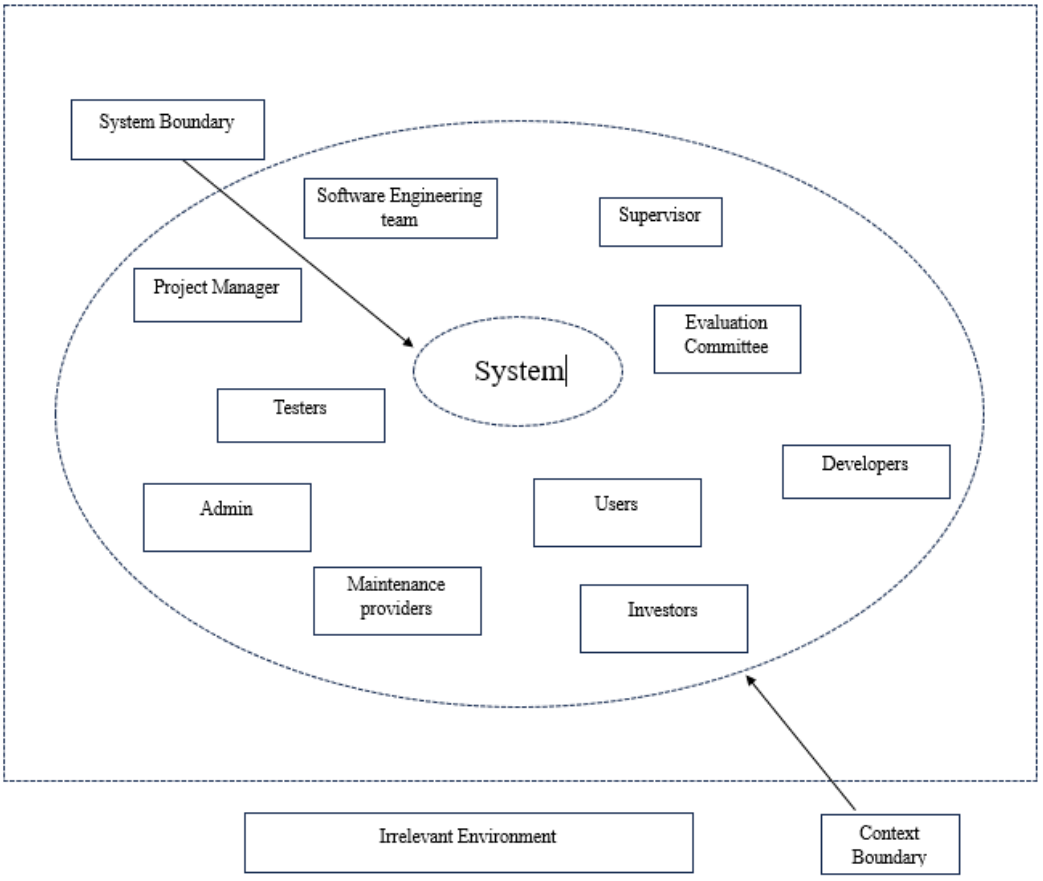


Figure 2-2: Context Diagram

2.4 Literature Review

Recognizing the immense potential and dedication of university and college students, we highly value the culmination of their efforts in their graduation projects. As students approach the milestone of graduation, we strive to ensure that they receive the recognition they deserve for the knowledge and skills they have acquired and applied throughout their academic journey. This not only signifies a significant achievement for the student but also serves as a testament to the quality and depth of education provided by our and other institution.

So, in this article, we will compare some other similar websites to ours

1- **Freelancer:** A freelancer website is an online platform that acts as a marketplace for independent professionals to offer their services to clients looking for specific skills and expertise. It provides a dynamic environment where freelancers and clients can connect, collaborate, and complete projects. Some key features that Freelancer offers:

   a. **Job Listings**:

      i. Clients post detailed job listings outlining their project requirements, budget, and timeline.

      ii. Freelancers can browse and apply for projects that align with their expertise and availability.

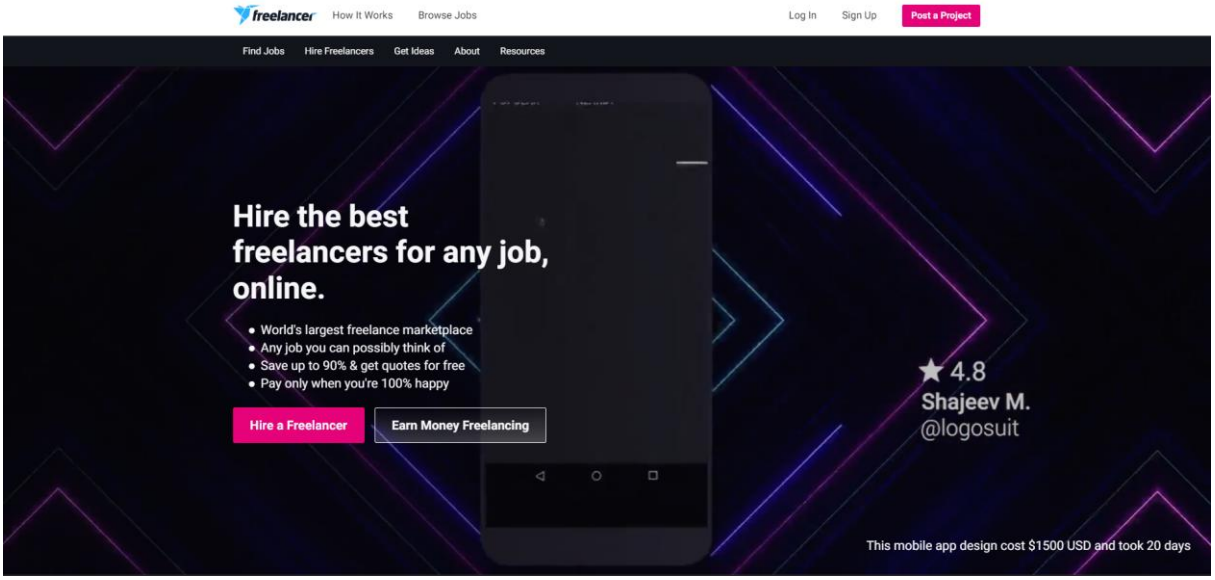
   b. **Messaging and Communication**:

      i. The platform provides a secure messaging system for freelancers and clients to discuss project details, clarify requirements, and negotiate terms.

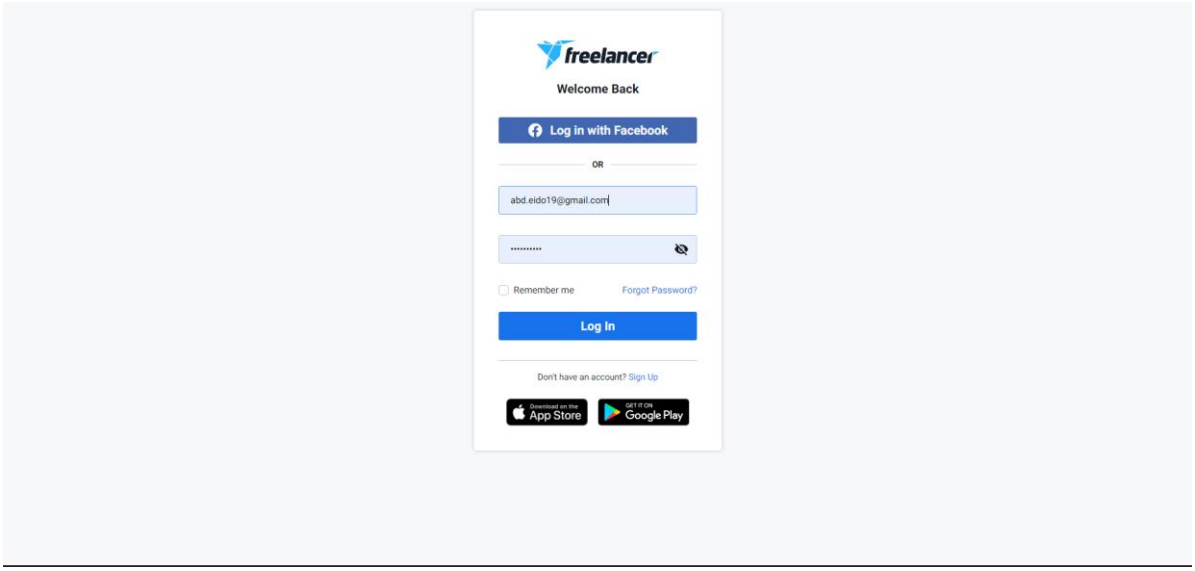
   c. **Feedback and Reviews**:

      i. After project completion, clients can provide feedback and ratings for the freelancer's work. This helps build trust and reputation within the community.

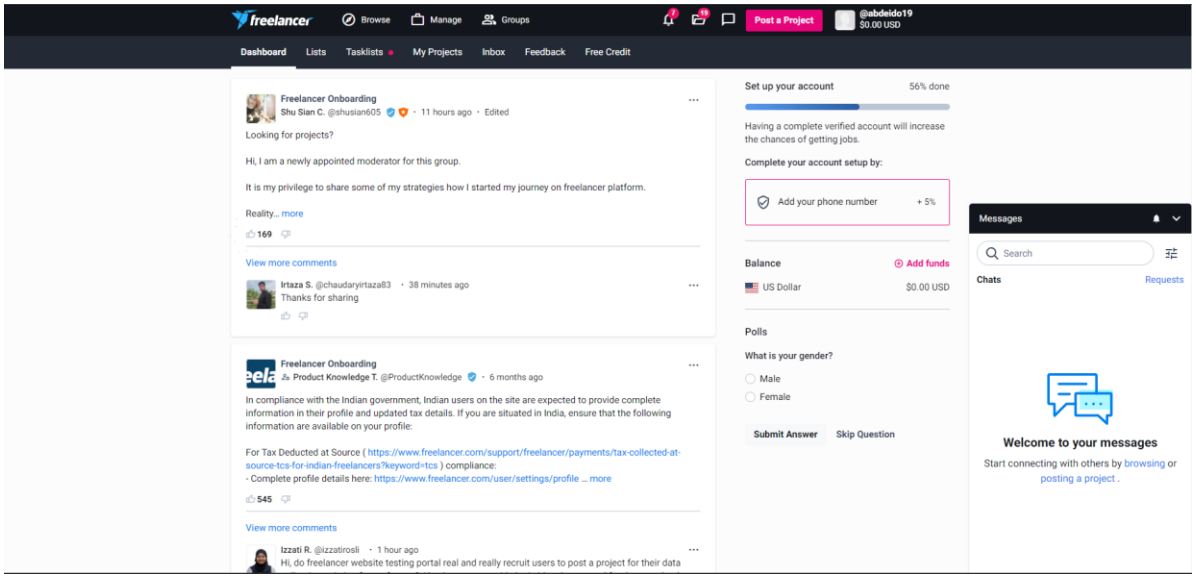
Screenshots of Freelancer:



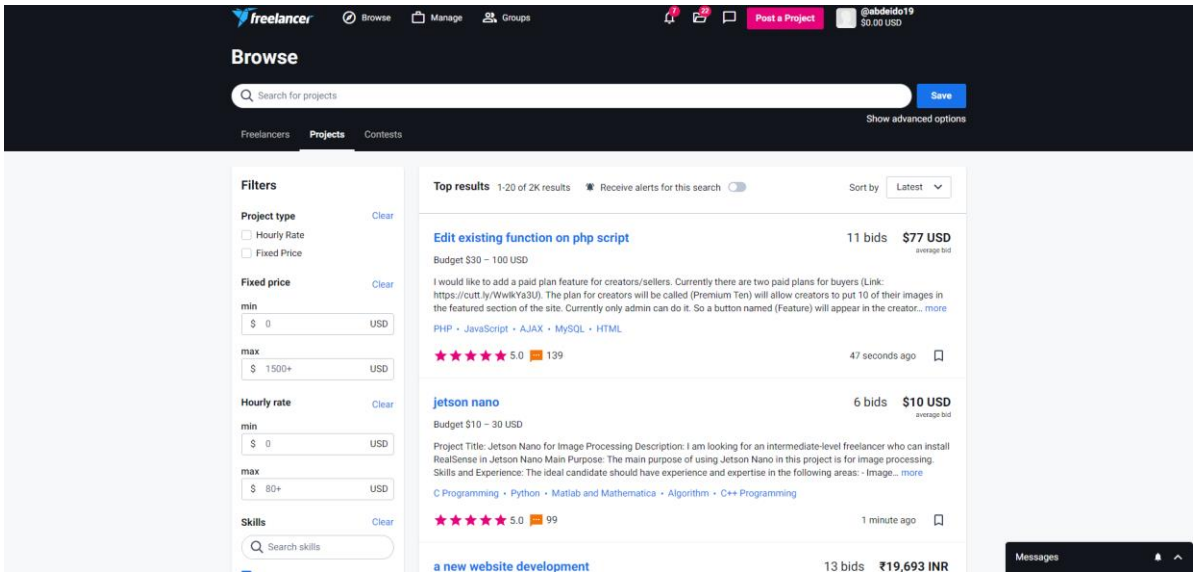
Freelancer Screenshots 2-3: Landing page



Freelancer Screenshots 2-4: Login page



Freelancer Screenshots 2-5: Dashboard page



Freelancer Screenshots 2-6: Projects page

2- **Upwork**: Upwork is a leading global freelancing platform that connects skilled professionals with clients seeking their expertise. Established in 2015 through the merger of Elance and oDesk, Upwork has since become a cornerstone of the online gig economy. With millions of registered freelancers spanning various industries and disciplines, the platform offers a dynamic marketplace for individuals and businesses to collaborate on projects of all scales. Some key features that Upwork offers:

   a. **Diverse Talent Pool**:

      i. Upwork boasts a vast community of freelancers covering a wide array of skills, including web development, graphic design, writing, marketing, and more.

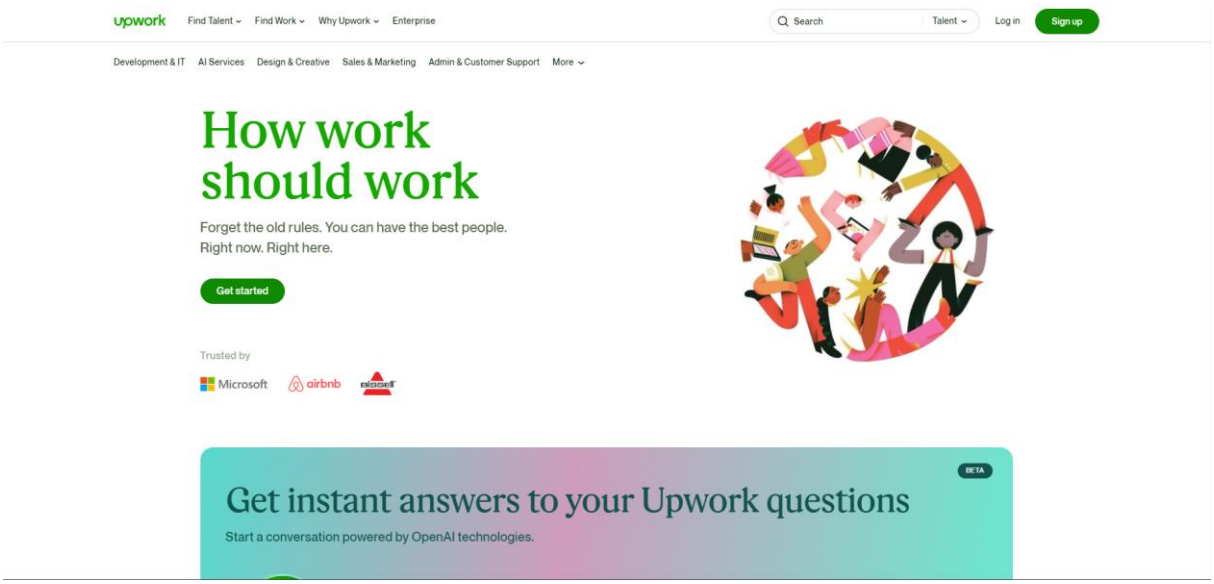
   b. **User Profiles and Portfolios**:

      i. Freelancers create detailed profiles showcasing their skills, experience, portfolios, and client feedback. This allows clients to make informed hiring decisions.

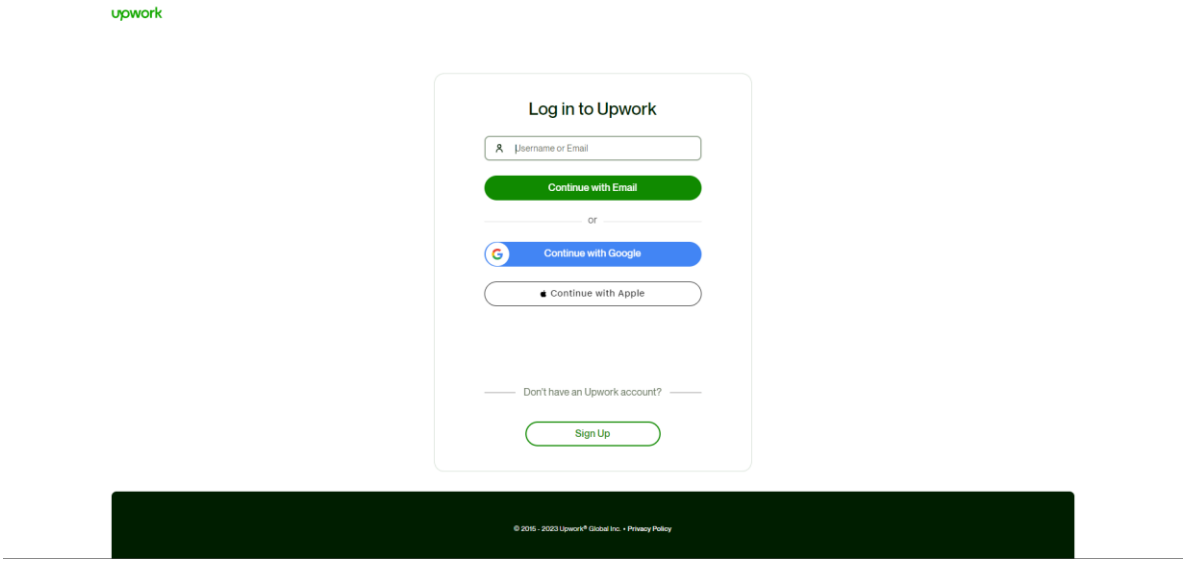
   c. **Job Listings and Search**:

      i. Clients post job listings specifying project requirements, budget, and timeline. Freelancers can search and apply for projects that align with their expertise.

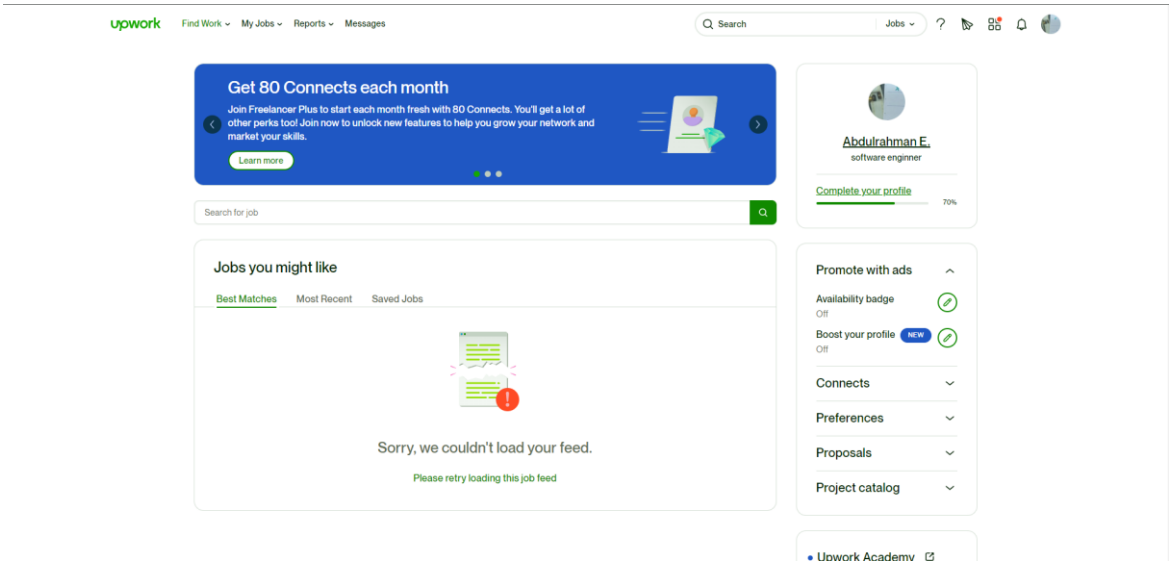
Screenshots of Upwork:



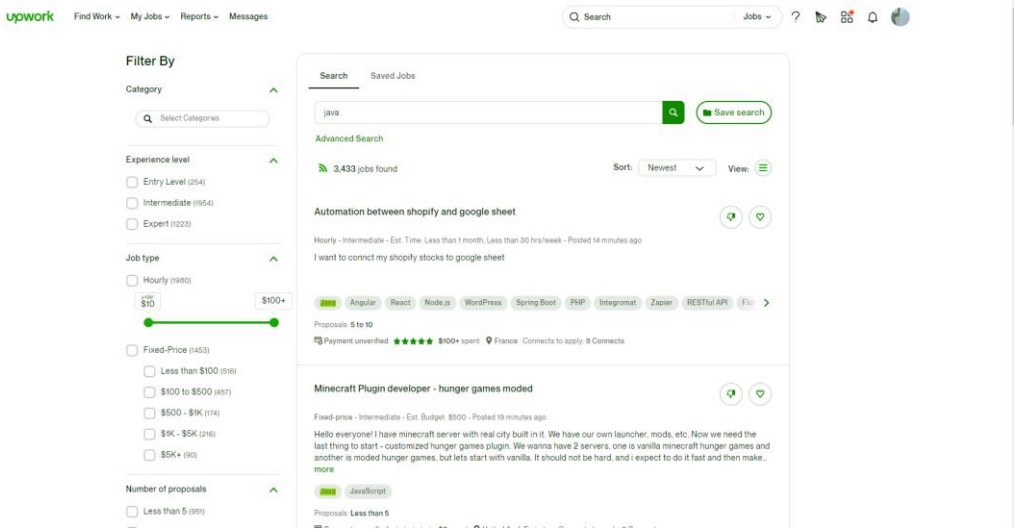
Upwork Screenshots 2-7: Landing page



Upwork Screenshots 2-8: login page



Upwork Screenshots 2-9: Dashboard page



Upwork Screenshots 2-10: Jobs Search page

	Freelancer	Upwork	Spark
Only educational users' access	No	No	Yes
Live Messaging for users and supports	No	Yes	Yes
Ability to set a profile	Yes	Yes	Yes
Ability to share a project with screenshots	No	No	Yes
Ability to sell projects ideas	No	No	Yes
Ability to request user for specific tasks	Yes	Yes	Yes
Ability to create new tasks for clients to users	Yes	Yes	Yes
Ability to find projects based on matching	No	No	Yes
Ability to subscription to projects	No	No	Yes

Upon careful comparison, it becomes evident that our envisioned web application offers a distinctive edge over existing platforms. This application uniquely provides students with an exclusive space to showcase their projects and establish profiles for upcoming presentations. Moreover, it prioritizes seamless communication, allowing direct interaction with relevant authorities for admission requests from external organizations, alongside a host of other features tailored to enhance the student experience.

After an extensive search, we have not come across any existing platforms that closely mirror the unique concept we are poised to introduce. As a result, our comparative analysis focused on platforms that share some similarities with our envisioned site, albeit not aligning precisely with the distinct features we plan to offer. We will show comparison features using below table.

2.5 Comparison Criteria Definition

The definition of comparison criteria involves a systematic process of establishing the standards and elements to be employed in the assessment and evaluation of diverse solutions, products, or systems. This process furnishes a structured framework for appraising the viability and appropriateness of various options, contingent upon specific requisites and limitations. The delineated criteria should possess attributes of measurability, specificity, and direct relevance to the particular problem at hand. These encompass facets like functionality, performance, cost-effectiveness, scalability, security, compatibility, and user experience. Moreover, the definition of comparison criteria should also account for the judicious trade-offs among these different criteria, ensuring that the optimal solution is discerned through a well-balanced assessment of all pertinent factors.

2.6 Comparison results and the feasibility study

a- In this segment of the project plan, we establish the set of criteria that will be employed to meticulously assess and contrast various solution alternatives. These criteria will encompass aspects like technical viability, financial implications, project timeline, and harmonization with the existing infrastructure.

b- Following the comparison process and the subsequent feasibility study, this section will divulge the outcomes of the evaluation of diverse solution options, all based on the predefined criteria. The feasibility study will meticulously scrutinize each option's practicability, ultimately offering a recommendation for the optimal solution aligning with the project's objectives. Technical limitations, financial allocations, and project scheduling will be considered to ascertain the most suitable option for execution. Additionally, this study may encompass detailed cost and schedule projections for each option, furnishing a comprehensive evaluation of feasibility.

2.7 Conclusion

In this chapter, we had undertaken a thorough review of the stakeholders involved in our project. We elucidated the scope of the project's activities and delineate the range of services that will be made available to students hailing from the University of Jeddah, as well as those from other academic institutions. Emphasized on the all-encompassing online solution we are poised to offer. Additionally, we had conducted a comparative analysis between our suggested approach and a selection of analogous websites currently in operation.

CHAPTER 3: ANALYSIS PHASE

3.1 Introduction

In this chapter, we will discuss and determine the project stakeholders as well as explain our project domain and the services that we will cover. In addition, a literature review will be presented to understand what is covered in other web sites that have similar ideas to us. Finally, a comparison study will be discussed at the end of this chapter comparing our proposed system with others.

3.2 Requirements Gathering:

Gathering requirements is a meticulous process that demands patience and exceptional analytical prowess. To address this, we propose a comprehensive methodology for requirements elicitation, meticulously crafted from our meticulous observations and insightful interviews conducted previously.

Furthermore, we draw upon our invaluable experiences as students at the University of Jeddah, where we gained firsthand insights into the professional landscape, enabling us to identify the specific roles that align with our proposed ideas.

This revised version utilizes stronger and more descriptive language to convey the importance and rigor of the requirements gathering process, emphasizing the meticulousness and insightful nature of the proposed methodology.

It also highlights the value of past experiences and the ability to identify relevant professional roles

3.3 Functional Requirements:

We have divided the requirements based on actors that we have in our project and the of course the common functionalities between them, so basically, we have 3 kinds of actors:

1. **Student**
2. **Doctor**
3. **Investor**
4. **Admin**

Num	Description
FR-1	**Registration**
FR-1.1	The system must allow to new users to register the website using (name, password, educational email)
FR-1.2	The system must allow the user to specify his rule, whether he is a student, doctor, or investor
FR-1.3	The system must validate the data
FR-1.4	The system must verify user email
FR-2	**Login**
FR-2.1	The system must provide login interface allow the user to put his information (email, password)
FR-2.2	The system must check the user data with original data in data base and compare it
FR-2.3	The system must Identify the user either (instructor, student, Investor) and show his page depends on his rule
FR-2.4	The system must allow the user to edit or update his information (name, profile content, password)
FR-2.5	The system must allow user to change his password using email if he forgets his password
FR-3	**student functionality**
FR-3.1	The student can display all projects from projects page and see them
FR-3.2	The student can write comment on any project, and it will appear in comment section and sorted by newest
FR-3.3	The student can create new project and upload images and text content to present his work
FR-3.4	The student cannot upload more than one project
FR-3.5	The student can delete or edit his own project
FR-3.6	The student can mention another student who are participating in the project
FR-3.7	The system must allow student to apply to any project uploaded through investors.
FR-4	**Doctor functionality**
FR-4.1	The doctor can display all projects from projects page and see them
FR-4.2	The doctor can write comment on any project, and it will appear in comment section, and it will appear at firs above all comments
FR-4.3	The doctor can evaluate the project out of 5
FR-4.4	The overall rating of the project will be the mean of all evaluate
FR-5	**Investor functionality**
FR-5.1	The investor can display all projects page and see them
FR-5.2	The investor can write comment on any project, and it will appear in comment section under doctors' comment
FR-5.3	The investor can send offer to student to buy his project or idea
FR-5.4	The investor can send job offer to any student
FR-5.5	The investor can adopt a project by uploading the requirements on the site

Functional requirement ID: 1.1

Actor: any user

Functional requirement short description: The system must allow to new users to register the website using (name, password, educational email)

Functional requirement long description: The system must facilitate new user registration on the website by providing a secure and user-friendly registration process. New users should be able to create an account by entering their name, password, and educational email address.

Functional requirement ID: 1.2

Actor: any user

Functional requirement short description: The system must allow the user to specify his base, whether he is a student, doctor, or investor

Functional requirement long description: The system should implement a robust user identification mechanism during the registration process to accurately classify new users into the “Doctor”, “Student” or “Investor” category. This categorization is crucial to tailoring a website's features and content to the specific needs and interests of each user group.

Functional requirement ID: 1.3

Actor: any user

Functional requirement short description: The system must validate the data

Functional requirement long description: The system must implement a data validation mechanism to ensure the accuracy, completeness and integrity of registration information provided by new users. This verification process is necessary to maintain the credibility and reliability of the user base and prevent the creation of fraudulent or invalid accounts. The system must perform a series of checks on the data provided, including:

- Format validation
- Content validation
- Duplicate validation

Functional requirement ID: 1.4

Actor: any user

Functional requirement short description: The system must verify user email

Functional requirement long description: The system should send an email to the user's registered email address containing the verification link. The email should clearly explain the purpose of the link and provide instructions on how to verify the email address.

Functional requirement ID: 2.1

Actor: any user

Functional requirement short description: The system must provide login interface allow the user to put his information (email, password).

Functional requirement long description: The system must provide a secure and user-friendly login interface that allows users to enter their email address and password to access their accounts.

Functional requirement ID: 2.2

Actor: any user

Functional requirement short description: The system must check the user data with original data in data base and compare it.

Functional requirement long description: The system must implement a robust user authentication mechanism to verify the identity of users attempting to access their accounts. This authentication process is crucial for maintaining the security of user data and preventing unauthorized access. To achieve accurate user authentication, the system should compare the user-provided login credentials (email address and password) against the corresponding records stored in the system's database.

Functional requirement ID: 2.3

Actor: any user

Functional requirement short description: The system must Identify the user either (doctor, student, Investor) and show his page depends on his rule

Functional requirement long description: The system must implement a robust user identification and authorization mechanism to determine the user's role (instructor, student, or investor) and provide them with access to the appropriate page and features based on their role.

Functional requirement ID: 2.4

Actor: any user

Functional requirement short description: The system must allow the user to edit or update his information (name, profile content, password)

Functional requirement long description: The system must allow users to manage their profile information, including their name, profile content, and password.

Functional requirement ID: 2.5

Actor: any user

Functional requirement short description: The system must allow user to change his password using email if he forgets his password

Functional requirement long description: The system must implement a password

reset mechanism to enable users to regain access to their accounts if they forget their passwords. This mechanism should be secure and user-friendly to ensure that users can easily reset their passwords without compromising their account security. To achieve this, the system should provide a password reset option on the login page. When a user clicks on the password reset option, the system should prompt them to enter their registered email address. The system should then generate a unique password reset token and send an email to the user's registered email address containing the token and instructions on how to reset their password.

Functional requirement ID: 3.1

Actor: student

Functional requirement short description: The student can display all projects from projects page and see them.

Functional requirement long description: Students should be able to view a list of all projects on the projects page. The projects page should display the project title, description and who upload it. Students should also be able to click on a project to view more information about it.

Functional requirement ID: 3.2

Actor: student

Functional requirement short description: The student can write comment on any project, and it will appear in comment section and sorted by newest

Functional requirement long description: Students should be able to write comments on any project and have their comments appear in a comment section sorted by newest first. The comment section should provide a text box for students to enter their comments and a button to submit their comments. Once a student submits a comment, it should be displayed in the comment section along with the student's name, date and time of submission, and the comment text.

Functional requirement ID: 3.3

Actor: student

Functional requirement short description: The student can create new project and upload images and text content to present his work

Functional requirement long description: Students should be able to create new projects and upload images and text content to present their work. The project creation process should be simple and straightforward, with clear instructions and guidance for students. Students should be able to enter a project title, description, and goals, and they should be able to upload images and text content to support their project.

Functional requirement ID: 3.4

Actor:

Functional requirement short description: The student cannot upload more than one project

Functional requirement long description: To ensure fairness and equity among students, the system should implement a mechanism that restricts each student to uploading only one project.

Functional requirement ID: 3.5

Actor: student

Functional requirement short description: The student can delete or edit his own project

Functional requirement long description: Students should have the ability to manage their submitted project, including the option to delete or edit their own work.

Functional requirement ID: 3.6

Actor: student

Functional requirement short description: The system must allow student to mention another student who are participating in the project

Functional requirement long description: In order to facilitate effective collaboration among students working on group projects, the system must provide a mechanism for students to easily identify and mention other participants within their respective projects.

Functional requirement ID: 3.7

Actor: student

Functional requirement short description: The system must allow student to apply to any project uploaded through investors.

Functional requirement long description: The system must allow students to submit a request for any investor who has raised legitimate requirements in an easy way by writing his personal information, his university major, and his university qualification.

Functional requirement ID: 4.1

Actor: doctor

Functional requirement short description: The doctor can display all projects from projects page and see them

Functional requirement long description: Doctors should be able to view a list of all projects on the projects page. The projects page should display the project title,

description. Doctors should also be able to click on a project to view more information about.

Functional requirement ID: 4.2

Actor: doctor

Functional requirement short description: The doctor can write comment on any project, and it will appear in comment section, and it will appear at firs above all comments

Functional requirement long description: Doctors should have the privilege of writing comments on any project and have their comments appear at the top of the comment section, ensuring their feedback is prioritized and readily visible to all involved parties. This elevated placement of doctor comments highlights their expertise and the importance of their insights in shaping the project's development.

Functional requirement ID: 4.3

Actor: doctor

Functional requirement short description: The doctor can evaluate the project out of 5

Functional requirement long description: Doctors should have the ability to evaluate student projects on a scale of 1 to 5, with 5 being the highest score.

Functional requirement ID: 4.4

Actor: doctor

Functional requirement short description: The overall rating of the project will be the mean of all evaluate

Functional requirement long description: The overall rating of the project will be calculated as the mean of all individual evaluations provided by doctors. This means that each doctor's evaluation will be given equal weight in determining the overall rating. The system will automatically calculate the mean of all evaluations once all doctors have submitted their evaluations. The overall rating will be displayed on the project page, along with the individual evaluations of each doctor

Functional requirement ID: 5.1

Actor: investor

Functional requirement short description: The investor can display all projects page and see them.

Functional requirement long description: investor should be able to view a list of all projects on the projects page. The projects page should display the project title, description. investor should also be able to click on a project to view more information about.

Functional requirement ID: 5.2

Actor: investor

Functional requirement short description: The investor can write comment on any project, and it will appear in comment section under doctors' comment

Functional requirement long description: investor should be able to write comments on any project and have their comments appear in a comment section under doctor comment sorted by newest first.

Functional requirement ID: 5.3

Actor: investor

Functional requirement short description: The investor can send offer to student to buy his project or idea

Functional requirement long description: Once an investor has identified a project that aligns with their investment criteria and has conducted thorough due diligence, they should have the ability to express their interest by sending an offer to the project team, specifically the student responsible for the project or idea. The offer should clearly outline the investor's proposed investment terms.

Functional requirement ID: 5.4

Actor: investor

Functional requirement short description: The investor can send job offer to any student

Functional requirement long description: In addition to expressing interest in a student's project or idea, investors should also have the ability to send job offers to students whose skills and expertise align with their investment portfolio or company's needs. This direct recruitment channel provides a valuable opportunity for investors to connect with talented individuals who can contribute to their business ventures and help them achieve their strategic goals.

Functional requirement ID: 5.5

Actor: investor

Functional requirement short description: The investor can adopt a project by uploading the requirements on the site

Functional requirement long description: Investors must have the ability to adopt the project by uploading the requirements to the website. This process should be simple and straightforward, with clear instructions and guidance for investors. Investors should be able to download the project proposal

3.4 Non-Functional Requirements

1- Usability: The system must have a user interface that attracts users to interact with it, and the components used must be familiar to users in order for the website to be easy to learn and not have complexity, and so that the user does not feel bored or have difficulty learning the site.

2- Modifiability: The system must be written in a clear way, with excellent planning, and in a form that can be developed so that we can add any update or other features to the program smoothly, and for the system to be documented and easy to test.

3- Scalability: The system must be able to grow in anticipation of any number of students and investors who wish to register and accept a large number of projects, so it must be flexible and expandable at any moment. Also, the system should be able to be integrated with other systems.

4- Security: The system must have high security standards, so the system must protect user data from unauthorized access. Encrypting sensitive data and using an encrypted protocol to transfer data. The system must also protect the data of investors, doctors, and investors in the database, so that no unauthorized person can tamper with or look at it.

3.5 Hardware Requirement :

We will use Amazon Server to host our website for several reasons, it also helps us achieve our Non-Functional Requirement needs, I will summarize these reasons in several points:

- **Improve performance**: Amazon Cloud Web Hosting is designed for high performance, with low latency and high availability.so that it will improve usability and customer needs.

- **Improve scalability**: Amazon Cloud Web Hosting can scale to meet the needs of our website from the beginning until it reaches to large amount of data.

- **Improve Security**: Amazon Cloud Web Hosting offers a variety of security features to protect our website from attack.

- **One of the main reasons is reduce cost**: amazon cloud web hosting It can make us avoid a lot of losses and avoid buying expensive devices. We can specify the storage space we want to purchase and the features we desire, so it will be appropriate at the beginning of the website until it becomes a huge website.

To sum it up we will use amazon cloud web hosting with less features and we will improve it when our program needs more storage or features. As using web-based applications does not require high performance of hardware components, it is at end depend on users' s capacity, but we can say spark need at minimum:

Hardware Component	Minimal Requirements
Processor	Intel, Core i3 or Ryzen 3
RAM	4 GB
Disk Space	265 GB

3.6 Actors Definition

1- **Student** : Share his project and stay in touch with investors.

2- **Doctor**: Evaluating student projects and giving a more accurate space for the investor to choose the most suitable project.

3- **Investor**: Brower projects and choosing the best for hit need, and can buy Spark project

4- **Admin**: Super user that can view data using website pages

3.7 Activity Diagrams

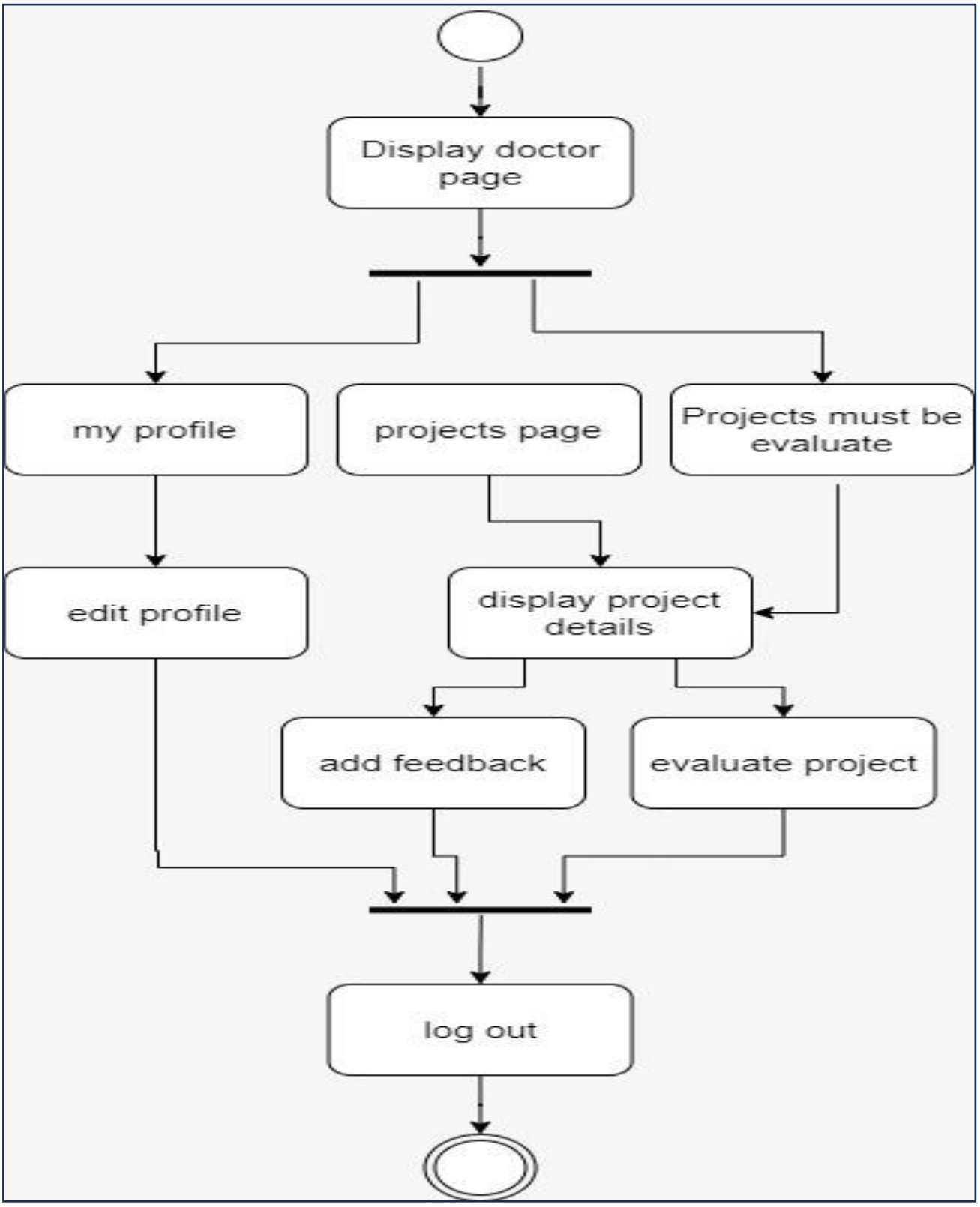


Figure 3-1: Activity Diagram 1

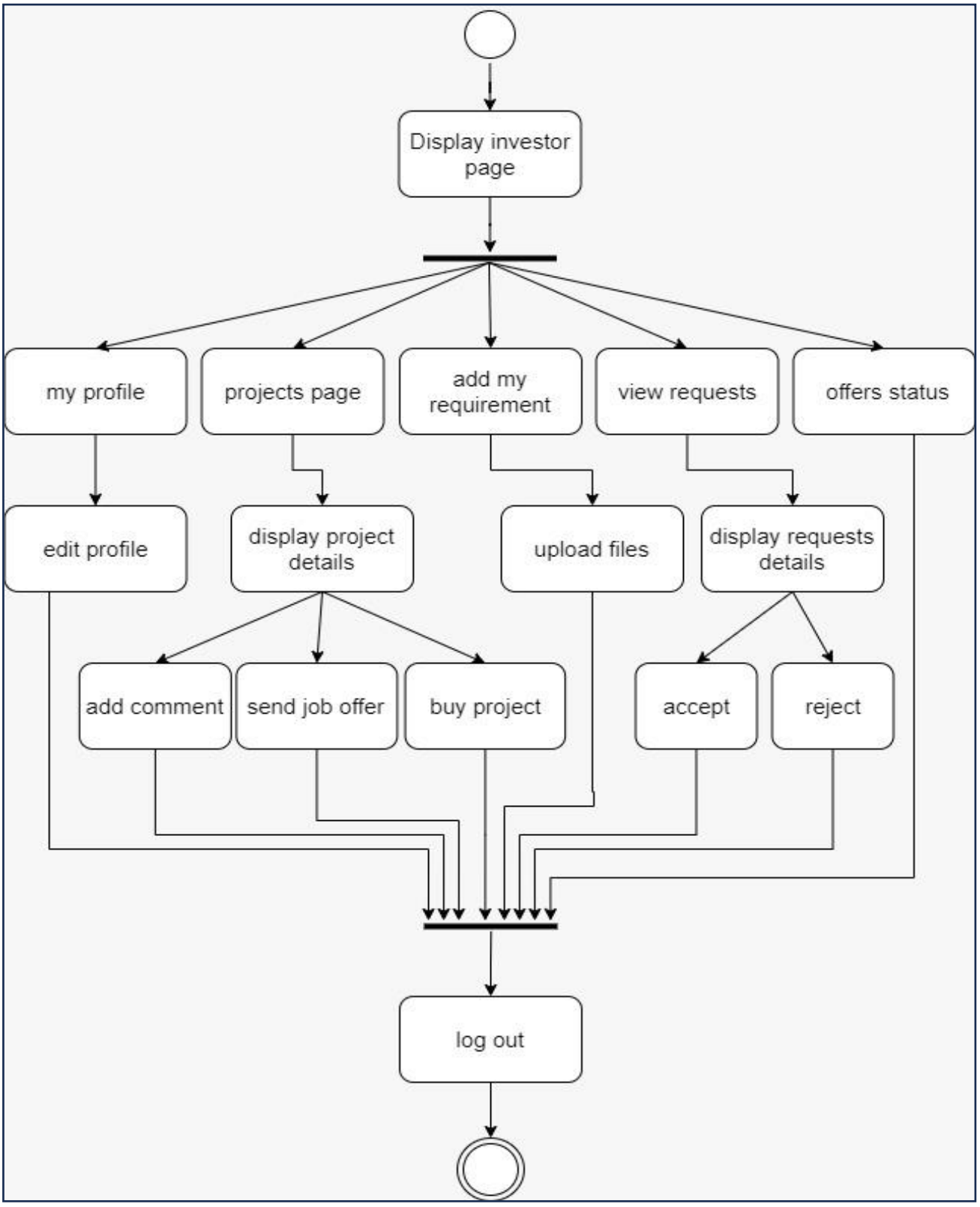


Figure 3-2: Activity Diagram 2

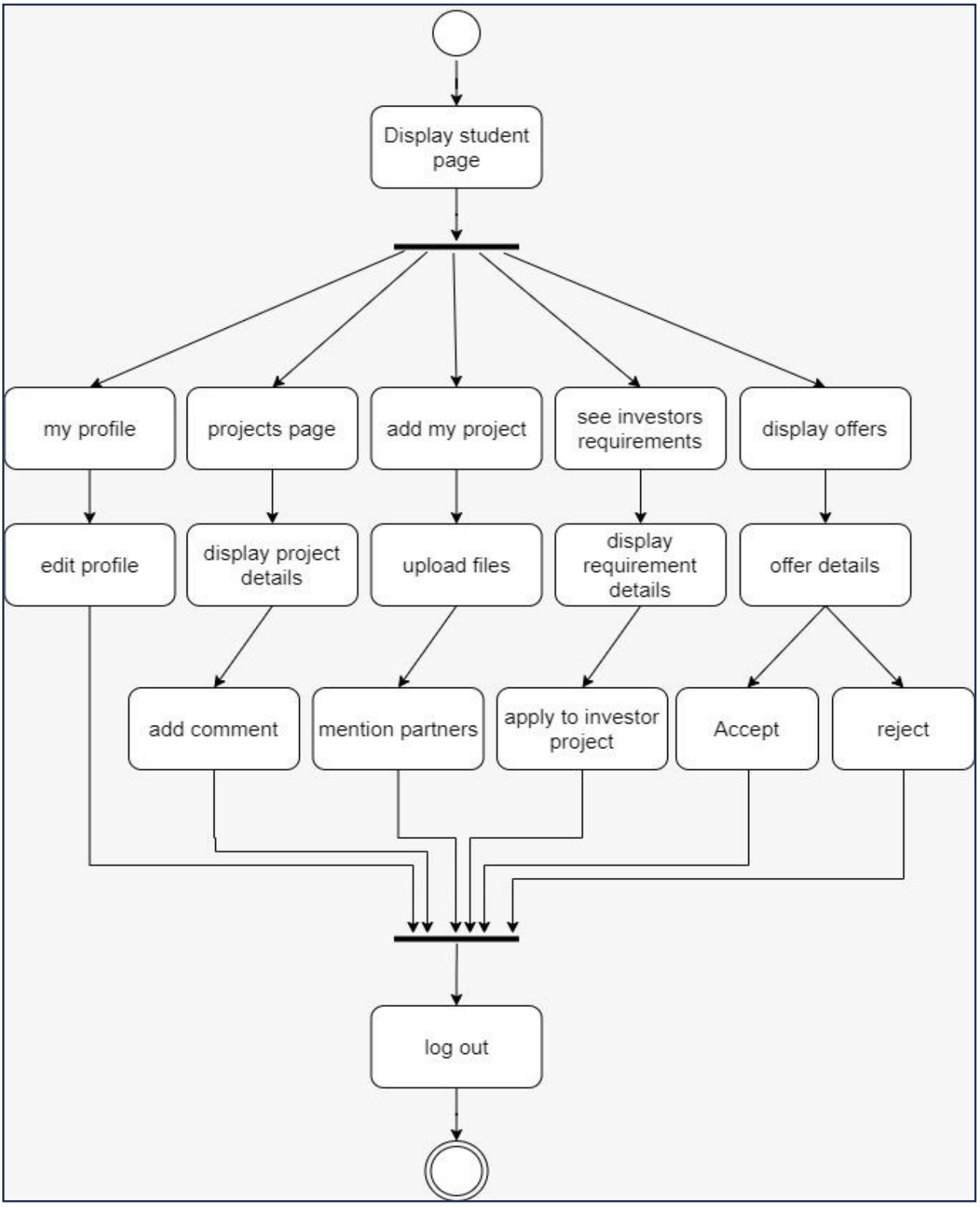


Figure 3-3: Activity Diagram 3

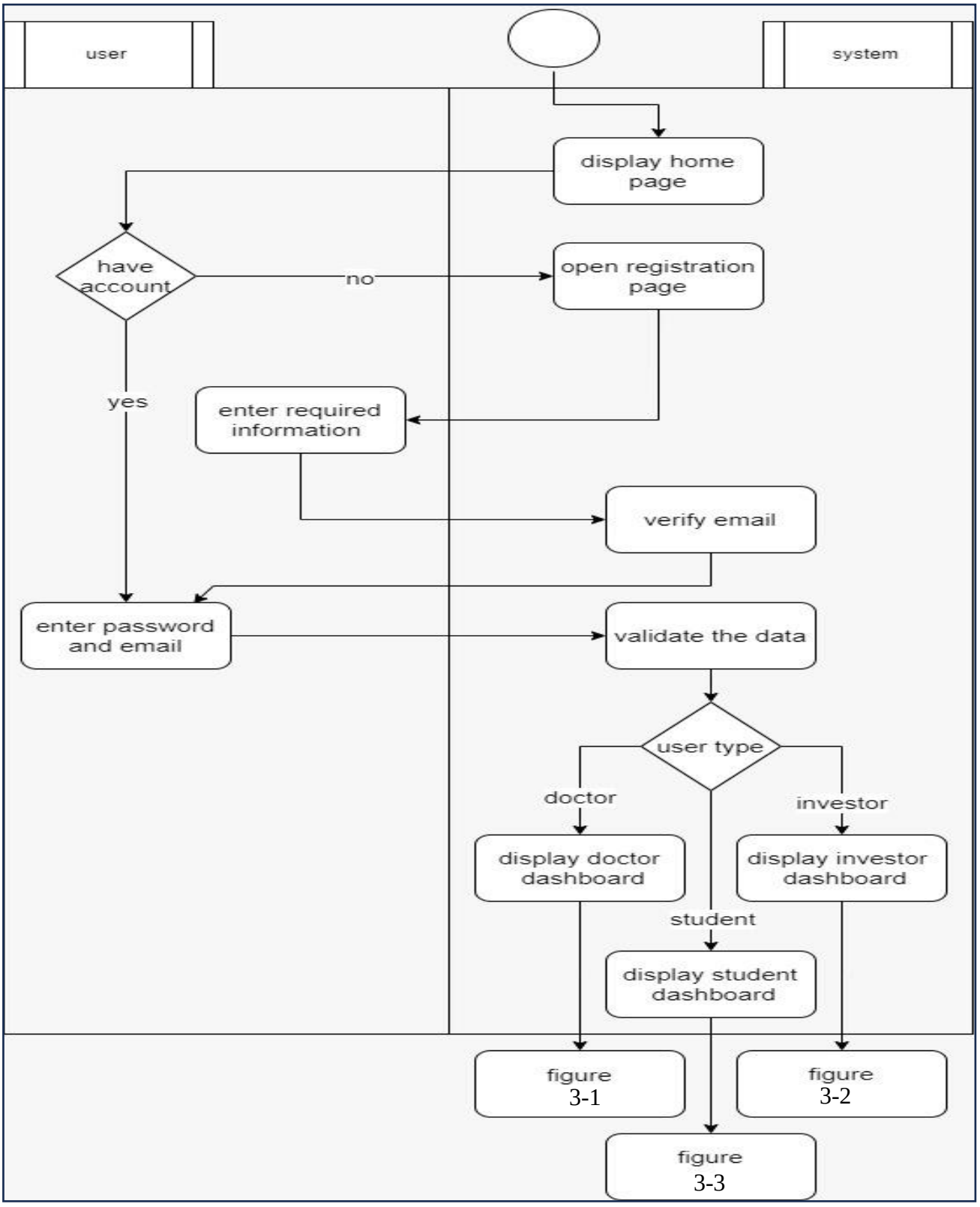


Figure 3-4: Activity Diagram 4

3.8 Use Case Diagrams

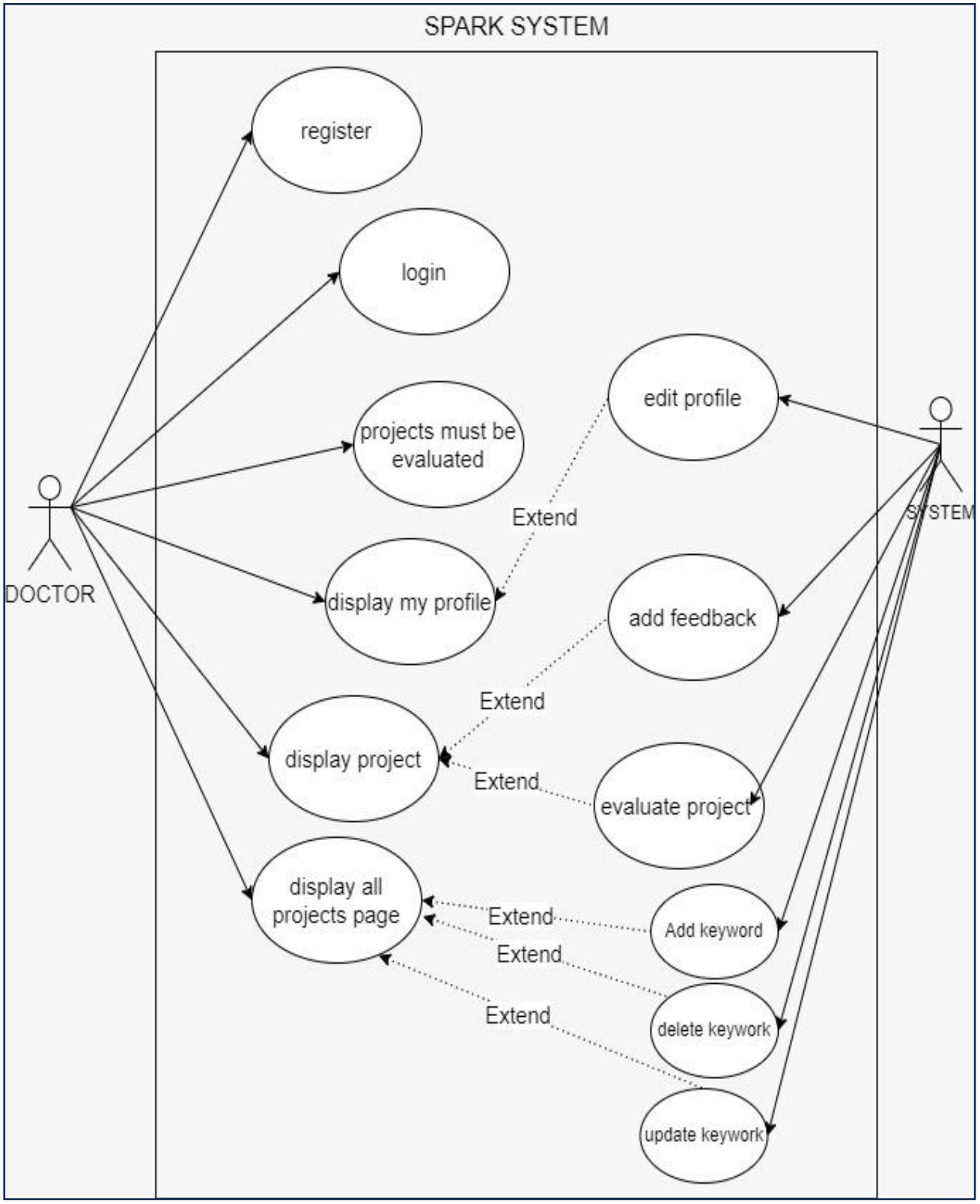


Figure 3-5: Use Case Diagram 1

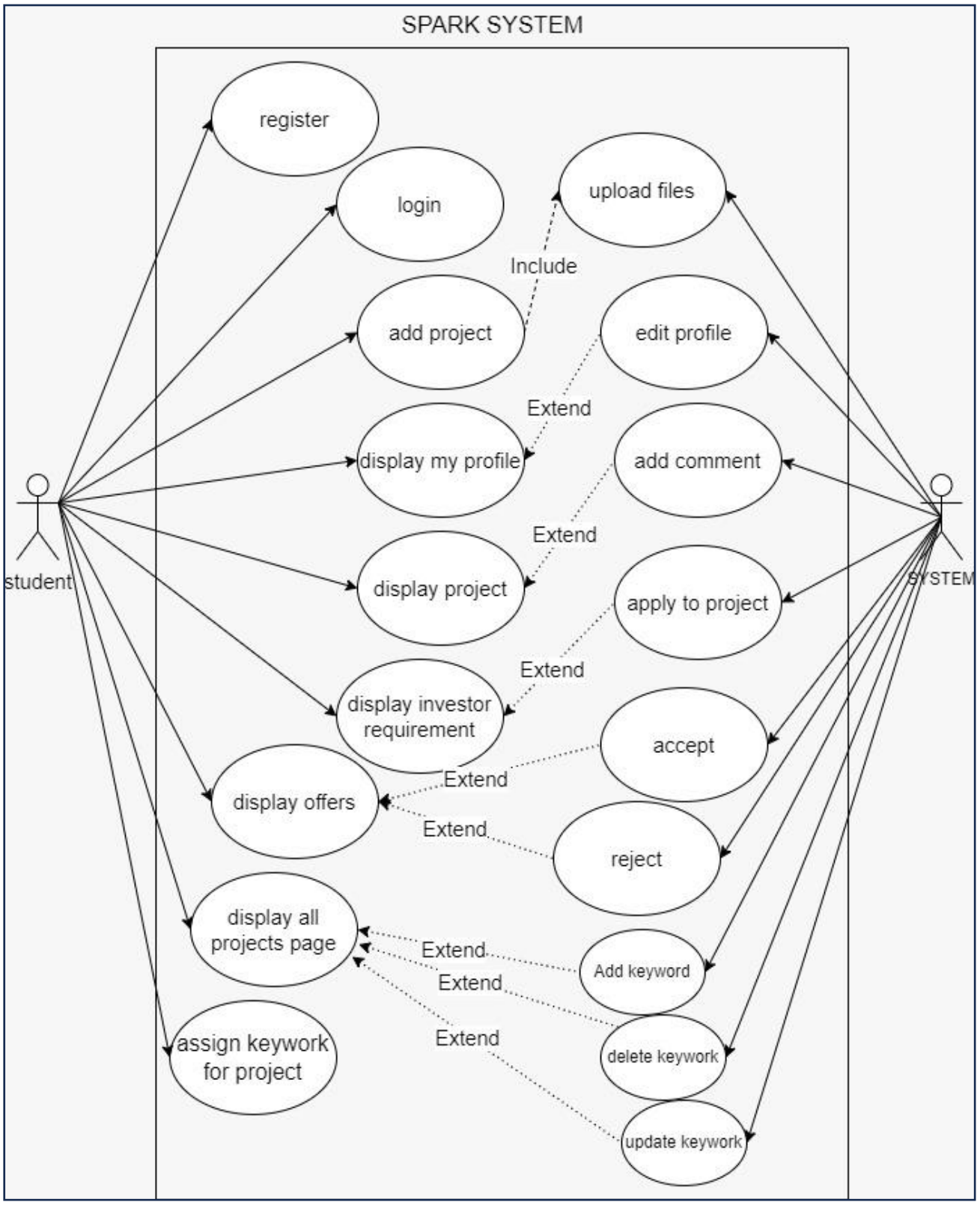


Figure 3-6: Use Case Diagram 2

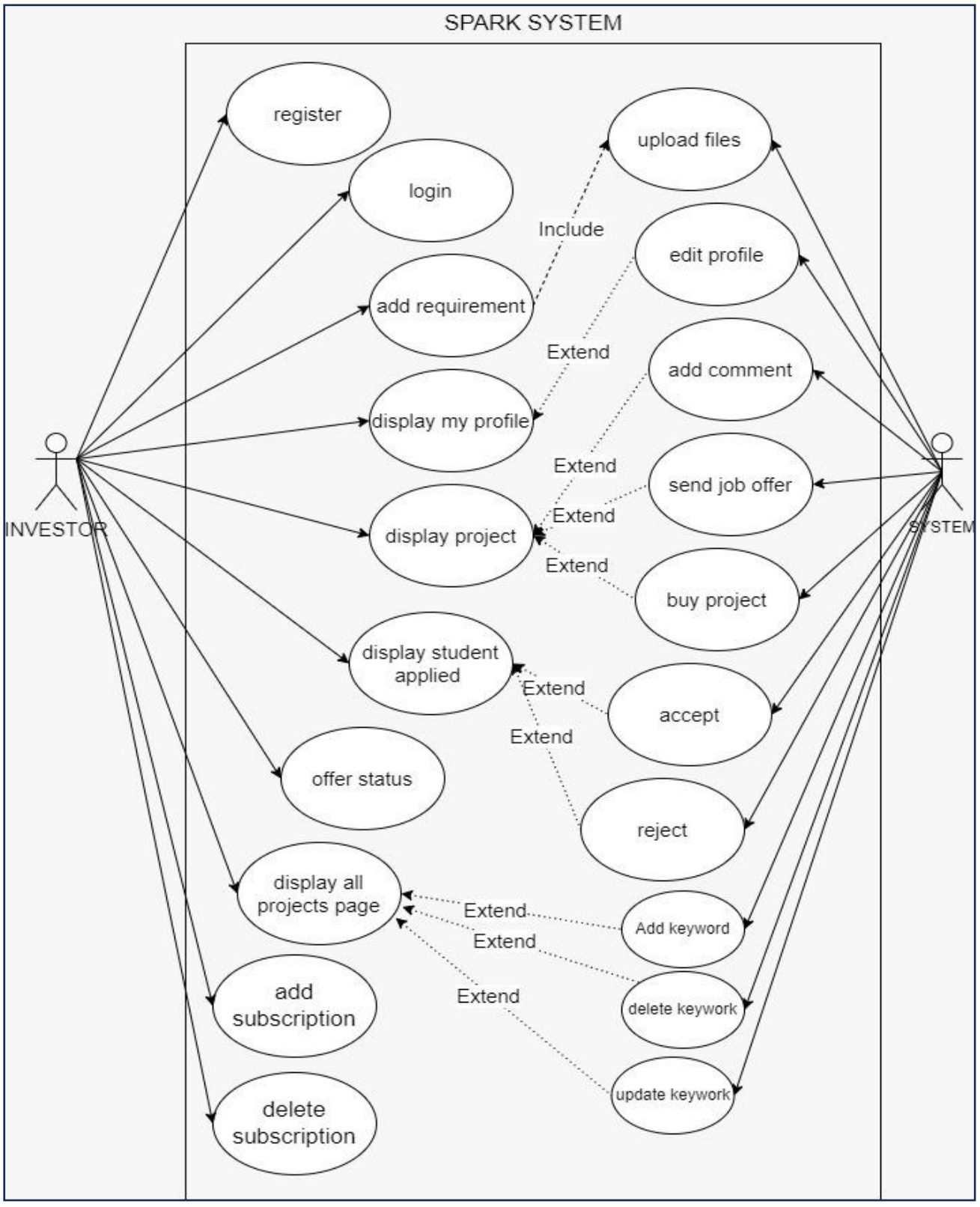


Figure 3-7: Use Case Diagram 3

3.9 Conclusion

Within this chapter, we embarked on a comprehensive examination of the fundamental functionalities required for our proposed system. Simultaneously, we meticulously identified and elucidated the influential stakeholders within this intricate ecosystem.

Furthermore, we delineated the system's intricate architecture through a series of meticulously crafted diagrams, providing a transparent and comprehensive visualization of its underlying structure.

This revised version employs stronger and more descriptive language to convey the comprehensiveness and thoroughness of the system analysis process. It emphasizes the careful identification of stakeholders and the creation of detailed diagrams to represent the system's structure.

CHAPTER 4: DESGIN PHASE

4.1 Introduction

In this chapter, we will discuss the system design by describing the main structure of Classes, Relationships and Database architecture through Class and Entity Relations diagrams. Also, we will also review the system interfaces that its users will interact with.

4.2 Architecture Design

In our Spark web application, we have strategically chosen the robust **Client-Server** architecture to seamlessly manage and safeguard our precious data. This architectural paradigm fosters centralized data storage, enabling effortless administration, unparalleled data accessibility, and optimized resource utilization. Moreover, the Client-Server model bolsters data security, safeguarding our valuable information from unauthorized access and potential threats.

- Centralized Data Management:

  The Client-Server architecture centralizes data storage on powerful servers, ensuring data consistency, simplifying access controls, and facilitating efficient backup and recovery strategies. This centralized approach empowers us to maintain a single source of truth for our data, minimizing discrepancies and streamlining data management tasks.

- Scalability:

  The Client-Server model seamlessly scales to accommodate increasing user demands and workloads. By adding or upgrading servers, we can effortlessly expand our infrastructure to handle growing traffic and computational requirements. This inherent scalability ensures that our application can adapt to evolving business needs without compromising performance.

- Resource Sharing:

  The Client-Server model promotes resource sharing, enabling clients to leverage resources provided by servers. This collaborative approach optimizes resource utilization, allowing us to maximize the value of our hardware and software investments. By sharing resources, we can reduce costs, enhance efficiency, and minimize hardware overhead.

- Data Security:

  The Client-Server model prioritizes data security, employing robust security measures to protect sensitive information. Servers implement authentication, authorization, and encryption mechanisms to safeguard data from unauthorized access and potential threats. This multi-layered security approach ensures that our valuable data remains protected and confidential.

For patterns, definitely have chosen **MVC**, best fit for **Client-Server**, and of course We are going to work with ASP.NET Core best fit for **MVC**. ASP.NET Core MVC: Leveraging the Power of .NET

ASP.NET Core MVC, a lightweight, open-source, and highly testable framework, provides a robust foundation for building modern web applications. It offers a rich set of features, including:

- **Routing**: Map URLs to controller actions to handle user requests effectively.
- **Model Binding**: Automatically populate model objects from incoming request data.
- **Dependency Injection**: Facilitate loose coupling and enhance testability.
- **View Engines**: Choose from various view engines, such as Razor Pages, to render dynamic content.

Integrating ASP.NET Core MVC into our Client-Server architecture brings several advantages:

- **Separation of Concerns**: Enforces clear separation between business logic, data access, and presentation, promoting maintainable code.
- **Testability**: Enables unit testing of individual components, ensuring code reliability and quality.
- **Performance**: Leverages the high-performance capabilities of .NET, ensuring efficient application responsiveness.
- **Rich Ecosystem**: Provides access to a vast ecosystem of tools and libraries, simplifying development and maintenance.

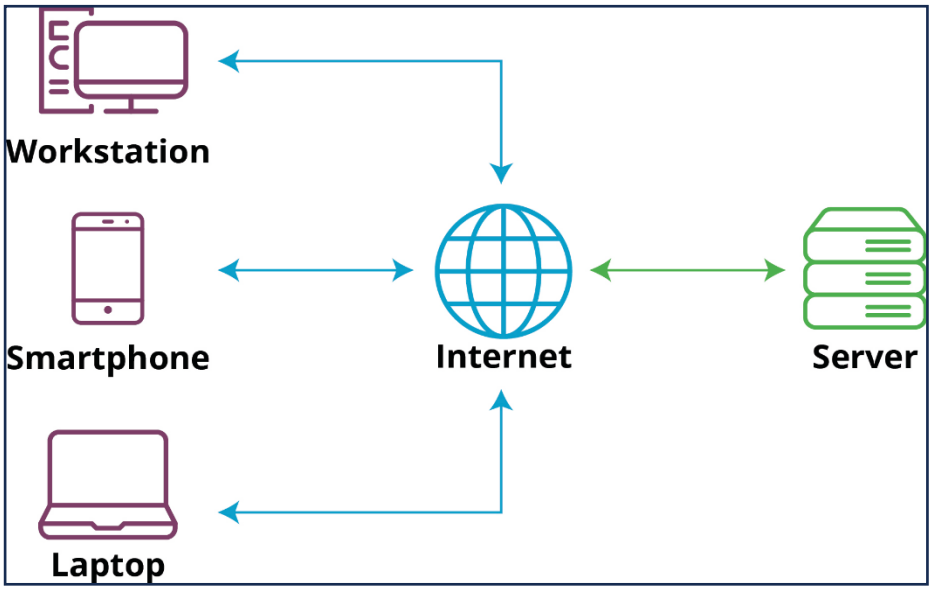


Figure 4-1: Client-Server Model

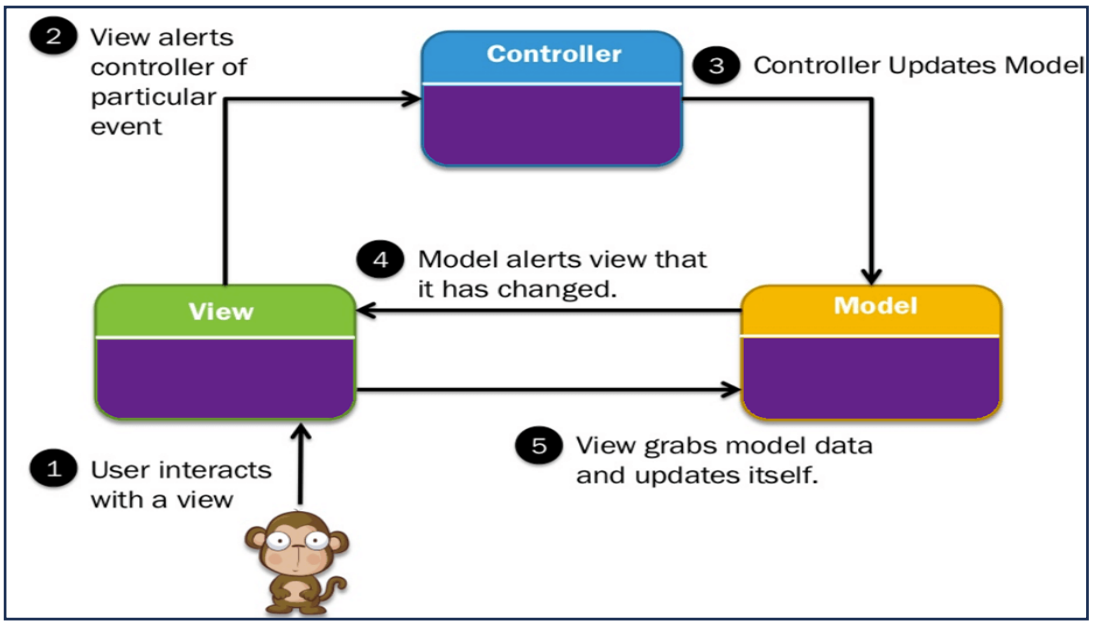


Figure 4-2: ASP.NET MVC Diagram

4.3 Class Diagram

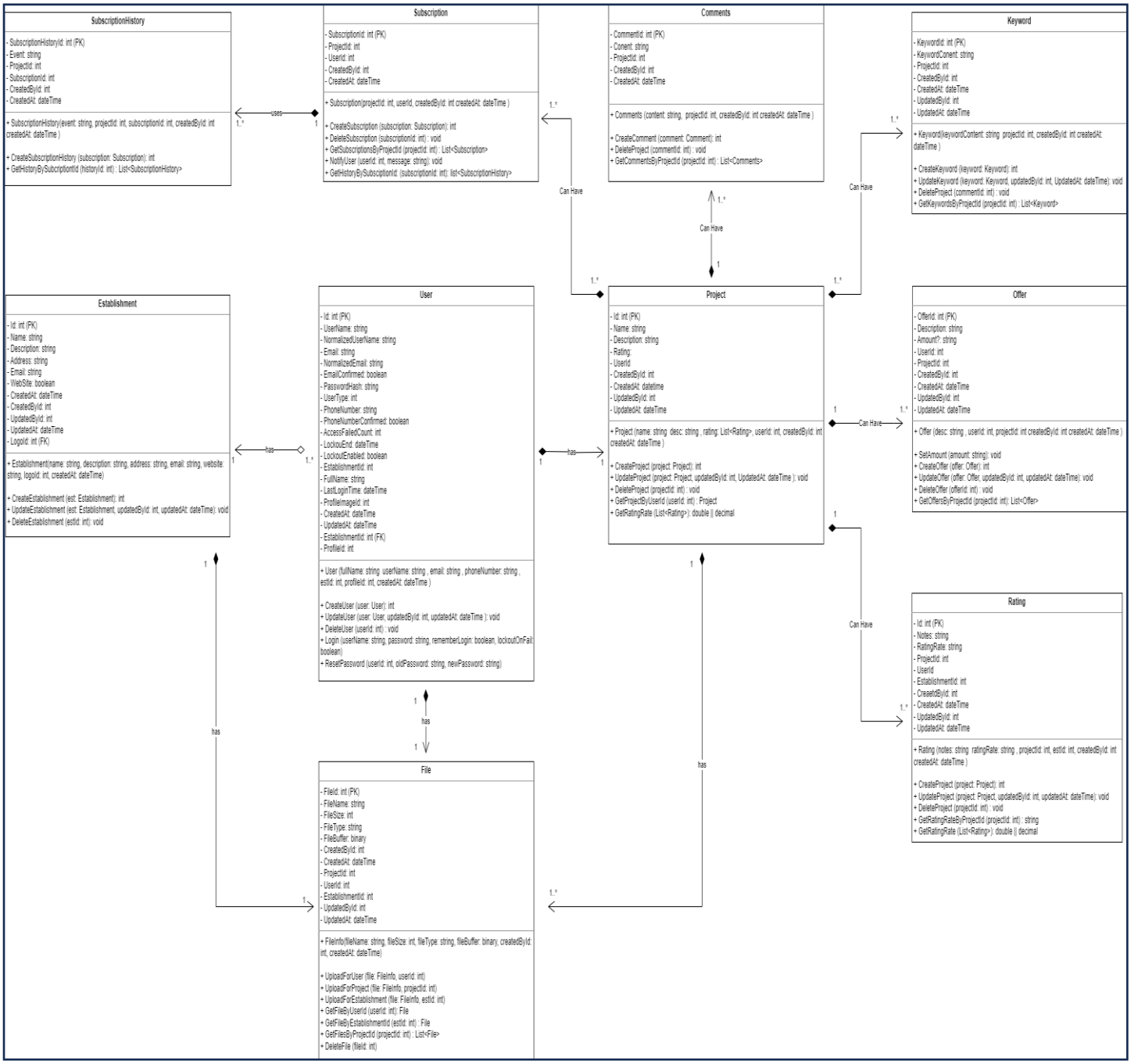


Figure 4-3: Class Diagram

4.4 Interfaces

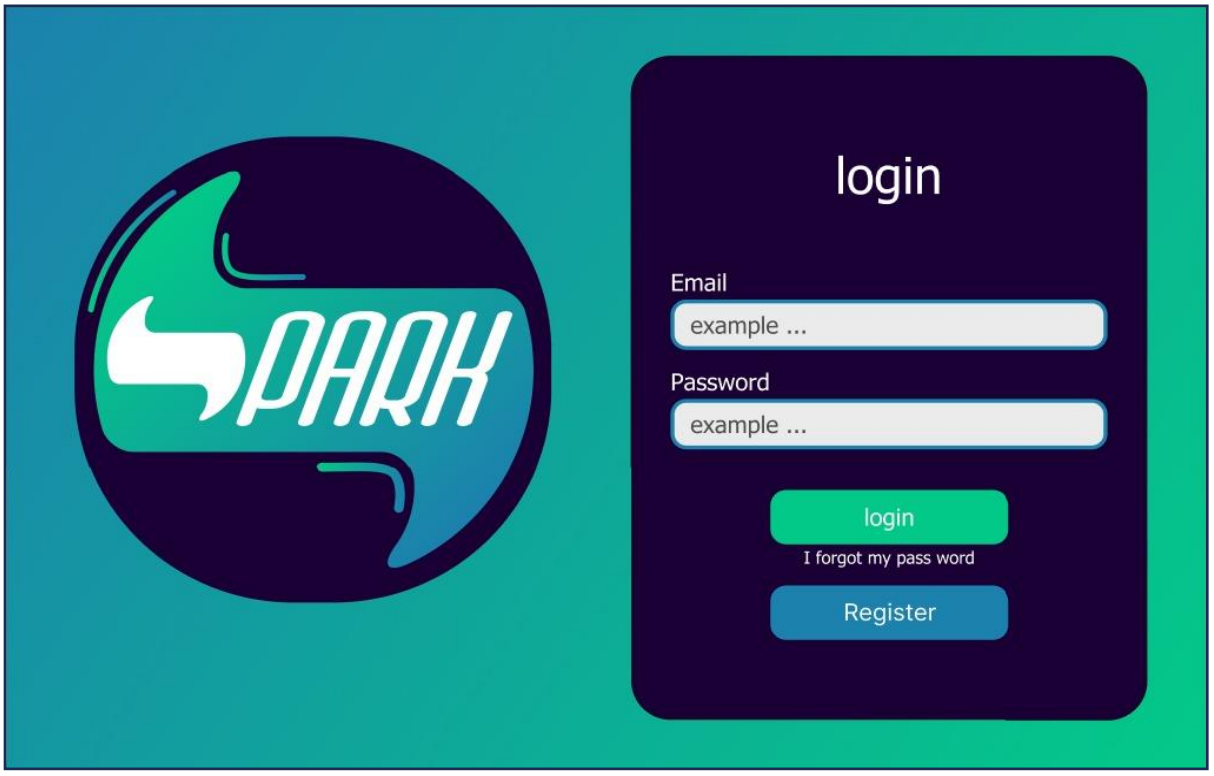


Figure 4-4: Spark Login Page

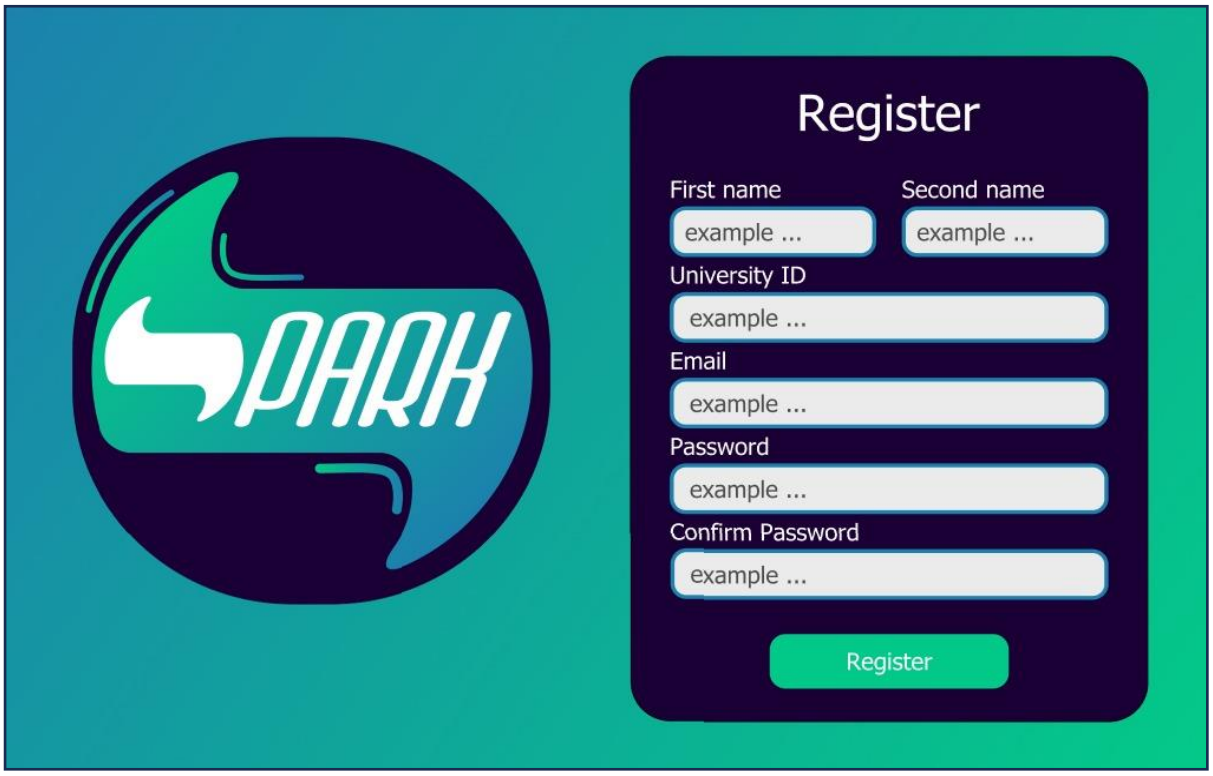


Figure 4-5: Spark Sign up Page

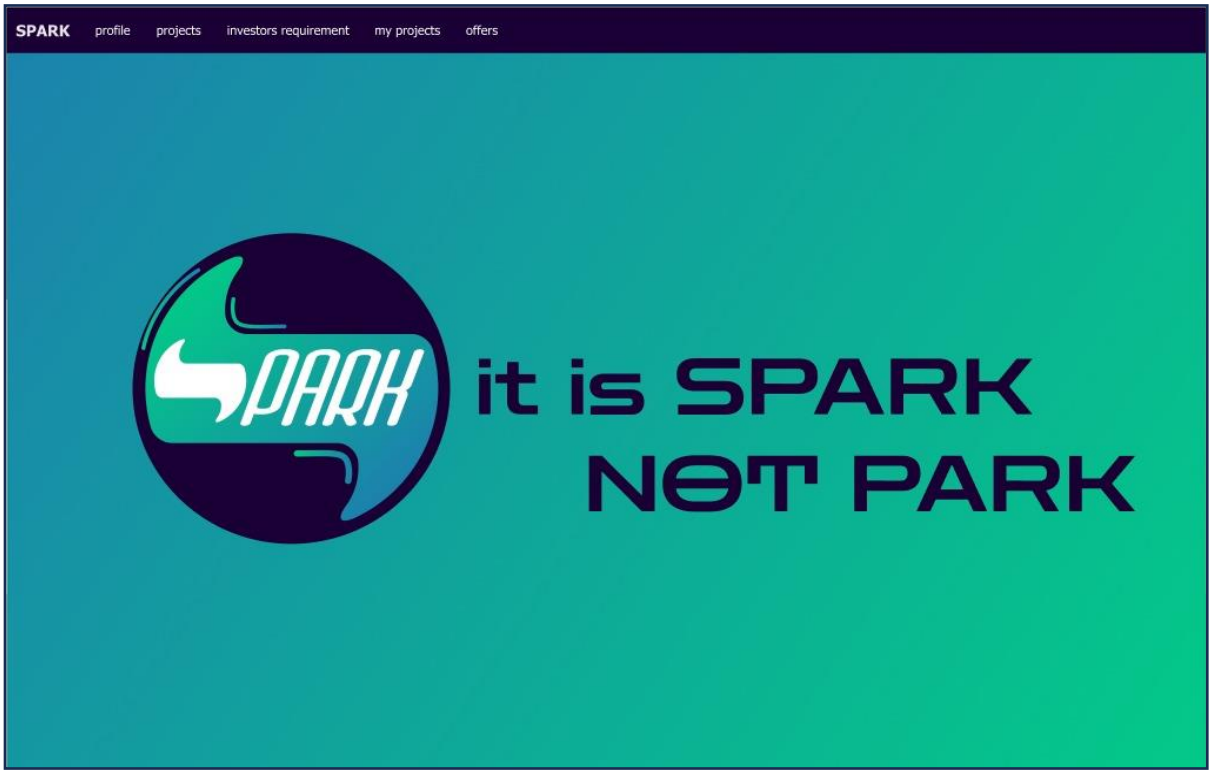


Figure 4-6: Dashboard Page

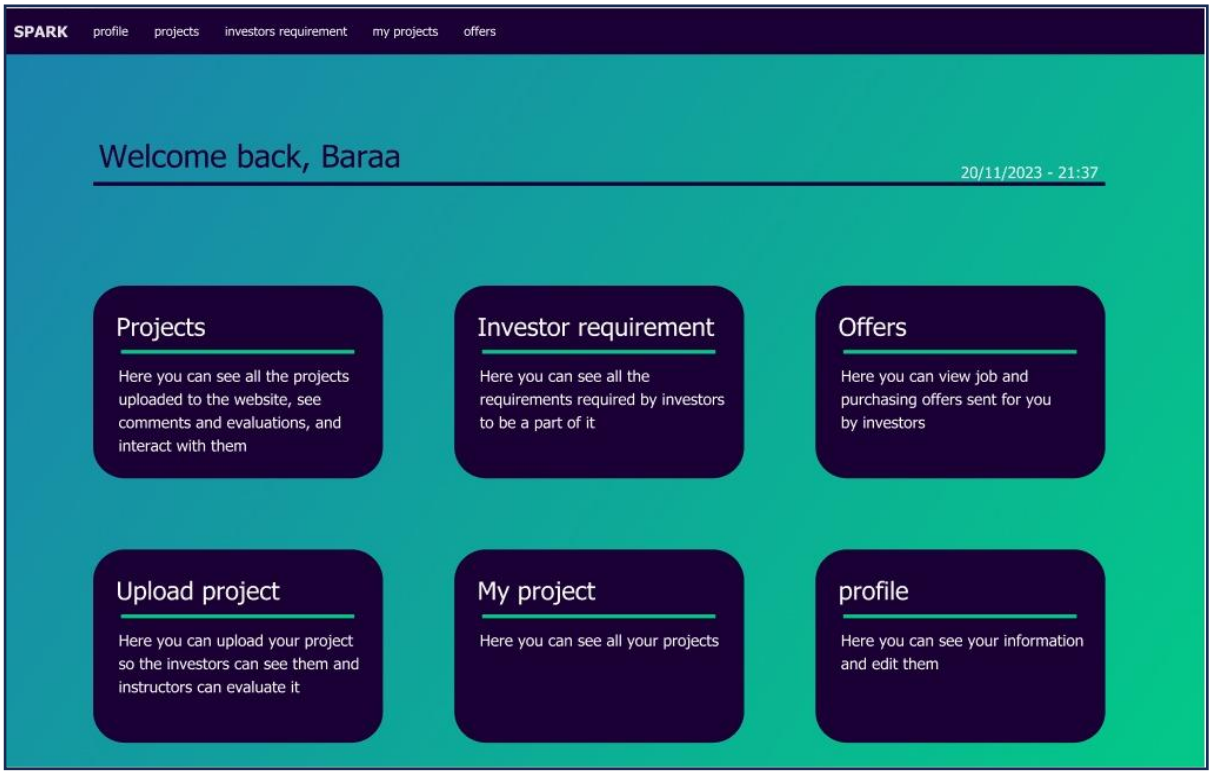


Figure 4-7: Dashboard Page 2

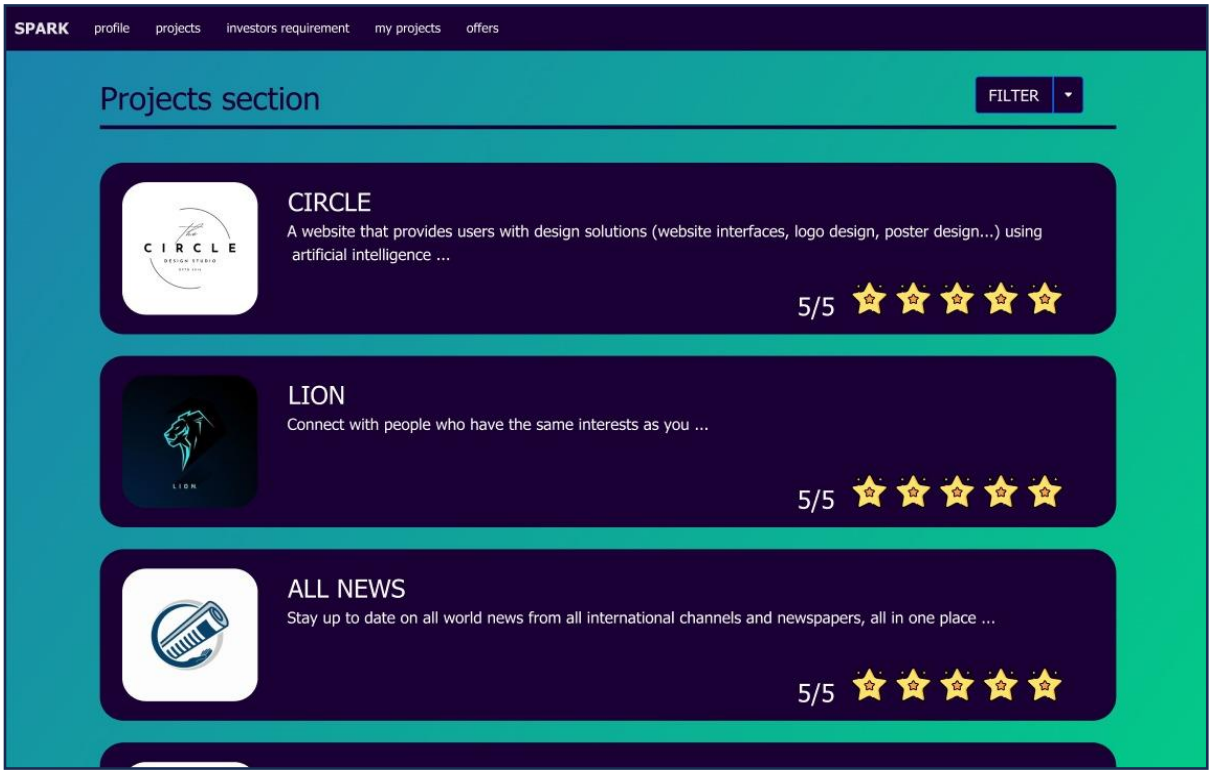


Figure 4-8: Projects List Page

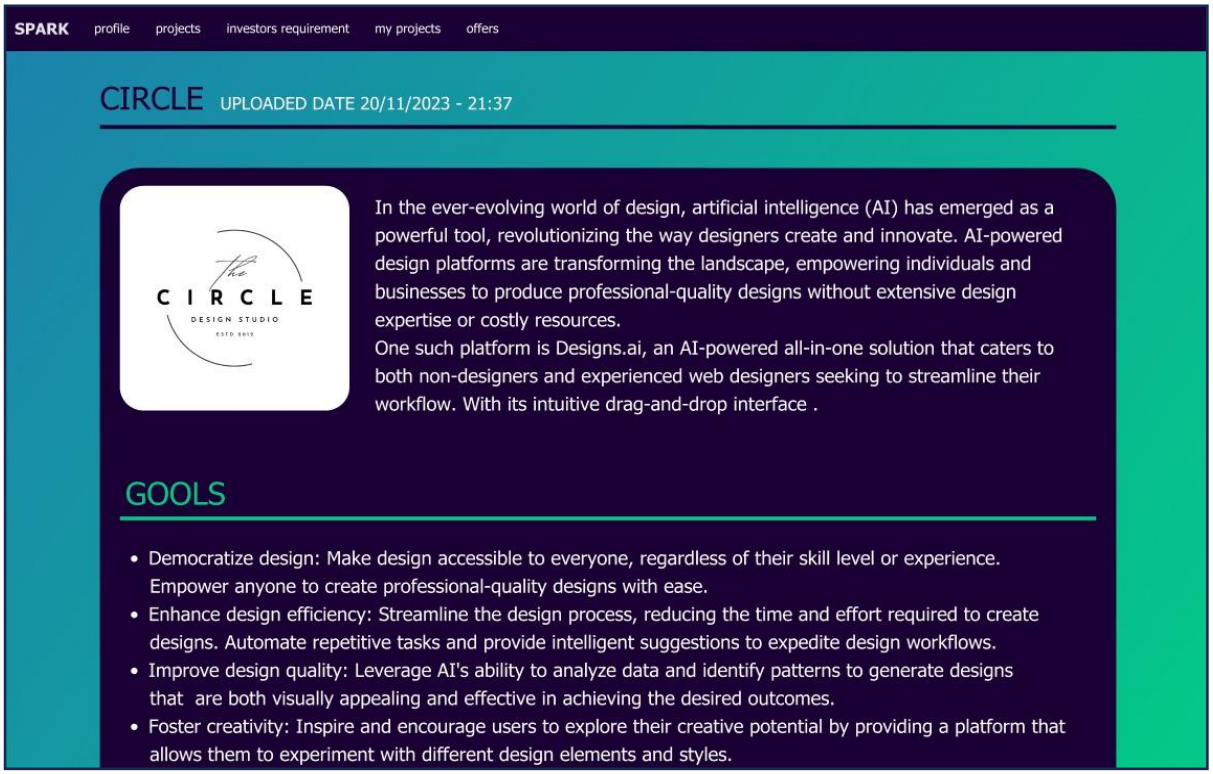


Figure 4-9: Project Details Page

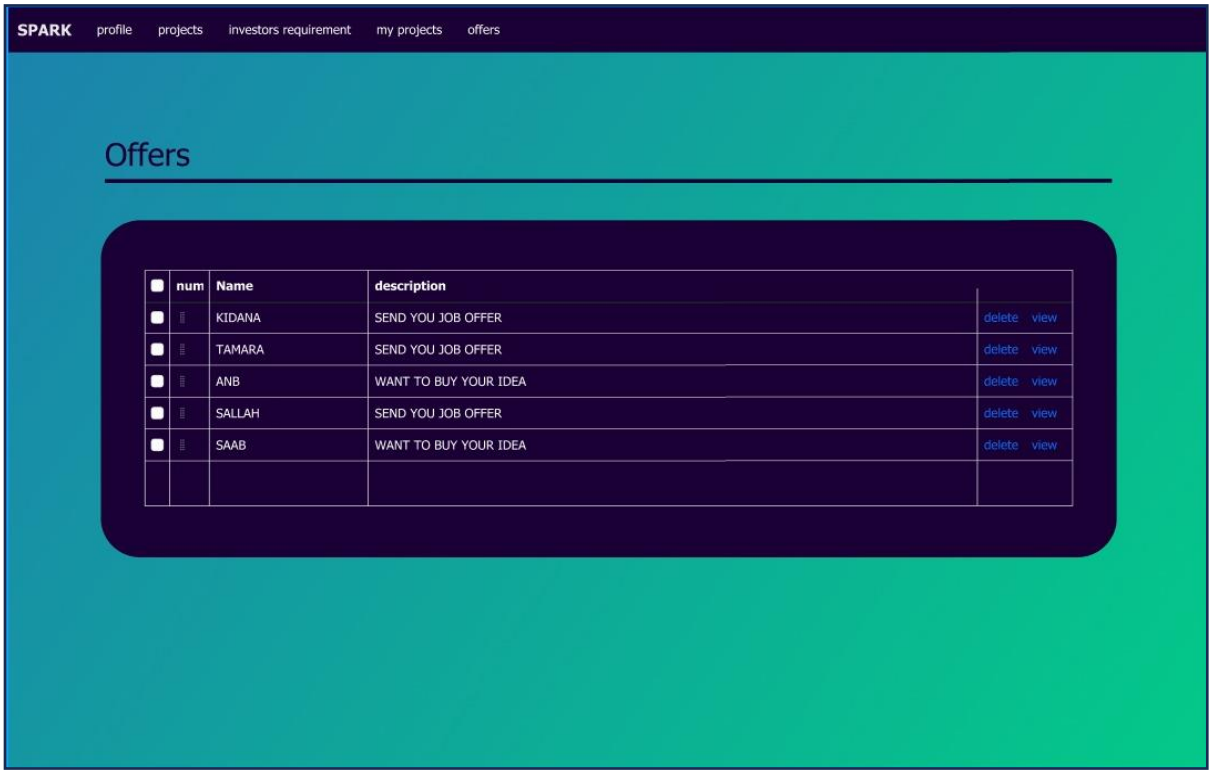


Figure 4-10: Offers List Page

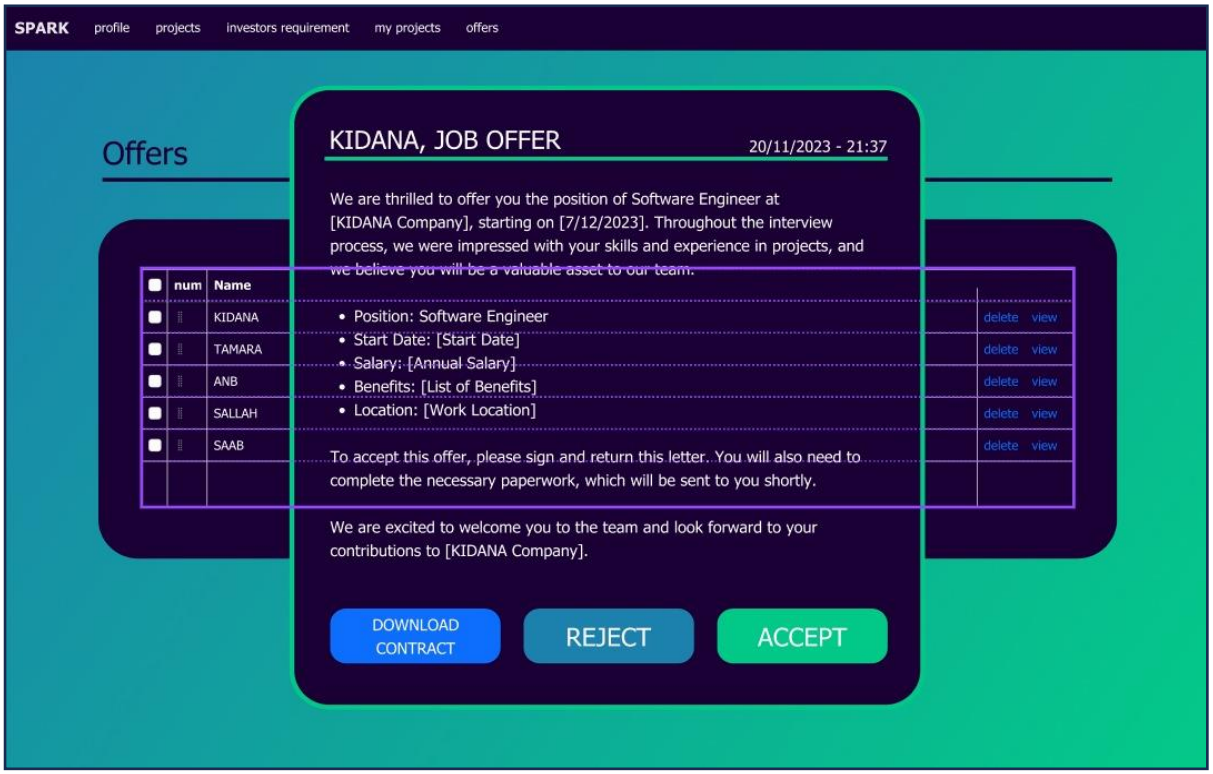


Figure 4-11: Offer's Details Page

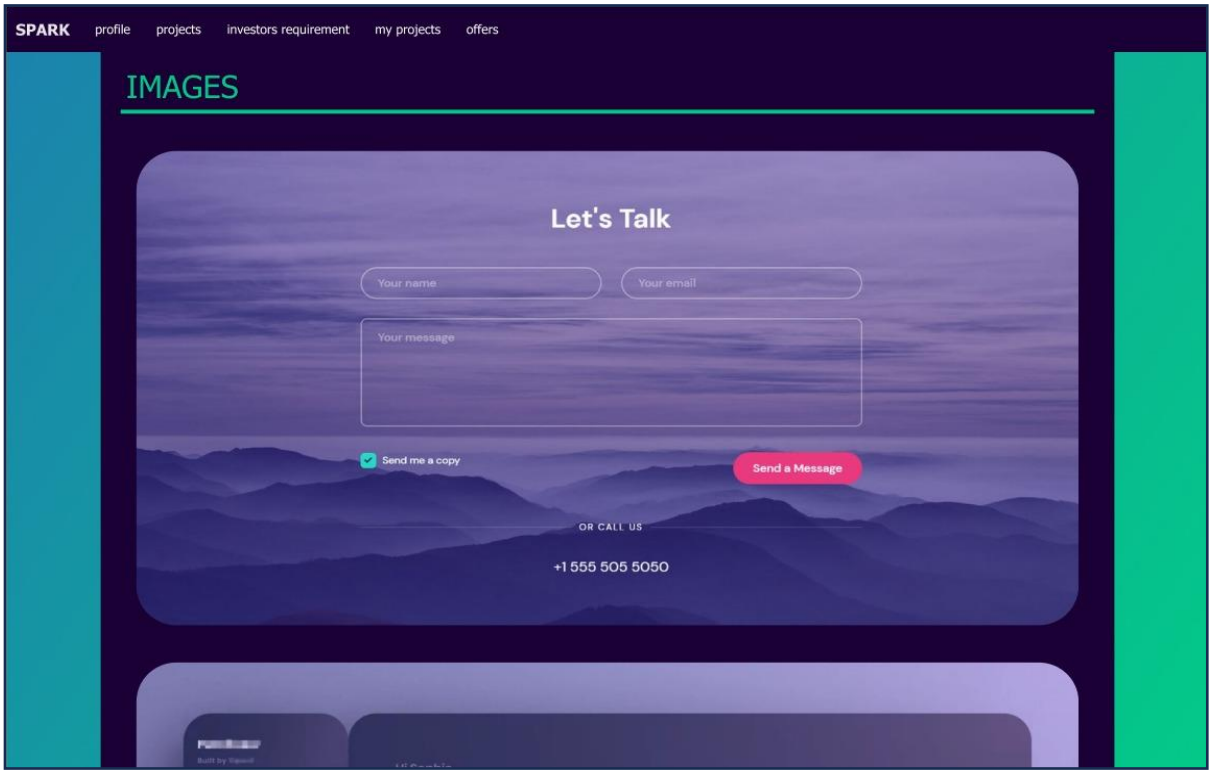


Figure 4-12: Contact Page

4.5 Conclusion

By carefully selecting the Client-Server architecture and integrating ASP.NET Core MVC framework, our Spark web application benefits from a robust and scalable foundation. This combination ensures centralized data management, unparalleled accessibility, optimized resource utilization, and enhanced data security. Additionally, the inherent scalability of the architecture allows us to seamlessly adapt to evolving business needs. Moreover, ASP.NET Core MVC promotes separation of concerns, facilitating maintainable code, high testability, and exceptional performance. As a result, our Spark web application is poised for success, offering a secure, efficient, and scalable platform to deliver exceptional user experiences.