

TUNISIAN REPUBLIC

MINISTRY OF HIGHER
EDUCATION AND SCIENTIFIC
RESEARCH



UNIVERSITY OF SFAX

FACULTY OF SCIENCES SFAX

DEPARTMENT OF COMPUTER
SCIENCES AND COMMUNICATIONS

Final year project to obtain the:

**NATIONAL DIPLOMA OF BACHELOR'S DEGREE IN COMPUTER
SCIENCES, SOFTWARE ENGINEERING AND INFORMATIONS SYSTEM
BRANCH**

Presented At the Faculty of Sciences Sfax

By

Afra Kout

Ahmed Adam Boussarsar

MSK ACADEMY: E-learning web application

Presented on the 27th of June 2024, to the honourable jury:

Ms. Lamia Tounsi **President**

Mr. Seif Eddine Abouda **Reporter**

Mr. Mohamed Mhiri **Academic Supervisor**

Mr. Mohamed Sami Khiari **Technical Supervisor**

Internship carried out within MSK Technologies

Academic year: 2023-2024

Code: LSI3-« 96 »

Dedication

With overflowing joy and a profoundly touched heart I dedicate this work to my beloved parents, **Badreddine** and **Dalila**, and my cherished siblings, **Adam** and **Ayna**. Your love, encouragement, and sacrifices have been my guiding light and source of strength throughout this journey. Your belief in me has fuelled my determination to continuously improve and move forward, and for that I am eternally grateful.

I wish to express my deepest appreciation to my partner in this work, **Ahmed Adam Boussarsar**. Your support and boundless enthusiasm have been instrumental in bringing this project to life. Thank you, this achievement would not have been possible without you by my side.

I would also like to express my gratitude to all my friends **especially Oumayma Amri, Linda Rouissi** and **Yousr Labiad** for their support, encouragement, throughout this journey.

One last thing:



Afra

Dedication

This work is dedicated with love to my parents, **Ezeddine** and **Thouraya**, and the best siblings I could wish for, **Nizar** and **Rahma**. Your love and support have guided me and strengthened my determination throughout my educational journey, and this project. Your belief in me has driven me to strive for excellence, and for that, I am truly grateful.

Extending a heartfelt dedication to my dear partner **Afra Kout**. Your passion, support, and dedication have been essential in succeeding. Your belief in our vision and constant encouragement have helped me overcome obstacles and reach our objectives. Thank you for always being there. I couldn't have done this without you.

Finally, I want to thank all my close friends, especially **Mohamed Ahmed Jerbi**, **Ahmed Khelif**, **Amine Nait** and **Wissem Hajbi** for being there for me every step of the way.

And it goes without saying:



Adam

Acknowledgments

We would like to express our deepest appreciation to our academic supervisor, **Mr Mohamed Mhiri**, and our technical supervisor, **Mr Mohamed Sami Khiari** at MSK Technologies, for their support, invaluable guidance, and encouragement throughout the journey of our final year project. Their dedication and expertise have been instrumental in shaping our work and fostering our growth. We are truly grateful for their mentorship and the opportunity to learn from their wisdom and experience.

We would like to extend our gratitude to the members of the jury **Mrs Lamia Tounsi** and **Mr Seif Eddine Abouda** for their valuable time, and expertise. Your insightful feedback, constructive criticism, and encouraging words will greatly contribute to the refinement and success of this report.

Thank you once again for your support and for being an integral part of this journey.

Sincerely,

Table of contents

List of figures	I
List of tables	III
List of Acronyms	IV
General Introduction.....	1
CHAPTER 1: PRELIMINARY STUDY	3
1 Introduction	4
2 Project Context Overview.....	4
2.1 Presentation of the host Company “MSK Technologies”	4
2.2 Services and applications.....	4
2.3 Project overview.....	5
3 Study of the existing	5
3.1 Critical analysis of the existing:	7
3.2 Proposed solution	7
4 Requirements’ specification	7
4.1 Identification of actors	8
4.2 Functional requirements	8
4.3 Non-functional requirements	8
5 Work methodology	9
5.1 Overview of Agile Methods.....	9
5.2 Overview of the Scrum Methodology	9
5.3 Project planning with Scrum.....	10
5.4 Sprint planning.....	12
6 Conclusion.....	13
CHAPTER 2: SPRINT 1: “USER REGISTRATION AND AUTHENTICATION MANAGEMENT”	14
1 Introduction	15
2 Analysis: Use Case Diagram.....	15
3 Conception.....	16
3.1 Sequence diagrams	16
3.1.1 “Sign-up” Sequence diagram	16
3.1.2 “Sign-in and profile management” Sequence diagram	17

3.1.3	“User management” Sequence diagram	18
3.2	Class diagram	21
3.3	SQL Server database example	22
4	Implementation	22
4.1	Security and performance	23
5	Conclusion.....	31
CHAPTER 3: SPRINT 2: “COURSES MANAGEMENT”.....		32
1	Introduction	33
2	Analysis: Use Case Diagram.....	33
3	Conception.....	34
3.1	Sequence diagrams	34
3.1.1	“Categories Management” Sequence diagram.....	34
3.1.2	“Courses management” Sequence Diagram.....	36
3.1.3	“Lessons Management” Sequence Diagram.....	38
3.1.4	“Enrollment” Sequence diagram	40
3.2	Class diagram	42
4	Implementation	43
5	Conclusion.....	56
CHAPTER 4: SPRINT 3: “COURSE PROGRESS TRACKING AND ENGAGEMENT MANAGEMENT”		57
1	Introduction	58
2	Analysis: Use Case Diagram.....	58
3	Gamification feature	59
4	Conception.....	60
4.1	Sequence diagrams	60
4.1.1	“Badges Management” Sequence diagram	60
4.1.2	“Quizzes Management” Sequence diagram	63
4.1.3	“Progress tracking” Sequence diagram	65
4.2	Class diagram	67
5	Implementation	68
6	Conclusion.....	74
CHAPTER 5: PROJECT’S CLOSURE		75
1	Introduction	76

2	Application's Architecture	76
3	Hardware environment	78
4	Software environment	78
4.1	Presentation of Development Languages	78
4.2	Frameworks used.....	79
4.3	Software used	79
5	Conclusion.....	80
	General conclusion	81
	Webography	82

List of figures

Figure 1: Coursera's Home page interface	6
Figure 2: Udemy's Home page interface	6
Figure 3: Scrum process	9
Figure 4: Sprint planning.....	12
Figure 5: "User registration and authentication management" Use Case Diagram.....	15
Figure 6: "Sign-up" Sequence Diagram.....	17
Figure 7: "Sign-in and profile management" Sequence Diagram	18
Figure 10: "User management" Sequence Diagram	20
Figure 11: "Authentication and user management" Class Diagram	22
Figure 12:Database Table – User example	22
Figure 13: Multilingual feature.....	23
Figure 14: Sign in interface	23
Figure 8: JWT Authentication	24
Figure 9: Data Encryption	25
Figure 15: Add user interface	25
Figure 16: Add candidate interface	26
Figure 17: Add tutor interface.....	26
Figure 18: Password reset pages interface	27
Figure 19: Profile settings interface	28
Figure 20: Profile interface.....	29
Figure 21: Users list interface.....	29
Figure 22: User details dialog.....	30
Figure 23: Confirmation dialog	31
Figure 24: "Courses management" Use Case Diagram	33
Figure 25: "Categories management" Sequence Diagram	35
Figure 26: "Courses Management" Sequence Diagram.....	37
Figure 27: "Courses management" Class Diagram	43
Figure 28:Home page interface.....	44
Figure 29: help center page interface	45
Figure 30: About us page interface	46
Figure 31: FAQs page interface	47
Figure 32: Contact us page interface.....	48
Figure 33: Courses interface.....	48
Figure 34: Course details interface	49
Figure 35: Lessons interface.....	50
Figure 37: Tutor's space interface	50
Figure 38: Courses list interface	51
Figure 39: Edit course interface.....	51
Figure 40: Add lesson interface	52

Figure 41: Lessons list interface	53
Figure 42: Edit lesson interface	53
Figure 43: Add meet interface	54
Figure 44: Meets list interface	54
Figure 45: Edit meet interface	55
Figure 47: My Courses interface	55
Figure 48: My meets interface	56
Figure 49: “Course progress tracking and engagement management” Use Case Diagram	58
Figure 50: MSK Academy's Certificate	60
Figure 51: “Badges Management” Sequence Diagram.....	62
Figure 52: “Quizzes Management” Sequence Diagram.....	64
Figure 53:“Progress Tracking” Sequence Diagram	66
Figure 54: “Course progress tracking and engagement management” Class Diagram	68
Figure 55: Quizz interface	69
Figure 57: Analytics dashboard	70
Figure 58: Add Badge interface	70
Figure 59: Edit Badge interface	71
Figure 60: Badges List interface	71
Figure 61: My badges interface	72
Figure 62: My certificates interface	72
Figure 63: Progression	73
Figure 64: candidates Leaderboard interface.....	73
Figure 65: Physical Architecture.....	76
Figure 66: Logical Architecture	77
Figure 67: MVC Architecture.....	77
Figure 68: PC ASUS TUF Gaming.....	78
Figure 69: PC HP Pavilion 15 Gaming	78

List of tables

Table 1: Product Backlog	11
Table 2: “Sign-up” Use Case Diagram Description.....	16
Table 3: “Sign-in and profile management” Use Case Diagram Description	17
Table 4: “User management” Use Case Diagram Description	18
Table 5: “Authentication and user management” Class Diagram Description.....	21
Table 6: “Categories management” Use Case Diagram Description	34
Table 7: “Courses Management” Use Case Diagram Description	36
Table 8: “Lessons Management” Use Case Diagram Description	38
Table 10: “Courses management” Class Diagram Description	42
Table 11: MSK Academy's Badges	59
Table 12: “Badges Management” Use Case Diagram Description.....	61
Table 13:“Quizzes Management” Use Case Diagram Description.....	63
Table 14:“Progress Tracking” Use Case Diagram Description	65
Table 15: “Course progress tracking and engagement management” Class Diagram Description.....	67

List of Acronyms

XP: eXtreme Programming

HTTP: Hypertext Transfer Protocol

API: Application Programming Interface

MVC: Model–View–Controller

SQL: Secure Sockets Layer

RAM: Random Access Memory

REST: Representational State Transfer

UML: Unified Modelling Language

General Introduction

In today's fast-paced world, education is changing rapidly, driven by technology. E-learning applications have become essential for flexible learning, giving learners the freedom to access educational materials whenever and wherever they need. These tools cater to different learning styles, making lessons more interactive and engaging, which helps learners understand and remember better.

Imagine being able to learn at your own pace, focusing on the areas where you need the most help. E-learning makes this possible, offering personalized experiences that traditional classrooms often can't. Features like virtual classrooms, video lectures etc ... turn learning into an engaging journey, encouraging collaboration and participation.

Recognizing this trend, MSK Technologies has decisively invested in the development of an advanced e-learning application MSK Academy, designed to meet the diverse needs of modern learners.

We have taken the lead in this initiative, embarking on a project aimed at developing this educational tool.

This report provides a comprehensive overview of our project from conceptualization to implementation, highlighting significant achievements, challenges encountered, and solutions developed. Additionally, we will delve into the unique features and functionalities of our e-learning application, showcasing its potential to revolutionize the way education is accessed and delivered.

Chapter 1 serves as the foundation of our project journey, providing an initial context by introducing our company, studying the existing, and outlining project requirements and management approaches.

In Chapter 2, we delve into the development of the first sprint, focusing on authentication management. Using UML diagrams, we meticulously model the development cycle, encompassing analysis, conception, and implementation stages.

Chapter 3 continues our development cycle with a focus on course management in the second sprint. We employ use case, sequence, and class diagrams to analyse, model, and illustrate the functionalities developed, culminating in the presentation of various interfaces.

Chapter 4 focuses on monitoring our candidates' progress in each course and fostering their engagement, which is a unique aspect of our project. Through comprehensive analysis, modeling, and diagrammatic representations, we illustrate the development process and display the interfaces created.

Finally, in Chapter 5, we present the application's architecture, as well as the hardware and software environment, providing insights into the technical infrastructure supporting our e-learning application MSK Academy.

CHAPTER 1: PRELIMINARY STUDY

Preliminary study

1 Introduction

This chapter marks the beginning of our project journey by providing an overview of its initial context. We introduce the company and dive into the project starting by studying the existing, identifying strengths and weaknesses, and suggesting areas for improvement. Furthermore, we outline both functional and non-functional project requirements and discuss our project management approach. This preliminary phase is essential, establishing a firm foundation for the future success of our initiative.

2 Project Context Overview

The project unfolded within MSK-Technologies over a span of 3 months, from February 1, 2024, to April 30, 2024. Throughout this period, we were tasked by the company with conceptualizing and developing an online learning application. This endeavour formed part of our final year project, undertaken to fulfil the requirements for obtaining a bachelor's degree in computer science, specializing in software engineering, at the Faculty of Sciences of Sfax during the academic year 2023 – 2024.

2.1 Presentation of the host Company “MSK Technologies”

Founded in 2014 in Sousse, Tunisia, by the computer engineer Mr. Mohamed Sami Khiari, MSK Technologies is a web agency specializing in software development. It stands out particularly in the fields of Web and Mobile development, artificial intelligence, cybersecurity, stock management as well as in the promotion of products and services on a global scale.

In addition to its team of five dedicated employees, MSK Technologies has built strong partnerships over the years with companies in Europe and the Middle East. Through a continuous improvement approach integrating a comprehensive orchestration approach, the company has managed to retain its clientele. This strategy is based on an Agile Scrum methodology, ensuring the delivery of smooth and feature-rich solutions while offering excellent value for money.

2.2 Services and applications

The following are the **services** provided by MSK Technologies:

- Virtual reality design services
- Artificial intelligence services
- Web/mobile design and rapid application development services
- Video game services
- SEO marketing services

- Cybersecurity services for network and website protection
- Technical advice and information services
- Custom software services and stock management
- Graphic design and advertising services

And these are some examples of the **applications** they realized:

- ❖ **Grammatical**, multilingual corrector and translator I Tool realized in 2023 by MSK Technologies.
- ❖ **Golden Cage**, a dating application for marriage purposes realised in 2021 by MSK Technologies for Kuwaitian client.
- ❖ **Mirage FPS Game**, realised in 2023 By MSK Technologies

2.3 Project overview

Our initiative, "MSK Academy," is aimed at crafting an online learning application that provides seamless access to courses, learning modules, and diverse educational resources, accessible anytime, anywhere.

The primary objective of our endeavour is to facilitate efficient and adaptable knowledge exchange, empowering candidates to advance at their own pace and according to their unique requirements. The application will feature a range of tools, including course videos, meets and interactive quizzes, fostering active engagement between candidates and tutors, while also offering progress monitoring capabilities.

What distinguishes our project is its forward-thinking approach, integrating cutting-edge interactive elements with personalized learning experiences. By dynamically tailoring the application to meet the individual needs of each candidate, we are reshaping the landscape of education delivery and absorption.

3 Study of the existing

We conducted research on various applications designed for online learning. A variety of options are available on the Internet, each with its own unique characteristics. Among these available solutions, we specifically selected those that we will study in detail:

- **Coursera:** an online platform offering a wide range of courses from universities worldwide. Its objectives include providing accessible, high-quality education, offering flexibility in learning, and promoting lifelong skill development.

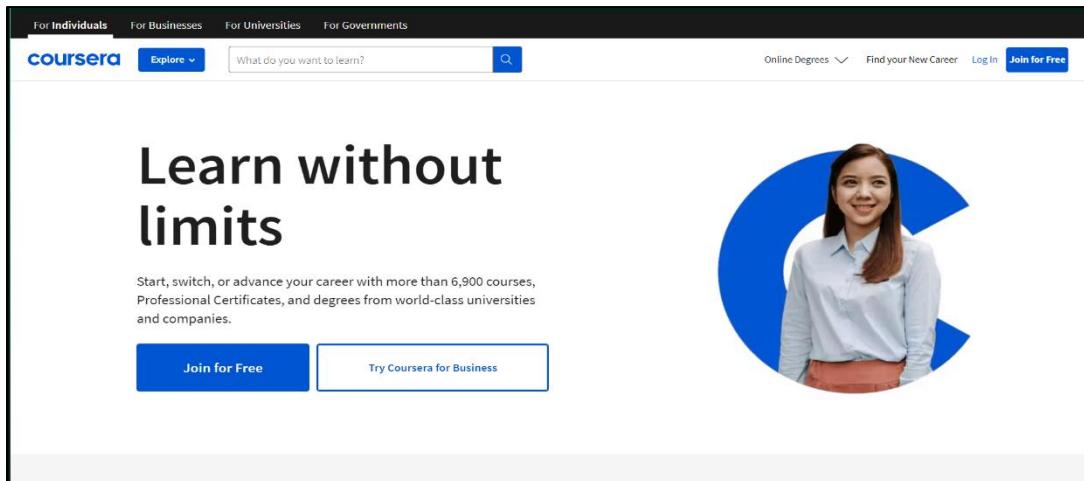


Figure 1: Coursera's Home page interface¹

- **Udemy:** an online learning platform that provides courses on various subjects, ranging from business and technology to personal development and hobbies. Its primary objective is to offer accessible and affordable education to individuals worldwide, allowing learners to acquire new skills and advance their careers at their own pace.

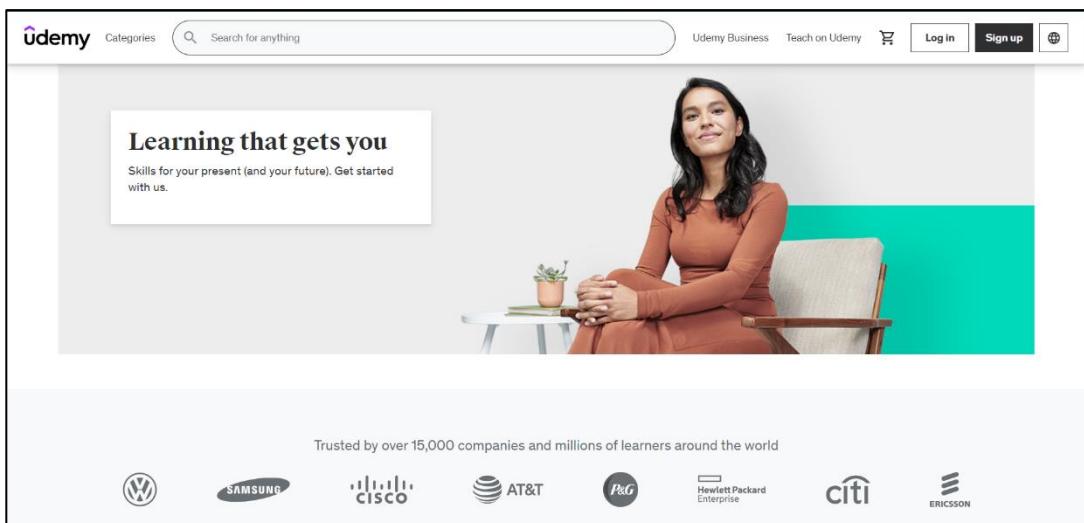


Figure 2: Udemy's Home page interface²

¹ www.coursera.org

² www.udemy.com

3.1 Critical analysis of the existing:

In our endeavour to enhance our e-learning application, we're conducting a critical analysis of Udemy and Coursera to identify areas for improvement. Our aim is to surpass these platforms by addressing potential shortcomings in key areas:

- 1. User Experience:** Both Udemy and Coursera encounter challenges related to the user interface (UI) and overall user experience (UX). This includes issues with navigation, layout, responsiveness, and accessibility.
- 2. Course Quality:** Ensuring consistent quality across all courses is a challenge for platforms like Udemy and Coursera. Variations in content quality, relevance, and instructional design impact the overall learning experience for users.
- 3. Lack of Live Interaction:** Udemy and Coursera fail to provide live sessions (Meets) for real-time interaction between candidates and tutors resulting in a less engaging and personalized learning experience.
- 4. Assessment and Feedback:** Udemy and Coursera encounter limitations in assessment options and feedback mechanisms, potentially hindering candidate development.
- 5. Engagement:** Udemy and Coursera face a challenge in keeping candidate actively involved and motivated, particularly in longer or less interactive courses.

By identifying and addressing these areas, we strive to create an e-learning application that exceeds the capabilities of existing platforms, providing an unparalleled learning experience for our users.

3.2 Proposed solution

Following the critical analysis of the existing, our e-learning application MSK Academy goals will include enhancing User Experience through intuitive navigation, clear layout, and responsive design, ensuring accessibility for all users. We will commit to maintaining Course Quality by regularly reviewing and updating content to align with learning objectives and remain relevant. Additionally, our application will facilitate real-time interaction between candidates and tutors for immediate clarification and dynamic discussions. We will prioritize Assessment and Feedback, employing diverse methods such as quizzes and providing timely, constructive feedback to support candidates' progress. To further enrich the learning experience, we will introduce gamification elements like points, badges, and leaderboards, promoting engagement and motivation among learners. Gamification taps into intrinsic motivation, making learning interactive and enjoyable while fostering healthy competition.

4 Requirements' specification

Before embarking on a project, it is imperative to define and plan it comprehensively to ensure effective management and the achievement of the client's desired objectives.

4.1 Identification of actors

Our application involves distinct actors: **the candidate, the tutor, and the administrator.**

1. Candidate: Candidates are registered users who actively engage in courses, interact with tutors, and seek to enhance their knowledge and skills.

2. Tutor: Tutors are experts responsible for course creation, content delivery, and guiding candidates through their learning journey.

3. Administrator: Administrators oversee application operations, manage user accounts, ensure compliance with policies and regulations, and manage the educational content of the application.

4.2 Functional requirements

Our e-learning application's functional requirements outline essential features for seamless user experience and effective application management.

1. User Registration and Authentication: Users should be able to create accounts, log in securely, and manage their profiles.

2. Course Enrollment and Management: Candidates should have the ability to browse available courses, enroll in desired courses, and track their progress.

3. Content Delivery: The application should support the delivery of various learning materials such as text, video lectures, quizzes, assignments, and interactive modules.

4. Interaction Features: Users should be able to interact with tutors and fellow candidates through chat.

5. Assessment and ratings: The application should provide tools for conducting assessments, grading assignments, and offering feedback to candidates by rating them.

6. Progress Tracking: Candidates should be able to monitor their progress, view completion statuses, and access performance analytics.

These functional requirements form the foundation of our e-learning application, ensuring a comprehensive and user-friendly learning experience for all actors.

4.3 Non-functional requirements

Non-functional requirements are visibly apparent to the user but are not directly related to the system's behaviour. They encompass essential internal imperatives.

The non-functional requirements of our system are described as follows:

Performance: The application must be capable of handling many simultaneous users without slowing down.

Security: User data must be protected by security measures such as two-factor authentication and data encryption.

Usability: The user interface must be intuitive and easy to use, with clear navigation for users of all levels.

Availability: The platform must be available 24/7 to allow users to access it at any time.

5 Work methodology

Opting for a suitable development methodology is crucial to ensure quality and meet deadlines. We will select effective methods that facilitate agile resource management and transparent communication.

5.1 Overview of Agile Methods

Agile methods are a set of project management practices and principles that emphasize flexibility, collaboration, and continuous delivery of functional products. Here's an overview of some commonly used agile methods:

- SCRUM
- eXtreme Programming (XP)
- Rapid Application Development (RAD)
- Crystal Clear

After conducting extensive research, we have opted to use the SCRUM methodology.

5.2 Overview of the Scrum Methodology

Scrum, an agile methodology established in 2002, derives its name from rugby, where it refers to the "scrum." This approach aims to develop software efficiently, promoting rapid execution. The process relies on a cohesive team pursuing a common goal.

Evolution in Scrum occurs through iterative cycles called sprints, which last two to four weeks. During each sprint, the current product is designed, coded, and subjected to testing. At the end of each iteration, the team can deliver the product as-is or choose to refine it in a subsequent sprint.

Here is the process on which Scrum is based:

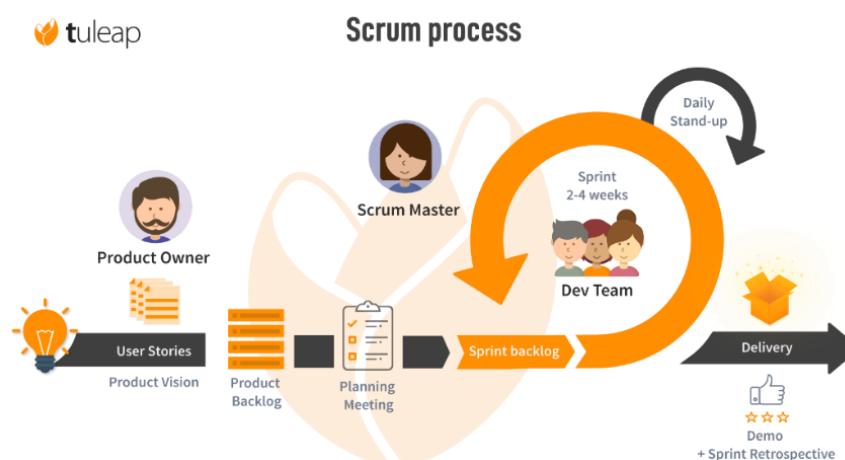


Figure 3: Scrum process³

³ www.tuleap.org

Product Backlog: This encompasses all the desired product features for development.

During project development using Scrum, there is interaction with various actors:

Product Owner: Holds the product vision.

Scrum Master: Ensures method implementation and goal adherence.

Development Team: Executes product development.

The Scrum project lifecycle is punctuated by a series of well-defined, time-constrained meetings.

In our project context, **Mr. Mohamed Sami Khiari** served as the Product Owner, while **Mr. Mohamed Mhiri** took on the role of Scrum Master. Together with our development team, we tackled the challenge of building this application in just three months.

Mr. Khiari played a pivotal role in guiding our team, leveraging his clear vision and understanding of actors' needs to provide direction and prioritize tasks. Meanwhile, **Mr. Mhiri** facilitated our Scrum process, ensuring adherence to principles and practices. He actively removed impediments, led productive meetings, and fostered a collaborative environment where we felt supported and empowered.

Their help was crucial in getting us through tough times and reaching our goals within the three-month timeframe.

Adhering to the Scrum method, we followed a structured approach to project management. We defined our goals and broke down the project into manageable tasks. During sprint planning sessions, we collectively decided which tasks to prioritize for the upcoming weeks. Daily stand-up meetings facilitated seamless communication and allowed us to address any issues promptly. As developers, we collaborated closely, sharing knowledge and supporting one another to overcome challenges effectively.

5.3 Project planning with Scrum

Adopting the Scrum method involves breaking down the system into sprints. Scrum relies on several key artifacts, among which is the "Product Backlog." This holds paramount importance in the Scrum methodology as it represents the entirety of features or technical aspects comprising the envisioned product.

The following table describes the Product Backlog:

Table 1: Product Backlog

Sprint	ID	Functionalities	ID	User story	Priority
Sprint 1: User registration and authentication management	1	Registration	1.1	As a user he can create an account.	High
			1.2	As a user he can sign up using their Facebook or Google account.	Medium
			1.3	As a user he can reset their password.	High
	2	Profiles management	2.1	As a user he can consult his profile.	High
			2.2	As a user he can modify his profile information.	Medium
			2.3	As a user he can disconnect.	High
			2.4	As a user he can delete his account.	Medium
	3	Accounts management	3.1	As an admin he can manage the users' accounts.	High
			3.2	As an admin he can manage the users' access.	Medium
Sprint 2: Courses management	4	Candidates' management	4.1	As a candidate he can enroll in a course.	High
			4.2	As a candidate he can view all enrolled courses.	Medium
			4.3	As a candidate he can leave feedback on the course.	Low
			4.4	As a candidate he can join a live session.	High
	5	Tutors' management	5.1	As a tutor he can upload a course.	High
			5.2	As a tutor he can manage his uploaded courses.	Medium

		5.3	As a tutor can host live sessions, to engage with candidates in real-time.	Low
6	Courses coordination	6.1	As an admin he can accept or reject a course awaiting verification.	High
		6.2	As an admin he can delete a course.	Low
7	Interaction management	7.1	As a candidate he can communicate with his tutors during the live session.	Medium
Sprint 3: Course progress tracking and engagement management	8	History management	8.1	As a candidate he can view his activity history.
	9	Progress tracking	9.1	As a candidate he can track his progress in enrolled courses.
	10	Performance rewards	10.1	As a candidate he can earn Badges and climb the leaderboard.
			10.2	As a candidate he can earn a certificate upon finishing a course.
			10.3	As a candidate, he can earn course discounts by collecting badges and ranking on the leaderboards.

5.4 Sprint planning

From February to April, our team completed three sprints to develop the core features of our application. From April to June, we focused on refining the application and fixing any issues. This approach ensured we delivered a reliable and user-friendly web application.

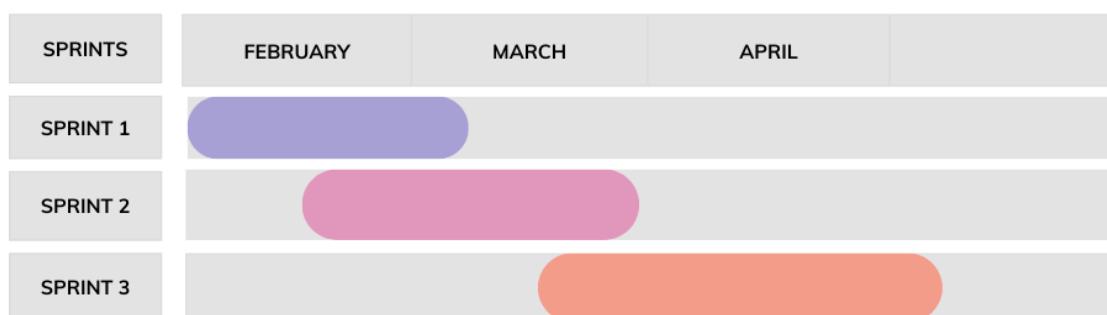


Figure 4: Sprint planning

6 Conclusion

With the completion of the preliminary study, we have established a strong foundation for our project. we are now well-equipped to move forward and transitioning into the first sprint, focusing on authentication management.

CHAPTER 2: SPRINT 1: “USER REGISTRATION AND AUTHENTICATION MANAGEMENT”

User registration and authentication management

1 Introduction

In this chapter, we embark on the development of the first sprint, dedicated to user registration and authentication management. To achieve this goal, we will employ UML diagrams to model its development cycle. This cycle is divided into three key stages: analysis, represented by the use case diagram; design, depicted through sequence diagrams and the class diagram; and implementation, illustrated by its interfaces.

2 Analysis: Use Case Diagram

This section covers the important functions needed for this sprint. We'll work on these functions in the first sprint. The next figure shows a picture of the different functions we'll be focusing on during this first phase.

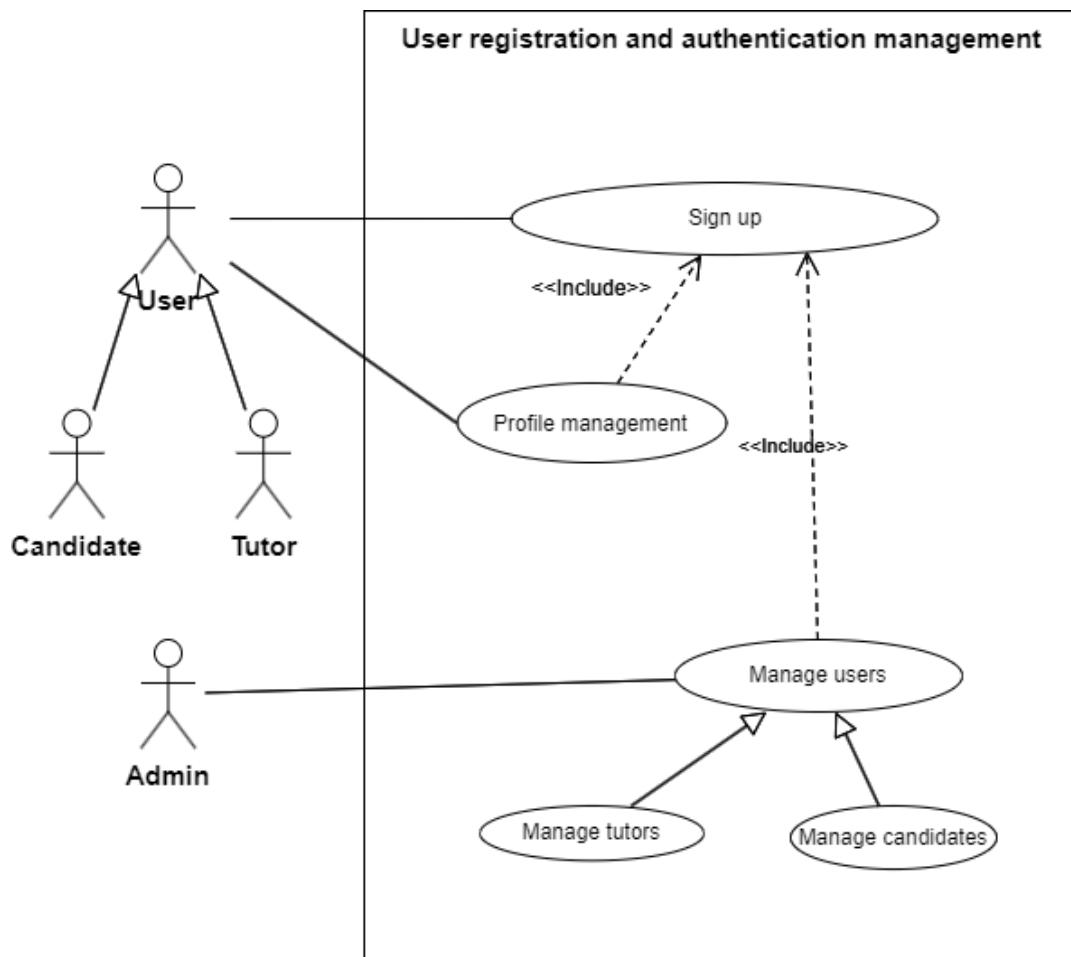


Figure 5: “User registration and authentication management” Use Case Diagram

3 Conception

The conception phase is realized through the creation of sequence diagrams and the class diagram. For this sprint, we've developed sequence diagrams for the **Sign-up** and **Sign-in** scenarios.

3.1 Sequence diagrams

The previous use case is the most important, so we will proceed to model its sequence diagrams according to the following scenarios.

3.1.1 “Sign-up” Sequence diagram

This scenario covers the sign-up process the user undergoes to register.

Table 2: “Sign-up” Use Case Diagram Description

Use case	Sign-up
Actor	User
Pre-condition	The user has access to the site.
Post-condition	The user signs up successfully and is added to the database.
Scenario description	<ul style="list-style-type: none">• The user enters the site and clicks on the Get Started button.• The system displays the sign-up page.• The user fills up the registration form.• The system validates the provided information and checks for duplicated data already stored in the database.• The system informs the user of the successful registration.• The system redirects the user to the login page.

The following sequence diagram will illustrate this scenario:

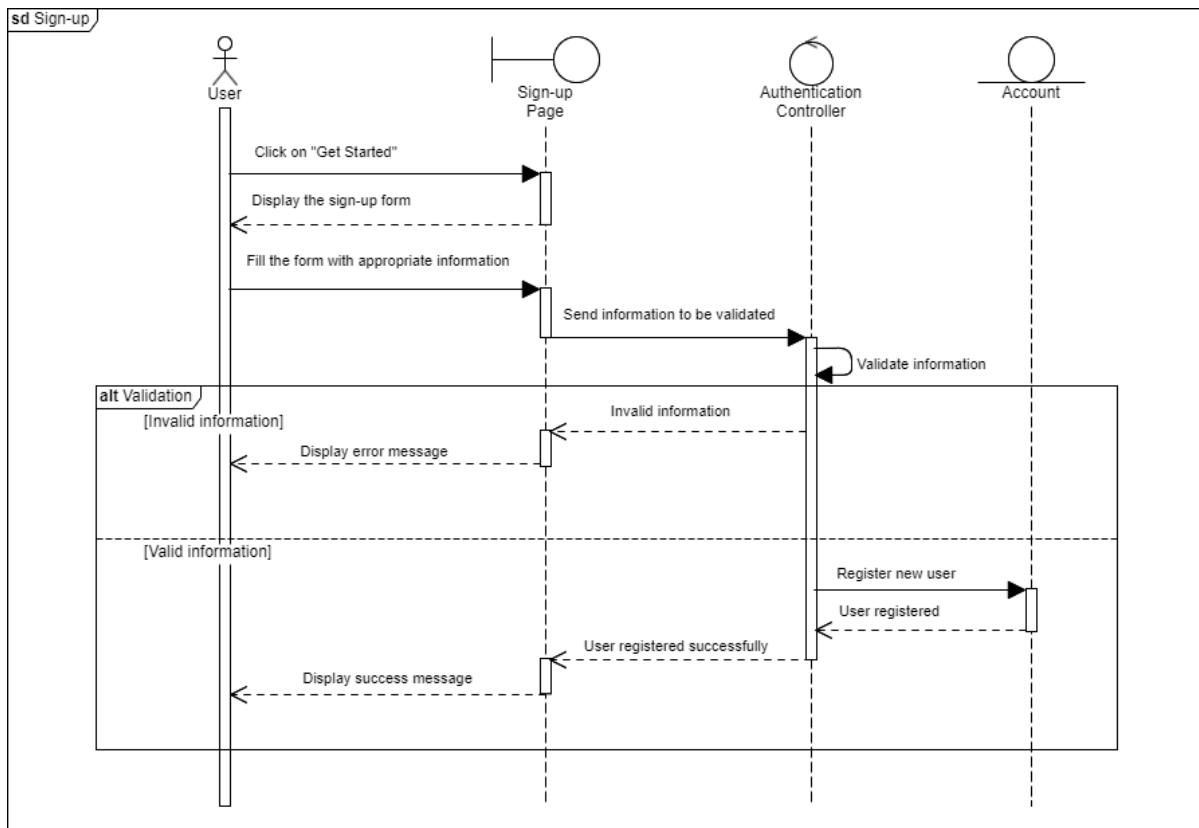


Figure 6: “Sign-up” Sequence Diagram

3.1.2 “Sign-in and profile management” Sequence diagram

This scenario covers the authentication process the user undergoes after registering.

Table 3: “Sign-in and profile management” Use Case Diagram Description

Use case	Sign-in and profile management
Actor	User
Pre-condition	The user had been previously registered.
Post-condition	The user signs in successfully and is granted access to the site’s features, which include checking his profile and editing his information.
Scenario description	<ul style="list-style-type: none"> • The system displays the login page. • The user enters his information. • The system verifies the provided credentials. • The system generates a JWT access token which contain user claims and stores it securely. • The system redirects the user to the home page. • The user can access his profile. • The user can edit his information.

The following sequence diagram will illustrate this scenario:

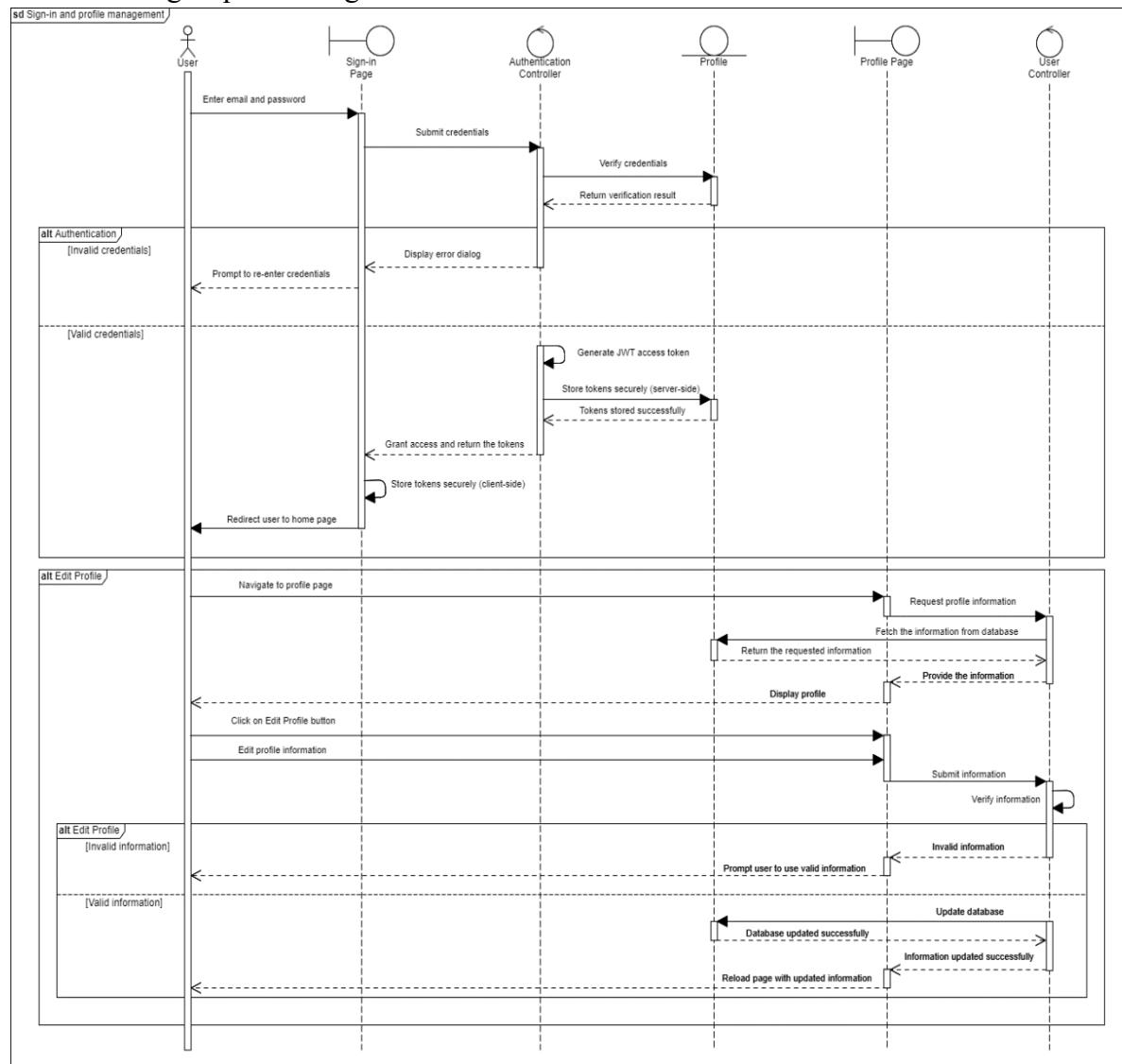


Figure 7: “Sign-in and profile management” Sequence Diagram

3.1.3 “User management” Sequence diagram

This scenario covers how the admin manages the users.

Table 4: “User management” Use Case Diagram Description

Use case	User management
Actor	Admin
Pre-condition	The admin must be authenticated and has access to user management options.
Post-condition	The admin can add, edit and delete users. The changes and additions made to the users are executed and shown in the users list.

Scenario description	<ul style="list-style-type: none">• The admin navigates to the users list.• The admin clicks on the Add button.• The system displays the “Add user” page.• The admin fills the form with user information and submits.• The system verifies the information, then adds the user to the database and displays him in the users list.• The admin clicks on the Edit button corresponding to a chosen user.• The system displays the “Edit user” page after fetching the user’s information.• The admin edits information.• The system verifies the information, then updates the information in the database and displays the updated user in the users list.• The admin clicks on the Delete button corresponding to a chosen user.• The system displays a confirmation dialog.• The admin clicks Confirm, and the user is deleted.• The system updates the users list, removing the user.
----------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

The following sequence diagram will illustrate this scenario:

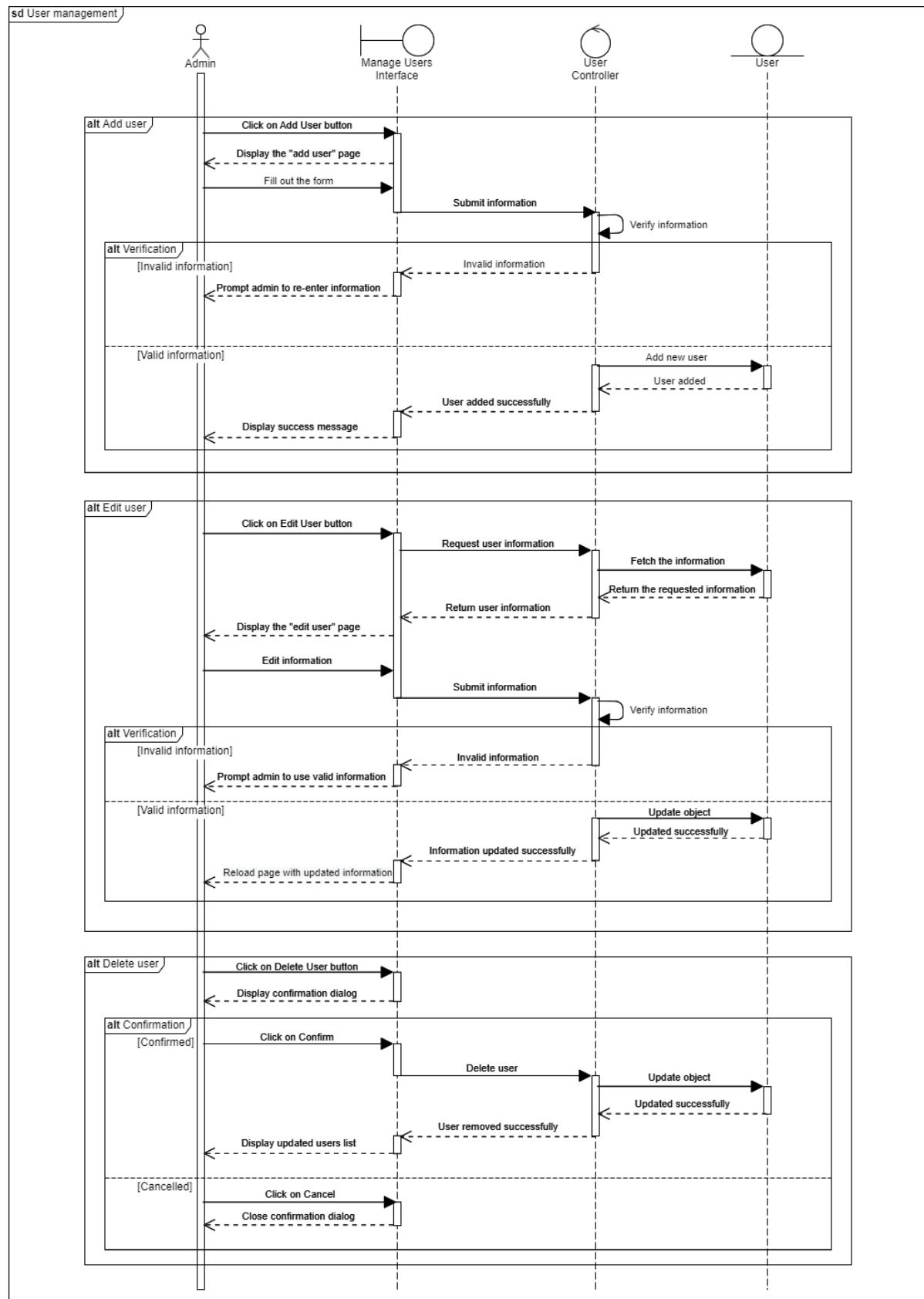


Figure 8: "User management" Sequence Diagram

3.2 Class diagram

Table 3 lists all the attributes associated with each class, their data types, as well as brief descriptions.

Table 5: “Authentication and user management” Class Diagram Description

Class	Attribute	Attribute description	Type
User	IdUser	User identifier	Numeric
	Username	Username	Alphabetic
	FirstName	User’s first name	Alphabetic
	LastName	User’s last name	Alphabetic
	Telephone	User’s telephone	Alphabetic
	IdRole	Role identifier	Numeric
	IdCountry	Country identifier	Numeric
Candidate	IdCandidate	Candidate identifier	Numeric
	IdUser	User identifier	Numeric
Tutor	IdTutor	Tutor identifier	Numeric
	IdUser	User identifier	Numeric
Account	Email	User’s email	Alphabetic
	Password	User’s password	Alphabetic
Profile	IdUser	User identifier	Numeric
	Title	User’s title	Alphabetic
	About	User’s bio	Alphabetic
	Language	Preferred language	Alphabetic

Next, we proceed to model the class diagram, comprised of all classes and relationships that represent this sprint.

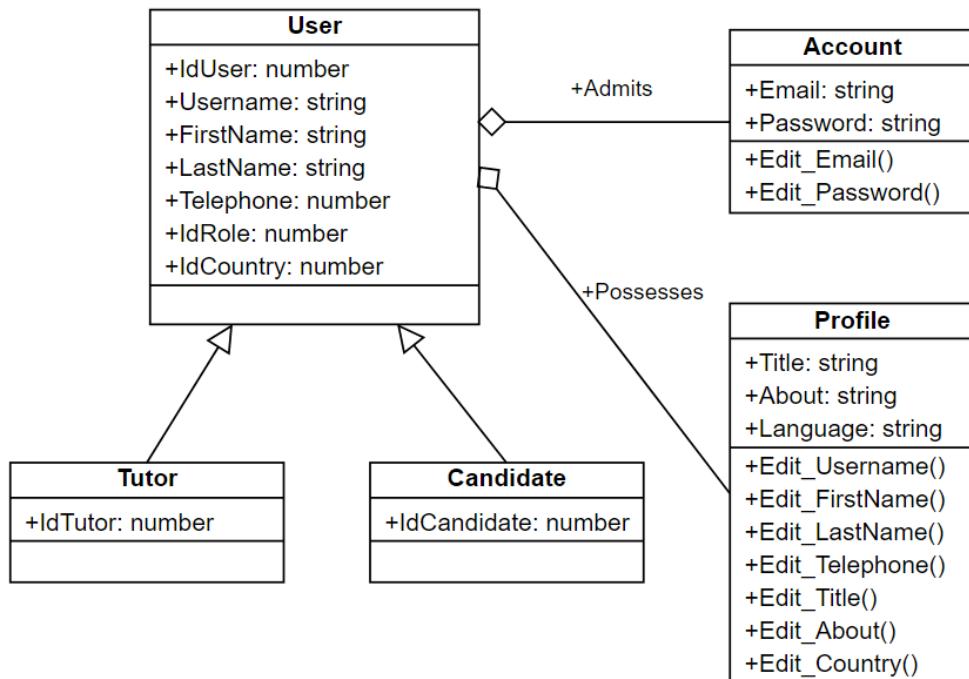


Figure 9: “Authentication and user management” Class Diagram

3.3 SQL Server database example

- User (IdUser, Username, FirstName, LastName, Email, Password, BirthDate, Address)
- Profile (IdProfile, IdUser#, Title, About, Language)
- Account (IdAccount, IdUser#, Email, Password)

<u>IdUser</u>	Username	FirstName	LastName	Email	Telephone	Password
4	adam_bsr	Ahmed Ada...	Boussarsar	adam.boussarsar@gmail.co...	50112233	\$2a\$11\$2d...
18	kout_afra	Afra	Kout	koutafra@gmail.com	11223345	\$2a\$11\$Zig...

Figure 10:Database Table – User example

4 Implementation

Based on the analysis and conception of the current sprint, we have developed interfaces that provide the functionalities defined earlier. Following this, we will present the most important interfaces.

- Multilingual feature

For globalisation reasons we wanted to make our application have this special feature where we translated every interface to French and Arabic so more users can take advantage of our app.

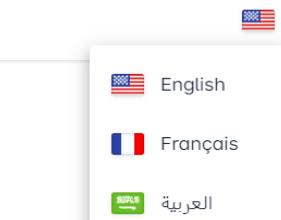


Figure 11: Multilingual feature

- Connection interface

The login interface presented in the following figure represents the "Sign In" page where the user fills in the fields with their login and password.

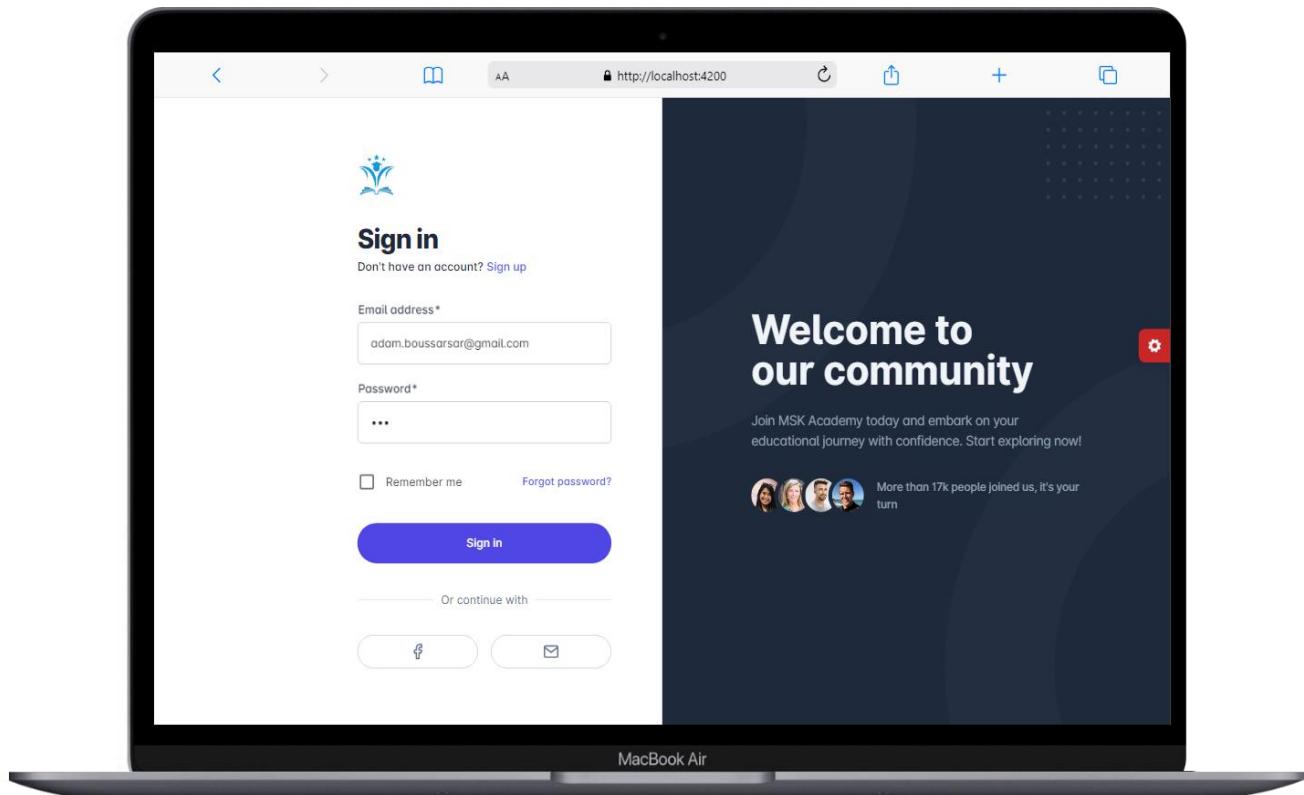


Figure 12: Sign in interface

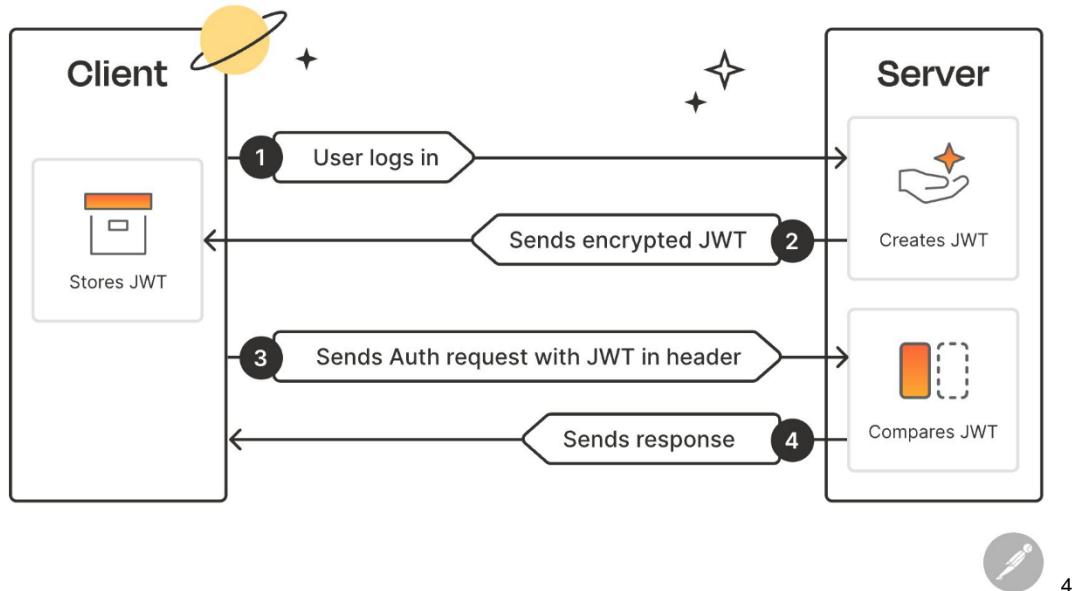
4.1 Security and performance

To provide a safe experience to our users we made sure to ensure security and performance of our API's.

- **JWT Authentication:**

To secure transmit authentication information, we used JWT (JSON Web Token) every time a user logs into our application, The API server creates a digitally signed and encrypted JWT that includes the user's identity.

The user then includes the JWT in every subsequent request, which the server deserializes and validates. The user's data is therefore not stored on the server's side, which improves scalability.



4

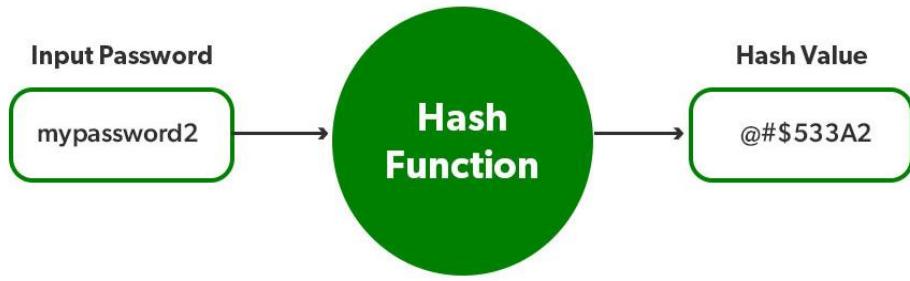
Figure 13: JWT Authentication

- **Data Encryption:**

To enhance the security of sensitive user information like passwords, as well as maintaining the confidentiality and integrity of data, we implemented robust measures using **BCrypt**, a hashing function specifically designed for password security.

In our implementation, BCrypt hashes each password with a unique salt and multiple rounds of hashing, significantly slowing down any attacks. The resulting hash is securely stored. For verification, our system compares the hashed input password with the stored hash, ensuring the original password remains unretrieved and secure.

⁴ <https://x.com/getpostman/status/1709289694075158748>



5

Figure 14: Data Encryption

- Add user interface

The next figure allows the administrator to add a new user. Our system provides them the following page:

The form consists of two columns of input fields. The left column includes: First name* (Ahmed Adam), Username* (adam_boussarsar), National Identification Card (NIC)* (11164054), Email address* (ahmedadam.boussarsar@gmail.com), Gender* (Male), Country* (Tunisia), and Role* (Candidate). The right column includes: Last name* (Boussarsar), Password* (three dots), Contact number* (+216 20843465), Birthdate* (February 8, 2002), Address* (Tunisia, Sfax, Route de l'aéroport km5), State* (Sfax), and Profile photo (Choose file adam.jpg). At the bottom right are "Reset" and "Submit" buttons.

Figure 15: Add user interface

- Add candidate interface

The following figure represents the sign-up interface for candidates:

⁵ <https://www.geeksforgeeks.org/hashing-passwords-in-python-with-bcrypt/>

First name*
Flen

Last name*
Fouleni

Username*
Flen_Fouleni

Password*

National Identification Card (NIC)*
11223344

Contact number*
+216 26777888

Email address*
flenfouleni7@gmail.com

Birthdate*
1/1/2000

Gender*
Male

Address*
Tunis, Tunisia

Field of study*
Computer sciences

Reset **Submit**

Figure 16: Add candidate interface

- **Add tutor interface**

The next figure shows the sign-up page interface for tutors.

First name*
Afra

Last name*
Kout

Username*
afra_kout

Password*

National Identification Card (NIC)*
13887722

Contact number*
+216 88222888

Email address*
afrikout8@gmail.com

Birthdate*
February 19, 2002

Gender*
Female

Address*
Avenue du maroc Zarzis , Mednine ,Tunisia

Qualifications*
Bachelor in computer sciences
software engineering degree

Teaching Experience*
Tutored UX/UI design courses in a
training center

Speciality*
UX/UI design front end development

Reset **Submit**

Figure 17: Add tutor interface

- Password reset interfaces

The next figure represents the password-reset process' interfaces.

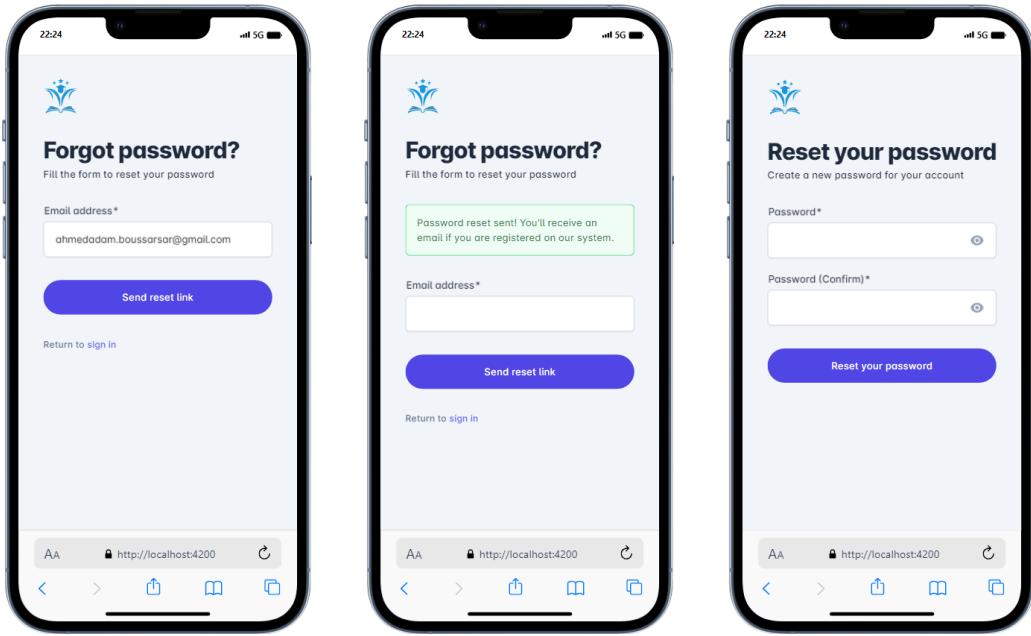


Figure 18: Password reset pages interface

- User's profile management interface

The interface shown in the next figure represents the user's profile management page. It allows users to set and modify their personal information.

Account

Profile
Following information is publicly displayed, be careful!

Name
 Afra kout

Username
MskAcademy.com/ Afrakout

Title
 Lead UX designer

About
PFE Survivor

Brief description for your profile.

Personal Information
Communication details in case we want to connect with you. These will be kept private.

Email
 afra.kout@gmail.com

Phone
 121-490-33-12

Country
 Tunisia

Language
 English

Cancel **Save**

Figure 19: Profile settings interface

And the following figure is the view profile interface

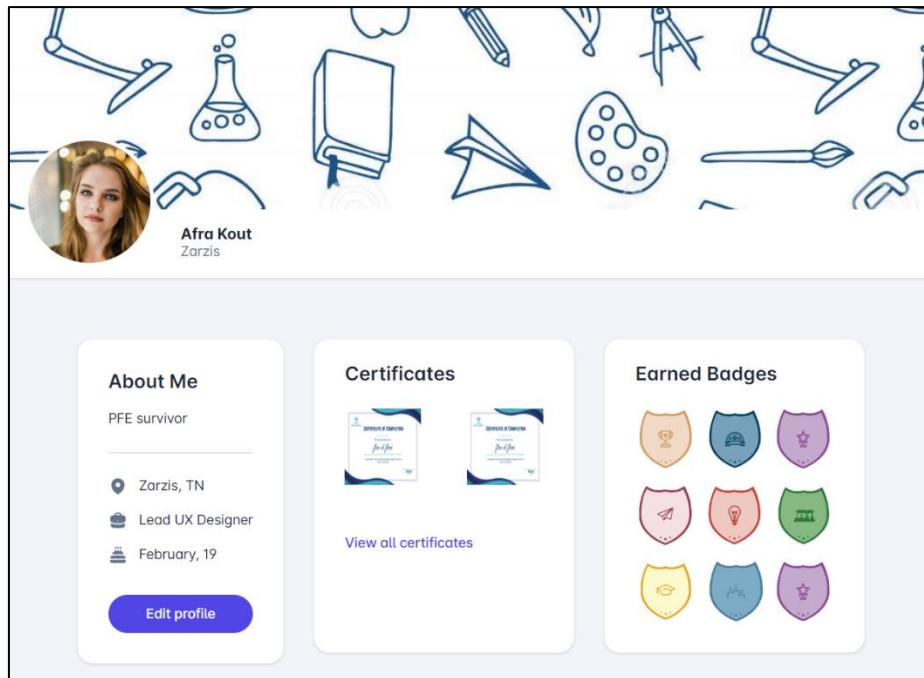


Figure 20: Profile interface

- Users list interface

The administrator can view the list of users and their characteristics. Additionally, they can delete, modify, and archive one or more users.

Users list						
Search <input type="text"/> <button>Add</button>						
ID	First name	Last name	Email address	Role	Actions	Status
22	Afra	Kout	afra@gmail.com	Tutor	 	Disable <input checked="" type="checkbox"/>
21	AhmedAdam	Boussarsar	ahmedadam.boussarsar@gmail.com	Student	 	Enable <input checked="" type="checkbox"/>
16	Mohamed Sami	Khiari	mohamedsamikhiali@gmail.com	Tutor	 	Enable <input checked="" type="checkbox"/>

Figure 21: Users list interface

Upon clicking the information button, a dialog containing the user's specific information will be displayed.

Users list

Users list						
Search						
Add						
Id	First name	Last name	Email address	Role	Actions	Status
22	Afra	Kout	afra@gmail.com	Tutor	Delete Info (highlighted) Edit Trash	Disable <input type="button" value="Off"/>
21	AhmedAdam	Boussarar	ahmedadam.boussarar@gmail.com	Student	Delete Info Edit Trash	Enable <input checked="" type="button" value="On"/>
16	Mohamed Sami	Khiari	mohamedsamikhiali@gmail.com	Tutor	Delete Info Edit	Enable <input checked="" type="button" value="On"/>

Items per page: 5 0 of 0 < < > >

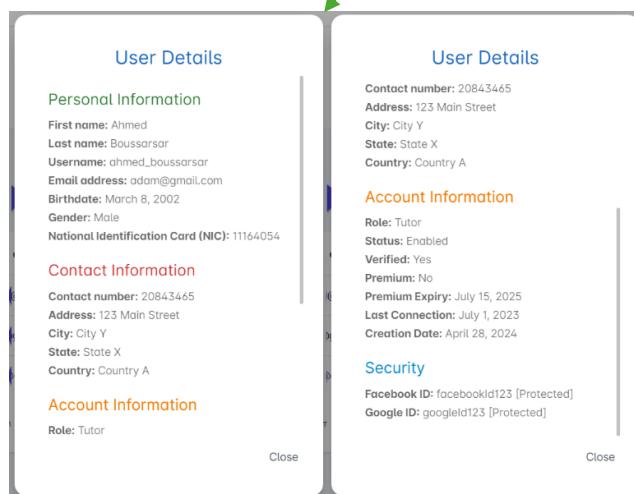


Figure 22: User details dialog

And likewise, when clicking the delete button, a confirmation dialog will pop up.

Users list

The screenshot shows a user management interface titled "Users list". At the top left is a search bar, and at the top right is a blue "Add" button. Below is a table with columns: Id, First name, Last name, Email address, Role, Actions, and Status. The table contains three rows of data:

Id	First name	Last name	Email address	Role	Actions	Status
22	Afra	Kout	afra@gmail.com	Tutor	Delete Info Edit Delete	Disable <input type="checkbox"/>
21	AhmedAdam	Boussarsar	ahmedadam.boussarsar@gmail.com	Student	Info Edit Delete Info Edit	Enable <input checked="" type="checkbox"/>
16	Mohamed Sami	Khiari	mohamedsamikhiali@gmail.com	Tutor	Info Delete Edit	Enable <input checked="" type="checkbox"/>

At the bottom right of the table are buttons for "Items per page:" (set to 5), "0 of 0", and navigation arrows. A green arrow points from the "Delete" button in the third row's "Actions" column to a confirmation dialog box. The dialog box has a red header with a warning icon, the text "Delete this user?", and the message "Are you sure you want to remove this user permanently? This action cannot be undone!". It features "Cancel" and "Confirm" buttons.

Figure 23: Confirmation dialog

5 Conclusion

In summary, Sprint 1 has successfully implemented authentication management, providing a secure foundation for our application. Moving forward, Sprint 2 will concentrate on course management, building upon this groundwork to enhance functionality and user experience.

CHAPTER 3: SPRINT 2: “COURSES MANAGEMENT”

Courses management

1 Introduction

This chapter covers the development cycle of the second sprint, focusing on course management. We start by analysing and modelling this sprint using a use case diagram. Next, we delve into the most significant use case, depicting it in a sequence diagram. Then, we construct its class diagram. Finally, we conclude with the presentation of the different interfaces developed.

2 Analysis: Use Case Diagram

In this section, we will outline all the functionalities required for managing courses and meets, focusing on the actors involved: tutors, candidates, and administrators. Figure 25 will illustrate the various functionalities developed during the second sprint.

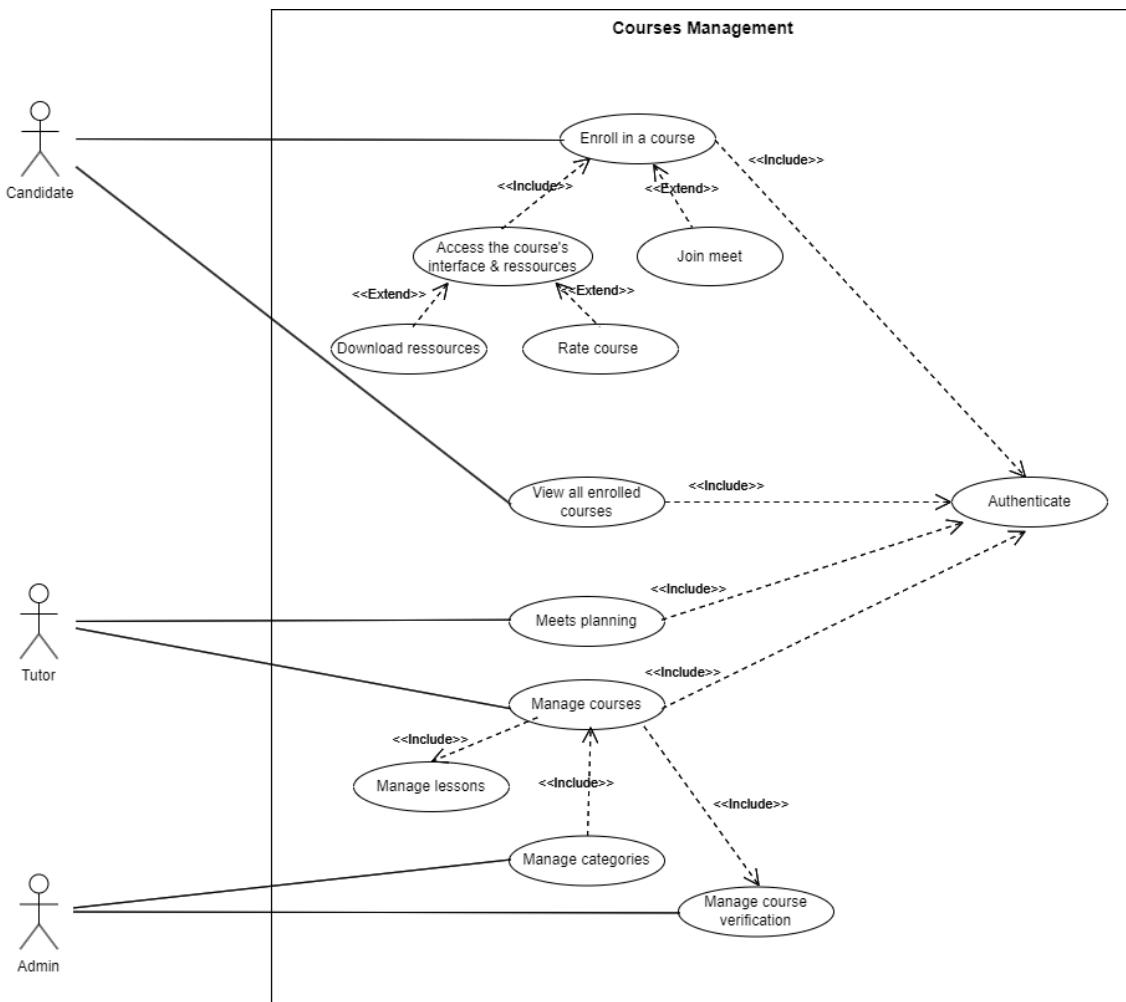


Figure 24: “Courses management” Use Case Diagram

3 Conception

In the conceptualization phase, we bring our ideas to life by creating sequence diagrams and a class diagram, highlighting the complexities of managing courses and enrolling in them.

3.1 Sequence diagrams

Because of the importance and complexity of the previous use case, we decided to create multiple sequence diagrams for each major use case, all based on the following scenarios that we've laid out.

3.1.1 “Categories Management” Sequence diagram

The following table represents the “Categories management” Use Case Diagram and its detailed description followed by its diagram.

Table 6: “Categories management” Use Case Diagram Description

Use case	Categories Management
Actor	Admin
Pre-condition	The admin is authenticated and has access to category management options.
Post-condition	The changes and additions made to the categories are saved and displayed in the categories list.
Scenario description	<ul style="list-style-type: none"> • The admin navigates to the categories list. • The admin clicks on the Add button. • The system displays the “Add category” page. • The admin fills the form with category information and submits. • The system verifies the information, then adds the category to the database and displays it in the categories list. • The admin clicks on the Edit button corresponding to a chosen category. • The system displays the “Edit category” page after fetching the category information. • The admin edits information. • The system verifies the information, then updates it in the database and displays the updated category in the categories list. • The admin clicks on the Delete button corresponding to a chosen category. • The system displays a confirmation dialog. • The admin clicks Confirm, and the category is deleted. • The system updates the categories list, removing the user.

The next figure illustrates the sequence diagram of “Categories management”:

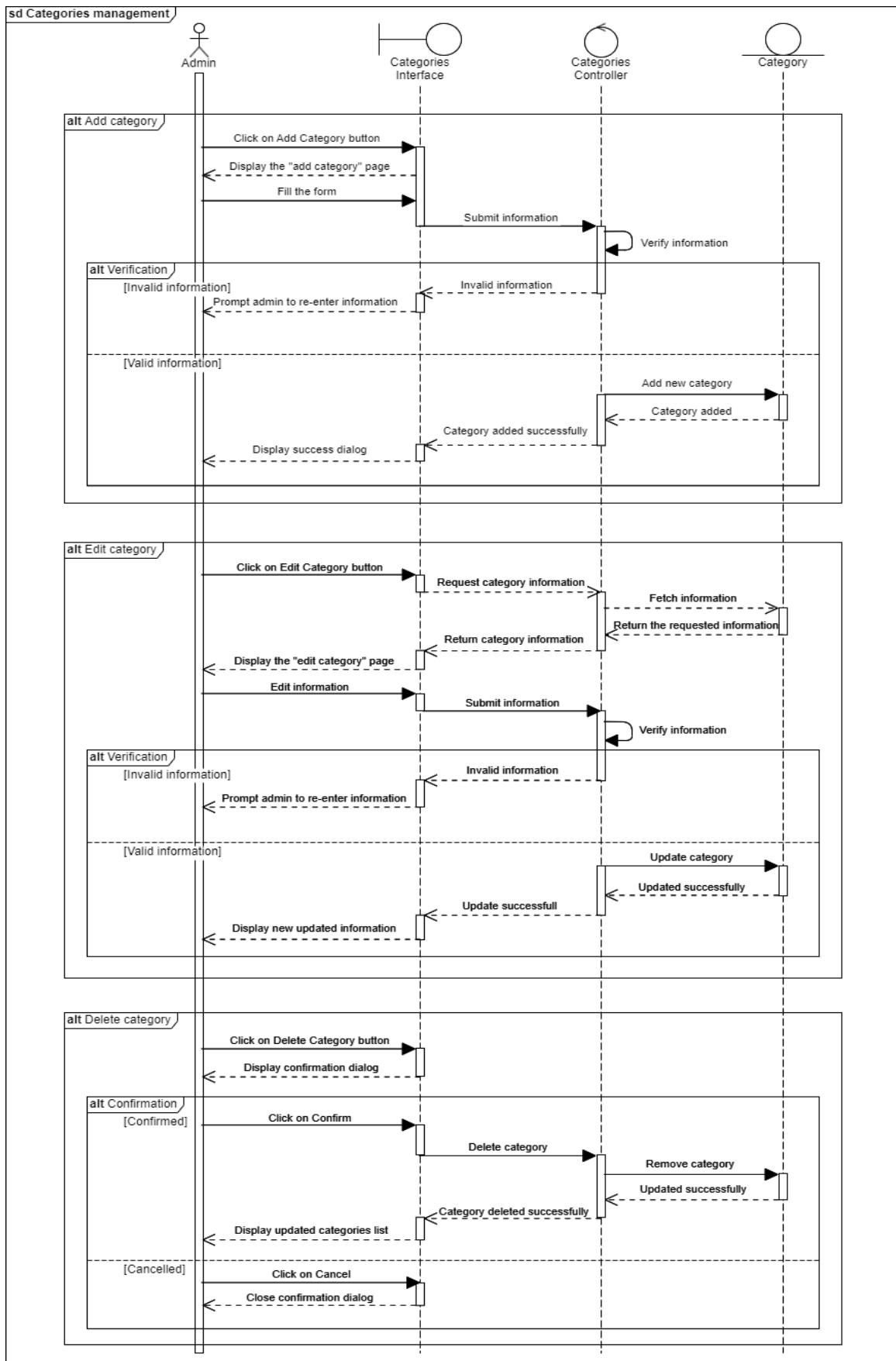


Figure 25: "Categories management" Sequence Diagram

3.1.2 “Courses management” Sequence Diagram

The next table represents the “Courses Management” Use Case Diagram and its detailed description followed by its diagram.

Table 7: “Courses Management” Use Case Diagram Description

Use case	Courses Management
Actor	Admin, Tutor
Pre-condition	All the actors must be authenticated, and the admin has access to course management options.
Post-condition	A tutor can upload a course which then undergoes verification by an administrator. The admin can accept or reject a pending course. If approved, the course is published, and the tutor may edit or delete it.
Scenario description	<ul style="list-style-type: none"> • The tutor navigates to the “My Courses” page. • The tutor clicks on the Add button. • The system displays the “Add course” page. • The tutor fills the form and submits. • The system verifies the information, then adds the course to the database and displays it in the “Pending Courses” page. • The admin navigates to the “Pending Courses” page. • The admin accepts or rejects the course. • If accepted, the system publishes the course and displays it alongside the accepted courses. • The tutor can edit an uploaded course. • The tutor can delete an uploaded course

The following figure illustrates the sequence diagram of “Courses management”:

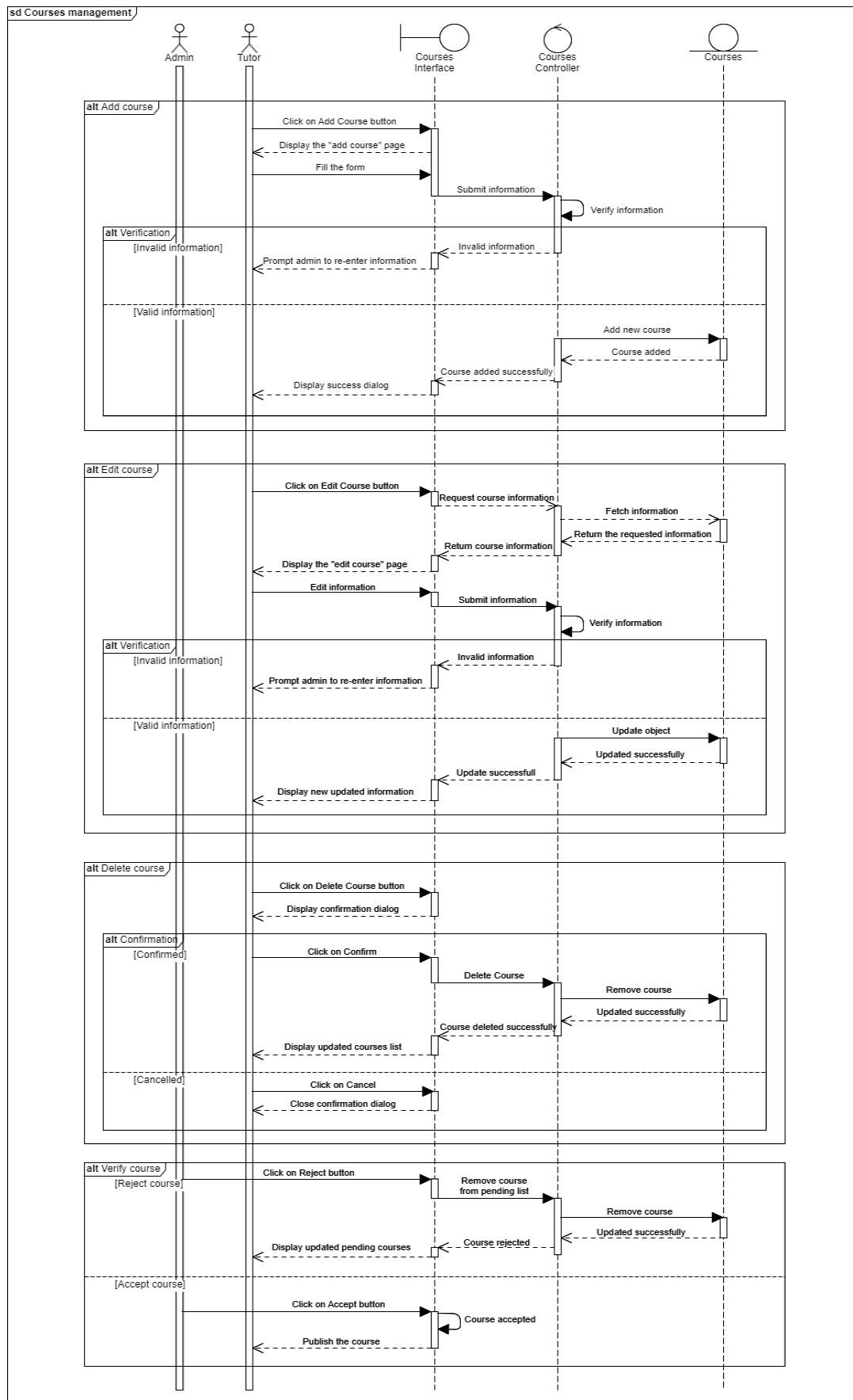


Figure 26: “Courses Management” Sequence Diagram

3.1.3 “Lessons Management” Sequence Diagram

The following table represents the “Lessons Management” Use Case Diagram and its detailed description followed by its diagram.

Table 8: “Lessons Management” Use Case Diagram Description

Use case	Lessons Management
Actor	Tutor
Pre-condition	The tutor must be authenticated and has uploaded a course.
Post-condition	A tutor can create and add lessons to an already existing course, as well as editing and deleting them if he wishes to do so.
Scenario description	<ul style="list-style-type: none"> • The tutor navigates to the “My Lessons” page. • The tutor clicks on the Add button. • The system displays the “Add lesson” page. • The tutor fills the form, selecting which course the lesson will be added to, then submits. • The system verifies the information, then adds the lesson to the database and displays it in the “Lessons list” page. • The tutor can edit a chosen lesson. • The tutor can delete a chosen lesson.

The following figure illustrates the sequence diagram of “Lessons management”:

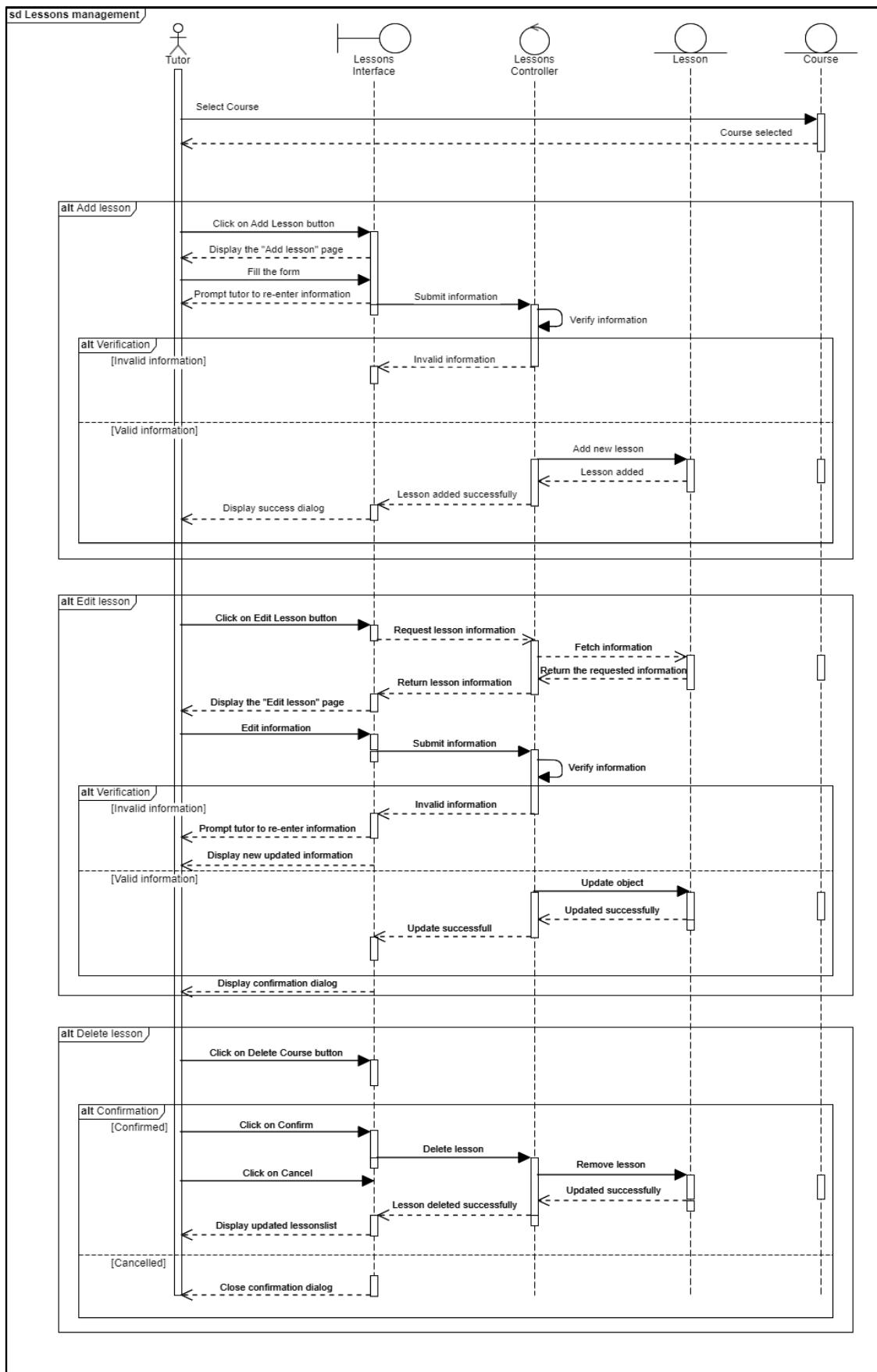


Figure 30: “Lessons Management” Sequence Diagram

3.1.4 “Enrollment” Sequence diagram

The following table represents the “Enrollment” Use Case Diagram and its detailed description followed by its diagram.

Table 9: “Enrollment” Use Case Diagram Description

-Use case	Enrollment
Actor	Candidate
Pre-condition	The candidate must be authenticated.
Post-condition	The candidate can enroll in a course, access its lessons, download course resources and join meetings. The candidate can also view all his enrolled courses and scheduled meetings.
Scenario description	<ul style="list-style-type: none"> • The candidate navigates to the courses list. • The candidate clicks on a chosen course. • The system displays the course’s details page. • The candidate can read a description about the course, view its included lessons and the publishing tutor. • The candidate clicks on Enroll Now, and the system redirects him to start reading the lessons, as well as allowing him access to the included resources. • Once enrolled, the candidate can review the course. • The candidate navigates to “My Courses” to view all his enrolled courses. • The candidate navigates to “My Meets” to view any scheduled meetings for his enrolled courses. • Clicking on a chosen meet’s link will open its page.

The next figure illustrates the sequence diagram of “Enrollment”:

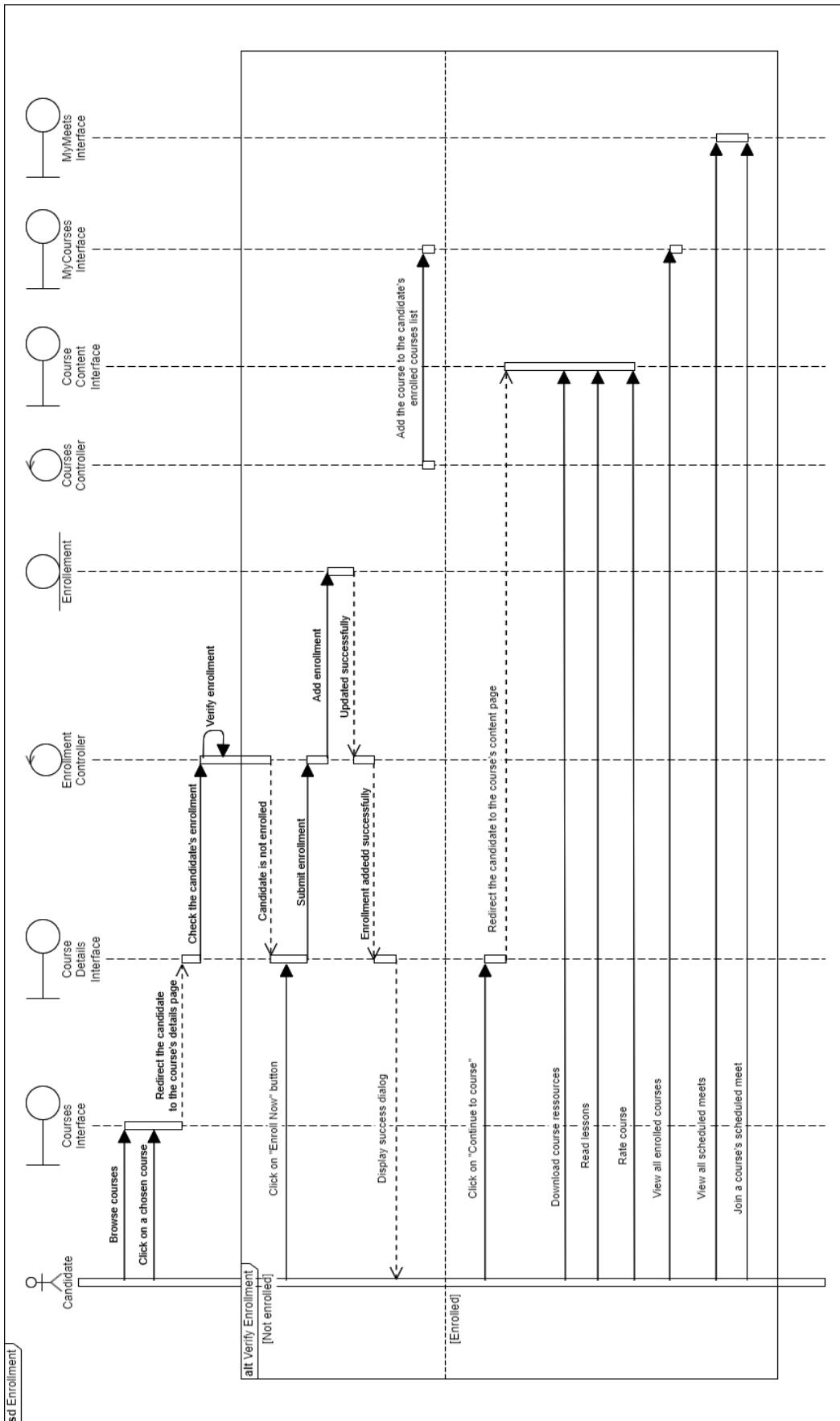


Figure 32: “Enrollment” Sequence Diagram

3.2 Class diagram

The following table lists all the attributes associated with each class, their data types, as well as brief descriptions.

Table 9: “Courses management” Class Diagram Description

Class	Attribute	Attribute description	Type
User	IdUser	The user's identifier	Numeric
	Username	The username	Alphabetic
Tutor	IdTutor	The tutor's identifier	Numeric
	IdUser	The user's identifier	Numeric
Candidate	IdCandidate	The candidate's identifier	Numeric
	IdUser	The user's identifier	Numeric
Course	IdCourse	The course's identifier	Numeric
	IdCategory	The category's identifier	Numeric
	TitleCourse	The course's title	Alphabetic
	DescriptionCourse	The course's description	Alphabetic
	DurationHour	The course's duration in hours	Numeric
	PriceCourse	The course's price	Numeric
Lesson	IdLesson	The lesson's identifier	Numeric
	IdCourse	The course's identifier	Numeric
	TitleLesson	The lesson's title	Alphabetic
	ContentLesson	The lesson's content	Alphabetic
	OrderLesson	The lesson's order	Numeric
Category	IdCategory	The category's identifier	Numeric
	TitleCategory	The category's title	Alphabetic
	DescriptionCategory	The category's description	Alphabetic
Enrollment	IdEnrollment	The enrollment's identifier	Numeric
	IdCandidate	The candidate's identifier	Numeric
	IdCourse	The course's identifier	Numeric
Meet	IdMeet	The meet's identifier	Numeric
	IdCourse	The course's identifier	Numeric
	TitleMeet	The meet's title	Alphabetic
	DescriptionMeet	The meet's description	Alphabetic
	DateMeet	The meet's date	Date
	StartTime	The meet's start time	Numeric
	EndTime	The meet's end time	Numeric

Video	IdVideo	The video's identifier	Numeric
	TitleVideo	The video's title	Alphabetic
	Duration	The video's duration	Numeric
File	IdFile	The file's identifier	Numeric
	TitleFile	The file's title	Alphabetic
Resources	IdCourse	The course's identifier	Numeric
	IdFile	The file's identifier	Numeric
	IdVideo	The video's identifier	Numeric

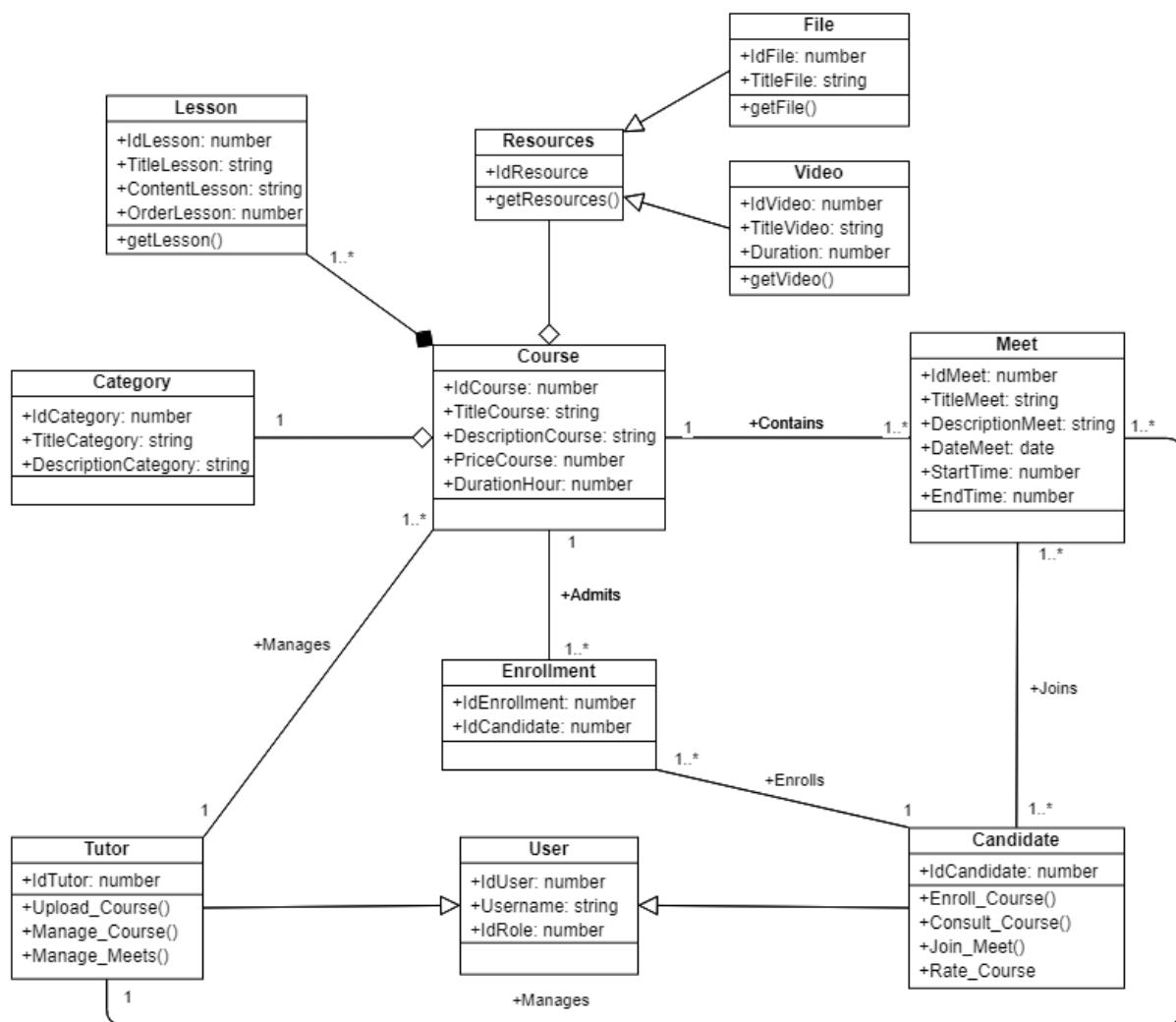


Figure 27: “Courses management” Class Diagram

4 Implementation

Building upon the analysis and conception of the current sprint, we've crafted interfaces that embody the functionalities outlined previously. In the next phase, we'll highlight the most critical interfaces developed.

- Home page interface

Once you open our web application this Home page will welcome you

The screenshot shows the MSK Academy home page. At the top, there's a navigation bar with links for Home, FAQs, About, Contact, a Get started button, and a language selector (English). The main header reads "MSK ACADEMY" and "What would you like to learn today?". Below it, a sub-header says "Our courses will step you through the process of discovering, learning, and mastering what you desire". The "Top courses" section features six course cards with titles like "AgileScrumCourse", "SEO", "Angular Advanced", "Angular", "PHP", and "Java". Each card includes a thumbnail, duration (e.g., 3 hours, 30 hours, 50 hours), and a "More details" button. The "Candidates leaderboard" section displays three profiles: Adam Boussarsar (Tunisia, Sfax), Afra Kout (Tunisia, Zarzis), and Ayla Boussarsar (Germany, Frankfurt). Each profile includes a photo, name, location, rank (Top 10), and score. The "Frequently asked questions" section is divided into "General questions" and "Expert questions", each with expandable dropdowns for answers.

MSK Academy

Home FAQs About Contact Get started

MSK ACADEMY

What would you like to learn today?

Our courses will step you through the process of discovering, learning, and mastering what you desire

Top courses

Explore the most engaging courses.

All

Search by title or description

AgileScrumCourse Scrumforbeginners

AGILE SCRUM TRAINING

3 hours

More details

SEO SEO for PRO

SEARCH ENGINE OPTIMISATION

30 hours

More details

Angular Advanced Angular for PRO

A

50 hours

More details

Angular Angular for beginners

A

20 hours

More details

PHP PHP for beginners

php

20 hours

More details

Java Java for beginners

Java

10 hours

More details

Candidates leaderboard

Meet our top candidates!

Adam Boussarsar Tunisia, Sfax

Top 10 in Angular Score: 420

Afra Kout Tunisia, Zarzis

Top 10 in UX/UI Score: 111

Ayla Boussarsar Germany, Frankfurt

Top 10 in Graphic Design Score: 856

Frequently asked questions

General questions

Who is the target audience for our online courses?

How can I register on the platform?

Expert questions

What's the type of content included in your courses?

Our courses include different resources such as text, videos, images, PDFs, quizzes, etc.

How long do I have access to the course content after enrolling?

Are the courses multilingual?

© 2024 MSK Academy™ All Rights Reserved.

About FAQs Contact

Figure 28:Home page interface

- Help center interface

This figure shows the help center interface which is one of the most crucial interfaces required for every application for a better user experience.

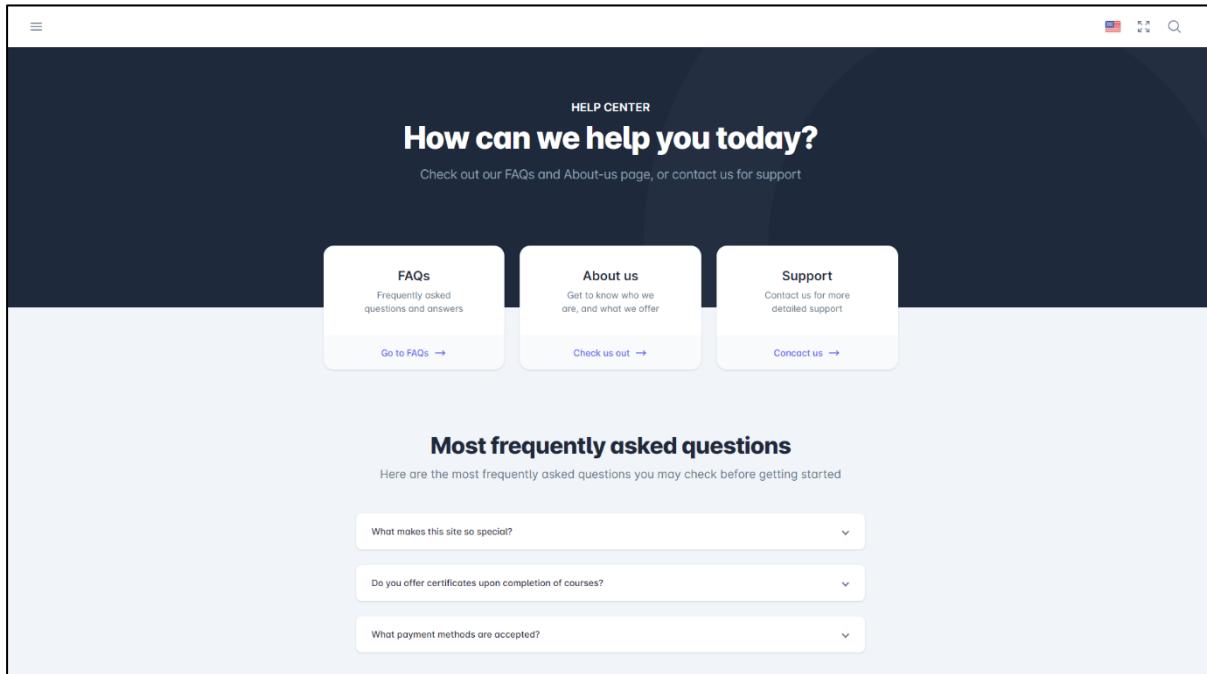


Figure 29: help center page interface

- About us interface

This figure represents the About us page where visitors or new users learn more about us, our story, goals, values and some reviews from our users.

[← Back to Home](#)

About us

**Broaden your knowledge with
MSK Academy**

Invest intelligently and discover a better way to learn and excel.



MSK ACADEMY

About Us

Driven by a passion for enriching educational experiences, we've designed our online learning platform to empower tutors and engage candidates. Our mission is to provide high-quality courses and foster interactive relationships between tutors and candidates, incorporating motivational elements to enhance learning. We ensure that each course is intuitive and engaging, facilitating a rewarding educational experience with every interaction.

Our Goals

We aim to provide our candidates with quality courses, ensuring continuous support to improve their experience and making learning more accessible through engagement and interaction

 Expand Course Variety Offer diverse courses to meet various interests and needs	 Ensure Quality Maintenance Assure high standards for a valuable learning experience	 Increase Access Make education available to all, regardless of location or resources	 Promote Lifelong Learning Support ongoing skill development and career growth
-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Our Values

Our application was built upon the following key values

1 Credibility Committed to our promises, loyal to our word	2 Transparency Ensuring accuracy and clarity in all transactions	3 Respect Valuing diversity of opinions and respecting others' rights
4 Professionalism Embracing talent, diversity, and creativity to achieve excellence	5 Leadership Leading through dissemination of science and knowledge	6 Confidence Building lasting, strong relationships with our students

What our happy users says!

<p>MSK-Academy has given me the opportunity to share my expertise to a broad audience of learners, enabling me to make a meaningful impact while connecting with candidates.</p>  <p>Brian Hughes Tutor</p>	<p>MSK-Academy's customer support and user-friendly application have made learning convenient and enjoyable for people. The ability to interact with tutors is a game-changer!</p>  <p>Amelia Edwards Blog Writer</p>	<p>Having access to top-quality courses & while also earning badges to show off my skills is amazing. These flexible learning options and valuable certificates have transformed my experience.</p>  <p>Melissa Morillo Candidate</p>
-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Figure 30: About us page interface

- FAQs interface

The following figure represents the FAQs (short for Frequently Asked Questions) page where you can find answers for your questions.

The screenshot shows a clean, modern website layout for a 'FAQs' page. At the top left, there is a 'Back to Home' link. The main title 'FAQs' is displayed prominently. Below the title, the heading 'Frequently Asked Questions' is centered in a large, bold, dark font. The page is organized into three main sections: 'Most Asked', 'General Inquiries', and 'Payment'. Each section contains two expandable (collapsible) questions, each represented by a rectangular box with a question and a small downward arrow icon in the top right corner. The 'Most Asked' section includes questions about certificates and site special features. The 'General Inquiries' section includes questions about new course additions and premium account benefits. The 'Payment' section includes questions about accepted payment methods and course discounts.

Figure 31: FAQs page interface

- Contact us interface

The next figure is the contact us page where you can reach out to us for further information or help.

[Back to Home](#)

Contact us

Submit your request

Your request will be processed and our support staff will get back to you in 24 hours.

Username*

Email*

Subject*

Message*

[Clear](#) [Submit](#)

Figure 32: Contact us page interface

- Courses interface

The following figure represents the courses interface:

The screenshot shows a web-based course catalog interface. At the top, there's a navigation bar with links for Home, FAQs, About, and Contact, along with a search bar and a 'Get started' button. Below the navigation, there's a dropdown menu set to 'All' and a search input field. The main content area displays a grid of six course cards, each with a thumbnail image, the course name, a brief description, a duration indicator (e.g., '3 hours'), and a 'More details' button. The courses listed are:

- AgileScrumCourse Scrumforbeginners (Thumbnail: Agile Scrum Training logo)
- SEO SEO for PRO (Thumbnail: SEO logo)
- Angular Advanced Angular for PRO (Thumbnail: Angular logo)
- Angular Angular for beginners (Thumbnail: Angular logo)
- PHP PHP for beginners (Thumbnail: PHP logo)
- Java Java for beginners (Thumbnail: Java logo)

At the bottom of the page, there's a footer with copyright information and links for About, FAQs, and Contact.

Figure 33: Courses interface

- Course details interface

After choosing a course and clicking on it, you will be redirected to the course details page, as seen in the following interface:

The screenshot shows the course details page for 'Angular Advanced'. At the top, there's a large Angular logo with the letter 'A'. Below it, the course title 'Angular Advanced' and subtitle 'Angular for PRO' are displayed. A navigation bar includes links for 'Description', 'Included lessons', and 'Tutor'. The main content area starts with a 'Description' section containing a brief overview of Angular and a 'Read more' button. To the right, a sidebar provides course details: 'Self-paced course, you can start learning now', 'Duration: 50 Hours', and a list of 'Benefits' including lifetime access, live sessions, exercises, and a certificate. A prominent purple 'Enroll now' button is located in this sidebar. An arrow points from this button down to a larger 'Enroll now' button at the bottom of the page. The 'Included lessons' section lists three lessons: 'BEST ANGULAR Lesson 1' (TypeScript), 'BEST ANGULAR Lesson 2' (Angular Components), and 'BEST ANGULAR Lesson 3' (Angular Services). Each lesson card includes a brief description. The 'Tutor' section features a profile picture of Mohamed Sami Khiali and a short bio. At the bottom, a green call-to-action box asks 'Are you ready to dive in?' and contains another 'Enroll now' button.

Figure 34: Course details interface

- Lessons interface

The moment you make your mind and enroll in a course you will be able to start your lessons and the next figure will be your lessons interface:

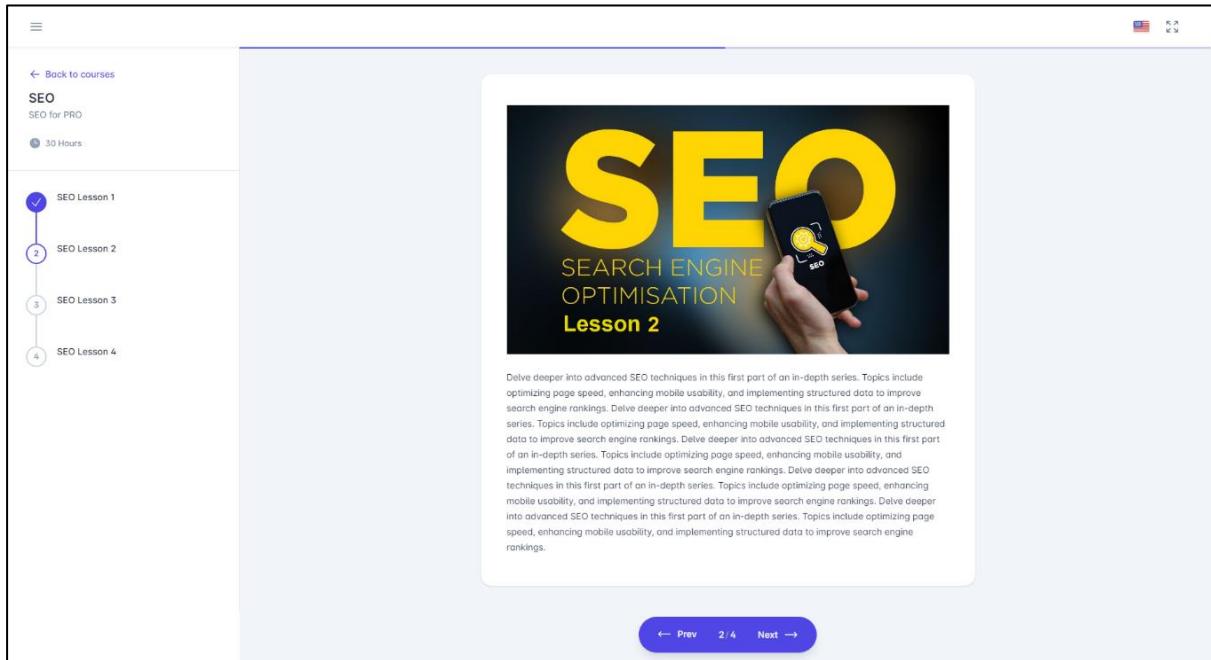


Figure 35: Lessons interface

- Tutor's space
- ❖ My courses
- Add Course interface

When the tutor aims to publish a course on the application, he must first go by filling the form represented in the following figure:

Figure 36: Tutor's space interface

Chapter 3: Sprint 2 : Courses management

▪ Courses list interface

When the tutor aims to view his courses on our application, he gets the following interface

Courses list							
Search							
<input type="text" value="Search.."/> + Add							
Id	Picture	Title	Subtitle	Duration	Actions	Status	
8		AgileScrumCourse	Scrumforbeginners	3 hours	  	Enable <input checked="" type="checkbox"/>	
5		SEO	SEO for PRO	30 hours	  	Enable <input checked="" type="checkbox"/>	
4		Angular Advanced	Angular for PRO	50 hours	  	Enable <input checked="" type="checkbox"/>	
1		Java	Java for beginners	10 hours	  	Enable <input checked="" type="checkbox"/>	

Figure 37: Courses list interface

And that was the list of courses he uploaded to our website.

▪ Edit course interface

Every time the tutor wishes to edit something in his course, he will be checking out the interface illustrated in the next figure.

Edit course							
Title*	<input type="text" value="AgileScrumCourse"/> 	Subtitle*	<input type="text" value="Scrumforbeginners"/> 				
Category*	<input type="text" value="Programming"/> 	Duration*	<input type="text" value="3"/> 				
Description*	<input type="text" value="A very beginner friendly course for those interested in starting the basics of Agile Scrum."/> 						
Upload photo	<input type="button" value="Choose file"/> No file chosen						
							
Reset Edit course							

Figure 38: Edit course interface

❖ My Lessons

- Add lessons interface

And when he wants to add a lesson, he goes by filling the form illustrated in the next figure:

The screenshot shows a web-based application interface titled "Add lesson". The main heading is "Fill the form:". Below it are several input fields:

- Title***: Agile Scrum - Lesson 1
- Subtitle***: The first lesson in our Scrum training journey!
- Description***: You will learn the fundamentals & basics of Scrum in this first lesson.
- Content***: Development Team. Key Scrum events include Sprint Planning, Daily Scrum, Sprint Review, and Sprint Retrospective, with artifacts like the Product Backlog, Sprint Backlog, and Increment guiding the process.
- Order***: 1
- Course***: AgileScrumCourse

Below these fields is a section for "Upload lesson picture" with a file input field containing "Agile Scrum Lesson 1.jpg" and a preview image thumbnail. The thumbnail displays the text "AGILE SCRUM TRAINING LESSON 1" with a gear icon. At the bottom right are two buttons: "Reset" (red) and "Add lesson" (blue).

Figure 39: Add lesson interface

- Lessons list interface

Every time the tutor wishes to view the lessons list interface the following is the interface he will get

Chapter 3: Sprint 2 : Courses management

The Lessons list interface displays a table of four lessons. Each lesson row includes a red Angular logo icon, the lesson title, subtitle, order number, and two action buttons (trash and edit).

ID	Picture	Title	Subtitle	Order	Actions
2		TypeScript	Introduction to Typescript basics	1	trash edit
3		Angular Components	Angular Component advanced	2	trash edit
4		Angular Services	Angular Services	3	trash edit
5		Angular Standalone	Angular Standard	4	trash edit

Items per page: 5 | 0 of 0 | < < > >

Figure 40: Lessons list interface

And that was the list of lessons he included in his uploaded course.

- Edit lesson interface

When the tutor aims to edit something in the lessons he uploaded he gets the interface illustrated in the following figure (only the details mentioned in this interface can be edited):

The Edit lesson interface shows a form for editing a lesson. It includes fields for Title*, Subtitle*, Description*, Content*, Order*, Course*, and an Upload lesson picture section. The preview image shows the Angular Services lesson.

Edit lesson

Fill the form:

Title*	Angular Services	Subtitle*	Angular Services
Description*	Explore the role of services in Angular for sharing data and functionality across different parts of your application. Learn how to create, inject, and utilize services to manage state, handle		
Content*	Explore the role of services in Angular for sharing data and functionality across different parts of your application. Learn how to create, inject, and utilize services to manage state, handle		
Order*	3	Course*	Angular Advanced
Upload lesson picture	<input type="file"/> Choose file No file chosen 		

Reset Add lesson

Figure 41: Edit lesson interface

❖ My meets

- Add meet interface

And when the tutors plan for hosting a meet his first step will be filling the form illustrated in the following figure:

The screenshot shows a form titled 'Add meet'. The form has fields for 'Title*', 'Date*', 'Course*', 'Description*', and 'Link*'. The 'Title' field contains 'Agile Scrum Meet', 'Date' is set to 'May 28, 2024', 'Course' is 'AgileScrumCourse', 'Description' is 'We will discuss & chat about what we learned from the first lesson.', and 'Link' is 'https://meet.google.com/usp-oude-yig'. There are 'Reset' and 'Add meet' buttons at the bottom.

Figure 42: Add meet interface

- View meet interface

When the tutor aims to check the list of meets his up to with the information needed, he will be getting the interface illustrated in the following figure

Meets list					
<input placeholder="Search" type="text"/> <button>+ Add</button>					
ID	Title	Link	Date	Actions	Status
10	Introduction to SEO	meet.google.com/dar-hoes-waa	2024-06-29T00:00:00	trash edit	Disable off
9	Java test meet	meet.google.com/arz-zesq-bop	2024-06-15T00:00:00	trash edit	Disable off
7	Angular meet OBLIGATORY	meet.google.com/abc-defg-hij	2024-06-20T00:00:00	trash edit	Disable off

Items per page: 5 | 0 of 0 | < < > >|

Figure 43: Meets list interface

- Edit meet interface

The moment the tutor wishes to edit some detail in the meet he gets the following interface and of course the candidates enrolled will be notified of the changes made

Edit meet

Fill the form:

Title*	Description*
Angular meet OBLIGATORY	Ice-breaking first meet
Date*	Link*
June 20, 2024	meet.google.com/abc-defg-hij
Course*	
Angular	

Reset **Add meet**

Figure 44: Edit meet interface

- Candidate's space
- ❖ My courses

When the candidate wishes to view his enrolled courses, he will be getting this interface containing all the necessary details about it

My courses

ID	Course Picture	Title	Duration	Progress	Actions
5		SEO	30 hours	1 / 4 25 %	View Course View Meets
4		Angular Advanced	50 hours	3 / 4 75 %	View Course View Meets

Items per page: 5 0 of 0 < < > >

Figure 45: My Courses interface

❖ My meets

When the candidate aims to view the meets, he gets the interface illustrated in the next figure containing all the necessary information

The screenshot shows a user interface titled "My meets". At the top, there is a search bar labeled "Search". Below the search bar is a table with four columns: "Picture", "Title", "Link", and "Date". A single row is displayed in the table. The "Picture" column contains a thumbnail image of a Java logo (a coffee cup with steam). The "Title" column contains the text "Java test meet". The "Link" column contains a blue button with the text "View Meets" and a small icon. The "Date" column contains the text "2024-06-15T00:00:00". At the bottom of the interface, there is a pagination control with the text "Items per page: 5" and "0 of 0" followed by navigation arrows.

Figure 46: My meets interface

5 Conclusion

In conclusion, our exploration of course management in the second sprint has been comprehensive. We've analysed, modelled, and implemented key components, including use case, sequence, and class diagrams, as well as essential interfaces.

CHAPTER 4: SPRINT 3: “COURSE PROGRESS TRACKING AND ENGAGEMENT MANAGEMENT”

Course Progress tracking management

1 Introduction

In this important chapter, we focus on tracking course progress, a feature that makes our project stand out. We carefully analyse and model this sprint using a use case diagram. Afterwards, we explore the primary use case in detail, illustrating it with a sequence diagram. Following that, we create its class diagram. Lastly, we present the various interfaces that have been developed.

2 Analysis: Use Case Diagram

In this section, we'll elaborate on the essential functionalities required for effective progress tracking. The following is a Use case diagram illustrating what we spoke of.

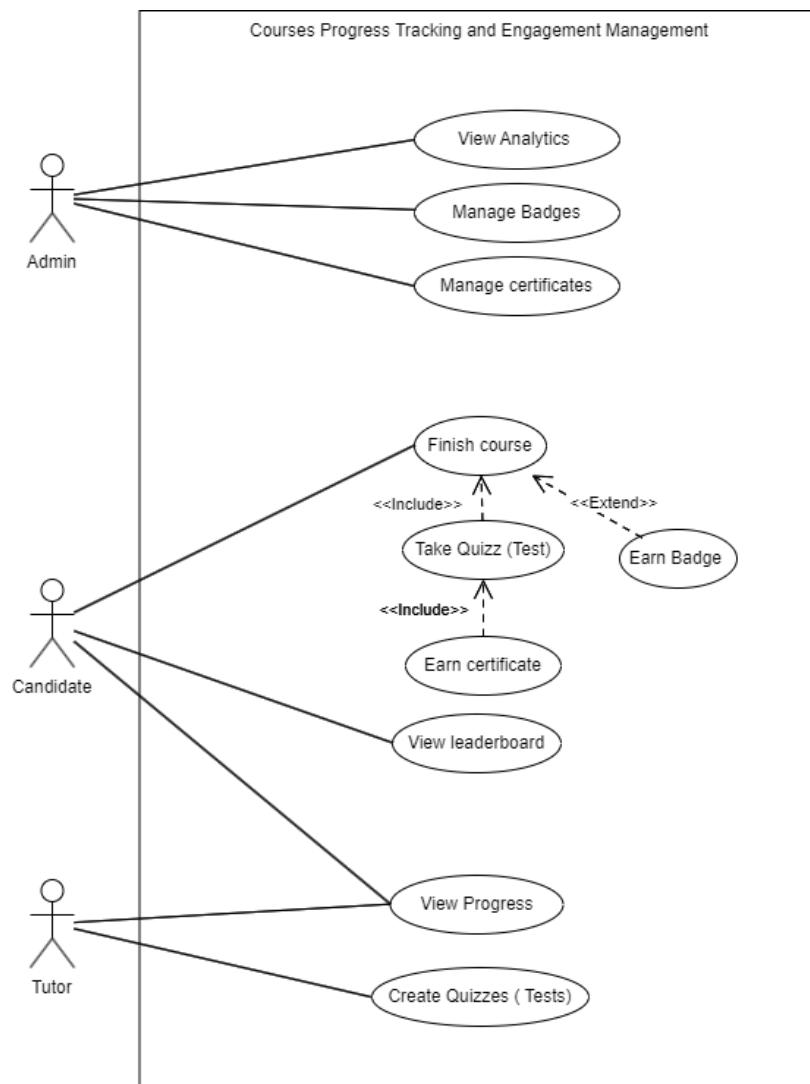


Figure 47: “Course progress tracking and engagement management” Use Case Diagram

3 Gamification feature

Gamification in e-learning boosts engagement and motivation through points, badges and leaderboards enhances retention, and promotes continuous learning and collaboration, while providing instant feedback and personalized experiences.

- **Badges**

Gamification badges tap into the reward center in the brain, and they help to make large or complex topics easy to digest and break down into stages of learning. Being able to easily win some praise for your efforts is central to the benefit that gamification badges offer and for that we decided to design badges personalised for our application, these badges will be illustrated in the following table with their description.

Table 10: MSK Academy's Badges

Badges	Description
	Course Completion Badge: This badge is awarded when a candidate completes a course.
	Progress Badge: Given to candidates as they make impressive progress through a course. For example, 50% of the course done in 24 hours
	Skill Mastery Badge: Awarded to candidates who demonstrate mastery of specific skills or topics within a course.
	Challenge Badge: Awarded to candidates who successfully complete quizzes with high scores. For instance, a "Challenge Badge" could be awarded to candidates who consistently score well on quizzes.
	Top performer Badge: Awarded to candidates who consistently rank in the top 10 of the leaderboard.
	Engagement Badges: Given to interactive candidates

- **Leaderboards**

Leaderboards serve to rank candidates based on their success. They are competitive tools that compare a candidate's performance to that of others, indicating who is performing best in each activity.

- Certificates

Certificates on e-learning platforms motivate learners, enhance platform credibility, and validate acquired skills for career advancement. They improve learner retention by encouraging course completion and serve as a marketing tool by showcasing achievements.

The following figure illustrates the certificate we designed; it will be awarded to candidates when they complete a course.



Figure 48: MSK Academy's Certificate

4 Conception

In the conceptualization phase, we bring our ideas to life by creating sequence diagrams and a class diagram, highlighting the complexities of our sprint.

4.1 Sequence diagrams

Due to the importance and complexity of the previous use case, we decided to create multiple sequence diagrams for each major use case, all based on the following scenarios that we've laid out.

4.1.1 “Badges Management” Sequence diagram

The following table represents the “Badges Management” Use Case Diagram and its detailed scenario description followed by its diagram.

Table 11: “Badges Management” Use Case Diagram Description

Use case	Badges Management
Actor	Admin
Pre-condition	The admin must be authenticated and has access to badge management options.
Post-condition	The admin can create, update and delete badges.
Scenario description	<ul style="list-style-type: none"> • The admin navigates to the badges list. • The admin clicks on the Add button. • The system displays the “Add badge” page. • The admin fills the form with badge information and submits. • The system verifies the information, then adds the badge to the database and displays it in the badges list. • The admin clicks on the Edit button corresponding to a chosen badge. • The system displays the “Edit badge” page after fetching the badge’s information. • The admin edits information. • The system verifies the information, then updates the information in the database and displays the updated badge in the badges list. • The admin clicks on the Delete button corresponding to a chosen badge. • The system displays a confirmation dialog. • The admin clicks Confirm, and the badge is deleted. • The system updates the badge list, removing the user.

The next figure illustrates the sequence diagram of “Badges Management”:

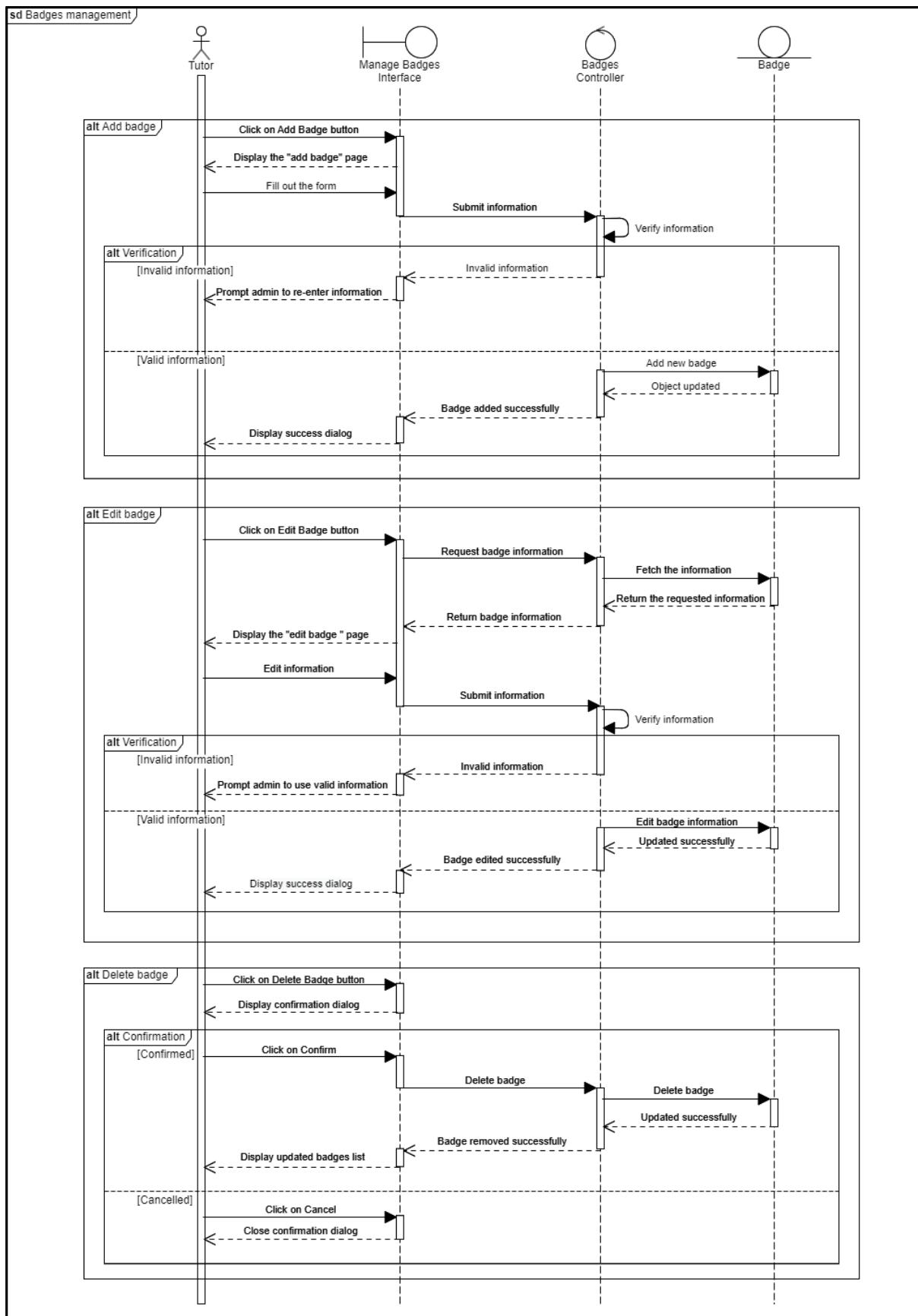


Figure 49: “Badges Management” Sequence Diagram

4.1.2 “Quizzes Management” Sequence diagram

The next table represents the “Quizzes Management” Use Case Diagram and its detailed scenario description followed by its diagram.

Table 12:“Quizzes Management” Use Case Diagram Description

Use case	Quizzes Management
Actor	Tutor
Pre-condition	The Tutor must be authenticated and has already created a course.
Post-condition	The tutor can create, update and delete quizzes which he can put in his courses.
Scenario description	<ul style="list-style-type: none"> • The tutor navigates to the quizzes list. • The tutor clicks on the Add button. • The system displays the “Add quizz” page. • The tutor fills the form with quizz information and submits. • The system verifies the information, then adds the quizz to the database and displays it in the quizzes list. • The tutor clicks on the Edit button corresponding to a chosen quizz. • The system displays the “Edit quizz” page after fetching the quizz’s information. • The tutor edits information. • The system verifies the information, then updates the information in the database and displays the updated quizz in the quizzes list. • The tutor clicks on the Delete button corresponding to a chosen quizz. • The system displays a confirmation dialog. • The tutor clicks Confirm, and the quizz is deleted. • The system updates the quizzes list, removing the quizz.

The following figure illustrates the sequence diagram of “Quizzes Management”:

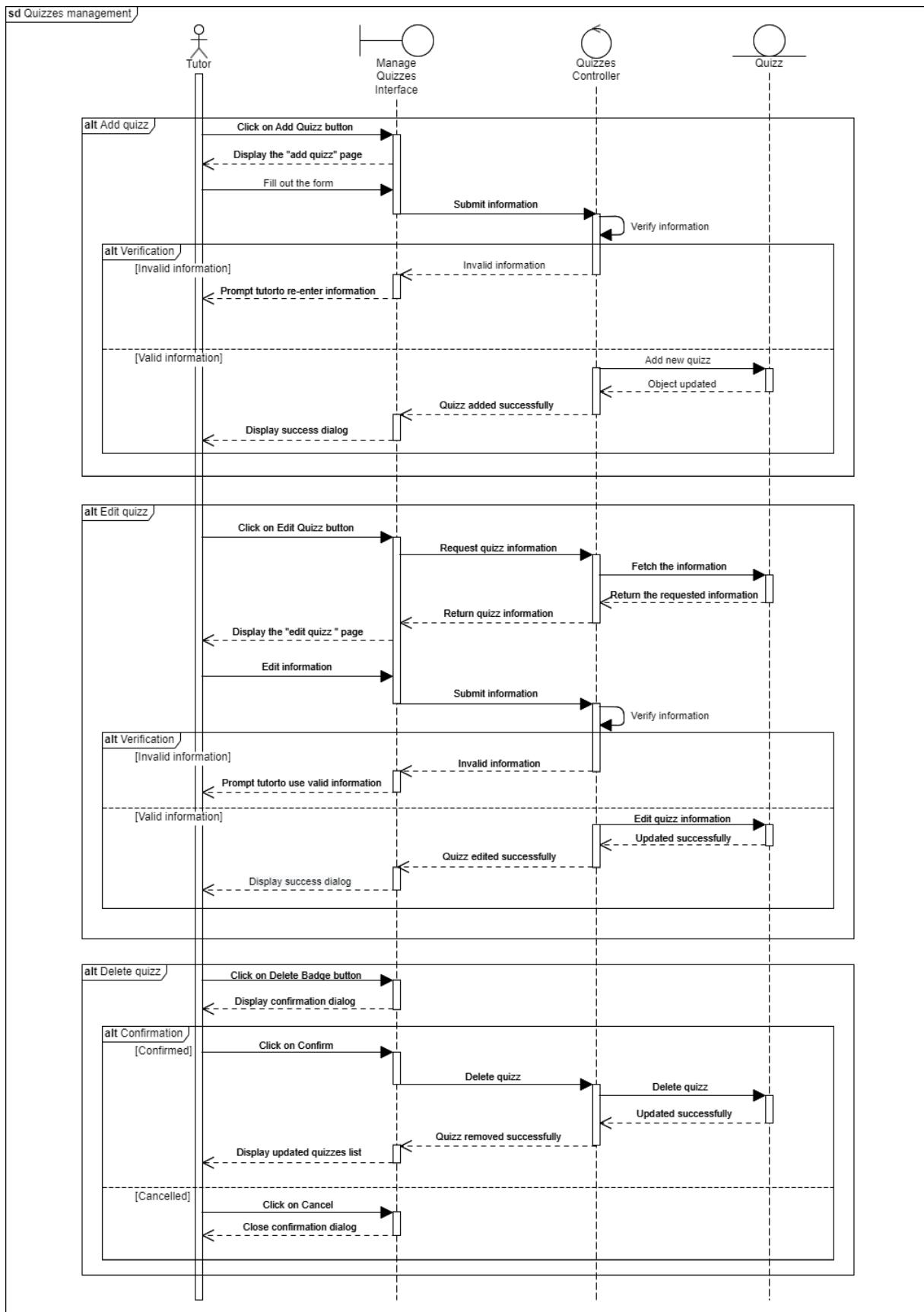


Figure 50: “Quizzes Management” Sequence Diagram

4.1.3 “Progress tracking” Sequence diagram

The following table represents the “Progress Tracking” Use Case Diagram and its detailed scenario description followed by its diagram.

Table 13:“Progress Tracking” Use Case Diagram Description

Use case	Progress Tracking
Actor	Tutor, Candidate
Pre-condition	The tutor and candidate must be authenticated. The tutor must have already created a course, and the candidate is already enrolled in this published course.
Post-condition	<ul style="list-style-type: none"> • The candidate can take a quizz, view his progression in his enrolled courses, earn badges and download certificates once he earned them. • The tutor can keep track of his candidates’ progression in his courses. • The tutor and the candidate can view the leaderboard.
Scenario description	<ul style="list-style-type: none"> • The candidate navigates to “MyCourses” page. • The system displays his progress in all enrolled courses. • Once finished, the course will have a 100% progression. • The system generates the course’s certificate using candidate credentials. • The candidate navigates to “MyCertificates” page. • The system displays all the earned certificates. • The candidate chooses a specific certificate and clicks on “Print Certificate” • The system displays the full certificate with the options to download or print. • The system keeps track of the candidate’s actions and achievements. • Once the candidate meets the criteria, he earns a badge. • The candidate navigates to “MyBadges” page. • The system displays all the earned badges. • The tutor navigates to “Candidates’ progress” page. • The system displays his individual candidates, as well as their progress in his published courses. • The candidate and tutor both navigate to “Leaderboard” page. • The system displays a leaderboard including the top candidates, courses, etc.

The next figure illustrates the sequence diagram of “Progress Tracking”:

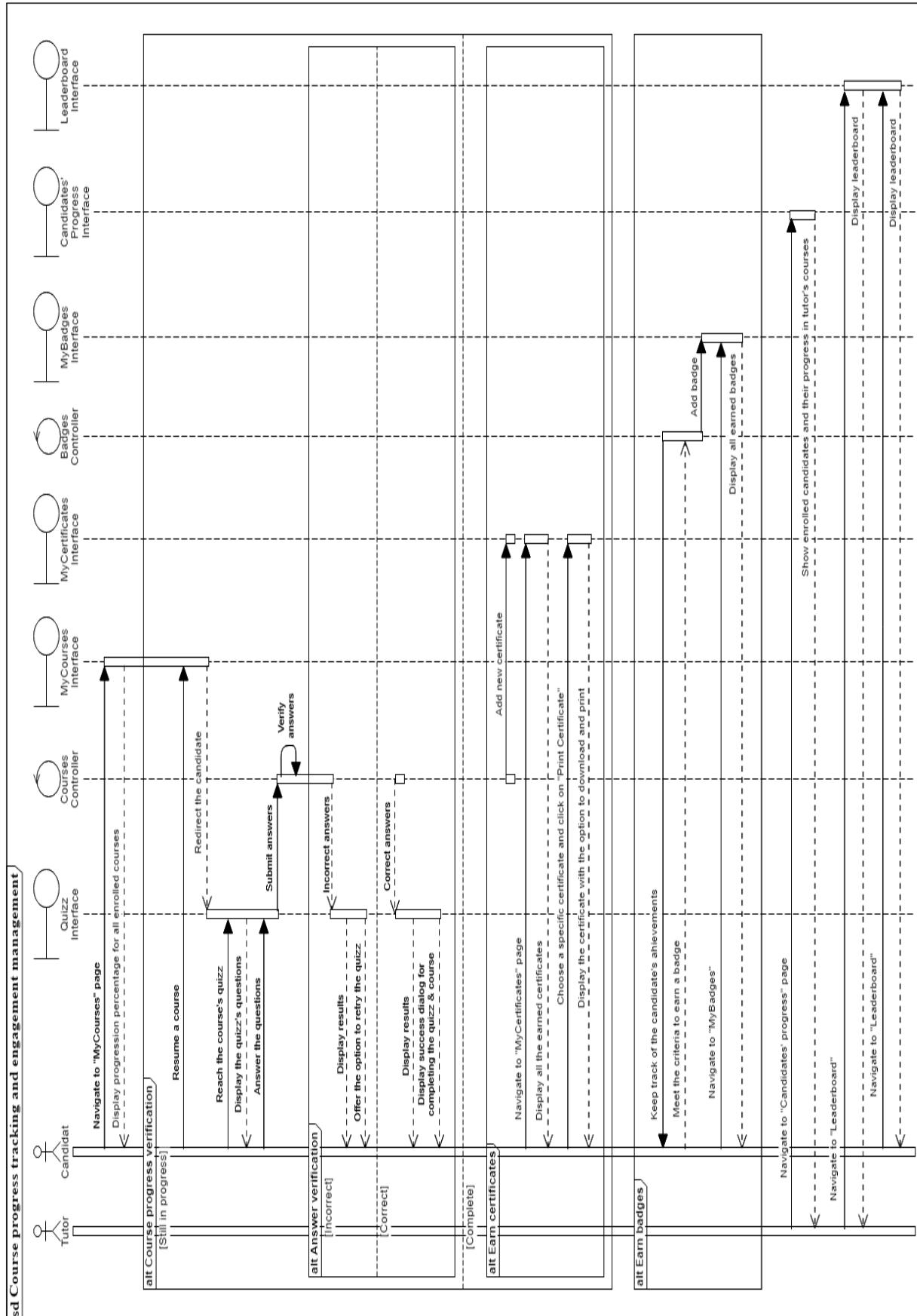


Figure 51:“Progress Tracking” Sequence Diagram

4.2 Class diagram

The following table lists all the attributes associated with each class, their data types, as well as brief descriptions.

Table 14: “Course progress tracking and engagement management” Class Diagram Description

Class	Attribute	Attribute description	Type
User	IdUser	The user's identifier	z
	Username	The username	Alphabetic
Tutor	IdTutor	The tutor's identifier	Numeric
	IdUser	The user's identifier	Numeric
Candidate	IdCandidate	The candidate's identifier	Numeric
	IdUser	The user's identifier	Numeric
	IdBadge	The badge's identifier	Numeric
Badge	IdBadge	The badge's identifier	Numeric
	NameBadge	The badge's name	Alphabetic
	DescriptionBadge	The badge's description	Alphabetic
	Criteria	The badge's criteria	Alphabetic
Progress	IdCandidate	The candidate's identifier	Numeric
	IdCourse	The course's identifier	Numeric
	progressPercent	The progress's percentage	Alphabetic
Certificate	IdCertificate	The certificate's identifier	Numeric
	IdCandidate	The candidate's identifier	Numeric
	IdCourse	The course's identifier	Numeric
	issueDate	The certificate's issue date	Date
Quizz	IdQuizz	The quizz's identifier	Numeric
	TitleQuizz	The quizz's title	Alphabetic
QuizzQuestion	IdQuestion	The question's identifier	Numeric
	QuestionContent	The question's content	Alphabetic
	Options[]	The question's options	Alphabetic
	CorrectAnswer	The question's correct answer	Alphabetic
Leaderboard	IdCandidate	The candidate's identifier	Numeric
	Score	The Score	Numeric
	Rank	The Rank	Numeric

The next figure illustrates the “course progress tracking and engagement management” Class diagram

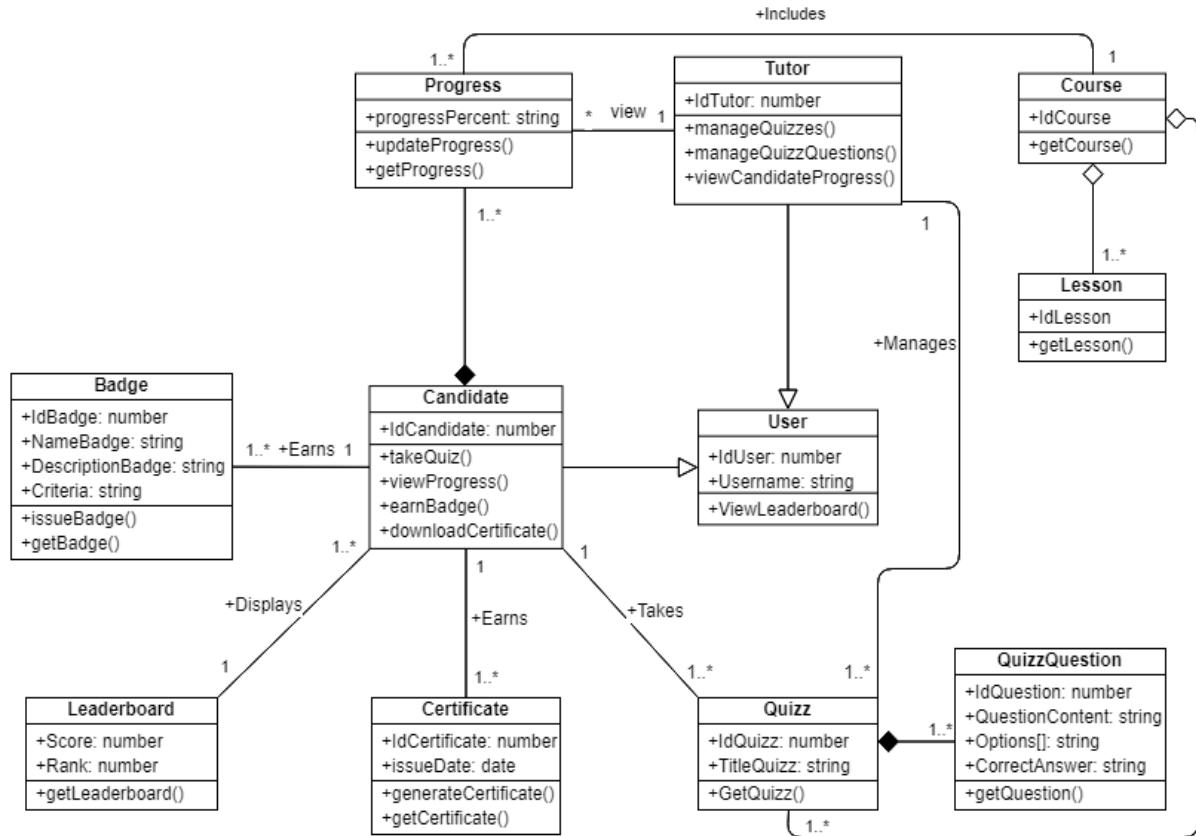


Figure 52: “Course progress tracking and engagement management” Class Diagram

5 Implementation

Expanding on the analysis and conception of the current sprint, we've created interfaces that reflect the previously outlined functionalities. In the upcoming phase, we'll emphasize the most important interfaces that have been developed.

- Quiz

In order to finish a course the candidate needs to take a quiz, this quiz will determine if the candidate is qualified to earn the certificate and completion badge.

The screenshot shows a quiz interface for a course titled "SEO for PRO". The sidebar on the left lists course modules: "SEO Beginner" (completed), "SEO Part 1" (completed), "SEO Part 2" (in progress), and "Quizz" (not started). A progress bar indicates 30 Hours completed. The main content area features a large yellow "SEO" logo with the text "SEARCH ENGINE OPTIMISATION Quizz". Below the logo is a hand holding a smartphone displaying a small "SEO" icon. The question "Question 4" is displayed, asking: "What is the primary purpose of using meta descriptions in SEO?". Three options are listed: "To increase the keyword density on a webpage.", "To provide a brief summary of the page content that appears in search engine results, which can improve click-through rates.", and "To ensure that search engines index every image on the webpage.". At the bottom, there are navigation buttons: "← Prev", "4 / 4", and "Submit →".

Figure 53: Quizz interface

- Admin's space

The admin is an internal actor who plays one of the most important roles in the application.

- Analytics page interface

As for every Admin, the analytics page is a critical tool for maintaining, improving and growing the application. Ours is presented in the next figure:

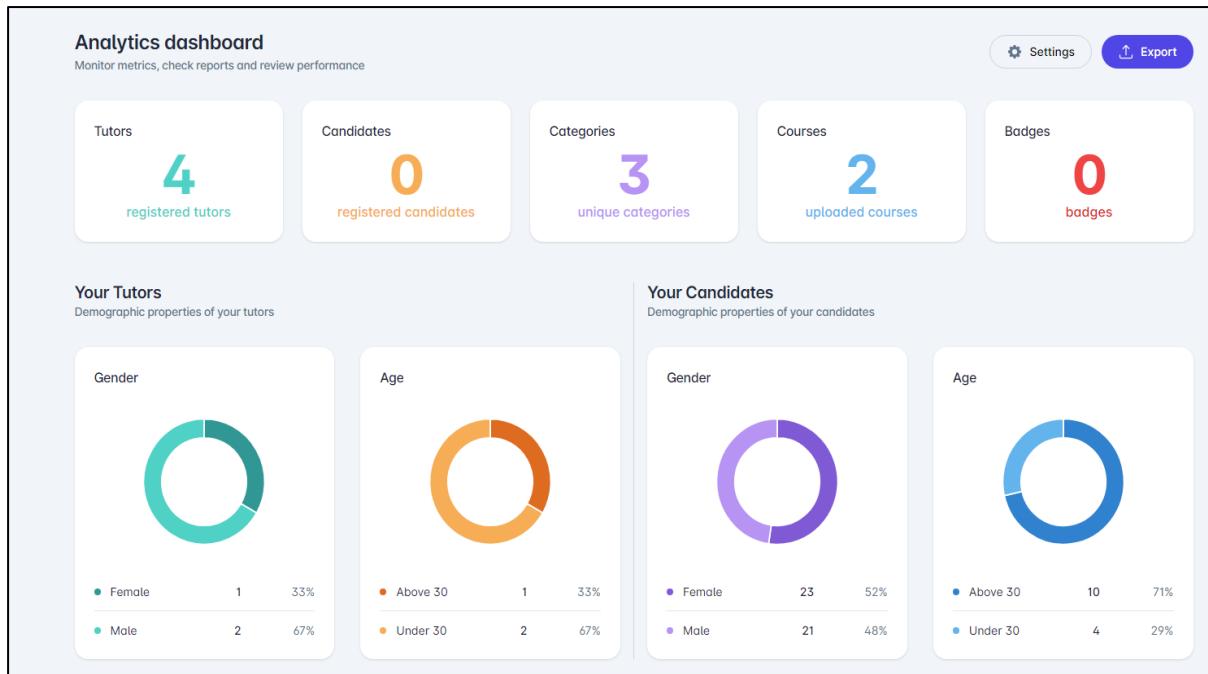


Figure 54: Analytics dashboard

- Admin managing Badges:

The admin can add, edit and view badges and this will be illustrated in the following figures:

The figure shows the 'Add Badge' interface. It includes fields for 'Badge name*' (Top Performer), 'Badge description*' (Awarded to candidates who consistently rank in the top 10 of the leaderboard.), 'Criteria to Earn*' (Earn this badge by consistently ranking in the top 10 on the leaderboard for at least four consecutive weeks.), and an 'Upload Photo' section featuring a blue shield badge with three stars and the number 1.

Figure 55: Add Badge interface

Edit Badge

Fill the form:

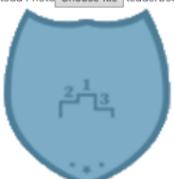
Badge name*	Badge description*
Top Performer (EDIT)	Awarded to candidates who consistently rank in the top 10 of the leaderboard.
Criteria to Earn*	
Earn this badge by consistently ranking in the top 10 on the leaderboard for at least three consecutive weeks.	
Upload Photo <input type="file"/> <small>leaderboard.png</small>	
	
<input type="button" value="Reset"/> <input type="button" value="Edit badge"/>	

Figure 56: Edit Badge interface

Badges list

Search				
	Badge name	Badge description	Actions	Status
	Engagement	Given to interactive candidates	 	Disable 
	Challenge	Awarded to candidates who successfully complete quizzes with high scores.	 	Disable 
	Progress	Given to candidates as they make impressive progress through a course.	 	Disable 
	Course Completion	This badge is awarded when a candidate successfully completes all requirements and assessments of a course.	 	Disable 
	Skill Mastery	Awarded to candidates who demonstrate mastery of specific skills or topics within a course.	 	Disable 
	Top Performer (EDIT)	Awarded to candidates who consistently rank in the top 10 of the leaderboard.	 	Disable 

Figure 57: Badges List interface

- Candidate's space
- ❖ My Badges

Every candidate on our platform can view the badges they earned, that interface is represented on the next figure:

The screenshot shows a user interface titled 'My badges'. At the top left is a search bar labeled 'Search' with placeholder text 'Search..'. Below the search bar is a table with three rows, each representing a badge. The columns are 'Badge picture', 'Badge name', and 'Badge description'. The first badge is purple with a star icon, named 'Engagement', described as 'Given to interactive candidates'. The second badge is orange with a trophy icon, named 'Challenge', described as 'Awarded to candidates who successfully complete quizzes with high scores.'. The third badge is pink with a paper airplane icon, named 'Progress', described as 'Given to candidates as they make impressive progress through a course.' At the bottom right of the table are pagination controls: 'Items per page:' with a dropdown set to '5', '0 of 0', and navigation arrows.

Badge picture	Badge name	Badge description
	Engagement	Given to interactive candidates
	Challenge	Awarded to candidates who successfully complete quizzes with high scores.
	Progress	Given to candidates as they make impressive progress through a course.

Figure 58: My badges interface

- ❖ My Certificates

Candidates can view the certificates they earned too, we illustrated in the following figure:

The screenshot shows a user interface titled 'My certificates'. At the top left is a search bar labeled 'Search'. Below the search bar is a table with three rows, each representing a certificate. The columns are 'Certificate Title', 'Course Title', 'Date Earned', and 'Actions'. The first certificate is for 'SEO Beginner' from 'SEO Beginner' course, earned on 'Apr 8, 2024'. The second is for 'Angular Advanced' from 'Angular Advanced' course, earned on 'Mar 18, 2024'. The third is for 'PHP' from 'PHP' course, earned on 'May 20, 2024'. Each row has a blue circular 'print' icon in the 'Actions' column. At the bottom right of the table are pagination controls: 'Items per page:' with a dropdown set to '5', '1 - 3 of 3', and navigation arrows.

Certificate Title	Course Title	Date Earned	Actions
SEO Beginner Certificate	SEO Beginner	Apr 8, 2024	
Angular Advanced Certificate	Angular Advanced	Mar 18, 2024	
PHP Certificate	PHP	May 20, 2024	

Figure 59: My certificates interface

The button under the action is used to print the certificate.

❖ My progression

One of the most special features we have in our application is progress tracking and to do so the candidate can check his progress in every course on My courses interface previously shown but highlighted on the next figure:

The screenshot shows a table of courses with columns for Id, Course Picture, Title, Duration, Progress, and Actions. The 'Actions' column contains buttons for 'View Course' and 'View Meets'. A blue arrow points from the text 'highlighted on the next figure:' to the 'Actions' button for the SEO course.

My courses					
Search					
Id	Course Picture	Title	Duration	Progress	Actions
5		SEO	30 hours	<div style="width: 25%;">1 / 4 25 %</div>	<button>View Course</button> <button>View Meets</button>
4		Angular Advanced	50 hours	<div style="width: 75%;">3 / 4 75 %</div>	<button>View Course</button> <button>View Meets</button>

Items per page: 5 0 of 0 < > >>

Figure 60: Progression

• Candidates' Leaderboard

The next figure illustrates the leaderboard containing our Top candidates, impacting every candidate making them more engaged, motivated and in a healthy competition trying to climb up the leaderboard to feel the pride, honour and satisfaction of being praised publicly.

The screenshot shows a grid of three candidate profiles. Each profile includes a circular photo, the candidate's name, their location, and their achievement.

Candidates leaderboard		
Meet our top candidates!		
 Adam Boussarsar Tunisia, Sfax Top 1# in Angular Score: 420	 Afra Kout Tunisia, Zarzis Top 1# in UX/UI Score: 111	 Ayla Boussarsar Germany, Frankfurt Top 1# in Graphic Design Score: 836

Figure 61: candidates Leaderboard interface

6 Conclusion

In short, this chapter explores course progress tracking in detail. By carefully analysing and modelling its functionality with diagrams and interfaces, we demonstrate our dedication to providing a user-friendly solution for effective course management.

CHAPTER 5: PROJECT'S CLOSURE

Project's Closure

1 Introduction

In this chapter, we will present the application's architecture, as well as the hardware and software environment.

2 Application's Architecture

▪ Physical Architecture:

Our application is structured in the form of a 3-tier architecture. The Web API component of the application acts as an HTTP-based interface that accepts HTTP requests from a third-party client application and performs data operations.

This figure illustrates the physical architecture of our application.

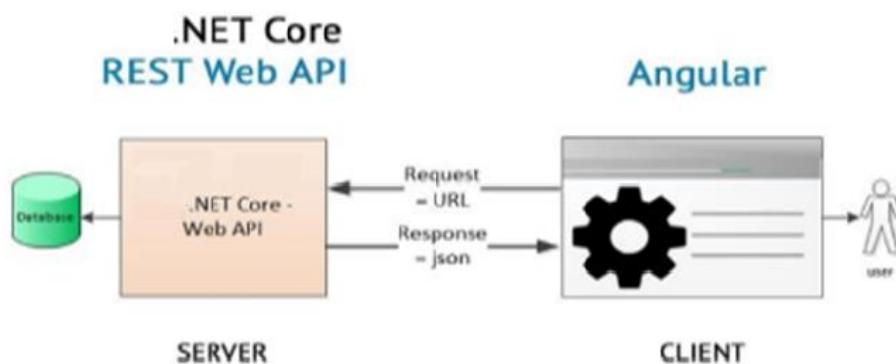


Figure 62: Physical Architecture

It is an architecture composed of three levels or layers, which are as follows:

- **Layer 1:** the application user.
- **Layer 2:** the web server, it receives a request from the user, processes it, and calls upon the database layer to serve the user.
- **Layer 3:** the data server, it shares stored data with the business layer so that the latter can complete its processing.

▪ Logical Architecture:

Our application is composed of two parts, which are the front-end part and the back-end part. The first part is developed with the Angular platform, which consumes the REST APIs prepared by the second part, which is developed with ASP.NET Core.

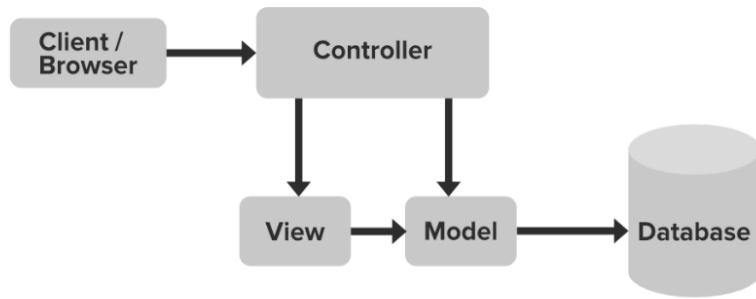


Figure 63: Logical Architecture

- **The MVC Model:**⁶ The MVC Model is a conception (Design pattern) that offers a general solution to the problem of structuring an application. MVC defines rules that determine in which layer of the architecture, and in which class (object-oriented) of this layer, a specific functionality should be integrated. An application that adheres to these rules is easier to understand, manage, and modify. Modular and separated design also allows developers and designers to work simultaneously, with the ability to quickly prototype: The separation also allows developers to make changes in one part of the application without affecting others.
- **The model** corresponds to a table in a database. It is a class that extends the Model class, allowing simple and efficient data manipulations and automated establishment of relationships between tables.
- **The controller** comes in several categories: classic controllers and resource controllers.
- **The view** is either a simple file with HTML code, or a file using the BOOTSTRAP Template system.

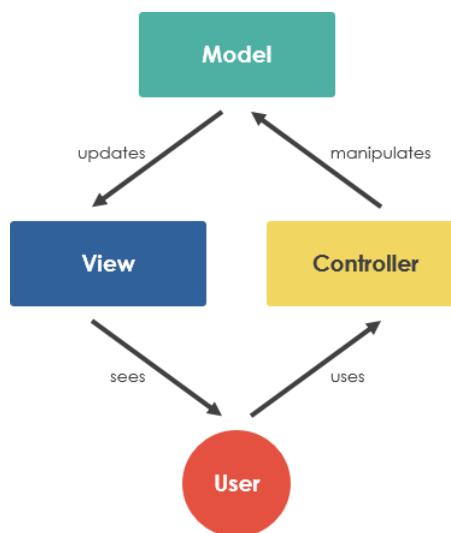


Figure 64: MVC Architecture

⁶ <http://en.wikipedia.org/wiki/Modele-vue-controleur>

3 Hardware environment



Processor: AMD Ryzen 5 3550H
RAM: 32 GB DDR4
Graphics Card: NVIDIA GeForce GTX 1650
Operating System: Windows 11 Home

Figure 65: PC ASUS TUF Gaming



Processor: Intel Core i5 8300H
RAM: 16 GB DDR4
Graphics Card: NVIDIA GeForce GTX 1050
Operating System: Windows 10

Figure 66: PC HP Pavilion 15 Gaming

4 Software environment

In this section, we present the software environment and the languages used during the development of our application.

4.1 Presentation of Development Languages

The programming languages used in our project are:

- ❖ **HTML5:** It is a version of the popular HTML format used for designing websites. HTML5 is a language format developed by the W3C (World Wide Web Consortium) and the WHATWG (Web Hypertext Application Technology Working Group).
- ❖ **CSS3:** Cascading Style Sheets is a computer language used on the internet to format HTML or XML files.
- ❖ **Tailwind CSS:** is a utility-first CSS framework that provides low-level utility classes to build custom designs quickly without having to write custom CSS.

- ❖ **JavaScript:** It is a computer language used on web pages. This language has the particularity of being activated on the client side, in other words, it is your computer that will receive the code and execute it. This contrasts with other languages that are activated on the server side.
- ❖ **SQL:** Structured Query Language is a standardized computer language used to exploit relational databases.
- ❖ **JSON:** JavaScript Object Notation is a textual data format derived from the object notation of the JavaScript language. It allows the representation of structured information as XML does.
- ❖ **TypeScript:** It is a strongly typed programming language that builds on JavaScript, providing better tooling at any scale as it adds additional syntax to JavaScript to support closer integration with the editor.
- ❖ **C#:** It is an object-oriented programming language with strong static typing, syntax inherited from C/C++, and resemblance to the Java language.

4.2 Frameworks used

The "Frameworks" used in our project are:

Angular: Based on TypeScript, it is a development framework that allows for the development of web pages.

ASP .NET Core: is a web framework developed by Microsoft and the community. It is more performant than ASP.NET because it is a modular framework that works with both the .NET framework, under Windows, and .NET Core, in a cross-platform manner.

4.3 Software used

- **Star UML:** It is a software engineering tool dedicated to UML modelling and published by the South Korean company MKLabs. It is cross-platform and works on Windows, Linux, and MacOS.
- **Visual Studio Code:** It is a source code editor that can be used with a variety of programming languages, including JavaScript, Java, Go, Node.js, and C++. Based on the Electron framework, it is used to develop Node.js web applications that run on the Blink rendering engine.
- **Microsoft Visual Studio:** It is a comprehensive set of development tools used to generate ASP.NET/ASP.NET Core web applications, XML web services, mobile applications, and desktop applications.

- **SQL Server Management Studio:** It is a software application used to configure, manage, and administer all components of Microsoft SQL Server (a database management system using SQL language, including, among other things, a relational database management system).
- **Postman:** It is a software that allows calling/testing an API.
- **Git:** It is a tool that allows managing different projects by sending them to a server. This server is connected to the computers of other developers who can send their code and retrieve yours. Anyone working on a project relates to others, and everything is synchronized.
- **Github:** Is a web-based platform used for version control and collaboration on software development projects. It allows users to host and review code, manage projects, and collaborate with others using features like pull requests and issue tracking.

5 Conclusion

Throughout this chapter, we have presented the application's architecture as well as the hardware and software environment required to carry out our project providing a better understanding of the work accomplished.

General conclusion

Throughout this report, we have endeavoured to explain as clearly as possible the procedures involved in the development of the application we have created, including the specification phase, the conception phase, and the implementation phase. Indeed, we followed a classic project management cycle, commencing with the specification of the functional and non-functional requirements of our app.

This initial step allowed us to gain a clear understanding of the project scope. During the conception phase, we successfully modelled the functions of the application using various UML techniques that we adopted throughout this work. While we attempted to further enhance the application, time constraints limited our efforts, but we hope to address these areas in future iterations. Overall, this practical experience within such a rich environment has provided us with a valuable opportunity, greatly enriching our academic and theoretical knowledge on a large scale and contributing to our professional growth in a meaningful way.

Our application stands out due to its generic, responsive design that adapts to new methods of learning English, ensuring it meets the diverse needs of users. This flexibility is crucial in today's fast-evolving educational landscape, allowing our platform to stay relevant and effective.

Looking ahead, MSK Academy has ambitious plans for expansion and development, aiming to achieve global recognition like renowned e-learning platforms like Coursera and Udemy. To facilitate this, we have already made the application multilingual, attracting users from regions beyond Tunisia and North Africa. This summer, we plan to develop a mobile application using Flutter, making learning on-the-go more accessible and convenient.

Additionally, for learners under 18, MSK Academy will introduce parental access features, allowing parents to track their children's progress and involvement in their education. To broaden our offerings and resources, we will seek partnerships with educational establishments, ensuring that MSK Academy remains competitive and comprehensive in its educational.

Webography

- [1] <http://stackoverflow.com/>
- [2] <https://code.visualstudio.com/>
- [3] <https://dotnet.microsoft.com/en-us/apps/aspnet>
- [4] <https://tailwindcss.com>
- [5] <https://www.postman.com/>
- [6] <https://git-scm.com/>
- [7] <https://www.javascript.com/>
- [8] <https://www.typescriptlang.org/>
- [9] <https://www.json.org/json-en.html>
- [10] <https://nodejs.org/en>
- [11] <https://angular.io/docs>
- [12] <http://en.wikipedia.org/wiki/Modele-vue-controleur>
- [13] http://en.wikipedia.org/wiki/Microsoft_SQL_Server
- [14] <https://github.com/>
- [15] <https://staruml.io>
- [16] <https://x.com/getpostman/status/1709289694075158748>
- [17] <https://www.geeksforgeeks.org/hashing-passwords-in-python-with-bcrypt/>







Ahmed Adam Boussarsar

Software Engineering Graduate

I am a soon-to-be graduate software engineering student, I'm passionate about Fullstack development, and I excel in both teamwork. With a solid grasp of computer science and a knack for Agile methodologies, I manage time-sensitive projects effectively.

EDUCATION

Faculty of Sciences Sfax
3rd year bachelor degree in Computer Science (Software Engineering)
09/2021 - Present

Lycée Hedi Chaker
Baccalaureate in Computer Science
09/2017 - 07/2021

ACADEMIC PROJECTS

MSK Academy: E-Learning web application
MSK Technologies
02/2024 - 05/2024

Tasks

- Full-Stack Development and Integration
- Database Design and Management
- Authentication and Authorization Implementation

Machine-Learning project: Wine Dataset
Faculty of Sciences Sfax
10/2023 - 11/2023

Tasks

- Interpret & visualize data
- Create & train different models, determining the optimal parameters with Cross-Validation

Web Application Scrum project: iThink2
Faculty of Sciences Sfax
03/2023 - 04/2023

Tasks

- Sprint & Product Backlog definition
- Objectives definition

SKILLS

Web Development (Angular, .NET)

System & Database Design (UML)

Agile project management (Scrum)

App Development (Flutter)

UX UI Design

LANGUAGES

Arabic
Native or Bilingual Proficiency

English
Native or Bilingual Proficiency

French
Professional Working Proficiency

German
Limited Working Proficiency

INTERESTS

Image manipulation

Video editing

ORGANIZATIONS & CLUBS

Google Developer Student Clubs (2021 - 2022)
I served as the social media writer, a guest at the Solution Challenge event, and a participant/organizer in numerous other events.

IEEE - FSS Student Branch (2021 - 2022)
I assumed the role of the social media writer due to my consistent and reliable contributions, alongside my participation in TSYP 2022 & other events.

CERTIFICATES

Microsoft Certified: Azure Fundamentals (12/2023 - Present)

Microsoft Certified: Security, Compliance, and Identity Fundamentals (12/2023 - Present)

Edraak Certification: User Experience Design (02/2024 - Present)

AFRA KOUT

Software Engineering Student | Front-End UX/UI Design Aficionado | Social Activist



✉ 94016274 ✉ koutafra8@gmail.com ✉ https://www.linkedin.com/in/afra-kout-60166b204/ ✉ Zarzis

SUMMARY

I'm a third-year software engineering student, and I'm really into front-end UX/UI design. When I'm not knee-deep in my studies, you can find me out volunteering and giving back to my community. With a solid grasp of software engineering and a knack for front-end development, I'm excited to dive into creating interfaces that are both intuitive and easy on the eyes. Collaboration is my jam, and I'm all about seizing every chance to learn and grow in this fast-paced tech world.

EXPERIENCE

Internship

MSK Technologies

⌚ 02/2024 - 05/2024 ✉ Gouvernorat Sousse, Tunisie

Company Description

- conceptualization and development of MSK Academy : e-learning web application

Summer Internship

OMMP (Office de la Marine Marchande et des Ports)

⌚ 07/2023 - 08/2023

📍 Zarzis, Gouvernorat Médenine, Tunisie · On-site

Summer internship

- Database Design

EDUCATION

Licence en génie logiciel, génie logiciel

Faculty of sciences Sfax - University of Sfax (USS)

⌚ 09/2021 - 06/2025

Baccalauréat sciences expérimentales

2 Mars 1934 High school Zarzis

⌚ 2017 - 2020

SKILLS

Programming: Python Java C JS

Integrated Development Environments : Visual Studio Code

IntelliJ IDEA Eclipse

Web Development: HTML CSS JavaScript

Frameworks: Angular (front-end) .Net(Backend)

Mobile development : Android studio

Database Management Systems:SQL Server Management Studio

Agile Methodologies:SCRUM

LANGUAGES

Arabic Native English Proficient

French Advanced

CERTIFICATION

UX/UI DESIGN

Edraak ادراك

Certifications Microsoft Azure

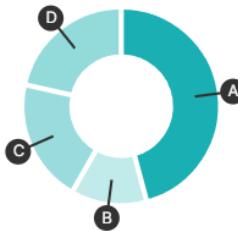
Microsoft

ACHIEVEMENTS

Hult prize worldwide competition semi finalist

It was a challenge , a hard one but we did great anyways and reached an honourable level

MY TIME



A Studying / learning new skills

B Quality time

C volunteering

D sports or books

PASSIONS

Psychology

Volunteering

Muay Thai

MSK ACADEMY: E-learning web application

Abstract:

This report outlines the development of the "MSK ACADEMY" web application, which is an online learning application providing easy access to courses and educational resources anytime, anywhere. Thus, our application reshapes the future educational landscape, achieving a profound impact. In this project, we used Angular for the front-end, Dot Net Core for the back-end, and SQL Server Management Studio 19 for the database.

Key words:

Online learning application / Easy access Anytime, anywhere / Front-end / Back-end / Database.

Resumé:

Ce rapport décrit le développement de l'application web "MSK ACADEMY", qui est une application éducative en ligne offrant un accès facile aux cours et aux ressources éducatives à tout moment et en tout lieu. Ainsi, notre application réorganise le paysage éducatif futur, réalisant un impact profond. Dans ce projet, nous avons utilisé Angular pour le front-end, Dot Net Core pour le back-end, et SQL Server Management Studio 19 pour la base de données.

Mots clés:

Application éducative en ligne / Accès facile / À tout moment et en tout lieu / Impact profond / Front-end / Back-end / Base de données.

الخلاصة

يوضح هذا التقرير تطوير منصة الويب

"MSK ACADEMY"

وهي عبارة عن تطبيق تعليمي عبر الإنترنت يوفر وصولاً سهلاً إلى الدورات والموارد التعليمية في أي وقت ومكان وبهذا يقوم تطبيقنا بإعادة تشكيل مسهد التعليم المستقبلي محققاً أثر عميق

استعملنا في هذا المشروع

لواجهة الأمامية و Angular

لواجهة الخلفية و Dot Net Core

لقاعدة البيانات SQL server Management Studio 19

لقاعدة البيانات

المفتاح

تطبيق تعليمي عبر الإنترنت/وصول سهل / في أي وقت ومن أي مكان / الواجهة الأمامية / الواجهة الخلفية / قاعدة البيانات.