

# *Design and creation of a web platform for distance education (E-Learning)*

## project report

Groupe : 07

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# Specification of needs

## 1.1 Introduction

The specifications of an e-learning website include functional requirements, design elements, and technical capabilities that enable an effective learning experience. To define the specifications, one needs to identify the needs of learners and instructors, determine the technical requirements and design elements of the website, and consider the types of multimedia resources and communication tools that will be available. By following this process, it is possible to create an engaging learning experience that meets the needs of diverse learners and leads to improved learning outcomes and greater satisfaction for learners and instructors.

## 1.2 The client :

TATWIR school is a privately-owned educational institution located in the Tlemcen El Riyadh neighborhood and established in 2019 by Attar HABIB. The school offers a range of private lessons and courses in various academic and educational fields, catering to the needs and preferences of students of different ages and backgrounds. With a focus on quality education and personalized attention, TATWIR school strives to provide its students with a supportive and stimulating learning environment that enables them to reach their full potential and achieve their academic and personal goals.

TATWIR school's highly qualified and experienced educators are dedicated to providing personalized attention to each student, making it one of their key strengths. As a result, they requested a website.



The website can provide details on the school's mission and vision, academic programs, extracurricular activities, faculty and staff members, and admission requirements. It may also feature news and events, student achievements, and information about the school's facilities and resources.

Overall, a well-designed and informative school website can enhance the school's visibility, attract potential students and parents, and improve the overall learning experience for everyone involved.

The private academy website is a platform designed to provide an online learning experience for students and teachers and in the same time it gives the administrator to have the ability to manage the school's data. The website should be user-friendly, secure, and easy to navigate, providing a seamless experience for all users. In this needs analysis, we will outline the functional and non-functional needs of the website.

### **1.3 Problematic :**

Private schools that offer both on-site and online bootcamps and courses require a web app to provide a centralized platform for their students. This app must be user-friendly, secure, and integrate with the school's existing systems. Additionally, the app must be scalable to accommodate the growing number of users and courses. Technical support is also essential to ensure that students and teachers can access the resources they need and troubleshoot any technical issues. Developing and maintaining such an app can be time-consuming and costly. The school must have a plan in place to address the challenges of developing and maintaining the app, including user-friendliness, data security, system integration, scalability, and technical support. Ultimately, the success of the web app will determine the success of the school's online and on-site programs.

### **1.4 Solution :**

A platform that makes learning easier can provide students with access to a wealth of information, resources, and interactive activities. This can enhance their learning experience and offer a personalized approach to education. Incorporating interactive elements can improve engagement and motivation among students. Ultimately, such a platform can revolutionize the way students approach education.

Merging the idea of private lessons and courses can create a unique and effective learning experience. Private lessons offer personalized attention while courses provide a structured curriculum. Combining these approaches can result in a tailored learning experience that caters to individual needs and learning styles. Such an approach can revolutionize the way we approach education.

It is a great chance for non-governmental teachers to store educational materials, eLearning courses, or tests in one convenient location. This can help to streamline the

learning process and make it easier for students to access the resources they need. Such a platform can also help to improve the quality of education and make it more accessible to a wider range of students.

A platform for educators can allow them to share their experiences and knowledge with a wider audience. This can help to enhance the quality of education and promote collaboration among educators.

## **Analysis of needs :**

### **Functional Needs :**

#### ***Former' Needs :***

Formers should have the ability to create and post courses, bootcamps, and arrange meet courses on the platform. The website should provide a user-friendly interface for Formers to manage their Bootcamps and training camps and events. Additionally, there should be tools available to allow Formers to communicate with their enrollers and provide support for their training. The website should also allow Formers to upload course material, including videos, images, and PDF files, and organize them in an easy-to-navigate way.

#### ***Teachers' Needs :***

Teachers should have the ability to create and post courses, bootcamps, and arrange meet courses on the platform. The website should provide a user-friendly interface for teachers to manage their courses and events. Additionally, there should be tools available to allow teachers to communicate with their students and provide support for their learning. The website should also allow teachers to upload course material, including videos, images, and PDF files, and organize them in an easy-to-navigate way. Teachers should also be able to create quizzes, assignments, and assessments and provide feedback to their students.

#### ***Students' Needs:***

Students should have easy access to courses, view teacher profiles, and register for bootcamps. The website should have clear and intuitive navigation, search functionality, and an easy-to-use registration process. The platform should also allow students to interact with their teachers and other students through a forum or chat feature, which will encourage collaboration and the sharing of ideas. Additionally, students should be able to access course material, including videos, images, and PDF files, and complete quizzes and

#### ***Course Delivery Needs :***

The website should provide courses with Google Drive and YouTube links directly on the website for everyone. However, for meet courses, it may be necessary to send links directly to each student's email address with nodemailer. This provides an additional

layer of security and ensures that only registered students have access to these courses. The platform should also be compatible with different browsers and devices to ensure students can access course material from anywhere.

### ***Admin's Needs :***

The admin should have access to all the information on the platform, including the ability to add new teachers and post new bootcamps. The website should have a secure and robust admin panel that allows the admin to manage the platform effectively and efficiently. The admin should have the ability to monitor the activities of the teachers and students on the platform, and to take action as needed to ensure the quality of the learning experience. Additionally, the admin should have the ability to manage payments and input the membership status for students who have paid the required fees and also handle managing and use time managing,

### **Non-Functional Needs :**

#### ***Teacher and Course Reviews :***

The private academy website should include a feature that allows students to review teachers and courses. The review system should allow students to rate teachers and courses on a scale, as well as provide written feedback. The website should display the overall rating for each teacher and course, as well as the individual ratings and feedback. This allows other students to make informed decisions when selecting courses and teachers. Teacher and course reviews are a good addition for the private academy website, as they provide students with valuable feedback and help improve the quality of education on the platform.

#### ***Mobile Friendly:***

The website should be mobile-friendly and responsive, allowing users to access the platform on different devices and screen sizes. This will increase the accessibility of the website and allow students and teachers to access course material from anywhere.

#### ***Fast Loading Time :***

The website should have a fast loading time and minimal downtime to provide a seamless experience for users. Slow loading times can negatively impact the user experience, and can lead to frustration and lower engagement.

#### ***Secure :***

The website should be secure and protect users' data and personal information. This includes implementing measures such as SSL certificates, firewalls, and encryption to ensure the protection of sensitive information.

#### ***Excellent Customer Support :***

The website should provide excellent customer support to help users with any issues

they may encounter. This includes providing contact information for customer support and having a comprehensive FAQ section that addresses common issues.

### ***Maintainability :***

The website should be easy to maintain and update to ensure the platform is up-to-date and runs smoothly. This includes implementing a content management system that allows for easy updates and changes to the platform. Additionally, the website should use clean code and have a clear architecture that makes it easy for developers to maintain and improve the platform.

### ***Scalability :***

The private academy website should be scalable, meaning that it can handle increased traffic and data volume as the platform grows. Since the website is using MongoDB as the database, it is important to design the system architecture in a way that ensures scalability. This may include the use of sharding, horizontal scaling, and load balancing techniques. Additionally, the website should be optimized for performance to ensure fast response times and minimize server load. Scalability is a non-functional need that is essential for the long-term success of the private academy website, as it ensures that the platform can handle increased usage and growth over time.

### **Use case diagram :**

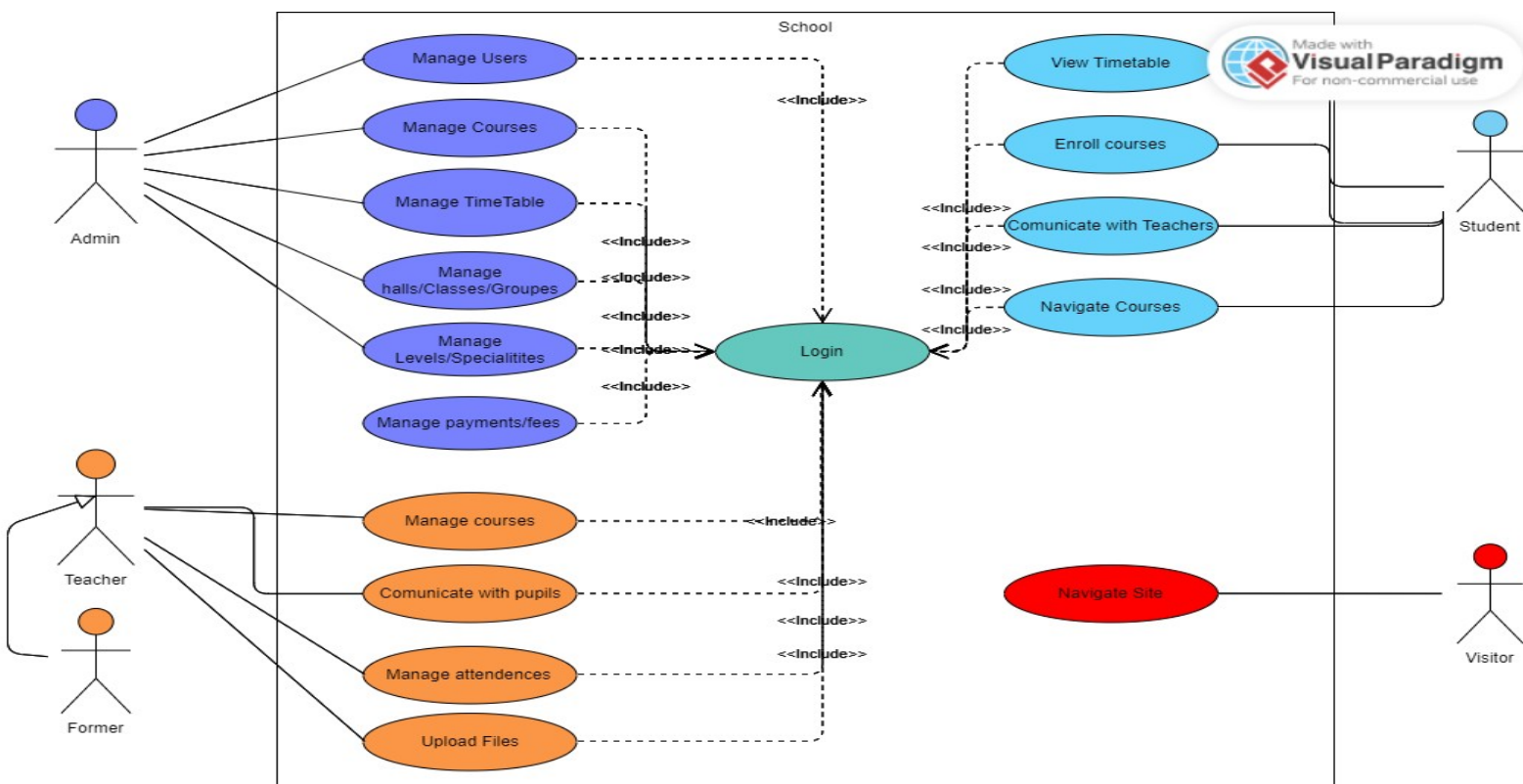


Figure 1.1: Tatwir school website use case diagram :

# conception

## 2.1 Introduction :

The needs analysis and specification stage plays an important role in the development cycle. development of information systems. This phase makes it possible to better clarify the expected functional and non- functional needs of the system in order to have a better understanding of the subject and allowed us to prepare a conceptual study of the solution proposed to be implemented. In order to achieve the objectives of our project, and after the analysis and specification of needs of our future system, we focus on the design which is certainly the most delicate step in the process unifies because it represents its heart. Throughout this chapter UML diagrams facilitating the study of processes according to different perspectives :

1. A use case diagram makes it possible to analyze and organize the needs and behavior of a system.
2. A UML class diagram to define the classes of the system and their relationship such as the inheritance relationship
3. A sequence diagram is used to represent the interactions between objects according to a temporal point of view.

## Architecture global du system E-learning :

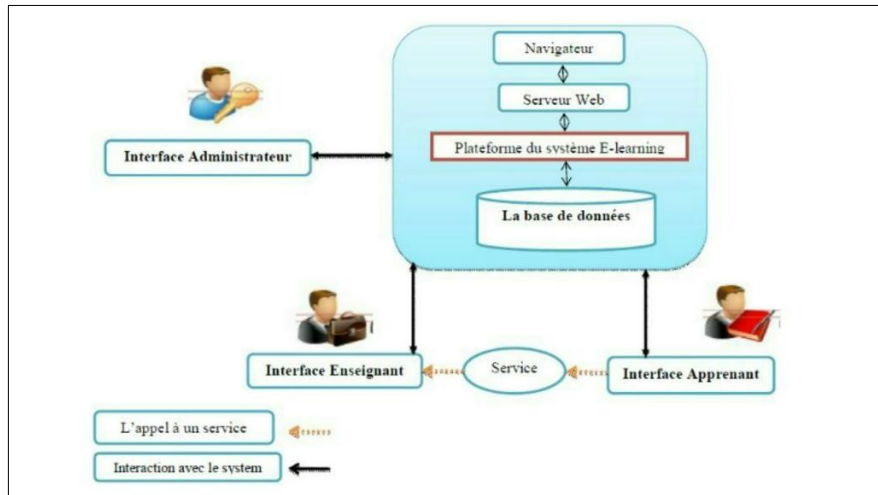


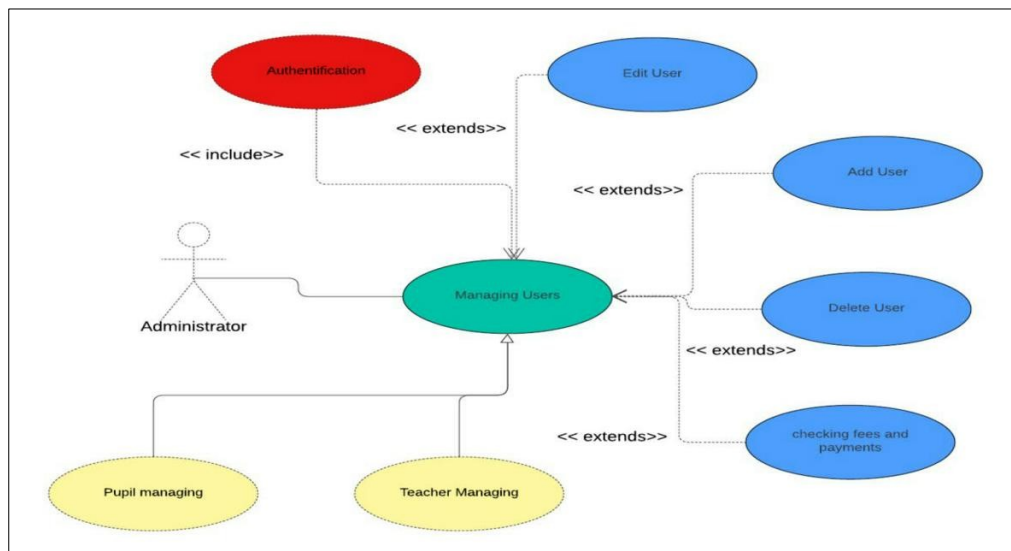
Figure 2.1: overall architecture of the E-learning system

## 2.3 Presentation of use case diagrams :

A use case diagram is used to graphically represent use cases. The system is delimited by a rectangle containing the use cases. The actor is represented as an icon called a stick man.

### 2.3.1 Detailed case diagram for “User Management”

the figure shows the detailed use case diagram of “User Management”



Use case diagram for “managing users”



## 2.4 System sequence diagrams:

The term System Sequence diagram is used to emphasize the fact that we consider the computer system as a black box, the behavior of the system is described seen from the outside, without knowing how it will achieve it. We will open the black box only in the design phase

### 2.4.1 “Authentication” system sequence diagram :

The following image shows the system sequence diagram of ”Authentication”:

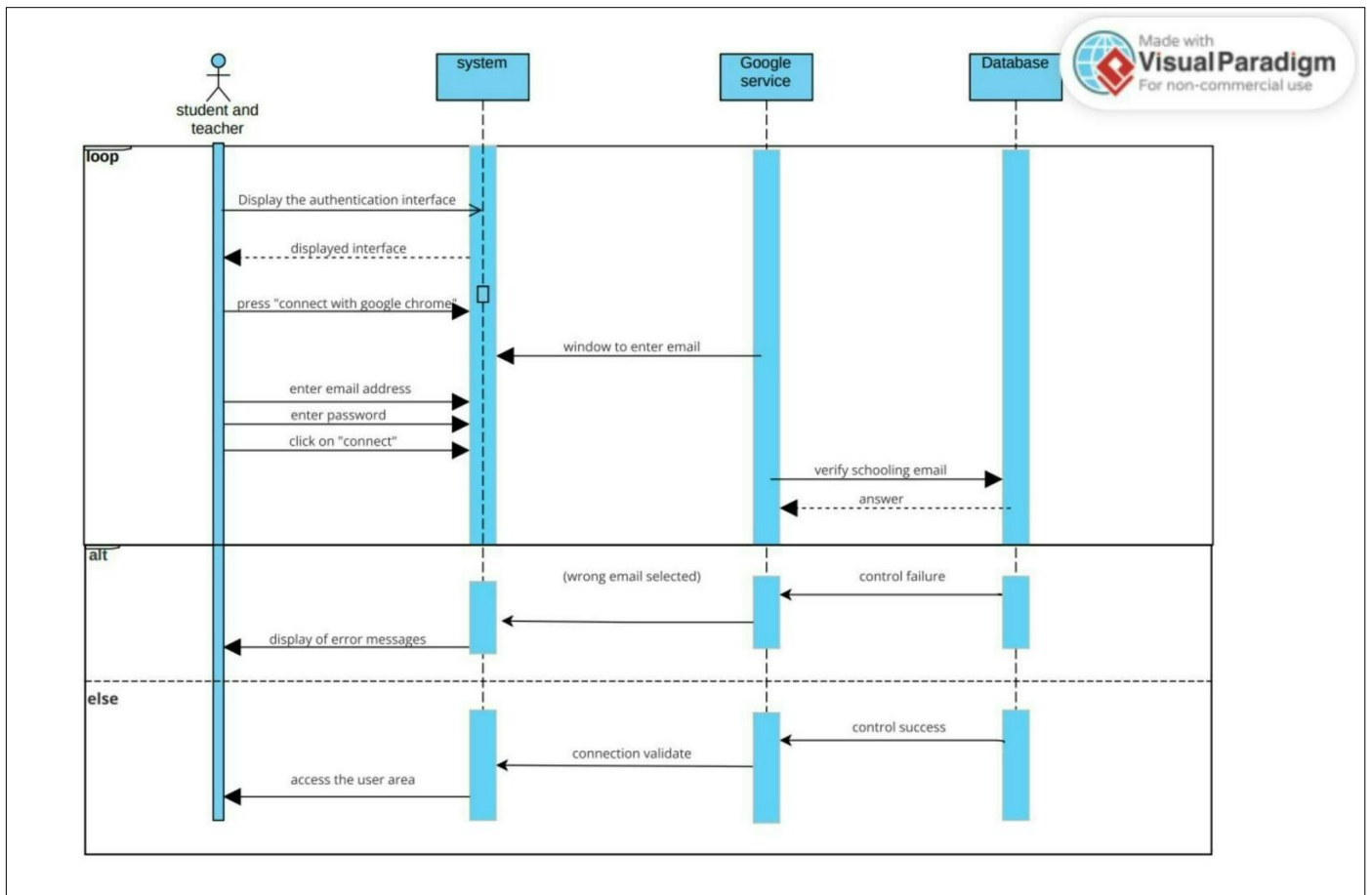


Figure 2.3: “Authentication” system sequence diagram

#### ***description :***

sequence diagram represents an authentication process for an online system involving a user (student / teacher) and the authentication system. The user wants to access an online account and must authenticate by providing their email address which sends it. The system verifies the credentials and sends a confirmation message if the information is valid. Otherwise, the system issues an error message stating that the credentials are incorrect.

## “ Course management ” system sequence diagram :

The following image represents the system sequence diagram ”Course management: Consult Courses to download”

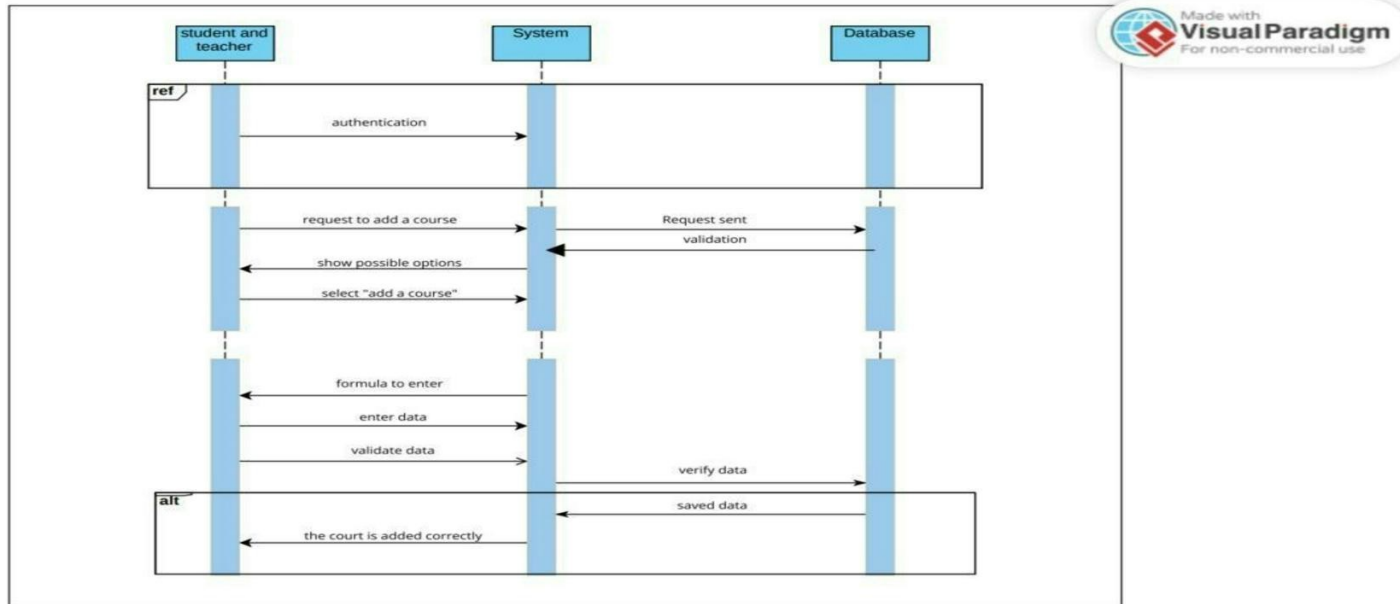


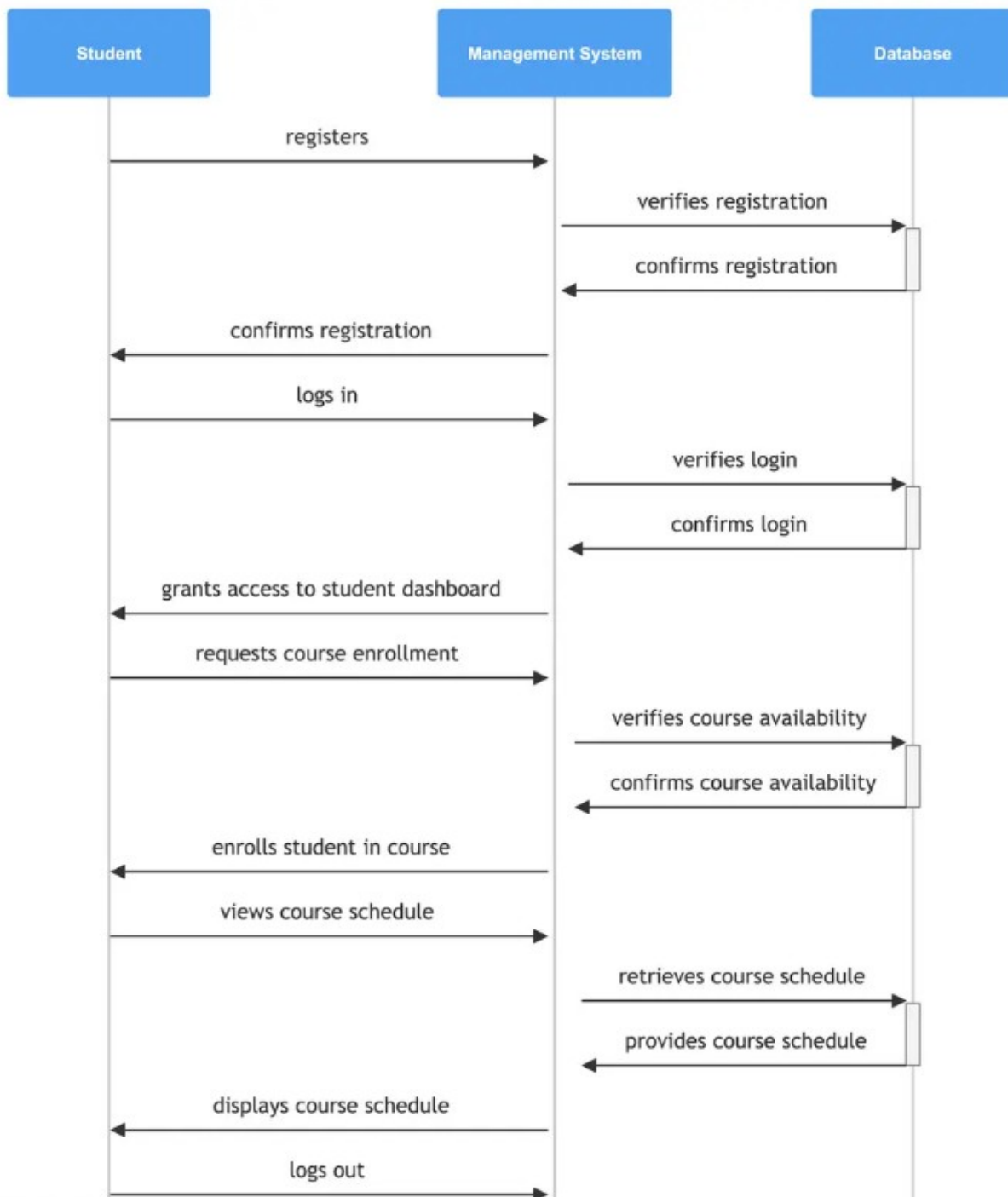
Figure 2.4: “Course Management” System Sequence Diagram

### *description :*

diagram includes three participants: the user, the e-learn website system, and the database. The user can either be a student or a teacher. When a user logs in, the system checks their credentials against the user database. If the credentials are valid, the user is granted access to their account.

## “ Enroll Courses ” system sequence diagram :

The following image represents the system sequence diagram ”enroll course”:



**Figure :** Enroll Couese Sequence diagram

## “ Upload Course ” system sequence diagram :

The following image represents the system sequence diagram ”Upload Course”:

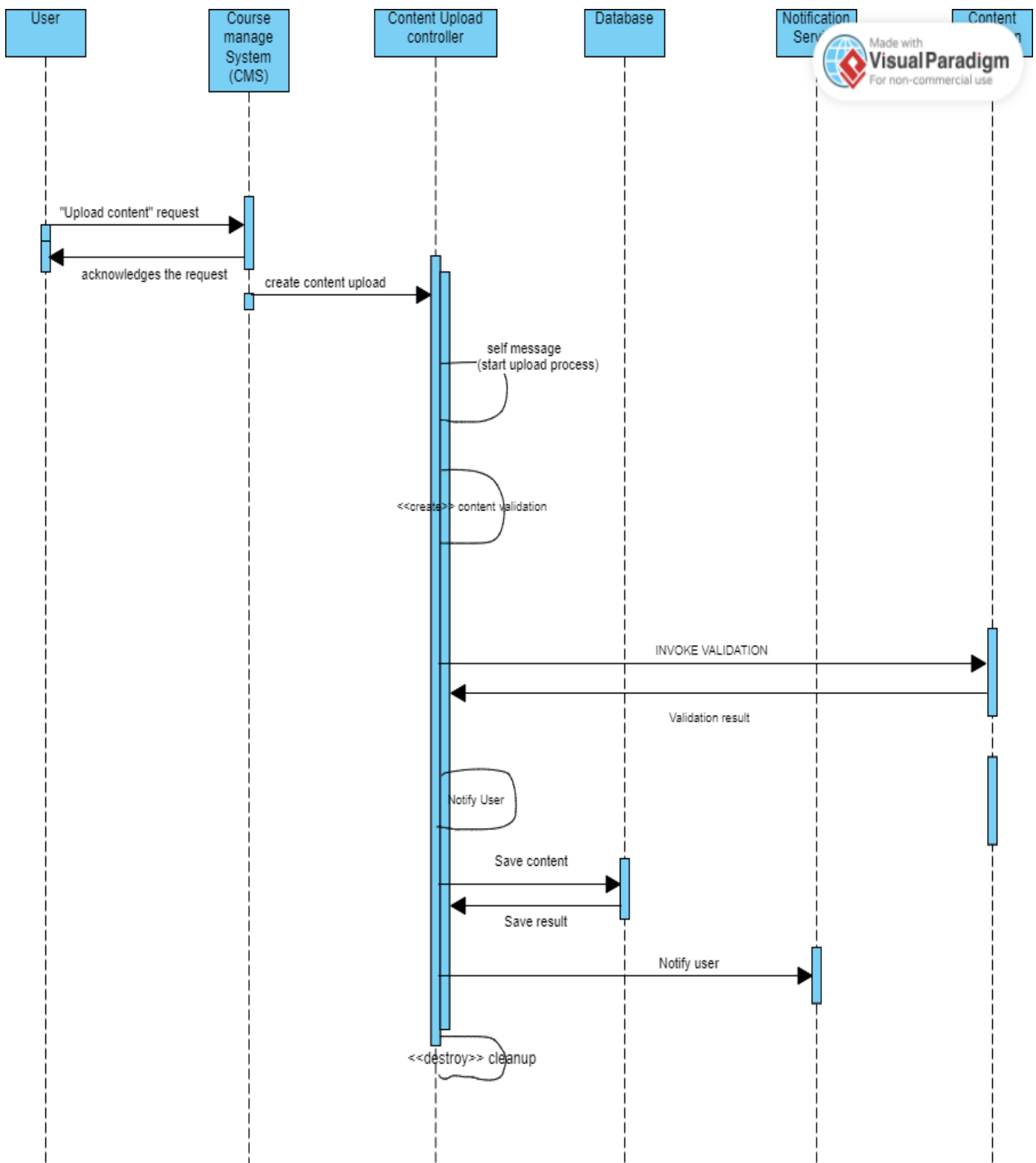


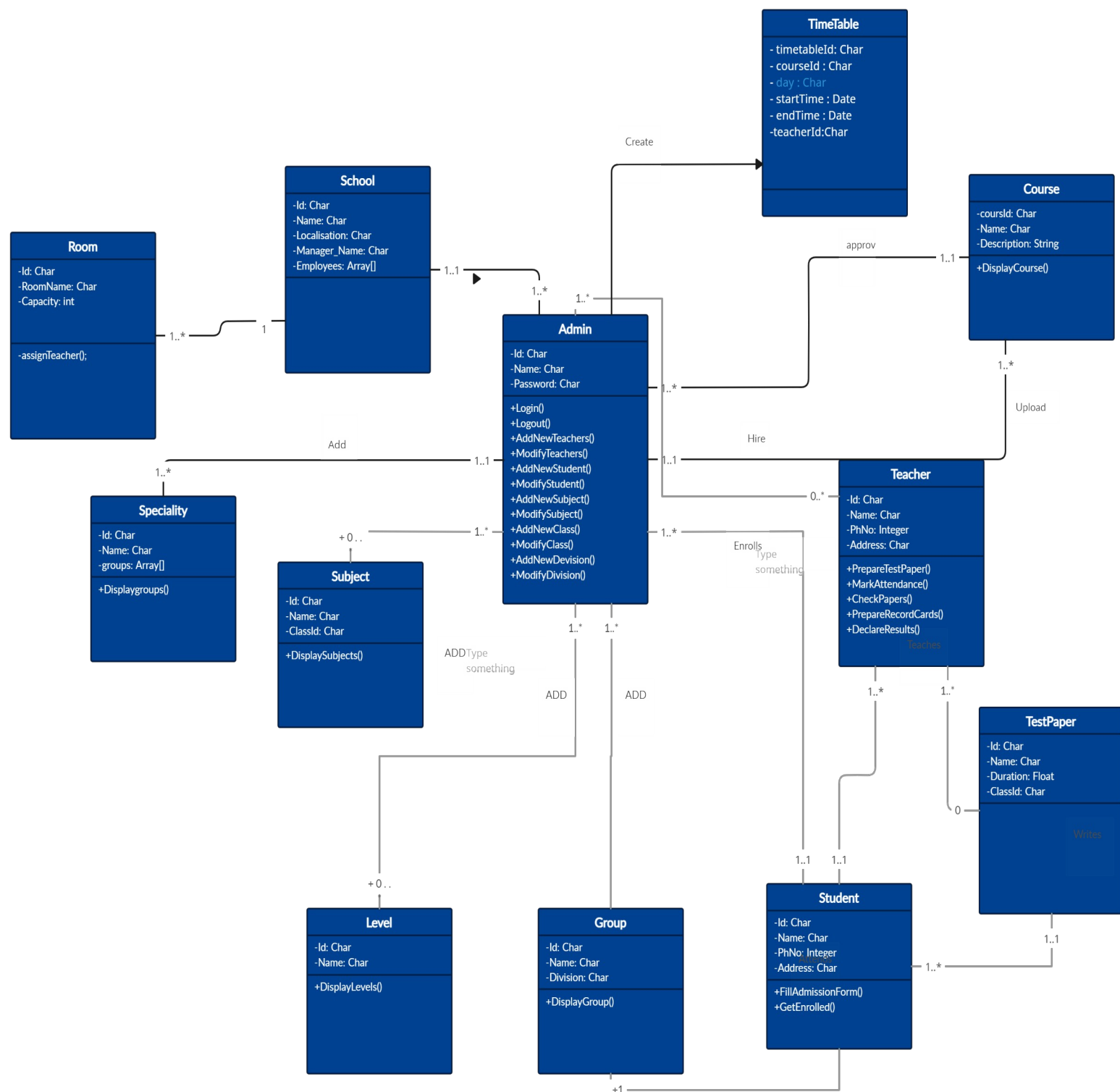
Figure : Upload Couese Sequence diagram

### Class diagram :

The class diagram is a very important element of modeling. It allows to model the concepts of the application domains and to identify the classes of the system and their relationship such as the inheritance relationship

### E-Learning design class diagram :

The figure below represents the class diagram which contains all the information such as classes, methods, associations and properties.

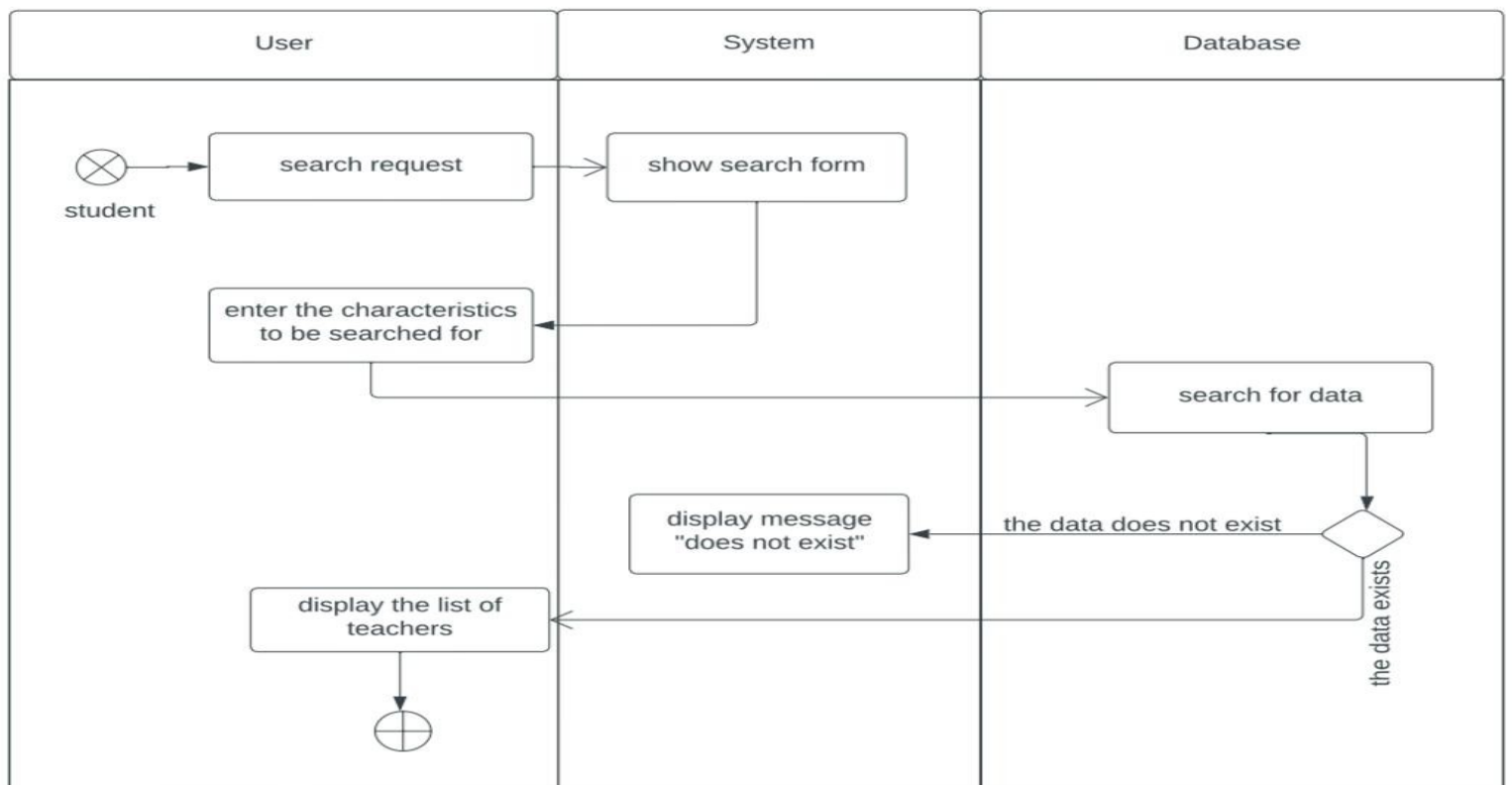


## Activity diagrams:

The activity diagram allows you to focus on the treatments. It is therefore particularly suitable for modeling the routing of control flows and data flows. It thus makes it possible to graphically represent the behavior of a method or the progress of a use case.

### Activity diagram ” Search diagram ”

The figure below represents the class diagram which contains all the information such as classes, methods, associations and properties.



**Figure :** Search activity diagram

# realization

## 3.1 Introduction :

In this chapter, we will discuss the implementation phase of our application, which marks the final stage of the entire design process. We begin with a technical study that outlines the software resources used in developing our project. Specifically, we describe our work environment, including the software we used to create our website, and we detail the architecture. Additionally, we provide examples of interfaces we created to demonstrate how certain activities in the system function.

## 3.2 Development tools :

### 3.2.1 UI / UX

UI (User Interface) and UX (User Experience) design are closely related concepts that focus on creating a visually appealing, intuitive, and engaging experience for users interacting with digital products.

It involves understanding the users' needs and behaviors and designing the product in a way that meets their needs while also being aesthetically pleasing and optimized for different devices and platforms.



#### ***Figma :***

is a web-based interface design tool used for creating and sharing digital designs and prototypes. It offers a variety of design features such as vector editing, prototyping, and design libraries. is a web-based interface design tool used for creating and sharing digital designs and prototypes. It offers a variety of design features such as vector editing, prototyping, and design libraries. Figma allows designers and teams to collaborate in real-time from anywhere.



It is a popular choice for creating user interfaces, website designs, mobile apps, and other digital products. Figma is known for its accessibility, ease of use, and integration with other tools and platforms.

### 3.2.2 Front End

Front-end development is the process of creating the user interface and user experience for a website or application using HTML, CSS, and JavaScript. Front-end developers are responsible for designing and optimizing the website's visual and interactive elements, making them responsive and accessible ,So the front-end is being built with the following tools:

## **HTML :**

HyperText Mark-upLanguage "HTML" is a so-called markup language (for structuring or markup) whose role is to formalize the writing of a document with markup formatting, tags indicating how the document should be presented and the links it establishes with other documents.



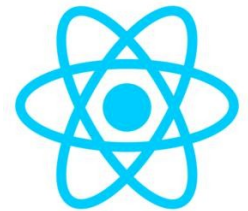
## **CSS :**

Literally Cascading Style Sheets, CSS is a language simple declarative to format HTML pages or XML documents. Language CSS allows you to specify the visual and sound presentation characteristics of a page web: fonts, margins and borders, colors, positioning of different elements, etc.



## **React :**

React is a JavaScript library used for building user interfaces. It allows developers to create reusable UI components and manage state and data flow within web applications. React is commonly used for developing dynamic and interactive web applications.



## **Back End**

Back-end development is building the server-side of a website or application using programming languages and frameworks. It enables the front-end to perform complex functions, such as processing payments and storing user data. It requires problem-solving skills, attention to detail, and a deep understanding of web development.

**Node.js :** is an open-source, cross-platform, JavaScript runtime environment that executes JavaScript code outside of a web browser

It is built on the V8 JavaScript engine from Google Chrome and provides an event-driven, non-blocking I/O model that makes it lightweight and efficient. Node.js is commonly used for building server-side web applications, command-line tools, and network applications. It has a vast ecosystem of modules and packages available through its package manager, npm.



**Express.js :** is a popular open-source web application framework for Node.js. It provides a set of features for building web applications and APIs, including routing, middleware support, and templating engines.

Express.js is known for its simplicity, flexibility, and minimalism, allowing developers to build scalable web applications quickly. It has a vast ecosystem of plugins and extensions, making it a versatile choice for building web applications. Express.js is widely used in building RESTful APIs and web applications.





***MongoDB*** : is a popular open-source NoSQL document-oriented database program. It uses a flexible and dynamic schema model to store data as documents, which allows for easy and fast development and data retrieval.

MongoDB is widely used for building web applications and offers high scalability, availability, and performance. It also provides a rich set of features such as indexing, aggregation, and replication, making it a versatile choice for various use cases.

