

République Tunisienne

Ministère de l'Enseignement Supérieur et de la Recherche Scientifique

Université de Monastir

Institut Supérieur d'Informatique et de Mathématiques de Monastir

Département Informatique



N° d'ordre : L**INFO

Project Memory End of Studies

Presented with a view to obtaining the

National Bachelor of Science Diploma Computer Science

Speciality:

Software and Information System Engineering

By Jaziri Ahmed

Development of a mobile application and web back office dedicated to real estate investment

Defended on *** in front of the jury composed of:

Mr: President Mr: Reporter

Ms.: Bali Nadia Educational Supervisor

Mr.: ZOUARI Khalil Technical Supervisor

SUMMARY

This work is part of the completion of our Final Year Project at the Higher Institute of Computer Science and Mathematics of Monastir for the academic year 2024-2025, aiming for the National Fundamental License Diploma in Computer Science. Conducted within the company 'KZ IT Services', our main objective is the development of a mobile application and a web back-office dedicated to real estate investment named 'KORPOR'. We used MySQL to manage the databases, Express-Node.js to implement the backend, and React and Vite to implement the frontend. Project management followed the SCRUM Agile methodology, emphasizing agile practices such as sprint planning, sprint management, and regular meetings.

Keywords: MySQL, Express-Node.js, React, Vite.

ABSTRACT

This project is part of our graduation project at the Higher Institute of Computer Science and Mathematics of Monastir for the 2024-2025 academic year, leading to the national diploma of fundamental license in Computer Science. Carried out within the company "KZ IT Services", our main objective is the development of a mobile application and web back office dedicated to real estate investment called "KORPOR". We used MySQL to manage the databases, Express-Node.js for the backend implementation, and React and Vite for the frontend. The project management followed the SCRUM Agile methodology, with an emphasis on agile practices such as sprint planning, sprint management, and regular meetings.

Keywords: MySQL, Express-Node.js, React, Vite.

Dedication

To the memory of my beloved father, whose guidance and wisdom continue to light my path.

Though no longer with us, your presence remains in every achievement of my life.

To my loving mother, whose strength and endless support shaped who I am today.

To my sister and brother, whose companionship and encouragement have been constant sources of joy and motivation.

To my little Aryouma, whose innocence and love bring happiness to our family every day.

To Mme Nadia, my professors and mentors, who have guided me with knowledge and patience throughout my academic journey.

To my friends, whose encouragement made this journey worthwhile.

This work is dedicated to all of you, but especially to you, Father.

Shound

ACKNOWLEDGEMENT

With profound gratitude, I acknowledge those whose wisdom and support were instrumental to the Korpor platform's development:

Academic Committee

Prof. [Name] & Dr. [Name] — for their invaluable evaluation and guidance.

Supervisor

Dr. Nadia Bali — whose mentorship illuminated the path through complex technological challenges.

Company Leader

Mr. Khalil Ezouiri — for his visionary leadership and providing the opportunity to contribute to this innovative platform.

Institution

Faculty and staff who fostered an environment of innovation and excellence.

This work stands as testament to the transformative potential of integrating blockchain security with AI-driven insights to democratize investment opportunities.

With apprec	With appreciation,	
Ahmed	Jaziri	
April	18, 2025	

TABLE OF CONTENTS

Ded	lication		2
Ack	nowledg	gement····	3
Gen	neral Int	croduction·····	7
1. I	Project	Context	8
1	1.1 Intro	$oduction \cdots \cdots$	8
ĵ.	1.2 Proj	ect Context · · · · · · · · · · · · · · · · · · ·	8
1	1.3 Host	ting Company · · · · · · · · · · · · · · · · · · ·	8
1	1.4 Prel 1.4.1 1.4.2 1.4.3	iminary Study	9 9 10 11
1	1.4.4 1.5 Dev	Proposed Solution · · · · · · · · · · · · · · · · · · ·	12 13
	1.5.1 1.5.2 1.5.3	SCRUM · · · · · · · · · · · · · · · · · · ·	13 13 14
1	1.6 Con	$clusion \cdot \cdot$	15

2.	Analysis and Specification of Needs·····	16
	2.1 Introduction · · · · · · · · · · · · · · · · · · ·	16
	2.2 Requirements Specification · · · · · · · · · · · · · · · · · · ·	16
	2.2.1 Identifying Actors · · · · · · · · · · · · · · · · · · ·	16
	2.2.2 Functional Requirements · · · · · · · · · · · · · · · · · · ·	17
	2.2.3 Non-functional Requirements · · · · · · · · · · · · · · · · · · ·	19
	2.3 Requirements Analysis · · · · · · · · · · · · · · · · · ·	20
	2.3.1 General use case diagram · · · · · · · · · · · · · · · · · · ·	20
	2.4 Software architecture · · · · · · · · · · · · · · · · · · ·	20
	2.4.1 Physical architecture · · · · · · · · · · · · · · · · · · ·	20
	2.4.2 Logical architecture · · · · · · · · · · · · · · · · · · ·	22
	2.5 Work Environment · · · · · · · · · · · · · · · · · · ·	23
	2.5.1 Physical environment · · · · · · · · · · · · · · · · · · ·	23
	2.5.2 Used technologies · · · · · · · · · · · · · · · · · · ·	23
	2.5.3 Tools used for the report · · · · · · · · · · · · · · · · · · ·	25
	2.6 Product backlog · · · · · · · · · · · · · · · · · · ·	26
	2.7 Sprint planning · · · · · · · · · · · · · · · · · · ·	30
	2.8 Conclusion · · · · · · · · · · · · · · · · · · ·	30
3.	Design and Implementation · · · · · · · · · · · · · · · · · · ·	32
	$3.1 \ Introduction \cdots \cdots$	32
	0.1 110010uuCtt01t	0



General Introduction

In today's rapidly evolving financial landscape, traditional investment methods are often burdened by opaque processes, cumbersome bureaucracy, and significant entry barriers. Investors have long struggled with outdated systems that impede transparency, elevate risks, and complicate access to promising opportunities. Such challenges not only limit diversification but also expose users to uncertainties that modern technology can easily overcome.

Korpor was conceived to transform this paradigm by delivering a fully integrated, AI and blockchain-powered mobile investment platform. By harnessing advanced data analytics, machine learning, and cutting-edge blockchain technology, Korpor streamlines every facet of the investment process. The application offers a seamless user onboarding experience, intuitive project listings enriched with AI-driven recommendations, and a secure, automated investment flow that simplifies transactions while ensuring that every operation is recorded immutably on the blockchain. Investors can manage their portfolios effortlessly through a comprehensive dashboard, with real-time notifications, an interactive AI chatbot, and multi-language support delivering a personalized and globally accessible experience.

Security and trust are at the heart of Korpor's design. By employing state-of-the-art encryption, blockchain-based transparency, and strict compliance measures, the platform safeguards sensitive financial data and guarantees that every transaction is executed within a secure and verifiable framework. Continuous monitoring, performance optimization, and the immutable nature of blockchain records further ensure that the application remains resilient, scalable, and resistant to fraud in a dynamic market environment. Developed under a flexible Agile framework that combines iterative development with strategic project management best practices, Korpor is designed to rapidly adapt to evolving market trends and user needs. This methodical approach allows for regular feedback, swift enhancements, and the seamless integration of innovative features throughout the development lifecycle.

Document Structure

- The first chapter, **Project Context**, delves into the industry challenges and the vision that inspired Korpor's creation.
- The second chapter, **Analysis and Specification of Needs**, outlines the comprehensive requirements gathering, needs analysis, architectural design, and the selection of cutting-edge tools and technologies.
- Subsequent chapters document the progressive implementation of core features—from AI-enhanced project recommendations and blockchain-secured transactions to comprehensive portfolio management—each developed through clearly defined sprints encompassing analysis, design, and deployment phases.

Through this structured approach, we demonstrate how Korpor leverages modern technology to reimagine investment management, offering a secure, transparent, and dynamic solution that is set to redefine digital financial engagement.

CHAPTER 1

Project Context

1.1 Introduction

The aim of this chapter is to present the general framework of the Korpor project, a solution dedicated to real estate investment. In this section, we'll discuss successively:

- The presentation of the host organization.
- The context and challenges of the real estate sector.
- Analysis of existing solutions and identification of their limitations.
- Definition of functional and non-functional needs of the mobile application and web back office.

1.2 Project Context

This work is part of the end-of-study project for the national diploma of Applied Bachelor's degree in Computer Science from the Higher Institute of Computer Science and Mathematics of Monastir (ISIMM) for the year 2024/2025. I had the opportunity to do my end-of-study internship at the company "KZ IT Services", under the supervision of Mr. Khalil Zouari.

1.3 Hosting Company

The purpose of this section is to present the company within which I developed my project.

1.3.1 Hosting Company

KZ IT Service is a dynamic software company dedicated to delivering innovative IT solutions tailored to modern business needs. We specialize in designing and developing robust,



scalable applications that drive efficiency and digital transformation. Our experienced team leverages cutting-edge technology to create customized software that exceeds client expectations. With a strong commitment to quality and continuous improvement, we build lasting partnerships based on trust and excellence. At "KZ IT Service", innovation is at the core of everything we do, empowering our clients to achieve sustainable growth and success.

1.4 Preliminary Study

This preliminary study provides a review of some existing investment and asset management platforms. Further, the next section identifies some key concepts that will lead to further understanding of the domain in question.

1.4.1 Existing Solutions Study

For understanding the present scenario and to clearly demarcate our goals, some renowned investment platform analyses offering similar features, including "Aseel" and "Stake", are performed.

1.4.2 Available solutions and analysis

The Aseel Platform

Aseel is a portal through which users can invest in different real estate projects with ease. The interface allows the clients to surf various investment opportunities, view the details of the properties, and then make an informed decision. Aseel introduces transparency in the investment process by offering financial data, updates regarding projects, and returns that are estimated. This platform comes with an easy-to-use dashboard through which one tracks their investments and manages their assets without any hassle.

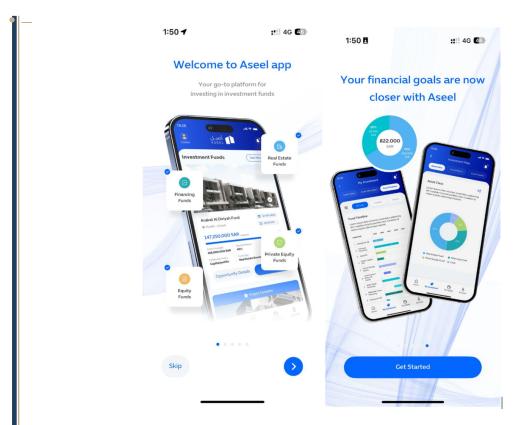


Figure 1.2: Interface of "The Aseel Platform"

The Stake Platform

Stake is an online investment platform that deals with real estate crowdfunding. It provides the opportunity to invest in fractions of property ownership, hence diversifying a portfolio without huge capital. On Stake, there are AI-powered recommendations based on user preferences, seamless payment integration, and a secure environment for investment. Besides, liquidity is guaranteed by enabling exit options for investors who may want to sell their shares in ongoing projects.

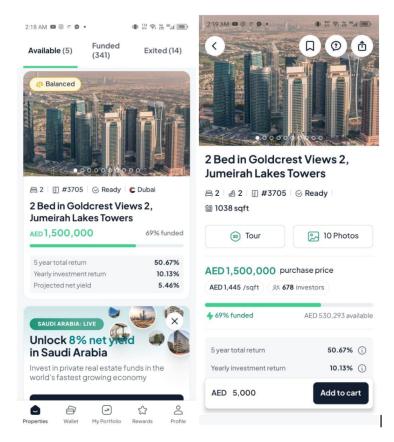


Figure 1.3: Interface of "The Stake Platform"

1.4.3 Comparative and Critical Analysis

We can summarize all that comes from our analysis based on a number of criteria used for the evaluation of these applications.

- Speed (C1): The platform should obtain value for the user as fast as possible and effectively, anticipating their proliferating expectations.
- Costs (C2): With minimum software development costs, it is important to keep the pricing predictable and acceptable.
- Quality (C3): Since the market expects quality, any kind of error might affect brand reputation. Improvement of the platform should be regular.
- Reliability (C4): Since modern-day investment platforms need to make sure of minimum downtime and maximum availability of services, this factor is critical.
- Security (C5): Such an investment platform enforces access rights, roles, and contribution rights through a powerful security system.
- **Performance** (C6): Crucial features include AI-powered recommendations going through seamlessly, easy transaction tracking, and investment monitoring.

- Stability (C7): The platform should have a proven track record, regular updates, and a large user base to ensure its longevity.
- Resilience (C8): In order to prevent data loss and guarantee a smooth experience for investors, it must be able to restore lost functionalities should issues occur.
- User Experience (C9): The interface should be intuitive and user-friendly, hence allowing investors to move with ease through it, thus making wiser decisions.

Solution C2C3C4C5**C6 C7 C8 C9** C1Stake \checkmark \checkmark \checkmark \checkmark \checkmark \checkmark X \checkmark Aseel X X ×

Table 1.1: Evaluation Table

1.4.4 Proposed Solution

Having studied the already working platforms for investments, we found strengths and weaknesses that could define what was required from the project. Our proposed solution will look at:

- Developing an efficient mobile application for investment management.
- Increasing the level of users' engagement with recommendations using the power of AI.
- Ensuring responsive and user-friendly interaction with the interface.
- Gaining the trust of investors by ensuring transparency and security in the investing platform.
- Enhancing the security of data and following all the financial regulations.

The **Korpor** platform will be offering the following features:

- A directory of investment opportunities with deep financial insights into those opportunities.
- AI-driven recommendations of investments as per users' preferences.
- Smooth funding and payout mechanisms.
- Real-time portfolio performance tracking on a single screen/dashboard.
- Forum for interactive discussions on strategy and market trends among its users.
- Referral and Rewards System: An engaging system for rewarding users via referral.

1.5 Development methodology

The completion of the project on its delivery date is the main problem of every software development team. One of the most common problems encountered in the production of software is insufficient technical specifications, poor time management in the face of the use of emerging technology, and sudden changes in needs. In order to avoid these critical issues, we follow an agile methodology for project management.

1.5.1 SCRUM

Scrum is an agile development approach that is used to create software using incremental and iterative methods. Scrum is a quick, flexible, and efficient agile methodology that is intended to provide value to the client at every stage of the project's development. Scrum's main goal is to meet customer needs by fostering an atmosphere of open communication, group accountability, and constant improvement. The development process begins with a broad concept of what must be constructed, developing a list of features that the product owner desires, and arranging them according to priority (product backlog).

1.5.2 Agile Scrum roles and responsibilities

The Product Owner

Understands the customer and business requirements, then creates and manages the product backlog based on those requirements.

Responsibilities:

- Managing the scrum backlog
- Release management
- Stakeholder management

Developers

In Scrum, the term developer or team member refers to anyone who plays a role in the development and support of the product and can include researchers, architects, designers, programmers, etc.

Responsibilities:

- Delivering the work through the sprint
- To ensure transparency during the sprint, they meet daily at the daily scrum

Scrum Master

The role responsible for gluing everything together and ensuring that scrum is being done well. In practical terms, that means they help the product owner define value, the development team deliver the value, and the scrum team get better.

The Scrum Master focuses on:

- Transparency
- Empiricism
- Self-organization
- The Scrum events

1.5.3 The Scrum Events

The Scrum events are key elements of the Scrum Framework. They provide regular opportunities for enacting the Scrum pillars of Inspection, Adaptation and Transparency. In addition, they help teams keep aligned with the Sprint and Product Goals, improve Developer productivity, and remove impediments and reduce the need to schedule too many additional meetings.

- Sprint: All work in Scrum is done in a series of short projects called Sprints. This enables rapid feedback loops.
- **Sprint Planning**: The Sprint starts with a planning session in which the Developers plan the work they intend to do in the Sprint. This plan creates a shared understanding and alignment among the team.
- Daily Scrum: The Developers meet daily to inspect their progress toward the Sprint Goal, discuss any challenges they've run into, and tweak their plan for the next day as needed.
- Sprint Review: At the end of the Sprint, the Scrum Team meets with stakeholders to show what they have accomplished and get feedback.
- Sprint Retrospective: Finally, the Scrum Team gets together to discuss how the Sprint went and if there are things they could do differently and improve in the next Sprint.

1.6 Conclusion

In conclusion of this chapter, it is clear that planning and methodology are essential pillars to ensure the success of the project. By fully understanding the project framework, including the host organization's expectations and the challenges ahead, the team is better prepared to meet the challenges ahead.

This chapter lays the solid foundation on which the entire project will be built, providing a valuable guide for the next steps. The next chapter will allow us to analyze and specify the needs developed in our project.

CHAPTER 2

Analysis and Specification of Needs

2.1 Introduction

In this chapter, we will present the analysis and specification of needs. We start by presenting the specification of the requirements, illustrating them using the diagram of the global use cases. Then we will present our project architecture and our working environment, and finally we will present our product backlog and releases planning, and we will close our chapter with a conclusion.

2.2 Requirements Specification

In this section, we will define the actors of our application and the functional and non-functional needs that our application aims to fulfill.

2.2.1 Identifying Actors

We define actors as a shorthand for the roles played by entities outside the system that interact directly with them. In our system, we identify four types of actors:

- Super Admin: Responsible for the global configuration of the platform, they have extended privileges to manage administrators, oversee security, and ensure compliance. They can also configure advanced features and control all system resources.
- Admin: In charge of the day-to-day management of the platform, they can add, modify, or delete listings, supervise agency and user profiles, and ensure smooth operations. They are also responsible for monitoring and assisting other actors.
- Real Estate Agent: Dedicated to creating and updating real estate listings, they manage property information, handle investor requests, and finalize transactions

related to sales or rentals. They can also coordinate property visits and propose tailored offers.

- **Investor**: A user who wishes to browse and finance real estate projects. They have access to all available offers, can make investments in a few simple steps, and monitor the evolution of their portfolio. They also benefit from personalized insights to optimize their investments.
- System: The entity that automatically manages all basic functionalities, such as authentication, notification generation, transaction validation, and adherence to security protocols. It ensures the coherence and reliability of the application at all times.

2.2.2 Functional Requirements

After several meetings with our client, the various functional requirements of our application are illustrated as follows:

For the Super Admin (Korpor)

- Authenticate: The super admin enters their credentials to access the advanced management console.
- Log Out: After viewing or updating global settings, they can securely log out.
- Manage Admin Accounts: Create, enable/disable, or modify admin profiles associated with different real estate companies.
- Monitor Security & Compliance: Oversee transactions, data integrity, and regulatory adherence using specialized reporting and audit tools.
- Configure Platform Features: Define key parameters (payment methods, AI/blockchain integrations, etc.) and roll out feature updates.
- View Global Reports: Generate and analyze consolidated metrics (financials, user activity, transactions) for overall performance insights.
- Moderate Content: Review and remove any inappropriate or erroneous property listings or user-generated data.

For the Admin (Real Estate Company)

- Authenticate: The admin logs in with valid credentials to manage daily operations.
- Log Out: They can end their session to maintain account security.

- Manage Real Estate Listings: Add, update, or delete property listings visible to investors.
- Oversee Real Estate Agents: Create and manage agent accounts, assign properties, and monitor performance and commissions.
- Track Transactions & Commissions: Review incoming payments, calculate commissions owed to agents, and track the history of completed deals.
- Address Investor Inquiries: Respond to questions or concerns from investors, ensuring a smooth user experience.
- Access Agency Dashboard: View comprehensive statistics on properties, sales, rentals, and market trends.

For the Real Estate Agent

- Authenticate: The agent logs in to manage assigned properties and interact with potential investors.
- Log Out: Securely exit the account after completing tasks.
- Manage Assigned Properties: Create new listings, update property details, set prices, and upload images.
- Handle Investment Requests: Review purchase or rental offers, negotiate terms, and initiate contract finalization.
- Contribute to AI Estimates: Provide or refine data to improve AI-driven pricing and market analysis.
- Maintain Client Relationships: Communicate with investors, schedule property visits, and follow up on inquiries.
- View Commissions: Track earnings based on successful sales or rentals.

For the Investor (Mobile App User)

- Create an account & authenticate: Register to gain access to the platform's core features.
- Log Out: End the session to protect personal and financial data.
- Browse Listings & Invest: Explore available properties, filter according to preferences, and commit to an investment in a few steps.

- Track Portfolio: Monitor owned assets, property status, and receive real-time updates on performance.
- Make Payments: Use integrated payment methods (credit cards, digital wallets, etc.) to complete transactions.
- Access AI Recommendations: View data-driven insights and return-on-investment estimates generated by the system.
- Manage Withdrawals & Earnings: Withdraw profits, monitor rental income, or exit investments under the right conditions.

For the System

- Automate Authentication: Validate credentials, manage sessions, and maintain user roles and permissions.
- Generate Notifications: Send real-time alerts (e.g., new listings, completed transactions, commission updates) to relevant users.
- Ensure Compliance & Security: Leverage blockchain for data integrity, verify payments, and detect anomalies or fraudulent activities.
- Coordinate AI Insights: Aggregate and analyze real estate data to produce market predictions and price recommendations.
- Maintain Transaction Consistency: Update dashboards, user balances, and property statuses automatically upon each operation.
- Optimize Performance: Monitor server load, scale resources, and ensure a smooth, responsive application experience.

2.2.3 Non-functional Requirements

In order to ensure the proper functioning of the decision-making system and to avoid any kind of anomaly, the implemented solution must meet a set of non-functional needs such as:

- Maintainability: The system must be designed for simplicity so that tasks, updates, and bug fixes can be executed with minimal complexity.
- Evolution: Platform administration must remain attentive to user needs and feedback, continuously enhancing the services offered while preserving the application's utility and efficiency.

- Security: Robust security measures are essential. The platform must enforce strong authentication protocols, access privileges, and comprehensive data encryption (both at rest and in transit). The integration of blockchain technology further ensures the immutability and integrity of sensitive information.
- Efficiency: The application must be effective in all circumstances, delivering prompt and reliable functionality regardless of external conditions.
- **Performance**: The system must operate optimally across diverse environments. It should consistently provide a responsive and reliable experience, even under high transaction volumes or varying network conditions.

2.3 Requirements Analysis

In this section, we'll outline the various features that our app should offer, using a general use case diagram.

2.3.1 General use case diagram

Below, we present the various actors of the application and the actions they are authorized to perform. The overall diagram is illustrated in the following figure:

2.4 Software architecture

Before starting the design and development of any computerized system, it is essential to prepare the architecture.

2.4.1 Physical architecture

The physical architecture of Korpor leverages modern, scalable technologies to deliver a seamless investment platform. The frontend is built with Expo, React, and TypeScript using Vite for rapid development and Tanstack for robust state management and data visualization, while Storybook supports isolated UI component development. The backend relies on Express.js with user authentication managed by Clerk, containerization via Docker, and MySQL for data storage hosted on Microsoft Azure. Integrated AI modules provide personalized insights, and blockchain technology ensures transactional security and data immutability. This setup is further supported by GitHub for version control, Postman for API testing, and end-to-end testing tools like Maestro and Playwright, with architectural designs and documentation maintained using StarUML and Overleaf.

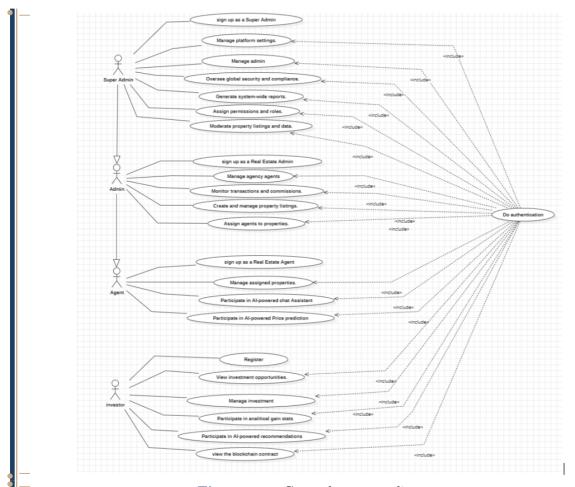


Figure 2.1: General use case diagram

Figure 2.2: Physical architecture

2.4.2 Logical architecture

The logical architecture of Korpor is structured around a modular, API-driven design, ensuring clear separation of concerns, scalability, and maintainability. The system follows a Model-View-Controller (MVC) approach, where each component has a distinct responsibility in managing data flow and user interactions.

Architecture Components:

- Model: The MySQL database serves as the core data source, responsible for storing and managing application data, including user profiles, real estate listings, transactions, and investment records. The data layer interacts with the backend through ORM or query-based operations, ensuring efficient data retrieval and persistence.
- Controller: The Express.js backend acts as the intermediary between the database and the frontend, handling user requests, business logic, and data validation. It processes API calls from the frontend and interacts with services such as Clerk for authentication, AI modules for predictive analytics, and blockchain integration for secure transactions.
- View: The frontend is built with React, TypeScript, and TanStack tools, ensuring a responsive and interactive UI. The frontend communicates with the backend via API requests, displaying dynamic content and allowing seamless user interaction.

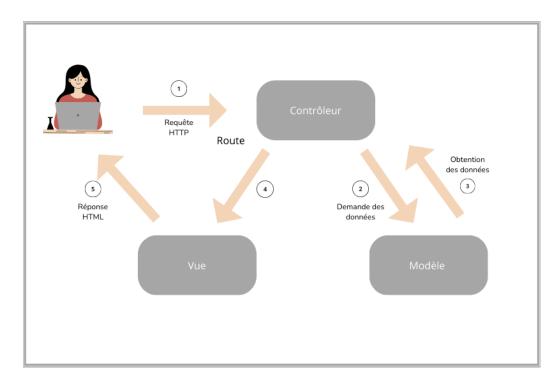


Figure 2.3: Logical architecture

Request Flow:

- 1. A user action (e.g., viewing property listings) triggers a request in the frontend.
- 2. The request is sent to the backend via an API call.
- 3. The Express.js controller processes the request, interacting with the database and other services.
- 4. Data is retrieved, processed, and returned as a response.
- 5. The frontend updates the UI dynamically based on the received data.

This structured approach ensures a scalable, secure, and high-performance system, optimizing Korpor's real estate investment and management operations.

2.5 Work Environment

In this part, we will talk about our work environment, focusing on different aspects: our material environment, the techniques we used in the realization of our project as well as the tools we used in our report, the product backlog and sprint planning, and finally, we will conclude this section.

2.5.1 Physical environment

The work was carried out by a laptop computer that is equipped with these detailed features presented in Table 2.1:

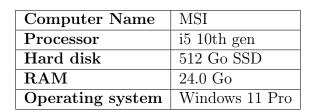


Table 2.1: Physical environment

2.5.2 Used technologies

^ Expo

Expo is an open-source platform for making universal native apps for Android, iOS, and the web with JavaScript and React.

TypeScript

TypeScript (abbreviated as TS) is a free and open-source high-level programming language developed by Microsoft that adds static typing with optional type annotations to JavaScript. It is designed for the development of large applications and transpiles to JavaScript.

Tanstack

High-quality open-source software for web developers. Headless, type-safe, & powerful utilities for Web Applications, Routing, State Management, Data Visualization, Datagrid-s/Tables, and more.

clerk Clerk

Clerk is a complete suite of embeddable UIs, flexible APIs, and admin dashboards to authenticate and manage your users.

■ Maestro

Maestro is the simplest, most powerful, and most trusted end-to-end testing platform for mobile and web apps.

Google cloud platform

Google cloud platform, or just GCP, is the cloud computing platform developed by Google. It has management, access and development of applications and services to individuals, companies, and governments through its global infrastructure.

GitHub

GitHub is a platform for developers to build, scale, and deliver secure software.

⊖× Express.js

Express.js is a minimal and flexible Node.js web application framework that provides a list of features for building web and mobile applications easily.

Postman

Postman is an API platform for building and using APIs. Postman simplifies each step of the API lifecycle and streamlines collaboration so you can create better APIs—faster.

▼ Vite

Vite is a modern build tool that provides a fast and optimized development experience for React 17 applications. It leverages native ES modules and offers a highly efficient development server with hot module replacement (HMR).

React

React, sometimes referred to as a frontend JavaScript framework, is a JavaScript library created by Facebook.

MySQL

MySQL is the world's most popular open source database. With its proven performance, reliability and ease-of-use, MySQL has become the leading database choice for web-based applications, used by high profile web properties.

Docker Docker

Docker is an open platform for developing, shipping, and running applications. Docker enables you to separate your applications from your infrastructure so you can deliver software quickly.

Playright

Playwright is an open-source testing and automation framework that can automate web browser interactions. To put it simply, you can write code that can open a browser.

Storybook

Storybook is a frontend workshop for building UI components and pages in isolation. It helps you develop and share hard-to-reach states and edge cases without needing to run your whole app.

2.5.3 Tools used for the report

Overleaf.com

Overleaf is a collaborative cloud-based LaTeX editor used to write, edit, and publish scientific papers.

StarUML

StarUML is a software for creating and editing UML and SysML diagrams. Download the latest version for macOS, Windows or Linux, and see the release notes and supported diagram types.

Canva

Canva is a global company that empowers people to design anything and publish anywhere. Learn about its mission, values, commitments, awards, product, and careers.

2.6 Product backlog

The backlog was created before the sprints to plan the milestones and determine the content of each sprint based on project needs. It includes the following fields:

- Code: The unique identifier of the task.
- Theme: The subject of a user story.
- User Story: A short description of the functionality requested by the client.
- **Priority:** A value indicating the importance of the functionality.
 - Must: The feature is essential and must be implemented.
 - Should: The feature should be implemented if possible.
 - Could: The feature is optional and may be deprioritized.
 - Won't: The feature is not a priority at this time.

Table 2.2: Korpor Product Backlog

Code	Theme	User story	Priority		
	Authentication & User Management				
PB001	Authentication	As a user, I want to create an account and	Must		
		authenticate securely			
PB002	User Management	As a user, I want to manage my profile infor-	Must		
		mation			
PB003	Authentication	As a user, I want to securely log out of my	Must		
		account			
PB004	Admin Management	As a Super Admin, I want to manage admin	Should		
		accounts for different real estate companies			
	Continued on next page				

Super Admin Features				
PB005	Security	As a Super Admin, I want to monitor security	Could	
		and compliance across the platform		
PB006	Configuration	As a Super Admin, I want to configure	Could	
		platform-wide features and settings		
PB007	Analytics	As a Super Admin, I want to generate and	Could	
		analyze global performance reports		
PB008	Moderation	As a Super Admin, I want to moderate con-	Won't	
		tent across the platform		
PB009	AI Integration	As a Super Admin, I want to chat with an AI	Could	
		assistant that can securely access database		
		information		
		Admin Features		
PB010	Listing Management	As an Admin, I want to manage real estate	Must	
		listings in my company		
PB011	Agent Management	As an Admin, I want to oversee real estate	Should	
		agents and their permissions		
PB012	Transaction Management	As an Admin, I want to track transactions	Should	
		and calculate agent commissions		
PB013	Customer Service	As an Admin, I want to address investor in-	Could	
		quiries and issues		
PB014	Analytics	As an Admin, I want to access a comprehen-	Could	
		sive agency dashboard		
PB015	AI Integration	As an Admin, I want to input property details	Should	
		and receive AI-powered valuation		
	Real	Estate Agent Features		
PB016	Listing Management	As an Agent, I want to create and manage	Must	
		property listings		
PB017	Investment Management	As an Agent, I want to handle investment	Could	
		and purchase requests		
PB018	Data Management	As an Agent, I want to contribute data for	Could	
		AI-driven estimates		
PB019	Customer Relations	As an Agent, I want to maintain client rela-	Could	
		tionships and communications		
PB020	Finance	As an Agent, I want to view my commissions	Should	
		on sales and rentals		
	Continued on next page			

Investor Features				
PB021	Property Discovery	As an Investor, I want to browse available	Must	
		property listings		
PB022	Search Functionality	As an Investor, I want to filter properties	Could	
		based on my preferences		
PB023	Investment Process	As an Investor, I want to invest in properties	Could	
		through a simple process		
PB024	Portfolio Management	As an Investor, I want to track my investment	Must	
		portfolio in real-time		
PB025	Payment Processing	As an Investor, I want to make secure pay-	Should	
		ments through various methods		
PB026	AI Recommendations	As an Investor, I want to receive personalized	Must	
		property recommendations		
PB027	AI Assistance	As an Investor, I want to consult an AI assis-	Could	
		tant for real estate legal questions		
PB028	Financial Prediction	As an Investor, I want to see predictions of	Could	
		potential earnings		
PB029	Finance Management	As an Investor, I want to manage my earnings	Could	
		and withdrawals		
	AI & N	Aachine Learning Features		
PB030	AI System	As the System, I want to analyze user inter-	Must	
		actions for personalized recommendations		
PB031	AI Prediction	As the System, I want to predict property	Should	
		valuations and rental prices		
PB032	AI Forecasting	As the System, I want to forecast potential	Should	
		investment returns		
PB033	NLP Integration	As the System, I want to provide real estate	Could	
		legal information via NLP		
PB034	Security	As the System, I want to secure AI database	Could	
		access for authorized queries		
Blockchain & Smart Contract Features				
PB035	Blockchain	As the System, I want to create and manage	Must	
		virtual contracts for transactions		
PB036	Blockchain	As an Investor, I want my property invest-	Must	
		ments to be secured via blockchain		
Continued on next page				

PB037	Blockchain Management	As an Admin, I want to verify and validate	Should
		blockchain transactions	
PB038	Data Integrity	As the System, I want to store transaction	Must
		records immutably on blockchain	
PB039	System Monitoring	As a Super Admin, I want to monitor	Should
		blockchain health and performance	
	Syste	em & Security Features	
PB040	Authentication	As the System, I want to automate authenti-	Should
		cation and session management	
PB041	Notifications	As the System, I want to generate real-time	Could
		notifications for relevant users	
PB042	Data Consistency	As the System, I want to maintain transaction	Should
		consistency across the platform	
PB043	Security	As the System, I want to ensure secure com-	Should
		munication between AI and database	
	De	vOps & Infrastructure	
PB044	CI/CD	As a Developer, I want CI/CD pipelines to	Must
		build project images on GitHub	
PB045	Deployment	As a Developer, I want to automate image	Must
		deployment to GCP registry	
PB046	Deployment	As a Developer, I want to auto-deploy back-	Must
		end services and database	
PB047	Containerization	As a Developer, I want to containerize appli-	Must
		cation components with Docker	
PB048	Web Deployment	As a Developer, I want to automatically de-	Should
		ploy the web app frontend	
PB049	Mobile Deployment	As a Developer, I want to automate mobile	Should
		app deployments to Play Store	
PB050	Versioning	As a Developer, I want to implement version-	Should
	-	ing for mobile app releases	
PB051	Monitoring	As an Admin, I want to monitor system health	Could
		and performance	
PB052	Configuration	As a Super Admin, I want to manage envi-	Could
	-	ronment configurations	
Mobile App Specific Features			
		Continued on	next page

PB053	Mobile UI/UX	As an Investor, I want a responsive, intuitive	Should
		mobile interface	
PB054	Notifications	As an Investor, I want to receive push notifi-	Should
		cations about my investments	
PB055	Offline Access	As an Investor, I want offline access to my	Should
		basic portfolio information	

2.7 Sprint planning

In order to complete the project within the deadlines set by the internship agreement, planning is an important step in the process. It was therefore necessary to define the essential steps and estimate the time to be devoted to the completion of the various tasks. To do this, we made a GANTT chart.

In our project management, we opted for the proportional distribution method in order to estimate the costs. Figure 2.4 shows the Gantt chart that describes the progress of our project:

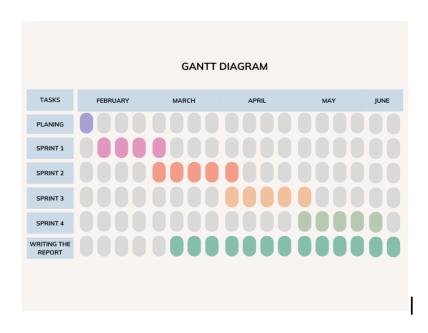


Figure 2.4: GANTT chart with sprint planning

2.8 Conclusion

Our Sprint 0 marked the exciting start of our KORPOR project. We defined global and specific objectives, developed a solid architecture, and configured an optimal working

environment. With a clear vision of the initial product backlog and preliminary planning for upcoming sprints, we are ready to achieve our vision and achieve our goals successfully.

CHAPTER 3

Design and Implementation

3.1 Introduction

In this chapter, we will present the design and implementation of our KORPOR application. We will start by explaining the design phase, including the database design, architectural choices, and UX/UI design decisions. Then, we will detail the implementation process, discussing the technologies used, coding standards followed, and integration of different components.