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Department of Computing and Information System (CIS)

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APPROVAL

This Project titled "**IELTS Pro**", submitted by **Sanaullah Efte Sani**, ID: **211-16-569** to the Department of CIS, Daffodil International University has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in CIS and approved as to its style and contents. The presentation has been held on 31-05-2025.

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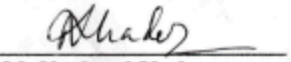

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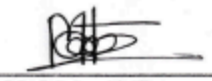

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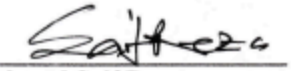

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Declaration

I hereby declare that; this project has been done by me under supervision of **Ms. Sonia Nasrin, Lecturer**, department of Computing and Information System (CIS) of Daffodil International University. I am also declaring that this project or any part of there has never been submitted anywhere else for the award of any educational degree like, B.Sc., M.Sc., Diploma or other qualifications.

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I am sincerely grateful to them for their kindness, assistance, and belief in my abilities. Their mentorship has not only helped me navigate through difficult tasks but has also taught me how to excel in demanding situations and handle large-scale projects in the future.

Abstract

IELTS Pro is an online program using AI to give learners resources for preparing for the IELTS exam through a practical, updated and full-featured environment. Google AI is used in improving the platform's automated assessment, so speaking and written responses can be reviewed in real time with an accurate result. With IELTS Pro, you have access to a variety of features including a dashboard, test practice modules, ways to track your progress and a large reference library. Because it has online tests, live lessons, AI analysis and a total band score, it is distinct from usual methods of study. Built on Next.js, Tailwind CSS, Firebase and MongoDB, the system provides strong performance, easy user authentication and can manage data smoothly.Adding Radix UI components simplifies site use and access for all users on any device. Many individuals who wish to prepare for the IELTS but have difficulty reaching centers will find this application useful. Besides, the platform is planning to provide practice sessions, ceremonial score certificates and extra live classes. We are using agility, laying out a clear plan for development, picking the team members and focusing on testing modules piece by piece. According to what we have studied, the business, technology and operations will all function well and our tests have revealed that color, logos and artificial intelligence are working correctly. Among the architecture files, you'll see use case diagrams, class and sequence diagrams and folders organized so updates can be easily made in the future. IELTS Pro is designed to close the learning gap through personalized help and study programs for every user. AI accuracy and user experience issues were found, yet development and testing solved them. On the whole, IELTS Pro encompasses the most important modern ideas and tools for studying and testing languages.

Table of Contents

List of Figures:

List of Tables:

1. Chapter 1: Introduction

1.1 Introduction

IELTS Pro is an AI-based online resource built to help individuals get ready for the International English Language Testing System (IELTS) exam. Because so many seek educational, work or migration chances beyond their home country, the IELTS is now considered a key measure of English abilities. IELTS Pro simplifies and improves how to get ready for the test using a modern, adaptable and enjoyable study method that addresses the needs of all learners.Because it uses Next.js, Tailwind CSS, Firebase and MongoDB, the platform is powerful and easy to use. There are practice segments for Listening, Reading, Writing and Speaking which are the same as the sections you'll find in the real exam. Using Google AI is what helps IELTS Pro to give meaningful feedback on Speaking and Writing, areas where automated systems commonly do not perform well.

Those using the platform enjoy personalized dashboards, progress tracking, a wide variety of learning resources and educational blogs filled with information. It does not matter if a candidate is just beginning or ready for the test; IELTS Pro is flexible and leads each candidate individually.IELTS Pro is currently working on and developing additional features. The integration of live sessions, creating certificates and offering intensive practice camps are planned to enhance your learning. Since IELTS Pro supports self-study as well as advice from IELTS experts, it is always ready to help those aiming for IELTS success.

1.2 Purpose of Project

- IELTS Pro exists to support individuals getting ready for the IELTS exam with an intelligent, accessible and useful system. Movements in the world require students and professionals to handle difficulties like a lack of guidance, hard access to good information and following their performance. IELTS Pro addresses all these issues by supplying a single, central solution that mirrors the conditions of the test, grades performance

using AI and helps learners improve with clear feedback.

- We are aiming to apply modern technology so that our system remains smart and scalable. With Google AI for Speaking and Writing assessments, IELTS Pro instantly shows you an estimate of your official IELTS band score. For this reason, the platform is both faster and better at tailoring practice to each person's needs. Also, students use progress charts, available resources and test analyses to guide their study and remain encouraged all the way.

- In addition, IELTS Pro is created to adapt as user requirements change in the future. The platform does more than simply offer practice tests; it aims to construct a full IELTS ecosystem. Live sessions, certificates and practice camps which have been designed, will interactively support learning in both solo and classroom settings. The goal of IELTS Pro is to help anyone around the world feel prepared and efficient for the important exam of IELTS.

2. Chapter 2: Initial Study

2.1 Project Proposal

IELTS Pro uses AI to guide individuals as they prepare for the IELTS exam on the web. This website allows you to practice in realistic test environments for Listening, Reading, Writing and Speaking, plus you get instant help and can keep an eye on your progress. Since Google AI helps to evaluate answers, IELTS Pro gives fair live scores that follow the same guidelines as the real IELTS. The site is developed with Next.js on the frontend, Firebase for registration and MongoDB for data storage, supporting quick load times, growth and a simple experience for visitors.

Besides standard test preparation, it includes valuable options such as talking to teachers in real time, accessing free mock exams and their final scores and using an engaging user dashboard. Members of Byju's can study from a wide range of resources, get performance data generated by AI and later register for practice camps and certification. The course is meant for both students interested in English and educators seeking scaled-up IELTS training options. The aim is to give learners around the world a reliable, intelligent and engaging resource for reaching their IELTS targets.

2.2 Project Scope

IELTS Pro includes building a complete web application to support comprehensive exam preparation for the IELTS test. Users will have access to interactive tests for all four modules: Listening, Reading, Writing and Speaking. Google AI technology will be used to strengthen the scoring and feedback in the Speaking and Writing parts of the test. Users can view a personal dashboard to monitor their advancement, see records of tests they have taken and get analytics that point out what they are good or not so good at.

The IELTS Pro package will also offer extra services such as a resource library, a blog with educational information and the ability to attend live session classes. To authenticate users and manage the data, backend infrastructure will use Firebase and MongoDB. To begin, the app includes only practice tests and an artificial intelligence system, but planned updates will offer practice camps, score certificates and more live interaction. The service is meant for IELTS candidates all over the world, providing a simple, approachable and adaptive way to learn.

2.3 Background of the project

IELTS is known around the globe as a major test of English skills used for educational, immigration and work purposes. Even though the IELTS is important around the world, lots of candidates have difficulties finding quality, detailed and personal prep tools that reflect the exam's structure. Because immediate feedback is rare in traditional preparation, it's difficult for learners to understand their weak areas and boost their performance, especially when it comes to Speaking and Writing.

Because AI is advancing so quickly, new opportunities arise to advance language test prep by giving automatic, reliable feedback and scores. The founders of IELTS Pro wanted to meet these needs by adding AI-based assessment to a dedicated web portal. Using innovative web tools, intelligent analysis and informative content, IELTS Pro seeks to make it easier and more helpful

for candidates to study for their IELTS exams.

2.4 Objective

- We want to make IELTS Pro a web platform that offers IELTS candidates structured practice tests, lets them keep track of their improvements and gives them instant responses through AI-based feedback. Every area of the IELTS exam mimics the main aspects and difficulty of the real examination, including Listening, Reading, Writing and Speaking. Users prepare themselves for the real environment and improve the skills important for exam situations.

- Apart from practice tests, IELTS Pro aims to create a friendly and engaging way to study and learn. The tool has a simple design, a centralized collection of documents and includes live training integration and tests that students can practice for free. Because of these parts, every learner has access to a complete preparation system. Because of AI, users instantly know their strong and weak subjects which makes it simpler for them to focus on growth.

- Additionally, the platform is evolving to include features like practice camps and digital score certificates. These additions are intended to further motivate users and provide measurable milestones on their IELTS journey. The system emphasizes accessibility, engagement, and personalized learning paths, ensuring that each user not only prepares effectively but also gains the confidence to achieve a high band score.

3. Chapter 3: Literature Review

3.1 Discussion on problem domain based on published article

Each year, people take the IELTS exam around the globe because it is used as a common test for anyone looking to study or migrate abroad. Although a lot of people need advice, many learners encounter great difficulties in getting ready for the exam. As revealed in a study published in the Asian EFL Journal (2019), chances for candidates to use good practice materials and receive feedback promptly are few, mainly in areas such as Writing and Speaking. Personalized evaluation of these components is uncommon in written materials and rigid apps.

In addition, a recent Journal of Educational Technology & Society article pointed out that using adaptive tools and AI is crucial in language education. The project revealed that using AI in learning platforms results in better learning because of immediate feedback and following progress closely. Even now, most tools for IELTS preparation require manual help, are not very interactive and give general feedback.

To tackle these issues, IELTS Pro uses state-of-the-art artificial intelligence from Google to judge user responses in Writing and Speaking with consistency. TestPagelabs stands out by letting students score, get specific recommendations and track their results all within the same place. It fits with the findings in recent studies that encourage using intelligent tutors to make learning a language easier for students working independently.

3.2 Discussion on problem solution based on published article

Since IELTS preparation often struggles with feedback, good practice materials and no clear way to track improvement, some researchers suggest including smart technologies into learning tools. Results from a 2020 paper in the Computers & Education journal suggest that using AI for assessment improves learners' ability to spot their errors and understand what they did wrong in tasks such as essay writing and basic speaking practices. Such tools behave like a human tutor and deliver consistent judgments that are rarely obtainable through manual assessments.

It makes use of this evidence by including Google's AI in the scoring and evaluation of Writing and Speaking. Data from a 2021 report in the International Journal of Artificial Intelligence in Education show that AI in scoring leads to faster feedback and keeps learners more interested because they receive immediate insights. Additionally, IELTS Pro uses data analysis to watch user improvements and matches what Journal of Learning Analytics (2019) found about the benefits of visual progress reports on motivation and learning speed.

IELTS Pro, through AI assessment, adaptive feedback and a centralized dashboard, has been developed according to the modern technology standards found in education. It allows users to learn, practice and get better in a measurable, personal and effective way, linking self-study and traditional tutoring.

3.3 Comparison of three leading solutions-

Unlike IELTS Liz, IELTS Pro uses AI to score you and offer feedback as you work, not just supply tips. Magoosh gives tests based on pre-made plans and can be accessed through mobile devices, but you must check the scores yourself. What makes IELTS Pro different are its personalized reports and live sessions.

Platform	Best Feature	Limitations
IELTS Pro (Proposed)	AI-based auto scoring (Writing & Speaking), real-time feedback, progress analytics, live sessions, and full mock tests with overall band score	Still in development, future features like practice camp and certificate are pending
	Expert IELTS tips, clear video lessons, widely trusted by students globally	No personalized progress tracking, no AI-based feedback, and limited interactive tests
Magoosh IELTS	Structured study plan, high-quality practice questions, mobile app support	Speaking and Writing feedback is not real-time (requires manual evaluation), limited free content

3.4 Recommended approach

The suggested way to develop IELTS Pro is to use a web application design that allows for progressive enhancement with today's technologies. Develop the main functions—the Listening, Reading, Writing and Speaking tests—on Next.js for frontend actions and with Firebase for making sure user access is safe. MongoDB is responsible for storing all user data, performance and feedback.

For smooth and unbiased teaching, start rating Students' Writing and Speaking automatically using Google Artificial Intelligence. A custom dashboard must exist for each user, so they can watch their progress, examine analytics and find relevant recommendations. Choose Tailwind CSS and Radix UI to keep the site's interface neat and easy to use.

Start increasing the platform's size by adding live sessions, certifications through mock tests and support from the community. Because this process puts users first, the IELTS Pro tool will always be improved, smart and user-friendly for preparing for IELTS.

4. Chapter 4: Methodology

4.1 What to use

In order to develop IELTS Pro, we use Next.js, a React framework that gives server-side rendering and simple routing, together with Tailwind CSS for effective, responsive design. Radix UI will give users both accessibility and the flexibility to customize their applications. Firebase Authentication will ensure the app uses secure user authentication and all changes will be deployed to Vercel for improved performance.

Many of the user profiles, tests and feedback are saved thanks to MongoDB on the backend. Using Genkit, Google's AI for writing and speaking, learners will receive instant, fair feedback for their tasks. Vercel Analytics will keep an eye on how your website is being used and how it performs. You can handle blog and resource content using MDX or Sanity, a headless CMS. Because of this combination, the platform becomes better for IELTS practice by being easy to use, easy to scale and smart.

4.2 Why to use

The chosen technologies have been designed to ensure Pro performs effectively, is easily scalable and can be used with pleasure. Thanks to Next.js, my web app will benefit from quick pre-rendering on the server which matters a lot for a web app used worldwide. Using Tailwind CSS speeds up styling and keeps everything looking the same on any screen and Radix UI adds to this by ensuring all components are accessible and can be changed as needed.

Firebase Authentication offers a safe and straightforward way to add user login, allowing different ways to log in. With MongoDB, you can store user information, testing results and feedback easily and without limits.

Genkit allows for instant, correct scoring of subjective tests such as Speaking and Writing, by

handling the process more efficiently than traditional manual systems. Vercel Analytics supports us in checking website stats and watching how users interact with the platform. Using all of these tools, we are able to provide a robust, intelligent and user-friendly IELTS solution.

4.3 Sections of Methodology

Requirement Analysis:

Identifying what users need, knowing the most important features and making project goals that match the structure of IELTS and typical candidate challenges.

System Design

Designing the structure of the system, covering activities between the frontend and backend, the database setup and how AI is applied.

Technology Selection

Evaluating project needs and using Next.js, Firebase, MongoDB and Google AI to solve those needs.

Frontend Development

Next.js, Tailwind CSS and Radix UI have been used to produce user pages that work and look well on any device.

Backend Development

Implementing APIs, authentication with Firebase, and managing data storage in MongoDB.

AI Integration

Integrating Google AI for automated scoring and feedback on Speaking and Writing modules.

4.4 Implementation Plan

Phase 1: Requirement Gathering & Planning

- Define detailed functional requirements and user stories.
- Finalize technology stack and system architecture.
- Prepare project timeline and milestones.

Phase 2: Frontend Development

- Develop core UI components using Next.js, Tailwind CSS, and Radix UI.
- Build main pages: Landing, About, Blog, Contact, and User Dashboard.
- Implement responsive design and accessibility features.

Phase 3: Backend Development

- Set up Firebase Authentication for user management.
- Design and develop RESTful APIs for tests, user data, and resources.
- Integrate MongoDB for data storage.

Phase 4: AI Integration

- Integrate Google AI for Writing and Speaking test evaluation.
- Develop logic to provide real-time feedback and scoring.

Phase 5: Testing

- Conduct unit testing for frontend and backend components.
- Perform integration testing to ensure smooth end-to-end functionality.
- Gather beta user feedback and fix issues.

Phase 6: Deployment & Monitoring

- Deploy the application on Vercel or similar platforms.
- Set up analytics and monitoring tools.
- Prepare documentation and user guides.

Phase 7: Future Enhancements

- Add live sessions, practice camps, and certification features.
- Continuously update content and improve AI accuracy.

5. Chapter 5: Planing

5.1 Work Break Down structure

A Work Breakdown Structure (WBS) represents the management and organization of tasks for a project as a hierarchy. It allows us to easily see the breakdown of the project, what is planned for the results and how each part of the work is connected. We have taken apart our project and decided on a timetable showing which parts will spend how much time in development. Sometimes, it guides us to look at the whole project in a specific timeframe intended for that job.

Task/Phase	Start Date	End Date	Duration	Description
Requirement Gathering & Planning	5 Nov 2024	15 Nov 2024	11 days	Define requirements, finalize tech stack, plan
Frontend Development - Core UI	16 Nov 2024	31 Dec 2024	46 days	Build landing page, dashboard, about, blog, contact
Backend Development Setup	16 Nov 2024	31 Dec 2024	46 days	Setup Firebase Auth, MongoDB, API design
Frontend Development - Tests UI	1 Jan 2025	31 Jan 2025	31 days	Develop Listening, Reading, Speaking, Writing pages
AI Integration	1 Feb 2025	28 Feb 2025	28 days	Integrate Google AI for scoring and feedback
Testing (Unit & Integration)	1 Mar 2025	31 Mar 2025	31 days	Perform testing, bug fixes, user feedback
Deployment & Monitoring Setup	1 Apr 2025	15 Apr 2025	15 days	Deploy app, set up analytics and monitoring
Documentation & User Guides	16 Apr 2025	30 Apr 2025	15 days	Prepare manuals and support documents
Future Features Planning	1 May 2025	15 May 2025	15 days	Plan live sessions, certificates, practice camp

Figure 5-1: Work Break down Structure

5.2 Resource Allocation

When completing a project, resources include everything needed for human and physical work to reach the goals successfully. When looking at real project implementation, it is obvious that projects succeed when tasks are shared between the team members and all available resources are used. Below, you'll find the overview of resource allocation, as well as what each stakeholder is responsible for, from the user phase to project management.

Task/Phase	Duration	Resources Required	Roles/Responsibilities
Requirement Gathering & Planning	11 days	Project Manager, Business Analyst	Define requirements, plan milestones, tech stack finalization
Frontend Development - Core UI	46 days	2 Frontend Developers, UI/UX Designer	Build pages, design UI, implement responsive layout
Backend Development Setup	46 days	2 Backend Developers	Setup authentication, database, APIs
Frontend Development - Tests UI	31 days	2 Frontend Developers	Develop interactive test interfaces
AI Integration	28 days	1 AI Specialist, 1 Backend Developer	Integrate AI scoring, feedback mechanisms
Testing (Unit & Integration)	31 days	QA Engineer, Developers	Test all components, fix bugs
Deployment & Monitoring Setup	15 days	DevOps Engineer, Backend Developer	Deploy app, configure monitoring and analytics
Documentation & User Guides	15 days	Technical Writer, Project Manager	Create manuals, guides, and FAQs
Future Features Planning	15 days	Project Manager, Product Owner	Plan next-phase features and improvements

Figure 5-2: Resource Allocation

5.3 Time Boxing

When managing projects, time boxing means organizing time into fixed time frames known as time boxes. It guides choosing what to do first, how important each step is and defining any deadlines for finishing the tasks. In our project the process is broken down into certain preceding time boxes as indicated below:

Phase/Task	Time Box Duration	Start Date	End Date	Focus
Requirement Gathering & Planning	2 weeks	5 Nov 2024	15 Nov 2024	Finalize requirements, plan scope and tech stack
Frontend Dev - Core UI	6 weeks	16 Nov 2024	31 Dec 2024	Build landing, dashboard, about, blog, contact pages
Backend Setup	6 weeks	16 Nov 2024	31 Dec 2024	Firebase auth, MongoDB setup, API design
Frontend Dev - Test Modules	4 weeks	1 Jan 2025	31 Jan 2025	Listening, Reading, Speaking, Writing interfaces
AI Integration	4 weeks	1 Feb 2025	28 Feb 2025	Integrate AI scoring and feedback
Testing & Bug Fixing	4 weeks	1 Mar 2025	31 Mar 2025	Unit, integration, UAT testing
Deployment & Monitoring	2 weeks	1 Apr 2025	15 Apr 2025	Deploy app, configure analytics and monitoring
Documentation	2 weeks	16 Apr 2025	30 Apr 2025	User guides and manuals
Future Features Planning	2 weeks	1 May 2025	15 May 2025	Plan live sessions, certification, practice camp

Figure 5-3: Time Boxing

5.4 Gantt chart

A Gantt chart is used to present tasks, important steps and a project's schedule date by date in a timeline. It shows all the project activities as graphs, outlining their timings and linkages, so planning, coordination and following project progress becomes easier.

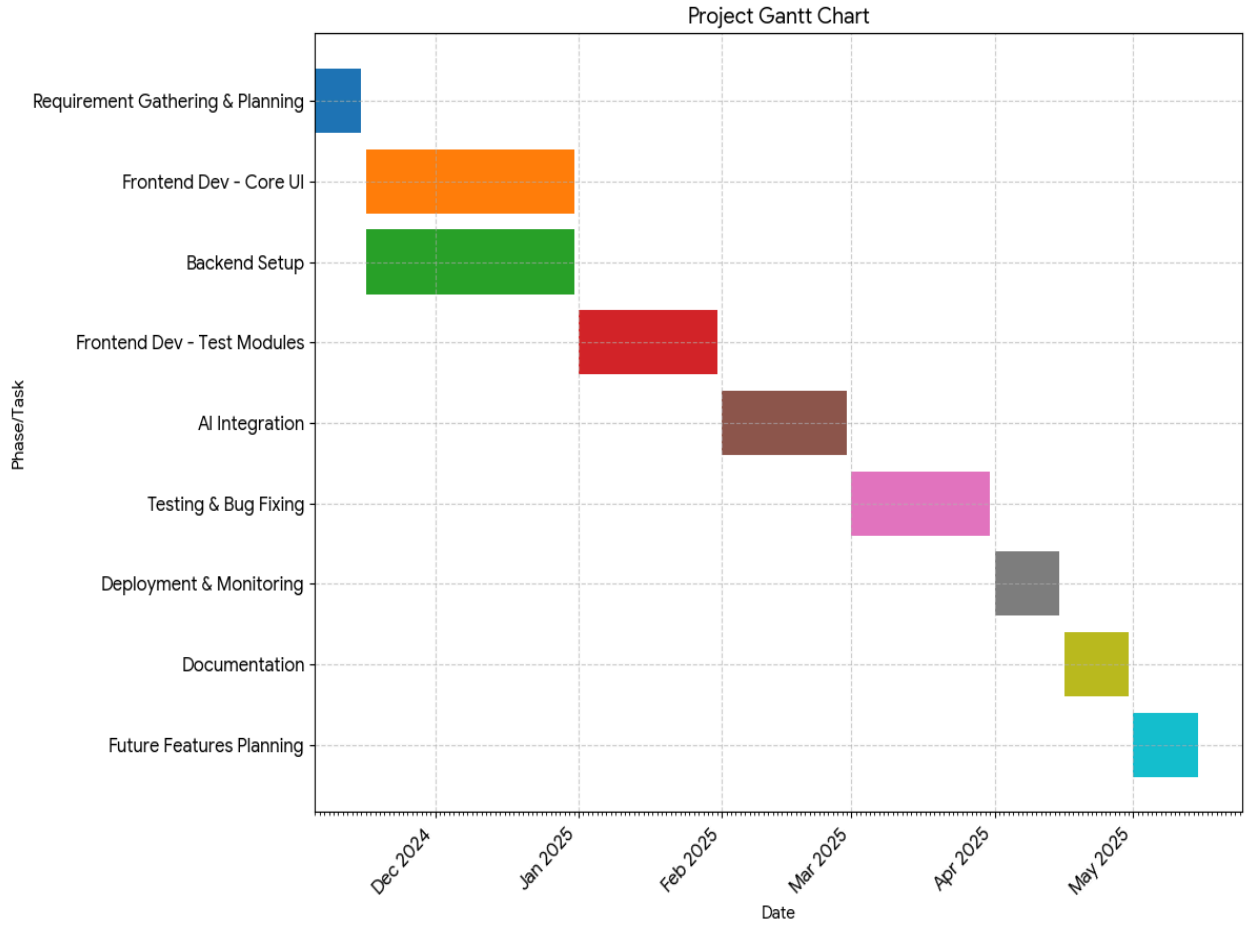


Figure 5-4: Gantt chart

6. Chapter 6: Feasibility Study

6.1 All possible types of feasibility study:

A feasibility study helps determine if a project is likely to be successful from several different views. The common types include Technical Feasibility, Economic Feasibility, Operational Feasibility, Legal Feasibility and Schedule Feasibility. Carrying out these feasibility studies enables us to pinpoint risks, required resources and challenges at an early stage to direct better decisions.

6.2 Cost Benefit Analysis:

CBA is a structure where the up-front and on-going costs of a project are compared with the benefits it may deliver. It offers insight to decision-makers about if reward is worth the cost. Some costs are obvious such as building, running and fixing a system, while others, like worker training and periods when the system is out of action, are harder to see. The main benefits can be more money earned, saving time, enhancing how users interact or becoming ahead of the competition. Measuring these aspects in terms of money helps CBA assess both the worth and the possibility of a project. As a result of this analysis, we can set priorities, ensure resources are used appropriately and reduce financial dangers.

6.3 DSDM - good or not for this project:

The iterative and incremental method used in DSDM impacts well because the IELTS Pro project can regularly improve AI-based scoring and the interactive options in tests. The system is designed to make users participate, keeping the website current with the needs of test takers and the latest IELTS changes. The idea of time-boxing sets a schedule for on-time deliveries which is important for managing various features like listening, reading, writing, giving tests and holding live sessions. Furthermore, using DSDM, teams are sure to work closely and play distinct roles which helps the project remain aligned and of good quality.

Taking on DSDM's disciplined methods and the needed documentation can be hard for small teams or limited projects that lack resources. If the group likes to use smaller frameworks, Scrum or Kanban might be better for their work. No matter that, the flexible and orderly method used by DSDM means it helps manage the changing demands of IELTS Pro and supports quick, user-driven updates.

7. Chapter 7: Foundation

7.1 The problem area identification:

One of the main issues tackled by the IELTS Pro project is that no integrated AI-based platform exists that tailors thorough preparation for the IELTS exam to everyone's specific needs. Many existing programs either pick few exam topics or fail to deliver timely, customized feedback, especially for speaking and writing in IELTS. In addition, learners find it hard to keep track of their achievements and locate helpful tools together in one spot. Old ways of preparing students can take a lot of time and aren't always suitable for a learner's individual learning method. The aim of IELTS Pro is to overcome the problems of limited practice, poor feedback and divided sources by bringing together everything in one place, so that students can prepare correctly, understand their strengths and weaknesses and have increased confidence to do the exam.

7.2 Interview

During an interview, one person ask questions to learn about the other person's skills, knowledge or experiences. Most organizations use surveys for job hiring, research or receiving feedback to judge how suitable someone is, find out more about them and make the correct decisions.

7.3 Questionnaire:

1.How often do you use IELTS Pro to practice each week?
2.Which IELTS test section do you find most challenging?
3.How helpful do you find the AI-based score feedback in improving your skills?
4.What additional features would you like to see in IELTS Pro?
5.How satisfied are you with the overall user experience of the platform?

7.4 Requirement Specification:

The IELTS Pro platform is built to help people get ready for the IELTS exam by using an interactive web application that includes AI. There are main functions for practicing Listening, Reading, Writing and Speaking included in the application. Users should have the opportunity to take practice IELTS tests, provide their answers and receive quick feedback thanks to AI for evaluating Speaking and Writing. To improve the app, users should register and be authenticated (using Firebase), view progress and performance in tests and use the provided study resources. Users need to be able to choose the sections they want to test and keep track of their development over a long period using detailed data.

Non-functional requirements deal with easy use, efficient performance and the ability to grow. The app has to be built with Next.js and Tailwind CSS which make the interface responsive and accessible and ensures that it works fast on all devices. Physicians should use MongoDB to store and retrieve data smoothly. The solution needs to provide real-time analysis options and scale up when usage increases among the users.

8. Chapter 8: Exploration

8.1 Activity diagram:

Modeling a system or process, outlining needed processes. and discovering strengths and weaknesses is most effectively done by using an activity diagram. They offer a simplified vision of detailed tasks which helps individuals understand the organization's major activities. To support better assimilation, we separated our work into two phases: first, drawing the customization activity diagram; second, processing the orders. We have also created the full activity diagram.

Full Activity Diagram:

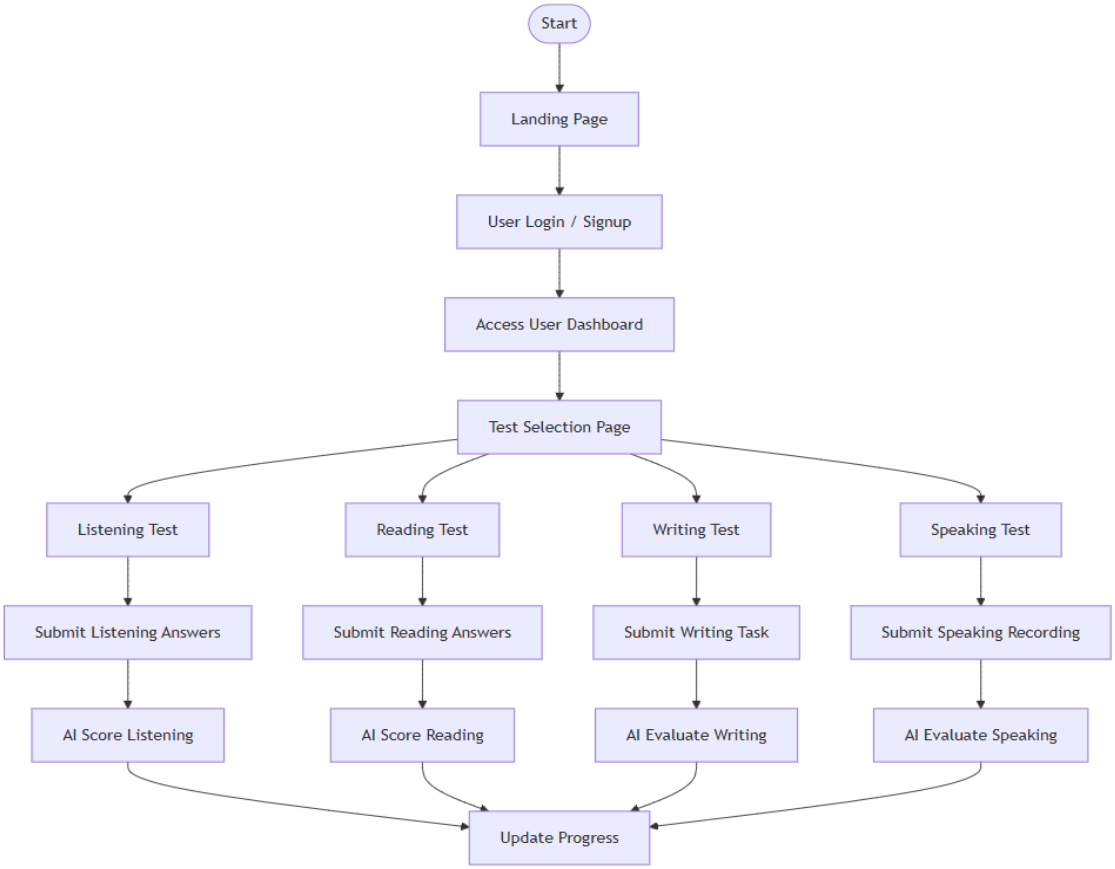


Figure 8-1: Activity Diagram of the full system

8.2 Full system use case:

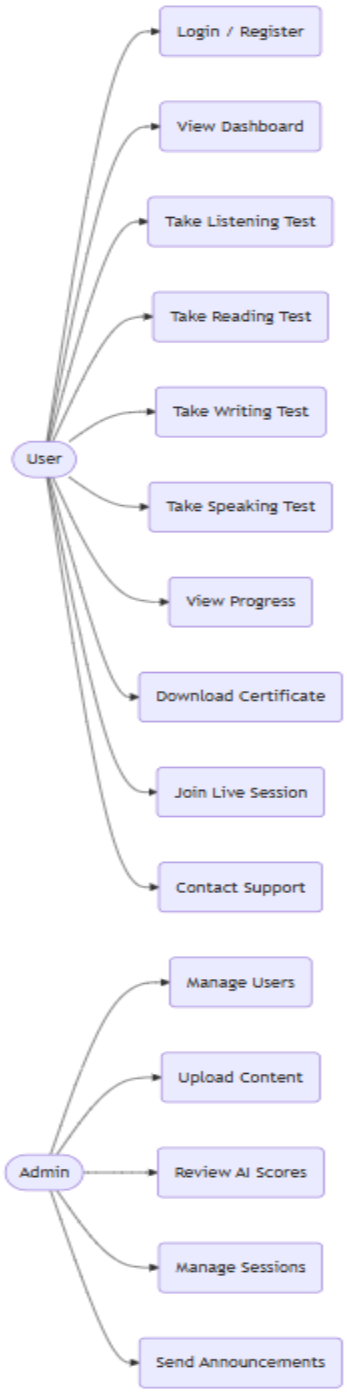


Figure 8-4: Full system use case

8.3 Use case of Dashboard:

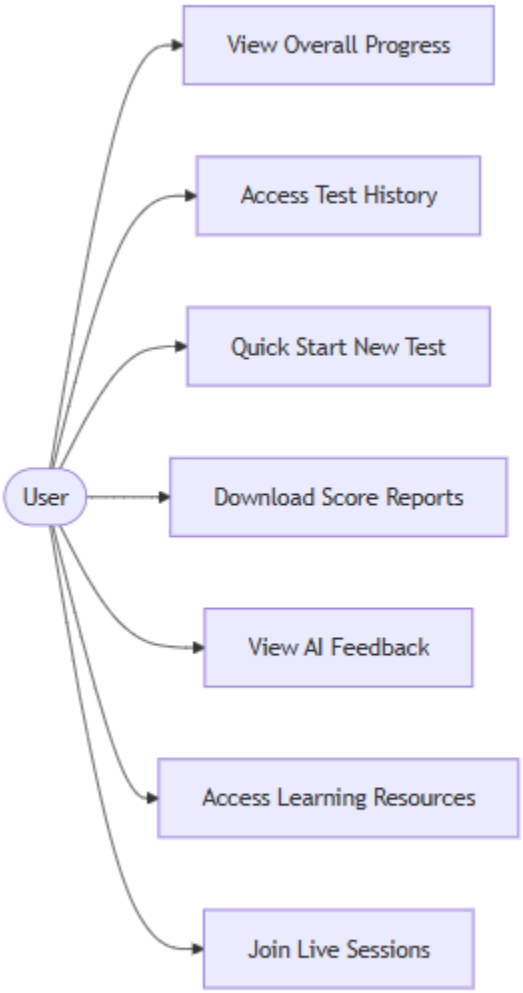


Figure 8-5: Use case of Dashboard

9. Chapter 9: Exploration

9.1 Module of the system:

Module Name	Description
Authentication Module	Handles user registration, login, logout, and session management via Firebase.
Dashboard Module	Displays user progress, test history, recommended tests, and quick access links.
Test Module	Allows users to take IELTS practice tests: Listening, Reading, Writing, Speaking.
AI Evaluation Module	Uses AI (Google AI/Genkit) to evaluate speaking and writing and generate scores.
Progress Tracker	Monitors user performance over time and shows analytics and score trends.
Resource Library	Provides access to study materials, guides, and downloadable content.
Blog Module	Displays articles, tips, and updates related to IELTS preparation.
Contact Module	Enables users to submit queries, feedback, or support requests.
Live Session Module	Allows scheduling and joining live IELTS practice sessions.
Certificate Module	Generates downloadable score certificates for completed mock exams.
Admin Module	Allows admin to manage practice camps, content, and generate reports.

Table 8.1.3-1: Table of Module system

9.2 Class diagram of the system:

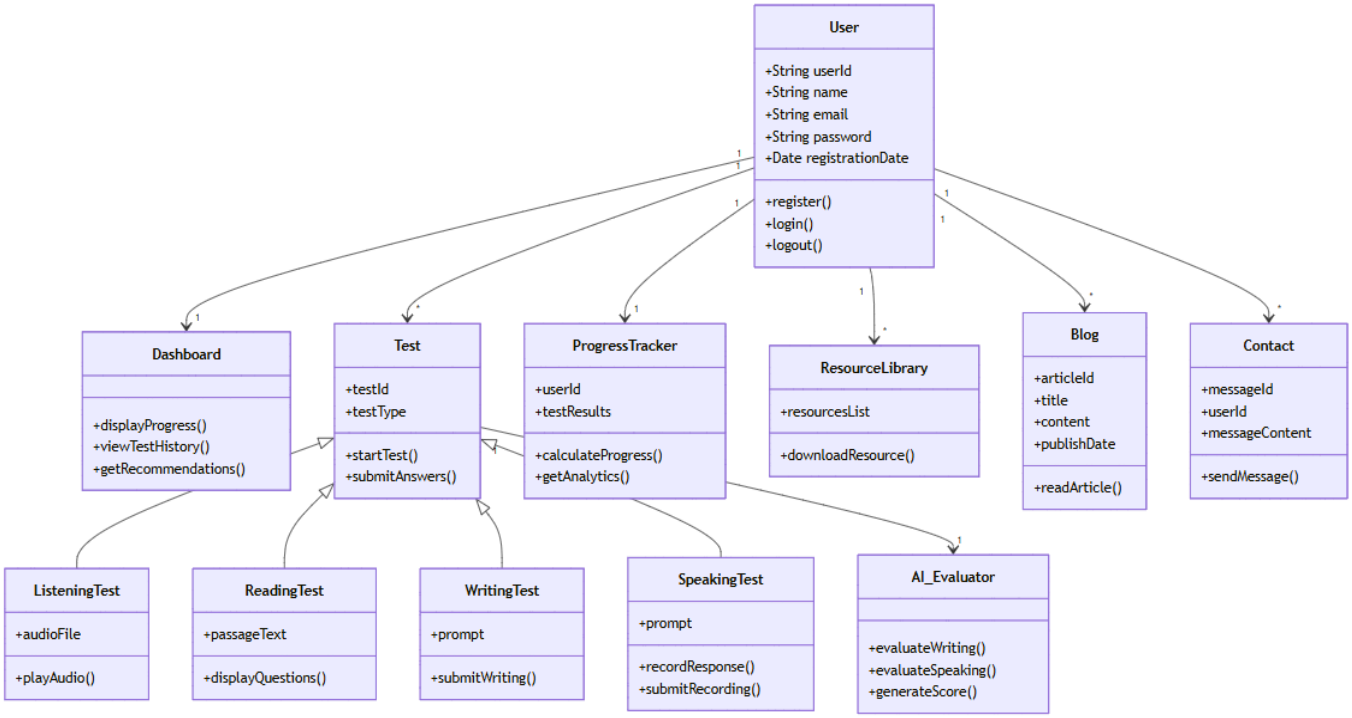


Figure 9-1: Class Diagram

9.3 Sequence diagram of the system:

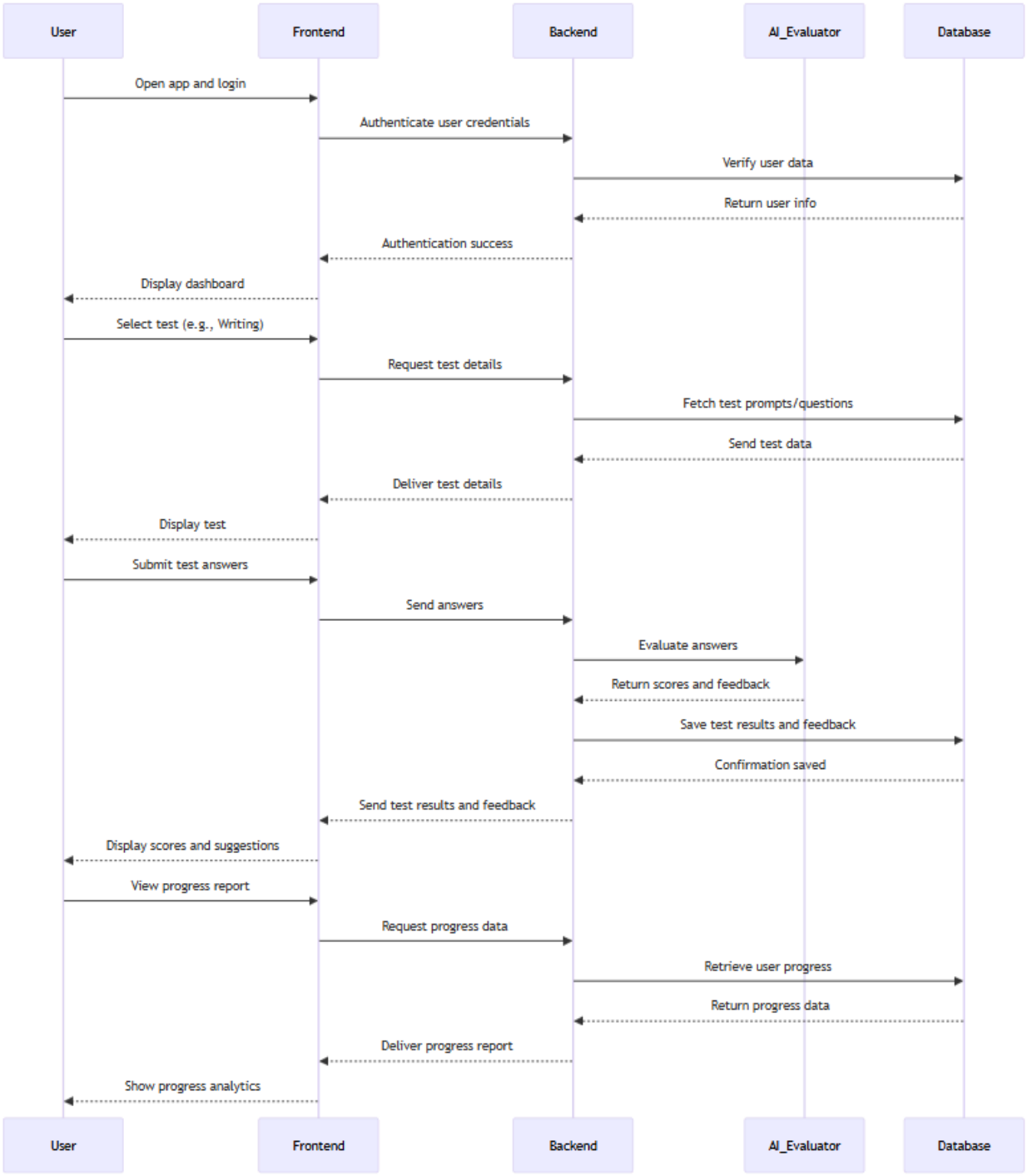
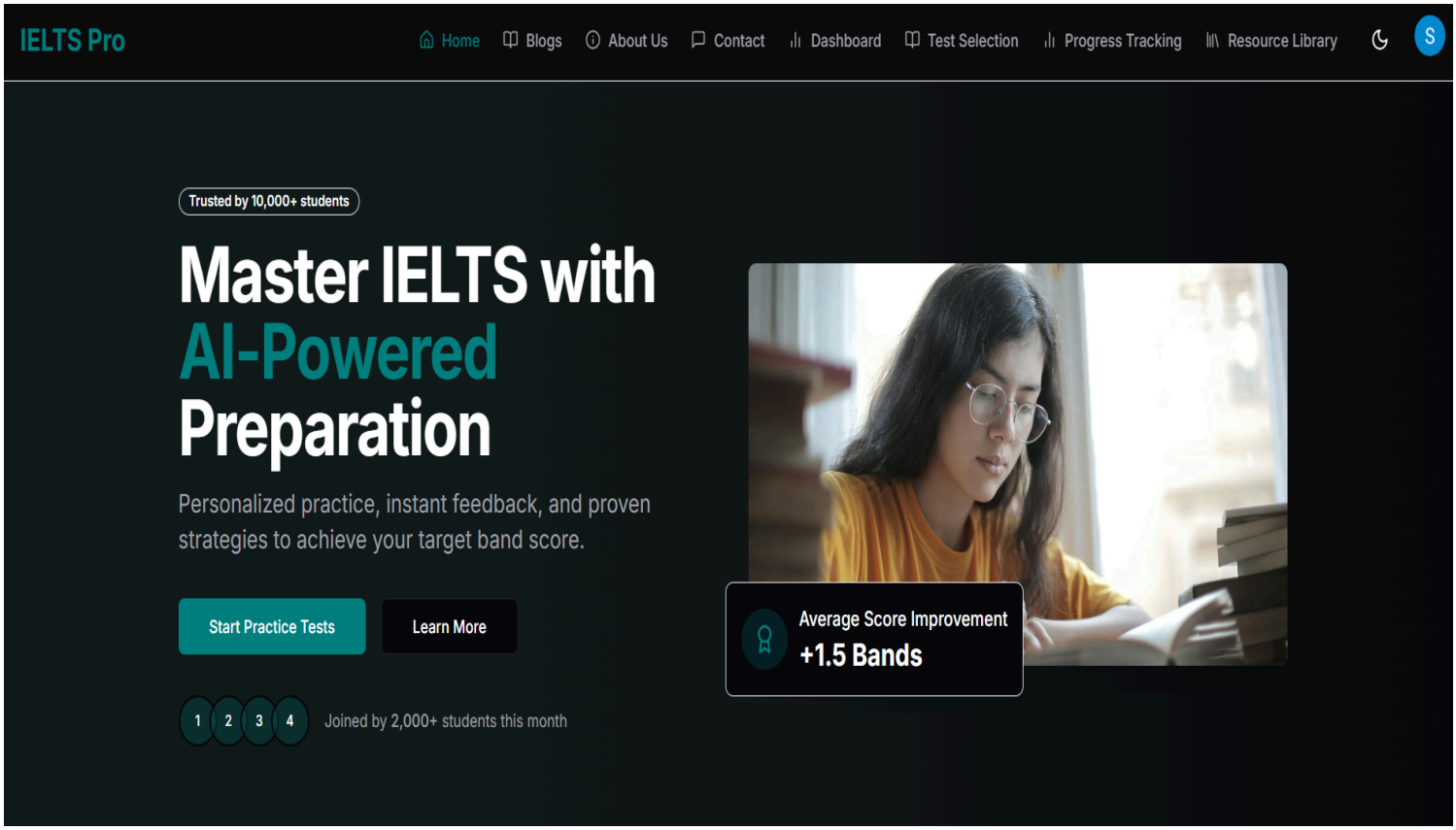
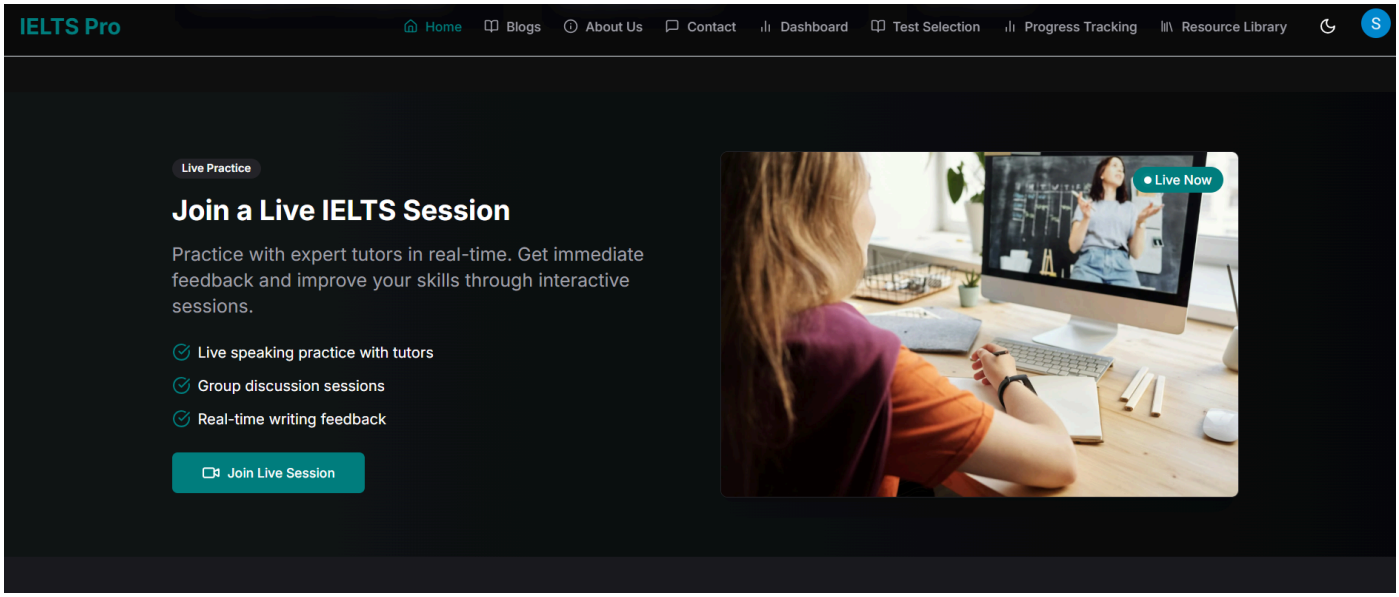


Figure 9-2: Sequence Diagram

9.4 High-fidelity prototype of the system:





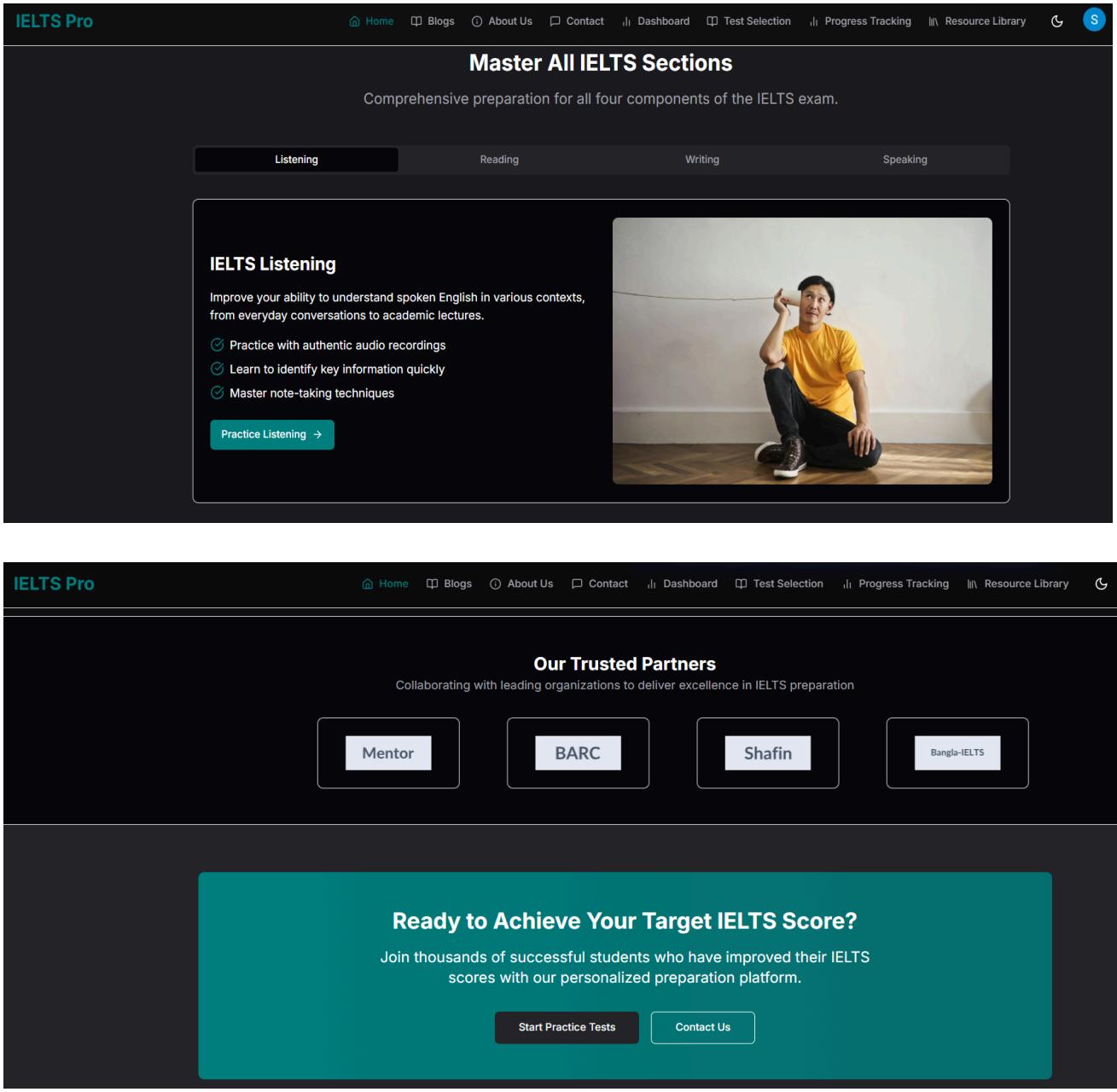


Figure 9-8: High Fidelity prototype (Home page)

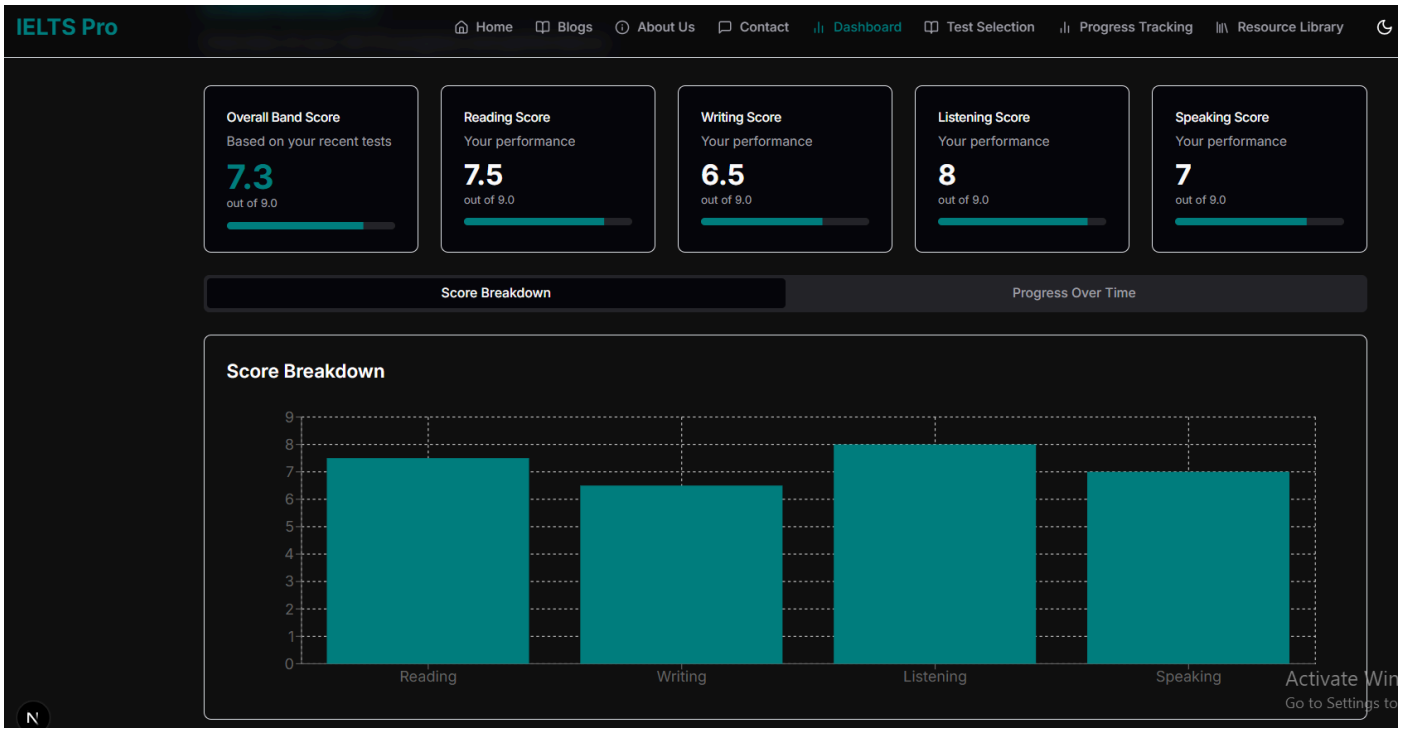


Figure 9-9: High fidelity prototype (Dashboard page)

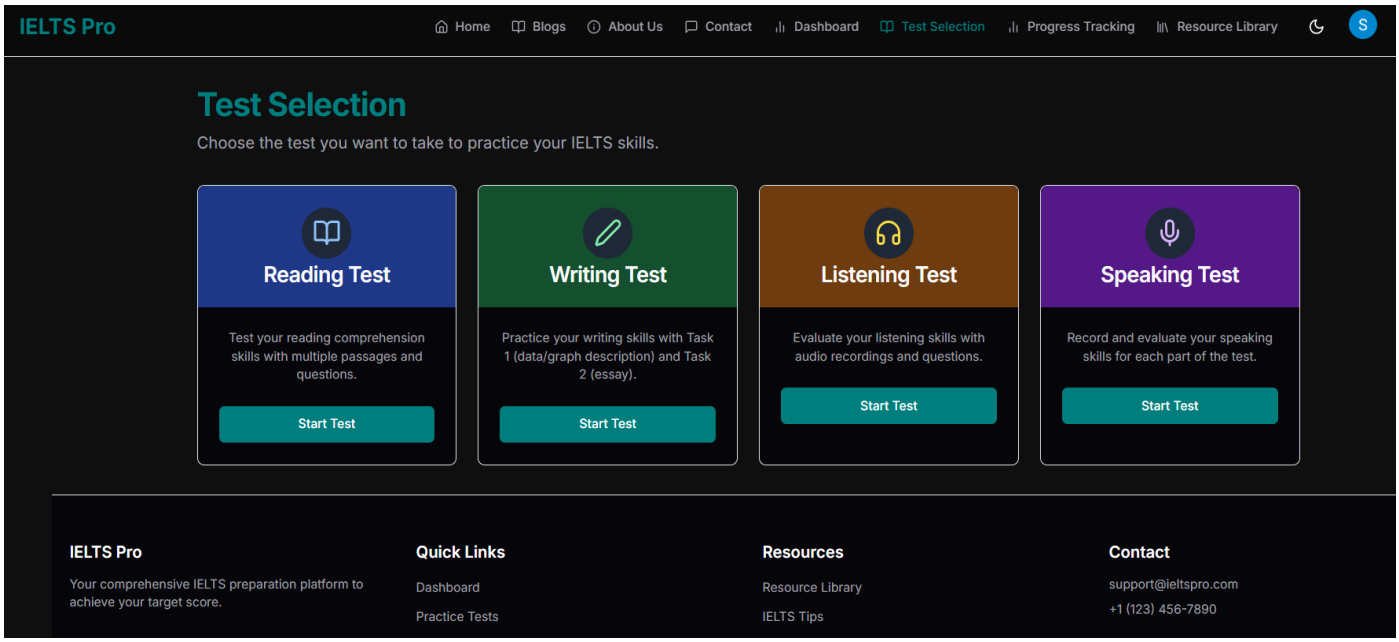


Figure 9-10: High fidelity prototype (Test Selection page)

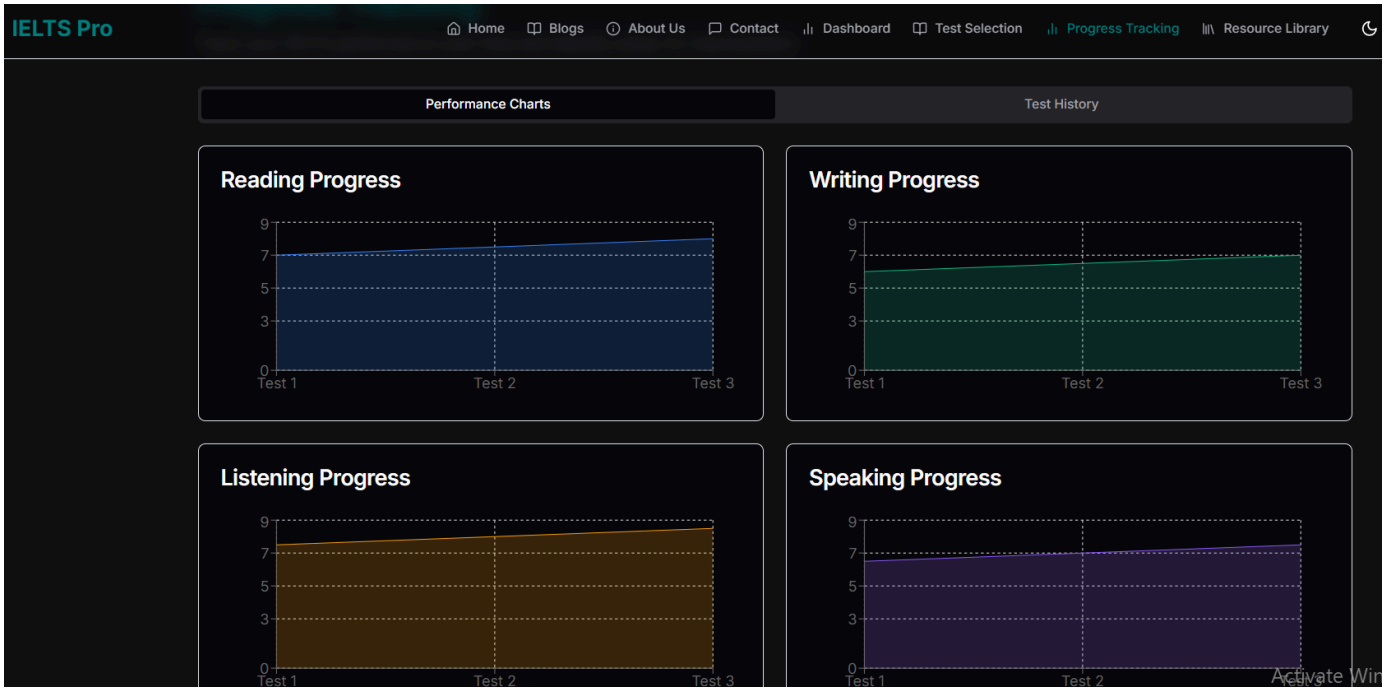


Figure 9-10: High fidelity prototype (Progress Tracking page)

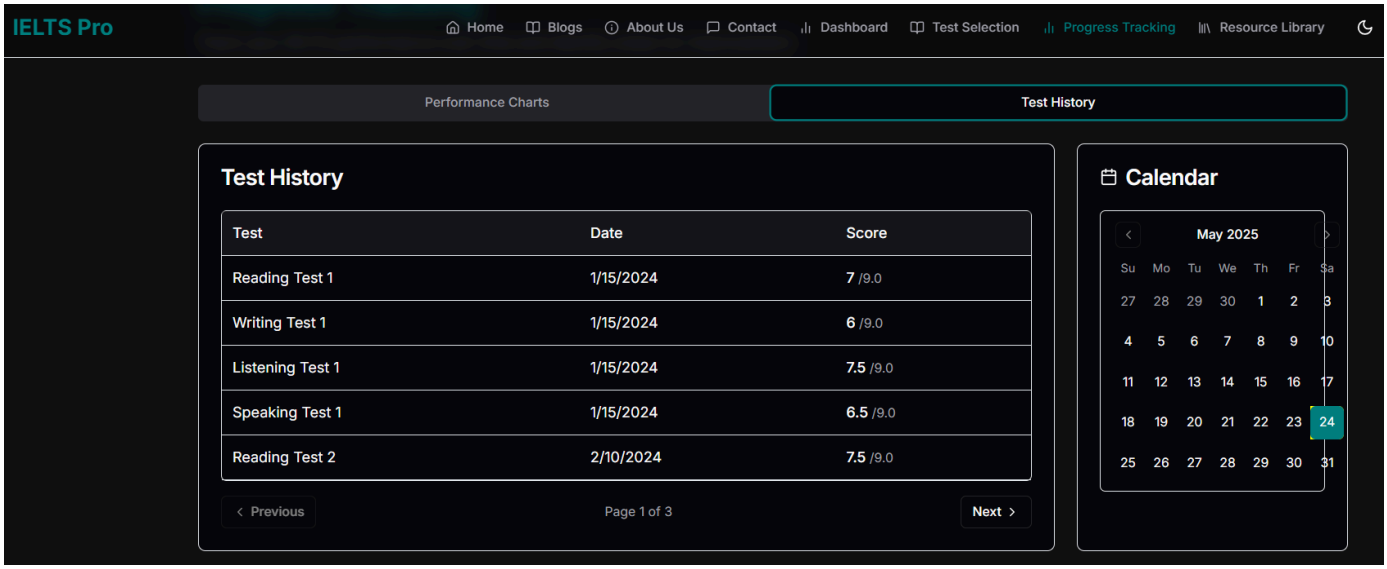


Figure 9-10: High fidelity prototype (Progress Tracking page)

10. Chapter 10: Development

10.1 Folder structure of the system:

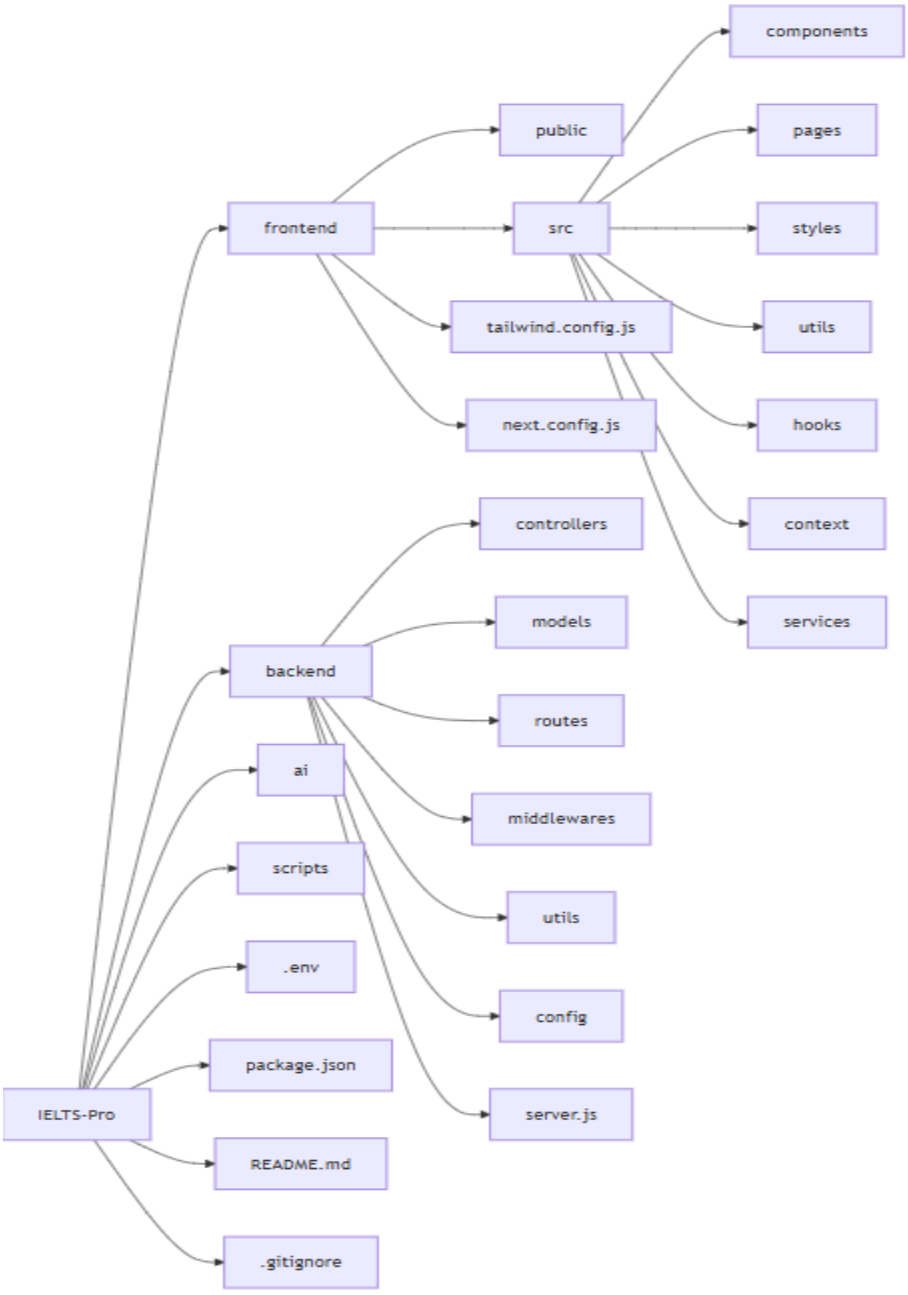


Figure 10-2: Client-side & Server-side Folder structure

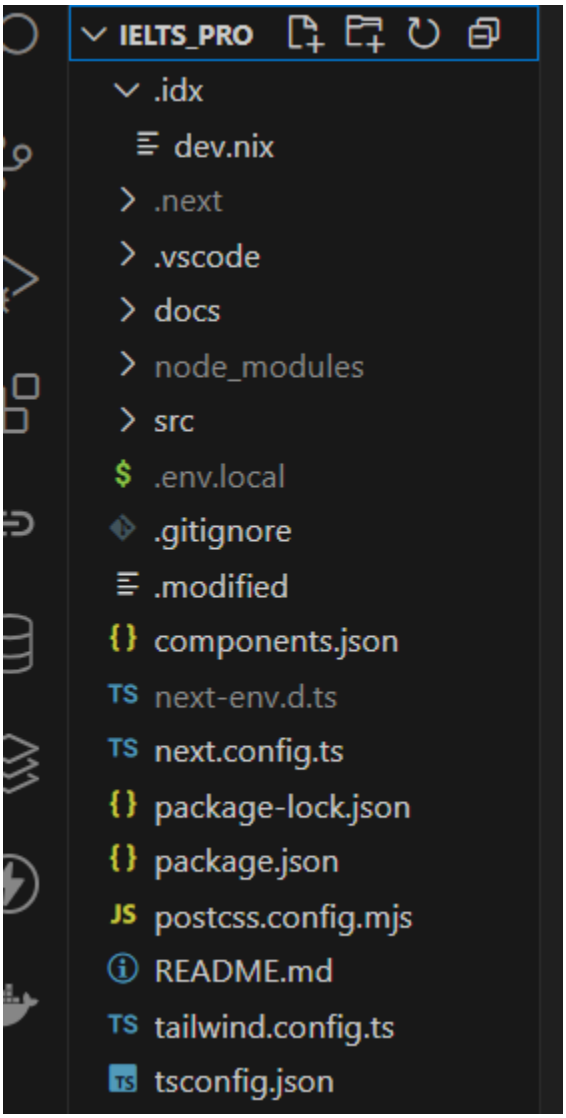


Figure 10-4: Actual folder Structure Sample

10.2 Prioritization while developing:

- It is necessary to organize tasks for IELTS Pro to be both practical and easy to use by users. Implementing the essential aspects that hold the application together is the first phase of development. They are user authentication, the dashboard, plus the four main tests: Listening, Reading, Writing and Speaking. Creating these features ahead of time allows users to use the platform for basic IELTS study right away.

- As soon as the main parts of the system are working efficiently, the AI evaluation process is given top priority. Having automatic, intelligent scoring and feedback sets IELTS Pro apart and supports positive learning results for the user. Then, users can track their achievements and find more materials in the resource library, while still working towards continuous development. Lastly, support for user participation and administrative duties, featuring blogs, in-person meetings, contact assistance and certification granting, is created. Because of this planned method, the first version of the product can be introduced on time and it can be improved continually using user feedback.

11. Chapter 11: Testing

11.1 Test Case:

Test Case ID	TC001
Test Case	User Login
Module	Authentication
Description	Verify that registered users can successfully log into the system with valid credentials.
Preconditions	User must be registered with valid credentials.
Test Steps	1. Navigate to the login page. 2. Enter valid email and password. 3. Click on the "Login" button.
Expected Result	User should be authenticated and redirected to the Dashboard page.
Actual Result	(To be filled during testing)
Status	Pass / Fail (To be filled during testing)
Remarks	(Optional notes)

11.2 Unit Testing:

Unit Test -1

Test Case Name	Unit Test -1
Test Case	Test the color adjustment functionality

Module	Function/Method	Description	Input	Expected Output	Status
Authentication	`login(email, password)`	Authenticates user login	Valid email & password	User object & success status	Passed
Authentication	`register(userData)`	Registers a new user	Valid user info	Confirmation message	Passed
Test Module	`startTest(testId)`	Initializes test environment	Test ID	Test questions loaded	Passed
Test Module	`submitAnswers(answers)`	Submits test answers	User answers	Confirmation & score update	Passed
AI_Evaluator	`evaluateWriting(text)`	Evaluates writing submission	Writing text	Score & feedback	Passed
Progress Tracker	`calculateProgress(userId)`	Calculates user progress	User ID	Progress data & analytics	Passed
Resource Library	`getResources(category)`	Retrieves study materials	Resource category	List of resources	Passed

Table 11.2.1-1: Unit test -1

Unit Test -2

Test Case Name	Unit Test -2
Test Case	Test the logo addition functionality

Test Case ID	**TC_LOGO_01**
Test Case	Verify logo is correctly added and displayed
Module	UI / Branding
Description	Ensure the logo image loads properly on designated pages and resizes correctly on different screen sizes
Preconditions	Logo image file is available in the project assets folder
Test Steps	1. Navigate to the page where the logo should appear (e.g., Landing Page). 2. Check if the logo is visible on the page. 3. Resize the browser window or open the page on different devices. 4. Verify the logo scales or repositions correctly without distortion.
Expected Result	Logo loads correctly, visible on the page, and adapts responsively to screen size changes
Actual Result	Logo displayed correctly on all tested devices and screen sizes
Status	Passed
Remarks	Responsive design works well

Table 11.2.2-1: Unit Test-2

Unit Test -3

Test Case Name	Unit Test -3
Test Case	Test the AI-generated print functionality

Test Case ID	**TC_AI_PRINT_01**
Test Case	Verify AI-generated score report can be printed correctly
Module	AI Evaluation / Reporting
Description	Ensure users can print their AI-generated IELTS test score reports with correct formatting and content
Preconditions	User has completed a test and AI score report is generated and visible on the screen
Test Steps	1. Navigate to the AI-generated score report page. 2. Click the "Print" button. 3. Preview the print dialog. 4. Confirm the print output displays score, feedback, and user details correctly. 5. Cancel or complete printing.
Expected Result	Print preview shows a well-formatted report with accurate AI scores and user info; printing executes without errors
Actual Result	Print preview displayed correctly; printing executed without errors
Status	Passed
Remarks	Functionality works smoothly on tested browsers and devices

Table 11.2.3-1: Unit test-3

11.3 Module Testing:

Module Test-1:

Test Case Name	Module Test -1
Test Case	Frontend and Backend Module Testing

Module	Test Case	Description	Input	Expected Output	Status
Frontend	Login Form Validation	Validate user input on login form	Invalid & valid credentials	Appropriate error/success messages	Passed
Frontend	Responsive Design	Check UI responsiveness on devices	Resize browser or device	Layout adjusts without issues	Passed
Backend	User Registration API	Register new user	User data (valid & invalid)	Success message or error	Passed
Backend	Test Submission API	Submit test answers	Test answers data	Confirmation and score update	Passed
Backend	AI Evaluation Service	Evaluate writing test	Writing text	AI-generated score and feedback	Passed

Table 11.3.3-1: Module test-3

12. Chapter 12: Implementation

12.1 Training:

Training means teaching users and team members how to appropriately use and look after the IELTS Pro platform. People who use the app receive tutorials, helpful guides and materials that make it easier for them to handle features such as test practice, review by AI and seeing their progress. As a result, they are better able to use all the tools and features available on the platform.

Developers and support crew learn about Next.js, Firebase, MongoDB, AI tools, how to set up the project, how to make it live and how to repair issues. Continuous team workshops and documentation help everyone stay aware of new system changes, lets them manage bugs efficiently and allows the system to improve gradually.Effective training ensures high user satisfaction and system reliability, contributing to the overall success of the IELTS Pro project.

12.2 Scaling:

The IELTS Pro platform is designed to ensure good performance and user experience as the number of users and the data they produce increases. Because more people are relying on the platform for IELTS preparation, it must now handle more simultaneous logins, exam submissions, AI analysis and information storage.

Next.js, Firebase and MongoDB are each used in the project to ensure efficient frontend, authentication and flexible data storage as the project grows. The option to scale horizontally on the backend is by adding more servers or choosing cloud services that scale when needed.

Furthermore, when you involve caching, balance applications and work on improving how AI calls are handled, acceptance is faster. The reliability and responsiveness of the platform depend on adequate scaling which also ensures the service will be popular for years to come and satisfy its users.

12.3 Load Balancing:

TrafficLoad balancing distributes all the work from requests to help prevent one server from getting overwhelmed. IELTS Pro ensures that logging in, learning with tests or downloading AI assessments happens smoothly even during the busiest online hours.

With load balancing, the load on the system is routed to working machines, so networks stay fast and stable. This raises the system's reliability, ability to handle faults and ability to expand. You have the option to set up load balancing on DNS, with solutions like routers or on the cloud through networks such as AWS Elastic Load Balancer or Google Load Balancing.

Good load balancing in IELTS Pro allows the platform to deliver impressive speeds, work without issues and offer testing and feedback with ease.

13. Chapter 13: Critical Appraisal and Evaluation

13.1 Objective that could be met:

The IELTS Pro project serves to give anyone preparing for the IELTS exam better preparation in every section—Listening, Reading, Speaking and Writing. With AI-assisted evaluation, it provides quick and accurate results, together with personal advice that helps users improve soon after. Students can keep track of their work and follow unique study plans through the dashboard. Because it works on all kinds of devices, the site is very easy to navigate. Besides, IELTS Pro engages students by offering blogs and holding live sessions. It is constructed to grow easily and maintain its dependability, as more students and information are added, so everyone has a positive learning environment.

13.2 How much better could have been done:

Although the Pro version of IELTS operates with AI, some changes could make it more effective overall. Advancing AI might allow us to provide stronger, better-explained feedback on speaking and writing. Attending live sessions guided by special tutors will encourage users to take part and boost their learning. Having the platform accessible through apps or without an internet connection would help users with no internet. If adaptive learning is on, what is taught during the session can change with your progress which often leads to greater success. If students have opportunities to interact in forums or receive feedback from peers, they may find it easier to remember things and want to keep studying.

13.3 Which features could not be touched:

Because of the timeline for the project, some advanced features planned for IELTS Pro had to be put aside. Of particular note, the development of the Practice Camp—a detailed guided training module—was not achieved. The creation of Score Certificates as official-looking report formats

is not yet complete. Real-time Live Session Integration with tutor support was discussed, but was not fully used in research. Handling these features means spending more time, money and making complicated back-end changes, mostly with live streaming and handling certificates. Adding them into future versions will greatly improve the website's value and ease of use for everyone.

14. Chapter 14: Lesson Learned

14.1 Pre Project – Review – Closing:

Pre Project

During this phase, the team decided what the project would accomplish, its boundaries and if it could be completed. Through investigations and talking with stakeholders, the team gathered the requirements. To be on track with the project's goals, the team developed a clear plan that showed timelines, needed resources and what technology would be used.

Review

As the review phase occurred, certain goals and achievements were carefully checked against planned dates. Assessments were made on functionality, usability and performance during the testing process. Early×users and testers shared their opinions to find out what could be improved. Steps were taken to improve problem areas and boost the best features.

Closing

Toward the end, the final products were produced and described in reports. A set of user guides and training materials was created for the handover. Records of what was learned during the project were developed for future work. All activities of the project finished after obtaining approval from stakeholders and reaching the objectives.

14.2 The Problem I Have Faced:

Several challenges popped up as we worked on developing IELTS Pro. AI could only be used for accurate IELTS assessments after models were fine-tuned for them to match official scoring methods. Keeping the data on the front and backend in sync at real time proved to be difficult for performance. Having the website respond equally well on any device was more difficult, considering there are many different screen sizes and browsers. In addition, properly connecting user authentication with Firebase and MongoDB storage for our app meant addressing issues related to compatibility and safety. Not having a lot of time limited our ability to add live sessions and score certificates to the app. The project moved ahead, as the team kept solving problems and adapting along the way.

14.3 What Solutions Occurred:

Tackling the challenges in IELTS Pro, several good solutions were applied. I used Google's existing AI tools and customized them to boost the accuracy of the evaluation, without having to design a new model from the start. We used Firebase's real-time database and API to fix real-time synchronization issues. Problems in Responsive UI were handled using Tailwind CSS and Radix UI components so that everything performs well on any device. Authentication for users was reliable and flawless thanks to Firebase Authentication and storage and control of data was managed properly by MongoDB. To handle time limits, the main features were done first, with advanced ones set for later phases to ensure the product could launch on time and be useful.

15. Chapter 15: Lesson Learned

15.1 Summary of the project:

IELTS Pro is a website developed to support users who wish to do well on the IELTS test. You can take IELTS-style tests in all four sections: Listening, Reading, Speaking and Writing and the AI technology provides details on your personalized feedback. Because the platform uses advanced tools such as Next.js, Firebase and MongoDB, everyone using it can expect a smooth, user-friendly service. The system has a personized dashboard, provides access to a wide resource collection, helps track progress and contains blog posts about learning. While mark certificates and live classes are set to come in later upgrades, the system now in place makes preparing for IELTS fast and interactive. The project successfully managed AI and real-time synchronization, so the result could be used by candidates worldwide.

15.2 Goal of the project:

The aim of IELTS Pro is to design a useful and friendly web application that comprehensively supports those taking the IELTS exam. The platform uses technology to score exercises and helps students build confidence and faster learning skills. It provides personalized reports and tips to help users get better in every part of the IELTS exam. In the end, the goal is to provide a solution that any learner can use, scaling up so more people worldwide can improve their IELTS exam performance.

15.3 What I have done in Documentation:

In the documentation for IELTS Pro, I provided a clear picture of the project's objectives, the work that had to be done and what technology was involved. I arranged sections that explained features, user steps and how the design should look to guarantee trouble-free growth and use. All important technical parts such as the stack, use of AI and database organizational scheme were noted down transparently for future use. I also set up how to test, created use case diagrams and planned everything to monitor progress and maintain quality. The documentation covers user guides and explains how to fix common problems for administrators and users alike.

My Experience:

Working with the IELTS Pro project has been both rewarding and informative. I worked directly with Next.js, Firebase and MongoDB which enhanced my learning experience in full-stack development. Looping AI into the way I score challenges prompted me to seek original approaches and improve my skills in problem-solving. Using Tailwind CSS and Radix UI allowed me to design interfaces that respond well and are pleasant for users. During this project, I found that taking time to plan, manage my time and test things repeatedly is very key. Overall, I became better at both development and managing projects which well-prepared me for harder challenges down the road.

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