Introduction to Software Engineering

Human Resources & Costing Plan

Software Engineering Department
Faculty of Information and Technology
University of Science

Project Organization

Technical role and responsibility table:

Role	Assigned to	Core focus	Key technical skills	Primary responsibilities	Collaborators
Project lead & backend lead	Đoàn Thành Phát	System architecture, core backend	-Node.js, Express.js -MySQL, Database Design -System Architecture -DevOps (CI/CD, GCP) -Git	-Design the overall system architecture and database schema. -Develop the core User & Authentication modules (Login/Register APIs, JWT). -Lead the deployment process to Google Cloud Platform and Cloud SQL. -Manage the project's Git repository and branching strategy.	-Phạm Phát Lộc: For AI Module integration -Front-end team: to define and provide required APIs
Backend & AI Specialis	Phạm Phát Lộc	AI Integration, Business Logic, Data Processing	-Node.js -External API Integration -Algorithm Design -Unit Testing	-Integrate Google Speech-to-Text API into the backend. -Develop the Speech Analysis module (scoring algorithm, phoneme analysis). -Build APIs for Lesson	-Đoàn Thành Phát: To ensure code aligns with the main architecture -Nguyễn Quang Minh: to align on the audio data format for analysis

				Management and Progress Tracking. -Write unit tests for complex business logic (e.g., scoring).	
Frontend Lead	Nguyễn Quang Minh	Frontend Architecture, State Management, Core Interactivity	-ReactJS -State Management (Context API/Redux) -Web APIs (Web Speech API) -API Consumption	-Set up the frontend project structure, routing, and state management. -Develop the core voice recording feature using the Web Speech API. -Build the main interactive components, especially the practice screen. -Manage API calls to the backend and handle application state.	-Lê Quang Phúc: To ensure component consistency -Back-end team: to consume APIs and handle data
Frontend & UI/UX Specialist	Lê Quang Phúc	UI Implementation, Component Library, Data Visualization	-ReactJS -HTML/CSS, Tailwind CSS -Responsive Design -Data Visualization (e.g., Chart.js)	-Translate Figma mockups into a library of reusable React components. -Build data-display pages like the Dashboard, Lesson Lists, and Reports.	-Nguyễn Quang MInh: To use the shared architecture and state -Phạm Phát Lộc: To accurately display data from the progress

				-Implement data visualizations for user progress. -Ensure the application UI is fully responsive and user-friendly.	APIs

Project Development Plan: ELSA - AI Speaking

Timeline table:

Week	Phase	Key activities	Deliverables
1	Foundation & Design	- Project Kick-off & Scope Definition: Rapidly define MVP (Minimum viable product) features. - High-Level Design: Sketch key user flows, design the database schema, and create a preliminary API contract. - UI/UX: Create simple wireframes for essential screens (Login, Practice, Report). - Environment Setup: Initialize Git repository and all development environments (Node.js, React).	- Lean Requirements & Design Document (including DB Schema and API contract). - Wireframes for core screens. - Configured Git repository.
2	Implementation – Core Systems	- Backend: Develop the User Module with APIs for registration, login, and JWT authentication. - Frontend: Build the UI and logic for the Login/Registration pages. - Integration: Connect the frontend	- Functional User Authentication System (Frontend + Backend). - Basic frontend application with protected routing.

		authentication forms to the backend APIs. - State Management: Implement global state for handling user authentication.	
3	Implementation – Core Feature	- Backend: Set up and integrate the Google Speech-to-Text API. Create the primary endpoint to receive audio and return a score/transcription. - Frontend: Integrate the Web Speech API to capture user voice input on the main practice screen. - Integration: Connect the frontend recording module to the backend speech analysis service.	- A functional end-to-end loop: user can speak into the app and receive a basic score and transcription.
4	Implementation – Enhancements	- Backend: Develop APIs to save practice results to the database. Refine the scoring logic to provide more detailed feedback. - Frontend: Build the UI to display detailed feedback (e.g., highlighting mispronounced words) and a simple practice history page. - Integration: Fetch and display user's past performance data.	-Enhanced scoring and feedback mechanism. - A functional Practice History feature. - Feature-Complete MVP.
5	Testing & Refinement	- Integration Testing: Thoroughly test all API endpoints and the communication between frontend and backend. - User Acceptance Testing (UAT): Conduct	- Testing Report (including UAT feedback). - A stable, polished, and debugged system.

		testing with a small group to identify usability issues and bugs. - Bug Fixing & Polishing: Address all critical issues found. Refine the UI/UX and ensure the application is responsive.	
6	Deployment & Documentation	- Deployment: Deploy the frontend (e.g., Firebase Hosting), backend (e.g., Google Cloud Platform), and database (e.g., Cloud SQL). - Final Testing: Perform smoke tests on the live production environment. - Documentation: Finalize the project report, create a user guide, and prepare the final presentation.	- Live URL for the fully deployed application. - Final Project Report and Presentation.

Cost Management Plan

Detailed Cost Breakdown

Human Resource Costs

This is the largest cost item, quantifying the value of the team's time and effort.

Total Estimated Human Resource Cost: 30,000,000 VND

+Details: This figure is based on a symbolic salary of 5,000,000 VND/month per student, multiplied by four team members over the 1.5-month project duration.

Infrastructure & Technology Costs

These are the necessary costs to deploy and run the application on cloud platforms.

Total Estimated Infrastructure Cost: 775,000 VND

+Backend Hosting (Google Cloud Platform): An estimated 525,000 VND for 1.5 months. This cost is primarily for usage that exceeds the Free Tier limits.

+Frontend Hosting (Firebase Hosting): 0 VND. The free Spark Plan is sufficient for the project's needs.

+Domain Name: 250,000 VND. This is a one-time fee for a one-year domain registration.

Third-Party API Costs
This covers the cost of the speech recognition service, which is a core technology for the application.

Total Estimated API Cost: 210,000 VND

+Details: This is based on using the Google Speech-to-Text service at a rate of 140,000 VND/month, calculated for the 1.5-month duration. This estimate accounts for the 60 free minutes provided by Google each month.

Tools & Software Costs
These are the tools used during the development process.

Total Tools Cost: 0 VND

+Details: The team will use the free versions of GitHub, Trello, and Figma, as well as open-source tools like Visual Studio Code, resulting in no costs for this category.

Project Budget Summary

Based on the detailed analysis above, the overall project budget is summarized as follows:

The total estimated cost from all categories is **30,985,000 VND**.
To handle unforeseen expenses, a contingency fund is established at 15% of the total operating costs (infrastructure and API). This contingency fund amounts to **147,750 VND**.

Therefore, the **TOTAL PROPOSED PROJECT BUDGET is 31,132,750 VND**.