University of Plymouth

School of Engineering, Computing, and Mathematics

Comp 3000 Final Stage Computing Project 2024/2025

Leitner Language Learning – Language Learning Application

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# Acknowledgements

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Abstract

This report describes a software project, documenting the development process of an application intended to help users learn topics that they can choose, focused upon language learning.

The functional requirements of this application are outlined and are followed by a look into the overall design and architecture of the system, as well as the chosen technologies and method of approach.

The development process

# Introduction

While there are many services and tools available to help with learning a language. The current available solutions fail to implement good categories and sectioning of topics within a language.

The system presented in this report, aims to provide a well implemented solution of the Leitner System.

# Background

## 2.1 Competition

Applications for learning languages is not a new concept and there are already multiple applications that aim to help in this area, there is lots of competition that cover a range of use cases. Two examples of competitors are as follows:

* Duolingo
  + Duolingo is an application that allows the user to select a language that they want to learn. As of 2022 it has over 500 million downloads [2](#_Duolingo_Reports_-) and is the most popular application in the Education category.
* Babbel
  + Babbel is a subscription-based language learning software. They have over 1000 employees [3](#_Wikipedia_–_Babbel). Babbel has its own research backed method of language learning.

## 2.2 Limitations of competitors

These applications do have limits, these limitations are the areas that I intend to focus upon, filling the gap in the market made available.

Firstly, these applications do not many options of categories. Duolingo has “chapters” that allow users to progress through a set learning plan. While this approach suits most learners, this does not allow user to control their own learning.

## 2.3 Objectives

The aim of this project is to create an application that will help users, to learn and improve their language skills via flashcards and the Leitner system. The objectives that have been set out are:

# 3. Legal Social and Ethical

# 4.1 Requirements

## 4.1 Functional Requirements

## 4.2 Non-Functional Requirements

# 5. Chosen Technologies

## 5.1 Front End application

## 5.2 Server and Database

# 6. Design Architecture and Implementation

## 6.1 UI Design

# 7. Evaluation

# Sprints

## Sprint 1 - 13/12/2024 - 27/12/2024

The initial sprint was focused around gathering requirements and planning the scope of the project. I developed user stories and other tasks that would need to be completed in the project adding these to Trello to track my progress effectively. Throughout the development new tasks may be added to increase the requirements.

The design of some of the pages were created using Figma, this is a rough design of what the pages might look like in the application, allowing me to idealise what requirements the program would include.

Here you can see some of the designs that were made at the start.

Screens screenshot of a game

Description automatically generatedScreens screenshot of a phone

Description automatically generated

## Sprint 2 - 27/12/2024 - 10/01/2025

Sprint 2 was focused on the documentation of the backend, making sure that all the routes and services that the application would need were documented. This will help during the implementation ensuring that it functions as expected.   
To make the documentation of the API, I am using open API documentation, or swagger, here you can see a screenshot of my swagger page:

A screenshot of a computer

Description automatically generated

## Sprint 3- 10/01/2025 - 24/01/2025

Sprint 3:

Objectives: Write test files so that I can perform test driven development.

I have written test files for the

## Sprint 4- 24/01/2025 - 07/02/2025

Sprint 4:  
Objectives:  
Finish off user designs  
Create feedback form.

Conduct user feedback study with peers and gather feedback.

## Sprint 5- 07/02/2025 - 21/02/2025

Sprint 5:

Objectives:  
Implement server code from documentation.

For each endpoint that I defined in the documentation I went one by one and wrote the server code for it, making sure to reference the documentation and making sure that all the test cases pass for each route.

Here you can see the test cases passing after I have written them:  
A screenshot of a computer program

AI-generated content may be incorrect.

## Sprint 6- 21/02/2025 - 07/03/2025

Sprint 6:

Objectives:

For this sprint I focused on implementing the frontend functionality, translating the designs and implementing the feedback that I have gathered from the peer review and UI feedback.

I will use fake data at the start to make sure that I can focus on developing functionality.

## Sprint 7- 07/03/2025 - 21/03/2025

Sprint 7:

Objectives:

Implement server communication with the frontend.

For this sprint I focused on implementing the API communication between the server and the frontend. This will replace the fake data that I was using for the development stage.

## Sprint 8- 21/03/2025 - 04/04/2025

Sprint 8 will be focused on making sure that the app is working as intended and that all features have been met.

# References

### Atlassian, 2020. What is version control? - Atlassian Git Tutorial. [Online] Available at: [https://www.atlassian.com/git/tutorials/what-is-version-control](https://www.atlassian.com/git/tutorials/what-is-version-control%20) [Accessed 28 Jan 2025].

### Duolingo Reports - <https://investors.duolingo.com/news-releases/news-release-details/duolingo-announces-record-bookings-first-quarter-2022-and-raises#:~:text=With%20over%20500%20million%20downloads,and%20the%20Apple%20App%20Store.>

### Wikipedia – Babbel <https://en.wikipedia.org/wiki/Babbel>

### What is the Leitner System? –

### Ref

# Appendix C – Third Party Resources Used

React Native

• Bcrypt - https://www.npmjs.com/package/bcrypt

• Cors - https://expressjs.com/en/resources/middleware/cors.html

• Express - https://expressjs.com

• Jsonwebtoken - https://www.npmjs.com/package/jsonwebtoken

• Mongoose - https://mongoosejs.com/

• Supertest - https://www.npmjs.com/package/supertest