Lab 2 – CreditTrax Product Specification

Joshua Martin

Old Dominion University

CS411W

Dr. Sarah Hosni

March 28, 2025

Version 2

Table of Contents

Listing of Figures

1 Introduction

1.1 Purpose

The purpose of this specification document is to define the features of CreditTrax and the proper implementation of these features. The document will be a technical reference for all features to be implemented within the application as it is developed.

1.2 Scope

CreditTrax will provide tools to help users learn proper financial literacy. The app's main features will include budget creation and analysis, what-if analysis, achievements and badges, debt tracking, and groups. Budget creation and analysis will utilize user-entered information to create budgets for the user to follow. What-if analysis will allow users to test different methods of paying off their debts in a risk-free environment, as well as offer AI-powered recommendations if the user chooses to use them. Achievements and badges will be earned upon reaching certain financial goals and will be used to track a user's financial progress over time. Friends and groups allow a user to join a community of users who can offer support for each other while they learn proper financial practices.

CreditTrax will not be a resource for users to take out new loans and will not pay bills for a user. CreditTrax will also not be linked directly to a user's financial accounts, and all information will be solely gathered through direct user data entry.

1.3 Definitions, Acronyms, and Abbreviations

Annual Inflation Rate: The percentage increase in the cost of goods over the course of a year.

APR (Annual Percentage Rate): The annual rate charged for borrowing money as a percentage of the total borrowed amount.

Credit Score: A three-digit number that reflects an individual's creditworthiness based on their credit history, influencing lenders' decisions on loan approvals and interest rates.

Debt: Money that is borrowed and must be repaid, typically with interest.

Financial Literacy: A strong understanding of essential financial skills and concepts, such as budgeting, saving, and debt management.

Financial Management: The process of budgeting, saving, and monitoring personal finances to achieve one's financial goals.

Financial Uncertainty: The fear or concern about one's financial situation, often relating to income, debt, or future stability.

Student Loans: Money borrowed by an individual for educational purposes (for tuition, transportation, textbooks, etc.) which must be repaid with interest.

"What-if" Analysis: A technique that allows users to simulate various (financial) scenarios and visualize their potential outcomes.

Young Adults: Individuals between the ages of 18 to 34 who are in the workforce and have limited experience with personal finances.

Young Professionals: Young adults aged 18-34 who are in the workforce, in college, or have recently graduated.

1.4 References

[1] "Consumer Credit - G.19". U.S. Federal Reserve. www.federalreserve.gov/releases/g19/HIST/cc_hist_memo_levels.html. 27 Feb. 2025.

[2] S. Chernikoff. "How are college costs adding up these days and how much has tuition risen? Graphics explain". USA TODAY. www.usatoday.com/story/news/education/2024/04/18/college-tuition-costs-graphics/73347491007/. 24 Feb. 2025.

[3] V. Cariaga. "Saving for the Future: Why Most Young Adults Put Nothing Toward Retirement". Yahoo Finance. finance.yahoo.com/news/saving-future-why-most-young-160623467.html. 22 Feb. 2025.

[4] E. Gravier. "Remind yourself of 'what makes you happy': Blogger shares her advice about battling debt and depression". CNBC. www.cnbc.com/select/debt-and-mental-health/. 24 Feb. 2025.

[5] "How to Get out of Debt". Consumer Advice. consumer.ftc.gov/articles/how-get-out-debt. 24 Feb. 2025.

[6] C. Horymski. "Consumer Credit Card Report". Experian. www.experian.com/blogs/ask-experian/state-of-credit-cards/. 22 Feb. 2025.

[7] J. Martin. "Lab 1 - CreditTrax Product Description". Old Dominion University. 27 Feb. 2025.

[8] D. Martinez and M. Seikel. "Credit card interest rate margins at all-time high". Consumer Finance. www.consumerfinance.gov/about-us/blog/credit-card-interest-rate-margins-at-all-time-high/. 27 Feb. 2025.

[9] K. Martincheck and M. Santillo. "Many Young Adults Have Taken on Debt. It Could

Jeopardize Their Financial Futures”. Urban Institute. www.urban.org/urban-wire/many-young-adults-have-taken-debt-it-could-jeopardize-their-financial-futures#:~:text=Young%20adults%20who%20don%27t,by%20up%20to%20100%20points. 22 Feb. 2025.

[10] C. Rugaber. “U.S. inflation at 9.1 percent, a record high”. PBS News. www.pbs.org/newshour/economy/u-s-inflation-at-9-1-percent-a-record-high. 24 Feb. 2025.

[11] I. Rademacher and G. Melford. “Young Adults and Consumer Debt: The Quiet Crisis Next Time”. New America. www.newamerica.org/millennials/reports/emerging-millennial-wealth-gap/young-adults-and-consumer-debt-the-quiet-crisis-next-time/. 22 Feb. 2025.

[12] E. Suknanan and J. Gravier. “Mint Is Gone — Here Are Some Alternative Budget Apps to Consider”. CNBC. www.cnbc.com/select/mint-budgeting-app-is-going-away-here-are-some-alternatives/. 24 Feb. 2025.

[13] R. Safier, and A. Harrison. “Student Loan Debt: Averages and Other Statistics in 2023.” USA TODAY Blueprint. www.usatoday.com/money/blueprint/student-loans/average-student-loan-debt-statistics/. 24 Feb. 2025.

[14] “US External Debt, 2003 – 2023 | CEIC Data”. CEIC Data. www.ceicdata.com/en/indicator/united-states/external-debt/. 24 Feb. 2025.

[15] M. Winters. “The 10 U.S. places with the highest cost of living—No. 1 costs more than double the national average”. CNBC. www.cnbc.com/2024/06/29/us-highest-cost-of-living.html. 24 Feb. 2025.

1.5 Overview

The following sections will outline the hardware and software components, as well as any necessary libraries and APIs required for the application's development. This specification document will serve as a reference for the development of each feature and will outline detailed descriptions of the requirements each feature will have to meet. Requirements for a working prototype will be outlined in section 2.

2 Overall Description

2.1 Product Perspective

The Presentation Layer of CreditTrax has been mostly handled by Laravel and will be based on touch controls upon full release of the prototype. Laravel links the Presentation Layer with the Server and Data Layer using Filament forms for input and handles the database portion on its own using SQLite queries and PHP Artisan.

The Web Server is currently hosted on a Virtual Machine at Old Dominion University and will allow CreditTrax to share and access a centralized database so all accounts can share the same real-time information instead of simply storing local copies of the database. Docker is used as the main method to connect the application to the Virtual Machine.

The Database is currently handled by Laravel and will be hosted remotely on a Virtual Machine to ensure all instances of the application have access to the same data. Docker will allow connection of the application to the Virtual Machine, and Laravel's Artisan plugin will allow database migration to be done efficiently throughout development.

Figure 1 on the following page shows a visual representation of how each portion of the application is connected to each other, with arrows representing the data flow between features.

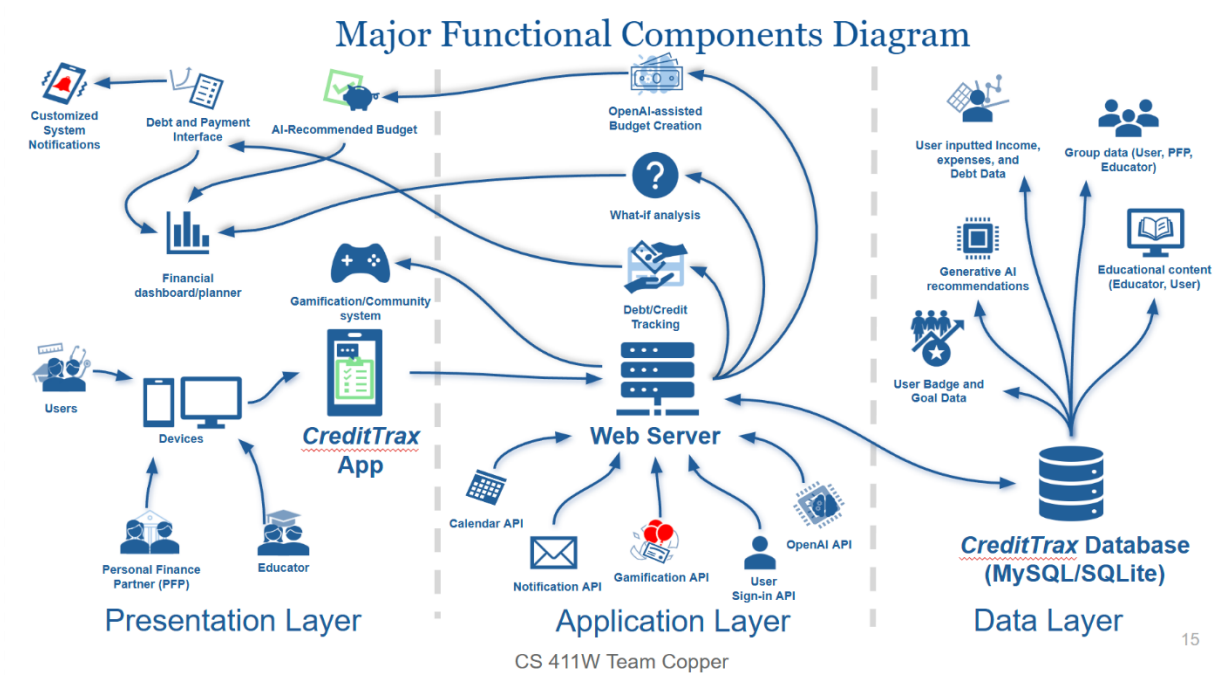

Figure 1: Major Functional Components Diagram

2.2 Product Functions

As described in Figure 2 below, users will be able to track their total debt and using CreditTrax's Debt Tracking feature, which will send reminders to users when payment due dates are approaching. Adding and creating Debts has been fully implemented in the prototype thus far, while the notification system has been eliminated.

Users will also be able to use CreditTrax's Budget feature to generate and edit budgets based upon their income and total debts. This feature has been only partially implemented in the prototype as of now. As described in Figure 2, personalized budget creation and expense tracking will be fully implemented by the end of the prototype creation, but AI-driven budget creation has been eliminated from the prototype due to difficulties with OpenAI's token costs and implementation issues with the API.

Real World Product vs Prototype

*Fully implemented
*Partially implemented
*Eliminated

Functionality Group	Feature	RWP	Prototype	Notes
Account Management	Add/Delete Account	Full add/delete functionality for user accounts	Fully Implemented	Can use stand-in accounts
	Login/Authentication	MFA and session management	Fully Implemented	Use stand-in accounts
	Profile Management	Customizable user profile	Fully Implemented	Use stand-in accounts
Debt Tracking	Add/Edit Debt	Comprehensive tracking editing	Fully Implemented	
	Smart Payment Reminders	Customizable with escalation	Eliminated	Unsure of method used to send reminders to user without Google APIs
AI-assisted Budgeting	Personalized Budget Creation	AI-driven recommendations	Fully Implemented	Focus generative AI use in what-if analysis
	Expense Tracking	Detailed tracking with visuals	Fully Implemented	
	Budget Adjustments	AI-driven recommendations based on spending patterns	Eliminated	AI recommendations for budgeting too costly/difficult to implement using tokens and OpenAI

Figure 2: Real World Product vs. Prototype

Users will be able to track goals using a Goal-Tracking feature, which will allow them to enter new goals to set for themselves and track their progress toward achieving this goal. This feature has been fully implemented in the prototype and is described in more detail in Figure 3 below.

Users will be able to create a What-If analysis to test different changes in their finances in a safe environment, as well as being given the option to use optional AI analysis of their what-if analysis for further recommendations. The hard-coded What-If analysis has been fully implemented in the prototype, while AI integration is still planned.

Users will be able to earn badges as signs of their progress over time. This feature is currently planned and will be implemented into the prototype once the GameLayer API is ready for use.

The Community feature will allow users to host and join groups, as well as add friends to share and connect. This feature has been partially implemented in the prototype and is planned to be fully implemented.

Real World Product vs Prototype Cont.

*Fully implemented
*Partially implemented
*Eliminated

Functionality Group	Feature	RWP	Prototype	Notes
Goal Tracking	Short/Long-Term Goals	Customizable short-term goal tracking	Fully Implemented	
	Goal Progress Visualization	Visual tracking	Fully Implemented	
What-If Analysis	AI-assisted projection/simulation	Use of AI for what-if	Fully Implemented	
	Create/Simulate scenarios	Algorithmic Impact simulations	Fully Implemented	
Analytics	Comprehensive Financial Dashboard	Budget and debt visualizations, goal progression,	Fully Implemented	
Reward System	Badges and Rewards	Custom badges for achievements	Partially Implemented	Basic badges for demonstration
	Community/Group page	Full community functionality with leaderboards	Partially Implemented	Can create groups
Financial Literacy Tools	Educational Resources	Upload external resources, show financial concepts embedded in other features	Partially Implemented	Only shows embedded finance information.

Figure 3: Real World Product vs. Prototype Cont.

2.3 User Characteristics

The primary users for CreditTrax will be young adults going through major life changes, such as taking out student loans, moving out on their own, making a large purchase, and so on. These users are assumed to have little experience with finance and budgeting and will be provided educational materials and walk-throughs to help them learn. These users will be allowed to join groups with other users and educators to help them progress in their learning, and they will have access to all of CreditTrax's main features such as budget creation and what-if analysis.

Educators will be assumed to have far more financial experience than standard users and will be people like verified college professors who will be able to help standard users learn. Educators will be able to create and share classes, share learning materials, and track their students' progress by seeing their progress toward badges.

Financial advisors will also be verified users who are part of various financial institutions like banks or tax agencies who will be able to pair with users one-on-one to help them learn more directly. Financial advisors will have direct access to the user's dashboard to see their budget and financial goal progress, as well as badge progress. Financial advisors will also be able to share educational materials with users as needed.

2.4 Constraints

A legal constraint that will need to be considered is the fact that AI recommendations are not fully accurate and could work against a user's best interests if not fact-checked correctly. Mitigation for this constraint will require a disclaimer to be displayed for the user warning them about the risks involved with using AI recommendations and a reminder that AI recommendation is experimental.

2.5 Assumptions and Dependencies

It is assumed that a user will be using this application on a mobile device, and touch controls will need to be accounted for. Desktop compatibility is something that is being considered, but primary development is for mobile applications.

The application relies on Laravel and Filament to create most of the data entry forms and for database handling, and all development will require Laravel Herd with the Filament plugin to be installed.

OpenAI will provide all AI recommendations through sending messages to a chatbot using its API directly from the application. Messages sent to the chatbot are currently planned to be hard-coded instructions selected by a user to ensure consistency during the prototype phase.

GameLayer will be used to handle the achievement tracking and badges for the users in the app.