

Lab 1 – CreditTrax Product Description

Joshua Martin

Old Dominion University

CS411W

Dr. Sarah Hosni

February 14, 2025

Version 3

Table of Contents

1 Introduction.....	3
2 CreditTrax Product Description	4
2.1 Key Product Features and Capabilities	5
2.2 Major Components (Hardware/Software).....	6
3 Identification of Case Study.....	8
4 Glossary	10
5 References	11

Listing of Figures

Figure 1: Major Functional Components Digram.....	7
---	---

1 Introduction

For most people, debt is an unavoidable part of life. Most major life milestones require taking on some sort of debt – from getting your first credit card, to taking out student loans, to financing your first car, to having a child. While many people can navigate these obstacles safely on their own, many younger people who are just starting out on their own either lack the knowledge or the means to avoid taking on large amounts of high-interest debts and find themselves trapped in an endless cycle of payments.

People just getting a start in their careers often end up saddled with debts, and just looking at pamphlets spread around the financial aid offices at every college will show you how. Student loans in the U.S. alone totaled over \$1.74 trillion by the second quarter of 2024, according to the Federal Reserve (Safier 2024). To put this into further perspective, the national debt of the entire country of Sweden totals only just over \$1 trillion (CEIC Data 2023). Paying off a country's worth of debt is a lot of ask of people who are just starting to learn to get around on their own, much less while they focus on other costs like rent and food using an entry-level income.

Ultimately, the problem of financial literacy breaks down into three major components: a lack of education on how to budget and pay, a lack of planning, and a lack of clarity in how debt works. What people who struggle with finances need is access to solutions to these three obstacles: educational resources to teach them about budgeting, a planner to keep payments on schedule, and a resource to help translate financial jargon into something they can understand.

CreditTrax helps by solving each part of the problem all in one place. To improve a user's education, CreditTrax will find and offer learning cues to help guide people toward resources that will best help them learn how to budget and pay. To improve a user's planning, CreditTrax will award badges to help give a user goals to strive toward, as well as offer custom notification

settings that will help users remember to pay bills on time. To demystify debt for a user, CreditTrax will use custom learning algorithms to create visual references for users, ranging from graphs of how past payments helped to what-if projections to help visualize what future payments can affect.

In the end, CreditTrax aims to help people conquer their struggles with debt. By taking steps and breaking the problem down into bite-sized pieces, people can make progress at a pace that works best for them.

2 CreditTrax Product Description

At its core, CreditTrax is an application designed to guide its users toward financial success. It does this by using a combination of tools: notifications to keep users on top of payments, rewards to motivate users to develop good habits, and educational resources to help users learn more about the way finance works. By giving users access to resources to help themselves, CreditTrax will teach them how to think and act for themselves when it comes to important financial decisions.

CreditTrax combines established budgeting plans with Artificial Intelligence and data visualizations, allowing users to generate and test new payment plans on the fly. By integrating both hard-coded algorithms and an OpenAI chatbot, users are also given the option to test both established budgets or test innovative AI-recommended budgeting. Developing what-if visualizations allows users to clearly see how they can control their finances, turning spreadsheets and equations into beginner-friendly graphs and calendars.

Budgeting can also be difficult for people going through major life changes. While financial planning is something that most people consider important, getting started can be difficult for someone without experience. CreditTrax offers several educational resources to help

these users gain both the knowledge and practice of planning for themselves, as well as giving people a chance to connect with others for help.

2.1 Key Product Features and Capabilities

The key features of CreditTrax start with the first screen that will be pulled up whenever someone logs in to the app – the user dashboard. The dashboard allows a user easy access to all the other features and will inform users about their current financial health with a quick glance. Users will be able to see their current debt, badge progress, educational resources, and upcoming payments on the home screen, along with links to CreditTrax's other tools like What-If Analysis and Budget Recommendations.

CreditTrax will also allow for a fully customizable notification system to allow users to remind themselves to make payments on time. Notification frequency is set by the user and can vary from a friendly reminder once around payment time to a persistent badge that can only be turned off once confirmation of a payment is made. Should a user miss a payment, the app will also recommend that the user raise the frequency of their notifications to help prevent subsequent late payments.

CreditTrax will also integrate both the use of Artificial Intelligence (AI) and hard-coded algorithms to offer budgeting recommendations to create a payment schedule. AI budgeting with OpenAI is optional and will be activated using a toggle on the budgeting page. The user can run either the hard-coded or the AI budgeting tool at one time, or both at the same time to compare the two methods to see which works better for their personal financial situation.

What-If Analysis will also be a major feature of CreditTrax and will allow users to project budget recommendations outward into the future to see how different payment methods and schedules will affect their debt payoff progress. The budgets recommended using the budget

recommendation tool can be loaded here, or the user will be able to enter their own custom payment amounts and payment schedule to test their own knowledge against the recommendations of CreditTrax. This allows the user to test what they've learning from the educational tools, while also giving them more agency in their decisions once they feel more comfortable with testing themselves.

CreditTrax will also serve as a resource for its users to access materials to improve their financial knowledge. OpenAI chatbot integration will help serve as a quick reference resource for users who choose to use AI recommendations, while human educators will also be allowed to sign up to take on and help groups of students improve their finances. There will also be basic baseline materials made available to help users who are just starting out get off on the right foot toward paying off their debts.

The badge system exists as a motivator for the user and will help users develop good financial habits by giving them goals to strive toward over time. By splitting progress into clear, focused steps, users will be less intimidated by their current situation and will be able to focus on making progress rather than being overwhelmed by taking on the whole amount at once. Badges also allow a more secure, private way for educators to track the progress of their students without giving full access to their students' financial information. Educators will be able see from a glance that a certain student has earned a few badges over the last month and tell that progress was made, or see that nothing changed and know that one of their students is struggling and needs additional help.

2.2 Major Components (Hardware/Software)

CreditTrax will be primarily an application developed for mobile devices, with desktop support likely to come in future releases. The initial design will be designed with touch controls

in mind, with larger buttons and on-screen keyboard support for the user to input their information. Since most of the tools will require web connectivity, an internet connection will be required upon release with offline support not yet offered.

Primary design of the application and its data flow will be based mostly off the following functional components, shown in Figure 1.

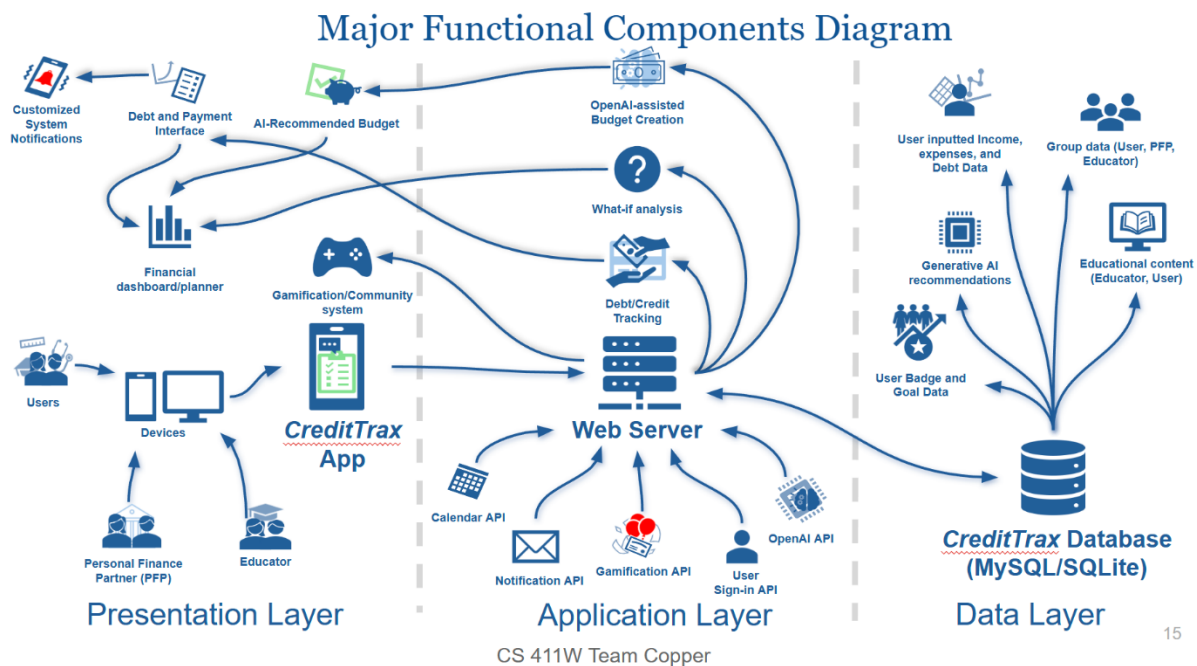


Figure 1: Major Functional Components Diagram

Starting in the Presentation layer, users will access the application using their personal devices. As mentioned before, the application is being developed initially for mobile devices, using Laravel as a framework to form the application's design. This layer also holds the application's Dashboard, allowing links to access all other features aggregated into one place. The application will also communicate with the user on this layer using notifications, currently planned to be done by linking to a user's Google Calendar and setting up reminders using the Google Calendar API.

The application layer is where much of the work is done internally. Currently, PHP will build much of the back-end algorithms and scripts, allowing development of ways to create and store budgets, implement what-if analysis, and implement gamification system for badges. OpenAI's chatbot API will form the basis of AI integration into the system, and GameLayer will form the basis for the badge system. The Google Calendar API will also be supported on this layer, while actively communicating with the user on the Presentation layer.

The Data Layer is where the application's database information will be handled. To do this, Docker will connect to a Virtual Machine hosted by Old Dominion University with SQLite as the database language to store and retrieve user financial data. User educational resources, groups, and financial data will also be stored in this database for easy retrieval and analysis.

3 Identification of Case Study

The primary audience for CreditTrax consists of young adults going through major financial changes in their lives, such as college students or people learning to live on their own. Building healthy financial habits early is an important foundation for financial success, but information about budgeting and financial management is complex and hard to access. CreditTrax will help young adults by becoming a resource that exists specifically to help them, through breaking down complex information into easily understandable visuals and by connecting them to others who can help educate them on proper financial practices.

The future of CreditTrax will focus on developing a community of resources for these young adults to access. The community will consist of other users, as well as educators and financial partners willing to offer help to people looking to learn more about finance. Educators will be able to build and share resources with classes of students, while financial partners will have more of a one-on-one relationship with specific users who prefer more personalized

learning. By building these communities, CreditTrax will become a platform for users to help each other as well as themselves.

4 Glossary

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.

5 References

- Consumer Credit - G.19*, U.S. Federal Reserve, 9 Sept. 2024,
www.federalreserve.gov/releases/g19/HIST/cc_hist_memo_levels.html.
- Chernikoff, Sara. *How are college costs adding up these days and how much has tuition risen? Graphics explain*, USA TODAY, 18 Apr. 2024,
www.usatoday.com/story/news/education/2024/04/18/college-tuition-costs-graphics/73347491007/.
- Cariaga, Vance. *Saving for the Future: Why Most Young Adults Put Nothing Toward Retirement*, Yahoo Finance, 17 May 2024, finance.yahoo.com/news/saving-future-why-most-young-160623467.html.
- Gravier, Elizabeth. *Remind yourself of 'what makes you happy': Blogger shares her advice about battling debt and depression*, CNBC, 11 Jan. 2024, www.cnbc.com/select/debt-and-mental-health/.
- How to Get out of Debt*. Consumer Advice, 1 Mar. 2018, consumer.ftc.gov/articles/how-get-out-debt.
- Horymski, Chris. *Consumer Credit Card Report*. Experian, 4 Nov. 2019,
www.experian.com/blogs/ask-experian/state-of-credit-cards/.
- Martinez, Dan, and Margaret Seikel. *Credit card interest rate margins at all-time high*, Consumer Finance, 22 Feb. 2024, www.consumerfinance.gov/about-us/blog/credit-card-interest-rate-margins-at-all-time-high/.
- Martincheck, Kassandra, and Miranda Santillo. *Many Young Adults Have Taken on Debt. It Could Jeopardize Their Financial Futures*. Urban Institute, 18 Sept. 2024,
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.

National Institute of Standards and Technology. *NIST Cybersecurity Framework: A Framework for Improving Critical Infrastructure Cybersecurity*. 2020, www.nist.gov/cyberframework.

Rugaber, Christopher. *U.S. inflation at 9.1 percent, a record high*, PBS News, 13 July. 2022, www.pbs.org/newshour/economy/u-s-inflation-at-9-1-percent-a-record-high.

Rademacher, Ida, and Genevieve 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/.

Suknanan, Elizabeth, and Gravier, Jasmin. *Mint Is Gone — Here Are Some Alternative Budget Apps to Consider*. CNBC, 9 Jul. 2024, www.cnbc.com/select/mint-budgeting-app-is-going-away-here-are-some-alternatives/.

Safier, Rebecca, and Ashley Harrison. *Student Loan Debt: Averages and Other Statistics in 2023*. USA TODAY Blueprint, 7 Sept. 2023, www.usatoday.com/money/blueprint/student-loans/average-student-loan-debt-statistics/.

US External Debt, 2003 – 2023 | CEIC Data. CEIC Data, www.ceicdata.com/en/indicator/united-states/external-debt/.

Winters, Mike. *The 10 U.S. places with the highest cost of living—No. 1 costs more than double the national average*, CNBC, 29 June 2024, www.cnbc.com/2024/06/29/us-highest-cost-of-living.html.