Development of a Loan Management Information System for Paku BHS Cooperative using C# Windows Form

A Project

Presented to

The Faculty of Visayas State University

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CSci 23 - Applications Development and Emerging Technologies

by:

Clyde Xavier S. Salar

Rodney M. Maniego Jr.

Project Adviser

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Abstract

The accessibility of credit remains a significant challenge due to stringent requirements imposed by traditional lending institutions. As a result, many individuals resort to local money lenders who often rely on outdated technologies such as paper and basic calculators. This paper presents LoanEase, a desktop application designed to address this issue by providing local money lenders with an accessible and user-friendly tool to streamline their lending activities. LoanEase offers automated calculations and a centralized database to store lending data, aiming to simplify the lending process for money lenders. Through functional and non-functional testing, LoanEase has demonstrated its functionality, usability, and accuracy in performing calculations and managing lending activities. Additionally, the application features monthly interest calculation, remaining loan balance tracking, and new monthly interest calculation after payment, all of which have been successfully implemented and tested. The development and implementation of LoanEase offer several benefits, including improved efficiency and accessibility for money lenders, accurate and reliable calculations, increased financial inclusion, and enhanced business management capabilities through real-time dashboards and reporting features. LoanEase has the potential to significantly improve the efficiency and accessibility of lending activities for local money lenders, promoting financial inclusion and enhancing their business management capabilities.

Preface

The current study aims to develop LoanEase, a user-friendly desktop application specifically designed for local money lenders. Traditional lending institutions often impose stringent requirements that hinder access to credit for many individuals. Consequently, local money lenders play a crucial role in providing financial support to those excluded from traditional channels. However, these lenders often rely on outdated technologies, resulting in a slow and inefficient lending process. LoanEase tackles this issue by offering a comprehensive solution that incorporates an easy-to-use interface, automated calculations, and a centralized database for efficient loan management. By providing local money lenders with a reliable tool to streamline their lending activities, LoanEase aims to improve accessibility and promote financial inclusion for borrowers who would otherwise face difficulties in obtaining loans.

I extend my heartfelt appreciation to Mr. Maniego for his continuous support, insightful feedback, and dedication to our learning journey. I would also extend my heartfelt appreciation for my classmates who also shared their knowledge which helped me cover my weaknesses upon creating this project.

It is important to acknowledge the limitations of this study. Firstly, LoanEase is specifically tailored for local money lenders and does not address the needs of traditional lending institutions. Therefore, the scope of the application is limited to managing lending activities and does not encompass other financial services.

Chapter 1   INTRODUCTION

1.1 Statement of the Problem

Despite the growing need for access to credit, traditional lending institutions often have stringent requirements that exclude many people from obtaining loans. For this reason, many people still go to a local money lender to loan money. However, many local money lenders still uses primitive technologies like paper, and basic calculator to store the data and do the calculations (Kondo 2015). To address these issues, this paper presents LoanEase, a desktop application that allows lenders to lend easily, with a built-in calculator that provides automated calculations and a database to store all the data. The problem this paper aims to address is the lack of accessible and user-friendly application for local money lenders to use in order to transact their business faster.

1.2 Current State of Technology

There are many payment apps such as GCash, which allows users to send and receive money to and from other users. These apps typically link to a user's bank account or credit card and use advanced encryption and authentication technologies to ensure the security of the transaction (Monteiro 2021). There are also blockchain-based lending platforms that use smart contracts to automate the lending process. These platforms are decentralized, meaning that there is no central authority controlling the lending process. Instead, borrowers and lenders interact directly with each other through the blockchain network (Frankenfield 2023). However, they often have tringent requirements that exclude many people

from obtaining loans that is why many people still go to a local money lender to loan money which still uses primitive technology when conducting its transaction.

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Chapter 2   INTRODUCTION

2.1 Problem Statement

The lack of accessible and user-friendly applications for local money lenders to use when lending money is an ongoing issue that is yet to be addressed. Despite the growing need for access to credit, traditional lending institutions often have strict requirements that exclude many people from obtaining loans. Consequently, many individuals still resort to local money lenders to borrow money. However, many local money lenders still use primitive technologies like paper and basic calculators to store data and perform calculations, resulting in a slow and inefficient lending process. This study aims to address this problem by developing LoanEase, a desktop application that will enable local money lenders to lend money with ease, a built-in calculator that provides automated calculations, and a database to store all the data.

2.2 Objectives

2.2.1   General Objectives

LoanEase aims to address the lack of accessible and user-friendly software for local money lenders to manage their lending activities more efficiently by providing automated calculations and a database to store all the data.

2.2.2   Specific Objectives

1. To provide an easy-to-use platform for local money lenders to transact their business. By developing a user-friendly interface, LoanEase seeks to simplify the lending process for money lenders who are still using primitive technologies like paper and basic calculators.

2. To provide automated calculation process, ensuring accurate and reliable calculations for both lenders and borrowers. This feature helps to reduce the possibility of errors, which can cause confusion and mistrust between lenders and borrowers.

3. To create a centralized database to store all lending data. The system will provide an easy-to-access, real-time dashboard to track all lending activities, making it easier for money lenders to manage their business.

2.2.3 Scope and Limitations

The scope of LoanEase is to provide a user-friendly and accessible desktop application for local money lenders to manage their lending activities more efficiently. The application will have a built-in calculator that provides automated calculations and a centralized database to store all lending data. The system will be capable of processing loan applications, generating repayment schedules, and tracking repayment histories. It will also generate reports to help lenders manage their business more effectively.

There are several limitations to the LoanEase application that should be considered. Firstly, the application is limited to local money lenders and is not intended for use by traditional lending institutions. Secondly, the system is limited to managing lending activities and does not provide other financial services like investment management or financial planning.

The implementation of LoanEase could have several implications. Firstly, it could improve the accessibility and efficiency of lending activities for local money lenders, making it easier for borrowers to obtain loans. This could lead to

increased financial inclusion, particularly for individuals who are excluded from traditional lending institutions due to stringent requirements.

Chapter 3   LOANEASE

3.1 Introduction

LoanEase is a desktop application designed to simplify the process of lending money and is specifically created for money lenders who need an efficient and reliable tool to automate the calculation process when someone borrows money. This app offers a user-friendly interface that allows lenders to easily input borrower information and loan amount, and automatically generates the monthly interest to be paid. It can store all the necessary information, making it easy for lenders to access and manage their loan records.

3.2 System Design and Specifications

3.2.1 Hardware

The application is designed to be used on desktop or laptop computers, and therefore, each stakeholder, end-user, and proponent will require access to a computer. LoanEase requires internet connectivity to function, and therefore, all users should have access to stable and reliable internet connectivity.

3.2.2 Software

Firstly, the .NET Framework will be required to support the development of the application using C#. The .NET Framework provides a large class library, runtime environment, and other tools necessary for software development. Secondly, Visual Studio 2022, an integrated development environment (IDE), will provide a comprehensive set of tools for developing, debugging, and deploying the software application. Thirdly, Windows Forms, a graphical user interface (GUI) class library included in the .NET Framework, will provide a set of

controls that can be used to create GUI applications for Windows operating systems.

In addition to these, Google Drive will also be required to store app data since it provides a reliable backup solution, ensuring that the data is always available, even if the local storage device is lost or damaged. Lastly, stakeholders, proponents, and end-users will need to have a computer running a supported version of Windows operating system, as the LoanEase application is designed to run on Windows operating systems.
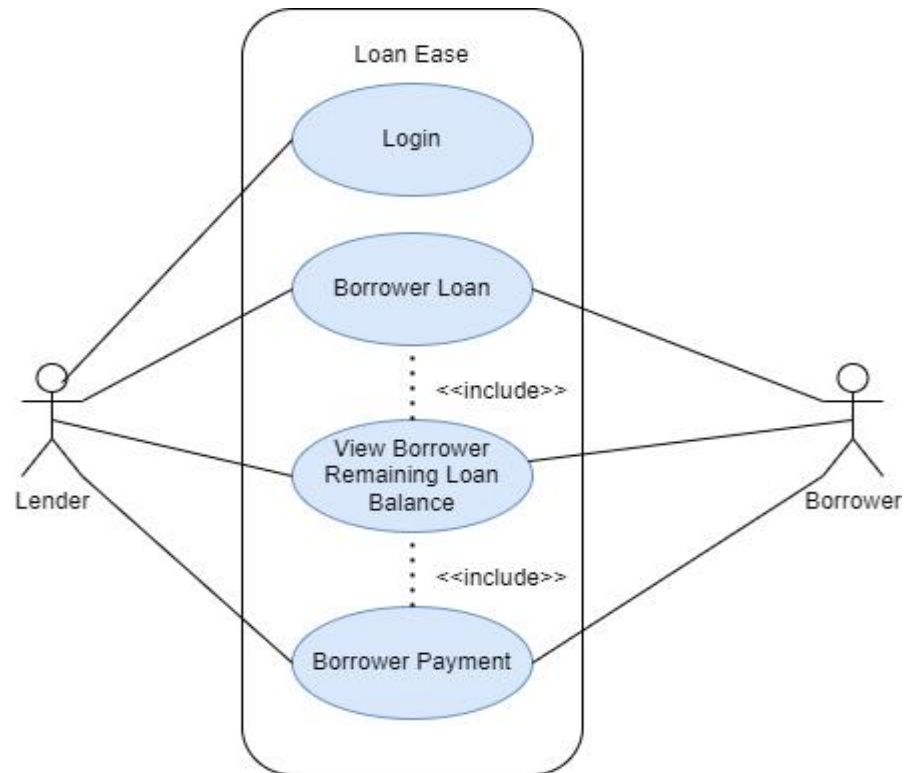
3.2.3 Context Diagram
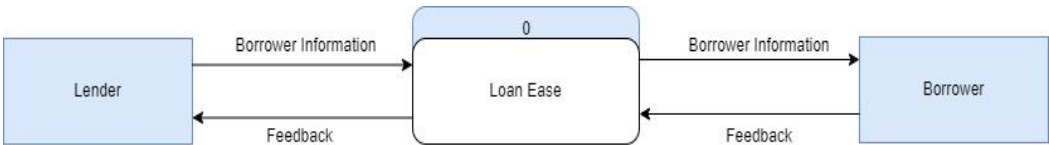
3.2.4 Diagram 0
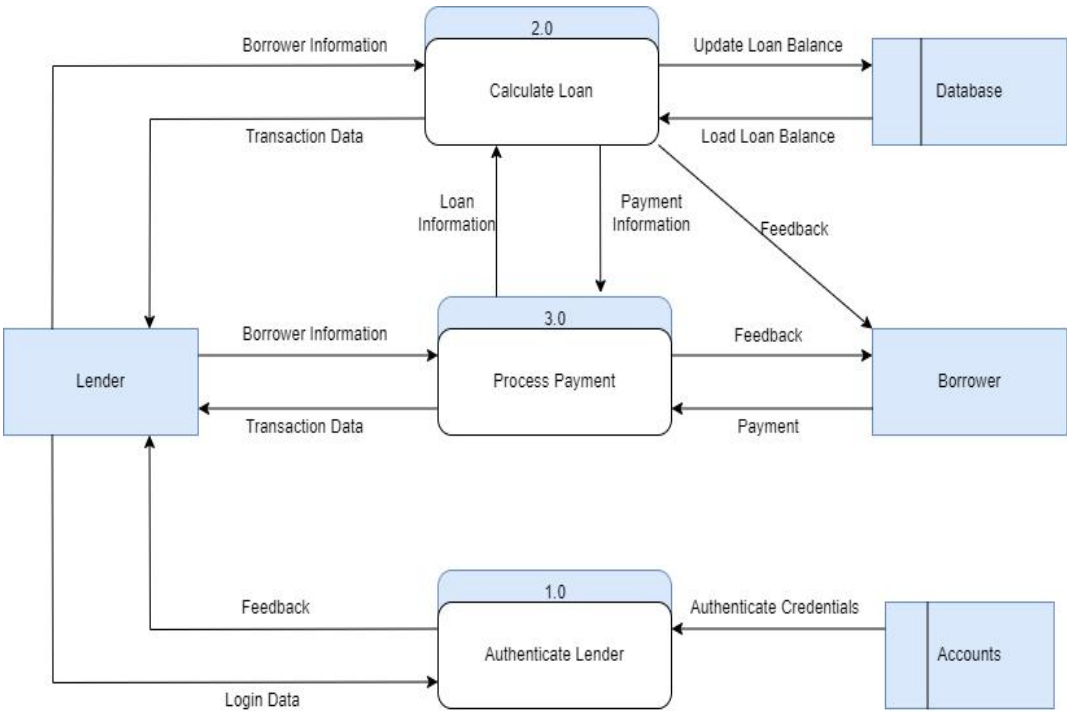
3.2.5 Use Case Diagram

3.2.6 Use Case Scenarios

Requests Loan

Use Case Name	Request a Loan
Summary:	Borrower requests a loan to Lender.
Actors:	Lender, Borrower
Preconditions:	The lender must be logged in in the system.

Use Case Name	Request a Loan	
Postconditions:	The loan balance of the the borrower will be updated in the database	
Basic Flow:	**Actor Action**	**System Response**
	1. Lender inputs borrowers information including the amount to borrow.	1.1. The system will look if the borrower has an existing loan. 1.2. If the borrower has an existing loan, the new loan will be added to the existing borrower entity. Else, the system will create a new entity and loan will be added there. 1.3. The system will calculate the monthly interest.
	2. Lender saves the transaction in the database.	2.1. The loan balance of the borrower will be updated.
Exceptions:	1. If the borrower does not agree with the interest rate, the transaction is canceled.	

Payment of Loan

Use Case Name	Payment of Loan	
Summary:	Borrower pays a loan to the lender.	
Actors:	Lender, Borrower, System	
Preconditions:	The lender must be logged in in the system.	
Postconditions:	The loan balance of the the borrower will be updated in the database.	
Basic Flow:	**Actor Action**	**System Response**
	1. Lender inputs borrowers information including the amount to pay.	1.1. The system will look for the borrower's information in the database. 1.2. The system will calculate the remaining balance of the borrower after the payment. If there is still a loan balance after payment, the system will generate the new monthly

Use Case Name	Payment of Loan	
		interest. Else, the borrower entity's loan will be marked as paid.
	2. Lender saves the transaction in the database.	2.1. The loan balance of the borrower will be updated.
Exceptions:	1. If the borrower does exist in the database, there will be no transaction that will happen.	

Checking of Loan Balance

Use Case Name	Checking of Loan Balance	
Summary:	Borrower wants to check their remaining loan balance and monthly interest.	
Actors:	Lender, Borrower, System	
Preconditions:	The lender must be logged in in the system.	
Postconditions:	The borrower will be informed about their remaining balance.	
Basic Flow:	**Actor Action**	**System Response**
	1. Lender inputs borrowers	1.1. The system will look

Use Case Name	Checking of Loan Balance
information.	for the borrower's information in the database. 1.2. The system will display borrower's information including their remaining loan balance.
Exceptions:	1. If the borrower does exist in the database, there will be no transaction that will happen.

3.2.7 Summary

The lender of the LoanEase application needs to perform these several high-level processes or modules to cover all the specified use cases. The first use case is when the borrower requests a loan. The lender needs to input the borrower's information, including the amount to borrow. The lender also needs to save the transaction in the database. The borrower's loan balance will also be updated.

The second use case is when the borrower pays a loan. To perform this action, the lender must be logged in to the system. The lender inputs the borrower's information, including the amount to pay. The lender saves the transaction in the database, and the loan balance of the borrower will be updated.

The third use case is when the borrower checks the loan balance. To perform this action, the lender must also be logged in to the system. The lender inputs the borrower's information, and the system looks for the borrower's information in the database. The system displays the borrower's information, including their remaining loan balance.

Chapter 4   PERFORMANCE ANALYSIS

4.1 Introduction

The application has undergone functional and non-functional testing as performed by the developer, testers, the instructor, and panelists. The areas that were observed, validated, and tested are the requirements and the additional features.

The minimum requirements are the functionalities that make the application practical and usable. These are the workflows that must be undergone to simulate the complete stakeholders' flowchart. The additional features are what makes the application unique. The additional features are not found in the stakeholders' flowchart but are implemented because it is beneficial to its end-users. The application provides local money lenders with a user-friendly and accessible desktop application for managing their lending activities. The application enables lenders to store borrower information, calculate loan amounts and interest rates, generate loan agreements, and track loan payments. The application is designed to streamline lending processes, making it easier and faster for lenders to transact their business.

4.2 Experimental

The "one-cycle" was carefully followed to test whether the requirements were met. This begins with a borrower requesting a loan. The lender must log in into the LoanEase application. Lender then inputs borrower's information and the amount to borrow. The system will then calculates the monthly interest and displays it to the lender. The lender saves the transaction in the database and the

loan balance of the borrower will be updated. The second one is when the borrower pays their loan. The lender logs in to the system and inputs the borrower's information and the amount to pay. The loan balance of the borrower will be updated and updated in the database. The third one is when the borrower wants to check their remaining loan balance. The lender logs in to the system and inputs borrower's information.The system displays the borrower's information, including their remaining loan balance.

The additional features were also tested whether it is functional. These additional features are calculating the monthly interest, remaining loan balance after payment, and new monthly interest after payment. The monthly interest calculation was tested by inputting different loan amounts and verifying that the interest calculated by the system was accurate. The remaining loan balance after payment was tested by inputting a loan payment amount and verifying that the system accurately deducted the payment from the borrower's balance. Finally, the new monthly interest after payment was tested by verifying that the system correctly recalculated the interest based on the new remaining balance after the payment. All tests were conducted successfully, and the additional features were deemed to be fully functional.

4.3 Result and Analysis

The application was able to perform the requirements and additional features which state that it is functional and usable.

4.4 Summary

The application was able to perform all the requirements which state that it is functional and usable.

Chapter 5   CONCLUSION

In conclusion, it is recommended to pursue the development and implementation of the LoanEase application for local money lenders. Through functional and non-functional testing, LoanEase has demonstrated its functionality, usability, and accuracy in performing calculations and managing lending activities. The additional features, including monthly interest calculation, remaining loan balance after payment, and new monthly interest after payment, have been successfully implemented and tested. The potential risks associated with the project include technical challenges, user adoption, and security and privacy concerns. However, the benefits of implementing LoanEase outweigh these risks.

LoanEase offers various benefits, including improved efficiency and accessibility for money lenders, accurate and reliable calculations that foster trust between lenders and borrowers, and increased financial inclusion by providing access to credit for individuals excluded from traditional lending institutions. Additionally, the application enhances business management capabilities through its real-time dashboard and reporting features. Considering the identified benefits outweigh the potential risks, it is recommended to proceed with the development and implementation of the LoanEase application. This initiative has the potential to significantly improve the efficiency and accessibility of lending activities for local money lenders, promoting financial inclusion and enhancing their business management capabilities.

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I am incredibly blessed to have the love and support of my family and friends. Their encouragement, understanding, and sacrifices have been the foundation of my journey. Their unwavering belief in me, even during the most challenging times, has been a source of motivation and inspiration. I am profoundly grateful for their presence in my life.

Lastly, I would like to extend my thanks to all the individuals who have contributed to this project, whether directly or indirectly. Your valuable insights, feedback, and encouragement have played a significant role in shaping this work. Your support has been invaluable, and I am truly fortunate to have had such wonderful people in my life.
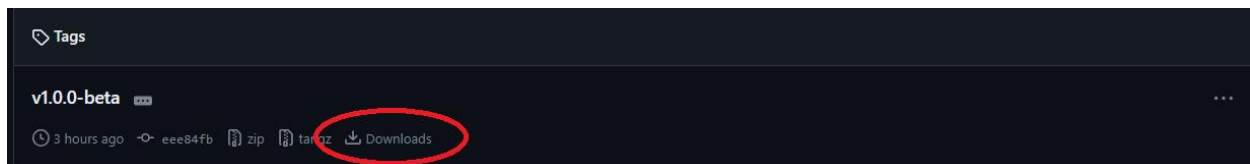
APPENDICES

      User Manual

I. Installation

    a)   Go to https://github.com/clydexavier/LoanEase
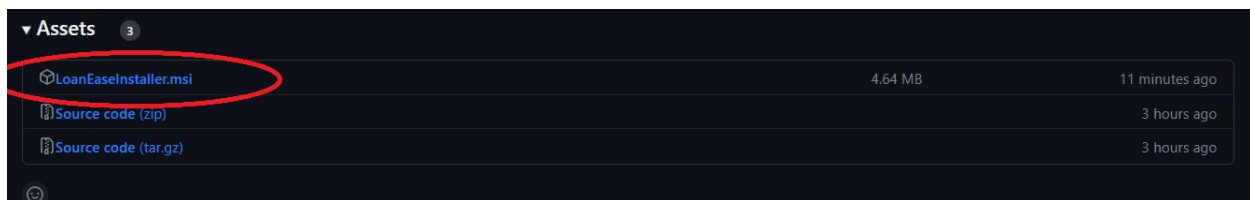
    b)   Go to the Releases and click the tags.
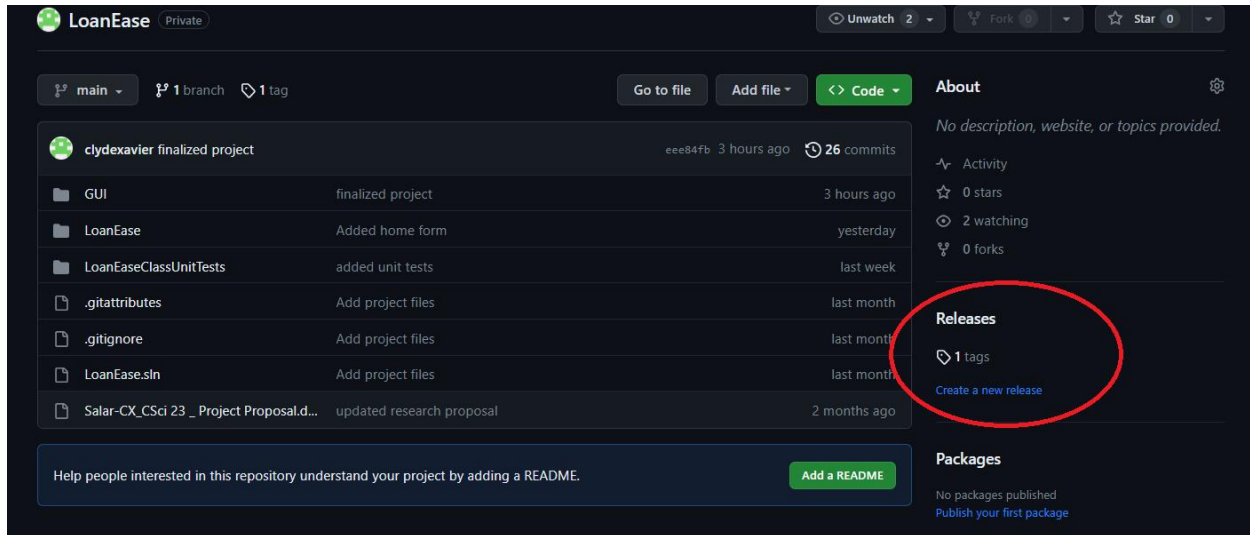
    c)   Click Download
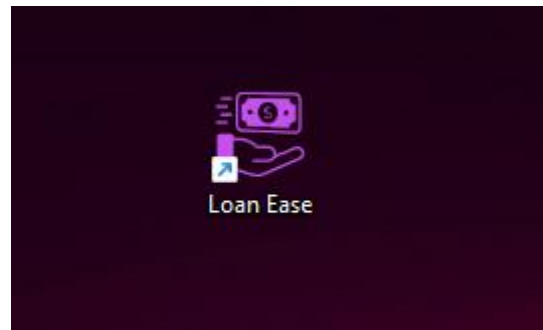

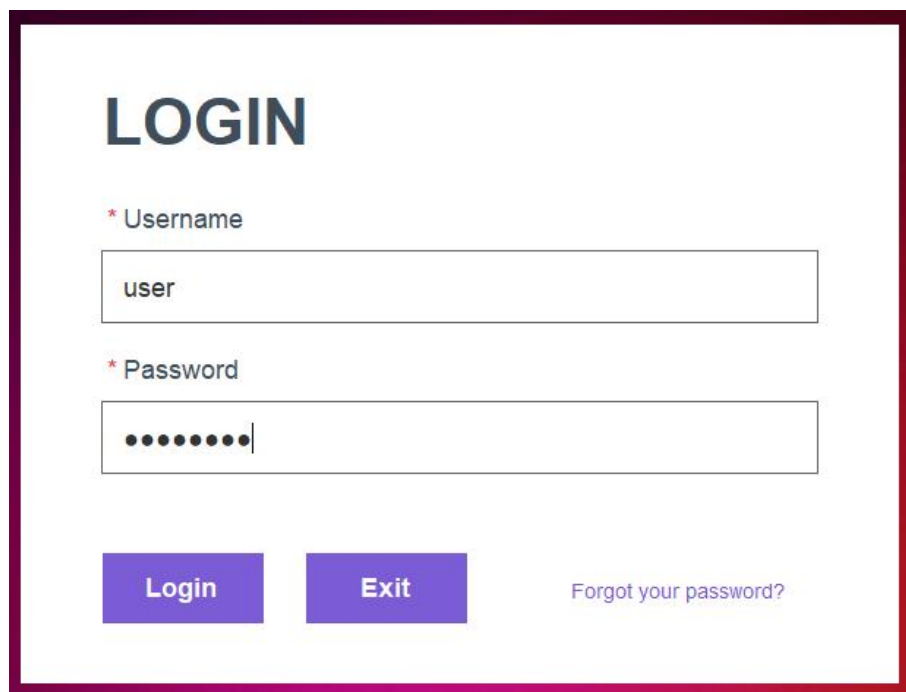   d)   Click the LoanEaseInstaller.msi to download the installer

    e)   Open the installer and follow the installation steps.

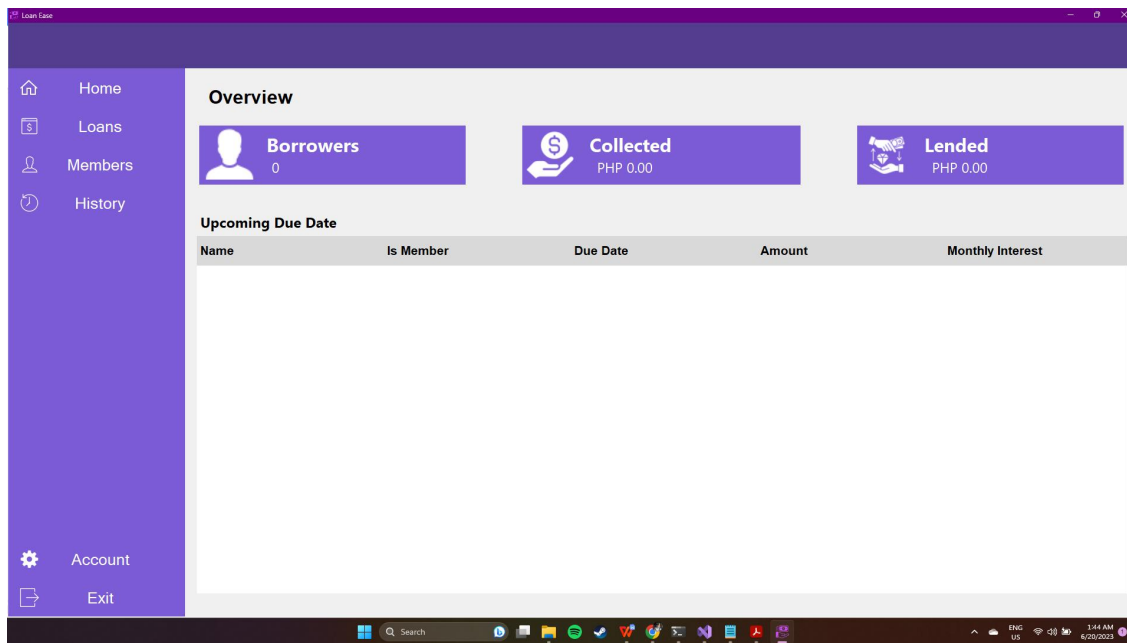f) After installing, you can find the application shortcut in your Desktop. Open the app.
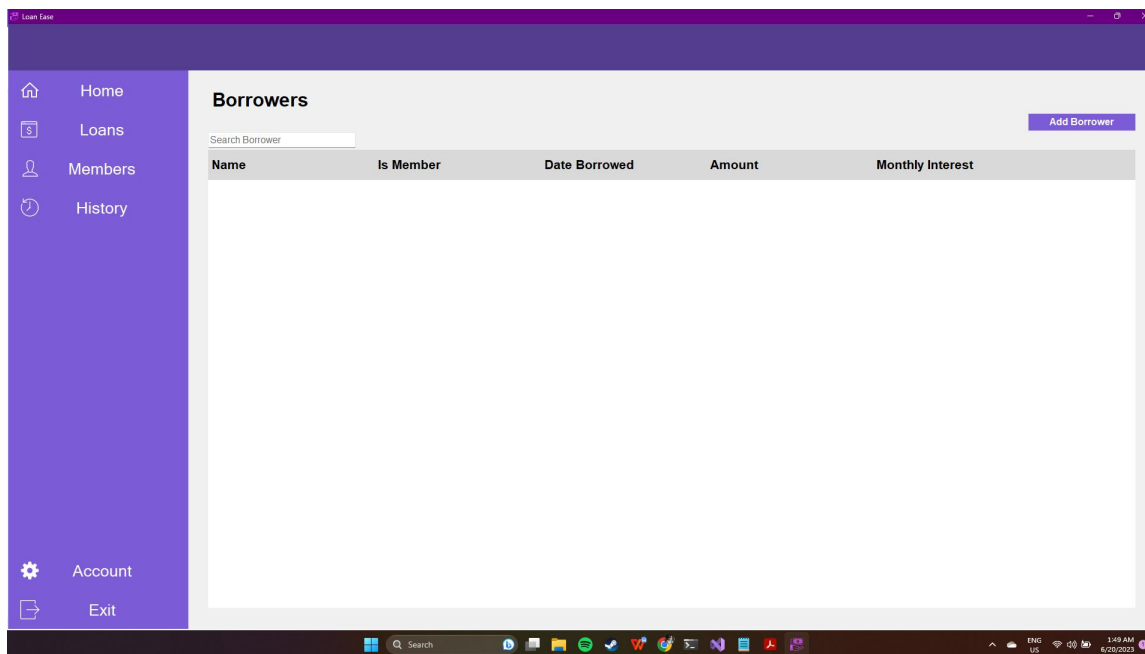

II. **Login**

a) The default username is **user.** The default password is **password**. You have an option to change it later after opening the app

b) Afrer logging in, you can see the Home panel where you can see the overview of all the transactions.

III. **Loan Section**

a) You can add and search for a borrower. Click the add borrower button to add. Input a name in the search box to search.

Add Borrower

Clyde Xavier

Salar

1500

Not Member ∨

Confirm

b) Fill in the necessary fields and click confirm to add a borrower.

Borrowers

Add Borrower

Search Borrower						
Name	**Is Member**	**Date Borrowed**	**Amount**	**Monthly Interest**		
Clyde Xavier Salar	No	June 20, 2023	PHP 1575.00	PHP 75.00	✏	⬇

c) It will now be added to the list of borrowers.

d) To pay, click the ⬇ button.

e) To edit the click the ✏ button.

f) Example of loan payment

✕

Payment Summary

Name of Borrower :	Clyde Xavier Salar
Current Balance :	1575.00
Payment Amount :	1500
After Payment Balance :	75.00
Change:	0.00

Pay PHP 1500.00

g) After paying, it will now be added to the transaction history.

Payments History

Search Borrower

Name	Is Member	Payment Date	Amount Payed
Clyde Xavier Salar	No	01:56 June 20, 2023	1500.00

IV. **Account Section**

Account

Set new password

Your new password must be different to currenty used password.

Current Password

Current Password

New Password

Password

Confirm Password

Password

Reset Password

a) Fill in the necessary fields to change password and the app will restart.

CLYDE XAVIER SALAR

Student

PROFILE

Highly motivated Computer Science student seeking an internship opportunity to apply and further develop my skills in software development, data analysis, and problem-solving.

CONTACT ME

📞 09810724384

✉️ clydexavier@gmail.com

📍 Bontoc, Southern Leyte, Philippines

EDUCATION

VISAYAS STATE UNIVERSITY
Bachelor of Science in Computer Science
- present

PROGRAMMING LANGUAGE

C, C++, Java, C#, Python

ACHIEVEMENTS

2022 ICPC ASIA-MANILA REGION
Competed in International Collegiate Programming Contest Asia-Manila Region