Vityarthi Project

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Subject- Introduction to Problem Solving And Programming

Subject Code- CSE1021

Project Title- Create a loan eligibility checker

Introduction

This is a simple project based on checking the loan eligibility criteria. This project is made using Python. This program is designed to evaluate the process of determining that whether a person or customer is eligible for loan or not. To make the program, I have taken five basic criteria for determining the approval of loan or not. The six criteria are Age, Annual income, Previous loan (in two years), Amount of loan, loan years (the time period of loan) and credit score. The project is basically a UI project.

The project is a basic but interesting project made by using conditional logic like (if/else) statements. The primary objective of this project is to classify a loan application as approved or not approved which helps to ease the work of institutions like banks. This helps the financial institutions to manage a large number of loan applicants which helps in the smooth loan eligibility checking process.

Problem Statement

As we can see that the current process of loan application process is very much inefficient, inconsistent and there is very much high chances of error. Financial institution like banks face severe challenges due to a high number of loan application requests due to which sometimes the loan application is not approved due to some kind of error. So this project will help the financial institutions to manage a large amount of pending application which helps in the smooth functioning process. This project seeks to reduce application processing time , inconsistency and unbiased decisions which will improve the overall efficiency of loan approval systems of the institutions.

The system will provide a user friendly interface in which the customers needs to input their some financial input data by which the program will show whether the customer is eligible for loan or not. The main objective of the project is bring a major change in the world and to help everyone to get the benefits of getting the loan.

Functional Requirements

The main functional requirements are as follows-:

1-Collection of the input by the user

The system must allow the user to input the required data of the user like age, annual income, credit score, desired loan amount and time to repay the loan.

2-Eligibility assessment which is rule based

The system must used conditional statements which evaluate the input data filled by the user.

The applicant must be between the age of 20 to 60. The applicant’s annual income must be atleast 2 lakh rupees.

3-Decision by evaluating the input result

The system must provide a clear interface to the user like whether the loan is approved or not.

4- User Interface- A simple interface should come for the user which will help to input the data

Non Functional Requirement

1-Performance- The program must be able to quickly calculate and evaluate the loan eligibility of the customer without any much longer delay of the input and output data and must ensure the smooth functioning for the user.

Security- The program must be able to handle some sensitive or important information and also it should ensure input validation which will prevent injection or other input.

3-The program must be able to return the correct output by telling whether the user is eligible for loan or not and this process should be quick and the program should not crash.

4-Maintainability- The program code should be clean and well defined and should have comments to allow to update it easily without any difficulty in the future.

System Architecture

The system applications are-:

1 – User Interface Layer- The Tkinter GUI framework handles user interaction and also contains entry fields for user input like name, age, loans taken, annual income, desired loan amount, loan term and credit score.

2 – Error Handling Layer- It catches input errors for different conditions and also it shows error message box and requires prompting correct input format.

3 - Business Logic Layer- This layer is implemented in the check_eligibility function and it also retrieves the input data from UI widgets. It also validates the input given by the user and converts to appropriate type like int, float. Along with this, it also check sequentially each eligibility conditions like age range, loans taken limit, etc and gives the message of result of eligibility based on conditions.

Comprehensive Commit History

1 - The project is started by imported “Tkinter” for UI and “messagebox” for the screen feedback.

2 – After that added the labels and entry fields for user inputs: Name, Age, Loans taken, Annual income, Desired loan amount, loan term and credit score.

3 – After that implemented check_eligibility function to retrieve input values and also added simple if else statement conditions.

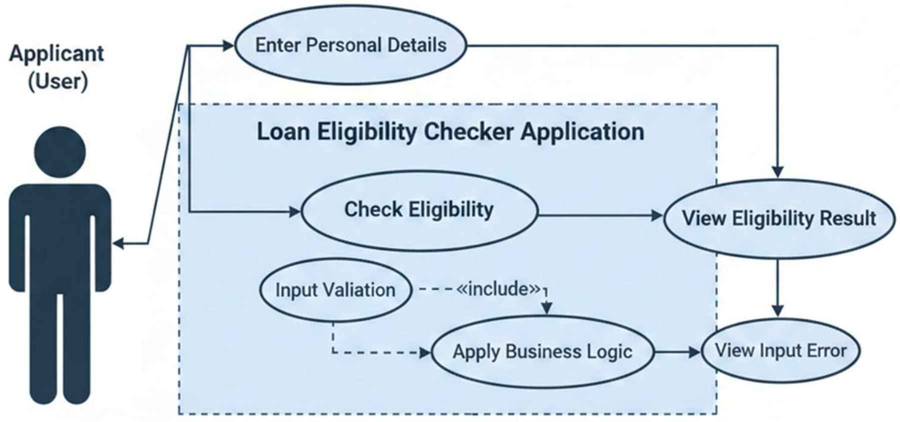
4 - After that added all the desired eligibility for all the conditions, display ineligible reason and also display ‘Congratulations message’ if eligible.

5 - Input logic in try- except to handle the invalid input types and also show the error dialog box

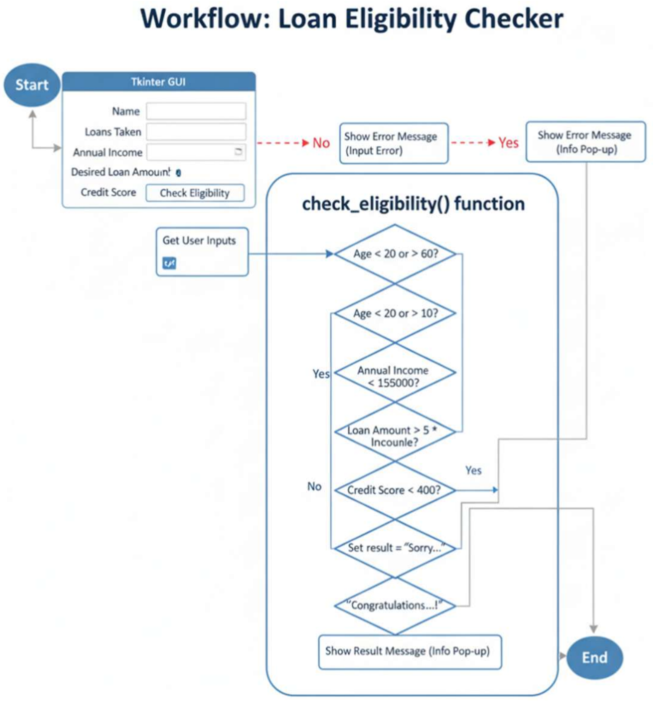
6- Added ‘Check Eligibility’ button to check eligibility command.

Design Diagrams

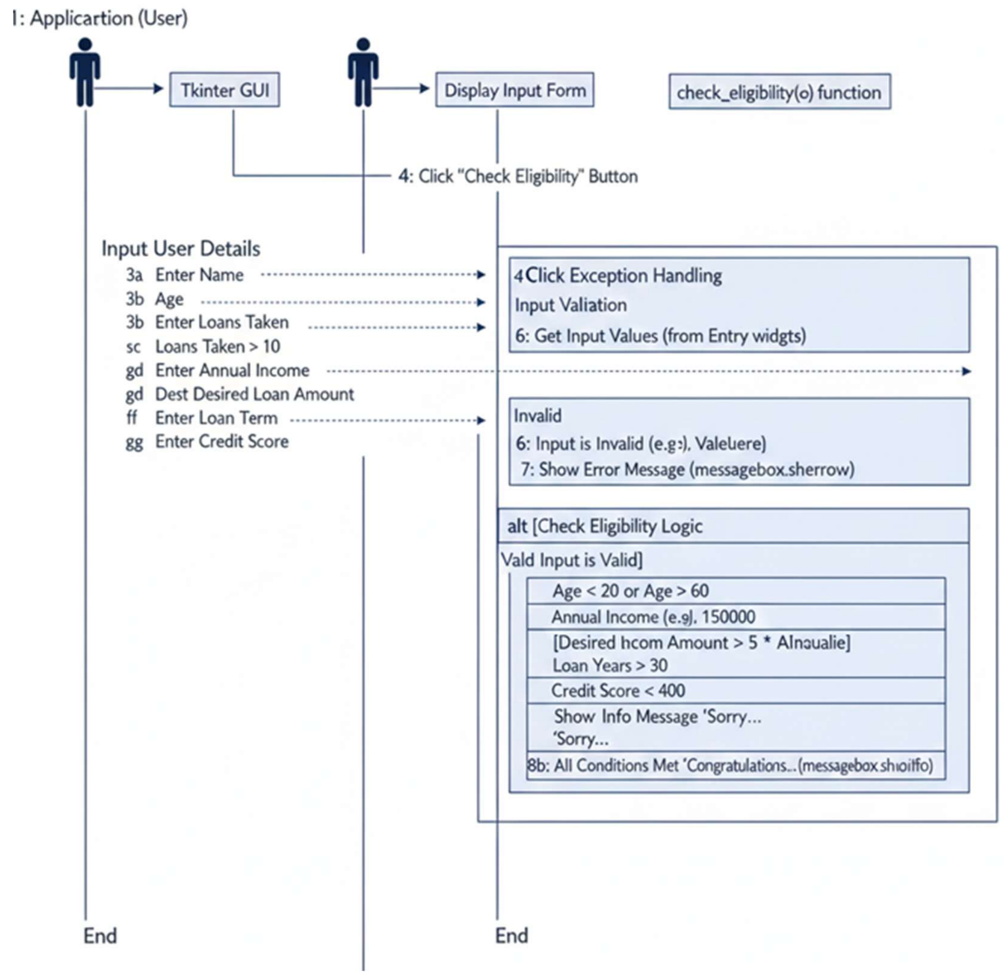
1 -Case Diagram



2- Workflow Diagram



3- Sequence Diagram


I: Applicartion (User)
Tkinter GUI
Display Input Form
check_eligibility(o) function
4: Click "Check Eligibility" Button
Input User Details
3a Enter Name
3b Age
3b Enter Loans Taken
sc Loans Taken > 10
gd Enter Annual Income
gd Dest Desired Loan Amount
ff Enter Loan Term
gg Enter Credit Score
4Click Exception Handling
Input Valiation
6: Get Input Values (from Entry widgts)
Invalid
6: Input is Invalid (e.g:), Valeuere)
7: Show Error Message (messagebox.sherrow)
alt [Check Eligibility Logic
Vald Input is Valid]
Age < 20 or Age > 60
Annual Income (e.g]. 150000
[Desired hcom Amount > 5 * Alnqualie]
Loan Years > 30
Credit Score < 400
Show Info Message 'Sorry...
'Sorry...
8b: All Conditions Met 'Congratulations...(messagebox.shoitfo)
End
End

Design decisions and rationale

The important points are as follows-:

1 – Use of Tkinter for GUI- This is built-in GUI toolkit, it helps to make the project easily and it is also ideal for small to medium desktop utilities where ease of coding is the key.

2- The Use of messagebox dialogs- It helps to give immediate feedback using dialog box like error or info and it also helps to improves user experience with clear and focused messages.

3- Simplicity must be over complexity- Since there is no external data storage or advanced validation which helps to keep the project simple, educational and quickly easy to understand.

4- Seperation of Concerns- The main work of UI is that it mainly handles input and output of data. The eligibility criteria check is isolated in the function which supports potential reuse

Implementation Details

The implementation done by me majorly consists of 4 steps-:

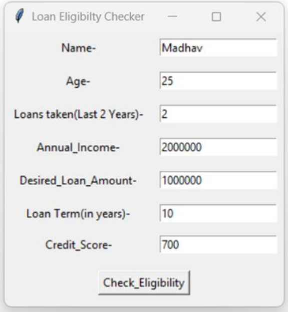
1-Collecting the Input data- By using the python functions like input to gather the person or user detail such as age of the person, loan requirement.

2- Validity of the Input- Check whether the input given by the user is of correct data type and whether the input is in the correct range.

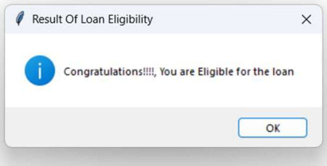
3- Logic of the Evaluated input or Decision-The program must validate if all the given inputs like age, credit score are within the limit otherwise it will not give the output.

4-Output Generation- The program must finally conclude by telling the user whether the loan is approved or not and it can also explain the reasons why the loan is not approved.

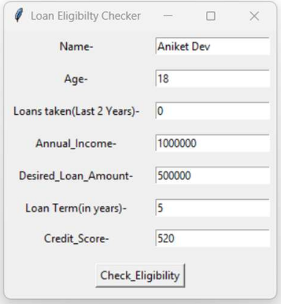
Screenshots



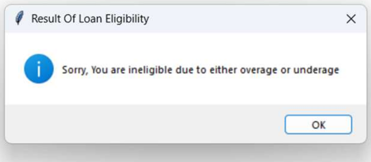
Name-	Madhav
Age-	25
Loans taken(Last 2 Years)-	2
Annual_Income-	2000000
Desired_Loan_Amount-	1000000
Loan Term(in years)-	10
Credit_Score-	700



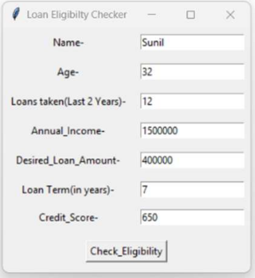
Congratulations!!!!, You are Eligible for the loan



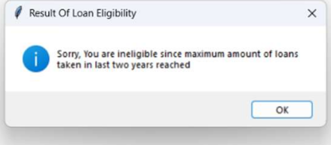
Name-	Aniket Dev
Age-	18
Loans taken(Last 2 Years)-	0
Annual_Income-	1000000
Desired_Loan_Amount-	500000
Loan Term(in years)-	5
Credit_Score-	520



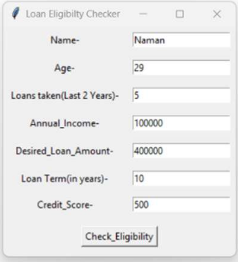
Sorry, You are ineligible due to either overage or underage



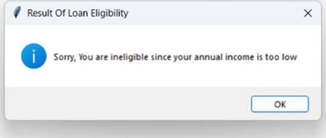
Name-	Sunil
Age-	32
Loans taken(Last 2 Years)-	12
Annual_Income-	1500000
Desired_Loan_Amount-	400000
Loan Term(in years)-	7
Credit_Score-	650



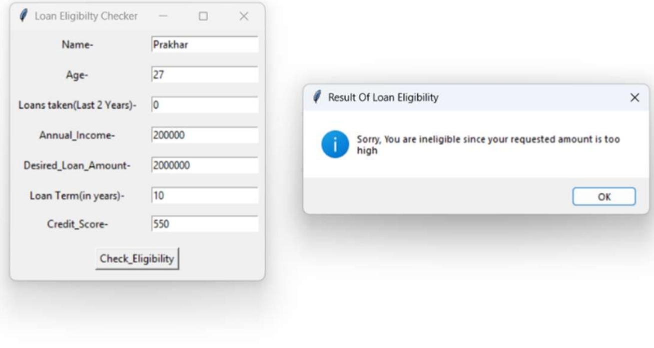
Sorry, You are ineligible since maximum amount of loans taken in last two years reached



Name-	Naman
Age-	29
Loans taken(Last 2 Years)-	5
Annual_Income-	100000
Desired_Loan_Amount-	400000
Loan Term(in years)-	10
Credit_Score-	500

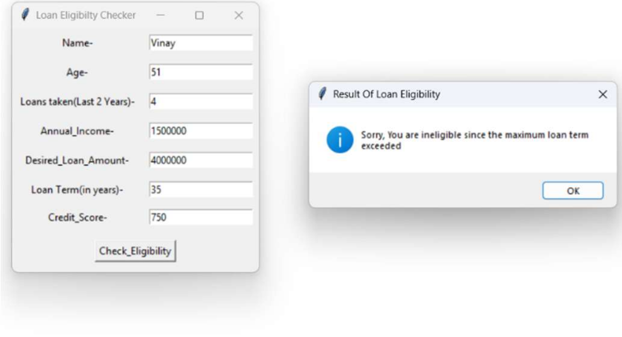


Sorry, You are ineligible since your annual income is too low



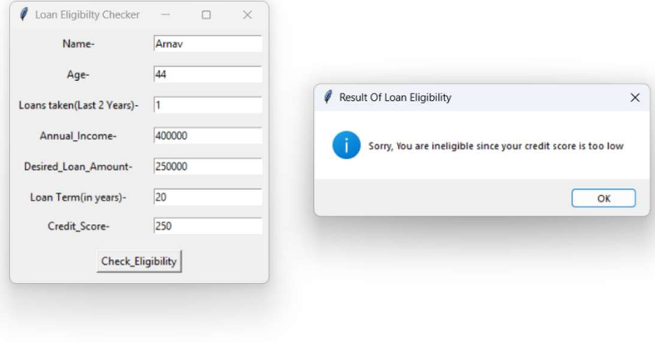
Name-	Prakhar
Age-	27
Loans taken(Last 2 Years)-	0
Annual_Income-	200000
Desired_Loan_Amount-	2000000
Loan Term(in years)-	10
Credit_Score-	550

Sorry, You are ineligible since your requested amount is too high



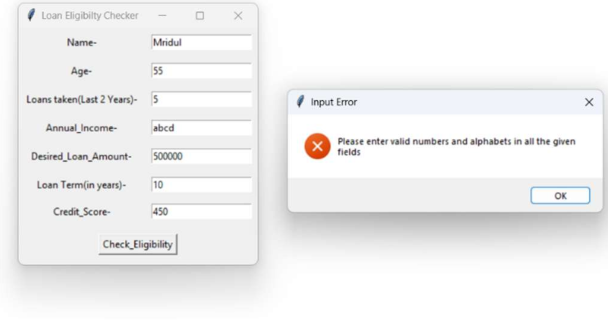
Name-	Vinay
Age-	51
Loans taken(Last 2 Years)-	4
Annual_Income-	1500000
Desired_Loan_Amount-	4000000
Loan Term(in years)-	35
Credit_Score-	750

Sorry, You are ineligible since the maximum loan term exceeded



Name-	Arnav
Age-	44
Loans taken(Last 2 Years)-	1
Annual_Income-	400000
Desired_Loan_Amount-	250000
Loan Term(in years)-	20
Credit_Score-	250

Sorry, You are ineligible since your credit score is too low



Name-	Mridul
Age-	55
Loans taken(Last 2 Years)-	5
Annual_Income-	abcd
Desired_Loan_Amount-	500000
Loan Term(in years)-	10
Credit_Score-	450

Please enter valid numbers and alphabets in all the given fields

Testing Approach

The testing which I did with my program are as follows-:

1 – Unit Testing- In this we have to test functions individually and also have to take a note on the maximum and minimum limits.

2- Functional Testing- In this we verify the overall program flow from input to output and we have to check all cases to ensure correct messages are displayed.

3- Boundary Testing- In this, we have to take the inputs from the boundary of the range like taking 59 from age between 20-60. It ensures whether the system is working as expected or not.

Negative Testing- In this we will provide invalid input to know whether it is showing some result or it is asking for correction.

Performance Testing- By this type of test, we get to know that the function is giving correct outputs but also it works smoothly and it also scales well for the user.

Challenges Faced

The problem faced by me during making the project are as follows-:

1-Handling the data- The program must ensure that all the input in correct format and without the robust validation there are some chances that program may get crashed.

2- Maintenance Challenges- The challenges are related to the need for continuous updates.

3-Eligibility rules must be clearly defined- Translating the real word loan criteria to a precise program requires deep understanding and good clarity.

4- Error Handling- Incorporating robust error handling to manage invalid data entry or any kind of error like runtime error.

Learning and Key Takeaways

1 – Importance of Input Validation- It helps me to understand that it is very important to do input validation as it helps me to prevent error.

2-Understanding Basic Concepts of Program- It gives me a memorable practical experience in making a program with the help of conditional statements.

3- Design Challenges- During the making of the project , I faced many challenges handling different kind of errors, specific conditions to be set like setting the limit of the criteria of loan eligibility checker and also making the code in a way that it is easy to update the code in future.

4-Importance of Testing- I realized the significance of deeply testing different think by doing unit testing, functional testing, boundary testing, negative testing and performance testing which helps me to catch logical errors in the code.

Future Enhancements

The future enhancements that I would like to do is-:

1 – Use of Machine Learning- I will move from conditional statement basic project to predictive models using machine learning models and algorithms.

2- Automated Data Validation- I will used new and advanced validation data to handle the missing or inconsistent data.

3- Performance Optimization- I will use various tools and also code optimization which will handle large number of loan applications.

4- Adding additional input features- I will add other input features such as past loan record, properties owned by the user.

5- Adding Database- I will add a database to store all the details of the user, eligibility records as well as I will further do a complete detailed analysis of it.

References

1 - Vityarthi Modules

2 – Python Libraries

3 – Python Programming books and tutorial