Project Propsal

Home Loan Monitor

John Jamieson

*Katherine Mulder & Alex Borawski*

Easter Institute of Technology NZ Bachelor of Computing Systems

ITPR7.508 Business Application Programming

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|  | REVISION DATE: Ongoing |

Home Loan Monitor

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| --- | --- | --- | --- | --- |
| **Approver Name** | **Title** | **Email** | **Signature** | **Date** |
| John Jamieson | Software Client | jjamieson@eit.ac.nz |  |  |
| John Jamieson | Project Manager | jjamieson@eit.ac.nz |  |  |
| Katherine Mulder | Software Engineer | [huangs3@student.eit.ac.nz](mailto:%48%55%41N%47%533@s%74u%64e%6et%2ee%69%74%2ea%63%2en%7a) | KM |  |
| Alex Borawski | Software Developer | [borawa1@student.eit.ac.nz](mailto:%42%4f%52%41%57%41%31@s%74%75%64en%74%2ee%69%74%2ea%63.%6e%7a) | AB |  |

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# Section 1. Overview

## Purpose

The purpose of this document is to propose the development of a user-friendly home loan monitor. It aims to simplify mortgage management by providing tools for calculating payments, tracking interest rates, managing multiple mortgages, and planning financial strategies effectively. This monitor will offer intuitive navigation, unobtrusive design, and advanced functionalities to enhance productivity and streamline the mortgage management process for users.

## Business Context

In today's changing real estate market, managing mortgages can be complex. Our software aims to simplify this by offering a user-friendly solution tailored to your needs. It helps individuals and businesses effectively handle mortgage obligations despite fluctuating interest rates and evolving financial products.

## 1.3 Scope

|  |
| --- |
| **Project Include** |
| A mortgage calculator module that allows users to calculate monthly or fortnightly payments based on loan amount, interest rate, and loan term. |
| Incorporate the ability to compare multiple loan and interest rates. |
| Enable users to input variable interest rates over specific periods and automatically update mortgage calculations accordingly. |
| Include a feature to view historical mortgage data. |
| Support multiple mortgages, allowing users to manage multiple properties simultaneously. |
| Include a chat to display mortgage data. |
| Development of a user-friendly interface webpage. |
| The project will include the utilized test files. |

|  |
| --- |
| **Project Exclude** |
| Not the actual deployment of the website onto designated servers. |
| Not include extensive SEO services such as keyword research, on-page optimization, or link building. |
| The project does not involve custom graphic design services beyond the scope of interface design and layout. |
| Not include the necessary maintenance and updates for the software. Not post. |

## User Characteristics

The target users of the home loan monitor/calculator software are diverse and may include individuals, families, real estate investors, and financial advisors. These users may have varying levels of familiarity with financial concepts and software usage. As such, the software will be designed with an intuitive interface and comprehensive help resources to accommodate users with diverse backgrounds and skill levels.

# Section 2. Assumptions, Dependencies, Constraints

## 2.1 Assumptions

For this project, we have had to make a few assumptions to ensure an understanding of the project’s conditions are understood correctly by all parties. These are listed below:

* **Loan Terms:** We must assume that loan terms are homogenized across all potential loans that utilize the software. This means that we will assume all loans carry the same terms regarding any “hidden” fees such as insurance and tax, which will be excluded from the final product and we will also assume that mortgages run through this software will have a full amortization, meaning that the loan will be paid off in full at the end of the term defined by the user.
* **Calculator Formula:** We also assume that the accuracy of all given formulas is empirically correct, but we will also allow for a margin of error of 0.1% to allow for any minor differences between the calculation from the software when compared to the real world.
* **Regulatory Compliance:**  As this software overlaps with areas of personal finances, we assume that all data used is compliant with Privacy laws around customer information. We also assume that all information is also compliant with relevant financial information laws.

## 2.2 Dependencies

We will rely on some dependencies for this project to be able to develop the software that meets the requirements laid out. These are as follows:

* **Data Sources:** This software is reliant on being given accurate and up-to-date information regarding the financial information of a given mortgage case. This information includes but is not limited to, interest rates, repayment periods, loan amounts, and loan terms.
* **Platform Compatibility:** The software will also require that the platform that it is being run on is compatible with the software’s design. This information is flexible until the agreed-upon design is settled, in which the compatible software will be locked in and discussed in the Formal documentation as well as the user documentation at the end of the project.
* **Mathematical Libraries:** If the software utilized in these projects uses any mathematical libraries, we would then be dependent on the accuracy of these libraries.

## 2.3 Constraints

There are a few key constraints to consider that will impact the project’s scope and development. These are:

* **Time:** This project will need to be completed by the 7th of June 2024, so it will be important to prioritize the key functionalities of the software to complete the project on schedule.
* **Budget:** The budget for this project will be set before the project’s start, meaning that we will need to operate within what the budget allows throughout this project.
* **Legal:** We will need to operate within all relevant laws regarding this project, which may include privacy of data and security as financial data is involved.
* **Technical:** We also need to ensure that we operate that we work within the limitations of the software used and the intended hardware for the software.

# Section 3. Requirements

## 3.1 Business Requirements

To provide software to simplify the process of mortgage calculations. This software will be delivered in full on or by the 7th of June 2024 alongside complete user documentation. This project will cost up to (number).

## 3.2 Functional Requirements

**Mortgage Calculation:**

The mortgage calculator function is the process of estimating mortgage payments.

### Mortgage Calculation Purpose:

This function is to calculate mortgage payments based on user-provided input, including loan amount, interest rate, and payment frequency.

## 3.3 Mortgage Inputs:

|  |  |
| --- | --- |
| **Function input** | **Definition** |
| Principal | The initial amount of money borrowed for purchasing a home. |
| Principal Increment | An increasing value of the principle. |
| Interest | The additional amount charged by the lender for borrowing the principal amount. |
| Interest Increment | An increasing value of the interest. |
| Years | The total duration of the loan is in years. |
| Months | The specific month within the loan term. |
| Payment override option | Confirming if a payment override is included. |
| Payment override amount | The adjustment amount was used instead for mortgage calculation. |
| payment override format | The repayment timeframe the override applies to. |

## 3.4 Mortgage Operations:

* Calculate mortgage payments based on Principal, interest, and term (years and months).
* Calculate payments based on increment amounts to a set value.
* If an override is provided, calculate based on those values.

## 3.5 Mortgage Outputs:

The outputs are presented both on a fortnightly and monthly basis, providing valuable insights into your repayment structure.

There are two categories initial payment breakdown and mortgage maturity and it will give you fortnightly and monthly outcomes.

The initial payment breakdown components include:

* Estimated Repayment ±0.1%:The estimated repayment amount with a margin of error of ±0.1%.
* Interest: The portion of the payment allocated towards the interest accrued on the principal amount.
* Principal: The portion of the payment allocated towards reducing the principal amount borrowed.
* Extra Payment: Any additional payment made towards the principal, beyond the required fortnightly payment.
* Repayment: The total repayment amount for the fortnight or monthly, including interest, principal, and any extra payment made.

In the analysis (mortgage maturity) section components include:

* Payments over full term: Total payments made over the entire duration of the loan term, inclusive of both principal and interest.
* Payments over reduced Term: Total payments made over a reduced loan term, if extra payments are made towards the principal.
* Full term to amortize: The total loan term required to fully amortize the loan.
* Estimated reduced term to amortize: The estimated reduced loan term is required to fully amortize the loan with additional payments towards the principal.
* Interest over full term ±0.1%: Total interest paid over the full loan term, represented as a percentage of the total loan amount, with a margin of error of ±0.1%.
* Principal + interest over full term: Total amount paid towards both principal and interest over the full loan term.
* Interest over reduced term ±0.1%: Total interest paid over the reduced loan term, represented as a percentage of the total loan amount, with a margin of error of ±0.1%.
* Interest saved over reduced term ±0.1%: Potential interest savings achieved by making extra payments towards the principal, represented as a percentage of the total loan amount, with a margin of error of ±0.1%
* Principal + interest over reduced term: Total amount paid towards both principal and interest over the reduced loan term.

## 3.6 Mortgage graphing function:

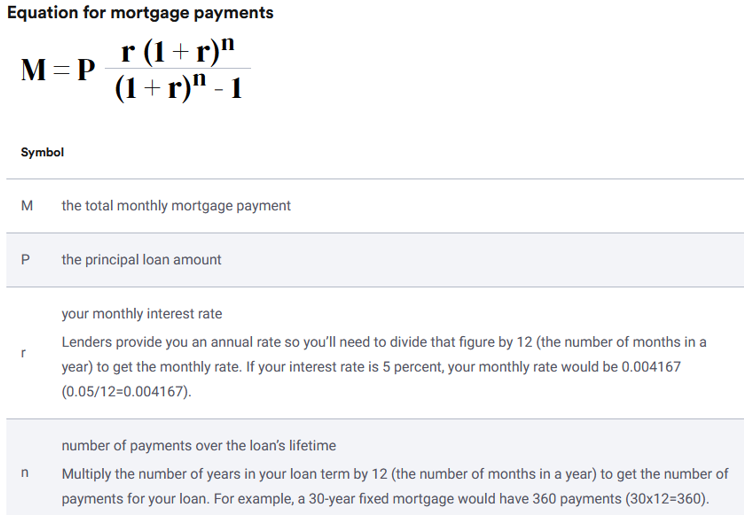
* Fortnightly payment breakdown for the principal amount vs. interest amount
* Monthly payment breakdown
* Total interest paid overtime
* Principal reduction over time
* Estimated repayment vs. actual repayment

## 3.7 User Case:

* User story 1: as a user, I want to input the principal amount, interest rate, loan term in years and months, and specify whether I want to make payments on a monthly or fortnightly basis, so that the system can calculate my repayment structure accordingly.
* User story 2: as a user, I want to specify whether I intend to make extra payments towards the principal beyond the regular repayment amount, so that the system can adjust the repayment schedule accordingly.
* User story 3: as a user, I want to view the breakdown of my mortgage repayment, including estimated repayment, interest, principal, and total repayment, based on the input principal, interest rate, loan term, and payment frequency, so that I can understand how my payments are allocated over time.
* User story 4: As a user, I want to analyze the maturity of my mortgage, including the total payments made over the full term, the full term required to fully amortize the loan, the total interest paid over the full term, and the total amount paid towards both principal and interest, based on the input principal, interest rate, loan term, and payment frequency, so that I can assess the overall cost of my mortgage.

## 3.8 Logical Data Requirements

The software will need to utilize the following formulas to calculate all the required values to correctly track the mortgage over time.

First is the equation for calculating the mortgage repayments which is done with the following formula:

## 

A screenshot of a computer screen

Description automatically generatedWe will also need a wat to calculate the rate per period which is done with this formula:

A math problem with black text

Description automatically generated with medium confidenceLastly, we need a formula to calculate the number of periods to repay the loan:

## 3.9 User Requirements

Users require a user-friendly home loan monitor to accurately calculate their mortgage payments. The software should allow users to input all necessary details and display the results, including additional graphical representations.

The mortgage software should enable users to easily input their loan information and view clear repayment details. Accuracy is crucial, with repayment calculations being precise to within a 0.1% margin. Additionally, users should have access to graphical representations of their mortgage data. The software must utilize correct mathematical formulas for precise calculations and Integration with a database system is essential to safeguard user data.

## 3.10 Information Management Requirements

We require the data to be held inside a database with access done via user logins to ensure that they can only access data relating to them. We will also have the inclusion of an admin account to access overarching controls. We will also store information in the server that is more sensitive behind an encryption layer to ensure privacy of more important data such as user’s passwords, loan amounts, repayment amounts and what user is associated with each mortgage.

## 3.11 Systems Requirements

### 3.6.1 Performance Requirements

The software will be required to operate with a fast response time as it is operating locally, also scalability issues will not be considered as it is operating locally, and it will not be designed with multiple concurrent users utilizing the software.

### 3.6.2 Quality Requirements

The software’s function will pass all available unit testing, integration testing and functional testing, with the level of accuracy of the repayments being limited to no greater than 0.1% difference.

## 3.12 Interfaces

The software will have options to login in and out, create a new user account, update and view their current mortgages and visually see how their mortgages are progressing via a graph.

# Section 4. Requirements Traceability Matrix

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ID | Requirement | Tests | Test Results | Issues |
| 1 | Input principal | allow the user to input the principal amount |  |  |
| 2 | Input increment | allow the user to input increment |  |  |
| 3 | Input interest | allow the user to input the interest rate |  |  |
| 4 | Input increment | allow the user to specify any increments |  |  |
| 5 | Input years | allow the user to input the duration of the loan term in years |  |  |
| 6 | Input months | allow the user to input the duration of the loan term in months |  |  |
| 7 | Input payment override (Y/N) | allow the user to specify whether they want to override the default payment schedule with additional payments towards the principal (Yes/No) |  |  |
| 8 | If payment override = y then input per month | If the user chooses to override the payment schedule, the system should allow them to input the additional payment amount per month |  |  |
| 9 | If payment override = y then input per fortnight | If the user chooses to override the payment schedule, the system should allow them to input the additional payment amount per fortnight |  |  |
| 10 | Estimated Repayment ±0.1% | Calculated estimated repayment amount with margin of error ±0.1% |  |  |
| 11 | Interest | calculate the portion of each payment allocated towards interest accrued on the principal amount |  |  |
| 12 | Principal | calculate the portion of each payment allocated towards reducing the principal amount borrowed |  |  |
| 13 | Extra Payment | allow for input of any additional payment made towards the principal, beyond the required payment amount. |  |  |
| 14 | Repayment | calculate the total repayment amount for each period, including interest, principal, and any extra payments made. |  |  |
| 15 | Payments over full term | calculate the total payments made over the entire duration of the loan term, inclusive of both principal and interest. |  |  |
| 16 | Payments over reduced Term | calculate the total payments made over a reduced loan term if extra payments are made towards the principal. |  |  |
| 17 | Full term to amortize | determine the total loan term required to fully amortize the loan. |  |  |
| 18 | Estimated reduced term to amortize | estimate the reduced loan term required to fully amortize the loan with additional payments towards the principal. |  |  |
| 19 | Interest over full term ±0.1% | calculate the total interest paid over the full loan term, represented as a percentage of the total loan amount, with a margin of error of ±0.1%. |  |  |
| 20 | Principal + interest over full term | calculate the total amount paid towards both principal and interest over the full loan term. |  |  |
| 21 | Interest over reduced term ±0.1% | calculate the total interest paid over the reduced loan term, represented as a percentage of the total loan amount, with a margin of error of ±0.1%. |  |  |
| 22 | Interest saved over reduced term ±0.1% | calculate the potential interest savings achieved by making extra payments towards the principal, represented as a percentage of the total loan amount, with a margin of error of ±0.1%. |  |  |
| 23 | Principal + interest over reduced term | calculate the total amount paid towards both principal and interest over the reduced loan term. |  |  |

# Section 5. Budget

I think I am on the right track for the RTM here, but I will ask john in class on Tuesday so don’t worry about this part I will sort it out ☺

<https://www.perforce.com/blog/alm/how-create-traceability-matrix#create-a-requirements-traceability-matrix-template>

questions:

1. Do I need to add dependencies in RTM ?

The total budget of **$14000** is allocated for labor costs, with two individuals working for 10 hours per week over a 16-week period. This results in a total of 320 hours of labor. Based on this, the hourly rate is approximately $43.75. Each person will work for a total of 160 hours, resulting in labor costs of $7000 for each individual.