**Project Plan**

**CMSC 495 6381 Current Trends and Projects in Computer Science (2208)**

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**Loan Amortization Calculator**

Revision: 1.3

Date: 09/29/2020

**Revision History**

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| --- | --- | --- | --- |
| **Revision** | **Date** | **Name(s) of Editor** | **Description** |
| 0.0 | 08/28/2020 | Sam Yuan | Original Document |
| 1.0 | 08/30/2020 | Sam Yuan & James Lisle | Substantial content added |
| 1.1 | 08/31/2020 | Lisle | Added timeline and additional roles |
| 1.2 | 09/13/2020 | Lisle | Added additional requirements |
| 1.3 | 09/29/2020 | Lisle | Updated Task Detail and refined requirements |
| 1.4 | 10/6/2020 | Lisle | Updated Task Detail for Phase 3 |
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**PROJECT PLAN**

# Project Overview

1. The Amortization Calculator will provide a user the ability to determine any of the four variables used in the formula shown in figure 1 dependent on the other three variables being provided. The user will also have the option of displaying an amortization schedule showing the number of payments over the life of the loan and the breakdown of interest and principal for each.

where

* A = loan payment per term
* P = loan principal
* r = interest rate per term
* n = total number of payments

**Figure 1 – Amortization Equation**

Month Payment Principal Interest Balance

1 1278.96 1225.84 53.13 13774.16

2 1278.96 1230.18 48.78 12543.98

3 1278.96 1234.54 44.43 11309.45

4 1278.96 1238.91 40.05 10070.54

5 1278.96 1243.30 35.67 8827.24

6 1278.96 1247.70 31.26 7579.54

7 1278.96 1252.12 26.84 6327.43

8 1278.96 1256.55 22.41 5070.87

9 1278.96 1261.00 17.96 3809.87

10 1278.96 1265.47 13.49 2544.40

11 1278.96 1269.95 9.01 1274.45

12 1278.96 1274.45 4.51 0.00

where

* A = 1278.96
* P = 15000
* r = 4.25%
* n = 1 year (12 months)

**Figure 2 – Amortization Schedule**

**Definitions**

Amortization is a process of reducing a debt by applying regular payments over the length of a loan.

* Loan Amount represents the magnitude of the loan.
* Loan Payment represents the amount of money to be paid on a regular basis that will reduce the balance of the loan.
* Loan Interest Rate represents the amount charged as a percentage of the loan amount for each period in the term.
* Loan Term represents the number of payment periods for the loan.
* Amortization Schedule is a report showing the characteristics of a loan (amount, payment, interest rate, and term) and a table that has the payment of each term of the loan consisting of payment, principal, interest, and the remaining loan balance.

# Requirement Specifications

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| **Functional Requirements** | | |
| **Requirement #** |  | **Description** |
| 1 | The System will provide a GUI interface. | |
| 2 | The System will provide a cloud-based Loan Calculation Service | |
| 2 | The System will provide a user with a form to enter 3 of the 4 required variables | |
| 3 | The System will validate the data values at entry and calculation. | |
| 4 | The System will provide the user with an error message if validation fails. | |
|  | The System will provide the user with an error message if connectivity fails | |
| 5 | The System will calculate and display the missing variable. | |
| 6 | The System will synchronously communicate with the cloud-based Loan Calculation Service via a SOAP API call over HTTPS | |
| 7 | The System will optionally allow the user to create an amortization schedule. | |
| 8 | The System will receive, calculate, and display the calculated variable and if selected an amortization schedule. | |
| 9 | The GUI will timeout after n seconds of initiating a call to the Loan Amortization Service | |
| 10 | The GUI will ping the service periodically to ensure that it is available and set the <Calculate> button according to availability (enabled/disabled) | |
| **Non-Functional Requirements** | | |
| **Requirement #** |  | **Description** |
| 1 | The System will not provide authentication or authorization. | |
| 2 | The System will not be guaranteed to be available. | |
| 3 | The System will not be guaranteed to be scalable. | |
| 4 | The System will not persist any user data. | |

**Table 1. Requirements**

# System Specification

1. **Client Side:**
2. The Amortization Calculator requires a computer with at least 4 GB memory, multicore CPU(s), and connectivity to the internet.
3. The Java Runtime Environment (JRE) version 8 or greater must be installed.
4. LoanCalcClient.jar must be installed.
5. **Server Side:**
6. Installation of the Loan Calculation Service into the Heroku Cloud environment.

**Team Roles**

·       Project Managers: Yuan / Lisle

·       Developers:

* GUI Component: Yuan / Wingfield / Tasker
* Service Component: Lisle /  Jacob / Tasker
* QA testers: Yuan / Jacob / Lisle / Wingfield / Tasker
* Online Collaboration Coordinator: Tasker
* Documentation
* Project Specifications & Timeline – Yuan / Lisle
* Test Plan – Yuan / Lisle
* User’s Guide - Tasker
* Design Document – Jacob / Wingfield
* Phase (1-3) & Final Reports – Yuan / Tasker / Jacob / Wingfield / Lisle

# Project Time Lines

9/1      Project Plan & Requirements Specifications  
9/8      Test Plan & User Guide  
9/15    Project Design Document  
9/22    Phase 1 Report   
9/29    Phase 2 Report   
10/ 6   Phase 3 Report   
10/13  Final Report & Project

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| **Task** | **Date** | **Responsibility** |
| Project Requirements |  |  |
| a) PR Writing | 8/26-8/31 | Yuan / Lisle |
| b) PR Review | 8/30-9/1 | Team Charlie |
| c) PR Revision |  | Wingfield/Jacob |
| Project Plan |  |  |
| a) PP Writing | 8/26-8/31 | Yuan / Lisle |
| b) PP Review | 8/30-9/1 | Team Charlie |
| c) PP Revision |  | Wingfield/Jacob |
| Test Plan |  |  |
| a) TP Writing | 9/2-9/7 | Yuan / Lisle |
| b) TP Review | 9/6-9/8 | Wingfield/Jacob |
| c) TP Revision |  | Yuan / Lisle |
| User Guide |  |  |
| a) UG Writing | 9/2-9/7 | Tasker |
| b) UG Review | 9/6-9/8 | Team Charlie |
| c) UG Revision |  | Tasker |
| Project Design Doc |  |  |
| a) PA Writing | 9/9-9/14 | Jacob/Wingfield |
| b) PA Review | 9/13-9/15 | Yuan / Lisle / Tasker |
| c) PA Revision |  | Jacob/Wingfield |
| Phase 1 Coding & Report |  |  |
| a) P1 Coding | 9/16-9/22 | Lisle/Yuan |
| b) P1 Review | 9/16-9/22 | Tasker/Jacob |
| c) P1 Testing | 9/16-9/22 | Wingfield |
| d) P1 Revision | 9/16-9/22 | Lisle/Yuan |
| e) P1 Report | 9/20-9/22 | Jacob |
| Phase 2 Coding & Report |  |  |
| a) P2 Coding | 9/23-9/29 | Tasker/Wingfield |
| b) P2 Review | 9/23-9/29 | Lisle/Yuan |
| c) P2 Testing | 9/23-9/29 | Jacob |
| d) P2 Revision | 9/23-9/29 | Tasker/Wingfield |
| e) P2 Report | 9/27-9/29 | Yuan |
| Phase 3 Coding & Report |  |  |
| a) P3 Coding | 9/30-10/6 | Jacob/Tasker |
| b) P3 Review | 9/30-10/6 | Yuan/Wingfield |
| c) P3 Testing | 9/30-10/6 | Lisle |
| d) P3 Revision | 9/30-10/6 | Jacob/Tasker |
| e) P3 Report | 10/4-10/6 | Wingfield |
| Final Project Coding |  |  |
| a) FP Coding | 10/7-10/12 | Yuan/Lisle |
| b) FP Review | 10/10-10/12 | Wingfield/Jacob |
| c) FP Testing | 10/7-10/12 | Tasker |
| d) FP Revision | 10/12-10/13 | Yuan/Lisle |
| Final Report |  |  |
| a) FP Writing | 10/9-10/11 | Team Charlie |
| b) FP Review | 10/12 | Team Charlie |
| c) FP Revision | 10/13 | Team Charlie |

Task Detail

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| **Task** | **Date** | **Responsibility** |
| **Phase 1** | | |
| Finalize Loan Calculator  WSDL | 9/16-9/22 | Group Charlie |
| Create Client Project | 9/16-9/22 | Group Charlie |
| Create Client Controller | 9/16-9/22 | Group Charlie |
| Create Client View Class | 9/16-9/22 | Group Charlie |
| Create Client Model Class | 9/16-9/22 | Group Charlie |
| Create Client Stub Classes | 9/16-9/22 | Group Charlie |
| Check-in code to Github | 9/16/-9/22 | Group Charlie |
| Create Service Project | 9/16-9/22 | Group Charlie |
| Generate Service Classes from WSDL | 9/16-9/22 | Group Charlie |
| Generate Service Classes | 9/16-9/22 | Group Charlie |
| Create LoanCalcEngine Class | 9/16-9/22 | Group Charlie |
| Check-in code to Github | 9/16-9/22 | Group Charlie |
| Create Heroku Environment for Service | 9/16-9/22 | Group Charlie |
| **Phase 2** | | |
| Connect Client to Service | 9/23-9/29 | Lisle |
| Review and enhance validation. | 9/23-9/29 | Group Charlie |
| Enhance JUnit tests for unit tests | 9/23-9/29 | Lisle |
| Test ping Timer class over a long duration (4 hours) | 9/23-9/29 | Lisle |
| Add field for email address & verification code to GUI if amortization table is selected. Include validation that sends email account a verification code to prove user controls account | 9/23-9/29 | Deferred to Phase 3 |
| Review Service Calculation class | 9/23-9/29 | Group Charlie |
| Review and Enhance JUnit tests for unit tests | 9/23-9/29 | Group Charlie |
| Update WSDL with email address. | 9/23-9/29 | Deferred to Phase 3 |
| Service Testing using SoapUI, JMeter | 9/23-9/29 | Wingfield  Lisle |
| Create Itext PDF helper class for creating pdf documents | 9/23-9/29 | Tasker |
| Updated Project Plan | 9/23-9/29 | Group Charlie |
| Update User Guide | 9/23-9/29 | Group Charlie |
| Update Testing Doc | 9/23-9/29 | Group Charlie |
| Update Technical Doc | 9/23-9/29 | Group Charlie |
| Create Phase 2 Report | 9/23-9/29 | Group Charlie |
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| **Task** | **Date** | **Responsibility** |
| **Phase 3** | | |
| Add 2-step email verification dialog to client | 9/30-10/06 | Group Charlie |
| Update amortization schedule displayed to include loan info with interest paid | 9/30-10/06 | Group Charlie |
| Client Security Review | 9/30-10/06 | Group Charlie |
| Defer final PDF generation modifications until Phase 4 | 9/30-10/06 | Group Charlie |
| Update WSDL with email address and pin verification. | 9/30-10/06 | Group Charlie |
| Generate Web Service artifacts for client and service for 2-step verification for email address. | 9/30-10/6 |  |
| Create email class for SendGrid – EmailManager – that allows emails with and without attachements. | 9/30-10/6 | Group Charlie |
| Service Testing of Email Functionality | 9/30-10/6 | Group Charlie |
| Add property file for SendGrid API access | 9/30-10/6 | Group Charlie |
| Add amortization schedule generation to service. | 9/30-10/6 | Group Charlie |
| Service Security Review | 9/30-10/6 | Group Charlie |
| End to End testing | 9/30-10/6 |  |
| Assorted bug fixes | 9/30-10/6 |  |
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