

ENSE 375 – Software Testing and Validation

Online Banking Simulator

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* Proof read the text for typing and grammar mistakes.
* Follow the IEEE Bibliography style for the references by selecting "References/ Citations & Bibliography/ Style".

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# Introduction

* Give a brief description of the design and a summary of the relevant background information related to the topic. Give a rationale about what is needed and why.
* Give the reader an overview of what is in the next sections.
* Do not put any detailed results of your work here.

# Design Problem

This section has the following two subsections:

## Problem Definition

We strive to create an online banking simulator to assist those who are new to using online banking and would like to have a better understanding of how to use this new technology effectively and efficiently. This simulator will be using preset accounts for the user to test online banking with to better understand how they may use it for their own banking needs without the worry of damaging their financials in the process. The motivation for this project stems from the observation that many growing individuals lack education on how one should properly operate and interact with a banking system. Acknowledging the fundamental role banking plays in our daily lives, we find it motivating to develop such a system. Some restrictions may include: deposit restrictions (can’t be below 0, can’t be above X), withdraw restrictions (can’t be 0 or lower, can’t be more than you have), daily withdrawal limits (cannot withdraw more than X in a day determined by account type), login and signup restrictions (length and/or required characters).

## Design Requirements

### Functions

* Withdraw: Takes money out of select account
* New Login: Create login credentials for a user
* Login: Login a user
* Deposit: Adds money to select account
* Etransfer: Send money from your account to someone else within your contact list or to a new contact
  + Add New Contact: Add a new recipient to your contact list
  + Delete Contact: Remove a recipient from your contact list
* Transfer between accounts: Takes funds from one account to add to another
* Pay Bill: select a payee to send money to
  + Add Payee: Add account information for a new payee
  + Remove Payee: Remove payee
* Update Account Info:
  + Update Name: allows to change the username
  + Update Address allows to change address
  + Update Phone Number: allows to change phone number
* View Account Balance: Check the balance of money within a specified account associated with the logged in user’s banking plan

### Objectives

* Be able to simulate creating login credentials (general bank account) [Primary]
* Be able to edit limited account settings (login credentials, address) [Primary]
* Be able to login with preset account (different bank account types for them to be able to play around with) [Primary]
* Withdraw and deposit funds on preset accounts [Primary]
* Transfer money from one account to another [Secondary]
* Simulate e-transfers from one preset account holder to another [Secondary]
* Add a payee and demonstrate how to pay bills electronically [Secondary]
* Demonstrate restrictions when moving monetary funds according to preset account types [Primary]
* View balances within existing accounts within a logged in user [Primary]

### Constraints

* Economic factors
  + Cost
  + Software available
* Regulatory compliance (Security and Access)
  + No real data from any account holders with the organization will be used
  + Ensure login details are correct before granting access to the (dummy) account information
* Reliability
  + It accurately simulates an interaction one would have with a real banking application
  + The software will be able to handle all incorrect input properly
* Ethics
  + No info based on real actors
  + Does not mimic existing banking institutions' design that could become a culprit of fraud.

# Solution

In this section, you will provide an account of some solutions your team brainstormed to implement the project. Some solutions might not have all the desired features, some might not satisfy the constraints, or both. These solutions come up in your mind while you brainstorm ways of implementing all the features while meeting the constraints. Towards, the end you select a solution that you think has all the features and satisfies all the constraints. Remember that an engineering design is iterative in nature!

## Solution 1

A full banking application with an embedded database to represent a fully functional application. In this version we envision to deliver the closest experience to our user with respect to using a banking application without the real-life risks that are closely coupled. We envisioned using an SQL database to hold sets of data where the users can create one of their own accounts. Based on the user’s requirements, this includes a child, student, and an everyday account. The primary reason we chose not to pursue with this solution is with respect to the project timeline and delivery constraints. In addition, managing a database requires for resources and time to be further divided, causing a deviation from the project’s primary goal and objectives, which falls beyond the scope of the project.

## Solution 2

Our second solution is to change from a banking application to make a banking simulation. This allows us to have similar functionality without requiring a database. The application will be able to simulate a user logging in with either pre-made or their own credentials, withdraw or deposit money into accounts, demonstrate restrictions and limits when moving money, view balances, and edit or change the accounts settings. Like solution one, we will still include multiple banking plans to represent the different types of accounts and restrictions a user is likely to face in a real banking application. The difference being we will not have to develop and maintain a database to accompany the banking application.

## Final Solution

This is the final solution. Explain why it is better than other solutions. You may use a table for comparison purposes. After providing the reason for selecting this solution, detail it below.

### Components

What components you used in the solution? What is the main purpose of using individual component? Provide a block diagram (with a numbered caption, such as Fig. 1) representing the connectivity and interaction between all the components.

### Features

Give an account of all the features your solution has. These features may be tabulated (with a title) for improved comprehension.

### Environmental, Societal, Safety, and Economic Considerations

Explain how your engineering design took into account environmental, societal, economic and other constraints into consideration. It may include how your design has positive contributions to the environment and society? What type of economic decisions you made? How did you make sure that the design is reliable and safe to use?

### Test Cases and results

What test suits did you design to test your prototype? How did you execute the test cases to test the prototype?

### Limitations

Every product has some limitations, and so is the case with your design product. Highlight some of the limitations of your solution here.

# Team Work

Since this is a group project, you must have a fair distribution of tasks among yourselves. To this end, you must hold meetings to discuss the distribution of tasks and to keep a track of the project progress.

## Meeting 1

## **Time:** May 23, 2024 9:30 pm to 11:45 pm

**Agenda:** Discuss and decide on Project Topic, Create link for project on github, Email Prof GitHub link of project

|  |  |  |  |
| --- | --- | --- | --- |
| **Team Member** | **Previous Task** | **Completion State** | **Next Task** |
| Brooklyn Coulson | Brainstorm project ideas | 100% | Project Idea  Email prof the GitHub link of the project |
| Quinn Maloney | Brainstorm project ideas | 100% | Potential Restrictions |
| Shahzil Siddiqui | Brainstorm project ideas | 100% | Project Motivation  Create Project GitHub |

## Meeting 2

## **Time:** May 29, 2024 4:00 pm to 5:30 pm

**Agenda:** Discuss design requirements (functions, objectives, constraints)

|  |  |  |  |
| --- | --- | --- | --- |
| **Team Member** | **Previous Task** | **Completion State** | **Next Task** |
| Brooklyn Coulson | Project Idea  Email prof the GitHub link of the project | 100%  100% | Design Requirements |
| Quinn Maloney | Potential Restrictions | 100% | Design Requirements  Update the Report template and push to GitHub |
| Shahzil Siddiqui | Project Motivation  Create Project GitHub | 100%  100% | Design Requirements  Clarify some questions with the prof |

## Meeting 3

**Time:** June 15, 2024 10:32 am to 11:30 am

**Agenda:** Discuss Project Solutions 1, 2, 3

|  |  |  |  |
| --- | --- | --- | --- |
| **Team Member** | **Previous Task** | **Completion State** | **Next Task** |
| Brooklyn Coulson | Design Requirements | 100% | Final Solution |
| Quinn Maloney | Design Requirements  Update the Report template and push to GitHub | 100%  100% | Second Solution |
| Shahzil Siddiqui | Design Requirements  Clarify some questions with the prof | 100%  100% | First Solution |

## Meeting 4

**Time:** June 20, 2024 5:05 pm

**Agenda:** Finalize Solutions

|  |  |  |  |
| --- | --- | --- | --- |
| **Team Member** | **Previous Task** | **Completion State** | **Next Task** |
| Brooklyn Coulson | Final Solution | 100% | Finalize Solutions |
| Quinn Maloney | Second Solution | 100% | Finalize Solutions |
| Shahzil Siddiqui | First Solution | 100% | Finalize Solutions |

# Project Management

Provide a Gantt chart showing the progress of your work here. Mention all the tasks along with their predecessors. Provide the slack time of each task and identify the critical path.

# Conclusion and Future Work

* A summary of what you achieved. Mention all the design functions and objectives that you achieved while satisfying the constrains?
* While keeping the limitations of your solution, provide recommendations for future design improvements.

# References

* Use the IEEE reference style.
* Do not put any reference if it is not cited in the text.

# Appendix

If you want to provide an additional information, use this appendix.