

ATMIYA UNIVERSITY

RAJKOT



A

Report On

SAVINGS AND LENDING APPLICATION

Under subject of

PROJECT

B.TECH, Semester-VII

(Computer Engineering)

Submitted by:

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CANDIDATE'S DECLARATION

We hereby declare that the work presented in this project entitled “**SAVINGS AND LENDING APPLICATION**” was submitted towards completion of the project in the **7th Semester** of B.Tech. (Computer Engineering) is an authentic record of our original work carried out under the guidance of “**Prof. Nirali Borad**”.

We have not submitted the matter embodied in this project for the award of any other degree.

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This is to certify that the “**SAVINGS AND LENDING APPLICATION**” has been carried out by **NISHIT ATULBHAI DETROJA** under my guidance in fulfillment of the subject Project in **COMPUTER ENGINEERING (7th Semester)** of Atmiya University, Rajkot during the academic year 2023.

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ABSTRACT

This project is a web application for the Savings and Lending Application. The project's objective is to deliver the safe and secure environment to the users wanting to Lend or borrow their assets to some another entity. Using this application, people would be able to take loans on the blockchains technology. That means they can essentially lock up certain assets and borrow other crypto currencies and then pay back later after a certain amount of time. A different use case for this kind of application is crypto currency trading. Traders can lock up certain crypto currency assets to borrow a different kind of asset, then trade it and make a profit.

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CHAPTER – 1

INTRODUCTION

1.1. Introduction to Design Engineering phase-wise process

The **design engineering process** is a methodical series of steps that engineers use in creating functional products and processes. The process is highly iterative- parts of the process often need to be repeated many times before another can be entered - through the part(s) that get iterated and the number of such cycles in any given project may vary. It is a decision-making process (often iterative) in which the basic sciences, mathematics, and engineering sciences are applied to convert resources optimally to meet a stated objective. Among the fundamental elements of the design process are the establishment of objectives and criteria, synthesis, analysis, construction, testing, and evaluation.

Research

Various stages of the design process (and even earlier) can involve a significant amount of time spent on locating information and research. Consideration should be given to the existing applicable literature, problems, and successes associated with existing solutions, costs, and marketplace needs.

Design requirements

Establishing design requirements and conducting requirement analysis sometimes termed **problem definition** (or deemed a related activity), is one of the most important elements in the design process, and this task is often performed at the same time as a feasibility analysis. The design requirements control the design of the product or process being developed, throughout the engineering design process. These include basic things like the functions, attributes, and specifications - determined after assessing user needs. Some design requirements include hardware and software parameters, maintainability, availability, and testability.

Feasibility

In some cases, a feasibility study is carried out after which schedules, resource plans, and estimates for the next phase are developed. The feasibility study is an evaluation and analysis of the potential of a proposed project to support the process of decision-making. It outlines and analyses alternatives or methods of achieving the desired outcome. The feasibility study helps to narrow the

scope of the project to identify the best scenario. A feasibility report is generated following which Post Feasibility Review is performed.

Conceptualization

A concept study (conceptualization, conceptual design) is often a phase of project planning that includes producing ideas and taking into account the pros and cons of implementing those ideas. This stage of a project is done to minimize the likelihood of error, manage costs, assess risks, and evaluate the potential success of the intended project. In any event, once an engineering issue or problem is defined, potential solutions must be identified. These solutions can be found by using Ideation, the mental process by which ideas are generated. This step is often termed **Ideation** or "Concept Generation."

Preliminary design

The preliminary design or high-level design includes (also called FEED), often bridges a gap between design conception and detailed design, particularly in cases where the level of conceptualization achieved during ideation is not sufficient for a full evaluation. So in this task, the overall system configuration is defined, and schematics, diagrams, and layouts of the project may provide early project configuration. (This notably varies a lot by field, industry, and product.) During detailed design and optimization, the parameters of the part being created will change, but the preliminary design focuses on creating the general framework to build the project on.

Detailed Design

Following FEED is the Detailed Design (Detailed Engineering) phase, which may consist of procurement of materials as well. This phase further elaborates each aspect of the project/product by complete description through solid modeling, drawings as well as specifications.

Product planning

The production planning and tool design consist of planning how to produce the product and which tools should be used in the manufacturing process. Tasks to complete in this step include selecting materials, selection of the production processes, determination of the sequence of operations, and selection of tools such as jigs, fixtures, metal cutting, and metal or plastics forming tools. This task also involves additional prototype testing iterations to ensure the mass-produced version meets qualification testing standards.

1.2.Scope

In this project, we have presented the idea that which can be useful for the normal people out there in the city. Our main objective of doing this is for those people who are planning to visit somewhere. They can use this application to check the weather forecast around their city. And using the available weather forecast applications is difficult for them to check just the situation out there so that they can plan accordingly. So, we have executed this idea for the solution of the problem of people like them.

We have kept the UI of our application as simple as we can so that it does not make it difficult for them to check the forecast. Apart from these, we have also set a section that enables a user to check the forecast for the next 10 days. Background audio is also added to the application for entertainment purposes. It can also act as a relaxing audio application for those who also want to meditate. For travelers, employees, and youngsters out there who most often visit the playground for their outdoor sports can also make use of this application to have a quick look at the weather forecast out that day.

1.3. Technology and Tool

i. Visual Studio Code

Visual Studio Code is a source code editor made by Microsoft for windows, Linux and macOS. Features include support for debugging, syntax highlighting, intelligent code completion, snippets, code refactoring, and embedded Git. Users can change the theme, keyboard shortcuts, preferences, and install extensions that add additional functionality.

- **Intelligent Code Editor**

Code editor facilitates the writing of better codes, faster working while increasing productivity through advanced code completion, code analysis, and refactoring. Visual Studio Code allows users to set the code page in which the active document is saved, the newline character, and the programming language of the active document.

- **Multiple Extensions**

Visual Studio Code includes multiple extensions for FTP, allowing the software to be used as a free alternative for web development. Code can be synced between the editor and the server, without downloading any extra software

ii. **React JS**

React (also known as React.js or ReactJS) is a free and open-source front-end JavaScript library for building user interfaces based on UI components. It is maintained by Meta (formerly Facebook) and a community of individual developers and companies.

- **Declarative**

React adheres to the declarative programming paradigm. Developers design views for each state of an application, and react updates and renders components when data changes. This is in contrast with imperative programming.

- **Architecture beyond HTML**

The basic architecture of React applies beyond rendering HTML in the browser. For example, Facebook has dynamic charts that render to <canvas> tags, and Netflix and PayPal use universal loading to render identical HTML on both the server and client.

iii. **Solidity**

Solidity is an object-oriented programming language for writing smart contracts. It is used for implementing smart contracts on various blockchain platforms, most notably, Ethereum. It was developed by Christian Reitwiessner, Alex Beregszaszi, and several former Ethereum core contributors to enable writing smart contracts on blockchain platforms such as Ethereum. The programs compiled by the Solidity are intended to be run on Ethereum Virtual Machine

iv. **Tailwind CSS**

Tailwind CSS is basically a utility-first CSS framework for rapidly building custom user interfaces. It is a highly customizable, low-level CSS framework that gives you all of the building blocks you need to build bespoke designs without any annoying opinionated styles you have to fight to override.

CHAPTER – 2

PROJECT MANAGEMENT

2.1 Project Planning

Project Planning is concerned with identifying and measuring the activities, milestones, and deliverables produced by the project. Project planning is undertaken and completed sometimes even before any development activity starts. Project planning consists of the following essential activities:

- Scheduling manpower and other resources needed to develop the system.
- Staff organization and staffing plans.
- Risk identification, analysis, and accurate planning.
- Estimating some of the basic attributes of the project like cost, duration, and efforts. The effectiveness of the subsequent planning activities is based on the accuracy of these estimations.
- Miscellaneous plans like quality assurance plan, configuration management plan, etc.

Project management involves planning, monitoring, and control of the people, process, and events that occur as the software evolves from a preliminary concept to operational implementation. Cost estimation is a relative activity that is concerned with the resources required to accomplish the project plan.

2.2 Project Scheduling

The scheduling is the peak of planning activity, a primary component of software project management. When combined with estimation methods and risk analysis, scheduling establishes a roadmap for project management. The characteristics of the project are used to adapt an appropriate task set for doing work.

2.3 Risk Management

Risk management consists of a series of steps that help a software development team to understand and manage uncertain problems that may arise during software development and can plague a software project. Risks are the dangerous conditions or potential problems for the system

which may damage the system functionalities to a very high level which would not be accepted at any cost. So to make our system stable and give its 100% performance we must have to identify those risks, analyse their occurrences and effects on our system, and must prevent them to occur.

2.3.1 Risk Identification

Risk identification is a first systematic attempt to specific risks to project plan, Scheduling resources, project development. It may be carried out as a team process using a brainstorming approach.

Technology risk

Technical risks concern implementation, potential design, Interfacing, testing, and maintenance problems

- Database Corruptness
- Garbage Collection

People Risks

These risks are concerns with the team and its members who are taking part in developing the system.

- Leaking an important data
- Failure of the administration
- Lack of knowledge
- Lack of clear product vision
- Technical staff conflict
- Poor communication between people.

Tools Risks

These are more concerned with tools used to develop the system

- Tools containing the virus.

General Risks

General Risks are the risks, which are concerned with the mentality and resources.

- Lack of resources can cause great harm to efficiency and timely productivity.
- Rapidly changing requirements.

-
- Changes in requirements can cause great harm to implementation, designing, and scheduling
 - of developing the system.
 - Insufficient planning and task identification.

2.3.2 Risk Analysis

“Risk analysis = risk assessment + risk management + risk communication.”

Risk analysis is employed in its broadest sense to include

Risk assessment:

Involves identifying sources of potential harm, assessing the likelihood that harm will occur, and the consequences if harm does occur.

For this project, It might be:

- System Crash.

Risk management

Evaluates which risks identified in the risk assessment process require management and selects and implements the plans or actions that are required to ensure that those risks are controlled.

Precautions taken to make risks minimal are as under:

- Periodical backups are taken to avoid major loss in case of a system crash.

Risk communication

Involves an interactive dialogue between stakeholders and risk assessors and risk managers which actively inform the other processes.

Steps taken for risk communication are as under:

- The probability of certain risks is negotiated with the client.
- All the possible risks are listed out during communication and the project is developed
- taking care of that risks.

CHAPTER – 3

SYSTEM REQUIREMENTS STUDY

3.1 Hardware and Software Requirement

This shows minimum requirements to carry on to run this system efficiently.

3.1.1 Software Requirements

Table 3.1.1 Software Requirements

For which	Software
Operating System	Any Operating System
Front End	Node.js + java + tailwind - CSS framework
Back End	Truffle + Ganache
Coding Language	Solidity

3.1.2 Client-side Requirements

Table 3.1.2 client-side Requirements

For which	Requirement
Operating System	Android Device or desktop

3.2 Constraints

The main constraints are memory, battery life, ability to adapt to different screen sizes and orientations, security, and network bandwidth

3.2.1 Hardware Limitations

The major hardware limitations faced by the system are as follows:

- If the appropriate hardware is not there like processor, RAM, hard disk the problem in processing requests of the client.

-
- If appropriate storage is not there our whole database will crash due to less storage because our main requirement is large storage.

3.2.2 Reliability Requirements

Since many users can access the server simultaneously, the load on the server becomes very high. Hence, the server should be of enough high configurations. There should be high backup storage and management of huge data for overall ideas, videos, images, multiple countries, multiple user profiles.

The Reliability requirements are the validations used to protect the system against one or more incorrect activities. Without proper validation of the system, the failure possibilities of it grow higher so it is must understand the proper validation of the system and must implement them. All the required validator controls spend a very good role to keep the system secure from any unauthorized or incorrect information. In all these validation actions if the system found one or more entries violating validation rules then the user will be warned by proper error messages and the details or the record is not going to be saved until corrections are made to them.

CHAPTER – 4

SYSTEM ANALYSIS

4.1 Study Current System

Implementation is the stage where the theoretical design is turned into a working system. The most crucial stage in achieving a new successful system and in giving confidence on the new system for the users that it will work efficiently and effectively.

The system can be implemented only after thorough testing is done and if it is found to work according to the specification.

It involves careful planning, investigation of the current system and its constraints on implementation, design of methods to achieve the changeover, and an evaluation of change over methods apart from planning. Two major tasks of preparing the implementation are education and training of the users and testing of the system.

The more complex the system being implemented, the more involved will be the systems analysis and design effort required just for implementation.

The implementation phase comprises several activities. The required hardware and software acquisition is carried out. The system may require some software to be developed. For this, programs are written and tested. The user then changes over to his new fully tested system and the old system is discontinued.

4.2 Problem and weakness of the current system

- Inconsistency in data entry and generate errors
- The system is fully dependent on skilled individuals
- Time-consuming and costly to produce reports
- Entry of false information
- Lack of security
- Duplication of data entry

4.3 Requirements of New System

4.3.1 User Requirements

The user requirement for this system is to make the system fast, flexible, less prone to error, reduce expenses and save time.

4.3.2 System Requirements

Functional System Requirement

This section gives a functional requirement that applies to the Online shopping system.

There are three sub modules in this phase.

1. Customer module.
2. Admin module.
3. Moderator module.

The functionality of each module is as follows

1. Customer module

A user must log in with his user name and password to the system after registration. If they are invalid, the user is not allowed to enter the system.

- Username and password will be provided after user registration is confirmed.
- A new user will have to register in the system by providing essential details to view the products in the system.
- The system must encrypt the password of the customer to provide security.
- The user can add the desired product into his cart by clicking add to cart option on the product. He can view his cart by clicking on the cart button.
- Users can remove an item from the cart by clicking remove.
- After confirming the items in the cart the user can submit the cart by providing a delivery address. On successful submitting the cart will become empty.
- The system must ensure that only a registered customer can purchase items.

2. Admin module

- The administrator can add users, delete users, view users, and block users.
- The administrator can add products, delete products, and view products.
- The administrator can view orders and delete orders.
- The system must identify the login of the admin.
- Admin account should be secured so that only the owner of the shop can access that account.

3. Moderator module

A moderator is considered as a staff who can manage orders for the time being. As a future update moderator may give the facility to add and manage his products.

- Moderator has all the privileges of an admin having except managing other moderators.
- He can manage users and manage products. He can also check the orders and edit his profile.
- The system must identify the login of a moderator.

Non-Functional System Requirements:

1. Efficiency Requirement

When an online shopping cart android application is implemented, customers can purchase product in an efficient manner.

2. Reliability Requirement

The system should provide a reliable environment for both customers and owners. All orders should be reaching the admin without any errors.

3. Usability Requirement

The android application is designed for a user-friendly environment and ease of use.

4. Delivery Requirement

The whole system is expected to be delivered in four months with a weekly evaluation by the project guide.

4.4 Feasibility Study

The feasibility study of any system is mainly intended to study and analyse the proposed system and to decide whether the system under consideration will be viable or not after implementation. That is it determines the usability of the project after deployment. To come to result a set of the query is answered keeping the efficiency of the software and its impact on the domain for which it was developed.

Technical Feasibility:

In technical feasibility, we study all technical issues regarding the proposed system. It is mainly concerned with the specifications of the equipment and the software, which successfully

satisfies the end-users requirement. The technical needs of the system may vary accordingly but include:

- The feasibility to produce outputs in a given time.
- Response time under certain conditions.
- Ability to process a certain volume of the transaction at a particular speed.
- Facility to communicate data.

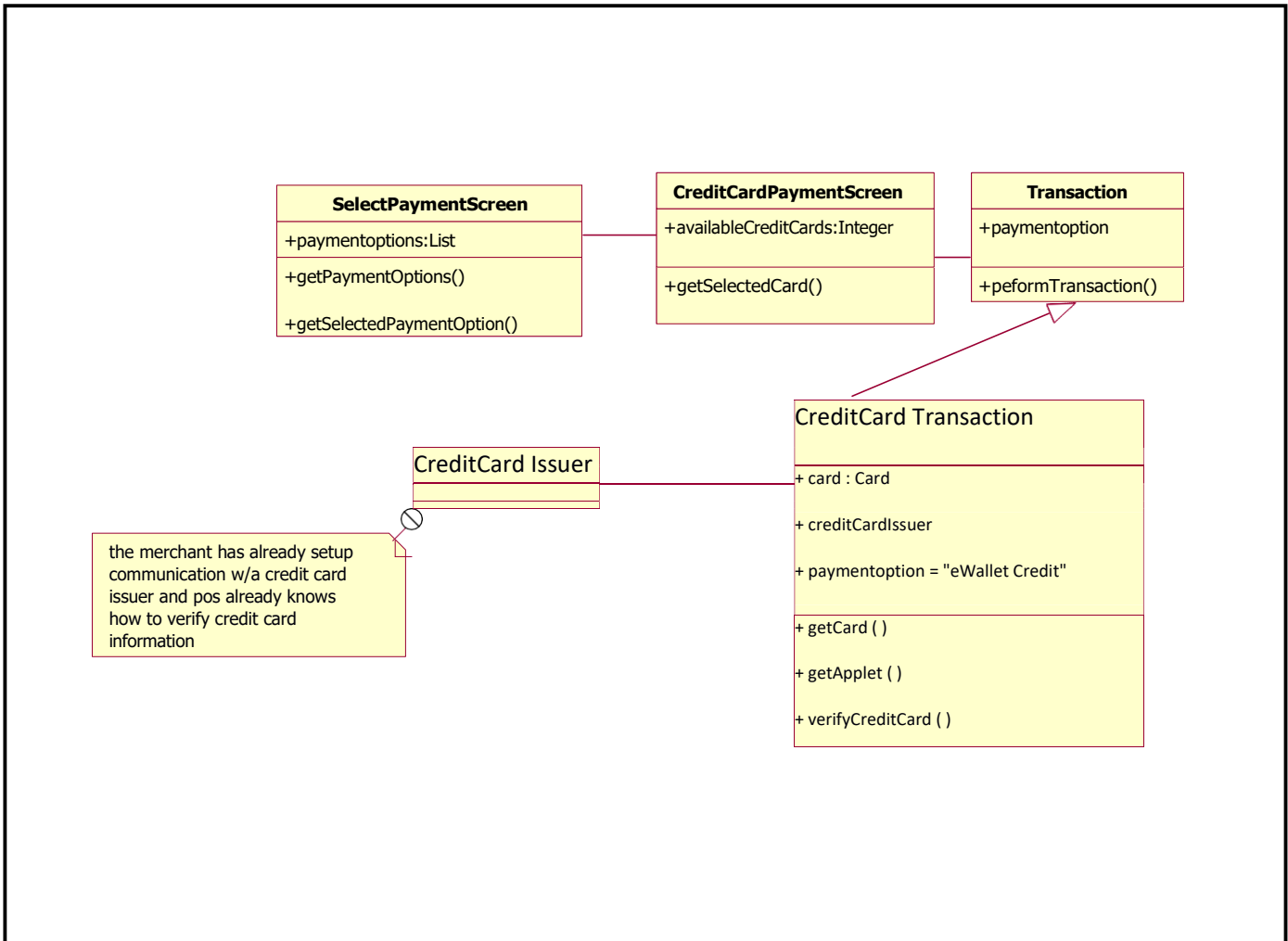


Fig.5.2.1 Class Diagram

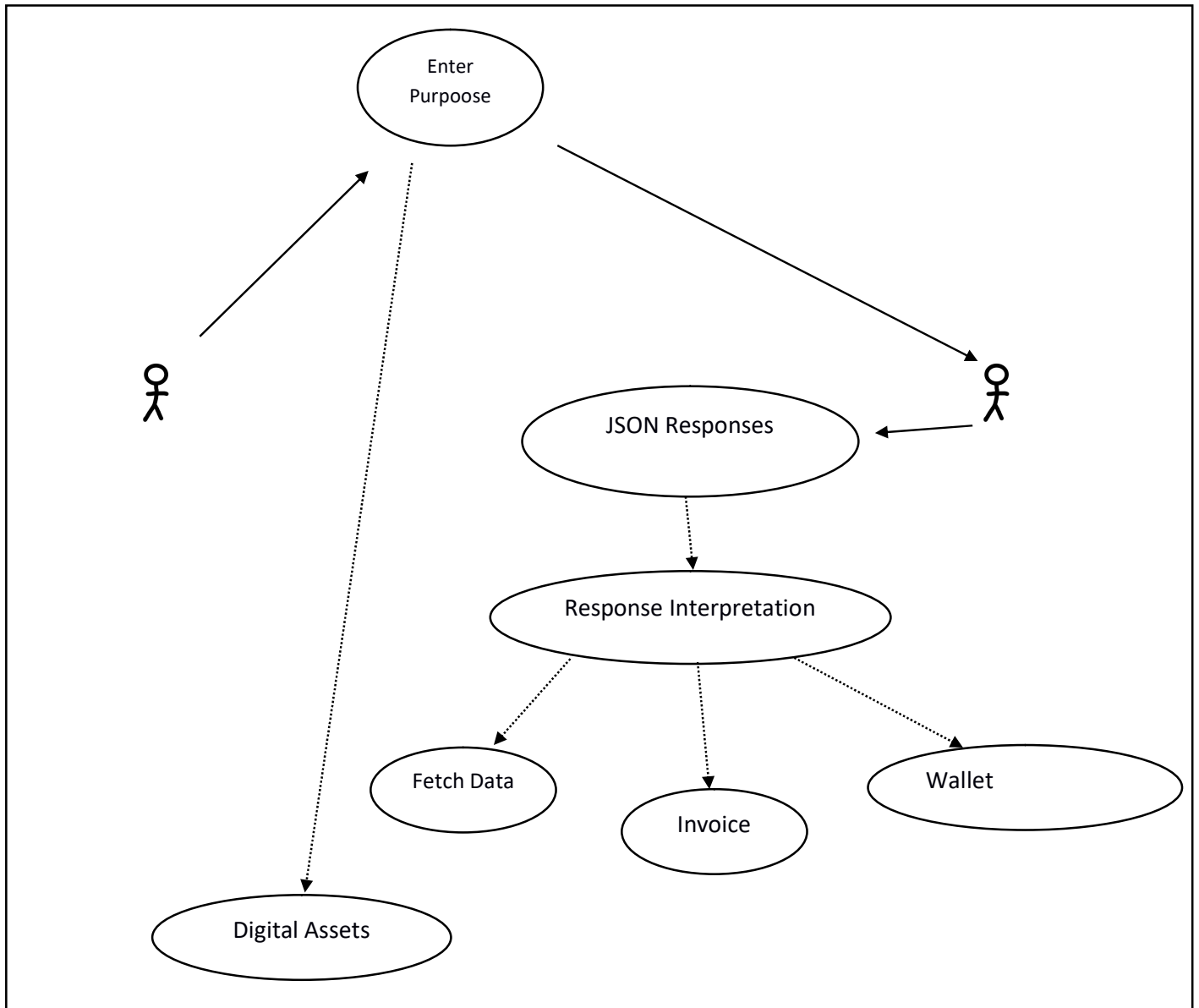


Fig.5.2.2 USE CASE DIAGRAM

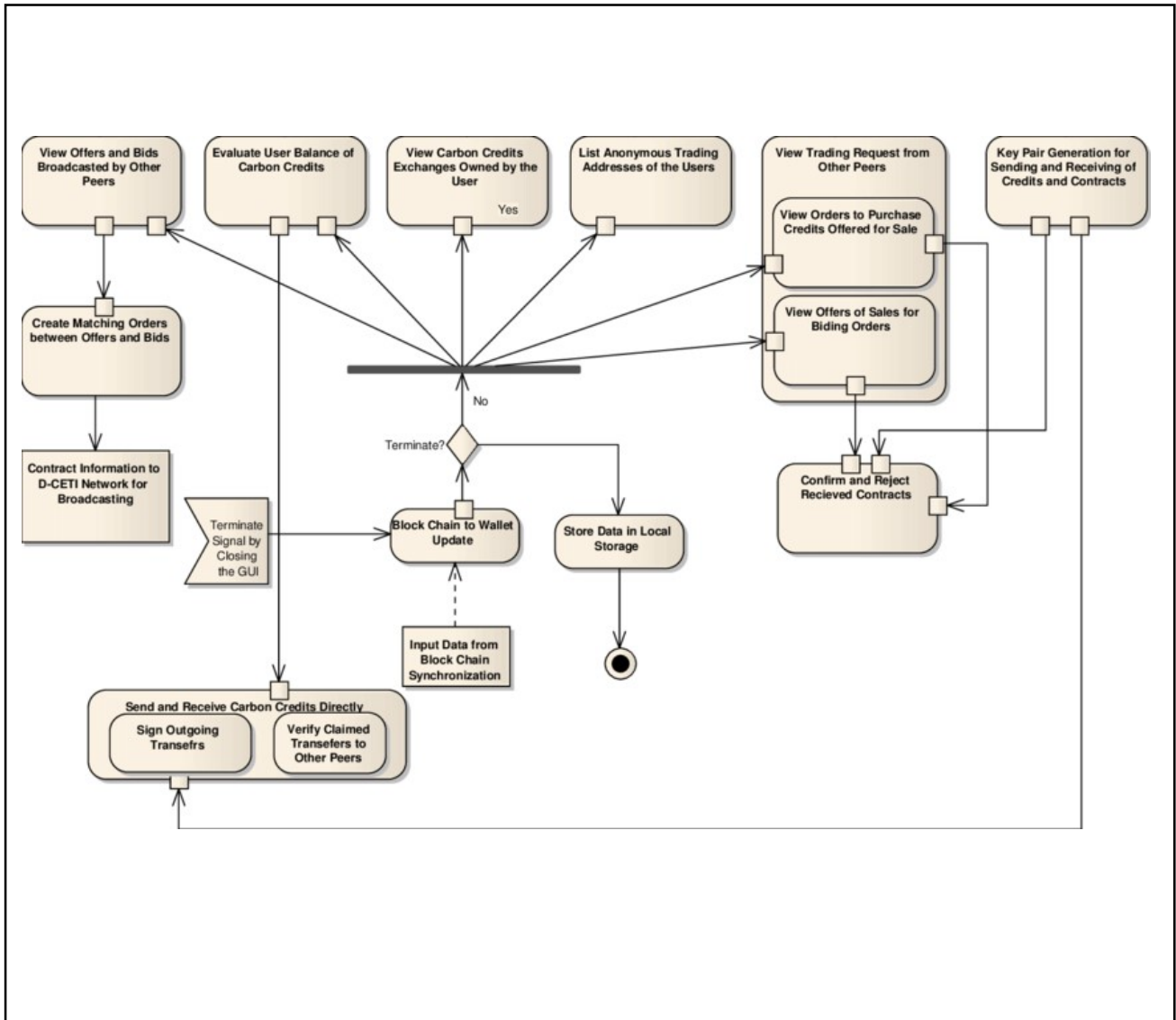


Fig.5.2.3 ACTIVITY DIAGRAM

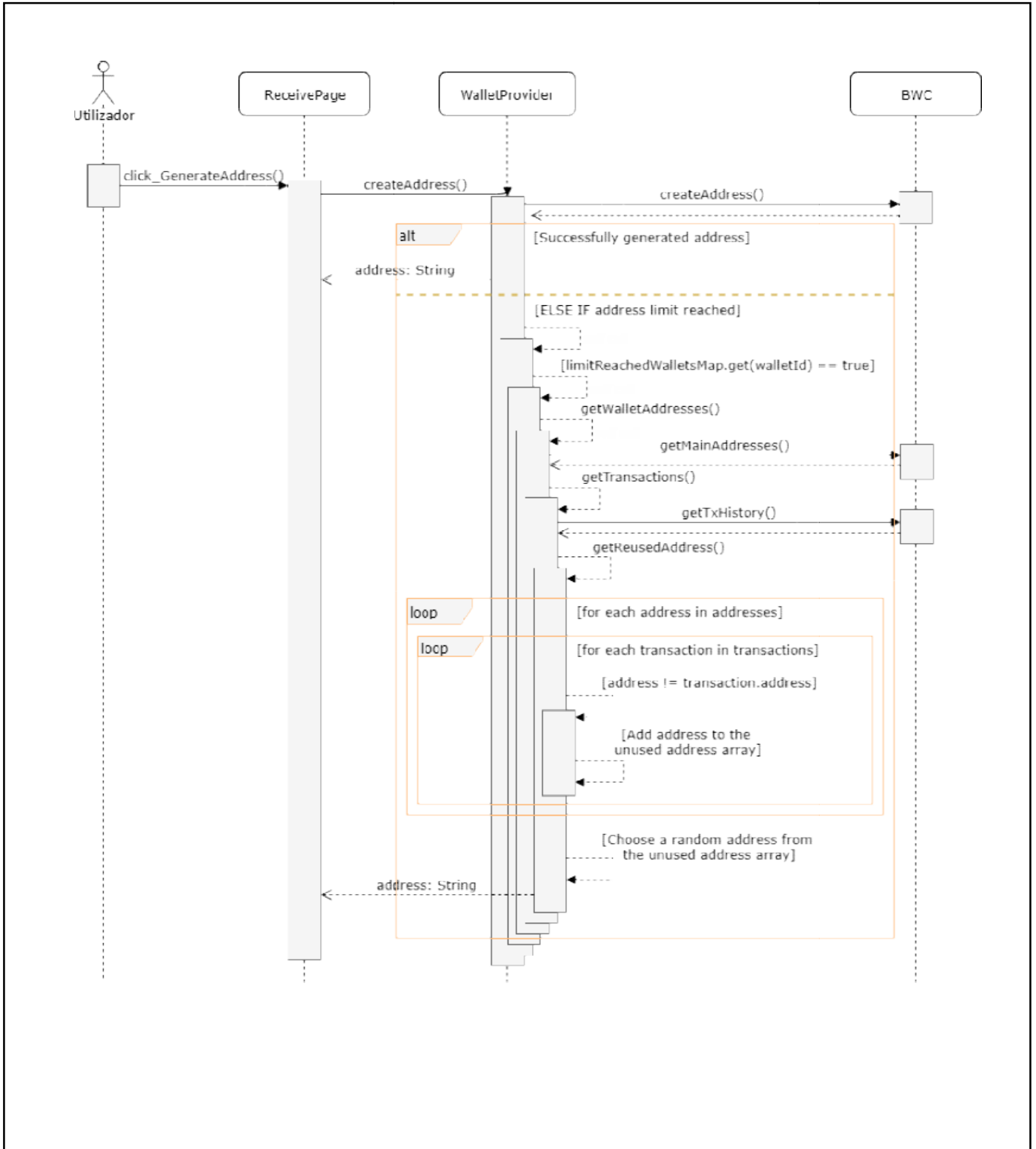


Fig.5.2.4 SEQUENCE DIAGRAM

CHAPTER – 6

CODE IMPLEMENTATION

6.1 Implementation Environment

Challenges identified for the successful design and implementation of this project are dominated by:

- Complexity, reliability/availability, transparent data access. The project was a result of a group consensus. The team was having two members. The team was guided by a project manager. The team structure depends on the management style of the organization, the no. of people in the team, their skill levels, and the problem difficulty.

6.2 Program/Module Specification

The application provides the following features:

- Show user account data (wallet)—account address, number of tokens, details of the transactions that were sent;
- User Preferences—PIN code protection and the Ethereum network endpoint;
- Option to backup and remove an account (wallet);
- Show the account address through the “Receive” tab;
- Send Eth through the “Send” tab.

6.3 Coding Standards

- Normally, a good software development organization requires its programmers to maintain some well-defined and standard style of coding called coding standard.

6.3.1 Comment Standards:

- The comment should describe what is happening, how it is being done, what parameters mean, which global are used and which are modified, and any registration or bugs.

The standards I have followed are:

- The comment may also be used in the body of the Cascading style sheets to explain individual sections or lines of codes to easily get access and easily review or manage the classes or properties for the pages.
- Inline comments should be made with the // . Comment style and should be indented at the same level as the code described.

CHAPTER – 7

TESTING

7.1 Testing Strategy

A strategy for software testing integrates software test case design method into a well-planned series of steps that result in the successful construction of the software. The strategy provides the roadmap that describes the steps to be conducted as a part of testing, then these steps are planned and then undertaken, and how much effort, time and resource will be required.

7.2 Testing Method

7.2.1 Unit Testing

The unit testing is meant for the testing smallest unit of software. There are two approaches namely bottom-up and top-down. In the bottom-up approach, the last module is tested and then moving towards the first module while the top-down approach reverses the action. In the present work, we opt for the first one. The bottom-up approach for the current project is carried out as shown in.

7.2.2 Validation Testing

After the integration testing software is completely assembled as a package, interfacing errors have been uncovered and corrected, and then validation testing may begin. Validation can be defined in many ways but a simple definition is what a validation succeeds when software functions in a manner that can be reasonably accepted by the user.

7.2.3 Integration Testing

The integration testing is meant to test all the modules simultaneously because all the modules may function correctly when tested individually. But they may not work altogether and may lead to an unexpected outcome.

CHAPTER – 8

CONCLUSION

The next project idea is to build a savings and lending application. Decentralized finance or DeFi is a big trend right now. DeFi is basically a way of taking existing financial solutions and putting them over to the blockchain. Saving and lending is a category where people are doing this a lot. Using this application, people would be able to take loans on the blockchains. That means they can essentially lock up certain assets and borrow other cryptocurrencies and then pay back later after a certain amount of time. A different use case for this kind of application is cryptocurrency trading. In the future, there's gonna be room for multiple types of products like this because just like there are multiple cryptocurrency exchanges there can be multiple lending and savings platforms because people are always looking for competitive rates.

CHAPTER – 9

LIMITATIONS AND FUTURE ENHANCEMENT

8.1 LIMITATIONS

This application is most useful for those who are fond of using digital means in their day-to-day life.

8.2 FUTURE ENHANCEMENT

There is always a scope for enhancements in any developed system, especially when the nature of the project is an iterative waterfall which allows us to rethink the method of development to adopt changes in the project. Below mentioned are some of the changes possible in the future to increase the adaptability, and efficiency of the system.

- More attractive GUI (Graphical user interface).
- Business Model.
- Sound effects..

CHAPTER – 10

REFERENCES

1. <https://docs.soliditylang.org/en/v0.8.12/>
2. <https://vitejs.dev/>