Burak Katı
Arda Hasgül

1. Introduction

Secure Donation Chain (SDC) is a blockchain based donation platform that aims to create a trustable decentralized environment for campaign donors and campaign owners. This platform offers a solution to the parties who wish to collect donations and send donations who don't want to lose time and money as they would with traditional donation systems.

2. Current System

Currently, there is a static webpage which is the planned front-end of the system and it serves design documents for the system that is not connected to the blockchain yet.

3. Proposed System

3.1 Overview

SDC shall be a donation platform such that both people who wish to collect donations through campaigns and the people who are looking to donate to certain campaigns.

3.2 Functional Requirements

Non-Registered users:

3.2.1 All users shall be able to login and sign-up to the system via their e-mails.

3.2.2 All users shall be able to search campaigns and campaign owners through a search bar.

3.2.3 Registered and non-registered users shall see different cryptocurrency exchange rates through our system.

Registered Users:

3.2.4 Registered users shall be able to integrate their wallets to our system.

3.2.5 Registered users shall be able to create campaigns and become campaign owners.

3.2.6 Registered users shall be able to donate to already existing campaigns.

3.2.7 Registered users shall be able to give ratings to campaigns and campaign owners.

3.2.8 Registered users shall be able to comment on campaign pages and campaign owners' profiles.

3.2.9 Registered users shall be able to track their transactions.

3.2.10 Registered users shall use our voting system for malicious campaigns and users.

Moderators:

3.2.11 Moderators shall be able to edit and delete content from campaigns.

Admin (System):

3.2.12 Admin shall authorize logins and sign-ups.

3.3 Non-Functional Requirements

Security

Our system shall contain important personal data about our users. Therefore, Blockchain shall be used to store the data of our users. Users must open an account to access the system. Users must create a strong password when creating an account, repeating numbers or words shall not be accepted. If a certain number of unsuccessful logins are made, the security system shall suspend the account and email shall be sent to the user's mail account. In addition, while users are signing up to the system, there shall be a CAPTCHA test to prevent bots from entering the system.

Portability

To improve the portability of our system, we shall design your apps to run smoothly across multiple devices and platforms. We shall first implement our product as a website, then we shall release a mobile application and we shall test on old and new mobile devices so that its portability can be at a high level.

Usability

The interface of our website shall be modern but understandable and simple. The interface shall be user-friendly and shall not confuse the user. Even an ordinary internet user shall be able to easily understand which icon is which.

Performance and Scalability

Since our system is connected to Ethereum through Solidity, our transaction speed is dependent on Ethereum. Right now, Ethereum can only handle around 30 transactions per second. But when eth 2.0 comes out, it is promised that the transaction speed shall increase greatly. By the end of 2.0 it shall allegedly be scalable to 100,000 transactions per second using sharding and other tactics.

3.4 Pseudo Requirements

3.4.1 REQ1:

The database system shall be done through Ethereum database

3.4.2 REQ2:

Even if the project is only on the website at first, the user interface should be developed with a cross-platform kit, as it may go mobile in the future.

3.4.3 REQ3:

Solidity language must be used, which is the code writing is very simple, very suitable for smart contracts and frequently used in Blockchain technology.

3.4.4 REQ4:

Blockchain technology should be used to protect security and privacy at the highest level.

3.5 System models

3.5.1 Scenarios

3.5.1.1 Signup Scenario

When a new user enters the site, he must be registered in order to use the site at full capacity. For this, he must first click the sign-up button. Then the user is asked to fill in the blank fields that appear. The contents of these boxes; Name, Surname, E-mail address, Phone number, and password. After the user has filled in these fields correctly, he should click the register button. Afterwards, a captcha bot popup appears in front of the user's screen. This system is to prevent bots. The user must choose the correct answers in order to register. Then, the system displays a verification box on the user's screen and requests the verification code sent to the e-mail address to be entered in this field to complete the registration process. If the code is entered correctly, the registration process is completed, but if the code is entered incorrectly, a new verification code is sent to the user's e-mail address.

3.5.1.2 Login Scenario

This scenario is for already registered users. When the user logs in to the site, he must press the login button. For member login, the system asks the user to enter only their e-mail and password. After entering the user information, click the login button. The system checks the user's information. If the information is entered correctly, the user logs into the account, but if the information is entered incorrectly, the system sends an "incorrect e-mail or password" message and prompts the user to enter their information again.

3.5.1.3 Add Wallet Scenario

The user must add a wallet to donate after logging into the site. After the user clicks the add wallet button, the system brings the add wallet screen to the user's screen. If the user enters the wallet information correctly here, the process is completed, but if it is entered incorrectly, an error message is received from the system and the user is asked to enter the information again.

3.5.1.4 Donation Scenario

Users click on the campaign they want to donate while browsing the campaigns on the site. If they want to donate after viewing the content of the campaign, they click on the donation button. If they have added a wallet before, they should select the amount of money or coins they want and click the send donation button. This way, he sends a hassle-free donation. But if they haven't added a wallet before, the system will display "no registered wallet" and "do you want to add a wallet" messages on the screen. After the user clicks the "Yes" button, the Add Wallet Scenario is executed.

3.5.1.5 Create Campaign Scenario

The user should click the "create campaign" button to create a campaign. Then the "create campaign" page appears on the user's screen. User enters campaign information here. After the user fills in the campaign information, they can start the campaign by clicking the "publish campaign" button.

3.5.2 Use Case Model

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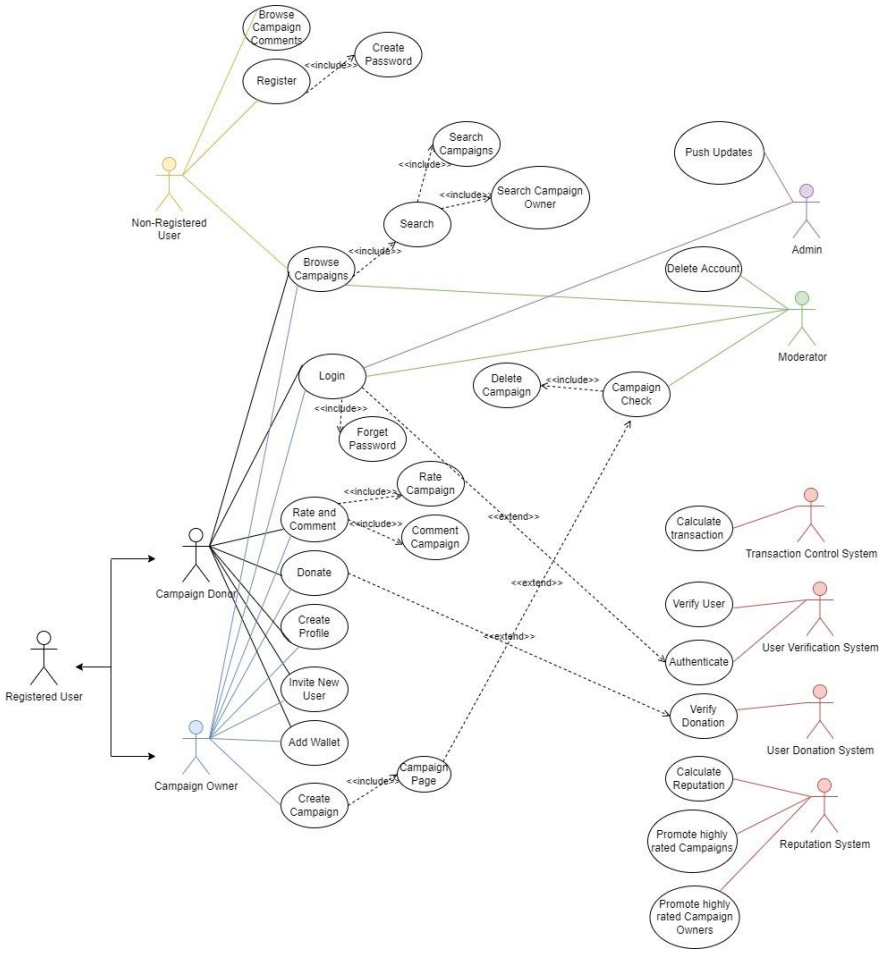

3.5.3 Object and Class Model

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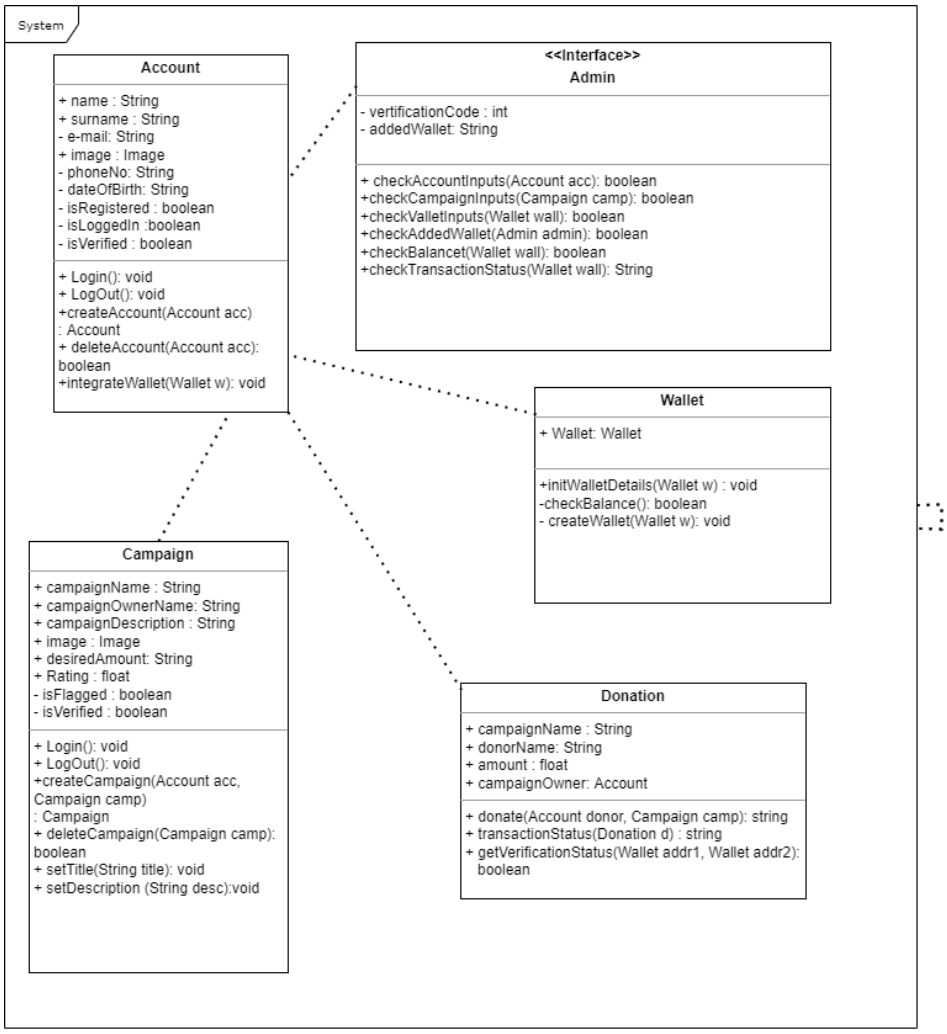

3.5.4 Dynamic Models

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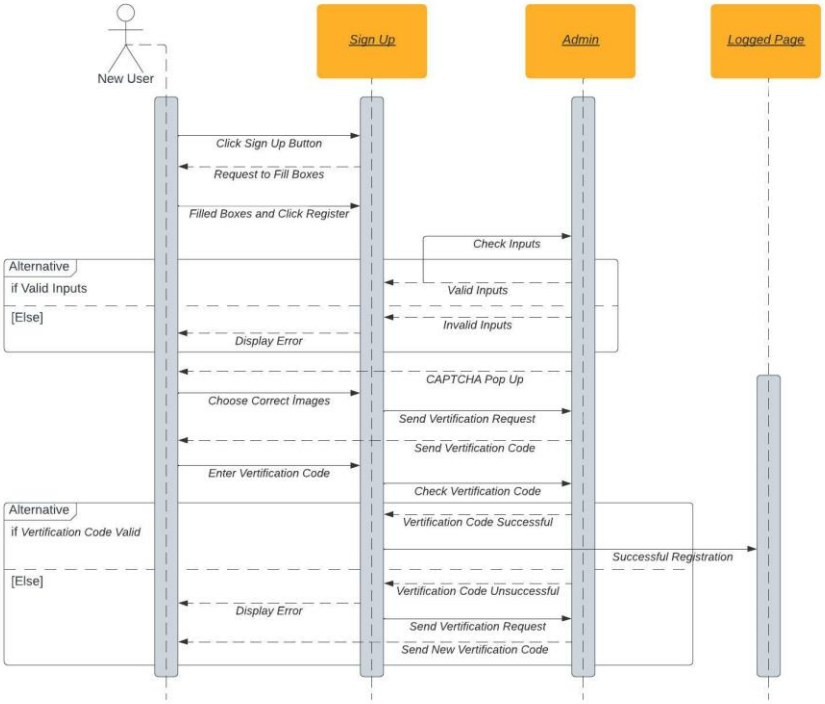
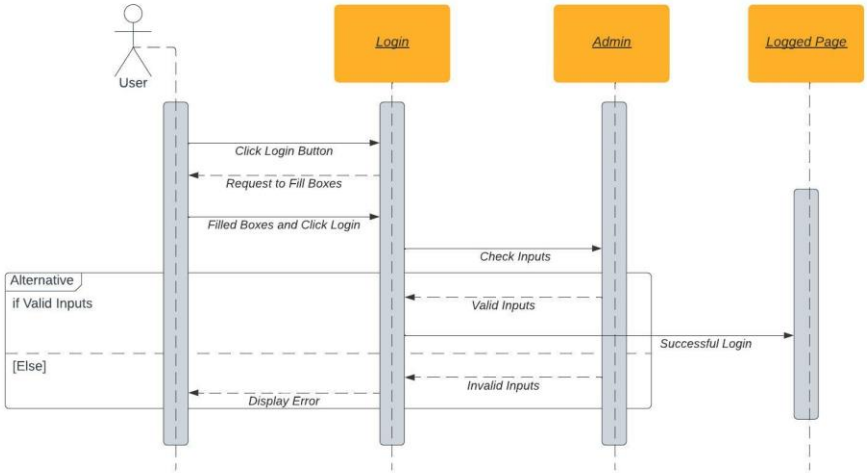
Sequence Diagram for Sign-up:



Sequence Diagram for Login



Sequence Diagram for Create Campaign Page

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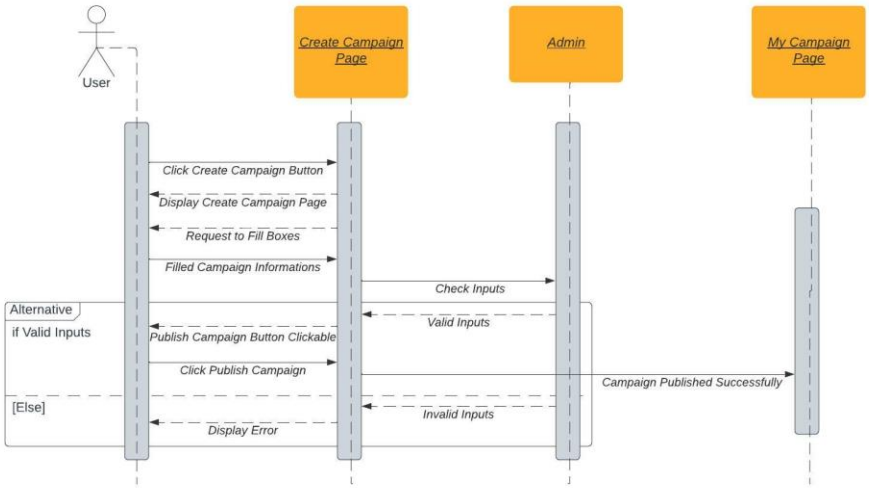
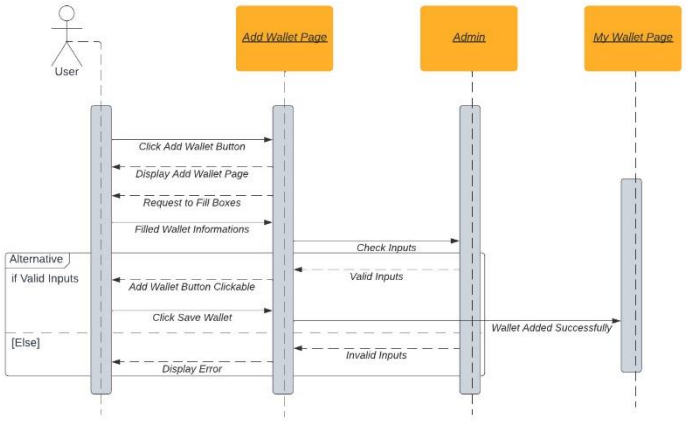


Sequence Diagram for Add Wallet Page



Sequence Diagram for Donation

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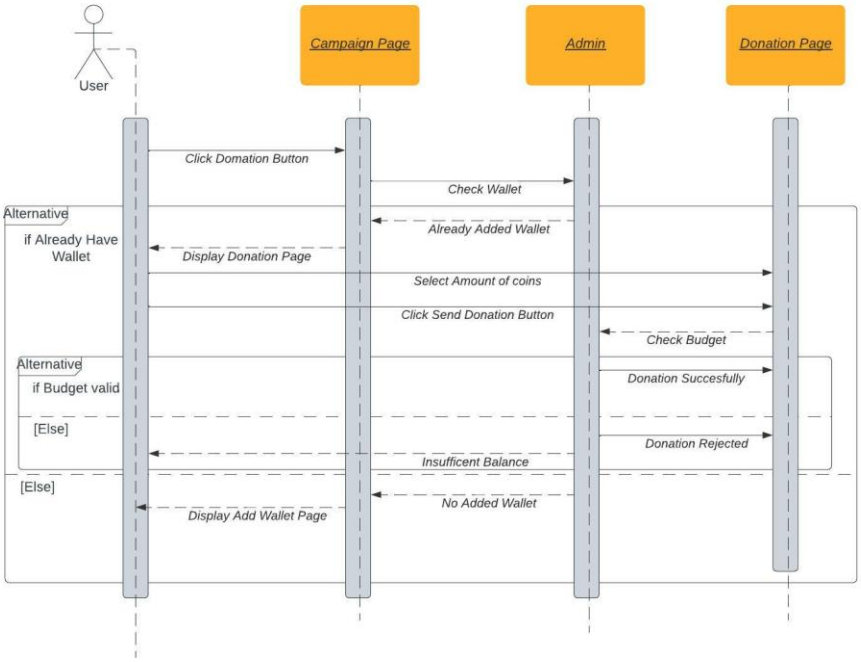

3.5.5 User Interface - navigational paths and screen mock-ups

3.5.5.1.1 Desktop View

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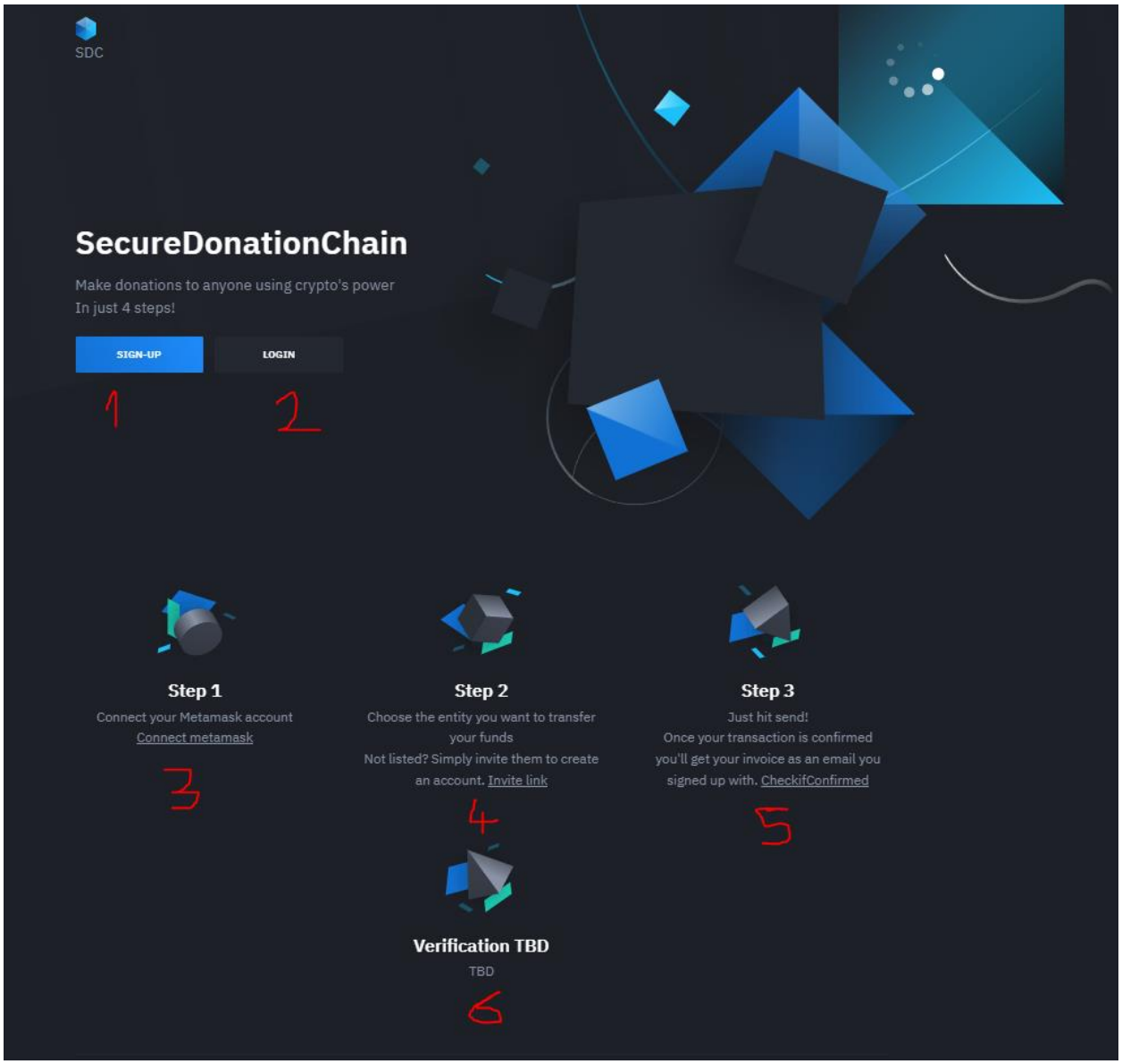

Part 1 Sign-Up Button:

All visitors can create a new account using the sign-up button. Once clicked, a new sign-up page opens and allows the user to choose to log-in or sign-up. Since our UI is responsive, it will look the same without any distortions in all sizes of screens.

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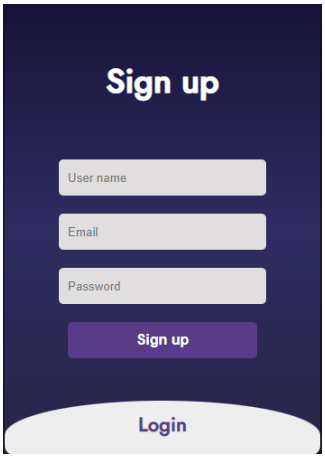
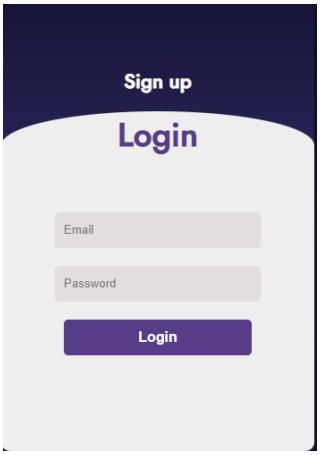




Part 2 Login Button:

Only registered users and invited users are able to login using this button and get authenticated.

Part 3 Connect Wallet link:

Users can connect their crypto wallet of their choice to our system using this link. With their wallet details. For metamask, our system will check if the extension is available on the browser before taking any input for the details from the user.

Part 4 Invite link:

Users can invite other users to either donate to campaigns or create new campaigns. Our system generates a new key for the new user to use while logging in.

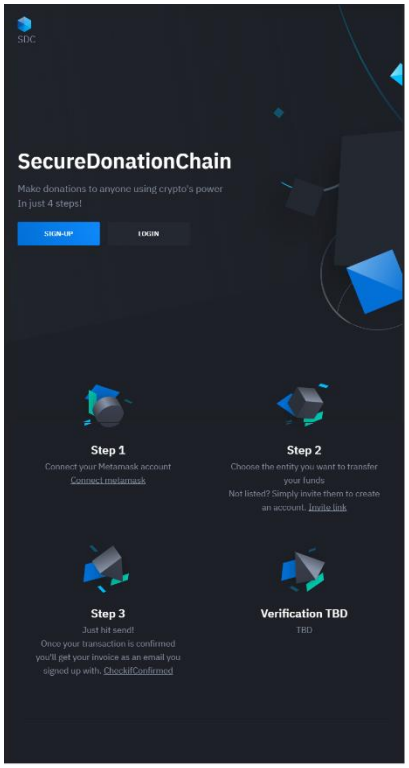
Part 5 Donation link:

Users can donate money to the campaign of their choosing. Our system will send an e-mail invoice containing the date, the amount, and the campaign details to both the donor and the campaign owner. (TBD)

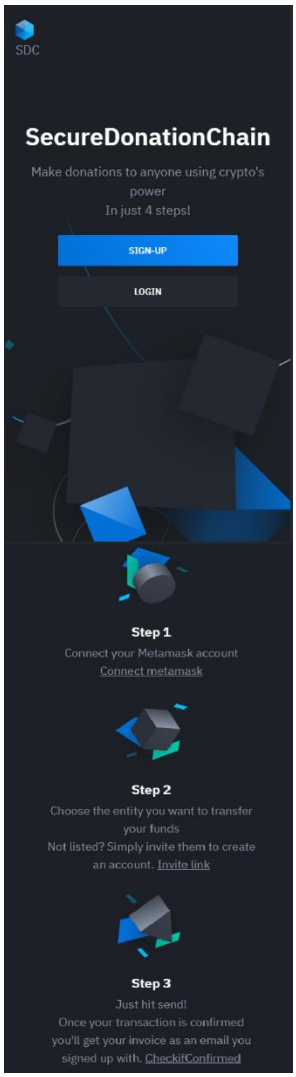
Part 6 Trace Transactions link:

Users will be able to see ongoing transactions on the Ethereum blockchain using this link. (TBD)

3.5.5.1.2 Tablet view



3.5.5.1.3 Mobile View:



4. References

For Sequence Diagrams:

https://www.lucidchart.com/

For Uml and use case diagrams:

https://app.diagrams.net/