Cryptocurrency Trading Simulator

Functional Specification

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1. Introduction

1.1 Overview

Our project entails the development of a cryptocurrency trading simulator that will provide beginner traders with a platform to trade with mock currency in accordance with the real cryptocurrency market, without the risk of trading with actual cryptocurrency. Users will be provided with statistical data that they can review to improve their trading strategy.

Users will have access to historical and real-time data from top performing traders on Binance, the world's largest crypto trading platform. Users will have the ability to "follow " profitable traders and learn from them by analysing their trades, receiving detailed reports for each trade their followed trader makes. Our aim for this project is to help beginner cryptocurrency traders learn how to invest effectively and practise trading without risking their own money.

Users will be able to,

- Register an account
- Trade mock cryptocurrency in accordance with the real cryptocurrency market
- "Follow" the top traders of Binance.com, the world's leading crypto exchange, allowing them to track and analyse the trades of these top traders, allowing them to mirror their trading patterns
- View data pertaining to their simulated trades (Return on Investment, Profit/Loss, etc.)

1.2 Business Context

This project will function as a web application that can be used by anyone who wants to start their cryptocurrency trading journey. Beginner traders, who justifiably fear losing their earned money in the real market, will be put at ease by the ability to trade mock cryptocurrency and learn from more advanced traders.

The web application can also be used by experienced traders who want to test trading methods with no risk or simply compare their trading progress with other experienced traders.

As users will be engaging with the volatile cryptocurrency market, it is imperative that they can access market information at any time. The web application will enable them to do this from their phone or computer.

Should we wish to make this application profitable, it would be possible to introduce paid advertisements on the UI real estate, or make the application subscription-based, where the user pays a monthly fee in return for application access.

1.3 Glossary

Cryptocurrency: A digital currency in which transactions are verified and records maintained by a decentralized system using cryptography, rather than by a centralized authority.

Simulator: Program that enables the operator to reproduce or represent under test conditions phenomena likely to occur in actual performance.

Binance: Worlds biggest bitcoin exchange and altcoin crypto exchange in the world by volume.

Bitcoin: A cryptocurrency that is designed to act as money and a form of payment.

Altcoin: An alternative digital currency to Bitcoin.

Long Position: What a trader has purchased when they buy a security or derivative with the expectation that it will rise in value

Short Position: Investing in such a way that the investor will profit if the value of the asset falls.

Return On Investment (ROI): ROI measures the amount of return on a particular investment, relative to the investment's cost.

Market Order: A market order is an order to buy or sell a stock at the market's current best available price

Limit Order: A limit order is an order to buy or sell a stock with a restriction on the maximum price to be paid or the minimum price to be received

2. General Description

2.1 Product / System Functions

- Register
- Login
- Delete Account
- Follow Traders
- Trade Mock Currency
- Review Statistical Data (Relating to their own trades, and the trades of followed Binance traders) e.g. ROI, PnL,

2.2 User Characteristics and Objectives

Our intended users will be able to access and browse the internet and will be familiar with the basics of cryptocurrency trading such as long and short positions, market and limit orders and have the ability to read basic statistics and graphs. The application will be hosted on a website and not all users will have access to all the features of the application. The permissions go as follows:

Unregistered Users:
These are unregistered or not signed in users, their permissions are limited to either registering an account or signing in to an account.

Registered Users:
These are users who have an account and they will have access to all of the features the web application provides for its members.

Administrators:
These are the maintainers of the website and they will have elevated permissions, such as being able to update the user interface and adding or removing features for the web application.

2.3 Operational Scenarios

Register:
Users can create an account on the website, inputting information such as name, username, email address and password.

Login:
Users can login to the website by inputting their registered details. This is a prerequisite for the following use cases.

Make a Trade:

Users will be provided with a set amount of mock currency. They will be able to choose a cryptocurrency to invest in from a list of the most popular crypto currencies. They will then choose the amount of crypto currency they would like to purchase.

Review User Trades:
Users will be able to select a “Portfolio” button, where they can view their trades. Users will then be able to select a particular trade from this list, should they wish to view more detailed information.

Follow a Trader:
Users will be provided with a list of suggested top Binance traders, whom they can “follow” in order to track their trades and review their trading history.

Review Followed User Trades:
Users will be able to select a “Following”button, where they can view the trades of followed users. Users will then be able to select a particular trade from this list, should they wish to view more detailed information.

Delete Account:
Users can delete their accounts by going into “Profile settings”. They will have to input their password in order to delete their account.

2.4 Constraints

Time Constraints
In this project we are going to be using a lot of technologies unfamiliar to us so we will need to allow for some time to research within our allocated time for a task. Overall as we are under a time constraint we will have to manage our time well. To manage our time well we are going to use Agile methodology and employ weekly sprints and regular standups.

Accessibility Constraints
As we intend to host a wide range of users, we will have to ensure that all users can perceive,understand, navigate and interact with the information on the web application. For example including large buttons, text and enough spacing for those who are visually impaired. We will consult academic UI design principles for guidance.

Binance Api Constraints
There is a limitation to the binance api so we will have to track traders' return on investments manually, using web scraping to do so .

Internet Constraints
As our application will be based online, users must acquire internet access in order to use our app and its functionality.

3. Functional Requirements

Register/Login

Description: Users must register before being able to log in. For this they will navigate to the registration button which will be displayed on the homepage if the user is not logged in.

Criticality: This requirement is of high criticality. It is essential for users to register and login to use the application, as we must log their usage, i.e. their trades, available currency and followed Binance users.

Technical Issues: This data must be stored securely, in a database that is protected from attacks.

Dependencies: N/A.

Making a trade

Description: The system must check if the user has the available mock currency to make the trade. The Binance API will then provide the currency exchange rate before the trade is executed. The user's resulting currency will be updated in their portfolio.

Criticality: This requirement is of high criticality. This is a pivotal feature of the application, as our primary goal is to allow the user to trade using mock currencies. This feature will be our primary focus initially.

Technical Issues: We must implement the Binance API effectively in order to ensure trades are executed at the correct exchange rate.

Dependencies: Users must be logged in before they can make trades.

Following a trader

Description: We will select a set of the top Binance.com traders for the user to follow. A subset of these traders will be suggested to the user based on the cryptocurrencies they would like to trade.

Criticality: This requirement is of medium criticality. While the primary goal of the application is to allow users to trade mock cryptocurrency, the secondary feature will involve the user following top performing Binance.com traders. This will allow the user to track not only their own trades, but also those of these followed traders. By analysing their trades, with the graphic data we will provide, users will gain insight into how trading can be performed more effectively in the pursuit of profitable returns.

Technical Issues: Traders could decide to make their trades private, that would mean users will not be able to follow their exact trades anymore.

Dependencies: Users must be logged in before they can follow Binance traders.

Provision of Trading Graphs and Data

Description: Graphs will be displayed to the user, conveying information related to their trades, or the trades of followed Binance users. Information will include Return on Investment, Profit/Loss, Currency Invested, Amount,

Criticality: This requirement is of high criticality, as users must be able to track the details of their trades in a visually intuitive manner.

Technical Issues: Graphs must display data effectively and accurately. The MatPlotLib library for Python will be used to implement the graphs.

Dependencies: Users must be logged in, with active trades, before they can track a trade.

Deleting an account

Description: The user must be able to delete their account, which will remove their registered details from our database along with their accounts usage data.

Criticality: This requirement is of low criticality, This requirement is not essential for the application's primary functionality, although it is important for end experience.

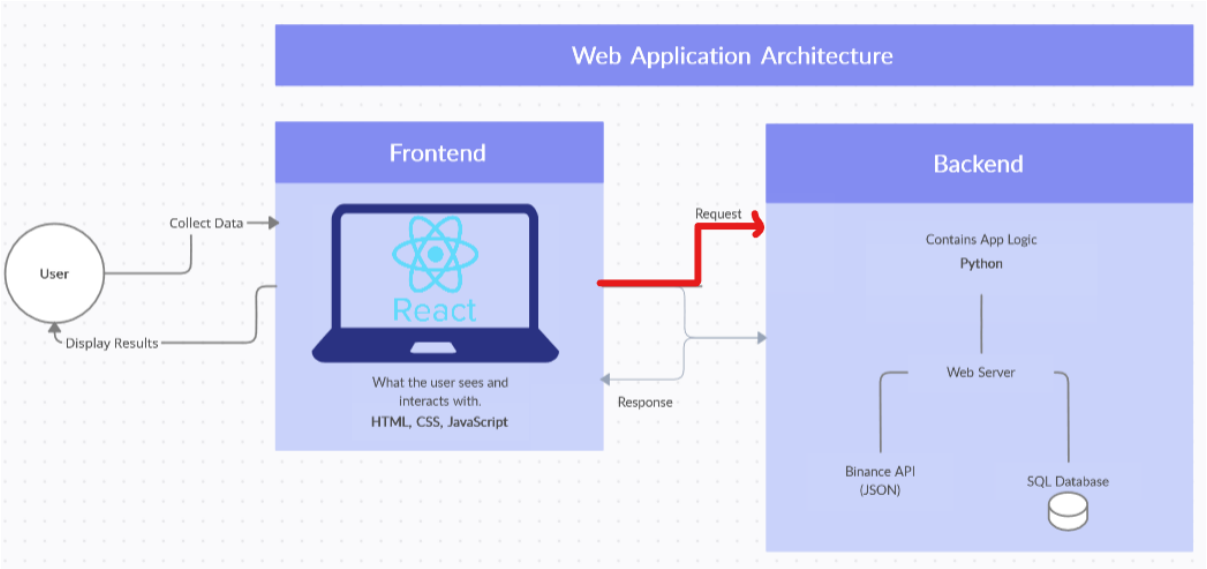
Technical Issues: User information must be securely deleted to comply with GDPR.

Dependencies: The user must first register an account, and login, before they can choose to delete their account.

4. System Architecture

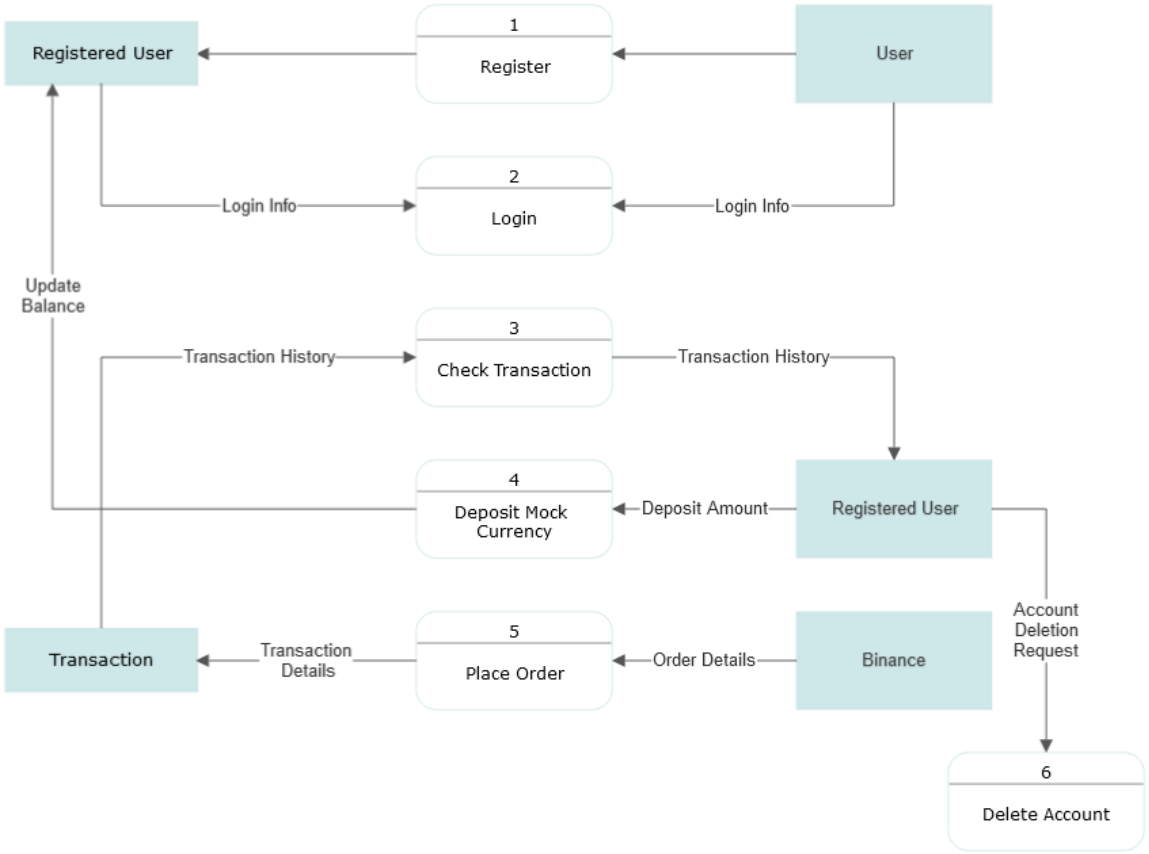
Frontend: The frontend of the website will be facilitated using the React framework for Python, in conjunction with HTML, CSS and Javascript.

Backend: The backend of the application will use the Django framework for Python. The Binance API will also be implemented to receive information from the Binance servers. SQL will be used to store data.

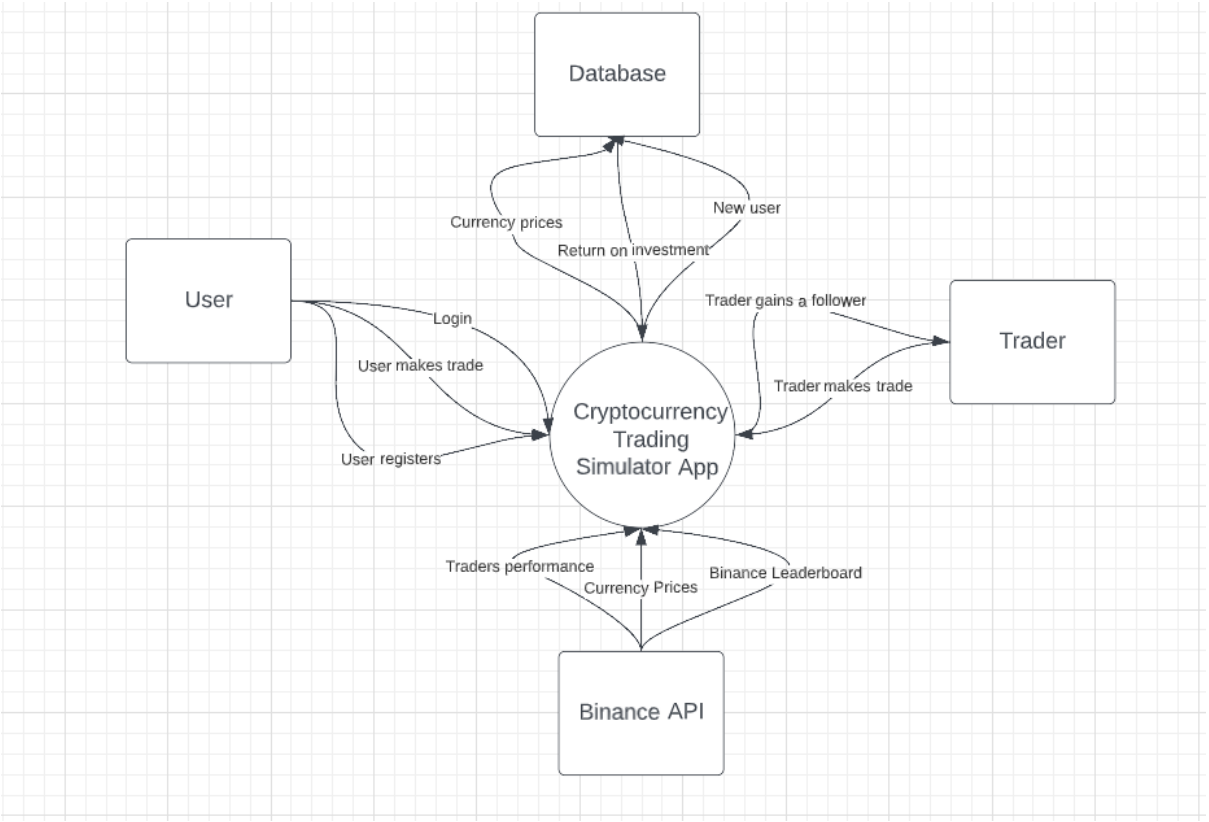


5. High-Level Design

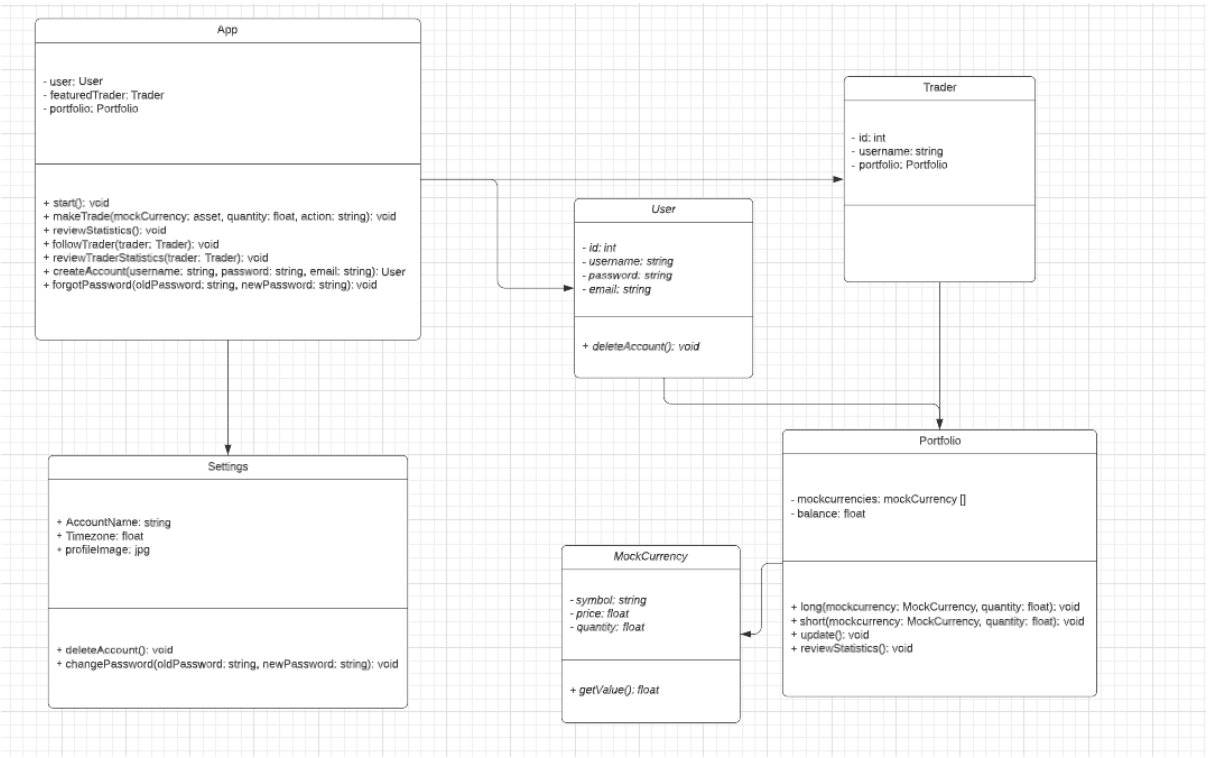
5.1 Data flow Diagram



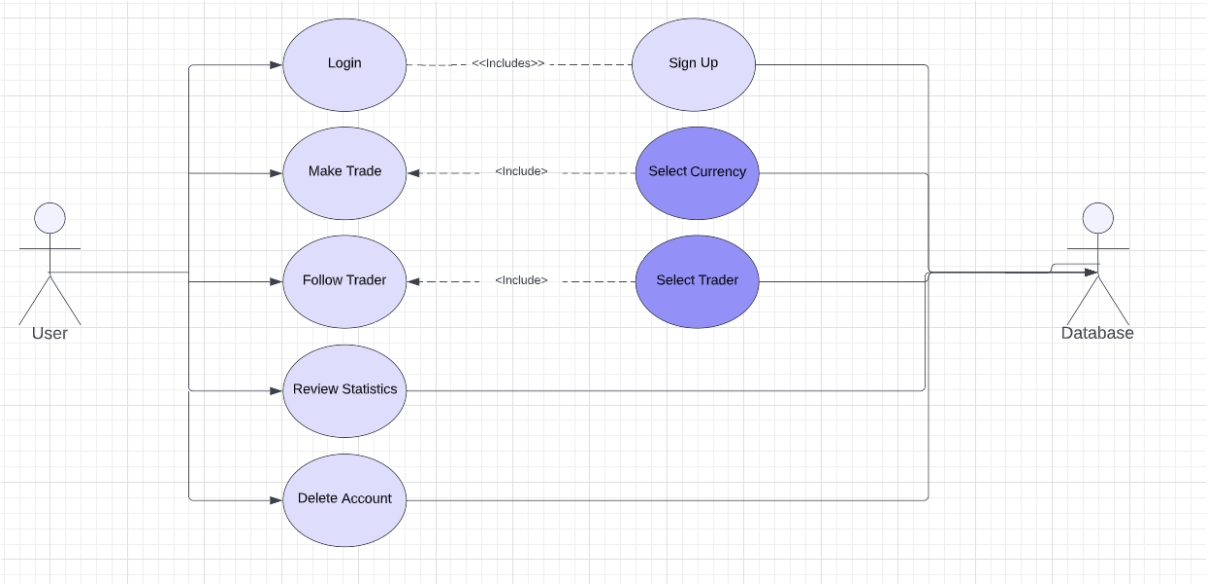
5.2 Context Diagrams



5.3 Class Diagram



5.4 Use Case Diagram



6. Preliminary Schedule

We have decided to follow the schedule to complete the workload of this project as follows. We will update our progress & set reminders for upcoming tasks using the Google Calendar App & reminders. We will also look to do bi-weekly meetings with our Supervisor on Zoom in order to get advice and to provide updates on our progress and bi-weekly meetings on Discord to discuss our next steps.

Task Name	Start Date	End Date	Duration (Days)
Functional Specification	24/11/2022	03/12/2022	9
Christmas Exams Study Period	04/12/2022	12/12/2022	9
Christmas Exams Period	13/12/2022	22/12/2022	10
Ui design	26/12/2022	30/12/2022	5
Database implementation	01/01/2023	06/01/2023	6
Api integration and web scraping implementation	07/01/2023	09/01/2023	3

Ui Implementation	10/01/2023	15/01/2023	6
Login/Registration	16/01/2023	18/01/2023	3
User Profile Set Up	19/01/2023	21/01/2023	3
Trader Profile Set up	19/01/2023	21/01/2023	3
Statistics and graph code Implementation	24/01/2023	28/01/2023	5
Integrate Code and Ui	29/01/2023	31/01/2023	3
Testing and Debugging	01/02/2023	04/02/2023	4
Demo run of project	05/02/2023	06/02/2023	2
Fix any errors	07/02/2023	09/02/2023	3
Technical Spec	09/02/2023	16/02/2023	8
Video Walkthrough	17/02/2023	18/02/2023	2
User Guide	19/02.2023	21/02/2023	3
Blog	22/02/2023	24/02/2023	3
Project Deadline	24/02/2022	24/02/2022	1
Project Demonstration	27/02/2022	03/03/2022	6

7. Appendices

Binance Marketplace
https://www.binance.com/en

Binance Trader Leaderboard
https://www.binance.com/en/futures-activity/leaderboard

Binance Leaderboard API
https://rapidapi.com/DevNullZero/api/binance-futures-leaderboard1

Binance Api Documentation
https://binance-docs.github.io/apidocs/futures/en/#change-log

Python
https://www.python.org/