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# Design Document

for

## PHInance

Version 1.00

Prepared by

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**Course:** CS253

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**Date:** 24/01/25



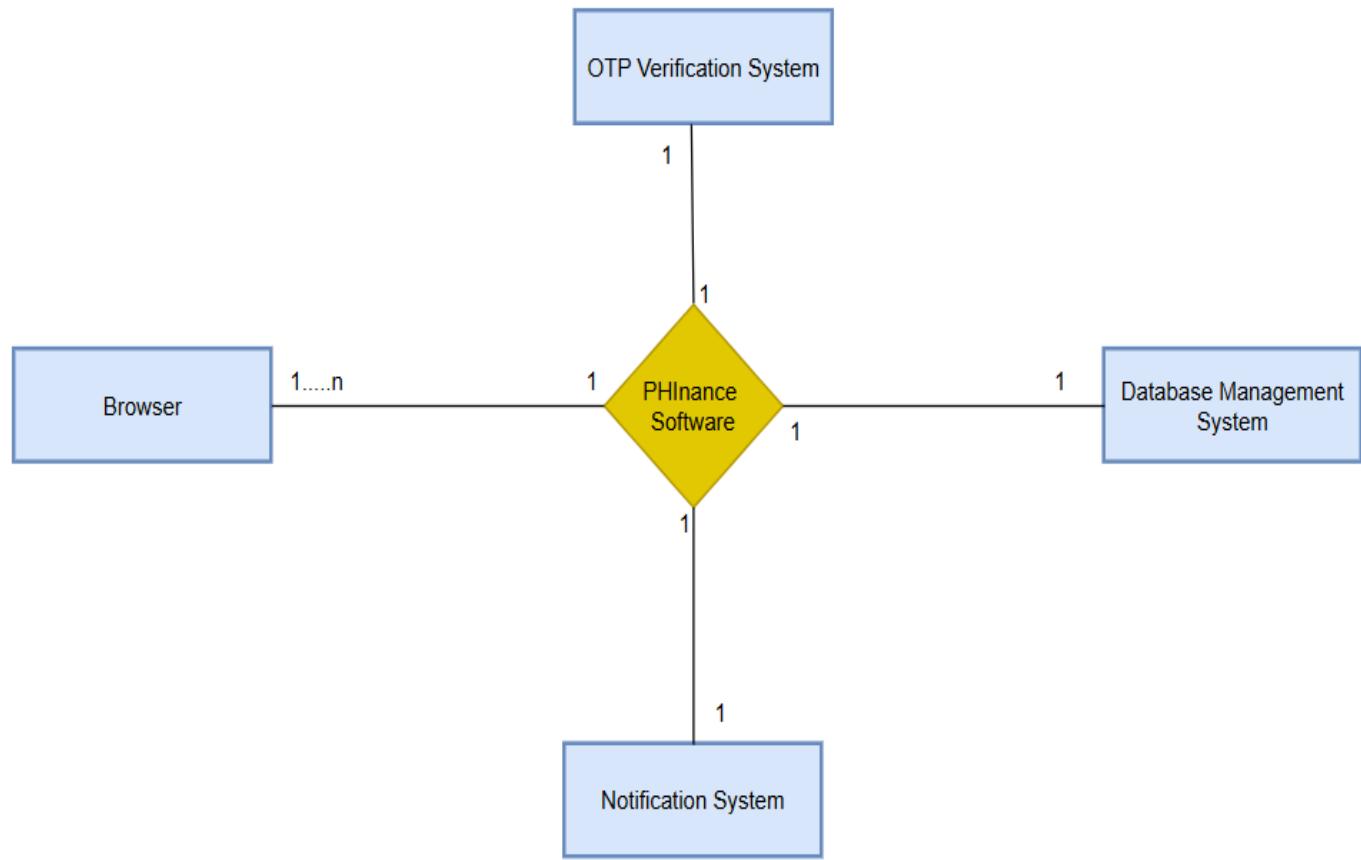
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## Revisions

Version	Primary Author(s)	Description of Version	Date Completed
Draft Type and Number	Full Name	Information about the revision. This table does not need to be filled in whenever a document is touched, only when the version is being upgraded.	00/00/00

# 1 Context Design

## 1.1 Context Model



## 1.2 Human Interface Design

### 1.2.1 Sign Up / Sign In:

The image displays two side-by-side screenshots of the PHInance web application's user interface, specifically focusing on the sign-up and sign-in processes.

**Left Screenshot (Sign Up):**

- Header:** The top navigation bar includes a search bar ("Type to search..."), a user profile icon for "ABC Web Developer", and a dropdown menu.
- Left Sidebar (MENU):** Contains links to Dashboard, Profile, Buy And Sell Stocks, AI Powered Predictions, Portfolio Management, Behavioural Analytics, Risk Management, and Support.
- Center Content:** A large logo featuring the word "PHINANCE" with a stylized "f" icon. Below it is a call-to-action: "Get Free Credits worth Rs. 25000".
- Right Form:** Titled "Sign Up to Phinance". It includes fields for Name (placeholder: "Enter your full name"), Email (placeholder: "Enter your email"), Password (placeholder: "Enter your password"), and Re-type Password (placeholder: "Re-enter your password"). A blue "Create account" button is at the bottom.
- Footer:** A link "Already have an account? Sign in"

**Right Screenshot (Sign In):**

- Header:** The top navigation bar includes a search bar ("Type to search..."), a user profile icon for "ABC Web Developer", and a dropdown menu.
- Left Sidebar (MENU):** Contains links to Dashboard, Profile, Buy And Sell Stocks, AI Powered Predictions, Portfolio Management, Behavioural Analytics, Risk Management, and Support.
- Center Content:** A large logo featuring the word "PHINANCE" with a stylized "f" icon. Below it is a call-to-action: "Get credits worth Rs. 25000".
- Right Form:** Titled "Sign In to PHINANCE". It includes fields for Email (placeholder: "Enter your email") and Password (placeholder: "Enter your password"). A blue "Sign In" button is at the bottom.
- Footer:** A link "Don't have any account? Sign Up"

## 1.2.2 Dashboard

The screenshot shows the PHInance dashboard interface. On the left is a dark sidebar menu with various options like Dashboard, Profile, Buy And Sell Stocks, etc. The main area has a search bar at the top. Below it are two sections: 'Stocks' and 'Watchlist'. The 'Stocks' section displays a table of stocks with columns for Company, Price, and Trend. The 'Watchlist' section displays a table of stocks with columns for Company and Price.

Stocks			
COMPANY	PRICE	TREND	
Reliance	₹5,768	Bullish	
TCS	₹4,635	Bearish	
HDFCBANK	₹4,290	Bullish	
SBIN	₹3,580	Bullish	
KOTAKBANK	₹6,768	Bearish	
TATA	₹2,564	Bullish	
HCLTECH	₹5,982	Bearish	
Wipro	₹2,452	Bullish	

Watchlist	
COMPANY	PRICE
TCS	₹4,635
SBIN	₹3,580
NTPC	₹1,354
Maruti	₹6,895
Titan	₹2,078

The screenshot shows the 'Stock Screener' section of the PHInance dashboard. It features a sidebar menu identical to the main dashboard. The main area has a search bar at the top. Below it is a table titled 'Trades' which lists various stocks with columns for Company, P/E Ratio, Market Cap, Avg. Volume, and Dividend Yield.

COMPANY	P/E RATIO	MARKET CAP	AVG. VOLUME	DIVIDEND YIELD
NSE: HDFCBANK	20.5	₹9.5T	3.2M	1.2%
NSE: BAJAJFINSV	25.8	₹4.1T	1.5M	0.6%
NSE: TCS	30.2	₹13.8T	2.7M	1.5%
NSE: BHARTIARTL	18.3	₹6.7T	4.0M	0.9%
NSE: ICICIBANK	22.4	₹7.3T	3.8M	1.1%
NSE: INFY	27.9	₹7.9T	2.9M	1.7%
NSE: ADANIPORTS	35.1	₹3.5T	1.9M	0.8%
NSE: JSWSTEEL	15.6	₹2.8T	2.3M	2.3%

### 1.2.3 Profile Page:

The screenshot shows the 'Profile' page of the PHInance application. At the top right, there is a search bar with placeholder text 'Type to search...', a notification badge with a red dot, and a user profile icon labeled 'ABC Web Developer'. Below the header, the page title 'Profile' is displayed, along with a breadcrumb navigation 'Dashboard / Profile'.

The main content area is divided into several sections:

- Profile Details:** Displays the user's name (John Doe), email (johndoe@example.com), phone number (+91 98765 43210), and unique client code (1399842635).
- Balance:** Shows a balance of ₹50,000.
- Your Stocks:** Lists recent purchases for Apple (AAPL) and Tesla (TSLA), showing their respective buying and current prices.
- Transaction History:** Lists two transactions: one spent ₹5000 and one earned ₹6000, both dated 2025-02-01.

The left sidebar, titled 'MENU', contains the following navigation items:

- Dashboard
- Profile (selected)
- ₹ Buy And Sell Stocks
- AI Powered Predictions
- Portfolio Management
- Behavioural Analytics
- Risk Management
- Support

### 1.2.4 Buy and Sell Stocks Page:

The screenshot shows the 'Buy and Sell Stocks' page for HDFC Bank Ltd (NSE: HDFCBANK). The page has a dark theme with a light-colored header and sidebar.

The header includes a search bar, a user profile icon for 'ABC Web Developer', and a navigation bar with tabs for 'NSE' (selected), 'BSE', 'DELIVERY' (selected), and 'INTRADAY'.

The main content area displays the stock information for HDFC Bank Ltd:

- Stock Price:** ₹1,746.50 (▲ 0.50% +8.70 Today)
- Stock Chart Placeholder:** A large empty area where a chart would normally be displayed.
- Key Metrics:**

Previous Close: ₹1,737.80	Day Range: ₹1,724.00 - ₹1,749.00	Year Range: ₹1,363.55 - ₹1,880.00
Market Cap: ₹13.54T INR	Avg Volume: 10.65M	P/E Ratio: 19.19
Dividend yield: 1.12%	Primary Exchange: NSE	Sentiment: Bullish
- Recent News:** A section listing recent news items about HDFC Bank.
- Order Placement Section:** On the right, there are fields for 'No. of Shares' (set to 3), 'Trigger Price' (set to 1705.75), 'Limit Price' (set to 1744.5), and a note about 'Margin Required: ₹5233.5 Available Cash: ₹8370.25'. A large green button at the bottom right says 'PLACE BUY ORDER'.

The left sidebar, titled 'MENU', contains the following navigation items:

- Dashboard
- Profile
- ₹ Buy And Sell Stocks (selected)
- AI Powered Predictions
- Portfolio Management
- Behavioural Analytics
- Risk Management
- Support

The screenshot shows the sell order interface for HDFC Bank Ltd (NSE: HDFCBANK). The stock price is ₹1,746.50, up by 0.50% today. The interface includes a search bar, delivery/intraday tabs, and a sidebar for placing a stop loss order. Recent news about HDFC Bank's CSR initiatives and Parivaritan programs is also displayed.

Previous Close	Day Range	Year Range
₹1,737.80	₹1,724.00 - ₹1,749.00	₹1,363.55 - ₹1,880.00

Market Cap	Avg Volume	P/E Ratio
₹13.34T INR	10.65M	19.19

Dividend yield	Primary Exchange	Sentiment
1.12%	NSE	Bullish

**Recent News**

- HDFC Bank's CSR initiatives empowering aspirational districts with tofu manufacturing and honey selling projects
- HDFC Bank Parivaritan Start-Up Grants to support over 50 startups with Rs 20 crore
- HDFC Bank Parivaritan impacts over 65.28+ lakh lives in Maharashtra

**PLACE SELL ORDER**

The screenshot shows the buy/sell stocks interface. It lists various stocks with their current prices and actions (Buy or Sell) available. The stocks listed are NSE: HDFCBANK, NSE: BAJAJFINSV, NSE: TCS, NSE: BHARTIARTL, NSE: ICICIBANK, NSE: INFY, NSE: ADANIPORTS, NSE: JSWSTEEL, and NSE: WIPRO.

STOCK	GRAPH	CURRENT PRICE (₹)	ACTIONS
NSE: HDFCBANK	[Graph Placeholder]	₹314.60	<span>Buy</span> <span>Sell</span>
NSE: BAJAJFINSV	[Graph Placeholder]	₹135.38	<span>Buy</span> <span>Sell</span>
NSE: TCS	[Graph Placeholder]	₹224.93	<span>Buy</span> <span>Sell</span>
NSE: BHARTIARTL	[Graph Placeholder]	₹288.42	<span>Buy</span> <span>Sell</span>
NSE: ICICIBANK	[Graph Placeholder]	₹158.14	<span>Buy</span> <span>Sell</span>
NSE: INFY	[Graph Placeholder]	₹195.35	<span>Buy</span> <span>Sell</span>
NSE: ADANIPORTS	[Graph Placeholder]	₹443.43	<span>Buy</span> <span>Sell</span>
NSE: JSWSTEEL	[Graph Placeholder]	₹454.94	<span>Buy</span> <span>Sell</span>
NSE: WIPRO	[Graph Placeholder]	₹148.46	<span>Buy</span> <span>Sell</span>

The screenshot shows the PHInance application's stock trading interface for buying HDFC Bank Ltd. The main header displays the stock information: **HDFC Bank Ltd (NSE: HDFCBANK)**, current price **₹1,746.50**, and a green upward arrow indicating a 0.50% increase for the day. To the right, there are tabs for **NSE** and **BSE**, and buttons for **DELIVERY** and **INTRADAY**. A dropdown menu for **No. of Shares** shows the value **3**. On the right side, there are input fields for **Stop Loss Order** (Price Range: ₹1,570.25 - ₹1,919.15, Trigger Price: 1710.25), **Market Price** (1746.5), and a **PLACE BUY ORDER** button. Below these controls, a message indicates **Margin Required: ₹5239.5 Available Cash: ₹8370.25**.

The screenshot shows the PHInance application's stock trading interface for selling HDFC Bank Ltd. The main header displays the stock information: **HDFC Bank Ltd (NSE: HDFCBANK)**, current price **₹1,746.50**, and a green upward arrow indicating a 0.50% increase for the day. The interface is identical to the buy order screen, with tabs for **NSE** and **BSE**, and buttons for **DELIVERY** and **INTRADAY**. A dropdown menu for **No. of Shares** shows the value **3**. On the right side, there are input fields for **Stop Loss Order** (Price Range: ₹1,570.25 - ₹1,919.15, Trigger Price: 1763.25), **Market Price** (1746.5), and a **PLACE SELL ORDER** button. Below these controls, a message indicates **Margin Required: ₹5239.5 Available Cash: ₹8370.25**.

## 1.2.5 AI Powered Predictions Page:

**AI Powered Stock Predictions**

Last Pricing Date: Fri Feb 07 2025 | Predicted Date: Sat Feb 08 2025

STOCK	GRAPH	LAST CLOSING PRICE (₹)	PREDICTED OPENING (₹)	PREDICTED CLOSING (₹)	VOLATILITY	MARKET SENTIMENT	ADVICE / CONFIDENCE
AAPL		₹547.21	₹542.35	₹579.99	3.72	Neutral	<b>SELL</b> (66.8%)
GOOGL		₹62.20	₹40.29	₹292.24	5.55	Bearish	<b>SELL</b> (87.7%)
MSFT		₹495.26	₹57.59	₹102.41	5.94	Neutral	<b>SELL</b> (98.5%)
AMZN		₹188.86	₹304.17	₹278.48	2.77	Neutral	<b>SELL</b> (65.1%)
TSLA		₹248.12	₹497.22	₹311.74	5.27	Bearish	<b>BUY</b> (72.4%)
RELIANCE		₹399.69	₹139.35	₹414.36	3.37	Bearish	<b>BUY</b> (89.1%)
TCS		₹247.03	₹549.66	₹396.55	5.02	Bearish	<b>BUY</b> (79.0%)
INFY		₹299.05	₹367.18	₹480.18	4.10	Neutral	<b>SELL</b> (94.9%)
HDFCBANK		₹507.15	₹157.29	₹164.68	5.72	Bullish	<b>BUY</b> (94.8%)
ICICIRANK		₹370.90	₹190.40	₹204.10	2.63	Bearish	<b>SELL</b> (84.1%)

## 1.2.6 Portfolio Management Page:

**Portfolio Management**

Dashboard / Portfolio Management

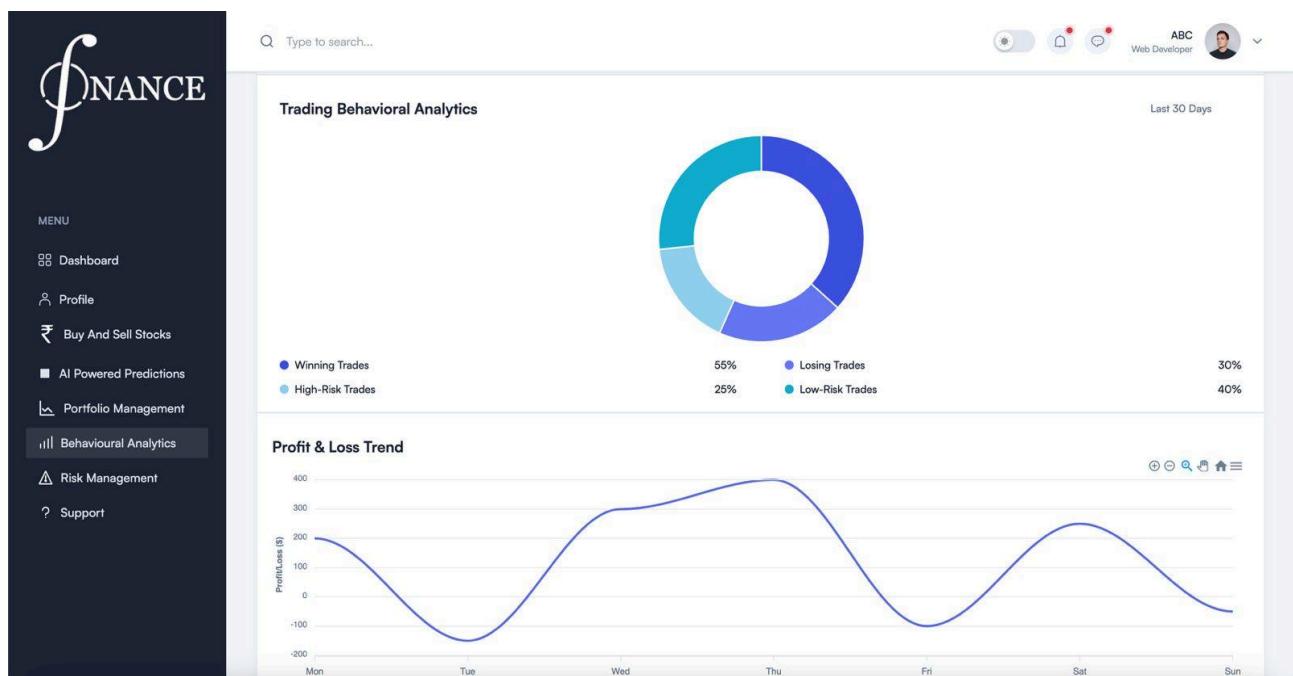
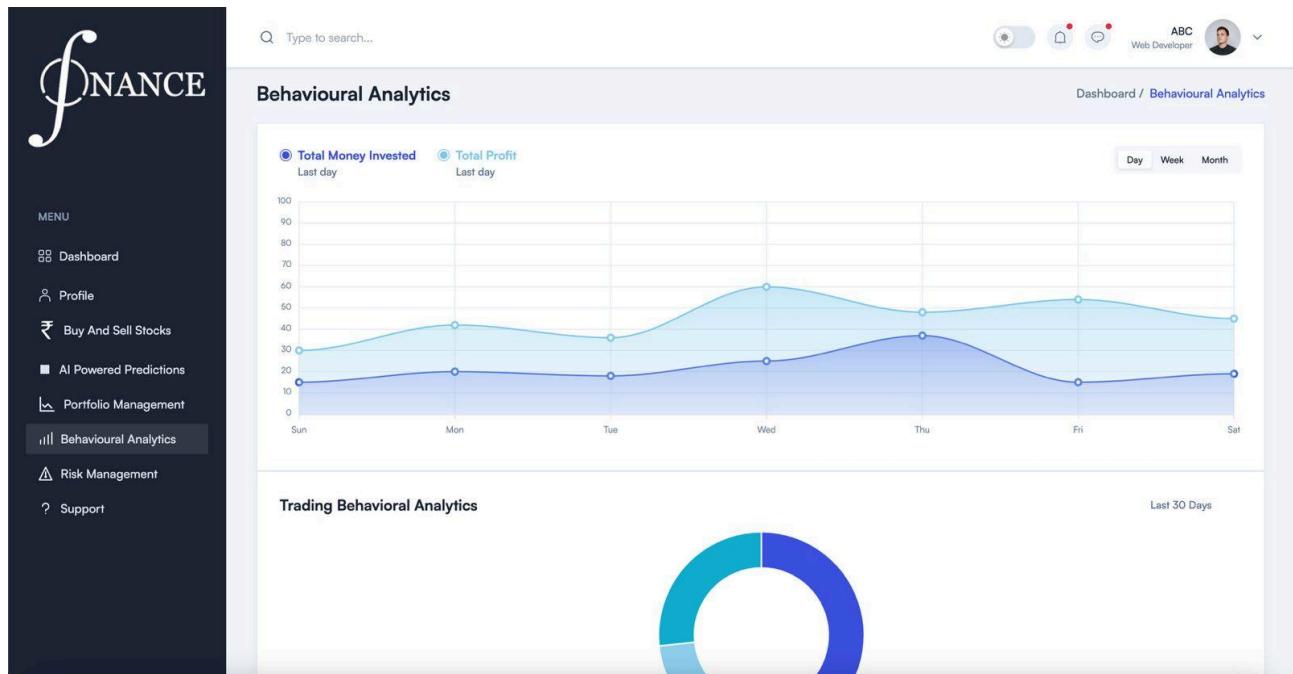
**₹27,530.74** Current value

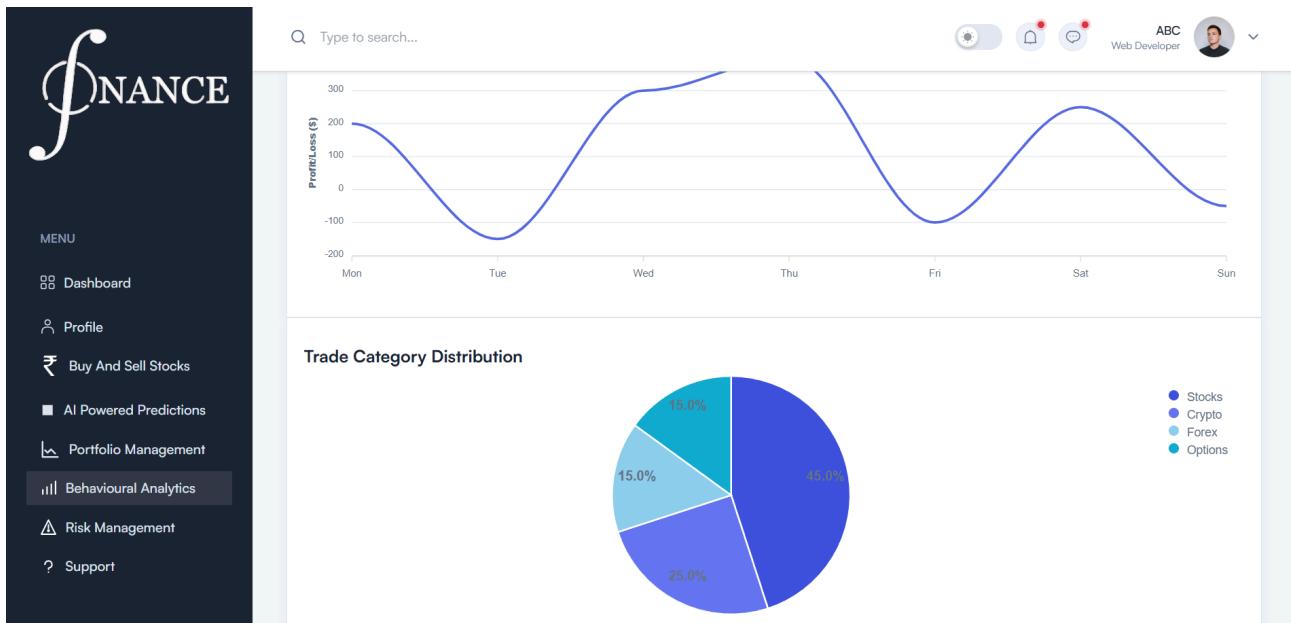
**Holdings (7)**

Invested Value ₹26,300  
Total Returns +₹1,230.74 (4.68%)  
1D Returns +₹230.5 (0.85%)

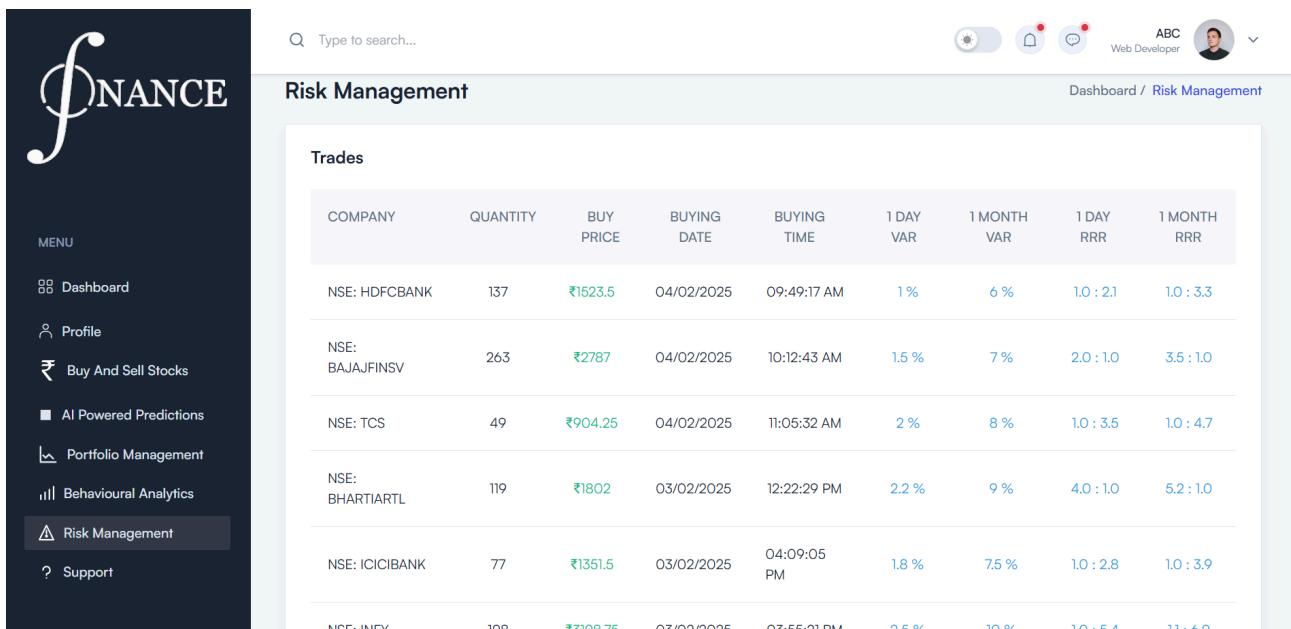
COMPANY	GRAPH	MARKET PRICE	RETURNS (%)	CURRENT
ZOMATO QTY 21 • AVG. ₹213.33		₹238.20	+₹498.96 (11.08%)	₹5002.20
<b>HISTORY</b>				
DATE	QTY	RATE	AMOUNT	
2024-01-15	10	₹200	₹2000	
2024-02-10	5	₹220	₹1100	
2024-03-05	6	₹230	₹1380	
SBI QTY 3 • AVG. ₹863.33		₹760.95	₹-292.35 (-11.35%)	₹2282.85
TATA STEEL QTY 8 • AVG. ₹167.50		₹131.82	₹-288.96 (-21.51%)	₹1054.56
APPLE		₹170.88	+₹300.50 (15.23%)	₹564.40

## 1.2.7 Behavioural Analytics Page:





## 1.2.8 Risk Management Page:



## 1.2.9 Support Page:

The screenshot shows the PHInance support page. On the left is a dark sidebar menu titled "MENU" with the following items:

- Dashboard
- Profile
- ₹ Buy And Sell Stocks
- AI Powered Predictions
- ↳ Portfolio Management
- |||| Behavioural Analytics
- ⚠ Risk Management
- ? Support

The main content area has a search bar at the top right with placeholder text "Type to search...". Below it is a user profile section for "ABC Web Developer" with a small profile picture. The main content includes:

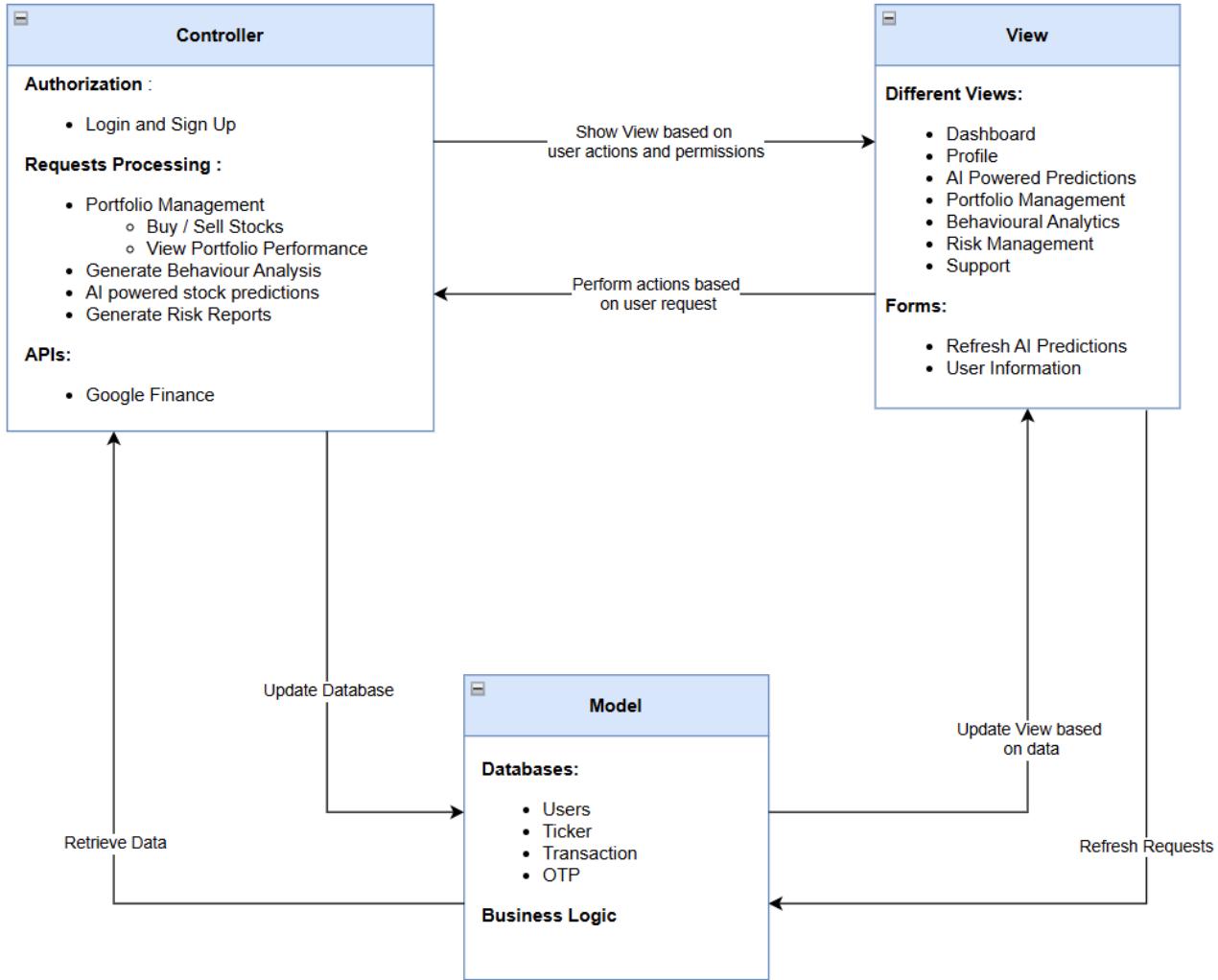
### Contact Us

Have a question?  
Email: [support@ourplatform.com](mailto:support@ourplatform.com)  
Phone: (123) 456-7890

### Frequently Asked Questions (FAQs)

- 1. What is this platform?**  
This platform offers a simulated trading environment where you can trade stocks using virtual money. You'll get access to real-time market data, technical analysis tools, AI-powered predictions, and educational resources to help you improve your trading skills.
- 2. How do I start trading?**  
Simply sign up for an account, and you'll receive ₹10,000 in virtual funds. From there, you can begin trading stocks in our simulated environment just as you would in a real trading platform.
- 3. Can I trade real stocks on this platform?**  
No, this platform is focused on providing a simulated trading experience. While the stock data is based on real-life information, all trades are made using virtual money.
- 4. How is the stock data sourced?**  
Our platform pulls real-time or near-real-time stock data from reliable financial data providers. You'll have access to comprehensive information like stock prices, market trends, and company financials.
- 5. What are technical analysis tools?**  
We provide a range of technical analysis features, including indicators like the Relative Strength Index (RSI), Moving Average Convergence Divergence (MACD), and On-Balance Volume (OBV) to help you analyze market trends and make informed trading decisions.

## 2 Architecture Design



### Model-View-Controller (MVC):

The Model-View-Controller (MVC) architecture is a structured framework designed to handle various operations related to simulated trading, stock market analysis, AI-powered predictions, portfolio management, and financial education. It separates the application into three main components: Model, View, and Controller, each responsible for a specific aspect of development.

### Model:

- The Model in our financial application is responsible for managing the database using PostgreSQL. It handles user portfolio management, virtual trading transactions, stock data storage, AI-driven price predictions, and financial risk assessments. Additionally, it maintains technical indicators, sentiment analysis reports, and tracks user progress in educational content.
- The Model receives data from the Controller regarding user trades, portfolio updates, stock queries, and learning progress. It processes this information and returns trade execution results, portfolio performance analytics, AI-generated stock predictions, and personalized trading insights to the Controller. The Controller then communicates this data to the View, enabling real-time stock searches, technical analysis requests, and trading actions initiated by the user.

## View:

- The View component defines the user interface for our financial application, utilizing Next.js with React and Tailwind CSS. It manages the presentation layer, displaying real-time stock prices, user portfolios, stock screener results, AI-driven predictions, risk analysis reports, and simulated trading dashboards.
- Information about user actions such as stock trades, portfolio adjustments, stock searches, and risk analysis requests is communicated from the View to the Controller. The View receives trade execution updates, AI-based stock insights, market trends, and notifications from the Controller, ensuring a seamless, interactive, and real-time trading experience.

## Controller:

- The Controller acts as an intermediary between the Model and View and is implemented using Gin (Go web framework). It handles application logic, processes API requests, and manages stock trading operations. The Controller receives user interactions from the View and communicates with the Model using GORM to perform database transactions, risk assessments, and trade validations.
- The Controller ensures that changes in the View and Model remain independent, improving modularity and maintainability.

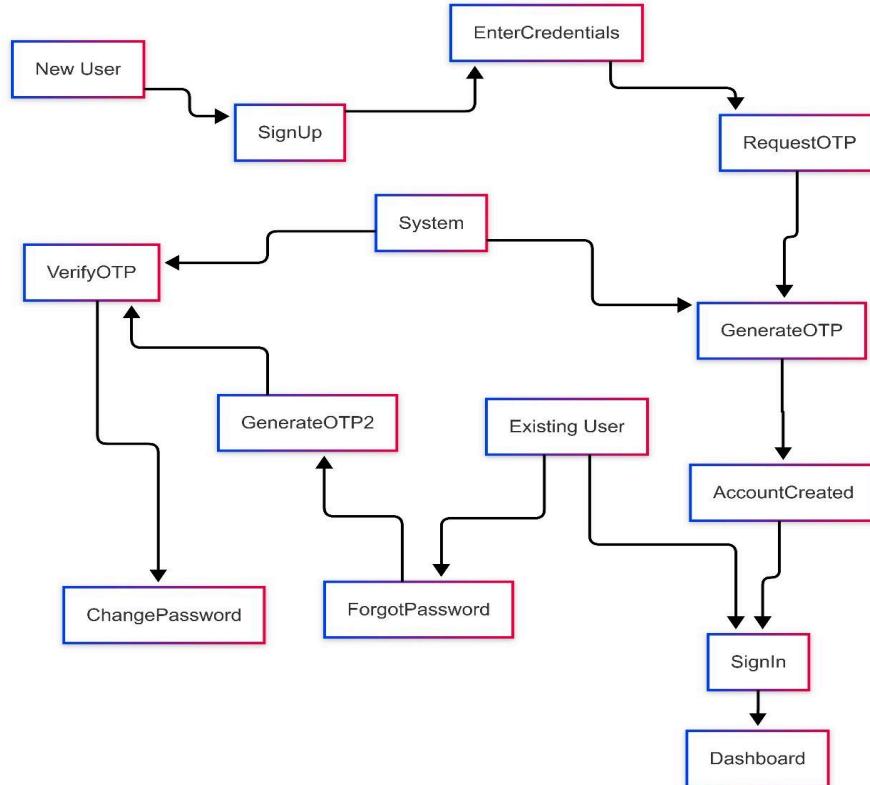
Therefore, the MVC architecture stands as the optimal choice for our financial application, seamlessly integrating the frontend, backend, and database to support a wide range of functionalities. This architecture excels in facilitating end-to-end connectivity, ensuring that user interactions, stock market data, AI-driven predictions, and portfolio management operate smoothly while maintaining independence between components. It provides flexibility in data representation and system functionality, making it well-suited for real-time stock trading simulations and financial analysis.

However, there are challenges associated with this architecture. The complexity of handling large-scale financial data, real-time transactions, and AI-based predictions may lead to an increase in code size and require efficient debugging strategies. Additionally, ensuring data consistency and optimizing performance in high-traffic scenarios could require additional infrastructure considerations.

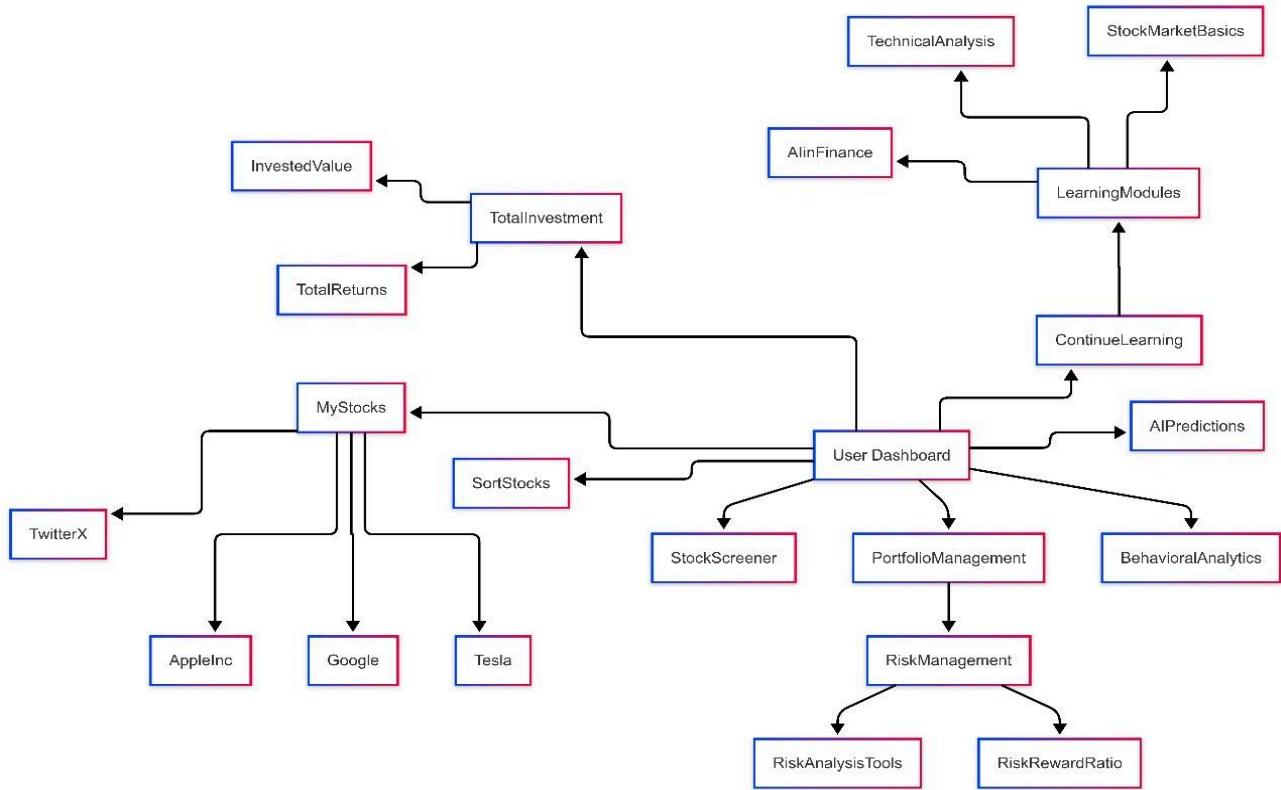
## 3 Object Oriented Design

### 3.1 Use Case Diagrams

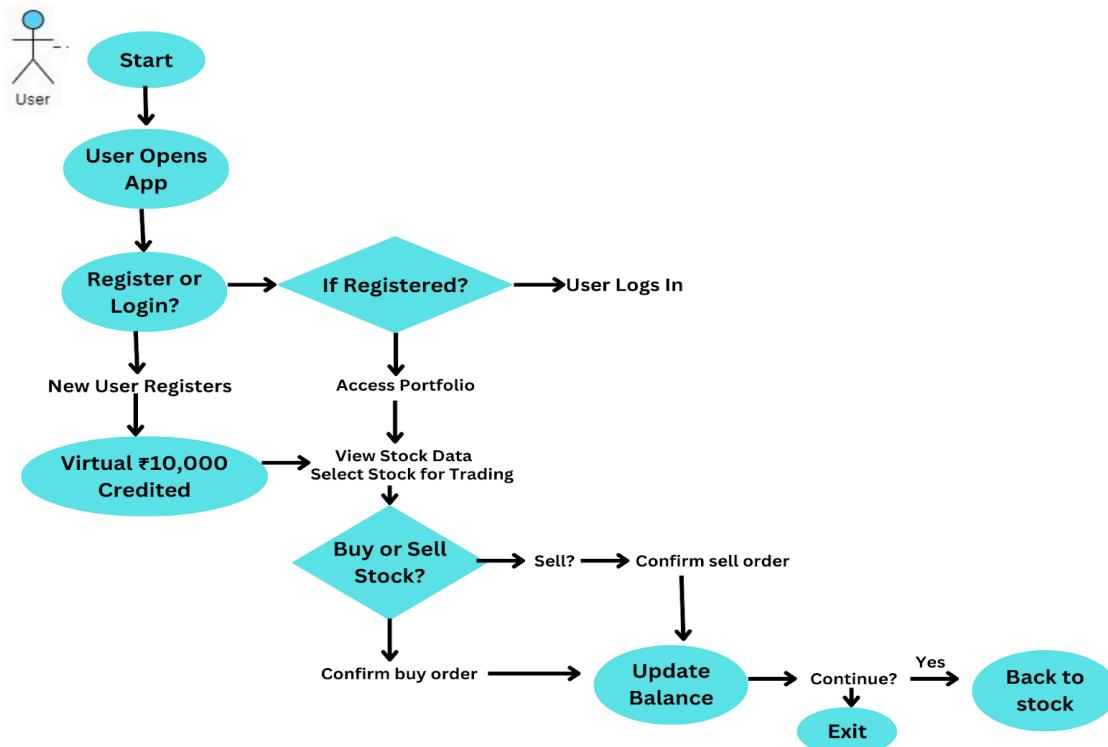
#### 3.1.1 Login:



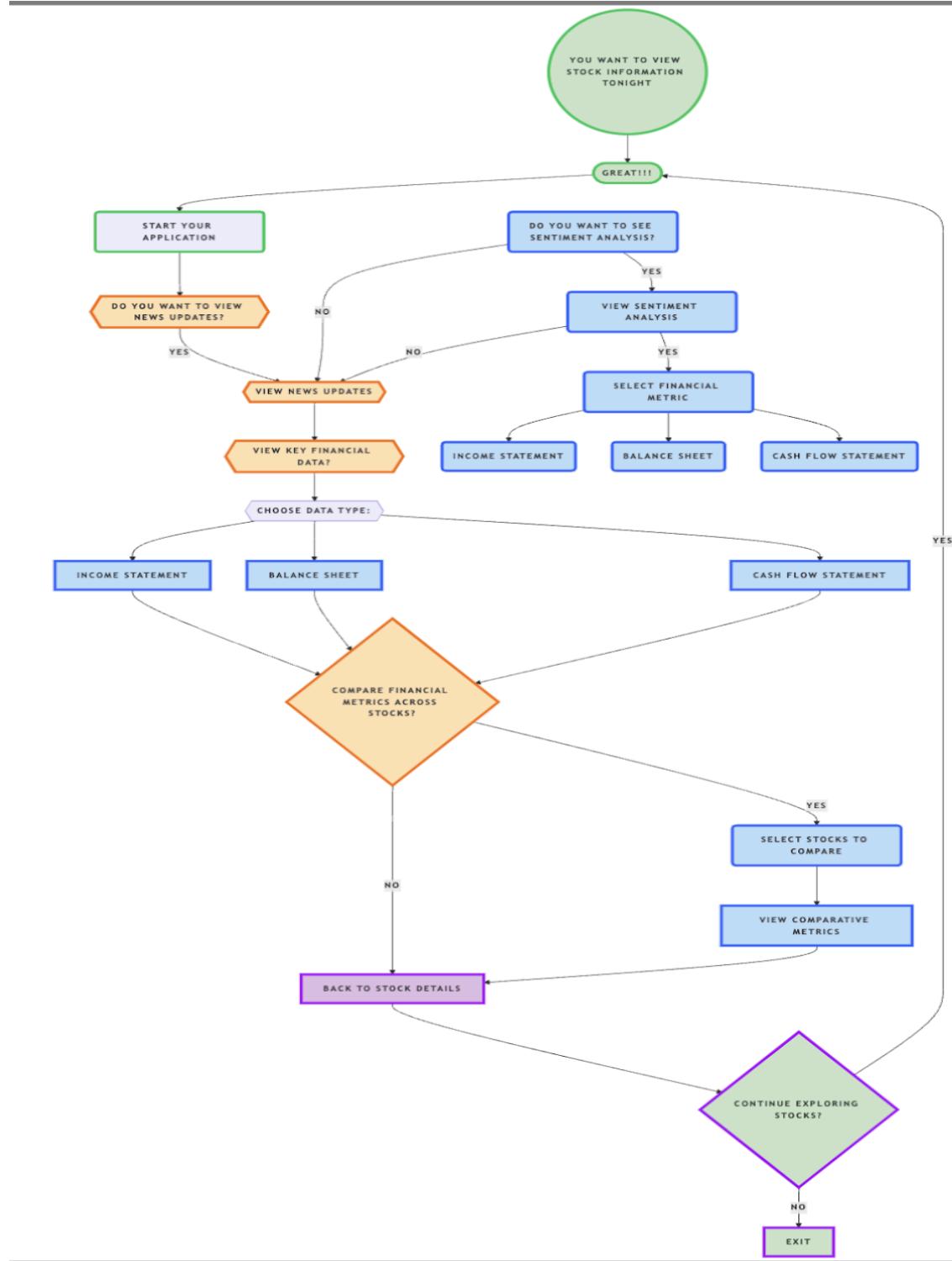
#### 3.1.2 User Dashboard :



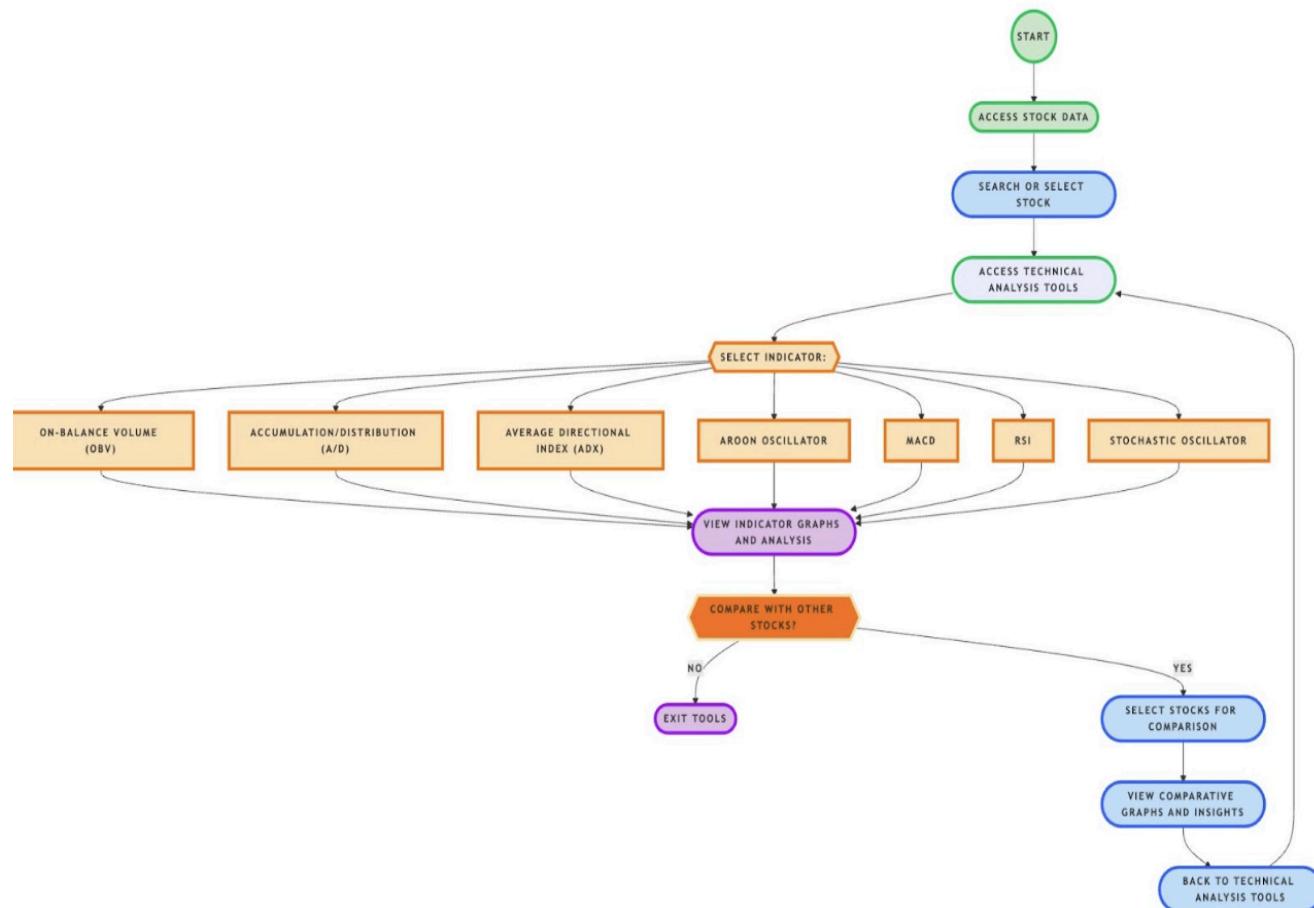
### 3.1.3 Simulated Trading Environment



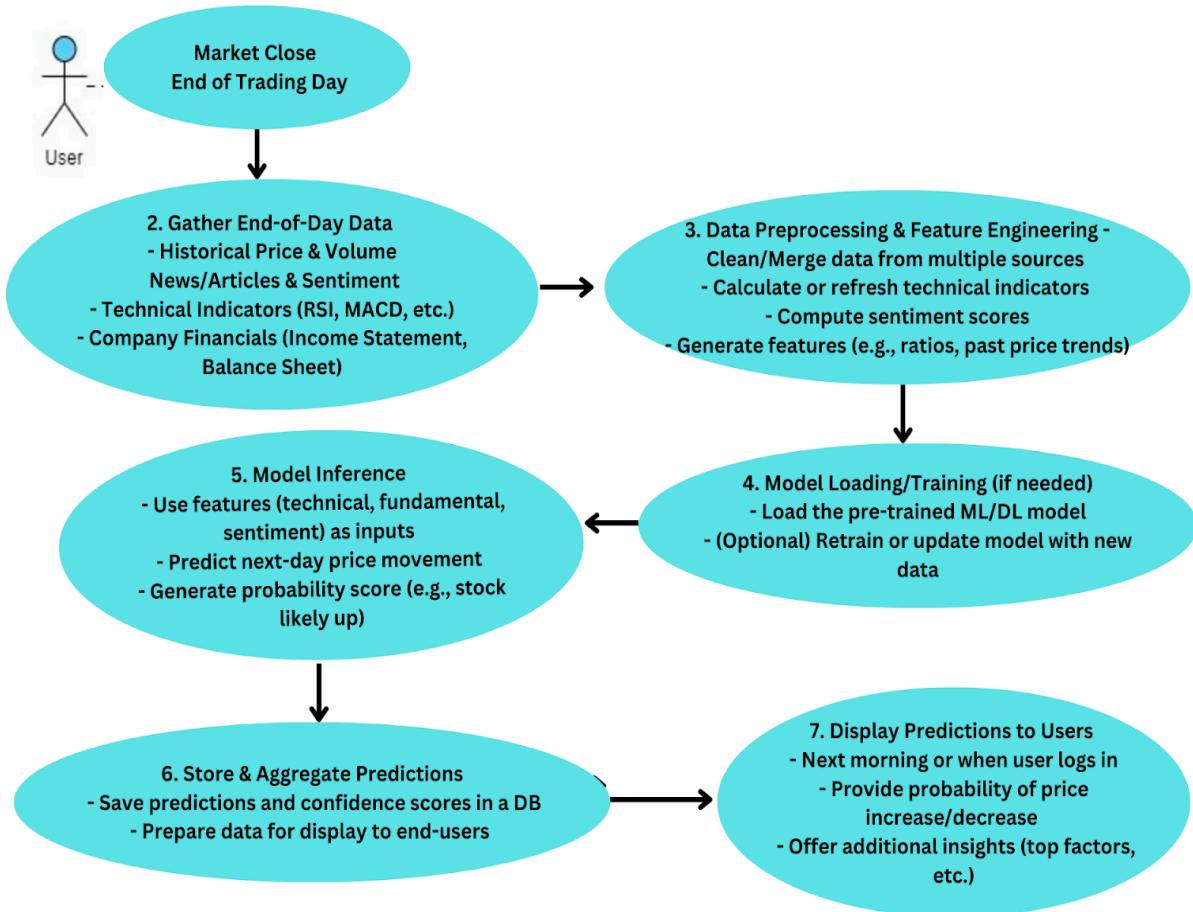
### 3.1.4 Comprehensive Stock Data



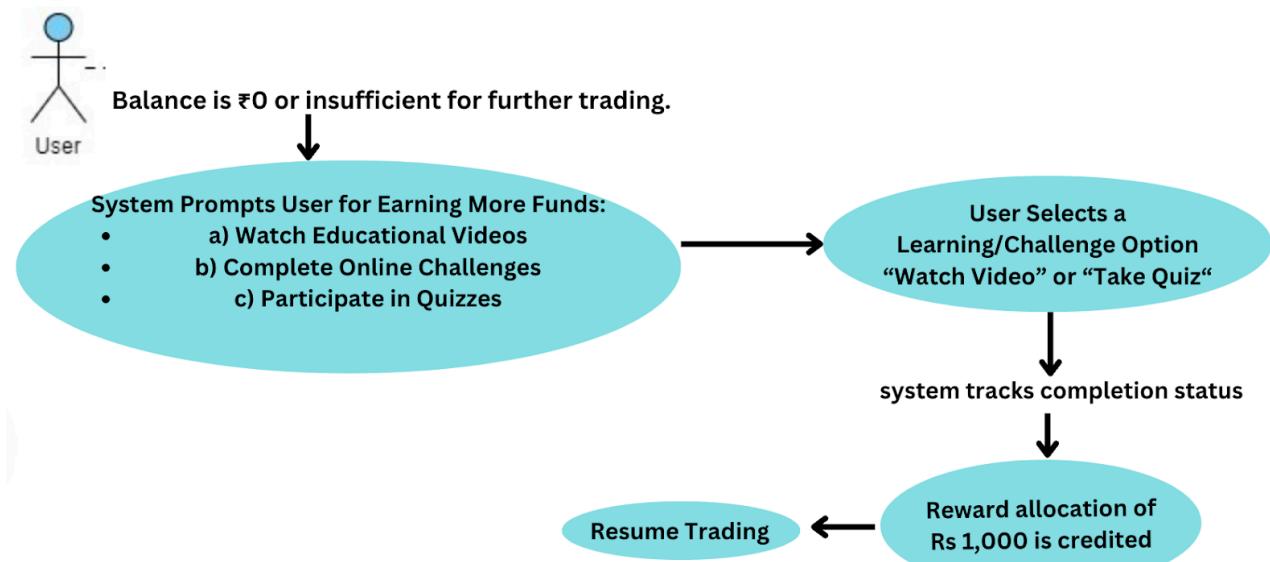
### 3.1.5 Technical Analysis Tools:



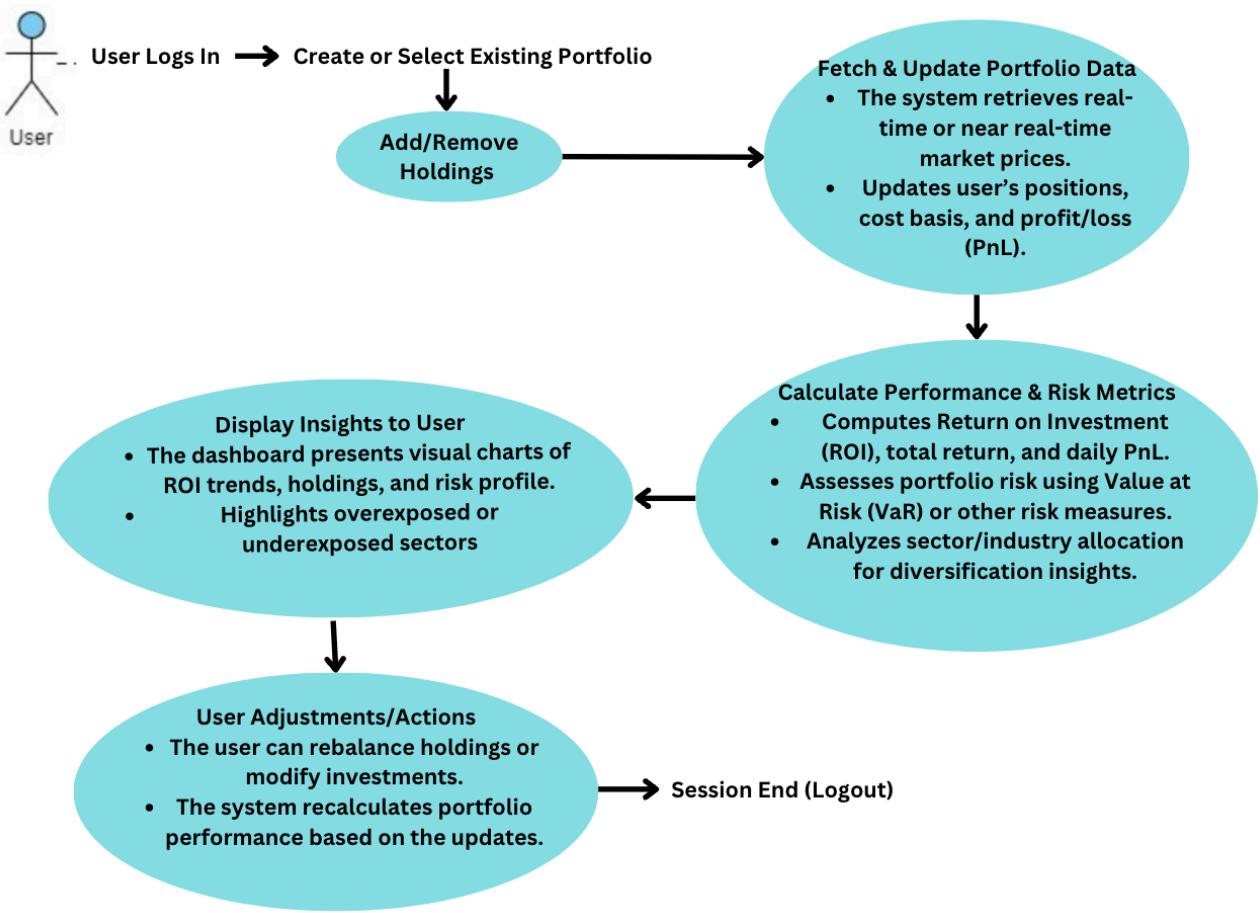
### 3.1.6 AI-Powered Predictions:



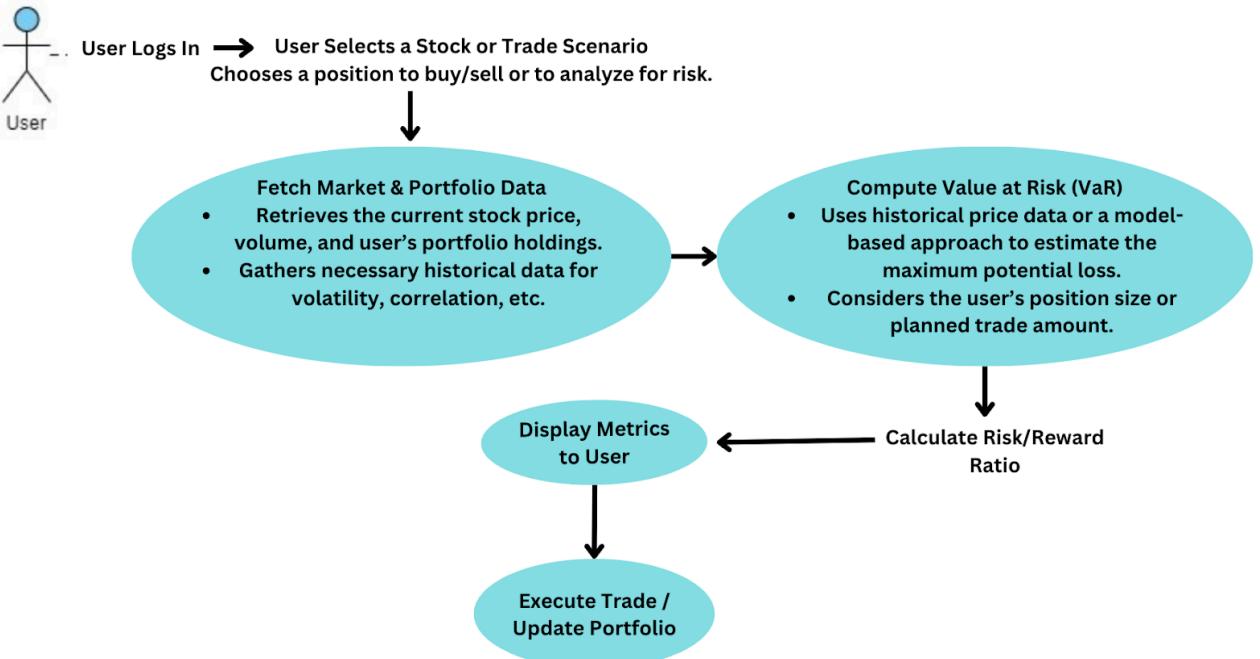
### 3.1.7 Educating Beginners:



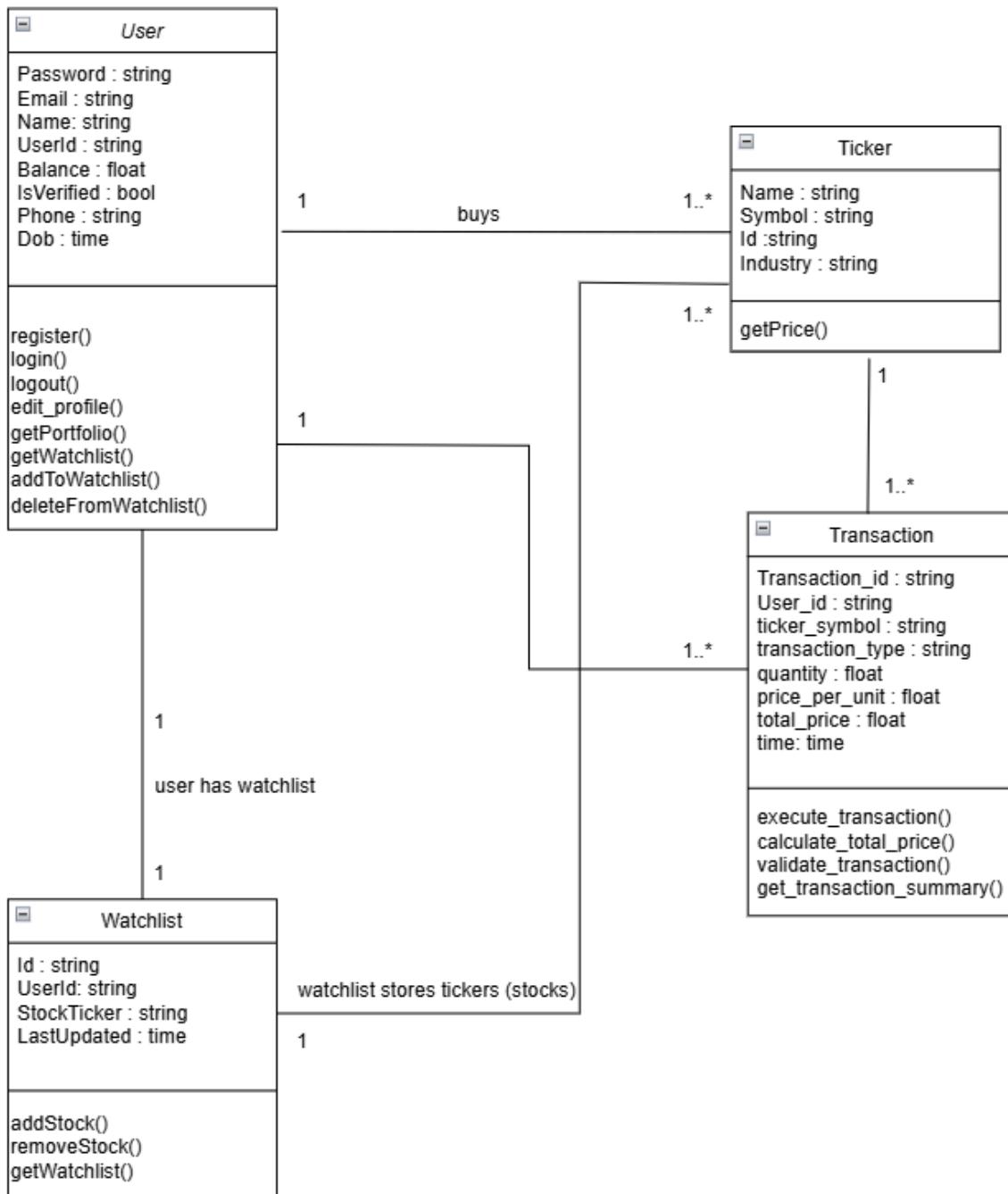
### 3.1.8 Portfolio Management Tools:



### 3.1.9 Risk Analysis Tool:



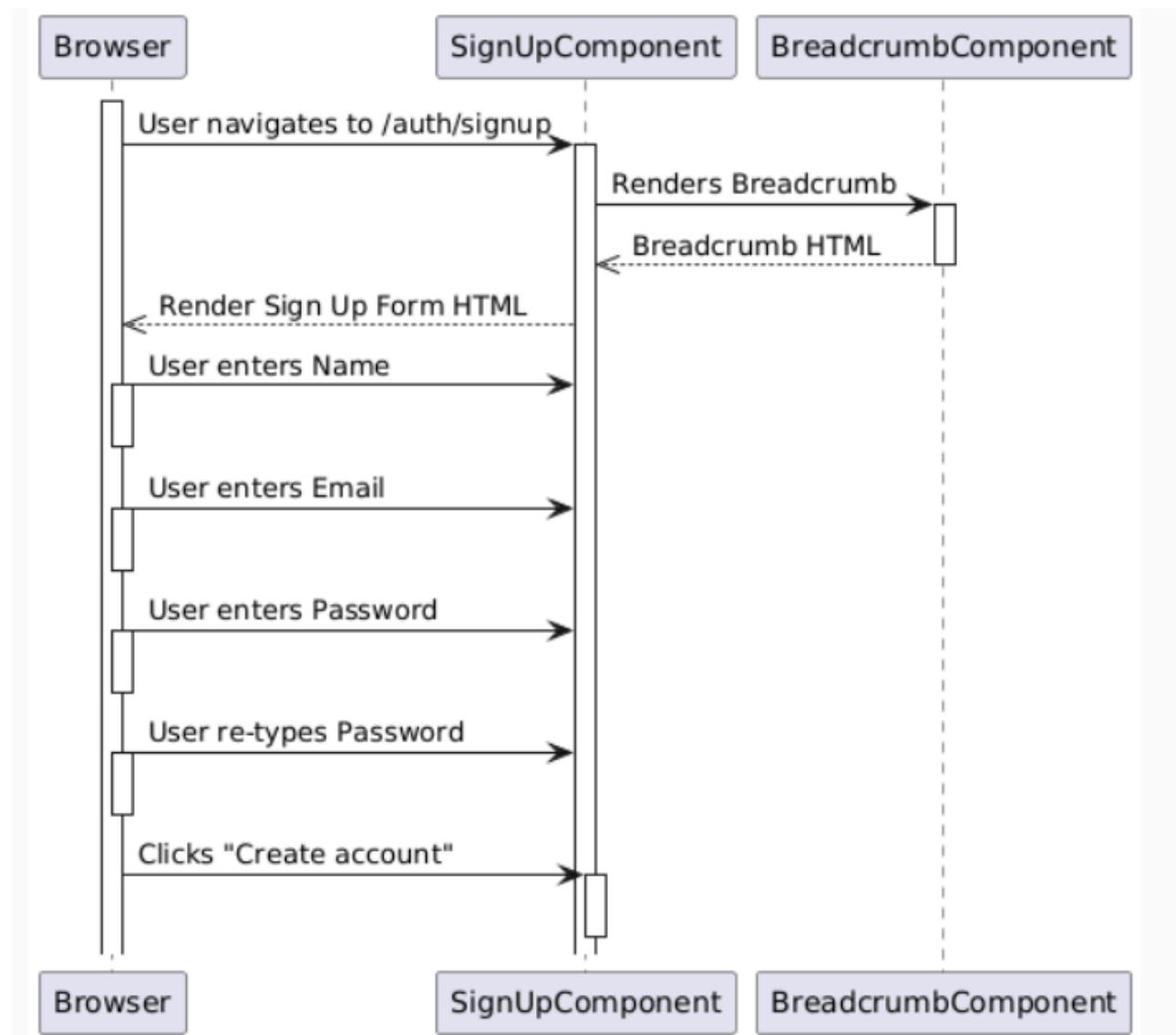
## 3.2 Class Diagrams



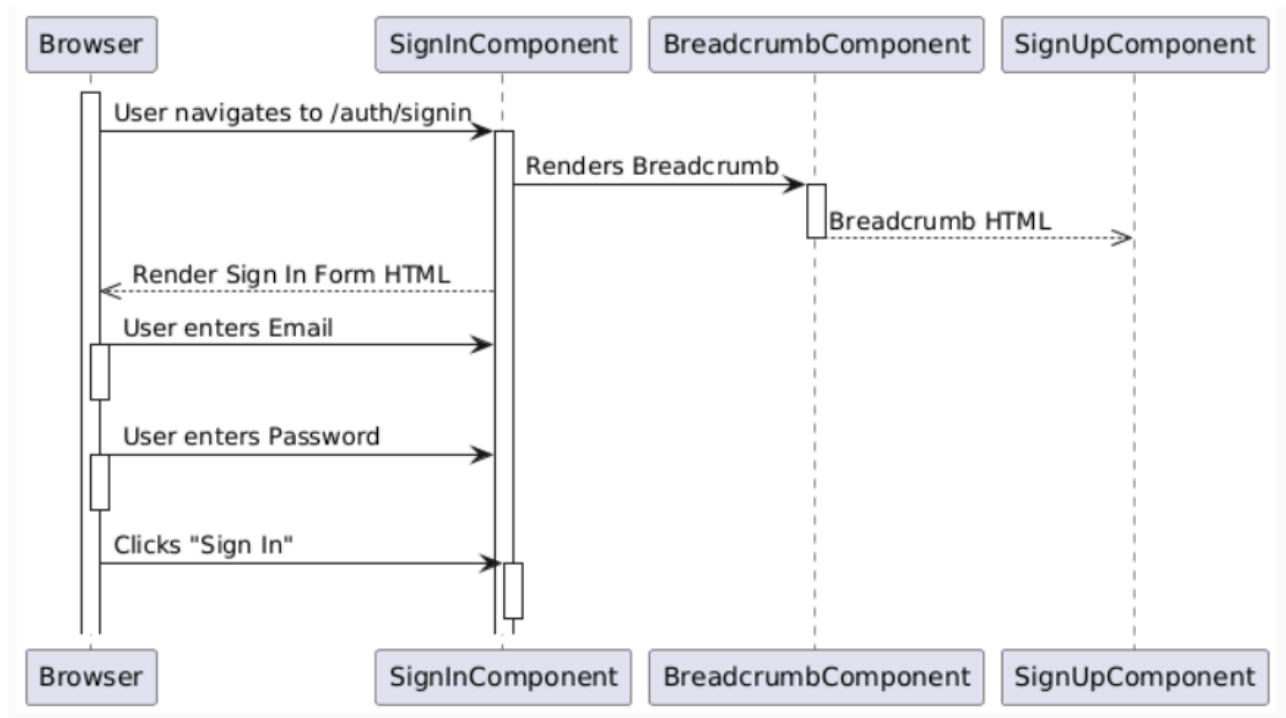
### 3.3 Sequence Diagrams

Symbol	Meaning
Arrow (solid line)	The sender of the message waits for an acknowledgement from the receiver
Arrow (dashed line)	The sender of the message does not wait for a reply
<>	Indicates a database
abc : xyz	'abc' is an object of class 'xyz'
<< a >>	Creation of object 'a'
Cross mark	Destruction of an object
Vertical dashed line	Lifeline symbol (Time increases down the line, hence, an interaction occurs after the interaction above it.)
Alt	Alternative (Exactly one of the two possibilities occurs)
Loop	Indicates a set of interactions that occur repeatedly

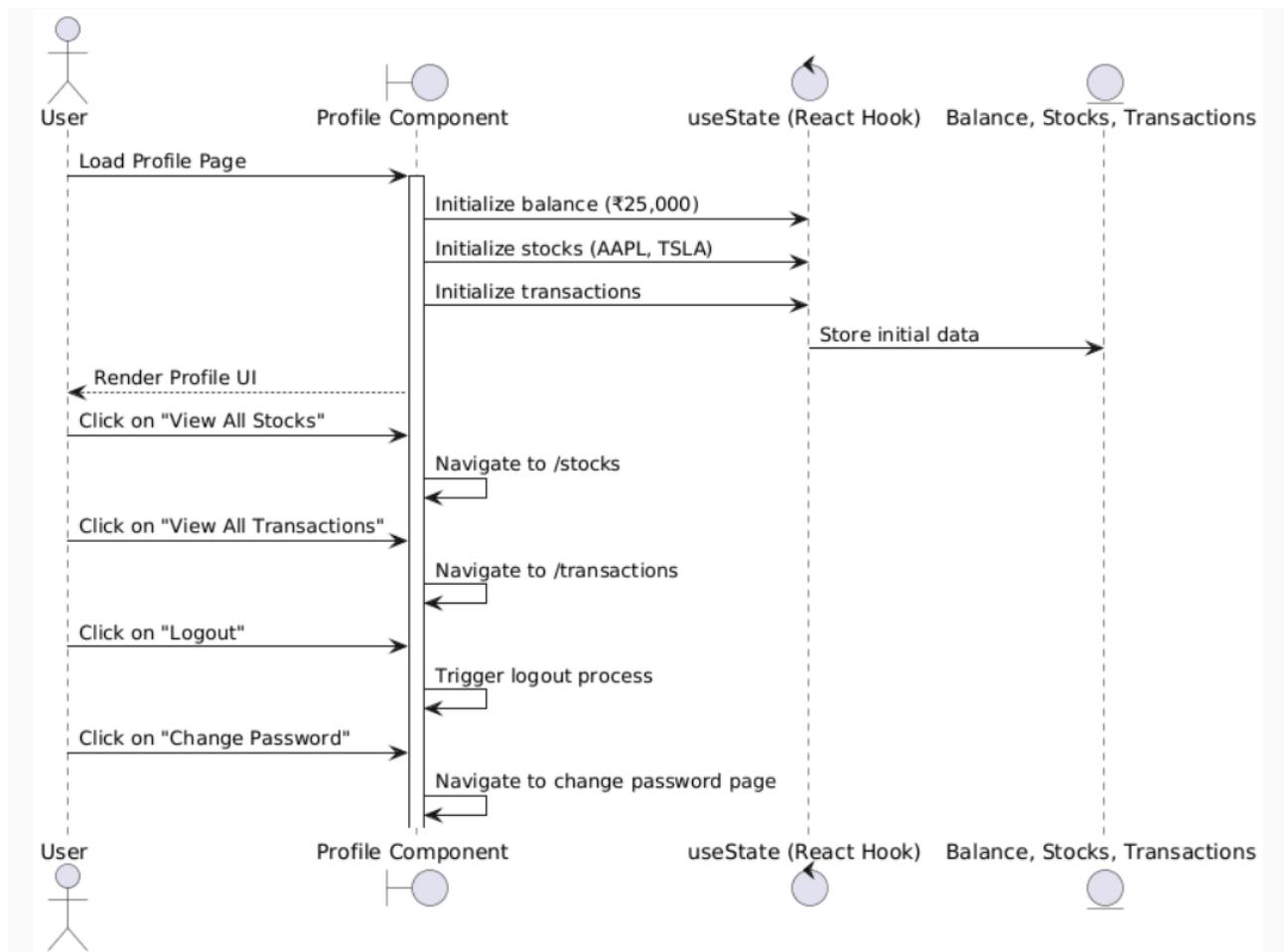
#### 3.3.1 Sign Up



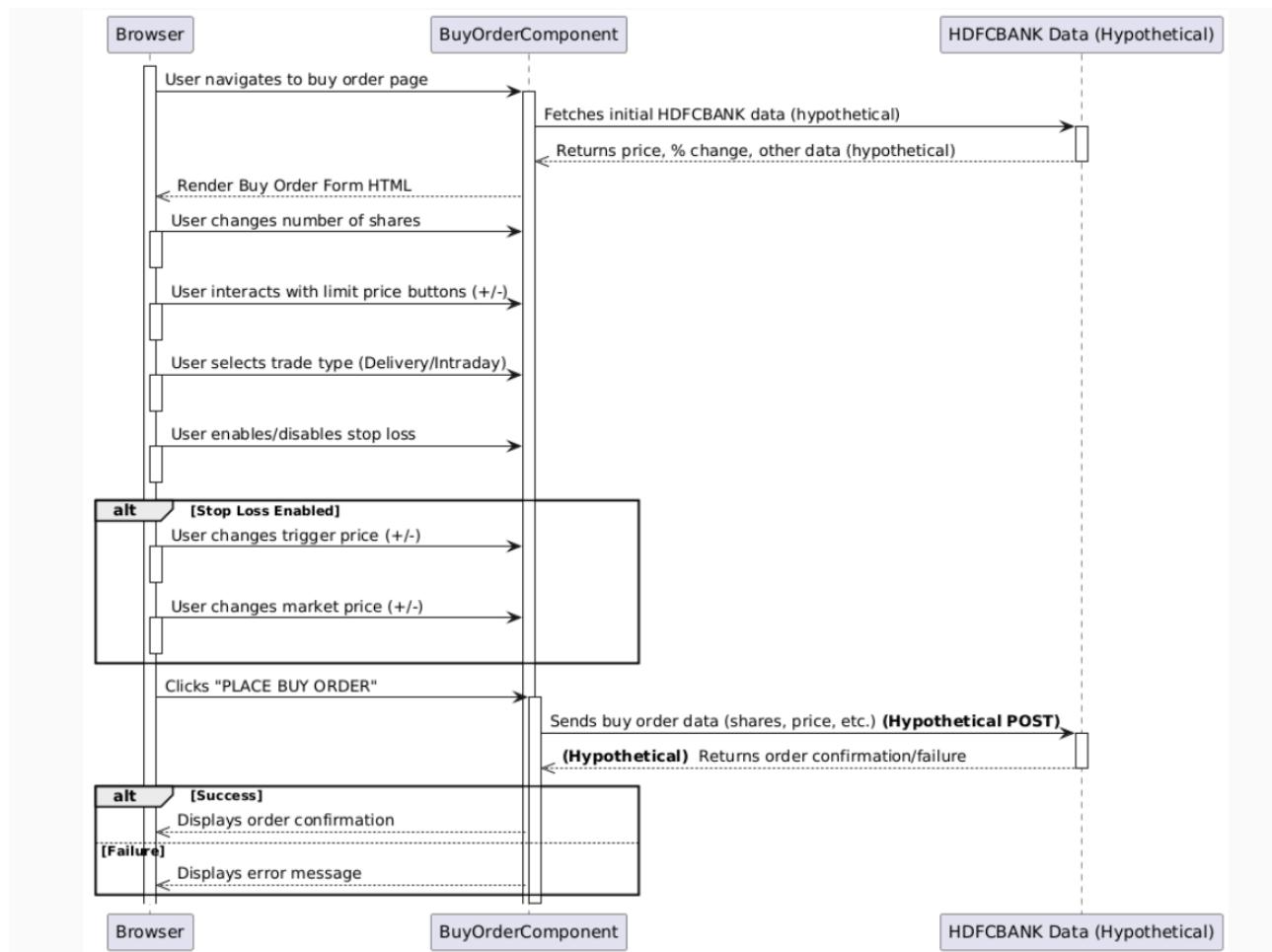
### 3.3.2 Sign In



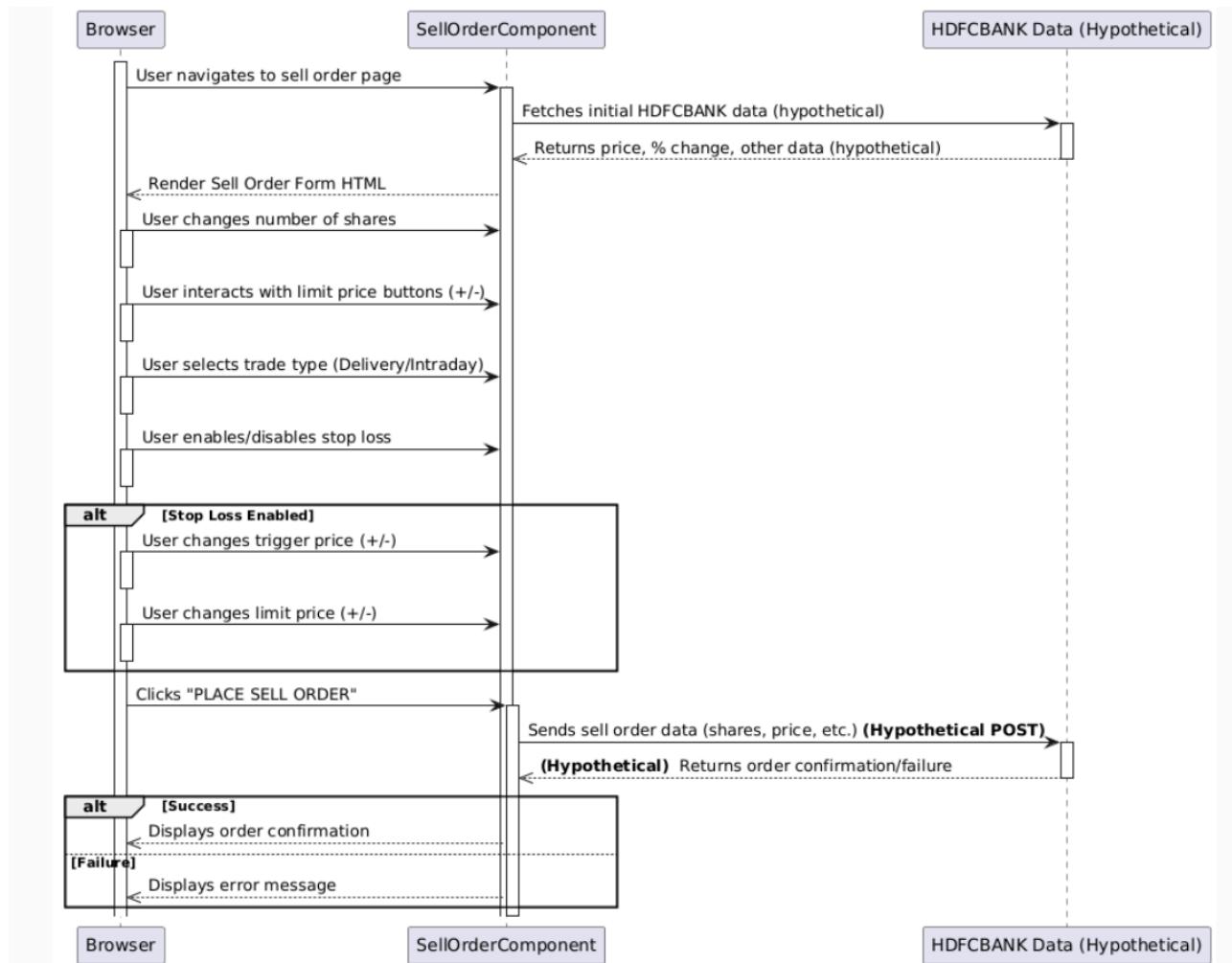
### 3.3.3 Profile



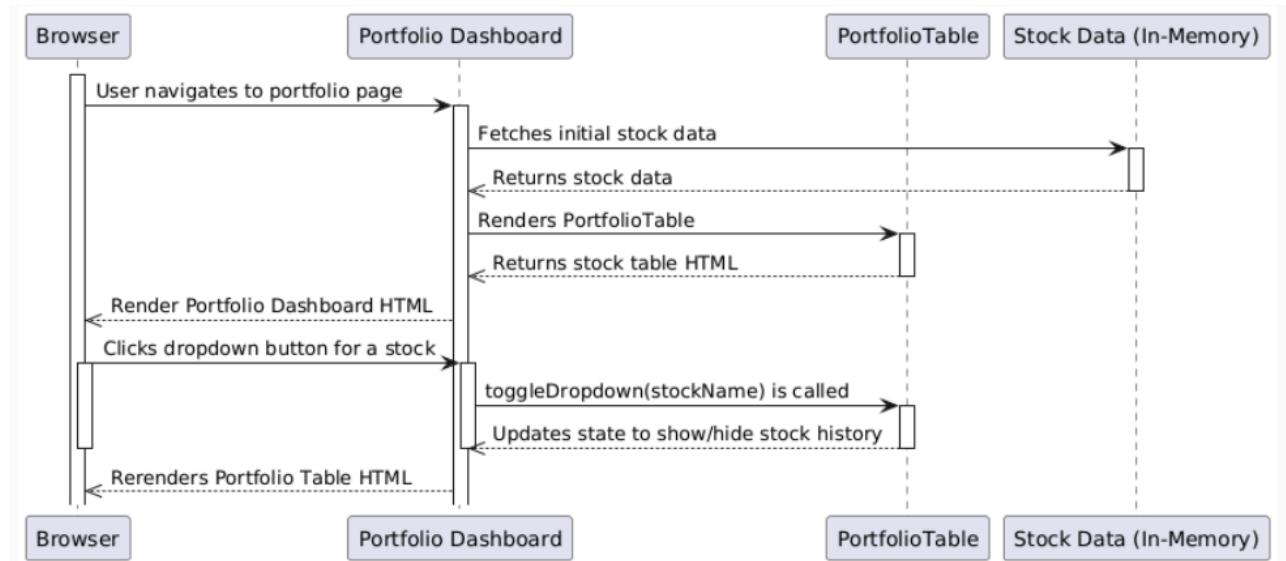
### 3.3.4 BuyOrder



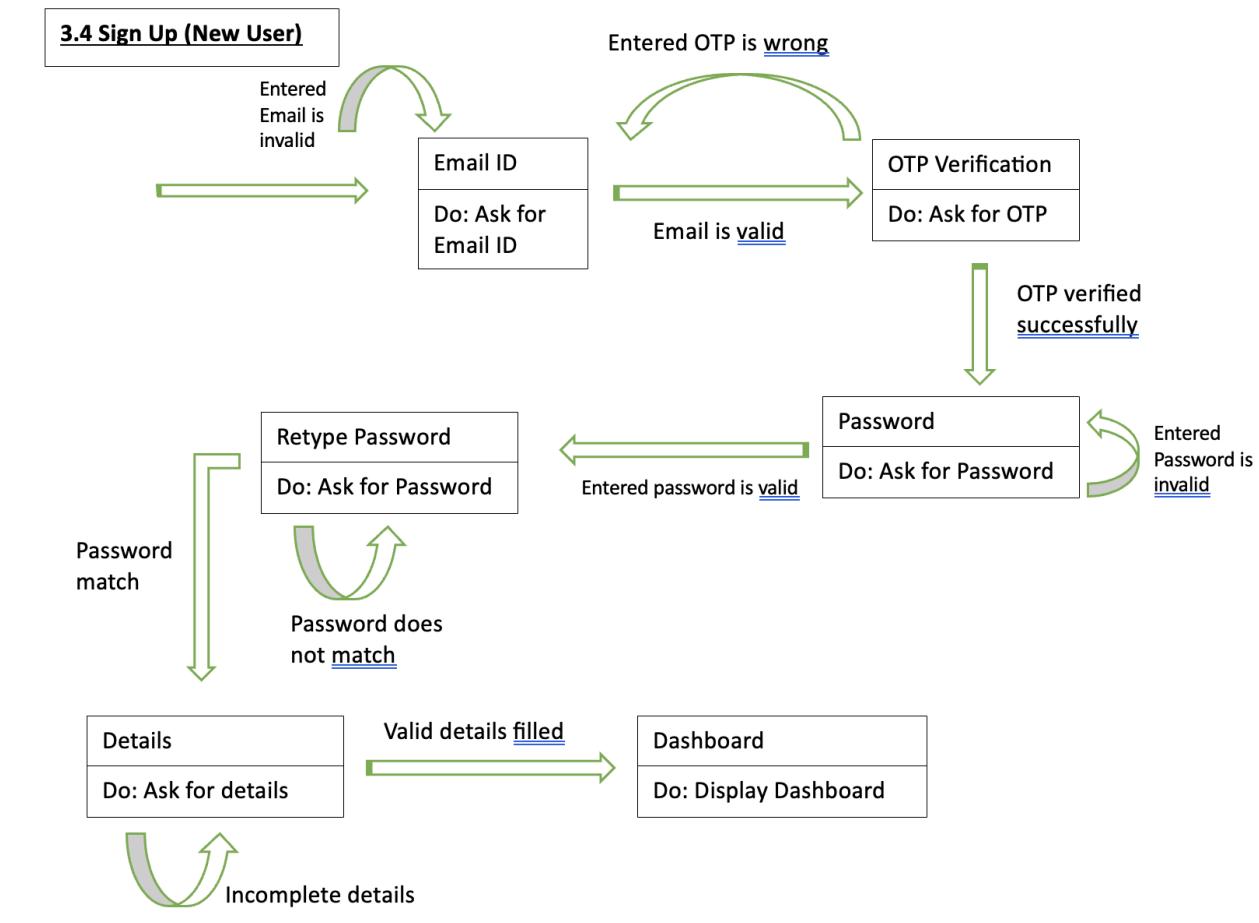
### 3.3.5 SellOrder

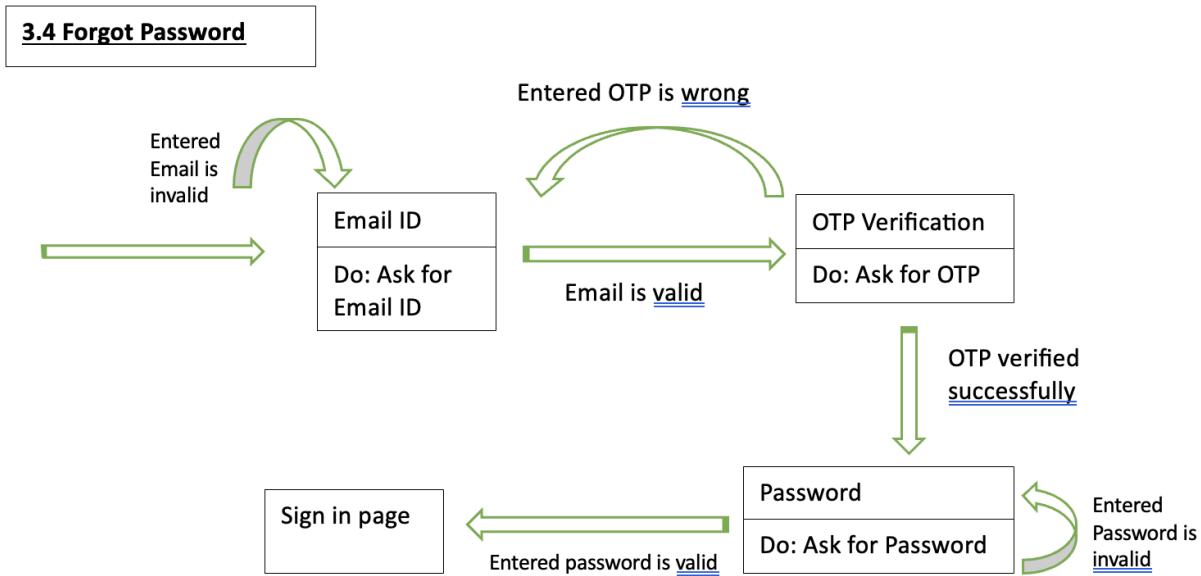
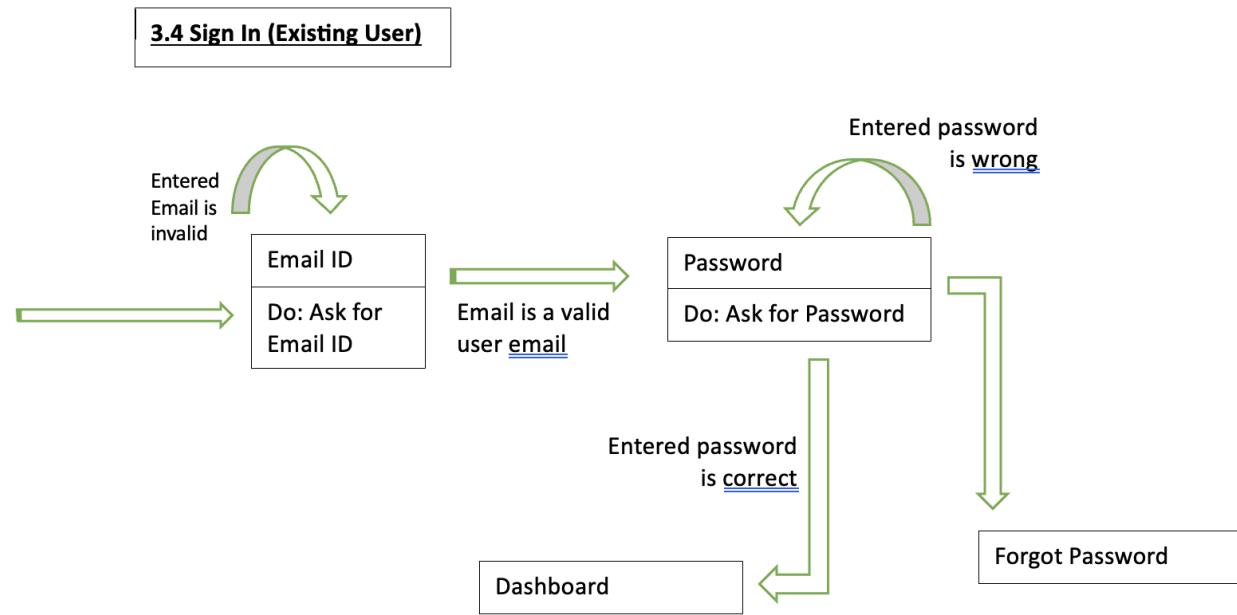


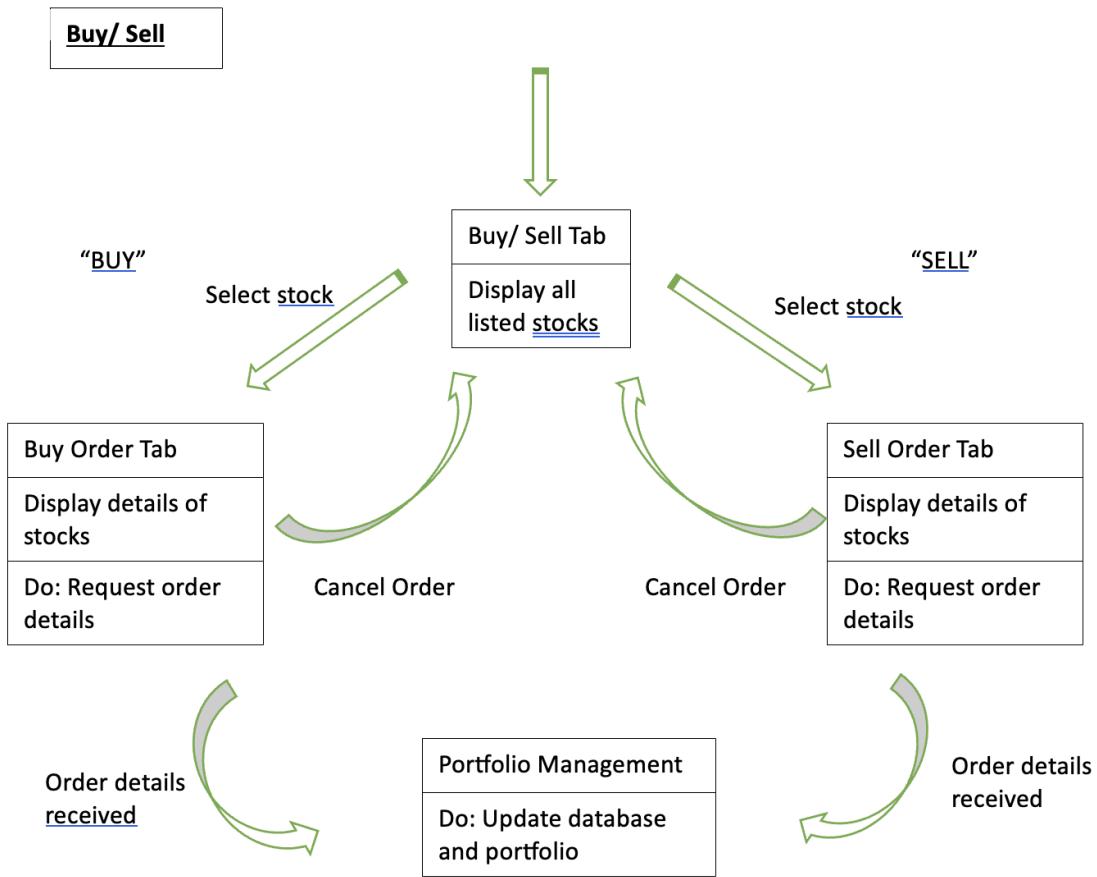
### 3.3.6 Portfolio Management

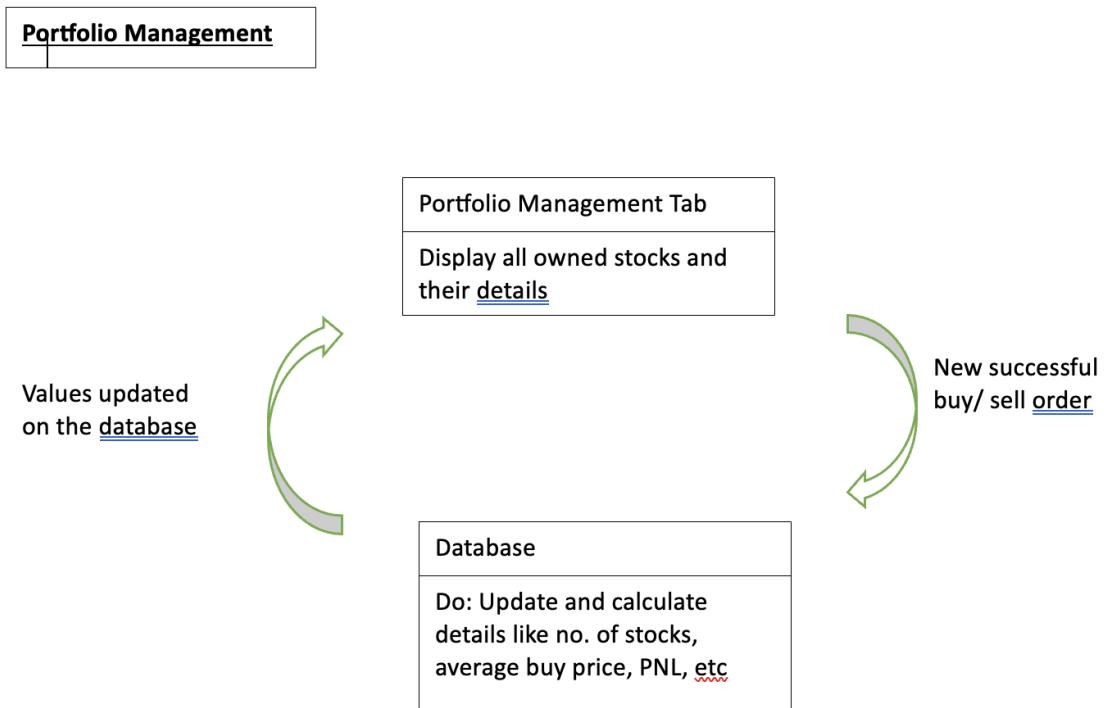


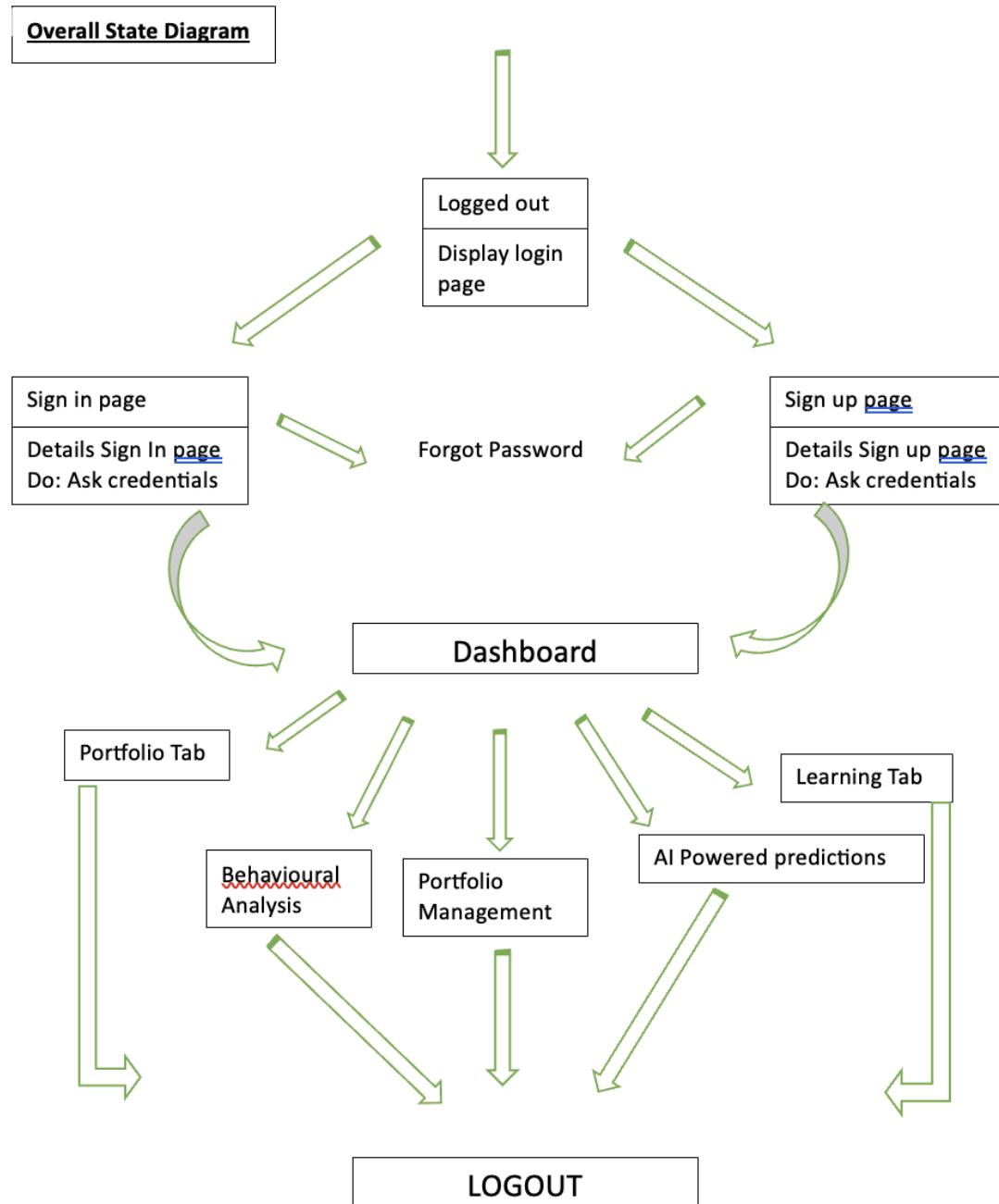
### 3.4 State Diagrams



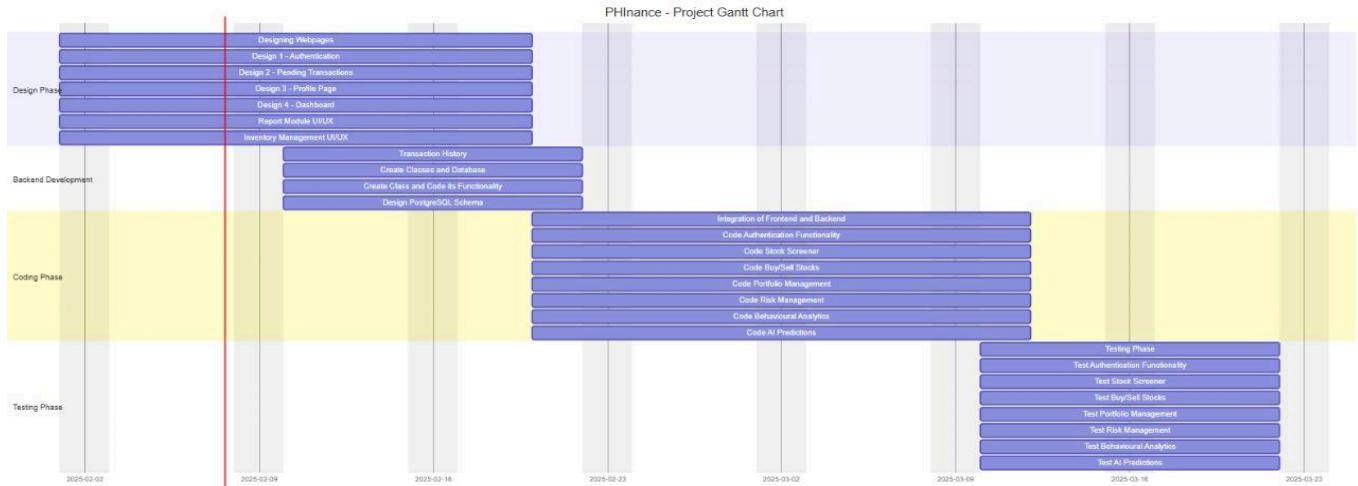






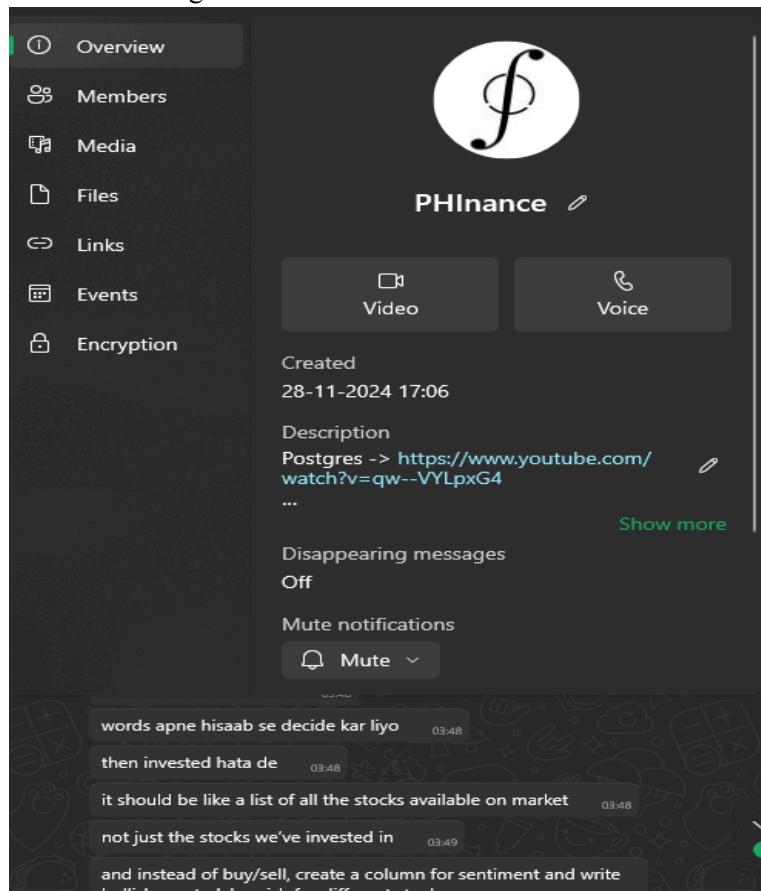


## 4 Project Plan



### Communication:-

For the communication purpose we used a Whatsapp Group. We also held offline meets at least twice a week,in which everybody was present, to ensure effective collaboration..After every meeting,the agenda and plan for the next meet used to be subsequently decided along with the division of work amongst team members.



Task	People Assigned
Frontend- Design 1	Aadi Singh, Aadya Dhir
Frontend- Design 2	Anirudh, Anish Sahu
Frontend- Design 3	Anisha Srivastava, Dilbar Singh Lamba
Frontend- Design 4	Pranshu Thirani, Sameer Yadav
Frontend- Design 5	Aruz Awasthi, Sangam Gupta
Backend - Authentication	Anirudh,Anisha Srivastava
Backend - Stock Screener	Aadi Singh,Anish Sahu
Backend - Buy/Sell Stocks	Aadya Dhir, Dilbar Singh Lamba
Backend -Portfolio Management	Pranshu Thirani, Sameer Yadav
Backend - Risk Management	Aadi Singh, Anirudh
Backend - Behavioural Analytics	Anisha Srivastava, Sangam Gupta
Backend - AI Predictions	Aadya Dhir, Dilbar Singh Lamba
Create Classes	Sangam Gupta, Aruz Awasthi
Create PostgreSQL Schema	Sangam Gupta, Aruz Awasthi
Create Database	Aruz Awasthi,Anish Sahu

## Appendix A - Group Log

Date	Timing	Duration	Agenda
29/01/2025	14:00 - 17:00	3 hours	<ul style="list-style-type: none"><li>• Distribution of tasks for design document.</li><li>• Divided into 5 teams.</li><li>• Distributed roles of backend, frontend and databasing for future.</li></ul>
31/01/2025	17:00 - 21:00	4 hours	<ul style="list-style-type: none"><li>• Explained approach of respective work to each other.</li><li>• Discussed doubts among team members.</li></ul>
02/02/2025	22:00 - 23:59	2 hours	<ul style="list-style-type: none"><li>• Reviewed the work done by the four teams and suggested improvements.</li><li>• Clarified any irregularities in different tasks.</li></ul>
03/02/2025	18:00 - 20:00	2 hrs	<ul style="list-style-type: none"><li>• Discussed our doubts with each other.</li></ul>
05/02/2025	21:00 - 22:00	1 hrs	<ul style="list-style-type: none"><li>• Discussed project plan among team members.</li></ul>
06/02/2025	14:30 - 16:30	2 hrs	<ul style="list-style-type: none"><li>• Finalised the document.</li></ul>