Fundamentals of Software Engineering

Crypto Trading Analytics & Risk Management App (CryptoAnalyticsPro)

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Deliverable # 2

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CryptoAnalyticsPro
A Crypto Trading Analytics & Risk Management App

Link to our Github Repository:

https://github.com/muhammadalisaleem/CryptoAnalyticsPro

Introduction

CryptoAnalyticsPro is a Windows-based desktop application designed for cryptocurrency traders to track their trade history, assess risk, and analyze profits and losses with real-time market data. Built using C# WinForms and MS Access for data storage, the application provides traders with a user-friendly interface for portfolio management, trade insights, and analyse market trend..

With the volatile nature of the cryptocurrency market, traders need robust tools to make informed decisions. CryptoAnalyticsPro offers essential features such as profit/loss tracking, stop-loss and take-profit calculations, risk assessment dashboards, and multi-currency portfolio valuation. The application aims to help traders minimize risks and maximize returns by offering actionable insights and historical trade analysis.

This project is ideal for traders who want a lightweight, standalone, and offline-capable trading analytics tool without relying on cloud-based solutions. The use of MS Access as a database allows seamless data management without complex setup requirements, making it accessible to beginner and advanced traders alike.

Note: During this iteration, we focused on redesigning parts of our app to improve the visual experience. We revised the layout, brainstormed new ideas, and made strategic changes by removing certain features and introducing new ones.

User Stories and Sub-User Stories

1. **Functional Portfolio Dashboard**

   ○ **User Story:** *As a trader, I want to analyze my portfolio to make informed decisions.*
   ○ **Sub-Stories:**
      ■ Display visual indicators of risk metrics (e.g., volatility, profit-loss asset concentration).
      ■ Show historical performance trends of the portfolio.
      ■ Categorize assets.

2. **Stop-Loss & Take-Profit Calculator**

   ○ **User Story:** *As a trader, I want to set stop-loss and take-profit levels to automate my trade exits.*
   ○ **Sub-Stories:**
      ■ Allow users to enter current price, stop-loss %, and take-profit %.
      ■ Calculate and display stop-loss and take-profit target values.
      ■ Display potential loss and potential profit based upon these percentages.
      ■ Allow saving of calculated thresholds for later use.

3. **Price Alerts**

   ○ **User Story:** *As a trader, I want to receive price alerts when a cryptocurrency reaches a specific value.*

   ○ **Sub-Stories:**
      ■ Let users select a cryptocurrency and set a price threshold.
      ■ Store alerts in the database for active monitoring.
      ■ Notify the user when the set price is hit.
      ■ Allow editing or deleting of alerts.

Structured Specifications

1. **Dashboard – Analyze Portfolio**

   ○ **Precondition:** User has a populated portfolio.

   ○ **Input:** None (auto-fetch data from portfolio and trade history).

   ○ **Processing:** Analyze asset performance and volatility.

   ○ **Output:** Dashboard showing total assets value, visual charts, and profit/loss amount.

2. **Stop-Loss & Take-Profit – Calculate Thresholds**

   ○ **Precondition:** User is logged in and provides asset data.

   ○ **Input:**
     - Coin Name
     - Desired stop-loss %
     - Desired take-profit %

   ○ **Processing:**
     - Calculate stop-loss and take-profit price points.
     - Calculate potential loss and profit.
     - Calculate risk/reward ratio.
     - Validate input ranges and suggest values if needed.

   ○ **Output:**
     - Display calculated price thresholds.
     - Option to save or link with portfolio items.
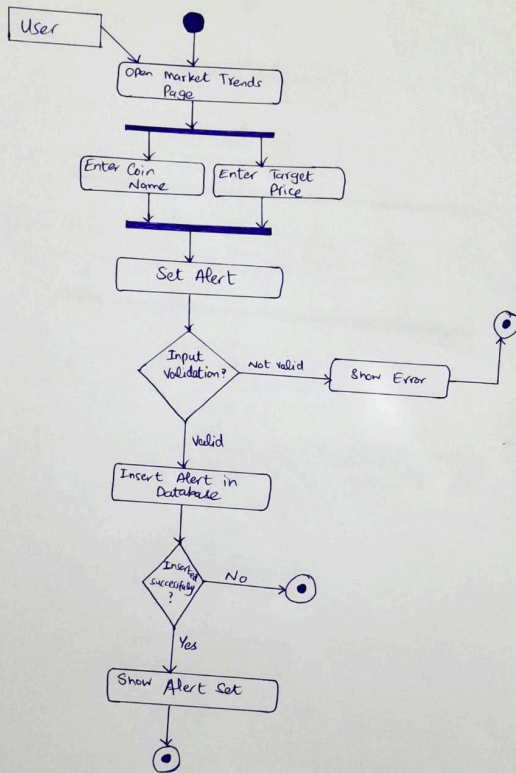
3. **Price Alerts – Configure and Notify**

    ○ **Precondition:** API price feed is active..

    ○ **Input:**
        ● Selected cryptocurrency.
        ● Desired alert price

    ○ **Processing:**
        ■ Monitor live price via API.
        ■ Compare current price with alert thresholds.

    ○ **Output:**
        ■ Notify the user when the alert condition is met.
        ■ Show alert status in the alert center.

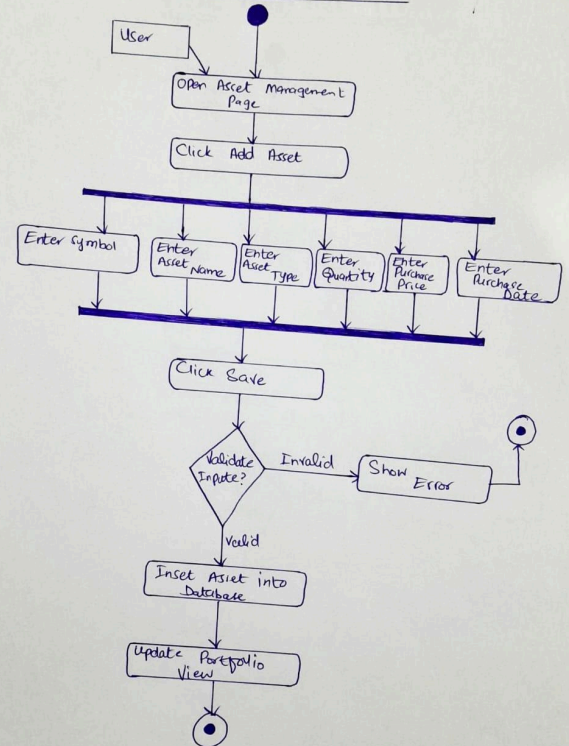## DesignDiagrams:

- ### Activity Diagram
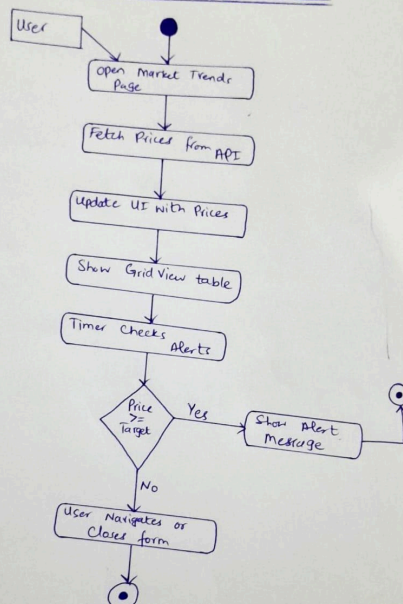

Activity Diagram #1
Set Price Alert

- ### UseCase Diagram:

User

- Open Market Trends Page
- Enter Coin Name
- Enter Target Price
- Set Alert
- Input Validation? — Not valid → Show Error
- Valid
- Insert Alert in Database
- Inserted successfully? — No
- Yes
- Show Alert Set

Activity Diagram #2
Manage Assets

User

- Open Asset Management Page
- Click Add Asset
- Enter Symbol
- Enter Asset Name
- Enter Asset Type
- Enter Quantity
- Enter Purchase Price
- Enter Purchase Date
- Click Save
- Validate Inpute? — Invalid → Show Error
- Valid
- Inset Asset into Database
- Update Portfolio View

Activity Diagram #3
View Market Trends

User

- Open Market Trends Page
- Fetch Prices from API
- Update UI With Prices
- Show Grid View table
- Timer Checks Alerts
- Price >= Target — Yes → Show Alert Message
- No
- User Navigates or Closes form

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- **Class Diagram:**

Class Diagram
CryptoAnalytics Pro

Log in
- username
- Password

+Login account ( )
+ Close App ( )
+ show Password ( )

sign up
- name

+ Register_Account( )
+ Show_Password

Dashboard
+ Show Purchase value ( )
+ show Profit Loss ( )
+ load holdings chart ( )
+ load Profit loss Chart ( )
+ get current Prices ( )

Asset Management
+ Load Asset Data ( )
+ Load Live market Prices ( )

Add Asset
- Symbol
- Asset name
- Asset Type
- amount
- Price Purchase
- data

+ Add Asset ( )

Trade History
+ Load Asset data ( )

Market Trends
- entry Price
- Loss
- Take Profit
- Investment
- Coin Name

+ request tp/SL ( )
+ set Alert ( )

- **UseCase Diagram**

Use-Case Diagram
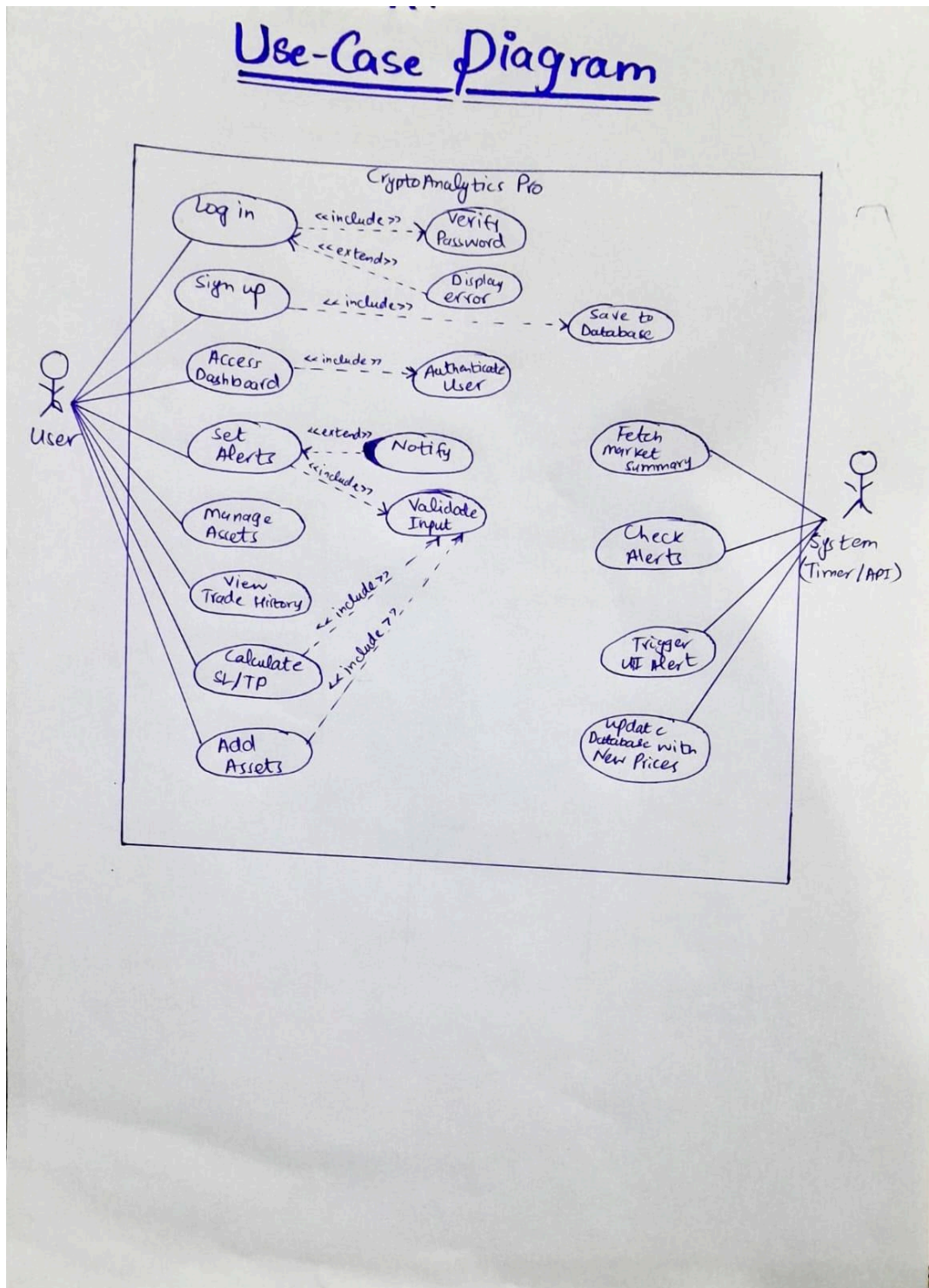
- **Sequence Diagram**

Sequence Diagram #1 — Get Alert Sequence

Actors/objects: User, Market Trends Form, Database

- Enter Coin
- Enter Target Price
- Set Condition
- Click "Set Alert"
- INSERT INTO Alerts

Alternative
- if INSERTED successfully
  - Alert_set
  - Success
- else
  - Alert_Not_set
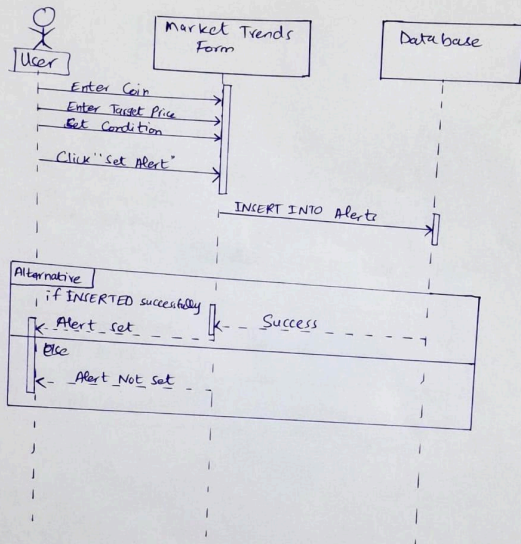
Sequence Diagram #2 — Add Asset

Actors/objects: User, Asset Management Form, Database

- Enter Symbol
- Enter Asset Name
- Enter Asset Type
- Enter Quantity
- Enter Purchase Price
- Enter Purchase Date
- Click Add Asset
- INSERT INTO Assets

Alternative
- if successfully inserted
  - Asset_Added
  - Success
- else
  - Asset_Not added
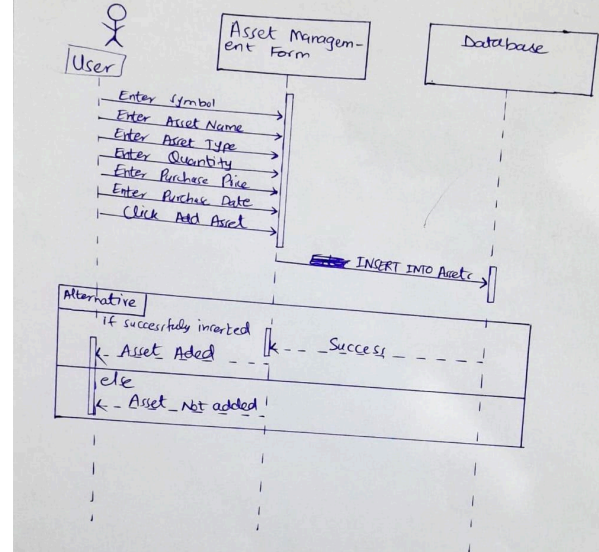
Sequence Diagram #3 — Alert Check

Actors/objects: UI, Timer, Market Trends Form, Database

- Tick Event
- Query latest Prices
- Query Alerts

Alternative
- if Records match
  - Show Alert in Panel
  - Return_Matching Records
- else
  - Cannot Show_Alert
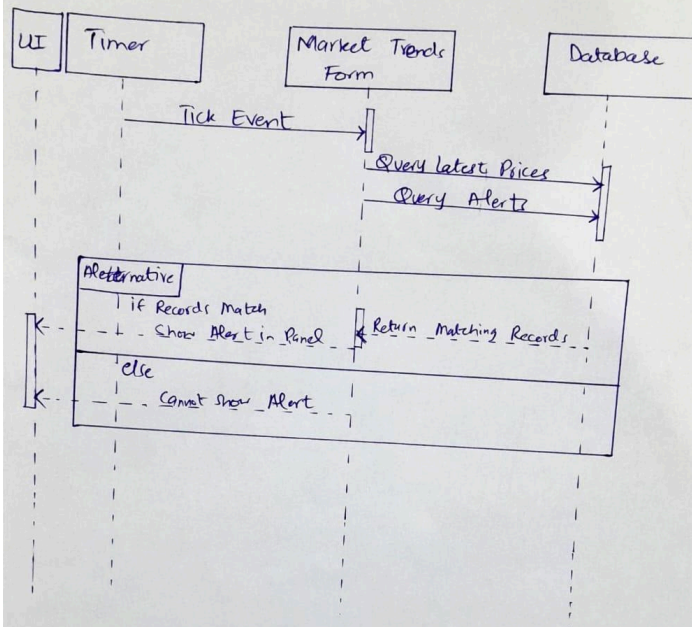
Scrum Board

Link to our Scrum Board: https://trello.com/b/yZkAkWpz/cryptoanalyticspro-ii

At Start:
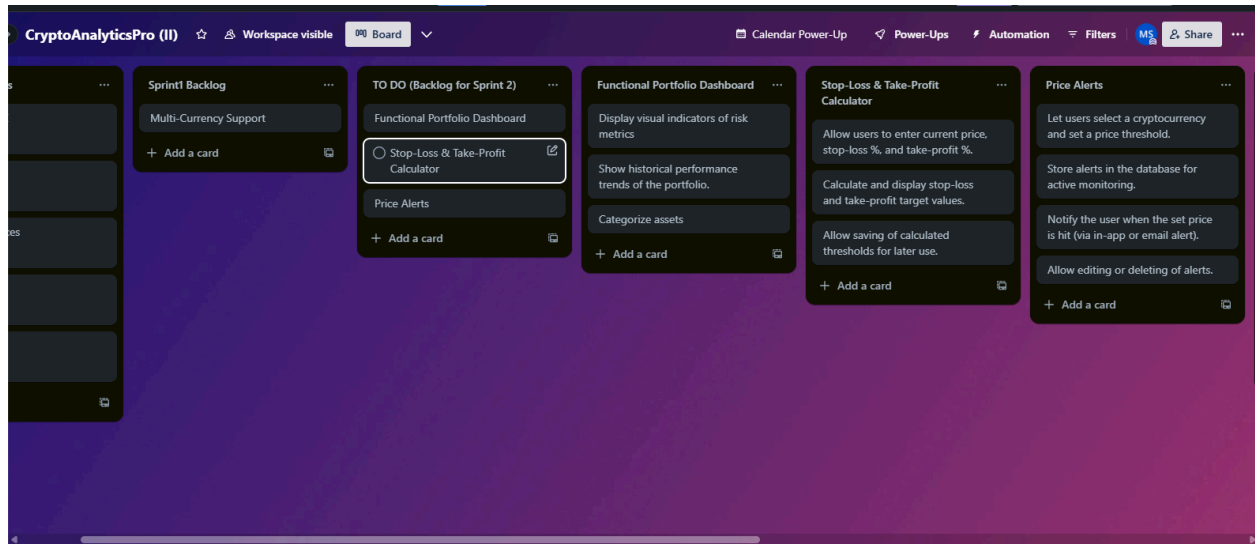
At Mid:
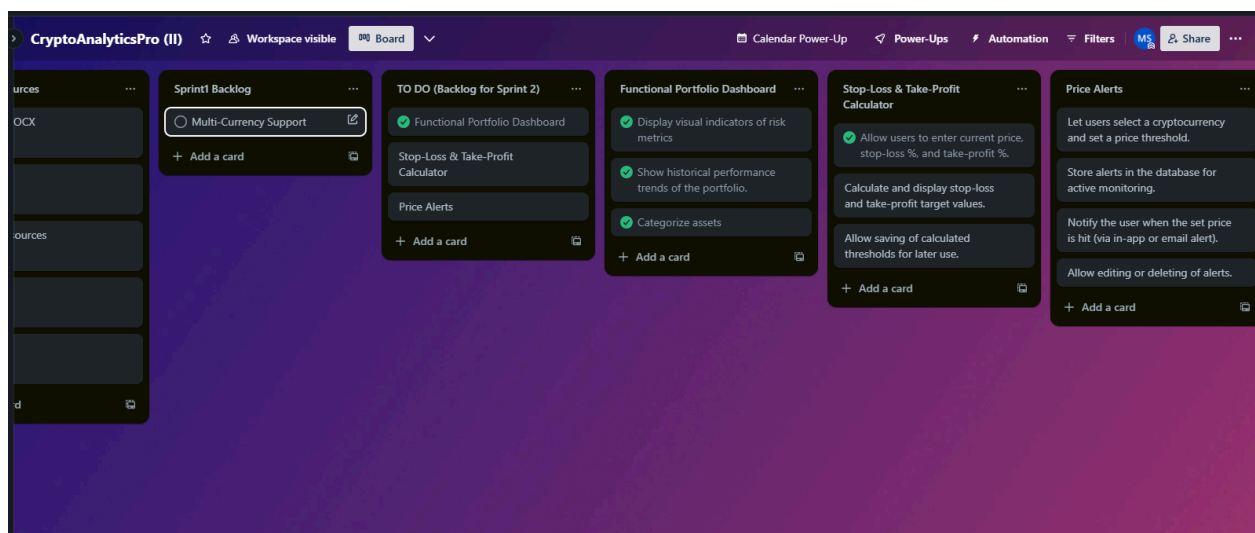
At End:
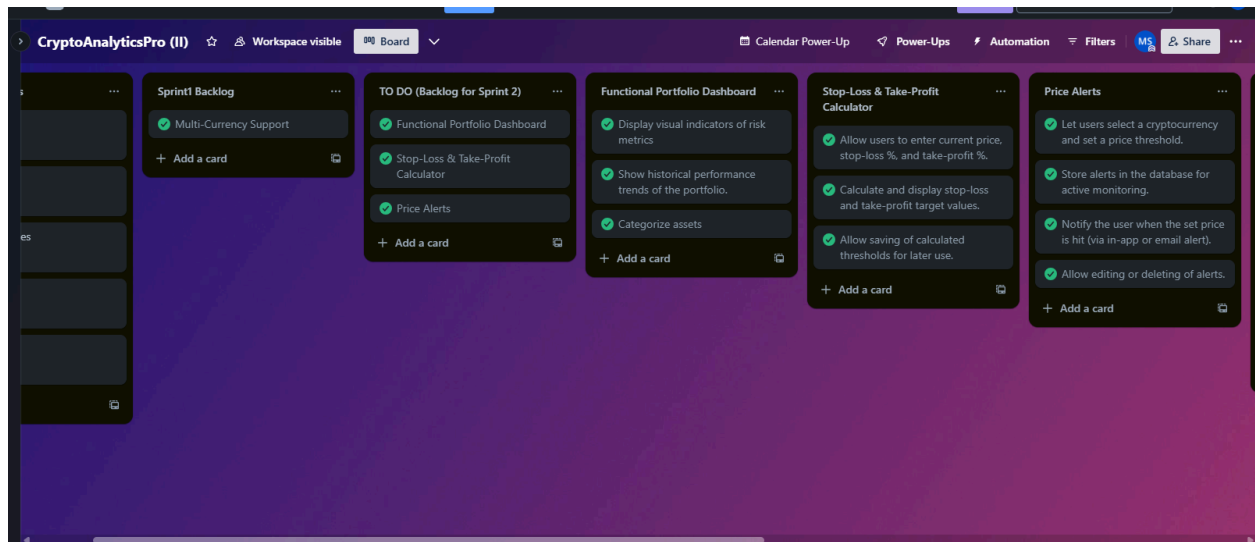
Work Division:

Ali Saleem – Dashboard & Risk Analysis Lead

Responsibilities:

- Design and implement the **Risk Analysis Dashboard UI** (charts, graphs, indicators).
- Develop logic to calculate risk levels (e.g., volatility, diversification, historical trends).
- Integrate dashboard with existing portfolio data.
- Conduct basic data validation and test with mock data.

Hamza Mumtaz – Stop-Loss & Take-Profit Module

Responsibilities:

- Create the **Stop-Loss/Take-Profit calculator UI**.
- Implement logic for percentage-based threshold calculations.
- Add ability to save thresholds and optionally suggest based on past trades.
- Coordinate with others for portfolio context data, if needed.

Ammar Hassan – Price Alerts System

Responsibilities:

- Design the **Price Alert configuration interface**.
- Implement logic to monitor real-time prices via API.
- Develop the alert notification system (e.g., modal popup or email).
- Add options to edit/delete active alerts.

<u>Implementation:</u>

Get Started

with

Crypto Analytics Pro

Enter Name

Ahmed

Enter Username

ahmed9

Enter Password

•••••

Confirm Password

•••••

Show Password

Register

Back to Login

Dashboard

Total Portfolio Value	Profit / Loss	Total Assets Purchase
$4,732.00	**-$12.00**	**10**

Portfolio Performance

Profit & Loss Per Asset

Profit/Loss

300
250
200
150
100
50
0
-50
-100

Profit / Loss (USD)

btc
Assets

Asset Allocation

Portfolio Holdings

- ADA
- btc
- DOGE
- ENA
- eth
- LTC
- pepe
- sol
- trx
- usdt

Dashboard
Asset Management
Trade History
Market Trends

Signout

Asset Management

Refresh

Portfolio Holdings

Update Current

+ Add Assets   **- Remove Assets**

Assets

Symbol	NameOfAsset	Type	Quantity
btc	Bitcoin	Cryptocurrency	0.02409638
eth	ethereum	Cryptocurrency	1.63827
usdt	Tether	Cryptocurrency	0.48
ENA	Ethena	Cryptocurrency	0.56
sol	Solana	Cryptocurrency	2.1666667
trx	Tron	Cryptocurrency	1.2

Live Market Prices

CoinName	Pri
Bitcoin	845
Ethereum	158
Tether	0.9
Pepe	0.0
Ethena	0.2
Solana	133
Tron	0.2
Dogecoin	0.1
Cardano	0.6
Litecoin	75.

Dashboard
Asset Management
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Signout

Add Assets

Symbol

btc

Asset Name

Bitcoin

Asset Type

crypto

Invested Amount (in usd)

25

Purchase Price

15

Purchase Date

2025-12-12

Refresh

Update Current

Live Market Prices

CoinName	Pri
Bitcoin	845
Ethereum	158
Tether	0.9
Pepe	0.0
Ethena	0.2
Solana	133
Tron	0.2
Dogecoin	0.1
Cardano	0.6
Litecoin	75.

Cancel   + Add Asset

Dashboard

Asset Management

Trade History

Market Trends

Signout

Trade History

	Symbol	NameOfAsset	Type	Quantity	PurchaseP
▶	eth	ethereum	Cryptocurrency	1.63827	1526
	usdt	Tether	Cryptocurrency	0.48	25
	ENA	Ethena	Cryptocurrency	0.56	25
	sol	Solana	Cryptocurrency	2.1666667	12
	trx	Tron	Cryptocurrency	1.2	15
	DOGE	Dogecoin	Cryptocurrency	5.6666665	12
	ADA	Cardano	Cryptocurrency	0.30769232	78
	LTC	Litecoin	Cryptocurrency	1.2888889	45
	pepe	Pepe	Cryptocurrency	0.48	25

Crypto Analytics Pro

Dashboard

Asset Management

Trade History

Market Trends

Signout