IT643
Software Design and Testing

Faculty Name : Ankush Sir

Project Name: CryptoCortex
Group Name : Pixel Pioneers

Team Members

202412026 : Tisha Jain
202412029 : Preksha Joshi
202412032 : Kaival Shah
202412066 : Dhruv Patel

Project Description :

CryptoCortex aims to streamline and simplify the complexities of cryptocurrency trading for both beginner and intermediate users. The target audience includes retail investors, hobbyist traders, and tech-savvy users interested in managing diverse crypto assets efficiently. The major pain points in current platforms include lack of intuitive user experience, fragmented transaction history, complex trading processes, and limited support for managing credits, portfolios, and real-time alerts.

Our solution provides an all-in-one web platform where users can buy, sell, and transfer crypto assets, manage portfolios, view transaction history, track credit usage, and receive real-time notifications. Features like trading cart functionality, unified trade execution, and clear credit/transaction logs address user frustrations with cluttered UIs and fragmented tools.

The final output is a full-stack platform powered by FastAPI (backend) and React (frontend), supported by MongoDB. It offers responsive dashboards, seamless trade workflows, and secure authentication. This makes it suitable for educational use, rapid prototyping, or scaling to support live trading environments.

Scope :

The scope of this project encompasses the complete design, development, and deployment of a cloud-ready crypto trading simulation platform. The system supports real-time price streaming, order execution, portfolio management, credit tracking, chatbot-driven user commands, and background processing of trades.

Key Functionalities :

- **Cart Management :** Add/Remove items,calculate totals, checkout.
- **Order Execution** : Place buy/sell orders, validate and cancel.
- **Transactions** : Execute and rollback transactions, record details
- **Credits System** : Deposit, withdraw, check balance, maintain history.
- **Portfolio Tracking** : Calculate value, add/remove items, update quantities.
- **Market Integration** : Reference symbols,update and fetch market values.
- **User Operation**s : Manage profile,portfolio, credits,cart, and transactions.

Tech Stack :

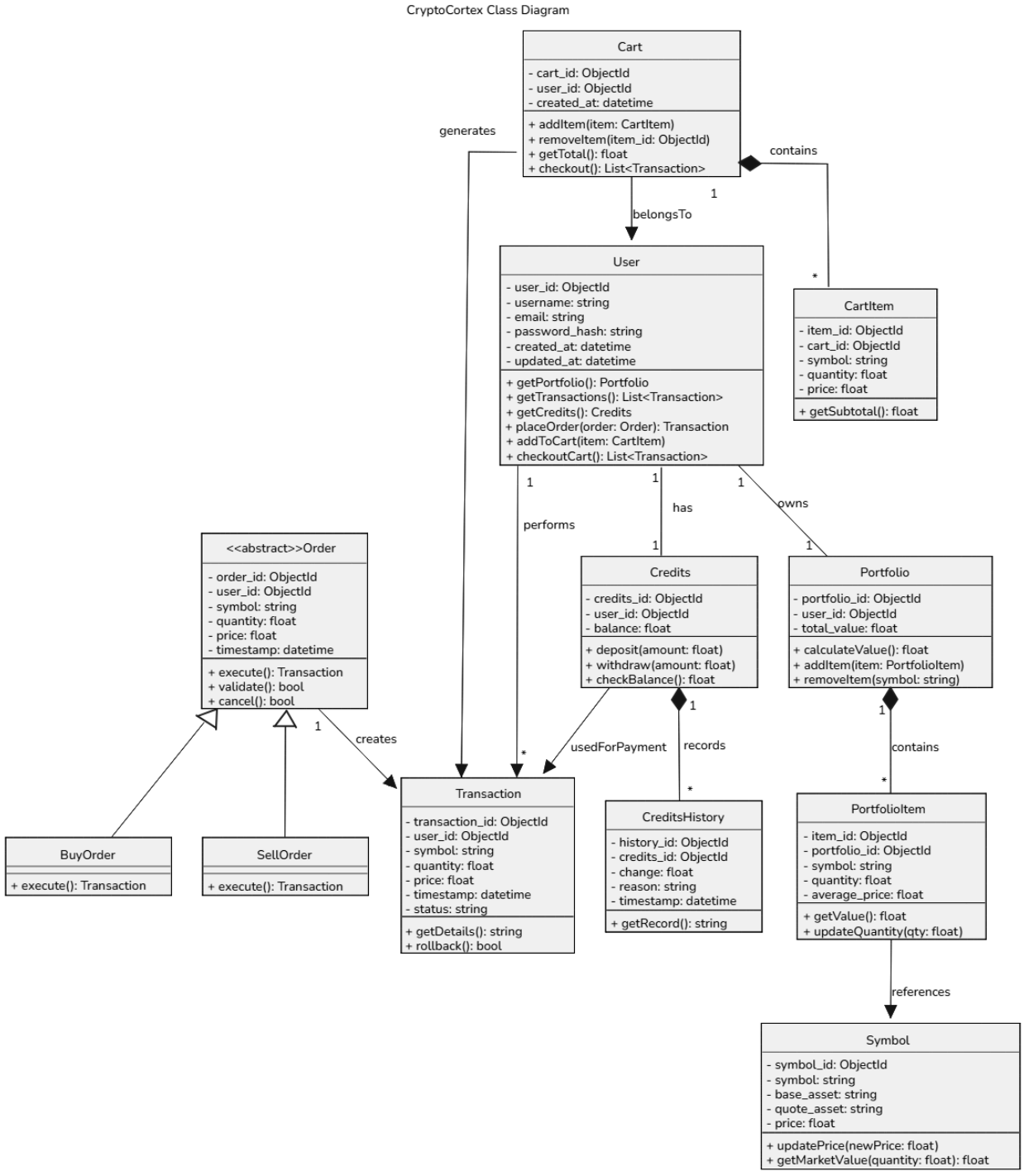
Backend

- FastAPI : Primary backend framework for APIs and WebSockets
- Celery : Background worker for asynchronous trade execution
- Redis: Message broker for Celery
- MongoDB with Beanie ODM Database for persistent storage
- Python : Core programming language

Frontend

- React : UI layer
- Axios : API communication
- WebSockets : Live price streaming

Class Diagram :



Source Files & Documentation

Deployment link :
https://crypto-cortex-xi.vercel.app/

Github link :
https://github.com/itspreksha/CryptoCortex/tree/main

Readme.md :
https://github.com/itspreksha/CryptoCortex/blob/main/README.md

design.md :
https://github.com/itspreksha/CryptoCortex/blob/main/design_md.md

Project_Testing_Documentation:
https://github.com/itspreksha/CryptoCortex/tree/main/Backend/tests

Project Documentation :
https://github.com/itspreksha/CryptoCortex/tree/main/Docs

Conclusion :

The completed system demonstrates a robust and scalable crypto trading simulation platform built using industry-standard backend, frontend, and cloud technologies. Throughout development, several architectural improvements were introduced such as migrating from Dramatiq to Celery, implementing atomic portfolio updates, and separating trade execution into asynchronous worker to ensure system reliability and correctness under real-world conditions.

The platform now supports seamless order placement, background trade processing, accurate financial computations, and real-time market data delivery. Comprehensive testing including unit, integration, end-to-end, and load testing validated the stability of each component and the system as a whole.