Design Document 431W

Project: Crypto Currency Trading System

Team:

Section -I (9:00 am to 10:00 am)

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Purpose:

This project aims to build a platform where customers can buy and sell cryptocurrency, track their portfolio and their past transactions. The admin plays a critical role in this system, as he or she can track all transactions and deactivate users to prevent fraud.

Target Audience:

In today's world it is necessary to diversify income streams and cryptocurrencies provide the perfect opportunity to grow an individual's financial portfolio. This platform provides a seamless way to buy and sell crypto, which is specifically attractive to millennials.
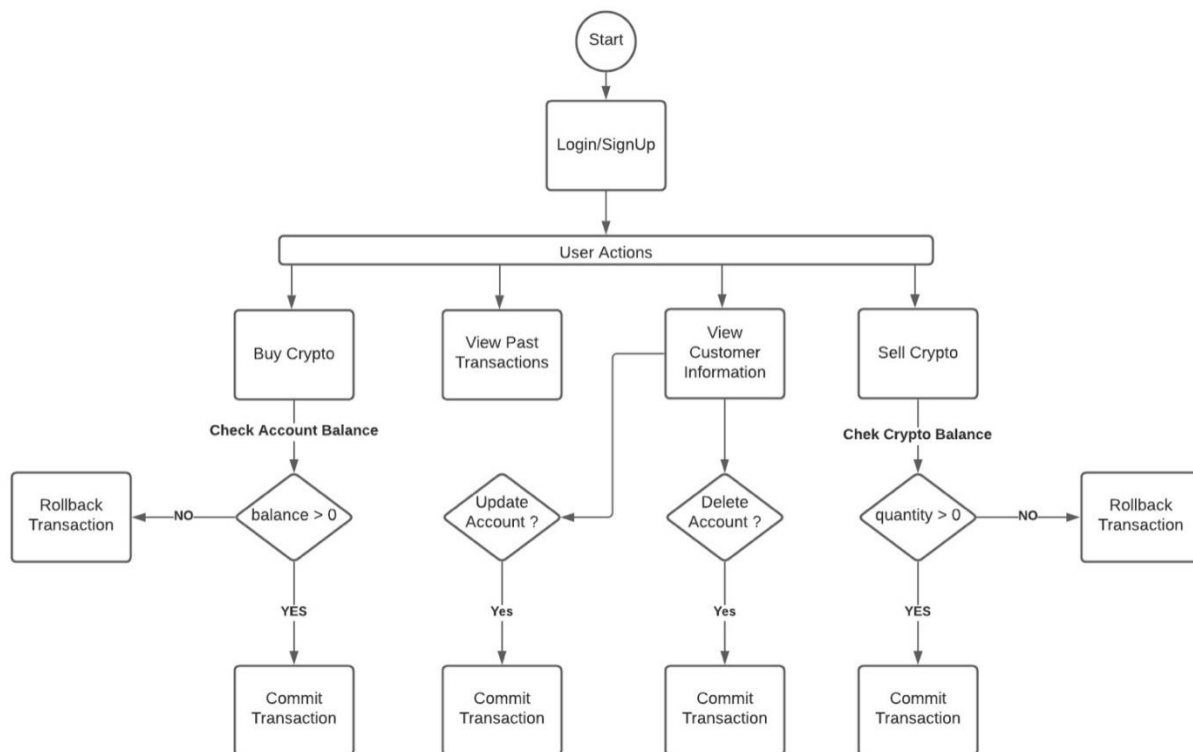
Workflow:

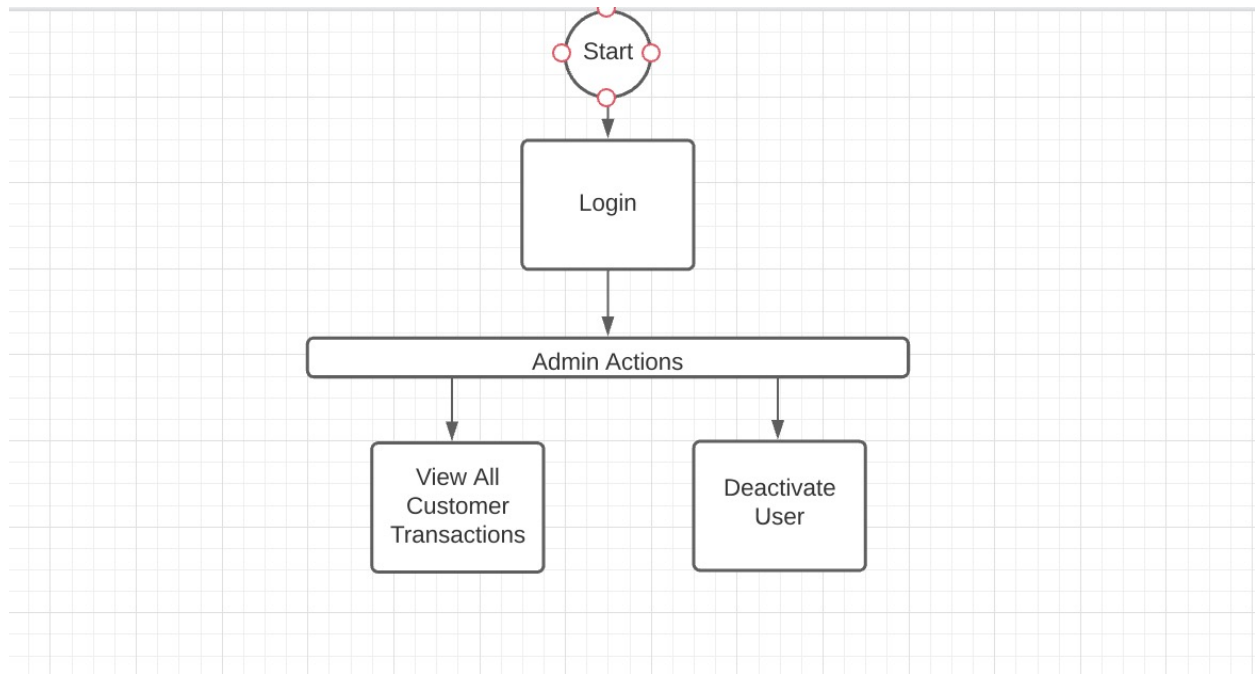The application primarily has two users

    a. Customer
    b. Admin

Customer Workflow:

- Customer initially must Sign Up using the Sign-up Screen to get access to the application.
- After logging in, customer will be able to see the prices of various cryptocurrencies in the "Market" section of the Buy Screen. The user can buy cryptocurrencies from this page using the "Buy Crypto Currency" section.
- In the Sell screen, customer can view his portfolio and can sell cryptocurrencies using the "Sell Crypto Currency" section.
- In the Transactions Page, customer can view his past transactions.
- In the "My Profile" screen, customer can update the currency of his choice to view his financial details.

<u>Admin Workflow:</u>

- Admin has access to two screens "Transactions" and "Customers".
- In the Transactions screen Admin can view all the transaction information from all the users.
- In the Customers Screen, Admin can view all the customer information and Deactivate/Activate any user if malicious transactions are detected.

```
                    Start

                    Login

                Admin Actions

   View All                    Deactivate
   Customer                       User
   Transactions
```

Interface Mockups:

Login Screen:

Screen to input Login Information.

Signup Screen:

Screen to input User information into the system.

Buying Screen:

This Screen generates a report of the prices of Crypto Currencies.

The Buy option updates and inserts the buying information in the database.

Fiat Currency Balance = 3000$

Buy	Sell	Transactions	My Profile

Market

Cryptocurrency	Name	Type	Price	About
BTC	Bitcoin	Ecosystem	45000$	xyz
SOL	Solana	Defi	200$	abc
COTI	Coti	Defi	1$	abc

Buy Cryptocurrency

Select :

BTC	˅

Quantity :

Submit

Selling Screen:

This Screen generates a report of the customer's portfolio.

The Sell Operation Inserts, Updates and Deletes various tables based on the sell transactions.

Fiat Currency Balance = 3000$

Buy	Sell	Transactions	My Profile

Portfolio Value = 230840$

Cryptocurrency	Amount	Avg Buy Price	Current Price	Total
BTC	5	45000$	46000$	230000$
SOL	7	110$	120$	840$

Sell Cryptocurrency

Select :

BTC	˅

Quantity :

Submit

Customer Transaction History:

This Screen generates a report of the past transactions of the user.

Fiat Currency Balance = 3000$

| Buy | Sell | Transactions | My Profile |

Past Transactions

Transaction ID	Transaction Type	Cryptocurrency	Name	Type	Amount	Price	Total	Time
1	Buy	BTC	Bitcoin	Ecosystem	5	45000$	225000$	21:10 4/4/2010
2	Buy	SOL	Solana	Defi	10	110$	1100$	04:09 4/3/2010
3	Sell	SOL	Solana	Defi	3	110$	330$	21:12 4/4/2010

Currency Update Screen:

This screen updates the User information in the Database.

Fiat Currency Balance = 3000$

| Buy | Sell | Transactions | My Profile |

My Profile

User ID

    Msm6348

First Name

    Rahul

Middle Name

    Suresh

Last Name

    Gandhi

Change Currency

    USD

[Update]

[Delete Account]

Complete Transaction History for all the users (Admin functionality):

This screen generates a report joining 7 tables in the database.

Transactions	Customers

All Transactions

User ID	Account Type	Account Status	First Name	Middle Name	Last Name	Balance	Transaction ID	Transaction Type	Crypto Currency	Amount	Price	Time	Crypto Name	Crypto Type	Price Per Unit	Currency
batman	Broker	Active	Bruce	Batman	Wayne	1000	45000	Buy	BTC	100	1000$	04:09 4/3/2010	Bitcoin	Crypto Currency	10$	USD
superman	Broker	Active	Clark	Superman	Kent	456	23560	Sell	DGC	10	10000$	04:13 2/3/2020	DogeCoin	Crypto Currency	1000$	INR
InactiveUser	Seller	Inactive	IA	MiddleName	User	0	23561	Sell	DGC	1000	10000$	04:03 2/3/2020	DogeCoin	Crypto Currency	1000$	INR

Deactivate User (Admin functionality):

This Screen deactivates the User Information in the database.

Transactions	Customers

Deactivate Users

Select User :

batman	˅

Deactivate User

All Customers

User ID	First Name	Middle Name	Last Name	Balance	Account Type	Account Status
batman	Bruce	Batman	Wayne	1000	Broker	Active
superman	Clark	Superman	Kent	45	Broker	Active
InactiveUser	IA	Inactive	User	0	Seller	Inactive

Report Mockups:

Complete Transaction report for all the users (Admin functionality):

User ID	Account Type	Account Status	First Name	Middle Name	Last Name	Balance	Transaction ID	Transaction Type	Crypto Currency	Amount	Price	Time	Crypto Name	Crypto Type	Price Per Unit	Currency
batman	Broker	Active	Bruce	Batman	Wayne	1000	45000	Buy	BTC	100	1000$	04:09 4/3/2010	Bitcoin	Crypto Currency	10$	USD
superman	Broker	Active	Clark	Superman	Kent	456	23560	Sell	DGC	10	10000$	04:13 2/3/2020	DogeCoin	Crypto Currency	1000$	INR
InactiveUser	Seller	Inactive	IA	MiddleName	User	0	23561	Sell	DGC	1000	10000$	04:03 2/3/2020	DogeCoin	Crypto Currency	1000$	INR

5+ Table Join:

Complete Transaction history of all the users will be accessible to the admin by using this report functionality. This report is created by joining the below tables.

1. Account_Info
2. Customer_Info
3. Transaction_Table
4. Buy_Order
5. Sell_Order
6. CryptoCurrency_Info
7. Currency_Info

Portfolio Report:

Fiat Currency Balance = 3000$

Buy	Sell	Transactions	My Profile

Portfolio Value = 230840$

Cryptocurrency	Amount	Avg Buy Price	Current Price	Total
BTC	5	45000$	46000$	230000$
SOL	7	110$	120$	840$

Customer Transaction Report:

Fiat Currency Balance = 3000$

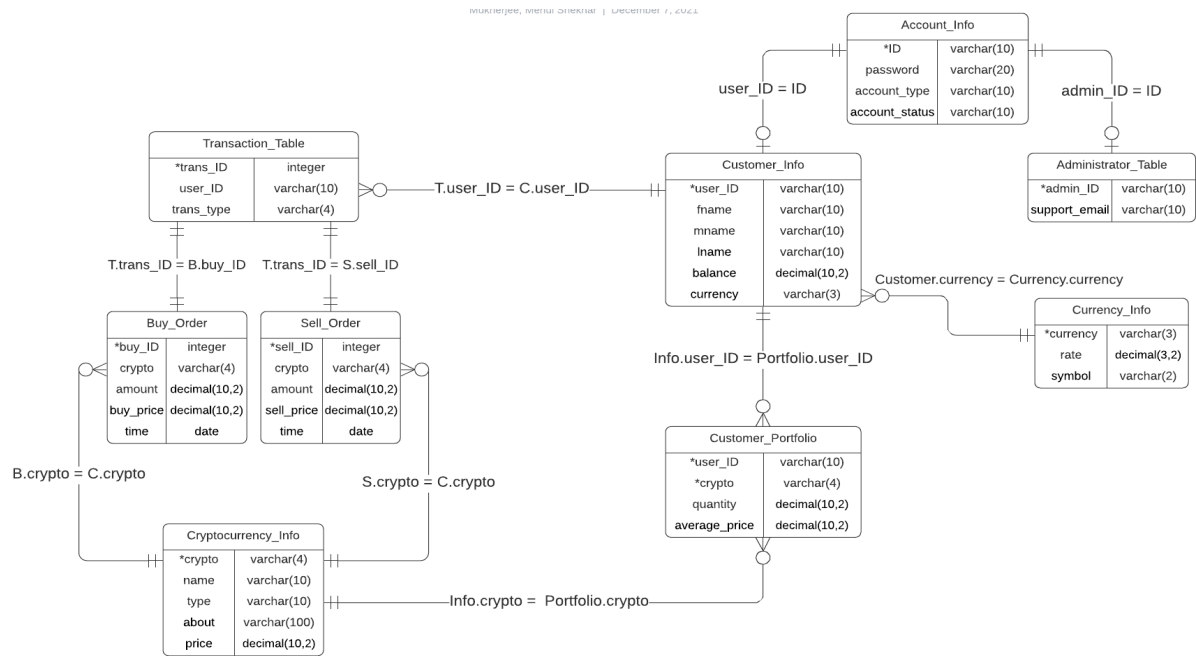| Buy	Sell	Transactions	My Profile

Past Transactions

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3	Sell	SOL	Solana	Defi	3	110$	330$	21:12 4/4/2010

Data Files:

For all tables except Cryptocurrency_Info and Currency_Info, data will be generated by the system, through the various sell, buy and sign-up operations. Data for Cryptocurrency_Info table will be obtained from the website https://www.coingecko.com/en. Data for Currency_Info table will be obtained from the website https://www.x-rates.co. This website contains dollar exchange rates for all the currencies.

Data Model:

Account_Info

*ID	varchar(10)
password	varchar(20)
account_type	varchar(10)
account_status	varchar(10)

user_ID = ID

admin_ID = ID

Administrator_Table

*admin_ID	varchar(10)
support_email	varchar(10)

Transaction_Table

*trans_ID	integer
user_ID	varchar(10)
trans_type	varchar(4)

T.user_ID = C.user_ID

Customer_Info

*user_ID	varchar(10)
fname	varchar(10)
mname	varchar(10)
lname	varchar(10)
balance	decimal(10,2)
currency	varchar(3)

Customer.currency = Currency.currency

Currency_Info

*currency	varchar(3)
rate	decimal(3,2)
symbol	varchar(2)

T.trans_ID = B.buy_ID   T.trans_ID = S.sell_ID

Info.user_ID = Portfolio.user_ID

Buy_Order

*buy_ID	integer
crypto	varchar(4)
amount	decimal(10,2)
buy_price	decimal(10,2)
time	date

Sell_Order

*sell_ID	integer
crypto	varchar(4)
amount	decimal(10,2)
sell_price	decimal(10,2)
time	date

Customer_Portfolio

*user_ID	varchar(10)
*crypto	varchar(4)
quantity	decimal(10,2)
average_price	decimal(10,2)

B.crypto = C.crypto

S.crypto = C.crypto

Cryptocurrency_Info

*crypto	varchar(4)
name	varchar(10)
type	varchar(10)
about	varchar(100)
price	decimal(10,2)

Info.crypto = Portfolio.crypto

Table Information:

Note: * signifies Primary Key

Customer_Info: This table stores Customer Information

Customer_Info	
*user_ID	varchar(10)
fname	varchar(10)
mname	varchar(10)
lname	varchar(10)
balance	decimal(10,2)
currency	varchar(3)

Account_Info: This table stores Customers' Account Information like password, Account Type and Account Status.

Account_Info	
*ID	varchar(10)
password	varchar(20)
account_type	varchar(10)
account_status	varchar(10)

Administrator_Table: This table stores the additional information about the Admin Users.

Administrator_Table	
*admin_ID	varchar(10)
support_email	varchar(10)

Currency_Info: This table stores the information about the general Currencies and their rates in USD with their symbols.

Currency_Info	
*currency	varchar(3)
rate	decimal(3,2)
symbol	varchar(2)

Customer_Portfolio: This table stores the information about Customer Portfolio i.e., the summary of the quantity of the Crypto Currencies in his possession and the price of those crypto currencies.

Customer_Portfolio	
*user_ID	varchar(10)
*crypto	varchar(4)
quantity	decimal(10,2)
average_price	decimal(10,2)

Transaction_Table: Master transaction table contains entries for both buy and sell transactions. Buy and sell transaction tables are divided into two tables even though they have similar fields to improve the performance. In the real world, number of buy and sell transactions will be in the millions.

Transaction_Table	
*trans_ID	integer
user_ID	varchar(10)
trans_type	varchar(4)

Buy_Order: Contains transaction details about buy order

Buy_Order	
*buy_ID	integer
crypto	varchar(4)
amount	decimal(10,2)
buy_price	decimal(10,2)
time	date

Sell_Order: Contains transaction details about sell order

Sell_Order	
*sell_ID	integer
crypto	varchar(4)
amount	decimal(10,2)
sell_price	decimal(10,2)
time	date

<u>Cryptocurrency_Info:</u> Contains Information about a cryptocurrency's price, type and brief description.

Cryptocurrency_Info	
*crypto	varchar(4)
name	varchar(10)
type	varchar(10)
about	varchar(100)
price	decimal(10,2)

Transaction:

Buy Operation:

1. A new record is inserted into the Transaction_Table .
2. A new record is inserted into the Buy_Order table with the Amount of Crypto Currency bought, type of Crypto Currency, buying price and the time of transaction.
3. If user buys a crypto which is not present in their portfolio, then a record is created in Customer_Portfolio table.
4. If user buys a crypto which is present in their portfolio, then Customer_Portfolio table is updated.
5. Balance is updated in the Customer_Info table.

If the fiat Balance in the Customer_Info table is less than zero, then the above-mentioned steps are rolled back.

Sell Operation:

1. A new record is inserted into the Transaction_Table .
2. A new record is inserted into the Sell_Order table with the Amount of Crypto Currency sold, type of Crypto Currency, selling price and the time of transaction.
3. If user sells a crypto partially then Customer_Portfolio table is updated.
4. If user sells a crypto completely then that crypto record is deleted from Customer_Portfolio table.
5. Balance is updated in the Customer_Info table.

If the crypto Balance in the Customer_ Portfolio table is less than zero, then the above-mentioned steps are rolled back.

Functionalities:

1. Buy new crypto – **Insert**
2. Buy more of the same crypto which is already part of the user's portfolio – **Update**
3. Sell partial amount of a particular Crypto – **Update**
4. Completely sell a particular crypto – **Delete**
5. Rollback buy order if fiat balance insufficient - **Rollback**
6. Rollback sell order if crypto balance insufficient - **Rollback**
7. Customer Sign Up – **Insert**
8. Update customer's choice of currency – **Update**
9. Customer can delete their account – **Delete**
10. Customer portfolio Report – **Report**
11. Customer transaction Report – **Report**
12. Admin can view complete transaction history of all customers - **Report**
13. Admin can deactivate a user's account - **Update**