The University of Texas, Dallas.
Erik Jonsson School of Engineering and Computer Sciences.
CS 6360: Database Design
Term Project: Fall 2021

Project #1
Bitcoin Transaction System

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ENTITY RELATIONSHIP DIAGRAM:

The ER diagram

Assumptions:

1. We assume that clients requests the trader regarding the buy/sell of the bitcoin is online. That is why we maintain a request table.
2. When trader wants to buys a bitcoin on behalf of a client, if there are no sufficient funds in the account then trader can see an error saying insufficient funds, we assume that trader will communicate with the client and get the funds.

RELATIONAL SCHEMA:

User (**user id: integer**, username: string, fname: string, lname: string, phone: integer, cell: integer, email: string, role: string, hpwd: string)

Client (**client id: integer**, membership: string, number of bitcoins: integer)

Address (client_id: integer, street: string, city: string, state: string, zip: integer)

Trader(**trader id: integer**)

Money_payment_transactions (**client id:integer, trader id: integer**, amount: integer, date_time: timestamp, final status: string)

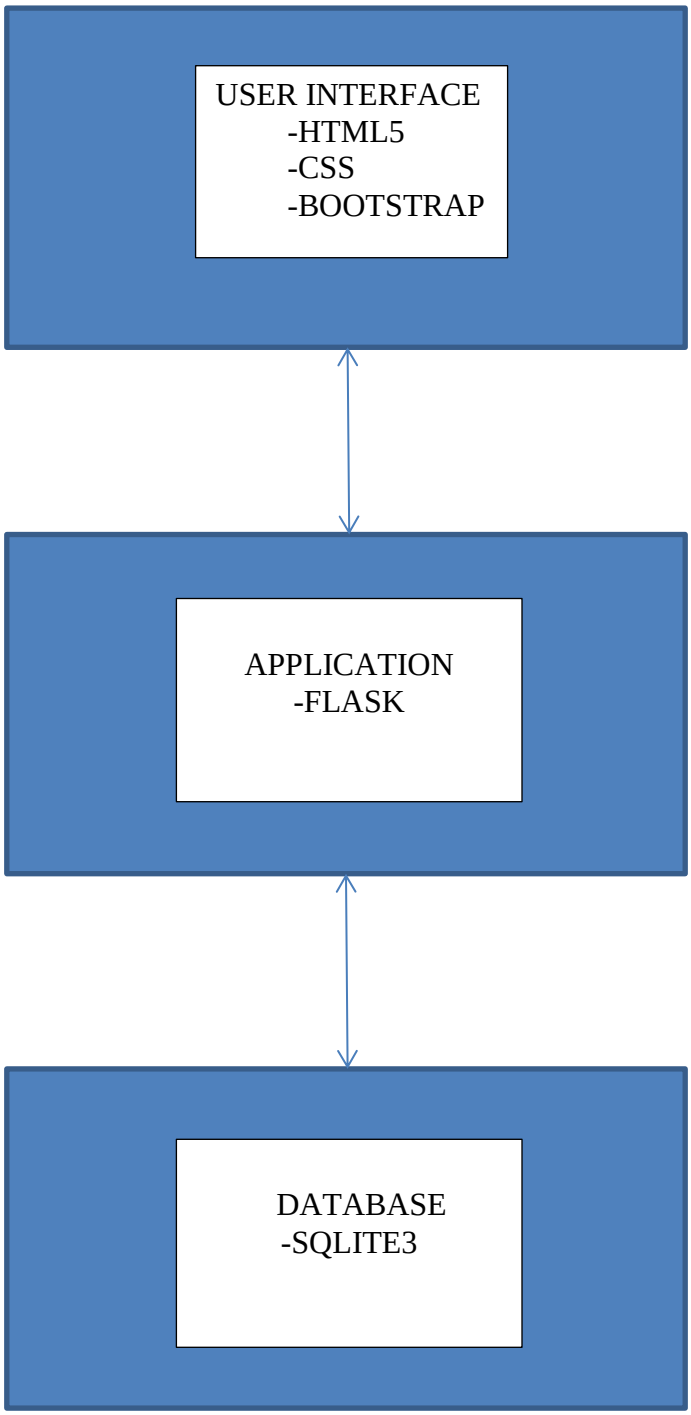
Bitcoin_transactions (**client id: integer, trader id: integer,** number of bitcoins: integer, price: integer, date_time: timestamp, commission type: string, commission amount: integer, final status: string)

Net_amount (**client id: integer, trader id: integer,** net amount: integer)

Requests (**client id: integer, trader id: integer,** amount: integer, number of bitcoins: integer, status: string)

SOFTWARE ARCHITECTURE

THREE TIER ARCHITETURE: It is a Software Application Architecture which logically organizes the application into User interface, Application tier and Database tier.



USER INTERFACE: User Interface is a space where user interacts with the software/machine. For the user interface, HTML5, CSS, BOOTSTRAP are used.

HTML5: Hypertext Markup Language is used for the proper formatting and ensures the structure of the web page created. It also includes the hyperlinks which are used for connecting the other webpages.

CSS: Cascading style sheets is used for the style, colors, fonts and layout of the web pages. CSS is used to style the HTML document.CSS has the power to control the multiple web pages all at once.

Bootstrap: Bootstrap is an open source frontend framework. It is also used for the creation of websites, webpages. Bootstrap is built on HTML5 CSS, JavaScript. It contains the list of number of tools which helps the user to develop webpages with less difficulty and makes the work easy.

APPLICATION TIER: It is used to process the interaction between the user and the database. In the project we used flask framework in the application tier.

FLASK: Flask is a light and small python framework. It has many useful tools and libraries which helps in web development in python. It is up to user to select which tools or libraries he/she wants to use.

Flask framework is used to connect the database to the user interface.

It also performs routing. It performs the query operations in database. It executes the select statements and takes the output from the database and displays it to the user interface. It is a micro framework which does not include ORM. The main advantage of flask framework is it helps in easy routing of URL.

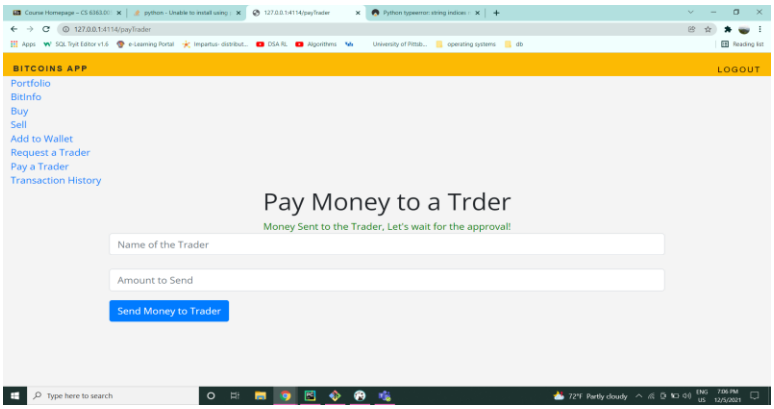
DATABASE: Database tier is the backend for the web application. It consist the database and controls to write and read access from the database. It stores the information independently.

MYSQLITE: It is a standard backend language which is used to manage relations and also to create relations. It is the most widely used database, which stores the data in the form of tables.

All the data which a user enters is sent to the database and checks for the tuples and whatever the result it is reflected on the user page.

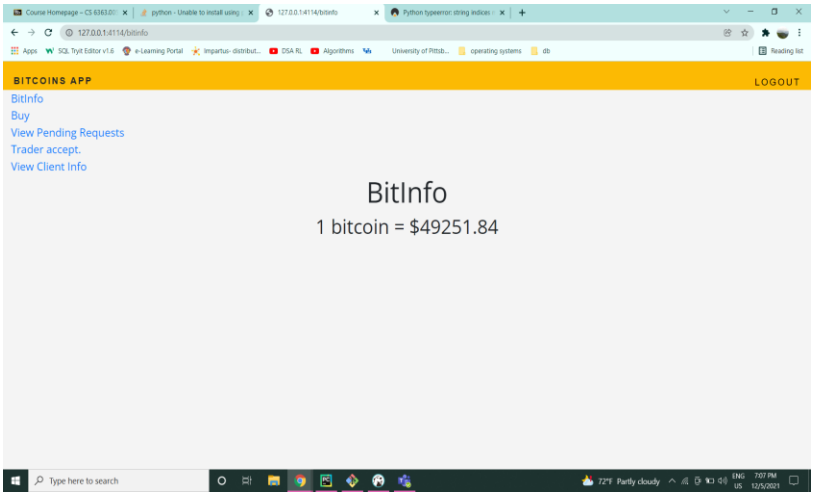
OVERVIEW OF CODE:

SIGNUP PAGE:
The signup page is for client, trader and manager. It has login/register option, If the person is not an existing user of the bitcoin app, then he has to sign up. If he already has an account then he can directly login.
For login: It needs username and password.
For Signup: The page asks for the following details they are First name, Last name, Street, City, ZIP, State, phone, mobile, Username he want to setup for his account, email, password for the account.
At this step user can choose whether to sign up as a client or trader and user should choose the desired option of his choice. If the username is already taken by any other existing customers it doesn't allow to next step. It shows an error message that username is already taken, please use another username. This is how we sign up.
Login as a client: When user logins as a client the page displays the following functionalities:
1. Portfolio: It shows the portfolio of the user, User can be able to see how many bitcoins he have and what is the cost of those bitcoins. It also displays the cash that the client has in the account of his bitcoin app. The total value of cash and the value of all the bitcoins he has is also displayed.
2. BitInfo: This shows the present value(in USD) of 1 bitcoin.
3. Buy: In this client can buy the bitcoins. Client has to enter the number of bitcoins he wants to buy and client has to select the type of commission he wants whether it is fiat or crypto. If the cost of number of bitcoins he wants to buy is greater than the funds in his account then he will not be able to move further. Also the commission that the user pays is based on his membership level. If the user has made transactions worth more than 100K$ in the previous month then his membership is upgraded to "gold" level and he thus pays lesser amount of commission.
4. Sell: Client can even sell the bitcoins he has in his account with the help of this functionality.
5. Add to wallet: This helps the client to add money to his bitcoin app wallet.
6. History: This shows all the recent transactions the client has made. It also has the date time column which helps the client to know at what time and date he made the transactions. It has all the records related to the client.
7. Request a Trader: In this client can request a trader to buy or sell the bitcoins on behalf of him. He can also enter the number of bitcoins he wants to buy or sell and choose the type of commission he wants to give. He can search for the trader by entering the name of the trader.
8. Pay a Trader: If the client wants to buy a bitcoin with the help of trader client pays money to the trader by entering name of the trader and the amount he want to send. A trader can accept/decline the payment made by client. This is logged in money_payment_transactions table
It has a logout option where they can logout once they are done with the use.



Login as a trader: When user logs in as a trader the page displays the following functionalities:

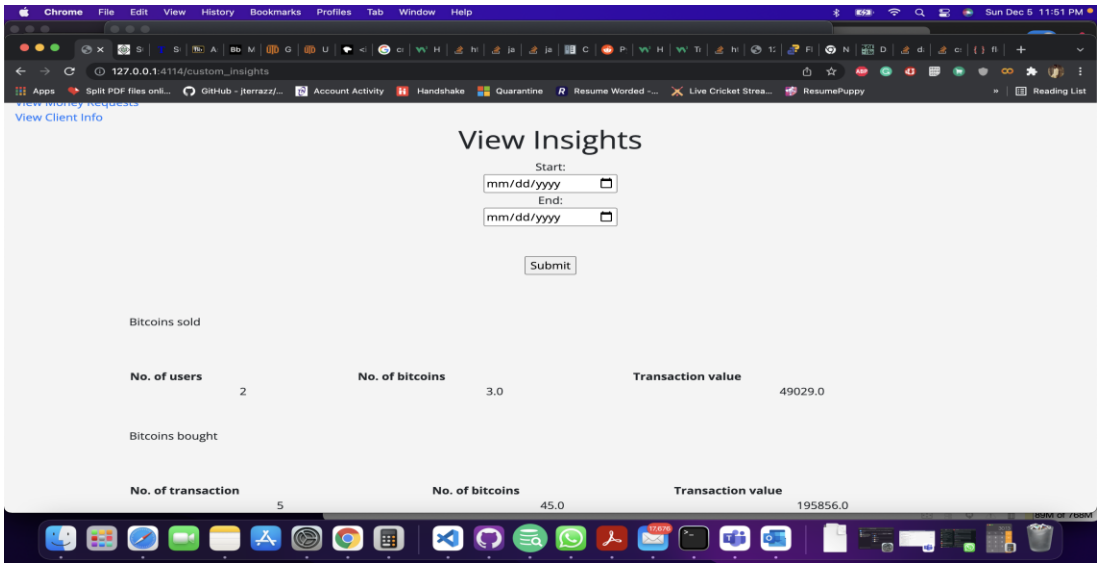
1. Bitinfo: This shows the present value of the 1 bitcoin.
2. View Bitcoin Requests: Trader gets many requests from different clients, this shows how many pending requests he got and he can also see the client username, from which client he got the request and also the number of bitcoins. Here trader has the option to accept or decline the request. If the trader buys the bitcoins then the number of bitcoins in the corresponding clients account increases, if he sells bitcoins, then number of bitcoins in the corresponding clients accounts decreases. All these actions are recorded in bitcoin_transactions_table.
3. View Money Requests: Here, the money requests sent by the clients to the trader will be visible. The trader can accept/decline the payment.
4. View client info: When the trader accepts any clients requests he could see the details of him in this module. Trader would be able to see clients name, clients address, street, clients state , clients zip. Trader can also view number of bitcoins he has got request for and the amount of money client sent, type of commission trader would get and the commission amount and at last the final status.



Login as Manager:

1. BitInfo: The manager can view the current bitcoin rate in USD.

Get Insights: The manager can get insight reports based on (i) Daily (ii) Weekly (iii) Monthly and (iv) Custom Transactions. The manager can select one of these options and can view the corresponding reports. Especially, upon clicking the custom option, the manager can select a start date and end date, and get the reports for transactions made within this range.



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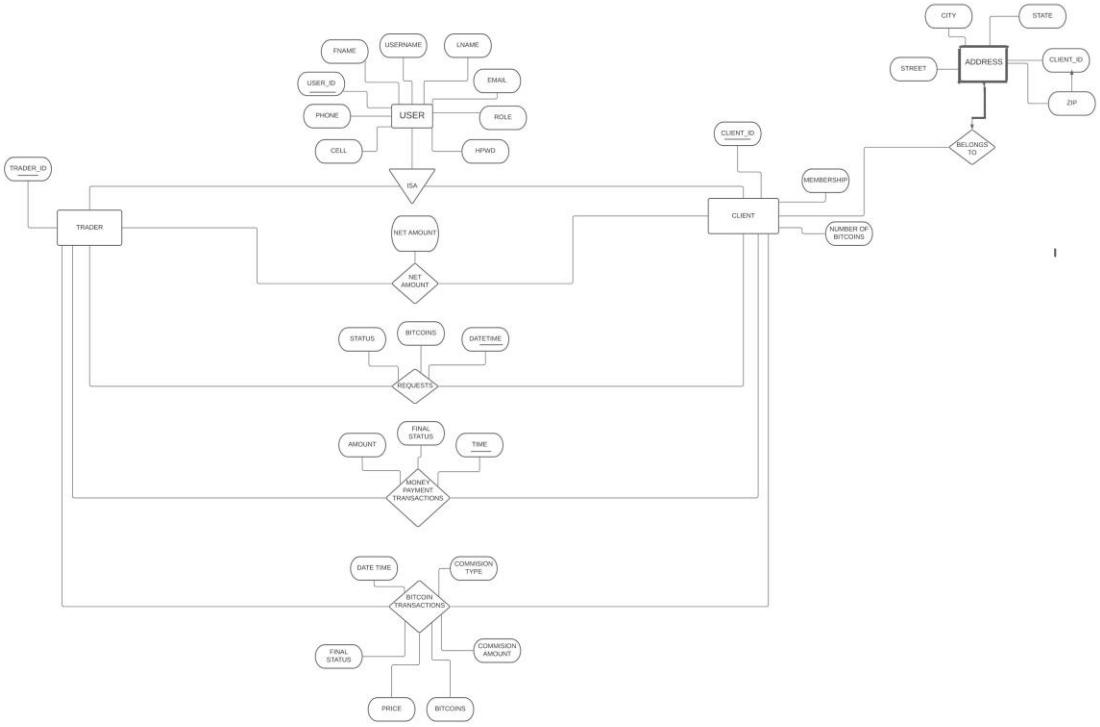
APPENDIX: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LNAME
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EMAIL
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