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Softdev
P01: ArRESTed Development
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Program Components

- Login system
- Leaderboard (closest to 0 at any given time)
- Buy & Sell stock (search for stock symbol)
    - Error message if can't find stock
    - *Popular stocks - optional*
- See info/news about stocks
- See other people's stocks
- Update information/leaderboard
- You win when the net worth is 0 (*when you create an account, everyone starts with the same amount of money)
- Each time you win, you add one to the score and the money resets so you can try again
- Update info every time the page that displays relevant information about a stock is refreshed.

Component Relationships

- __init__.py uses the HTML Templates, api.py, stock.py, and user.py
    - Renders the different routes using the HTML Jinja templates
    - Uses functions from user.py to interact with the user SQLite database and create basic register/login/logout functionality
    - Uses functions from stocks.py to interact with stock SQLite database
    - Uses functions from api.py to pull data from the REST api
    - Details:
        - login page:
            - Calls check_user() function in user.py
            - create account page:
        - Calls add_login () in user.py
            - home page:
            - update_ data() for popular stocks that will be displayed on the home page
            - calculate_balance () with new data
        - my stock page:
            - update_data() for all the stocks the user owns with get_stock() and display them
        - buy and sell page:
            - Search information for a stock with update_data()
            - Calls buy_sell() in stock.py, pass in stock name and shares
        - leaderboard page:
            - Calls leaderboard() in user.py
            - view other people's profile page
            - Calls get_stock() for the other user and update_data() for their stocks

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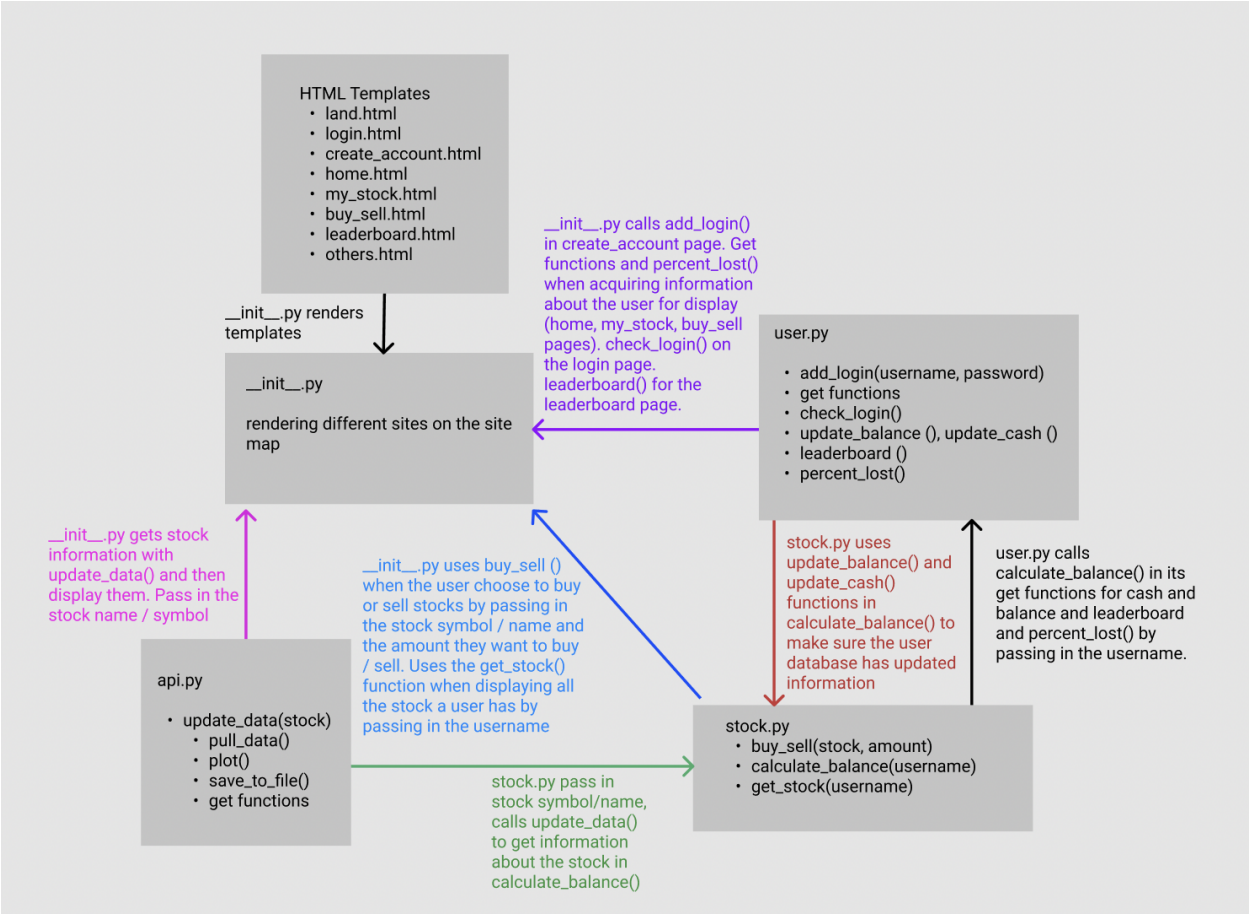
- user.py does database operations on the user table in database
    - set up the user database
    - add_login(), add login entries (creating account, initialize money and stock ID)
    - functions to get all the information in the user database
    - check_login() checks if username and password matches
    - update_balance () changes the net worth of the user's stocks + cash, update_cash () changes the amount of cash the user has to a certain number.
    - leaderboard () function to return sorted leaderboard, will be used in __init__.py leaderboard page.
    - percent_lost() calculate the percentage lost, will be used in __init__.py to display percent lost.
- stock.py uses api.py and user.py to update a certain user's stocks
    - set up stock database
    - buy_sell() function to modify stock database (buy & sell certain shares, buy + amount, sell - amount, as parameters)
        - if sells all shares remove stock from database,
        - if stock didn't exist, add to database
        - will be used in __init__.py when the user chose to buy and sell a certain amount.
        - calls calculate_balance() and update_balance() and update_cash() in user.py. Also calls update_data() in api.py to do automatic updates after a buy / sell action.
    - calculate_balance() calculates the balance (net worth), will be used in user.py to input that information into the user database. uses update_data() to calculate balance with new prices
    - get_stock() gets all the information about the stocks a user owns, pass in the username of the user, and will be used in __init__.py for displaying the stocks a user owns and updating data.

- api.py gets information from apis.
    - update_data() function that pulls new data from apis and modify them to fit our purposes.
        - potential helper functions:
            - pull_data() function that gets data from apis and put them to appropriate data structures
            - plot() function if we are doing any kind of graphs ourselves
            - save_to_file() function that saves data to files and overwrites existing files
            - get functions for different data that the other .py would need (as a returned value instead of reading from file).

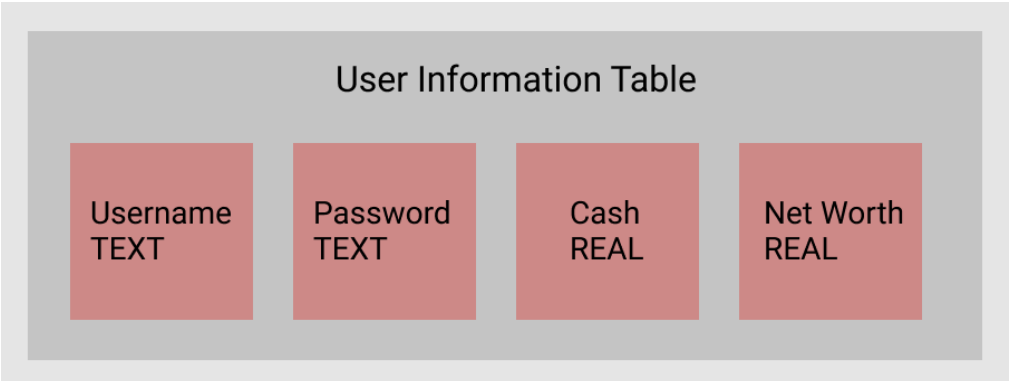
https://www.figma.com/file/QgfTb1xFWV62GsHPXuDjTA/Component-Map?node-id=0%3A1



Database

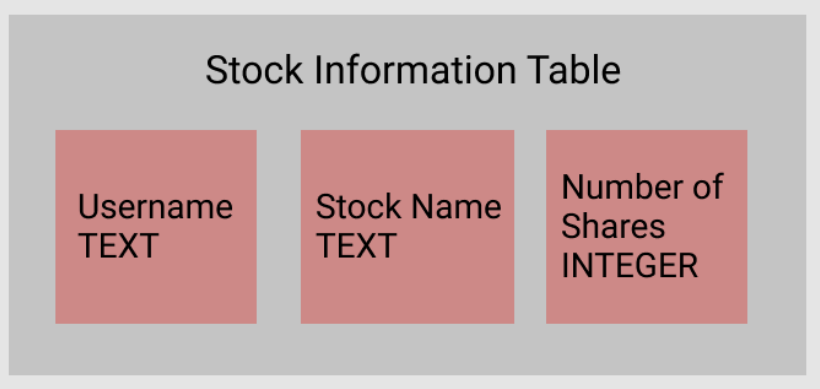
User database- *each new entry is a new user*

- Username | password | total money left not in stocks (everyone starts with the same amount) | net worth (money + money in stocks)



Stock database- *each new entry is for a new stock purchased by a certain user*

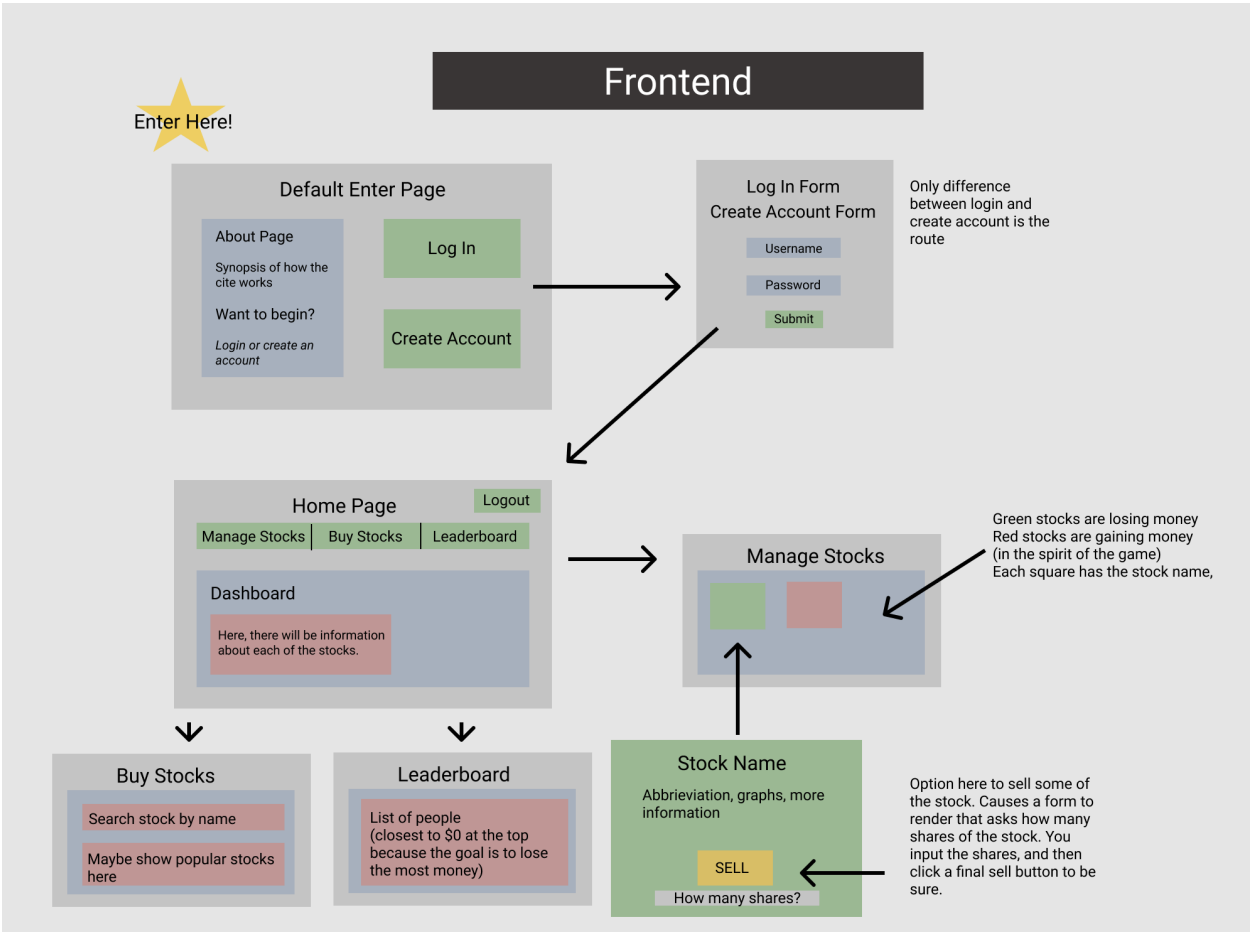
- username | stock name | how many shares



Relationships

- When a user creates an account, they create an entry in the user database with a username, password, and net worth + total money set to a given amount
- Each time a user buys a stock, it creates an entry in the stock database with their username and keeps track of the stock and how many shares
- When we want to render the stocks of a user, you search the stock database where the username corresponds.

- Site map for front end



- A breakdown of the different tasks required to complete this project, with target ship date
    - 12/13
        - Login system from last project + initializing money & stock ID - Andrew
        - Establish all the html linking & render templates - Eliza
        - Setting up apis (get keys and check is able to retrieve info we need) - Pat
        - Setting up all the python files with docstrings and function headers - Yuqing
    - 12/15
        - Buying and selling stocks (do this on like 5 stocks first), adding this information to the database, nothing with prices yet because the api is not set up. - Eliza & Yuqing
        - Getting info from api to our site, at least get the prices for certain stocks. - Andrew & Pat
    - 12/17
        - Putting buy and sell and api prices together so that it actually displays the balance correctly. - Eliza & Yuqing
        - Updating api & balance data with refreshing - Andrew & Pat
        - The entire base of the game should work and you should be able to play it
    - 12/20
        - Searching stocks for buy and sell, actually able to buy / sell whatever stock we want. - Eliza
        - Leaderboard - Andrew
        - Displaying additional info with API (like company news and stuff) - Yuqing & Pat
    - 12/22
        - Making sure everything works, error handling, debugging
        - Displaying additional info with API (like company news and stuff) if more time is needed. - Yuqing & Pat
        - Viewing other people's profiles - Andrew & Eliza
    - During break
        - Finish everything
        - Bootstrap, css
            - Collaborate on a base template for all of the pages
            - Dividing up the pages for fine tuning each page if needed.
        - Debug
    - Target ship date: Jan 4th

APIS

- NewsAPI
    - A rest API enabling us to grab news from a given period of time surrounding a particular topic, works well with stock tickers. Provides a rich amount of data including links to articles, their descriptions, etc.
    - Extremely simple to use and legible responses
    - Does require an API key, but it purportedly supports 8,000 requests a day. It would be able to suffice even during a hypothetical competition with 80 students.

- FinnHub.io API
    - An API providing copious amounts of data, however we intend to us this to aid us in creating candlestick graphs.
    - Very simple just like the NewsAPI
    - This requires an API key, their free plan supports 60 requests a minute, so it might crash while under heavy load. We might need to stack API keys in the case of 429 errors.
    - Might also be useful for other charts and statistical data. To be decided what else it is used for considering it has a 60 call/min cap.
- Yahoo Finance API via third party wrapper
    - The Yahoo finance API provides a lot of individual data regarding stock prices, news, volume, etc.
    - It does require a key, but with the use of this exceptional third party wrapper, it seems volume isn't an issue.
    - We shall see the limitations of this wrapper soon, but right now it's working brilliantly.
    - One thing is that it does have a lot of dependencies….so we're going to see if this is a problem.

Frontend Framework

Why Bootstrap?

We will use bootstrap for this project. First of all, three out of four of us have already become familiar with bootstrap through the frontend frameworks assignment. Second of all, because bootstrap has a wide variety of easily combinable components and we aren't masters of css/designing, it is probably better for us to be less unique while creating something that looks decent. The features of bootstrap that we are currently thinking of using the tables and flexboxes to make our page easily resizable. We will also use the nice designs for button creation and navbars. Also, on our login page, instead of having a create account and login button, we are thinking of having a get started dropdown menu and putting create account and login there. Bootstrap also has an interesting chart functionality which we haven't quite yet looked into in conjunction with the graph data we will receive from the API but we think that it will be possible to incorporate the information together to make nicer graphs.