

# Stock Prediction App

## Evaluating Requirements

CS361 HW 2



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# Specifications

## Functional Specifications

1. A User can search for a stock by its ticker symbol. ( e.g. INTC )
2. A User can search for a stock by its name. ( e.g. Intel )
3. A User can search for a stock by category. ( e.g. Technology )
4. The Software will get the selected stock's historical values for the last 1 year.
5. The Software will analyze the historical data to generate a prediction.
6. The Software will display the prediction from the above analysis along with the historical data in a line graph.
7. A User can create an account.
8. A User can save a stock to their account.
9. A User can login to their account to go to their dashboard.
10. A User's saved stocks will show up on their account dashboard.
11. A User can click on a stock on their dashboard to go to that stock's prediction page.

## Non-functional Specifications

1. The Software will use Alpha Vantage<sup>1</sup>'s API to get stock data.
2. The Software will use an LSTM algorithm<sup>2</sup> to predict stock value.
3. The Software will use Python / TensorFlow to generate the prediction.
4. The Software will use HTML / CSS / JS to provide a website interface.
5. A User will be able to login in under 5 seconds.
6. The Software will display the prediction to the User in under 5 seconds<sup>3</sup>.

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<sup>1</sup> <https://www.alphavantage.co/>

<sup>2</sup>

<https://towardsdatascience.com/using-lstms-for-stock-market-predictions-tensorflow-9e83999d4653>

<sup>3</sup> The time to generate a prediction is currently unknown.

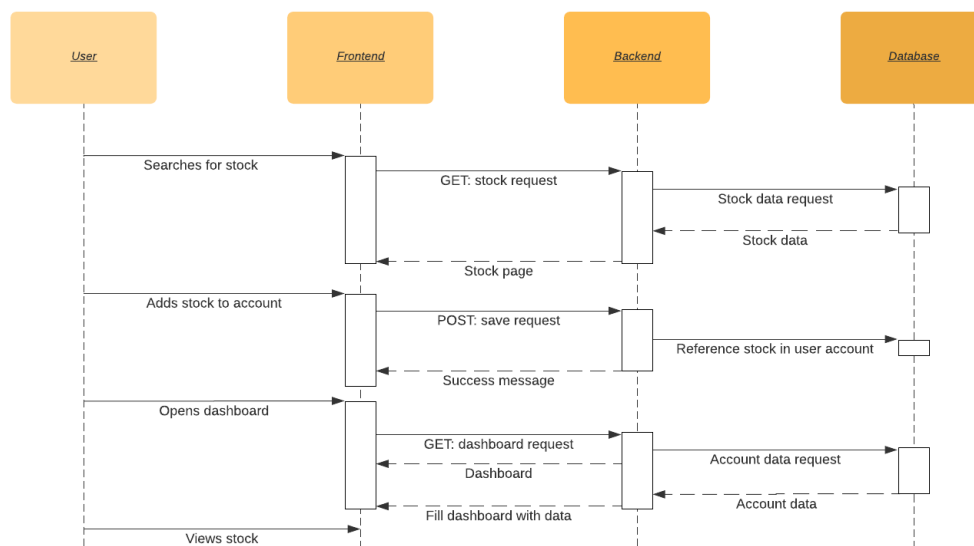
# Use Cases & MSDs

## Use Case 1: Saving a Stock to a User's profile

1. Scope:
  - a. Stock prediction web-app
2. Level:
  - a. User-goal level
3. Actors:
  - a. User
4. Stakeholders and Interests:
  - a. Users: want to be able to save their stocks to their account for convenience and easy access
5. Preconditions:
  - a. User is logged in
  - b. User's device is connected to the internet
  - c. User can view the desired stock
6. Postconditions:
  - a. The stock is saved to the user's account
  - b. The user can view the stock on their dashboard
7. Main Success Scenario:
  - a. User searches for the desired stock, whether by ticker symbol, name, or category
  - b. User views the stock
  - c. User interacts with the software to indicate that the currently selected stock should be added to their account
  - d. Software displays a success message to the User
  - e. The User can now view the stock on their dashboard
8. Extensions:
  - a. User device loses internet connectivity while attempting to add a stock
    - i. Software displays an error message
    - ii. User may reconnect to the internet and try again
  - b. Software experiences a different error while attempting to add a stock
    - i. Software displays an error message
    - ii. User may try again

Use Case 1: Message Sequence Diagram

February 2, 2020

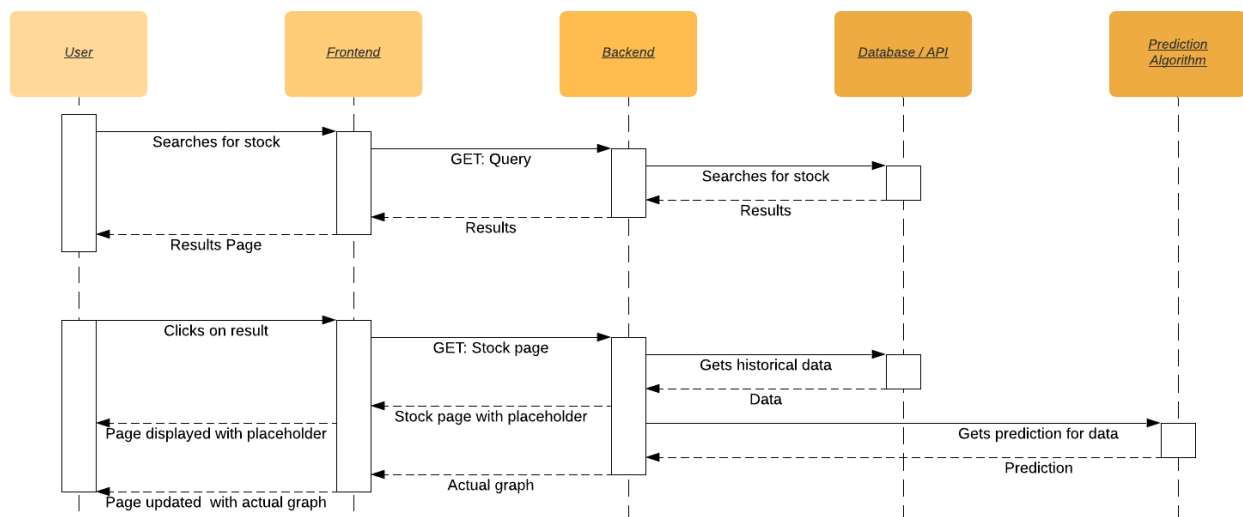


## Use Case 2: Generating Prediction for Stock

1. Scope:
  - a. Stock prediction web-app
2. Level:
  - a. User-goal level
3. Actors:
  - a. User
4. Stakeholders and Interests:
  - a. Users: want to be able to predict a stock's value
5. Preconditions
  - a. User has website open in browser
  - b. User's device is connected to the internet
6. Postconditions
  - a. User has received stock prediction
7. Main Success Scenario
  - a. User goes to website.
  - b. User enters a stock symbol in the search bar.
  - c. User selects the stock's page in the search result.
  - d. The Software will display the stock page with a blank graph.
  - e. The Software will get historical stock data from the API.
  - f. The Software will pass the historical data into the prediction algorithm.
  - g. The algorithm will produce a prediction line.
  - h. The Software will produce a graph with the historical data and the prediction.
  - i. The Software will replace the placeholder graph with the generated graph.
8. Extensions:
  - a. User device loses internet connectivity while attempting to add a stock
    - i. Software displays an error message
    - ii. User may reconnect to the internet and try again
  - b. Software experiences a different error while attempting to add a stock
    - i. Software displays an error message
    - ii. User may try again

Use Case 2: Message Sequence Diagram

February 2, 2020

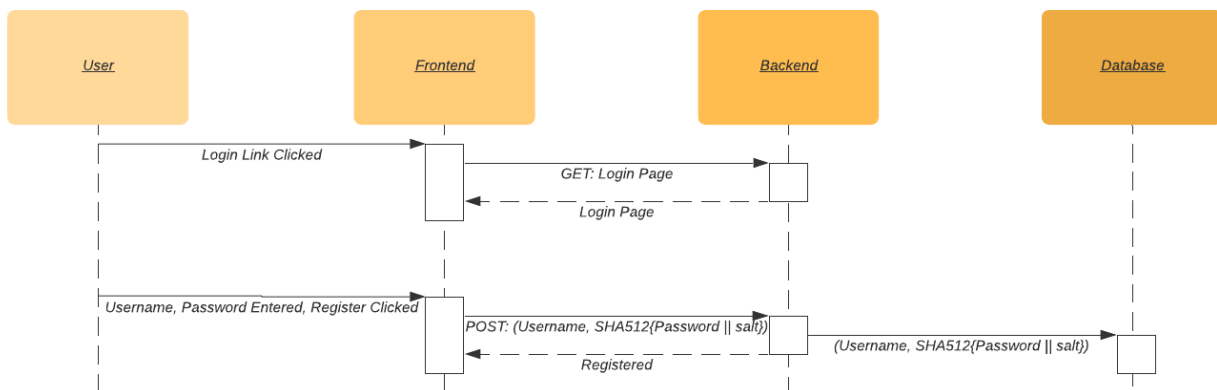


## Use Case 3: Creating an Account

1. Scope:
  - a. Stock prediction web-app
2. Level:
  - a. User-goal level
3. Actors:
  - a. User
4. Stakeholders and Interests:
  - a. Users: want to be able to save their stocks to their account for convenience and easy access
  - b. Therefore, users want an account to save such data.
5. Preconditions:
  - a. User's device is connected to the internet
  - b. User has an email address.
6. Postconditions:
  - a. User has an account with a username (email) and password.
7. Main Success Scenario:
  - a. User opens the website
  - b. User clicks on the login/register button
  - c. User enters their desired username(email) and password
  - d. User registers an account with their email and their password
  - e. User can now log in with their email and password
8. Extensions:
  - a. User device loses internet connectivity while attempting to add a stock
    - i. Software displays an error message
    - ii. User may reconnect to the internet and try again
  - b. Software experiences a different error while attempting to add a stock
    - i. Software displays an error message
    - ii. User may try again

### Use Case 3: Message Sequence Diagram

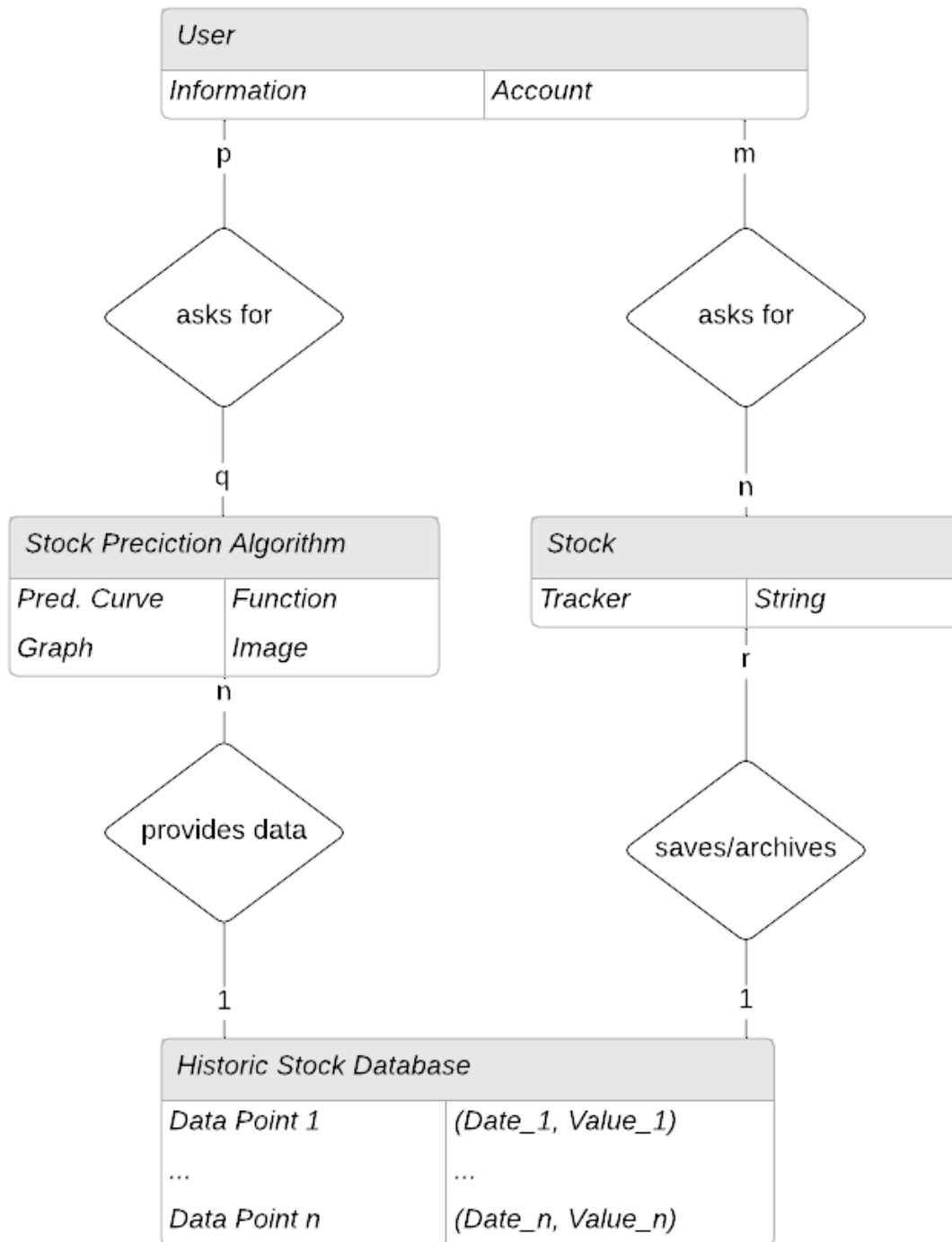
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# ERD Diagram

## Stock Prediction ERD

February 2, 2020



# Definitions

## Functional Definitions

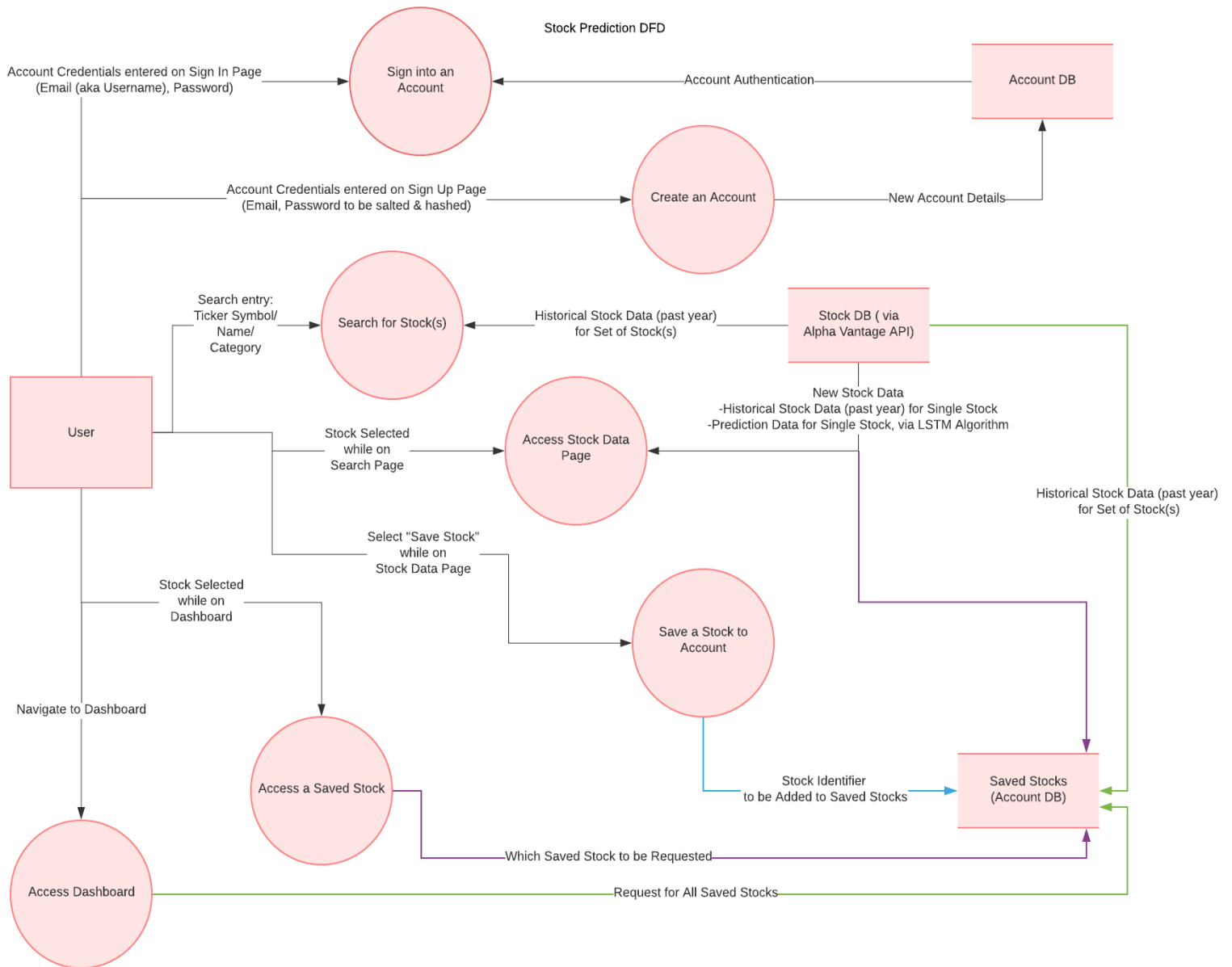
1. The system can display a list of available stocks to predict when requested by the user
2. The system can display a default welcome page to the first time user
3. The system can return a list of stocks to the user when the user searches for a certain category of stock (i.e. Tech)
4. The system can determine if the ticker symbol entered is valid
  - a. If the ticker does not exist, the system can communicate that to the user
  - b. If the ticker does exist, the system can allow the user to select that ticker as one to track and predict
5. The system can store the credentials encrypted, with passwords salted and hashed, in a database
6. The user can make an authentication request by logging in
7. The server can reliably, correctly answer an authentication request by checking the credentials against the database
8. After a user registers, they are automatically logged in.
9. The system then redirects the logged in user to their profile page.
10. The user can save stocks of interest to them to their account when logged in.
11. The system can display a user's saved stocks upon request.
12. The system will allow the user to store stocks of interest to the user in a database, and retrieve them at the user's request
13. The user can view the forecasted stock prices for a given ticker according to the latest available data to the system
14. The system can retrieve up-to-date data to generate it's prediction from
15. The system can generate a prediction for a stock given the latest data on that stock ticker
16. The system can issue errors if inappropriate pages are requested

## Non-functional Definitions

1. The system will display a website
2. The system's website will include a search bar at the top where the user can search for stocks by ticker or by category.
3. When the user is not logged in, the website will display a banner informing the user that they can log in to save their preferred stocks.
4. The website will present a login / register option
  - a. This option will lead to a page where the user can login by filling the username and password fields, or where the user may register by filling out a username and password.
  - b. This login/register page will display the outcome of any operation.
5. The user can see their saved stocks of interest under their profile
6. The prediction graph when shown includes a plot of past data, and a clear delineation between the past and predicted data.



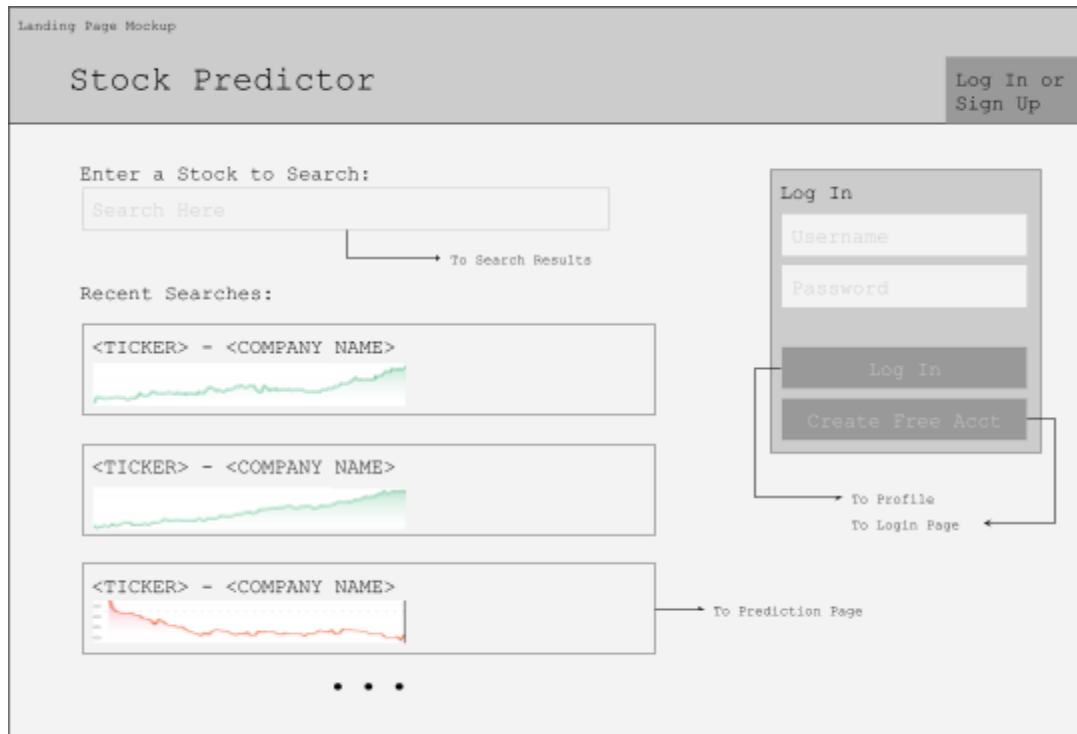
# Data Flow Diagram



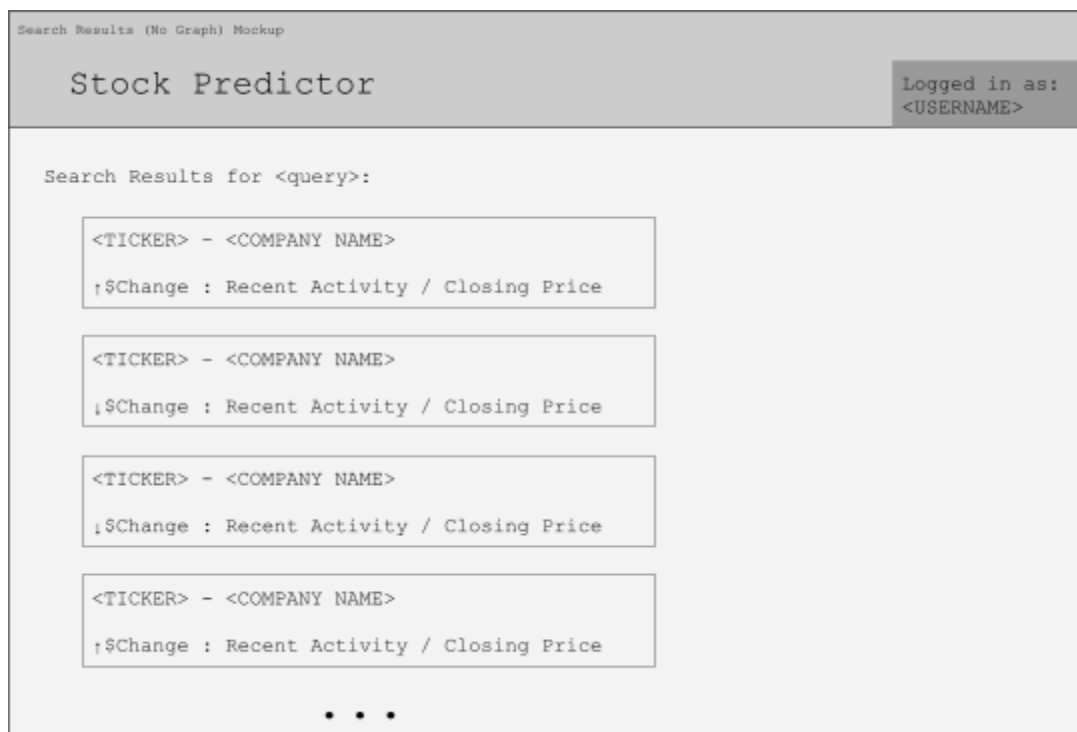
# Rendered Mockups

See Appendix A for the original paper drawings.

## Landing Page Mockup



## Search Results Mockup (no graphs)




## Search Results Mockup (with graphs)

Search Results (With Graph) Mock Up


# Stock Predictor

Log In or Sign Up


Search Results for <query>:

<TICKER> - <COMPANY NAME>  



☆

<TICKER> - <COMPANY NAME>  


★

<TICKER> - <COMPANY NAME>  


★

<TICKER> - <COMPANY NAME>  


☆

...

## Login Page Mockup

Login Page Mockup

# Stock Predictor

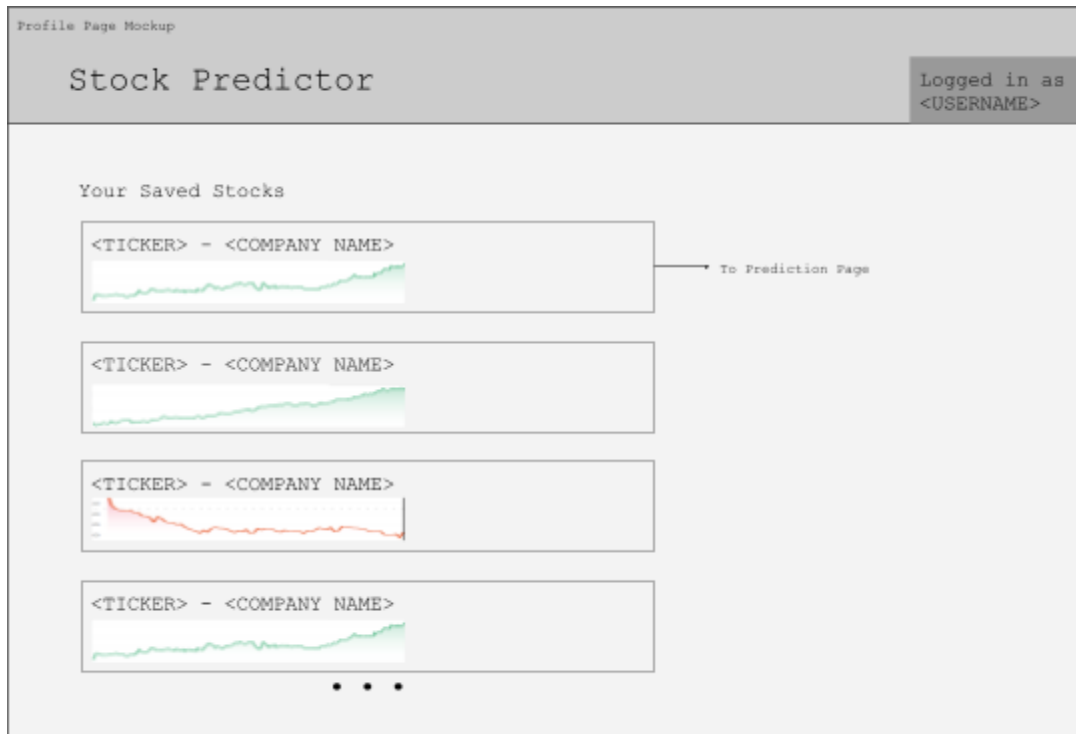
### Log In

Log In

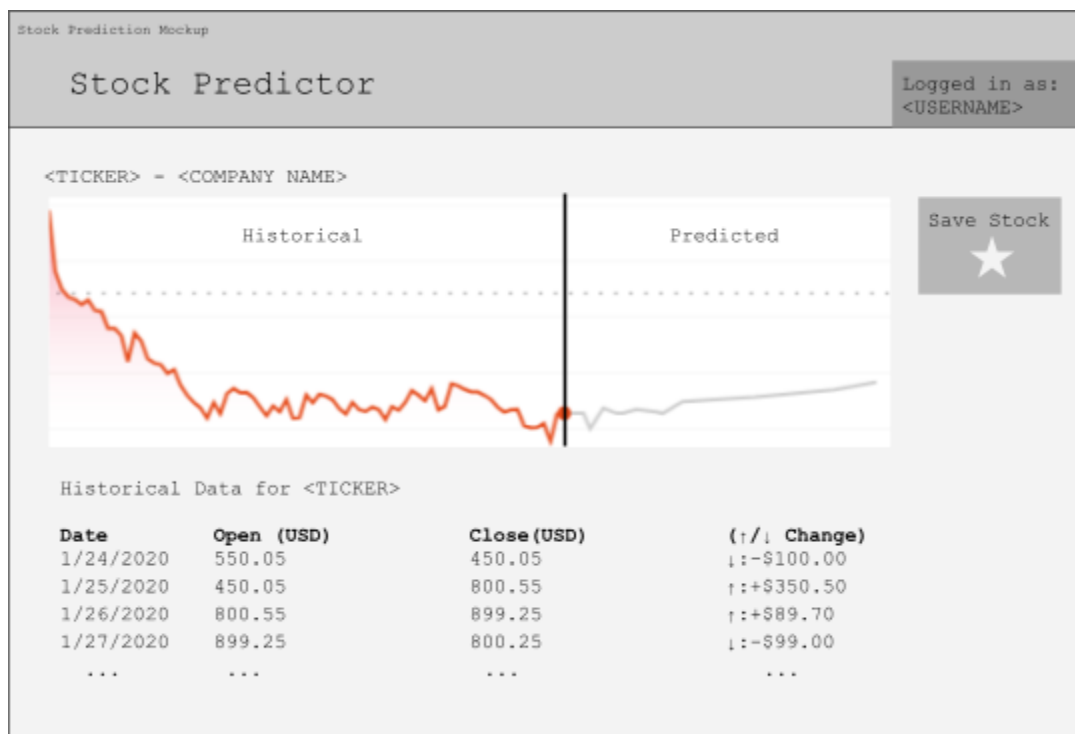
### Create Account

Create Free Acct

## Profile Page Mockup



## Stock Prediction Page Mockup



# Changes Made Since HW1

## **Changes to Specification**

The Message Sequence Diagrams were missing boxes to show the life of the requests, so those have been added.

The Message Sequence Diagrams were mislabeled with POST requests instead of GET and POST where appropriate. This was fixed.

## **Changes to Definitions**

Feedback from HW 1 said that some of the wording for some of the functional definitions was ambiguous. We have changed those to be more clear.

In addition, some definitions were removed, as they were better fit as specifications and/or duplicates of existing specifications.

Our customer was satisfied with the specifications and definitions as they were, and felt no need for change after reviewing them when we met up.

Therefore, we felt no need to make major changes, and left them as they were.

# Contributions

## Customer

### HW1

- We met with our customer Ghaith Shan after class on 1/23/2020.
- We have maintained communication with our customer on Discord since 1/16/2020.

### HW2

- We met with our customer Ghaith Shan after class on 1/30/2020 to present the paper mockups.
- We discussed requirement revisions and went over the mockups with our customer over Discord on 1/31/2020.

## Team members

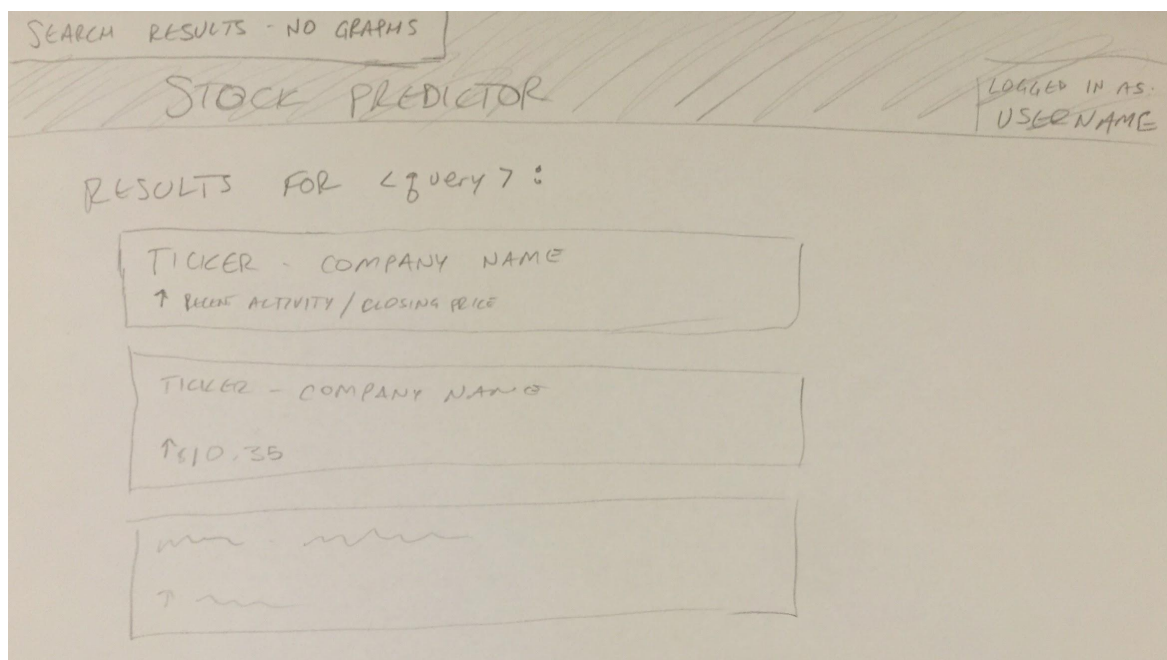
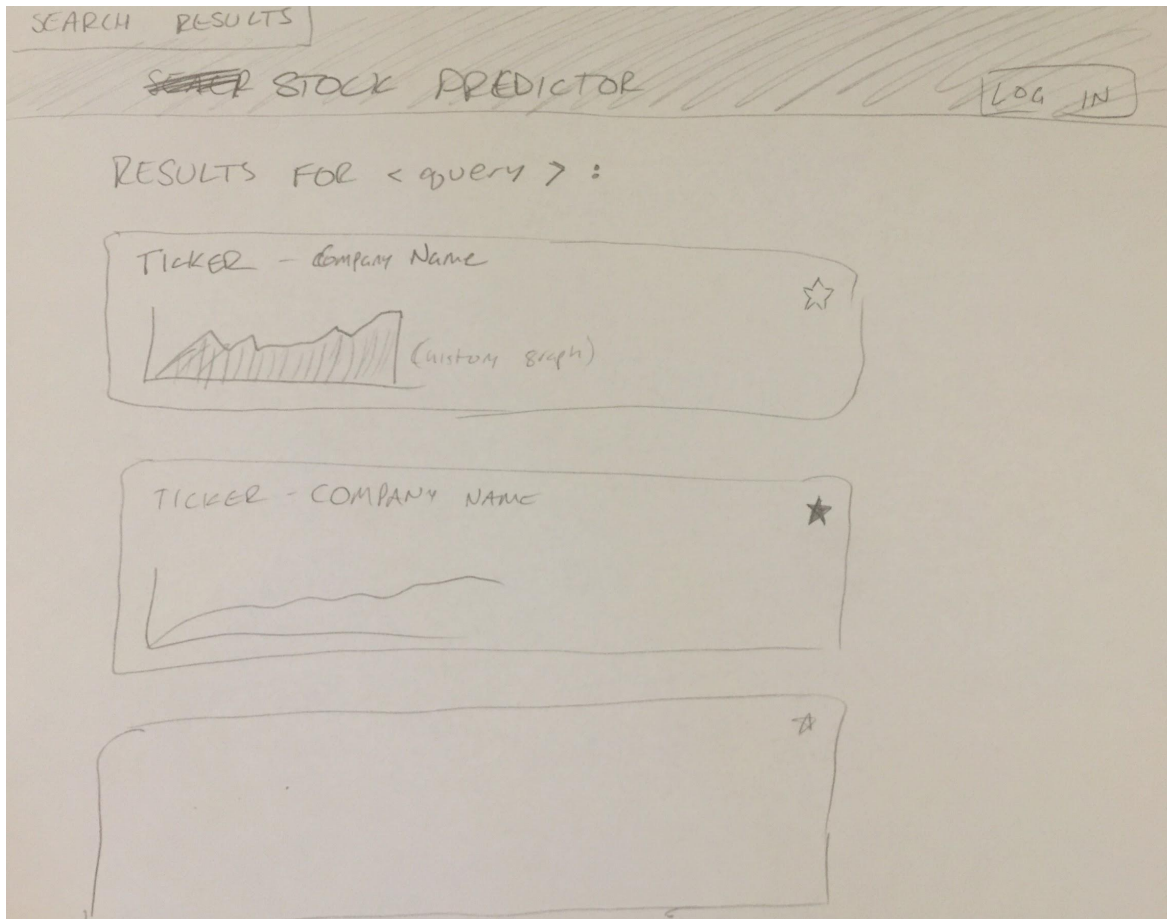
### HW1

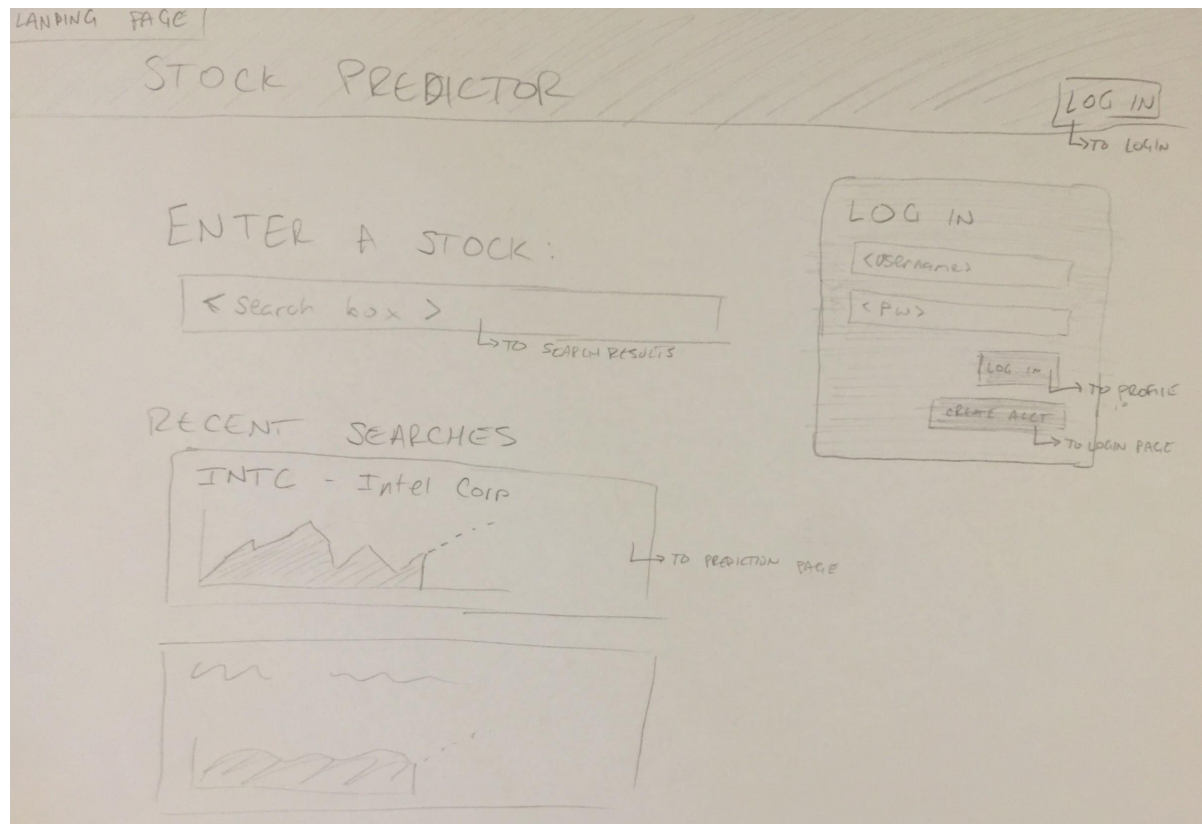
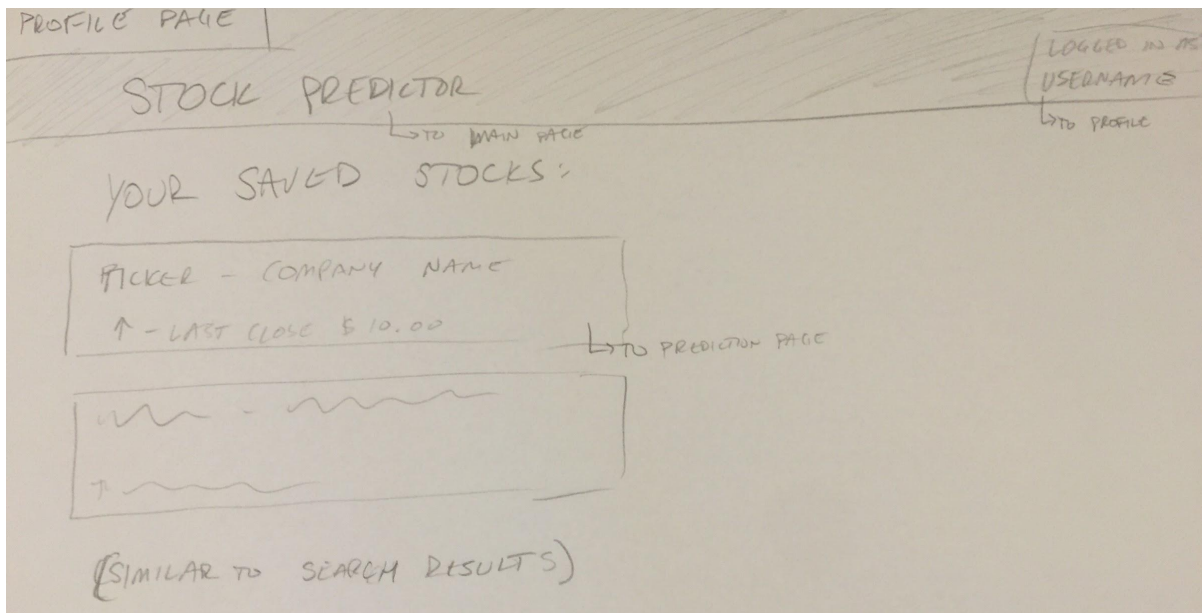
- Felix Brucker: Document Creation, Data Flow Diagram, Proofreading
- Robert Detjens: Functional Specifications, Non-functional Specifications, ERD Revision, Use Case 2, Use Case 2 MSD
- Remi Kendig: Use Case 1, Data Flow Diagram
- Dominykas Zobakas: ERD Revision, Use Case 1 MSD
- Lyell Read: ERD First Draft, Document Formatting, Customer Contributions, Functional Definitions, Non-Functional Definitions, Use Case 3, Use Case 3 MSD

### HW2

- Felix Brucker: Mockup proofing, Use Case 1 Revision
- Robert Detjens: Paper mockups, Mockup meeting w/ customer, Definition revision
- Remi Kendig: Changes made since HW1
- Dominykas Zobakas: MSD Revisions, ERD revision
- Lyell Read: Mockup proofing, Paper -> Digital mockup drawings, Appendix, Corrections to UC1 & UC3 MSDs.

## Appendix A: Paper Diagrams







LOGIN PAGE

## STOCK PREDICTOR

LOG IN

USERNAME:  
  
PASSWORD

CREATE ACCOUNT

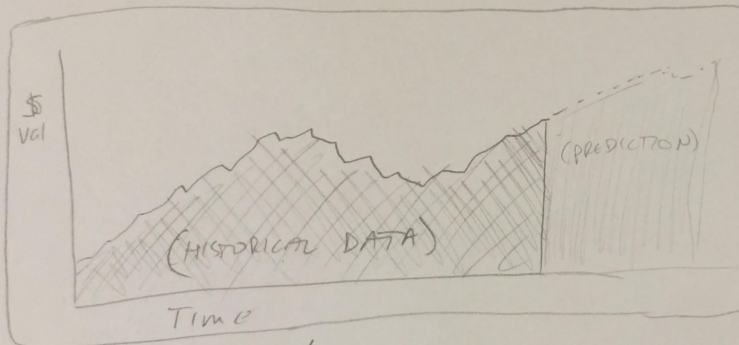
USERNAME  
  
PASSWORD

PREDICTION PAGE

## STOCK PREDICTOR

LOGGED IN AS  
USERNAME

TICKER - CORP NAME



SAVE TO ACCT.  
WATCH? ☐

HISTORICAL VALUES / CLOSING PRICES

DATE	\$ OPEN	\$ CLOSE	(↑ \$ DELTA)
DATE	\$ OPEN	\$ CLOSE	(↑ \$ DELTA)