AgriCom Training

CSCI 441 - Team B

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Contents

1 Customer Problem Statement

1.1 Problem Statement

Introduction

A conundrum with employers is with challenges to the workforce are appropriate credentialing and services on stocks and how companies can give the edge in our competitive market today to extradite a complex series of decisions to streamline our users to make the best decision in the shortest amount of time. A customer requires a centric focus on expounding information from the theory put into practice. The capacity requires taking on calculated risk in a controlled environment to trade in goods worldwide. Fortunately, our solution in mind, a web-based system for training those in various positions, can assist employees and managers alike to incorporate strategies and theories in a structured format to use trades and sales for common metals across broad regions across the globe. Our mission statement is to help customers find the strategies they intend to work for them with our website in a place that can be accessed anywhere at any time with real-time metrics that can correlate to real-world stock reports.

Project Summary

Proper induction into the workforce is the forefront of many company concerns in reducing turnover and providing the necessary means to retain key talent across the marketplace. While on-the-job training is critical for assignment, it predicts that risk is involved when exposing new talent to the workforce that can create an unidentified source of cost to help retain and protect those that are in the interest of procuring a service or product to the company. A company is required to provide a necessary source of interest in the employee to help retain staff but also is required to maintain a safety net of sorts to help prelude new employees to the risks of an ever present and changing marketplace that is high intensity with minimal setbacks.

Our mission is to empower our customers to assist with the on-the-job training process with the scope of our model and to assist through graphic imagery and design processes to target our audience through the website we have created. Our idea is to bring into action to implement learning and bring learning-support aids to assist customers and managers of sales through agent networks that bring theory and practice alike together to incorporate in our website design as a medium to present a design philosophy to life that those in finance may implement to better understand the environment that trades with common metals to better incorporate a schema to include when required in such a demanding environment.

A system that may identify detailed, accurate, and up-to-date product information to inform potential buyers effectively and efficiently for purchases for sellers and to allow a streamlined means to reduce processing in supervisory or managerial positions to define and

address needed issues from available sources for an on-the-go interaction for faster resolution times. Our intention is to provide the necessary dynamic, real-time. Available anywhere with internet access, customers may be allowed access to the website with appropriate credentials for those with access. Our website can include training for traders and managers alike who would require assisting with employees in a manner that can expedite the process for future processes when assisting customers and employees alike.

The intention is one to include stocks of ongoing trades in a controlled environment to help buffer the potential impacts that decision makers can perform while operating freely as though they were to perform actual trades. Along with providing a model to introduce the usage of common metals, we also incorporate inventory and account billing to mirror stock trading to its finest with an ongoing, updated database system to utilize for one's leisure. The usage of common metals extends beyond the traditional format of a 2-dimension format and includes regional changes in currency to better understand and incorporate a dynamic viewpoint into regional differences to compare prices and incorporate the necessary depth to better allow traders the opportunity to understand real-world implications when working with such a broad range of materials.

Overview

The main overview of the survey of documentation is to assist with product ordering by customers, agents, and management alike. Our website is more of a training ground for those who are looking for a chance to get involved in the stock market with valued goods and to train into a medium that can assist on what to look for and review when it comes to split second decision making. The ability to determine and value where a decision is to make maximum impact is what our website is meant to create and build from when reviewing and determining what would be an ideal selling point when trading. The main selling points are those from the traders and the managers when looking into the parameters and what our product is meant to entail when reaching the market.

The primary duties of the website include direct access to up-to-date information and decision-making ability to buy or sell goods with customized offerings to allow differing access to information dependent on the user while order information and product information to managers as learning aids. As mentioned previously, working in a wide regional area marked by large trading centers across the glove (UK, EU, USA, etc.) will show differences in pricing and market shares to dictate worldwide costs and to include differences in pricing via regional currencies, transfer rates, and impact to overall costs when transferred to one region to another. Differing currencies are to be in place to ensure that an accurate account of balances is to dictate and infer upon upcoming trades.

Proposition

The proposition is one that can help create the necessary groundwork to allow employees to operate in an artificial environment prior to being released into the workforce. One where we can ensure that demands are being met with minimal risk in allowing employees the

chance to grow into the role to reduce the cost of on-the-job incidents and to create stronger employment with higher retention rates across the board. Our interest is to help ensure that traders and managers alike are able to produce the highest possible result in a competitive environment while still reducing the impact of a chaotic environment due to a lack of experience brought about by a high barrier of entry that can serve as a deterrent to prospective employees that can predict poor outcomes to companies that can contribute to an overall lack of quality that can be noticeable over a period of time. To provide a secure means to allow employees and managers to remain engaged prior to being released from training is an integral part of the onboarding process to allow departments the rationale to pontificate a means to reduce and streamline the workload into an applicable part of the hiring process.

Solution

For the trader, eliminating the delay between buying or selling with ongoing prices for metals in the market may reduce errors by current market trends and eliminate redundancies with trades while incorporating a medium to include that can foster an environment to dictate decisive action and to include into necessary resources, tasks, and tutelage to better evolve into a more effective means to allow for more yields when trading metals and other common goods. Our product can also allow for necessary distribution of identifying materials to be correctly exchanged based on specific regions to be able to subtract out fees, materials with similar or better purchasing power, and to extract interest when rates make changes throughout the period that the trader is in training. With online resources that are available,

For managers, our website can allow a necessary opportunity to allow managers to reduce decision making by ensuring that interaction with traders is done in an expedite process to include necessary reaction time for input to be included to help retain staff during the training process and to allow managers to interact with traders to ensure that processes remain in place. Quick time intervention to trader concerns and resources to include into the decision making process is a priority to better implement a standardized practice to maintain focus on stock trading, a key priority during the lifecycle of onboarding for new employees.

Conclusion

In summary, a training program to allow traders and managers the opportunity to operate with relative freedom to their positions with material present to educate and reform bad practices prior to be released is a necessary inclusion to any onboarding process that can dictate a higher level output and retain talent to include into the HR hiring process that any respectable organization is to require to maintain a standard that can reduce costs over a long period of time. It should be noted that training is a priority for staff and to include a methodology that can reduce the risk associated with newer employees is a key focus to remain in high-standing and productive positions in trades.

1.2 Glossary of Terms

- **Account total** - Also known as Net Worth or Total Equity. It is the user account's value in cash plus its total holdings value.
- **Actors** - Any external entity that interacts with the system.
- **Agricultural Commodities** - Plant, animal products, and their by-products, such as crops and meat products.
- **Cash total -** The user account's total available cash. Cash can be spent by submitting an order ticket to buy commodities. Cash can be gained by submitting an order ticket to sell owned commodities.
- **Commodity** - Raw material or agricultural product that can be bought and sold.
- **Holdings -** The user account's owned commodities.
- **Manager** - An user with administrative privileges. This user can manage over multiple Trainee users and have access to their profiles and transactions.
- **Order Ticket** - A form filled by the user to submit a transaction.
- **Order Type** - A transaction can either be a "Sell Order" or a "Buy Order" type.
  - Sell Orders exchanges a specified amount of the account's commodity holdings to its cash value.
  - Buy Orders exchanges a specified amount of the account's cash value to its equivalent value in commodity.
- **Portfolio** - A detailed grouping of financial information and assets consisting of available cash balance and current commodity holdings at their current and purchased value.
- **Revenue Stream** - the different sources of money for a company generated from the sale of goods and services
- **Trader** - A person who engages in the buying and selling of commodities.
- **Trainee** - An user with standard privileges. This is the user who will act as a Trader.
- **Transaction** - An exchange between a commodity and cash currency.

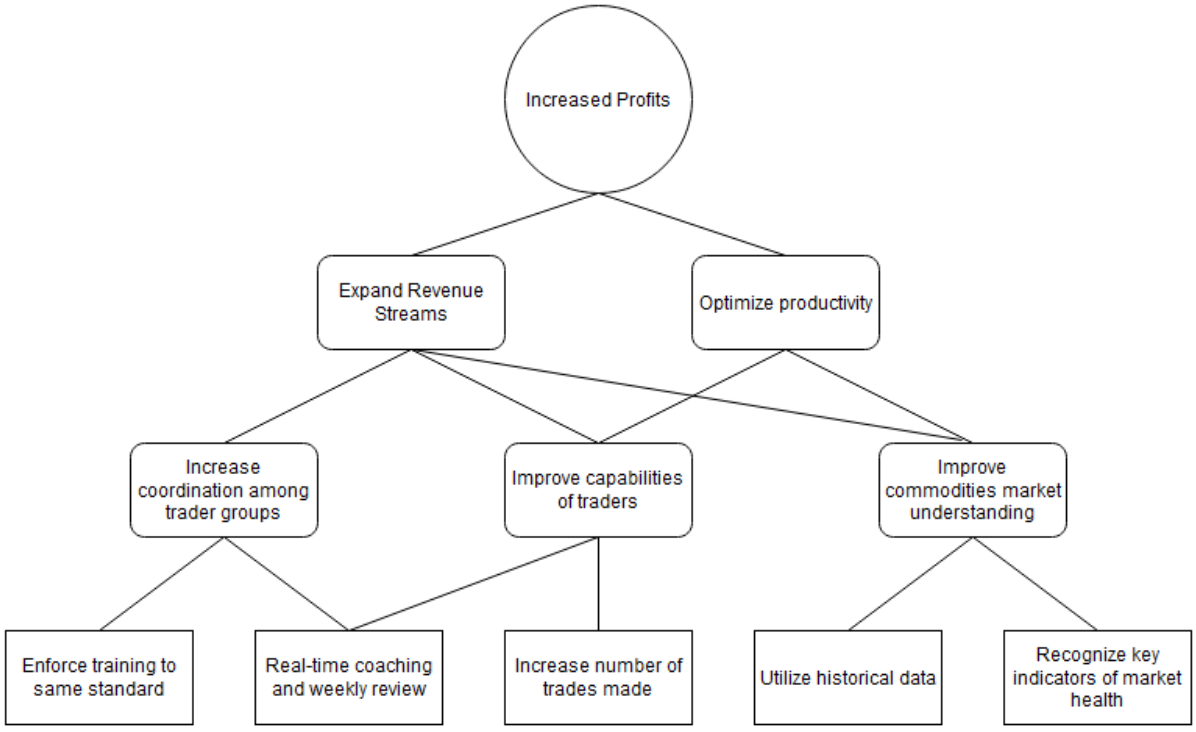
2 System Requirements

2.1 Business Goals

Increase profitability by improving the ability to recognize key indicators of market health leading to less mistakes and taking advantage of opportunities as they present themselves.

Increase productivity of the trader workforce that is more knowledgeable and proficient in trading on the commodities market.

Expand revenue streams by increasing the capabilities of the traders who in the past would be locked down to a small portfolio, but now will be able to manage a wide spread of commodities and improve cash flow by orders of scale



2.2 Functional Requirements

ID	PW	REQUIREMENT
REQ-1	5	The system shall allow new users to register an account by providing a real-world email, which shall be external to our system. Required information shall include an unique login ID and a password that conforms to guidelines, as well as the user's first and last name. The user shall be able to specify if the new account will be a Manager account or a Trainee account at registration. Upon successful registration, the system shall set up an account with a $10,000 starting balance.
REQ-2	5	The system shall support order placement by filling out a form known as "order ticket". The order ticket shall include the account's information, order type (buy/sell), quantity, and commodity. The order ticket shall be placed in an order queue to be processed.
REQ-3	5	The system shall constantly review the queued orders and for each order ticket in the queue check the following: ● If the order type is a buy order, cancel the order ticket if there is not sufficient cash in the account. ● If the order type is a sell order, cancel the order ticket if there is not sufficient commodity holding in the account. ● Else, execute the trade instantly at the current price.
REQ-4	5	The system shall maintain a database of user accounts, portfolios, commodities price history, transaction history, and educational information.
REQ-5	5	The system shall periodically update and process market data to provide close-to-real-time information for each commodity, including: ● Prices and graph ● Fundamental Indicators such as 52 week highs and lows ● Latest news ● New education information
REQ-6	5	The system shall maintain each Trainee account with a portfolio of commodities, account total, cash total, holdings, and transaction history information. The account total shall be updated with the latest value upon access.
REQ-7	4	The system shall allow Manager accounts to find Trainee accounts by their account login ID and add/remove them to their profile for supervision. The system shall allow Managers to view their supervising Trainee's profile and transaction history.

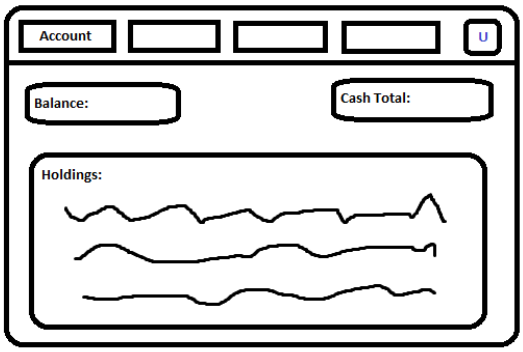
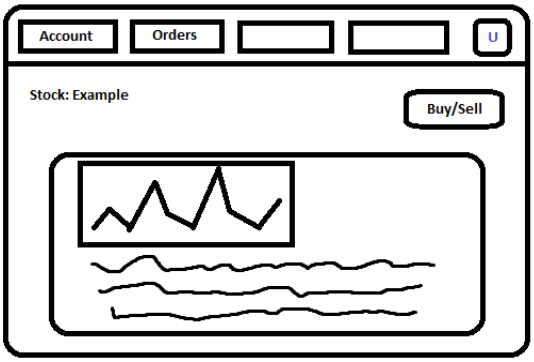
REQ-8	4	The system shall allow Trainee accounts a month's time frame for their training in which order tickets can be placed within that frame. The time frame can be reset by the account holder at the end or by a Manager.
REQ-9	3	The system shall allow Manager accounts to reset the balance and training timeframe of their Trainee's account.
REQ-10	2	The system shall allow Trainee accounts and their Manager to comment on each Trainee account's transaction.
REQ-11	1	The system should have an area that allows Trainee accounts to access educational information about trading commodities.

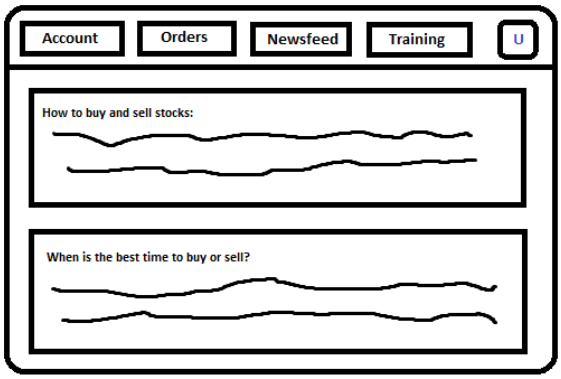
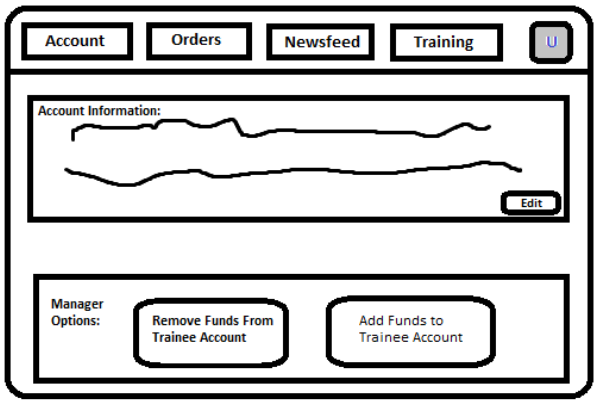
2.3 Nonfunctional Requirements

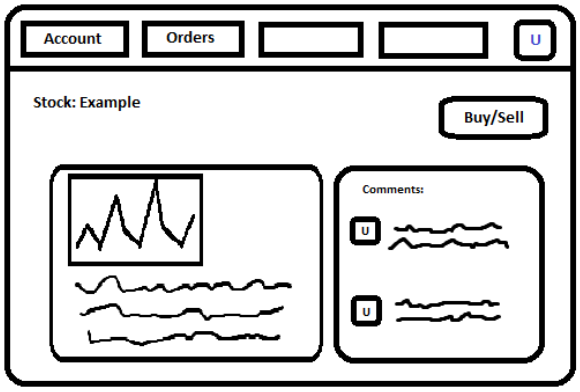
REQ-12	5	The system shall be simple to use and have a minimal learning curve. Data shall be presented in such a way that the user's focus is automatically drawn to them when the user views each page. The user shall have less than 5 clicks to navigate to any page.
REQ-13	5	All user data shall be stored in the system's database. No user information shall be stored on the user's device. No user shall have access to directly modify any data.
REQ-14	3	Market data shall be updated as real-time as possible. Data latency shall not be more than 30 minutes at any given time.
REQ-15	3	The system shall be platform independent and should appear and run the same across Windows, Mac, and Linux systems.
REQ-16	2	The system shall require minimal maintenance. The system shall require maintenance at most once a week.

2.4 User Interface Requirements

ID	PW	REQUIREMENT
REQ-17	5	GUI must have a log-in page.

		
REQ-18	5	GUI must have a page that shows current account information such as current balance, cash total, and holdings. 
REQ-19 a,b	5	GUI must have a page to submit orders. GUI must show the history of stock prices and consistently update. 
REQ-20	5	GUI will have a newsfeed showing notable events on account

		
REQ-21	4	GUI should have a training page that holds valuable learning information for trainees. 
REQ-22	5	GUI must have a page for account management. Managers will be able to control funds on trainee accounts. 

REQ-23	3	GUI will allow comments to be made on orders 

3 Functional Requirements Specifications

3.1 Stakeholders

There are two main groups of stakeholders for this proposal including internal and external stakeholders. Internal stakeholders are defined as those within the organization that will approve requirements, use the platform, give feedback, and measure performance. External stakeholders are defined as those outside the organization that have an effect on this platform that is outside the organization's control.

1. Internal Stakeholders

a. Owners: an organization that has paid for the right to use this software through our licensing agreement.

b. Managers: a person with administrator privileges necessary to maintain the training environment and the performance of trainees.

c. Trainees: any employee of the organization that will be using this training software to improve their understanding of the commodities market

2. External Stakeholders

a. Government: The government of the United States involved in setting policy and laws related to the legal transactions on the commodities market

b. Competitors: Any company offering similar products that involve teaching the basic concepts of the commodities market and allowing the user to practice in a safe environment

c. Commodities Market: The public market available for the sale and purchase of commodities between multiple entities.

3.2 Actors and Goals

- **Guest:** User who has not yet registered or been authenticated by the system.
  - **Type**: Initiating
  - **Goals**:
    - Register an account.

- Login with valid account information.

❖ **Manager:** User who has been registered as a manager account.

➢ **Type**: Initiating

➢ **Goals**:
- Search for trainee accounts.
- Add trainee accounts to their supervision profile.
- View trainee accounts profiles and transaction history.
- Reset or add funds to trainee accounts portfolios.
- Comment on trainee accounts transactions.

❖ **Trainee:** User who has been registered as a trainee account.

➢ **Type**: Initiating

➢ **Goals**:
- View profile of commodities, account totals, cash total, and holdings.
- View account information.
- View educational information related to commodity trading.

❖ **Browser:** Allows interaction between user and system.

➢ **Type**: Participating

➢ **Goals**:
- Presents data to the user.
- Accepts data from the user.

❖ **Commodity API:** Provides up-to-date commodity prices for the system.

➢ **Type**: Participating

➢ **Goals**:
- Provide up-to-date commodity price information when fetched.
- Provide latest educational information when fetched.
- Provide latest commodity news when fetched.
- Updates system database accordingly for historical information.

❖ **Database:** Holds all information of current user accounts and their portfolios.

➢ **Type**: Participating

➢ **Goals**:
- Save account information for new users.
- Save and maintain portfolio balance and holdings.

        - Save and maintain transactional history.
        - Maintain commodities price history.
        - Save and maintain manager comments.

- **TimerTask:**

    - **Type:** Initiating/Participating

    - **Goals:**
        - Fetch information from commodity API at regular set intervals.
        - Store fetched information into the database.
        - Set a Trainee account's training time frame of 1 month. Will trigger a performance report at the end of the regiment.

3.3 Use Cases

Casual Description

- **UC-1: Buy Commodity**

    - **Actor:** Trainee *(Initiating)*, Commodity API *(Participating)*, Database *(Participating)*
    - **Goal:** To buy a commodity. This involves the Trainee filling out and submitting a buy order ticket of a specified commodity and its market price queried from Commodity API. The order ticket will be processed and its data saved in the Database. Changes to the Trainee's portfolio will be reflected.

  Related Requirements: REQ-2, REQ-3, REQ-4, REQ-5, REQ-6

- **UC-2: Sell Commodity**

    - **Actor:** Trainee *(Initiating)*, Commodity API *(Participating)*, Database *(Participating)*
    - **Goal:** To sell a commodity. This involves the Trainee filling out and submitting a sell order ticket of a specified commodity at the current market price queried from Commodity API. The order ticket will be processed and its data saved in the Database. Changes to the Trainee's portfolio will be reflected.

  Related Requirements: REQ-2, REQ-3, REQ-4, REQ-5, REQ-6

- **UC-3: Register as Trainee**

    - **Actor:** Guest *(Initiating)*, Database *(Participating)*

- **Goal:** To register an account as a Trainee. This involves the Guest to fill out the Trainee registration form with their user information. The Database will check to make sure that the user name submitted is unique and create an account for the Guest.

Related Requirements: REQ-1, REQ-4, REQ-6

- **UC-4: View Portfolio**

  - **Actor:** Trainee/Manager *(Initiating)*, Commodity API *(Participating)*, Database *(Participating)*
  - **Goal:** To view the current status of an account's portfolio. This involves the User selecting an account to display the current portfolio information retrieved from the Database. The Database will update the holdings and account total with the latest values retrieved from the Commodity API.

  Related Requirements: REQ-4, REQ-5, REQ-6

- **UC-5: View Transaction History**

  - **Actor:** Trainee/Manager *(Initiating)*, Database *(Participating)*
  - **Goal:** To view a list of transactions made. This involves the User selecting the transaction history section of a profile to view the logged transactions made by order type, time, and price.

  Related Requirements: REQ-4, REQ-6

- **UC-6: Submit Comment**

  - **Actor:** Trainee/Manager *(Initiating)*, Database *(Participating)*
  - **Goal:** To submit a comment on a Transaction. This involves the User submitting a comment on through the transaction history to provide feedback for the Manager/Trainee.

  Related Requirements: REQ-4, REQ-6, REQ-10

- **UC-7: View Comment**

  - **Actor:** Trainee/Manager *(Initiating)*, Database *(Participating)*
  - **Goal:** To view a comment made on a Transaction. This involves the User selecting a transaction from the transaction history to view the saved comments.

  Related Requirements: REQ-4, REQ-6, REQ-10

- **UC-8: View Educational Information**
  - **Actor:** Trainee/Manager *(Initiating)*, Commodity API *(Participating)*, Database *(Participating)*
  - **Goal:** To view education information. This involves the User selecting to view the educational information section saved in the Database. New educational information will be periodically retrieved from the Commodity API and saved in the Database.

  Related Requirements: REQ-4, REQ-5, REQ-11

- **UC-9: View Commodity**
  - **Actor:** Trainee/Manager *(Initiating)*, Commodity API *(Participating)*, Database *(Participating)*
  - **Goal:** To search ticker symbols and view market information for specified commodities. Information will include prices, charts, fundamentals, news articles, etc. Information will be queried from Commodity API.

  Related Requirements: REQ-4, REQ-5

- **UC-10: Register as Manager**
  - **Actor:** Guest *(Initiating)*, Database *(Participating)*
  - **Goal:** To register an account as a Trainee. This involves the Guest to fill out the Manager registration form with their user information. The Database will check to make sure that the user name submitted is unique and create an account for the Guest.

  Related Requirements: REQ-1, REQ-4

- **UC-11: Add Trainee to manage**
  - **Actor:** Manager *(Initiating)*, Database *(Participating)*
  - **Goal:** To add a Trainee account for management by a Manager. This involves the Manager to search Trainee's by user name and select to add them to their management profile so the User will gain access to controlling and viewing the Trainee's account.

  Related Requirements: REQ-4, REQ-6, REQ-7

- **UC-12: Remove Trainee from management**
  - **Actor:** Manager *(Initiating)*, Database *(Participating)*
  - **Goal:** To remove a Trainee account for management by a Manager. This involves the Manager to search Trainee's by user name and select to remove them from their management profile.

Related Requirements: REQ-4, REQ-6, REQ-7

- **UC-13: Reset Trainee's account**

  - **Actor:** Manager *(Initiating)*, Database *(Participating)*
  - **Goal:** To reset the training timeframe or account balance of a managed Trainee. This involves the Manager to find the Trainee's profile and selecting to either reset the Trainee's training timeframe or account balance if their Trainee commits a significant mistake.

  Related Requirements: REQ-4, REQ-7, REQ-9

- **UC-14: Provide end of training feedback**

  - **Actor:** Manager *(Initiating)*, TimerTask *(Participating),* Database *(Participating)*
  - **Goal:** To comment on the performance report of a managed Trainee at the end of their training regiment. This involves the Manager to access and review a Trainee's performance report as well as their transaction history to provide feedback for the Trainee.

  Related Requirements: REQ-4, REQ-6, REQ-7, REQ-8

Use Case Diagram

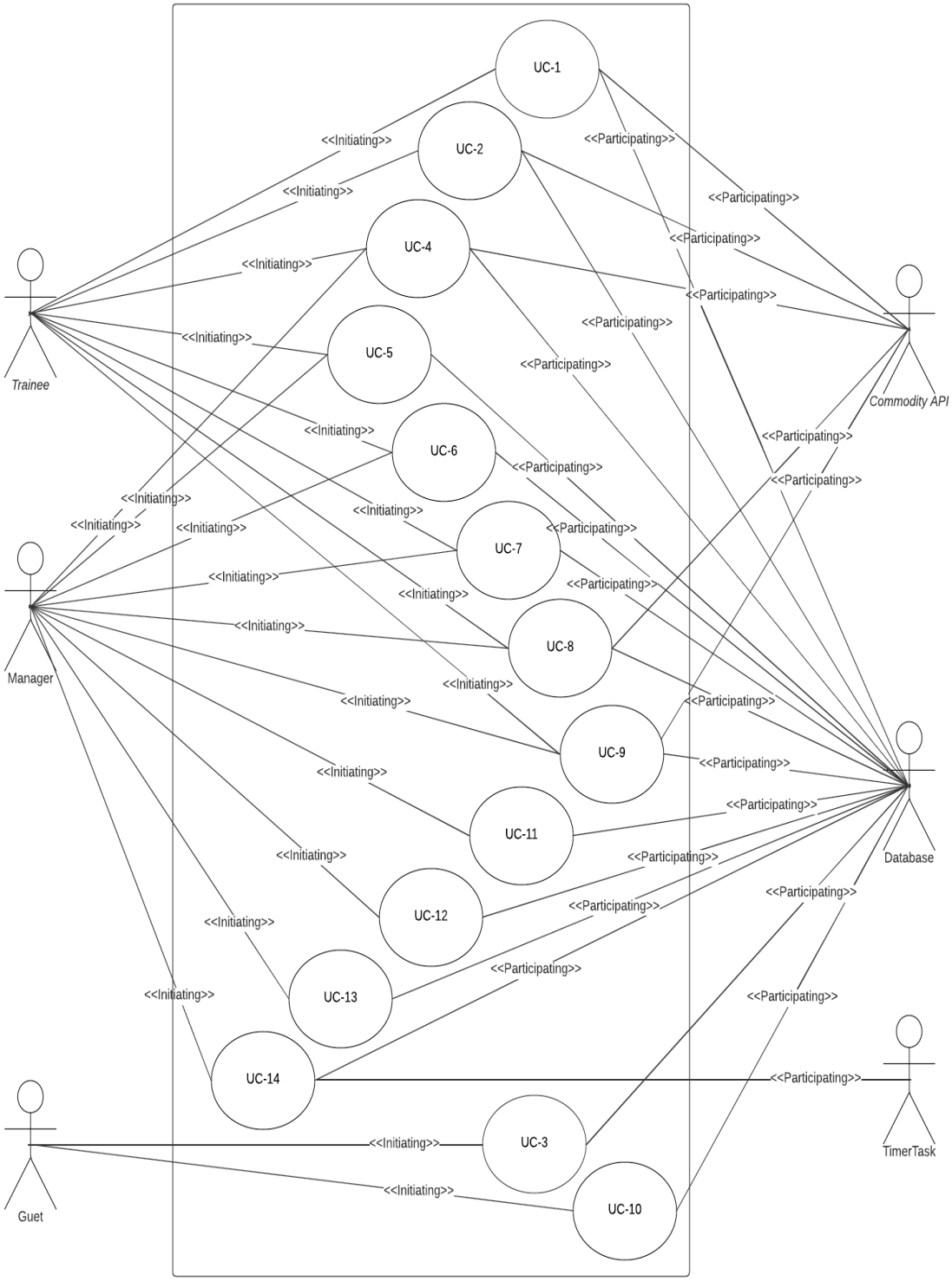


Figure 3.3: Use Case Diagram

Traceability Matrix

REQ	PW	UC1	UC2	UC3	UC4	UC5	UC6	UC7	UC8	UC9	UC10	UC11	UC12	UC13	UC14
REQ-1	5			X							X				
REQ-2	5	X	X												
REQ-3	5	X	X												
REQ-4	5	X	X	X	X	X	X	X	X	X	X	X	X	X	X
REQ-5	5	X	X		X				X	X					
REQ-6	5	X	X	X	X	X	X	X				X	X		X
REQ-7	4											X	X	X	X
REQ-8	4														X
REQ-9	3													X	
REQ-10	2						X	X							
REQ-11	1								X						
Max PW		5	5	5	5	5	5	5	5	5	5	5	5	5	5
Total PW		25	25	15	15	10	12	12	11	10	10	14	14	12	18

Fully Dressed Descriptions

Use Case UC-1	Buy Commodity
Related Requirements:	REQ-2, REQ-3, REQ-4, REQ-5, REQ-6
Initiating Actor:	Trainee
Actor's Goal:	To buy a commodity
Participating Actors:	Commodity API, Database
Preconditions:	Trainee is logged in and shown an option to "Buy Commodity".
Postconditions:	System has notified trainee of purchase order outcome. History and portfolio updated.
Flow of Events for Main Success Scenario	
→ Trainee clicks on "Buy Commodity" link.	
← System prompts for Commodity name/symbol and amount.	
→ Trainee enters/selects valid commodity name/symbol and amount.	
← System queries market price from Commodity API and returns total cost.	
→ Trainee confirms order.	
← System saves order, purchased amount, and total cash deducted to database.	
← System returns notification to trainee that the transaction has been completed.	
Flow of Events for Alternate Scenario 1	
→ Trainee enters/selects invalid commodity name/symbol.	
← System returns notification to trainee that the name/symbol is invalid.	
Flow of Events for Alternate Scenario 2	
→ Trainee attempts to purchase using more funds than are available.	
← System returns notification to Trainee that there is not enough cash to complete purchase.	

Use Case UC-2	Sell Commodity
Related Requirements:	REQ-2, REQ-3, REQ-4, REQ-5, REQ-6
Initiating Actor:	Trainee
Actor's Goal:	To sell a commodity
Participating Actors:	Commodity API, Database
Preconditions:	Trainee is logged in and shown an option to "Sell Commodity".
Postconditions:	System has notified trainee of sell order outcome. History and portfolio updated.
Flow of Events for Main Success Scenario	
→	Trainee clicks on "Sell Commodity" link.
←	System prompts for Commodity name/symbol and amount.
→	Trainee enters/selects valid commodity name/symbol and amount.
←	System queries market price from Commodity API and returns total return.
→	Trainee confirms order.
←	System saves order, sell amount, and total cash added to database.
←	System returns notification to trainee that the transaction has been completed.
Flow of Events for Alternate Scenario 1	
→	Trainee enters/selects invalid commodity name/symbol.
←	System returns notification to trainee that the name/symbol is invalid.
Flow of Events for Alternate Scenario 2	
→	Trainee attempts to sell more shares than are available.
←	System returns notification to Trainee to enter an available amount of share to sell.

Use Case UC-3	Register as Trainee
Related Requirements:	REQ-1, REQ-4, REQ-6
Initiating Actor:	Guest
Actor's Goal:	To register an account as a Trainee
Participating Actors:	Database
Preconditions:	An unregistered Trainee (Guest) visits the system.
Postconditions:	The guest has been successfully registered as a Trainee, or an error message has been provided.
Flow of Events for Main Success Scenario	
→	Guest clicks on "Register" link.
←	System prompts Guest for their user information via Trainee registration form.
→	Guest enters user information in Trainee registration form.
←	System queries database to verify user name is unique.
←	System saves new Trainee user into database.
←	System notifies Trainee (Guest) that account creation is successful.
Flow of Events for Alternate Scenario 1	
→	Trainee enters an existing user name.
←	System returns notification to Guest to enter a different user name.

Use Case UC-4	View Portfolio
Related Requirements:	REQ-4, REQ-5, REQ-6
Initiating Actor:	Trainee/Manager
Actor's Goal:	To view current portfolio
Participating Actors:	Commodity API, Database
Preconditions:	Trainee/Manager is logged in.
Postconditions:	Account portfolio is displayed for Trainee/Manager
Flow of Events for Main Success Scenario	
→	(If manager) Manager selects which managed Trainee account to display.
→	Trainee/Manager clicks on "View Portfolio" link.
←	System queries market prices from Commodity API and updates database.
←	System pulls selected account portfolio information from database.
←	System displays current account portfolio information to Trainee/Manager.

Use Case UC-14	Provide end of training Feedback
Related Requirements:	REQ-4, REQ-6, REQ-7, REQ-8
Initiating Actor:	Manager
Actor's Goal:	To comment on Trainee performance
Participating Actors:	TimerTask, Database
Preconditions:	Manager is logged in, has Trainees to manage, and performance report is ready for review.
Postconditions:	Comments are saved and available for Trainee to review
Flow of Events for Main Success Scenario	
→	Manager selects which managed Trainee account to display.
→	Manager clicks on "View Performance Report" link.
←	System pulls selected account portfolio information and transaction history from database.
←	System displays performanace report information to Manager.
→	Manager clicks on "Provide feedback" link.
←	System prompts Manager for Trainee performance feedback.
→	Manager enters feedback for Trainee and clicks "Submit".
←	System saves feedback to database.
←	System returns notification to Manager that feedback has been successfully saved.

3.4 System Sequence Diagrams

In the sequence diagram listed below, we are to describe the interactions and how they respond in tow to our design philosophy. The interactions listed are dynamic and meant to infer an interaction to expedite time-sensitive sales for maximum impact. As such, communication from server to trader is to deliver the information to the user to maximize the decision making process.

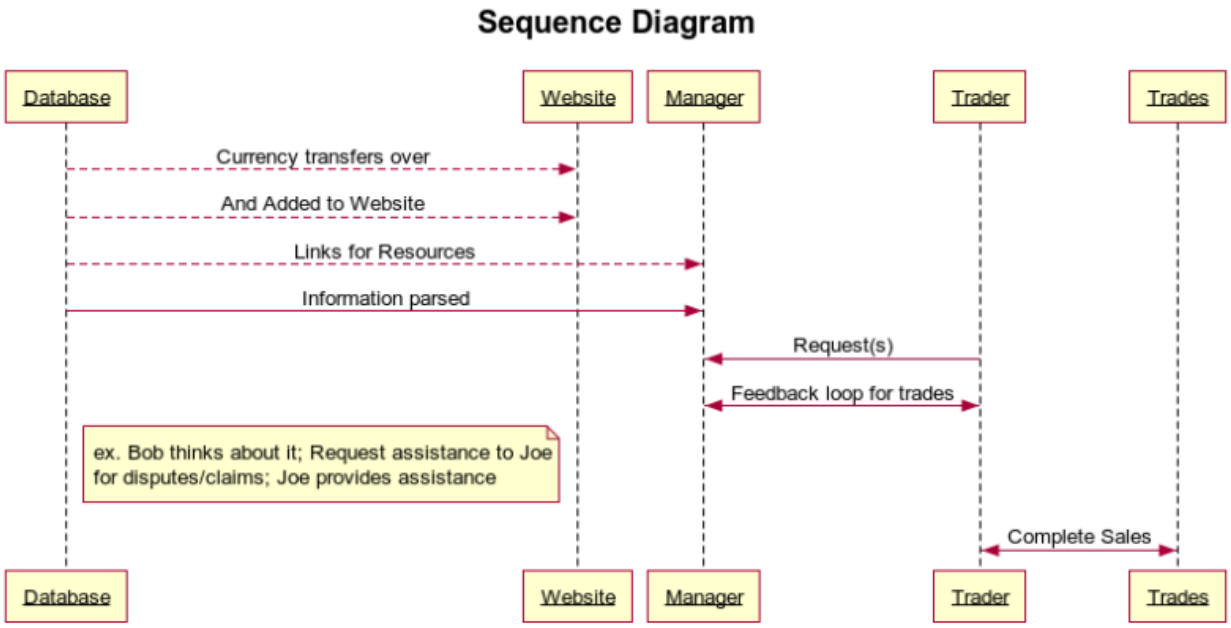


Figure 3.4: On page 23, Process to determine accuracy in sales begins in the database and trickles down to where the Manager and Trader are able to pull from resources to ensure that the onboarding process to determine accuracy remains in high integrity during the training process. Our indication of success goes back to the feedback loop between Manager and Trader to determine sales and an upward mobility in being able to accurately indicate and determine efficacy of trades.

4 User Interface Specification

4.1 Preliminary Design

The user interface (UI) for AgriCom Training will be a command center for users and managers to interact with their portfolio, manage their or trainees balance, conduct orders on products, and become a center of learning on how stock trading works with commodities. The Account Status page (Figure 4.1) will act as the home view for users to show what status their account is at by being able to view their balance, cast total and holdings all at once.

The UI should be lightweight so as to easily run on restrictive platforms such as mobile or tablet browsers. The color scheme should also be easy on the viewer and hold a basic pallet of colors that are web-supported.

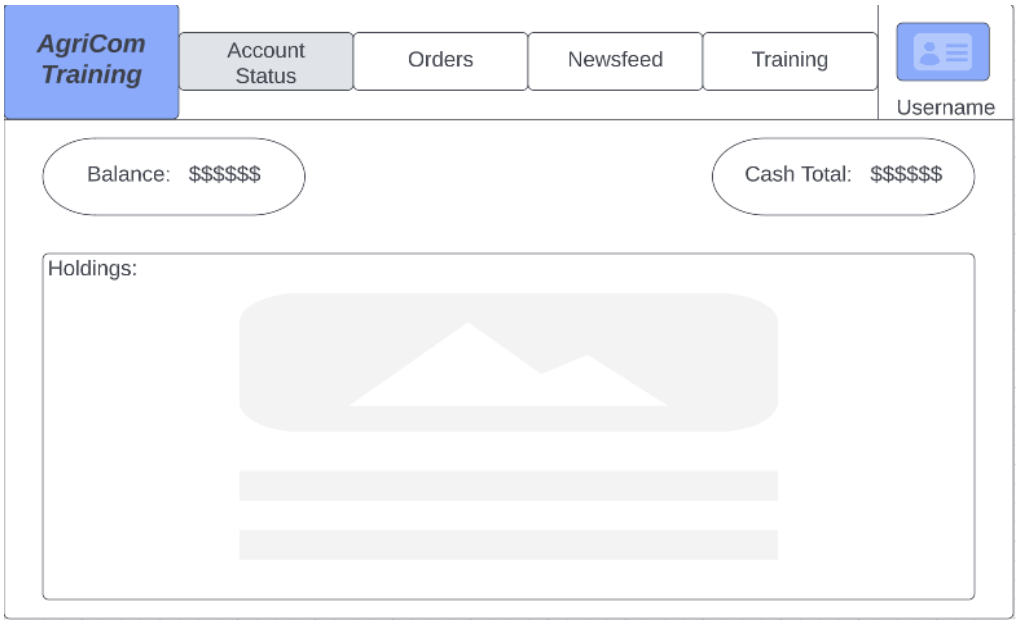


Figure 4.1 Preliminary design for Account Status page.

Landing Page and Login

While logging into AgriCom Training, a user has the ability to choose whether they are making a manager or trainee account. This initial page (Figure 4.2) also does not have any of the header navigation as the features of the website do require user authentication in order to proceed. The training page may be relaxed in the future, so users can have information without logging into the website about how to trade commodities.

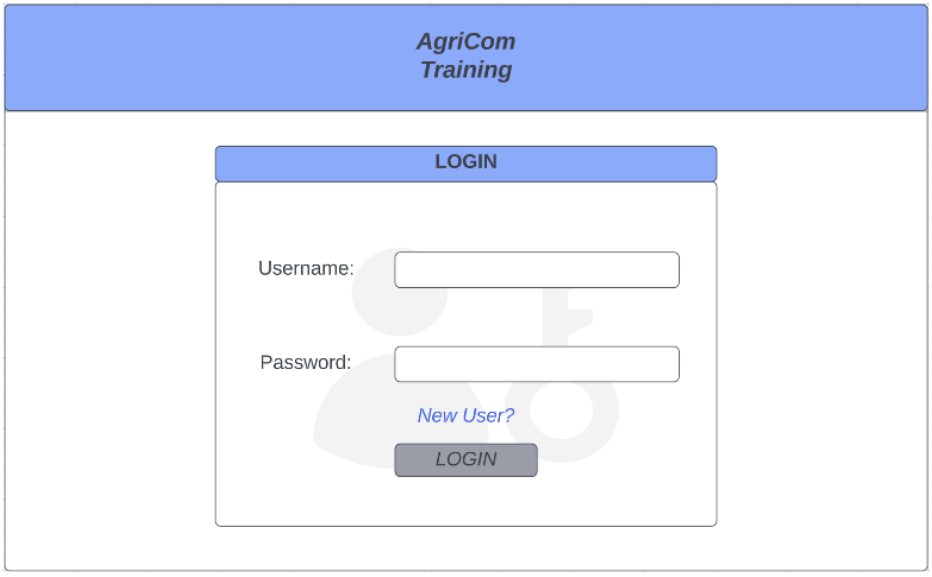


Figure 4.2: Preliminary design of AgriCom login page.

Orders

The Orders page (see Figure 4.3) is the most fluid in the preliminary stage as it has the most information on it and is the most subject to change visually as we code the system into working. It is our goal to have everything listed on the figure however the actual page may not look like this in the finished product. Stock details will be listed and the ability to buy/sell a commodity is found on this page. Users will be able to comment on stocks and other users will be able to see those comments made.

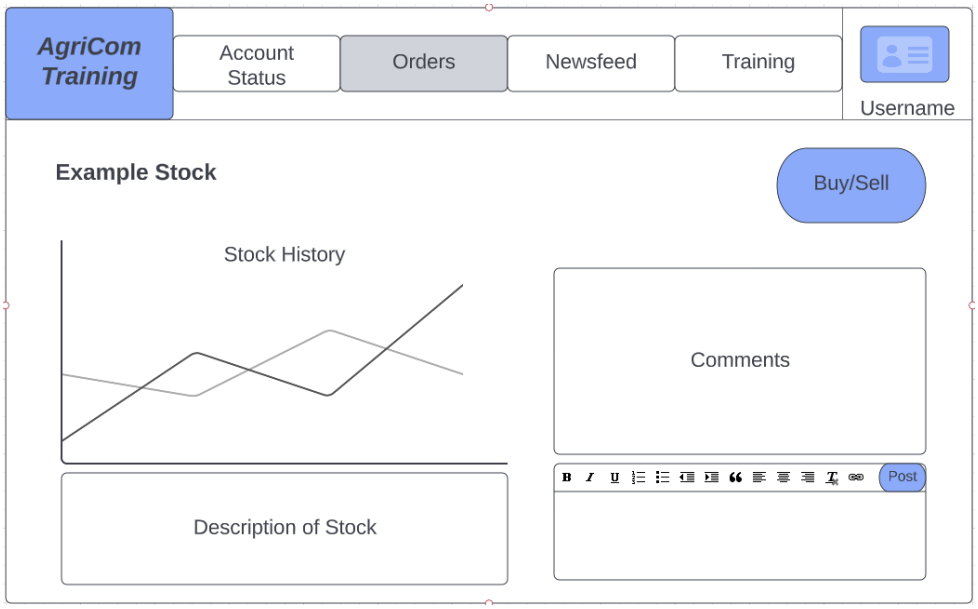


Figure 4.3: Preliminary design for Orders page, subject to change during coding.

Newsfeed

The Newsfeed page (Figure 4.4) gives information about what is happening on the account and gives a history of the events that have occurred. In the future we may add the ability for managers to see what is occurring on trainee accounts on their newsfeeds but at the moment this is mainly a benefit for trainee accounts.

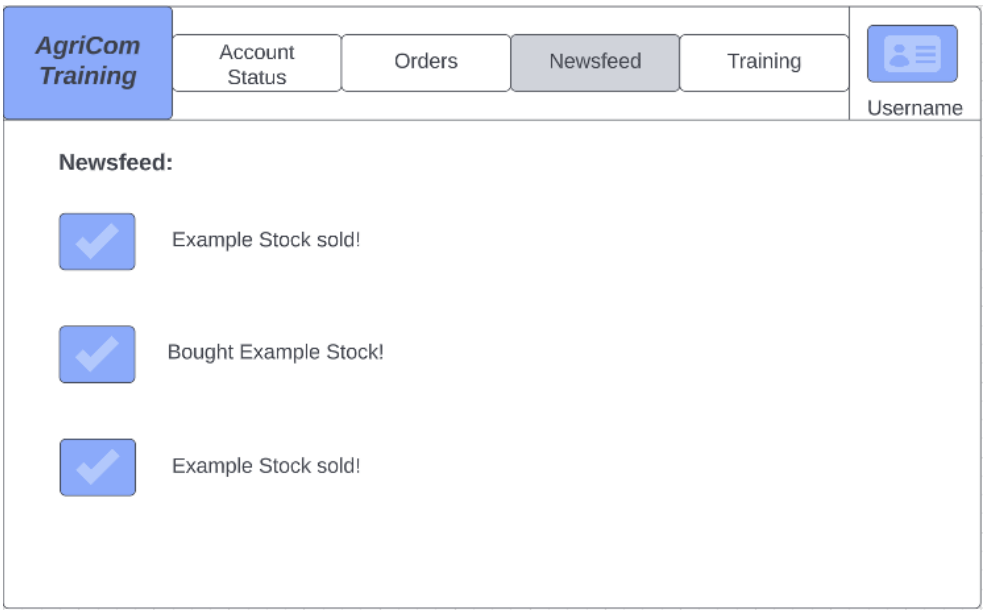


Figure 4.4: Preliminary design of Newfeed showing example events.

Training

Training (Figure 4.5) is a learning asset for all users to be able to gain more information about how to buy and sell commodities. This page is supplemental and useful to those who are just learning how to use the stock market. As mentioned above it may be implemented in the future that you may not need to login to access this page as it is purely an informational section beneficial to all who would access the site.

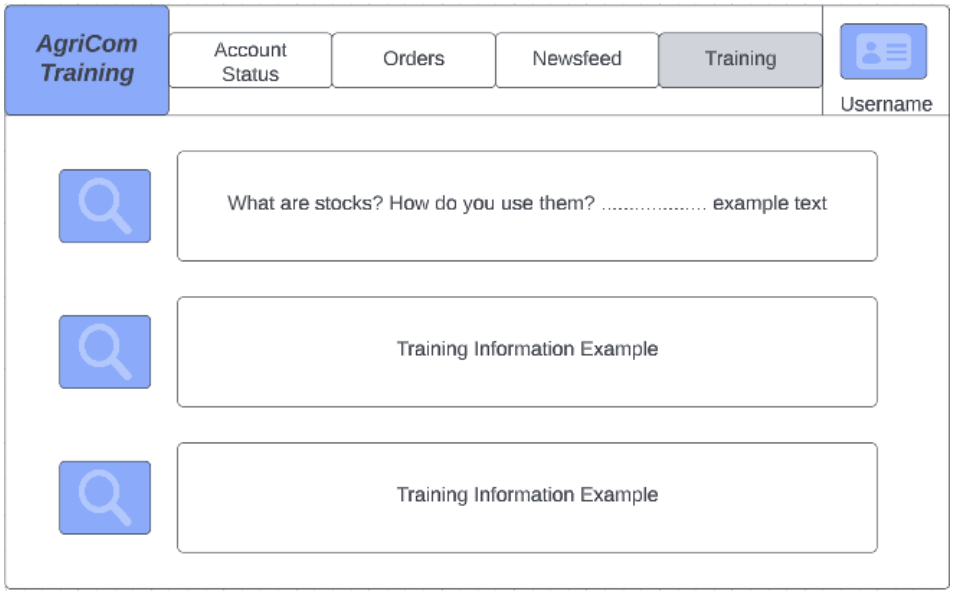


Figure 4.5: Preliminary design of Training page that will show useful information on how to buy and sell trading commodities.

User Settings

User Settings (Figure 4.6) lets the user have the ability to edit information on their account and change their password if needed. This is also the page where managers are able to add/remove funds from trainee accounts they are managing. The top left will show an actual username in the functional website.

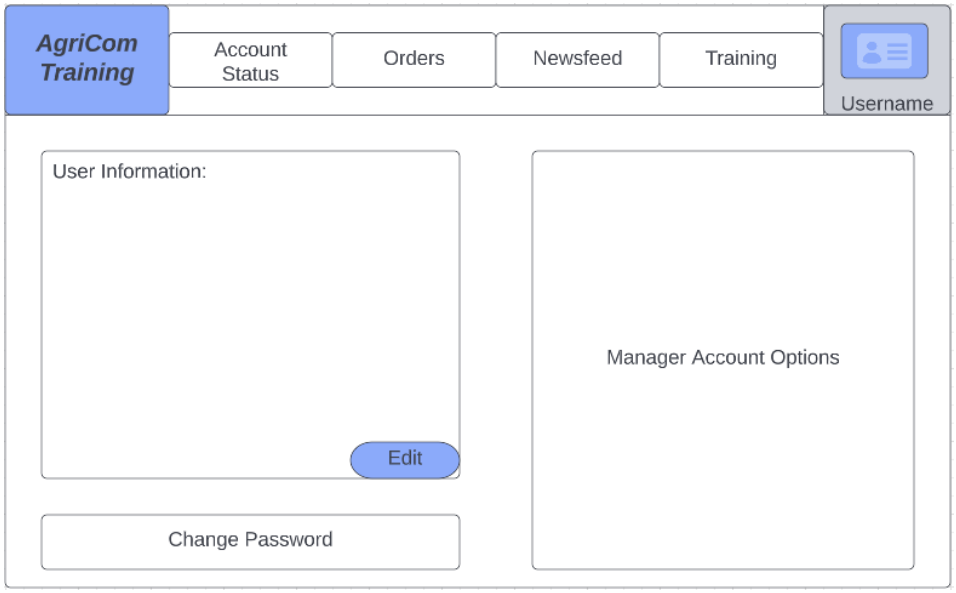


Figure 4.6: Preliminary design of User Settings where a user can change their basic information or a manager can set trainee account funds.

4.2 User Effort Estimation

Some of the most common use case scenarios for AgriCom Training:

Usage Scenario	Clicks	Keystrokes
Login to Existing Account	1 - 3	2 - 50
Register New Account	4 - 5	2 - 50
Buy/Sell Commodity	6	2 - 76
Create Comment on Stock	4	2 - 550

Login to Existing Account

Assume the user has already navigated to the domain and wishes to login if already a registered user:

- Data Entry
  - Click in the username textbox to enter registered username, 1 click.
  - Enter registered username, 1-25 keystrokes.
  - Click or tab into the password textbox to enter password, 0-1 click.
  - Enter registered password, 1-25 keystrokes.
  - Hit enter or click login, 0-1 click.

Register New Account

Assume the user has already navigated to the domain and wishes to create a new user account:

- Navigation
  - Click on New User button
- Data Entry
  - Click in the username textbox to enter a new username, 1 click.
  - Enter a username, 1-25 keystrokes.
  - Click in the password textbox or hit tab to enter a new password, 1 click or keystroke.
  - Enter a password, 1-25 keystrokes.
  - Select from dropbox whether trainee or manager account, 2 clicks.
  - Click Register, 1 click.

Buy/Sell Commodity

Assume the user has navigated to the domain and has logged into an already existing account:

- Navigation
  - Click on Orders header, 1 click
- Data Entry
  - Click on the search bar to enter commodity/stock name, 1 click.
  - Enter commodity/stock name, 1-50 keystrokes.
  - Hit enter or click on the search button, 1 click or keystroke.
  - Click on Buy/Sell button, 1 click.
  - Click on the amount textbox, 1 click.
  - Enter the amount of money the user wants to buy/sell, 1-25 keystrokes.
  - Click on the order button, 1 click.

Create Comment on Stock

Assume the user has navigated to the domain at the Order header and is logged into an already existing account:

- Data Entry
  - Click on the search bar to enter commodity/stock name, 1 click.
  - Enter commodity/stock name, 1-50 keystrokes.
  - Hit enter or click on the search button, 1 click or keystroke.
  - Click on the comment textbox, 1 click.
  - Enter comment, 1-500 keystrokes.
  - Click post, 1 click.

5 System Architecture

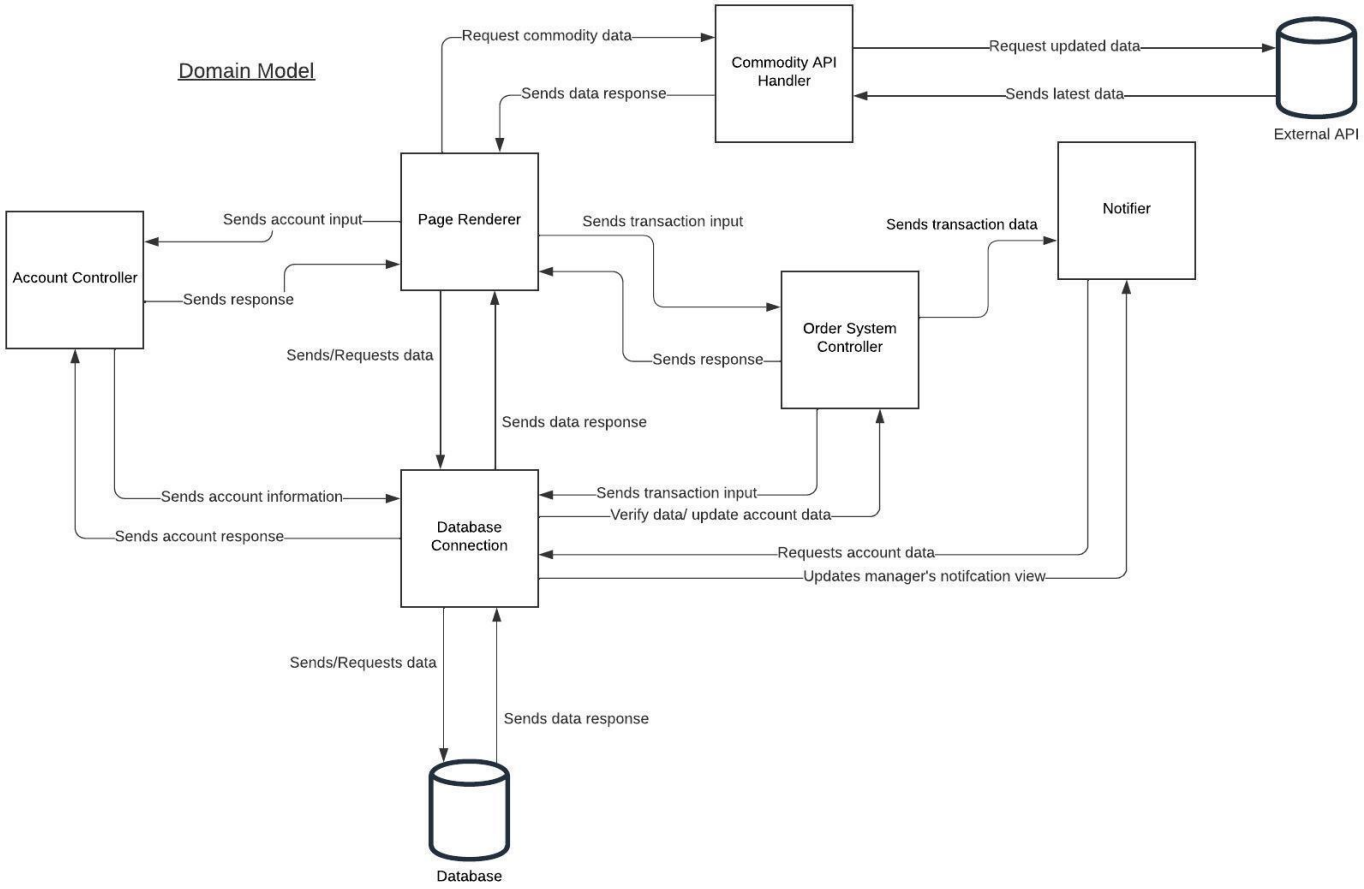


Figure 5.1: Domain Model

5.1 Identifying Subsystems

Concept Definitions

The definition of our concepts (Figure 5.1) are as follows:

- **Account Controller**
  - The first step for anyone using this system is to gain access by creating an Account. Account Creator is an interface that allows an user to create a new Trainee or Manager account. It will check with the database for an account with the same details, and if not found it will proceed to create the account and store the details into the database. The Account Controller can reset a Trainee's account balances and training timeframe data that is saved in the database.

- **Page Renderer**

  Takes user requests and creates a user-friendly page of the following:

  - **Trainee Profile View**
    - The Trainee Profile displays statistics and saved settings for the user that logs into AgriCom Training as a Trainee. Trainee Profile should query with the Database to find owned commodities and communicate with Commodity API Adaptor to retrieve the latest prices to update the account balance.

  - **Manager Profile View**
    - The Manager Profile displays managed Trainee accounts and saved settings for the user that logs into AgriCom Training as a Manager. Manager Profile should query the database to get information about its managed Trainee accounts.

  - **Login View**
    - The Login View displays a UI to allow the user to login with their ID. This will send a request to the account controller. If it fails the Login View will be updated to reflect this. If this succeeds the user will now see the Trainee Profile View or Manager Profile View.

  - **Transaction View**
    - The Transaction View displays the Trainee's transactions and comments. The Transaction View will query with the Database to find all transactions and comments related to the Trainee account. Comments on each transaction data can be made and saved to the database.

  - **Educational Information View**
    - The Educational Information View will display the educational information regarding commodity trading retrieved from the database.

  - **Commodity View**
    - The Commodity View will display a graph of the latest price of the commodity, price history, and news. The Commodity View will query with Commodity Data Handler and Database to retrieve the latest price, price history, and news information.

  - **Training Completion View**
    - This will be displayed instead of the Trainee Profile View when TimerTask determines that the trainee's training timeframe has expired. The Training Completion View will display overall profits or losses as well as the Trainee's transaction history and comments. More comments could be made.

- **Commodity API Handler**
  - Commodities-api.com's API provides the almost real time commodities data that our application is dependent on. Commodity Data Handler will send a request to Commodities-api.com to retrieve the latest commodity data and process and save them in the database. The Commodity Data Handler will also retrieve the latest news on a specific commodity and save the data in the database.

- **Order System Controller**
  - Any order placed by a Trainee will go through the Order System which will sum the cost of the transaction and check that the account balance is satisfied. This will require communication with the Commodity Data Handler to get the current price of the target commodity to be purchased/sold.

- **Database Connection**
  - We want to have a single subsystem maintain control of accessing the database to make retrieving information modular. This will allow expansion of the application to add additional functionality later which may also need access to the database. This should provide a layer of security so each subsystem does not access the database directly.

- **Notifier**
  - The notifier sends manager accounts of transactions made by their trainees.

Association Definitions

Concept Pair	Association Description	Association Name
Page Renderer <> Account Controller	Page Renderer sends a login request. The Account Controller can respond with Success or Failure.	Sends account input
Account Controller <> Database Connection	Account Controller sends user login details. Database Connection sends account info or failure.	Create account, Send account response
Page Renderer <> Commodity API Handler	Page Renderer requests to update data from Commodity API Handler. Commodity API Handler returns updated values.	Request commodity data
Page Renderer <> Database Connection	Page Renderer requests or sends stored data from or to Database Connection.	Request account data, Send account data, Update account data

	Database Connection sends or updates account information.	
Page Renderer <> Order System Controller	Page Renderer sends transaction data. Order System Controller respond with Success or Failure.	Send transaction input
Order System Controller <> Database Connection	Order System request account data from Database Connection. Order System verifies new transaction information with retrieved data. Send transaction data to Database Connection if successful.	Send transaction input, Request account data, Update account data
Database Connection <> Notifier	Notifier requests account data from Database Connection. Database connection sends account information. Notifier sends notification information for manager account to Database connection	Request account data, Send account data, Update account data
Order System Controller <> Notifier	Page Renderer sends transaction data to Notifier.	Send transaction input

Attribute Definitions

Concept	**Attribute**	**Meaning**
Account Controller	LoginStatus	Success or Fail to login
Account Controller	AccountCreationStatus	Success or Fail to create new account
Page Renderer	ViewType	Trainee Profile View Manager Profile View Login View Transaction View Educational Information View Commodity View Training Completion View
Commodity API Handler	RetrievalStatus	Success or Fail to retrieve new data

Order System Controller	ValidOrder	Success or Fail verification with account data
Order System Controller	OrderType	Buy or Sell
Database Connection	IsConnected	Success or Fail to communicate with database server
Database	AccountID, AccountType, NetWorth, TransactionID, TransactionList, Positions, Comment, CommodityID, etc	All system and account data
Notifier	Manager	Stores the manager account of the trainee to be sent back to Database Connection
Notifier	Message	Notification message to be saved in Database Connection

Traceability Matrix

		DOMAIN CONCEPTS					
Use Case	**PW**	Account Controller	Page Renderer	Commodity API Handler	Order System Controller	Database Connection	Notifier
UC1	25		X	X	X	X	X
UC2	25		X	X	X	X	X
UC3	15	X	X			X	
UC4	15		X	X		X	
UC5	10		X			X	
UC6	12		X			X	X
UC7	12		X			X	
UC8	11		X			X	
UC9	10		X	X		X	
UC10	10	X	X			X	
UC11	14	X	X			X	
UC12	14	X	X			X	
UC13	12	X	X			X	
UC14	18		X			X	X
Max PW		15	25	25	25	25	25
Total PW		65	203	75	50	203	80

5.2 Architecture Styles

To efficiently use our software, we must couple several software tools and principles into our design. The following architecture types will be expanded in detail below to reflect functionality in both the general sense as well as the functionality of the system as a whole. The systems that we include will be (and perhaps expand upon in the future) Client-Server access, Data-Centric Design, and RESTful design. Each of these architecture styles will be serving a part of the whole system.

Client-Server Access

All interactions are occurring on a client-server basis with our program as the client is constantly interacting with the interface. The user is and always will be the primary client and because of this must always be able to interact with the other subsystems. AgriCom Training must be completely accessible to the user. The infrastructure must be able to communicate as well with API's for stock information.

Data-Centric Design

Data is absolutely essential in the functionality of AgriCom Training, without it the system would not work as intended at all. The database will store bouts of data that is necessary for all aspects of the program. It will need to store important information from both user specific data as well as information from API's so that stocks can be regularly updated to reflect proper information when placing orders. Each time the user logs in, the system will have to have stored a host of personal data including but not limited to the user's portfolio, account holdings, settings, and history of transactions.

Representational State Transfer

When using a Client-Server Access system, a REST system is inherently implied. The RESTful design principles state that in addition to having a Client-Server Access system, the system is uniform, stateless, and cacheable as well as having a scalability of components. By using this interface it allows both the users as well as the designers to have streamline interactions with the interface. Each time the user is going to do an action on the webpage it is quite clear what is going to happen. If we were to want to make this compatible with mobile browsers the RESTful implementation would also help streamline the process.

5.3 Mapping Subsystems to Hardware

This system will be fairly lightweight with access to the application interface being provided through the client's web browser. The manager and trainee users can use their web

browser loaded onto their PC. The backend services such as the Account Controller, Order System Controller, Page Renderer, API Handler, Notifier, and Database will be handled by the server. The server side subsystems will handle the inputs from the application interface and display the validated outputs after running through the logic programming while communicating with the database and API feed.

5.4 Network Protocol

In accordance with standards on a typical web-based application, AgriCom Training will use the standard Hypertext Transfer Protocol (HTTP). HTTP structures text which is used in hyperlinks to communicate messages between nodes. It is not particularly unique however it is still the primary protocol in how the user and software communicate between each other. From any browser medium, a user is able to access multiple links and web pages throughout the AgriCom Training website. Most importantly, they will be able to access through this protocol all relevant stock information, portfolio history, and other relevant information throughout the website.

5.5 Global Control Flow

Execution Order

For the most part, the AgriCom Training System is an event-driven system. The elements and features of the system are largely triggered by the user or by an embedded portion of the system, with the users being in the majority for triggering the events. Viewing portfolio, history, adding comments, etc. are some of the features that are only available for the user to trigger. Alternatively, some of the triggering embedded portions of the system are the behind the scenes processes that run on certain events. A user submitting a buy or sell order will also initiate the system to call the Commodity API to retrieve current market values.

A few functionalities have an established linear order in which the process requires a specific order of events. These functionalities are:

- Registering in the system: All users must be registered before they can attempt to use any of the systems' functionality.

- Adding Trainees to manage: All Managers must add Trainees to manage before they can review Trainee accounts, leave comments, or leave feedback.

Time Dependency

The AgriCom Training System is largely a real-time system for most of the functionalities, however, there are some features that are event-driven and not dependent on time as well. There are system features that are dependent on the commodity trading hours which are limited to specific time intervals depending on numerous factors such as time of day, day of the week, commodity trading, national holidays, etc.

- Commodity trading hours: The commodity market has specific time intervals for when the market is open and closed.
- TaskTimer: Fetches market information at regular periodic intervals to store into the database.
- Trainee training regiment: An monthly periodic interval set for Trainee accounts to know when to generate the Trainee performance report and allow for Manager review and feedback.

5.6 Hardware Requirements

- Disk storage – minimum of 10 GB of available space on hard disk should be more than enough to handle the low requirements of the software package on the desktop
- Display - minimum resolution of 1280 x 800 color monitor
- Memory – minimum 2GB of RAM
- Network – minimum of 100 mbps bandwidth to ensure adequate response times for the real-time market data
- Operating System – minimum Windows 10 32-bit with latest updates to ensure compatibility
- Peripherals – keyboard, mouse (or compatible pointing device), and either a wireless or wired network card
- Processor – minimum CPU with 1 GHz frequency

6 Project Size Estimation

We have employed the “Use Case Points” system of estimating the effort necessary to create the system. This is done due to the need to have a metric on the complexity of the design of the project in order to properly delegate resource allocation, with the acceptance that the created metric is necessarily subjective and arbitrary.

6.1 Background

The estimation of “Use Case Points” or UCP is calculated based on the team’s perception of the project’s complexity and the team’s efficiency. Each variable in the computation is defined and computed separately using weighted values, subjective values, and constraining constants. The equation for computing UCP is as follows:

$$UCP = UUCP \times TCF \times ECF$$

In this equation, Unadjusted Use Case points (UUCP) are calculated as a sum of two components:

- Unadjusted Actor Weight (UAW) which is based on the combined complexity of the actors in all the use cases.
- Unadjusted Use Case Weight (UUCW) which is based on the number of activities contained in the use case scenarios.

There are also two complexity factors in this equation: technical and environmental. The technical complexity factor represents the challenge of implementing nonfunctional requirements of a system. There are two constants used with the technical complexity equation, the first being $C_1 = 0.6$ and the second being $C_2 = 0.01$. Meanwhile the environmental complexity represents the miscellaneous factors such as experience and time management. There are also two constants used for the environmental complexity equation which are $C_1 = 1.4$ and $C_2 = -0.03$. The complexity factor equation is as below:

$$CF = c_1 + c_2 \sum_{i=1}^{13} w_i F_i$$

6.2 Unadjusted Actor Weight

Actor Name	Description	Complexity	Weight
Guest	User who has not yet registered or been authenticated by the system	Simple	1
Manager	User who has been registered as a manager account	Complex	3
Trainee	User who has been registered as a trainee account	Complex	3
Browser	Allows interaction between user and system	Simple	1
CommodityAPI	Provides up-to-date commodity prices for the system	Average	2
Database	Holds all information of current user accounts and their portfolios	Average	2
TimerTask	Task that executes after a certain time period has been met	Simple	1

6.3 Unadjusted Use Case Weight

Use Case	Description	Complexity	Weight
Buy Commodity UC - 1	To buy a commodity. This involves the Trainee filling out and submitting a buy order ticket of a specified commodity and its market price queried from Commodity API. The order ticket will be processed and its data saved in the Database. Changes to the Trainee's portfolio will be reflected.	Complex	15
Sell Commodity UC - 2	To sell a commodity. This involves the Trainee filling out and submitting a sell order ticket of a specified commodity at the current market price queried from Commodity API. The order ticket will be processed and its data saved in	Complex	15

	the Database. Changes to the Trainee's portfolio will be reflected.		
Register as Trainee UC - 3	To register an account as a Trainee. This involves the Guest to fill out the Trainee registration form with their user information. The Database will check to make sure that the user name submitted is unique and create an account for the Guest.	Simple	5
View Portfolio UC - 4	To view the current status of an account's portfolio. This involves the User selecting an account to display the current portfolio information retrieved from the Database. The Database will update the holdings and account total with the latest values retrieved from the Commodity API.	Average	10
End of Training Feedback UC - 14	To comment on the performance report of a managed Trainee at the end of their training regiment. This involves the Manager to access and review a Trainee's performance report as well as their transaction history to provide feedback for the Trainee.	Simple	5

6.4 Technical Complexity Factor

Technical Factor	Description	Weight	Perceived Complexity	Calculated Factor
Distributed System	Distributed system between end users having access through web and main server.	2	5	10
System Performance	System performance expected to be good but nothing exceptional.	1	3	3
User Efficiency	End users expect efficiency but no exceptional demands.	1	3	3
Reusability	No requirements for the system to be reusable.	0.5	0	0

Ease of Use	Ease of use for users is imperative.	0.5	3	1.5
Ease of Change	System should only change marginally, so ease of change is a low priority.	1	1	1
Concurrent Use	Concurrence is an issue due to users having access to activity, history, and the system has to poll data.	2	5	10
Security	Security is important but does not require extreme efforts.	1	2	2
Training Requirements	System should be easy to use, but basic tutorials are available to users.	1	1	1

6.5 Environmental Complexity Factor

Environmental Factor	Description	Weight	Perceived Complexity	Calculated Factor
Application Experience	Some novices to the field of finance and some have experience.	0.5	0	0
Development Experience	Some competent with UML-based development and construction processes as well as some beginners.	1.5	1.5	2.25
Motivation	Motivation is high to finish project but fluctuates over the semester	1	3	3
Stable Requirements	Requirements are defined but only approximate.	2	3	6
Time Management	All developers are working very few hours a week due to jobs and other classwork.	-1	5	-5
Language	Developers are using a collection of modern languages where some are familiar and some are not.	-1	2	-2

6.6 Calculations

UAW = # of Simple x 1 + # of Average x 2 + # of Complex x 3 = 3 x 1 + 2 x 2 + 2 x 3 = 13

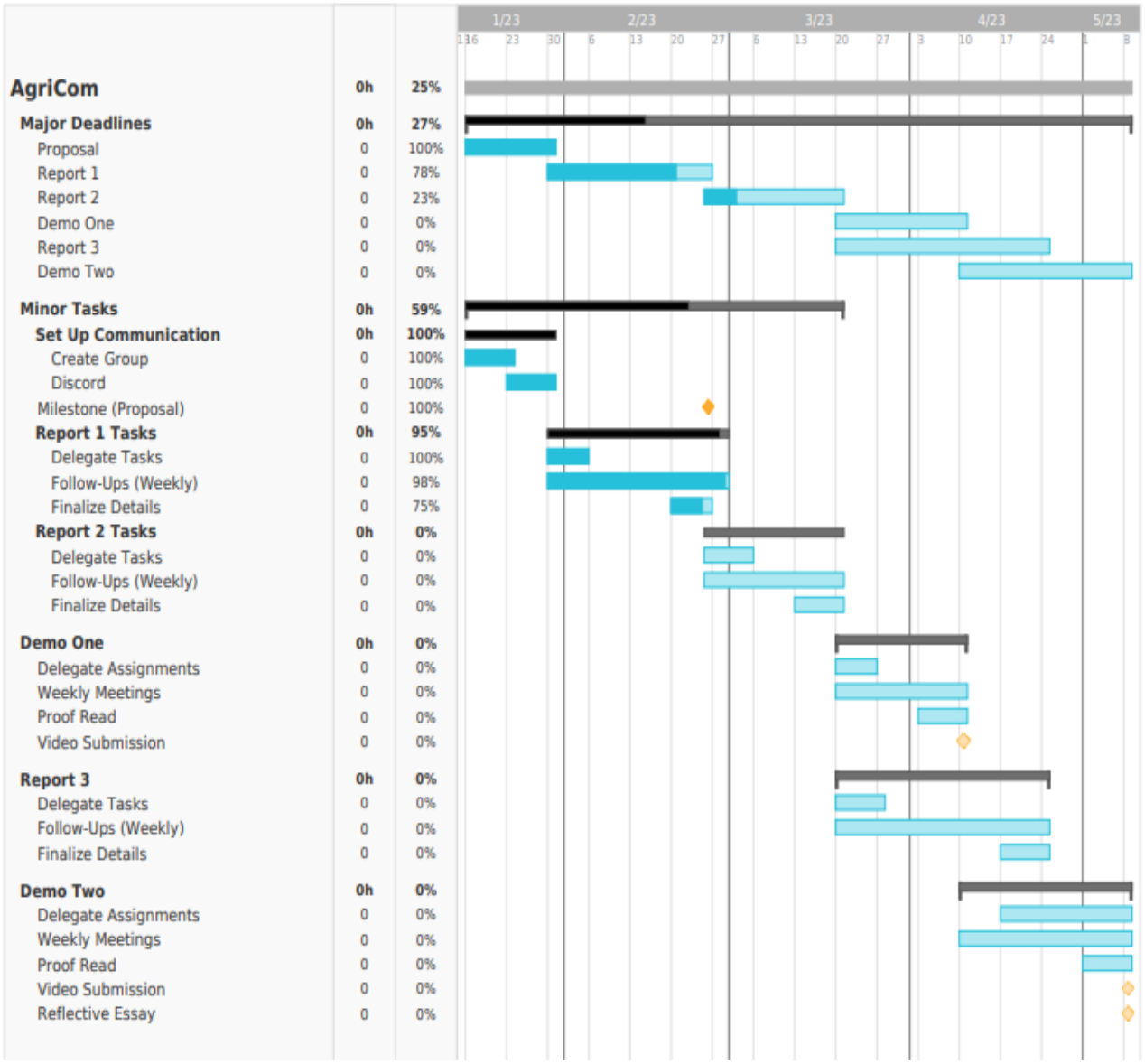
UUCP = # of Simple x 5 + # of Average x 10 + # of Complex x 15 = 2 x 5 + 1 x 10 + 2 x 15 = 50

TCP = 0.6 + 0.01 * (Technical Factor Total) = 0.6 + 0.01 * (31.5) = 0.915

ECP = 1.4 - 0.03 * (Environmental Factor Total) = 1.4 - 0.03 * (4.25) = 1.2725

***UCP* = (*UAW* + *UUCW*) x *TCF* x *ECF* = (13 + 50) x 0.915 x 1.2725 = 73.35**

7 Plan of Work



8 Report 1 Contributions

	Names				
Category	David Gladden	David Schiffer	Alexis Angel	Calvin Ku	Christopher Katz
Project Management/Formatting	10%	10%	60%	10%	10%
Customer Requirements	15%	0%	0%	15%	70%
System Requirements	25%	25%	25%	25%	0%
Functional Requirements	30%	20%	0%	30%	20%
User Interface Specification	0%	0%	100%	0%	0%
System Architecture	25%	25%	25%	25%	0%
Project Size Estimation	0%	0%	100%	0%	0%
Plan of Work	0%	0%	0%	0%	100%

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