TallyUP

Project Document

Jeramie Castillo
jeramiec@uw.edu

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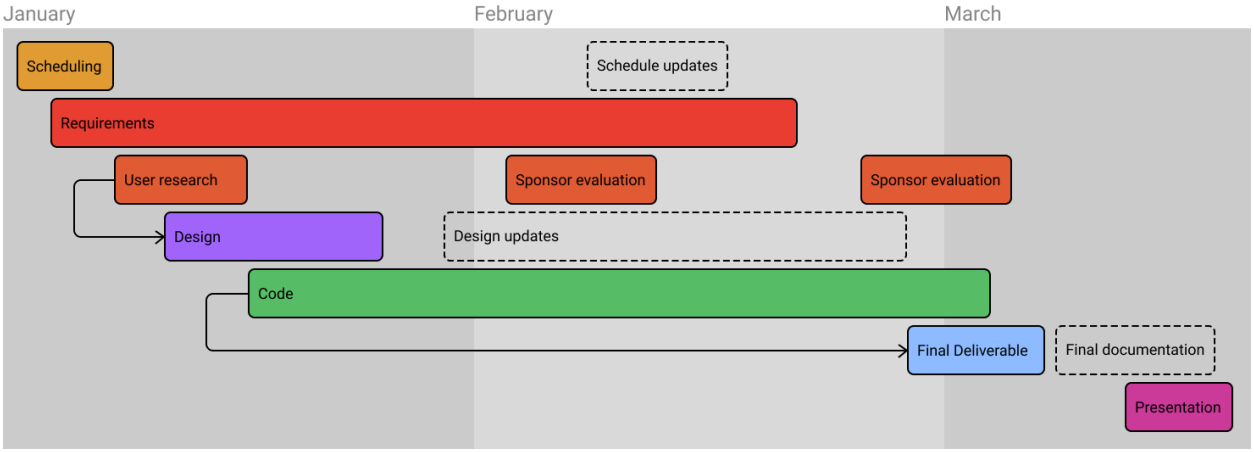
Project Plan

The listed tasks provide an overview of the overall project work schedule throughout the quarter. Each task is expected to be completed by the listed due date. Upon completion, the status box will be marked green. A yellow status box indicates a task is in-progress. An empty status box indicates that a task is not yet completed.

Task	Info	Due Date	Status	Notes
Gather Requirements	Continue building understanding of project scale, develop goals and expectations for sponsors and advisor	January 8, 2021		Created Software Specification Requirements section in document.
Conduct User Research	Contact capstone sponsors and potential users; discover user needs	January 15, 2021		Developed elaborate research plan.
Design Application	Create mockups, storyboards, and product flow based on conducted user research. Also plan code design and structure (for SQL, JavaScript, etc.)	January 20, 2021		Analyzed user research needs; updated requirements.
Implement Design	Develop SQL code and design	February 5, 2021		Utilized SQL, PHP, HTML, JavaScript in a XAMPP stack.
Testing	Test and review application. Debug where needed.	February 12, 2021		
Gather Feedback	Gather feedback from sponsors and/or advisor. Redesign/implement where needed.	February 26, 2021		Feedback was gathered often during the testing period.
Final testing and Sponsor/Advisor Evaluation	Present final product to sponsors and advisor. Discover any issues and	March 5-10, 2021		
Final documentation	Create deliverable document/manual for users such as product information and features.	March 12, 2021		Included capstone poster, presentation, and project document
Colloquium Preparation	Create and practice presentation for colloquium	March 18, 2021		
Colloquium Presentation	Present final product to Colloquium	March 19, 2021		

Visual Schedule w/ Gantt Chart



Software Development Life Cycle Model

- Agile model
  - Allows the product to be developed through many deliverables. A skeleton prototype maps out base requirements and further incremental changes are made and tested based on customer (in this case, sponsor's) needs. This helps create a product that best meets user needs and requirements.

Resources Supporting Project Development

- Forest App
  - While it may seem like a simple concept, this tool has allowed me to stay focused throughout the quarter. Its goal is to keep you from using your phone and penalize you when doing so.

- Planner
  - A standard, yet organized, method for setting goals, plans, and tasks throughout the span of the quarter. This tool allows me to keep a physical eye on things that are expected to be completed by the specified date.

- Fundamentals of Database Systems 7th Ed. By Ramez Elmasri
  - This textbook is a helpful resource in creating quality SQL database structures. Not only does it provide details on SQL code properties, syntax and structure, but also methodologies and practices to help developers familiarize themselves with the language.

- W3Schools
  - Website which includes tutorials, information, and documentation of languages used during this project. Topics include HTML, CSS, PHP, and SQL.

Software Specification Requirements

Introduction

TallyUP is an all-in-one inventory management and expense sheet tool for small e-commerce business owners and secondhand sellers. This is a tool that can be easily transferrable and customizable for each company, allowing full control on how one may use the application – meaning that small Etsy brands or sneaker resellers may configure this tool to fit their inventory type. Unlike commercial inventory management tools, TallyUP can offer insights/analysis on one's current inventory, like market value estimates or predictions. With many business owners simply log their company expenses into an Excel spreadsheet, this tool will offer new features that all business owners would love to utilize all while maintaining a simple and accessible experience. Things like pulling the best prices of a specific expense or providing more analysis tools on current expenses are just some of the many features that this tool will introduce.

Functional Requirements

Functional Requirement #	**Functional Requirement Description**
TU-FR1	Account creation and profile for personalized experience
TU-FR2	Users can enter new product information such as price and dates purchased/sold
TU-FR3	Users can edit which entry types is shown in their inventory/expenses (name, size, quantity, purchase date, sold date, total price, etc.)
TU-FR4	Interface allows for different sorting methods; alphabetically, brand, type, quantity, price high/low, and dates purchased/sold
TU-FR5	Users can edit product information such as price and dates purchased/sold
TU-FR6	Users can view total net gain/loss and profits/losses
TU-FR7	Users can add, remove, delete inventory listed
TU-FR8	Create graphs of daily, weekly, and overall sale reports
TU-FR9	Create graphs per item type in inventory
TU-FR10	Compile monthly sales and expense reports
TU-FR11	Users can click on an item in their inventory and be sent to its product listing page or product marketplace page
TU-FR12	Users can add business-related items in their expense sheet if applicable
TU-FR13	Users can click on an item in their expense sheet and be directed to its cheapest online price
TU-FR14	Application will allow all CRUD (create, read, update, and delete) functions and operations
TU-FR15	Application will utilize a XAMPP stack server architecture

Non-functional Requirements

Non-functional Requirement #	**Non-functional Requirement Description**

TU-NF1	System will be built on an SQL database via MySQL Workbench, then connected to PHPMyAdmin
TU-NF2	Inventory (clothing/sneakers only) list syncs with marketplace inventory like StockX and GOAT
TU-NF3	Expense sheet list syncs with retail sites for price matching
TU-NF4	Compatibility on both desktop and mobile devices
TU-NF5	Ability to export and import via .csv or .xlsx file formats
TU-NF6	Notifications options for inventory and/or market price thresholds
TU-NF7	Two-factor authentication option upon login

Design Influences

- PCPartPicker
    - Ability to compare prices online and search for best-possible deals. Pulls and refreshes prices from various e-commerce sites such as Amazon, Newegg, B&H Photo, and Adorama.

- Microsoft Excel
    - A great foundation for inventory management; gives many tools to start a simple inventory/expense sheet but may be cumbersome when trying to analyze useful data and graphs.

- StockX & GOAT
    - These popular global marketplaces utilize statistical analysis to capture trendlines, price premiums, and average sale prices based on user sales. For many, these sites are starting points for some users who are using TallyUP. While some of the data and graphs are useful, most of it can be quite unreliable since it captures data outside of its own application (ex. eBay).

- eBay & Etsy
    - Popular starting points for independent business owners to sell goods. Product listings can be made based on one's choosing, although these sites generally do not offer intuitive methods to manage or analyze inventory.

- BECU App
    - Shows statistical analysis on daily, weekly, monthly, and yearly spending and earnings in bank account.

- Amazon
    - In particular, the Amazon wishlist system is a great way to find the best prices in an easily accessible list. Within this system, Amazon presents the best possible price along percentage decreases/increases when a product's price was recently changed. It also shows best possible prices

from other sellers which allows users to save even more money when purchasing through this system.

- Grailed
    - This popular marketplace does a great job with their notification system; when a price is lowered, a notification is immediately sent to users notifying them of any changes. When a product is relisted/restocked, a notification is also immediately sent to users regarding this update.

Tools

Tool	**Usage**
SQL	Framework for creating, sorting, and modifying inventory and expense sheets. Serves as the main database for the application.
MySQL Workbench	Visual database design tool for SQL development.
Mockaroo	Random table test data generator for SQL. Helps create views, triggers, and discover any bugs within the application.
PHP	Web development programming language for connecting the application's database to a web server.
phpMyAdmin	MySQL administration tool used to manage MySQL databases on a web server.
JavaScript	Allows for webpage scripting and interactive design.
HTML	Standard language for web application design
CSS	
Figma	Prototype development for overall layout and design for application.
GitHub	Code progress will be uploaded regularly for version control and easy shareability.
Draw.io	Maps out the database schema and Entity Relationships for the back-end database design of the application. This helps both normalize the data and determine how data will be entered into the system.
XAMPP	A full-stack web server solution for developing the TallyUP web application.
Notepad++	Versatile source code editor that is utilized for HTML, PHP, and JS development.
Undraw.co	Free and open-source SVG illustrations for websites to use as simple web page design elements.
Font Awesome	Font and icon toolkit for CSS and design

Research Plan

Hunt Statement

“To understand the needs for business owners and/or second-sellers who seek to utilize inventory management tools that further increase both productivity and efficiency within their business(es).”

Foundational/Field Research

The following user research questions create the framework for discovering user needs for TallyUP. All information collected from this research further develops the scope and understanding of this application. Furthermore, each question is to be answered to the best of the interviewee’s ability, meaning that the interviewee can skip if they have no answer or are not comfortable in answering said question. There are three separate sections within this questionnaire; Q1-4 includes inventory management; Q5-6 includes managing expenses; Q7 includes data analysis; and finally, Q8 is a concluding research question. The questions are as listed:

1. What resources are you familiar with when it comes to inventory management?

2. Have you ever created an inventory sheet for your business? If so, why do you use this? [If no] What features do you expect to find within this tool?

    a. What is the best part about your current methods for inventory management?

    b. What is the worst part about your current methods for inventory management?

    c. Are there any features that would help provide you a better experience?

3. Tell me about your process when a sale is made from your business – provide me as many steps as you can starting with the moment a product is sold.

4. Why do you think businesses utilize inventory management tools?

5. What resources are you familiar with when it comes to managing expenses?

6. Have you ever created an expense sheet for your business? If so, why do you use this? [If no] What features do you expect to find within this tool?

    a. What is the best part about your current methods for managing expenses?

    b. What is the worst part about your current methods for managing expenses?

    c. Are there any features that would help provide you a better experience?

7. Have you ever analyzed the data within your sales and expenses? If so, what do you look for when analyzing this data?

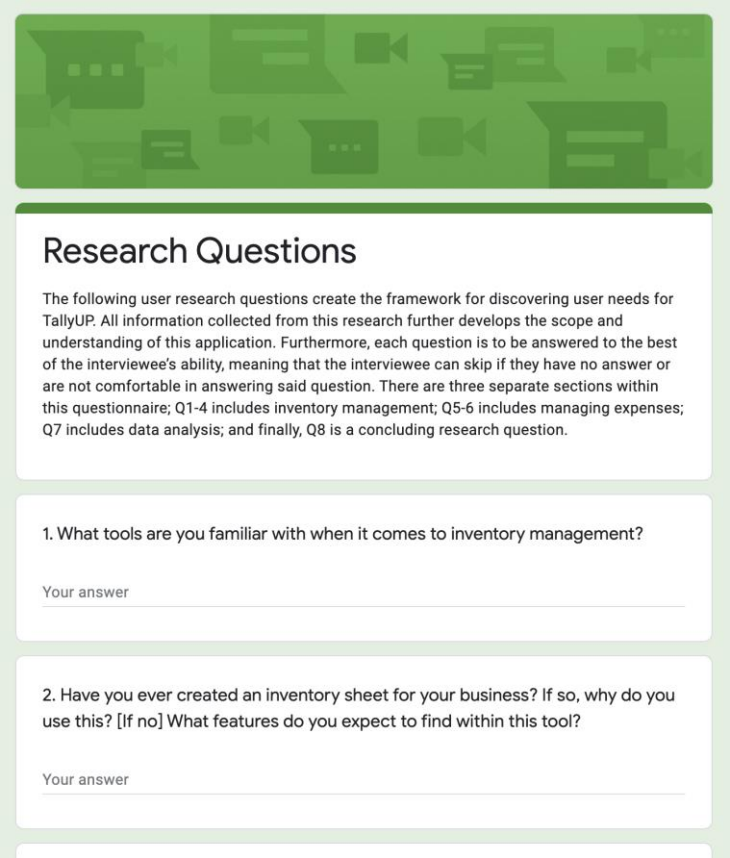
    a. When it comes to data analysis, what methods or features do you find helpful for analyzing (ex. graphs, filters)?

8. Tell me about a time when these tools greatly impacted your business (whether it was for better or for worse). [OR for tools not used] What ways do you think these tools can help or hurt your business? How and why?

A separate document has been created for the purposes of collecting answers from this user research.

Target customers

The user research study focuses on small e-commerce business owners within the Seattle area. It was important that this interview was conducted via voice conference to receive the best results. For individuals who were unavailable for voice conferences, a separate form was created to record their answers, which can be found **here**.



Research Questions

The following user research questions create the framework for discovering user needs for TallyUP. All information collected from this research further develops the scope and understanding of this application. Furthermore, each question is to be answered to the best of the interviewee's ability, meaning that the interviewee can skip if they have no answer or are not comfortable in answering said question. There are three separate sections within this questionnaire; Q1-4 includes inventory management; Q5-6 includes managing expenses; Q7 includes data analysis; and finally, Q8 is a concluding research question.

1. What tools are you familiar with when it comes to inventory management?

Your answer

2. Have you ever created an inventory sheet for your business? If so, why do you use this? [If no] What features do you expect to find within this tool?

Your answer

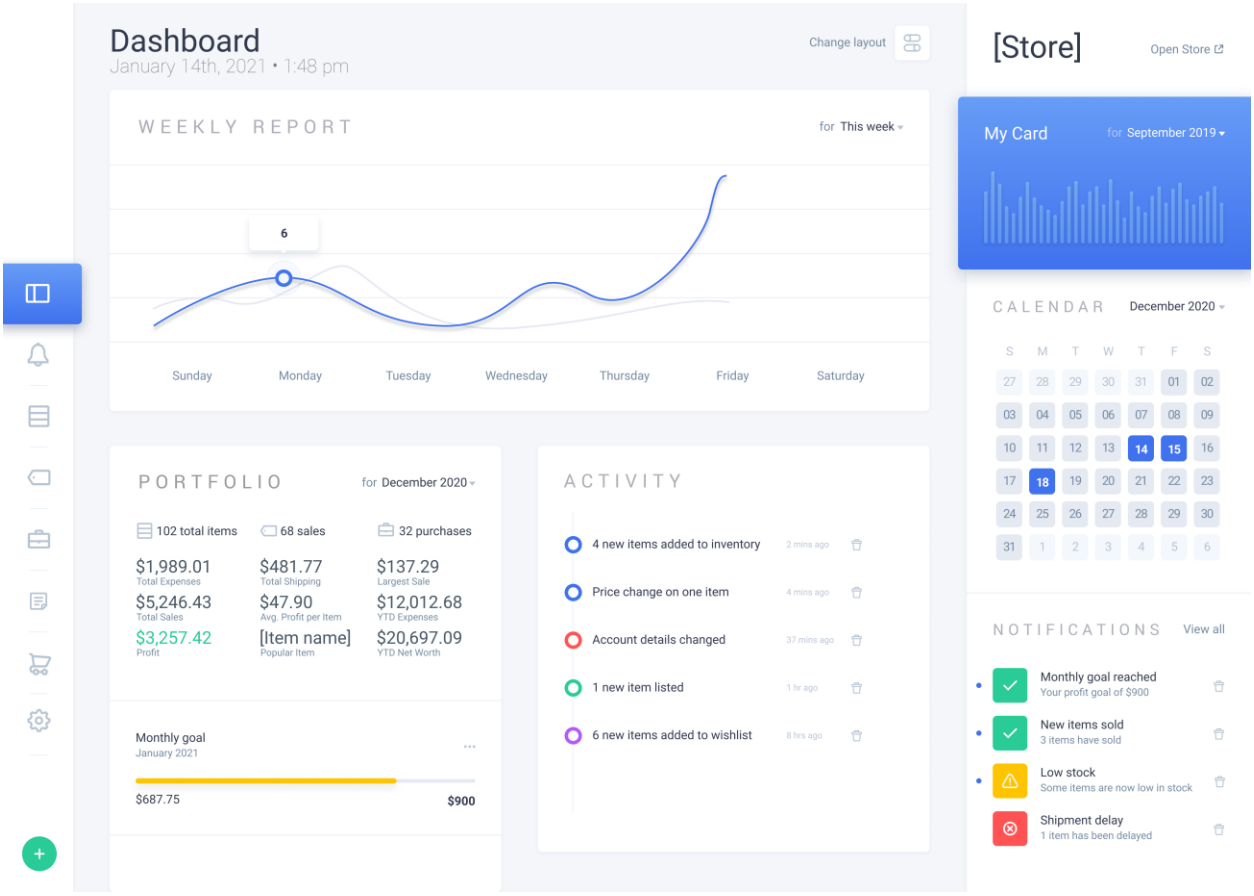
The list of target storeowners for interview along with their company names are as follows:

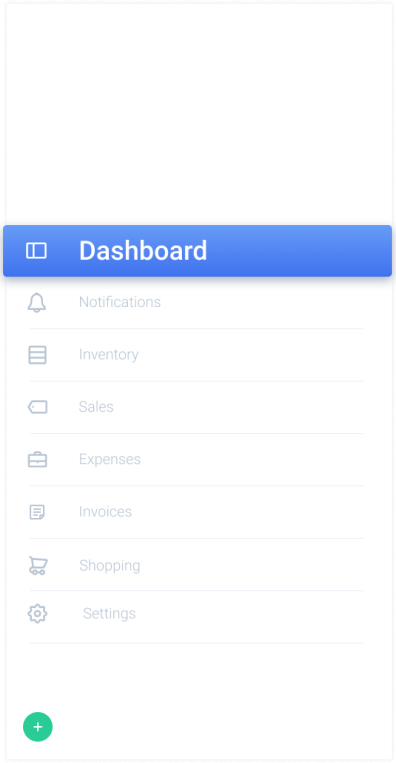
- Emily: Pout
- Erik: Grailed store
- Josh: Plug Seattle
- Abby: Solescense
- Kevin: Sole Seattle
- Justin: Drip Tea / Drip Tea Market

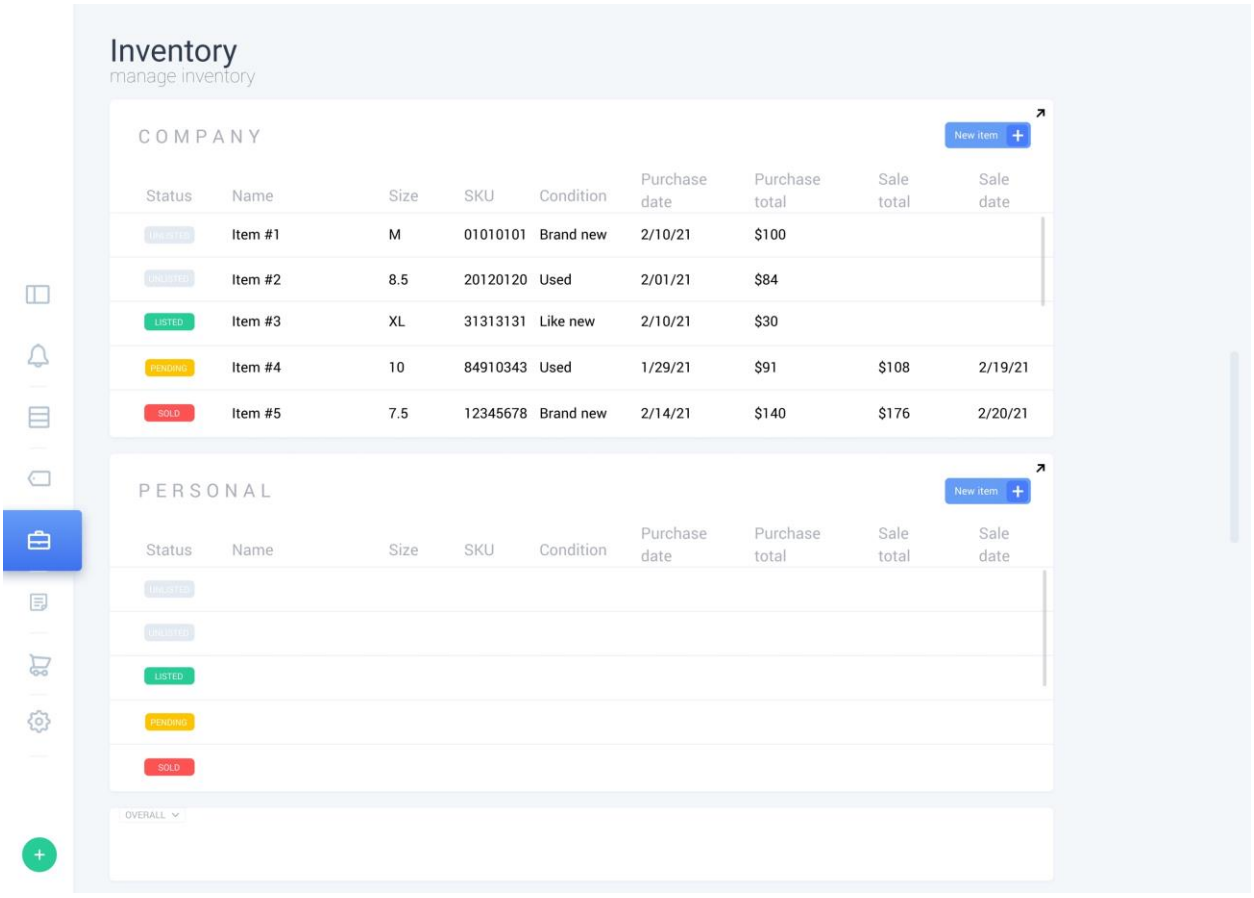
Design & Prototype

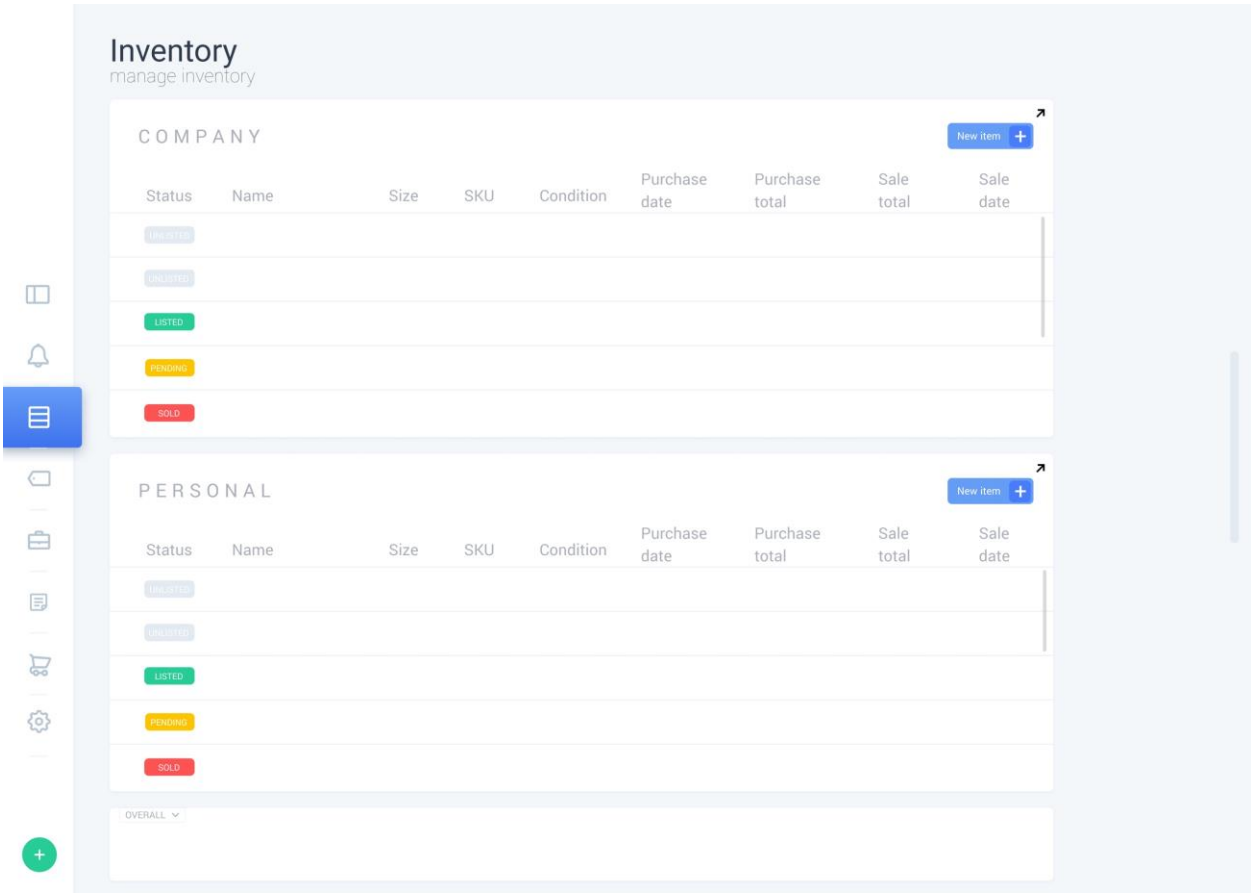
Initial Prototype

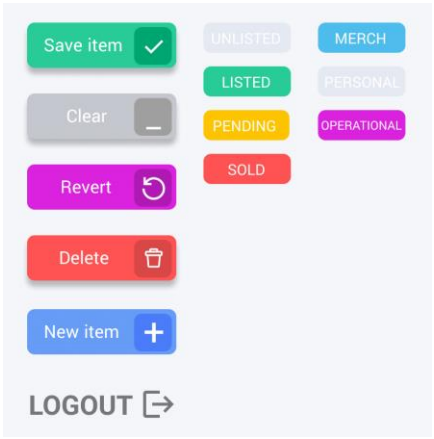
The initial prototype was prepared using a design application such as Figma to represent an application that best-fits the user interface based on user needs found during user research. This product design is subject to change based on the replicability when implementing.




Dashboard
Notifications
Inventory
Sales
Expenses
Invoices
Shopping
Settings


Inventory
manage inventory
COMPANY
New item
Status Name Size SKU Condition Purchase date Purchase total Sale total Sale date
Item #1 M 01010101 Brand new 2/10/21 $100
Item #2 8.5 20120120 Used 2/01/21 $84
LISTED Item #3 XL 31313131 Like new 2/10/21 $30
PENDING Item #4 10 84910343 Used 1/29/21 $91 $108 2/19/21
SOLD Item #5 7.5 12345678 Brand new 2/14/21 $140 $176 2/20/21
PERSONAL
New item
Status Name Size SKU Condition Purchase date Purchase total Sale total Sale date
LISTED
PENDING
SOLD
OVERALL





The application's navigation layout has been divided into various sections:

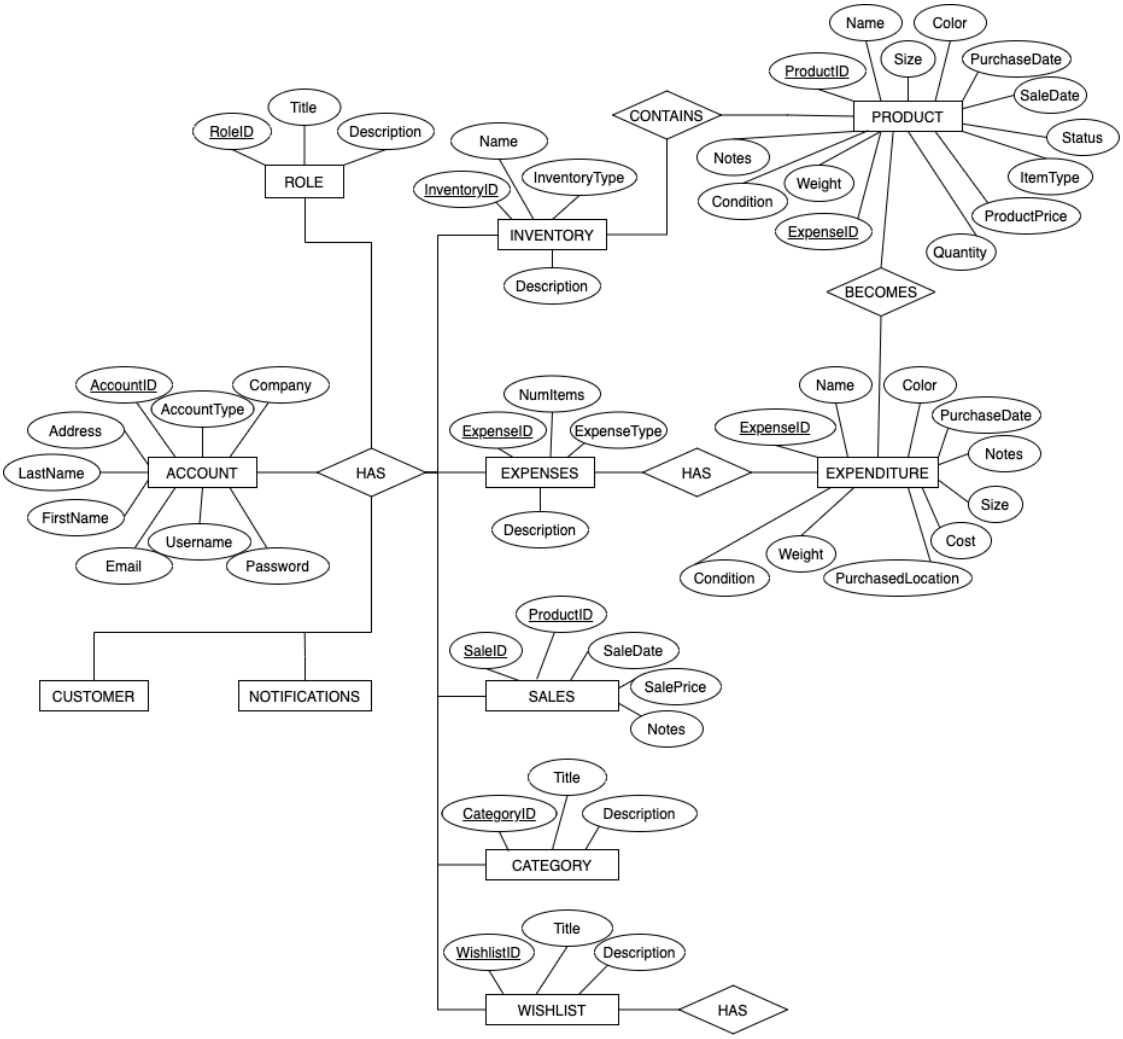
- Homepage/Dashboard
- Notifications
- Inventory
- Sales
- Expenses
- Invoices

- Shopping
- Settings

These sections were determined by what users seek for most when managing their inventory. A clean, organized homepage allows for the user to easily navigate through their company, analyzing both sales/purchasing data and logistics. For example, the main dashboard (home screen) presents weekly reports, an overall portfolio, recent activities, calendar dates, and notifications, all which can play a vital role in running the company remotely. Many buttons are expected to help offer users with a customizable experience to use the application based on their company and personal needs.

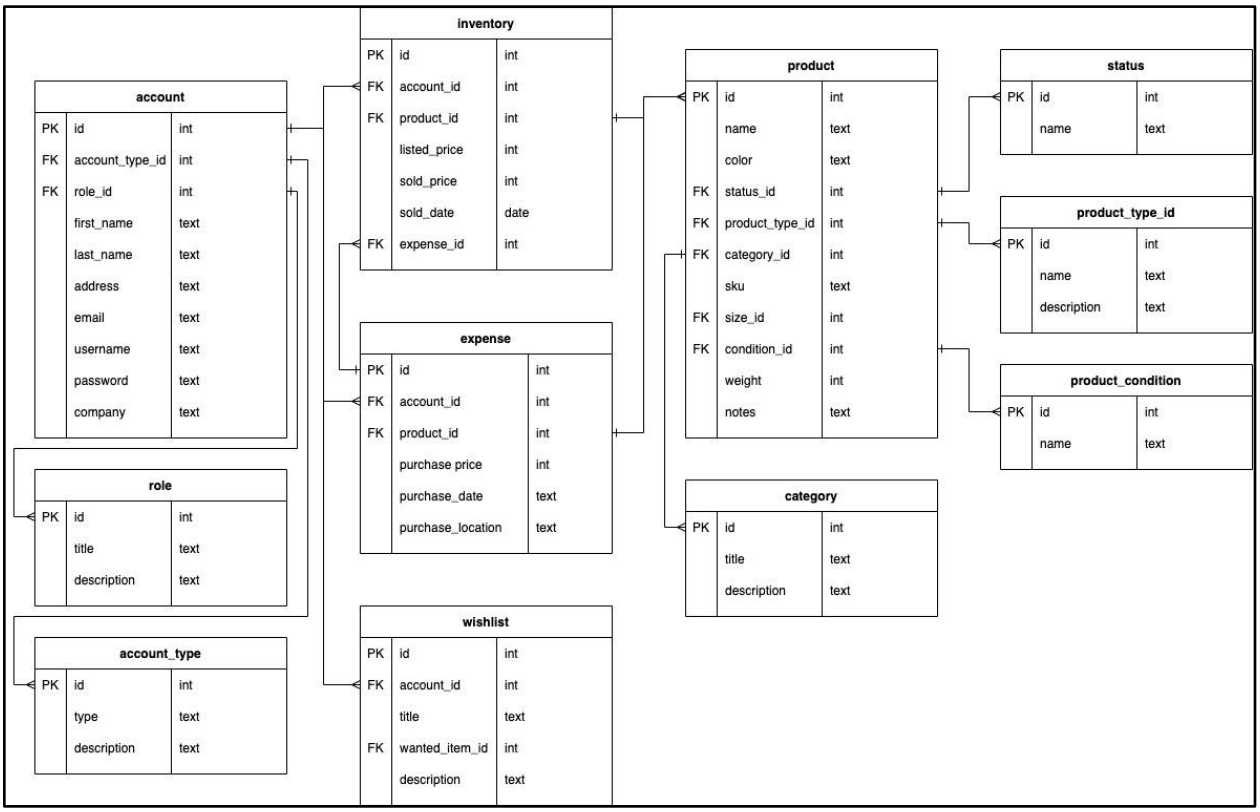
DBMS – Entity-Relationship Diagram

This Database Management System (DBMS) diagram represents the initial planning for the SQL database schema. This provides a visual for each entity relationship within the system.



DBMS – Database Schema

This DBMS diagram represents the SQL database schema. This provides a larger conceptual understanding of the database, which will help determine the primary and foreign keys, syntaxes, key constraints, and also 1F, 2F, and 3F normalization. By solving issues at this stage, it will help prevent any major issues in future stages.



Identifying DBMS views

It is important for the TallyUP database to generate unique virtual tables by selecting data to be seen and obstructing data that does not need to be seen by the user. This will help prevent extraneous data being presented to the user. A table of views are as listed:

View	Description
annual_purchases	Returns annual total purchases per account; ordered by year
annual_sales	Returns annual total sales per account; ordered by year
monthly_purchases	Returns monthly total purchases per account; ordered by month and year
monthly_sales	Returns monthly total sales per account; ordered by month and year

net_purchases	Returns net purchases made per account
net_sales	Returns net sales made per account
show_all_company_assets	Returns every product that has been entered in the TallyUP system
show_all_expense_product	Returns detailed information on each expense product entered in the TallyUP system, organized by account
show_all_inventory_product	Returns detailed information on each inventory product entered in the TallyUP system, organized by account
show_all_sales	Returns detailed information on each sold product entered in the TallyUP system, organized by account
total_available_items	Returns total number of available items per account
total_purchases	Returns total number of purchased items per account
total_sold	Returns total number of sold items per account
total_users	Returns total number of users on the platform
weekly_purchases	Returns weekly total purchases per account; ordered by week, month, and year
weekly_sales	Returns weekly total sales per account; ordered by week, month, and year

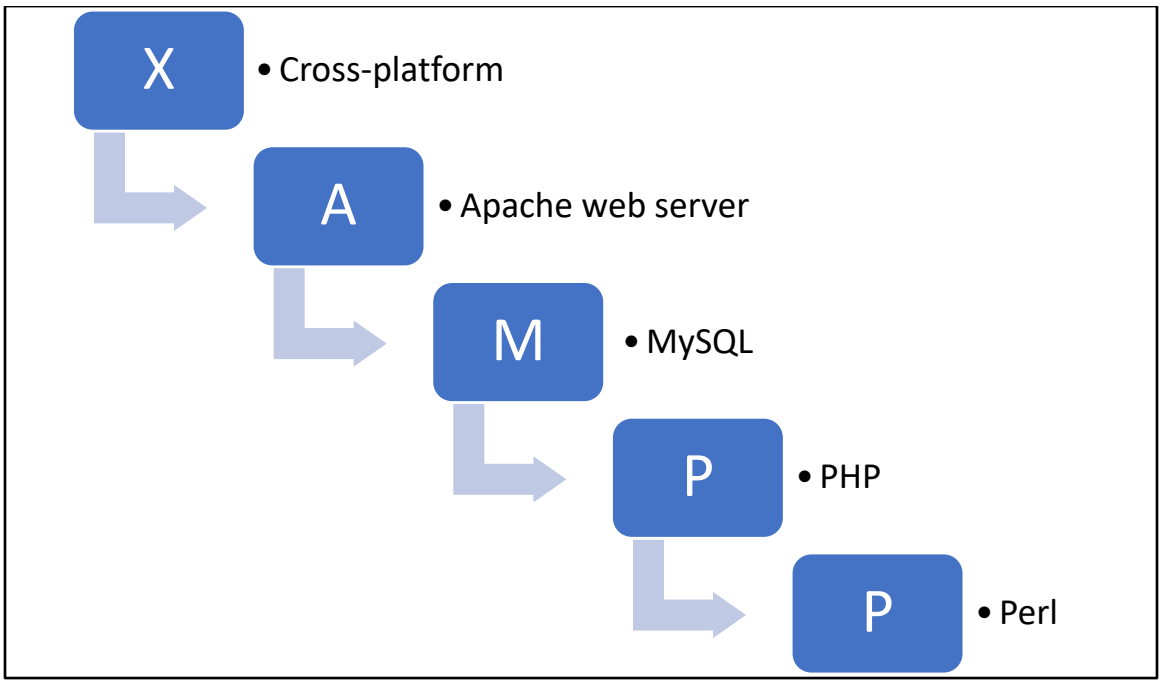
Identifying DBMS triggers

Triggers help execute scripts for TallyUP which inserts, deletes, and/or update data automatically based on information being inserted into one or more tables. For this project, triggers were not a necessary feature to implement, therefore will not be utilized. PHP is capable of handling any automated changes needed in the database.

Implementation

Application Implementation Methodology (AIM)

This application requires full stack development, specifically utilizing the XAMPP stack package solution.



The goal of this development style is to allow for an accessible experience on personal databases created on TallyUP. It is important that this application is cross-platform and can easily modify, retrieve, and delete data from the Apache web server. Since MySQL is the foundation of this application, XAMPP allows full control to managing the back end database. Finally, PHP and Perl are web development programming language that communicates front-end development with the application's database.
This application will not be utilizing any CSS frameworks (ex. Bootstrap, jQuery, AngularJS, etc.) for the purpose of this project. By skipping these frameworks, it will help build a better understanding of CSS and JavaScript usages in front-end design.

Reflection

Overview

The development of TallyUP has taught me an array of new skillsets while still applying concepts and methodologies learned from previous courses in the Computer Science & Software Engineering program. Responsibility has been a huge takeaway during this independent project which required careful discipline and planning. This quarter – despite the pandemic – has placed me in a new work dynamic which focuses purely on one overarching project rather than a classroom of lectures, assignments, small projects, with short-burst due dates. I found that the pre-planning stage (capstone contract, schedule building, etc.) of this project was extremely important in understanding the logistics and what is expected of this project. The TallyUP Project document has greatly benefit the development process by serving as the project blueprint and progress reporter.

Pitfalls and Challenges

- Database design
- Triggers and views
    - Decided to create UI which will help map out what type of views would best fit the program
- Time spent on DBMS
- Understanding file structure and organization
- Attempted to use APIs and Simple HTML DOM for market price estimates but was unsuccessful

Future Goals

- Implement a APIs for data retrieval
- Better user account security
- Host application on a public domain
- Dynamically changing data
- Dedicated phone application
- Team collaboration capabilities

Conclusion

TallyUp is inspired by a love for software engineering, design and fashion. The program demonstrates an understanding of full-stack development by applying core concepts such as server hosting, web development, and user interface design. The 10-week long project focused on growing these skills to create a more optimizable inventory system for small ecommerce business owners. Moreso, the agile approach resulted in a successful product that accurately reflects my sponsor's needs and pain points.