



# SkyNet

– A business management system



Present by:

**Spring 2023 Pace Capstone Project Team Three**



Josh Krinsky, Kai Wang,  
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Houqi Zhan, Jincheng Zou

# Agenda

- Team Intro
- Problem Statement & Project Description
- Team working Agreement
- Personas & MVP (Minimal Viable Product): Design & Functions
- Technologies & Algorithms
- Architecture Diagrams
- Recaps of previous sprints
- Product Backlog & Sprint 8 Backlog
- Metrics
- Retrospective
- Feedback History & Improvements
- Project DEMO

# Team Members

SkyNet

**Josh Krinsky**

Scrum Master  
Back-end Developer



**Peter Torrente**

Front-end Developer



**Kai Wang**

Database Admin  
Back-end Developer



**Peter McKechnie**

Front-end Developer  
Project Consultant



**Jincheng Zou**

Front-end Developer



**Houqi Zhan**

Database Developer



# Problem Statement

## What problem is our project aiming to solve?

- Companies rely heavily on Customer Relationship Management(CRM) and Point-of-sale(POS) software to control and improve
- These are often sold as large software platforms offering a wide variety of features.
- Expensive packages with helpful but complex features dominate the market and are tailored to larger companies.
- Many customers do not have the budget, nor the technological aptitude, to effectively employ popular CRM and POS platforms.

# Project Description

## What are we building?

- We aim to design a POS styled system with greater simplicity for customers.
- We will prioritize fundamental services for day to day operations of a small business.
- Users will be able manage inventory, track sales, compare vendors, analyze production output, organize contact info, track orders/deliveries. Record order, shipping, and vendor history.
- Easy-to-use interface means even the most novice users are capable of creating custom data visualizations and useful metrics.

# Team working agreement (1/3)



## Introduction:

Team Information can be found at GitHub: <https://github.com/htmw/Skynet/>

This agreement outlines the expectations and responsibilities for our graduate computer science project team, consisting of 6 members, using an Agile approach.

## Team Values:

Open and honest communication

Respect for each other's time and commitments

Collaboration and teamwork

Continuous improvement and learning

High-quality work that meets project requirements

## Agile Approach:

Our team will follow an Agile methodology, which emphasizes iteration, collaboration, and flexible planning. We will hold regular stand-up meetings, sprint retrospectives, and sprint planning sessions.

# Team working agreement (2/3)



## Responsibilities:

- Attend all team meetings and events on time and prepared.
- Complete assigned tasks and deliverables within the agreed-upon timeline.
- Communicate progress, issues, and concerns in a timely manner.
- Provide constructive feedback to improve the project and team processes.
- Respect each other's opinions and ideas.
- Take responsibility for the success of the project and team.

## Decision Making:

Decisions will be made through a consensus-building process that involves all team members. In the event of a disagreement, the team will engage in productive and respectful discussions to reach a solution.

## Meeting time:

Major meeting on Monday, Thursday, at 13:00

Daily meeting: Implemented via Discord, each group member reports daily on their work progress. If needed, a quick meeting is scheduled via Zoom.

# Team working agreement (3/3)



## Conflict Resolution:

In the event of a conflict, team members will follow a structured conflict resolution process that involves open communication, active listening, and a focus on finding a mutually acceptable solution.

## Commitment:

By signing this agreement, each team member commits to following the expectations and responsibilities outlined above. We all hope to learn development experience close to the workplace through this hands-on project, and to become familiar with software development and working with teams with the help of our mentor professor.

## Team members (A–Z):

Houqi Zhan, Jincheng Zou, Josh Krinsky (Scrum Master),

Kai Wang, Pete McKechnie, Peter Torrente.

# Personas - 1

## David:

### Who is he?

- A 43-year-old man, the owner of the retail store.
- Has a happy family: his wife has just given birth to his third child.
- Currently on sabbatical; His oldest daughter just entered college to study nursing, while his son just entered high school and is the point guard for the school's basketball team.
- To make his family's financial situation better, he started to expand his retail business last year.

### Issue:

- Spends a huge amount of time each week comparing offers from different suppliers.
- Needs to do a lot of calculations and comparisons based on stock availability and expectations of sales
- Has very little free time to spend with his wife and children, despite his off-hours.



# Personas - 2

## Mike:

### Who is he?

- A 26-year-old production manager, responsible for several different production lines
- He and his accountant fiancée got engaged this spring and the wedding is being planned!
- He and his fiancée are both hikers and usually go on weekend excursions to the countryside

### Issue:

- The traditional forms (for example, Excel or the printed forms) makes him tired of calculating the efficiency of the different lines
- Needs to provide more rational and useful advice for each quarter of production
- His factory is a traditional manufacturing factory, in the cost-effective consideration, did not use the popular production management software



# Personas - 3

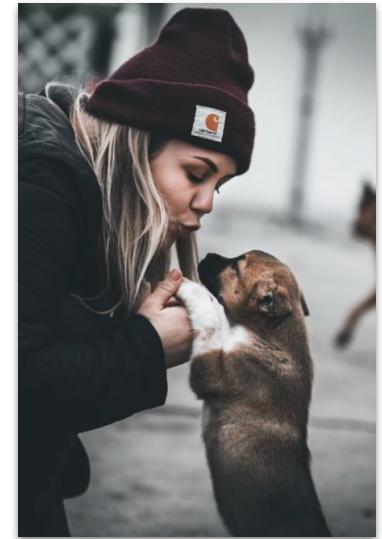
## Alexis:

### Who is she?

- A 23-year-old girl, with her college friends, founded a pet transport company
- She likes to travel with her pets. A few years ago she traveled abroad with a friend and due to the negligence of her pet transport company, her shepherd became ill upon her return.
- She is a girl who is good at dealing with people and knows many friends who are in pet services.

### Issue:

- Alexis's company needed a low-cost management software to help them calculate costs and compare suppliers.
- She needs to manage different service providers, such as transportation companies, pet nail technicians, etc.

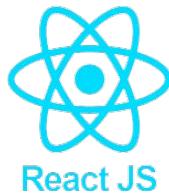


# MVP Design

# MVP Design

Features	Manage items	Manage Inventory	Manage Order	Manage Shipment	Manage Supplier	Cash registers
	Add item	Add record	Add order	Add log	Add supplier	Calculation of receivables
	Edit item	Edit record	Edit order	Edit log	Edit supplier	Calculate change
	Delete item	Delete record	Delete order	Delete log	Delete supplier	Automatic order generation
	Use barcode to get item INFO	Filtering	Link to shipment	Link to order	Filtering	Use barcode to get item
	Filtering		Filtering	Track a shipment		Print the receipt
				Filtering		

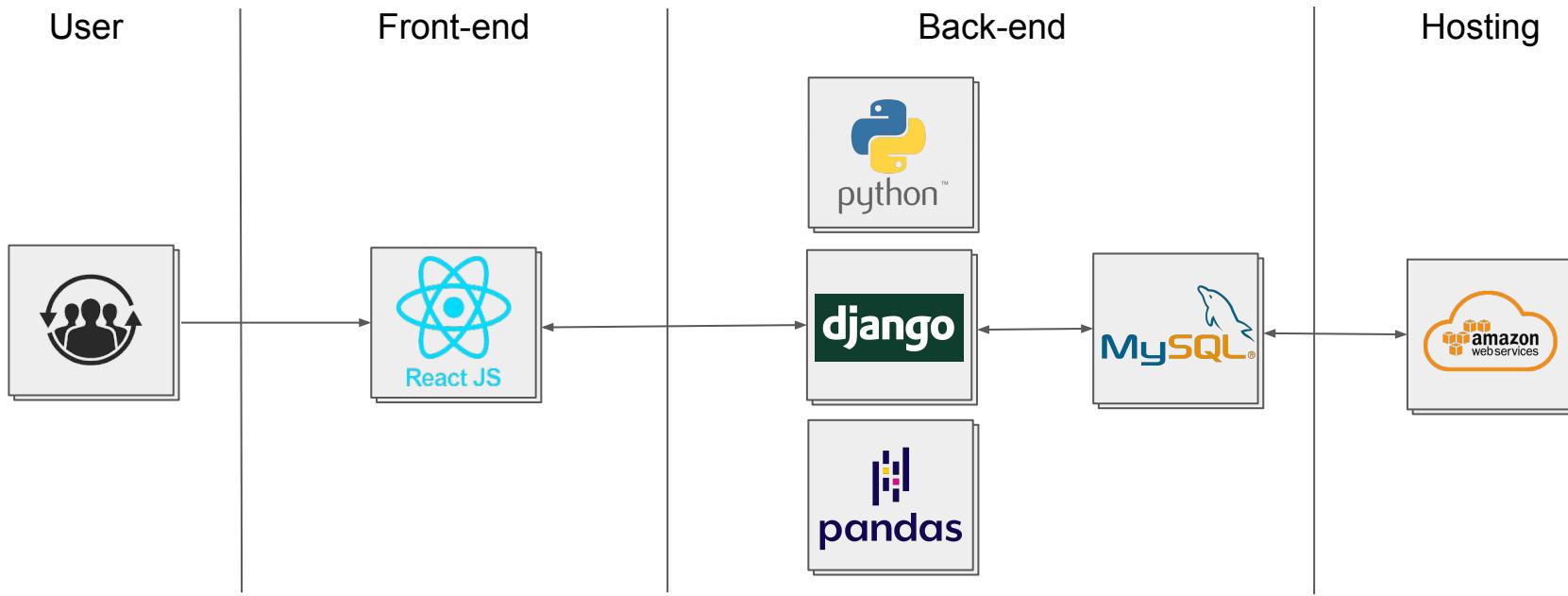
# Technologies



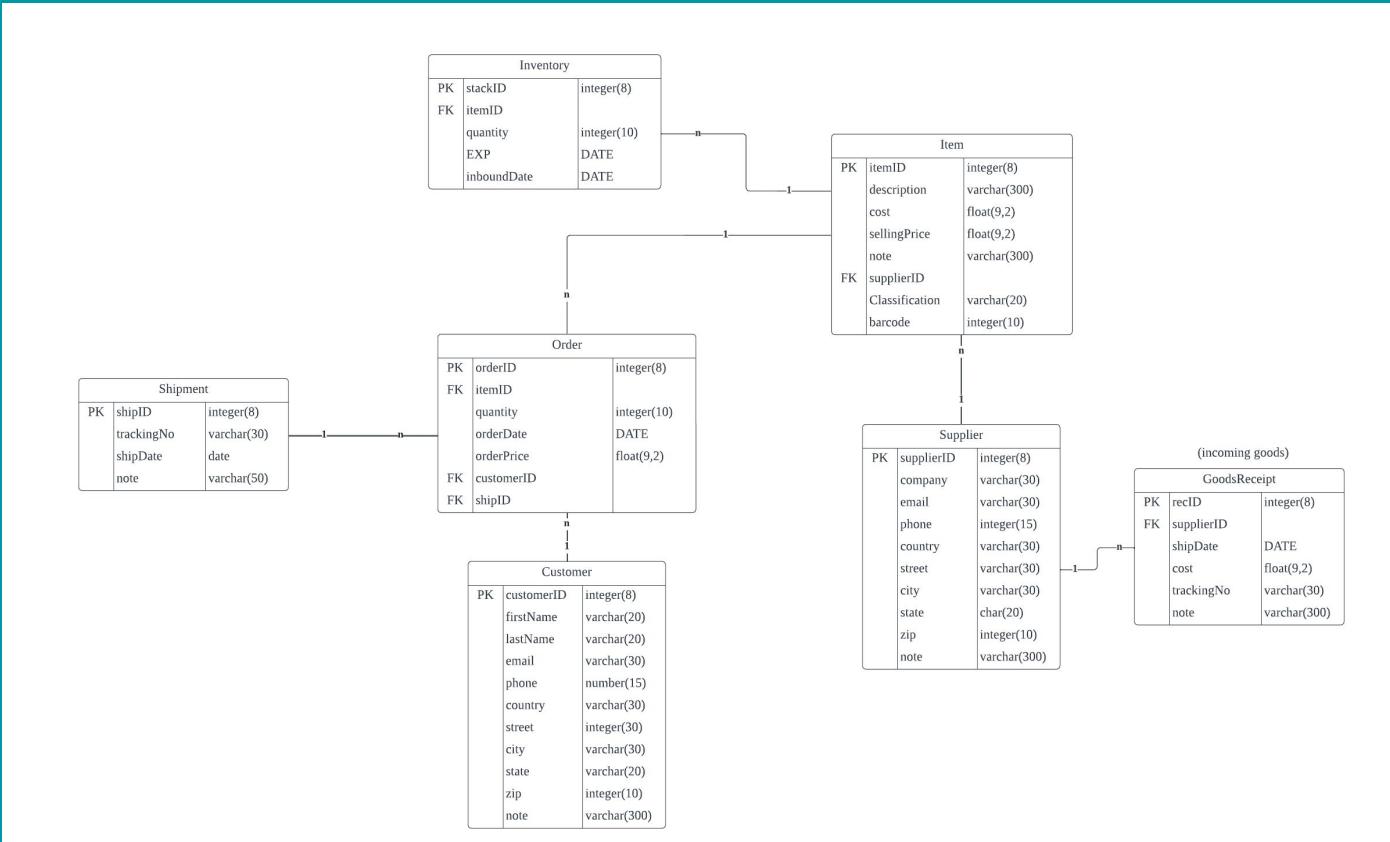
## The Purpose of the Technologies

- React - Front-end JavaScript library for building UI
- Django - Back-end Python framework that implements a restful API
- Pandas - Python based data structure & data analysis tools
- MySQL - Database Management
- AWS (Amazon Web Services) - Hosting, Relational Database Service
- Discord - Team Communication

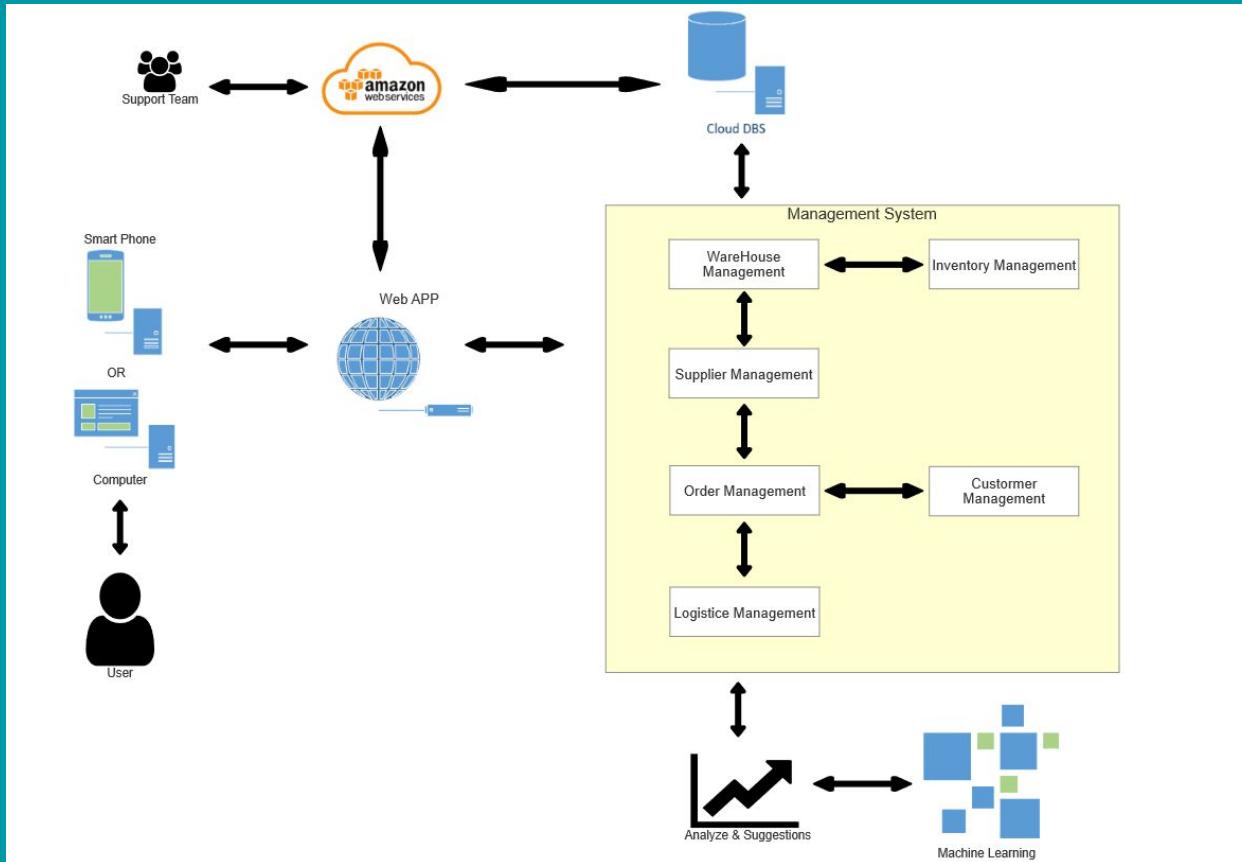
# Technologies - continue



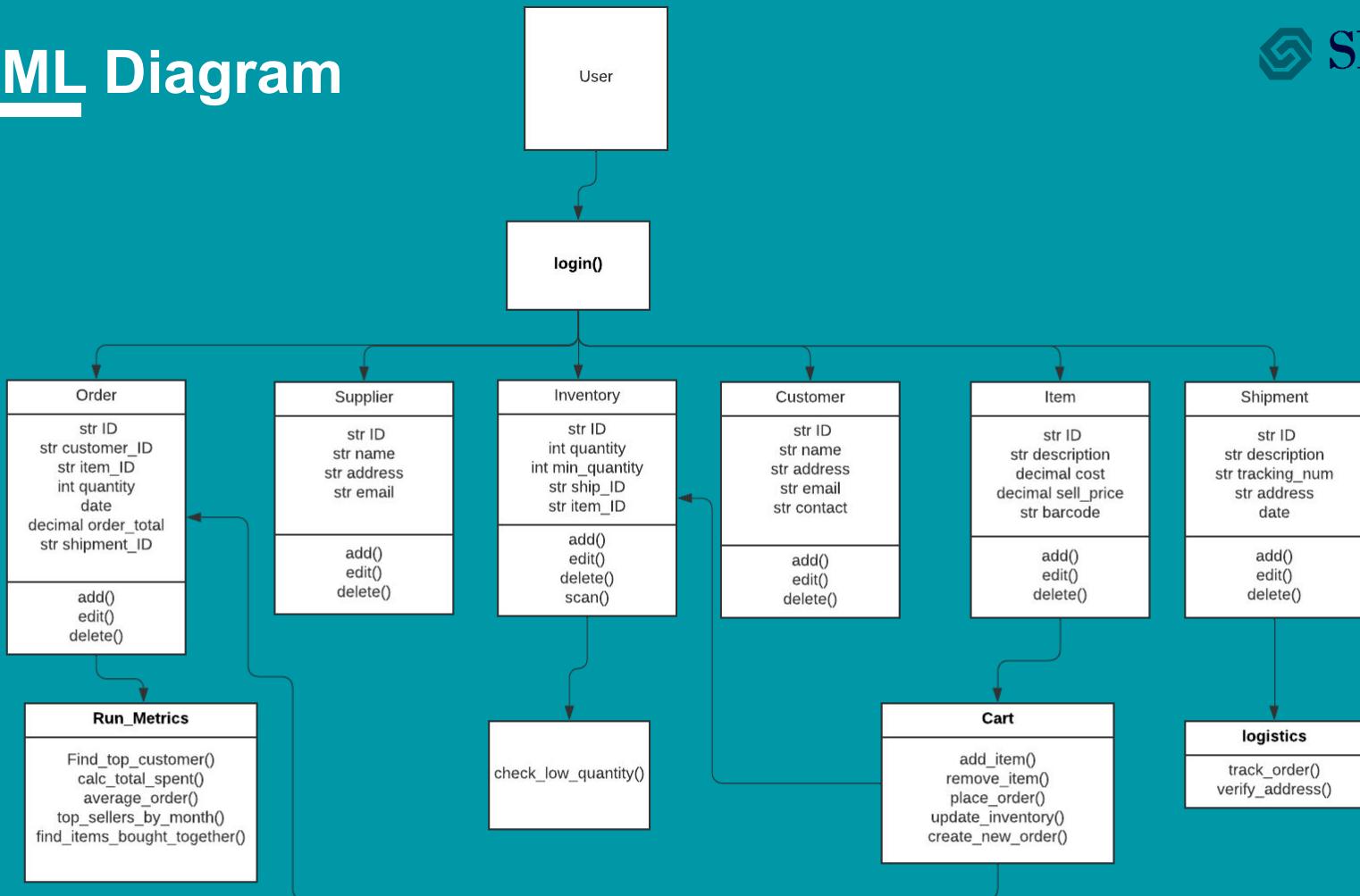
# Database ER-diagram



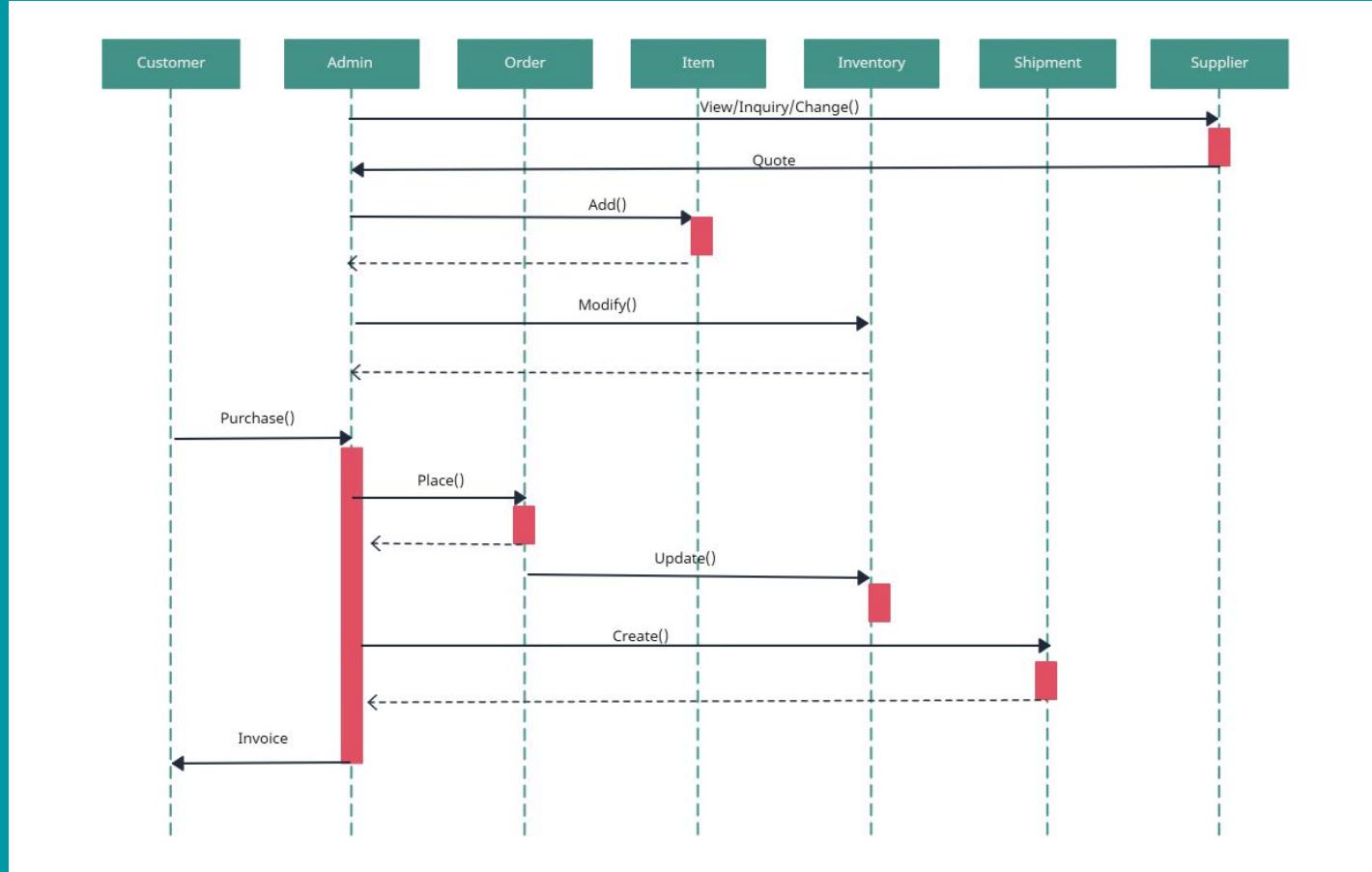
# Conceptual Architecture Diagram



# UML Diagram



# User Sequence Diagram



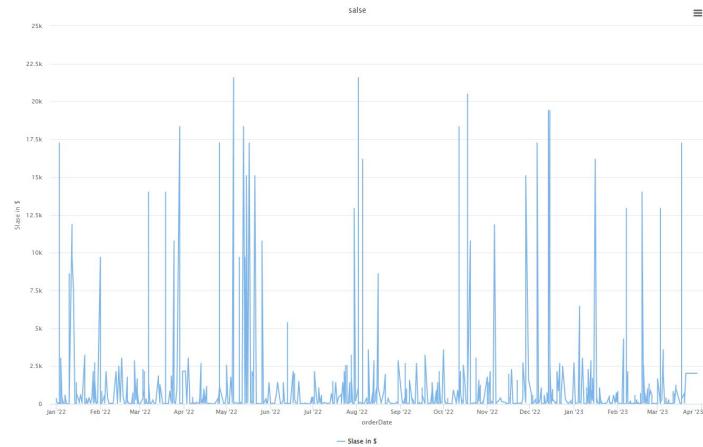
# Apriori Algorithm

- a machine learning algorithm used for association rule mining in data mining.

The Apriori algorithm is a classic algorithm used in data mining to identify frequent item sets (items that frequently occur together) in a dataset and generate association rules based on these item sets. These association rules can be used to identify patterns and relationships between different items in the dataset.

The algorithm works by iteratively scanning the dataset and generating candidate itemsets that meet a minimum support threshold. The support of an item set is defined as the proportion of transactions in the dataset that contain the item set. The algorithm then prunes the candidate itemsets that do not meet the minimum support threshold and repeats the process until no more frequent item sets can be generated.

Overall, the Apriori algorithm is a powerful tool for discovering interesting patterns and relationships in large datasets, and it has many applications in areas such as market basket analysis, recommendation systems, and web mining.



(Sales of our dummy data)

# Apriori Algorithm

- a machine learning algorithm used for association rule mining in data mining.

	antecedents	consequents	antecedent support	consequent support	support	confidence	lift	leverage	conviction	zhangs_metric
14501	(5, 2, 3, 7, 9, 1)	(8, 4)	0.016129	0.290323	0.016129	1.000000	3.444444	0.011446	inf	0.721311
14161	(5, 4, 1)	(2, 3, 7, 8, 6)	0.290323	0.016129	0.016129	0.055556	3.444444	0.011446	1.041746	1.000000
14052	(2, 3, 7, 8, 6)	(5, 4, 1)	0.016129	0.290323	0.016129	1.000000	3.444444	0.011446	inf	0.721311
14728	(8, 4)	(5, 2, 3, 7, 9, 1)	0.290323	0.016129	0.016129	0.055556	3.444444	0.011446	1.041746	1.000000
14147	(5, 2, 1)	(3, 7, 8, 4, 6)	0.306452	0.016129	0.016129	0.052632	3.263158	0.011186	1.038530	1.000000
14063	(2, 7, 8, 6, 1)	(5, 4, 3)	0.016129	0.306452	0.016129	1.000000	3.263158	0.011186	inf	0.704918
14150	(5, 4, 3)	(2, 7, 8, 6, 1)	0.306452	0.016129	0.016129	0.052632	3.263158	0.011186	1.038530	1.000000
14066	(3, 7, 8, 4, 6)	(5, 2, 1)	0.016129	0.306452	0.016129	1.000000	3.263158	0.011186	inf	0.704918
14046	(5, 7, 8, 4, 6)	(1, 2, 3)	0.016129	0.322581	0.016129	1.000000	3.100000	0.010926	inf	0.688525
14167	(1, 2, 3)	(5, 7, 8, 4, 6)	0.322581	0.016129	0.016129	0.050000	3.100000	0.010926	1.035654	1.000000
14497	(5, 2, 3, 7, 8, 9)	(4, 1)	0.016129	0.354839	0.016129	1.000000	2.818182	0.010406	inf	0.655738
14224	(4, 1)	(5, 2, 3, 7, 8, 6)	0.354839	0.016129	0.016129	0.045455	2.818182	0.010406	1.030722	1.000000
11720	(2, 3, 7, 8, 6)	(4, 1)	0.016129	0.354839	0.016129	1.000000	2.818182	0.010406	inf	0.655738
14732	(4, 1)	(5, 2, 3, 7, 8, 9)	0.354839	0.016129	0.016129	0.045455	2.818182	0.010406	1.030722	1.000000
11829	(4, 1)	(2, 3, 7, 8, 6)	0.354839	0.016129	0.016129	0.045455	2.818182	0.010406	1.030722	1.000000
11452	(4, 1)	(5, 2, 3, 7, 8)	0.354839	0.064516	0.064516	0.181818	2.818182	0.041623	1.143369	1.000000
11341	(5, 2, 3, 7, 8)	(4, 1)	0.064516	0.354839	0.064516	1.000000	2.818182	0.041623	inf	0.689655
13989	(5, 2, 3, 7, 8, 6)	(4, 1)	0.016129	0.354839	0.016129	1.000000	2.818182	0.010406	inf	0.655738
11366	(7, 8, 5, 2)	(1, 4, 3)	0.080645	0.290323	0.064516	0.800000	2.755556	0.041103	3.548387	0.692982
11427	(1, 4, 3)	(7, 8, 5, 2)	0.290323	0.080645	0.064516	0.222222	2.755556	0.041103	1.182028	0.897727

A demo result of applying apriori algorithms in our database with orders' data. Showing the interesting patterns and relationships

# Sprint 1~4 Recap

- We have done some market research and have defined our product positioning
- We defined the development framework and Backlog of our software
- We have completed the development of the following features:
  - Supplier Management
  - Inventory Management
  - Order Management
  - Item Management
  - Bar code scanning and online product information lookup
  - Shipment Tracking and address verification

# Sprint 5~7 Recap

- We have redesigned our Dashboard
- We compared different algorithms on sales data analysis and finally chose the a Priori Algorithm suitable for our project
- We have completed the development of the following features:
  - Cashier functions (including automatic order price update calculation and receipt printing)
  - Logistics tracking updates
  - Data visualization for the database
  - Low inventory alert
  - Machine learning of sales data

# What is new in Sprint 8?

- Final testing and debugging
- UI design & improvements on but not limited to
  - Tracking and Address Verification
  - Dashboard - charts, organization, data presentation
  - Cash register cart/invoice feature
  - Low inventory button
  - Json response data formatted as HTML with CSS

				When, And, Then)				
US1	user	I want to be able to add new inventory to my database	Keep my database accurate to my changing inventory	When a user adds data, Then the database will add a new row.	DBS_add	4	High	Done
US2	user	I want to be able to edit inventory items in my database	Make changes to inventory details and correct typos	When a user delete data, Then the database will delete the row.	DBS_edit	4	High	Done
US3	user	I want to be able to delete inventory items in my database	Effeciently utilize server space and keep data accurate	When a user edit data, Then the database will edit the row	DBS_delete	4	High	Done
US4	user	I need to sort the data in my database	analyze and track my inventory my different metrics	Given different categories, When the user selects a category, Then show the products undere that category.	DBS_sort	4	Medium	Done
US5	user	I want to be able to check my inventory with a visual chart	Get a clearer picture of my inventory	Given automatically generated charts, When the user changes the chart options or changes the date range, Then the chart is regenerated based on user behavior	DBS_visualization	7	High	Waiting
US6	user	I would like to be alerted when some items are out of stock	Replenish my inventory in a timely manner	When an item is about to expire, Then the system will automatically send a reminder.	DBS_alert	5	Medium	Waiting
US7	user	I want the system to record my sales and analyze them	Keep track of my sales and change sales strategies	Given users the option of AI analysis, When the user chooses to use this feature, Then the user's data is used as input for his analysis fuciton, Then provides analysis of the data such as the history of sales for	DBS_analyze	10	Medium	Waiting
US8	user	I want to be able to enter data via cell phone camera or			DBS_modelInput	3	Low	Waiting
US9	user	I want to be able to scan items				5	Medium	Waiting
US10	user	I want to be able to calculate the amount of money owed	Know the total amount of money owed	When there are no items remaining to be added, Then the total amount of payment due will be correctly reported	CR_amountowed	3	High	Waiting
US11	user	I want to be able to record a payment	Collect money from the customer	When payment is tendered, Then the status of the order will change from "Payment Outstanding" to "Paid"	CR_deposit	3	High	Waiting
US12	user	I want to keep track of what items the customer wants to purchase	Analyze consumer preferences	Given a list of custmore, When select a customer, Then show the history of the customer	CR_trackCusnsumer	3	High	Waiting
US13	user	I want to record and offer a receipt of the customer's purchase	Have an itemized list of items purchased by the customer	When an order is paid, Then a formatted record of the sale will be created	CR_receipt	3	Low	Waiting
US14	user	Evaluate suppliers	Create relationships with the best possible suppliers for my industry	Given a list of all suppliers, When a user filters on a detail, Then the relevant data will be shown	SRM_eval	6	High	Done
US15	user	Streamline onboarding with suppliers	Quickly establish working supply chains	Given a new supplier, When new data needs to be collected, Then a standard template will be sent and uploaded to the database	SRM_select	3	High	Done
US16	user	Manage supplier performance	Quickly and easily track supplier performance with key performance metrics that are already established for me	Given a supplier ID, When the metrics are requested, Then the database returns accurate data	SRM_kpi	6	Medium	Done
				When upload sales data, Then the				

# Backlog

# Product Backlog (1/5)



Task								
ID	Task Description	Acceptance Criteria	Task Name	Size	Priority	Status	Sprint	Notes
TS1	Project Start - group finalized 9/14/22	Agreed by all team members	Project_groupForm	5	High	Done	1	
TS2	Pick Project Idea/ assign roles	Agreed by all team members	Project_setup	8	High	Done	1	
TS3	Project Description/Statement/Scope	Approved by all team members	Project_proposal	8	High	Done	1	
TS4	Working Agreement	Agreed by all team members	Project_agreement	8	High	Done	1	
TS5	Build Wiki Page	Wiki page is well organized, shows all the information about the project	Project_wiki	8	High	Done	1	
TS6	Market Research	Agreed by all team members	Project_market	3	High	Done	2	
TS7	Establishment of techniques and tools	Agreed by all team members, and identify the type of technology or tool that will be used in each section	Project_toolsResearch	8	High	Done	2	
TS8	Define specific feature details	Approved by all team members	Project_define	8	High	Done	2	
TS9	API Research	Approved by all team members	Project_API	3	High	Done	2	
TS10	Design of User Stories & Other Tasks (Backlog-1/2)	Approved by all team members	Project_Backlog	13	High	Done	2	
TS11	Design Project Acceptance Criteria (Backlog-2/2)	Approved by all team members	Project_AC	8	High	Done	2	
TS12	Design Project Test Cases	Approved by all team members	Project_testCases	8	High	Done	2	
TS13	Design MVP prototypes and sketches	Approved by all team members	Project_MVPdesign	8	High	Done	2	
TS14	Design interactive interface with the user	Approved by all team members	Project_Uldesign	8	High	Done	3	added in 2022/11/01
TS15	Design Dashboard for the webApp that shows key information	Approved by all team members	Project_Dashboard	8	High	Done	4	added in 2022/11/28

# Product Backlog (2/5)



User Story										
ID	As a...	I want to...	So that I can...	Acceptance Criteria (format: use keywords Given, When, Then)	Task Name	Size	Priority	Status	Sprint	Notes
US1	Inventory Manager	I want to be able to add new inventory to my database	Keep my database accurate to my changing inventory	When a user adds data, Then the database will add a new row.	DBS_add	5	High	Done	3	
US2	Inventory Manager	I want to be able to edit inventory items in my database	Make changes to inventory details and correct typos	When a user delete data, Then the database will delete the row.	DBS_edit	5	High	Done	3	
US3	Inventory Manager	I want to be able to delete inventory items in my database	Effeciently utilize server space and keep data accurate	When a user edit data, Then the database will edit the row	DBS_delete	5	High	Done	3	
US4	Inventory Manager	I need to sort the data from the database that is displayed on the page	analyze and track my inventory my different metrics	Given different categories, When the user selects a category, Then show the products undere that category.	DBS_sort	5	Medium	Done	3	
US5	Retailers Manager	I want to be able to check my inventory with a visual chart	Get a clearer picture of my inventory	Given automatically generated charts, When the user changes the chart options or changes the data range, Then the chart is regenerated based on user behavior	DBS_visualization	8	High	Done	5 & 6	
US6	Inventory Manager	I would like to be alerted when some items are out of stock	Replenish my inventory in a timely manner	When an item is about to expire, Then the system will automatically send a reminder.	DBS_alert	5	Medium	Waiting	3	
US7	Inventory Manager	I want the system to record	Keep track of my sales and c	Given users the option of AI analysis, When the user chooses to use this feature, Then the user's data is used as input for his analysis fuciton, Then provides analysis of the data, such as the history of sales for each item.	DBS_analyze	8	Medium	Done	7	Not finished in sprint6, move to sprint 7

# Product Backlog (3/5)



User Story										
ID	As a...	I want to...	So that I can...	Acceptance Criteria (format: use keywords Given, When, Then)	Task Name	Size	Priority	Status	Sprint	Notes
US8	Retailers Manager	I want to be able to enter data via cell phone camera or code reader	Input data easily	Given barcode entry options, When the user enters product information using the barcode Then the corresponding product information, such as product name, brand, price, etc., is automatically populated.	DBS_barcodeInput	8	Medium	Done	4	
US9	Inventory Manager / Cashier	I want to get the item information from online database	I don't need to type everything about the item manually	Given a item's barcode, When the barcode is scanned, Then the "add item" form is filled automatically	DBS_itemInfo	8	Medium	Done	4	
US10	Cashier	I want to be able to calculate the amount of money owed	Know the total amount of money owed	When there are no items remaining to be added, Then the total amount of payment due will be correctly reported	CR_amountowed	3	High	Done	5 & 6	
US11	Retailers Manager	I want to be able to record a payment	Collect money from the customer	When payment is tendered, Then the status of the order will change from "Payment Outstanding" to "Paid"	CR_deposit	3	High	Done	5 & 6	
US12	Marketing Manager	I want to keep track of what items the customer wants to purchase	Analyze consumer preferences	Given a list of custmore, When select a customer, Then show the history of the customer	CR_trackCunsumer	3	High	Done	4	
US13	Cashier	I want to record and offer a receipt of the customer's purchase	Have an itemized list of items purchased by the customer	When an order is paid, Then a formatted record of the sale will be created	CR_receipt	13	Low	Done	5 & 6	changed story points
US14	Marketing Manager	Evaluate suppliers	Create relationships with the best possible suppliers for my industry	Given a list of all suppliers, When a user filters on a detail, Then the relevant data will be shown	SRM_eval	5	High	Done	3	

# Product Backlog (4/5)



User Story										
ID	As a...	I want to...	So that I can...	Acceptance Criteria (format: use keywords Given, When, Then)	Task Name	Size	Priority	Status	Sprint	Notes
US15	Marketing Manager	Streamline onboarding with suppliers	Quickly establish working supply chains	Given a new supplier, When new data needs to be collected, Then a standard template will be sent and uploaded to the database	SRM_select	3	High	Done	3	
US16	Marketing Manager	Manage supplier performance	Quickly and easily track supplier performance with key performance metrics that are already established for me		SRM_kpi	5	Medium	Canceled	8	New US replacement redesigned to meet demand
US17	Marketing Manager	I want to upload my sales data	Track/Maintain/Organize my data	When i upload sales data, Then the database update to add	DBS_upload	3	High	Done	4	
US18	Marketing Manager	I want the model to forecast prices for items in my inventory	Reduce the uncertainty and guesswork in my pricing	Given a data set, When a forecast is run, Then a best fit price will be calculated	ML_predict	13	High	Canceled	7	New US replacement redesigned to meet demand
US19	Marketing Manager	I want the model to predict total sales revenue by time period	Best serve my customers and maximize seasonal consumer trends	Given a data set in a timerange, When a forecast is run, Then total projected sales will be calculated	ML_timepredict	13	low	Canceled	7	New US replacement redesigned to meet demand
US20	Marketing Manager	I want the model to recommend quantities of products for sale	Be leaner in my logistics and maximize profits	Given a data set in a timerange, When a forecast is run, Then suggested total quantity of inventory will be calculated	ML_pricequantity	13	low	Canceled	7	New US replacement redesigned to meet demand
US21	Retailers Manager	I want to check the detail of the current orders	Have idea of a order detail	Given information about all order. When the user selects a particular order, Then the details of that order are provided.	LOG_OrderDetails	3	High	Done	4	
US22	Retailers Manager	I want to get notification when delivery of an order is imminent	Be prepared for the coming package	Given information about all logistics. When the user selects a particular logistics, Then the details of that logistics are provided.	LOG_comingTrack	5	Medium	Done	4	

# Product Backlog (5/5)



User Story										
ID	As a...	I want to...	So that I can...	Acceptance Criteria (format: use keywords Given, When, Then)	Task Name	Size	Priority	Status	Sprint	Notes
US23	Retailers Manager	I want to check the previous shipping information	Ensure accurate shipping details	When shipping details are entered, Then a check against the previous details is run	LOG_history	5	low	Done	4	
US24	Retailers Manager	I want to see shipping history filtered for specific details	Review and analyze my shipment efficiency and timeliness	When a filter is added, Then data matching that filter is returned	LOG_filter	3	Medium	Done	4	
US25	Retailers Manager	I want to use two factor authorization to verify my customer's login	Prevent fraudulent login	Given a new device, When login is successful, Then the secondary security check will be sent	Login_2Factor	5	Medium	Canceled	4	We don't need this for our MVP
US26	Retailers Manager	I want to strongly encrypt and safely store my user's data	Ensure my customers their data is safe	Given a database of customer data, When unauthorized entry is attempted, Then request will not be returned	DBS_security	3	Medium	Done	4	
US27	Retailers Manager	I want to be able to access my data from any device	Know the status of my business anytime, anywhere	Given successful login from a device, When access is attempted, Then the app is correctly rendered	DBS_cloud	3	High	Done	3	
US28	Marketing Manager	I want to have a simple statistic for my customers	Better understanding of the people I sell to and their spending habits	Given a overall statistic of the top customers	DM_cus	8	Medium	Done	7	redesigned US, added in Mar.13
US29	Marketing Manager	I would like to have a simple statistic for historical sales data	Better understanding of the overall sales situation each month	Given a overall statistic of the each months	DM_mm	5	Medium	Done	7	redesigned US, added in Mar.13
US30	Marketing Manager	I want to find the customer's preferred product mix, and some potential patterns	Improve marketing strategy and merchandise placement layout	Given Provide common item pairings, including statistically significant potential patterns	DM_sales	13	Medium	Done	7	redesigned US, added in Mar.13

# Test Cases (1/3)



ID	User Story	Test Description	Test Date	Action	Expected Output	Actual Output	Test Result (Pass/Total)	Comments
T1	US1	Insert a product data	2022/11/13	Enter product info(price, description...)	Product data is correctly displayed in the database	New item shown in the database	3 of 3	
T2	US2	Edit a product data	2022/11/13	Change the price. update the image, re-write the description	Product database is updated with new data	Updated item info is shown in the database	3 of 3	
T3	US3	Delete a product data	2022/11/13	Delete a product	The target data is deleted	The target item is deleted	3 of 3	
T4	US4	Sort the data	2022/11/13	Select Classification = food	all food items are display	all food items are display	3 of 3	This project will need to be retested in the future. We should have a drop down list for users to select categories instead of manually typing
T5	US16	Evaluate suppliers	2022/11/13	Select supplier which id=1	all info of supplier is shown	all info of supplier is shown	3 of 3	
T6	US17	Collect supplier's info	2022/11/13	Add a new supplier to the DBS	a new supplier info is added	shows the info of the new supplier	3 of 3	
T7	US31	Online realtime Database	2022/11/13	Add a new item data from device A, and check the update from device B	the new item is shown on device B	the new item is shown on device B	3 of 3	
T8	US5	Visualize data	2023/3/2	Renders the output page of the imported database combined with the graph	For example, a pie chart (the proportion of each product, the quantity is clearly marked)	The graph that present the data	3 of 3	
T9	US6	Set up cargo replenishment reminders	2023/4/2	Alerts are sent when the product falls below the set quantity	When the number of products is less than or equal to 10, the out-of-stock status will be displayed	A list of low quantity items	3 of 3	
T11	US8	Scan barcode	2022/12/10	Barcode recognition by camera	Output the data contained in the barcode	The barcode numbers	8 of 10	Need HD webcam for better result
T12	US9	Scan product	2022/12/14	Identify and add items via camera	Add the item to the bill	The item INFO is automatically filled into the form	10 of 15	Some item is not found in the database
T13	US10	After stopping adding goods, produce a total price	2023/3/2	Calculate the sum of the total price after multiplying the unit price and quantity of each item	Total amount owed=Specific amount (40 \$)	Total amount owed	3 of 3	
T14	US11	Navigate to the record the payment	2023/3/2	Load the payment page, confirm the payment and display the payment	Load paid page	Load paid page	3 of 3	

# Test Cases (2/3)



ID	User Story	Test Description	Test Date	Action	Expected Output	Actual Output	Test Result (Pass/Total)	Comments
T15	US12	Generate customer list and scroll through the form	2022/12/5	Navigate to the customer list, and click to view the details of each line of customer history	Each customer history record in the list can be clicked. Click a customer history record randomly to navigate to the history details page	A list of customers	3 of 3	
T16	US13	Generate & print the invoice	2023/3/2	Input orders' detail	Generate a receipt for the orders	a receipt	5 of 5	
T17	US14	Provide the name list of suppliers	2022/11/2	Navigate to the supplier list and display some basic information. For example, name, main industry, etc. Users can click the supplier to obtain more details.	View the name of each supplier, and click a supplier to view its details.	a list of suppliers	3 of 3	
T18	US15	regular template	2023/4/2	When import new data, provide a general template(including name, price, quantity, type, saving time, etc.)	This interface can generate a standard template	a standard template	3 of 3	
T19	US16	Filter index	2023/4/2	Set suppliers ID, evaluate and so on. (Used to filter user needs)	This interface displays some public data of the supplier on business cooperation, such as performance	a filtered list	3 of 3	
T20	US17	Upload, update data	2022/12/15	Upload local data and update it to the database	After the local data is uploaded, the database is updated and new data information can be viewed	New data is shown	3 of 3	
T24	US21	Logistics transportation status management	2022/12/15	Navigate to the logistics of the item, provide the date and location, and predict when it will arrive	The status of the article (shipped or not shipped), information about the goods, date, and location	The UPS shipment INFO is shown	4 of 5	only works for UPS shipments
T25	US22	Logistics arrival management	2022/12/15	When the goods are about to arrive, the recipient will receive a prompt from the app	Pop up window with prompt (SMS or email or other methods)	A message is shown	5 of 5	
T26	US23	Logistics History	2022/12/15	Navigate to the logistics history page. Each history is a separate information, record date, recipient, sender, bill of lading number, goods information, etc	The latest historical data are arranged from top to bottom, and you can view the details of each historical data	A list of all the shipments	3 of 3	

# Test Cases (3/3)

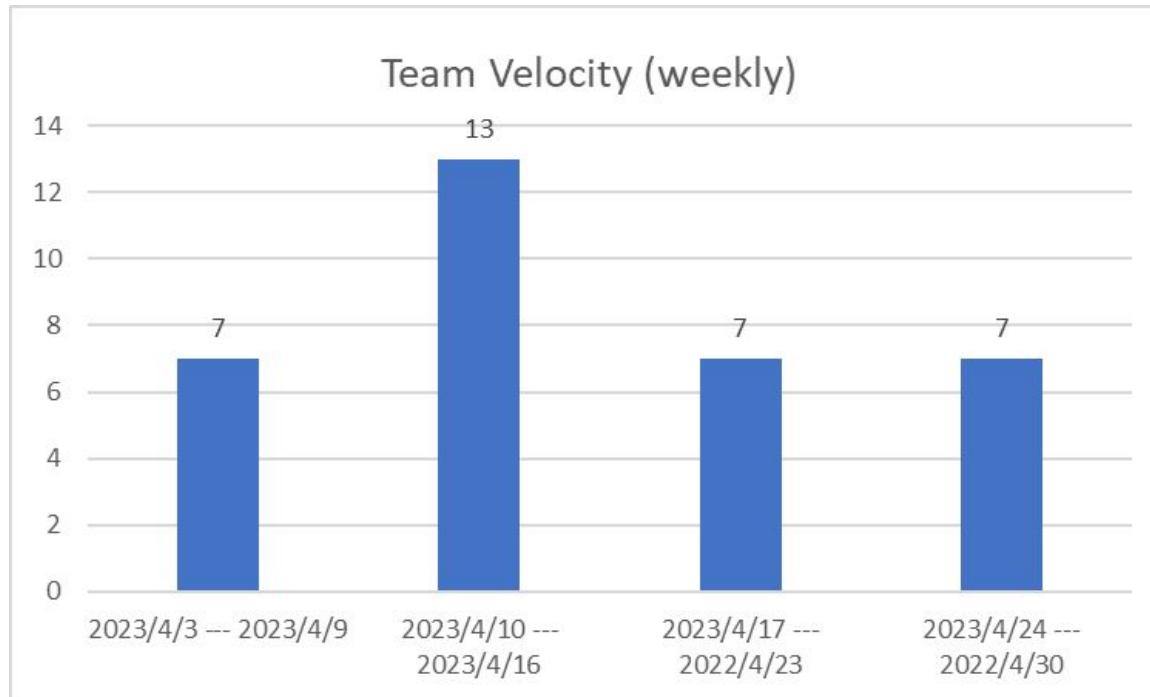


ID	User Story	Test Description	Test Date	Action	Expected Output	Actual Output	Test Result (Pass/Total)	Comments
T26	US23	Logistics History	2022/12/15	Navigate to the logistics history page. Each history is a separate information, record date, recipient, sender, bill of lading number, goods information, etc	The latest historical data are arranged from top to bottom, and you can view the details of each historical data	A list of all the shipments	3 of 3	
T27	US24	Logistics History Filter Settings	2022/12/15	This setting has specific filtering information, such as keywords, dates, logistics, etc	After selecting filtering information, jump to the page with relevant data	Filtered data is displayed	3 of 3	
T28	US25	Double layer security verification		Pop up authentication protection pop-up settings	The user is required to enter the verification code (version 1) or the verification code sent to the mobile phone or email (version 2)			we canceled this feature
T29	US26	Cloud data security management		When viewing the uploaded data, you need to set a password (including numbers, letters, etc.) for the first time, and the password can be changed. You need to enter the password every time you view the uploaded data	Enter the password, or change the password from an existing password. Assumption (if the input error exceeds 3 times, it will be locked)			we canceled this feature
T30	US27	User account password setting		Set the login interface. The data of each user is not interconnected. Enter the account password and log in to your own account	Login interface, account, password, forgotten password, login button. Can log in after input			we canceled this user story
T31	US7	Evaluate whether the results of machine learning are meaningful	2023/4/19	Provide it with different categories of sales data (random numbers and non-random records) and observe the output	Scatter plot and the data frame that was processed correctly	Scatter plot and the data frame that was processed correctly	3 of 3	
T32	US28	Observe whether the statistics of TOP customers are correct.	2023/4/19	Provide it with different categories of sales data (random numbers and non-random records) and observe the output	Statistics about customers are correctly calculated and displayed	Correctly processed data frames and conclusions	2 of 2	
T33	US29	Observe whether the statistics of each month are correct.	2023/4/19	Provide it with different categories of sales data (random numbers and non-random records) and observe the output	Statistics about each months are correctly calculated and displayed	Correctly processed data frames and conclusions	2 of 2	
T34	US30	Observe the performance of the apriori algorithm and whether our data preprocessing is correct.	2023/4/19	Provide it with different categories of sales data (random numbers and non-random records) and observe the output	Observe the performance of the apriori algorithm and whether its output can find some potential patterns and relationships with a high degree of support	Some potential patterns and relationships were found with high support; when random data were provided, no RULE had high support.	3 of 3	

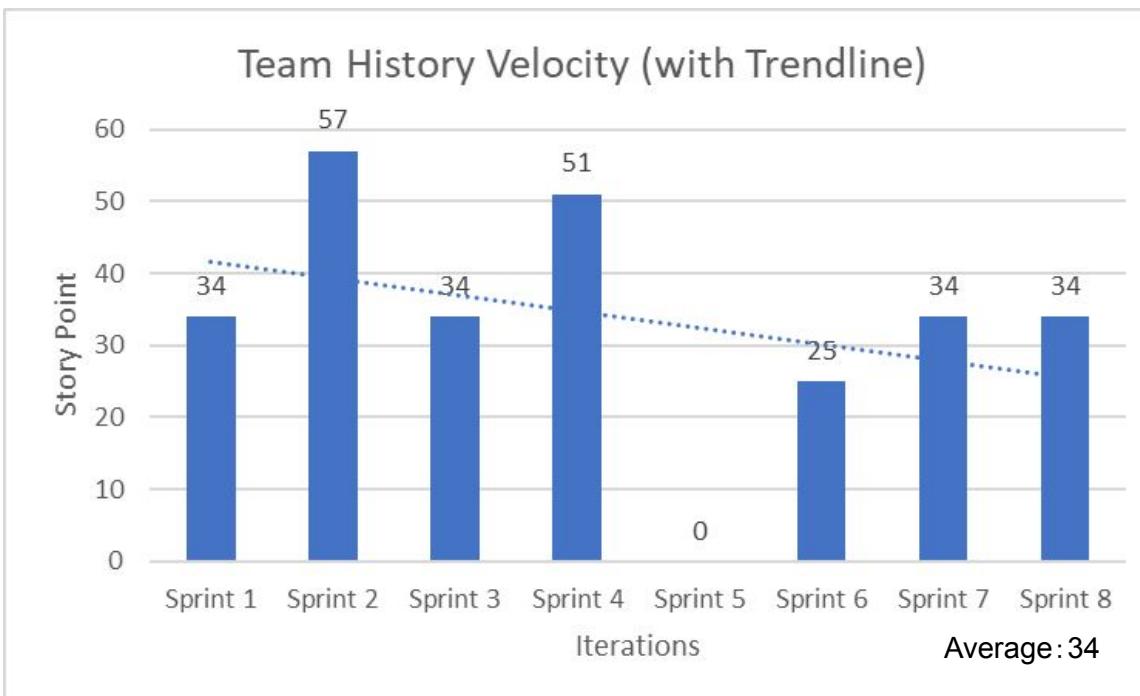
# Sprint 8 Backlog (final check list)

Sprint 8 Task			
FinalCheckID	Task Description	Status	Notes
FC1	Update the tech Paper	Done	Josh
FC2	Update the Dashboard according to the new features	Done	Peter T
FC3	Update the database with more reasonable data	Done	Josh, Kai
FC4	Final check the GitHub code, solve all version issues	Done	Everyone
FC5	Overall testing	Done	Jincheng, Houqi
FC6	Record final video DEMO	Done	Everyone
FC7	Final presentation set up	Done	everyone, (templete: Kai)
FC8	Wiki Page final update	Done	Kai

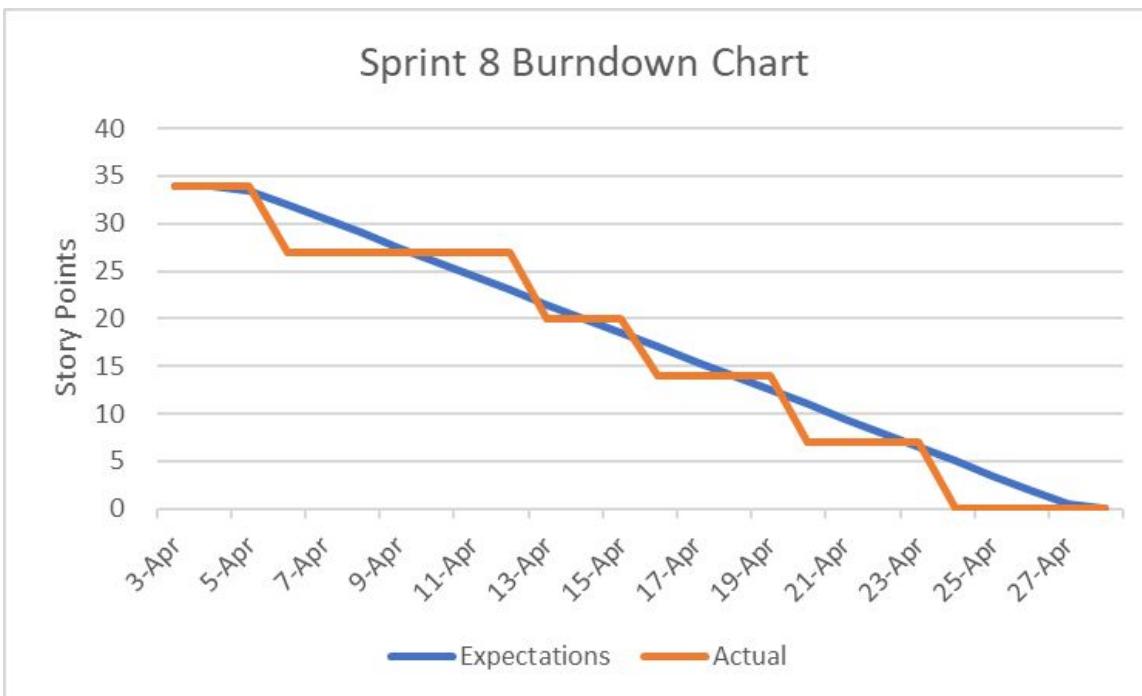
# Metrics - Team Velocity of Sprint 8



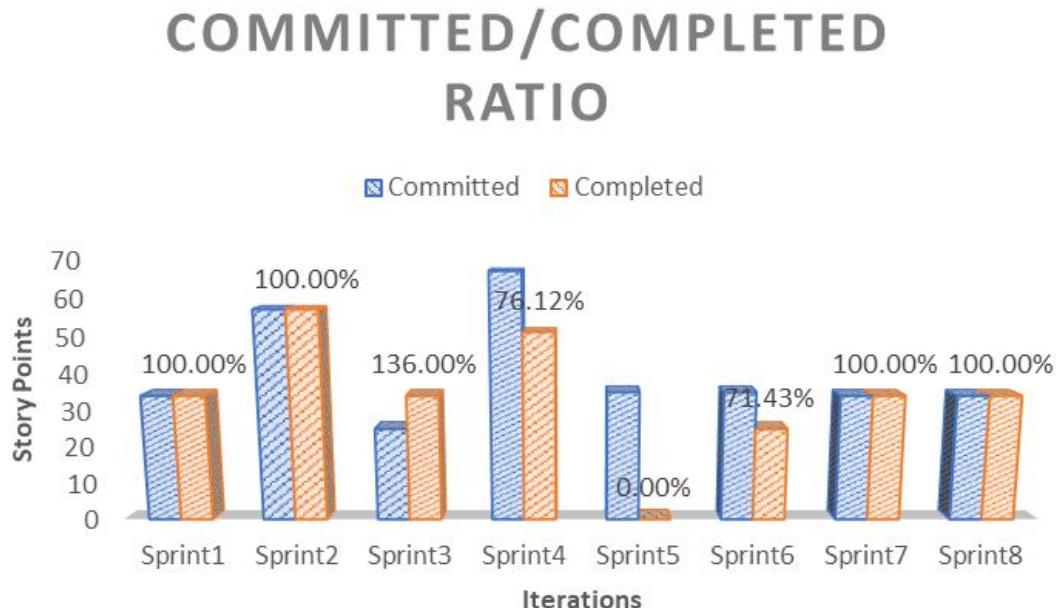
# Metrics - Team History Velocity



# Metrics - Burndown Chart



# Metrics - Committed/Completed Ratio



# Retrospective - What Went Well

## What went well in Sprint 8?

- There was the most collaboration of any sprint
- We finalized all the testing/debugging earlier than expected
- We have finished our MVP and updated features to represent what we have achieved over the course of the capstone project

# Retrospective - What Did Not Go Well

## What did not go well in Sprint 8?

- Incompatible commit history on our separate branches when trying to merge final code to main
- A few instances of poor communication, not updating each other on changes we were working on/bug fixes

# Retrospective - Action Plan

**Since it's the last sprint - we instead have “advice for ourselves at the start”**

- Make sure we all learn, understand, and practice using Github and managing local/remote files
- Double the “expected” time to complete features/stories to allow for all the unexpected problems
- Meet multiple times a week from project start
- Record presentations a few days early to allow time to fix any issues or re-record
- Have at least one extra person fully understand each feature to be able to “fill in” when needed

# History Feedback from the professor

- Better to have a “header” sentence to describe what the bullet points.
- Add more diagram (UML, component)
- For size of the items in the Backlog, use story point instead of large, medium, small
- Call “task stories” and “user stories”
- Missing planned/committed ratio
- The speed of the presentation is slow
- Remove the phrase “task story”
- Add a sequence or UML diagram
- Team velocity should reflect all sprints
- More enthusiasm in presentation
- Shorten testing portion of presentation, and show amount of times tested instead of either pass/fail
- Product seems good but packaging could be more interesting
- UML diagram is in an unusual style
- More enthusiasm in presentation
- Change story points to a fibonacci number scale
- A lot of story points are committed for sprint 5, make sure you set reasonable expectations
- Add a User Sequence Diagram to explain the idea of the project better
- Even if a user story haven’t been completed yet, still show the work we done (debugs, fixes, etc.)
- Don’t overcommit to stories, work within reasonable capacity

# History Improvements from the professor

- Improved the slides' structure
- Design diagrams that explain our project better
- Applied story point for the Backlog
- Rename the “task” to “task story”
- Create planned/committed ratio
- Rehearse before the presentation recording
- Use “task” instead of “task story”
- We added UML diagram
- Rebuild the team velocity graph
- Presentation reflects a more appealing and less granular overview of product
- Learned and created more diagrams
- Plan the sprint better and aimed to complete an number of story points in line with previous sprints
- Report the work done outside of completed stories

# Project Demo - Screenshot



SkyNet

Dashboard

Supplier

Item

Inventory

Order

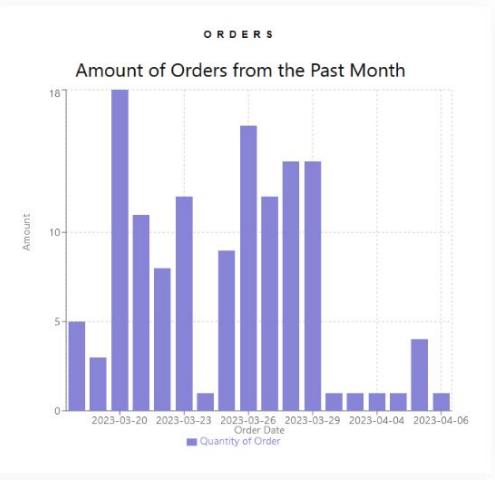
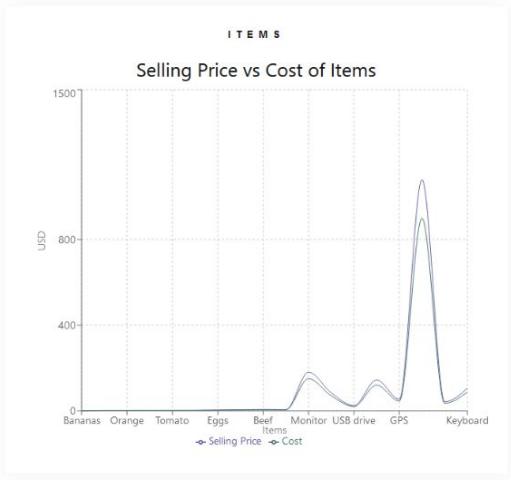
Cash Registers

Tracking

Address Verification



# SkyNet



#### Recent Orders

- Order ID: 1032  
Item ID: 4  
Quantity: 1  
Order Date: 2023-04-06  
Order Price: 2.10  
Customer ID: 1

#### Low Quantity Items:

- (The inventory ID) 1 : 0
- (The inventory ID) 3 : 15
- (The inventory ID) 4 : 11
- (The inventory ID) 7 : 6
- (The inventory ID) 13 : 9

[See more details](#)

# Project Demo - Screenshot

S U P P L I E R M A N A G E M E N T

#	Company	Email	Phone Number	Country	Street	City	State	Zip	Note	Actions
1	Clark and Farley Taylors	wumyme@mailinator.com	19844518223	Est sit corporis e	Sunt elit ipsaasdjkjasd	Officia ad incididun	Est illum tempora	14951	Quisquam sit veniam	<button>Edit</button> <button>Delete</button>
2	Stanton and Snow Traders	noguvyymo@mailinator.com	12121212	Dolor omnis et est	Rem molestiae eaque	Quibusdam quia sit	Quos et facilis volu	15969	Voluptatem maiores	<button>Edit</button> <button>Delete</button>
3	Campbell Soup Co.	manager@Campbell.com	357-11-4335	USA	Carlisle St	Phoenix	Arizona	34057		<button>Edit</button> <button>Delete</button>
4	Cobb Noble LLC	kacorog@mailinator.com	15629949363	Ea vitae consectetur	In autem non volupta	Dicta velit reiciend	Optio vel laborum	80783	Rem tempora est magn	<button>Edit</button> <button>Delete</button>
5	Cardinal Health Inc.	manager@Cardina.com	605-455-7059	USA	Chambers St	San Antonio	Texas	61878		<button>Edit</button> <button>Delete</button>
6	Chubb Corp	manager@Chubb.com	742-994-143	USA	Delancey St	San Diego	California	62991		<button>Edit</button> <button>Delete</button>
7	Ciena Corp.	manager@Ciena.com	109-333-4925	USA	E Broadway	Dallas	Texas	28164		<button>Edit</button> <button>Delete</button>

S U P P L I E R M A N A G E M E N T

#	Company	Email	Phone Number	Country	Street	City	State	Zip	Note	Actions
1	Clark and Farley Taylors	wumyme@mailinator.com	19844518223	Est sit corporis e	Sunt elit ipsaasdjkjasd	Officia ad incididun	Est illum tempora	14951	Quisquam sit veniam	<button>Edit</button> <button>Delete</button>
2	Stanton and Snow Traders	noguvyymo@mailinator.com	12121212	Dolor omnis et est	Rem molestiae eaque	Quibusdam quia sit	Quos et facilis volu	15969	Voluptatem maiores	<button>Edit</button> <button>Delete</button>
3	Campbell Soup Co.	manager@Campbell.com	357-11-4335	USA	Carlisle St	Phoenix	Arizona	34057		<button>Edit</button> <button>Delete</button>
4	Cobb Noble LLC	kacorog@mailinator.com	15629949363	Ea vitae consectetur	In autem non volupta	Dicta velit reiciend	Optio vel laborum	80783	Rem tempora est magn	<button>Edit</button> <button>Delete</button>
5	Cardinal Health Inc.	manager@Cardina.com	605-455-7059	USA	Chambers St	San Antonio	Texas	61878		<button>Edit</button> <button>Delete</button>
6	Chubb Corp	manager@Chubb.com	742-994-143	USA	Delancey St	San Diego	California	62991		<button>Edit</button> <button>Delete</button>
7	Ciena Corp.	manager@Ciena.com	109-333-4925	USA	E Broadway	Dallas	Texas	28164		<button>Edit</button> <button>Delete</button>

# Project Demo - Screenshot

## Item

#	Description	Cost	Selling Price	Note	Supplier ID	Classification	Actions
1	Bananas	0.06	0.77	per lb	1		<button>Edit</button> <button>Delete</button>
2	Orange	1.73	2.08	per lbs	2		<button>Edit</button> <button>Delete</button>
3	Bread						<button>Edit</button> <button>Delete</button>
4	Tomato						<button>Edit</button> <button>Delete</button>
5	Chicken	3.49					<button>Edit</button> <button>Delete</button>
6	Eggs						<button>Edit</button> <button>Delete</button>
7	Gasoline						<button>Edit</button> <button>Delete</button>
8	Beef						<button>Edit</button> <button>Delete</button>

### Add Item

Description  
CVS Health Isopropyl 91% Alcohol First Aid Antiseptic Spray - 10 Oz

Cost  
Cost

Selling Price  
3.49

Note  
CVS Health Isopropyl 91% Alcohol First Aid Antiseptic Spray | CVS Health Isopropyl 91% Alcohol First Aid Antiseptic Spray -

Supplier ID  
Supplier ID

Classification  
Health & Beauty - Health Care - First Aid

Scan Save changes Cancel

# Project Demo - Screenshot

SkyNet

- Dashboard
- Supplier
- Item
- Inventory
- Order
- Cash Registers
- Tracking
- Address Verification
- Metrics

**INVOICE**

One Pace Plaza  
New York, NY 10038

Some Company  
c/o Some Guy

Invoice #	101138
Date	Mon, 01 May 2023 15:56:37 GMT
Amount Due	\$13.72

#	Item	Description	Rate	Quantity	Price
1	Apple	per pound	\$2.00	2	\$4
2	Orange	per lb	\$2.08	3	\$6.24
3	Eggs	per lb	\$3.48	1	\$3.48

Total	\$13.72
Amount Paid	\$0.00
Balance Due	\$13.72

**Submit**   **Print**

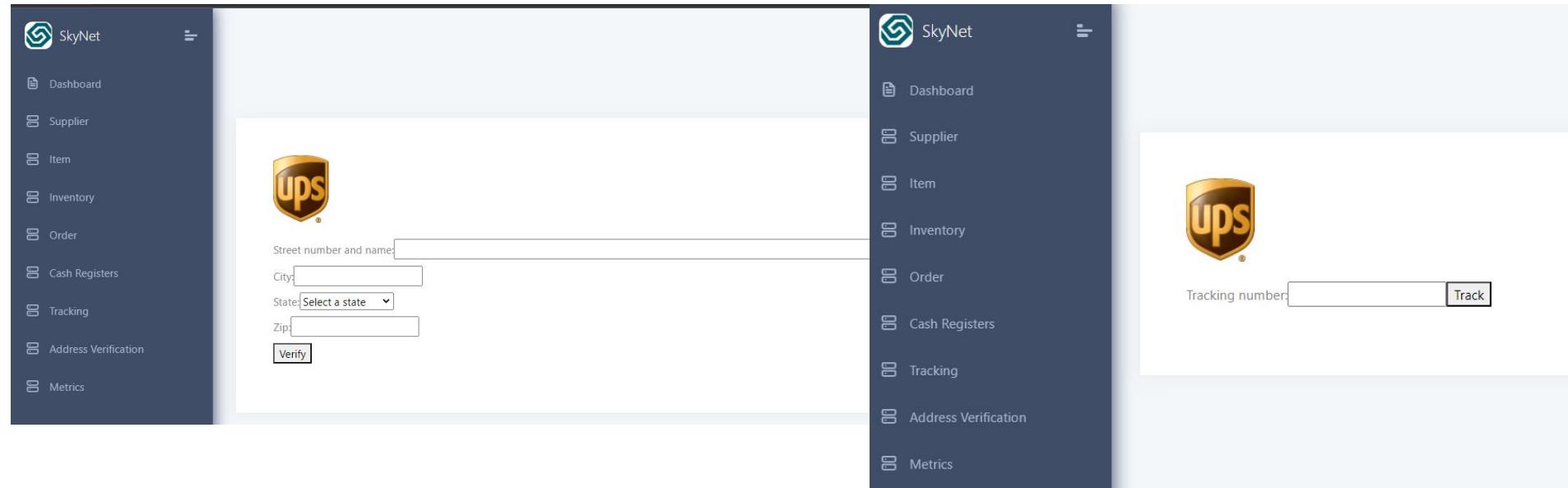
**ADDITIONAL NOTES**

A finance charge of 1.5% will be made on unpaid balances after 30 days.

# Project Demo - Screenshot



# Project Demo - Screenshot



The screenshot displays a web application interface with a dark blue sidebar menu on the left and a main content area on the right.

**Left Sidebar (Dark Blue):**

- SkyNet
- Dashboard
- Supplier
- Item
- Inventory
- Order
- Cash Registers
- Tracking
- Address Verification
- Metrics

**Right Content Area:**

**Left Panel (Address Verification):**

- UPS logo
- Street number and name:
- City:
- State:
- Zip:
- 

**Right Panel (Tracking):**

- UPS logo
- Tracking number:

# Project Demo - APIs

Bootstrap

Django rest framework

Django CORS(Cross-origin resource sharing)

Django also comes equipped with many APIs in its standard library, some examples include a Database API, Model-View-Template APIs, HTTP request and Response, and URL utility API.

Barcode lookup - item information database which matches barcodes to known inventory items

Quagga - a barcode-scanner entirely written in JavaScript supporting real-time localization and decoding of various types of barcodes

UPS package track and address verification APIs

Axios library - used to handle the Javascript HTTP requests

# Github Link

**<https://github.com/htmw/Skynet/wiki>**

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# Live Demo

The link can be found on GitHub or in the  
description below the presentation



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Thank you for watching!