



SkyNet

– A business management system

Present by:

CS 691 Capstone Project Team Three



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Agenda

- Feedback & Improvements
- Market Research & Analysis
- Architecture Diagram & Technologies
- Backlog & User Stories
- Acceptance Criteria & Test Cases
- MVP (Minimal Viable Product): Design & Functions
- Sprint 2: Team Velocity & Retrospective
- Plan for Sprint 3

Team Members

Josh Krinsky
Project Manager
Scrum Master



Peter Torrente
Software Architect

Kai Wang
Database Admin



Houqi Zhan
Database Developer



Jincheng Zou
Software Developer



Peter McKechnie
Software Developer



 SkyNet

Improvements from feedback

Feedback

- Don't use static website
- Make it accessible from mobile device
- User Personas are not specific
- Add machine learning feature
- Retrospective had too little

Improvements

- Changed our front end to React.JS
- React framework will allow for easy mobile access
- User Personas now describe who the app is intended for
- Added a machine learning model for sales forecasting
- Retrospective was updated to include, what went well, what didn't go well, action steps to improve

Problem Statement

- Companies rely heavily on CRM and POS software to control the customer experience.
- These are sold as complex software platforms offering a variety of features.
- Large and expensive packages 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.

Problem Statement - Market Research

- The average American small business owner is over 50 years old.¹
- This demographic is not very technologically inclined (40% of Americans aged 50 to 64 have never owned a smart phone.)²
- Very few options on the market day have been designed with the technologically unsavvy business owner in mind.
- Most start up ventures ultimately fail, citing cash-flow shortages as the primary reason.
- For those that do succeed, most take 3 - 5 years to turn a profit.³
- Few things are more unappealing to a struggling start up than hefty subscription fees on essential software.
- Many platforms offer cheaper packages, which are frequently stripped down and have numerous features removed.

Problem Statement - Market Research

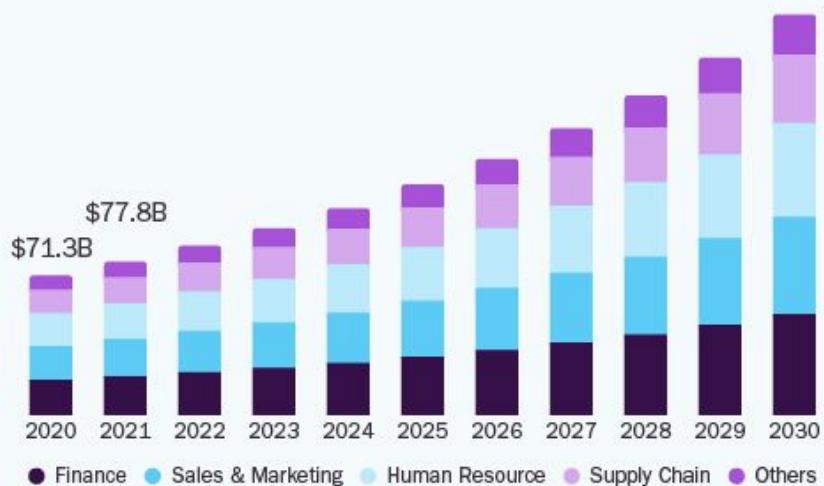
Favorable Market Conditions

- Globally valued at over \$400 billion ³
- North American market dominates ⁴
- Significant growth expected in U.S. market ⁵

Opportunities for SkyNet

- Small and medium sized enterprises
- Growth of BPaaS ⁶

U.S. Business Software & Services Market
size, by software, 2020 - 2030 (USD Billion)



Project Description

- 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 analysis

Personas - 1

David:

- 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:

- 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



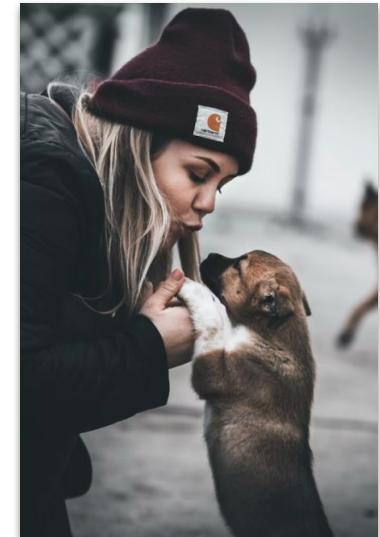
Personas - 3

Alexis:

- 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 - Warehouse Management

Current Inventory Incoming Orders Reports

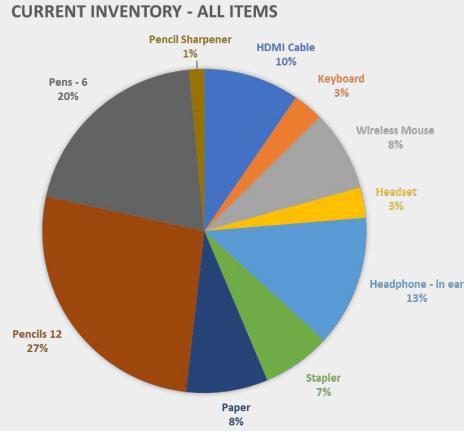
Search

+ Add Item

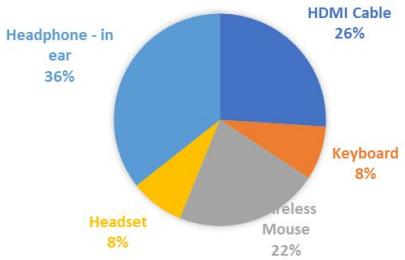
Name	Current Inventory	On Hand	In Transit	Minimum required	Needs reorder	Details
<u>Computer Supplies & Accessories</u>						
HDMI Cable	80	65	15	30	product	
Keyboard	30	30	0	5	product	
Wireless Mouse	80	80	0	100 !!!!	product	
Headset	20	10	10	25 !!!!	product	
Headphone - in ear	90	50	40	45	product	
<u>Office Supplies</u>						
Stapler	51	34	17	39	product	
Paper	68	55	13	30	product	
Pencils 12	177	90	87	96	product	
Pens - 6	136	73	63	78	product	
Pencil Sharpener	13	11	2	22 !!!!	product	

MVP - Warehouse Management

Current Inventory Incoming Orders Reports



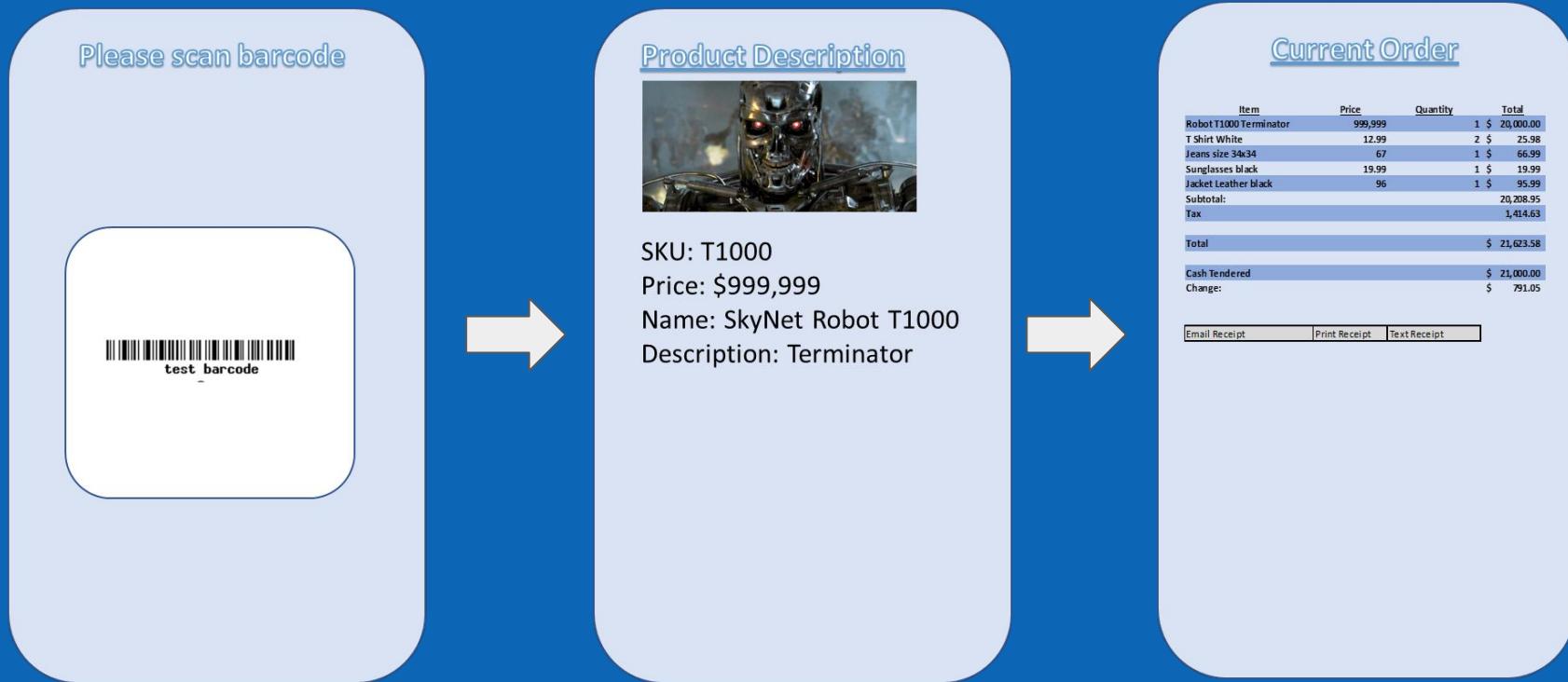
CURRENT INVENTORY - COMPUTER SUPPLIES



Order Amount by Month: 2022



MVP - Cash Register (mobile view)



MVP - Supplier Management

Example User

+ Add Vendor

Supplier	Main Contact	Email	Phone
FaceBox	Mike Zokerin	ZokerinMike@Facebook.com	555-0123
Tosla	Elon Tusk	Etusks@tosla.com	555-0123
Glamazon	John Beezo	John.Beez@Glamazon.com	555-0123
Oranges Inc	Steph Works	SteWorks@Oranges.Inc	555-0123

FaceBox

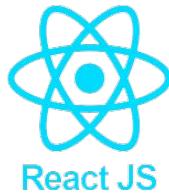
[Issue Log](#) [Contract](#)

+ Generate Purchase Order

Order History

Order Number	Total	Ordered by	Date Placed	Date Shipped	Expected Delivery	Date Received	Status	Notes
001	\$ 8,080.00	Sara Connors	12/1/2015	12/17/2015	12/31/2015		In Transit	
002	\$ 1,520.29	Jon Connors	10/2/2015	11/17/2015	12/1/2015	12/1/2015	Complete	
003	\$ 7,225.95	Sara Connors	8/3/2015	10/18/2015	11/1/2015	11/1/2015	Complete	
004	\$ 2,508.37	Sara Connors	6/4/2015	9/18/2015	10/2/2015	10/2/2015	Complete	
005	\$ 1,272.31	Bilbo Baggins	4/5/2015	8/19/2015	9/2/2015	9/2/2015	Complete	

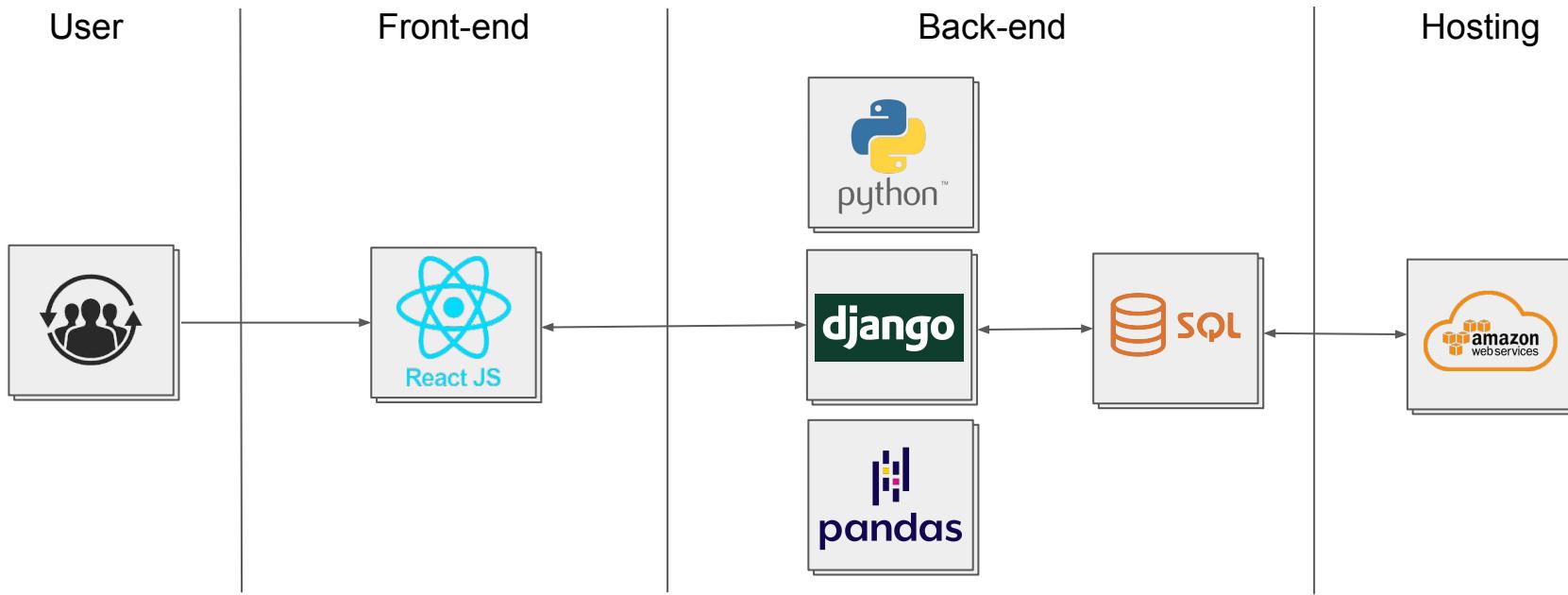
Technologies



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
- SQL - Database Management
- AWS (Amazon Web Services) - Hosting, Relational Database Service, and Machine Learning
- Discord - Team Communication

System Architecture Diagram



ID	As a...	I want to...	So that I can...	Task Name	Size	Priority	Status
US1	Retailers Manager	I wish I could record my inventory in the database and make changes at any time	Keep track of my inventory in real time	DBS_add	Small	High	Waiting
US2		I would like to be alerted when some items are out of stock	Replenish my inventory in a timely manner	DBS_delete	Small	High	Waiting
US3		I want my inventory situation to be intelligently categorized	Track and manage inventory information by category	DBS_edit	Small	High	Waiting
US4		I want to be able to check my inventory with a visual chart	Get a clearer picture of my inventory	DBS_alert	Medium	Medium	Waiting
US5		I want the system to record my sales and analyze them	Keep track of my sales and change sales strategies	DBS_sort	Large	Medium	Waiting
US6		I want to be able to enter/change data via cell phone camera or code reader	Input data easily	DBS_visualization	Large	High	Waiting
US7		I want to be able to scan items	See information about the item	DBS_analyze	Large	Medium	Waiting
US8	Cashier	I want to be able to calculate the amount of money owed	Know the total amount of money owed	DBS_barcodeInput	Small	Low	Waiting
US9		I want to be able to status of payment	Know if the customer has paid yet	CR_scan	Medium	Medium	Waiting
US10		I want to be able to record a deposit	Collect money from the customer	CR_amountowed	Small	High	Waiting
US11		I want to be able add items	Keep track of what items the customer wants to purchase	CR_paymentstatus	Small	Low	Waiting
US12		I want to be able remove items	Change what items the customer wants to purchase	CR_deposit	Small	High	Waiting
US13		I want to have a receipt of the current transaction	Have a receipt of the transaction	CR_additem	Small	High	Waiting
US14		Evaluate and select suppliers	Keep track of what items the customer wants to purchase	CR_removeitem	Small	High	Waiting
US15	Retailers Manager	Streamline onboarding with suppliers	Have a receipt of the transaction	SRM_onboard	Small	Low	Waiting
US16		Negotiate contracts and pricing	Flag potential issues and bring them to suppliers attention in an expedited fashion	SRM_contract	Medium	High	Waiting
US17		Simplify communication with suppliers	Flag potential issues and bring them to suppliers attention in an expedited fashion	SRM_help	Small	High	Waiting
US18		Manage supplier performance	Performance metrics that are already established for me	SRM_kpi	Medium	High	Waiting
US19		Resolve issues with suppliers	Flag potential issues and bring them to suppliers attention in an expedited fashion	SRM_kpi	Small	Medium	Waiting
US20		I want to upload my sales data	Track/Maintain/Organize my data	ML_upload	Small	High	Waiting
US21		I want to use regression to train my model	Accurately forecast sales data on a constantly changing dataset	ML_runmodel	Medium	High	Waiting
US22	Marketing Manager	I want to use large amounts of data to improve the model's accuracy	So that I can be more confident in the accuracy of my forecast	ML_pulldata	Large	Medium	Waiting
US23		I want to be able to deploy the model to make sales predictions	Reduce the uncertainty and guesswork in my forecasts	ML_predict	Large	High	Waiting
US24		I want the model to predict total sales revenue by time period	Best serve my customers and maximize seasonal consumer trends	ML_timepredict	Large	Low	Waiting
US25		I want the model to recommend prices and quantities of products for sale	Be leaner in my logistics and maximize profits	ML_pricequantity	Large	Low	Waiting
US26		I want to check the detail of the current orders	Have idea of a delivery	DEL_details	Small	High	Waiting
US27		I want to get notification once the customers receive their product	Know the delivery is completed	DEL_notify	Medium	Medium	Waiting
US28		I want to get notification if there a package for me is about to arrive	Be prepared for the coming package	DEL_history	Medium	Low	Waiting
US29	Stuff	I want to check the previous shipping information	Keep everything recorded	DEL_history	Medium	Low	Waiting
US30							
US31							

Backlog

Product Backlog

ID	As a...	I want to...	So that I can...	Acceptance Criteria (format: use keywords Given, When, And, Then)	Task Name	Size	Priority	Status	Sprint	Notes
US1	Retail Manager	I want to be able to add new inventory to my database	Keep my database accurate to my changing inventory	Given a user adds data, When the database will add a new row.	DBS_add	Medium	High	Waiting	3	
US2	Retail 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	Medium	High	Waiting	3	
US3	Retail Manager	I want to be able to delete inventory items in my database	Efficiently utilize server space and keep data accurate	When a user edit data, Then the database will edit the row	DBS_alert	Medium	High	Waiting	3	
US4	Retail Manager	I need to sort the data in my database	analyze and track my inventory by different metrics	Given different categories, When the user selects a category, Then show the products under that category	DBS_sort	Large	Medium	Waiting	5	
US5	Retail 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	Large	High	Waiting	4	
US6	Retail 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	Medium	Medium	Waiting	3	
US7	Retail Manager	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 function. Then provides analysis of the data, such as the history of sales for each item.	DBS_analyze	Large	Medium	Waiting	5	
US8	Retail Manager	I want to be able to enter/change 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	Small	Low	Waiting	4	
US9	Cashier	I want to be able to scan items	See information about the item	When the user scans the barcode, Then the scanned product information is added to the checkout list	CR_scan	Medium	Medium	Waiting	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	Small	High	Waiting	4	
US11	Cashier	I want to be able to check the status of payment	See if the customer has paid yet	Given order details, When the order is viewed, Then the status will show "Payment Outstanding" or "Paid"	CR_paymentstatus	Small	Low	Waiting	4	
US12	Cashier	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	Small	High	Waiting	4	
US13	Cashier	I want to be able add items to a cart	Keep track of what items the customer wants to purchase	Given a list of items, When the customer adds an item to the cart, Then the cart will update to include the new item	CR_additem	Small	High	Waiting	4	
US14	Cashier	I want to be able remove items from the cart	Change what items the customer wants to purchase	Given a cart with at least 1 item, When the customer removes an item, Then the cart will update to remove the item	CR_removeitem	Small	High	Waiting	4	
US15	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	Small	Low	Waiting	4	
US16	Retailers 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	Medium	High	Waiting	3	

Product Backlog

ID	As a...	I want to...	So that I can...	Acceptance Criteria (format: use keywords Given, When, And, Then)	Task Name	Size	Priority	Status	Sprint	Notes
US17	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	Small	High	Waiting	3	
US18	user	Centralize communication with my suppliers	Avoid delays and confusion	When the user selects a communication medium(email, schedule meeting, voice call), Then the communication will be sent	SRM_msg	Small	Medium	Waiting	4	
US19	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	Medium	Medium	Waiting	4	Suppliers evaluated and given selection scorecards (capacity, quality, performance, pricing historical, etc.)
US20	user	I want to upload my sales data	Track/Maintain/Organize my data	When i upload sales data, Then the database update to add	ML_upload	Small	High	Waiting	6	
US21	user	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	Large	High	Waiting	6	
US22	user	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	Large	Low	Waiting	6	
US23	user	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	Large	Low	Waiting	6	
US24	user	I want to check the detail of the current orders	Have idea of a delivery	Given information about all logistics, When the user selects a particular logistics, Then the details of that logistics are provided.	LOG_details	Small	High	Waiting	5	
US25	user	I want to get notification once the customers receive their product	Know the delivery is completed	When a shipment is delivered, Then a notification will be sent	LOG_delivery_fulfilled	Medium	Medium	Waiting	5	
US26	user	I want to get notification when delivery of an order is imminent	Be prepared for the coming package	When an order is due to be delivered, Then a notification will be sent	LOG_order_notice	Medium	Medium	Waiting	5	
US27	user	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	Medium	Low	Waiting	5	
US28	user	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	Small	Medium	Waiting		
US29	user	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	Medium	Medium	Waiting	4	
US30	user	I want to strongly encrypt and safely store my user's data	Ensure my customers' data is safe	Given a database of customer data, When unauthorized entry is attempted, Then request will not be returned	DBS_security	Large	Medium	Waiting	6	
US31	user	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	Small	High	Waiting	3	

Test Cases

Category	ID	Action	Test Data	Test Description	Expected Output	Actual Output	Test Result
Warehouse Management	US1	Insert a product data		Enter product image, price, description	Product data is correctly displayed in the data		
	US1	Edit a product data		Change the price. update the image, re-write the description	Product data is updated with new data		
	US1	Delete a product data		Delete a product	The target data is deleted		
	US3	Select a category		Select a start and end date	Displays a graph of the data for that time period		
	US1	Add a product data		Add a product data with the database	Add product data		
	US2	Item alert		Item is about to expire	Automatically send a reminder		
	US4	Data visualization		Change the chart options or change the data range	Chart regenerated based on behavior		
	US5	Data analyze		Analysis function	Analysis of the data		
	US6	Barcode Input		Enter product information using barcode	Automatically populate product information		

Test Cases

Category	ID	Action	Test Data	Test Description	Expected Output	Actual Output	Test Result
Cash register function	US7	Scan product	barcode of item	Item is scanned with the mobile app	Item is found in database		
	US8	Find product details	item code	Lookup item code to pull product details	image, price, quantity, and description are displayed		
	US8	Calculate order totals and change	one instance of an order	Calculate total amount due, tax, change due	correct totals calculated		
	US11	Add item to order		Scan or manually add an product	product is added to order and to amount due		
	US12	Remove item from order		Delete an item from order total	item is removed, amount due is reduced		
Data Security	US30	verify login credentials	username and password	1) Enter correct credentials 2) Enter Incorrect credentials	login successful/ login denied		
	US32	access from mobile device	front end software	Load app from mobile device	app loads and functions normally		
	US31	test encryption	encrypted login credentials	1) attempt to reverse engineer password from encrypted data	correct password not found		

Test Cases

Category	ID	Action	Test Data	Test Description	Expected Output	Actual Output	Test Result	Comments
Merchandising (machine learning)	US20	Add recent sales	CSV file of sales data	upload data to database	data is added to database			
	US25	generate price suggestions	life to date sales data	Machine learning model reviews data and outputs suggestion	price suggestions within a 10% change in price			
	US23	generate inventory suggestions	life to date sales data	Machine learning model reviews data and outputs suggestion	a list of suggested inventory amounts to stock			
	US24	generate timing suggestions	life to date sales data	Machine learning model reviews data and outputs suggestion	dates in line with seasonal trends			we don't want to see Easter goods suggested for Halloween

Test Cases

Category	ID	Action	Test Data	Test Description	Expected Output	Actual Output	Test Result
Logistics management (express delivery)	US26	provide a logistics details		Enter a tracking number associated with an order	Details of courier transfer		
	US27	Get a notification when my purchases from vendors are due to arrive soon		Test an order due to arrive in 3 days	get a notification of package with expected delivery		
	US28	Get notification when a shipment arrives to customer		A notice of completion is sent from the courier	get a confirmation alert of delivery		
	US29	give all logistics information		Run a history of all deliveries received and sent	a list of logistics is emailed or downloaded		

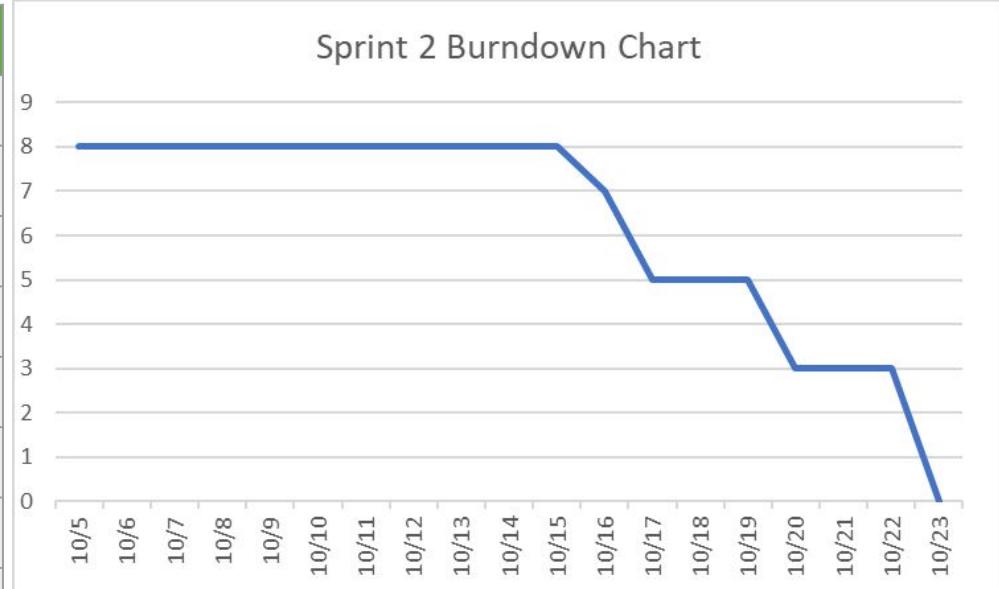
Sprint Backlog

For this sprint, we still focused on the project set-up. We redesigned the framework and function of our project, and are learning some new tools. So we can't finish any user stories for now until the framework is finished.

User Story	Task Name
	Market Research
	Establishment of techniques and tools
	Define specific feature details
	API Research
	Design of project Backlog & User Stories
	Design Project Acceptance Criteria
	Designing Project Test Cases
	Designing MVP prototypes and sketches
NONE	

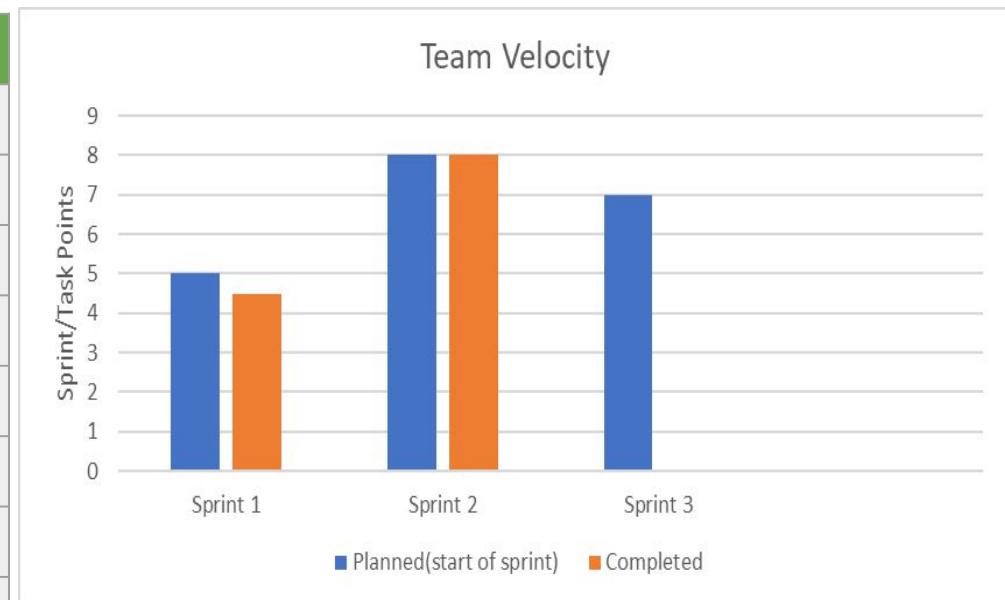
Metrics

Task Name	Status	Date
Market Research	Done	10/16
Establishment of techniques and tools	Done	10/17
Define specific feature details	Done	10/17
API Research	Done	10/20
Design of project Backlog & User Stories	Done	10/20
Design Project Acceptance Criteria	Done	10/23
Designing Project Test Cases	Done	10/23
Designing MVP prototypes and sketches	Done	10/23



Metrics

Task Name	Status	Date
Market Research	Done	10/16
Establishment of techniques and tools	Done	10/17
Define specific feature details	Done	10/17
API Research	Done	10/20
Design of project Backlog & User Stories	Done	10/20
Design Project Acceptance Criteria	Done	10/23
Designing Project Test Cases	Done	10/23
Designing MVP prototypes and sketches	Done	10/23



Retrospective - What Went Well

- We found the best fitting technologies and frameworks (through research and collaboration)
- We finished the presentation on time
- Team members were receptive to changes and new ideas
- When the urgency got high, team members were contributing as much as needed
- The group's communication via Discord is very effective, and in addition to regular meetings, we often schedule ad hoc meetings to exchange ideas.

Retrospective - What Did Not Go Well

- There were unclear roles and responsibilities for a major portion of the sprint
- Sprint timing was not clearly defined, leaving most of the work for the end
- Work was done by team member availability resulting in an uneven split in stories completed
- Input and progress was driven by few members instead of everyone
- Took us a while for everyone to understand the new features and tech
- MVP took longer than we expected to plan

Retrospective - Action Plan

- Have a clear idea of exactly what needs to be done and who will do it
- Follow the timeline so work can be spread over the entire sprint
- We should split the deadline into two dates for drafts and final approval
- Clearly define the responsibilities of each member so that there is no need to require everyone to be proficient in all the tools
- Have everyone bring up at least one idea/item/issue in weekly planning meetings

Sprint 3 - Plan: Framework Construction and User Stories

ID	As a...	I want to...	So that I can...	Acceptance Criteria (format: use keywords Given, When, And, Then)	Task Name	Size	Priority	Status	Sprint
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	Medium	High	Waiting	3
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	Medium	High	Waiting	3
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_alert	Medium	High	Waiting	3
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 underne that category.	DBS_sort	Large	Medium	Waiting	5
US16	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	Medium	High	Waiting	3
US17	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	Small	High	Waiting	3
US31	user	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	Small	High	Waiting	3

Github Link

<https://github.com/CarviS0302/Pace-MS-Capstone/wiki>

References

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Thank you for watching!