



---

# Project Design and Management

UrMother

Emily Abraham  
Jane Landrum  
Sonika Reddy Madhu  
Alexis Santiago  
Yuxin Zhang

## Executive Summary

This project aims to develop a comprehensive point of sale system tailored for a restaurant where the customer will be able to order both through a kiosk and in person. It is focused on delivering a seamless and efficient experience for managers, employees, and customers. The purpose of this project is to create a user-friendly system that keeps track of orders, inventory, and payments for the time-effectiveness of the restaurant. This system will feature distinct user interfaces for managers, employees, and customers. Managers will be able to see real-time access to critical business information, including revenue reports, inventory levels, and employee information. This will allow them to make informed decisions and manage the restaurant's operations effectively. They will also be able to manage inventory and oversee employee performance. Employees need a system that will allow them to take orders and apply coupons, as well as help customers smoothly. Customers expect an intuitive user interface to easily navigate through and place orders with clear nutritional and allergen information. This system is designed to support order processing, payment handling, and inventory management. Additionally, the interface is built to be usable for anyone, with accessible features such as high contrast visual options and text to speech functionality. The team will use an Agile methodology ensuring iterative development and timely delivery of key features, all while evaluating the project status and requirements after each sprint. This project will focus on enhancing efficiency and user satisfaction with huge potential.

## Personas and User Stories

### Personas:

1. **Manager** - assume they have access to all views of the website. They need to be able to see important information in regards to inventory, revenue, and the other employees, as well as everything that normal employees and customers can see on their ends. They bring the ability to increase inventory quantities and manage (add or remove) both employee data and



---

menu items from the database. They also are capable of decreasing the inventory when they complete an order as well as add promotions or discounts.

2. **Normal employee** - assume they have access to both standard employee view as well as customer view. The normal employees need to be able to access the order building and checkout page, and should also be able to swap to customer view in the event that a customer needs help with the system. They bring the ability to decrease the quantity of the inventory as well as add discounts to orders.
3. **Customer** - assume they have limited access to only customer view. The customers should see an easy-to-navigate and understandable page to build their own orders and check out, essentially a simplified version of what the normal employees see. They should be able to see menu items' food specifications such as allergens and calories so they can be informed about what they are buying. They bring the ability to decrease the quantity of the inventory when they complete an order and checkout.

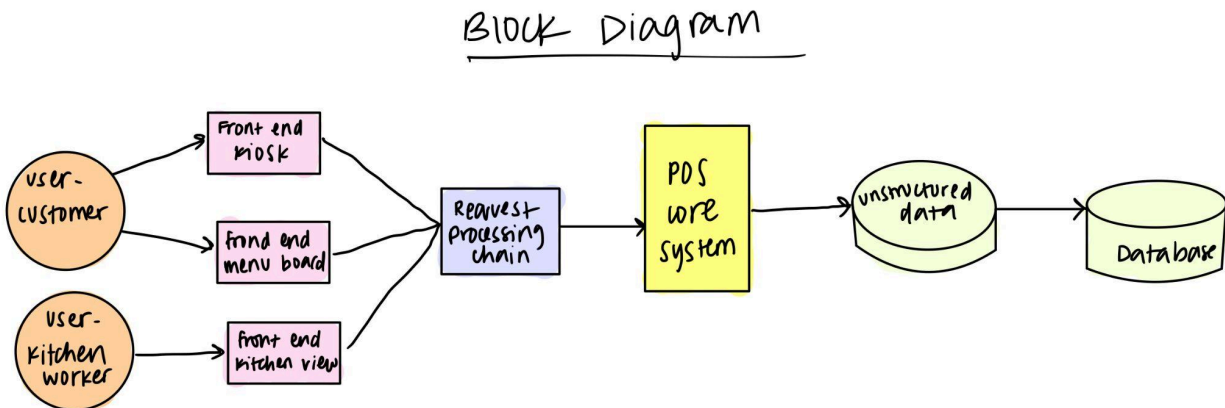
**User stories:**

1. As a manager, I want to be able to view information related to the database, including revenue reports, employee information, inventory, order and sales history, etc
2. As a normal employee, I want to be able to add discounts to an order if a customer has a discount code or as an apology when an order takes too long.
3. As a normal employee, I want to be able to take customers' orders and then cash them out
4. As a customer, I want to easily be able to build my own order so I know my food will be made properly.
5. As a customer, I want to be able to add my name to my order so when the order is completed, the employees can call out my name so I can identify my order.

# Proposed Work

## Solution Design

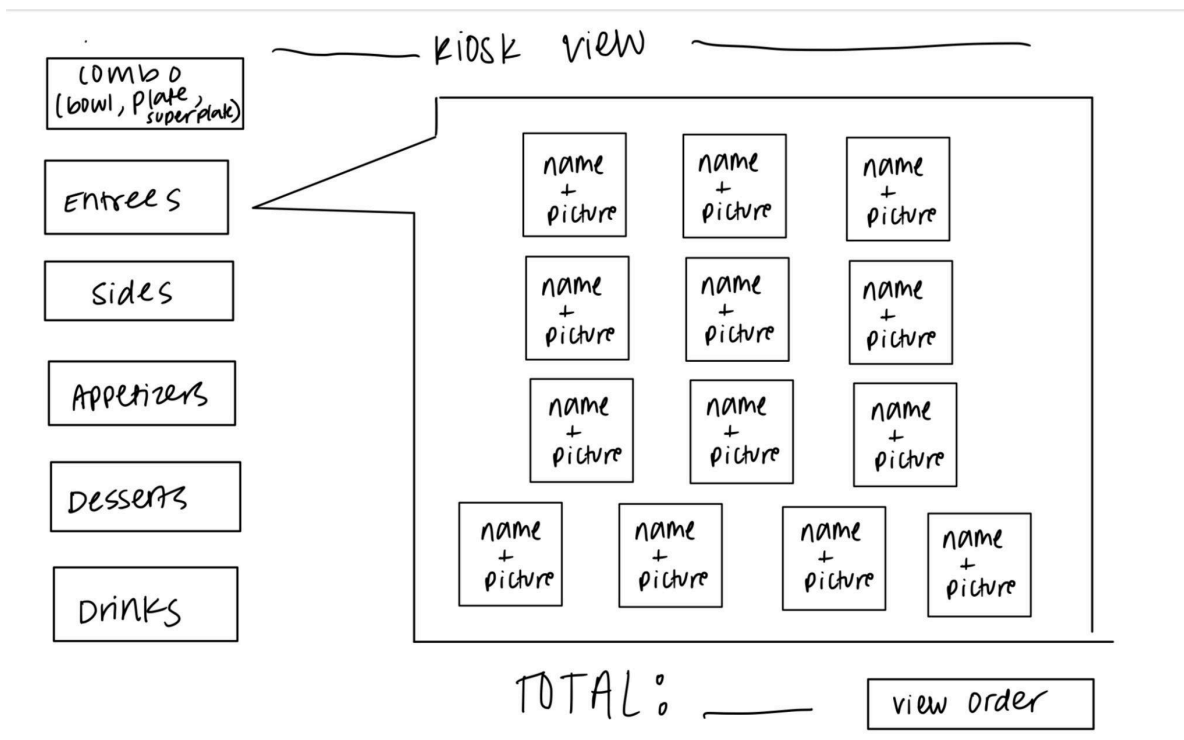
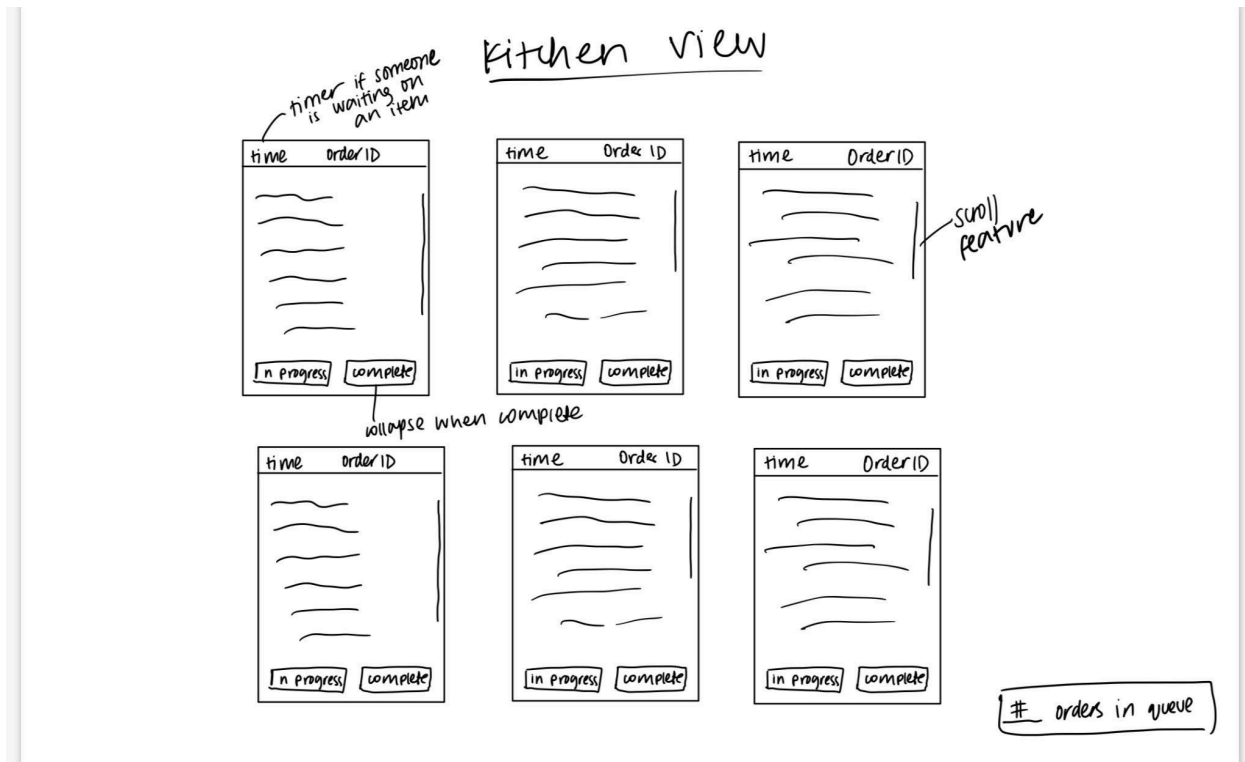
### System Diagram

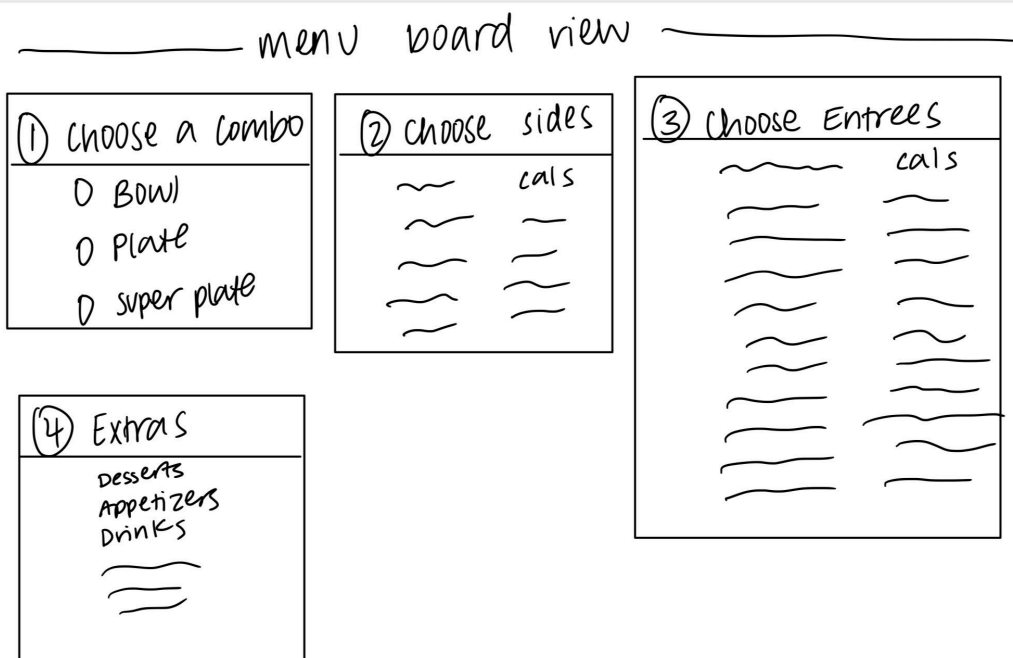


The user icon represents which front end view will be shown based on if the user is a customer or an employee/worker. The POS front-end is the interface that customers and staff will interact with (ex: kiosk, menu board, kitchen view). It sends user inputs (orders) to the Request Processing Chain. The Request Processing Chain processes requests like orders, payments, and inventory updates. It communicates with the POS Core System to fetch or update data. The POS Core System handles order management, payment processing, and inventory control. It links with the backend systems for further data processing. Unstructured data stores incoming data temporarily (order data) and is sent to the central database for processing and structuring. The database stores structured data like sales reports, employee information, inventory levels, ingredients, menu items, and orders.



## Interface Diagram





In designing the interface for the Kiosk, Menu & Kitchen system, our goal is to provide an intuitive, accessible, and user-friendly experience for all users, including those with disabilities. The following is a breakdown of how the interface will support users and the accessibility features that will be implemented:

#### User Support in the Interface

- Kiosk Navigation:
  - Clear Menu Structure
  - Touchscreen interface
- Menu Customization:
  - Interactive images
  - Calorie information
  - Nutritional Information
  - Spice Level
- Kitchen Interface:
  - Streamlined Orders

#### Accessibility Features for End Users

- Text-to-speech
- Bigger Text
- Dark Mode/ High Contrast Mode
- Pictures and Descriptions



# Project Management

## Team Roles and Qualifications

### **Project manager** - Jane

She has good time management skills and likes planning and seeing the big picture of the project, and will be able to effectively communicate with the team. She will also be able to contribute technically to the project wherever the team requires.

### **Back-end development** - Yuexin

She had experience in developing the backend for a project before and a strong proficiency in JavaScript and Python. She also had experience working with various APIs as well as hosting websites.

### **Front-end development** - Emily

I have had experience creating the front-end layout of the POS system for panda express. Additionally, I have created a personal website using HTML. My coding language experiences include Python, C++, Java, HTML & CSS. I love seeing the entire project come together and increase user experience.

### **Usability testing** - Alexis

I have had experience on both the employee and customer side of the system before, so I have a general understanding of what elements are used in the system and can bring in two different viewpoints when testing.

### **Technical reporting** - Sonika

I am well versed in the technical aspects as well as report writing. Thus, I am able to coordinate between the development team and the clients/users to ensure technical data is clear and understandable.

## Development Methodology

This project will utilize the agile development methodology, which includes three sprints and three scrum master meetings. We will track progress of our work and due dates for each sprint using a Trello board. We have weekly scheduled meetings on Monday and Wednesday 2:00 PM - 4:00 PM and meet during lab times from 4:10PM - 5:00PM. Scrum meetings will be held in class on Friday between 9:10 AM - 10:00 AM. We are also using Trello, a project management tool that helps teams organize,



plan, and collaborate on projects. We have separated our Trello by backlog, Sprint 1, doing, and complete.

## Planned Scope

The fallback goal for this project is to exactly meet the requirements defined in the Canvas page. At the very minimum, we would like to have all the required features implemented by the deadline. Our stretch goals, however, include a much larger list of features that greatly expand the scope of the project:

- Customer table in the database, so that customers can earn points and get rewards/discounts
- Classifications for menu items (spicy, calorie-smart, etc), and then displaying those classifications on the menu board and in the kiosk next to each menu item
- Ability to sort/prioritize menu items in the kiosk view based on a checkbox that the user can enable or disable
- Add a timer for the kitchen's cards so that if one item has been in the queue for a certain amount of time, it gets emphasized such that the kitchen staff know to prioritize it
- Menu items that contain ingredients that are out of stock are grayed out

## Task Breakdown and Scheduling

See appendix 1 for the product backlog, which contains a complete list of **subtasks** and their **dependencies**.

**Critical paths:** The most critical path is the path that the application takes as a customer is placing an order, and then what happens once that order is cashed out. Take a kiosk order for example: first, a customer selects an item from the menu. That item immediately gets added to the order\_items table in the database, with attributes like the associated order\_id. This continues until the customer is done selecting items. Once they click the cash out button, the orders table is updated with all the information about the order (the information is placed into an already existing row that is mostly blank to start out, and once the info is inputted, a new blank row is added to the table). Then, the inventory table needs to be updated such that for each ingredient that was part of the order, its quantity is subtracted from. Additionally, the local variables that are keeping track of things like whether or not the order is a combo, the size of the current items, and the total price of the order for example, all need to be reset. This path of data and logic is the crux of the project, and is the most critical part of ensuring that all database tables are up to date and that sales and order histories are being accurately tracked.



---

**Tentative schedule:** Our first priority is to create a minimum viable product by the end of Sprint 1. This means that by the end of Sprint 1, we need to have at least a working prototype of each of the 5 pages. We will want to have at least basic react components that will be on each page, as well as the basic functionality ported to our new project from project 2. By the end of Sprint 2, we will have each of the pages' front end views much more fleshed out, as well as many more backend functionality implemented. There should be many queries to the database, and connections to update the tables upon completing orders should be implemented as well. By the end of Sprint 2, we also will want to have started putting the external API's into the project, for example displaying the weather. Then, by the end of Sprint 3, we will have implemented all the accessibility features, as well as all of our reach goals that expand our scope. Throughout Sprint 3, we will fully polish all the front end designs, as well as shore up the backend functionality. This Sprint will also be for debugging and finishing up anything that didn't get completed yet.

## References

B. M. Rehkopf, "User Stories | Examples and Template | Atlassian," *Atlassian*.  
<https://www.atlassian.com/agile/project-management/user-stories>

"[Full Guide] Exploring 6 types of Architecture Diagram."  
<https://boardmix.com/knowledge/types-of-architecture-diagram/>





## Appendix 1: Product Backlog

Product Backlog:

#	Task	Priority	Dependencies	Time Estimate	Points	Status
1	Port GUI.java to JS	High	N/A	1hr	1	Not started
2	Port CustomActionListener to JS	High	N/A	1hr	1	Not started
3	Port AddEmployee to JS	Medium	N/A	1hr	1	Not started
4	Port AddMenuItem to JS	High	N/A	1hr	1	Not started
5	Port DeleteMenuItem to JS	High	N/A	1hr	1	Not started
6	Port DeleteEmployee to JS	Medium	N/A	1hr	1	Not started
7	Port EmployeeInfo to JS	Medium	N/A	1hr	1	Not started
8	Port InventoryReport to JS	Medium	N/A	1hr	1	Not started
9	Port LoginPage to JS	High	N/A	1hr	1	Not started
10	Port SalesReport to JS	Medium	N/A	1hr	1	Not started
11	Port XReport to JS	Medium	N/A	1hr	1	Not started
12	Port UpdateInventory to JS	Medium	N/A	1hr	1	Not started
13	Port ZReport to JS	Medium	N/A	1hr	1	Not started
—	React	—	—	—	—	—



14	Create React components for Cashier view	High	N/A	3hr	3	Not started
15	Create React components for Manager view	High	N/A	3hr	3	Not started
—	<b>Kitchen View</b>	—	—	—	—	—
16	Create card layout for kitchen view	High	Task 14	1hr	2	Not started
17	Generate new cards with kiosk orders for kitchen view	High	Task 14, 16	2hr	2	Not started
18	Create React components for kitchen cards	High	Task 14, 16	1hr	1	Not started
19	Implement Complete button functionality for kitchen cards	High	Task 14, 18	2hr	2	Not started
20	Implement In Progress button functionality for kitchen cards	High	Task 14, 18	2hr	2	Not started
21	Implement timer for orders that take too long	Medium	Task 14, 18	1hr	1	Not started
22	Add queue for orders that don't fit on screen	Medium	Task 14	3hr	3	Not started
23	Connect inventory to kitchen card completion	High	N/A	1hr	1	Not started
24	Connect orders table to kitchen card completion	High	N/A	1hr	1	Not started
25	Connect order_items to kitchen cards	High	N/A	1hr	1	Not started
26	Design customer table for database	High	N/A	1hr	1	Not started
27	Add and populate customer table in database	High	Task 26	2hr	2	Not started
28	Create point system as rewards for customers	Low	Task 24, 25, 27	4hr	4	Not started
29	Implement getting points	Low	Task 28	2hr	2	Not



	upon an order cashout					started
—	<b>Menu Board</b>	—	—	—	—	—
30	Design menu board layout	High	N/A	2hr	2	Not started
31	Create React components for menu board front end	High	Task 30	3hr	3	Not started
32	Connect menu board items to menu_items database table	High	Task 30	2hr	2	Not started
33	Display menu prices	High	Task 32	1hr	1	Not started
34	Display menu item descriptions on menu board	High	Task 32	1hr	1	Not started
35	Display weekly deals on menu board	Low	Task 32	1hr	1	Not started
36	Redesign menu_items table (add real description, create new columns for allergens, and extra info ie spicy or wok meal)	High	Task 32	4hr	4	Not started
37	Add spicy and wok meal icons next to menu board items	Low	Task 36	2hr	2	Not started
—	<b>Kiosk</b>	—	—	—	—	—
38	Develop kiosk view	High	N/A	3hr	3	Not started
39	Create React components for kiosk	High	Task 38	3hr	3	Not started
40	Grey out items that are out of stock	High	Task 38	3hr	3	Not started
41	Implement cash out for kiosk view	High	Task 39	2hr	2	Not started
42	Implement coupon codes for kiosk checkout	Low	Task 39	2hr	2	Not started



43	Add ability to include promotional deals on kiosk (weekly)	Low	Task 39	2hr	2	Not started
44	Design kiosk view	Low	Task 38	2hr	2	Not started
45	Connect kiosk view to database	High	Task 44	2hr	2	Not started
46	Add pictures to kiosk menu	Low	Task 44	1hr	1	Not started
47	Display total order price in the kiosk	High	Task 44	1hr	1	Not started
48	Add menu item descriptions to kiosk	Low	Task 36, 44	1hr	1	Not started
49	Add alternate text for all images	Low	Task 44	1hr	1	Not started
50	Add spicy and wok meal icons next to kiosk items	Low	Task 36, 44	3hr	3	Not started
51	Add checkboxes to kiosk view to sort/prioritize menu items	Medium	Task 44	4hr	4	Not started
52	Clean up kiosk visuals	Low	Task 44	1hr	1	Not started
—	<b>General</b>	—	—	—	—	—
53	Find API to translate page to different languages	Low	N/A	1hr	1	Not started
54	Implement API to translate pages to different languages	Low	Task 53	1hr	1	Not started
55	Find API to get weather	Low	N/A	1hr	1	Not started
56	Implement weather display for all pages	Low	N/A	1hr	1	Not started
57	Find API for authentication	Low	N/A	2hr	2	Not started

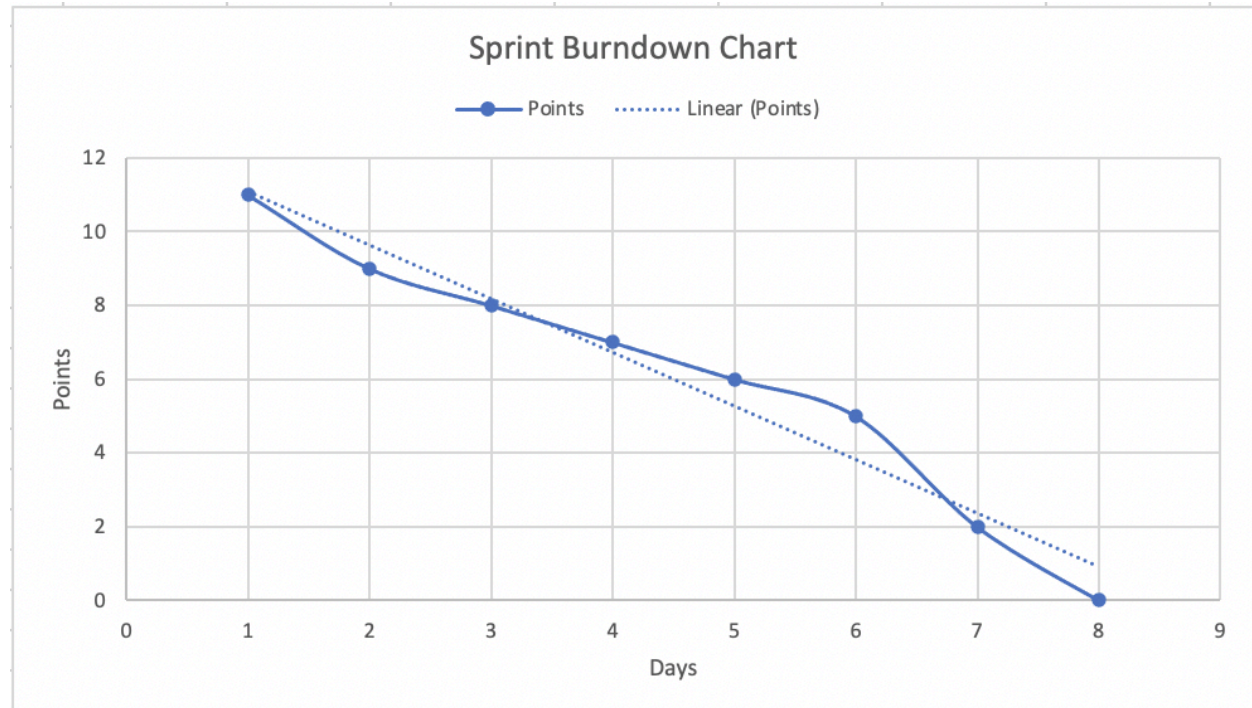


---

58	Implement API for authentication	Low	Task 56	3hr	3	Not started
59	Host system on the web-based application	High	Task 1-15, 18, 31, 39	1hr	1	Not started
60	Update database tables	High	N/A	2hr	2	Not started
61	Add text to speech feature	Low	N/A	2hr	2	Not started
62	Add dark mode/high contrast mode	Low	N/A	1hr	1	Not started
63	Create a database table for deals/promotions	Low	N/A	2hr	2	Not started



## Appendix 2: Initial Product Burn-down Chart





### Appendix 3: Initial Sprint Backlog

User Stories	#	Task	Points	Team Members	Time Estimate	Actual time	Status
As a manager, I want to be able to view information related to the database, including revenue reports, employee information, inventory, order and sales history, etc	59	Update/redesign all database tables and their connections	1	Jane	2hr	0hr	In progress
	59	Create customers table	1	Jane	1hr	0hr	In progress
	9	Connect menu_items database table to kiosk and menu board	1	Yuexin	1hr	0hr	In progress
As a normal employee, I want to be able to take customers' orders and then cash them out	1	Port GUI	1	Yuexin	1hr	0hr	In progress
	2	Port CustomActionListener	1	Yuexin	1hr	0hr	In progress
	16	Create kitchen view	2	Emily	2hr	0hr	In progress
As a customer, I want to easily be able to build my own order so I know my food will be made properly.	38	Create kiosk view	3	Alexis	3hr	0hr	In progress
	30	Create menu board	2	Sonika	2hr	0hr	In progress