



**Faculty of Engineering  
Department of Management Sciences  
MSCI 343 Human Computer Interactions  
Fall 2023**

*Professor: Oliver Schneider*

**TEAM MOON 9**

**Milestone 2**

Team 6 Members	Student ID	Contact Information
Bhairavi Thalayasingam	[REDACTED]	[REDACTED]
Elize Kooij	[REDACTED]	[REDACTED]
Larissa Troper	[REDACTED]	[REDACTED]
Serena Pang	[REDACTED]	[REDACTED]

October 29th, 2023

<b>Initial Design Process</b>	
<b>Design Process Reflection:</b> .....	<b>3</b>
Post-Discussion Selection Process of Designs to Elaborate:.....	3
Tasks Included and Excluded from Ensuing Designs:.....	7
<b>Elaborated Design Alternatives.....</b>	<b>7</b>
Core Tasks for the Alternative Designs:.....	7
Intended Walkthrough of User Interaction with Potential System:.....	8
Exploration of Design Alternatives:.....	8
Design Alternative #1:.....	9
Design Alternative #2:.....	13
Design Alternative #3 – Iteration #1:.....	16
Design Alternative #3 – Iteration #2:.....	18
<b>Paper Prototype Process Description.....</b>	<b>20</b>
<b>Cognitive Walkthrough of Paper Prototype.....</b>	<b>21</b>
Task #1 : Placing an Order.....	21
Task #4 : Modifying Menu Item.....	24
<b>Post-Cognitive Walkthrough Discussion.....</b>	<b>25</b>
<b>Appendix.....</b>	<b>27</b>
Appendix A - Initial Design Process (Concepts, Sketches, Storyboards).....	27
Appendix B - Paper Prototype (Core Interfaces).....	36

## **Initial Design Process**

### **Design Process Reflection:**

Our team began the initial design process by independently brainstorming abstract conceptualizations for the system, and sketching low fidelity ideas for what an improved system could look like given the task descriptions and user personas outlined in Milestone 1. We kept the process open to both abstract conceptualizations and user interface designs to maximize the amount of ideas. Doing so resulted in the sketching of user interface designs described using abstract conceptualizations.

Another note to highlight is that we started off the design process independently, which was important to do given the nature of our selected system. Since our team chose to target problems that exist within current POS systems, this increased the likelihood that our ideas would be confined to the existing solution space. Thus, working independently during the initial design process was intended to not skew any creative or novel ideas that members in our team could propose. Doing so resulted in the generation of unique solutions, such as a voice control system for ordering, implementing inventory tracking in a smart fridge, and having dual screens between customer and cashier. In addition to these novel ideas, there were concepts and sketches that resembled existing POS systems but with improvements to target their problems. A collection of our team's ideas and sketches can be found in **Appendix A**.

Following the independent brainstorming and sketching, we discussed each of the ideas, and their associated storyboards, and took notice of elements that made frequent occurrences which we were able to cluster together. There were also different approaches to tasks depending on the persona (e.g., cashier versus manager core interface). We engaged in discussions on how to merge our overlapping ideas and which of the proposed features should be prioritized based on feasibility. These discussions led to the refinement of our design into alternative prototypes, which can be further explored in the following sections.

### **Post-Discussion Selection Process of Designs to Elaborate:**

From the brainstormed concepts and low-fidelity sketches created during the initial design process, the designs concluded as most promising can be seen in *Figure 1a* and *Figure 1b*, *Figure 2*, and *Figure 3* below (also found in **Appendix A**). These ideas and designs were selected to be refined and elaborated on because they pose the greatest potential to

encompass all of the must-have requirements, along with some of the should-have requirements, outlined in Milestone 1. Additionally, given their similarity to how POS systems currently look and operate, these designs would pose the least amount of disruption/resistance in how our user persona's perform their core tasks.

**Note:** For simplicity, the selected designs will be referred to as *Initial Design #X*

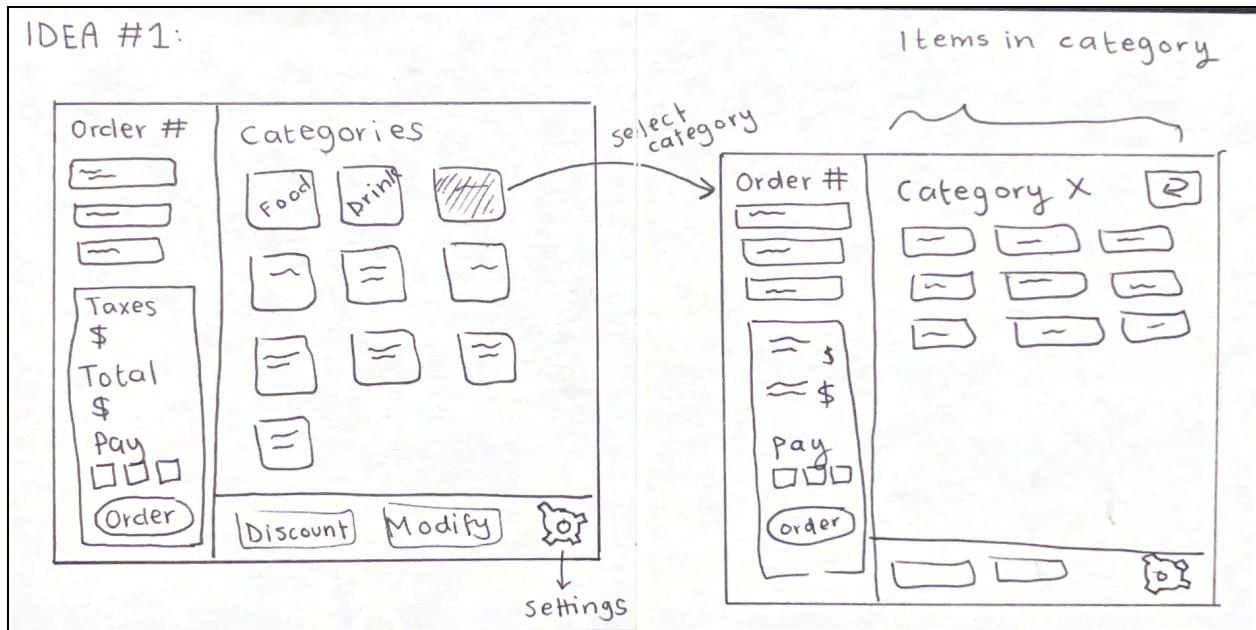


Figure 1a. Core User Interfaces for taking order of Initial Design 1

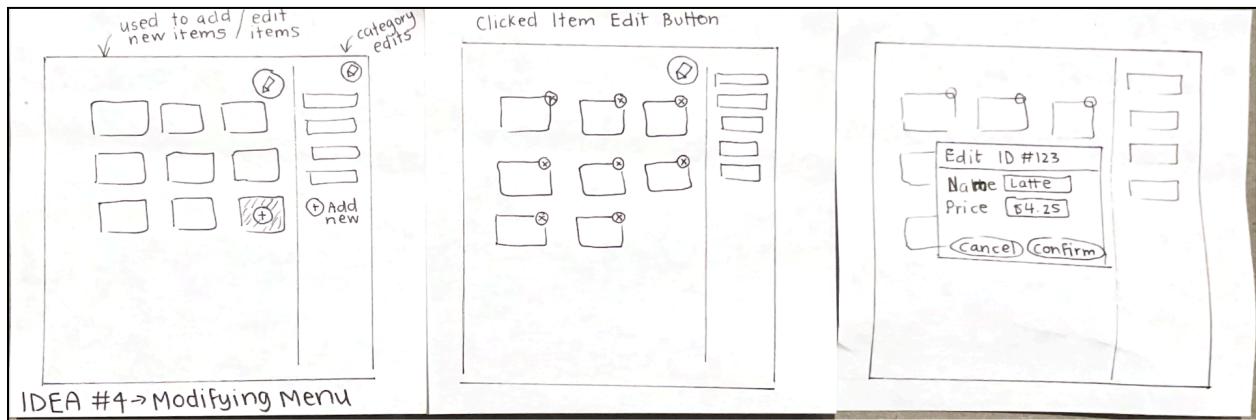


Figure 1b. Core User Interface and Storyboard for modifying menu of Initial Design 1

Initial design #1 has two distinguishable features which is the different design in navigating the menu as well as a unique approach to editing the menu (adding, modifying, deleting menu items). A manager can add, delete, and modify an item or category within

view of all the existing categories and items. Using add, edit and delete icons, the design is *consistent* with how other systems implement those functionalities.

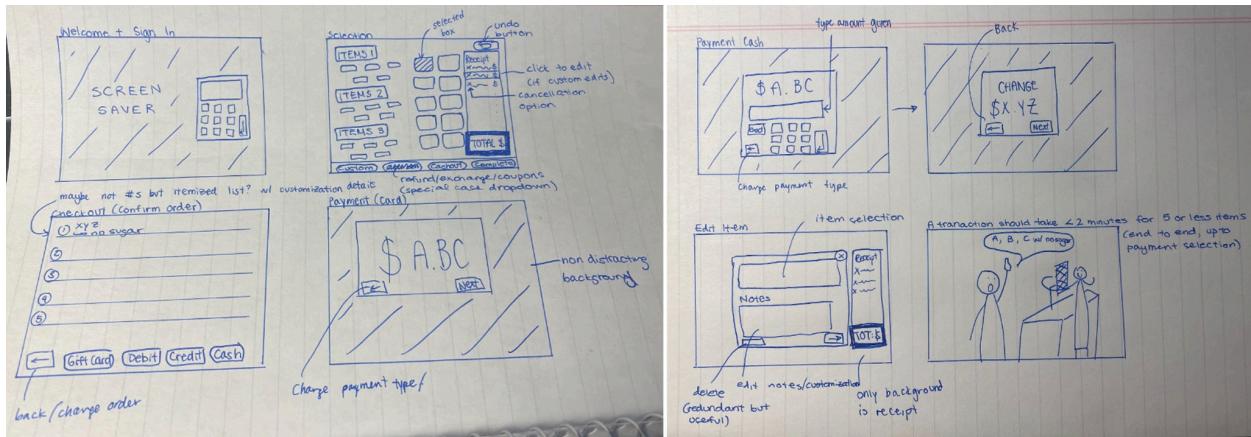


Figure 2. Core User Interfaces and Order Placing Storyboard of Initial Design 2

Initial design #2 has two distinct features: the navigation layout and the use of serial screens to process payment/checkout. Rather than implementing a navigation screen that nests items within categories, the user can directly view all categories and items within a selected category on the same screen. This layout enhances the design's *visibility* by helping the user keep track of where they are and what they've selected. Additionally, the serial screens for processing payments can be helpful to instruct the user through cashing out a customer.

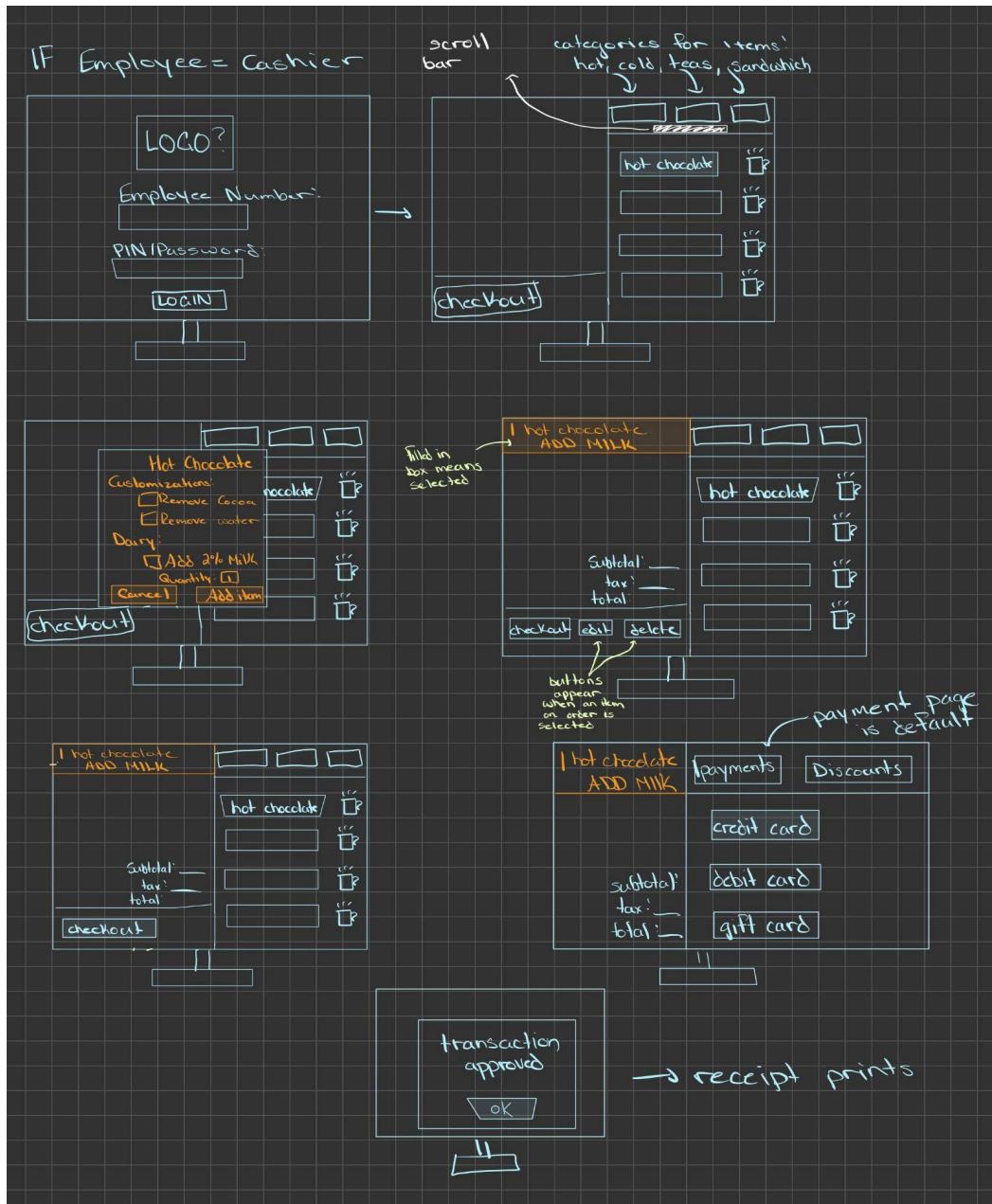


Figure 3. Core User Interfaces and Order Placing Storyboard of Initial Design 3

Initial design #3 has two distinct features: permission differences between user personas (seen in *Figure 2b* of **Appendix A**) and modal pop-up windows for modifying ordered items. The core managerial screens only include functionality limited to only managers, versus cashiers who are led to the ordering screen, which ensures the correct users are performing their permitted tasks. Additionally, the modal for modifications displays pre-defined customizations for specific items which reduces the time needed to write modifications (e.g., with oat milk) and adds *constraints* to what a user should and shouldn't be able to do.

## **Tasks Included and Excluded from Ensuing Designs:**

While evaluating our initial versions of our designs, the selected ideas from the initial design process cumulatively support the must-have requirements and should-have requirements outlined in Milestone 1 whether explicitly done through a storyboard or by including a button for specific actions. These include order taking, payment processing, menu modifications, processing discounts or refunds.

We decided not to move forward with a handful of brainstormed ideas, despite being interesting and valuable to explore. For example, the integration of a voice assistance system presents significant technological limitations and would be an inadequate response to our users' challenges, possibly even exacerbating their difficulties with efficiency. Similarly, a fridge interface that can track inventory was not selected to move forward, as it would not be able to meet the entire scope of tasks required for the system. Lastly, some designs were too nested, and did not demonstrate intuitive user flow, which could lead to an increase in cycle time and are considered as should-have requirements.

The specific tasks that will be excluded from ensuing designs are training tutorials and advanced report analytics; these features may overwhelm users on an already complex system full of functionalities, hence their utility would be minimal.

## **Elaborated Design Alternatives**

### **Core Tasks for the Alternative Designs:**

For the next step of the iterative design process, we established a list of three core tasks that the alternatives and paper prototype should demonstrate. These core tasks are taken from the "*must have*" requirements in Milestone 1, which include: taking an order and payment processing, and managers being able to customize the menu. Both order taking and payment processing (as one cumulative task) are the most frequently done processes for cashiers, and thus were of the utmost importance to have in a design. Additionally, the lack of flexibility was one of the problems we intended on addressing with a new solution; hence, the reason why menu customizations should be a prioritized feature. Choosing these three tasks also allowed us to demonstrate core tasks for both our cashier and managerial user personas.

## Intended Walkthrough of User Interaction with Potential System:

The flowchart diagram in Figure 4 provides centralized insight into how users will interact with the system, and is applicable to the breadth of our interface design options. This process was helpful to map out the sequence of steps and function we intend to include in our final prototype, while again relating to the chosen task descriptions on a more granular level.

We chose to focus on two user groups: managers and cashiers. Managers are given additional permissions, such as cashing out the system and editing the item selection and supporting attributes. This includes adding, editing, and deleting items from the ordering interface. The cashier, however, can only take the customer's order. After entering the main menu page, they will iteratively navigate to and add ordered items to a total order. Once the order is complete, the cashier will checkout to close out the order and any special cases such as discounts will be applied by the user. Payment type will then be prompted for selection in the system.

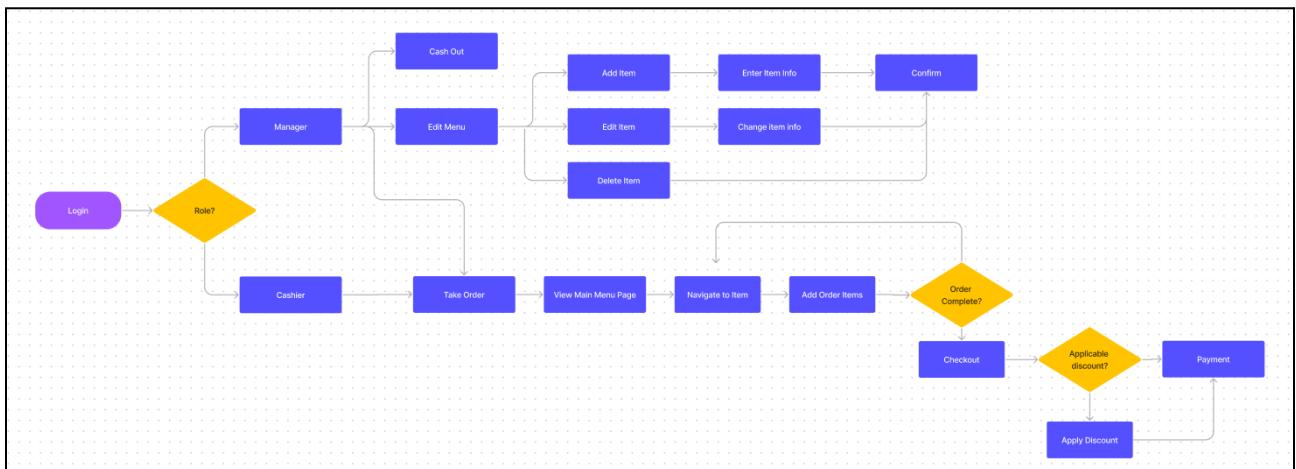


Figure 4. Workflow of cashier and manager for taking an order and adding a menu item in POS system, respectively

## Exploration of Design Alternatives:

The designs selected from the initial design process were then elaborated into four possible alternatives to an improved POS system. Each alternative design includes a storyboard for a cashier processing an order as well as a manager adding a new item to the menu. The design alternatives can be seen below:

## Design Alternative #1:

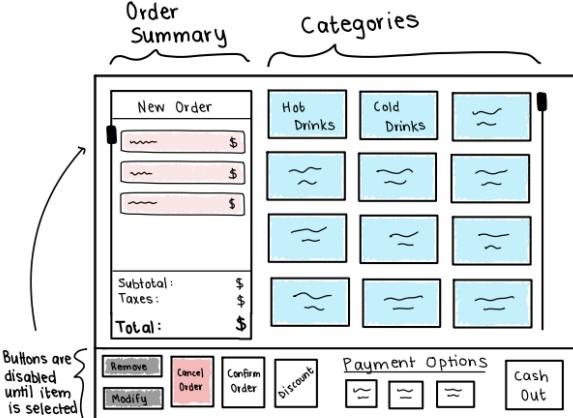
### Core Screens



Welcome + Sign In

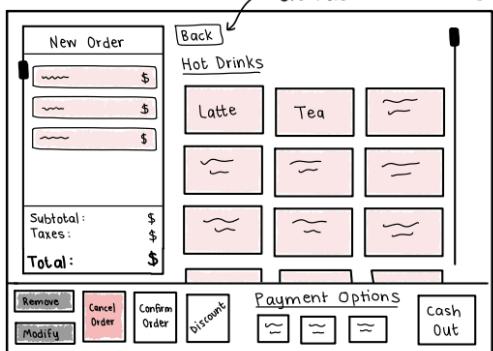
### Order Summary

### Categories

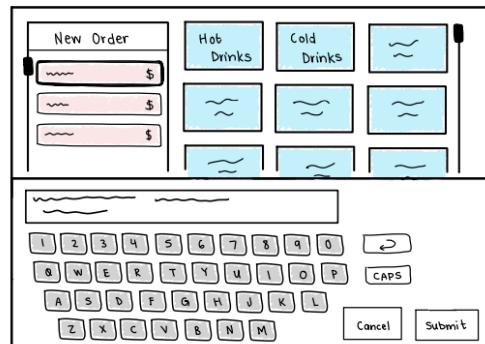


(Initial) Ordering Screen #1 (categories)

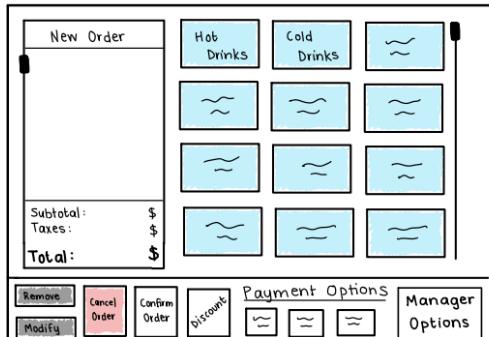
Go back to all categories



Ordering Screen #2 (Items in Category)

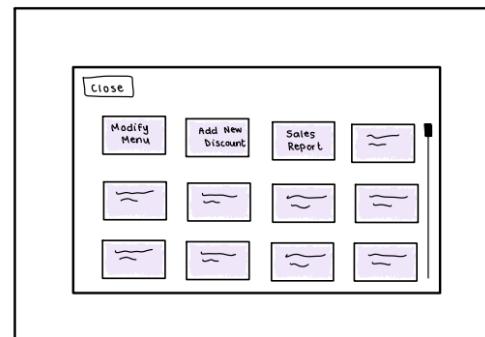


Modifying Items (Partial Keyboard Screen)



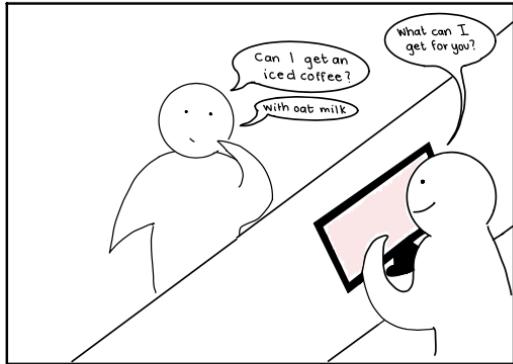
Management POV

manager-only button that leads to screen of manager functionality

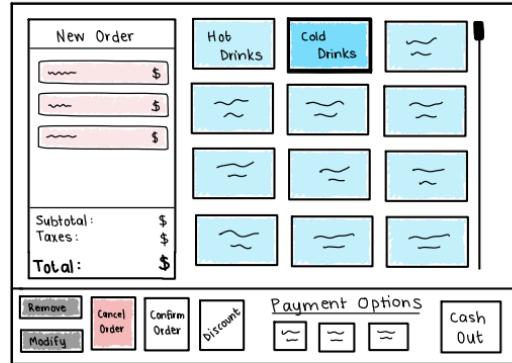


Manager Options Screen

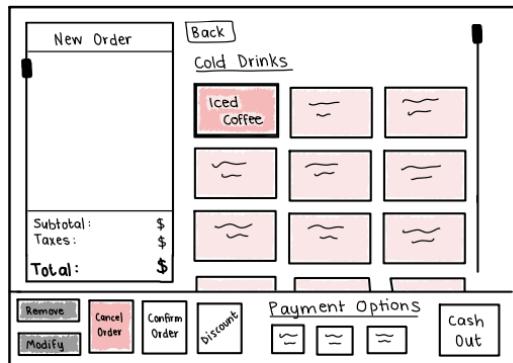
## Storyboard #1: Taking an Order



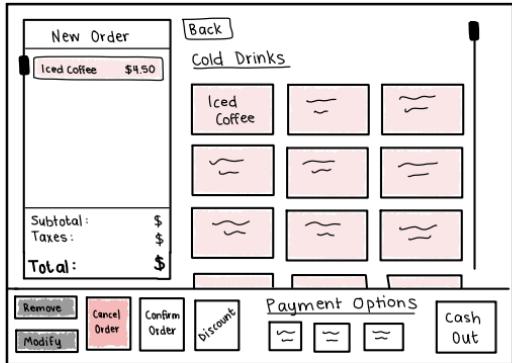
Customer places an order with the cashier



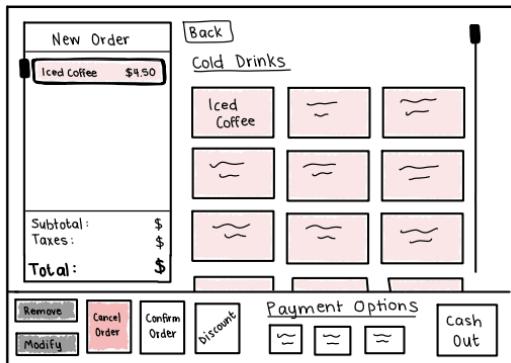
\* Click \* on Cold Drinks Category



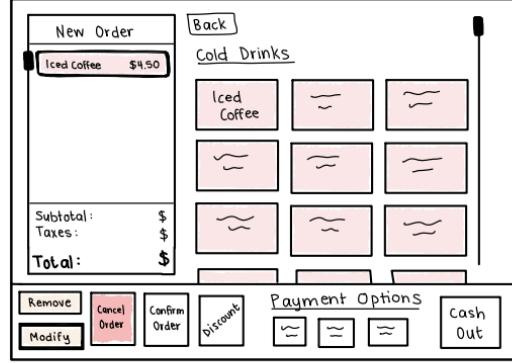
Find and \*Click\* on Iced Coffee



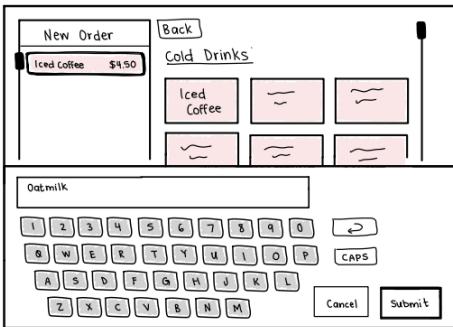
Iced Coffee gets added to order panel



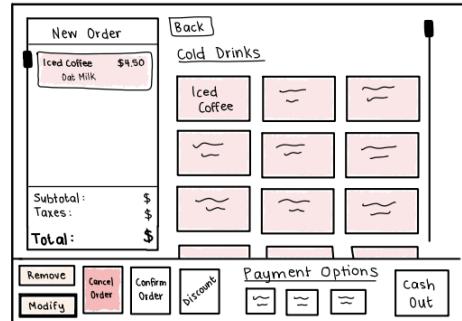
\* Click \* on the Iced Coffee item in order panel



Remove and Modify buttons become enabled. \*Click\* on modify.

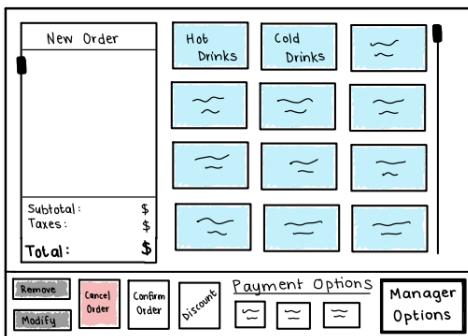


Type in modification on keyboard then \*Click\* Submit

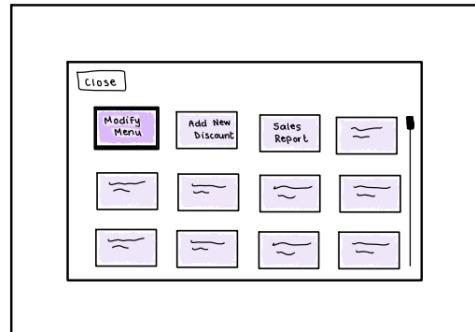


Order is successfully entered. Cashier can move onto payment and making the drink.

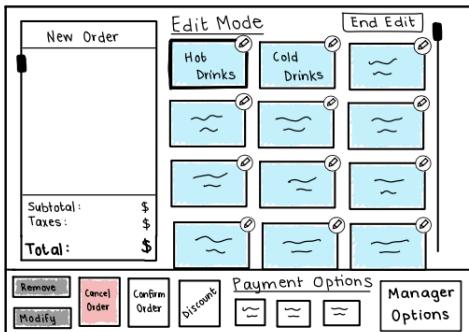
### Storyboard #2: Adding a New Menu Item



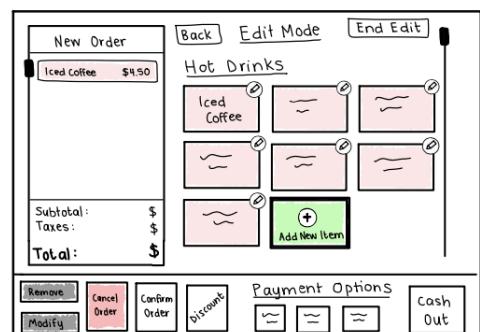
\* Click \* on Manager Options Button



\* Click \* on Modify Menu



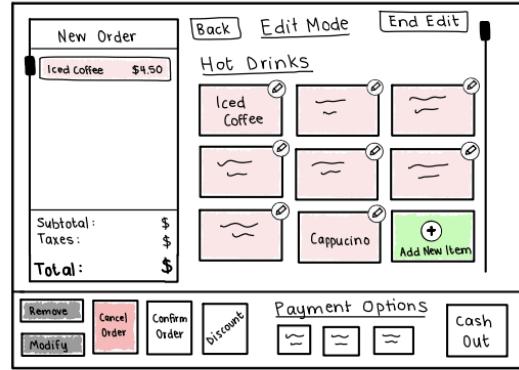
Manager enters edit mode. To add a new hot drink item, \* Click \* hot drinks category button (not the edit icon).



\* Click \* add new item button



Enter information for new hot drink. When done, \*Click\* Add Item.

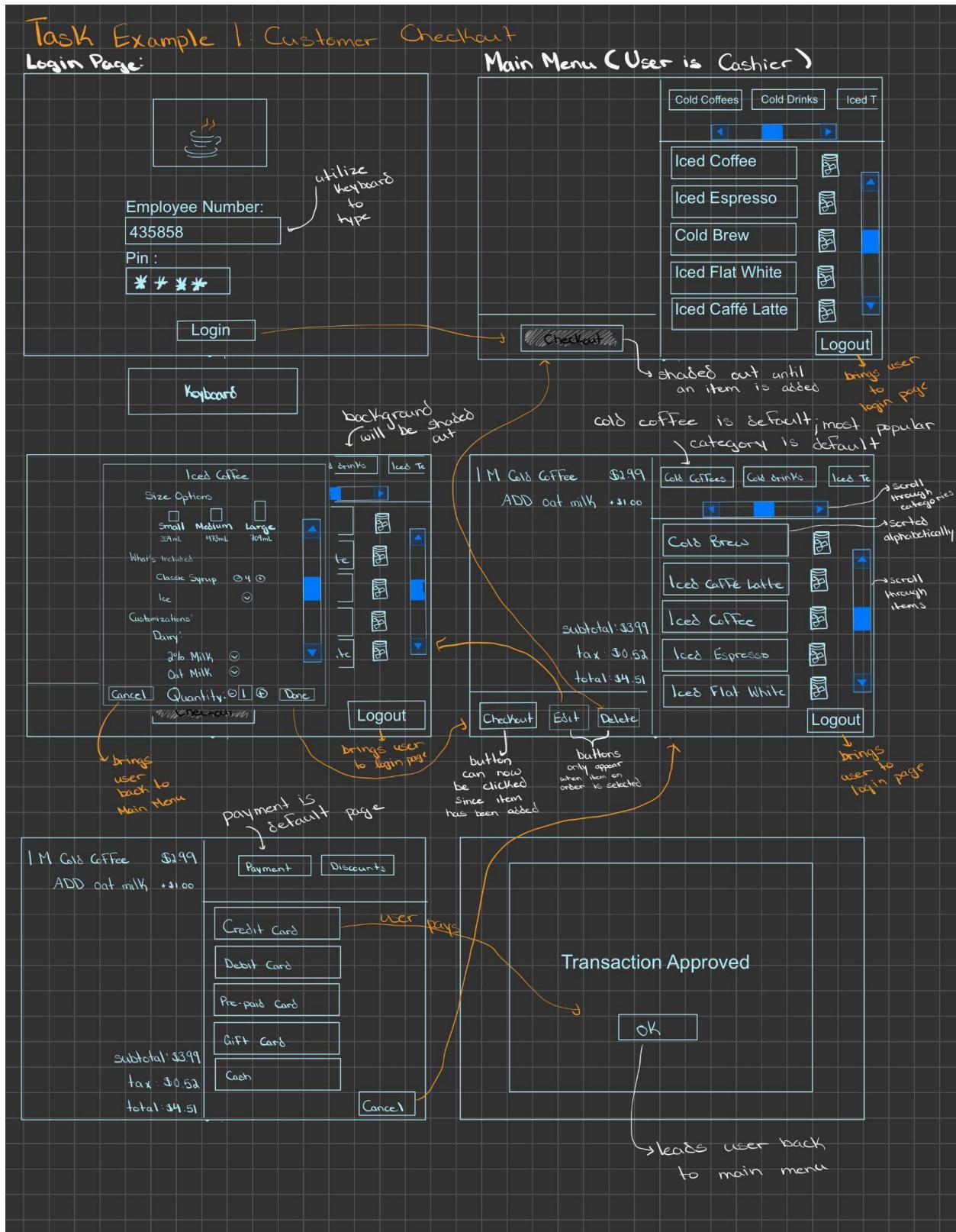


New Menu Item was successfully added.

### Alternative Design #1 Description:

The alternative design above further elaborates on the navigation system of Initial Design #1, and provides more details on how managers would modify menus. Managers and cashiers are shown the same screen upon initial log-in; managers are provided an additional button that allows them to access their permitted actions. This design is improved as it incorporates more functionality surrounding order placing, such as being able to apply discounts, remove items and modify items. The limitations of the system are the nesting of the navigation which may be unfavourable to service time, and the small distinction between a cashier versus manager screen.

## Design Alternative #2:



## Task Example 4: Add item

Login Page:

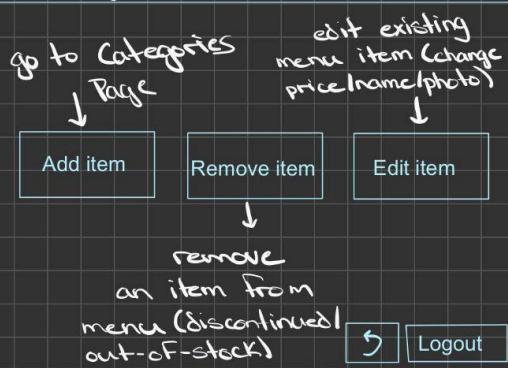
Employee Number:  
435858

Pin :  
\* \* \* \*

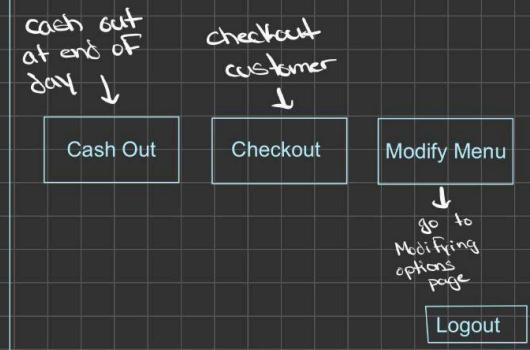
Login

Keyboard

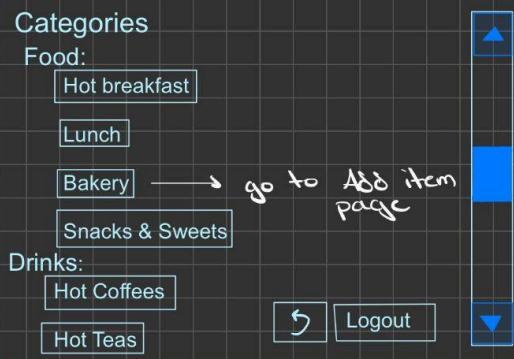
Modifying Options:



Main Menu (User is manager)



Categories Page



Add item Page

Add Bakery Item

use Keyboard to type

Item Name:

Price: \$

Upload Photo:  upload photo from computer

Logout

Done

Keyboard

go to Categories Page

Confirm Change

Add the following item :

Item Name: Pumpkin Chai Muffin

Price: \$3.85

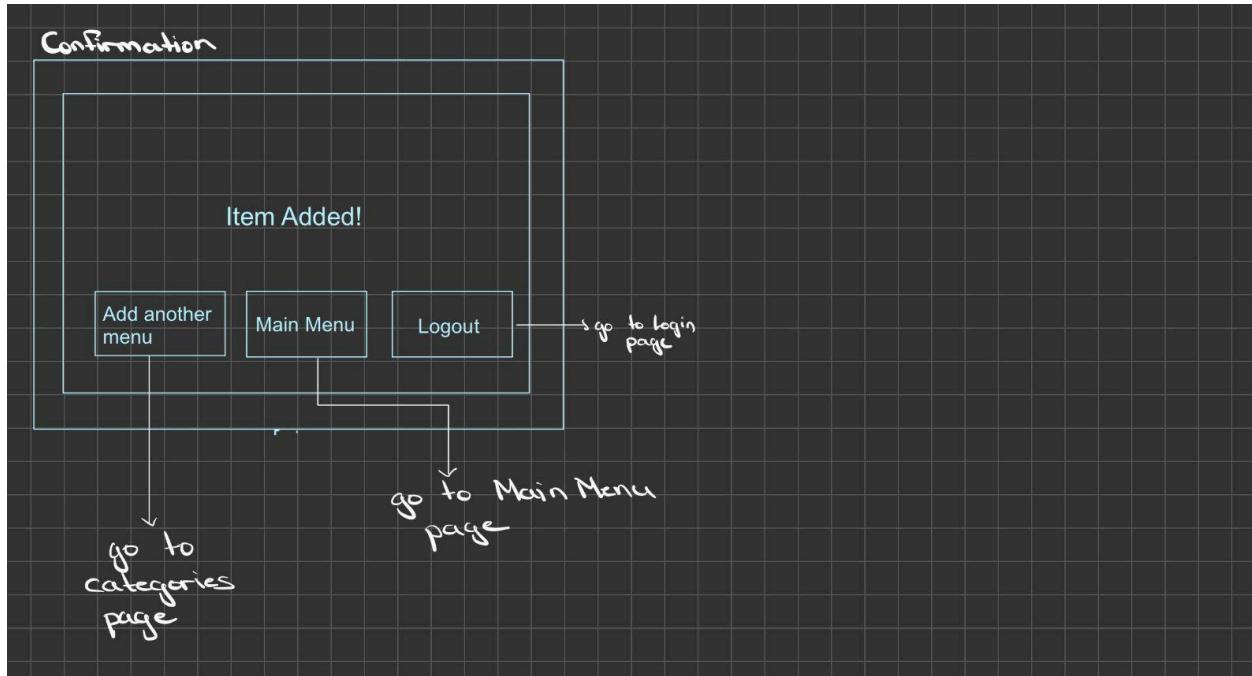
Photo: pumpkinchaimuffinphoto.PNG

Edit

Add

go to Add item page

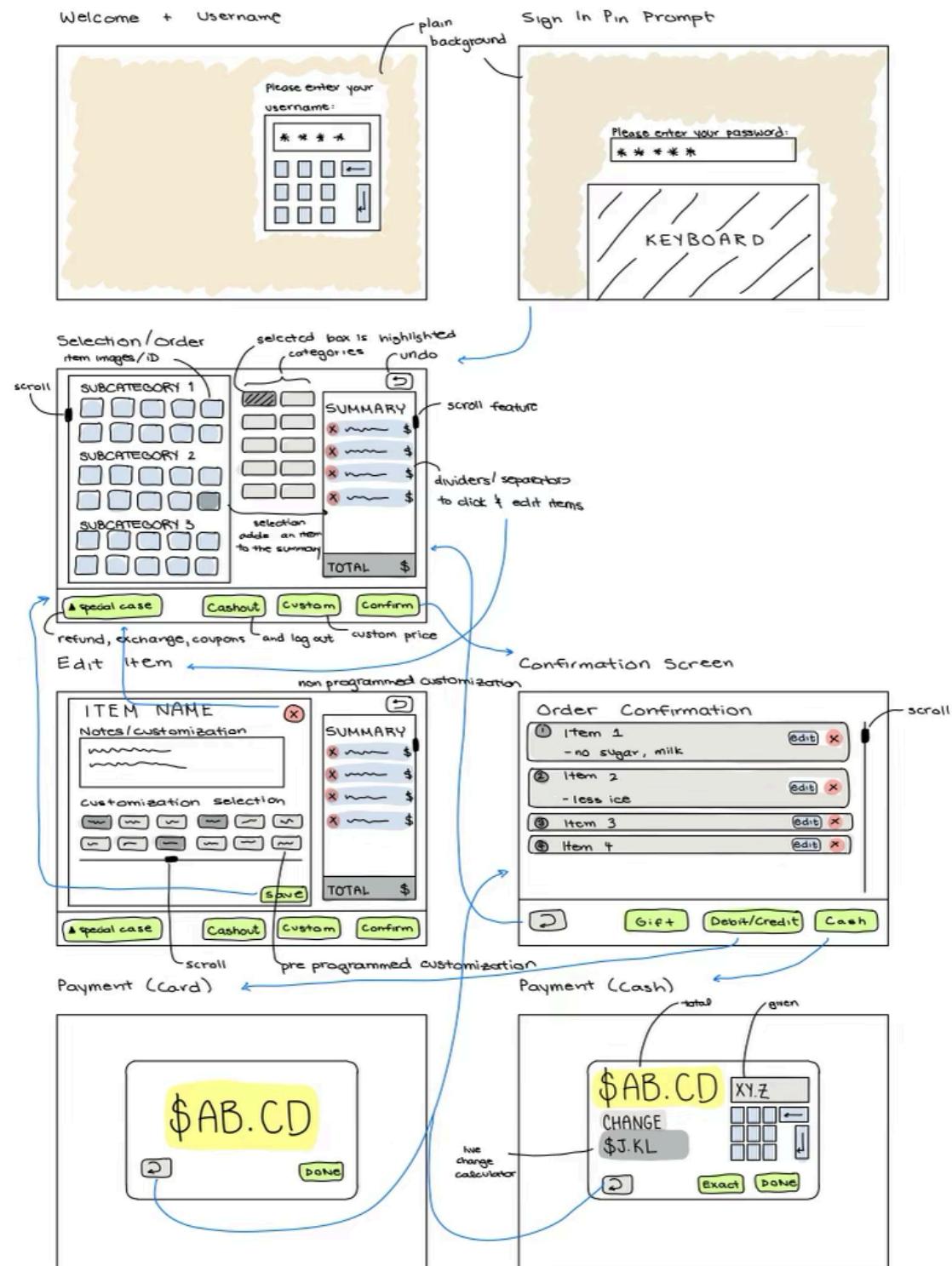
go to confirmation page

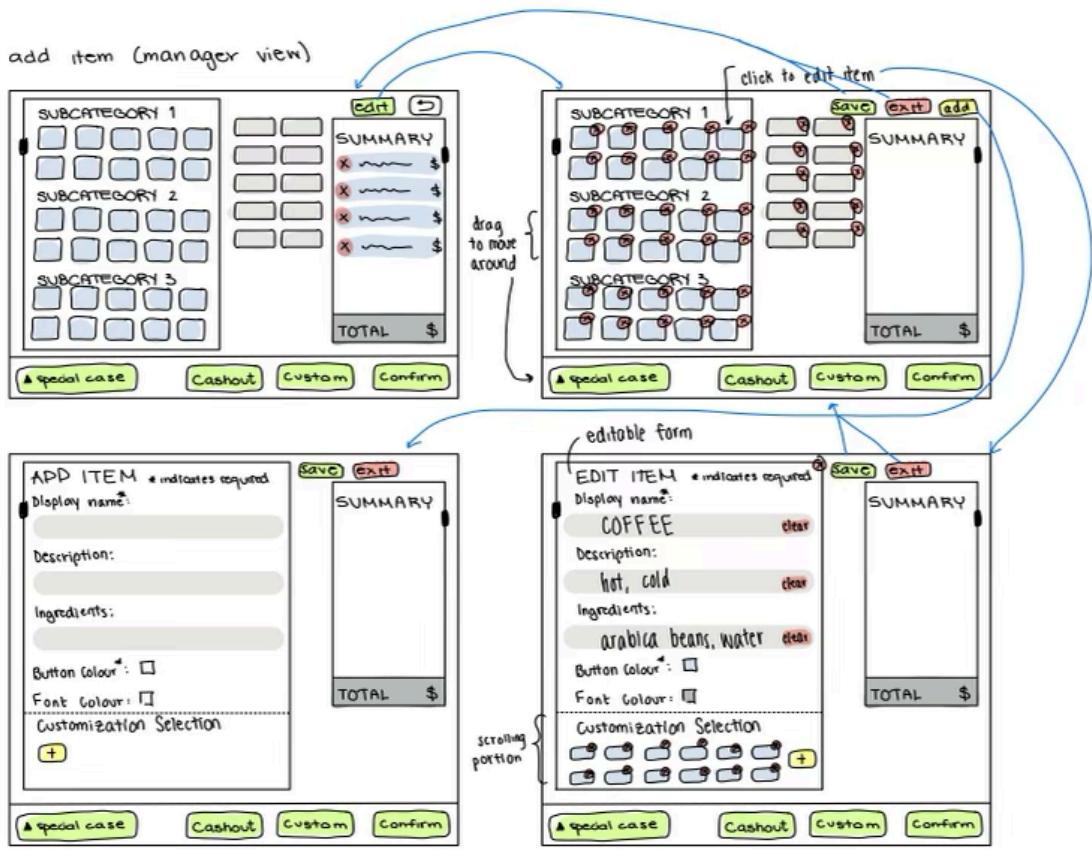


### Alternative Design #2 Description:

The above alternative design elaborates on some of the ideas from initial design #2, such as pop-up modals for item modifications and distinct user permissions. Some features in alternative design #2 are revised versions of alternative design #1's limitations including a less nested navigation system and more distinct manager and cashier screens. This design takes a completely different approach to making menu modifications than Alternative Design #1 by prompting the user and serializing the steps together into different screens. Some additional improved functionality going into this design iteration include log-out functionality, removal of the "checkout" button when an order is not yet started, and more confirmation features (pop-up notifications).

## Design Alternative #3 – Iteration #1:



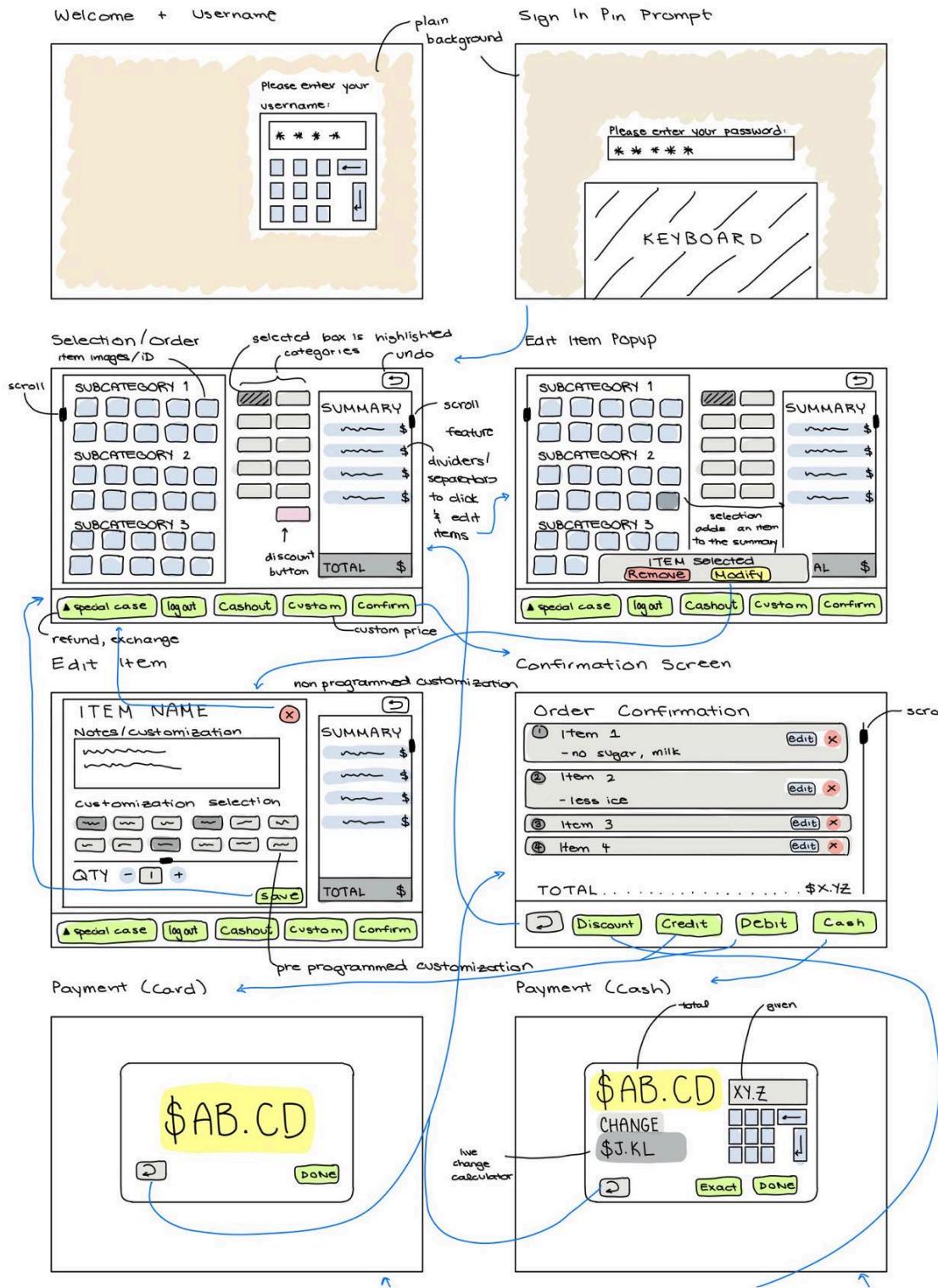


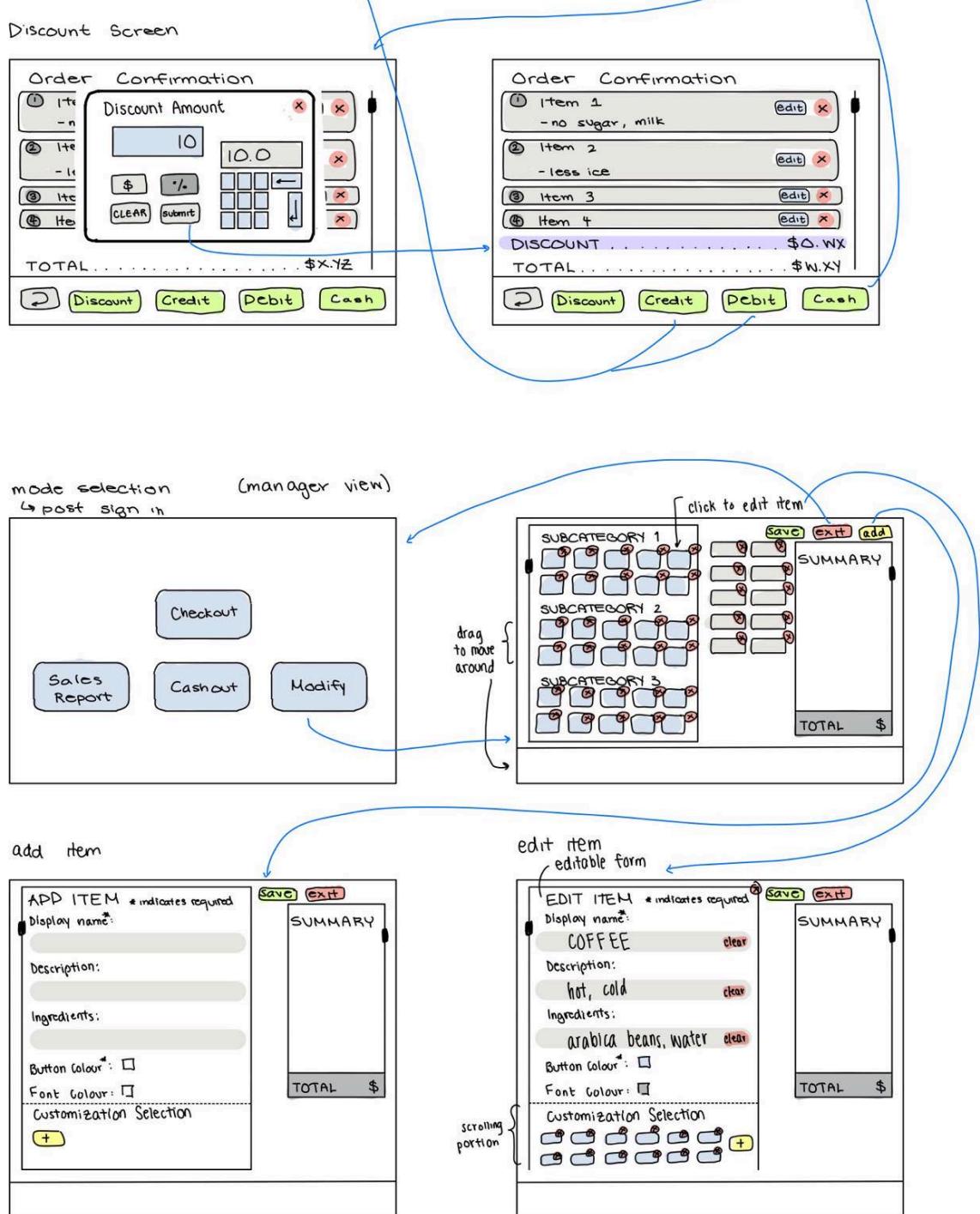
### Alternative Design #3 (Iteration #1) Description:

The alternative design above is revised based on some of the ideas from initial design #3, including the navigation layout and the use of several screens prompting the cashier through order processing. The design for adding menu modifications was inspired by alternative design #1 and is revised to support the different navigation layout. The organization and consistency of the layout was enhanced by using distinct colors and sharp lines for accessibility considerations. Scrolling features were added in areas to account for large orders or categories with too many items to fit within screen size.

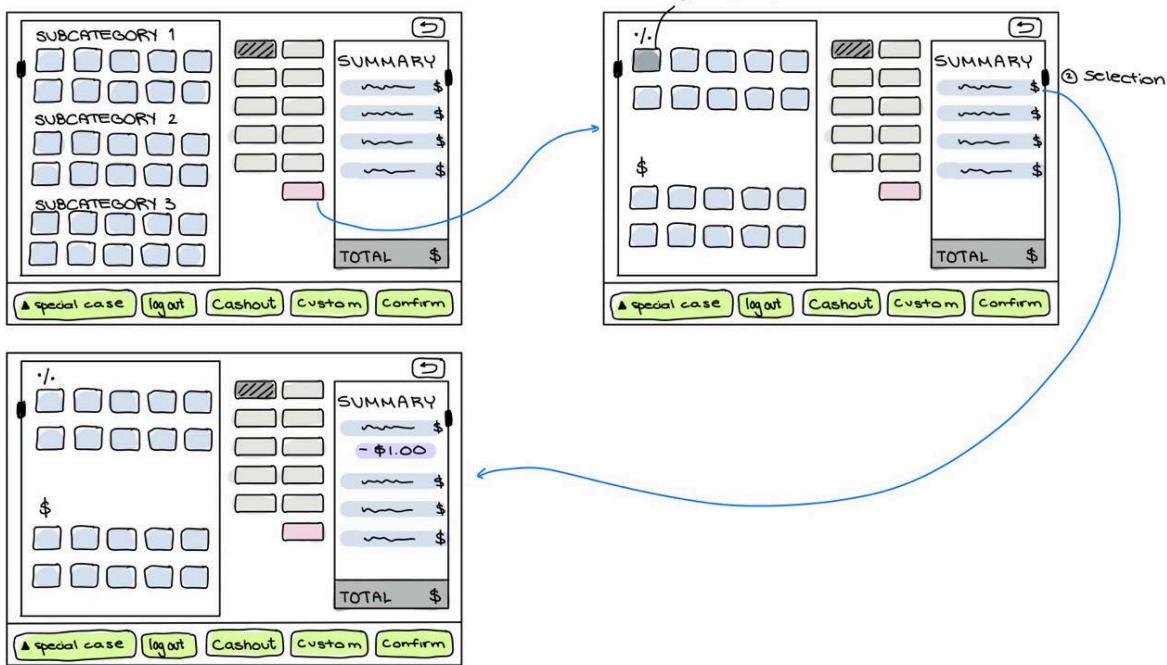
This alternative design supports all the required actions and expected design/look for the system, however we wanted to create a second iteration to incorporate a revised version of the manager versus cashier screens and log-out functionality introduced in alternative design #2.

## Design Alternative #3 – Iteration #2:





apply a discount to an item (order screen)



### Alternative Design #3 (Iteration #2) Description:

The second iteration of alternative design #3 has an added manager screen for manager-only functionality (menu modifications, sales reports, etc.) inspired by alternative design #2. Additionally, an important added part of the iteration was including discount functionality and how the user would add a discount (either at check-out for the entire order or for a singular item).

## Paper Prototype Process Description

The elaborated design selected for the paper prototype was the second iteration of alternative design #3. Images of the paper prototype can be found in **Appendix B**. As one of the last iterations, it supports the important elements required for the system and merges many of the favourable design considerations from earlier alternatives and designs.

The design used for paper prototype implemented a few revisions to alternative design #3, which are as follows:

- The screen was flipped horizontally to have the order column on the left. This provides better visibility of an order summary for right-handed people as the interactions they will have are primarily on the right side of the screen.

- Modify and remove buttons were added in the bottom navigation bar, taken from alternative design #1, to provide the user with more clarity of how to edit an order
- Logout functionality added to the manager screen

In addition to functionality requirements, it was essential to establish ways to provide users with a form of feedback, either through a notification or visual changes that ensure their inputs were properly processed. The paper prototype was an attempt at demonstrating the visual feedback expected when interacting with the system.

Link to paper prototype video: <https://www.youtube.com/watch?v=CNQNQzipAtk>

## Cognitive Walkthrough of Paper Prototype

### Legend of Evaluation Criteria:

A : Action = Does the user know what to do to achieve the task?

F : Feedback = Will the user interpret response from the action correctly

V : Visibility = Will the user know that the correct action is available?

### Task #1 : Placing an Order

Steps	Evaluation
<b>1. Login : Enter Username and Password</b>	<b>A :</b> Yes, there are text fields for the user to input username and password and a 'Done' button for when they are done <b>F :</b> Yes, once the user enters correct username and password and they select 'Done', the screen changes to the main menu <b>V :</b> Yes, there are labelled text fields and there is a 'Done' button after the 'Password' text box so the user knows to click the button to complete the action
<b>2. Select Iced Coffee from menu</b>	<b>A :</b> Yes, there is an 'Iced Coffee' button on the side listed under the subcategory 'Cold Drinks' <b>F :</b> Yes, once users select Iced Coffee, a modification pop-up will show with the title 'Iced Coffee' <b>V :</b> Yes, users may need to scroll down on the menu items to see the 'Iced Coffee' button, however there is a scroll bar that shows users that they can scroll
<b>3. Add oat milk to coffee</b>	<b>A :</b> Yes, The modification pop-up has buttons to allow for users to add oat milk to coffee. <b>F :</b> Yes, once the user makes the modifications on the

	pop-up, it will be highlighted on the modification pop-up <b>V</b> : There is a clear button for "Oat Milk" under "Milk"
<b>4. Confirm changes</b>	<b>A</b> : Yes, users can select 'Done' to confirm changes <b>F</b> : Yes, changes will be shown in summary along with the changed total for the order. <b>V</b> : Yes, the button is located on the bottom right of the pop-up which is standard for 'Done' buttons
<b>5. Add a Tea to the order</b>	<b>A</b> : Yes, the user needs to select 'Tea' from under subcategory 'Hot Drinks' and it will be added to the order. There is no modification option for teas, hence there is no modification pop-up. <b>F</b> : Yes, once the user selects Tea, it will be added to the summary and the total will change as well. <b>V</b> : There is a button labelled 'Tea' under 'Hot Drinks'. Users may need to scroll to find the 'Tea' button but there is a scroll bar for users to know that they can scroll.
<b>6. Select 'Pastries' category</b>	<b>A</b> : Yes, there's a button called 'Pastries' listed beside 'Drinks' <b>F</b> : Yes, the button will be highlighted once you select it and the menu items listed on the side will be pastry items <b>V</b> : Yes, the button is listed right beside the highlighted 'Drink' button on the center of the screen.
<b>7. Select croissant from menu</b>	<b>A</b> : Yes, there is an 'Croissant' button under the subcategory 'Other' <b>F</b> : Yes, once users select Croissant, a modification pop-up will show with the title 'Croissant' <b>V</b> : Yes, the user may have to scroll to see the 'Croissant' button, however there is a scroll bar to indicate to the user that they can scroll on that page.
<b>8. Add "warmed up" in notes</b>	<b>A</b> : Yes, there is an editable input text box that prompts a user to enter modification information through a popup keyboard. <b>F</b> : Yes, The user will interpret the response correctly because typed input will display in the text box. <b>V</b> : Yes, The user will know the action is available through selecting the text box and the keyboard popup.
<b>9. Confirm changes</b>	<b>A</b> : Yes, there is a "Done" button that allows the user to save their changes or notes. <b>F</b> : Yes, after the "Done" at the bottom right button, submitted modifications will be reflected in the summary. <b>V</b> : Yes, The user knows the action is available through the labelled button at the bottom right of the screen.

<b>10. Edit Iced Coffee item</b>	<p><b>A :</b> Yes, users need to select item first and then users have to select "Modify" button to edit item</p> <p><b>F :</b> Yes, once the user selects the item, the item will be highlighted and once the user selects 'Modify' a pop-up shows for the user to make the modification necessary.</p> <p><b>V :</b> No, the user needs to select an item first before the 'Modify' button can be used so users will have to know to select the item first. This may not be intuitive since the button is not hidden when they don't have an item selected, so they may think that they don't need to select an item to click the 'Modify' button.</p>
<b>11. Change oat milk to almond milk on Iced Coffee</b>	<p><b>A :</b> Yes, the modification pop-up has buttons to allow for users to add almond milk to coffee. Once the user selects the almond milk, the oat milk button will be automatically deselected since only one type of milk can be added to an Iced Coffee.</p> <p><b>F :</b> Yes, once the user makes the change on the pop-up, the 'Almond Milk' button will be highlighted and the 'Oat Milk' button will be unhighlighted</p> <p><b>V :</b> Yes, there is a clear button for "Almond Milk" under "Milk"</p>
<b>12. Confirm changes</b>	<p><b>A :</b> Yes, users can select 'Done' to confirm changes</p> <p><b>F :</b> Yes, changes will be shown in summary</p> <p><b>V :</b> Yes, the button is located on the bottom right of the pop-up which is consistent for standard 'Done' buttons</p>
<b>13. Confirm order</b>	<p><b>A :</b> Yes, there is a button that says 'Confirm Order' on the bottom right for the user to click to get the order confirmation screen. All the order items are displayed in a cohesive list at the top of the page with their modifications. At the bottom of the list, the user can then select the payment type.</p> <p><b>F :</b> Yes, once the user clicks the 'Confirm order' button, they will be redirected to a page that says 'Order Confirmation'</p> <p><b>V :</b> Yes, the button is listed on the bottom right of the screen and isolated from the other buttons on the bottom task bar where it is visible for the user to see.</p>
<b>14. Select Discount</b>	<p><b>A :</b> Yes, there is a button that says 'Discount' on the bottom of the page for users to add a 'Discount' to the order</p> <p><b>F :</b> Yes, once the button is selected, a pop-up with the title 'Discount' will show.</p> <p><b>V :</b> Yes, The user will know the action is available since there is a 'Discount' button clearly labelled on the bottom of the page</p>

<b>15. Cancel Discount</b>	<b>A :</b> Yes, there is a 'x' button on the top right corner of the 'Discount' pop-up to cancel the discount <b>F:</b> Yes, once the button is clicked, the pop-up will close <b>V :</b> Yes, The user will know the action is available since there is a red 'x' button on the top right corner which is standard for a lot of websites/apps.
<b>16. Select Credit for payment method</b>	<b>A :</b> Yes, there are buttons at the bottom of the confirmation screen that indicate payment types such as credit. <b>F:</b> Yes, once the user selects the 'Credit' method, a screen with the total will show. <b>V :</b> Yes, The user will know the action is available due to the colour coded buttons at the bottom of the screen indicating payment type.
<b>17. Select Done</b>	<b>A :</b> Yes, there is a button at the bottom of the screen that allows a user to finish the transaction. <b>F:</b> Yes, once the user selects 'Done', the screen will renavigate to the main checkout page for the user to checkout the next customer. This was not shown in the paper prototype video since the task ends with the user being checked out. <b>V :</b> The user will know the action is available given the colour-specific and labelled button.

#### Task #4 : Modifying Menu Item

Steps	Evaluator #1
<b>1. Enter Username and Password</b>	<b>A :</b> Yes there are text fields for the user to input username and password <b>F :</b> Yes, once the user enters correct username and password, the screen changes <b>V :</b> Yes, there are labelled text fields
<b>2. Select Edit Menu</b>	<b>A :</b> Yes, there is a button that allows users to edit the menu <b>F :</b> Yes, once user selects edit menu button, it redirects user to the menu page <b>V :</b> Yes, there is a clear button that says "Edit Menu"
<b>3. Select add button under subcategory Juices</b>	<b>A :</b> Yes, there is a + button at the end of the subcategory Juices to allow users to add an item under Juives <b>F :</b> Yes, once the user selects the button, a pop up shows for the user to add item <b>V :</b> Yes, the + sign is visible at the end of each category and the + sign is widely known as add.

<b>4. Add details for the new item</b>	<b>A :</b> Yes, there's a pop-up for the user to add the details for the item <b>F :</b> Yes, once the users add information, the information will stay in the text boxes <b>V :</b> Yes, the buttons for each detail to be added are labelled so the user knows what information to include and where
<b>5. Save item</b>	<b>A :</b> Yes, there's a button that allows user to save the item <b>F :</b> Yes, the item will be shown on the menu items once you click save, however you can't confirm whether the details of the items are correct. <b>V :</b> Yes, there's a button that says 'Save'
<b>6. Save changes</b>	<b>A :</b> Yes, there's a button that allows user to save the menu <b>F :</b> No feedback for the button <b>V :</b> Yes, there's a button that says 'Save' on the bottom right corner

## Post-Cognitive Walkthrough Discussion

The cognitive walkthrough magnified some logic issues with the design which will be rectified during the final milestone. One issue that came to our attention pertains to the flow of actions for modifying items once they have been added to the menu. In the paper prototype, we observed that, for items like 'Iced Coffee' or 'Croissant,' a modification pop-up appears upon selection, necessitating the user to make modifications and then confirm by selecting 'Done' to add the item. However, this approach introduces unnecessary complexity, as even if a user desires to add an 'Iced Coffee' without any modifications, they are still compelled to navigate through the modification pop-up and confirm their selection, which can be somewhat tedious and confusing. Additionally, when selecting 'Tea,' there is no option to modify the item, yet there is no clear confirmation prompt upon selection. To mitigate these issues, we must consider the inclusion of an 'Add' button on the menu page, offering users a streamlined method to add items to their order without the need for the modification page. This adjustment not only simplifies the process but also reduces the likelihood of users inadvertently selecting the wrong items and having to remove them from their order.

Another issue we have found in our paper prototype is that we do not include constraints for certain tasks that the users should not be able to do. For example, a cashier should not be able to cash out and so having that button on the cashier's checkout page can lead to tedious clicking and confusion which we would like to avoid in our design. Also, the 'Modify' and 'Delete' buttons on the bottom right of the menu screen should only be visible/available when an item is selected from the summary tab. We will rectify this issue by shading out the buttons and making them unclickable unless the user is allowed to click on them.

Moreover, during the task example of editing the menu, there is a lack of direct confirmation or feedback when saving menu changes. Users currently must refer back to the menu once an item is added to ensure the addition was successful, making it challenging to verify the accuracy of their input since the only visible information is the name of the item. To enhance the user experience, we intend to introduce a confirmation page following the addition of a menu item. This page will display the new item details, with options to confirm or return for editing in case of an error. Additionally, a confirmation message will be triggered upon selecting 'Save' on the menu page, offering users reassurance regarding their changes.

Apart from these issues, the cognitive walkthrough went relatively well. All of the actions were available and relatively straightforward to accomplish. Visibility features were included at each screen such as scroll bars so that users know they can scroll and buttons that are clearly labelled. Another thing that went well during the cognitive walkthrough was the consistency of the design of the POS system. The consistency makes it easier to navigate through the system and understand interactions as you can expect where certain buttons may be on each page and how certain functionalities work. It's also easier for users to familiarize themselves with the system when each page is consistent. The feedback mechanisms are implemented for the majority of the actions so that users are able to tell that they completed an action correctly right away, such as changing screens or highlighted buttons to signify they are selected.

# Appendix

## Appendix A - Initial Design Process (Concepts, Sketches, Storyboards)

### Team Member #1 Sketches, Storyboards, and Flowchart:

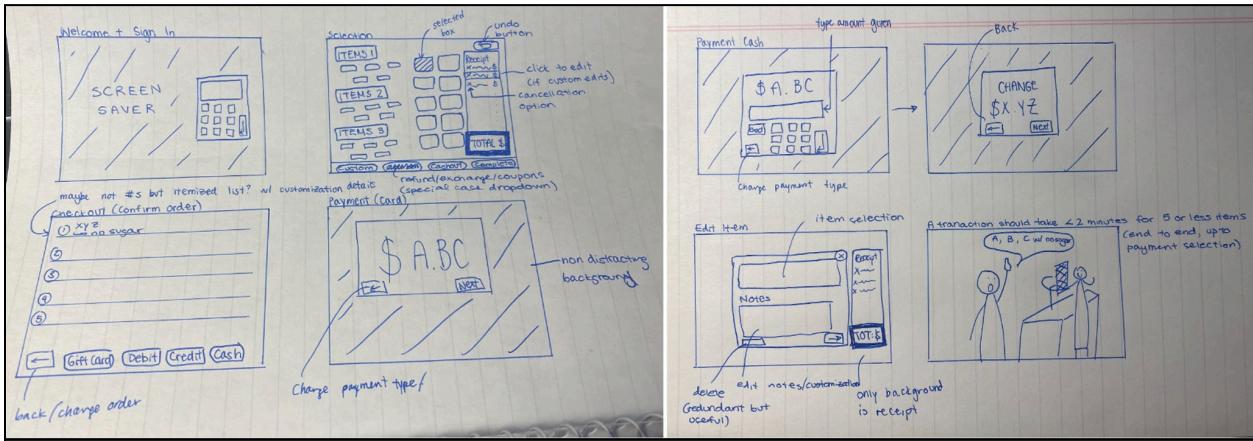


Figure 1a. POS system design with enhanced navigation visibility and serial payment processing workflow

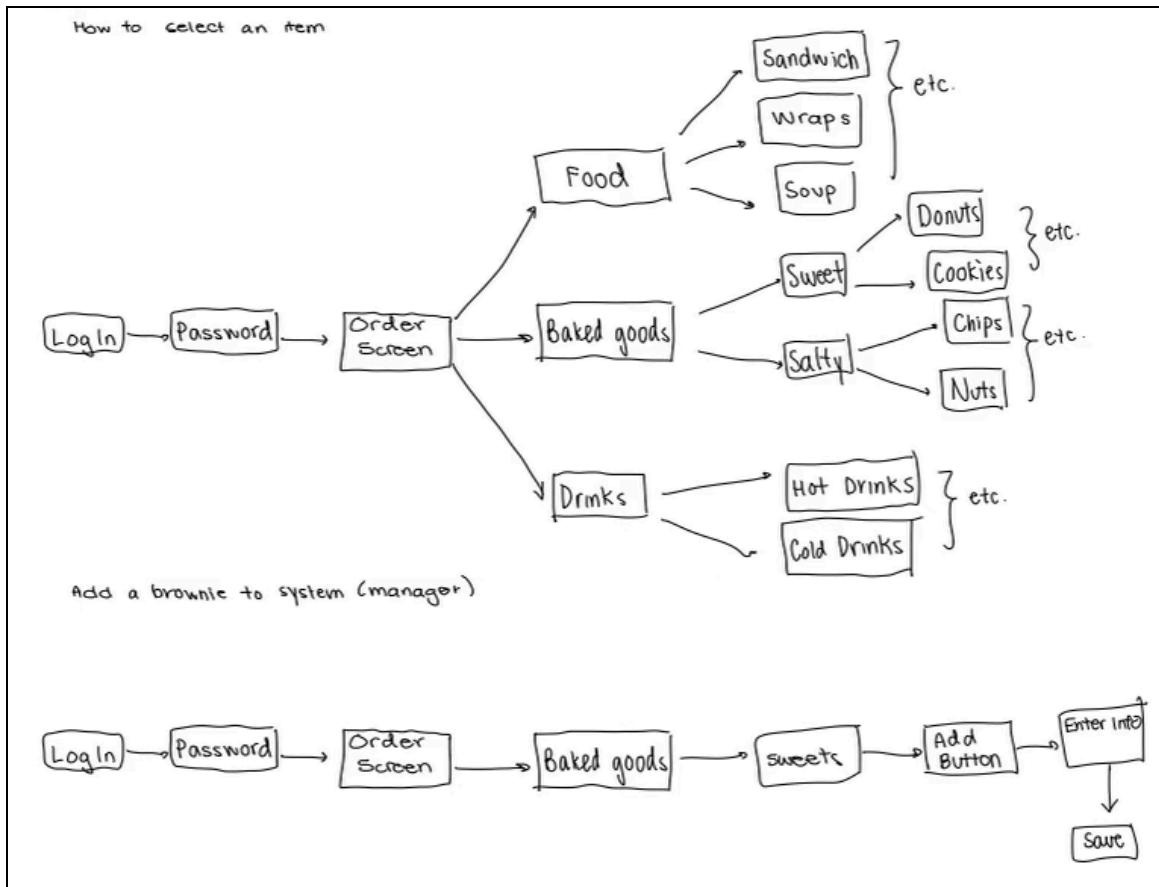


Figure 1b. POS system workflow design for selecting an item and manager adding a new menu item

### Team Member #2 Sketches and Storyboards:

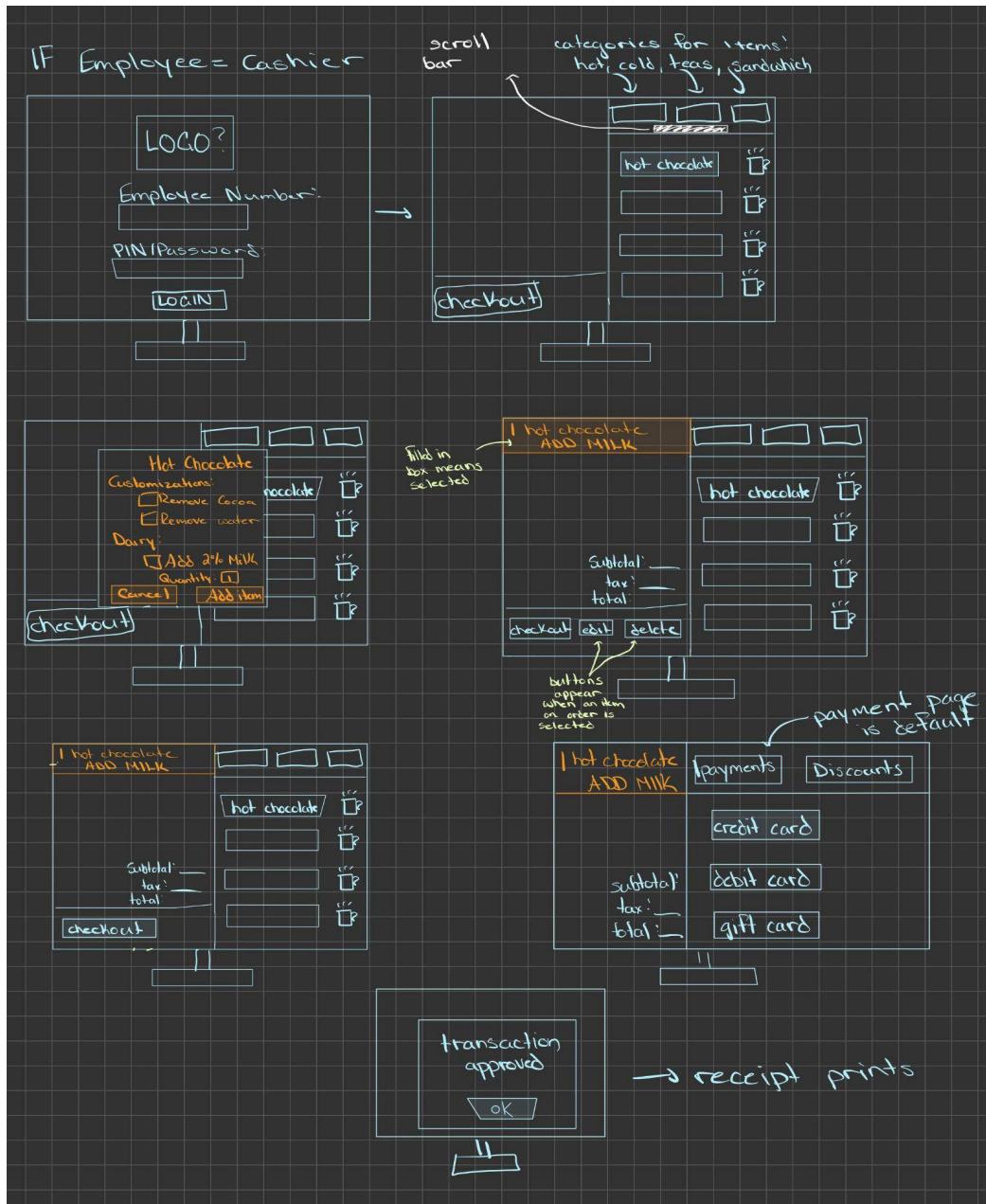


Figure 2a. Storyboard sketches of a cashier taking an order using a redesigned POS system

IP User = Manager

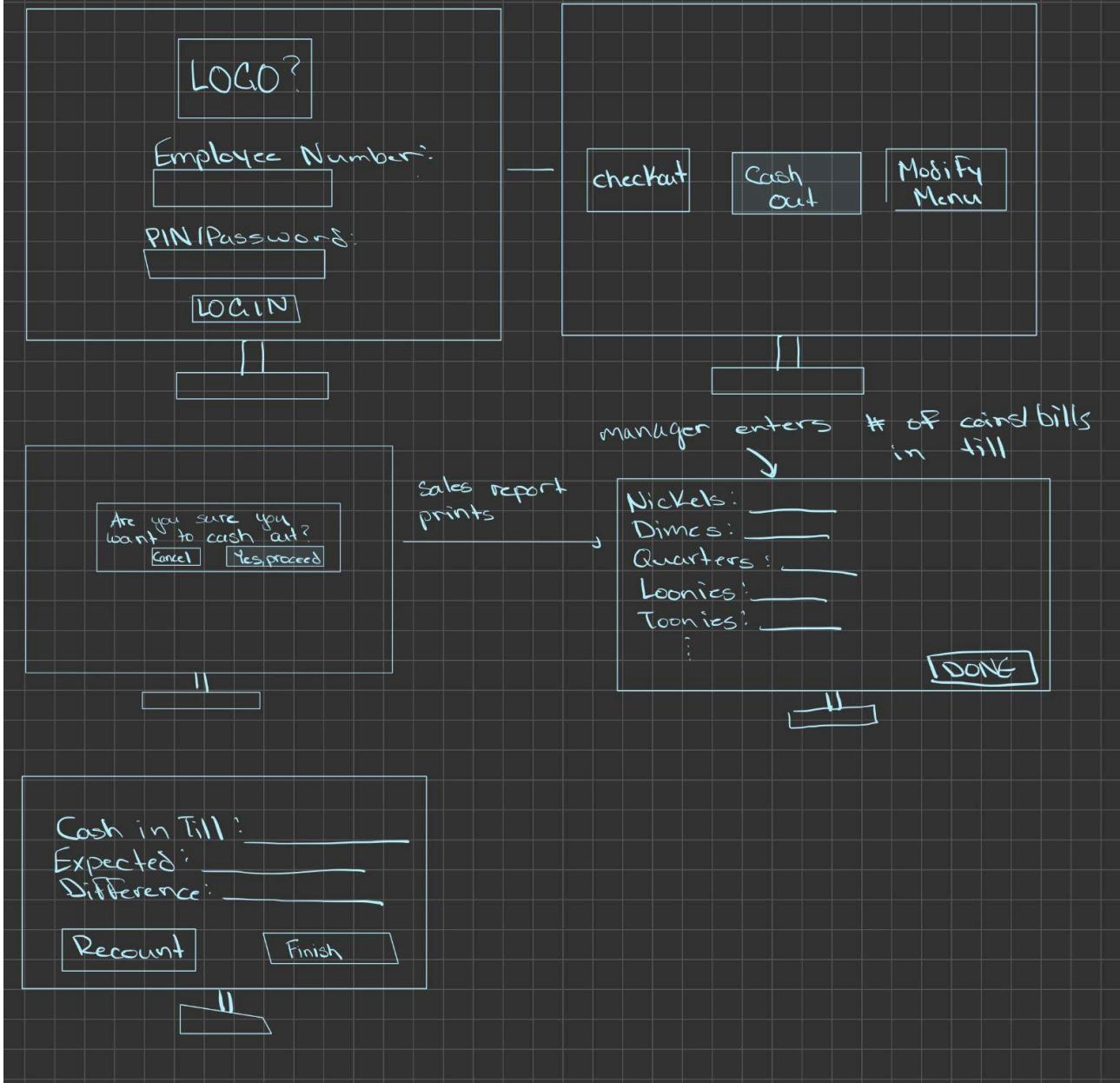


Figure 2b. Storyboard sketches of a manager cashing out using a redesigned POS system

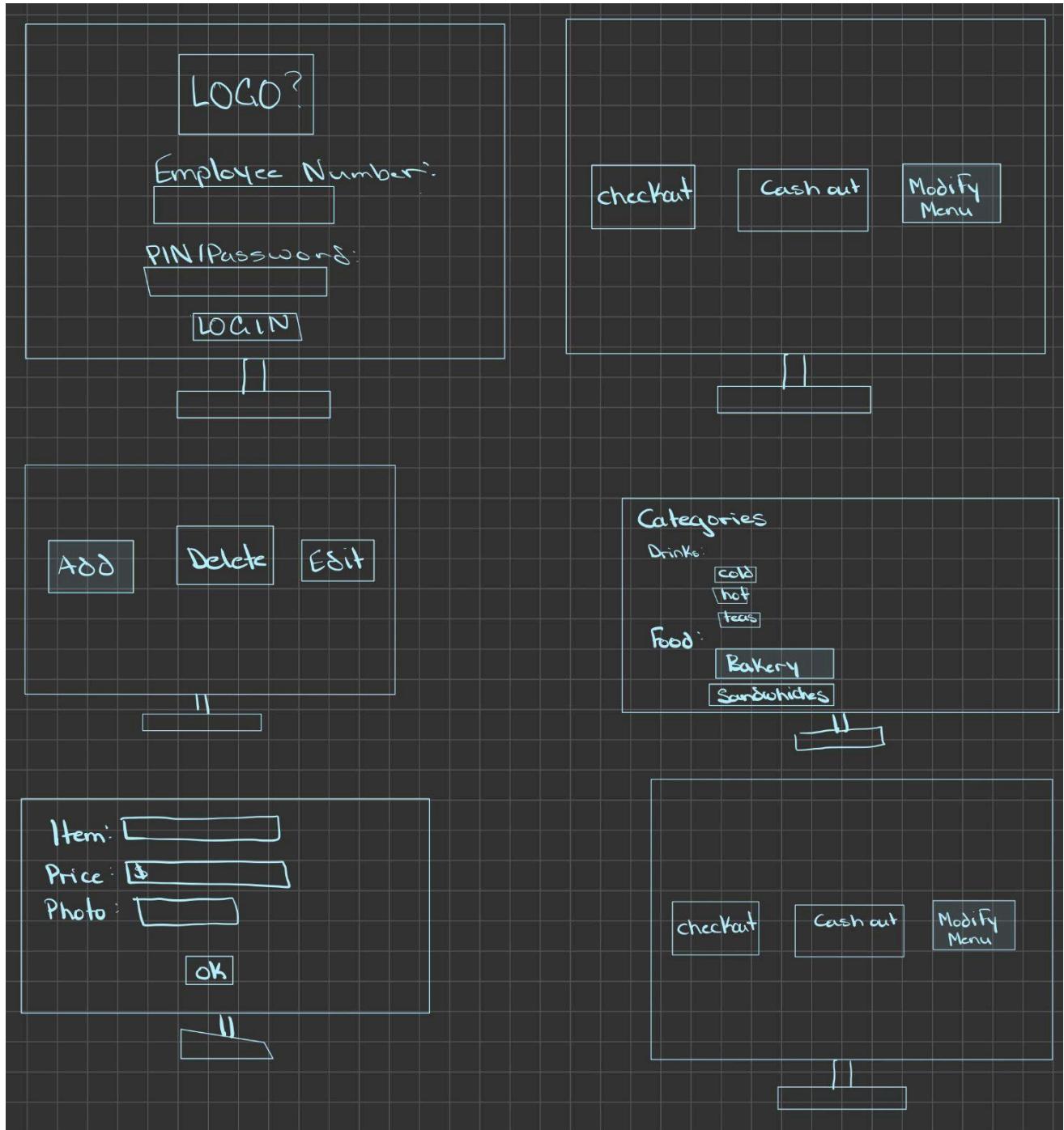


Figure 2c. Storyboard sketches of a manager adding a new menu item in a redesigned POS system

### Team Member #3 Ideas and Sketches:

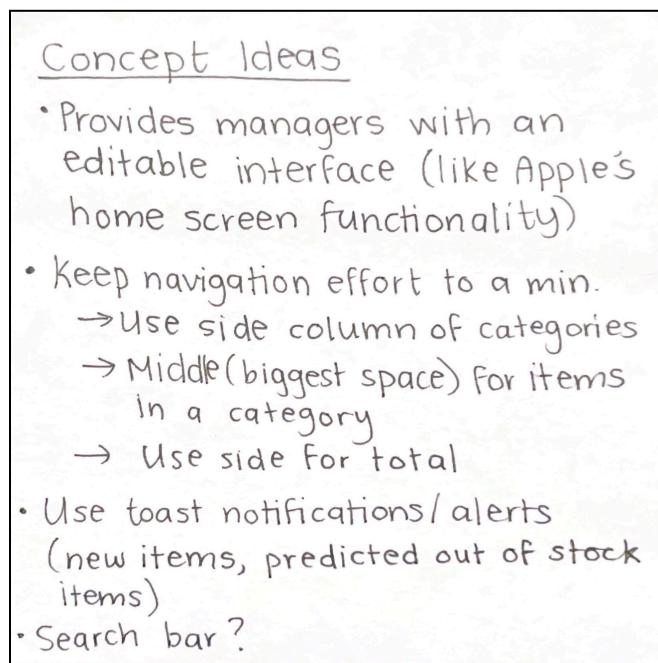


Figure 3. Abstract conceptualizations and features of a possible solution

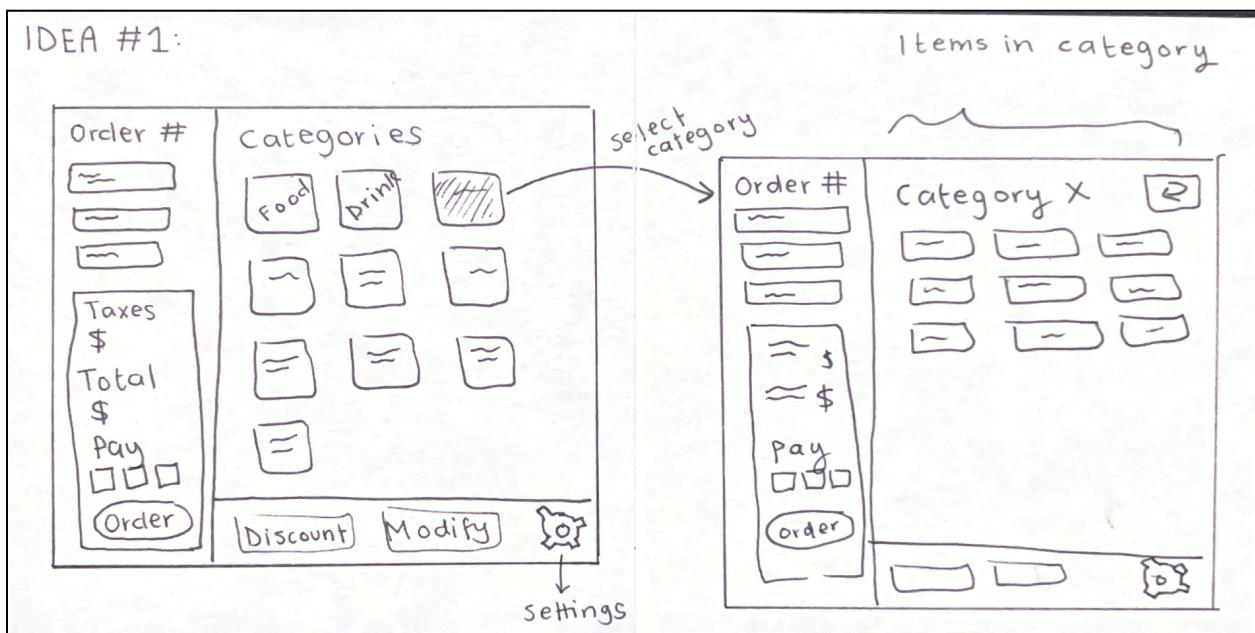


Figure 4. Idea #1: Navigation system of designed new POS system

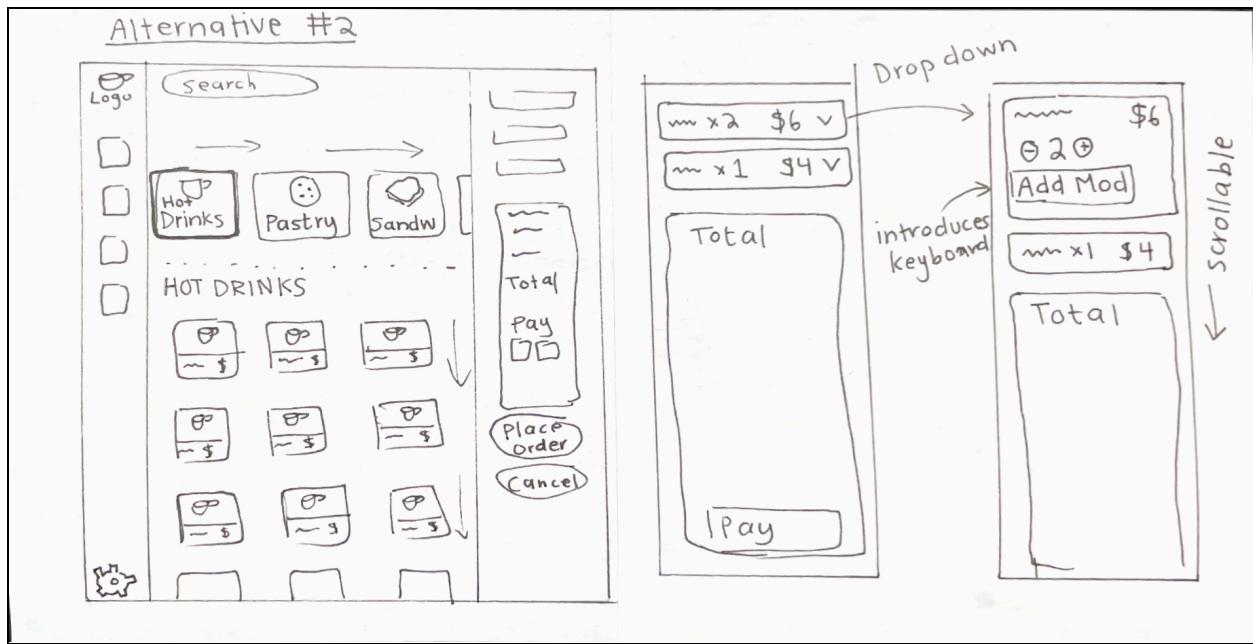


Figure 4. Idea #2: Navigation system of designed new POS system, including more order processing functionality (modify, remove items)

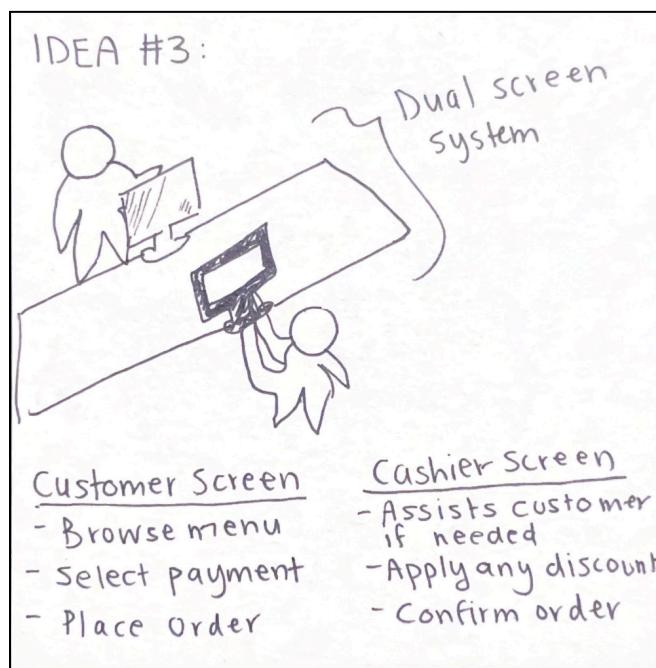


Figure 5. Idea #3: Dual screen system between customer and cashier with different yet connecting core user interfaces

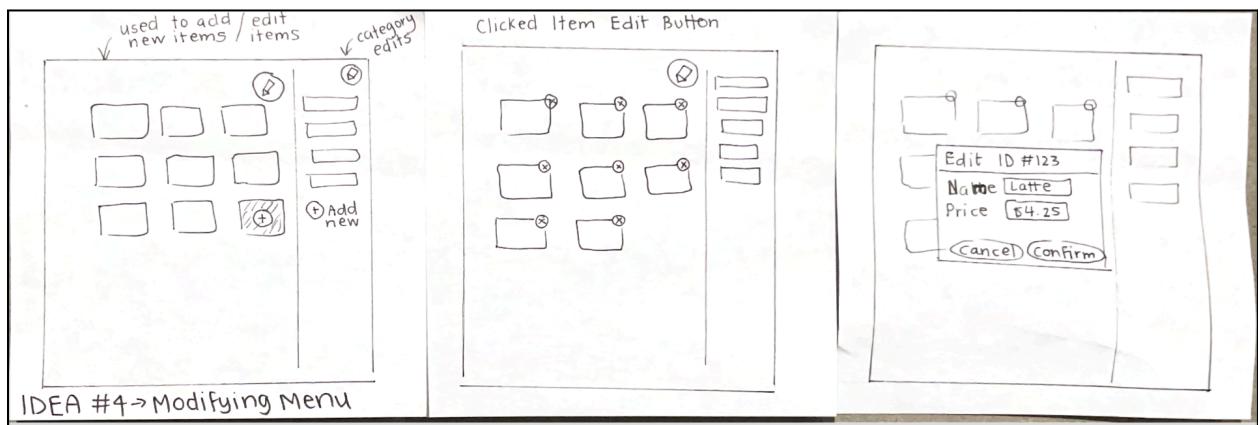


Figure 6. Idea #4: Low-fidelity storyboard of possible POS system handling menu modifications

### Team Member #4 Ideas and Sketches:

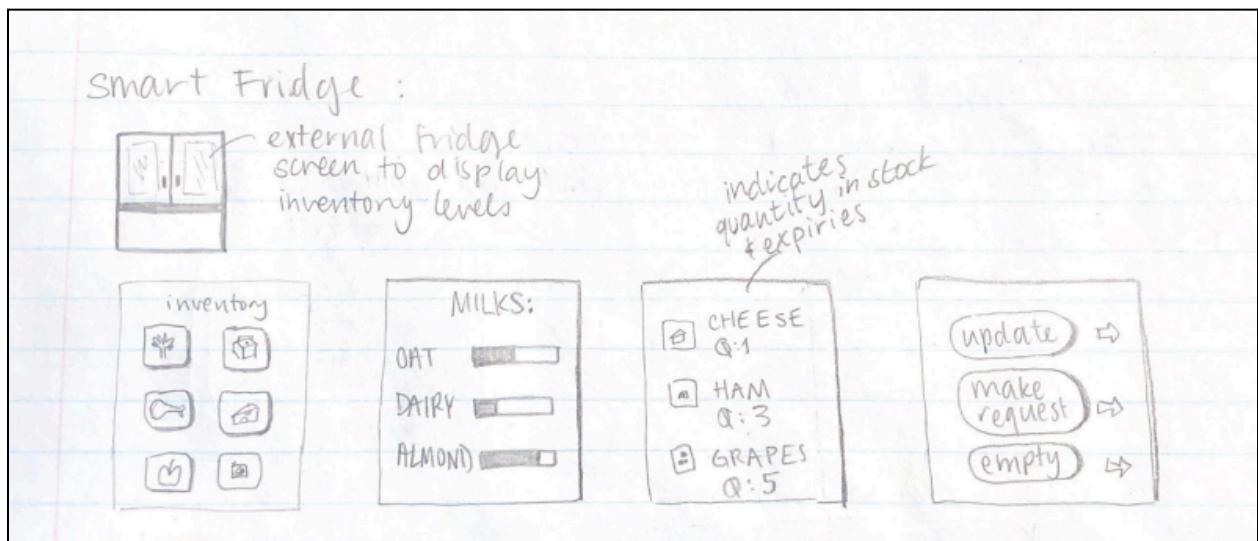


Figure 7. Idea #1: Smart Fridge system to keep track of inventory (a functionality of current POS systems)

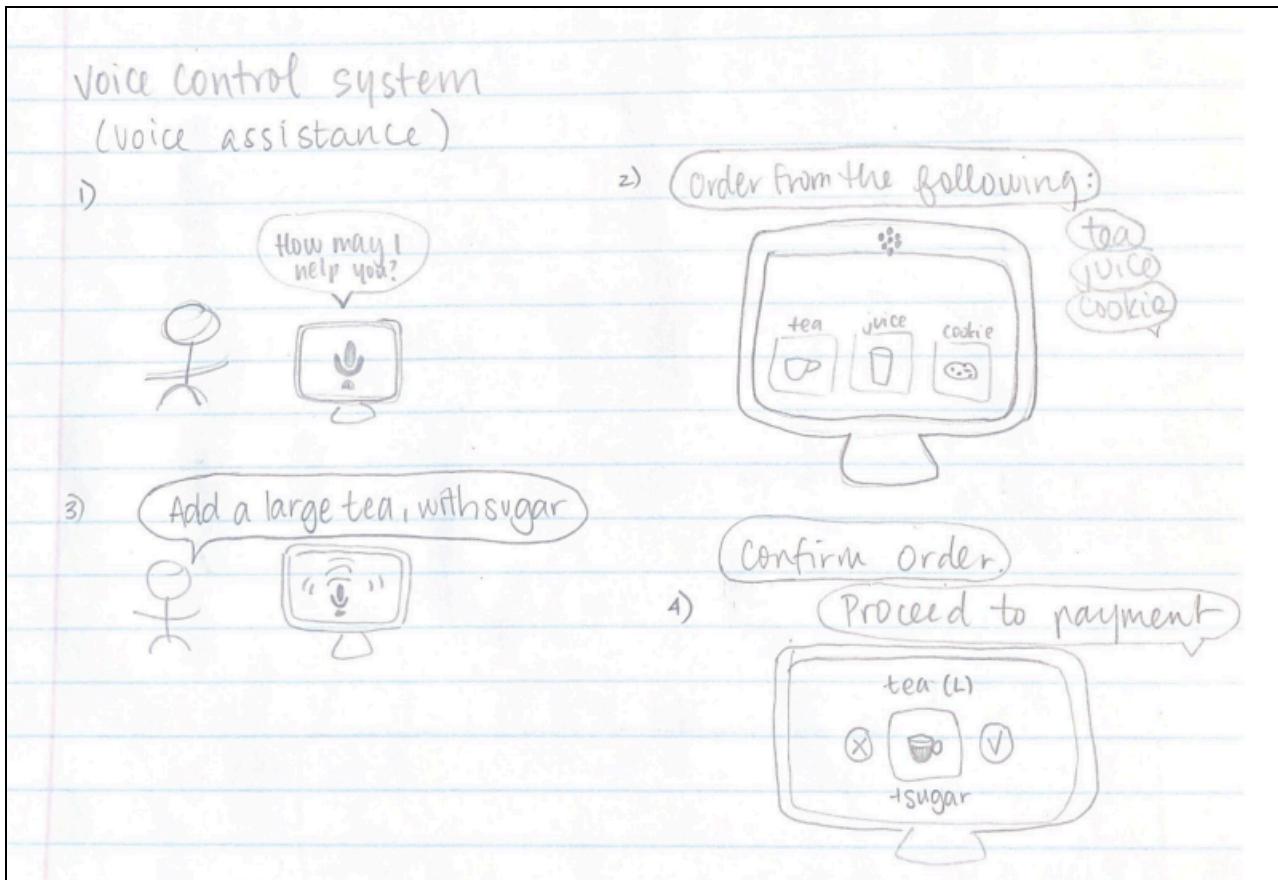


Figure 8. Idea #2: A voice control system that allows processes audio orders of cashiers

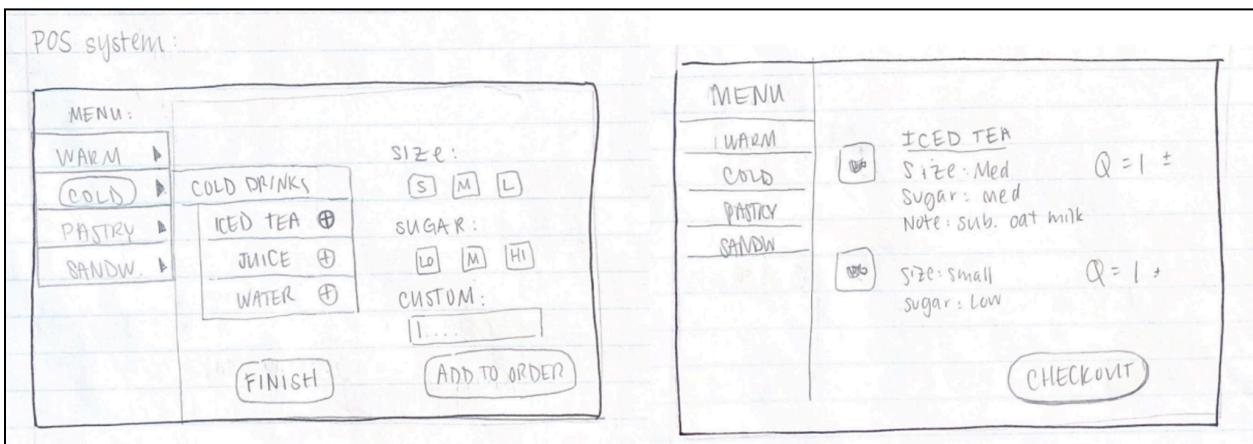


Figure 9. Idea #3: Design for new POS system

## Appendix B - Paper Prototype (Core Interfaces)

### Cashier: Order Processing

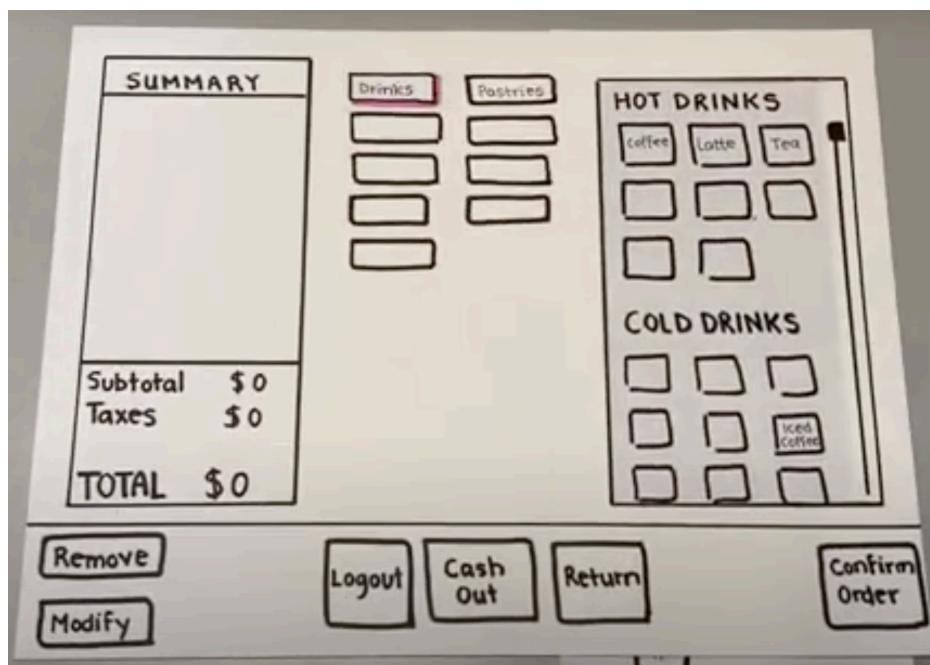


Figure 1. Core screen for cashier to place customer orders

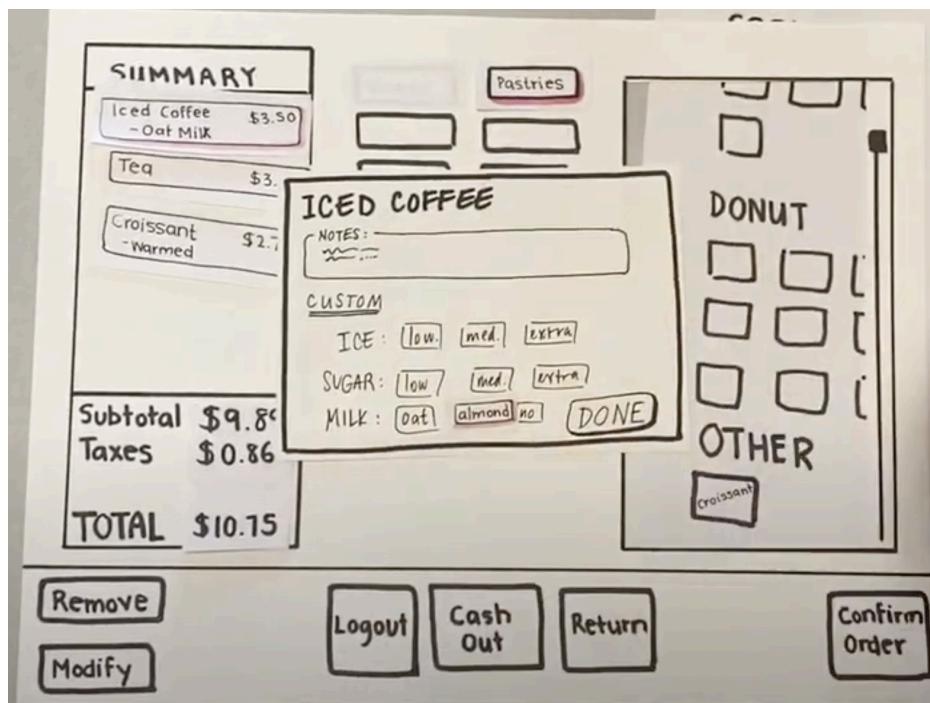


Figure 2. Item modification pop-up modal

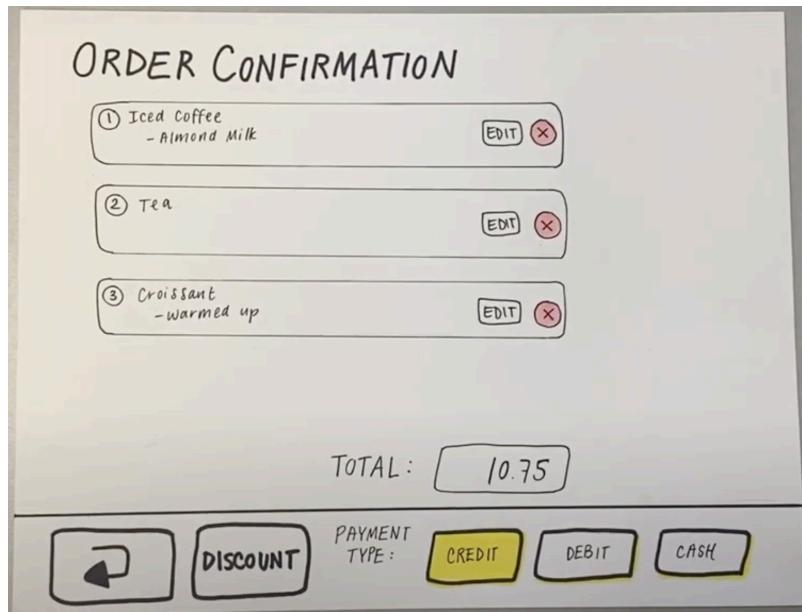


Figure 3. Order confirmation screen

### Manager: Adding Menu Item

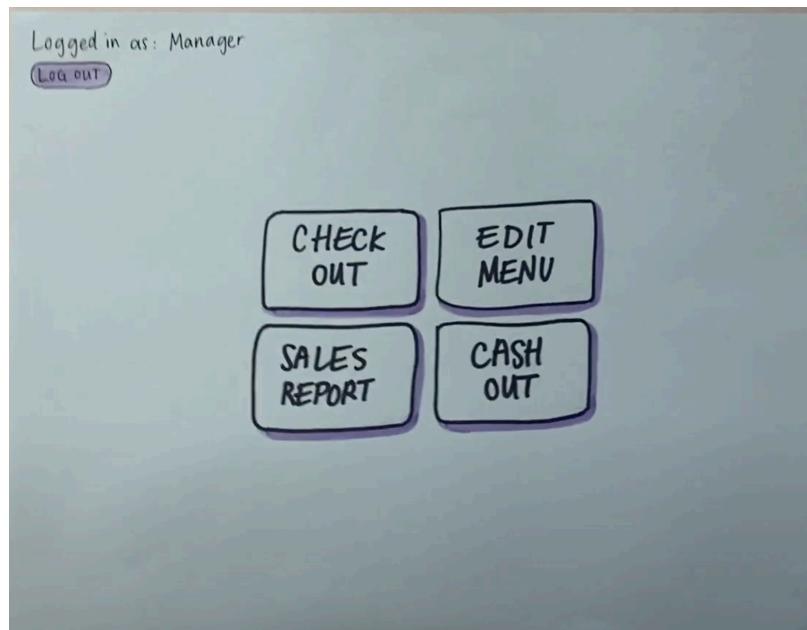


Figure 4. Manager core screen upon log-in

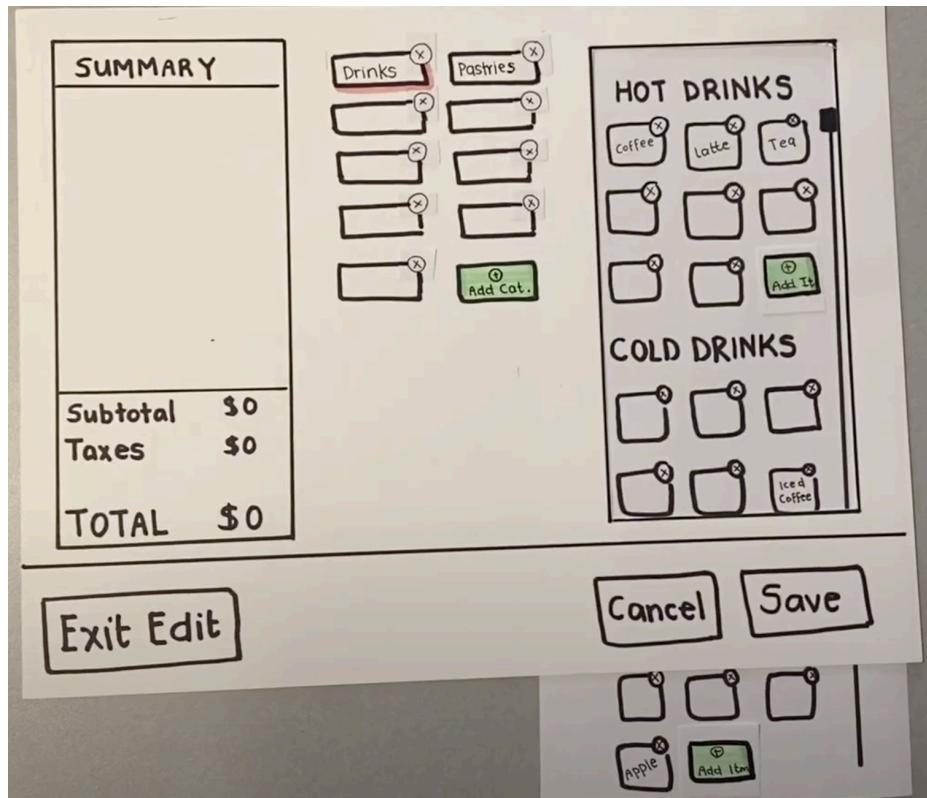


Figure 5. Core screen for manager to add, remove, or edit a menu item

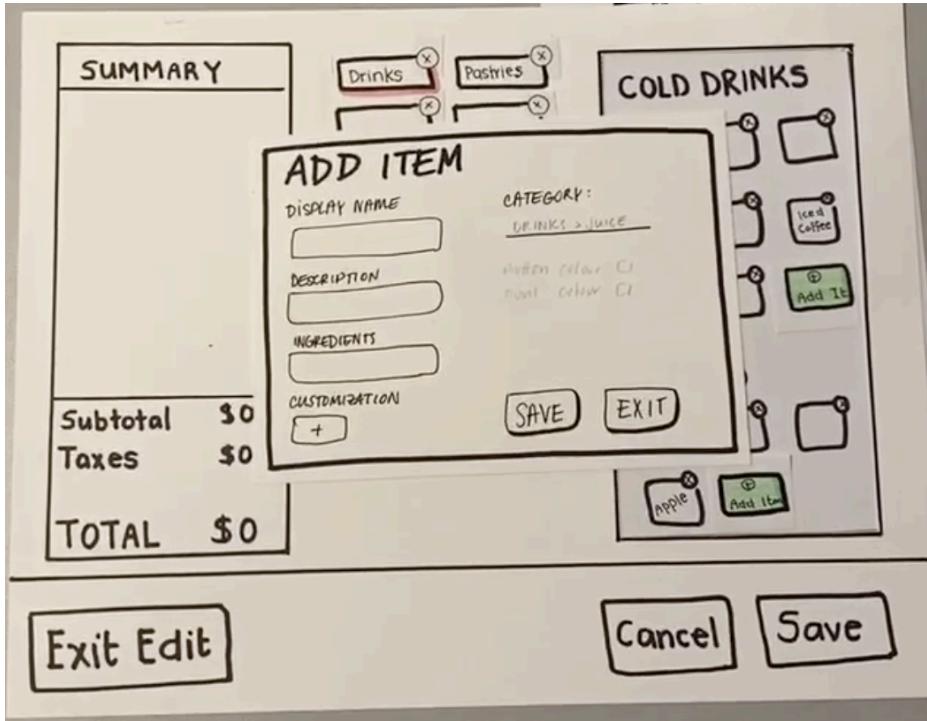


Figure 6. Pop-up modal when manager selects to add a new menu item