

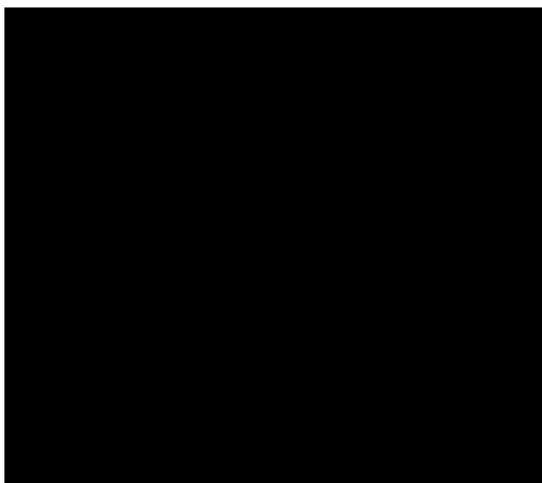
**University of Toronto**  
**Faculty of Applied Science & Engineering**  
**MIE240**

**Fantuan Project Report: Phase 2**

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## Executive Summary

This report presents the “Create” phase of our Fantuan app project for MIE240, building upon the Understand phase findings, where user observations and Hierarchical Task Analyses (HTAs) revealed critical usability shortcomings in two core functions of the Fantuan food delivery app: (1) Selecting a Restaurant and (2) Checking Out. Our target user population—University of Toronto students seeking convenient, cost-effective meals—struggled with redundant navigation paths, ambiguous promotional offers, and confusing checkout procedures.

In this phase, we systematically identified and articulated each shortcoming from Phase 1, mapping them to established interaction design principles [1], such as perception, response selection, and attention design principles. Guided by these insights, the team employed brainstorming techniques (including SCAMPER [2] and Wishful thinking [3]) to generate multiple design alternatives. The alternatives were then consolidated into a single final low-fidelity prototype.

The main improvements include:

- Streamlined restaurant selection: Consolidating multiple navigation paths into a single, intuitive route with labeled tabs and carefully placed filtering options.
- Cleaner interface: minimizing intrusive popups in favour of labeled sections for promotions, ensuring that special deals and vouchers are distinguished.
- Simplified checkout flow: centralizing payment, discount application, and address input on a single screen, with visual feedback to confirm which discounts are active.

Throughout the design process, the team collaborated to balance ambitious ideas with practical constraints, refining our prototype based on iterative discussion and peer feedback.

Finally, this report concludes with the next steps for evaluating the usability of the prototype. In the upcoming “Evaluate” phase, we will conduct user testing to validate our solutions, measure improvements in efficiency and satisfaction, and further refine the interface.

The ultimate goal is to deliver a cohesive, student-centric Fantuan experience that is both intuitive and gratifying to use.

## 1.0 Introduction

The Phase 2 (“Create”) report builds upon the findings from the Understand phase, where the team conducted Hierarchical Task Analyses (HTAs) on two central Fantuan functions with the target user group of university students—(1) Selecting a Restaurant and (2) Checking Out—to identify usability issues and inefficiencies. In Phase 1, the team analyzed how users interacted with the aforementioned functions through screen recordings and surveys. In Phase 2, the focus is on analyzing shortcomings identified in Phase 1 to generate interface design solutions that improve usability and showcasing the modifications in a low-fidelity prototype.

## 2.0 Shortcomings

From the initial HTA, screen recordings, and user feedback in Phase 1, the key usability issues were identified; the issues and their user/interface design violations [1] are listed below.

### 2.1 Function 1: Selecting a Desirable Restaurant

As previously mentioned, selecting a desirable restaurant encompasses navigating from the main page to the search page, where filters may be applied to aid in selecting a restaurant. The following shortcomings were identified:

1. **Multiple Navigation Paths:** Several pathways to a particular goal indicate redundancy (Appendix A.1)
  - a. *Simplify and Structure Task Sequences:* Multiple paths create unnecessary complexity, thus, tasks are not broken into a streamlined sequence.
2. **Endless Scrolling:** Content continuously loading onto the homepage impacts navigation and user experience (Appendix A.2)
  - a. *Support Visual Momentum:* There are no clear landmarks, making it difficult for users to track progress, resume tasks after switching pages, and reassess previously explored content simultaneously.
3. **Unclear Navigation & Display:** Ambiguous filters, misleading deals, and poor labeling are unintuitive (e.g., price filter ambiguity, mixed cuisine and VIP deals) (Appendix A.2)
  - a. *Make Displays Legible (Audible):* The ambiguity of filter options, combined with poor labelling, led to an unclear interface, making it difficult for users to interpret interface elements.

- b. *Make Accessible*: Misleading discounts and poor placement of filters cause users to experience difficulty locating functions.
  - c. *Minimize information access cost*: The unclear price filter values the random mix of categories cause users to put in extra effort to interpret and navigate the interface.
- 4. **Intrusive Pop-ups**: Pop-ups appear at random upon entry or reload, disrupting the user's experience. (Appendix A.2)
  - a. *Limit interruptions and distractions*: Pop-ups forcibly capture user attention, disrupting the user's workflow.

## 2.2 Function 2: Checking out an order

The checkout process in Fantuan involves verifying items, applying discounts, and completing payment. The following issues were identified:

1. **Complicated Discount Application**: Users experience confusion when applying vouchers and coupons due to unclear eligibility rules and a lack of transparency in discount application.
  - a. *Provide Feedback*: The system should offer immediate and clear feedback on applicable discounts.
  - b. *Highlight Changes*: Any modifications to the final price should be visually prominent to ensure users are aware of applied discounts.
  - c. *Simplify and Structure Task Sequences*: The checkout flow should guide users through a structured process, reducing unnecessary complexity.
2. **Unclear Difference Between Vouchers and Coupons**: Users struggle to differentiate between vouchers and coupons, leading to uncertainty about which discounts can be applied to their orders.
  - a. *Make Displays Legible*: The system should use clear labeling and visual distinctions to help users understand the differences between discount types.
  - b. *Support Top-Down Processing*: The interface should align with users' expectations by presenting vouchers and coupons in a way that matches their mental models.
  - c. *Reduce Information Access Cost*: The system should ensure that users can easily

find and understand available discounts without unnecessary effort.

By addressing these issues, the team aims to streamline the checkout experience, ensuring a more intuitive and efficient process for users.

### 3.0 Methodology

To develop a low-fidelity prototype that optimally addressed the identified shortcomings, each team member employed brainstorming techniques to develop an alternative design solution for the shortcomings of each function. The alternatives were then compared to extract the most optimal solution.

#### *3.1 Brainstorming and Ideation Techniques*

To systematically generate solutions, each team member employed multiple ideation methods.

##### 1. Wishful thinking. [2]

Team members imagined “ideal scenarios” where all user functions vanished. For example:

- An interface where all promotions are automatically applied if eligible.
- A consolidated checkout page that displays address, payment method, and discount in one glance.

##### 2. SCAMPER. [3]

We considered how to Substitute, Combine, Adapt, Modify, Put to another use, Eliminate, or Rearrange elements of the current Fantuan interface. The ideation results are illustrated below.

For instance:

- Substitute: Replace endless vertical scrolling with tabs and horizontal scrolling options.
- Combine: Merging filter and search functions under a single menu.
- Eliminate: Removing or delaying pop-ups until they are contextually relevant.

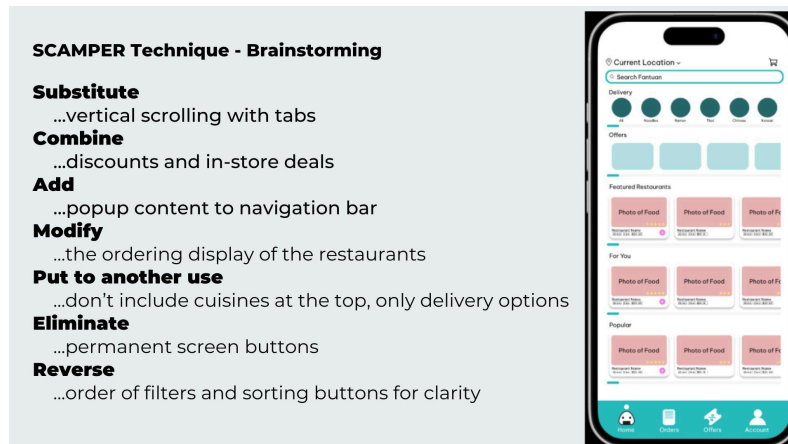


Figure 1: How the SCAMPER technique [2] was used to brainstorm prototype features.

### 3.2 Comparison of Design Alternatives

A table was compiled (see Appendix C) that listed each identified shortcoming (e.g., “Multiple Navigation Paths”) and how/if each design resolved the design violations. The components were then reviewed as a team, and the components that best achieved a goal were integrated into the final solution. This method facilitated a clear compare-and-contrast approach, revealing that certain ideas effectively tackled multiple issues simultaneously.

## 4.0 Design Alternatives

### 4.1 Alternative Design 1

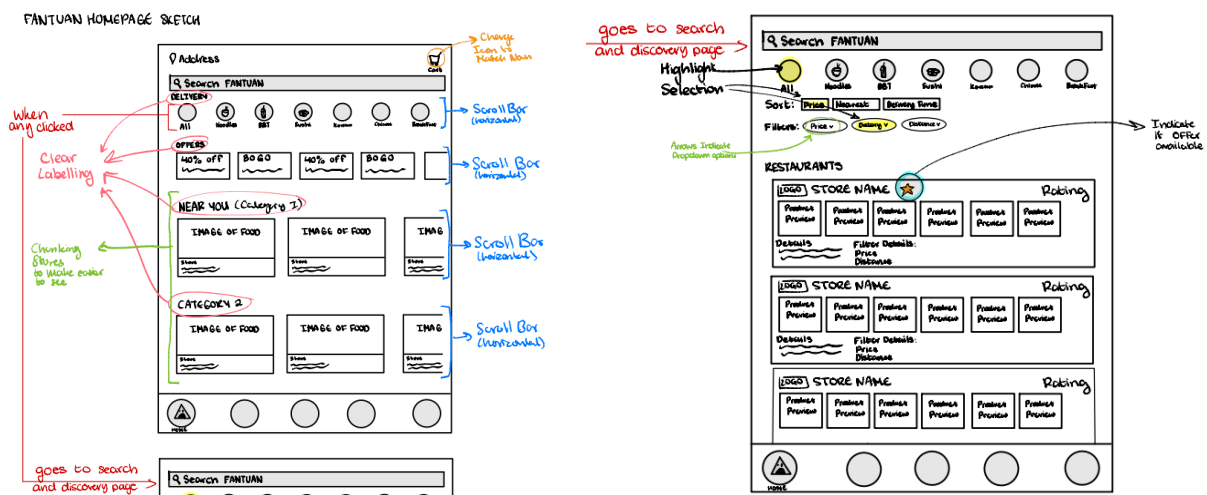


Figure 2: Sketch of Alternative Design 1

Alternative Design 1 was created using Wishful Thinking [3]. The design is made up of 3 main components: the home, search and checkout pages. The home page leads to the search page through the cuisine selection or by clicking on the search bar. Additionally, on the home page, the offers have been grouped into a horizontal scroll bar, as well as the food options in different categories to recommend restaurants to users. The Cart icon has been changed from a shopping bag to a cart to reflect its naming better. The search page features all cuisines listed alongside the sorting and filters. Here, sorting and filters have been separated such that the sorting orders by a particular need while filters remove restaurants that do not fit a certain standard. Finally, an icon marking offers available has been added to reduce confusion for users with misleading deals.

For the second function, checking out, two defaults have been set: one for location (current location) and one for delivery time (ASAP). Star marks have also been added to indicate required fields to help minimize information access costs. Finally, to help keep visual momentum, there are arrows indicating that more options will appear after selecting an entry field.

#### 4.2 Alternative Design 2

The second alternative design primarily addresses the process of selecting a restaurant and is a redesign of the front page. It was created with the use of the SCAMPER technique. The design

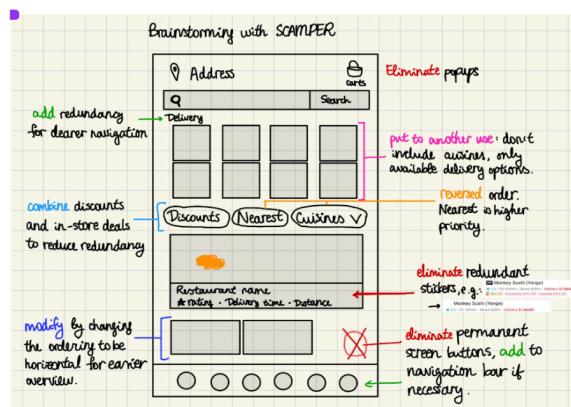


Figure 3: Sketch of Alternative Design 2

aims to eliminate unnecessary parts of the design to make the app more user-friendly by abiding more closely by the interaction design principles [1]. For example, popups and permanent screen buttons were removed from the main page to limit interruptions and distractions, following attention principles. Instead, their contents were added to the navigation bar at the bottom to make the system structure more visible (perception principles), making deals and other popup content more easily accessible when required.

### 4.3 Alternative Design 3

This alternative design was developed using reverse brainstorming, identifying current pain points and addressing them with streamlined solutions.

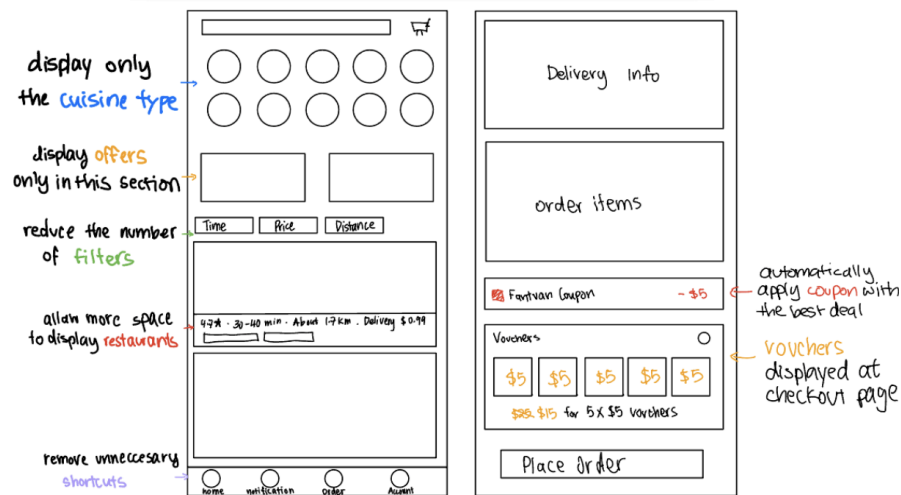


Figure 4: Sketch of Alternative Design 3.

Promotions and announcements have been moved to the notification center or a small tab at the top, reducing clutter on the main page while still keeping deals accessible. To improve restaurant selection, the design replaces unnecessary subcategories with clear categories -displaying only cuisine type- providing more relevant options. Filter labels have also been simplified to essential options like Time, Price, and Distance, reducing decision fatigue and improving navigation.

The auto-apply feature for coupons ensures that users automatically receive the best deal available, eliminating confusion between vouchers and coupons. Vouchers are displayed at checkout, allowing users to understand their discounts before placing an order. These changes enhance usability and reduce cognitive load.

## 5.0 Final Prototype

The video of the final prototype walkthrough is available in Appendix B.

### 5.1 Function 1: Selecting a Desirable Restaurant

The design of function 1 consists of two pages: 1) Home Page and 2) Search Page. Improving the structure and task sequence, redundant pathways were removed. To support visual momentum, categorical scroll bars have been added to the homepage, allowing users to navigate efficiently



without endlessly scrolling. Labels are placed on every button to enhance intuitiveness, ensuring the display remains legible and accessible. Restaurant offers are denoted by an icon beside the name, reducing distractions and minimizing information access cost while providing additional details on the restaurant's page. Additionally, offers have been organized into a scroll bar category, limiting disruptions and minimizing information access costs. An offers section is dedicated to coupons, vouchers, and offers for users to easily locate, minimizing information access costs. The modifications listed are highlighted in the figure below.

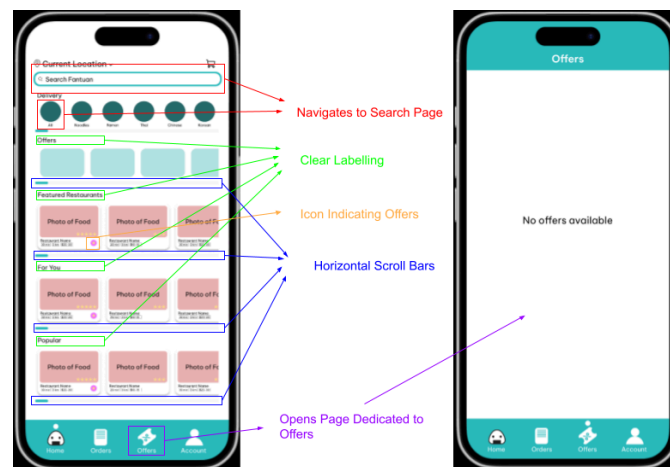


Figure 5: Annotated Home Page & Offers Modifications of Prototype

Drop-down arrows on filters leverage top-down processing, aligning with user expectations that additional options will appear. To minimize confusion, sorting and filtering functions are distinctly separated. Finally, filters, sorting, and cuisine selections are highlighted upon interaction [1], following the principle of highlighting changes. Additionally, filters were made to be clearer by removing ambiguity (ex. Price filter is now <\$10, <\$30, <\$50, etc...)

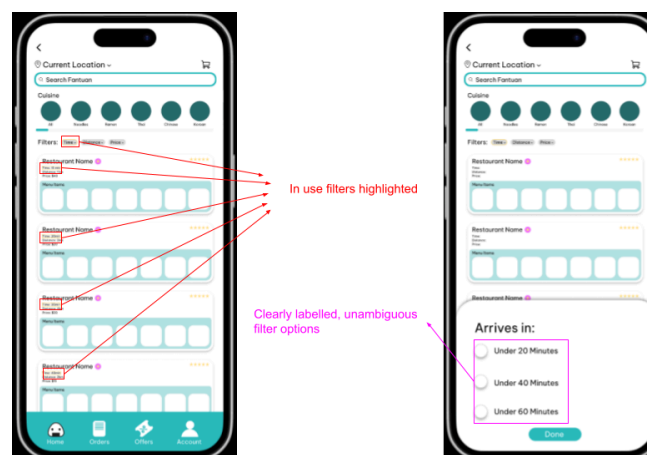


Figure 6: Annotated Search Screen Modifications of Prototype

## 5.2 Function 2: Checking out an Order

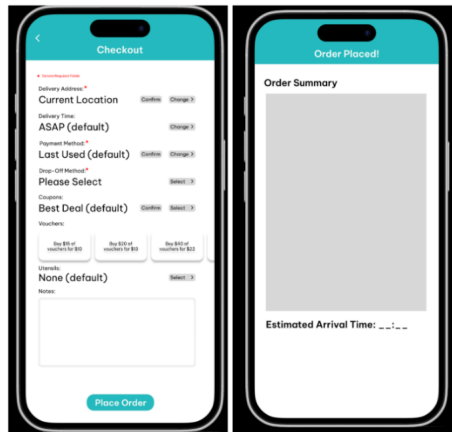


Figure 7: Checking out.

The design for function 2 consists of two pages (Fig. 7). It sets and highlights appropriate defaults for location and delivery time, as well as removes the pin code option and automatically sets it based on the type of delivery (e.g. apartment vs house). Required fields are also highlighted. These design choices abide by the response selection design principles and let users place orders quickly. The design incorporates vouchers in a horizontal bar. If a user wants to buy a voucher, they can simply click it. This change makes the system structure visible, following perception principles.

## 6.0 Next Steps

Phase 2 was a highly collaborative effort, where the team worked to identify usability shortcomings, generate alternative designs, and develop a low-fidelity prototype for Fantuan. Each member contributed to analyzing findings, brainstorming improvements, and refining the final design. One of the main challenges was balancing creativity with practicality, as some design ideas were ambitious but not feasible within the app's existing structure. Through iterative discussions and peer feedback, the team successfully refined the prototype into a clear and user-friendly solution.

Moving forward, the next phase will focus on user testing and evaluation, ensuring that the proposed design improvements effectively enhance the app's usability. By gathering feedback and making necessary refinements, the team aims to develop a final solution that provides a seamless and intuitive experience for university students.

## 7.0 References

- [1] J. D. Lee, C. D. Wickens, Yili Liu, and Linda Ng Boyle, *Designing for people: an introduction to human factors engineering*, 3rd ed. Charleston, Sc: Createspace, 2017.
- [2] THE DECISION LAB, “SCAMPER,” *The Decision Lab*, 2024.  
<https://thedecisionlab.com/reference-guide/philosophy/scamper>
- [3] S. Markov, “Wishful Thinking - creativity technique for breakthrough innovation,” *Genvive*, Jan. 15, 2020.  
<https://geniusrevive.com/en/wishful-thinking-creativity-technique-for-breakthrough-innovation/>

## 8.0 Appendices

### Appendix A: Phase 1 Report: Understand - HTA, Analysis & Findings

#### A.1 Hierarchical Task Analysis

##### HTA 1 - Function 1: Selecting a Restaurant

In Figure 1, it can be seen that multiple pathways can be taken to arrive at step 2, as supported by survey feedback (Appendix D). This makes the flow of the app confusing as there are many ways to arrive at the same point. Steps 2 and 3, however, were very simple and easy to follow. Neither had too many additional pathways.

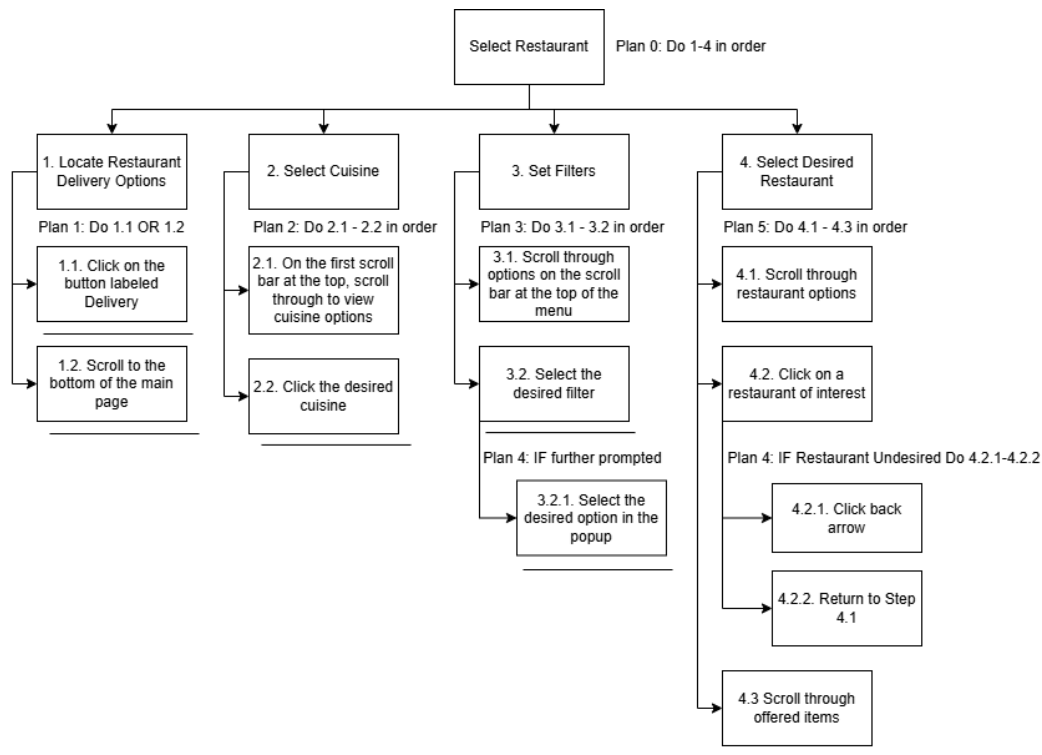


Figure 1: Hierarchical Task Analysis of Function 1 (Selecting a Restaurant)

Participants spent the least amount of time specifying the cuisine type and selecting the price filter as they were easy to navigate, as evidenced by the recordings and feedback (Appendix C and D). During Step 4, participants visually scanned through their filtered options to select one of interest. This process was quick and straightforward since each listing included key restaurant details such as time and price point. However, the provided information was sometimes

misleading. For example, offers that initially attracted participants often turned out to be for particular items or required membership status, resulting in participants frequently returning to the previous page to find another restaurant

## HTA 2 - Function 2: Checking out an order

In Figure 2, it can be seen that Steps 1 & 3 are very simple, straightforward processes completed with ease. In contrast, Step 2 consists of multiple subtasks and is much more complex, making for a major hindrance to a streamlined user experience.

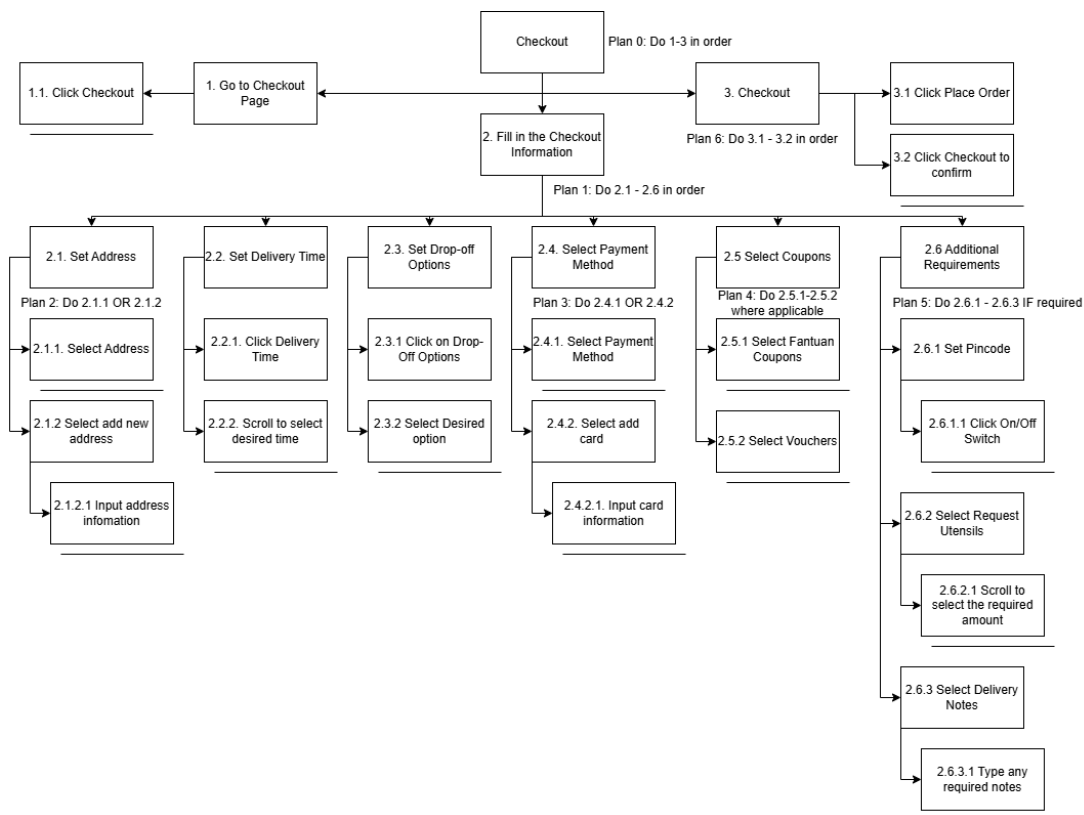


Figure 2: Hierarchical Task Analysis of Function 2 (Checking out an order)

In Step 2, participants were asked to complete the payment and delivery information required to process an order. As evidenced by the recordings, this step took participants the longest and was the most intricate (Appendix C and D). Participants often neglected subtasks of Step 2 such as pincodes, utensil requests, and delivery notes due to ambiguity. Additionally, the availability and use of vouchers/coupons were difficult to understand. Often, participants would receive a

notification of an available coupon/voucher, which they weren't able to use for unknown reasons. Differentiating between vouchers and coupons proved to be a major challenge as well.

## *A.2 Findings and Insights*

### *Primary Observations and Implications*

Several user behaviours that could have major implications for human factors-oriented app design were observed.

For example, while selecting a restaurant (Figure 1), several participants filtered restaurants primarily by cuisine and price, emphasizing the importance of a clear and intuitive filter system. It is important to ensure that filtering and sorting options are visible and easily accessible, potentially with default “popular near you” settings to reduce cognitive load.

Additionally, several users noted the app was somewhat overwhelming to use (Refer to Appendix D, Figures D11 and D17 for more detailed feedback). It is essential to make sure the app is easy to use and look at to expedite decision-making and not be distracting to its own users.

### *Suitability of HTA in this context*

Hierarchical Task Analysis proved sufficiently comprehensive for capturing Fantuan's interaction flow. It helped identify physical actions completed by users, such as tapping menus, scrolling, and filtering, as well as the more cognitive steps, including evaluating restaurant information, deciding which items to order, and verifying accuracy during checkout.

While HTA did not explicitly capture error recovery steps or advanced mental models (e.g., changing one's mind mid-way), these can be addressed in a complementary cognitive task analysis if needed for deeper insights.

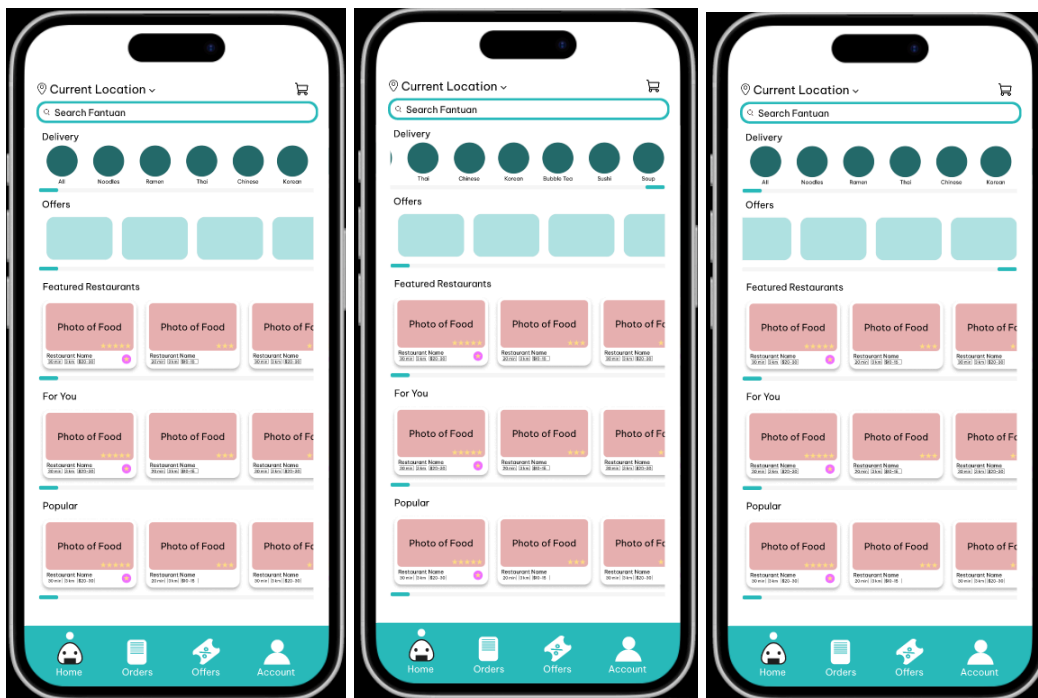
## Appendix B: Prototype

The prototype was created using Figma and a walkthrough was then recorded. The Youtube preview of the prototype as well as the link to the Figma, are provided below. The frames created in figma are also provided.

[Click for Link to Figma](#)

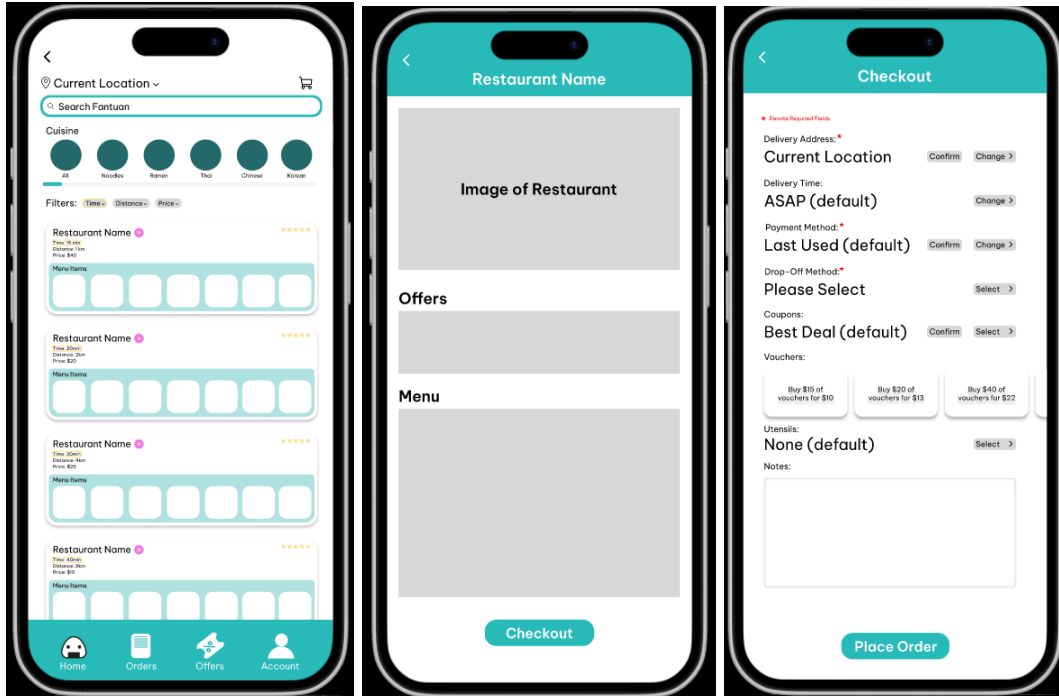
[Click for Link to Youtube Preview](#)

Images of Prototype Frames:









### Appendix C: Alternative Design Comparison Chart

All the ideas were compared by compiling a chart with how each alternative design met each shortcoming. The table below showcases the components used to complete each objective and the highlighted components were incorporated in the final prototype.

Shortcoming	Alternative #1 Shreya	Alternative #2 Maria	Alternative #3 Rain
<b>Function 1</b>			
Poorly organized layout of the main page (ex. Never ending scroll of restaurants)	Restaurants split into categories with horizontal scroll bars Offers kept to a need scroll bar. Stars to indicate offers. Make it clear which filter exactly is getting satisfied.	Eliminate popups. Change the layout to be vertical to have several restaurants for directly relevant results and horizontal with smaller preview images for indirectly relevant results.	Include clear categories of restaurants Reduce the descriptions under each restaurant Display icons of different categories on the main page Make app consistent in a region (ex. Dont make layout different for different addresses)
Display is not intuitive as the navigation is unclear (ex. Use Search/Filter related features )	All features are clearly labelled so that the display is very intuitive. Filters and sorting are separate functions, drop down arrows, highlighting clicks	Change the order of the Filtering functions to be more grouped together (e.g. reverse “Nearest” and “Cuisines”). Combine discounts and in-store deals.	Change of labels for filters in to more quantitative wording. For example, change “\$” label to “\$0-20”
There are multiple ways to navigate to the selection screen which makes the display overly complex as there is no simple path	There are no longer multiple ways to navigate to the next page, only by selecting a cuisine or all, search you can progress	Eliminate permanent screen buttons, keep the navigation buttons in the navigation bar at the bottom.	
Popups are distracting: they appear any time a user enters the app or reloads the main page.	Offers have been moved to their own categorical scroll bar so that customers can view by choice. Additionally,	Remove popups.	Reduce the number of ads around the page. Move promotion and announcement to notification center, or

	stars next to a store name indicate if they have a deal.		have a small tab at the top.
<b>Function 2</b>			
<p>Redundant/complicated checkout process</p> <ul style="list-style-type: none"> <li>- Confusing vouchers and coupons</li> <li>- Uncertainty about which are applicable</li> </ul>	<p>Set and highlight defaults for location and delivery time. Remove the pin code option and automatically set it based on the type of delivery (ex. Apartment vs house)</p> <p>Have an icon representing required fields</p>	<p>Add a user guide page with more information on vouchers vs. coupons.</p>	<p>Include a auto-apply feature for coupons, when they are cheaper than in-store deals</p> <p>Display price when using coupons.</p> <p>Display vouchers at the checkout page directly</p>
<p>Redundant discounts vs in-store deals.</p>	<p>Have a small information icon that will provide info on the difference between a coupon and a voucher</p>	<p>Combined discounts and in-store deals on the restaurant selection page.</p>	<p>Have vouchers displayed in a little scroll bar and if you want to buy click tick box</p>