Contents

Introduction

Under the influence of the COVID-19 epidemic, overseas travel is strictly controlled. Hong Kong citizens lose the opportunity to travel with their families, which causes stress to accumulate. However, recently the restrictions on local entry into Hong Kong have been loosened to 0+3 days. This has greatly increased the willingness of Hong Kong people to travel. To cope with this phenomenon and provide a high-quality, comfortable, and convenient travel experience. Therefore, our group decided to build a mobile app for inquiring and ordering flights to cover travel advice.

The application could help users find the best flight options, covering multiple airlines, and providing the cheapest and best choices. Users can use the application to query the remaining seats and the airlines that provide services to meet their needs. Spending more willing to travel.

Overall design

Core Functions

The main function of the system is to allow users to book air tickets.

Steps to use the app:

1. User needs to be logged in to use the system
2. Users can search for the place they want to go directly in the search bar on the homepage, or they can think about the place they want to go according to the pictures provided on the homepage
3. After selecting the destination, the user can select the flight date and number of people
4. The system displays the cheapest and most popular airfare to the destination for the user to choose from

5. Users can choose their own plane seat and checkout

6. The system will display the flight details and e-tickets that the user has purchased

Targeted Users and platforms

Everyone can use this flight booking system. However, the main user group of our system is Hong Kong people.

Example:

- family members or couples who want to travel together
- independent traveler
- business traveler

Development process

Phase 1: Requirement analysis

Functional requirement:

- Book flight tickets

Non-functional requirements:

- Provide descriptions of different cities for users to view and consider travel locations
- The wallet page where the user views the ticket purchase record
- Recovery: Users need to log into the app to save their records on the app
- Availability: Users can access this app anytime, anywhere

User experience requirement:

- Users can change the language and currency of the app on the home page and settings
- Users can choose dark mode or light mode for the app in the profile page
- Users can choose their preferred avatar and make changes on the profile

page

- The app has a navigation bar at the bottom of the interface that categorizes different options for the user to choose from

Phase 2: Preliminary & detailed design

We choose to make high-fidelity prototypes.

Phase 3: Implementation

Phase 4: Evaluation

Principles applied in UI Design and Usability Studies

Concepts mentioned in the course

Usability measures

Time to learn: Users can quickly master the usage method of the application. Take ‘Profile’ as an example. When users click this page, they can see the user’s photos and several options. From top to bottom, they can see the user’s favorite country / city. The user has registered in the application’s credit card. The customer support center allows users to ask questions they encounter. Browsing the relevant information and usage rules of the application, and options for evaluating the application.

Speed of performance: The response speed of the application will change depending on the function used. If we switch from 'Search' to 'Home', it may take one to two seconds to refresh the photos of the country and city on the ‘Home’ page. If we search for air tickets, if the flight requirements are not high, it is likely that many suitable search results will appear, and a large amount of data will slow down the system's response speed.

Rate of errors by users: In our ‘Search’ page, we have selected the calendar as the tool to select the date, and we have also used the addition and subtraction interface

method for passenger options. These are all to avoid users' wrong input and multiple search input procedures.

Retention over time: Based on users may want to find cheap tickets and cater to their own itinerary, they will conduct multiple searches. Therefore, we will display the search results of the tickets of the day in ascending order starting from the lowest price and mark the cheapest tag on the first search result, so that users can quickly skip the process of searching for the cheapest ticket.

Subjective satisfaction: On the 'Profile' page, the bottom scoring option allows users to rate and evaluate our application. In addition, users can also provide real-time feedback to our manual customer service through 'Customer Support'.

Universal Usability Concerns

Cognitive and perceptual abilities:

1. Provide a search engine on the homepage, which is convenient for users to directly search for travel locations, without wasting a lot of time scrolling through different pictures

Cultural and international diversity:

1. User can change language and theme mode in homepage and settings
2. Left-to-right and vertical input and reading
3. Date and time formats are "DD Mon, YYYY", "DD/MM/YY" and 24-hour format

The main user age group is adults:

We use neutral colors and medium-sized fonts in our prototypes. Adults can also accept smaller font sizes.

8 golden rules

Golden Rule #1 - Strive for consistency: Considering this rule, we design the interface we used Identical terminology in the menu to help the user easily identify information, also similar colors, layout, capitalization, and fonts those have well consistent.

Golden Rule #2 – Seek universal usability: We provide the functions in the Universal Usability Concerns section above.

Golden Rule #3 – Offer informative feedback: When booking a flight, there is a button at the bottom of each page for the user to jump to the next page. Furthermore, detailed interface guidance and categorization allow users to get visual feedback after each operation.

Golden Rule #4 – Design dialogs to yield closure: Considering this rule, we provide a clear transaction interface, including but not limited to (selecting a destination page, selecting a flight ticket page, selecting a seat page, selecting the payment method, complete payment). Those interfaces can provide the satisfaction of accomplishment to user to have a better experience.

Golden Rule #5 – Prevent errors: Considering this rule, we provide gray-out menu items that are not appropriate (seats), provide standard formats and a Forget password button to prevent users from making mistakes when filling in the information, and provide valid instructions that users can modify.

Golden Rule #6 – Permit easy reversal of actions: Considering this rule, we provide a return button to return to the previous page, and provide a search function to instantly search for destinations, reducing redundant tasks and data input

Golden Rule #7 – Keep users in control: Considering this rule, we provide various flight packages (one-way or two-way) to simplify the operation, use the common operator interface and payment methods in the market, and use the recommendation system to recommend destinations or flight plans to reduce the cumbersome input requirements of users.

Golden Rule #8 – Reduce short-term memory load: Considering this rule, we provide appropriate interface switching and filling in data without repeated repetitions can reduce the time and memory of tasks that users need to fill in and use.

User-Centered Design Process

Consider the user requirements/needs, wants, and limitations.

Requirements/needs: Booking and purchasing of air tickets to the destination.

Wants: Providing the cheapest way/plan for buying the air tickets.

Limitations: User must enter email and password when registering or logging in (on the login and registration pages, "*" means must be filled in to continue)

CRAP principles

Contrasts: We used color choice to classify air tickets (Economy or business class) to help users quickly filter information. Additionally, we use larger fonts to display price and location of flight details.

Repetition: We use similar text types and icons design to categorize different tasks, such as icons and text in the navigation bar. Also, we used the background color to keep the UI interface more cohesive. To make sure that the interface design has unity and consistency.

Alignment: On different pages, we used subtitles to classify the different elements and neatly list the information that users need on each page to ensure that there are clear plans and instructions for users to quickly complete tasks.

Proximity: Group similar type of information to the four menu buttons provided on the main page allowing users to quickly move to the menu page to obtain the required information or services (Home page for searching the destination).

Effective navigation interface

Graphic layout and design:

1. Different travel locations with pictures in the homepage

Shortcuts for knowledgeable frequent users:

1. "My Cards" feature on the profile page to store frequently used card information, eliminating the need to re-enter credit card information each time

a payment is made

2. Users can add their favorite travel places seen on the homepage to their personal favorites, and then they can see their favorite travel places in the "Favorites" function on the profile page, which can save users' time to search for places again

Online help:

1. On the profile page, the user can click on "Customer Support" to send an email to customer assistance

Display design

Mullet and Sano's categories of design principles

Elegance and simplicity: The results of ticket search uniformly display the price, departure place to destination, flight time and travel time, so that users can see important information briefly.

Scale, contrast, and proportion: In the 'Wallet' ticket overview, the information of the departure place and destination is displayed in the cross-reference position, and both are aligned to the left, which makes people feel neat.

Organization and visual structure: On the 'Home' page, we show multiple optional destinations in layers. Users first choose continents, and then choose their favorite countries or cities.

Module and program: When the user selects the ticket seat, the selected seat will be shown in blue, and canceling the selected seat will restore the status of still available seats, which will be shown in a transparent background.

Image and representation: In the bottom toolbar, houses, magnifying glasses, wallets and icon are used to represent four important pages, which can help users understand what pages are.

Style: We have chosen to provide users with simple and commonly used functions

appropriately, so that users can filter a lot of unnecessary information.

Sequence of displays:

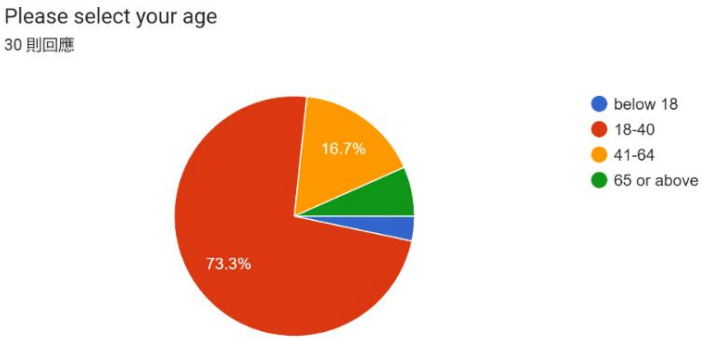
1. In flight plan search results, the cheapest plan is at the top, sorted by price

Possible to go backwards in a sequence to correct errors:

1. Each part of the booking flight has a back button for the user to go back to the previous page
2. The flight booking process has a progress bar for users to see which stage they are in

Text and Background Colors: Dark text on light backgrounds in our interface designs

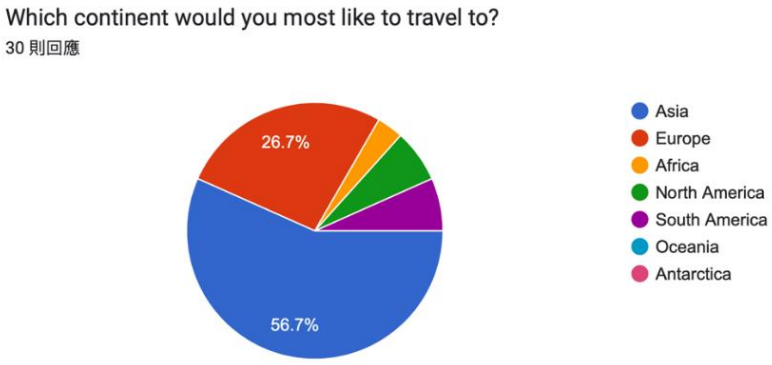
Gather user requirement, feedback, or evaluation



First, we asked 30 people, mostly around 18 to 40 years old, to do this survey. We developed our prototype based on their answers, which we explain below.

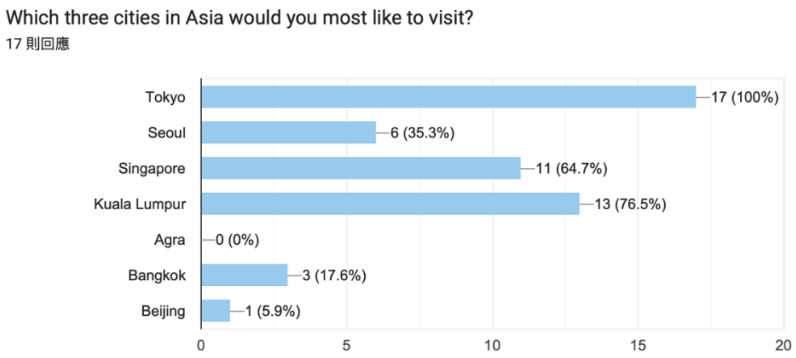
Home page

- We need to determine which 3 continents are primarily displayed on the home page ("Continent" button to categorize different cities for users to view and consider travel locations.)



The 4 main choices people chose in our survey were Asia, Europe, North and South America. In our survey, most people prefer to travel to Asia, with 56.7% choosing it. The second is Europe, with 26.7% choosing. Third, North America and South America have the same proportion of choices. Since North and South America have the same percentage at 6.7%, we've consolidated it into America. Therefore, on our homepage, the different cities will be divided into three continents, Asia, Europe, and America.

- We needed to identify which 4 cities in Asia were primarily displayed on our prototype homepage, as Asia was where most people in our survey wanted to go.

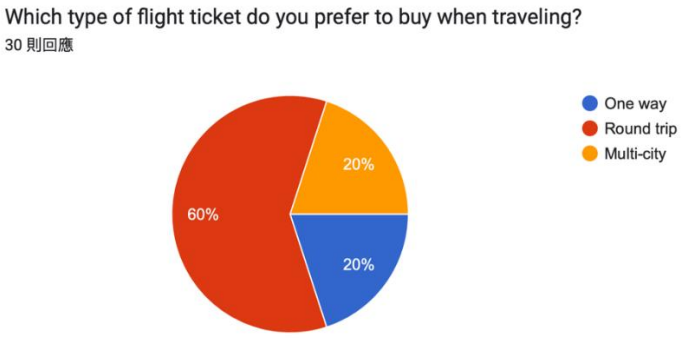


In our survey, Tokyo was the most popular city in Asia, with about 100% wanting to go (17 people). Then the second one was Kuala Lumpur, 13 people wanted to go there. After that, the third is Singapore 11 people want to go

there. Finally, 6 people want to visit Seoul. Therefore, on our prototype homepage, the four cities that will be shown are Tokyo, Kuala Lumpur, Singapore, and Seoul. Also, we will choose Tokyo as the travel location on our prototype search page.

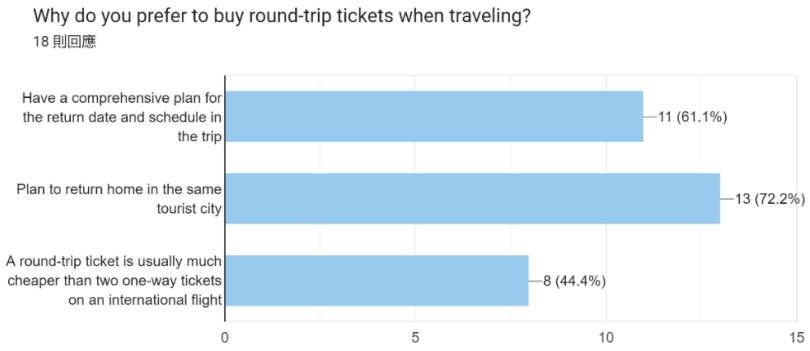
Search page

- We need to determine which flight type ticket the user will choose in our prototype



In our prototype, users can choose from three types of flight tickets, including one-way, round-trip, and multi-city. In our survey, 60% opted for a round trip (18 people). Both “Multi-city” and “One way” are 20% (6 people). Therefore, in our prototype, we would select a round trip during the flight booking process.

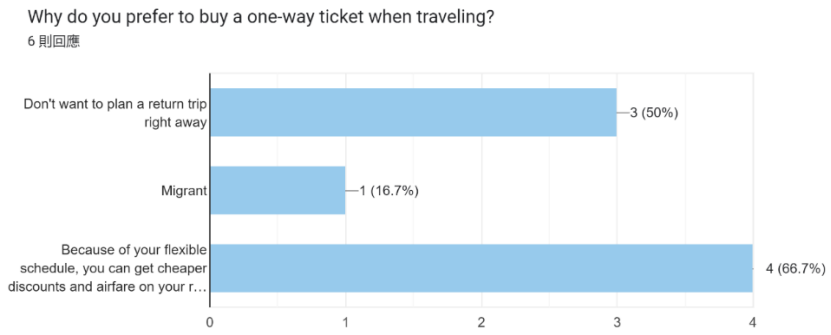
- ✧ Reasons why people choose round-trip tickets



The main reason was that people were planning to go home to the same tourist city, with 13 (72.2%) choosing this option. It is convenient for people who go back

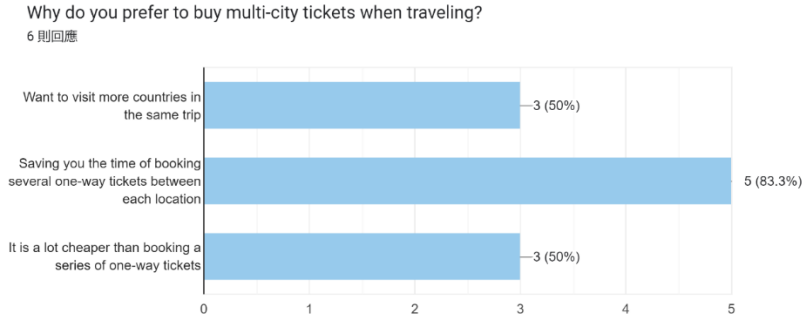
to the same city to not need to buy two one-way tickets. The second reason was that people were likely to have a comprehensive plan for the return date and schedule in their travels, with 11 (61.1%) choosing this option. The third reason was the perception that a round-trip ticket is generally much cheaper than two one-way tickets on an international flight, with 8 (44.4%) choosing this option.

✧ Reasons why people choose one-way tickets



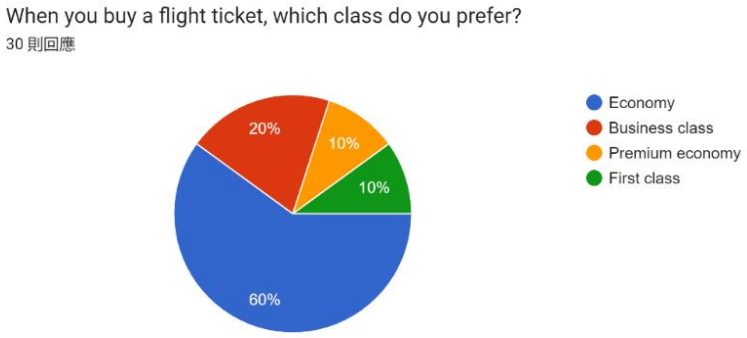
The main reason was that people could get cheaper discounts and airfare on return flights based on flexible schedules, which 4 people (66.7%) chose. When users have flexible schedules, they can buy tickets when they want to go home. So, they can choose some discounted dates instead of weekends and get cheaper discounts. The second reason was that people did not want to plan a return trip right away, which 3 (50%) chose. The third reason was people migrating, with 8 (44.4%) choosing this option.

✧ Reasons why people choose multi-city tickets



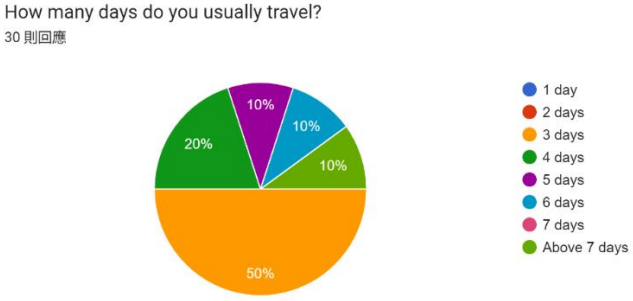
The main reason was that people could save time booking multiple one-way tickets between each location, an option chosen by 5 people (83.3%). It can reduce repeated steps for users to book flights and pay. Another reason is that people want to visit more countries on the same trip, and it is a lot cheaper than booking a series of one-way tickets, with 3 (50%) of both choosing these options.

- We need to determine which class of flight ticket the user will choose in our prototype



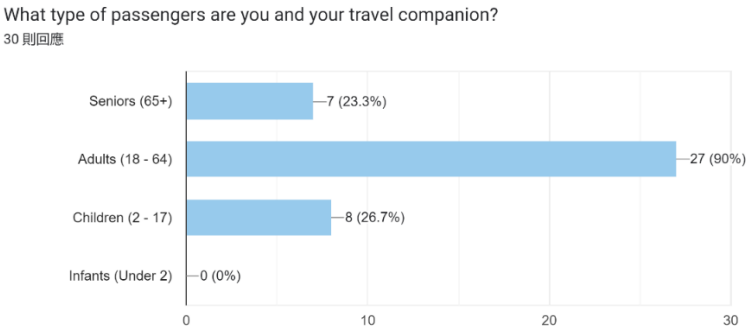
When the user selects the flight class, 4 classes are available in our prototype including Economy, Premium Economy, Business and First Class. Most believe that when they buy a ticket, they would prefer to buy economy class, with 60% believing it is the best cabin. The other 40% choose another flight class. Therefore, we will book the economy class in our flight booking prototype.

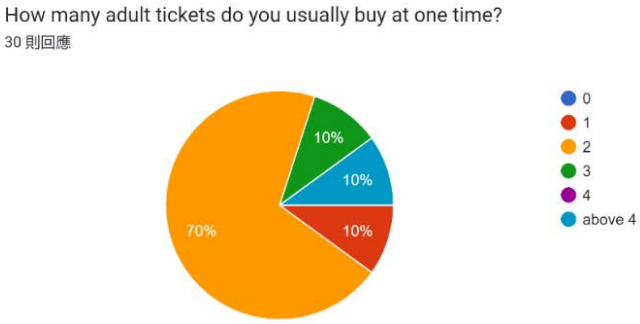
- We need to determine the user's total travel days, which are used to select the depart and return dates for the ticket.



We chose 3 days in our prototype because 50% of people thought 3 days was their usual travel time.

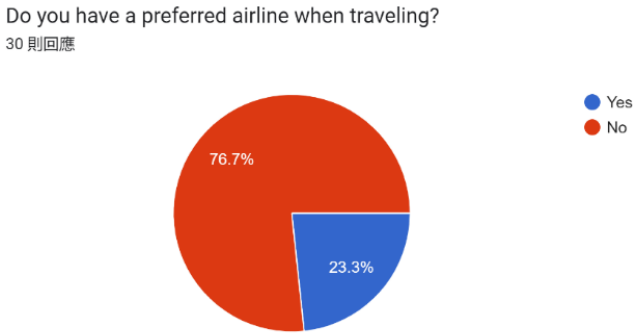
- We need to determine the type and number of passengers who booked the ticket





In our survey, 27 people (90%) travelled with adults. Also, 70% will buy 2 adult tickets. So, what we opted for is to buy 2 adult tickets in our prototype.

- We need to determine if the user will have a preferred airline when booking a flight



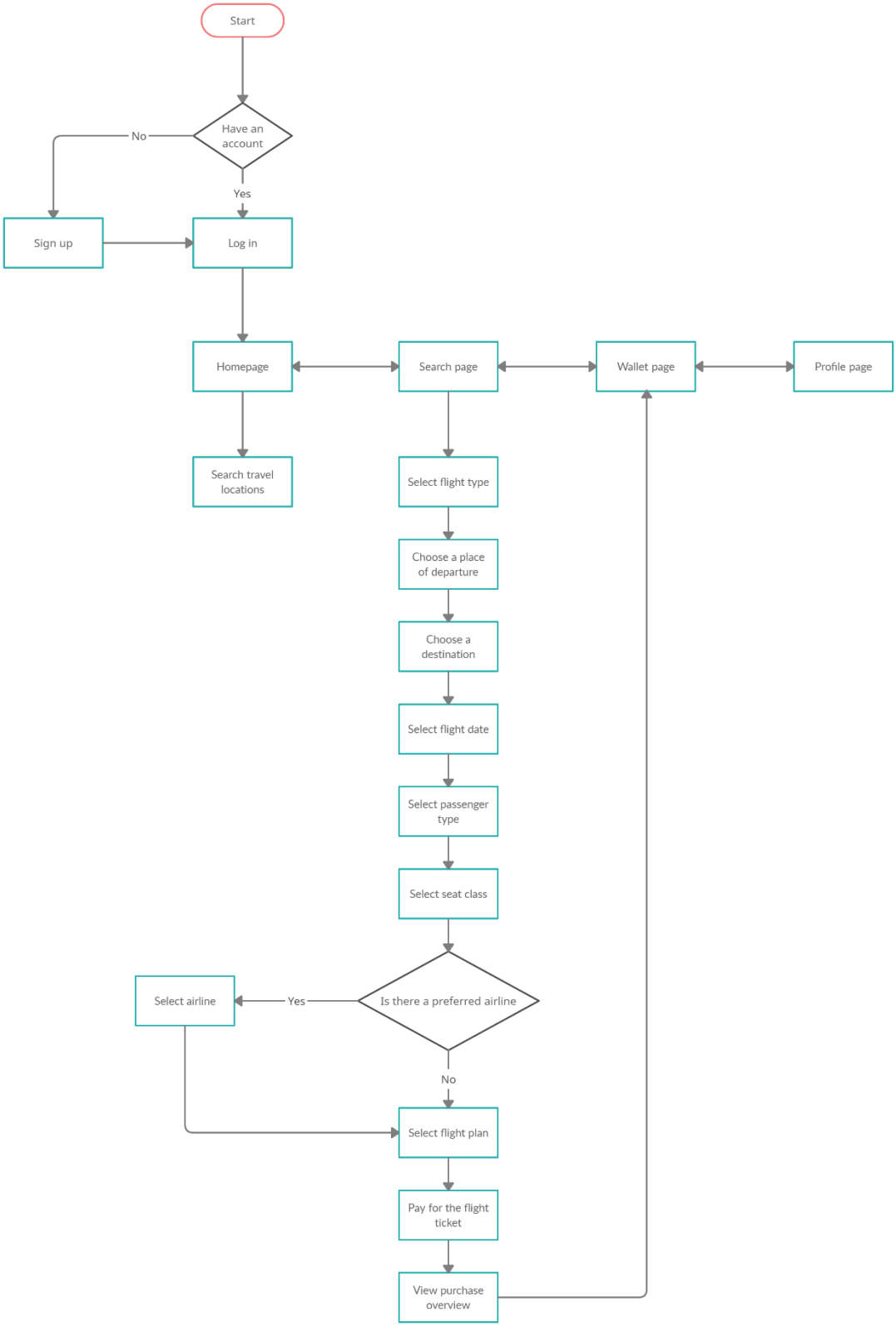
Since approximately 75% of people believe they do not have a preferred airline when traveling, we made the "Any airline" option at the top of the preferred airline options drop-down list as the user's default choice.

Prototype details

Software used, Source of data

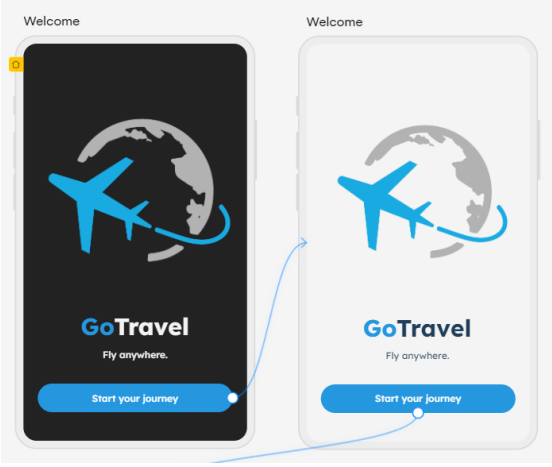
The software we use to develop high-fidelity prototypes is “Uizard”. It is a web app and we can develop the prototype directly in the browser. The limitation of Uizard is that it only supports very few interactions compared to Axure RP. We tried to build data validation for the login and registration process on the prototype, but Uizard only supports "open link" interaction. Therefore, we can only design login and registration pages on the prototype without data validation. Since the software we are using is not Axure RP, we will demonstrate our prototype in a video.

Flow charts of the prototype or mockup (User Flowchart)



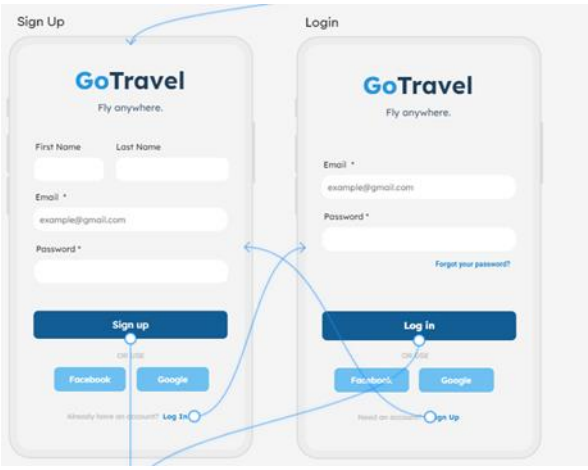
Sample results with explanation

Welcome page



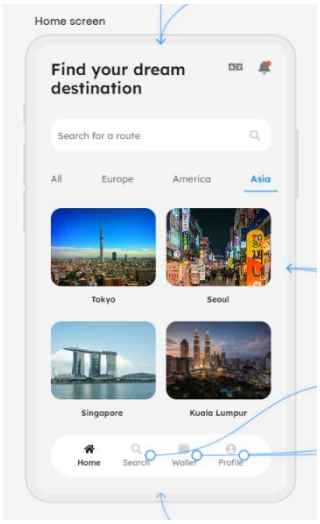
The first page of our prototype is the welcome page. There are two versions of the welcome page, using black and white contrasting colors. The black version of the welcome page can reduce the screen brightness when the user opens the program to prevent the eyes from being damaged by the bright light. The welcome page contains the app's logo and name (GoTravel). When users click the "Start your journey" button on the white welcome page, they will be taken to the registration page.

Registration and login pages



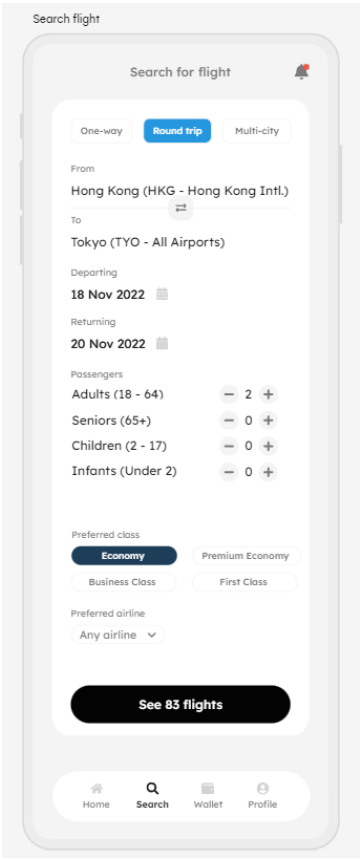
The name of the application is displayed at the very top of the registration and login pages. Users can sign up or log in using their email or third-party apps like Facebook or Google. If the user already has an account, they can click "Log In" in the text at the bottom of the registration page to jump to the login page to log in. There is an email format in the email field for user reference. If a user has forgotten their password, they can click "Forgot your password?" on the login page for further assistance. Fields marked with *, such as email address and password, are required to be filled in.

Homepage



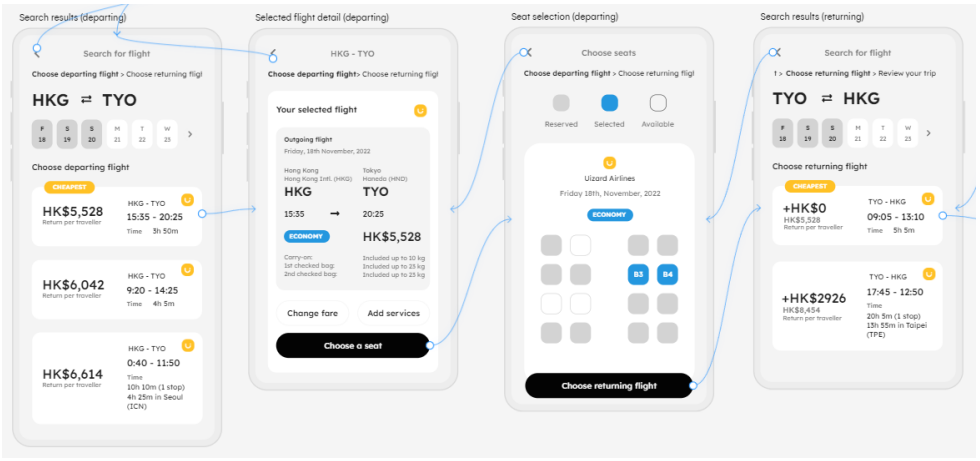
The user will be redirected to the home page after logging in or registering. Users can view and consider different travel locations by continent or type directly into the search bar. After the user clicks on a picture of a tourist location, the application will display a description of the location. However, we did not demonstrate this interaction in the prototype because it is not the main application of our flight booking app. In the upper right corner of the home page, there is a "Language" button and "Notifications" button for users to change the interface language and view the latest announcements of the application. At the bottom of the home page, there is a navigation bar for users to go to different pages.

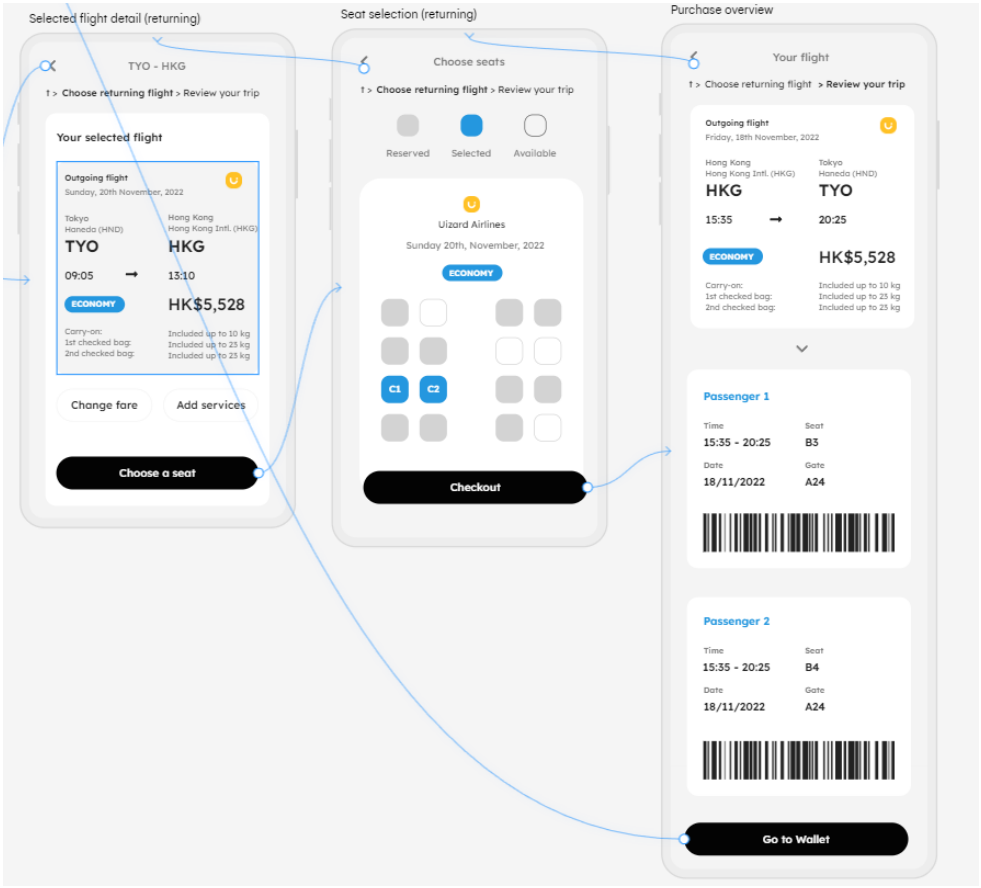
Search page



If a user clicks "Search" in the navigation bar, they will be taken to that page to book a flight. There is a title and a "Notification" button at the top. There is a navigation bar at the bottom for users to go to different pages. Users need to select flight type, departure location, destination, flight date, passenger type, flight class and airline to book a flight. After the user enters the information, they will see the number of flights that meet their needs at the bottom of the interface. Click the "See flights" button to view the flight details.

Flight booking process

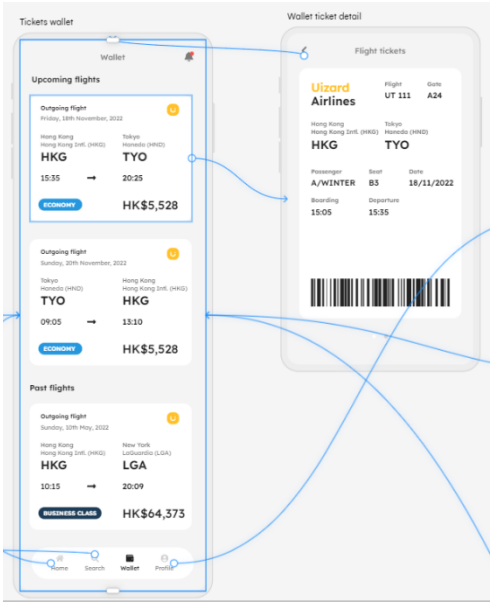




Users can view and select flight plan that matches their needs. There is a progress bar at the top for users to see what stage they are in. Selected dates will be greyed out. Also, use abbreviations for location names for a cleaner interface. In the upper left corner of each flight booking page, there is a "Back" button that allows the user to return to the previous page. After the user selects a flight, they will be redirected to

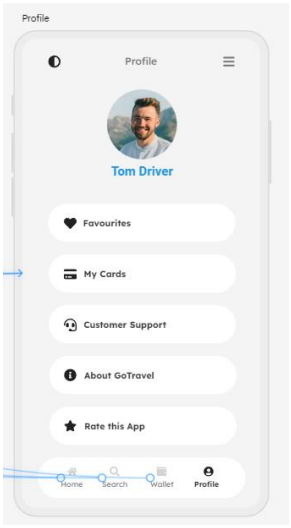
the flight details page to view more flight details or add services. Then they can choose the flight seat. After selecting a seat, the user can check out. Since the checkout process is not the main function of the app, we did not demonstrate it in our prototype. After the user purchases, jump to the purchase overview page. The user can view the barcode and flight information of the purchased ticket on this page. After booking the ticket, the user can click the "Go to Wallet" button at the bottom of the interface to jump to the wallet page.

Wallet Page



The wallet page displays the flights purchased by the user. The interface displays upcoming and past flights from top to bottom. When users click on a flight, they can see more details about that flight on another page. On the ticket details page, users can see the ticket barcode, boarding gate, seat number and other flight details.

Profile page



In the upper left corner, there is a "Mode" button that allows the user to switch to dark or light mode. In the upper right corner, there is a "Settings" button where the user can change the language and currency of the app. In the center, users can view and change their icons and names. This page has some custom features for the app, such as "Favorites" and "My Cards". Users can also view more details about the app, rate the app and get help from customer service.

Conclusion

Through this project, we learned more about the process of flight booking and stages such as user evaluation and principles of UI design. Hopefully, we can travel anywhere without masks as soon as possible.

Reference

1. Expedia: https://www.expedia.com.hk/en/
2. Cathay Pacific: https://www.cathaypacific.com/cx/en_BE.html

Appendix

Difficulties

We have difficulty thinking and using principles in prototypes because we need to consider both functionality and design layout. Also, we need to determine what content should consider the user's perspective when prototyping. It is important that we have a clear idea of UI design after finishing the project.