Flight booking system

Product Description:

The new system will give an optional GUI that allows the user to select what countries they want to fly to and from. When the user selects a destination, the system will give relevant information on the countries mimicking a travel agency experience. Alongside this, due to the current climate COVID-19 has created, the system will also give the users relevant COVID-19 information about the flight and the destination. The extra information should allow users to feel confident and safe when choosing a flight. The target demographic is for anyone interested in travelling e.g., for business use or families going on holidays.

Once a user has booked their flight, a booking confirmation email is sent, and they will be able to opt into receiving notifications on any updates that may occur to their booking e.g., delays. The new system will keep a real-time check of when flights can no longer be booked. Users may want to adjust their booking to accommodate a change in their schedule; however, the flight they wish to change to may already be booked. This new system will allow users to express interest in flights that are currently fully booked, so if there is a cancellation, the flight is available on the website and users that have expressed interest in the flight can be notified of the availability.

The system will also give users the option to make travel arrangements to and from the airport when they have booked their flight via the website, the aim of this is to cut down the hassle for users that prefer to organise these aspects of their trip together. We will be able to accept a large variety of payment methods including Cryptocurrency to be able to enhance user satisfaction.

Qualitative and Quantitative analysis:

Quantitative

To gather results that we could use to further develop our system we decided to make a questionnaire of quantitative questions. The use of quantitative questions means we could gather quick information on what is most important to most users. Quantitative questions such as "How important is an airline's COVID-19 policy to you" allows us to understand if we should advertise if there are obvious distinctions between how specific airline chains handle their COVID-19 response.

To get a good sample of data for our questionnaire we all shared the questionnaire around a variety of different age groups trying to get input data from as many different demographics as possible. This is important as it allows us to get a good representation of people that will be buying flights at different ages and for different purposes and allows us to understand our different demographics wants and needs better.

While asking our questionnaire we tried to keep our questions as unbiased as possible. We avoided using too negative or too positive words as we did not want to sway the participants opinion in a specific way. We needed to make sure that all the participants could understand the questions, so we pilot tested all our questions and adjusted them to fit our criteria.

The main benefit of collecting quantitative data is that due to the question being closed-ended we can collect a larger amount of data and analyse the data easier from a variety of different stakeholders quicker than open ended questions. However, the problem of quantitative data is that it isn't in depth, so it is hard to establish how certain questions make a respondent feel.

Qualitative

For our system, we wanted to establish what are the most important features to a user when using a flight booking system, trying to establish what makes users feel satisfied and what features that users want to see improvement in. To gather this information, we conducted qualitative interviews with users to gather more detailed opinions on aspects of our system. These interviews provided us to explain users' opinions in a great amount of detail allowing them to elaborate on their answers, something that cannot be ascertained from a quantitative question alone.

An example of this was asking users the question "How do you decide what destination you are travelling to?". This question allows the user to formulate more complex opinions and answers which we can then use to shape how our system functions.

The use of qualitative questions allowed the participants to describe their thoughts in more detail and therefore allows us to make more detailed changes on how our system can work. Participants are not restricted by multiple choice answers and are more likely to think about their answer before submitting it which means that we as the researchers, can analyse their responses. Our question of "What features do you find most useful when booking a flight on a website?" allowed participants to shape our system on what we should prioritise in advertising on our home screen.

The benefit of using qualitative questions is that respondents can provide us with an unlimited number of answers and potentially find answers that were not anticipated. However, a major drawback of qualitative information is that the answers respondents give can be a varying level of detail and sometimes even irrelevant. Causing more time needed to be taken to conduct these questions and analyse the data.

Quantitative survey question analysis

The flight booking system needs to have the ability to accommodate to all age demographics. So, we need to gather information to establish who the demographic is exactly and based on that we can make necessary changes to our system to feed their needs i.e., for a more elderly user a simpler page layout may be more appealing. It is also important to gather information to establish why the user is traveling for the same reasons i.e., for a user planning a family trip we can offer additional family packages at a discount if that is something that would entice them to book a flight. Overall allowing us to design the interface to be more appealing and relevant to the user. The following question provide us with this information:

How old are you?

- Under 18
- 18-29
- 30-39
- 40-49
- 50-59
- 60+

What are your reasons for travelling?

- Family Vacation
- Business
- Personal Leisure Trip
- If other, please specify
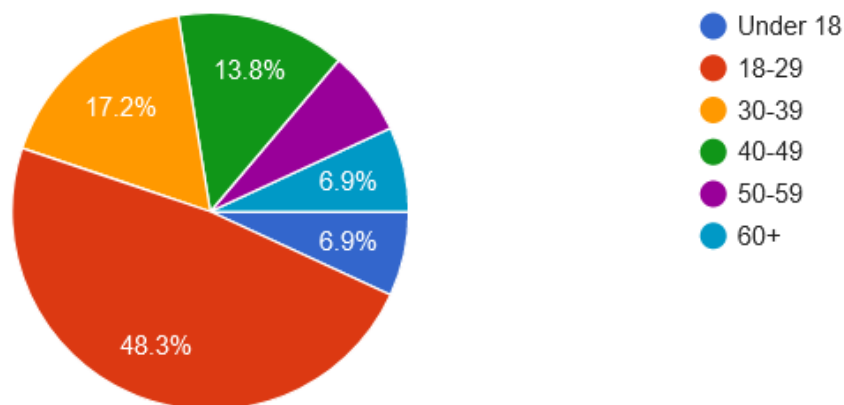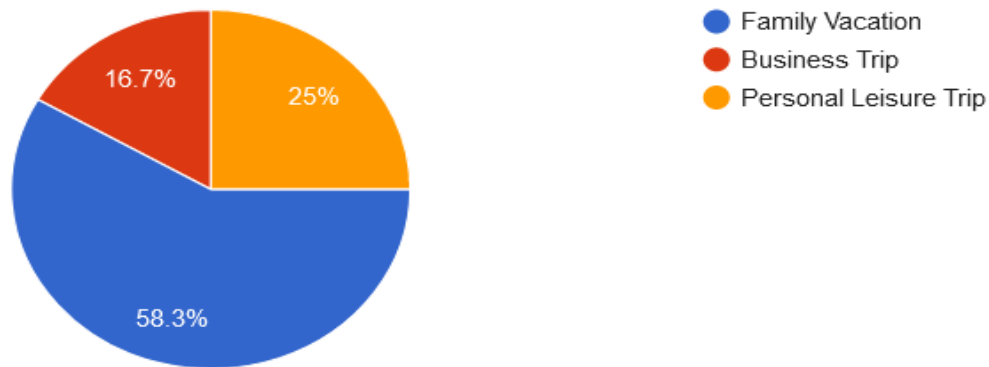
Chart showing age range of participants

Chart showing how people responded for the reasons they travelled

- Family Vacation
- Business Trip
- Personal Leisure Trip

16.7%

25%

58.3%

From conducting our questionnaire, we have found that over 75% of participants fall between the 18-49 age range with vacations being the primary reason for traveling. This means that our new system should keep this demographic in mind when implementing our system, so it is suitable to their needs. From our analysis we can also determine that majority of the time the users travel for leisure. The new system will aim to reflect this by providing the user with relevant information to the country they have chosen to travel to such as popular tourism destinations for users in the 18-49 age range.

Regarding "the new system to be able to accept cryptocurrency as a payment for flight tickets" it is important to establish the kinds of payment options our users prefer. A quantitative question addressing this could be:

What method of payment would you most likely use if available when purchasing flight tickets online, please select all that apply?

- Credit Cards
- Debit Cards
- PayPal
- Google pay/ Apple pay/ any other mobile payment system
- Crypto Currencies (e.g. Bitcoin, dogecoin)
- If other, please specify

Chart showing users preferred payment methods

From carrying out our survey method we found that most users prefer to use the traditional payment methods of Credit and Debit cards (27.8% and 38.9% of returns respectively) when booking a flight. However, we can see that there is a demand calling for the implementation of other methods with PayPal mobile payment systems and crypto currencies getting a combined total 33.3% responses. From this we can see that it is relevant for our new system to provide these alternative methods to increase the user satisfaction and experience.

Regarding "The system will also allow users to pre book taxis to and from the airport via the website" We need to find out what kind of transportation the user is likely to use when going to the airport on the day of the flight. It is also important to identify if they are to likely organise their travel information in advance, if so, how early in advance. This is so we can establish what links we can add to our system to allow the user to prebook there travel arrangements. Two quantitative question allowing us to gather the necessary information could be:

What method of transportation are you likely to use to travel to the airport?

- Car/personal vehicle
- Public Transport
- Taxi
- Uber/Lyft/Curb/Flywheel or any other ride hauling services
- If Other, please specify

When would you organise your travel arrangements to the airport relative to the time of the flight?

- Same day as booking
- More than 3 months prior
- 1-3 months prior
- Less than 1 month prior
- Same day as flight
- If Other, please specify

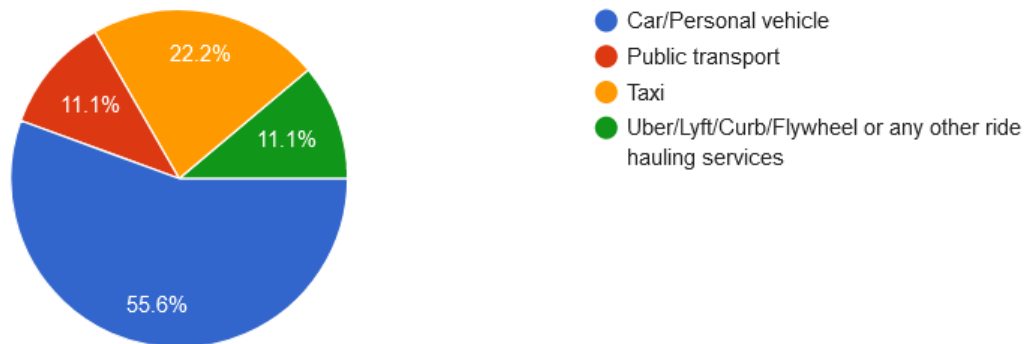Chart showing preferred methods of transportation to and from the airport

- ● Car/Personal vehicle
- ● Public transport
- ● Taxi
- ● Uber/Lyft/Curb/Flywheel or any other ride hauling services

22.2%

11.1%

11.1%

55.6%

Chart showing the distribution of when respondents organise their travel arrangements relative to the flight

- ● Same day as booking
- ● More than 3 months prior
- ● 1-3 months prior
- ● Less than 1 month prior
- ● Same day as flight

42.9%

14.3%

7.1%

28.6%
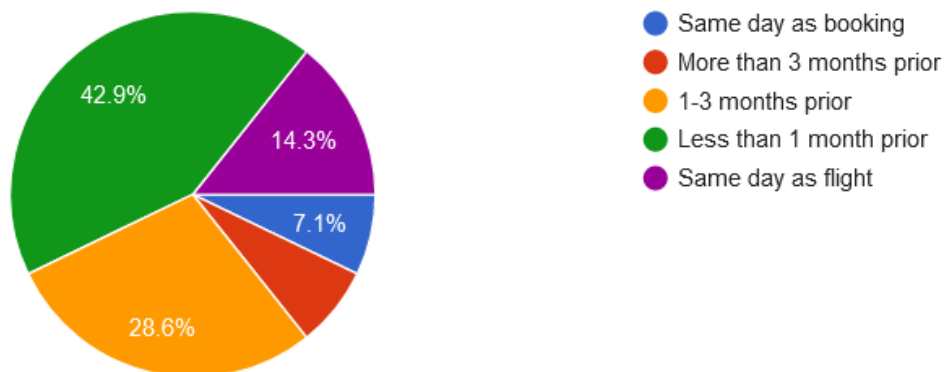
From the data collected we can see that only 33.3% of customers used a taxi service or a ride hauling service implying there could potentially be a demand for a pre booking travel arrangements in our system. However, among closer inspection only 7.1% of participants stated that they arrange their travel arrangements the same day as the booking of the flight. Factoring this in the evidence suggests that this should not be a priority when implementing features into our new system as it only helps a very small amount of our user base.

In our product description we state we want a "basic graphical user interface" so it can be navigational to anyone regardless of age. However, we may be able to implement more features if we know how important it is for it to be simple, for example, we could take the user to different hyper linked web pages than previously expected, spreading the information so it does not become overwhelming for the user. We asked the following questions:

How important is a simple website layout?

- o 1, Not very important
- o 2
- o 3
- o 4 Very important

How easy do you normally find your experience of booking a flight?

- • 1, Very Difficult
- • 2,
- • 3
- • 4, Very Easy

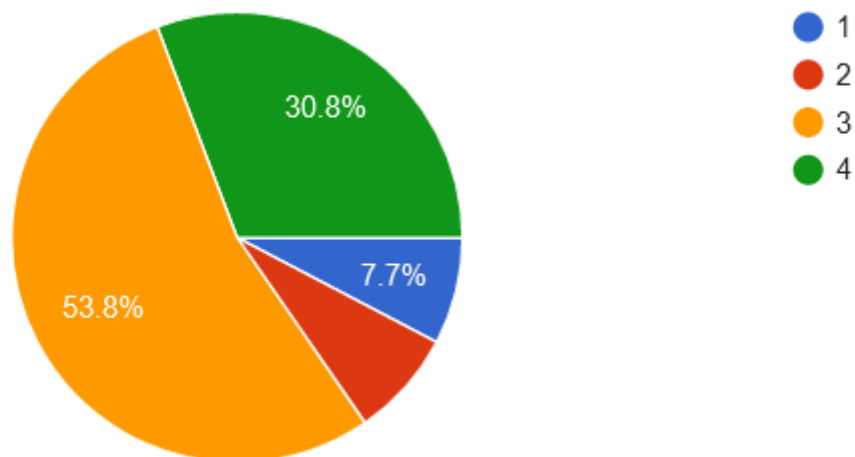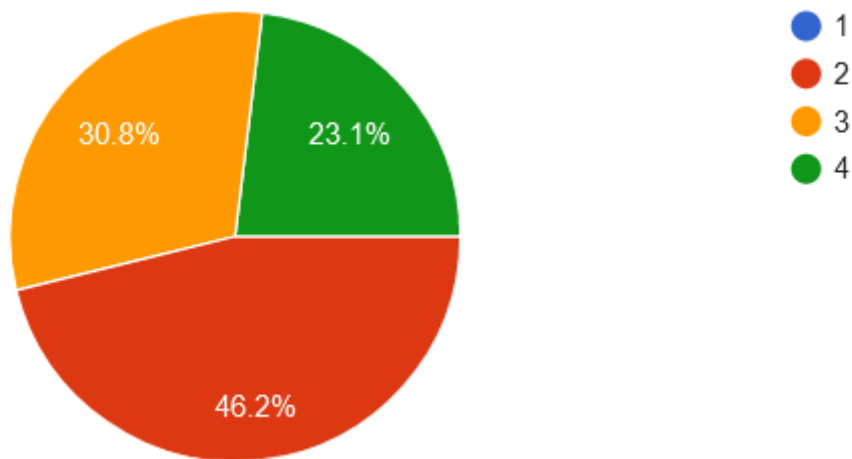Chart showing the results of how important respondent believed a simple website layout is.

Analysing these results, we can see that over 80% of respondents find the need of having a simple website layout being important to them, with them currently feeling that the current already established systems are easy to use. This is a good indication to us on how we should design are the layout of our new system, so it is still familiar to the average system. Also, this means when we develop new features for our system the number one factor, we should always consider is keeping the layout of the system simple and easy to use.

Some people may struggle to navigate websites, so having multiple ways to navigate and select your destination may appeal to some. However, if there is not enough interest then there is no point in us implementing it into our system, so the following is a very important question to ask:

Would you like to select your destination of travel from clicking on a world map as an additional alternative to just searching for it. On a scale of 1 to 4 how interested would you be if this were implemented?

- o   1, Not interested
- o   2
- o   3
- o   4 Extremely interested

Chart showing how interest respondents are in an alternative location search system

- 1
- 2
- 3
- 4

35.7%

7.1%

35.7%

21.4%
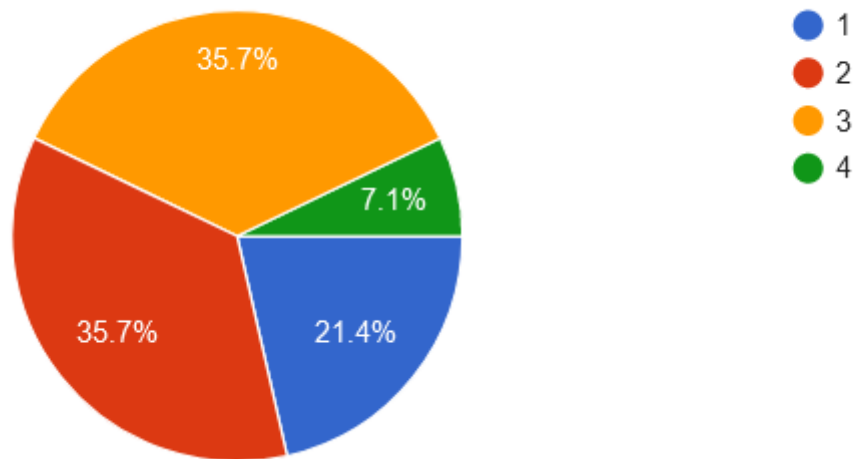
Looking at the data from the following questions we see that there is an interest in users wanting to use a different location search system. We will implement this feature according to these results however we have to be mindful of how users have stressed the importance of keeping the system simple. So if we were to carry out the implementation of this feature in our system , we would need to test it continuously to ensure it falls within our criteria of being simple and easy to use.

COVID-19 has become an important part in life for everyone and the control and fear of COVID-19 has also become an important part in life. Knowing how people respond to COVID-19 means that we cater to our users' needs more if most of them are COVID-19 wary or not. We can ask the following questions:
How important is an airlines COVID-19 policy to you when choosing an airline for your flight on a scale from 1-4, 1 being the least important whilst 4 being the most important?

- 1
- 2
- 3
- 4

How important is a countries current COVID-19 policy when choosing a location to travel to, 1 being the least important whilst 4 being the most important?

- 1
- 2
- 3
- 4

Chart showing how important respondents feel COVID-19 policies airlines have are.
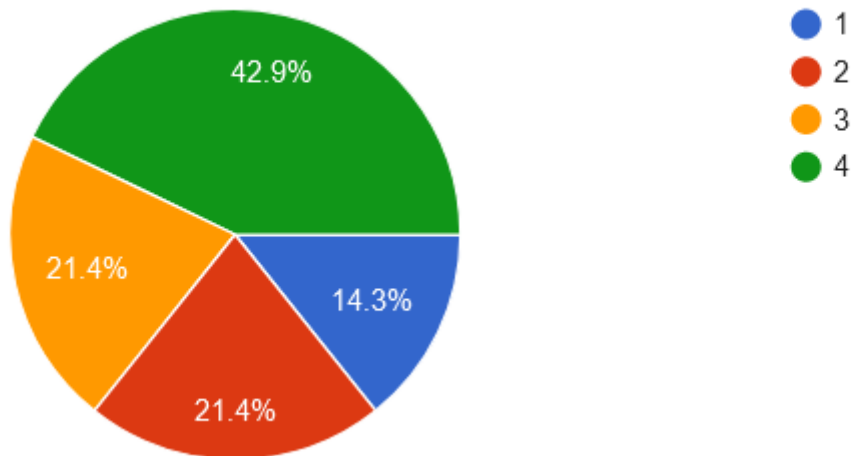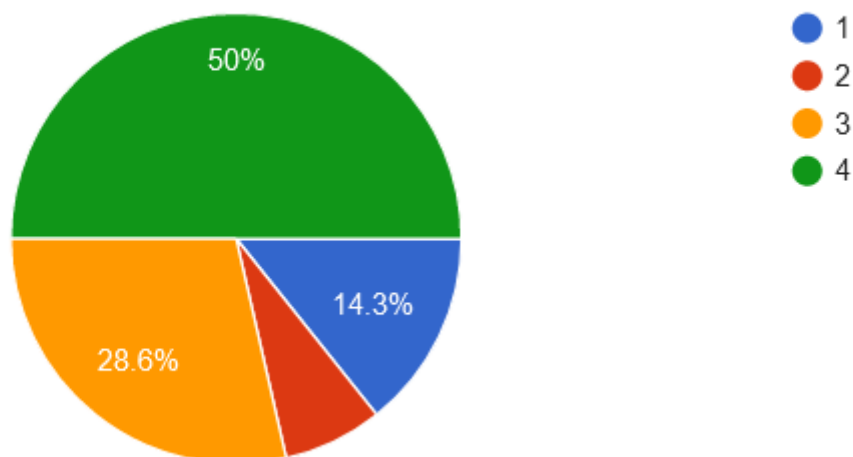

Legend:
- 1 (blue)
- 2 (red)
- 3 (orange)
- 4 (green)

42.9%
21.4%
14.3%
21.4%

Chart showing how important respondents feel COVID-19 polices countries have are.

Legend:
- 1 (blue)
- 2 (red)
- 3 (orange)
- 4 (green)

50%
28.6%
14.3%

From this data we can see that COVID-19 19 is a huge part of peoples concern while flying, people want to feel safe while flying and it shows in the data with 42% putting it as being a huge factor when choosing just an airline to fly to and 50% for choosing a country. Therefore, we should blatantly advertise safer to go to countries due to their control and stance on COVID-19 19. We should also add in the description of each flight how they tackle the issue of spreading COVID-19 on board so customers can make an informed decision of if they want to fly on that airline due to how they handle COVID-19.

<u>Qualitative Interview Questions analysis</u>

<u>What the most important factor when booking a flight?</u>

This question allows us to understand what our target demographic wants when they go to either a travel agent or onto a flight booking website and therefore, we can add features or advertise that we have this feature more prominently on the home screen to keep customer engagement and satisfaction up. A lot of interviewees responses saying that COVID-19 safety is an important part of booking flights therefore flights giving their COVID-19 safety requirements and how they can protect the passengers is something that we are going to advertise in the first few lines of each flight company.

A large majority of interviewees also complained that getting to the hotel from the airport is always a hassle and therefore we will advertise car rental and taxi services alongside the plane ticket which can be added to the user's overall price. This will cut down on a lot of the mental strain that people get when they are flying to and from places as it is one less thing to worry about.

<u>Do you have any concerns about booking flights online?</u>

By asking this we can determine if there are any trust issues between flight booking websites and the stakeholders interested in purchasing tickets and therefore, we can try and ensure that our users feel safe while using our system. While a lot of the interviewees gave responses saying that they had no concerns, there was 20% that replied they had concerns of scams and credit card details being stolen. To calm queries of credit card details being stolen we will use AES-256 encryption to keep personal details safe, but we will also advertise this broadly on our website. By clearly advertising this, users will trust this website over others and use ours as a result.

<u>Why choose online booking over travel agents?</u>

We asked this because it allows us to know why our target market would pick us on the computer compared to traditional face to face meetings with workers at travel agents. It is important to understand this as the more we can understand our target demographic the more we can specifically market and advertise to them. A large majority (90%) of interviewees mentioned something about it being easier to book online from the comfort of your own home, therefore we have decided to go with a very simplified GUI as this allows more users to feel less overwhelmed as they do not get lots of information thrown at them at once.

<u>How do you decide what destination you are travelling to?</u>

By asking this question, we can determine whether our customers are travelling abroad for further business or working purposes, or for other factors such as entertainment and personal pleasures, by collecting such data we are able to prioritise people who fly out abroad for working purposes over stakeholders who are flying over specifically for leisure and entertainment purposes. As it would be unfair for stakeholders who need to fly out for business purposes as that cannot be postponed compared with stakeholders who can fly out anytime for purposes like entertainment and leisure.

By asking such through a questionnaire, our results shown that majority of people travel at first for entertainment purposes but in the end tend to travel back to the same country for work purposes, whereas majority of younger aged people between the age of 18-20 would only travel for Entertainment purpose or if they were studying a year abroad at University.

Written Requirements:

Functional Requirements:

1. A user must be able to book their flight using their name, address, email address, and phone number.
2. The user must be able to create an account with an email address or phone number and password to store their name, age, address, and card information (if they want that saved).
3. The user passwords must be hashed and encrypted so they can be stored in the database.
4. All personal information must be encrypted using the Advanced Encryption Standard (AES-256) encryption.
5. The system must be able to rectify and adjust any personal details if the user needs to change any information.
6. The system must comply with all GDPR regulation to protect and secure users' personal information.
7. A user must be able to have the option to make payment with a form of payment card from the four major card distributors; American Express (Amex), Discover, Mastercard, and Visa.
8. A user must be able to make payment via Paypal must be able to securely login to their account and proceed to payment.
9. A user must be able to make payment via the 4 current major crypto currencies; Bitcoin, Ethereum, Litecoin and Bitcoin Cash must be able to login into their Crypto Wallet securely and proceed to payment.
10. The user must be able to have the ability of selecting a destination and time they want to book.
11. The system must provide the user with an alternative search method using a graphical interface if the user wants the choose the location by clicking on a map
12. The system must show the user what flights are available and show the cost of the flight, airline, the class of ticket (economy, premium economy, business, and first) how long the flight is, covid-19 policies of the airline, and whether the ticket is for an adult or a child.
13. The user should also have the option to see If there was a flight that was fully booked that the user may have interest in and give them the ability to opt into a notification system that will send a notification out to the user if there are spaces available
14. The user should also be able to opt into receiving information of any updates to the flight.
15. The system must be able to automatically log the user out if the user is inactive for 10 mins.

Non-Functional Requirements

1. The booking system must be able to deal with 150 million bookings from users a year.
2. The booking system should be able to load within 10 seconds
3. The user should be able to check their past bookings using the system of up to 5 years back.

<u>Extra detail on certain requirements.</u>

Our Flight Booking will have a very flexible range of payment methods to choose from. Visa and Mastercard credit/debit cards, PayPal, Google, and Apple Pay are all common methods of payment we will be able to accept. We will also accept Bitcoin, Ethereum, Litecoin and Bitcoin cash as cryptocurrency payment. Our flight booking system will be able to ensure that the payment methods above will be accepted with the currency conversion rates will be provided on a real-time basis so that we can also accept the 8 major currencies which will be Canadian Dollar, US Dollar, British Pound, Swiss franc, New Zealand dollar, Australian Dollar, Japanese Yen making a payment for people in different countries easier as well as this saves them having to exchange their national currency into GBP.

Our flight booking system will be using a strict payment verification method to counter fraudsters, identity thefts and any other criminal activity which is occurring on a wider range of websites and companies to this date. This will help the customer to ensure that their payment will remain safe and secure and that none of the details they enter will be used against them or without their permission. This payment verification method will be done through

Another feature when it comes to making a payment is that we will provide an easy to navigate process in making the payment, so the customer is fully aware of the final costs and the product and service they have chosen to purchase from. We will also send them multiple confirmations through their preferred contact methods, this can be done through Text messages, phone call, email, paper or even can be managed through the account which they had created with us. This ensures the validity of the product they purchased is legit and that the customer should be left satisfied with their purchase.

This will ensure that when it comes to the flight, there should not be any problems as there are multiple confirmations to prove that this purchase was valid and that the product they use belongs to the right customer and does not get lost in transaction or given to the wrong customer. This means that the customer will be able to verify the purchase through more than one method so there are multiple back-ups of the purchase confirmation in case there is ever an issue where one of the confirmation methods gets deleted or lost.

This allows the customer to be less worried about losing the confirmation when it comes to their flight then not being able to get onto that flight because they had lost the confirmation. We will always allow customers to receive more than one confirmation of the product they had purchased from us meaning that they will always have access to a back-up and if all of these are lost then their account will always have that product in their orders which will never be able to be lost. But as this requires internet, there can be times in an airport where internet is not available so it is always good to have this confirmation saved so that the customer can access this without worry.

Our final feature of the payment system is that we will be able to let customers choose whether they want to save their payment details on their account or remove them as this will allow them to make an easier payment the next time, they choose to order from us. This will help make the transaction on the customer easier and less stress the next time they choose to order a flight from us and when a user is to save their details, again we will ensure that these details are not accessible to anyone but the owner meaning that security on these details will be really tight and sat behind a bunch of firewalls, anti-viruses and encryption techniques to ensure that these details cannot llbe obtained illegally or without the owner's permission.

Within our flight booking system, when it comes to a flight being cancelled, we will always have real time updates on this to ensure that the user is aware of this as soon as a flight is announced of it being cancelled, we will always ensure that the user is made aware of the cancellation of the flight within 24 hours of the flight being cancelled and we will always ensure that we have a valid and verified way to contact the customer through 2 different contact methods in which when a flight is cancelled, we will send this to the user through both of these methods and through a valid text message to ensure the user that the cancellation is legit and not a scam message we will also ensure the user that their purchase they made will be refunded to them as soon as possible and will ensure to get this refund in process within 24 hours of the user being notified of the cancellation.

We will always ensure that within the cancellation of the flight, we will give the user an opportunity to rebook a flight with us or to get all their money back and we will give them options on what they would like to receive from us for a reimbursement of inconvenience caused. We will always ensure that the customer has options to choose from the cancellation in which they would like to proceed with instead of us choosing for them as there may be times where a cancellation happens, and the customer would like to rebook another flight with us instead of receiving the payment back and having to make the payment again to rebook another flight when we could make the booking of another flight easier on them by transferring them over to another flight.
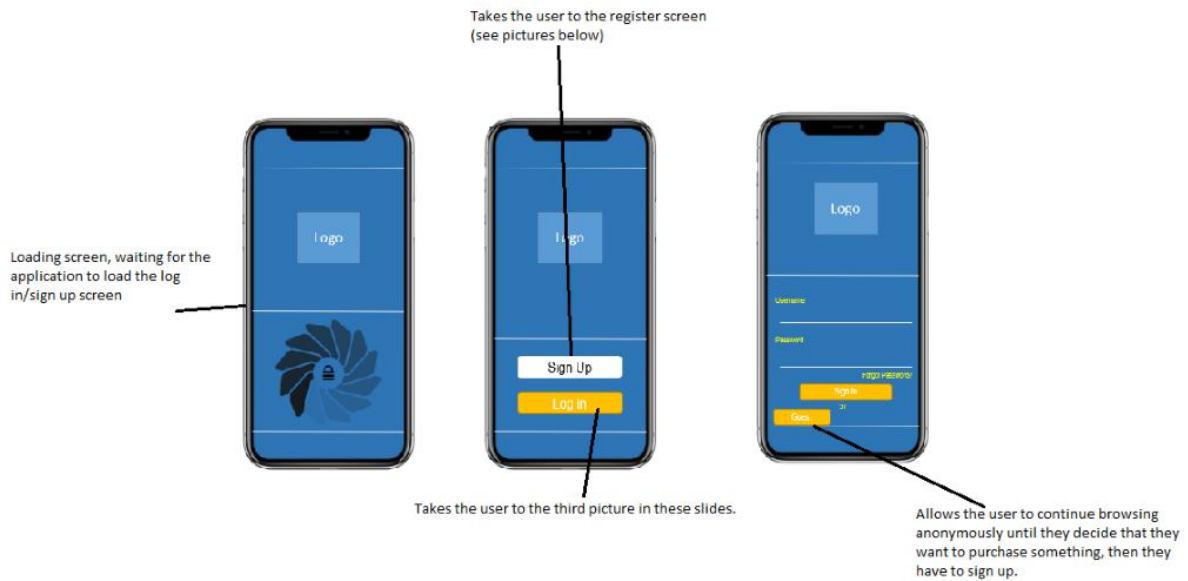
Our ways of notifying the customer would be through many different methods, this would be through their account on our website, text message, phone call, email, and we will even have an application for our booking system available for mobile devices on IOS and Android operating system which will also send them a notification to their phone to notify the user of changes to their account or product they had purchased with us.

When it comes to our system, we will allow users to add multiple products to their watch list which this will allow for the user to keep an eye on multiple different flights with us and whenever a flight is cancelled we will let the user know about the items they had on their watchlist and give them the opportunity to book one of those items. With the watchlist we will also let the user be aware of the products they are viewing or selling out or being a high demanding purchase meaning that if they want to secure a flight, they may need to act quickly. Methods of notifying the user will be done through many different contact methods in which the customer prefers to be contacted through. This will be done through real time updates as well as the cancellations so that we ensure the customers are aware of any problems within any of the flights they have purchased or are willing to purchase.

Sketches and Prototypes:

For our system we have adopted a very simplistic design and layout of the GUI (graphical user interface) as our research from our questionnaire showed that a vast majority of participants complained about how other travel websites over complicated their design to "make the destinations seem more appealing" despite 90% of all participants in our questionnaire saying they already knew their desired destination of travel.
Log in

Takes the user to the register screen (see pictures below)

Loading screen, waiting for the application to load the log in/sign up screen

Takes the user to the third picture in these slides.

Allows the user to continue browsing anonymously until they decide that they want to purchase something, then they have to sign up.

Pressing the sign in button brings up this window where users are prompted to either login (which brings the third screen with the login boxes) or signup (which brings up a whole new window asking the user to make a new account). We have decided that to login users have the options of face ID, touch ID, or regular login text boxes. The login options are dependent on the user's device. If the user decides to click on login/signup but then changes their mind we have the "Continue as guest" button which takes the user back to the home screen and they can browse anonymously like before.
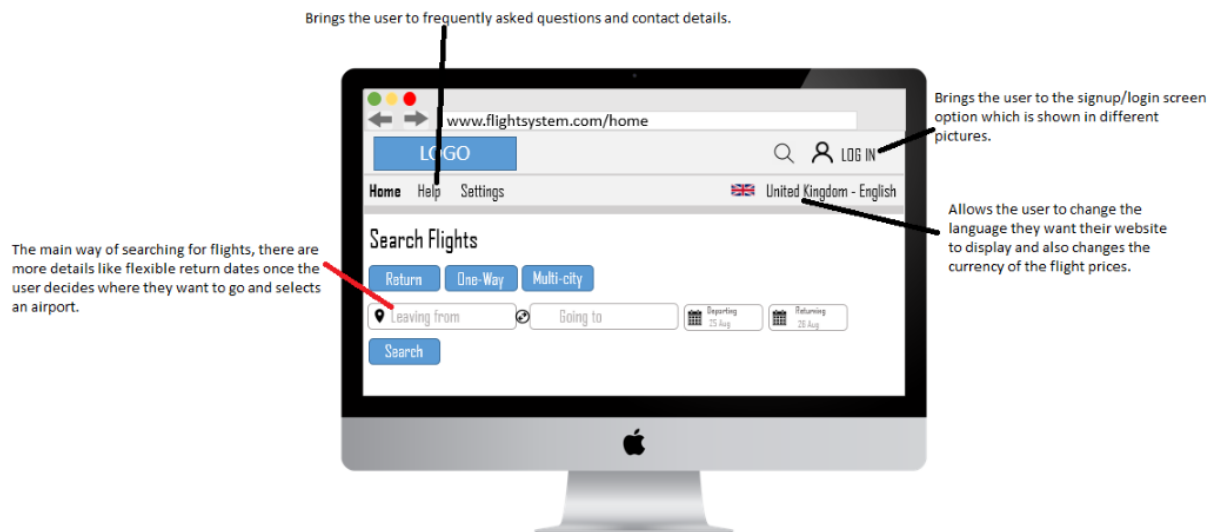
Sign up

Allows the user to make their account. This is not needed to browse the flights but is required to book flights. The user is prompted to go on this screen once they checkout OR they hit login/signup at the top of the web page

Any sensitive data will be saved and encrypted to keep security in the system. Sign up/log in screens are needed for every website/system, users will be able to log in to their account and see their details on previous flights, previous purchases, upcoming flights, and access to their own user profile where they can change their details.

Home page and options

Brings the user to frequently asked questions and contact details.

Brings the user to the signup/login screen option which is shown in different pictures.

Allows the user to change the language they want their website to display and also changes the currency of the flight prices.

The main way of searching for flights, there are more details like flexible return dates once the user decides where they want to go and selects an airport.

Being the main page for our system, we have a lot of our details on this page. The user can log in/sign up for an account on this page and edit their details by pressing the person button when logged in. It is important to have the language/currency changer to hit a broader target demographic and to make the whole experience easier for users to help persuade them to use our system over others. The GUI on the home page is very simplified in order to keep the user experience as easy as possible.

Geographical Search

Our alternative search system, allows users to click on a country and then choose which airport that they want to fly to within that county/country

While not needed, it is an alternative search function instead of typing it in. This was a feature that people said would be interesting to implement within our questionnaire. It allows users to consider what airports that they can fly to quickly as they won't need to type in the county/state/region.

Payment

Possible examples of payment methods, there are more payment methods such as Ethereum, Litecoin and Bitcoin cash as described in our functionality.

There are some examples of possible payment methods including cryptocurrency, however, we were not able to fit all payment methods on the page. Having cryptocurrency as a payment option will help the system stand out against other systems and allow for a bigger target market as a company.