

FINAL REPORT

Interactive Multimedia Design - 2014

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<http://meetyouhalfway.com>

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1.0 INTRODUCTION

1.1 - The Challenge

The challenge that was initially set in the beginning, was to develop and build a web application that would allow two friends to connect using Foursquare, to find the halfway point between the two users and present them with a list of possible venues where they can choose to meet. The idea for this project, Meet You Halfway, was derived from an observation that there is no already existing application to make the process of finding and choosing a place to meet friends, more convenient. Therefore, the challenge was to build an application using a combination of social media API's and geolocation to find the halfway point between two friends and show a list of possible venues to meet at in that area, meaning that both users will travel the same distance to meet, and can pre pick the location before meeting. All of this is targeted at the idea that this process can be made more effectively and enjoyable for both users.

1.2 - The Aims and Objectives

In order to achieve the challenge of creating an application that will firstly, generate the halfway point between two friends connected via Foursquare and present them with a list of possible venues to meet at, will require a list of well devised aims and objectives. By setting and achieving a list of clear and well defined aims and objectives, will mean a greater possibility of developing the application to its highest and fullest potential.

1.2.1 - Aims

Since the initial planning process, one of the main aims that was clearly identified, was to develop an application that the users will find convenient and enjoyable to use when deciding on a place to meet friends and socialise. Therefore in order to achieve this, the aim is to ensure that the application has a clear, fluid and enjoyable user interface, which will add to the user's experience as well as ensuring that the process is easily understood so that reaching the end of the process is straightforward.

1.2.2 - Objectives

In order to achieve the aims that were earlier established in the planning process, the aims must be further broken down into a longer list of smaller objectives. Once each single objective is attained, then it should ultimately lead to the aims being attained.

After breaking down the aims, it was made clear that one of the main objectives was to ensure that the application was completed within the deadline. Therefore, each stage and all the elements needed for the application, was broken down into smaller more manageable tasks and slotted into a well devised and planned time schedule known as a gantt chart [**see appendix 1.1**]. By strictly following the gantt chart, each task would be completed on time, and essentially meaning the application finished before the deadline.

After analysing the challenge, it was apparent that the application would require the use of various Application Programming Interfaces. As using API's was a relatively new experience, an objective was set to ensure that time was set aside to experiment with various API's to get a better understanding on how they function. This proved successful because when it was time to begin the build process of the project, a combination of various Foursquare API's and Google Geolocation API's was effortlessly integrated.

The aim of having a clear and enjoyable user experience lead to the objective of also setting aside time to research what makes a user interface friendly and understandable. Thoroughly planning the interface can result in a professional and high quality outlook on the application, thus adding to the user's opinion and experience. A fluid and straightforward interface will result in the user to effortlessly navigating their way through the processes of choosing a venue to meet a friend, while finding the over all experience delightful. This could potentially lead to the app becoming more popular and increasing the possible traffic of more new users.

1.3 - Overview of Work Undertaken

To build Meet You Halfway, there was much work that needed to be planned, explored and developed so that the finished application would successfully connect two users and find the halfway point. Firstly, a login element had to be developed which required the use of the Foursquare's User API. For a user to be able to use this application they first must already have signed up to Foursquare as the login will use their login details.

The next element of work that was undertaken, was to build and design the homepage for Meet You Halfway. The homepage will show all a dashboard of the user's details that will also be generated from the Foursquare User API. Aside form the user's details, the homepage will display the user's current location. This was achieved by using Google Map's Geolocation to find the user's current latitude and longitude coordinates.

Alongside displaying the user's personal information, there will also be a list of all the user's friends on Foursquare. This list was accomplished by using Foursquare's Friends API. By using a combination of the various API's available from Foursquare, a wide verity of data can be rendered once the user log's in. The homepage itself was developed by using both Bootstrap, the free framework from Twitter and also with a heavy influence by the trending style of having a flat user interface.

To make the application carry out it's main functionality, the user must first select a friend to meet halfway. Upon doing so, an email is sent which will trigger the process of finding the halfway point. In order to find the halfway point, both the user's information must be sent to a database via PHP. To calculate the halfway point, both user's current locations is sent to the application which will calculate the halfway coordinates by using a simple formula. These halfway coordinates are then entered into another Foursquare API that will search for venues in that specific area. By using a combination of PHP, API's and javascript, the list of possible venues to chose from are sent to a user in the form of another Google map, where they can explore the interactive map and make a decision. Once the user selects a location, this information is then sent to the other user for confirmation. When the selection is confirmed, both users are notified and this information is returned to the database. By completing each element of work, the finished product successfully finds the halfway point and allows users to select the venue they wish to meet at.

1.4 - Overview of Report

In this report, each stage and process of the application Meet You Halfway will be broken down, evaluated and compared to the original plans and predictions that were initially made. The application will be weighed against the aims and objectives that were originally set, to evaluate if they were fulfilled. The report will show how each stage of the application developed from the initial planning stages all the way through to the development, implementation and testing stages whilst commenting and evaluating each phase. The report will outline how ideas were generated and what requirements and specifications each idea entailed.

After the concept was defined and settled upon, the next stages was to plan and design the potential look and feel of the application, which was thoroughly considered during the

paper prototyping phase. This section of the report will outline the wireframe and the initial stages of what the app's main layout and what it will look like before it's designed.

Once the planning stages were settled, the next phase was to design up the plans. The design section of the report will show the evolution progress made in both the user interface as well as the system's design. Outlining not only the logic design, detailing how the application will handle any data requests but also the data design and how the data will be stored, as well as the design of the database and how it will store data. With any project, once all the design stages are complete, the next phase is the implementation and development of the actual plans.

Following design is the detailed descriptions and evaluations of how the different technologies and tools were firstly tested and then utilised during the implementation phase. All the challenges that were faced, as well as all the achievements that were had will all be documented. Once the build is finished, the testing stages will then be analysed, including which test approach was the most appropriate and why as well as the actually testing process that was carried out on the application, such as browser testing etc. As well as these tests, user surveys were also carried out and the responses analysed. Lastly, the report will also cover an overview of the evaluation stages on all aspects of the project, Meet You Halfway. Each stage of the project, from the planning to the finished application will be evaluated and compared to the original predicted outcomes. Each stage, from the beginning to the completion of Meet You Halfway will be documented, analysed and evaluated.

2.0 CONCEPT DEFINITION & TESTING

2.1 - Idea Generation

In the beginning of the project, the basic idea that began the whole process, was to develop an application that would carry out a simple service to connect two friends and find a place to meet, halfway between the two. In the early stages of any project, “*a good idea emerges methodically out of a sensible analysis of readily-available ideas and impressions*”[see reference 2.1].

This idea, was generated through personal observation and research into the different social medias and the features that they offer, as well as already exiting applications that calculate the halfway point between two locations. After studying these websites, it was apparent that aside from the issue that the user had to manually enter both locations, these services were more aimed at presenting information and finding the halfway point over long distances, meaning the applications were more targeted at drivers and travellers.

Time was also spent researching the social media application Foursquare and analysing if it was the most appropriate service for integrating with Meet You Halfway. This service offers it's users a wide range of features and data but again, it did not offer the capability of allowing friends to connect and finding a halfway point to meet at. Therefore an assumption was made about the evaluation of the research carried out, that the idea behind Meet You Halfway was slightly unique.

Once the basic idea was defined, it then had to be further developed to get a better understanding of what all this idea would entail in regards to functionality and features the application would offer it's users. A useful tool that was used to help outline and create more ideas was by designing a mind map, [see appendix 2.1]. Mind maps are particularly helpful for brainstorming and coming up with new ways and approaches to the same problem.

2.2 - Requirements & Specification

Following the idea generation stages, it was then time to clearly define and outline the requirements of the application, as well as the specifications that would be needed in order to meet the requirements. Both the requirements and specifications will be the list of features that the application will be able to carry out, the requirements will be generated from the

perspective of the users that will be interacting with the application. From the requirements, then the specifications will then be defined, as they will be wrote from a more technical perspective and will be how to achieve the requirements. Requirements and specifications roughly communicate the same information and data, but the two are very different and target different audiences regarding the functionality of the application, Meet You Halfway.

2.2.1 - Requirements

When creating a list of requirements, the processes and features that the application will carry out must be clearly defined. This means that these features can be broken down into a list of requirements that are necessary for the features to work. As the completion of this project is on a very tight deadline, and time is limited so there is a considerable danger of some requirements leading to scope creeping. This was a notable challenge that occurred various times throughout the build and implementation stages. Therefore it was very important during the requirements and specification stages, to create an agenda of prioritised, well defined functional requirements.

Once all the requirements that were needed to make the application operate at a basic functionality level were illustrated, the rest of the requirements were then classed as non-functional. These non-functional requirements are a collection of requirements, that although would benefit the over all performance of Meet You Halfway, are not necessary for the application to carry out its main operation. These functions would be a list of extra features that would improve the application and seen more as additional features that can be implemented once the main build is complete if there is time to spare.

To create a list of requirements, the application must be seen from the perspective of the user. Then, from the beginning of the process of meeting a friend halfway, must be broken down and each requirement clearly defined. Each requirement must be recorded with a type, which will either be functional or non-functional. They must also be completed with a description about the requirement as well as its rational. Additionally, there is also a section that will test the requirement and judge if it has been satisfied. Each requirement will then be awarded a priority level and any dependancies that may have. This structure of developing and documenting requirements follows the Volere Requirements Specification Templates.

In order to visualise the requirements needed for Meet You Halfway, the break down of the journey that the user must take, all the way through until the user has selected a place to

meet their friend halfway. The first major requirement that was needed was the login function. The requirements are detailed below in the form of a Volere requirement specification card. To see more functional and non-functional requirements *[see appendix 2.2]*.

| LOGIN | |
|-------------------------|--|
| Requirement Type | Functional |
| Description | In order for the user to login to the application, they must already be a member of Foursquare as they will need their Foursquare login details. If they are not already a member there will be a button link to the Foursquare signup page. |
| Rational | Having this login feature is vital because in order for the application to work, it needs to collect the user's Foursquare profile data as well as their friend's list which can only be called through Foursquare's API with a user ID. |
| Fit Criterion | To satisfy this requirement, the user will be successfully logged in and redirected to the homepage showing a verity of data related to that user and their friends list. |
| Priority | 5 (5 being the highest) |
| Dependencies | Depending on user being a Foursquare member |

Table 2.1: Login Functional Requirement

| FILTER SEARCH RESULTS | |
|-------------------------|---|
| Requirement Type | Non-Functional |
| Description | Once the venues at the halfway point has been generated, allow the users to filter and customise their search results by the categories of the various venues e.g. bars, restaurants etc. |
| Rational | Having this feature will mean the search results can be tailored to the user's preferences which can result in a better user experience and optimising the application's functionality |
| Fit Criterion | Once the halfway point is calculated, the user will have the ability to select the different categories in order to filter the search according to their preference of venue. |
| Priority | 2 (5 being the highest) |
| Dependencies | Depending on the halfway point calculation is successful |

Table 2.2: Filter Search Results Non-Functional

2.2.2 - Specifications

Once all the functional and non-functional requirements have been acknowledged and documented, a list of specifications was then developed, detailing how each requirement would be fulfilled. The specification list represents the application from a more technical perspective and will demonstrate how the requirements would be attained in terms of technologies.

As the functional requirements are of high priority and what was needed to make the application function at a basic level, they will need their specifications realised first. As the application Meet You Halfway is heavily dependant on API's, a lot of the requirements will be fulfilled by using a combination of the necessary API's to present the desired information. Below is a list of the functional requirements and their specifications, outputting a functional application that will connect two users, calculate their halfway point and display a list of possible venues for them to meet at.

Functional Requirement Specifications

 **Login** - The specification for this requirement is the use of Foursquare's User API. In order for the user to gain access to Meet You Halfway, they must first already be a member on Foursquare. This is because the login will require the user's email address that they used to signup with in Foursquare. This will pass through the user's email address and password back to Foursquare and will be checked against their database. Once the user has successfully entered the correct details they will be redirected to the site's homepage and their data will be entered into Meet You Halfway's own database.

 **User Profile** - The specification for this requirement will mean the use of the Foursquare User API again, as well as combination of PHP. By already gathering the user's login information, this can again be passed through the User API but returning more information based on the user, such as the user's check-in count, last seen, bio and contact details etc.

 **Geolocation** - The specification for this requirement will mean the need of Google Maps API. Once the user logs in, their browser should prompt the user for their permission to find their current location. The latitude and longitude coordinates will then be sent to database and returned to the map API to present the user's current location on an interactive map on the homepage.

📍 **Friend's List** - The specification for this requirement will be the Foursquare User API but focusing on the friends aspect. By using the user's ID, their friend's list can then be called using a combination of php functions. Once the friend's Id is found, it can be used to call each friend's information, including their contact details which will be necessary to begin the meeting halfway process.

📍 **Notifications** - The specification for this requirement will mean the combination of both PHP and the application's database. Once a user selects a friend to meet halfway, that user is sent an email notification. This is created using the mail php function. Once a request is sent, the data is sent to the database so that when a user logs in, a range of php if statements will query if that user has any pending requests and if so, they will be notified.

📍 **Meeting Point** - The specification for this requirement is the Foursquare Venue API and information stored in the database generated by the Google Map's API. Once a request to meet a friend is made, both the user's latitude and longitude coordinates sent to the database. This information is needed in order to carry out the formula needed to calculate the halfway point between the two locations. The coordinates will be forwarded in the Venue API call which will return a list of possible venues to meet. From here the users will be able to browse and select a venue to meet.

Non-Functional Requirement Specifications

📍 **Filter Search** - The specification for this requirement will be a set of PHP if statements. Once the halfway point has been generated, the user would be presented with a list of the categories of the different venues and have the ability to filter the results by selecting the preferred venue. Each filter will have a category Id and will be passed into the results so that the user is only presented with venues they have selected.

📍 **Increase Search Radius** - The specification for this requirement will mean that in the occurrence that the halfway point has no registered venues in that area, a PHP if statement will send the request back to Foursquare's Venue Search API but increasing the radius perimeter by a set amount of meters until a venue can be sent back to the users.

📍 **Responsive** - The specification for this requirement is will require a combination of CSS media queries. These CSS files will adapt the layout of the application according to the screen size that the user has accessed Meet You Halfway through. If the application is accessed through a mobile device, to ensure that the application's experience is not affected by the smaller screen size, the media queries will present the homage in a view that was designed for a smaller screen size.

📍 **Analytics**- The specification for this requirement will be Google Analytics. By adding a small link to the head of the application, data such as the amount of user's that login and use Meet You Halfway can be recorded and queried. Recoding information like the amount of traffic to the site can be beneficial as they can give a good indication on the status and popularity of Meet You Halfway.

2.3 - Paper Prototyping

Once all the requirements and specifications were defined and finalised, it was then time to begin the paper prototyping stages. As the major functions of this process was now outlined, it was then time to plan the possible flow for these functions and how these different views would be ordered and rendered.



Figures 2.3, 2.4 & 2.5: Post-it Layout of User Flow

To begin this stage, each possible process of the application was listed on to post-its and then arranged in order of sequence. The above diagrams illustrates the break down of Meet You Halfway, listing the processes and the flow the user will follow, in order to achieve their goal of finding a friend and a place to meet halfway. During this stage of the design process, other elements were able to be considered and planned for. Elements in

these cases would include potential error messages and special one-off occasions. By following the post-it method, the user flow was deeply analysed and potential design problems were soon discovered and corrected. All of these stages were carried out with a clear aim of ensuring a fun, enjoyable user experience through simple and understandable interface and actions.

Through the post-it stage, each possible process for the user must complete in order to meet the criteria needed to meet a friend halfway, meaning that each of these stages would then need a view / page designed in order to present each process. This was very beneficial for the next phase, as the post-its had outlines each process that would need a wireframe. Below is some roughly initial sketched wireframes that were created, mostly in an effort to gain a better grasp on what the process of Meet You Halfway would do and how it would do it.

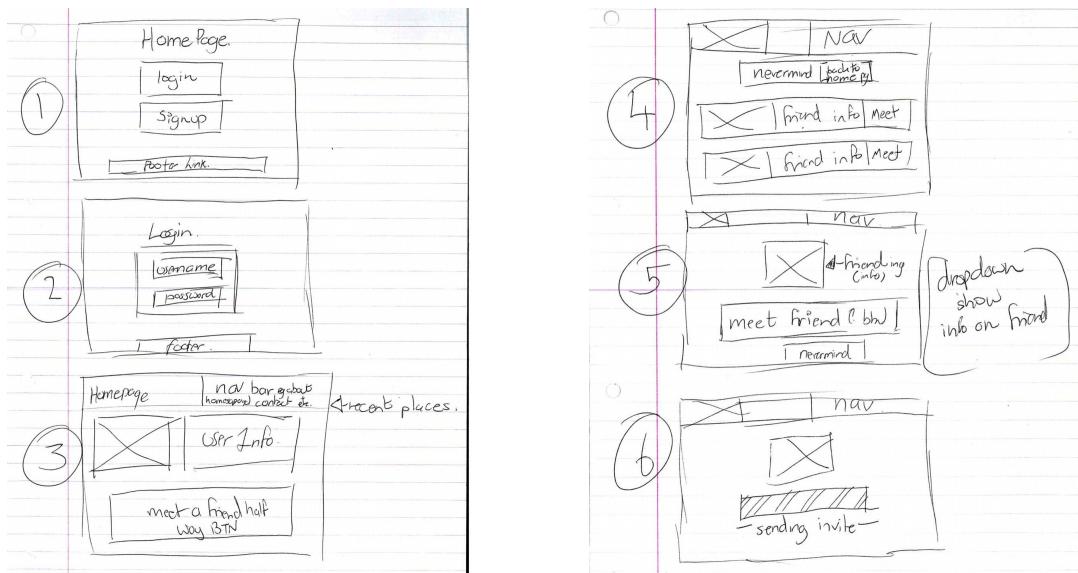


Figure 2.6 & 2.7: Initial Roughly Sketched Wireframes

One of the main aims set, was to have a clear and easy understood user interface, and so it was during the wireframe design process where this aim could be accomplished. By keeping close to the original simplistic layout of these sketched wireframes, the interface would remain clear and understandable. The reasoning for emphasising a clean user interface is because, as the application carries out a process, the user will need to meet certain criteria at different stages before they can progress further into the process. If they encounter an issue and do not understand what they must do next, then the user may not

reach the end of the process and essentially, not being able to pick a location to meet a friend halfway.

2.3.1 - 6 UP's

As developing a user friendly interface was essential, another design tool was implanted at this stage in order to help develop the most appropriate layout for the view with the most interactivity. In regards to Meet You Halfway, the view with the most points of interactivity is the process where the halfway point has been calculated and the coordinates sent back to Foursquare to display a list of venues to choose from. This is the modal where the user will see the list of generated venues to select from. Each venue will have its contact information and its address. But another desired feature for this modal, was to include an interactive map that would mark out each location. From here, the user has the ability to navigate through the Google map, as well as browse the list of places to meet. Therefore, to ensure that the best possible layout was developed, six different possible layouts for this view were sketched and created, following the rules of the design tool 6-UP's. This tool was very helpful in the task of constructing an easy to understand interface, ensuring that the user's experience was not impacted on.

By drawing different wireframes, the range of different possible layouts could be compared so that the most appropriate layout was chosen for the venue selection modal. This had the advantage of being able to take note of how the placement of different elements potentially affected the way a user sees and understands the view. By creating six different layouts and designs for the same modal meant, that there was the freedom to experiment, change and adapt ideas and combine different elements to create the perfect 1-UP.

Research had to be carried out so that a better well informed decision could be made in regards to the perfect layout. As the application relies heavily on the social media Foursquare, time was spent investigating their own layouts and designs for elements and information. Meet You Halfway is closely similar to the nature of Foursquare, and it was planned that it would resemble a similar theme, meaning that users with experience in using Foursquare can transfer their skills and navigate easily through the processes of

Meet You Halfway. Below is the six different approaches that was taken in order to develop the most appropriate layout for the venue selection modal.

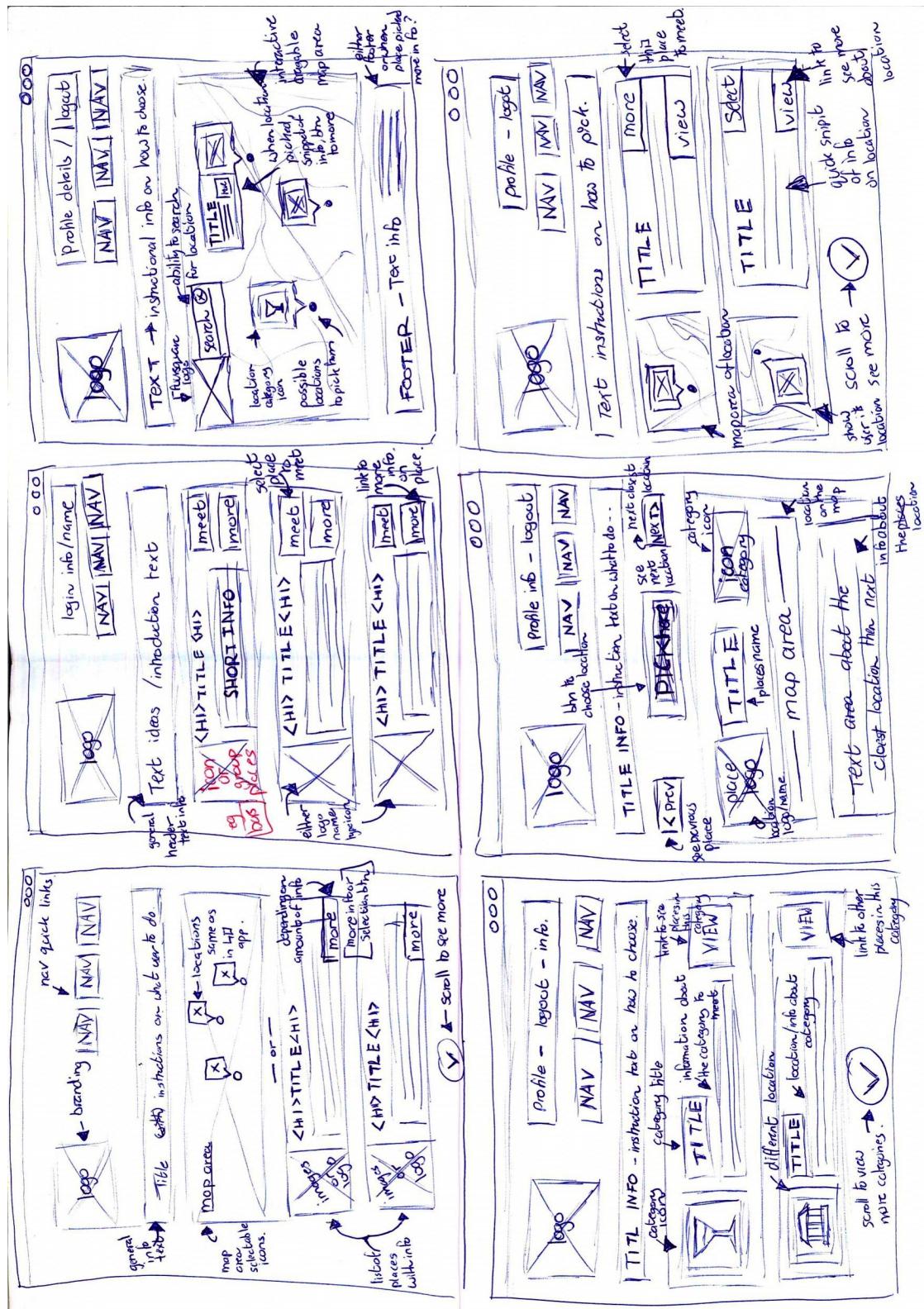


Figure 2.8: 6-UP's For Venue Selection Modal

Each 6-UP contains all the same information, but just presented in different ways. After completing the 6-UP's, they could then be analysed and the different elements that was

the most approbate over all the wireframes could be combined into one perfect 1-UP. Once the layout was finalised from the 6-UP process, the chosen wireframe layout was then designed in Illustrator.

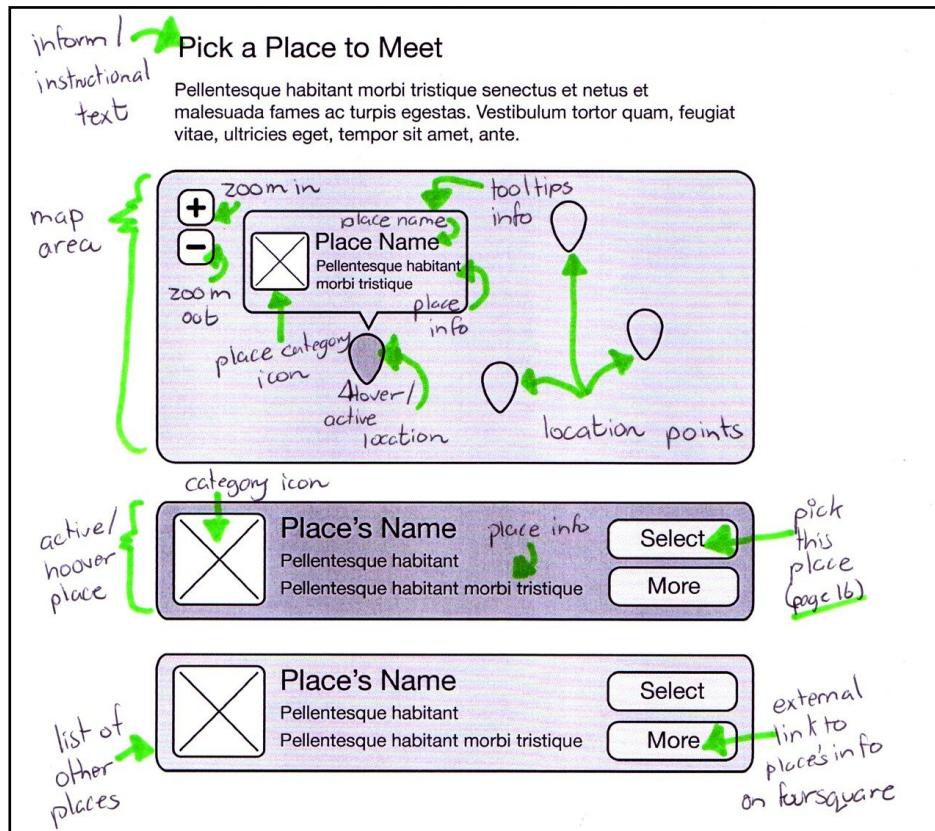


Figure 2.9: 1-UP's For Venue Selection Modal

After reviewing the other layouts, it was decided that in this modal, the user should be able to see both the list of venues as well as their location marked on a Google map. Including the map was a nice interactive feature and also allows the user to explore the locations and visually display the whereabouts of each venue. By using both these elements to present the list of meeting locations to the user, they will be able to make a better informed decision as well as adding to their over all experience.

When it came to developing this wireframe into a coded modal, the final product had little changes. In the coded modal, the map and the user cards have changed layout to being side by side, making it easier for the user to read across both the map and the list. The "More" button was not included as in the prototype stages, only the necessary information was called from the API. Below is a screenshot of the current select venue modal form the application.

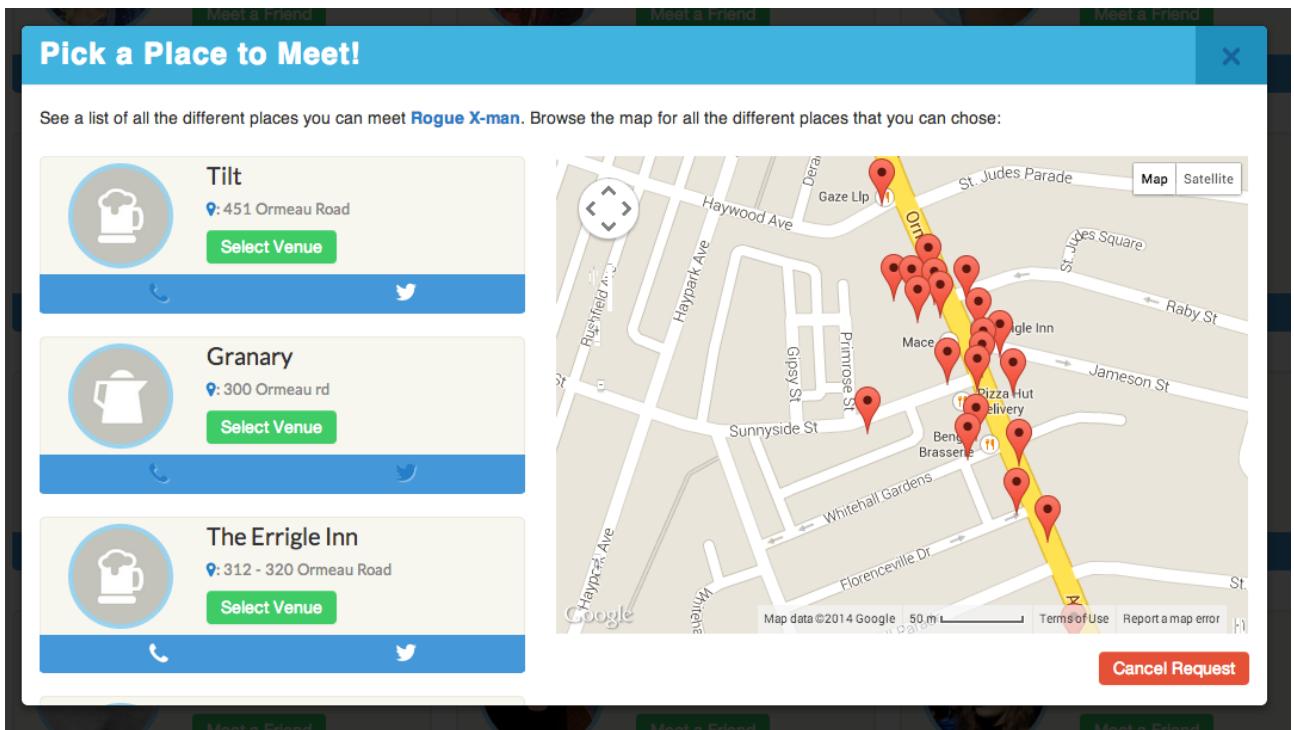


Figure 2.10: Developed Venue Selection Modal

2.3.2 - Wireframes

Once each wireframe had been roughly sketched out, they were then rendered and passed through Illustrator in order to have cleaner, more understandable wireframes that could be lightly annotated. By doing this, each view had to be carefully considered, including positing of information and trigger buttons etc. By developing wireframes, ideas and predictions regarding layout can be be stabilised before time is invested into the development and implementation of code. Any potential issues are flushed out at these early stages and can be rectified easily and effectively, which would not have been so easy if the changes were to be made to developed code.

Below are some of the wireframes that were developed, accompanied with the finished developed views in order to show how the evolution process from wire framing to physical development progressed.

📍 Login / Signup

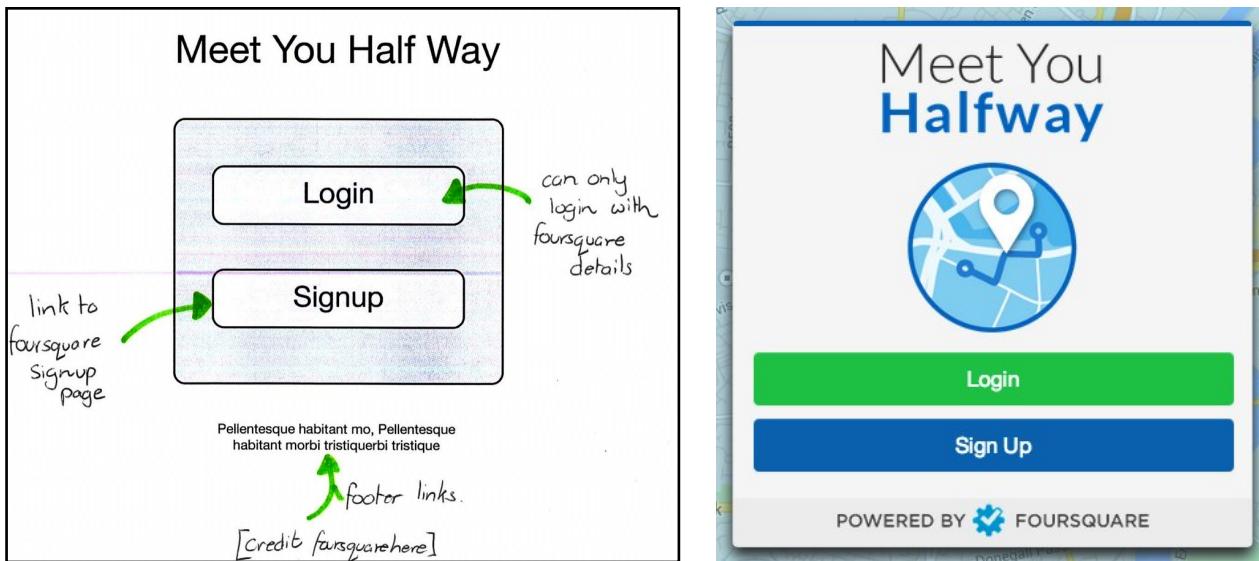


Figure 2.11 & 2.12: Login Wireframe & Developed Modal

This is the landing page that the user will be direct to before they can select a friend to meet. The user must use their Foursquare details to login or signup through Foursquare. Even in the wire framing stages, it was clear that this view is very simplistic. The only development from the wireframe stage, was the addition of the application's logo and the powered by Foursquare icon, both which were necessary. The logo because it is the applications own brand and also because it sets as an introduction to the application. The Powered by Foursquare was also added because it means the application is keeping within the rules of attributing Foursquare if any of their API's are being used.

📍 Request Successfully Sent



Figure 2.13 & 2.14: Request Sent Wireframe & Developed Modal

Once a user selects a friend to meet halfway, they will need to be informed if the request

was sent successfully or not. This is the modal that will appear once the request is successfully sent. As this modal was only to display a simple success message, there was no need for any extra features, therefore the wireframe was very closely followed.

📍 Request Notification

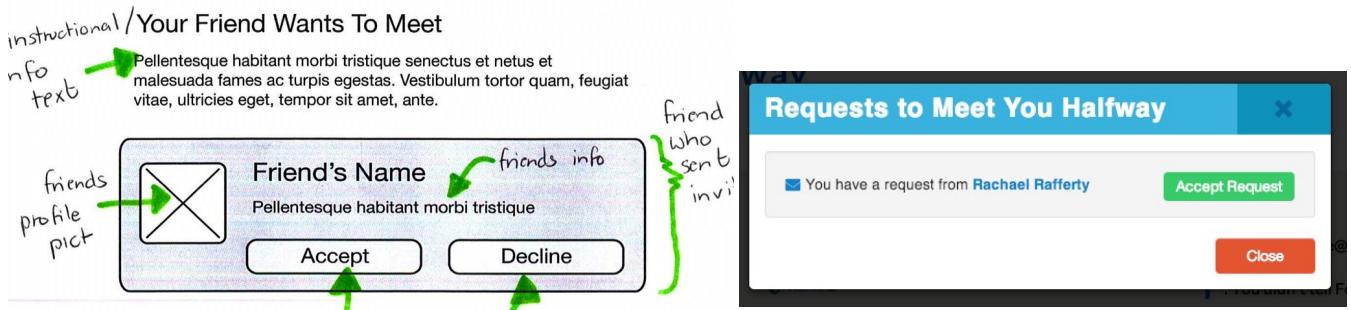


Figure 2.15 & 2.16: Request Notification Wireframe & Developed Modal

This wireframe was designed to show what the user will see once they login to the application and they have a request waiting for their acceptance. It will show a list of the requests the user still has to accept. As this list could contain more than one request, it was decided to remove the friend's user profile picture as they are all viewable on the homepage.

After developing an extensive collection of wireframes, they were used in a paper prototype test. These wireframes were given to a user so that they could test the user flow. Once the user “clicked” on a button to trigger a process, the pages were physically swapped with the next stages of the process until the user reached the end of the application, and in theory, had successfully selected a place to meet a friend halfway. Results from this test instantly highlighted areas where changes had to be made to the process and layouts. All of the above tools and stages of development helped to modify and finalise a simplistic, easy understandable user interface and layout of the complete process of meeting a friend halfway, all before a line of code was written.

2.4 - Feasibility Testing

After reviewing the aims and objectives, following the completion of the list of functional requirements and a paper prototyping, the feasibility of Meet You Halfway was made more clear and what was necessary to make it more feasible, was also highlighted. By taking time to outline the feasibility of the project, new risks were identified, changes to be made

were highlighted and methods to avoid these new risks were also identified. By analysing all these elements, the feasibility of the application was justified in terms of both technical and in operational aspects.

In the initial predictions, the user interface was a point of important focus but after analysing the nature of the application, it was discovered that it was more programming intensive than originally planned. This had a considerable impact on the judgement of the feasibility of certain aspects and requirements. In the original gantt chart, there was a considerable amount of time devoted to developing the user interface and graphic creation, but in the turn of events in realising the heavy programming needed for the application to be fully functional, it was decided that this time would be better spent researching database and API's. This would mean that when it came to the code development and implementation stages, time would not be wasted experimenting and familiarising with code.

As the scope of the project had not changed, these new elements that needed factored into a revised time schedule meant that there was even less room for any scope creeping and any new features that were discovered during the paper prototyping stages would have to be stored as extra non-functional features and could later be added to a potential beta version of Meet You Halfway. If the revised gantt chart was strictly followed, then in regards to the project, it would still be fully feasible to develop.

During the feasibility testing stages, it was discovered that there was a certain theoretical level of understanding regarding PHP and API's would be necessary in order for Meet You Halfway to be technically feasible. Firstly it was identified that research would need to be carried out for the sake of being able to feasibly develop the code needed for this function. Another aspect that needed to be addressed was the combination of various API's. As API's was a relatively new at that stage, extra time had to factored into the time schedule so that dealing with API's would not be such a technical issue and save time. Taking steps such as these were all aimed in the hope to make the application and its processes more feasible.

2.5 - Methodology Testing

With any application projects, there is a wide range of different methodologies that can be utilised to help improve the way the project is developed and managed. After dedicating some time to researching which methodology would be most advantageous to fit the style of Meet You Halfway, it was apparent that the most appropriate methodology was the prototype model. This methodology model is better aimed for projects where approximations about the final project can be made early on rather than depending on strict planning. Once a crude version of the application has been developed, this will be seen as the initial crude prototype with limited functionality. At this stage, design elements are not an important factor.

During the build and implementation stage of Meet You Halfway, the prototype model was heavily relied upon. At the beginning, a very crude version of the application was initially developed including a main function. After the first prototype of the application was developed, it was then refined and modified so that once the next build release occurred, the project was one step closer to becoming fully function with all the elements described in the functional requirements.

Advantages to using this model type was its ability to help clarify the requirements needed early on in the projects development cycle. The prototype model is specifically aimed at applications that deal with a high amount of end user engagement, which meant it was very beneficial and well suited for Meet You Halfway. Below shows the evolution of the designs for the user information section. Through releasing each prototype, the design was able to evolve each time until the it had been refined and finalise and released.

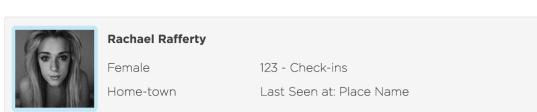


Figure 2.17: User Info Visual Design

Profile: Rachael Rafferty



Gender: female
Check-in Count: 164

Email: rachaelrafferty@yahoo.co.uk
Bio: Pixel Pusher by day...Gamer / Zombie Slayer at night & only a diet coke of evil! :) #uumd #NerdForLife



Figure 2.18: First Prototype Release



Figure 2.19: Second Prototype Release

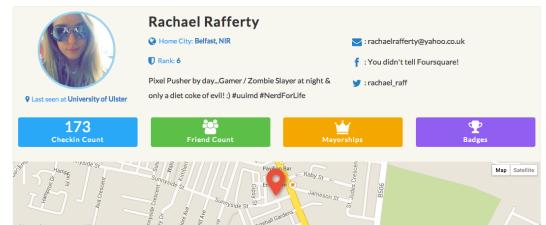


Figure 2.20: Final User Info View

3.0 DESIGN

3.1 - UX Design Evolution

Following the concept and definition testing phase, the next stage was to then plan, create and develop the user experience design and how the application would look. This phase was very important in regards to Meet You Halfway as one of the main aims that was originally defined, was to ensure that the application has a clear, fluid and enjoyable user interface, which will add to the user's experience.

3.1.1 - Branding

With any business or service, branding and how the logo is perceived by the user is vital because the brand can help to give users a sense of quality about that particular business or service. *"A positive user experience has a direct correlation to positive brand perception."* [see reference 3.1] This was one of the main reasons as to why the branding and interface was initially set as on the main aims to achieve. For Meet You Halfway, the aim for the branding was to stand out and leave a lasting impression on the user as well as keeping small similarities with Foursquare and their branding. By keeping similar to Foursquare, it enables the opportunity for users to feel a small sense of familiarity, prior they have had experience using Foursquare.

Research into Foursquare was the next stage in developing the brand. It was clear through Foursquare's branding guidelines that it was essential to the overall experience of their service. The aim was to develop a brand that was simplistic, fun, unique and playful, all of which can be used to describe Meet You Halfway and what the application does, a unique way to meet friends and have fun.

The plan for the logo was to incorporate a map with two markers and a halfway marker between them. The logo would also include the name of the application, "Meet You Halfway". It was also decided in this stage to include the ".co.uk" as it made the brand that little bit more unique but also added rhythm to the name. The map in the logo represents the idea of using maps to find a place to meet a friend, while the two markers represent the two friends. To add even more character, another marker was included at the halfway point between the two friend markers to act as the halfway mark. A location pointer was most appropriate for this as it is a globally recognised icon for pinning a location to a map. The logo below is the first draft, representing all the initial elements planned.



Figure 3.1: First Draft Logo Design

Like any logo, there will be some occurrences when the logo will be rendered slightly different than originally designed. For these circumstances, the Meet You Halfway logo guidelines states that the logo must either be displayed as originally designed but in black and white. As well as this, the text element, the map icon or the “.co.uk” may also be removed as necessary in order to fit the design. It is very important that the brand remains consistent across all platforms so that the user gains the full intended branding experience. **[see appendix 3.1]**

The shape of the icon in the logo also has significance in relation to the brand being similar to Foursquare. The thick border of the icon is to match the same look of an achievement badge that a user can attain through Foursquare. Users with experience in Foursquare should hopefully make the connection.



Figure 3.2: Logo & Achievement Badges From Foursquare

Before continuing with the branding development, the logo was then appraised for feedback so that it could be further refined before being selected as the finished logo. The general feedback was that although the badge idea worked really well with the application, the halfway marker needed to be made more prominent as it was generally seen as the main aspect. To help generate more feedback and further refine the logo, A/B testing was then carried out. **[see appendix 3.2]** This meant that not only could the user's reaction be better gaged, but they had a choice and a chance to compare the different versions of the logo and select the best elements from each. These elements could be combined into the final version of the logo and ultimately appealing to more users.

Aside from the logo's design, another very important aspect that needed developed and refined was the colours used. Colour can be very effective if used appropriately, as it can portray many different messages about the brand's personality. The intended brand for Meet You Halfway is to be bright, bold and colourful. Blue was established as the main colour not only because all the other big social media's such as Facebook, Twitter, LinkedIn and even Foursquare are blue themed, but also because they all contribute to the image that blue represents the colour of communication and being social. Blue has also been researched to give users a sense of security, and can add dependability and trustworthiness to a brand, all which are traits that are aimed to be associated with Meet You Halfway. All of these indicators are factors as to why blue was chosen as the brand's colours.

By editing the opacity and shades of blue in the first draft of the brand, the halfway point marker was able to be made more prominent. By swapping the colours in the first logo for more pastel shades, not only was the marker made more visible but it added a flat design to the logo, a growing trend at the moment. *[see appendix 3.3]* As well as the colours used in the logo, the font was also commented on during the feedback stages. The font that originally was chosen, Nimbus Sans, was altho simple and professional, was not bold enough nor friendly enough to match the outlook of the application. Therefore after conducting some research and further feedback, Google's own font Lato was the most favoured as it is simple, professional and still has a friendly feel. Below is the final version of the refined logo after considering and implanting the feedback received from users. Overall, the finalised version of the branding is very appropriate as it presents a clear, clean and professional logo yet remains fun, unique and memorable which are all aspects needed to build a strong branding. Once a user see's the logo they will instantly recognise it as the brand for Meet You Halfway.



Figure 3.3: Final Version of Logo Design

3.1.2 - Visual Design

For the application's visual design, it too must be developed with a clear target of ensuring that the design of the website is highly useable. Meaning regardless of the user's level of experience, they should be able to achieve their goal of meeting a friend halfway without any frustration or confusion due to design error. The visual design must complement the interface and add to the user's experience. All of these aspects are targeted at the aim of ensuring a clear, easy understood user interface.

When researching the visual design, an important note to consider was the inclusion of the "Powered by Foursquare" image. As Meet You Halfway has many connections to Foursquare and also avails of the API's they offer, in accordance with Foursquare's licence, this image must be displayed in order to give the proper recognition and credit that is due. Including this image also offers advantages such as the trusted feeling that users will get from recognising Foursquare's official logo in the application's design.



Figure 3.4: Powered By Foursquare Logo

Another element of the visual design that had to be considered, was the font to use to render any text or copy in the application. The chosen font must maintain the same level of quality regardless of the size of screen and resolution it will be rendered on. The font must remain strong, playful professional yet not overbearing. After researching, the most suitable font was Proxima Nova. Like Helvetica, this font is built with even strokes meaning they will not disappear on smaller screens and is also suited better interface design as it is a sans serif. The vertical and horizontal stems all bear a constant thickness making them consistent and suitable for various serene size.

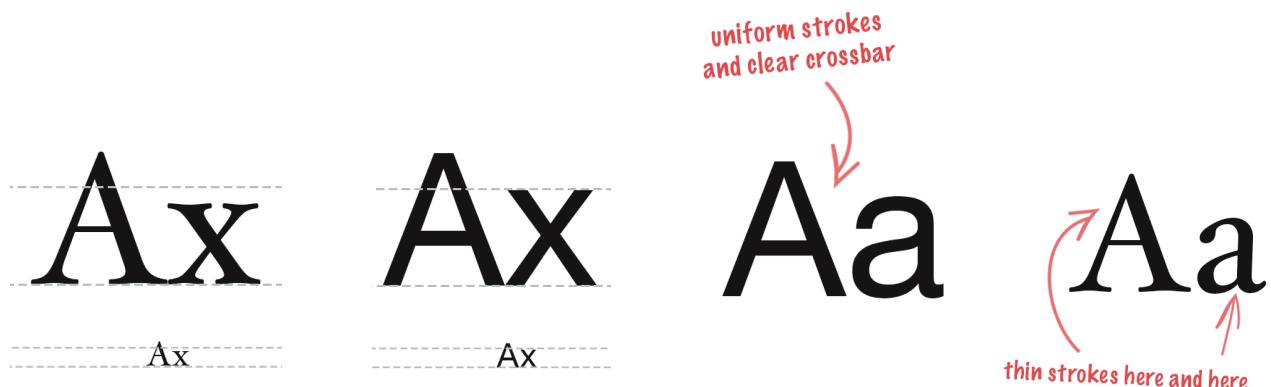


Figure 3.5: Type Face for UI [see reference 3.2]

Landing Page

In the beginning of the visual design stages, the original design for the landing page can be seen below. By following the developed wireframe and research that had been carried out into other landing pages, the design of the landing page has changed very little.



Figure 3.6: Landing Page Visual Design

Figure 3.7: Feedback From Dribbble

By using online services such as Dribbble, allowed the opportunity to ask other designers and professionals their opinions on presented designs. The feedback regarding the initial login screen can be seen above, **figure 3.7**. The suggestions were taken into consideration and changes were made. As the landing page has limited functionality, with login with Foursquare details or signup through Foursquare, there has not been much need for large refinements. Therefore, apart from a polish, the current landing page, below, is the well designed and a pleasant welcome to any user.

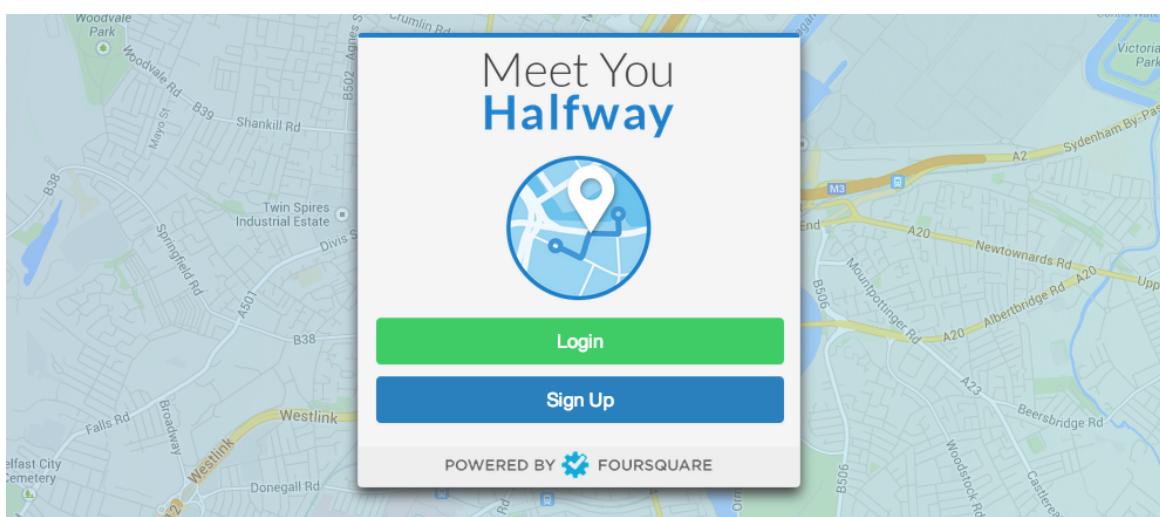


Figure 3.8: Current Live Landing Page

📍 Homepage

In the early stages of the development of Meet You Halfway, it had originally been designed with the idea that there would be multiple pages. But since then, the project has undergone many various changes that have impacted both the technical and design side. In regards to the initial visual design for the homepage, **figure 3.9** which can be seen below. In the initial planning, the homepage was to follow the standard homepage layout, of a main header with the navigation, main content area with the user's information and any trigger events and a footer area.

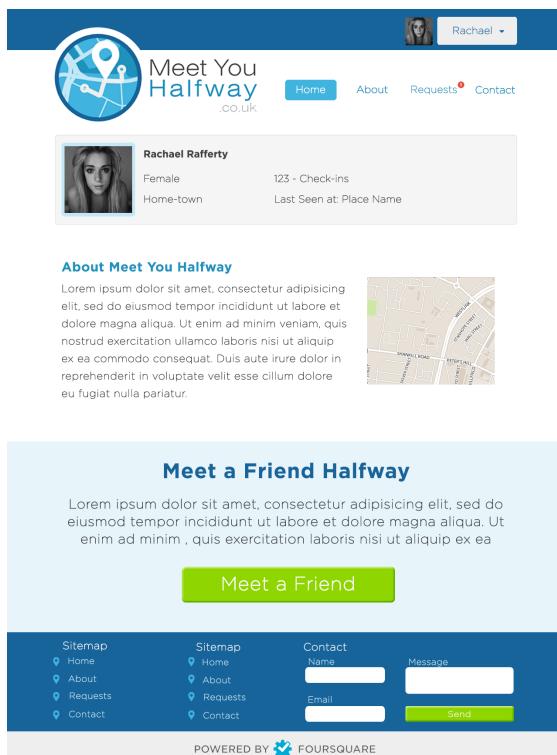


Figure 3.9: Homepage Visual Design

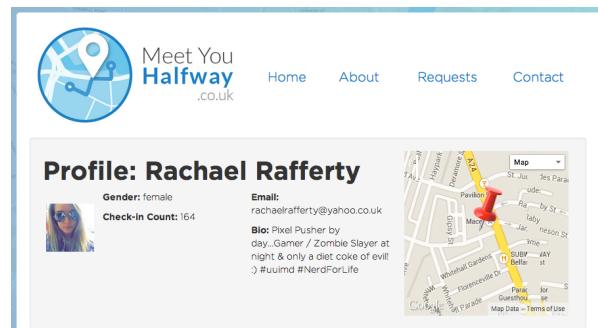


Figure 3.10: Homepage During Development

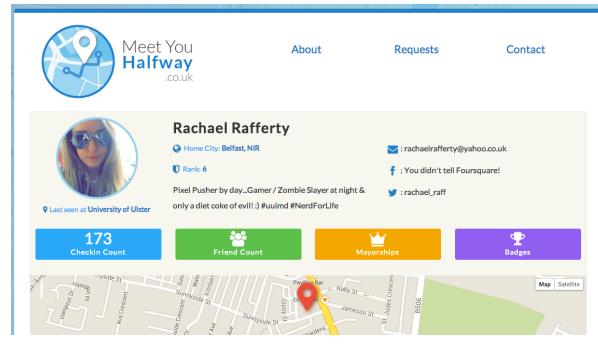


Figure 3.11: Finalised / Live Design

Since the development of changing the project to a one-paged application, this meant all the operations were going to be happening on the same page, all the trigger events and points of interactivity for any of the processes for meeting a friend halfway had to be made visible on the homepage. Above, in **figure 3.10**, illustrates the developments made in terms of the visual design and **figure 3.11** is the finished design that was released. With the improvement to a one paged application, this had implications surround the old layouts and visual designs.

The main navigation, rather than leading to different pages, would now consist of links to modals. In the original visuals, the “About” link was to scroll the user to the About section further down the homepage, but in recent developments, this was changes to a modal link.



Figure 3.12: About Visual Design



Figure 3.13: Revisited Visual For About Modal

Following the navigation is the user's information. In the original visual design, this data was simply listed. But following some research, this was an opportunity where the interface could be improved before development. The figures below, **figure 3.14** and **figure 3.15** presents how the use of icons and block colours helped to improve the user dashboard of information such as their checkin count, bio and more.

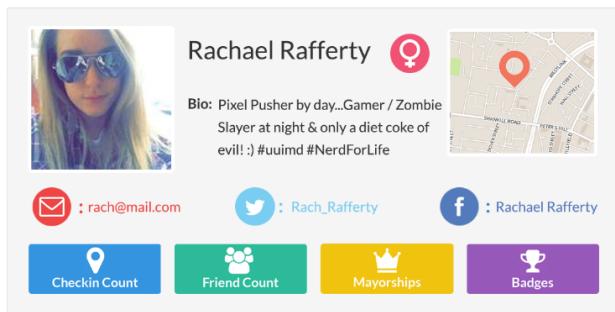


Figure 3.14: User Info Visual Design

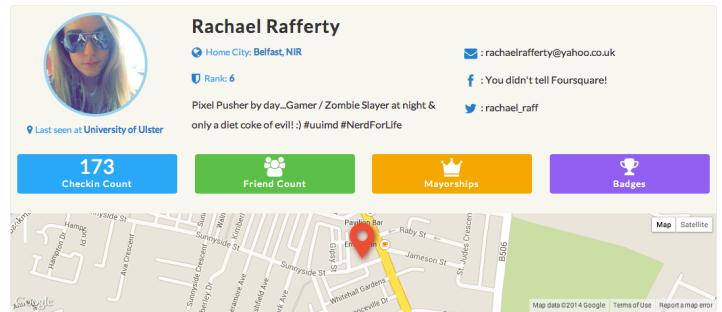


Figure 3.15: Finalised/Current User Info Dashboard

The major change since the visual design was the way the user triggers the event to select a friend to meet. In the visual designs, **figure 3.16**, there was a button to begin the process. This button would bring the user to a new page/modal showing all the friends to chose from. Upon the development stage, this was then changed to displaying all the friends once the user sign's in. This means no extra click to begin the process and complimented the new objective of keeping a Meet You Halfway a one paged application.



Figure 3.16: Meet Friend Visual Design



Figure 3.17: Refined Friend Info

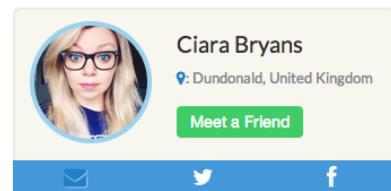


Figure 3.18: Finalised Friend Info

3.1.3 - Interactions

Even in the early paper prototyping stages, it was clear that Meet You Halfway has many occurrences where the user can instigate different interaction through various triggers being mostly buttons. Being that the process to meet a friend halfway, it will entail many processes and points of interactivity with the users. As Meet You Halfway is a one paged application, all these interactions will occur across a range of different modals and views while remaining on the homepage.

Still flowing the main aim to ensure the user interface is as understandable as possible, these modals will need to be well researched and designed. This is because the user needs to be able to understand what the next step is in order to move forward to the next process, otherwise the process will not be complete and the user left angry and confused. These modal designs need to be fluid and clear and contributing to the overall enjoyable experience of the application.

The layout of these interactions were initially designed in the wire framing stages. But since then the modals design have slowly developed. The stages of the development can be seen below. The first modal, **figure 3.19**, is the initial modal that was designed to show the user that their friend is picking a place to meet, essentially a waiting/loading modal. The second figure, **figure 3.20**, was developed during the UX design process and displays what the initial look and design of that modal was going to look like. The user's information such as their name and user profile picture will be generated from the Foursquare API. Including small pieces of information like this, personalises the modals which can contribute to the user's experience with the application. The last figure, **figure 3.21**, is the finished and fully designed modal on the live application. There has been little if any design changes. This is the case for most of the interaction modals.

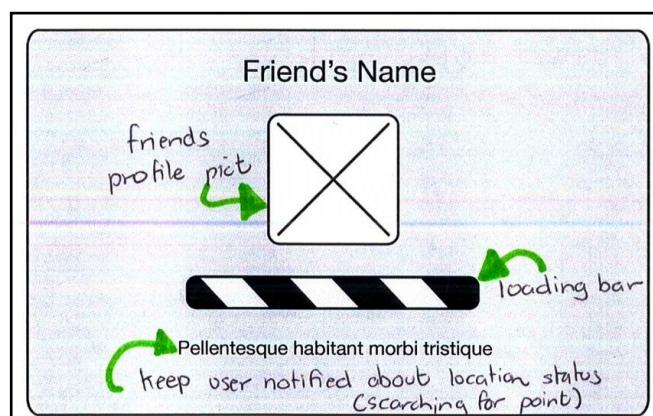


Figure 3.19: Waiting Modal Wireframe

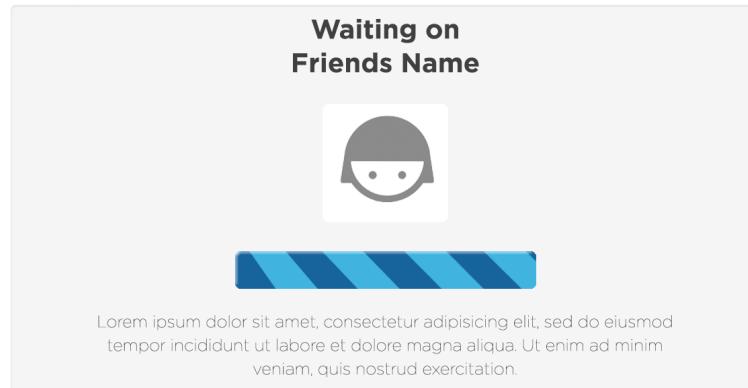


Figure 3.20: Waiting Modal Design

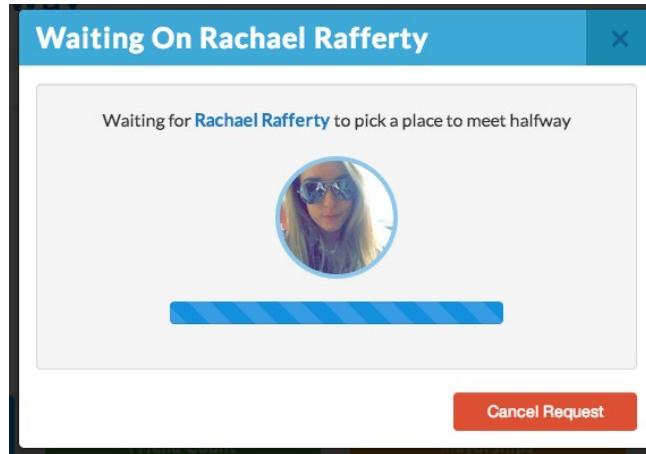


Figure 3.21: Current Waiting Modal

As the main processes of Meet You Halfway are presented and carried out in the form of modals, the design had to be fully refined before development. All the interaction modals were planned to share a very similar style and layout, which will contribute to the ease of the user interface due to a high level of consistency in addition to adding to the level of professionalism. During this design stage, the planned designs for the interaction were brought to a professional UX designer for their opinion. A sign of good user interface is placement consistency. In the feedback it was noted about the standard of consistency they were presenting. The placement of important elements such as trigger buttons was appropriate and remain in the same locations for each modal which contributed to the ease of navigating through the processes. Another positive note was made on the simplicity of the designs which would most certainly help in the achievement of designing a user friendly application. With the encouragement and instruction of a fellow peer who specialises in this area, not many changes were made to the initial designs from the paper prototyping stages as they fit the criteria of being easily understood in terms of interface.

3.1.4 - User Journey

From analysing the post-it development stage earlier on in the project, it was a rough draft for a potential user journey map. After reviewing the revised processes involved for selecting and meeting a friend halfway, a new more detailed user journey map was developed. A main benefit of developing this map was the way it can represent and highlight the series of steps and processes that they user will interact with at each stage during the application, visually clarifying the designs and functions that will need to be developed at a later stage. The diagram below is a visual aid, representing the planned journey of interactions involved in the process of Meet You Halfway.

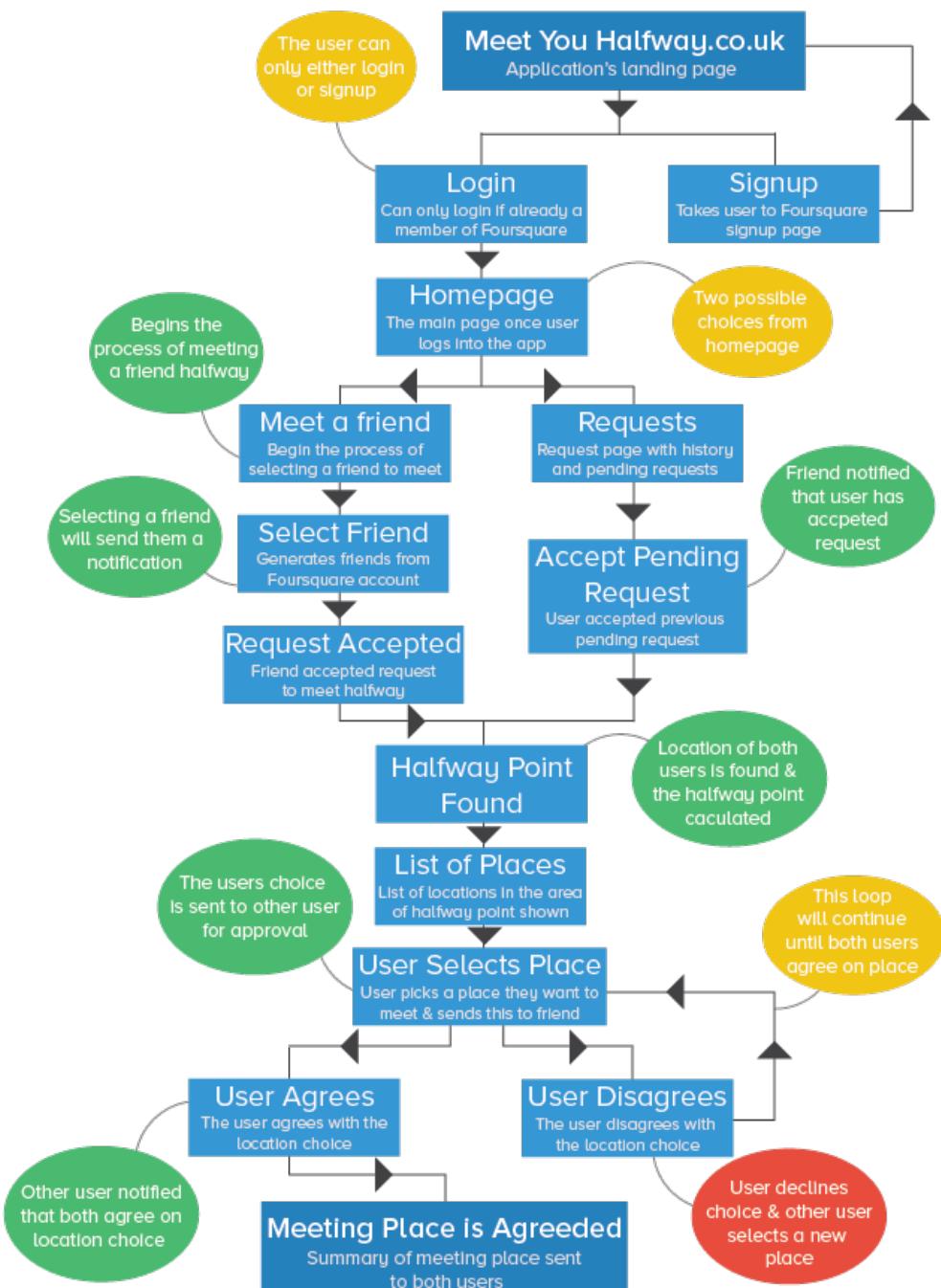


Figure 3.22: User Journey Diagram

3.1.5 - Experience Mapping

Increasingly more often, users are choosing services based on the quality of the experiences they are offered. In regards to Meet You Halfway, the aim was to develop the application so that it offered the user a fun, simple and enjoyable method to meeting a friend halfway. This involves the user's interaction at various stages therefore the interface and flow must be refined so the experience is enjoyable and understandable, and as a result, attracting new users and retaining existing ones. The experience map designed, helped to highlight all the touch points regarding the processes that make up Meet You Halfway.

By developing an experience map for Meet You Halfway, the different stages where the user interacts with the application are identified in the form of highlighting area were issues may occur and possible opportunities where the user's experience could be enhanced. The map covers the process cycle from the very beginning, from when the user is first made aware of the service, all the way through, to the point where the user would recommend this service to others.

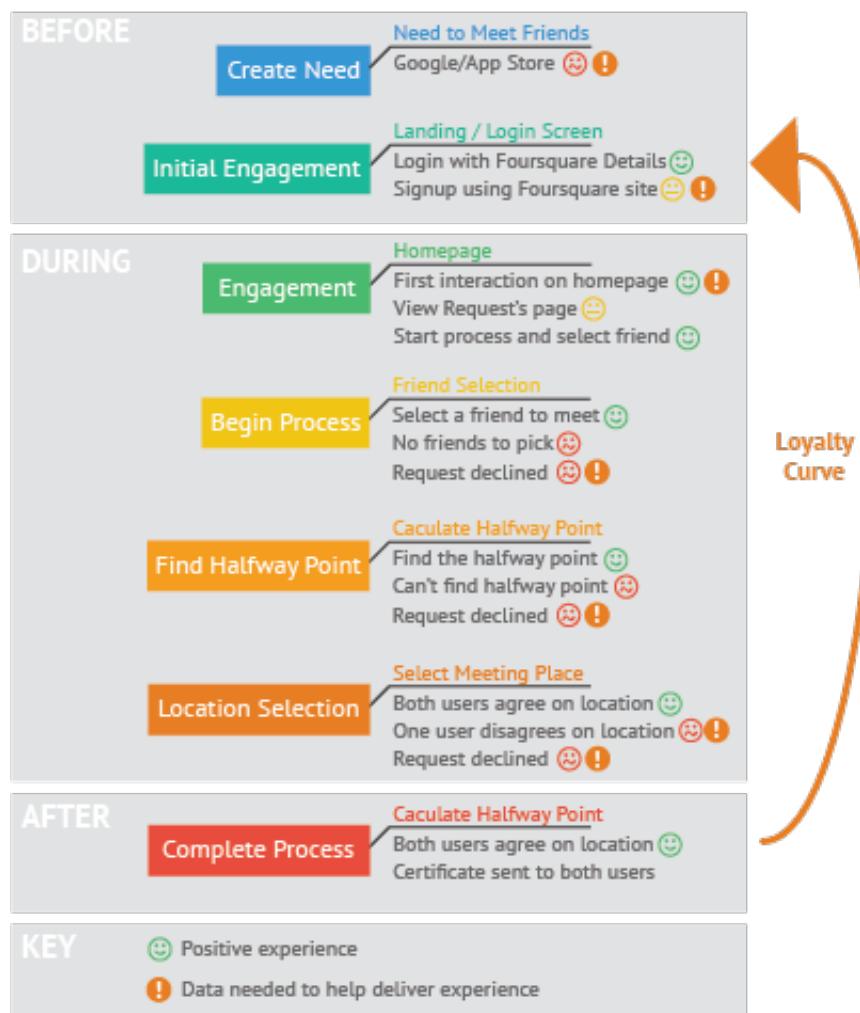


Figure 3.23: Experience Mapping

3.1.6 - Voice & Tone

As stated in the main aims and objectives, it is very important the user's experience with Meet You Halfway is optimised as much as possible. With the correct use of voice and tone, the user's will perceive the friendly, helpful, interesting and overall pleasant persona that was planned and refined in these design stages. The overall personality will account for the tone set and the language style chosen to set that tone. By setting an appropriate attitude in regards to the use of language relating to the service, it can help users to feel more comfortable about the service and add to the overall experience. Setting an appropriate attitude is very important if the user's respect is to be achieved. Respect is the main mechanism for expressing that there is value placed in the user. The main aim with the personality of Meet You Halfway is to make the user feel respected and welcomed.

This personality can be achieved by the use of voice and tone. The aim with the voice and tone was to set a fun, professional and quirky personality which can be achieved through various elements, including how information is worded and structured as well as colour and layout. With the main aim of the application to have a simple user interface, this can be created and complimented with the use of fun, laid back language rather than using default distant formalities.

The nature of Meet You Halfway is a fun, sociable and friendly and is reflected in the use language and tone. An example of this being demonstrated in the application would be the final message the user will see when they have selected and confirmed a venue to meet.

You and **Rogue X-man** have decided to meet at **Pavilion Bar**.

Don't forget to have fun!

Figure 3.24: Voice & Tone Example

3.2 - System Design

Following the UX design process, the next phase was to outline the deign of the actual system and what it would entail. During this stage various elements were well planned and processed. By carrying out continuous research and experimentation with various sorts of code and documentation, the requirments needed to develop Meet You Halfway were more defined and clear.

3.2.3 - System Structure

In order to attain the main aim of creating a basic functional application that connects two friends through Foursquare and find the halfway point so they can select a venue to meet, the design of the system structure will have to be well researched and planned. The navigation needed to be stable and fluid so that the user can easily make their way through the processes.

Once the user access www.meetyouhalfway.co.uk they are directed to the landing page. From here the user can either login with their Foursquare details or select the signup button which will be an external link to Foursquare's own signup page.

Once logged in, the homepage is where all the rest of the processes are carried out. The homepage will contain the links to begin the process to meet a friend or view any pending requests. But the user will never leave the Homepage during any process.

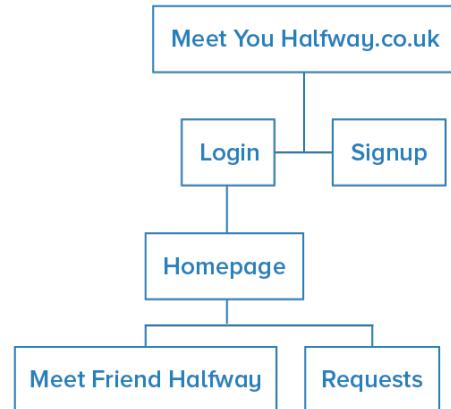


Figure 3.25: System Structure Navigation

3.2.2 - Identify Elements & Technologies

To help further the development of the system's structure, the different elements that would be needed to build the processes, needs to be researched and defined. Upon following up this research, the elements that were necessary are listed below along with the technologies that were best suited to carry out each element:

📍 **Login Function** - This is the first element that needed developed. Upon researching what this element entailed, a combination of Foursquare's API and PHP was most appropriate. Before the user can avail the service that Meet You Halfway offers, they must first be a member of Foursquare, and if not, the signup link will redirect them to the signup page. Here the API will generate the oath access tokens needed to generate the user's information for the homepage. Once the user logs in, and if it is their first time logging in, their data will be added to the database using MySQL. When the user logs in, the browser will prompt for permission to find current location which is achieved through the geolocation API.

📍 **Friend Selection** - The next element identified and developed was the friend selection. The friends list is generated using the same combination of Foursquare's API and

PHP. By having the user's Foursquare Id, it can be passed back into another request call which will return all the user's friends and their details. This information can then be rendered using PHP. The friends list is where the main process of meeting a friend halfway is triggered. Once a friend is selected to meet halfway, PHP will generate the information needed to send the email and the Javascript will send it. As the users selects a button to trigger this event, soma AJAX was needed here to stop the page refreshing. Once a friend request is sent, this information is also sent to the database with MySQL. When the request is sent, the user's current coordinates are sent to the database so that they can be called at a later stage in the process.

- 📍 **Find Halfway Point** - This element will occur once both users have agreed to meet. By accepting a request to meet, this will trigger the process of finding the halfway coordinates. The database will be updated with the request as well as both the user's current geolocation coordinates, which were found using Google Map's API once the users logged in. This process will require both sets of coordinates for the calculation of finding the midpoint. Once both locations are found, they are called from the database via PHP so the halfway point calculation can be executed within a PHP function. Once the halfway latitude and longitude coordinates are found they are sent back to the database.

```
//find the halfway points
$user_a_coords = find_coords_by_user_id($user_a_id);
$user_a_latitude = $user_a_coords['Latitude'];
$user_a_longitude = $user_a_coords['Longitude'];

$user_b_latitude = $user_b_coords['Latitude'];
$user_b_longitude = $user_b_coords['Longitude'];

$halfway_latitude = ($user_a_latitude + $user_b_latitude)/2;
$halfway_longitude = ($user_a_longitude + $user_b_longitude)/2;
```

Figure 3.26: Halfway Point Calculation

- 📍 **Decide on Location** - This was the last element identified in the process for Meet You Halfway. This is when the user's halfway coordinates are called from the database using PHP and then sent to Foursquare using an API. This API will use these locations and generate a list of venues in that area. From the list, the users will be able to pick a location to meet. In the early stages of the system design it was planned to allow the users the ability to decline a venue choice and then they could choose a venue. But through further into the development and implementation stages, to achieve the objective of developing a functional application was more programming intensive than originally predicted. Therefore this function has been demoted to a non functional requirement. So presently, once a user selects a venue to meet halfway, the other user only has the option to accept or cancel the request all together. This will most certainly be a feature included within the next build release.

3.2.3 - Element Relationships

Once the elements needed for the basic functions of Meet You Halfway were identified, the next stage was to distinguish the relationships between them. The diagram outlining the relationships can be seen in **appendix 3.4**.

3.2.4 Languages, Frameworks & API's

In order to fully develop all the elements that were identified, researched and refined, a combination of various tools would be necessary, including different programming languages, open source frameworks and API's.

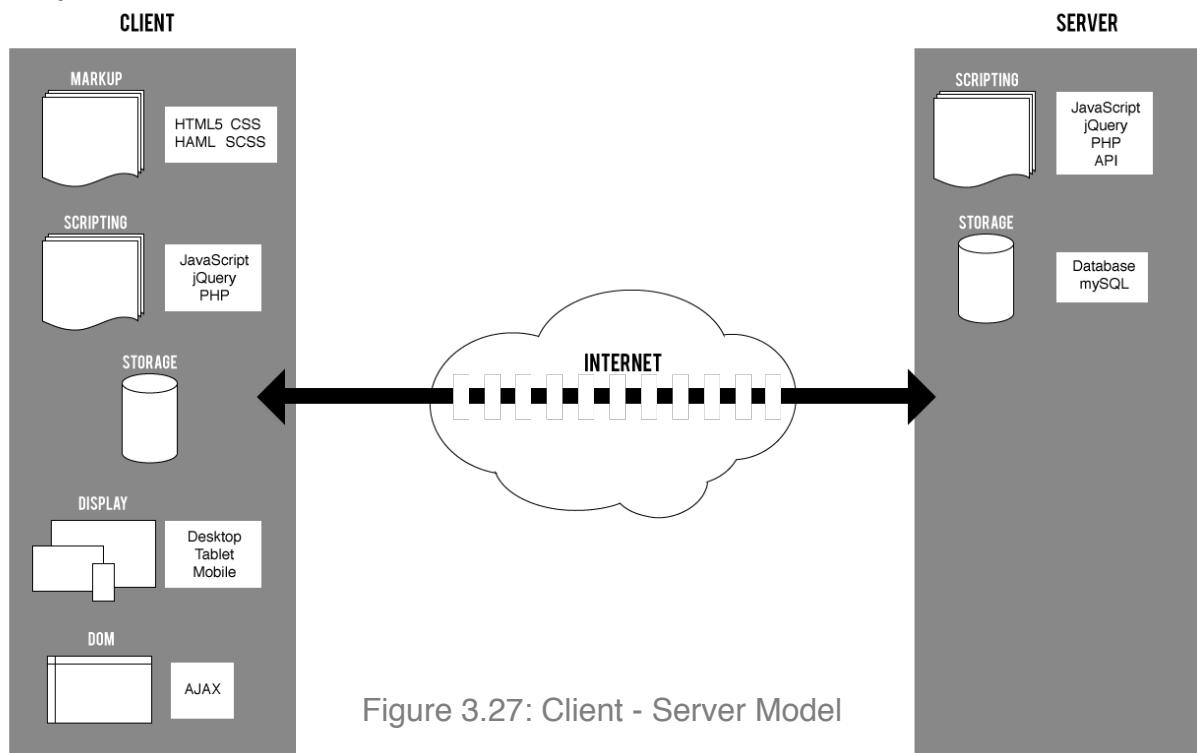
- 📍 **Languages** - To develop the elements that have been discovered during the system design stages, a combination of different languages would be necessary. HTML(5) and CSS(3) will build the foundations of the webpages and style them. PHP will be used to delegate information to and from the API's as well as used to render these pieces of information and connecting to the database. MySQL will be used to query the information that will be passing back and forth from the application. Dynamic elements will be developed using a combination of Javascript, jQuery and AJAX.
- 📍 **Frameworks** - Due to previous experience in dealing with the open sourced framework from twitter, Bootstrap, it was an instant choice of framework. Bootstrap will enable quick development of responsive and pre styled code. An advantage of using this framework, is its ability to work across all browsers and screen sizes. With previous experience in this framework, customisation on code styles will also be quickly and easily achieved.
- 📍 **API's** - The use of API's is a major necessity in Meet You Halfway. As the application is about meeting with friends in different venues in different areas, it was clear that the vast databases of information on users and venues in Foursquare would be most useful therefore there is a lot of advantages to using their API's. There will be an API call needed for the login to find the user's information. Another call to find the user's friends list and finally another API call to generate the list of venues the user can pick from. Another API that was needed, was Google's own Map API. Before the list of venues at the halfway point can be rendered, the system first needed to geolocate both user's current location. Therefore Google's Map geolocation ability was perfect for this element.

3.3 - Logic Design

The logical design of Meet You Halfway was the stage of the system's design, when the data flow of inputs and outputs for the application were considered and planned.

3.3.1 - Client - Server Model

As the logical design of the data flow for Meet You Halfway was being fully explored, a very useful tool that was utilised at this phase, was the creation of a Client-Server Model, **figure 3.27**. Client-Server models are very beneficial in illustrating the software architecture and would be advantageous in further refining the logic design of Meet You Halfway.



3.3.2 - Platform Architect

By developing an accurate system platform architecture can help to ensure that the system's design for the application is strong, delivering and fully optimised for the purpose it was developed for. This can also help to ensure that the end user will be able to access the application and efficiently make their way through the process of inputs and outputs and still reach their end goal with no issues. A sequence diagram was the next tool that was used to help represent the flow and collaboration of messages, events and decisions between the components and processes of the system. A reason this form of diagram would be beneficial is how it can recognise the interface as well as the potential for logical problems early on in the development stages of the application. This diagram visually

represents how the system architecture would handle different basic scenarios and how valid the architecture, interface and logical of the overall system would be. The diagram below visualises a high level view of the potential of Meet You Halfway's system behaviour.

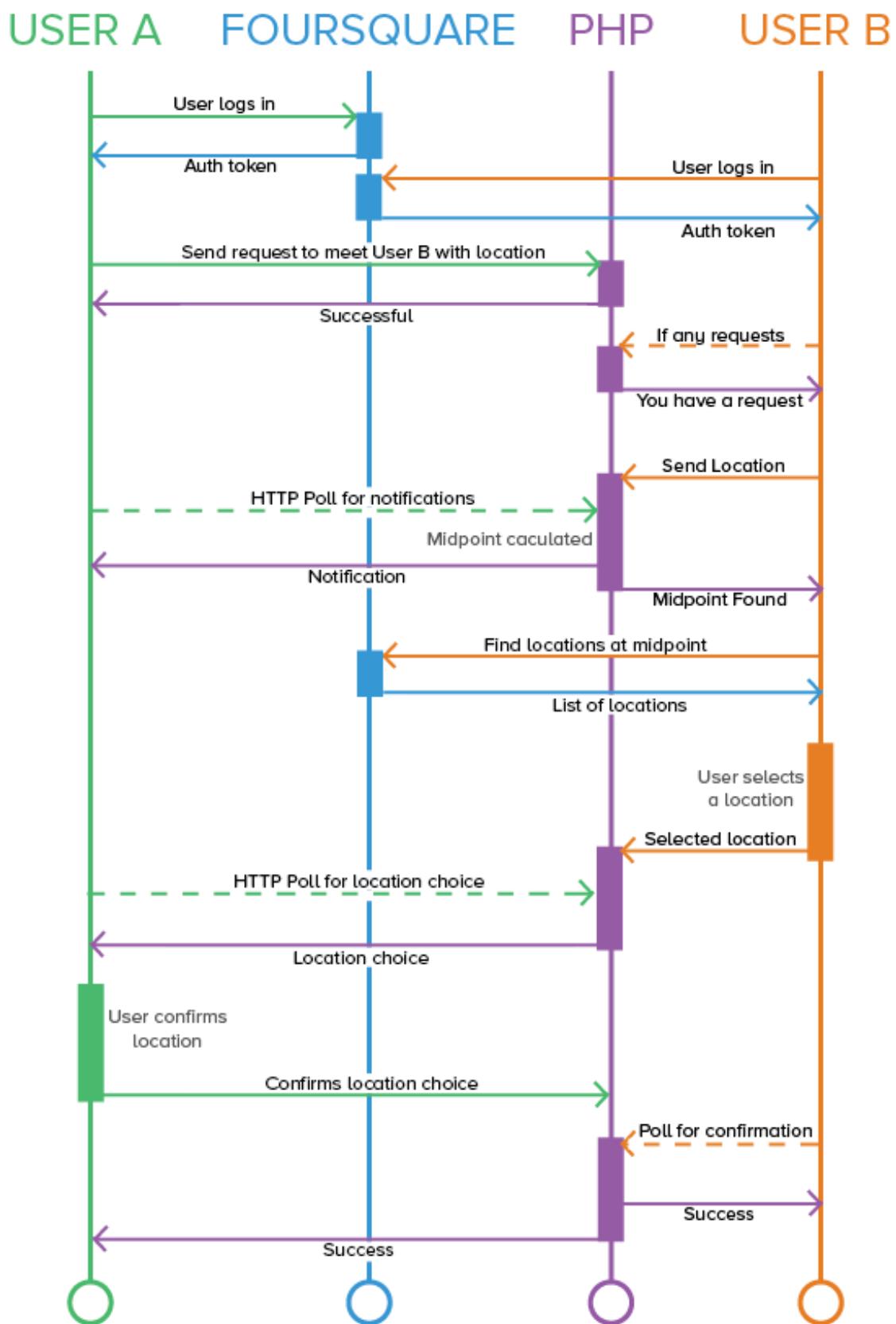


Figure 3.28: Sequence Diagram

3.4 - Data Design

Another aspect of the system's design that needed planned before the development stages was the data design. The data design is vital to get correct before the development stages because errors in the data design can cause unknown errors in the code which can be very time costly.

Data design is a specialised format for organising and sorting the data to suit a specific purpose so that it can be accessed and worked with in appropriate ways regarding the system. This can be a collection of data items that are stored in memory, in relation to Meet You Halfway, i.e. a database. The inclusion of a database means that there are relationships that exists between the data items. Therefore these relationships need to be defined and how they would appear in a database. In relevance to Meet You Halfway, there are countless processes that require the need of a database. One of the main purposes of the database being that during the process of meeting a friend halfway, both the user's Id's, latitude and longitude coordinates need to be stored and queried multiple times. The data structure design of the database that will be needed for all the processes within the application is presented blow, demonstrating all the necessary tables and field of information that will be saved, quieted and updates during the process of meeting a friend halfway.

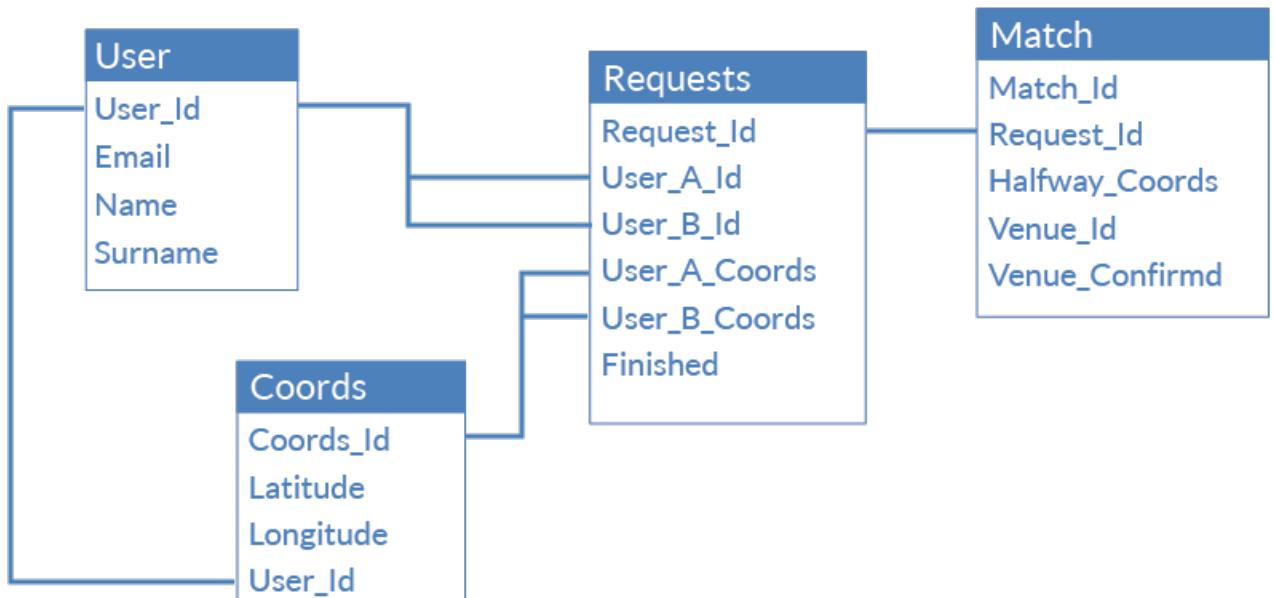


Figure 3.29: Data Structure

4.0 IMPLEMENTATION

4.1 - Technology / Tool Selection

After the planning and design stages were completed and finalised it was then time to begin the actual build of the project and develop an application that would connect two friends through Foursquare, find the halfway point between the two and present them with a list of possible venues to meet at. Following the research into what technologies and tools were necessary to make this process functional, and what order these processes needed to be carried out in, it was time to put the time spent on experimentation to work and begin to build the foundations of what would be needed.

The tools and technologies needed to develop this application were previously outlined during the System Design phase, meaning that before the implementation stages, these technologies could be examined and time could be spent understanding relevant documentation. By spending time experimenting and understanding how these technologies operated, meant building confidence in areas that were new, thus ensuring that the objective of completing the project before the deadline would not be jeopardised.

One of the main pieces of technologies and tools that were predicted in the planning stages, was the need of Foursquare and their API's. As API technology was a new field of technology, time was dedicated to searching through the developer documentation[[see appendix 4.1](#)], in order to get a better understanding of the types of API calls that would best suited to Meet You Halfway. By using the API Endpoints section on the Foursquare site, the range of different data types that could be called were listed here and so a better more informed decision was made on the certain types of information to be used. Using the API Explorer tool meant the information inside these different areas could be further researched. After examining these tools and documentation, the selected API requests that would be implemented was the user platform where the user's info, the leaderboard stats and their friends info could be called. Venue platform was another API request that was selected for the application.

```
//connection to the foursquare user's api with oauth token
function get_foursquare_userinfo($access_token){
    $userinfo = file_get_contents("https://api.foursquare.com/
                                v2/users/self?v=20130815&oauth_token=".$access_token);
    $decoded_userinfo = json_decode($userinfo, true);
    //return the data about the user and their profile on foursquare
    return $decoded_userinfo['response']['user'];
}
```

Figure 4.1: User API Request to Foursquare

As there was multiple requests being send to Foursquare, they shared a very similar layout as this saves time and kept the code clean and understandable, [\[see appendix 4.2\]](#).

Another technology that was selected because it helped to gather the user's current location, was Google Map's API. As the application is all about finding a place to meet halfway, the halfway point first needed to be calculated, which is possible through selecting the Google Map's tool. By adding the geolocation javascript to the homepage via a php include, once the user logs in, they will be prompted for permission for the browser to find their current location. This tool was also selected due to the feature of showing the user's current location on a map in the user dashboard which was considered a welcoming feature. This tool offered many advantages and was relatively easy to customise. In relation to Meet You Halfway, the scrolling to zoom features has been removed etc.

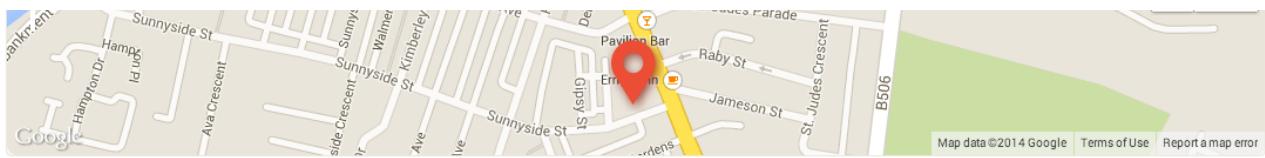


Figure 4.2: One Example of Google Maps API in Meet You Halfway

Another tool that was selected to help the implementation stages of Meet You Halfway, was the free open source framework, Bootstrap. Bootstrap offers a wide range various tools, including predesigned responsive code with javascript and dynamic elements. By linking the Bootstrap files meant the use of their predefined classes and id's making it relatively easier and faster to code up pages and elements. Although the elements have a set default style, due to previous experience, it was relatively easy to change styles and customise them to better suit the style of Meet You Halfway and make changes where it can help optimise the user interface, [\[see appendix 4.3\]](#).

To help fulfil the objective of a clean, enjoyable interface, another tool that was selected was Font Awesome. This tool was designed to work best with Bootstrap and offers the ability to include "scalable vector icons that can instantly be customized — size, color, drop shadow, and anything that can be done with the power of CSS." [\[See reference 4.1\]](#). Font Awesome was a very useful tool as the use of its easily styled, nicely designed icons helped the layout remain clean, quirky and enjoyable. Below is an example of how Font Awesome was utilised throughout Meet You Halfway.



Figure 4.3: Example of Font Awesome Being Used

4.2 - Technology / Tool Use

After deciding upon the tools that would be needed to generate all the necessary information to fulfil the criteria of meeting a friend halfway, it was time to develop all the technology and combine them together to fulfil the objective of creating a fully functional application.

Once all the API's were implemented and fully functional, it was then time to retrieve the data that would be necessary for the application to carry out its main function, as well as any extra information that will be rendered on the homepage. This was achieved with a combination of the API's and PHP. The API Explorer tool on the Foursquare website presented the list of the available information that could be called with their labels that would be needed to call this information. Below, **figure 4.4** and **figure 4.5** shows the information to be called, and the php that used to call the information.

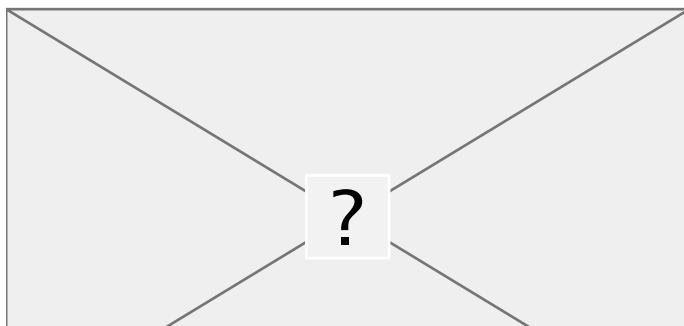


Figure 4.4: User API Explorer Info

```
$user_id = $user_connection['id'];
$name = $user_connection['firstName'];
$surname = $user_connection['lastName'];
$gender = $user_connection['gender'];
$bio = $user_connection['bio'];
$avatar_pre = $user_connection['photo']['prefix'];
$avatar_suf = $user_connection['photo']['suffix'];
$avatar_size = "/150x150";
$home_city = $user_connection['homeCity'];
```

Figure 4.5: User_Helper.php

To call the information from the API, the data must be given variable names, then this name can be echoed throughout the homepage using PHP. It became apparent that not all pieces of information that was being called from Foursquare, was present. Examples, which are vital to Meet You Halfway included the user contact information. It is not required to enter a Facebook, Twitter or even display an email address which can be problematic as the email address is used to send a form of notification within the application. Therefore most variables are inside an if statement checking if the data is entered. If not, a class will be added to disable or hide that piece of information.

```
if (isset($friend_facebook) && !empty($friend_facebook)){
    echo "<a href='http://www.facebook.com/<?php echo $friend_facebook; ?>' alt='facebook link'>
        <i class='fa fa-facebook'></i>
    </a>";
} else{
    echo "<a href='http://www.facebook.com' alt='facebook link' class='disabled-link'>
        <i class='fa fa-facebook'></i>
    </a>";
}
```

Figure 4.6: If Statement For Presence Check

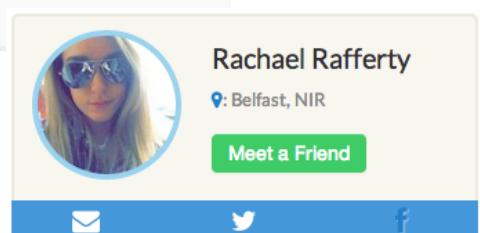


Figure 4.7: Result If No Information

In order to call any information from the API's, they all must be given variable names, therefore all the necessary calls from Foursquare share the same basic layout, which means the code is clean and easily understood, [[see appendix 4.4](#)].

The next stages of reaching a fully functional application was to develop the database that was planned earlier in the application. This involved using phpMyAdmin. This is where all the information regarding the process of meeting a friend halfway will be saved, [[see appendix 4.5](#)].

Once all the information was available, it was then time to build the rest of the application and the functions it would need to allow users to meet halfway and pick the venue to meet at. To begin with, a number of basic php functions had to be created to send information back and forth from the database. With any new information, it had to be checked if it existed in the database already and if not, a new entity would be created. Every table in the database will have a create function [[see appendix 4.6](#)].

```
//insert the match's data into the database
function create_match($request_id, $coords_id){
    //connection to the database
    global $db;
    error_log("Create match $coords_id");
    query("INSERT INTO `Match` SET Request_Id = $request_id, Halfway_Coords = $coords_id");
    $match_id = mysqli_insert_id($db);
    $match = find_match($match_id);
    //this will be the match after the user accepts the request
    return $match;
}
```

Figure 4.8: Create Function For Matches

As well as a create function, each table in the database will have a Find query where all information is returned, [figure 4.9](#). They will also also have a Find_By_Specific_ID query relative to the data, [figure 4.10](#). This function will make finding specify data much easier. There will also be instances where the new fields that are created will be missing information that can only be gathered during or at the end of the process of meeting a friend. Therefore update queries also had to be developed, [figure 4.11](#). As the functions carry out similar processes, again their layout was very similar.[[see appendix 4.6](#)]

```
function find_request($request_id){
    //connect to the database
    global $db;
    $request_result = mysqli_query($db, "SELECT * FROM Requests WHERE Request_Id = '$request_id' LIMIT 1");
    if(mysqli_num_rows($request_result) > 0){
        $request = mysqli_fetch_assoc($request_result);
        return $request;
    } else{error_log("Request not found $request_id");}
}
```

Figure 4.9: Find Request Query

```
function find_coords_by_user_id($user_id){
    $result = query("SELECT * FROM Coords WHERE User_Id = $user_id LIMIT 1");
    if(mysqli_num_rows($result) > 0){
        $coords = mysqli_fetch_assoc($result);
        return $coords;
    } else{error_log("Could not find coord for user $user_id");}
}
```

Figure 4.10: Find Coords By User Id Query

```

function finish_request($request_id){
    global $db;
    query("UPDATE `Requests` SET Finished = true WHERE Request_Id = $request_id");
}

```

Figure 4.11: Finish Request Update Query

In order for these functions to be carried out, they first need to have the information sent from the API's. As well as the main php files with the function, the data from the API's have to be sent using a “POST” method as shown below. Each main function also requires POST methods, which again are all developed in the same manner.*[see appendix 4.7]*

```

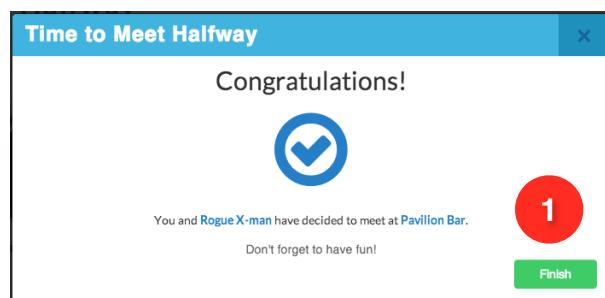
<?php
require_once 'php/match_request.php';
$request_id = $_POST['request_id'];
$latitude = $_POST['latitude'];
$longitude = $_POST['longitude'];
accept_request($request_id, $latitude, $longitude);
?>

```

Figure 4.12: POST Method For Latitude & Longitude

Once all the php functions were developed, it was time to develop the process of selecting a friend, finding the halfway point and then showing a list of venues to pick from. This was developed using a combination of php if statements to question if a particular criteria is met, example being, once the user logs in, if they have a request waiting for their confirmation, show the new request modal. For every step in the process of meeting halfway, there will be an if statement searching for particular information, is there a request waiting, has the other user selected a venue to meet etc. Modals were needed for every part of this process for the user to interact. Each modal was designed to have a trigger button which would carry out a javascript function to begin the next stage in the process by sending the appropriate data. Below shows the venue confirmation process. Once both users have agreed on a venue to meet, the request can be marked as complete in the database. Therefore when the user's select the “Finish” button, data is being sent through the button click by javascript and AJAX to the finish.php which is received by the request.php file where the “Finished” column in the requests table will be updated.

```
<button class="btn btn-success" onclick="finished(<?php echo $request['Request_Id']; ?>)">Finish</button>
```



```

function finished(request_id){
    $.ajax({
        method: 'POST',
        url: 'finished.php',
        data: {request_id: request_id},
        success: function(data){
            refresh();
            //Should updating database
        },
        error: function(){ alert("data not sent"); }
    });
}

```

```

function finish_request($request_id){
    global $db;
    query("UPDATE `Requests` SET Finished = true WHERE Request_Id = $request_id");
}

```

1

2

3

Figure 4.13: 1-2-3 Step Process when “Finish” Button is Selected

4.3 - Notable Challenges

For the duration of planning and developing the project, Meet You Halfway, there was numerous occasions where different challenges were encountered which had to be overcome in order to reach the objectives of developing a fully functional application that connected two users to find the halfway point.

From the beginning, there was always the obstacle of dealing with API's and being able to include them within the application. During the initial planning stages, gaining experience and time for experimentation was made an objective. As there was a lack of experience in dealing with API's, the implementation of various API's was seen as a daunting challenge. In order to overcome this challenge, various amounts of time were spent, reading developers documentation from multiple sources, as well as online tutorials. In doing so, confidence grew in understanding their operations. This meant that when it came to implementation, API's were no longer a challenge and no time was lost.

Halfway through the development of various prototype versions, Foursquare updated their API's. As experience in these features was still not strong, this was a very challenging aspect. But after spending some time researching the issue, it was discovered in Foursquare's own documentation that all API calls now needed a version parameter. After reading the release updates on the Foursquare website, this challenge was easily overcome by the inclusion of a date in all the request calls made to Foursquare.

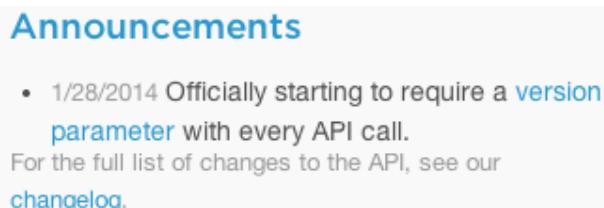


Figure 4.14: Foursquare Developer Announcements Section

Another notable challenge was being to develop all the originally planned elements and functions before the deadline. During the planning stages, there was a lot of different elements there were going to be included, but once the development of the application began, the work involved was more programming intensive than expected which meant more time was spent on aspects than planned for. Therefore some of these elements had to move to out of scope functions such as having the application fully responsive. By prioritising certain elements, the objective of developing a fully functional app before the deadline was still achieved and there are much more elements to include in the next build.

4.4 - Notable Achievements

From the beginning to end of the project, Meet You Halfway, there were many occasions where there were challenges that were overcome as well many achievements throughout the process of creating a social application that Foursquare users could use.

During the planning stages, there was many ideas for features to be included within the application, but the main function was always to be, two friends sign in, the halfway point is found and they users can pick a venue at that location. Personally, the achievement was being to build and create a fully functional application that carried out these functions successfully. The sense of achievement stems from the acknowledgment that before the project began, there was no understanding on how API's could be used and implemented. Another reason for noting this as an achievement is do to the amount of programming that was necessary for this project to function. Although there was a good base knowledge in programming and dealing with php and databases, there was a great element of the unknown before building this project but with the help of friends and online research, the elements needed to make the project function were completed resulting in a successful application.

Another achievement is the steep learning curve that was accomplished in completing this project. Now that a basic prototype has been developed, there is now the knowledge, motivation and enthusiasm to continue to develop this application further and implement more functions and elements.

Another personal notable achievement was the success of the overall design of the Meet You Halfway and its branding. Although the function looks very basic, there is still a sense of achievement in the design of the logo and the interface of the application. After consulting a professional UX designer, their positive feedback was very encouraging. As well as the prototype being very basic, so is the amount of dynamic and design elements in the application. With time being the main challenge, functionality was prioritised over design, but the overall look and feel of the design is personally an improvement and an achievement.

5.0 TESTING

5.1 - Testing Approach Selection

Once the project had been completely developed and was fully functional, it was then time to begin the testing processes. Before releasing Meet You Halfway to the public, the application had to undergo various methods of testing to ensure not only was the functionality completely operational with no errors but also to gage how well user's found the processes of the system and how easily they found it to navigate through. Not only will testing highlight any potential bugs in the system, but it also gives the opportunity to hear user's opinions and feedback on the overall application. This feedback can be gathered and analysed into data which will indicate what changes need to be made and where, all before the release of the application. Testing overall, offerers the ability to test and make changes to the application so that before the launch of Meet You Halfway, it has been tested for any potential errors and the flow of the processes have been amended in accordance to the testers preferences. There are various methods and tools that be used for testing an application, all of which offer different results due to different criteria each tool entails. After spending some time looking into the various methods of testing, there were three approaches that were decided most beneficial to Meet You Halfway.

The first testing approach to be selected was White Box testing. This form of testing was used to test the internal structures of Meet You Halfway rather than testing the functionality and processes that that the user will see. For this form of testing the user must have a knowledge of how software is implemented. This method of testing can undercover many errors within the code. To carry out white box testing the user choses inputs to enter into the program to exercise paths throughout the code in order to determine the appropriate outputs. These forms of testing and their outputs will only be accurate if the tester is aware of what Meet You Halfway is and can only be effective if the user is already aware of what Meet You Halfway is supposed to achieve. This way, they will be able to gage if the programme diverges from its intended goal.

Another form of testing that would complete the software examination process is Black Box testing, therefore this was another obvious testing approach selection. This method of testing involves the examination of the functionality of the application without the knowledge of how the core processes were implemented. This means that the testers will only need to be aware of what Meet You Halfway is supposed to do and not how it does it.

This process requires the user following a set of test cases, so they can test each process and compare the result to the expected result and simply answer, if the test was successful, “is”, or if the result is not the expected outcome i.e. it fails and “is not”. With the main advantage of black boxing testing, being that the tester does not need to have a background knowledge in programming, it means that the experience of these testers can be of the same experience levels of the potential real world users. Resulting in the usability of the application also being tested.

Developing user surveys was the last testing tool that was selected for the testing selection process of Meet You Halfway. Creating simple surveys was a great way to offer users the opportunity to share their thoughts, opinions and feedback on how easy they found the use of the application and its overall design. Selecting user surveys as the last selection tool had many advantages. Aside from being relatively easy to administer, user surveys do not require a lot of time to develop and can contain numerous amounts of tailored questions about the application, covering a wide range of data that can be collected. Once the user surveys are completed, they can be gathered and the feedback can be analysed into quantitative and qualitative data, in hope to highlight any areas within the application that needed addressing or tweaking to better satisfy the needs of the users. User surveys was a very helpful tool in ensuring that the main aim of developing an application with an interface that users find fun, easily understood and pleasant.

5.2 - Test Process

Once the testing tools had been selected and researched it was then time to begin the testing processes for each method. During the testing period, any potential bugs or errors inside the code would hopefully be discovered and corrected ensuring that the version of the application released is as error free as possible.

The first tool that was decided for Meet You Halfway was White Box testing. This form of testing is carried out not only at the end, when the project had been fully developed, but during the code development and implementation stages. During these stages there was need for constant testing to ensure that the functions being written were correct so that the data being inputted into the program returned the appropriate output. This was most beneficial during the development of the PHP functions that were used to send data back and forth from the database. It was essential that these functions were correct otherwise the system would not operate properly and the objective of developing a functional

application would not have been attained. A tool that was used to achieve this was the php error_log() function. This function will send any errors or messages inside the brackets, to the server's error log which can be seen in the terminal after writing the command "php_log". The php_log command will show the list of errors that are happening inside the php of the application. This was used throughout most functions in the php, of Meet You Halfway, to return values and messages to the error log to help gage if the values, if any, were successfully being called and were following the processes in the correct order. This meant that the output of each function could be seen to ensure that the correct information was being sent out to the next function or database. This was particularly helpful to ensure that the halfway coordinates were found and calculated correctly. To check, an error_log messages was inserted inside the accept_request function where the halfway coordinates are calculated.

```
$halfway_latitude = ($user_a_latitude + $user_b_latitude)/2;
$halfway_longitude = ($user_a_longitude + $user_b_longitude)/2;

error_log("Halfway point $halfway_latitude , $halfway_longitude");

$halfway = create_coords($halfway_latitude, $halfway_longitude);
```

Figure 5.1: Error_Log Inside the Accept_Request Function

```
Create or update coords for 56291304
Could not find coord for user 56291304
Creating coords for 56291304
Halfway point 54.5756 , -5.91789
Creating coords for halfway point
Create match 3
```

Figure 5.2: Error_Log Message in PHP_Log

| Coords_Id | Longitude | Latitude | User_Id |
|-----------|-----------|----------|----------|
| 1 | -5.23999 | 54.1126 | 75436744 |
| 2 | -5.91789 | 54.5756 | 56291304 |
| 3 | -5.3491 | 54.6835 | NULL |

Figure 5.3: Successful Test Result, Coords Created

5.2.1 - User Survey Questions

The next process for testing was developing the user survey and the questions it would contain. Ensuring the phrasing in the questions was matching the tone and personality of Meet You Halfway, they also had to be carefully worded in order to get useful feedback. After researching possible questions styles, there was 8 questions devised:

- 📍 **Q1. Would you recommend Meet You Halfway to a friend?** - This question was a great way to find the user's opinion on the application as a user would not recommend something they themselves did not like/enjoy. Instead of including just "Yes" or "No" fields, an option to allow the user to explain their answer was also added. This gives users a chance to describe what they selected and why, thus giving better feedback.

- 📍 **Q2. In one or more words, how would you describe Meet You Halfway?** - This question was very useful for understanding the users perception of the application as well as giving the users the freedom to enter their own words.
- 📍 **Q3. What did you like most about Meet You Halfway?** - As well as being able to discover areas that the user feels works really well already within the application, these will be areas that do not need any improvements.
- 📍 **Q4. What did you like least about Meet You Halfway?** - This offers users the chance to list areas in the application they felt didn't work so well and these will be the areas that need improving.
- 📍 **Q5. How did you find the overall ease of use for Meet You Halfway?** - An important question to investigate the usability. With options to pick from there will also be a "Why is this?" follow up question so the users can express why they feel that way.
- 📍 **Q6. Out of 10, what score would you give Meet You Halfway?** - Similar to the online shopping surveys for rating products, this offers the users flexibility to rate the application out of 10, along with an option to justify their choice.
- 📍 **Q7. Have you any ideas/suggestions on how to improve Meet You Halfway?** - This question was designed to gather general user feedback regarding the application as well as potential improvements and ideas for beta releases.
- 📍 **Q8. Is there anything else you would like to share with us?** - This offers the user a great opportunity to express anything that may have not been covered by the survey. Although it will not be a required answer, some could be potentially interesting.

5.3 - Test Results

Cross-browser was another form of testing that had to be carried out to ensure that the application was fully functional and still user friendly, regardless of the browser that the user access the application on. If the quality of the user experience is to remain the same across the different browsers, then the application had to be accessed on all the major browsers and then tested from beginning of the process of logging in, all the way through to the end, to confirming the place to meet halfway. Following some research, it was decided that the main browsers that should be tested were Firefox, Google Chrome and Safari.

- 📍 **Chrome** - As this was the browser used during the development stages, it was safe to predict that these tests were accurate and the benchmark in terms of functionality and usability for the other browsers to attain.

📍 **FireFox** - As this is another very popular and well used browser, it was very important that Meet You Halfway was fully functional and still maintained the high level of user interface. By carrying out a full process from start to finish, the test proved very successful and the application works perfectly on Firefox, [\[see appendix 5.1\]](#).

📍 **Safari** - This was the last browser that Meet You Halfway was tested on. As this is also another very popular browser, it was very beneficial to ensure that the application worked correctly here too. Following a full test, the application's processes work perfectly on Safari as well. Aside from some minor css changes, such as bold fonts appearing normal on places, etc the overall user interface is still satisfactory, [\[see appendix 5.1\]](#).

Another benefit to making the cross browser testing stage more smooth, was by including the Bootstrap tool as it was designed to work across the different browsers, therefore this made a lot of elements inside Meet You Halfway also work across the different browsers.

Following the white box testing and the creation of the user surveys, it was then time to review the black box testing that was carried out on the main functions of Meet You Halfway and the results that they produced. In order to ensure that from a user's perspective, the main processes of the application worked correctly and were easily followed, a black box test was created for each main function, [\[see appendix 5.2\]](#)

| Test Id | Test Name | Description | Expected Results | Actual Results |
|---------|-----------|---|--|--------------------|
| 1 | Login | The user should be able to login using their Foursquare details | Login successful, redirected to homepage | Login unsuccessful |

This first test was unsuccessful but this was due to the user not having a Foursquare account, which for Meet You Halfway is essential. But this was a very good result as it meant the user then had to select the signup button.

| Test Id | Test Name | Description | Expected Results | Actual Results |
|---------|-----------|---|--|-----------------------------------|
| 2 | Signup | User selects the signup button and will be directed to the Foursquare signup page | Signup button redirects user to Foursquare Signup page | Signup button redirect successful |

This second test was to ensure that if the user did not have a Foursquare account to login, then had a quick link to direct them to signup so they could then comeback to Foursquare to login.

| Test Id | Test Name | Description | Expected Results | Actual Results |
|---------|---------------|---|--|--|
| 3 | Select Friend | User should see list of their Foursquare friends and should be able to select one to meet | From list of friends, select the one to meet Click button will display success modal when email has sent | Successful, selected friend to meet, success email sent notification |

Black Box test 3 was also successful as once the user selected a friend to meet, a success modal appeared to inform the user that a notification was sent to their friend, meaning that the friends contact information was successfully pulled from the API.

| Test Id | Test Name | Description | Expected Results | Actual Results |
|---------|----------------------|---|--|---|
| 4 | Notification Request | If a user has been selected to meet halfway, there will be a notification waiting as soon as they login | Once user logs in, notification modal waiting as well as notification badge on Request link in nag | Successful, as soon as user had a request, notification modal appeared onscreen |

Test number 4 was also successful as once the user had been selected to meet halfway, a notification modal appeared on their screen, once the browser refreshed. This means that the request information was successfully sent to the database and called to the approbate user, once they logged in.

5.4 - User Survey Responses

Once the user survey questions had been well researched and finalised, it was then time to design up a user survey so that the responses could be gathered and analysed. Rather than spending various amounts of time manually creating the surveys and handing them out to users for feedback and running the risk of not receiving many responses. It was decided to utilise an online web service that offered the ability to create online surveys. After researching the possible services, it was decided to use SurveyMonkey.

SurveyMonkey is an online tool which allows users to create their own surveys using pre designed question format templates. Another benefit that makes this tool most appropriate for the user survey testing process, was that once a user fills in the form, it can be instantly viewed and reports can be generated. The finished survey can be seen in [appendix 5.3](#).

In order to get a better understanding of how the users perceive and think about Meet You Halfway, 5 user surveys were sent out. One for a user on mobile, two for users using Chrome, one for Firefox and the last survey for a user using Safari. All the surveys were completed and sent back to SurveyMonkey where the money results could be analysed.

The first question being would they recommend the application to other users proved very positive with a four out of five result in users recommending Meet You Halfway to their friends. The only user who said they would not, was the user testing the application on a small tablet/phone. This result was justifiable as the application, although functional, it is not user friendly and hard to understand and therefore this result was expected. The application was still tested on the smaller screen size to ensure that the main processes could still be carried out.

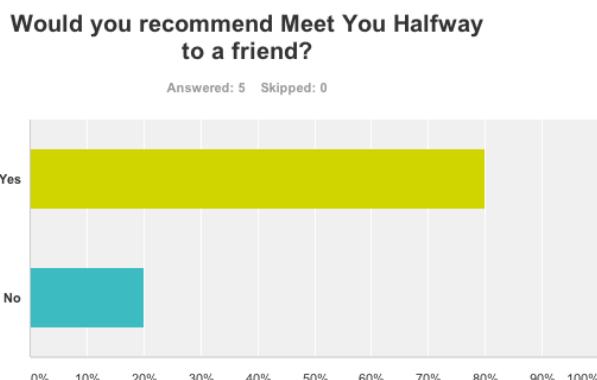


Figure 5.4: Recommendation Survey Results

The second question allowed the user to describe the application using their own words, most of which were very positive, again the negative being that it was not responsive.

Unique. creative Colorful Not user friendly as was not made for phones user friendly

Figure 5.5: Words to Describe App From Surveys

The third and fourth questions, focused on what the users liked and disliked most about Meet You Halfway. There was a common element in the positive feedback being the idea behind the application and its design. The negative had a verity of feedback, all which can be considered for the next release, *[See appendix 5.4]*.

Question five enquired about the ease of the overall use of the application and why the user through this. With four out of five answers being that they found the use of the site very easy to use, apart form the user on the smaller screen. Their reasoning was very similar and also confirms the aim of an easy user interface successful, as most of the answers complemented the ease of use and how clear it was to follow each step.

| | |
|--|---|
| very easy | View respondent's answers |
| 4/09/2014 10:29 PM | |
| Very easy to use | View respondent's answers |
| 4/10/2014 10:11 PM | |
| not very easy | View respondent's answers |
| 4/11/2014 10:04 PM | |
| I thought that it was very simple to use. Good UX. | View respondent's answers |
| 4/11/2014 2:05 PM | |
| it is very easy to use | View respondent's answers |
| 4/12/2014 1:49 PM | |

Figure 5.6 & 5,7: The Ease of Use For Meet You Halfway & Why From Surveys

| | |
|--|---|
| it was pretty self explanatory | View respondent's answers |
| 4/09/2014 10:29 PM | |
| Everything was pretty straight forward | View respondent's answers |
| 4/10/2014 10:11 PM | |
| not made for iphone | View respondent's answers |
| 4/10/2014 10:04 PM | |
| Notifications made it clear on what the next step was. | View respondent's answers |
| 4/11/2014 2:05 PM | |
| it is self explanatory | View respondent's answers |
| 4/12/2014 1:49 PM | |

6.0 EVALUATIONS

6.1 - Evaluate Survey Results

Once the user surveys had been collected and revised, it was then time to evaluate their feedback and understand how these opinions and ideas could be implemented and revised into the next release of Meet You Halfway. The last three questions of the survey were aimed to capture the overall evaluation and perspective of the user. Question 6 was a rating question on the overall application, which resulted in an encouraging 7.5 out of 10. Upon reflection, this is a very good result, assuming that the user testing on the smaller screen ranked the application justifiably low.

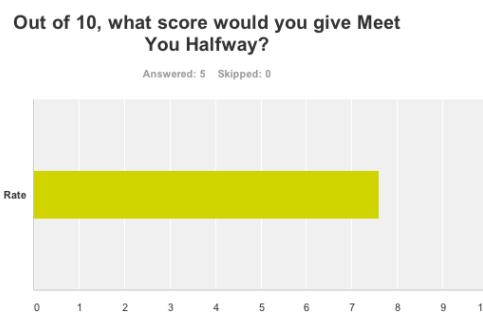


Figure 6.1: Rating Scale Survey Results

Questions 7 and 8 were designed to be very open questions to offer the user some freedom to express their ideas and thoughts on potential improvements for Meet You Halfway. It is important to hear what the users think could make the application more appealing as they are the target audience. From analysing the idea suggestion question, there was a range of potential future functions for Meet You Halfway. Some ideas were regarding the release of an application for mobile. In the initial stages, building a fully responsive application was a target but after progressing into the project this was moved to an out of scope function and was kept for the next release. Other potential ideas that are now being considered, is the ability to meet more than one friend at a time. This is a great new feature that could attract even more users, **[see appendix 5.4]**

From evaluating all the results from the user surveys, it is safe to say that the project Meet You Halfway was rather successful and most users seemed very pleased and eager to see its progression. By considering and developing their feedback into potential new objectives, there is a lot of room for improvement on Meet You Halfway but currently it has fulfilled its aims and objective of being seen as a very fun, unique and user friendly application that successfully allows two users to select a venue to meet, halfway between each other.

6.2 - Evaluate Project Outcomes

After the completion of the planning, development and implementation stages of Meet You Halfway, it can now be evaluated against the original aims and objective targets to judge if they were successfully met or not. In the planning stages, the main aim for Meet You Halfway was to create an application that was a convenient and enjoyable way to meet friends and socialise. To achieve this, it was vital that the functionality and interface was properly coded and developed, and the interface clear, understandable and friendly. From carrying out the testing phase, it is clear that Meet You Halfway, not only successfully functions and will allow two users to connect through the use of the Foursquare API, find the halfway point between the two, and render a list of venues to meet at, but the interface complements the applications nature. The interface contributes a lot to the application and from carrying out the user survey testing, it is clear that the targeted audience finds the application very easy to understand and enjoy the process of being able to meet friends and select places to meet.

As well as evaluating the project against the main aims, it can also be evaluated against the objectives that were originally planned. One of the main objectives, and biggest concerns was being able to develop the application within the timeline. Although Meet You Halfway is fully functional and each target set was achieved, but due to the tight timescale, various functions and ideas had to be priorities and therefore had to be left for the next build. Although disappointing, it was necessary in order to achieve the objective of meeting the deadline with a fully functional and well designed application.

Following these evaluations, it is clear that the finished product is very successful and succeeded in attaining the original objectives and aims that were originally developed in the early stages of planning, and so Meet You Halfway is a successful basic prototype of an application that successfully allows two users to meet halfway at a venue of their choosing.

6.3 - Evaluate Methodology

As stated during the Concept, Definition and Testing phase, the planned methodology for this project was the prototype model. This form of methodology proved very beneficial for this application, as it covered a lot of areas relating to Meet You Halfway. This model works best for projects where there is a lot of interaction with end users, and is "*excellent for designing good human computer interface systems.*" [**see reference 6.1**]. By following the

prototype model very closely, errors were detected in very early stages and any missing functionalities were easily identified, as well as constant release of basic prototypes were developed. This enabled quicker user feedback being made available and so better solutions and refinements were made to the prototypes as they progressed. Upon evaluation, it can be said that for Meet You Halfway, the prototype model was a very successful choice for the project's methodology and contributed to the success of the released application.

6.4 - Evaluate Plan

From finishing the development of Meet You Halfway, it can be evaluated, that although it is a very rough and basic version of the project, the plan created to develop this project was very successful. In the planning stages, the project and what it would contain was well prepared and carefully considered. Inside the project's plan, was the time schedule, the gantt chart [**see reference 1.1**], which took a lot of time researching and planning, but after evaluating the overall success of the project, it can be duly noted that the time plan was very successful. By strictly following the schedule of each phase, Meet You Halfway was developed ontime and to a high level of quality. Throughout the project, decisions regarding functions that could potentially lead to scope creeping and removing these functions lead to better time management and so the project was able to continue within the time schedule.

7.0 CONCLUSION

7.1 - Summarise Report

The project, Meet You Halfway required a process of various stages to be carried out and followed to ensure that the application was properly and efficiently planned, developed and implemented. Once the main concept idea was decided upon, it had to be broken down into a plan made up of aims and objective that needed to be fulfilled. These objectives then had to be broken down to evaluate what the requirements and specifications would be needed in order to develop an application of this unique nature.

After the concept of the project was defined, it was then followed by the paper prototyping stages, which helped to clarify the process of the main function as well as the early stages of design and layout through wireframes and sketches. This made the next process of developing the design and user interface much easier and better organised as well as the system's design. Once the plans were solid, the implementation stages then began and the tools used along with any achievements and challenges were documented.

Once the project was fully built, it was then time to test and evaluate the test results so that any changes and amendments could be made. These test were very useful in highlighting areas where targets were achieved and interface could be optimised. All of these stages helped to produce a unique and fun application that allows users to meet their friends halfway at a venue of their choice.

7.2 - Reflect On What Happened

Throughout the process of developing Meet You Halfway, there were many occasions when challenges were overcome and turned into success, and stages, that if revisited would be done differently. Before the application could be brought any further, the planning stage was essential to get correct as this was the foundation for the organisation and development for Meet You Halfway. By creating a well developed plan, this helped to ensure that the basic functions of the application could be outlined and clearly understood and resulting in a very successful design and implementation stage. Once the build was complete, the testing phase also was very successful and highlighted areas that needed revisiting. By following the plan very closely, an application that connects users via the social media Foursquare was created and it enables to meet halfway at a venue they both voted and agreed upon.

7.3 - Reflect On Your Role

Throughout the project of Meet You Halfway, on a personal level regarding the role undertaken, there were many moments of self achievement and moments of feeling overwhelmed. The overall experience of this project was very challenging but very rewarding as there were many new elements that were researched and implemented as well as the sense of accomplishment for achieving such a steep learning curve over a short period of time. API's and understanding how they function was an important and personal achievement that occurred during the role of this application, which will be very useful for the next version release of the application. The role in this project has offered much experience and knowledge as well as great motivation to continue working on Meet You Halfway to develop a very professionally functional and looking application that will be very popular among social users.

7.4 - Suggest Future Work

Now that the application, Meet You Halfway has been developed and released for the public to use, there is now time to take the evaluations and begin to plan the next potential route for Meet You Halfway. With a combination of the user survey results and personal ideas, there are many potential ways to take this project further. One of the ideas in particular that would be an interesting and challenging to implement but would increase the application's interactivity and functionality, is the ability to meet more than one friend halfway. This could also include the ability for users to vote on venues to meet and have in-group discussions within the application. Other ideas could include the addition of simple yet dynamic elements such as the ability to filter search results with specific venues etc. There is much potential for this application to be developed and improved and as a result there is an even greater determination and motivation to continue with this project, Meet You Halfway.

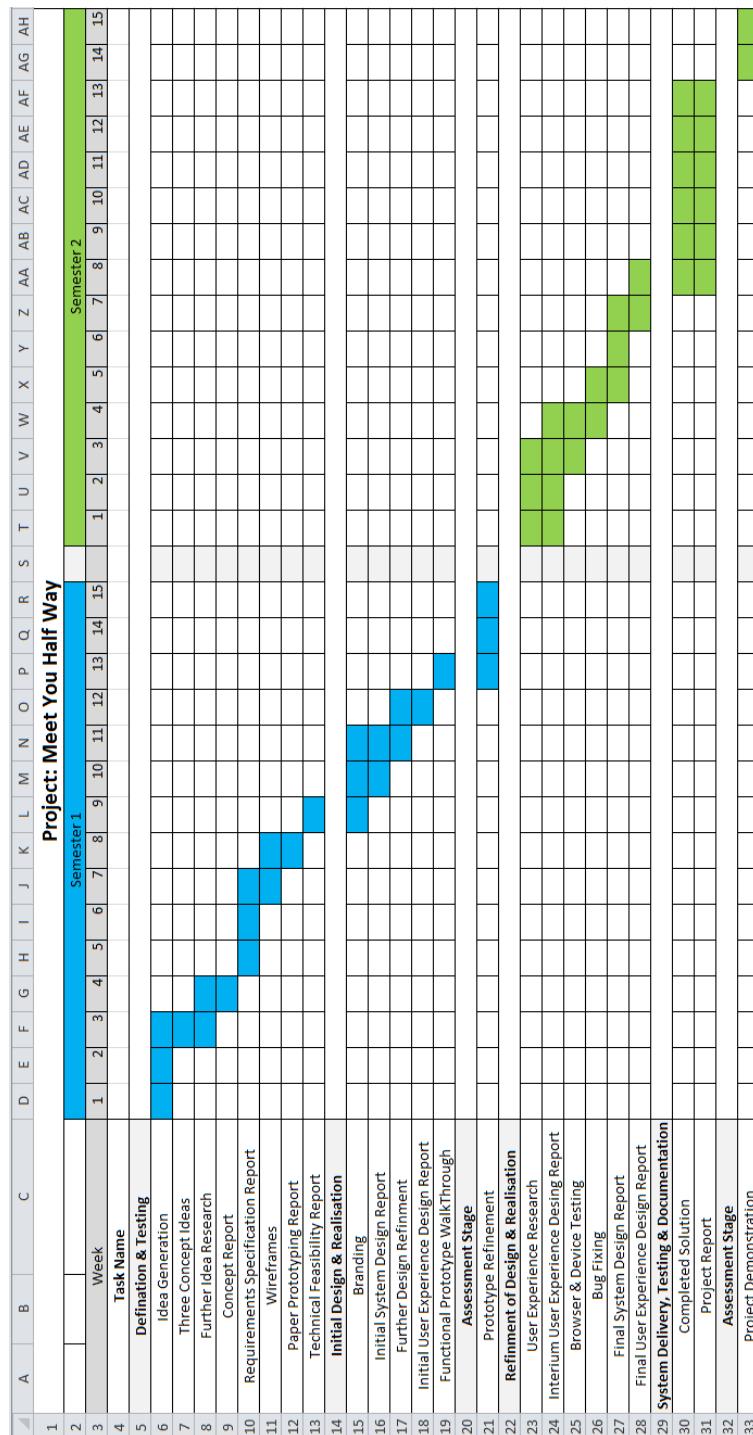
8.0 REFERENCES

- 2.1)** Examining The Design Process: Clichés and Idea Generation | Smashing Magazine. 2014. Examining The Design Process: Clichés and Idea Generation | Smashing Magazine. [ONLINE] Available at: <http://www.smashingmagazine.com/2011/02/21/clich-s-and-idea-generation-how-to-turn-clich-in-a-successful-visual-solution/>. [Accessed 10 April 2014].
- 3.1)** Untangling Brand And User Experience In 10 Minutes Or Less - See more at: <http://stevendiebold.com/untangling-brand-and-user-experience-in-10-minutes-or-less/#sthash.YHV2baeG.dpuf>. Available: <http://stevendiebold.com/untangling-brand-and-user-experience-in-10-minutes-or-less/>. [Last accessed 12th April 2014.]
- 3.2)** Type On Screen: 5 Faces for UI Design | Design in the browser with web fonts and real content — Typecast. 2014. Type On Screen: 5 Faces for UI Design | Design in the browser with web fonts and real content — Typecast. [ONLINE] Available at: <https://typecast.com/blog/type-on-screen-5-faces-for-ui-design>. [Accessed 12 April 2014].
- 4.1)** Font Awesome, the iconic font designed for Bootstrap. 2014. Font Awesome, the iconic font designed for Bootstrap. [ONLINE] Available at: <http://fontawesome.github.io/Font-Awesome/>. [Accessed 14 April 2014].
- 6.1)** What is Prototype model- advantages, disadvantages and when to use it?. 2014. What is Prototype model- advantages, disadvantages and when to use it?. [ONLINE] Available at: <http://istqbexamcertification.com/what-is-prototype-model-advantages-disadvantages-and-when-to-use-it/>. [Accessed 16 April 2014].

9.0 APPENDICES

1.1- Gantt Chat

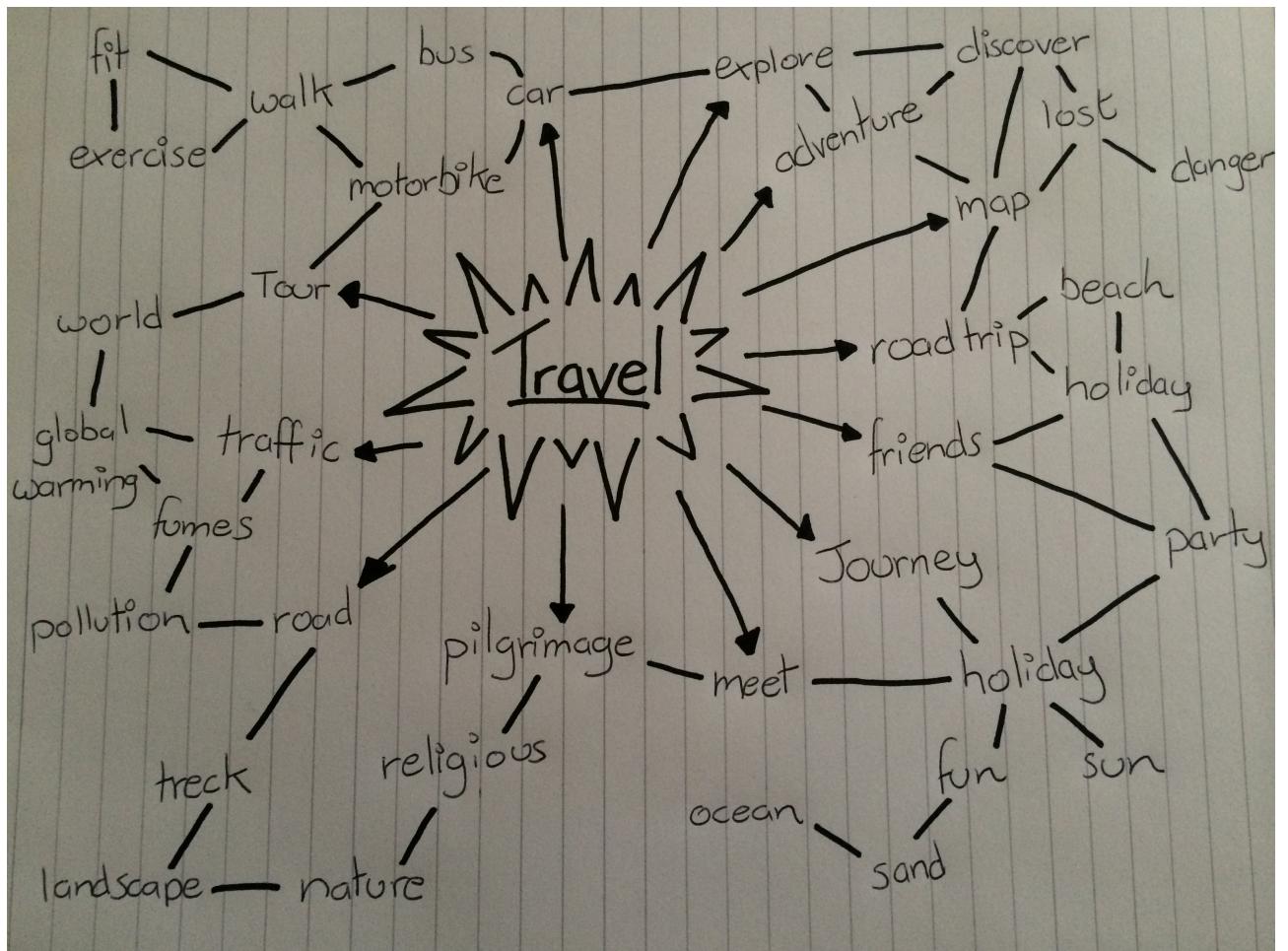
In order to ensure that the main aim of developing an application that finds the halfway point between two users is found, there is a lot to consider and include for a project of this magnitude. Therefore the best approach was to breakdown each process into smaller more manageable tasks and slot them into a Gantt Chart. By strictly following this tight schedule, each element should be completed at appropriate times, leaving enough time to complete other tasks etc. The diagram below presents the plan that would be undertaken.



2.1 - Mind Map

In order to help get a better creative outlook on the idea behind Meet You Halfway, a mind map was used to help generate more ideas on possible features and elements that the application could include. By doing a mind map, there was a lot of potential ideas recognised and by saving these idea, they can be added to potential future features in later builds and prototypes.

By having a key word, in this case “Travel”, can help to generate new ideas and see a new perspective on how possible new ideas can be developed. A mind map also helped in the development of the applications branding.



2.2 - Requirements

Below is the rest of the list of all the function and non-functional requirements for Meet You Halfway.

| USER PROFILE | |
|-------------------------|--|
| Requirement Type | Functional |
| Description | Once the user logs in, they will see a dashboard displaying all their Foursquare profile information including their profile picture, last checkin, bio and the contact information they have entered. |
| Rational | It is important and a welcoming feature, to show the user all the information that they have on Foursquare, including their friend count, checkin-count, any mayorships they are holding as well as their achievement count. |
| Fit Criterion | To satisfy this requirement, the homepage will show all the user's personal information in the form of a simply designed dashboard, presenting data such as the user's last checking, their profile picture and other data. |
| Priority | 4 (5 being the highest) |
| Dependancies | Depending on user successfully logging in with their Foursquare details |

| GEOLOCATION | |
|-------------------------|--|
| Requirement Type | Functional |
| Description | Once the user logs in, their browser will ask for permission to find their current location. If they accept then the user's current location will be marked on a small interactive map at the bottom of the dashboard. |
| Rational | By asking for the user's permission for Google Maps at the benign of the login, the current latitude and longitude coordinates can be sent to the database so it can be used again during different processes. |
| Fit Criterion | Once the user logs in, the browser will prompt the user for their permission to access their current location which will load the marker on the Google map showing the users location. |
| Priority | 5 (5 being the highest) |
| Dependancies | Depending on user allowing permission for browser to access their current location |

FRIENDS LIST

| | |
|-------------------------|---|
| Requirement Type | Functional |
| Description | Once the user has successfully logged in, they will see a list of all their Foursquare friends below the dashboard. Each friend will be presented in a small user card displaying their profile picture, home city and the available contact information. |
| Rational | In order to begin the process of meeting a friend halfway, the user must first select a friend from their friend's list that have on Foursquare, which will be presented below the dashboard. |
| Fit Criterion | To satisfy this requirement, the user will be successfully logged in and redirected to the homepage showing a verity of data related to that user and their friends list. |
| Priority | 5 (5 being the highest) |
| Dependencies | The user has friends on their Foursquare account |

NOTIFICATIONS

| | |
|-------------------------|--|
| Requirement Type | Functional |
| Description | Once the a user is selected as a friend to meet halfway, they will firstly be notified via an email as well as once they login and land on the homepage, a modal as well as a notification badge on the Requests link will all highlight any notifications to the user. |
| Rational | It is important that when a user is sent a request or has a notification that they are notified in more than one method. It is vital that user's are made aware of incoming requests as to minimise the waiting time after a request is sent. |
| Fit Criterion | If a user has a notification to meet halfway then they will firstly receive an email. As well as this, once the user logs into Meet You Halfway, a popup modal will appear presenting any and all requests as well as the Requests section of the navigation will have a badge alert showing the number of requests. |
| Priority | 3 (5 being the highest) |
| Dependencies | Depending on user receiving a request to meet halfway |

| MEETING POINT | |
|-------------------------|---|
| Requirement Type | Functional |
| Description | Once a user accepts a request to meet, the halfway point is calculated and the user is presented with a list of venues to browse that are within the radius of the halfway point. |
| Rational | By calculating the halfway point, the users can decide to meet at a venue that is halfway between them both, meaning that it is an equal travelling distance and they users can preselect a location to meet in a convenient and enjoyable way. |
| Fit Criterion | Once the user accepts a request, both users will be notified once the halfway point is calculated. One user will be presented with the list of venues in that area to browse and the other user will be shown a waiting screen. |
| Priority | 5 (5 being the highest) |
| Dependencies | Depending on venues being found at the halfway point |

| INCREASE SEARCH RADIUS | |
|-------------------------|---|
| Requirement Type | Non-Functional |
| Description | Once the halfway location is found, but if there are no venues within the search radius parameter, then the search radius will expand until there is a venue to pick to meet halfway. |
| Rational | If there is no venues within the original venue search radius parameter then there will be no location for the users to pick to meet halfway. |
| Fit Criterion | Regardless of the halfway point and its location, there will always be a location to pick to meet your friend halfway. |
| Priority | 5 (5 being the highest) |
| Dependencies | Depending on a halfway point being calculated first |

RESPONSIVE

| | |
|-------------------------|---|
| Requirement Type | Non-Functional |
| Description | Regardless of the device or screen size the user uses to access Meet You Halfway, the overall experience of the application will not be hindered by the size. |
| Rational | With the growing preference and convenience, most web applications are now visited using hand held devices which means a smaller screen, therefore the application must also be designed to work for these dimensions without hindering the experience. |
| Fit Criterion | Regardless of the screen size the application is accessed from, Meet You Halfway will be fully functional and offer the same user experience from desktop view to mobile view. |
| Priority | 4 (5 being the highest) |
| Dependencies | Depending on the screen size the app is accessed on |

ANALYTICS

| | |
|-------------------------|--|
| Requirement Type | Non-Functional |
| Description | In the header section in the code of the application, the Google Analytics will be added so that any interactivity with any user can be tracked and recorded. |
| Rational | Having the ability to record the information regarding the amount or traffic and usage Meet You Halfway receives can be very beneficial in regards to how to market and target the app and its services. |
| Fit Criterion | Once the analytic have been added to the application, simply login to Google and analyse the data recorded |
| Priority | 2 (5 being the highest) |
| Dependencies | Depending on if the application is accessed by users |

3.1 - Branding

As stated, there will be occurrences where the branding will have to change slightly in order to fit the design the logo is presented in. The only allowances where the logo can change, is if the logo is for print and then shall be rendered in black and white. The only other allowed occasion of for either the map icon, the text element or the “.co.uk” may be removed so that the logo fits the design more appropriately. In no other circumstances must the logo be designed or changed. Below outlines how the logo can be presented.



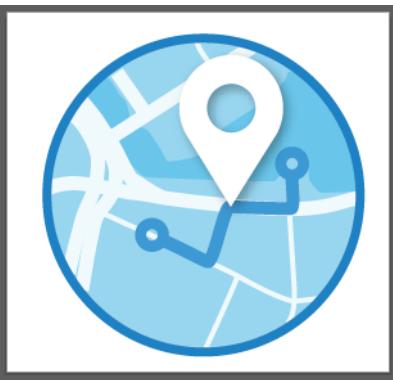
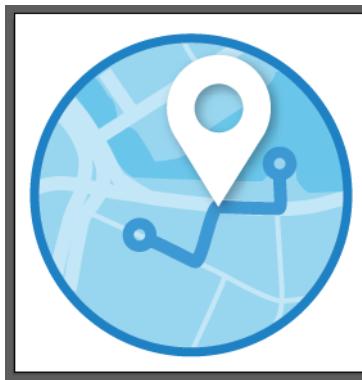
Meet You
Halfway
.co.uk

Meet You
Halfway

Meet You
Halfway
.co.uk

3.2 - A / B Testing

Below are the different versions the logo that were presented to users in order to gain their feedback on the more preferred logo - A / B Testing.



3.3 - New Colour Palette

As the colour of the branding developed, below presents the finalised colour palette for not only the branding but also the use of blues throughout the application.



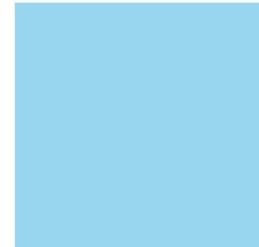
Border Blue



Main Blue



Light Blue



Lighter Blue

RGB: 35, 128, 195

HEX: #2380C3

RGB: 67, 152, 211

HEX: #4398D3

RGB: 107, 195, 299

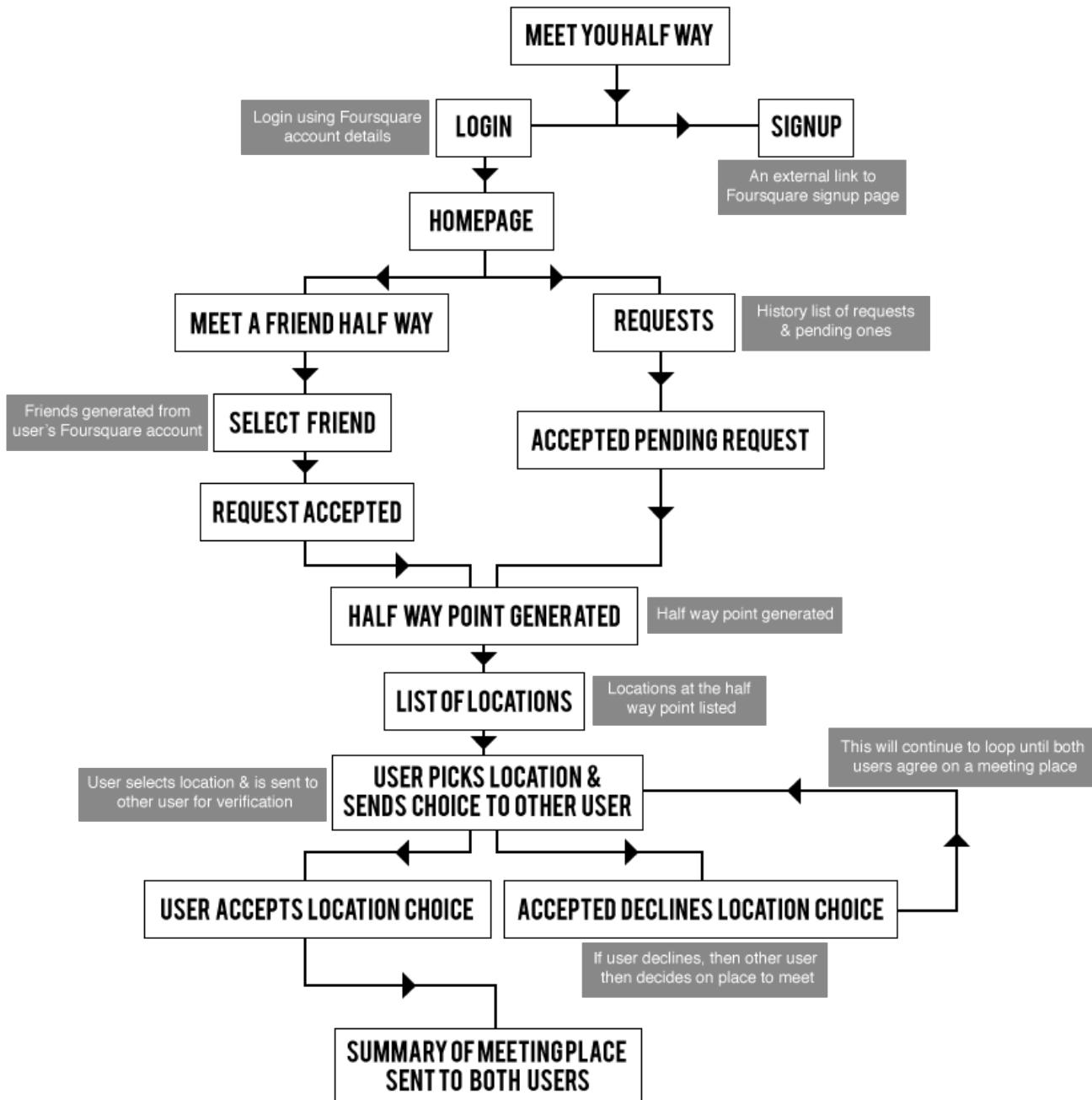
HEX: #6BC3E5

RGB: 152, 212, 236

HEX: #98D4EC

3.4 - Element Relationships

The diagram to highlight the relationship between the elements needed to develop a basic version of a system that connects two users via Foursquare to find the halfway point to the users can find and select a venue to meet halfway.



4.1 - API Documentation

Below shows some examples of the documentation and what was available from Foursquare's own site regarding their API's.

What Can You Do With Foursquare?

 Search for Places in an Area  Connect With Foursquare Users
 Know When Somebody Checks In  Get Global Streaming Check-In Data

Take a look at our new [getting started guide](#) that gives a broad overview of the API's capabilities and how to get started with the most popular features of the Foursquare platform.

The foursquare Platform

Core API

Our API lets you do all the things you could do on our mobile application and website. Your users can check in, view their history, see where their friends are, create tips and lists, search for and learn more about venues, and access specials and recommendations.

Real-time API

Our venue push API notifies venue managers when users check in to their venues, and our user push API notifies developers when their users check in anywhere.

Venues Platform

Just need a database of places? The Venues Platform allows developers to search for places and access a wealth of information about them, including addresses, popularity, tips, and photos. It's available free and without any user authentication, as long as applications include adequate attribution.

| | | | |
|---------------|--|---|--|
| users | leaderboard requests search | badges checkins friends lists mayorships photos tips todos venuehistory | approve deny setpings unfriend update |
| venues | add categories explore managed search suggestcompletion timeseries trending | events herenow hours likes links listed menu nextvenues | dislike edit flag like proposeedit setrole setsinglelocation |

4.2 - API Request Functions

Below show the different API request calls that are being used within Meet You Halfway in order to get the information needed for the application to work

API call to retrieve the user's friends list

```
<?php
//connection to the foursquare friends api with oauth token
function get_foursquare_friendinfo($access_token){
    $userFriends = file_get_contents("https://api.foursquare.com/v2/users/self/
                                    friends?oauth_token=".$access_token.
                                    "&v=20130815&afterTimestamp=1279044824");
    $decoded_userFriends = json_decode($userFriends, true);
    //return the data about the user's friends on foursquare
    return $decoded_userFriends['response']['friends']['items'];
}
?>
```

API call to retrieve the user and their friends data in the leaderboard

```
<?php
//connection to the foursquare leaderboard api with oauth token
function get_foursquare_leaderboardinfo($access_token){
    $userLeaderboard = file_get_contents("https://api.foursquare.com/v2/users/
                                         leaderboard?oauth_token=".$access_token.
                                         "&v=20140325&afterTimestamp=1279044824");
    $decoded_userLeaderboard = json_decode($userLeaderboard, true);
    //return the data about the user's status in the leaderboard on foursquare
    return $decoded_userLeaderboard['response']['leaderboard']['items'];
}
?>
```

API call to retrieve the information about the list of venues at the halfway point as well as specific information for a single venue

```
<?php
function get_foursquare_venueinfo($access_token, $latitude, $longitude){
    $venueinfo = file_get_contents("https://api.foursquare.com/v2/venues/
                                  search?ll=".$latitude.",".$longitude.
                                  "&oauth_token=".$access_token."&v=20140401");
    // error_log("Venue Info" . $venueinfo);
    $decoded_venueinfo = json_decode($venueinfo, true);
    return $decoded_venueinfo['response']['venues'];
}

function get_foursquare_single_venue($access_token, $venue_id){
    $venueinfo = file_get_contents("https://api.foursquare.com/v2/venues/"
                                 ".$venue_id.?oauth_token=".$access_token.
                                 "&v=20140401");
    $decoded_venueinfo = json_decode($venueinfo, true);
    return $decoded_venueinfo['response']['venue'];
}
?>
```

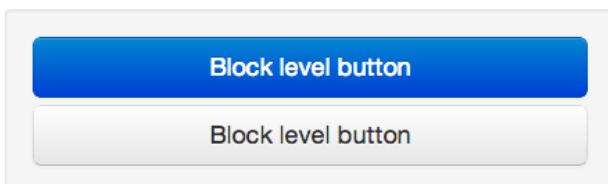
All of the above request calls all need the same Autho token with the permissions defined in order to connect to Foursquare and to get the permissions to make requests

```
<?php  
//this is the clint ID from my app on Foursquare  
$client_id = "4JXEPDWJ0M04A0I25FDK0D4ZQ0AXLAR4SFBHD025H30UWI5C";  
//This is my app's secret  
$secret = "UNSRLF2CF3ZJBHW1LNC3331YSYTA2W4VYXB22A4WA5PSZUX";  
//this will be my apps callback link  
$redirect = "http://www.meetyouhalfway.co.uk/APP/callback.php";  
?>
```

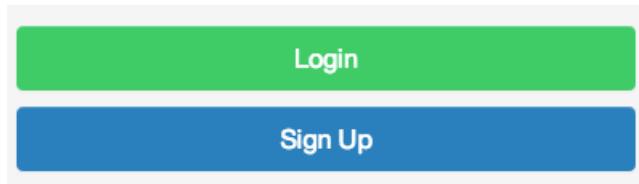
4.3 - Bootstrap Styles Vs Personalised Styles

As the tool Bootstrap came with pre-styled elements, some were not useful or appropriate for Meet You Halfway, therefore these default styles then had to be slightly edited but with previous experience in this framework made this relatively easy. Below are some Bootstrap styles against the Meet You Halfway Styles.

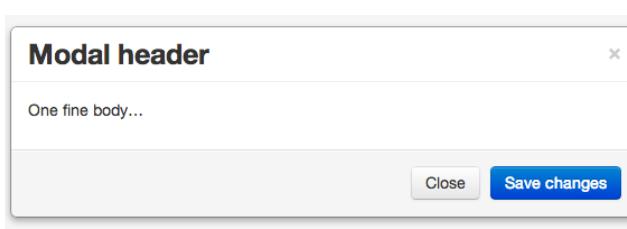
Bootstrap Buttons



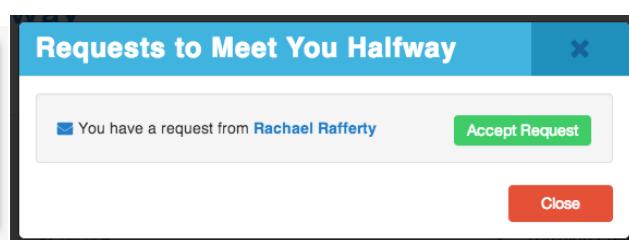
Meet You Halfway Buttons



Bootstrap Modal



Meet You Halfway Modal



4.4 - List of Variables for Foursquare Data

Below are the screenshots of the code inside the application where the information is being called from Foursquare and given a variable name so it can be called though out the application.

List of variables for the user's friends information

```
foreach ($friend_connection as $id => $friend):
    $friend_id = $friend['id'];
    $friend_name = $friend['firstName'];
    $friend_surname = $friend['lastName'];
    $friend_avatar_pre = substr_replace($friend['photo']['prefix'], '', -1);
    $friend_avatar_size = "/128x128";
    $friend_avatar_suf = $friend['photo']['suffix'];
    $friend_profile_pict = $friend_avatar_pre.$friend_avatar_size.$friend_avatar_suf;
    $friend_homecity = $friend['homeCity'];
    $friend_bio = $friend['bio'];
    $friend_facebook = $friend['contact']['facebook'];
    $friend_twitter = $friend['contact']['twitter'];
    $friend_email = $friend['contact']['email'];
```

List of variables for the venue information

```
require_once 'php/venue_helper.php';
$venue_connection = get_foursquare_venueinfo($_GET['access_token'],
...                                         $halfway['Latitude'], $halfway['Longitude']);

foreach ($venue_connection as $id => $venue):
    $venue_id = $venue['id'];
    $venue_number = $venue['contact']['formattedPhone'];
    $venue_twitter = $venue['contact']['twitter'];
    $venue_name = $venue['name'];
    $venue_address = $venue['location']['address'];
    $venue_lat = $venue['location']['lat'];
    $venue_long = $venue['location']['lng'];

    $venue_map_marker = ('[$venue_name.', '$venue_lat.', '$venue_long.]');

    foreach ($venue['categories'] as $cat_id => $category):
        $venue_category_id = $category['id'];
        $venue_category_name = $category['name'];
        $venue_icon_pre = $category['icon']['prefix'];
        $venue_icon_size = "bg_88";
        $venue_icon_suf = $category['icon']['suffix'];
        $venue_img_src = $venue_icon_pre.$venue_icon_size.$venue_icon_suf;
    endforeach;
```

4.5 - The Database Tables & Properties

Table Match

| # | Name | Type | Collation | Attributes | Null | Default | Extra |
|--------------------------|--------------------------|--------------|-------------------|------------|------|---------|----------------|
| <input type="checkbox"/> | 1 Match_Id | int(11) | | | No | None | AUTO_INCREMENT |
| <input type="checkbox"/> | 2 Request_Id | int(11) | | | No | None | |
| <input type="checkbox"/> | 3 Halfway_Coords | int(11) | | | No | None | |
| <input type="checkbox"/> | 4 Venue_Id | varchar(100) | latin1_swedish_ci | | No | None | |
| <input type="checkbox"/> | 5 Venue_Confirmed | tinyint(1) | | | No | 0 | |

Table User

| # | Name | Type | Collation | Attributes | Null | Default | Extra |
|--------------------------|------------------|-------------|-------------------|------------|------|---------|-------|
| <input type="checkbox"/> | 1 User_Id | int(11) | | | No | None | |
| <input type="checkbox"/> | 2 Email | varchar(50) | latin1_swedish_ci | | No | None | |
| <input type="checkbox"/> | 3 Name | varchar(50) | latin1_swedish_ci | | No | None | |
| <input type="checkbox"/> | 4 Surname | varchar(50) | latin1_swedish_ci | | No | None | |

Table Coords

| # | Name | Type | Collation | Attributes | Null | Default | Extra |
|--------------------------|--------------------|---------|-----------|------------|------|---------|----------------|
| <input type="checkbox"/> | 1 Coords_Id | int(11) | | | No | None | AUTO_INCREMENT |
| <input type="checkbox"/> | 2 Longitude | float | | | No | None | |
| <input type="checkbox"/> | 3 Latitude | float | | | No | None | |
| <input type="checkbox"/> | 4 User_Id | int(11) | | | Yes | NULL | |

Table Request

| # | Name | Type | Collation | Attributes | Null | Default | Extra |
|--------------------------|------------------------|------------|-----------|------------|------|---------|----------------|
| <input type="checkbox"/> | 1 Request_Id | int(11) | | | No | None | AUTO_INCREMENT |
| <input type="checkbox"/> | 2 User_A_Id | int(11) | | | No | None | |
| <input type="checkbox"/> | 3 User_B_Id | int(11) | | | No | None | |
| <input type="checkbox"/> | 4 User_A_Coords | int(11) | | | No | None | |
| <input type="checkbox"/> | 5 User_B_Coords | int(11) | | | Yes | NULL | |
| <input type="checkbox"/> | 6 Finished | tinyint(1) | | | No | 0 | |

4.6 - Functions with Similar Layouts

As the functions inside the application do very similar actions just with different pieces go information, it was beneficial and more efficient to keep the layout of these functions as similar as possible. Thus ensuring the code is accurate and has a better layout.

Find Request_by_User_A_Id

```
//find the request by using user A's id
function find_requests_by_user_a_id($user_a_id){
    global $db;
    $result = mysqli_query($db, "SELECT * FROM Requests WHERE User_A_Id = $user_a_id AND Finished = false");

    if(mysqli_num_rows($result) > 0){
        $number_of_results = mysqli_num_rows($result);
        $requests = [];
        for($i = 0; $i < $number_of_results; $i++){
            array_push($requests, mysqli_fetch_assoc($result));
        }
        error_log("this is the $requests");
        //found the request using user A's id
        return $requests;
    }else{
        //couldnt find the request with user A's id
        error_log("Request not found $request_id");
        return [];
    }
}
```

Find Request_by_User_B_Id

```
//find the request by using user B's id
function find_requests_by_user_b_id($user_b_id){
    global $db;
    $result = mysqli_query($db, "SELECT * FROM Requests WHERE User_B_Id = $user_b_id AND Finished = false");

    if(mysqli_num_rows($result) > 0){
        $number_of_results = mysqli_num_rows($result);
        $requests = [];
        for($i = 0; $i < $number_of_results; $i++){
            array_push($requests, mysqli_fetch_assoc($result));
        }
        error_log("this is the $requests");
        //found the request using user B's id
        return $requests;
    }else{
        //couldnt find the request with user B's id
        error_log("Request not found $request_id");
        return [];
    }
}
```

Create User

```
//create a user when they login
function create_user($user_id, $email, $first_name, $last_name){
    global $db;
    mysqli_query($db, "INSERT INTO User SET User_Id = '$user_id', Email = '$email', Name = '$first_name', Surname = '$last_name'");
    $user = find_user($user_id);
    return $user;
}
```

Create Request

```
//create a new request for the users with user A coords
function create_request($user_a_id, $user_b_id, $user_a_coords_id ){
    global $db;
    mysqli_query($db, "INSERT INTO Requests SET User_A_Id = '$user_a_id', User_B_Id = '$user_b_id', User_A_Coords = '$user_a_coords_id'");

    $request_id = mysqli_insert_id($db);
    $request = find_request($request_id);
    //insert new request with user's id and long and lat coords
    return $request;
}
```

Create Coords

```
//insert the user's coords into the database
function create_coords($latitude, $longitude){
    global $db;
    error_log("Creating coords for halfway point");
    query("INSERT INTO Coords SET Longitude = $longitude, Latitude = $latitude");
    $coords_id = mysqli_insert_id($db);
    $coords = find_coords($coords_id);
    //this will be the halfway coords for the usser
    return $coords;
}
```

Find Coords

```
//find already existing coords by the coords id
function find_coords($coords_id){
    $result = query("SELECT * FROM Coords WHERE Coords_Id = $coords_id LIMIT 1");
    if(mysqli_num_rows($result) > 0){
        $coords = mysqli_fetch_assoc($result);
        //return the coords by the coords id
        return $coords;
    }else{
        //if the coords do not exist, a terminal message will appear
        error_log("Could not find coord for user $user_id");
    }
}
```

Find Match

```
//find already existing match by the match id
function find_match($match_id){

    $result = query("SELECT * FROM `Match` WHERE Match_Id = $match_id LIMIT 1");
    if(mysqli_num_rows($result) > 0){
        $match = mysqli_fetch_assoc($result);
        //return the match by the match id
        return $match;
    }else{
        //if the match does not exist, a terminal message will appear
        error_log("Could not find match for match_id $match_id");
    }
}
```

Find User

```
//find the user by the user'sid
function find_user($user_id){
    global $db;

    $result = mysqli_query($db, "SELECT * FROM User WHERE User_Id = '$user_id' LIMIT 1");

    if(mysqli_num_rows($result) > 0){
        $user = mysqli_fetch_assoc($result);
        return $user;
    }
}
```

4.7 - POST Methods to pass data to the PHP functions

POST Method for Confirming Venue Choice

```
<?php
require_once 'php/venue.php';

$match_id = $_POST['match_id'];

confirm_venue_choice($match_id);
?>
```

POST Method for Selecting Venue at Halfway Point

```
<?php
require_once 'php/venue.php';

//venue_id is the venue id from foursquare api
$venue_id = $_POST['venue_id'];
$match_id = $_POST['match_id'];

update_venue_choice($venue_id, $match_id);
?>
```

POST Method for Sending Data for Accepting and Sending Requests

```
<?php
require_once 'php/match_request.php';

$user_a_id = $_POST['user_a']['id'];
$user_a_latitude = $_POST['user_a']['latitude'];
$user_a_longitude = $_POST['user_a']['longitude'];

$user_b_id = $_POST['user_b']['id'];
$user_b_email = $_POST['user_b']['email'];
$user_b_name = $_POST['user_b']['name'];
$user_b_surname = $_POST['user_b']['surname'];

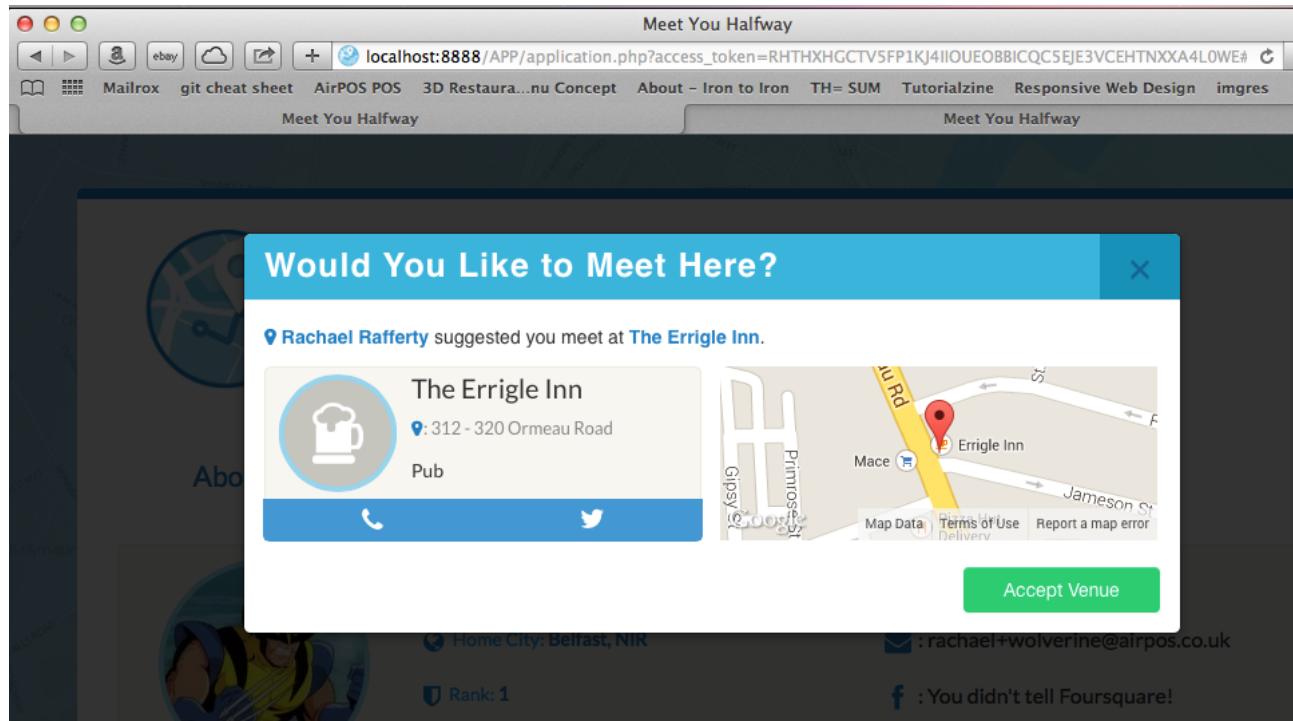
send_match_request($user_a_id, $user_a_latitude, $user_a_longitude,
    |$user_b_id, $user_b_email, $user_b_name, $user_b_surname);

?>
```

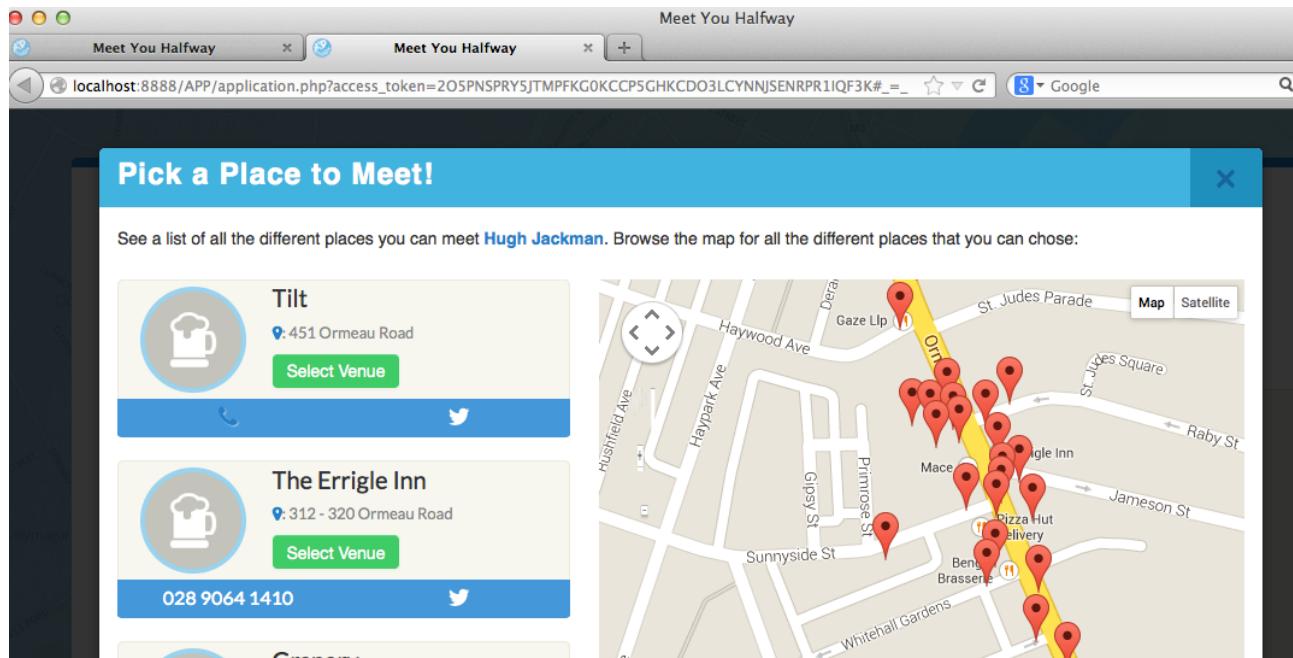
5.1 Browser Testing

As explained in the testing section, due to the proper development of code and use of the Bootstrap tool, it has enabled the application to fully function across the three main browsers. Below are screenshots of the application functioning on both Safari and Firefox.

Safari Screenshot



Firefox Screenshot



5.2 - Black Box Testing

Below are the rest of the black box testing and their results.

| Test Id | Test Name | Description | Expected Results | Actual Results |
|---------|----------------|--|---|--|
| 5 | Accept Request | Once user is selected to meet, there is a accept request button to begin the process | Selected button begins process of finding halfway point | Successful, Success button selected and halfway point modal appeared |

This test was also successful as once the user clicks the selects the accept request button, the halfway point is found and the modal presenting the list of venues at the halfway point is displayed.

| Test Id | Test Name | Description | Expected Results | Actual Results |
|---------|----------------------|---|--|---|
| 6 | Select Venue To Meet | Once halfway point is found, modal displays list of venues at that location | User selects the venue they want to meet | Successful, user selected the venue they wanted to meet |

Test number 6 was also very successful as the halfway point coordinates were successfully calculates and these coordinates were sent back to Foursquare API and was able to generate a list of venues at that area for the user to select from.

| Test Id | Test Name | Description | Expected Results | Actual Results |
|---------|---------------------|---|--|---|
| 7 | Accept Venue Choice | Once user selects venue to meet, this info is sent to the other friend for confirmation | Select confirm button and congratulations modal then appears | Test successful, once user selects confirm menu, congratulations modal appeared |

Final test number seven was successful as once user selected the accept venue button, the congratulation modal appears meaning that the data was successfully sent to the database and that the user interface was a success as the user was able to make their way to the end of the application.

5.3 - Completed Survey from SurveyMonkey

Below is the fully designed survey that was created for the testing stages to gain feedback from users.

[SURVEY PREVIEW MODE] Meet You Halfway Survey
www.surveymonkey.com/s.aspx?PREVIEW_MODE=DO_NOT_USE_THIS_LINK_FOR_COLLECTION&sm=Nw2Z4I7rzRdjbkFjLiKa4DZs2vJno1pGaxQqHimQvew%

Meet You Halfway

***1. Would you recommend Meet You Halfway to a friend?**

Yes
 No

Please explain why

***2. In one or more words, how would you describe Meet You Halfway?**

***3. What did you like most about Meet You Halfway?**

***4. What did you like least about Meet You Halfway?**

***5. How did you find the overall ease of use for Meet You Halfway?**

How did you find the ease of use?

Why is this?

***6. Out of 10, what score would you give Meet You Halfway?**

| | | | | | | | | | | |
|------|-----------------------|-----------------------|-----------------------|--------------------------|-----------------------|--------------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| | Dreadful | Quite poor | Poor | Little bit below average | Average | Little bit above average | It's good | It's quite good | Very good | Brilliant |
| Rate | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

***7. Have you any ideas/suggestions on how to improve Meet You Halfway?**

8. Is there anything else you would like to share with us?

5.4 - SurveyMonkey Results

Below are the rest of the answers from all the surgery responses regarding Meet You Halfway

Q3 Export ▾

What did you like most about Meet You Halfway?

Answered: 5 Skipped: 0

Responses (5) Text Analysis My Categories

Categorize as... ▾ Filter by Category ▾ Search responses ?

Showing 5 responses

I really liked the way the website was designed
4/09/2014 10:29 PM [View respondent's answers](#)

I liked the small effects on things like the checkin count
4/10/2014 10:11 PM [View respondent's answers](#)

The idea of being able to meet a friend halfway
4/10/2014 10:04 PM [View respondent's answers](#)

I like that I can invite a friend to meet me at a neutral place.
4/11/2014 2:05 PM [View respondent's answers](#)

it suggests places to meet to save time
4/12/2014 1:49 PM [View respondent's answers](#)

Q4 Export ▾

What did you like least about Meet You Halfway?

Answered: 5 Skipped: 0

Responses (5) Text Analysis My Categories

Categorize as... ▾ Filter by Category ▾ Search responses ?

Showing 5 responses

that it did not load new requests automatically, sometimes i had to refresh my browser manually
4/09/2014 10:29 PM [View respondent's answers](#)

I didn't like the way there was not a lot of information describing what the app is about
4/10/2014 10:11 PM [View respondent's answers](#)

it was nit useable on such a small screen size
4/10/2014 10:04 PM [View respondent's answers](#)

It would be cool if they had an iPhone app.
4/11/2014 2:05 PM [View respondent's answers](#)

there is no app version yet
4/12/2014 1:49 PM [View respondent's answers](#)

Q7

Export ▾

Have you any ideas/suggestions on how to improve Meet You Halfway?

Answered: 5 Skipped: 0

Responses (5)

Text Analysis

My Categories

Categorize as... ▾

Filter by Category ▾

Search responses



Showing 5 responses

more interactive features mobile app

4/17/2014 10:29 PM [View respondent's answers](#)

Maybe include a little paragraph explaining what Meet You Halfway actually does and how it does it

4/17/2014 10:11 PM [View respondent's answers](#)

make an app for the iphone

4/17/2014 10:04 PM [View respondent's answers](#)

An iPhone app with push notifications would be cool.

4/17/2014 2:05 PM [View respondent's answers](#)

tie it in with dating apps

4/17/2014 1:49 PM [View respondent's answers](#)

Q8

Export ▾

Is there anything else you would like to share with us?

Answered: 4 Skipped: 1

Responses (4)

Text Analysis

My Categories

Categorize as... ▾

Filter by Category ▾

Search responses



Showing 4 responses

maybe add the ability to meet more than one friend??

4/17/2014 10:29 PM [View respondent's answers](#)

Maybe also make it work for my iPad?

4/17/2014 10:11 PM [View respondent's answers](#)

Brilliant idea, very unique. I'll certainly be using this with my friends!

4/17/2014 2:05 PM [View respondent's answers](#)

all round a great website, also class it works with my foursquare

4/17/2014 1:49 PM [View respondent's answers](#)