



Specification Document

Project: Northumberland Tourism App

Team 9



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Document Information

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Table of Contents

| | |
|--|-----------|
| Purpose | 4 |
| 1. Background & Analysis | 4 |
| 1.1 Analysis Process..... | 4 |
| 1.2 Project Purpose | 6 |
| 1.3 Client Requirements | 6 |
| 2. Roles and Deliverables | 7 |
| 2.1 Roles – Team Roles and Responsibilities..... | 7 |
| 2.2 Deliverables | 8 |
| 3. Project Plan | 9 |
| 3.1 Breakdown of Tasks and Deadlines | 10 |
| 4. Hardware and Software Platforms | 13 |
| 4.1 Software Versions..... | 13 |
| 4.2 Hardware Requirements | 13 |
| 5. Solution Requirements | 14 |
| 5.1 Functional Requirements..... | 14 |
| 5.2 Non-Functional Requirements..... | 16 |
| 6. Assumptions | 17 |
| 7. Constraints & Dependencies | 17 |
| 8. Software Design | 18 |
| 8.1 Software Overview | 18 |
| 8.2 Layered Architecture Diagram | 18 |
| 8.3 Component Diagram | 19 |
| 8.4 Entity Relationship Diagram | 19 |
| 8.5 Class Diagram | 20 |
| 8.6 User Flow Diagrams | 21 |
| 8.6.1 App..... | 21 |
| 8.6.2 Website | 22 |
| 8.7 Preliminary Designs | 23 |
| 8.7.1 App..... | 23 |
| 8.7.2 Website | 25 |
| 8.8 Final Designs | 27 |
| 8.8.1 App..... | 27 |
| 8.8.2 Website | 28 |
| 8.9 User Functionality | 29 |
| 9. Test Plan | 29 |
| 9.1 Overview | 29 |
| 9.2 Mobile App (Black Box Tests) | 30 |
| 9.3 Mobile App (White Box Tests) | 31 |
| 9.4 Website Tests..... | 32 |
| 10. Definition of Terms | 33 |
| 11. References | 34 |
| 12. Contribution Matrices | 35 |

Purpose

To create a tourism app detailing events and locations in Northumberland County. This document serves to fully set out what is required and expected from the app by both the team and the project client.

1. Background & Analysis

1.1 Analysis Process

A recent survey by eMarketer shows that 60% of smartphone users prefer travel apps to any other method for planning their leisure tours (Dickinson, Ghali, Cherrett, 2014). In order to produce an app that is both functional and meets the requirements of the target users, it is important to research other apps on the market. The research will aim to scope out what regular users of travel apps see as useful and desirable. This involves organising descriptions of common components and architectures in a set of applications. This will be done through analysing similar, travel-based apps that are available to download in the App Store in order to gather ideas and observe what has been done well, and areas that users found could be improved. The apps that were examined were as follows:

App #1 - Northumberland Offline Map and Travel Guide

Desirable Qualities

This app aims to provide an offline map service along with a travel guide of Northumberland and the surrounding areas. In a sense it is similar to the design specification of this project, however there is much that expands upon the brief, such as an offline map service as well as a travel guide of Northumberland.

The homepage is a map centred on the user's location, this map also functions offline without the need for mobile data or Wi-Fi (See Figure 1.0). The offline maps are a good idea and are a highly desirable feature.

Another enticing feature of the app is the "handbook" feature, the user presses the handbook button and text appears beside the navigation buttons on the main screen- illustrating to the user the various buttons and what is their purpose (See Figure 1.1). This could prove to be a beneficial feature to implement when refined.

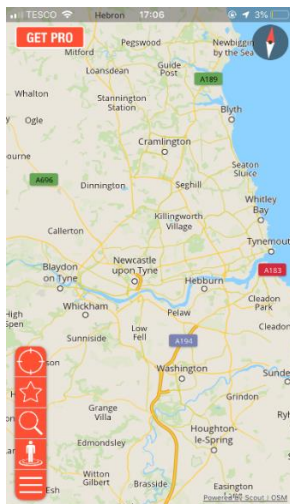


Figure 1.0

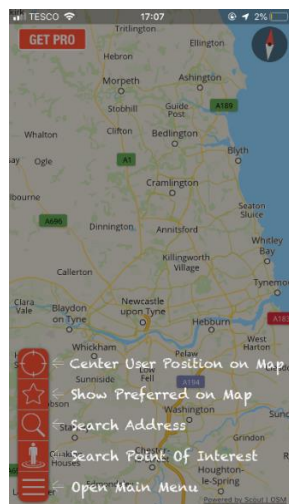


Figure 1.1

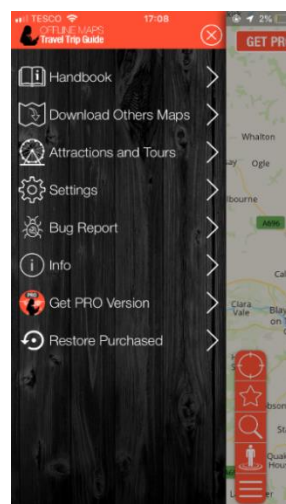


Figure 1.2

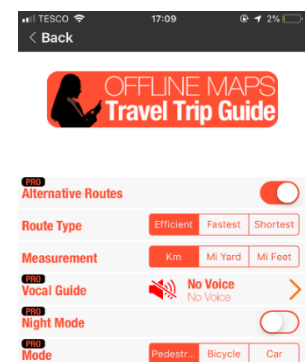


Figure 1.3

Undesirable Qualities

Navigation is in the form of buttons in the bottom left corner to navigate through the app. The interface is difficult to use for a novice end-user who may not be familiar with this sort of app (See Figure 1.2). In terms of the travel guide element of the app, the information is not contained within the app itself, but rather provides a link to a website containing a list of tours and attractions. Additionally, the app provides the option of a vocal guides, night mode and alternative routes. However, these paid features cost £7.99 (See Figure 1.3), while these are advantageous, they should not only be utilised by paid users especially considering the target audience of the brief was decided to be students (**See Project Purpose 1.2**).

App #2 - London Travel Guide

The London travel guide, much like the Northumberland travel guide is a guide with an integrated offline map service. It provides a comprehensive account to all the attractions London has to offer. While this app is not based in the same area outlined in the design specification, it is beneficial to explore what features travel apps from other cities have to offer.

Desirable Qualities

This app contains a feature that allows the user to change the language of the app, there are 8 languages that the user can select including Dutch and Spanish (See Figure 1.4). This is a feature that every app should contain, as it ensures the app is accessible to as many nationals as possible. This is key when considering international students.

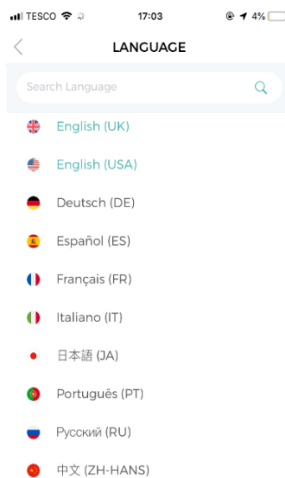


Figure 1.4



Figure 1.5

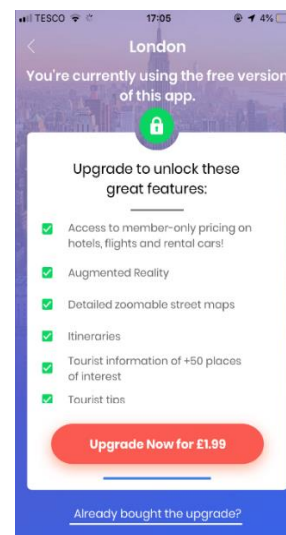


Figure 1.6

Undesirable Qualities

Similarly, to the Northumberland Offline Map and Travel Guide, the London Travel Guide offers the user great features such as tailored tours depending on the length of their trip, tourist tips, Local Discounts and offline maps (See Figure 1.5). However, these paid features cost £1.99, and while advantageous, the user should not have to pay money in order to utilise them. While the app has great features as outlined in the desirable qualities, almost all of them require the user to make a purchase (See Figure 1.6). This makes the app almost unusable without buying the upgrade and this is not something that fits in with the brief, as accessibility for all students is the main aim.

It also has to be noted that this market research was undertaken through the App Store and therefore is not the market the app will be pushed towards (the app will be implemented through Android Studio and hence will be available only on the PlayStore). This was done with the intention of providing Android users with the best overall experience and this required looking at the other most prominent application store currently on the market.

1.2 Project Purpose

The task was to create a tourism app detailing events and locations in Northumberland County. It was stated in the specification that:

“You may consider a generic app for all tourists/visitors or if you prefer, you can focus on a specific type of tourist/visitor such as walkers, bird-watchers, cyclists or even ghost-hunters. The council is open to any ideas involving apps and therefore the exact focus of the app is entirely up to your team”

It was decided upon by the team and the client that this app would choose to be targeted to a specific niche, and not to the whole consumer market. This would allow more creative freedom within that genre. It was later voted that this genre would be students. Benefits of doing this would be that the team would be their own target audience. They would know how best to cater towards the target audience as they themselves would have a personal investment in the app.

There are many objectives to ensure that this app is the most thorough it can be. A full list of the objectives that are to be achieved are laid out in the Solution Requirements section.

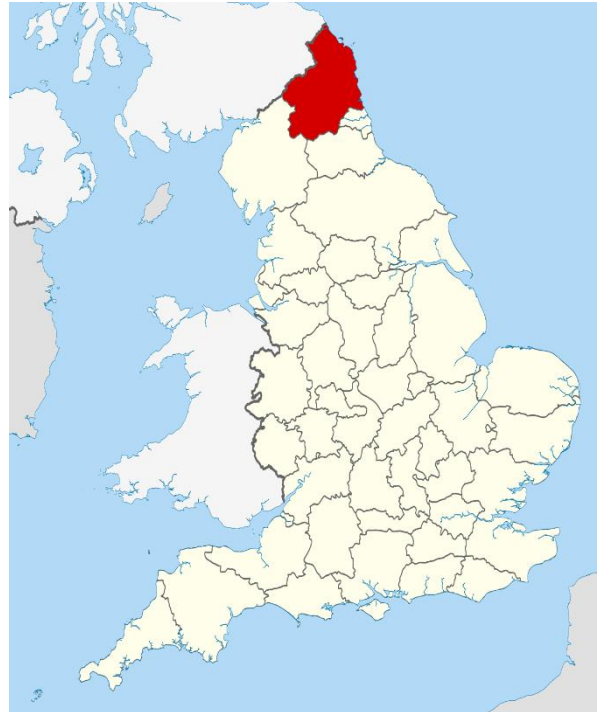


Figure 1.7

1.3 Client Requirements

The customer for this project is Northumberland County Council, who have commissioned an app from the team to serve as a promotional tool to attract tourism to the county.

The point of contact for the team was Dr Dan Nesbitt - an elected member of the Seaton Valley Community Council with contacts at Northumberland County Council.

There were only two key requests given by the County Council.

The first request was to limit the amount of data displayed on the site. The reasoning being that the app is aimed only towards tourists, and therefore does not need to be concerned with local council matters – such as bin collection and bus routes. It therefore requires a certain level of abstraction.

Another key feature required was a lack of bias. This app will be representing the views of the County Council, and for that reason needs to remain impartial and not be seen promoting a specific brand or business.

2. Roles and Deliverables

2.1 Roles – Team Roles and Responsibilities

Emil Delvaux - Team Leader and Website Design

Oversees the project and makes sure that all deadlines are adhered to. Keeps track of upcoming deadlines and attends all team leader meetings. Joint-responsible for creating the marketing website. Will work on both the front-end and the back-end.

Helen Evans - Secretary and Lead Documentation

Takes minutes for each meeting, creates meeting itineraries, organises documentation roles and makes sure documents are coherent.

Ethan Gwilliams – Senior Programmer

Joint-responsible for developing the bulk of the app. Will create most of the classes and work alongside the front-end developers in order to create an app which fully integrates with the design, and that has full functionality.

Emily Harrison – Lead Research and Documentation

Conducts the majority of the research for the project and assists with the writing up of team documents.

Vilius Kaulinskas – Website Design

Joint-responsible for creating the marketing website. Will work on both the front-end and the back-end.

William Kershaw - Senior Programmer

Joint-responsible for developing the bulk of the app. Will create most of the classes and work alongside the front-end developers in order to create an app which fully integrates with the design, and that has full functionality.

Callum Nicholson – Front-End Developer

Joint-responsible for designing the aesthetic of the app and ensuring that the design is consistent between all different devices.

Will be responsible for ensuring that the app will look the same on different screen sizes and will work alongside the programmers in order to ensure that the design works well with the code. Also needs to think of how to navigate efficiently between the different pages in the app.

If need be, one of the front-end developers can switch to a junior programmer if more work needs to be done on the back-end of the app.

Nicholas Ng - Front-End Developer

Joint-responsible for designing the aesthetic of the app and ensuring that the design is consistent between all different devices.

Will be responsible for ensuring that the app will look the same on different screen sizes and will work alongside the programmers in order to ensure that the design works well with the code. Also needs to think of how to navigate efficiently between the different pages in the app.

If need be, one of the front-end developers can switch to a junior programmer if more work needs to be done on the back-end of the app.

Robert Kovbasiuk- Junior Programmer

In charge of aiding the senior programmers. The junior programmer will have less responsibility than senior programmers, but will still be involved in the development of the app.

Testing roles are laid out in the Test Plan

2.2 Deliverables

Team Contract

A document outlining team functionality including the procedure for meetings, peer reviews and team roles and responsibilities.

Final Submission by 26/10/2018

Dragon's Den Slides

A presentation pitching the initial ideas and designs for the app. This will be used as the basis for the Dragon's Den presentation.

Final Submission by 28/11/2018

Peer Review #1

An Excel file representing a team average of the contribution matrices for semester 1

Final Submission by 07/12/2018

Draft Specification

A preliminary version of the document that sets out what is expected and planned for the implemented system. Includes the document that lays out the intended tests, extensively covering any form of input in and about the system.

Final Submission by 12/12/2018

Specification

A document that sets out what is expected and planned for the implemented system.

Includes the document that lays out the intended tests, extensively covering any form of input in and about the system.

Final Submission by 08/03/2019

Poster for Trade Fair

An A1 poster that aims to fully describe and advertise the app to someone who has not heard of it.

Final Submission by 29/03/2019

Android App

A fully functional app available for download on the Play Store that serves as a well-informed student guide to the Northumberland area.

Final Submission by 29/04/2019

Marketing Website

A website that serves to aid and advertise the app.

Final Submission by 29/04/2019

Individual Report and Log Book

Documents detailing own personal experience during the course of the project especially regarding the development of skills and focusing on both positive and negative experiences. The logbook will be an Excel file listing the number of individual hours put on this project and what they were put towards.

Final Submission by 07/05/2019

Peer Review #2

An Excel file representing a team average of the contribution matrices for semester 2

Final Submission by 07/12/2018

3. Project Plan

| | Academic Year 2018-2019 | | | | | | | |
|-------------------------------------|-------------------------|----------|----------|---------|----------|-------|-------|-----|
| | October | November | December | January | February | March | April | May |
| Team Structure | | | | | | | | |
| Team Contract | | | | | | | | |
| Project Plan | | | | | | | | |
| Draft Requirements Spec | | | | | | | | |
| Domain Analysis | | | | | | | | |
| Roles & Deliverables | | | | | | | | |
| Hardware & Software | | | | | | | | |
| References | | | | | | | | |
| Assumptions | | | | | | | | |
| Constraints | | | | | | | | |
| Dragons Den | | | | | | | | |
| Peer Review 1 | | | | | | | | |
| Face to Face with Client | | | | | | | | |
| Website Prototype | | | | | | | | |
| Design Diagrams & UI Designs | | | | | | | | |
| Java App Development | | | | | | | | |
| Website Development | | | | | | | | |
| Testing | | | | | | | | |
| Fix Errors in Testing | | | | | | | | |
| Final Requirements Spec & Test Plan | | | | | | | | |
| Poster for Trade Fair | | | | | | | | |
| Submit Final System | | | | | | | | |
| Trade Fair | | | | | | | | |
| Individual Report & Log Book | | | | | | | | |
| Peer Review 2 | | | | | | | | |
| Technical Demo of System | | | | | | | | |

3.1 Breakdown of Tasks and Deadlines

| Programming Team – General | | | |
|--|--|---------------|------------|
| Task | Description | Deadline Type | Deadline |
| Design Application front-end | Draft up some concepts based on research done on well received designs from other apps | Internal | 21/11/2018 |
| Review front-end designs | Check with other members of the team and perhaps get suggestions for touch ups | Internal | 27/11/2018 |
| Decide on final design | Compare each concept with each other and decide on a concept to be used | Internal | 13/12/2018 |
| Create a test plan | Write the white box and black box testing that would be required | Internal | 08/03/2019 |
| Research back-end database implementation | Determine the best implementation for the back-end database for t | Internal | 12/03/2019 |
| Collate data to be used in back-end database | Find the information that will be used by the app | Internal | 14/03/2019 |
| Research implementation of different API integration | Looking at how to implement maps, twitter etc. | Internal | 14/04/2019 |
| Testing | Testing of the application, both front-end and back-end | Internal | 28/04/2019 |
| Final Code Submission | Submitting final code to NESS | External | 29/04/2019 |

Programming Team – Front-end Development

| Task | Description | Deadline Type | Deadline |
|--|---|---------------|------------|
| Implement front-end design in Android Studio | Create the designed GUI with buttons and navigation set up | Internal | 27/03/2019 |
| Design Review #1 | Review app design and functionality | Internal | 28/03/2019 |
| Implement front-end changes based on review | Modify and improve previous design considering different screen sizes | Internal | 10/04/2019 |
| Design Review #2 | Write the white box and black box testing that would be required | Internal | 11/04/2019 |
| Final Edits | Finalize the GUI on all expected screen sizes and Android versions | Internal | 27/04/2019 |

Programming Team – Back-end Development

| Task | Description | Deadline Type | Deadline |
|--|---|---------------|------------|
| Create a Wikipedia client | Will be used to update the description column in database with relevant information | Internal | 11/03/2019 |
| Create an image scraping client | Used to grab links of images and store them in the database for use. | Internal | 23/03/2019 |
| Create basic implementation of Map View | Map API Integration, Track user location via GPS | Internal | 28/03/2019 |
| Create basic implementation of Tabular View | Tabular view with placeholder images | Internal | 28/03/2019 |
| Create basic implementation of Information View | Information view with placeholder images | Internal | 10/04/2019 |
| Advanced implementation of Map View, Tabular View and Information View | Link with back-end database and display real information. Sort, search, filters, colour coded locations, centre location on user. | Internal | 14/04/2019 |
| Low priority feature implementation | Integrate reviews with points of interest, Dark Mode, Nearby attractions, voice assistant, Facebook log-in | Internal | 21/04/2019 |
| Resolve any errors from testing | Fix code so that all tests pass with no errors or bugs | Internal | 28/04/2019 |

| Website Team | | | |
|----------------------------------|--|---------------|------------|
| Task | Description | Deadline Type | Deadline |
| Implement Framework | Using Bootstrap for mobile accessibility | Internal | 07/02/2019 |
| Create "Home" page design | Navigation bar with placeholders | Internal | 14/02/2019 |
| Create "Features" page design | Placeholders for displaying main functions of the app | Internal | 21/02/2019 |
| Create "Download" page design | Placeholder for link to download app | Internal | 28/02/2019 |
| Design Review #1 | Review of main page design and functionality | Internal | 07/03/2019 |
| Create "Contact Us" page design | Create structure of contacts section | Internal | 14/03/2019 |
| Create "User Manual" page design | Placeholders for documentation, user manual, FAQ sections | Internal | 28/03/2019 |
| Optimisation of website | Improve scalability, performance and user experience | Internal | 04/04/2019 |
| Testing | Testing for features outlined in the Test Plan | Internal | 08/04/2019 |
| Finalise content | Put the actual content into placeholders | Internal | 12/04/2019 |
| Design Review #2 | Final review of documentation and main page style, functionality and performance | Internal | 18/04/2019 |
| Final Code Submission | Submit website together with app | External | 29/04/2019 |

| Documentation Team | | | |
|----------------------------|--|---------------|------------|
| Task | Description | Deadline Type | Deadline |
| Submit Draft Specification | Submitting a preliminary version of the specification | External | 12/12/2018 |
| Submit Specification | Submitting the document that sets out what is expected and planned for the implemented system. Includes the document that lays out the intended tests, extensively covering any form of input in and about the system. | External | 08/03/2019 |
| Create User Manual | Creating an instruction guide on how to use the app. This will then be accessible through the website | Internal | 27/03/2019 |

4. Hardware and Software Platforms

To create the app, the set of development tools provided with the Android SDK will be used. This includes Android Studio, a development environment built specifically for writing Android apps. Android Studio has tools to interface with both GitHub, the chosen VCS, as well as an SQL database to store app information.

The development will occur on personal machines or the computers available at the university. Commitments to the project will then be synced with a central GitHub repository for other developers to access. Testing will be done using either personal devices or with the AVD manager bundled with Android Studio. AVD allows the developer to emulate a virtual device on their computer to run and test the app. Production code can then, once tested, be pushed to the play store from within Android Studio.

4.1 Software Versions

| Name | Description | Version |
|----------------|--|--------------|
| Java | Current version of the Java SDK | 8.0 |
| Android Studio | Current version of Android Studio software | 3.3.1 |
| SQLite | Current version of SQLite software | 3.27.2 |
| Git | Current version of Git software | 2.20.1 |
| Photoshop | Current version of Adobe Photoshop | 20.0.3.24950 |
| Eclipse | Current version of Eclipse | 4.1.0 |
| Atom | Current version of Atom | 1.34.0 |
| Pages | Current version of Pages; used for diagram drawing | 7.3 |
| PowerPoint | Current version of Microsoft PowerPoint | 1811 |
| Publisher | Current version of Microsoft Publisher; used for diagram drawing | 1904 |

4.2 Hardware Requirements

| PC Requirement (Website) | Description |
|--------------------------|--|
| RAM | 1GB minimum |
| Operating System | Supported version of either Windows or macOS |
| Wi-Fi | Reliable connection to any network |
| Web Browser | Latest version of any web browser |
| Processor | 1GHz Single Core |

| Phone Requirement (Website/App) | Description |
|---------------------------------|------------------------------------|
| RAM | 1GB minimum |
| Storage Space | 200 MB minimum |
| Operating System | Android version 4.1 and up |
| Wi-Fi | Reliable connection to any network |
| Web Browser | Latest version of any web browser |
| Processor | 1GHz Single Core |
| Touchscreen | Required for user input |

5. Solution Requirements

5.1 Functional Requirements

| Requirement | | Priority (H, M, L) | Supplier Compliance (Full, partial or will not be delivered) | Supplier Comment |
|-------------------|---|--------------------------|--|--|
| Mobile App | | | | |
| 1.1.1 | The application will use Google's map API | H | Full | Essential to the app functioning |
| 1.1.2 | The application will use GPS to track the user's current location. | H | Full | Allows the user to use the app in real time based on their location |
| 1.1.3 | The application will have two views, a map view and a tabular view that can be switched between freely. | H | Full | Map view will be uncluttered, tabular view will have more information on demand |
| 1.1.4 | The application will show the nearby points of interest on a map, categorised by colour. | H | Full | Improves user friendliness of the application |
| 1.1.5 | The application will allow user to filter/un-filter the map view to show a certain category only | H | Full | Allows user to filter as per their needs, improving usability |
| 1.1.6 | The application's map will give the user the option to zoom in/out as well as re-centre on their current location. | H | Full | Standard map functionality |
| 1.1.7 | Upon clicking on a point of interest (both map view and tabular) the application will show Google reviews | L | Full | Increases app functionality, increasing the chance user will continue to use the app |
| 1.1.8 | The application will have a tabular view showing categorised images of points of interest that user can navigate through. | H | Full | Gives user the ability to scroll through categories rather than basing it on their proximity on the map |
| 1.1.9 | The application will allow the user to click on an individual point of interest to view more information on it (such as historical information, opening times, popular times, directions) | H | Full | Allows user to get more information about each point of interest |
| 1.1.10 | The application will allow the user to toggle to a language of their choice | L | Partial | While this is an important feature as many Students are from different parts of the world, adding multiple |

| | | | | |
|--------|--|---|------|--|
| | | | | languages will likely not be feasible in the final specification |
| 1.1.11 | The application will allow the user to change to a colour-blind mode | H | Full | This will improve accessibility to users who are colour-blind |
| 1.1.12 | The application will allow the user to toggle a 'dark theme' | L | Full | Improves usability of the app, dark mode can help reduce battery usage |
| 1.1.13 | The application will integrate with social media | M | Full | Students are primary target of the app, integration will help to make them more likely to use the app. |
| 1.1.14 | The application will allow user to search for a nearby location based on name, type, etc. | H | Full | This will improve usability as user can search specifically for something rather than having to look through the app manually. |
| 1.1.15 | The application will store data locally, allowing the user to login and maintain a profile. | H | Full | Required for function of other features |
| 1.1.16 | The application will allow user to create a list of favourite locations | M | Full | This will allow user to have quick access to their favourite locations, increasing user friendliness |
| 1.1.17 | The application will allow user to plan a trip to a location within the app | M | Full | Allowing the user to plan a trip to the location they have in mind will increase the chance they will use the map instead of others such as google maps. |
| 1.1.18 | The application will show a list of 'Nearby Attractions' based on the time of year (perhaps haunted castles at Halloween etc) | L | Full | Expands functionality of the app, making it more appealing to the user. |
| 1.1.19 | The application will have voice assistant functionality (e.g. where is the nearest coffee shop) | L | Full | Expands functionality of the app, making it more appealing to the user. |
| 1.1.20 | Allows the user to log in using Facebook. This reduces the amount of data stored by the app and leaves any security liabilities with Facebook. | L | Full | May isolate users who do not have a Facebook account. Useful on the security and memory front. |
| 1.1.21 | Gives the user a brief run through of the app | L | Full | Increase user-friendliness and allow users to be more familiar with using the app before they start |

5.2 Non-Functional Requirements

| Requirement | Priority (H, M, L) | Supplier Compliance (Full, partial or will not be delivered) | Supplier Comment | |
|-------------|---|--|------------------|--|
| 1.2.1 | Software documentation | H | Full | User guide for the application hosted on the website showing how to use it/FAQ etc |
| 1.2.2 | Wi-Fi/Mobile internet | H | Full | In order to use the app, there must be an active internet connection |
| 1.2.3 | The application will be concerned with people visiting the county, not local county matters. | H | Full | Essential to the specification guidelines |
| 1.2.4 | Any information presented in the application will be impartial, avoiding promotion of any businesses/hotels. | H | Full | Essential to the specification guidelines |
| 1.2.5 | The language used in the app will be clear and concise, avoiding the use of any slang/regional terms | H | Full | This will avoid alienating users who may not be familiar with this |
| 1.2.6 | The app should be intuitive, but a help/tutorial section should still exist | H | Full | This could be achieved only through the website |
| 1.2.7 | Ease of navigation, all features of the app are accessible from the home page | H | Full | Allows quick and easy information. |
| 1.2.8 | Saved locations should be stored locally to avoid data usage | M | Full | Will reduce the amount of data on the server. |
| 1.2.9 | The social events page should be updated by a student representative or by extrapolating data from social media, e.g. a twitter tweet | M | Full | Stops manual logging. |
| 1.2.10 | Most actions should be accompanied with icons to reduce the language barrier | L | Full | Good consideration if the language feature ends up not being implemented |
| 1.2.11 | The application will follow Google's material design guidelines | M | Full | These guidelines are found in lots of apps, maintaining them will increase familiarity with the layout of the app. |

6. Assumptions

- Users will possess an Android smartphone with the necessary hardware.
- User has a near-constant internet connection with Wi-Fi capabilities.
- User has got a web browser to view the website.
- User knows how to use an online map or other similar Utilities.
- User has got at least 100MB (lower bound) of free storage space to install the app.

7. Constraints & Dependencies

- Explore Northumberland is a mobile app which relies heavily on having an Internet connection in order to load the map to allow for GPS tracking. Other features such as showing different tourist attractions and nearby facilities also require an internet connection.
- The mobile app is currently only being developed for Android phones
 - The team already knew Java, so would not have to learn a new programming language, compared to having to learn Swift if the app was being built for iOS devices
 - Android devices take up 74% of the worldwide mobile phone operating system market share (*StatCounter Global Stats, 2019*), allowing for a significantly larger customer base.
 - In the future, an iOS and Windows compatible version may be built, but due to time constraints, this is not feasible for the moment.
- The mobile application relies heavily on GPS in order to locate where the user is
 - GPS is not always reliable
 - Due to the rural environment of Northumberland, it is likely that the user may experience a lack of reception where they get poor or no signal at all, causing GPS technology to not work properly
 - Attraction information would not load, leaving the user confused and annoyed.
- The application partially relies on Google's API (especially for the map)
 - Reliant on being able to access it freely without constraint or cost
 - Relies on Google keeping their API open, free and accessible.

8. Software Design

8.1 Software Overview

There will be a number of features implemented in the application that will make it attractive and a competitive product in the market.

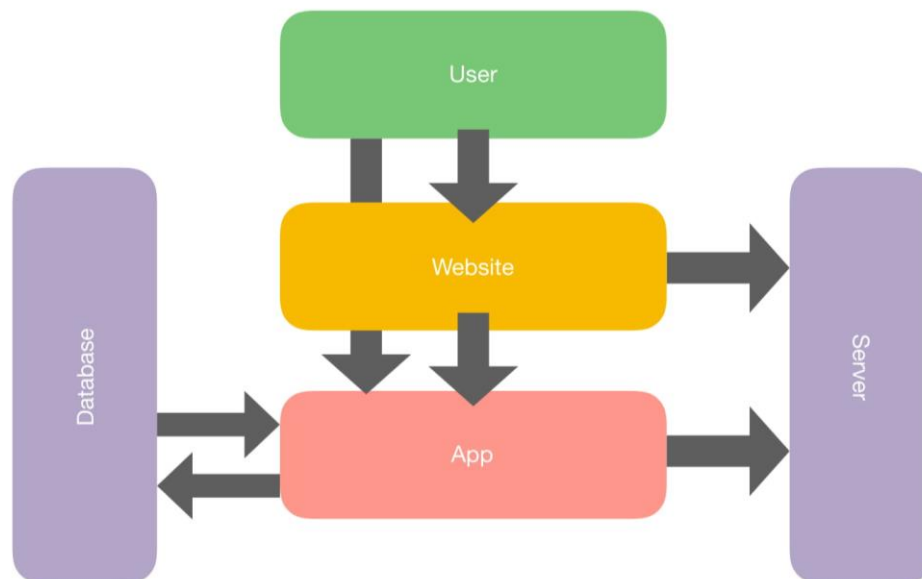
As this is a tourism app, the key aspect of it is to introduce the user to the region and give a list of different attractions and locations. This will be done in a convenient way for the user. Attractions will be categorised, and users will be able to filter by category or distance from the user's current location, as well as search for specifics using the search bar. To make trip planning easier, attractions can be saved to the list.

The target market for this app is not only the students who live in the UK but also students coming from abroad and visiting Northumberland county. These students may not understand English and find it more convenient to use the app in different languages. They will be able to switch to different languages (languages available will be confirmed later).

Finally, it is believed that social media integration will benefit user experience. Pages from Facebook, Instagram, Twitter etc. from the region will be posted in the app and give users information about what is currently happening in the region, allowing them to adjust their trip plans accordingly.

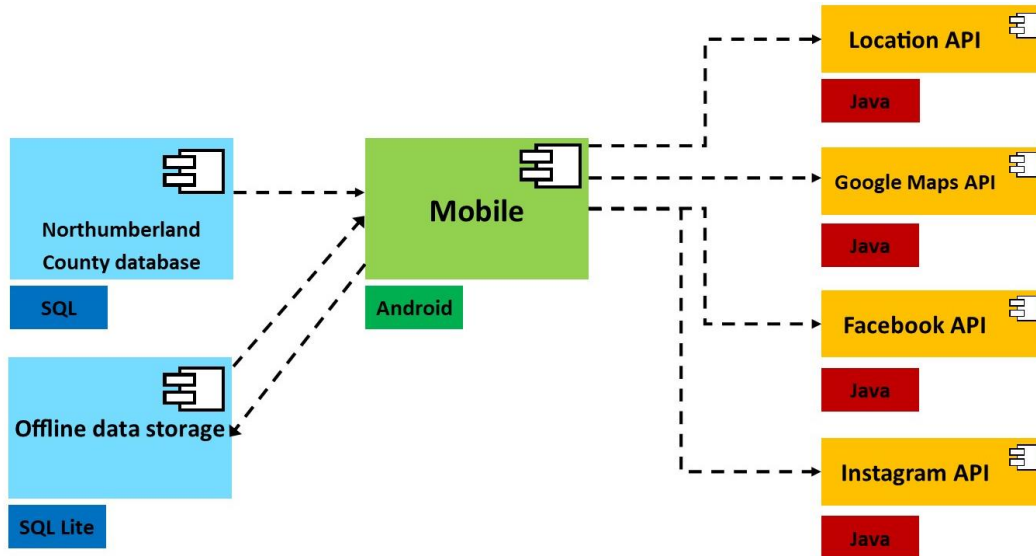
8.2 Layered Architecture Diagram

This diagram shows the relationship between the different interfaces, and how they interact with each other and the user.



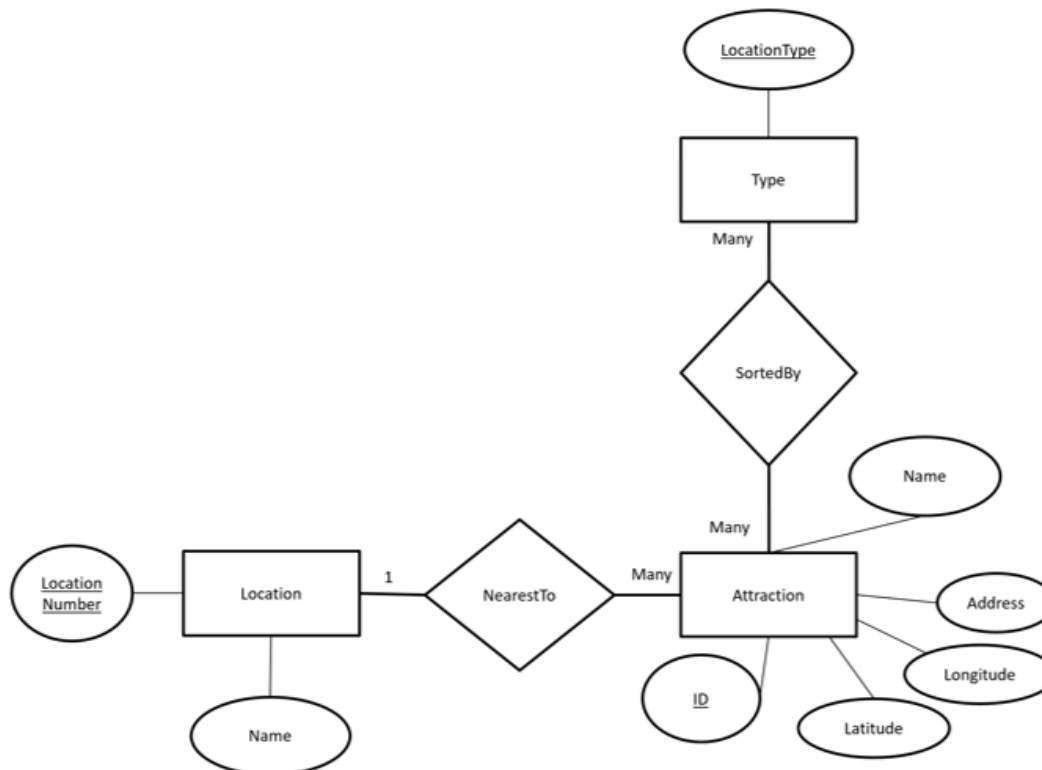
8.3 Component Diagram

This diagram shows how the mobile app interacts with the database and the different APIs being integrated within the app.



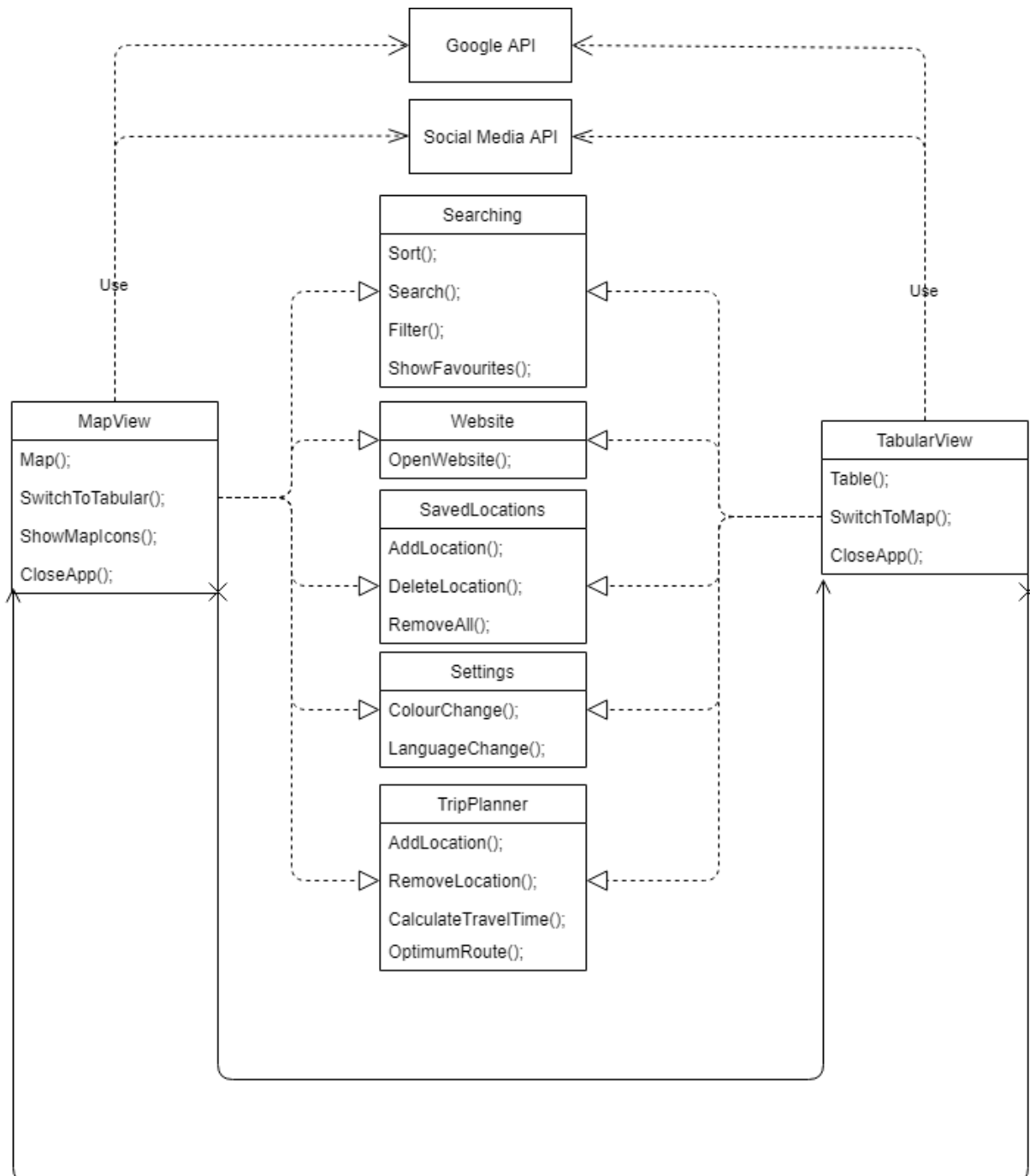
8.4 Entity Relationship Diagram

This diagram shows the different tables in the SQL database and the relationships between them. It also shows the entities of each relationship, and the primary keys.



8.5 Class Diagram

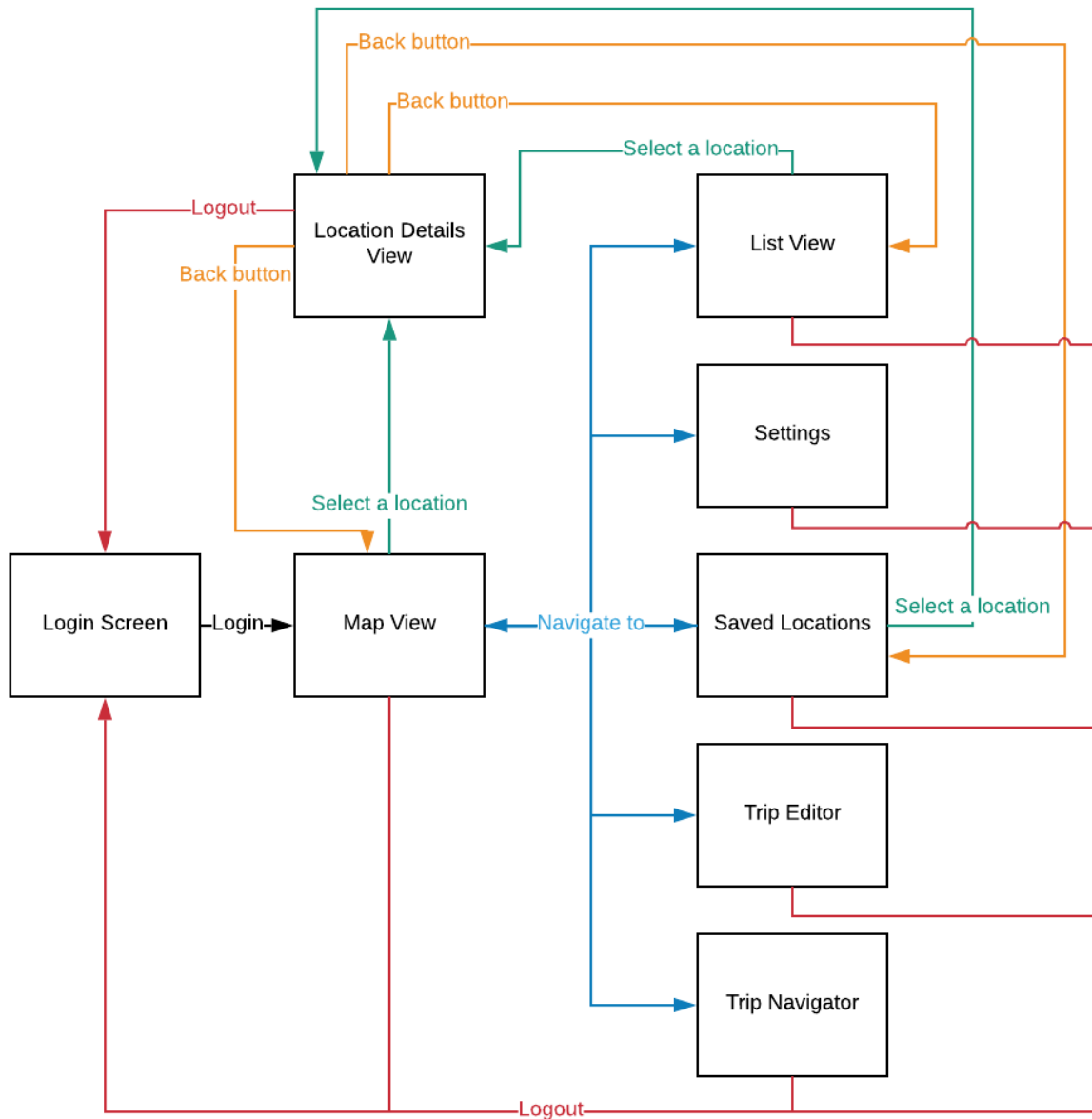
This class diagram shows the different classes in the app and how they interact with each other, as well as the different APIs being used. The diagram also shows the different methods in each class.



8.6 User Flow Diagrams

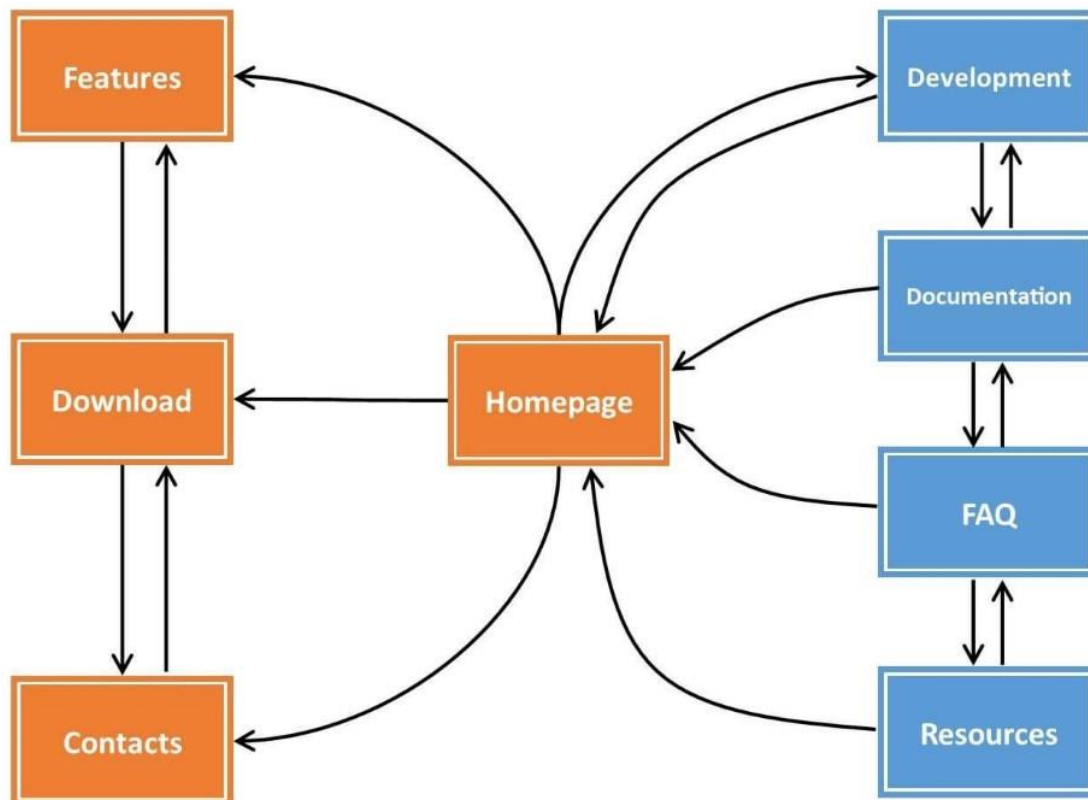
8.6.1 App

This diagram represents how all the different app displays link and transfer to one another. Due to this being the main product for the end user, the aim is to make it very user-friendly and ensure that there are many ways to get around the app.



8.6.2 Website

This diagram represents how the different web pages in the website link to each other. As seen from the diagram, the homepage is central to all the pages and this will be a fundamental feature to ensure consistency throughout the site.



8.7 Preliminary Designs

8.7.1 App

App design templates

The following designs are the three different ideas proposed by members of the design team (now defunct and absorbed into the programming team).

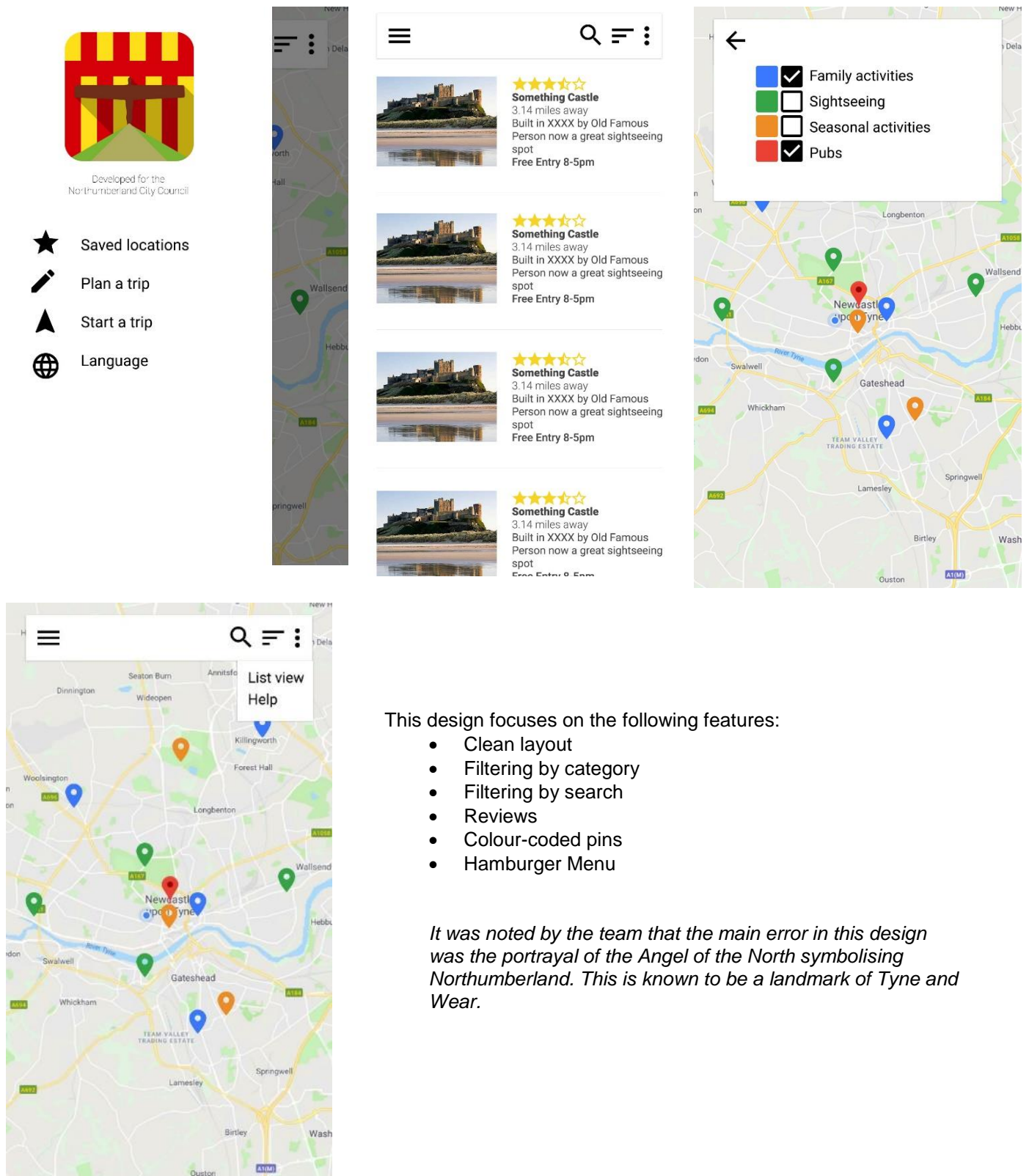
Design 1



This design focuses on the following features:

- Colour-coded pins
- Easy navigation by having all pages accessible through a taskbar
- Events/Attractions categorised
- Search bar
- Favourites
- User Profile

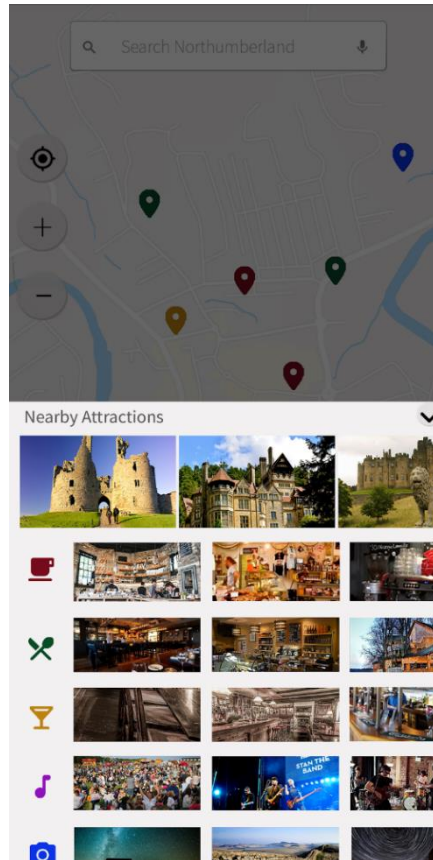
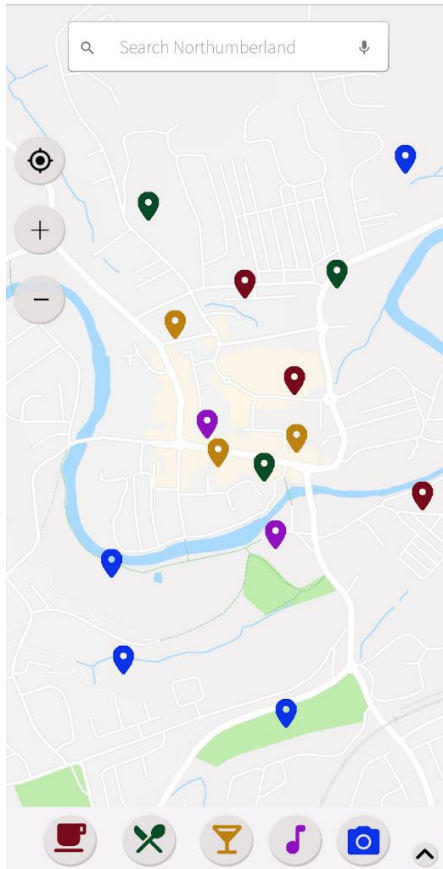
Design 2



This design focuses on the following features:

- Clean layout
- Filtering by category
- Filtering by search
- Reviews
- Colour-coded pins
- Hamburger Menu

It was noted by the team that the main error in this design was the portrayal of the Angel of the North symbolising Northumberland. This is known to be a landmark of Tyne and Wear.

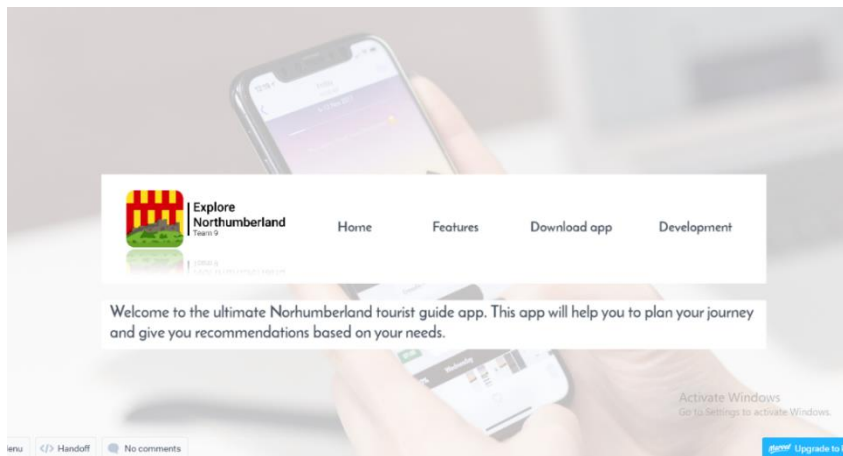
Design 3

This design focuses on the following features:

- Clean layout
- Search function
- Task Bar
- Zooming
- GPS Locator
- Filtering by category
- Colour-coded pins
- Expandable event menu

8.7.2 Website

Website design templates

Start-up Page

Features Page

Home Features Download app Development

This is a nice sentence about some of the features of the app.

- Best restaurants around you
- Outdoor activities
- Modern and responsive user interface
- How to get there
- Historical heritage

Handoff No comments

Home Features Download app Development

This is a nice sentence about some of the features of the app.

- Best restaurants around you
- Outdoor activities
- Modern and responsive user interface
- How to get there
- Historical heritage

| Line | Time | Cost |
|-----------------------|------|------|
| London - Newcastle | 2:59 | £50 |
| Edinburgh - Newcastle | 1:32 | £80 |

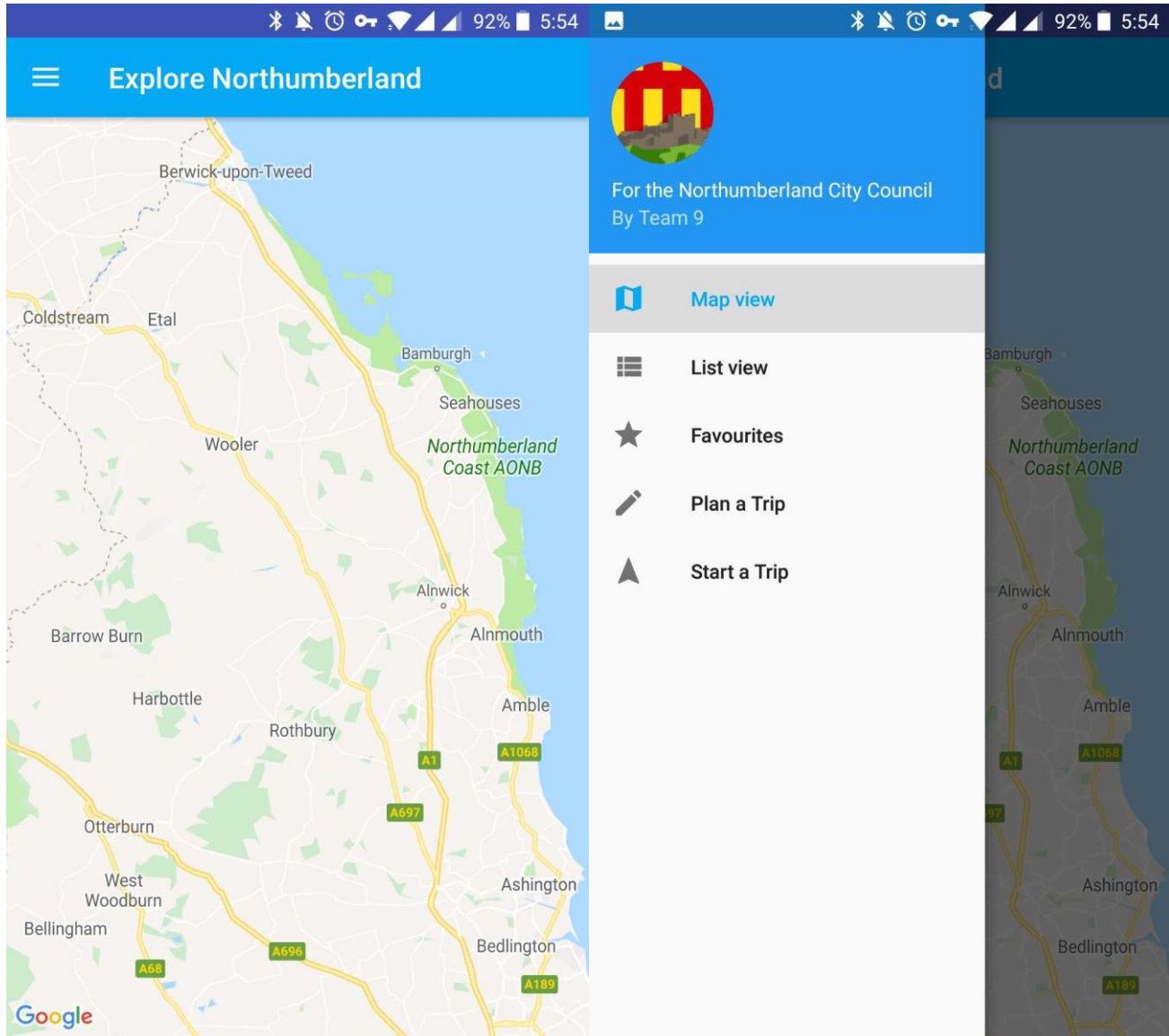
Handoff No comments

8.8 Final Designs

These represent the state of the app and website as they were at time of submission.

8.8.1 App

Application implementation



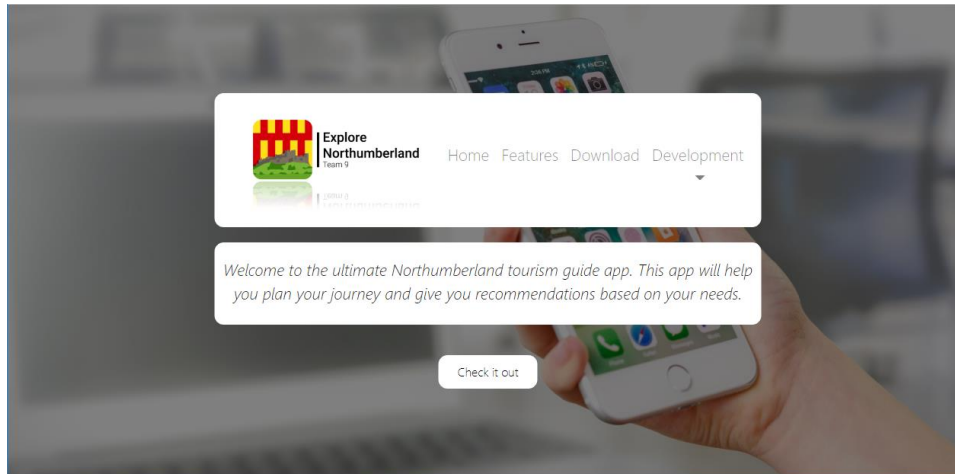
The current design of the app with some placeholder text.

Multiple buttons still need to be implemented, such as search and sort.

The method to switch views is also currently temporary, a more user-friendly way will be used in its place.

8.8.2 Website

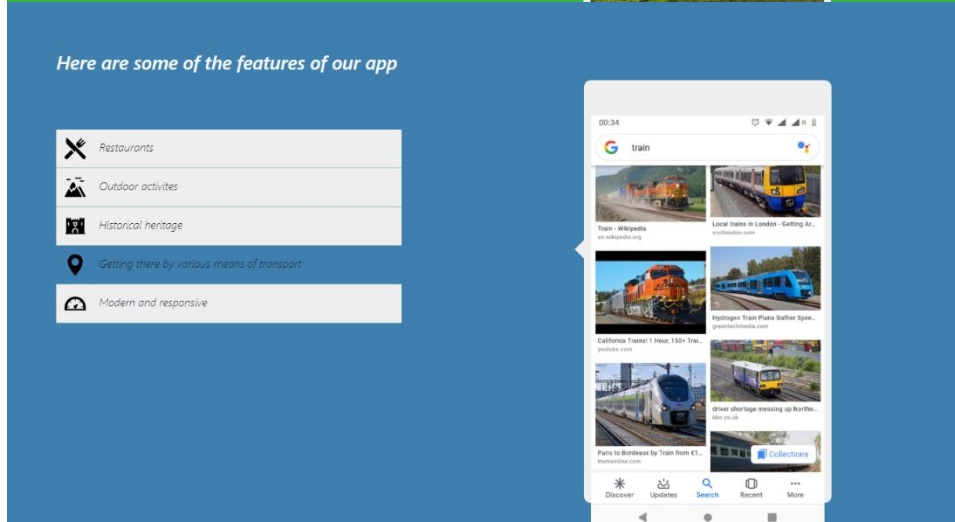
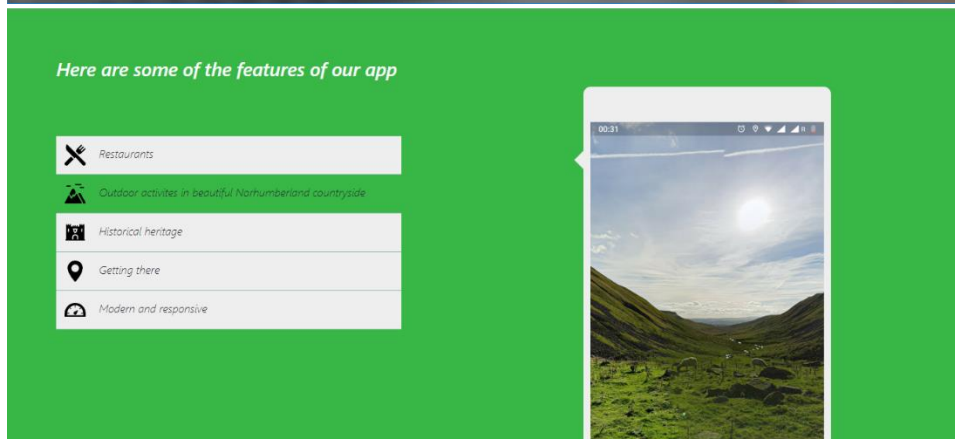
Website implementation



The website was implemented closely following the design templates.

Some of the changes were made in order to improve functionality of the website. For example, the Development section of navigation bar has been implemented with a drop-down list to allow the users get to the relevant section quicker (FAQ, Documentation, User Manual or Contacts).

Some other minor differences (e.g. padding, font) are caused by the way browser renders code. The visual representation of website will be improved in the further development process.



8.9 User Functionality

When developing the design of the app, the main aim was to make the user interface uncluttered and easy to use. The design of the application will be very consistent and based on Google Material Design rules which most users are familiar with.

First of all, large number of different attractions will be shown in the app. In order to make navigation between those attractions convenient, a practical solution was proposed. There will be two modes to view the attractions. Map view will display attractions as a pin to mark their locations on a map. This mode is useful when the user is interested in finding attractions nearby. The different colours of pins represent different categories of attractions which allows to find relevant information quicker.

Another important feature that makes navigation quicker is allowing users access features as directly as possible (i.e. not hiding them under many categories of menu). This way, users find the desired features quicker and it results in higher user satisfaction.

Moreover, it has been considered that some users may have a disability and so the interface has been adapted for their needs. A high contrast mode will be useful for colour-blind people and a larger font available for those who have poor eyesight.

9. Test Plan

9.1 Overview

The purpose of the testing phase is to locate and solve any errors in the system before the system is launched and the public have access to it. Testing the system will ensure that it meets the requirements that have been set out of the client, and that it is of an adequate standard.

Testing will commence once the app solution has started to develop, and will run until either all bugs have been removed or until final submission. Code will be tested at the same time as the solution is developed, rather than testing all the code at the end. This is to avoid being in the situation where it is close to the final deadline and the testing hasn't been done, and many bugs still exist in the system.

To test the solution, a PC that meets outlined system requirements will be utilised, along with an Android phone that meets the minimum system requirements.

To thoroughly test the app and website, two different kinds of testing will be used: white box (tested by people who worked on that specific medium) and black box (tested by people on another sub team). In the case of the website, white box and black box testing have been substituted for better-suited forms of testing. These web tests will test the functionality, usability, and compatibility of the site.

The following is a table detailing who is testing each section and what testing method they will be conducting.

| Name | App Testing | | Website Testing |
|------------------|-------------|-----------|-----------------|
| | White Box | Black Box | Web Tests |
| Emil Delvaux | | | |
| Helen Evans | | | |
| Emily Harrison | | | |
| William Kershaw | | | |
| Callum Nicholson | | | |
| Robert Kovbasiuk | | | |

9.2 Mobile App (Black Box Tests)

| Test Number | Tests | Expected Result |
|-------------|-----------------------------------|---|
| 1.1.1 | Download button on the Play Store | App successfully downloads onto the device from the Google Play Store. |
| 1.1.2 | Open app | Start up the app and homepage appears. |
| 1.1.3 | Login screen | If user chooses to login, validate user can correctly enter data in the username and password text area. |
| 1.1.4 | Login screen | If user chooses to login, verify user correctly logs into their account upon entering correct username and password. |
| 1.1.5 | Login screen | If user enters incorrect username or password, verify that a message is displayed saying the username or password is incorrect, and the user is denied access into the account. |
| 1.1.6 | Registration screen | If user chooses to register a new account, validate that the user can correctly enter data in the username and password text area. |
| 1.1.7 | Registration screen | If user chooses to register, verify that a new account is created if the username is not already used. |
| 1.1.8 | Map and tabular view | User can toggle between map view and tabular view by clicking a button. |
| 1.1.9 | Settings display | User can change the colour display in the settings. This would allow the user to change to different colour-blind modes, catering for their needs |
| 1.1.10 | Settings display | User can change the colour of the pins on the map view to suit their preferences. |
| 1.1.11 | Map display | The user can navigate map, allowing them to move around and zoom in and out to view different attractions. |
| 1.1.12 | User favourites | Different attractions can be saved to the users favourites if they are logged into an account. |
| 1.1.13 | Hyperlinks in app | Upon clicking on different links, the user will be correctly transferred to the corresponding website of that attraction. |
| 1.1.14 | Attraction filter | User can filter different attractions and only view certain ones, such as pubs, or castles. |

| | | |
|--------|-----------------------|--|
| 1.1.15 | Settings display | User can switch between different pre-set languages, and words are correctly translated. |
| 1.1.16 | Social media links | When user clicks on Instagram icon, Instagram is opened up, giving the user the possibility to share their experience. |
| 1.1.17 | Social media links | When user clicks on Twitter icon, Twitter opens up allowing the user to tweet and mention Explore Northumberland. |
| 1.1.18 | Transportation page | Different transport methods can be selected that show the fastest way to a destination, via the selected transportation method. |
| 1.1.19 | Attraction search bar | Search bar at the top of the map view can be used to find certain attractions that match the description of what the user entered. Attractions found will then pop up, and their information be displayed. |
| 1.1.20 | Attraction search bar | When the user uses the search bar to search for an attraction that does not exist, the app returns no attractions. |
| 1.1.21 | Attraction pop-up | When an attraction is clicked on, either in the tabular view or the map view, a screen will pop-up displaying more information about the specific attraction. |
| 1.1.22 | Attraction pop-up | When the user clicks on the map or tabular view and no attraction is selected, no pop-up will display. |

9.3 Mobile App (White Box Tests)

| Test Number | Tests | Expected Result |
|-------------|--------------------------------------|---|
| 1.2.1 | Filter map icons to match a search | App takes search box query and performs SQL search on query. |
| 1.2.2 | Filter map icons to match a search | Database returns all matches for query to the map. |
| 1.2.3 | Opening information view | When an icon or image is pressed, app finds relevant data from database or online. |
| 1.2.4 | Filter map icons to match favourites | App loads up saved list of favourites and searches through relevant data in SQL database. |
| 1.2.5 | Filter map icons to match favourites | Database returns all matches and map only displays those icons |

9.4 Website Tests

It is to be taken that wherever 'TBD' is stated, the actual results are yet to be determined as of time of submission.

| Test Number | Testing | Tests | Expected Result | Actual Result |
|-------------|-----------------------------|--|--|---------------|
| 1.3.1 | Functionality | Access website via typing in URL | When the user correctly types in the URL, the website will appear on their web browser. | TBD |
| 1.3.2 | Functionality | Website hyperlinks | All hyperlinks in the different tabs will lead the user to the corresponding webpage when clicked. | TBD |
| 1.3.3 | Compatibility/ Usability | Webpage screen formatting | When the webpage is narrowed, all content moves inward ensuring nothing vanishes off the screen. | TBD |
| 1.3.4 | Compatibility | Webpage screen formatting on phone | When the website is accessed on a phone, all content is still centred, and navigation bar is turned into a dropdown list to save screen space. | TBD |
| 1.3.5 | Functionality | Social media hyperlinks | Upon clicking on the Instagram icon, user is redirected to Instagram allowing them to share their experience with Explore Northumberland. | TBD |
| 1.3.6 | Functionality | Social media hyperlinks | Upon clicking on the Twitter icon, user is redirected to Twitter allowing them to tweet about their experience with Explore Northumberland. | TBD |
| 1.3.7 | Usability | User manual accessibility on website | User can easily access the user manual on the website, and it is properly formatted. | TBD |
| 1.3.8 | Functionality | Download PDF of user manual | User can download a PDF version of the user manual to view later. | TBD |
| 1.3.9 | Functionality | Validate HTML | Use an HTML validation tool to validate all HTML in the website | TBD |
| 1.3.10 | Functionality | Validate CSS | Use a CSS validation tool to validate all CSS in website. | TBD |
| 1.3.11 | Compatibility | Webpage screen formatting on different browsers. | The website will look the same on all browsers. | TBD |

10. Definition of Terms

- API- **Application Programming Interface:** A set of functions and procedures allowing the creation of applications that access the features or data of a service.
- AVD- **Android Virtual Device:** Configuration that defines the characteristics of an Android device that you want to simulate in an emulator.
- CSS- **Cascading Style Sheets:** Used to format the layout of web pages.
- FAQ- **Frequently Asked Questions:** Listed commonly asked questions and their respective answers pertaining to a particular topic.
- HTML- **Hyper Text Mark-up Language:** A standardised system for creating text files to be shown on World Wide Web pages.
- iOS - **iPhone Operating System:** A mobile operating system used by mobile devices manufactured by Apple Inc.
- MB- **Megabytes:** A unit of storage space used on electronic devices.
- PDF- **Portable Document Format:** File format, presents documents in a manner independent of application software, hardware and operating systems.
- RAM- **Random Access Memory:** A volatile form of data storage.
- SDK- **Software Developer's Kit:** Set of programs used by a computer
- SQL- **Structured Query Language:** Used to manage data held in a relational database management system
- URL- **Uniform Resource Locator:** A reference to a web resource that specifies its location on a computer network and a mechanism for retrieving it.
- VCS- **Version Control Systems:** Manages changes to documents, computer programs, large websites and other collections of information.
- Wi-Fi- **Wireless Fidelity:** The standard wireless network technology for connecting electronic devices to each other and to the Internet

11. References

Article title: Get Started | Maps SDK for Android | Google Developers

Website title: Google Developers

URL: <https://developers.google.com/maps/documentation/android-sdk/start>

Date Accessed February 12, 2018.

Article title: Introduction · Bootstrap

Website title: Bootstrap

URL: <https://getbootstrap.com/docs/4.3/getting-started/introduction/>

Date Accessed February 18, 2018.

Article title: Using MySQL and PHP with Google Maps

Website title: Google developers

URL: <https://developers.google.com/maps/documentation/javascript/mysql-to-maps>

Date Accessed February 23, 2018.

Article title: Mobile Operating System Market Share Worldwide | StatCounter Global Stats

Website title: StatCounter

URL: <http://gs.statcounter.com/os-market-share/mobile/worldwide>

Date Accessed: 1/3/19

Article title: Northumberland Offline Map and Travel Trip Guide on the App Store

Website title: itunes.apple.com

URL: <https://itunes.apple.com/gb/app/northumberland-offline-map-and-travel-trip-guide/id1178420723?mt=8>

Date Accessed: 15/11/18

Article title: Northumberland Offline Map and Travel Trip Guide on the App Store

Website title: itunes.apple.com

URL: <https://itunes.apple.com/gb/app/northumberland-offline-map-and-travel-trip-guide/id1178420723?mt=8>

Date Accessed: 15/11/18

Article title: London Travel Guide Offline on the App Store

Website title: itunes.apple.com

URL: <https://itunes.apple.com/gb/app/london-travel-guide-offline/id334617497?mt=8>

Date Accessed: 15/11/18

Author names: Dickinson, J.E., Ghali, K., Cherrett, T., Speed, C., Davies, N., Norgate, S.

Year published: 2012

Title: Tourism and the smartphone app: capabilities, emerging practice and scope in the travel domain. Current Issues in Tourism.

Date Accessed: 16/11/18

Figure 1.7; Northumberland Map; Wikipedia; Accessed: 06/03/2019

https://en.wikipedia.org/wiki/Northumberland#/media/File:Northumberland_UK_locator_map_2010.svg

12. Contribution Matrices

These show the contributions made to each section for each semester. Topics that are greyed out indicate no further contribution/minor edits from the draft specification submission.

| | Emil | Helen | Ethan | Emily | Vilius | William | Callum | Nicholas | Robert |
|---------------------------------|------|-------|-------|-------|--------|---------|--------|----------|--------|
| Purpose | | | | | | | | | |
| Background & Analysis | | | | | | | | | |
| Project Plan | | | | | | | | | |
| Hardware and Software Platforms | | | | | | | | | |
| Solution Requirements | | | | | | | | | |
| Assumptions | | | | | | | | | |
| Software Design | | | | | | | | | |
| Test Plan | | | | | | | | | |
| Definition of Terms | | | | | | | | | |
| Contribution Matrix | | | | | | | | | |

| | Emil | Helen | Ethan | Emily | Vilius | William | Callum | Nicholas | Robert |
|----------------------------|------|-------|-------|-------|--------|---------|--------|----------|--------|
| Analysis | | | | | | | | | |
| Proj. Purpose | | | | | | | | | |
| Client Requirements | | | | | | | | | |
| Roles | | | | | | | | | |
| Deliverables | | | | | | | | | |
| Project Plan | | | | | | | | | |
| Software Versions | | | | | | | | | |
| Hardware Requirements | | | | | | | | | |
| Solution Req. | | | | | | | | | |
| Assumptions | | | | | | | | | |
| Constraints & Dependencies | | | | | | | | | |
| Software Design Diagrams | | | | | | | | | |
| Preliminary Designs | | | | | | | | | |
| Final Designs | | | | | | | | | |
| User Func. | | | | | | | | | |
| Test Plan | | | | | | | | | |
| Definition of Terms | | | | | | | | | |
| References | | | | | | | | | |