Activity B

This document provides a set of design documents for the digital solution proposed to Health Advice Group. This document should be read along with the proposal document in order to fully comprehend the solution proposal.

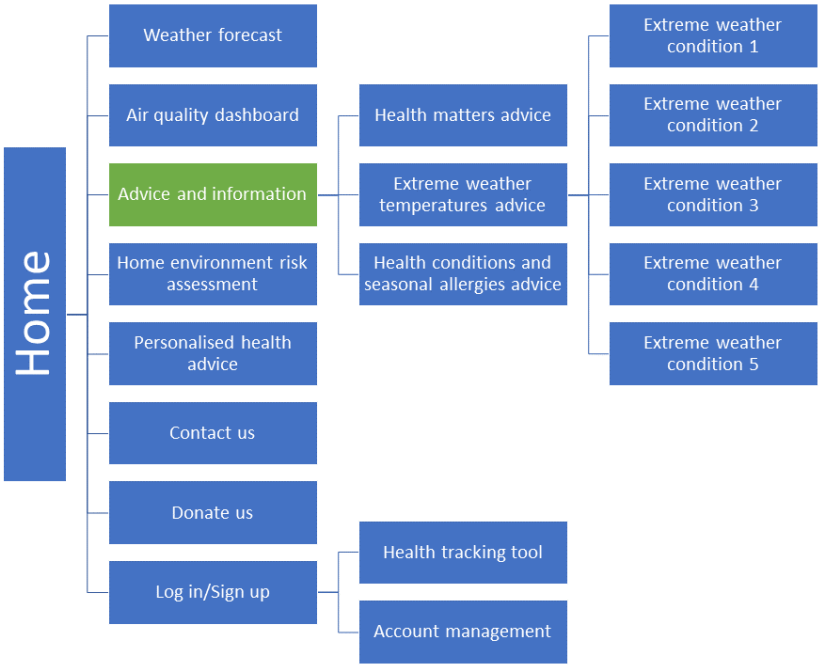
Accessibility considerations in the design:

In terms of accessibility the solution will include a number of accessibility features, as mentioned in the proposal. Where external software or hardware are required the solution will definitely support these as these have been developed to be used in accordance with general solutions, and ours will contain all the feature of a general solution as well as specific accessibility considerations such as alternative texts present in all images.

Where text is specified (in the visual designs), this will contain relevant headings, subheadings and specific style. The style the solution will be following must comply with the accessibility standards set by W3C. Based on this, the solution will contain text in Arial font, with appropriate sizing (in order to get an idea of the sizes, headings will be around 18pt, subheading 14pt and the content 11pt), black colour, bold and/or italic when highlighting important information, and underlined when links will be provided.

Other than the text the standards set by W3C will also be followed across the whole solution. The colours that will be chosen are colours that everyone can see, therefore the menu will be in white and the buttons provided across the software will be in dark blue. The background will be in grey following a radial gradience, so that the information which is shown in black can be clearly visible since grey and black will be contrasting. The images will be colourful so images with a single tone will be avoided.

Hierarchy:



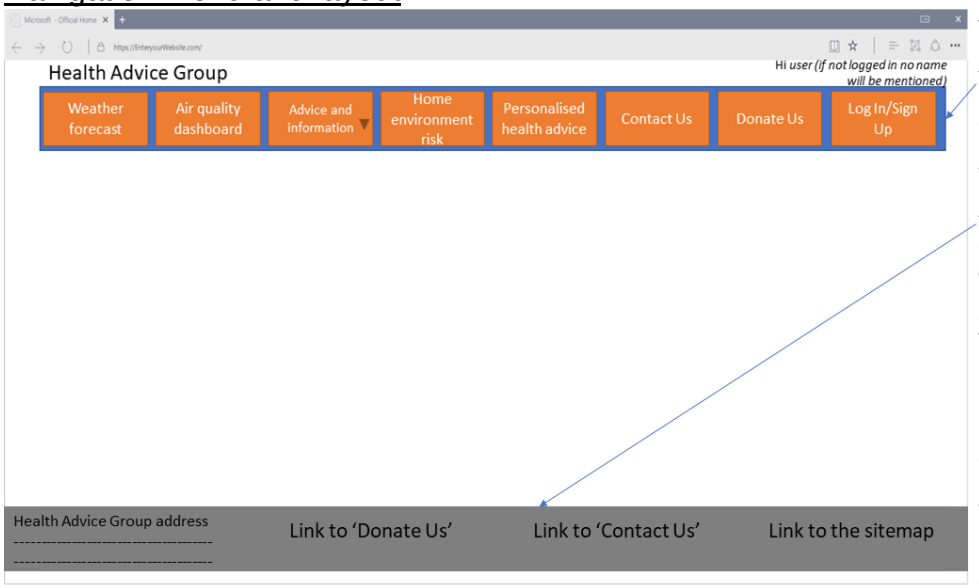
As shown in the hierarchy above, the website will have 18 pages, each page will be different from the others. The main page will be the home page which will have links to the 8 types of pages. These links will be provided in a navigation menu, which won't be available only in the home page but in all the other pages as well. In order to use the health tracking tool the

user will have to log in to their account or sign up to make a new account, once this is done they will be granted access to the tool. Similarly, the account management page can also only be accessed after logging in or signing up since an account is needed before it can be managed. ‘Advice and information’ is displayed using a green box in the hierarchy, this is to highlight that this is not a page but a section of pages that are similar so will be accessible through that category in the navigation menu. The extreme weather temperature advice page will contain links to further five pages (the number of pages could change in the future), each dedicated for a single weather condition.

Visual design:

The following designs (wireframe) provide designs for the desktop version of the solution. Overall, a minimalistic and aesthetic design has been chosen, considering the various type of audience the solution will be meeting with, ensuring that the information is helpful, informative and comprehensible. The colours used in the wireframe are for informational purposes only and won’t be used in the solution.

Navigation menu and layout:

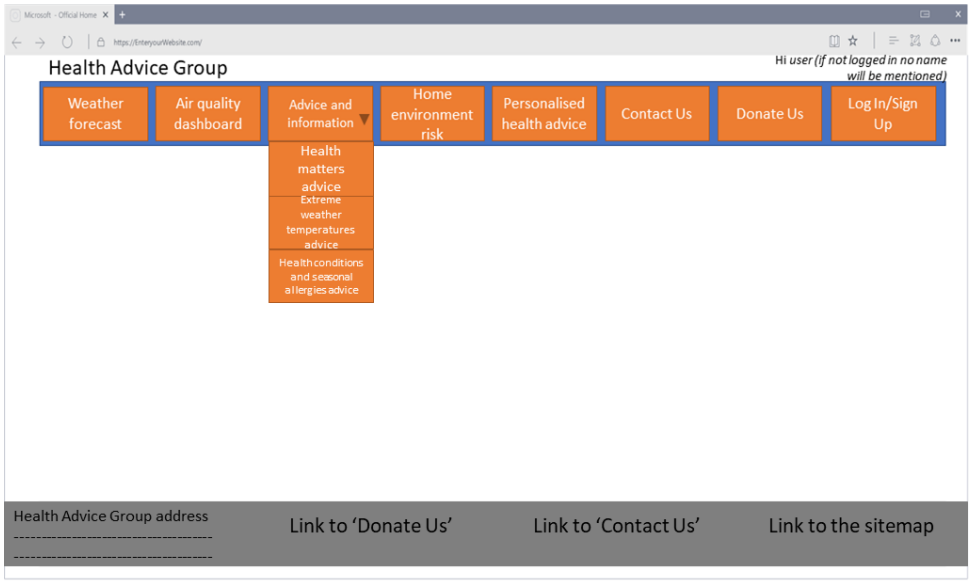


This will be the main layout of the website. The top of each page will be made of a navigation bar, containing links to the main pages of the solution while the bottom of each page will be made of a footer containing the address of Health Advice group, link to the ‘Donate Us’ and ‘Contact Us’ pages and to the sitemap.
The text in the ‘Log In/Sign Up’ button will become ‘Sign Out’ once the user is logged in.

On top of the menu the name of the organisation will be mentioned on the left and a greeting message saying “Hi name of the user*” will be displayed on the right, this will only say “Hi”, if the user is not logged in.

The above page represents the layout the website will be following for every page of the solution. In the solution each link/button in the navigation bar will share equal space, based on the width of the user’s screen. This layout has been chosen to make the solution intuitive as well as minimalistic. The navigation menu and the information given above it has been placed there following the standards followed by most similar web solutions, so the user won’t find this solution anormal.

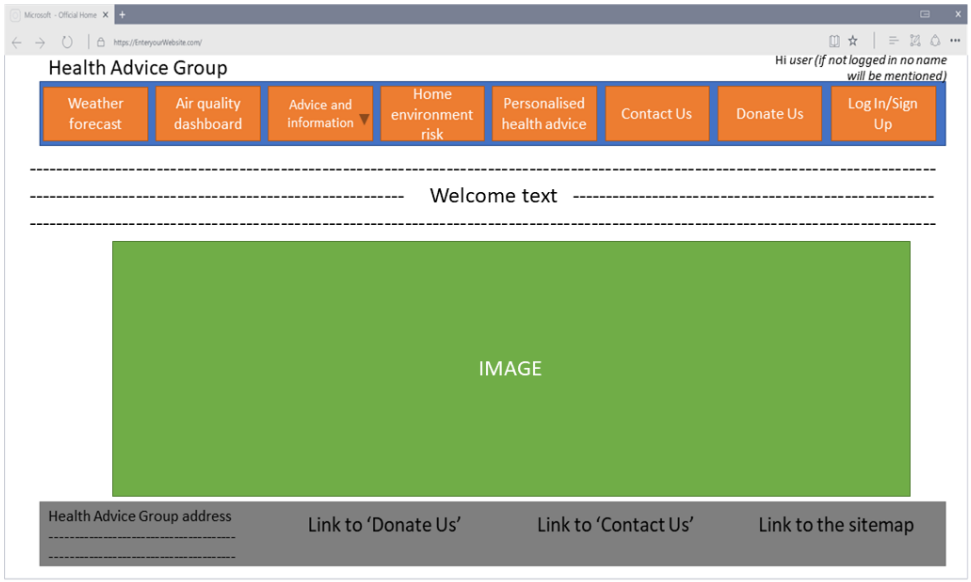
The advice and information section will have a drop-down menu providing access to further pages providing advice and information.



The advice and information part in the navigation menu is a category of pages providing advice and information. Once the user hovers their mouse over this part links to 3 more pages will open up.

These are: health matters advice, extreme weather temperatures advice and health conditions and seasonal allergies advice pages.

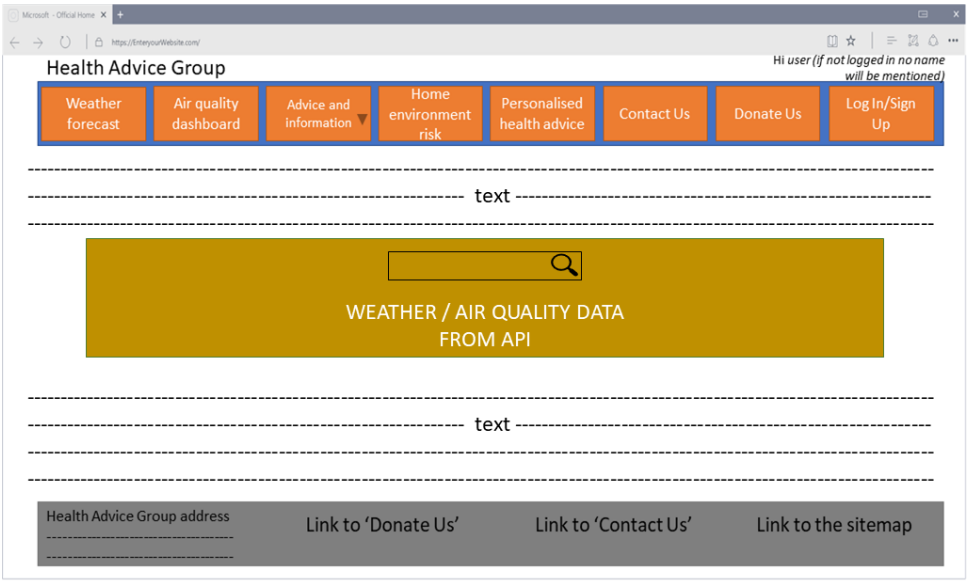
Home page:



The home page will be the first page the user will see, therefore this will have a welcome text followed by an image relevant to Health Advice Group.

The image has been chosen to be of large size so that it takes more than half of the page avoiding empty white spaces, this is to grab the user's attention with something colourful and not the usual basic information.

Weather forecasting and air quality dashboard:



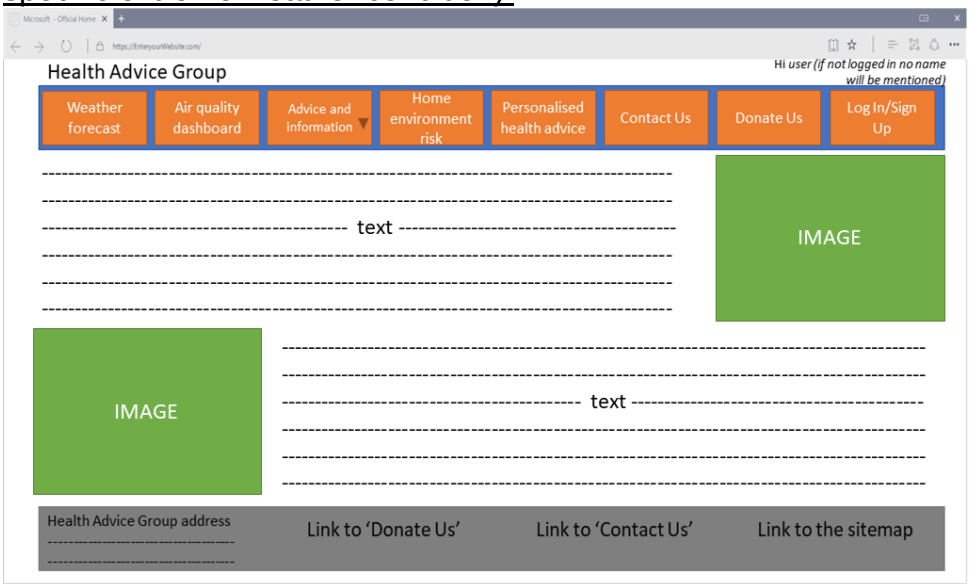
The weather forecast page and the air quality dashboard page are similar to each other, both providing data from the API source. Therefore they will be both laid out in the same way following the style shown.

The user will have to type in their location to obtain the data. This will be asked within the section of the API as it is the API that will be asking for it.

Relevant text will precede and follow the API data.

The type of text here could include any weather warnings, that the client will be able to modify depending on the need. The API is taking the middle of the screen as that is the main subject of the page and the user will be visiting the page to mainly use that tool.

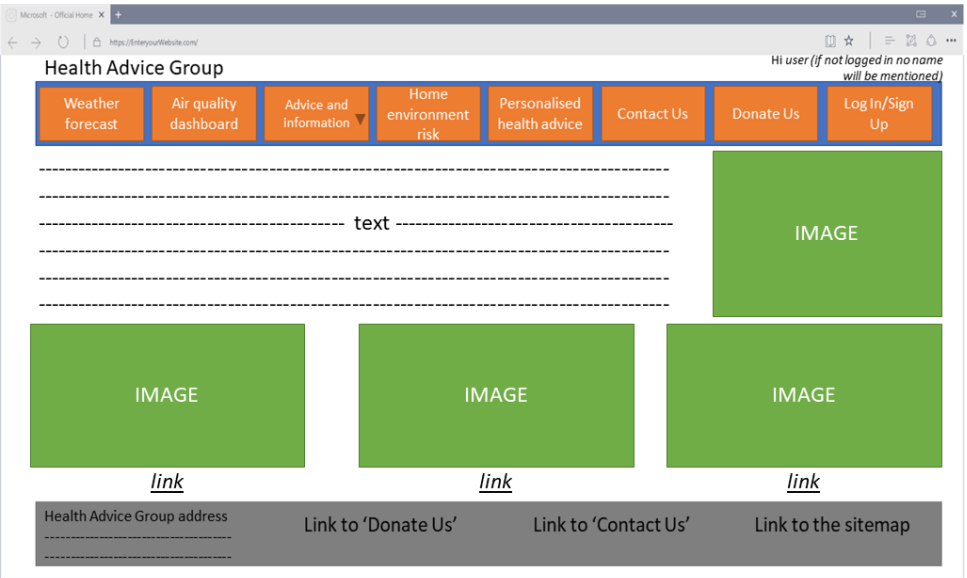
<u>Informational pages (health matters advice, health conditions and seasonal allergies, specific extreme weather condition):</u>



Health matters advice and health conditions and seasonal allergies advice pages are all informative pages, hence they will follow the same style. They will contain text as well as images as shown.

This same style will be followed by each page about an extreme weather condition.

<u>Extreme weather temperature advice:</u>

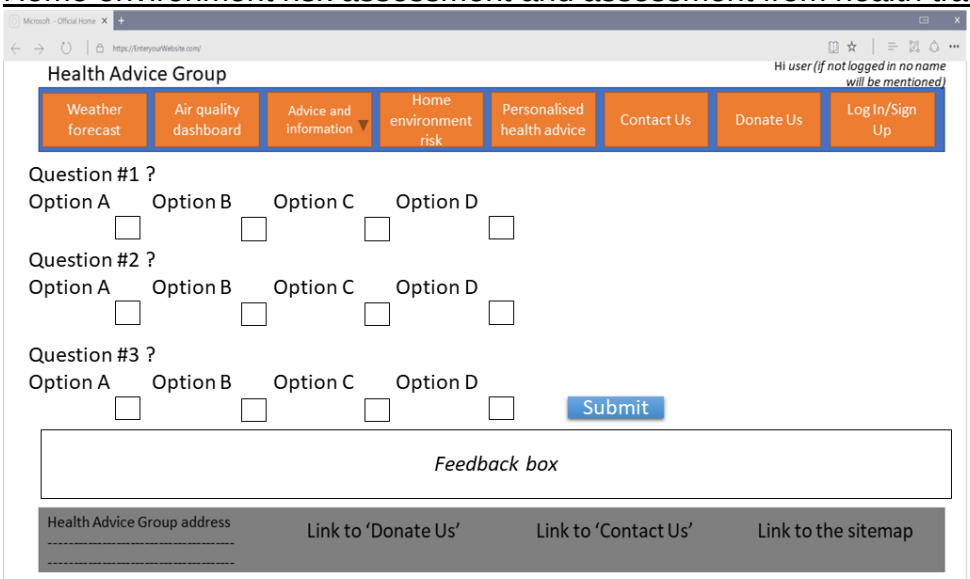


The page regarding extreme weather temperature advice will also follow similar style to the previous since it is also an informative page, however this will contain links to specific pages for each type of extreme weather temperature.

The link will be provided under a text relevant to the page with the use of an image relevant to the extreme weather temperature and a link underneath this, as shown.

All the informational pages in the website do the same work of providing information. For this purpose all the pages providing information will follow the same style, in order to make the website more cohesive and appealing. For these purposes images will be included, these will be laid out in a way that allows smooth reading.

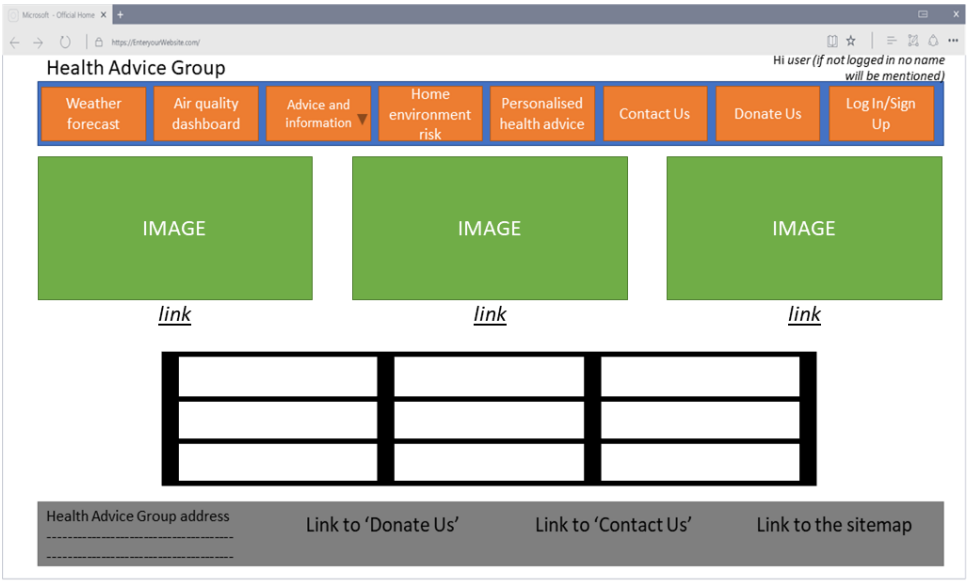
Home environment risk assessment and assessment from health tracking tools:



The home environment risk assessment and the health tracking tool will both follow the same style hence both are assessments.
Once the user has submitted their response using the submit button they will be given a feedback in the feedback box, this will only appear once the user has submitted their response.
In case of the personal tracking tool the style will apply for each test they will be taking (more details about the personal tracking tool is given in the next page).

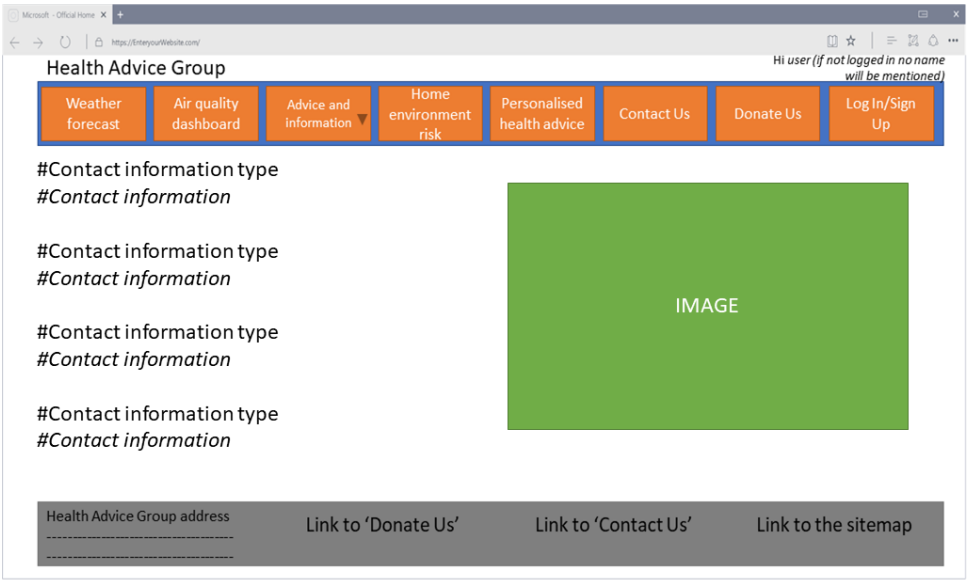
The assessments will have some questions and a set of options for each question. In the wireframe above the number of options for each question is shown as three, however this entirely depends on the question. The personal health tracking tool will follow the same style, with the only difference that the feedback will be stored in the database.

Personal health tracking tool:



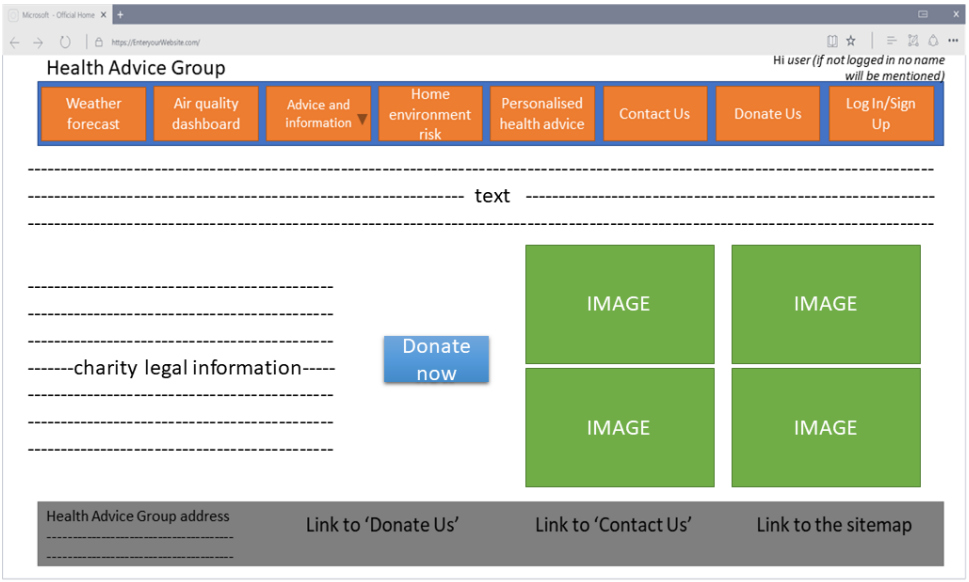
The health tracking tool will consist of several tools, for different health issues.
Each tool will be able to be accessed through links given below each relevant image.
The data for the last result of each test will be shown in a table below as shown.

Contact us:



The 'contact us' page will provide contact information for various type of contacting needs and contain an image representing Health Advice Group, laid out as shown.

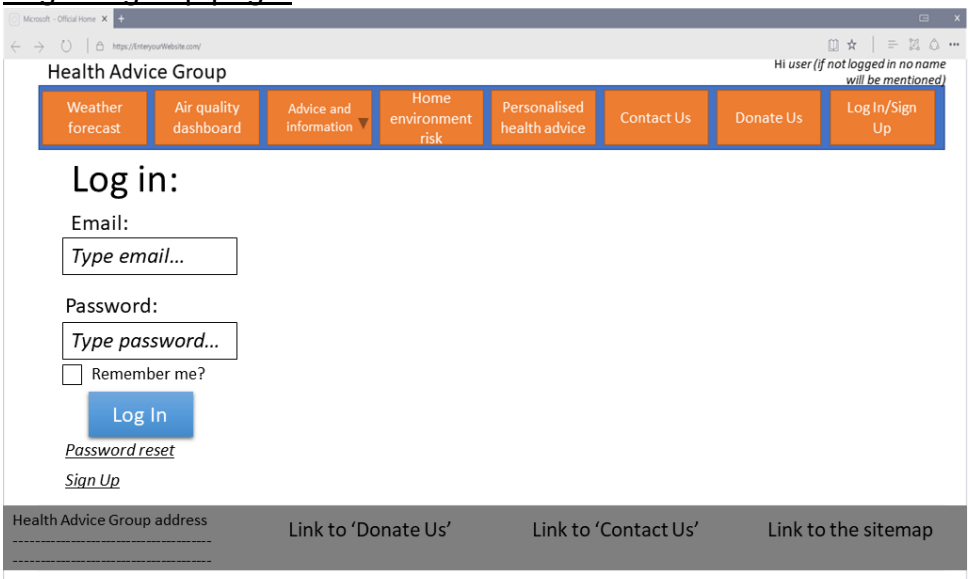
Donate us page:



The 'donate us' page will contain a text containing information regarding donations, information proving the charity is legally registered, relevant images and a donation button; following the layout shown.

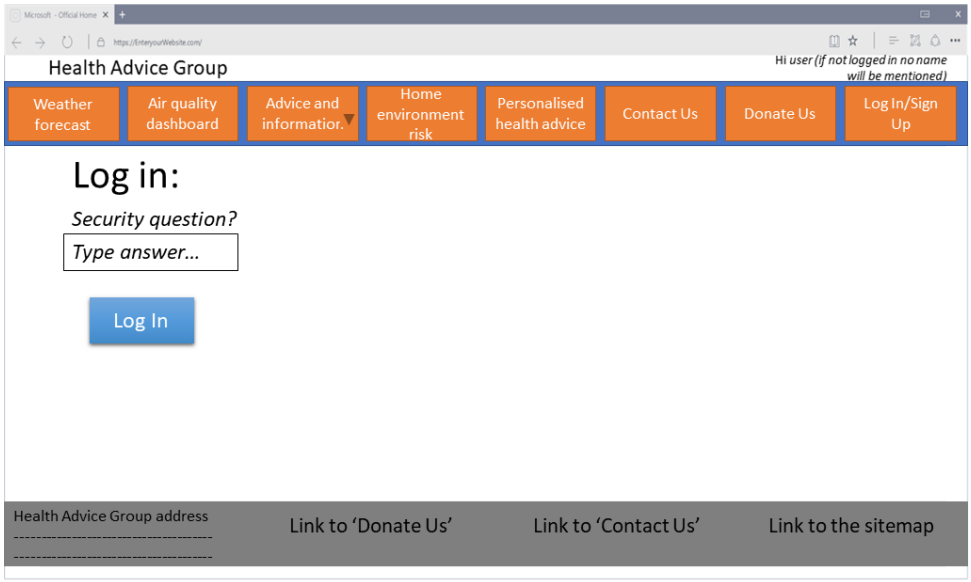
The donate us page is a very important page for the charity, since the funds they will be collecting from this page will fund their work. This page needs to convince the user to make their valuable donation, therefore I've planned to provide the charity's information as well as some additional text the client. The donation button has been designed to be in the middle since that's where a user's attention will first go. On the right-hand side of the page images will be shown, these images have to be images that will bring the attention of the user and convince them to make their donation.

Log in/sign up page:



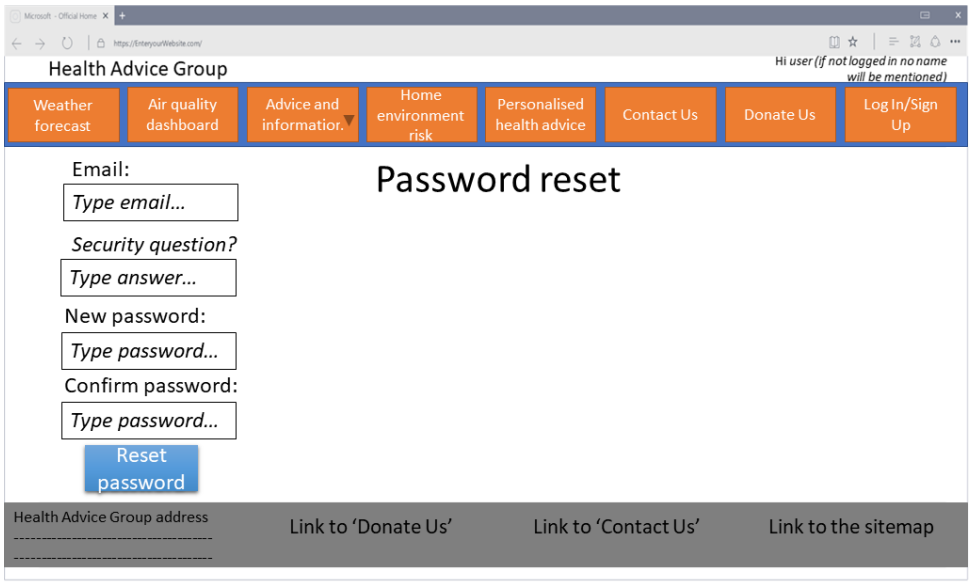
The 'log in/sign up' page will be laid out as shown. It will also include links to 'password reset' and 'sign up' pages.

If an admin has attempted logging in they will be asked their security question and will have to answer this to gain access as shown:



The security check page for the admin attempting to log in will be developed as shown.

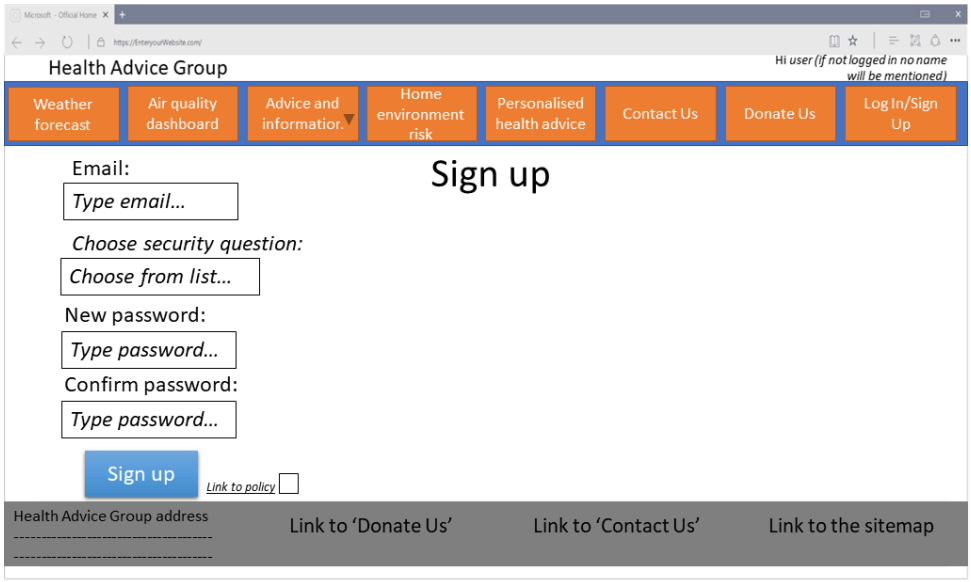
Password reset page:



The 'password reset' page will be developed as shown.

If the user forgets their password, they will be able to reset this using the above requested information.

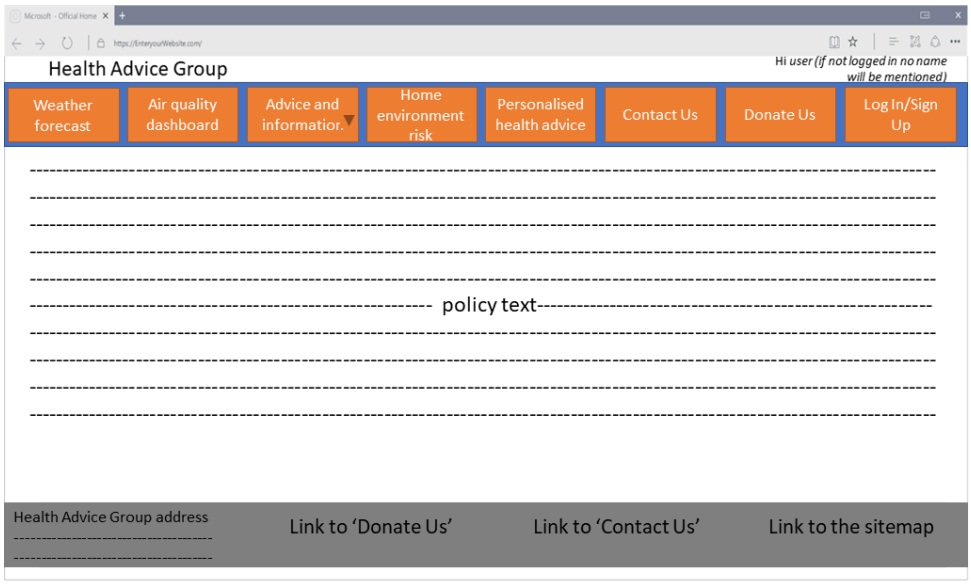
Sign up:



The 'sign up' page will be developed as shown. The page will also contain a link to a 'policy' page, followed by a box acknowledging the acceptance of this policy. This has to be accepted in order to proceed with the sign up.

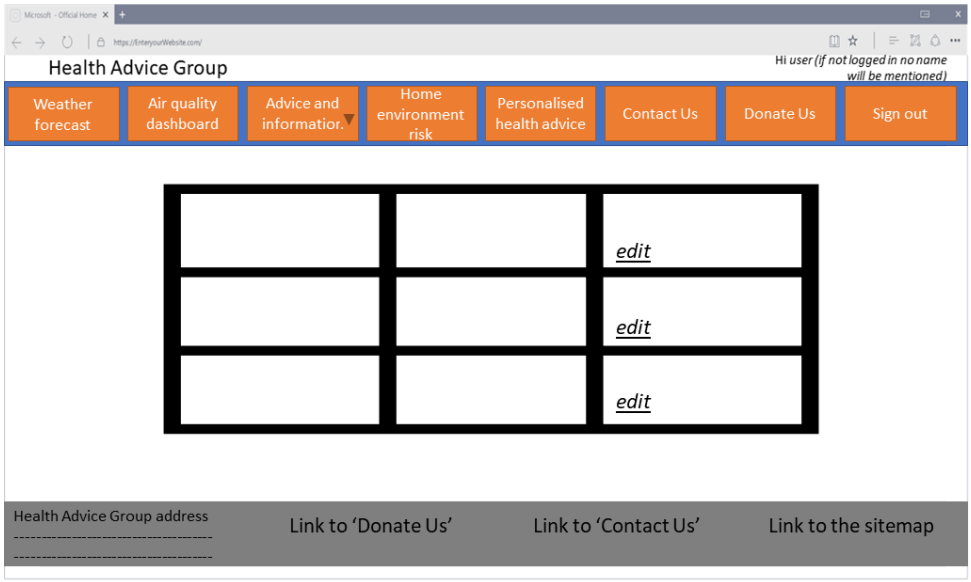
If the user is not registered yet they will have to do this by accessing the sign up page using the button given in the log in page and will be asked for their email, and twice for their preferred password. Unnecessary information is not requested in order to comply with GDPR regulations, if further information is required these will be requested in future when updates will be implemented.

Policy (page):



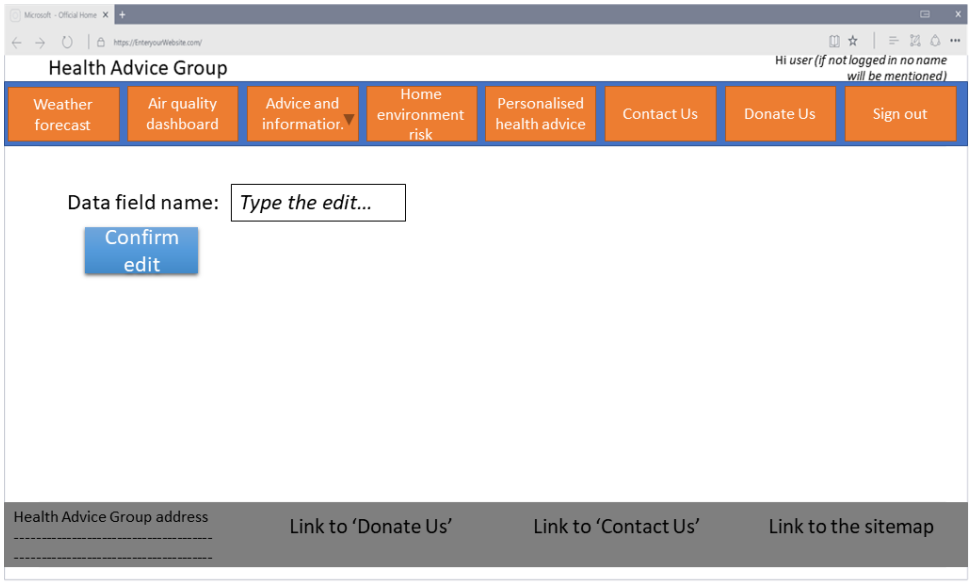
The 'policy' page will contain only the policy in textual format and be laid out as shown.

Content edit:



The admin will have an option to modify the information shown in text format in each page, this page ('Content edit') will be a table displaying all the content in the website, and the user will be able to modify this by clicking on the edit button next to the record. This page can be accessed only from the link and log in as admin should be done before logging in.

This style will be followed by the 'account management' page for each account, where the user can modify their details. In case of the password this will be hashed.



Once the user clicks on edit the edit page will be shown where edits can be made and saved.

Data requirements:

Variable name	Function	Data type	Reason
$IsEmailValid	To check if the email is in valid format	boolean	Since this is the only data the system will use to identify a single user, this has to be right, also because this will be used to contact the user.

$IsPasswordValid	To check if the user uses a password in an accepted format.	boolean	So that the security is enhanced, and it is nearly impossible for criminals to crack the password.
$isCompleted	To check if all the questions in the assessments are completed.	boolean	To ensure that the user has answered all the questions required to be answered so the best accurate feedback can be given.
$isAdmin	To verify if the user has administrator permissions	boolean	So that administrators and general users can be distinguished, and general users cannot modify the information shown in the website.

Database diagrams

The following tables represent the tables that will make up the 'HAG' (standing for Health Advice Group) database. The first letter of each noun of the organisation's name has been chosen to make it easier to quote this during programming or in any other needs.

user_tbl

This table will contain all the data related to user accounts. The id field will be the key in the table and will be related to the health-tool-feedback_tbl.

Field name	**Data type**	**Nullable**
Id [key]	int	No
email	string	No
SecurityQuestion	string	No
SecurityAnswer	string	No
Password	string(8,16)	No
IsAdmin	bool	No

health-tool-feedback_tbl

This table will contain all the feedback given to the user when doing health related assessments. More fields may be added in the future as the assessments increase.

Field name	**Data type**	**Nullable**
id[key]	int	No
diabetes	string	Yes
bmi	string	Yes
asthma	string	Yes

advice-info_tbl

The following table will contain the information that will be displayed across all pages. The following is just a model of how this will be done, depending on the occurrence more or less records may be created in the solution. home-text1 is set as the key here as this data will be always present as it is the welcoming page.

Field name	**Data type**	**Nullable**
home-text1[key]	String (max)	Yes
weather-text1	String (max)	Yes
weather-text2	String (max)	Yes
air-text1	String (max)	Yes
air-text2	String (max)	Yes
extreme-text1	String (max)	Yes
extreme-text2	String (max)	Yes
extreme-text3	String (max)	Yes
extreme1-text1	String (max)	Yes
extreme2-text1	String (max)	Yes

Across the project naming conventions that can be understood by third parties will be used, therefore these will have to convey what they represent and be direct.

Front end needs:

- Accessibility features
- Minimalistic design
- Coherent display of information/data
- Edit information for the admin account

Back end needs:

- Hidden communication between front end and back end
- storage of data in a database
- database connection
- security
- hashing password
- receive front end input and send the correct output

Security:

One of the biggest advantages of information technology is that it is always developing, that is also a disadvantage since as IT is developing solutions to counter older solutions are found and cyber criminals take advantage of this to complete their attacks. That is the main reason why our home systems need to be regularly updated. In the context of the project, it is our responsibility that we develop a secure solution. For that purpose, we propose an optional (although we highly recommend it) regular update of the solution every six months, during which we will evaluate the current status of the solution, maintain it and if required upgrade the whole solution.

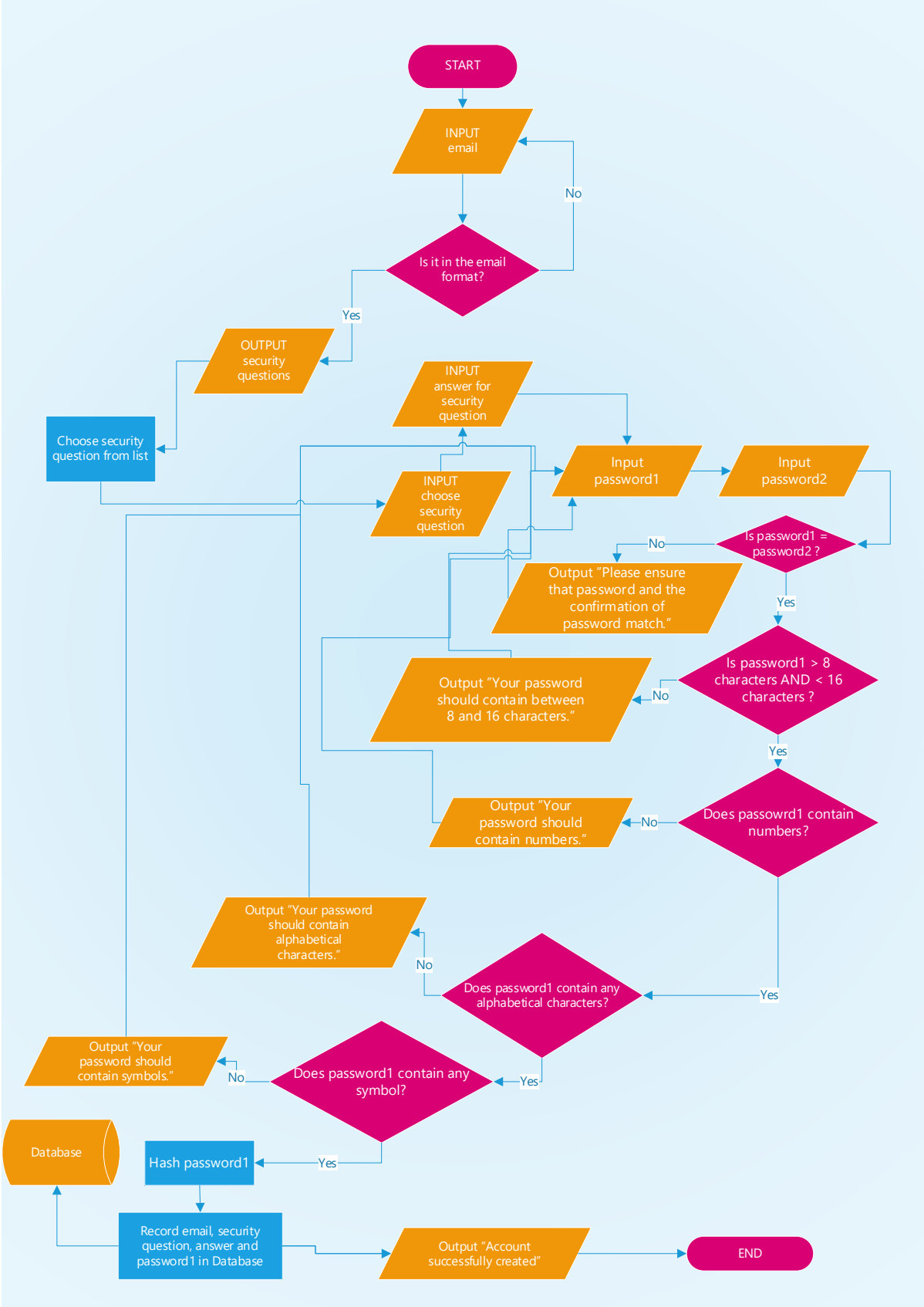
During the development of the solution, we will develop it in a way that it is 100% secure. We will achieve this by strongly encrypting vulnerable data such as passwords, so that if a criminal gains access to this the data will be encrypted and so inaccessible. Moreover, the solution can only be accessed by one single user if modifications are required, this is so that

in case inappropriate information is published the culprit can be easily identified. Moreover, in case a user wants to reset their password they will have to pass a security check by answering a security question answered during the registration (people with access to the database can see the user's security data and email but they will be identified since only a few important members will be given access to this).

Depending on the client's need we could implement Cloudflare's DDoS protection which protects web solutions from DDoS attacks. However, this comes for a cost so we will be implementing Google's reCAPTCHA API depending on the timeframe that will be given if the solution is successful as this was not required by the client. This hasn't been mentioned in any design or anywhere in the proposal as it is only a possible feature which will be included depending on the need.

Algorithms:

Sign up:

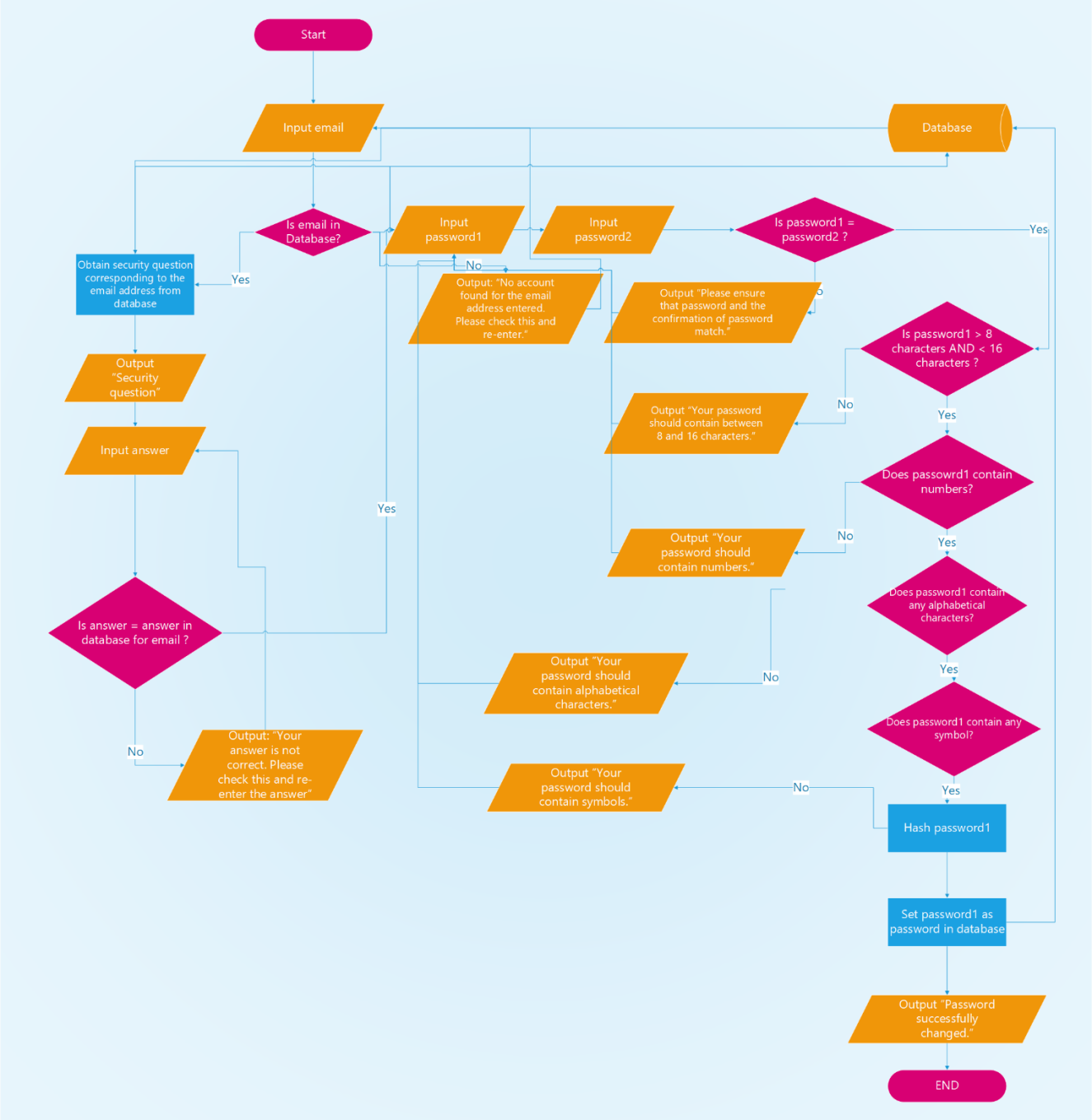


Explanation and justification:

The sign up algorithm requests the user for three main information: email, security question and answer and a password. As the user inputs these the system will be running some

validation, in order to ensure that the input is in the correct format. For the email, the built in function for email verification (available in html as well as C# - the main programming language the solution will be based on) will be used. Validation is not required when the user inputs their answer for the security question as this is individual to each user and cannot be expected to follow a certain format. Finally the password will be checked through various checks; first of all it will be ensured that the user types what they mean so they will be asked to type this twice and both should match, if not they will be alerted and invited to re-enter the password, this password will first be checked whether it is between 8 and 16 characters for security purposes, once this test is passed the data will be checked if it contains any number, once this is passed it will be checked for any alphabetical characters, and later for any symbol; if all of these tests are passed the password will then be hashed and be stored in the database along with the email and security question and answer and a message confirming this will be displayed. In case the user's password fails any of the check they will be alerted about what went wrong and will be invited to re-enter this again. In order to ensure that no-one including us have access to the password the hashing will be done using C#'s pre-built hashing function.

Password reset:



Explanation and justification:

In order to reset a password, the user will have to enter their email address associated to the account they have registered, this will be checked in the database, if no record is found they will be told about this and will be invited to check their input. If a matching record is found the user will be asked their security question and will have to provide the answer for this; if this is correct they will be allowed to reset the password, which will follow the same process as when signing up to make a new account (previous algorithm) but instead of creating a new record the password will be updated. If the answer they provide is incorrect they will be asked to re-enter this until it is correct.

The security question will be stored in a database as well as other data, these must be protected and access to this should be strictly restricted in order to maintain security.

Approach to testing:

The solution will be tested using a variety of testing methods during the development and before the delivery of the first prototype. The main testing strategies that will be used is white box testing, but black box testing will also be done once the first prototype is ready. Black box testing is the testing of a solution without coding knowledge from the front end of it, hence the type of test that will be conducted will be from a user perspective. It is expected that black box testing won't produce many errors as white box will be conducted first while developing the solution in order to produce the least or no errors in the next testing phases.

Testing method	White box
Purpose	To find errors that cannot be found using any other testing strategy and fix them so that there are no more errors and no further errors are caused. This is done by individually testing each component internally.
Tester	Myself
Timescale	The test will mainly be done during development and assuming the solution will take a minimum of 16 hours to complete, 4 of these can be allocated to testing. In addition to these, further 1.5 hours will be spent after the completion of a fair amount of the solution; bringing the total to 5.5 hours.
When will it be done	Throughout the development and after completing the development.
Test outcome	The final outcome should match the expected results, which will be all documented and produced to the client with the first prototype of the solution.

Black box testing strategy

Date of test	Component to be tested	Type of test to be carried out	Prerequisites and dependencies
	Navigation menu links	Black box	• Downloaded version of the solution prototype • Computer
	Extreme weather temperature links: the right extreme weather is loaded	Black box	• Downloaded version of the solution prototype • Computer
	Sign up and log in using these credentials	Black box	• Downloaded version of the solution prototype

			• Computer • Log in depends from sign up
	Display of images	Black box	• Downloaded version of the solution • Computer
	Display of updated information after website update	Black box	• Downloaded version of the solution • Computer
	Result in the home environment risk assessment	Black box	• Downloaded version of the solution • Computer
	Result in the health tracking tools assessment	Black box	• Downloaded version of the solution • Computer