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POD: Plenty Of Dogs

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FINAL PROJECT

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Abstract

Finding the ideal match for dog breeding has never been an easy task for most dog owners in different parts of the world, including Ireland. Seeking an opportunity to minimise this problem, a lovely user-friendly web application called *Plenty Of Dogs (POD)* was developed to facilitate dog owners to found a perfect match for their dogs, according to their search criteria. Besides that, dog owners will also be able to find new friends to their *doggies*. Initially, only the Republic of Ireland will be benefited from *POD* services.

To achieve this goal, this project was divided into five distinct phases: Planning, Analysis, Design, Implementation, and Testing. Respectively, all these different stages were accomplished respecting the main premises of the software development life cycle. Planning versus reality played an important role throughout the whole project. Results, technical solutions, and challenges are discussed comparing what worked well to what did not work as expected.

All architecture designed to develop *POD* is also presented, emphasising the use of HTML, CSS, JavaScript, and Bootstrap on the client-side, PHP on the server-side, MySQL database, and AWS to the deployment of the application on the cloud platform. Then, a general overview of the whole development is made presenting the final version of the prototype and all documents produced along with the project. A suggestion for further works is given and necessary improvements are highlighted.

Introduction

The relationship between humans and their pets becomes increasingly evident in our day-to-day lives (Kosachenco, 2016). This phenomenon is not new however, there is a great increase in the importance given to this relationship in families around the world, including Ireland. Even with this phenomenon, it is observed great difficulties to find an ideal match for their dogs. Usually, some dog owners can use their busy daily routine to justify this fact, and the most common reasons found are work, study, family, friends, and social life.

Nowadays technology is getting more and more crucial on society daily basis (Allen, 2019). Not only improving our systems, communications, health, and entertainment but also the way of how we interact and behave with others. Besides Facebook, Instagram, and other social media, Tinder has become really popular, especially among teenagers and young adults, for helping them to expand their social connections and mostly to get into relationships.

Although, it's not just humans who can find love or make friends on social media. Pets can find it too! “It’s nothing new that the pet market is constantly growing and in 2019 dog owners face difficulties in finding pet-friendly establishments such as accommodations, restaurants, shops and even a partner to be friends with or to breed with their pet”. (Kacerauskas,2019).

What POD is?

In order to minimize this problem and bring an innovative solution to the market, we are going to present a new Web application called “POD – Plenty of Dogs”, that aims initially being developed for the Republic of Ireland. The name POD was inspired by “POF – Plenty of Fish” which is an online dating service application.

This application allows a dog owner to register their lovely doggie and help them to find a perfect match. For this, the owner just needs to set some preferences such as breed, gender, dog size and easily start the hunt for ideal candidates. Also, when selecting a city, owners can search for dogs in that specific area, and a bunch of different dogs, waiting for the perfect match, and come up to the screen.

In addition, a dog owner will be able to create photo albums to their dogs and chat with other dog owners via a webchat. Once giving a like to a dog’s profile, an owner can start a private chat with its owner, which may or may not lead to a dog's first date at a park or other location where doggies are welcome.

Furthermore, POD will allow lonely dogs to expand their circle of friends. This is another feature of our application that also makes it different from others in the market. In other words, this web application can be also helpful to allow dogs to build a new friendship with other dogs. So, besides breeding, dogs will finally have the opportunity of meeting other dogs to hang out, socialize, and play with.

The main objectives of our application are:

- Create an application that stores dog data for breeding and possible meetings;
- Find dogs for breeding;
- Find dogs to socialize;
- Allow the exchange of messages between interested suitors.

As well as some people are on date apps just for fun (Frazer-Carroll, 2018), we expect that there will be some casual browsers on our Web application such as dog lovers who want to have contact with other dogs or just exchange experiences with other dog owners. Regardless of the reason that might bring someone to use our application, our mission is to spread love among those who are considered our best and loyal friends, the dogs.

So, we strongly believe that POD will help a lot of dog owners, who used to have a hard time trying to find a compatible match for their dogs, to improve the way of searching for the perfect dog match, regardless of breeding or even for just socialising with. Our project will also inevitably help dog owners to expand their social circles and bring to our society a revolutionary way of dealing with our pet necessities.

Chapter 1- Literature Review

A good number of researches were carried out throughout the whole process regarding the conception of this project. The first and one of the main important researches were to search for similar applications available in the market. Although our findings were only related to applications whose main focus is on either dog's care, wellness, or adoption, there were no applications found whose purpose is similar to ours. As mentioned before, *POD* is primarily focused on helping dog owners to find another particular dog for breeding also with the feature of searching for dogs just to socialise with. As part of the results from our researches, it is relevant to mention briefly, just as a comparison, a few of those applications existents in the market.

Tindog

Focus to provide online information resources for dogs, such as Health Care and Wellness, Pet Nutrition, Behaviour and Training Guides, and Dog Breeds and Personalities. This web application requires the user to register your dog to find suitors for them. This site doesn't allow us to search for another dog without creating an account.

DogsTrust

DogTrust proposes to find dog profiles available for adoption through a Google map API. Registered users must fill out a form with all the animal's data such as breed, sex, birthday, photos, name, and their physical and behavioural characteristics. The owner is also entitled to a profile, where the e-mail and telephone number are provided. For those who want to adopt, there is the option to enter their breed preferences. During registration, you can use your Facebook account or your email.

Petfinder

Petfinder has an interface similar to POD, however, it is focused only for adoption, and as already mentioned above it differs from our application which is focused on reproduction or meeting. During registration, basic information such as name, sex, age and breed of the dog is requested. Then you add the photo, description and define the search area. Like POD, the app shows a series of photos from other users and you can like it or not. Users take their interactive quiz to find the perfect dog to adopt.

BorrowMyDoggy

BorrowMyDoggy is geared towards connecting dog owners with local dog borrowers for walks, weekends and holidays. Users can register as a dog`s Owner and find a local dog lover to take care of their dog when they can't, or register as a dog`s Borrower by spending time with one dog and helping out Owners at the same time to fill the dog void in their life. Also, that is an option of giving one gift of a dog's love. Their gift vouchers can be used to redeem a year's membership. Users can give a one treat for a dog owner or fellow dog lover.

Technologies

Compared to any other project, *POD* is also structured in three different parts of development which are front-end, back-end, and databases. Despite their differences, front-end, back-end, and database are integrated, communicating among themselves and allowing data to traffic between platforms, which is essential in a web application development.

A front-end will be characterised by its greater focus on the application interface layer that will be presented to the user. Its goal is to offer the user the best experience on their platform. On the other hand, the back-end is what is behind the application, acting on what the user cannot see, acting mostly through the persistence of data, business rules, information security, performance, etc. All technologies used to develop *POD* will be discussed in this chapter, following the same breakdown: front-end, back-end, and database.

Front-end

To develop *POD's* front-end, researches were carried out and after discussing a few options available in the market, the team agreed that it would be worth working with *HTML*, *CSS, JavaScrip*t, and *Bootstrap*. Following these premises, our web application will provide a user-friendly interface with easy navigation and a well-presented appearance.

HTML

HTML, which stands for Hyper Text Markup Language, was created in the 1990s by Tim Barners Lee and its specifications are controlled by the W3C (World Wide Web Consortium). It consists of a markup language used for the production of web pages, which allows the creation of documents that can be read on almost any type of computer and passed on over the internet.

To write HTML documents, no more than a simple text editor and knowledge of markup language is needed. The codes, tags that we are familiar with, serve to denote the function of each element of the Web page. The tags work as commands for formatting texts, forms, links, images, tables, among others. Browsers then identify the tags and present the page as specified.

HTML was chosen to be used in our application because it allows easily the browser to interpret it, telling how to structure the web application and displaying its content when accessed over the internet.

CSS

CSS stands for Cascading Style Sheets and is used to control the layout of multiple pages at once, attributing to them style and format. It also describes how HTML elements should be displayed on the screen, saving considerable work. In short, some relevant points can be highlighted to support the use of CSS in our project:

- Allows to style everything in a different file, thus creating the style separately. And, later, integrate the CSS file in the part top of the HTML markup, keeping HTML markup clean and easy to maintain
- It is no longer necessary to write repeatedly making individual elements look alike. This saves time, shortens the code, and decreases the chance of errors.
- Allows having multiple styles on an HTML page, making almost endless customization possibilities. Nowadays, this is becoming more of a necessity than a simple resource.

Moreover, CSS has been used widely to standardize and allow the development of Web systems with easy maintenance (HTML.NET, 2013). When the web application content generated is very extensive, the benefits of using CSS files are even better. Eventually, *POD* makes use of CSS because of all those reasons already mentioned, concluding that using CSS would be very useful in the development of our web application.

JavaScript

JavaScript is a high-level client-side open-source language that allows cross-platform. As it is known, JavaScript is used to control HTML and CSS to manipulate page behaviours. It also enables developers to include features that create dynamics webpages using carousels, image galleries, fluctuating designs, responses button, etc. JavaScript was developed in 1995, by Netscape Communications Corporation, Mozilla Foundation, Ecma International, becoming well-known for being a scripting language mostly used in the development of Web Pages. Basic functions of JavaScript are:

- Autocomplete: The search box gives recommendations, in light of what the user has already typed.
- Form validation: In the event of the user commit an error while filling a form, JavaScript quickly informs the user of the error, avoiding filling everything once again.
- Repair layout issues to avoid the overlapping of elements on the page.
- Add animation to the page to make it more attractive.

The following image shows that JavaScript is among other languages, the most popular in repository language, active repositories, and total pushes in GitHub.

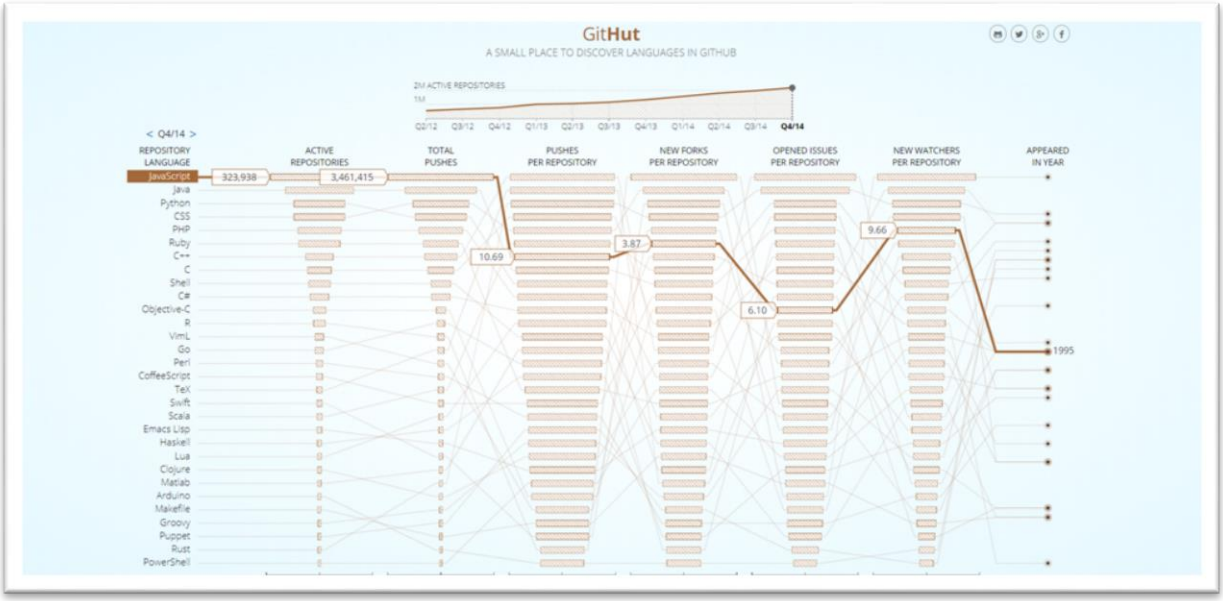


Image Introduction.1 – GitHub flow showing the popularity of JavaScript on the development of systems.

At the beginning of our project, we studied the hypothesis of developing *POD* also as a mobile application. For this reason, two technologies were very well-debated between us when planning the development of *POD's* front-end. The use of JavaScript as mentioned previously to control HTML and CSS, or React Native as a framework and cross-platform also for the development of Android and iOS mobile apps.

However, when we closed our scope, our group decided that ideally, at this moment, the best option would be to keep as our scope only the development of *POD* as a web application. Having said that, our group had to take into consideration that React-Native does not make use of HTML, providing alternative components that work similarly though. Also, the creation of style sheets in JavaScript is necessary as it does not make use of CSS.

Therefore, to study a new technology would not worth for two reasons. Firstly, learning how to work with React-Native would take us a certain time, once no one in our team used to be familiar with this platform. Secondly, using our existing knowledge of HTML, CSS, and JavaScript would be sufficient to develop our application.

Moreover, JavaScript is a language that we already had contact in the classroom. So, to support this choice, we can still present the following advantages, which were important for making our final decision:

- Fast Speed: Because it is a client-side script it can run immediately instead of having to contact the server and wait for an answer;
- Easy of Learning: JavaScript is straightforward and learn. The structure is basic for the users just as the developers;
- Popularity: Since all modern browsers support JavaScript, it is seen all over;
- Rich user interfaces: Improves user experience, by making an interactive and intuitive webpage;
- Versatility: There are a few different ways to use JavaScript. For example, JavaScript can be used on the face end for clients. It is possible to create an entire JavaScript application from the front to the back end simply utilizing this programming.

Despite the fact that loads of benefits were already mentioned, a few drawbacks were also found in our research. They were balanced and none of them presented a great concern to the development of this application. Even though, it is relevant to present which these drawbacks are:

- Sluggish Bitwise Function: Translates the operand in 32-bit signed integer turning the outcome back to a 64-bit suspended point. Thus, this operation is slow in JavaScript, because, this continuous conversion takes more time in conversion of number to an integer. This builds the time expected to run the content and lessens its speed;
- Client-Side Security: Since the code executes on the user PC, at times it can be abused for malicious purposes;
- Single Inheritance: JavaScript includes only single inheritance, and therefore manifold inheritances are not common;
- Browser Support. JavaScript can perform differently by a different type of browsers.

Bootstrap

Following *POD's* front-end structure and choices, our team considered necessary to make use of Bootstrap to facilitate our development, once it offers standards for HTML, JavaScript, and CSS. As mentioned, and justified previously, these are the technology used to develop the front-end of our Web application.

Another reason for using Bootstrap in our project is that it is now one of the most widely used frameworks Front-End around the world. It is also clear that its standardization will allow our application to look even more attractive, creating aesthetically pleasing pages. In addition, it is relevant to highlight relevant points that were considered, such as:

- Component library, likely one of the most interesting features of this framework is the fact that it has an extensive library of components, such as text boxes, icons, panels, and colours in links.
- Code reuse, as is the objective of every framework, it allows less code to be written since it delivers a series of ready-made visual formats. The developers only need to know which class he should call.
- Documentation and Community, on the official Bootstrap web application, is found a very complete documentation of the framework. As the documentation is always up-to-date and easily accessible, answering questions about the tool is extremely easy.
- Not only doubts but updated documentation allows the best programming practices with the framework to be known. This increases the chance of new projects being made with visual and technical quality, which is great for the final value of the product.
- Responsiveness, Bootstrap brings with it a 100% responsive layout system, which makes the life of the developer much easier. Using Bootstrap will allow us to keep the page completely responsive. And all this with a few lines of code.

Back-end

Technology is always changing and developers need to be ready to get up to date and not be indecisive in which technologies to use. More well-known applications are more welcomed to developers for just being more used among users than the new ones. The reason is that the unknown can be tricky and time is extremely precious for developers.

As part of the common architecture of a Web application, *POD* will make use of a back-end to connect to a database. Also, following the basic premises, the back-end will not take part in the visual aspects of our application. In order to choose the best option for developing our back-end, more researches were conducted and two options were well-discussed among our team: PHP and Node.JS. Considering all pros and cons, our choice was to use PHP and the reasons why it is going to be presented next.

PHP

PHP is an acronym for Hypertext Pre-processor created by Rasmus Lerdorf in 1994. According to the article “Is PHP Dead?” wrote by Brian Jackson and published by the website Kinsta, "PHP is used by 78.9% of all websites with a known server-side programming language". This means that almost 8 out of every 10 webpages out there, including host websites like WordPress and Shopify, are currently using PHP somehow.

PHP is an open-source and free language. It is a server-side scripting language and is used to create dynamic and static websites and web applications. It has the extension “.PHP” and is only interpreted by a server with it installed. This language is used to talk directly to the server and access a database all in the back-end.

When searching about Node.JS one important aspect found is that it is an open-source, cross-platform, JavaScript runtime environment able to execute JavaScript code also outside of a web browser. Node.JS is also faster and built with loops and events, preventing errors and making the responses extremely quick when it is highly requested. Node is great to be used in many types of projects such as APIs, Multiplayer games, and streaming. It has a great review in the market but still many things to be improved.

On the other hand, PHP has a rich codebase, meaning that there are plenty of templates and resources out on the internet that can be used just like bootstrap. It is also portable so it can in almost every platform and server. For this project, considering our front-end choices, and everything already mentioned, our team decided to make use of PHP. It is also really relevant to mention that our team has the knowledge and feel confident with this language instead of using Node.js.

Databases

Databases are sets of files organized to create some sense and facilitate searches and searches, like a list of dogs in the case of our project, for example. With the advancement of technology, databases started to be stored in the software. The database, as well-known, is where all information will be stored.

MySQL

MySQL is an Open Source database management software that has been used in numerous environments. MySQL used to be the first choice for the open-source database system. However, as technology has advanced exponentially, there are many more choices now.

For this project, some benefits and drawbacks regarding the use of MySQL had to be balanced in order to make a final decision. Some relevant positive points were considered, such as:

- MySQL is a database widely used, which brings a lot of benefits;
- It is very easy to interact with. MySQL offers rich features, although there is no need for having a huge knowledge to use them;
- Most of the tasks can be done in the command line without the need of a GUI;
- When a GUI is needed to make its use even easier, it is really simple to access it through the use of the MySQL Workbench tool;
- PHP has built-in support API for interacting with MySQL;
- MySQL has better performance on simple queries such as primary key lookups, range queries, and so on;
- It is open-source software with a huge variety of online content to research;
- This is the database our team has had more experience in working with.

Despite the fact that they did not bring to this project a relevant concern, a few drawbacks were found as well, such as:

- In MySQL store procedures and triggers might be a bit limited;
- It is a database hard to scale if expecting an application to grow in a really large proportion;
- MySQL is not for large-sized data. Its performance tends to degrade when the data grows drastically;
- MySQL is not full compliance with standard SQL.

Chapter 2 – System Analyses:

System Development Life Cycle – SDLC

The present work manages the utilization of the SDLC as a basis for the development of the POD project. The Software Development Life Cycle (SDLC) is the product improvement world's spellcheck. SDLC can signal errors in programming creation before they're found in progressive stages. SDLC in a consistent process, which begins from the occasion, when it’s settled on a decision to launch the project, and it closes right at the moment of it is full remove from the exploitation. In any case, it's considerably more than that, obviously: SDLC can likewise spread out an arrangement for getting everything right the first run through.

The Spiral SDLC process consists of detailed stages, including planning, analysis, design, coding, testing, deployment, and going through and back, in each step that is necessary to the full development of a phase. As shown in the image below, SDLC has seven types of methodologies to consider.

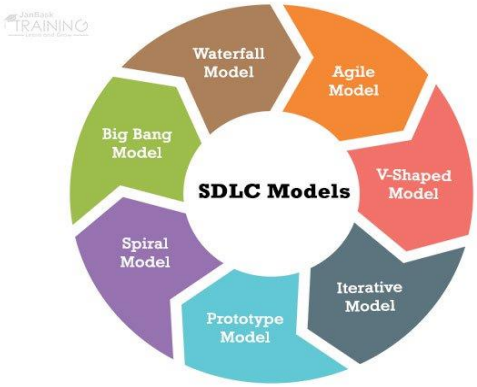


Figure 2.1: SDLC Models
Systems development life cycle Agile software development

In this particular project, we decided to follow the path of the Spiral SDLC Model, in which the improvement process appears as though the flow, moving bit by bit through the periods of requirement analysis, system design, implementation, testing, deployment, and backing. According to Winston W. Boyce, the SDLC model incorporates the continuous execution of each stage totally. This procedure is carefully reported and predefined with highlights expected to each period of the software advancement life cycle model.

The advantages brought with the use of the spiral model in the POD scenario, was the flexibility of going forward and back, every time need during the development, to bring the results needed. Some changes requested during the process were on the divided of the development into parts, this action helped with a new vision of the user interface, which leads to changes in some requirements to accommodate the changes made. Whereas, the management of tasks became more complex, with the going forward and back during the development of the system.

Conception

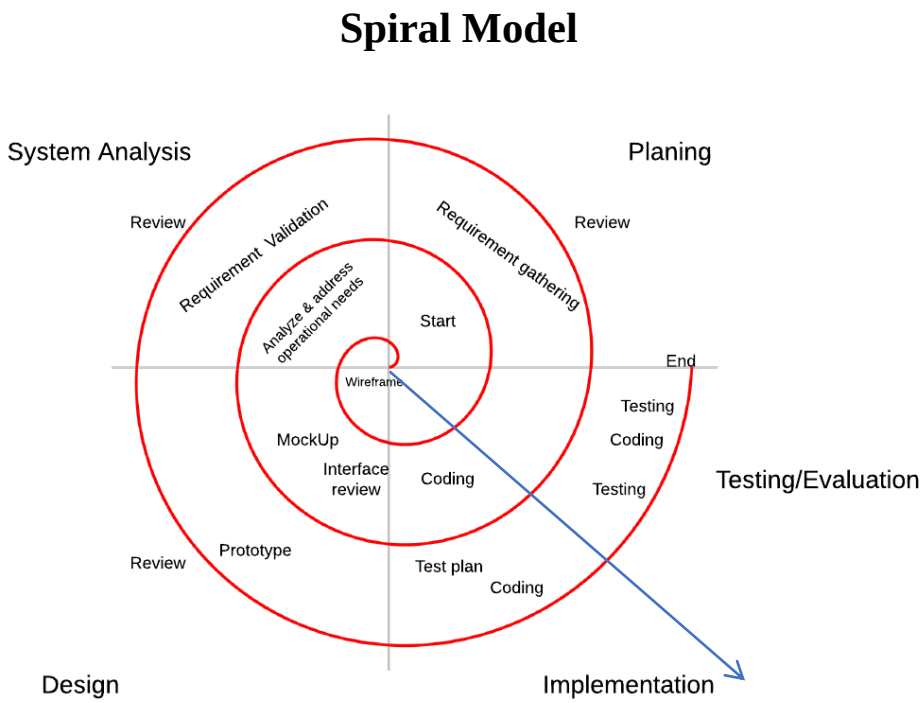


Figure 2.2: SDLC Phases representation, by Adriana Julio Moreira

Planning

This stage was focused on identifying the main audience and their needs, and how to design a friendly software application system that could hold functionalities and quality requirements to address a dog meeting software application, and by taking account of the possibilities of conflictions that could emerge during the development due of the lack of all knowledge needed to build the application.

This phase was crucial since it introduced a clearer and detail image of the scope of the whole project and predicted issues, openings, and commands that set off the project.

As a team, we identified all the work to be done, which help us to outline the activities, tasks, and, timeframes.

With the targets settled and the project planned in detail, with the technologies requirements for the front-end, back-end and, database defined, the Plenty of Dogs web application was prepared to be executed.

System Analysis

At this point, a particular systemic approach was required to define step by step of the Three-Tier Architecture which was based on the system proposed designed on an earlier stage; the Front-end our presentation layer was designed on HTML, CSS, JavaScript, and Bootstrap, and the application logic layer our Back-end makes use of PHP, and the Database makes used the MySQL to store the system data.

The Database and the software interface design were the first to come to life. To ensure that the database and the web interface had the same functionalities and requirements needed to make the system run; both were developed at the same time, and it included tests to verify the synchronization of them.

Design

The POD design phase begins with the development of the user wireframe interface, which brought directions to the system architecture. With the wireframe setup, it was possible to design the POD user Mockup interface. Additionally, based on the user Mockup interface, it was possible to check the need of some attributes to make the POD system, appropriate, such as the need of password policies, password security, data protection, the implementation of those requirements, will be discussed with more detail on Chapter3.

The System Design preparation was crucial to the progress of the project, bringing clarity to the step by step need to the implementation requirements for the development of the POD project.

Implementation

In this phase, all our specifications came to life. As described in Chapter 1, our team carried out considerable researches to make the best decisions regarding which technologies would be the most adequate to build our Web application. When developing the front-end, HTML, CSS, JavaScript, and Bootstrap worked together to give to *POD*'s prototype the user-friendly interface expected. Regards to the back-end, we made use of PHP to handle data storage and business logic. In order words, it is responsible for trafficking all data between the presentation layer and the data access layer. At last but not least, our database was physically created, locally at the first moment, following our ERD which was produced during System Design's phase. After carrying out the first tests and making the first accesses to ensure it was satisfying our project's specifications, our database was deployed in the cloud. It is relevant to mention that our team chose Amazon RDS for being one of the best options in the market. Also, because we had already produced our script for database creation, which made it even simpler. Besides that, just with a few steps, we were able to set up our database, making sure when necessary it can be operated and scaled easily.

Testing & Integration

At this stage, with the first features developed our team started testing the POD system functionalities in parallel to the development of the rest of the system. This was done to confirm that the parts of the application developed works as the POD scope planning on earlier stages.

POD test phase was based on the Black Box Testing, this test strategy in which the (AUT) is tried without taking a gander at the code structure, implementation details, and information on interior ways of the POD system. BBT test depended on the POD prerequisites settled during the implementation of the system.

The BBT followed three phases Integration Testing to verify the interaction of the front-end, back-end, and database, System Testing focused on the POD scenarios and Acceptance Testing to confirm that all requirements planning on the system analyses were followed. There is a detailed explanation of the testes made in Chapter 5.

During this phase, the testing team found some bugs that we're communicating with the development POD department to fix the bugs and send back to the testing team to re-test. This process was done, over and over, until the system was bug-free and working according to the POD needs.

Requirement List

According to the system planning, we could have clarity about what the application would be, with the defined application, it was the study of the functionalities that the application would need, with that the functional requirements of the system that represent the functionalities arose.

Initially, we had 13 requirements, with the passing of the phases, the development of Mockup, presented the need to include new requirements and to change the requirements list.

Functional Requirements - POD

R01 Access the web application - The user will be required to access the webapplication – POD

R02 New user profile - The system allows user to create a new user profile by email

R03 Login - The system allows user to login to POD

R04 My Dogs - The system will permit the user to create a new profile for one or more dogs

R05 Insert photo - The system allows user to download picture of the dog

R06 Like a profile - The system allows user to swipe through profiles of dogs in your area (like/dislake a profile)

R07 Find dogs by breed - The user will be able to filter dogs by dog breed

R08 Find dogs by sex – The user will be able to filter dogs by dog sex

R09 Find dogs by size – The user will be able to filter dogs by size

R10 Find dogs by city – The user will be able to filter dogs by dog city

R11 Find dogs by available to meet- The user will be able to filter users by available to meet

R12 Find dogs by breeding cycle - The user will be able to filter users by dog breeding cycle

R13 Logout - The system will permit to logout of the system

R14 Delete Account - The system will permit to logout of delete Account

Chapter 3 – System Design

Project Architecture

The software architecture serves as a framework through which to understand the components of a system and their interrelationships. According to the ISO IEEE 1471, there are many forms of developing system project architecture.

The system architecture comes right after the requirements list of the system. This helps to determine the technologies used to get the system working; by determining where the system will run, in locations, where data will be stored, and how this communication will be between processes, where customers will access and where data will be stored.

In the system analysis phase, we determined how to develop the POD system, while in the project architecture phase; we give the definitions of how these technologies will communicate with each other.

Some of the advantages of implementing project architecture are:

- Build flexible, quality application
- Integration with different languages and systems
- Application security
- Identification of interaction mechanisms - the communication between objects through the exchange of messages is a way in which the software components interact with each other.

To fulfil the POD mission, functions, and objectives, we determined that the type of architecture that best fits to achieve the success of our system would be, an architecture based on the Three Tier-Architecture, where we are making use of the presentation layer which supports the Front-end with the utilization of HTML, CSS, and JavaScript, this layer is crucial, because it is responsible for the visual part of the POD system, the user interaction; Application Logic layer that holds the Back-end utilizing PHP, this layer includes the control the end-user view of the system; the Databases utilizing MySQL, storing all the system data.

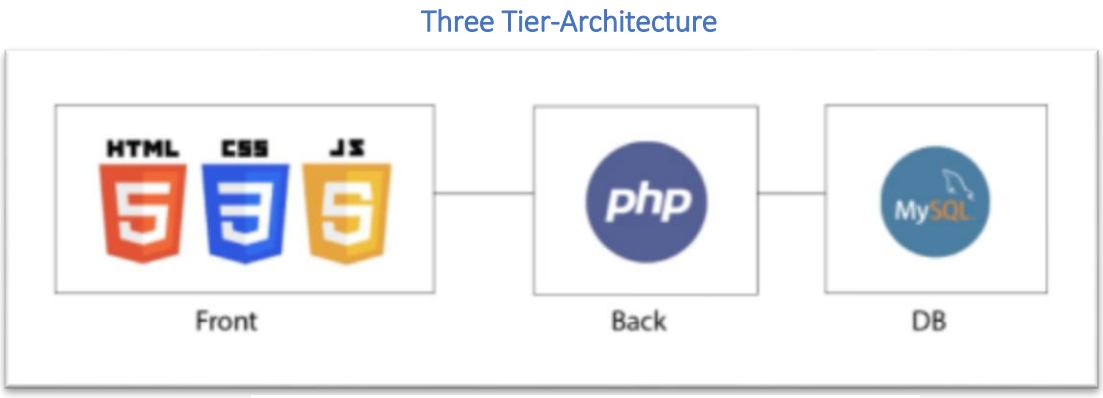


Figure 2.1: Three Tier-Architecture, figure design By Kevin Cardoso

User Interface – Wireframe

This skeleton of the POD system shows a good practice of using wireframes in the development of a system. This structural level helps to develop a more targeted and assertive final product. The ultimate goal of using wireframe is to validate and structure ideas, so the use of colours, fonts, or even images is not necessary here.

POD interface wireframe gives a direct demonstration of the architecture of what the final interface will look like, and based on the specifications stipulated in the development of the system.

Figure 2.2: POD Wireframe interface

User Interface – Mockup

User interface Mockup was developed to show the system product to a client. Through that, we can start to analyse the need for the use of password policy and data protection, which we are going to explain with more details through this document.

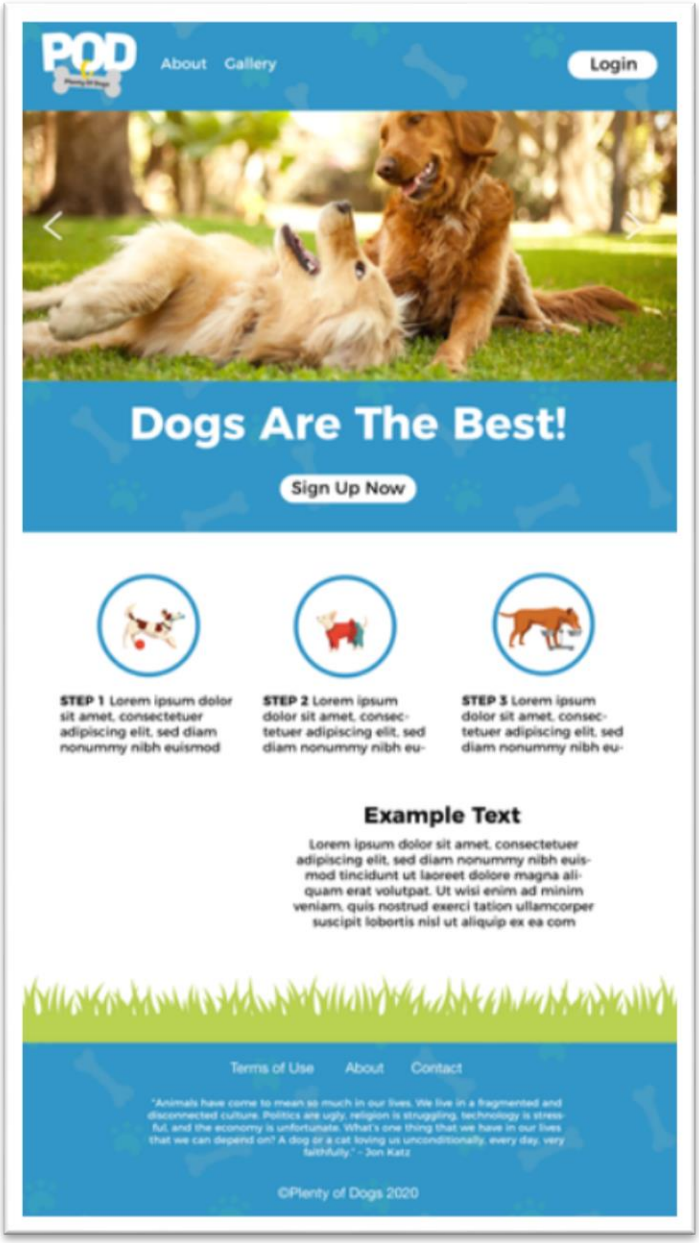


Figure 2.3: POD Mockup interface

UML Diagrams

Back to the 90s, different ways of representing and documenting software systems used to be applied when developing a new system, resulting in a difficult understanding and communication among software developers, engineers, and architects. For this reason, the necessity of having a unified model arose, and since 1997, UML, which stands for Unified Modelling Language, has played an important role in the System Analysis and Design phases.

Some of the objectives of UML are:

- Be an expressive, visual modelling language that proves to be relatively simple and extensible;
- Be independent of any programming language;
- Be independent of the process;
- Support high-level concepts (structures, standards, and components);
- The vast majority of the work examining model based testing of OO systems focuses on the use of either class or state diagrams.

Beginning programming straightforwardly, without going through the analysis phase, as is often done when developing a small and simple system, can be disastrous when the target system is large and / or complex. It is possible periodically to get a satisfactory system that can survive the maintenance challenge, however, that would unquestionably be a separate case and reliant on luck and individual skills.

It is known that there are plenty of UML diagrams that can be classified as behavioral or structural. However, in order to identify possible flaws or errors in advance, before start coding *POD*, our team considered relevant and enough to apply only three of those diagrams: Use Case, Sequence, and Class diagrams. Whilst elaborating Use Case and Sequence diagrams helped us to identify all the behaves and functionalities that *POD* will have, drawing Class Diagram allowed us to start structuring all information and relations between all the classes.

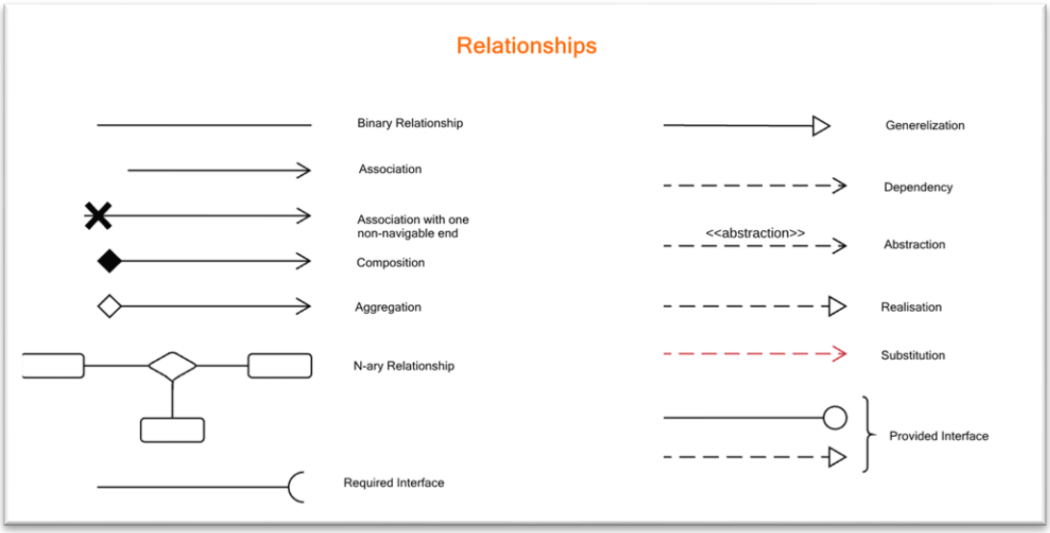


Figure 2.4: Types of UML Relationships, by Digital Guide Ionos.

Use Case

The use case diagram was proposed by Ivar Jacobson in 1967 at Ericsson as a way to specify the description of software requirements.

This diagram was basically used to present the user interaction with *Plenty Of Dogs* Web application, indicating the relationship between a user and functional requirements that *POD* fulfils.

All functional requirements are expressed through use cases and allowed us to analyse all requirements gathered during Planning and System Analysis phase, when the Requirement List document was produced.

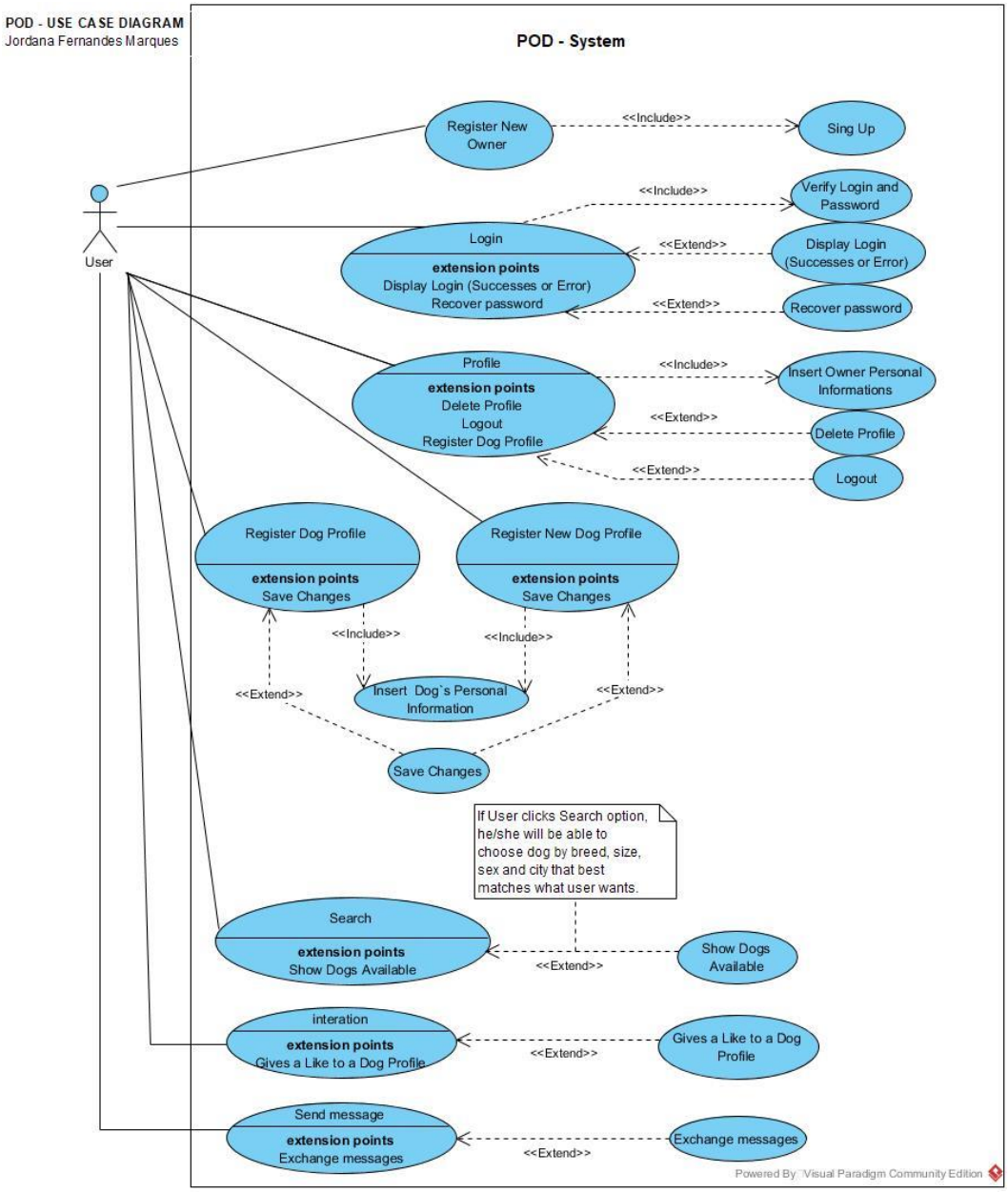


Figure 2.5: Use Case Diagram

Class Diagram

The most essential rule is the association of Objects into classes. Class diagram can be defines by individual entities that has a characteristics and common behaviour. The class diagram indicates all the classes that have to be implementing on the system. A class is chosen to host the operations that perform the behaviour of system use cases.

The use of a Class diagram was important to map out the structure of the POD system, by showing the POD classes, attributes, operations, and relationships among objects.

When you want to talk about a set of similar objects without having to talk about each one individually, we talk about the Class to which these objects belong. Just to make clear how relevant was the use of this diagram in our project, we can use the class called image as an example.

This particular class was created to encapsulate all the images uploaded on the system by an Owner of a dog, the images have a straight relationship with the class dog and are also integrated with the class owner. In the bottom part of the class image, it is shown the operation +updateImage() which is associated with the class.

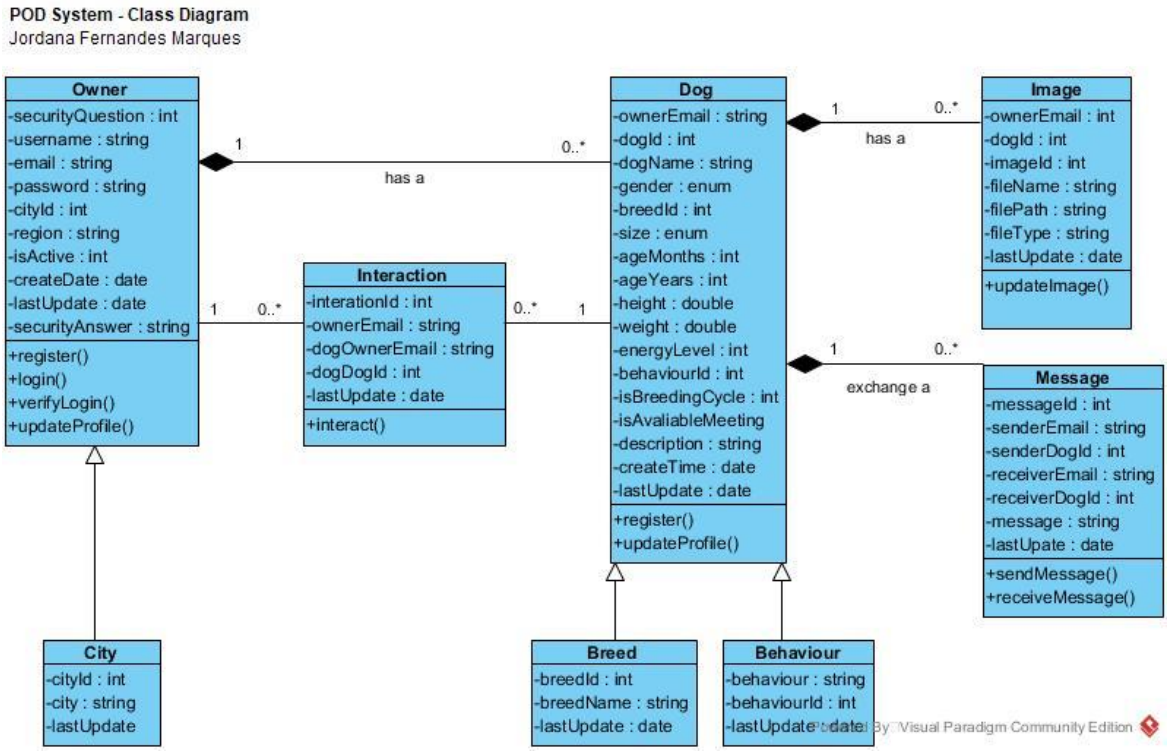


Figure 2.6: Class Diagram

Sequence Diagram

This particular diagram is considered one of the most important UML diagrams among the computer science community and shows objects interactions arranging how and in which order the progression of messages traded between objects need to proceed in order to send the information to the next object.

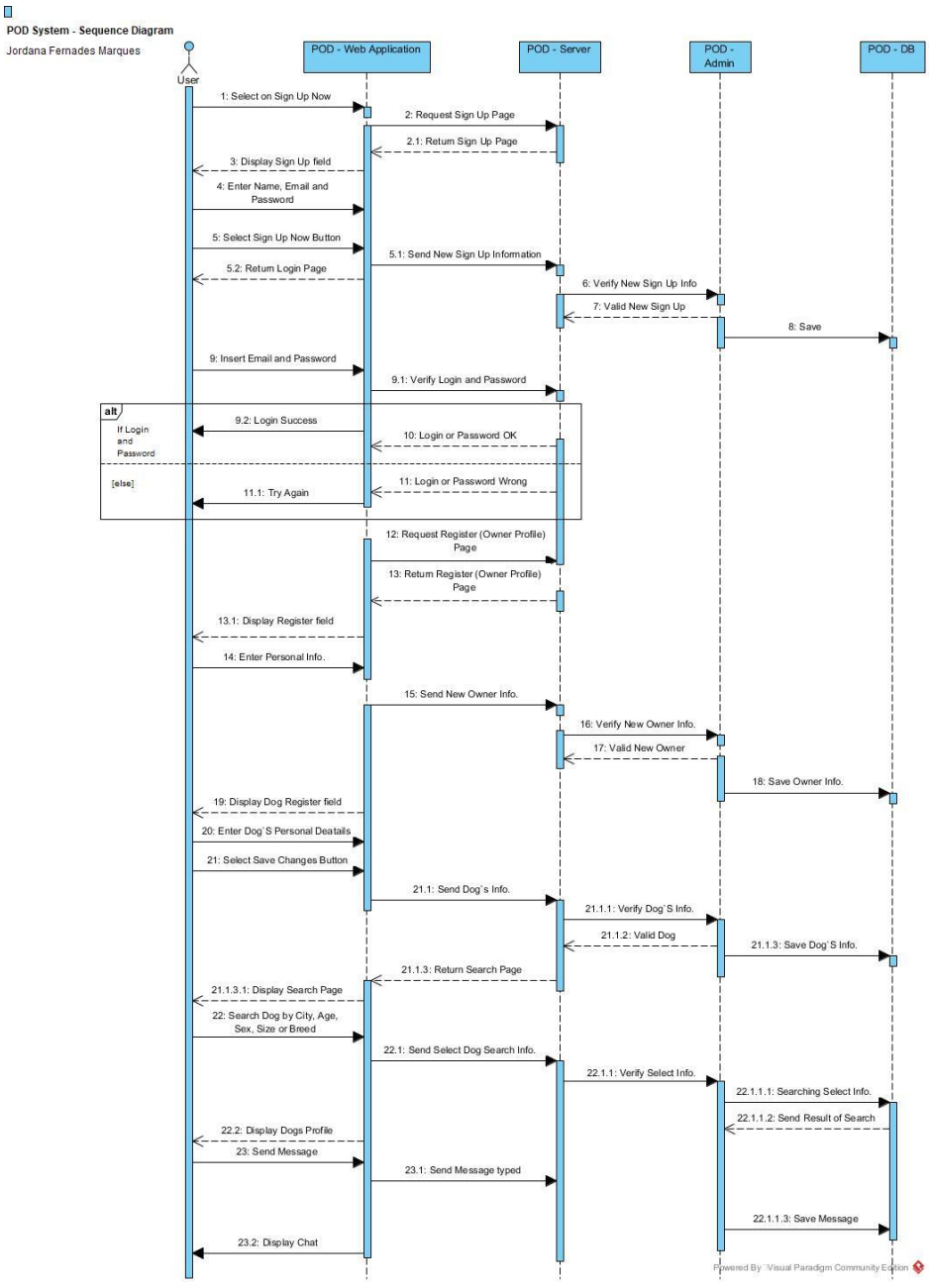


Figure 2.7: Sequence Diagram

To attend all the necessities of *POD*'s development, a high-level of Sequence diagram was drawn to represent its functionalities and interactions in a macro view. In this way, we had a better idea of how our system would behave before its development.

Entity-Relationship Diagram - ERD

During this phase of design, to elaborate *POD*'s ERD was one of the most crucial documents for the development of the entire project in terms of understanding the necessary data structure and also in terms of supporting the physical Database implementation. Additionally, drawing this diagram helped us to guarantee the production of high-quality database design to support database creation, management, and maintenance. In other words, at this moment, our team started planning out the physical structure of the database.

This structural diagram, as shown below, reveals the entities, showing POD attributes, primary, foreign and composed keys, and the relationship among the entities.

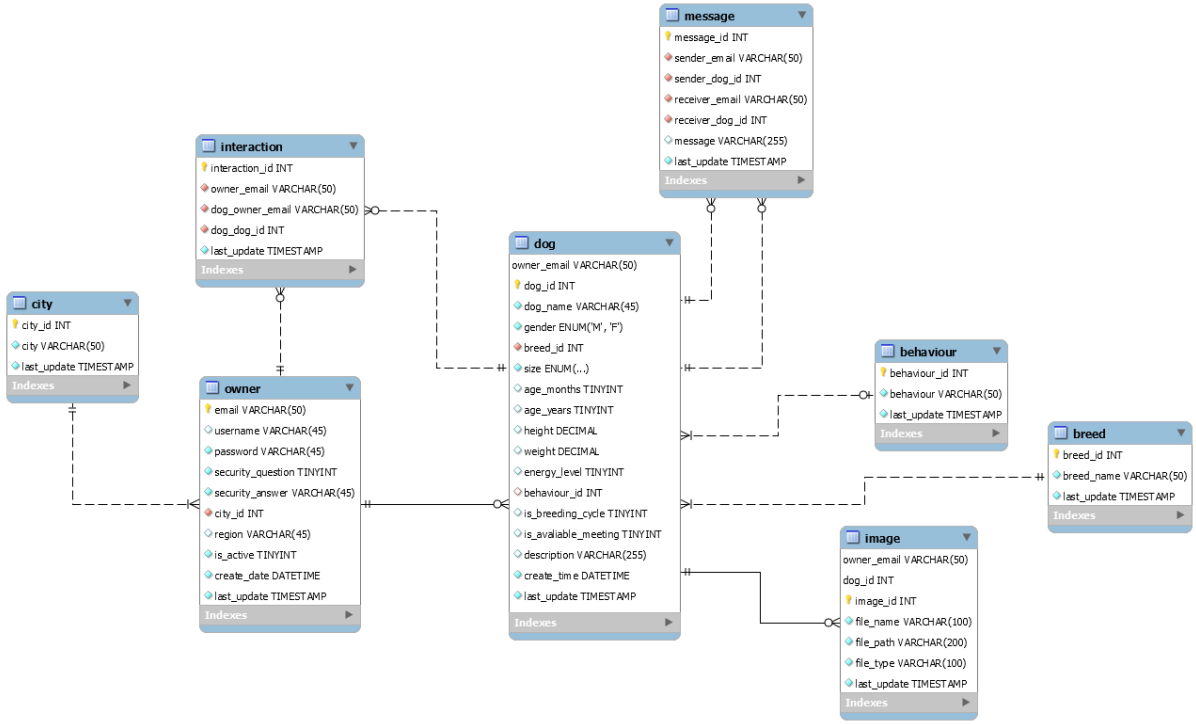


Figure 2.8: Entity-Relationship Diagram - ERD

Table Description

The table description brings a detailed description of each attribute in the database, showing as well as its datatypes and specifications. This document was created to clarify to anyone who needs to understand every single item of our database and possibly maintain our application in the future. As we follow the basic premises of System Analysis and Design, to have accurate and up-to-date documents is really important.

Ex: The table city, holds the attributions, city_id, which represents a unique identification number of a city, the attribute city, which stores the name of a city, and the attribute last_update, which brings the current timestamp that shows the row most recent update. That information is used to identify the location of a user/owner.

A full version of this table can be find on Appendice D.

Project Name: POD - Plenty of DOG

Documentation: SQL Table description

Created by: Adriana Moreira

Creation Date: 09/04/2020

Last Updated: 23/04/2020

able Na	Table Description	Column Name	Data Type	PK	NN	UM	AI	Description
ity	stores details about cities	city_id	INT	Yes	Yes	Yes	No	unique identification number of a city
ity	stores details about cities	city	VARCHAR(50)	No	Yes	No	No	stores the name of a city
ity	stores details about cities	last_update	TIMESTAMP	No	Yes	No	No	current timestamp that shows the row most recent update
wner	stores details about owner	email	VARCHAR(50)	Yes	Yes	No	No	e-mail that identifies an owner as unique
wner	stores details about owner	username	VARCHAR(45)	No	No	No	No	stores username
wner	stores details about owner	password	VARCHAR(45)	No	Yes	No	No	stores username password
wner	stores details about owner	security_question	TINYINT	No	Yes	No	No	stores 3 security questions about the user password 1 - "What primary school did you attend?" 2 - "What is the middle name of your r
wner	stores details about owner	security_answer	VARCHAR(45)	No	Yes	No	No	store security answer about the user password
wner	stores details about owner	city_id	INT	No	Yes	Yes	No	foreign key attribute that garantees referencial integrity with the table city
wner	stores details about owner	region	VARCHAR(45)	No	No	No	No	shows generic information about region
wner	stores details about owner	is_active	TINYINT	No	Yes	No	No	indicates if the owner profile is active or not 0- False 1-True
wner	stores details about owner	create_date	DATETIME	No	Yes	No	No	shows what time and data the row owner was created
wner	stores details about owner	last_update	TIMESTAMP	No	Yes	No	No	current timestamp that shows the row most recent update
ehaviour	stores details about dog behaviour	behaviour_id	INT	Yes	Yes	Yes	Yes	unique identification number of a dog behaviour
ehaviour	stores details about dog behaviour	behaviour	VARCHAR(50)	No	Yes	No	No	stores breeds of dog
ehaviour	stores details about dog behaviour	last_update	TIMESTAMP	No	Yes	No	No	current timestamp that shows the row most recent update
reed	stores details about all types of dogs breed	breed_id	INT	Yes	Yes	No	Yes	unique identification number of a dog type breed
reed	stores details about all types of dogs breed	breed_name	VARCHAR(50)	No	No	No	No	stores breed names
reed	stores details about all types of dogs breed	last_update	TIMESTAMP	No	Yes	No	No	current timestamp that shows the row most recent update
nage	stores details about dog images	owner_email	VARCHAR(50)	Yes	Yes	No	No	foreign key from table Owner that represents a unique identification of an Owner and integrates the composed key
nage	stores details about dog images	dog_id	INT	Yes	Yes	Yes	No	foreign key from table Dog that represents a unique identification of a dog and integrates the composed key
nage	stores details about dog images	image_id	INT	Yes	Yes	Yes	No	primary key that represents a unique identification of an image and integrates the composed key

Image 2.9: Database Table Description

Password Policy

Password policy is, in fact, a set of rules and procedures that the company establishes to deal with data protection, as well as to interfere in case of problems. Password Policies are regulated by ISO 27001, which defines guidelines for the steps that are part of its preparation process.

The main objective of password policies, however, is to minimize risks and reduce the vulnerability of data systems.

Its importance is mainly due to the fact that it not only prevents, but also controls more effectively everything that happens when accessing the network and other technological systems and platforms, being much more prepared to face threats and possible invasions.

For POD, we came to the conclusion to make the system secure to implement the following requirements:

- Username cannot be blank;
- Password must contain at least 6 characters;
- Password must be different from username;
- Password must contain at least one number (0-9);
- Password must contain at least one lowercase (a-z);
- Password must contain at least one uppercase letter (A-Z);
- Return false in case, the user press enter without entering a password, not allowing anyone logging without entering a password.

Password Security

As our application will not send emails to users, we will ask for each user a "security question" which will allow them to create a new password, if it is forgotten. In this case the user would not need to create a new profile if forgetting their password. The security questions set to ask each user to answer are:

- What primary school did you attend?
- What is the middle name of your mother?
- What is the name of your first pet?

Data Protection

According to the General Data Protection Regulation (GDPR) guidelines, a business should have just the requirements needed to the business run. Where possible, it is preferable to use anonymous data.

Under the principles, users must be told of information the site gathers from them and expressly agree to that data gathering, by tapping on a Concur button or other activity.

There are FIVE basic principles to build a data security plan:

1. TAKE STOCK. Know what personal information you have in your files and on your computers.
2. SCALE DOWN. Keep only what you need for your business.
3. LOCK IT. Protect the information that you keep.
4. PITCH IT. Properly dispose of what you no longer need.
5. PLAN AHEAD. Create a plan to respond to security incidents.

Figure 2.10: Data Protection Principles

POD offers a match services directed specific for dogs. For this service, it is require the Dog Owner name, Dog Owner address, Dog Owner e-mail, Dog name and dog attributes, such as, behaviour of a dog, breed, gender, size, age, height, weight, energy level and breeding-cycle

PRACTICE TIP: If your brokerage does not have a legitimate business need for personal identifying information – then don't collect it. If there is a legitimate business need for the information, then keep it only as long as it's necessary. Once that business need is over, then properly dispose of it.

Chapter 4 – Implementation of the System

Implementation is the following phase after the System Analysis and Design, and it is certainly one of the most important and challenging phases of the whole System Development Life Cycle. This is the phase where everything planned and all gathered requirements come to life. Also, this is the stage where all documents produced during previous phases give the direction to where developers have to go to.

Moreover, database admins need to create all relevant data in the database, front-end developers build the interfaces and GUI to interact with the back-end following all guidelines and procedures defined by the client or system analysis team (Ghahrai, 2018).

In this chapter, details of how *POD* was developed will be presented, based on its design. Also, it will be described its technologies and tools used during this phase. In addition, this chapter will address potential problems that arose in the system, implemented solutions and further suggestions to improve this system.

Plan x Reality

According to Imam (2018), planning is the most crucial and critical organisational stage. As it will be more discussed in Appendix A, the project planning guides all the development of software, presenting to the development team all determined goals in a high-level plan to establish the intended project.

Despite the fact that to stick to the plan and do not lose the track of activities is generally a difficult task, it is essential to bring the implementation of a system to its success. Sometimes, different factors might lead to loss of the planned deadline of activities causing its delay such as problems occurred during the execution of other activities that creates dependencies to the referred task. In those cases, a contingency plan has to be made to avoid further delays and keep the next tasks on track.

Comparing the beginning of the project to the phase of implementation, a few changes were made in regards to its scope to tailor the project to the right public, to satisfy the team's expectations and mainly to work through the team's technical skills. A good example of that was the choice of developing a Web application instead of a mobile app. Back in the days of planning, the team carried out researches to support the decision of what would be more suitable taking into consideration the learning curve of studying new technology. When balanced effort, complexity, and time, the team decided to stick with technologies in which knowledge was more common among the group.

However, a few functionalities had to be modified during the implementation phase due to its complexity. These functionalities were gathered during the Planning stage but, in that stage, as mentioned before, only high-level research was necessary. In other words, the team considered reachable to develop them but, when it came to the coding time, they had to

suffer a few adaptations to be developed. As an example, the functionalities of adding more than a dog per owner and messaging other dog owners. When developing these functionalities, our team identified a complexity that would impact not just the user-interface but also the back-end, requiring more time to be developed. In this case, the group decided to stick with the core and open the possibility of implementing these functionalities in the future if having a remaining time.

Following the Design and Project Architecture of the system, there were no changes in regards to the technologies drawn to develop *POD*'s front-end, back-end, and database. As previously planned, the group was very assertive and happy with these choices. Prove of this was the development of the prototype. After facing the first difficulties, the team had no doubts that choosing well-known technologies makes a difference when searching for solutions, for example.

Although the Project Architecture remained the same as designed, to meet all deadlines as planned was clearly a big villain in this project. The initial plan was created during the previous semester and it forecasted different tasks happening in parallel to make our development more agile. However, when bringing it to reality, the implementation of our project started late and eventually caused the delay of the beginning of tests, the next phase of the SDLC.

A track tracer was created by our team and a few tasks were speeded up to minimise further impacts. A good example of that was the implementation of the database. At that moment, our database was firstly created locally with the relevant data to run the first unit tests. As the plan suggested two weeks for this whole process including the deployment on the cloud (AWS), our team successfully achieved this whole task in a week, reducing possible impacts during the integration of the system.

Besides Agantty, an online tool used to produce the Gantt-chart during the previous semester, and a track tracer, the main planning tool used by our team during this phase was definitely Basecamp. This tool was crucial for the development of our application because it brought back to the whole team realistic dates based on the current situation of our project. In this case, our team acquired more awareness about which tasks should be completed following priorities, its due dates and also eventually delays in executing tasks. Additionally, some features such as To-dos, Message Board, and Campfire were adopted in order to make our team more committed, once all tasks can be seen by every member of the group including our supervisor.

Development

For the development of our web application "Plenty of Dogs", we used the languages HTML, CSS, Bootstrap and PHP to perform the front-end and back-end together with MySQL for the database. We started our development based on the wireframes and mockups created at the beginning of the project, where we had our first ideas about how we wanted the final result for our application. With that, the development started to take shape, with its skeleton being formed in the front-end with HTML and CSS languages and with the help of Bootstrap in visual formatting. First, the Index was created, which is the main page of all web applications. Then, the About, Privacy Terms pages and lastly the registration and login pages. Based on the established prerequisites and also on the created database, the registration and login pages correspond perfectly to the established specifications, both in appearance and values, as well as in-field validation.

Therefore, we introduced PHP, responsible for integrating Frontend with Backend. This language was in charge of making the connection to our database, validating and manipulating the application data. In the fields of the registration and login pages, PHP acted so that each user's input was properly validated according to our specifications and was finally inserted into the database or verified, in the case of the login page.

During the development of the application, MAMP was used, which is similar to XAMPP, which offers necessary tools for testing and development, in which case we need it to run the PHP language through Apache and create this environment where our application makes the local connection to our database.

PHP is a well-known programming language and the most used in the world for the development of dynamic systems, applications and websites. Apache is one of the oldest server systems in the world, where we can allocate our web application and applications and, as soon as the user requests access, simply by typing the URL of our web application in the browser, Apache makes this connection to display all of our web application, content hosted on it.

We connected to an RDS (Relational Database Service) MySQL DB instance using MySQL Workbench client. MySQL Workbench it features data modelling, SQL development, and comprehensive administration tool for server configuration, backup, and so on.

During the implementation, the local server was used through MAMP accessing our database locally. After the whole integration of the system, we connected to our database deployed in the cloud (AWS).

Finally, whilst executing the integrated tests, further researches were carried out in order to find the best and quickest solution to deploy our application in a Web Server. As mentioned before, during unit tests, the use of a local web server (Apache) was necessary to run our application, especially because of our back-end developed in PHP. Inclined by the fact that our group had already a database deployed on AWS cloud, the most suitable option at that moment was to use an easy-to-use service for deploying and scaling web applications called AWS Elastic Beanstalk, also provided by Amazon.

To handle the deployment, the only necessary task was to upload the code and choose which kind of platform would be the correct one. In order to deploy *POD*, the most suitable one was PHP 7.4 running on 64bit Amazon Linux 2/3.0.1. After approximately ten minutes, the environment was automatically created with the correct support to PHP. One of the best advantages of this web application management is the version control. In other words, when necessary to update our application, the only action need is to upload the new version of the code. Once again, not taking more than four steps in a few minutes.

Have a look of a demonstration of our Web application in action

Signup now

Challenges

Since the idea came up, there was an understanding of the difficulties that would go through the project, especially in the development part, which, being the practical part, tended to be the most complicated. And it was no different, some of the difficulties of this stage will be listed below.

Functions that seemed simple at the beginning, proved problematic, considering the complexity that involves programming or computing in general. The paging system, for example, which defines the number of records presented per page, was a major problem, but with a very detailed study it was possible to conclude and this function is correctly running.

One of the difficulties during development was how to display data on the profile pages. The creation of the SESSION variable was not enabled to work on all pages of the web application, therefore, we were unable to pull such data from the database to be displayed, but in the end, we were able to successfully connect and display it.

Another difficulty was on the message page where we had to drastically change our original layout to meet the correct functioning of our code.

Certainty remains that all the difficulties encountered, which were several, in addition to those mentioned above, are part of professional, intellectual, and human growth. It is with them that we become great professionals, by acquiring experiences and knowledge of knowing the ways to overcome the next obstacles that arise in the job market.

Source Code

The login source code is shown below because is very important as it indicate the starting point for entering our application, with the exception of registration. With the login, we were able to validate the user by checking if the credentials correspond to the databases and thus, preventing unregistered users from having access to the application.

When logging in, a session will be created and user data will be available so that you can access the pages of registered users. The session is only interrupted when the user clicks on logout, causing his data to be forgotten and thus his login closed.

Login

In the Login form, the user is obliged to enter his registered email and password. After entering, this information goes to our backend where the connection to the database is made and validation is made. If both data hit the owner table, the user is redirected to the index.php page, which is the homepage for logged in users. If email and / or password are invalid, an error message will appear on the login screen.

Frontend

```
<form method="post" action="login.php">   POST Form
        <?php include('errors.php'); ?>  Catch errors

<div class="form-group md-form mr-3 ml-3 text-white"><br> Input of registered email
         <input type="email" class="form-control" name="email" placeholder="Enter your e-mail" >
</div>

<div class="form-group md-form mr-3 ml-3 text-white"><br> Input of registered password
        <input type="password" name="password_1" class="form-control" placeholder="Enter your password" >
</div>

<div class="form-group"> Button to call the backend and validate
         <input type="submit" class="btn btn-light" name="login_user" value="Login">
</div>

 </form>
```

Cardoso, K (2020) Login form source code – Front-end (Version 3.0)

Backend

```
<?php
session_start();
$email    = "";
$errors = array();

$db = mysqli_connect('localhost', 'root', 'root', 'POD'); connect to the database

[...]

if (isset($_POST['login_user'])) {
  $email = mysqli_real_escape_string($db, $_POST['email']);
  $password_1 = mysqli_real_escape_string($db, $_POST['password_1']);

  if (empty($email)) {    Check if the email and password have been entered in the


fields
          array_push($errors, "Email is required");
  }
  if (empty($password_1)) {
          array_push($errors, "Password is required");
  }

  if (count($errors) == 0) { If no error is found, we enter the database
          $password = md5($password_1); encrypting the password
          $query = "SELECT * FROM owner WHERE email='$email' AND
password='$password_1'";
          $results = mysqli_query($db, $query);
          if (mysqli_num_rows($results) == 1) {
        while ($row=mysqli_fetch_row($results))
    {
     $_SESSION['email'] = $row[0];     each of these variables, represent each row
in the owner table
     $_SESSION['username'] = $row[1];
     $_SESSION['city_id'] =  $row[5];
     $_SESSION['region'] =  $row[6];
    }

[....]
```

```
            $_SESSION['success'] = "You are now logged in"; login message successfully

            header('location: index.php'); you will be redirected to the main page for logged in users
        }else {
                array_push($errors, "Wrong email/password combination"); error message if the login and password combination are incorrect
        }
  }
}
}
```

Cardoso, K (2020) Login form source code - Back-end (Version 3.0)

Presentation of system

The software development implementation stage is the process of converting a system specification into an executable system. It always involves the design and software programming processes, but if an evolutionary approach is used, it can also involve the refinement of the software specification (SOMMERVILLE, 2007).

The prototype can be understood as the first system that is presented to the user. According to SOMMERVILLE (2007), the purpose of prototyping is to allow users to gain direct experiences with the interface. Most people find it difficult to think abstractly about a user interface to explain exactly what they want. However, when examples are presented, it becomes easier to identify the characteristics they want. says PRESSMAM (2006) that the prototype also serves as a mechanism for identifying system requirements.

In this work, the prototype of the system interface is presented, as a proposal to solve the problem that dog owners encounter in order to find an ideal pair for their dog.

Home Page

The Home page is the application`s base page as shown in **Image 4.1**. Through this page, users can access the application's functionality. The main feature, which is to sing up to become a member is the first to be shown to the user, or log in if already signed up. Pressing in the upper left corner users can see those options, and by selecting Sing Up it will direct users to the registration page. Meets the requirement **R01 - Access the web application**, of our Functional Requirements list. Some information about the system appears on this page also, such as step by step of how our web application will work, gallery, and about "Button".

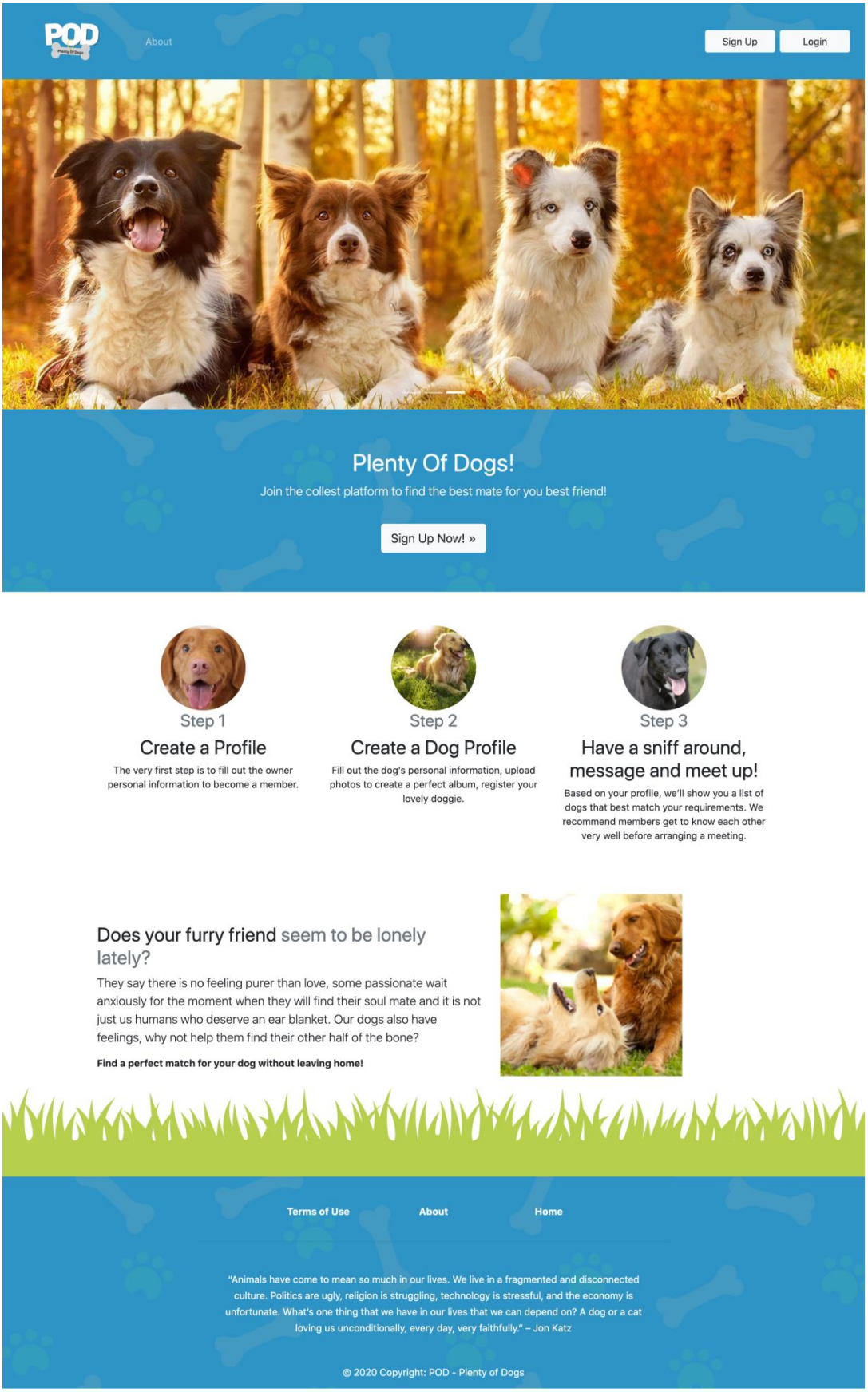


Image 4.1 Home Page

Sign Up Page

Sign Up Page, is used by owners to register itself and become a member of POD as shown in **Image 4.2**. Meets requirement **R02 - New user profile**, of our Functional Requirements list. Each new user will need to insert all the information needed to complete the registration; a security question feature was implemented in case the user forgets or wants to change the password in the future. The last step is to agree with our Terms and Conditions, and then users can complete the registration.

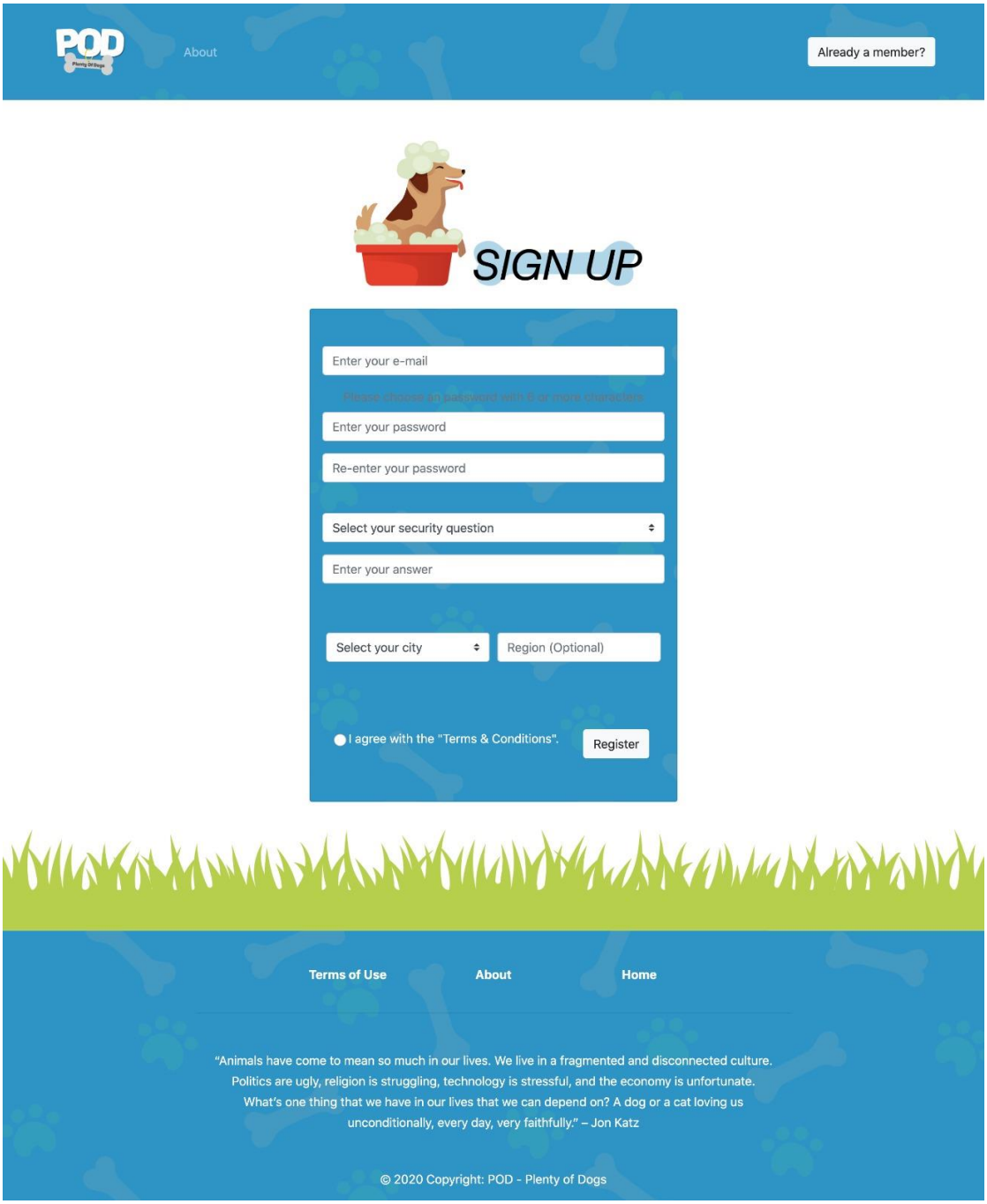


Image 4.2 Sign up Page

Login Page

Login page, users will need to fill the field, seen in **Image 4.3**. The email and password fields are displayed to be filled in, as soon as the correct information is entered and successfully logged in. Meets requirement **R03 - Login**, of the Functional Requirements list.

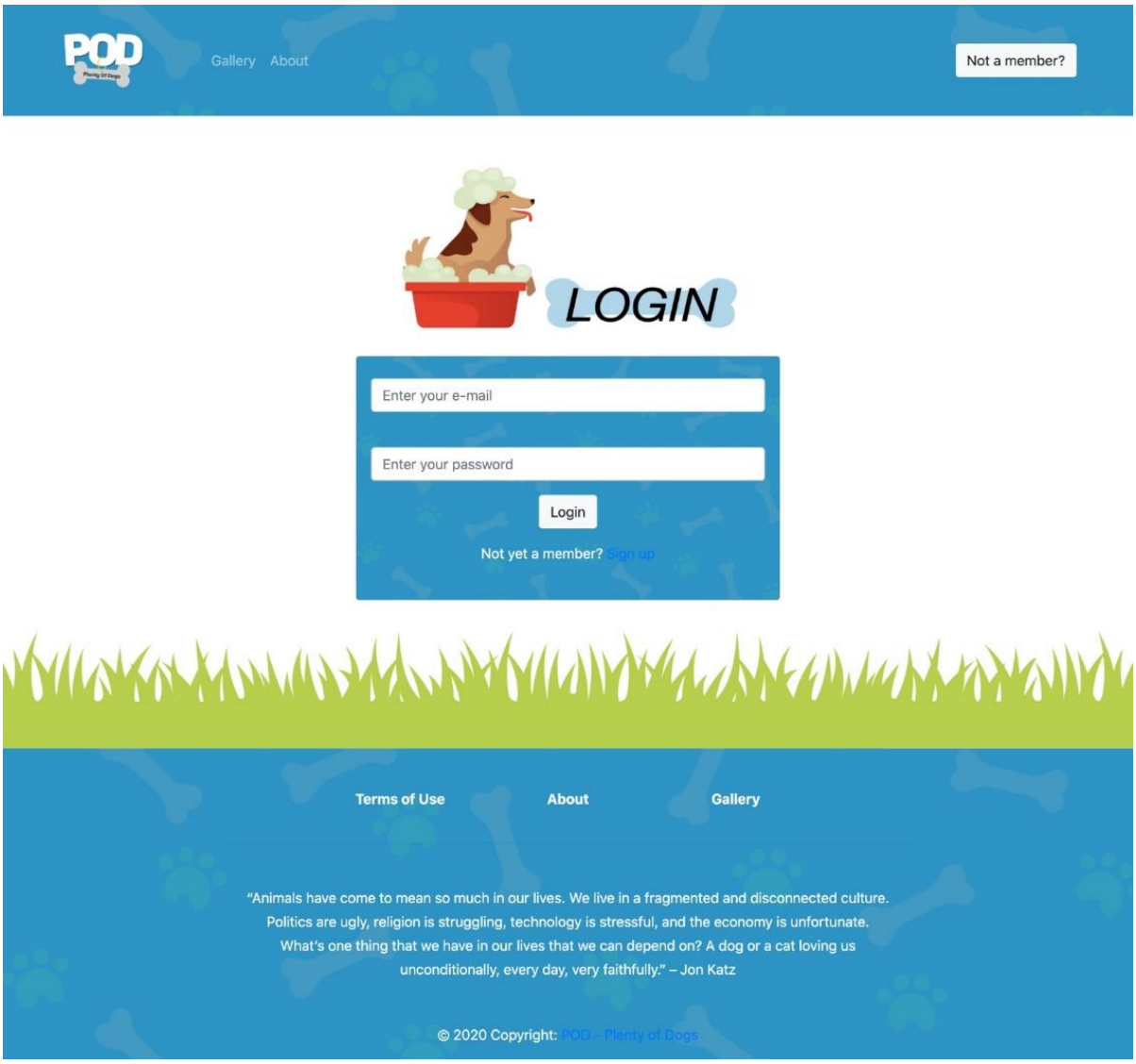


Image 4.3 Login Page

Add Dog Page

Add Dog Page, is used by owners to register their dog to find its perfect match, as shown in **Image 4.4.** Each new dog added the owner will need to insert all the information needed to complete a dog`s registration; a security question feature was implemented in case the user wants to add extras information's about the dog. The last step is to upload pictures of the dog and create an album. Meets requirement **R04 - Insert photos**, of our Functional Requirements list.

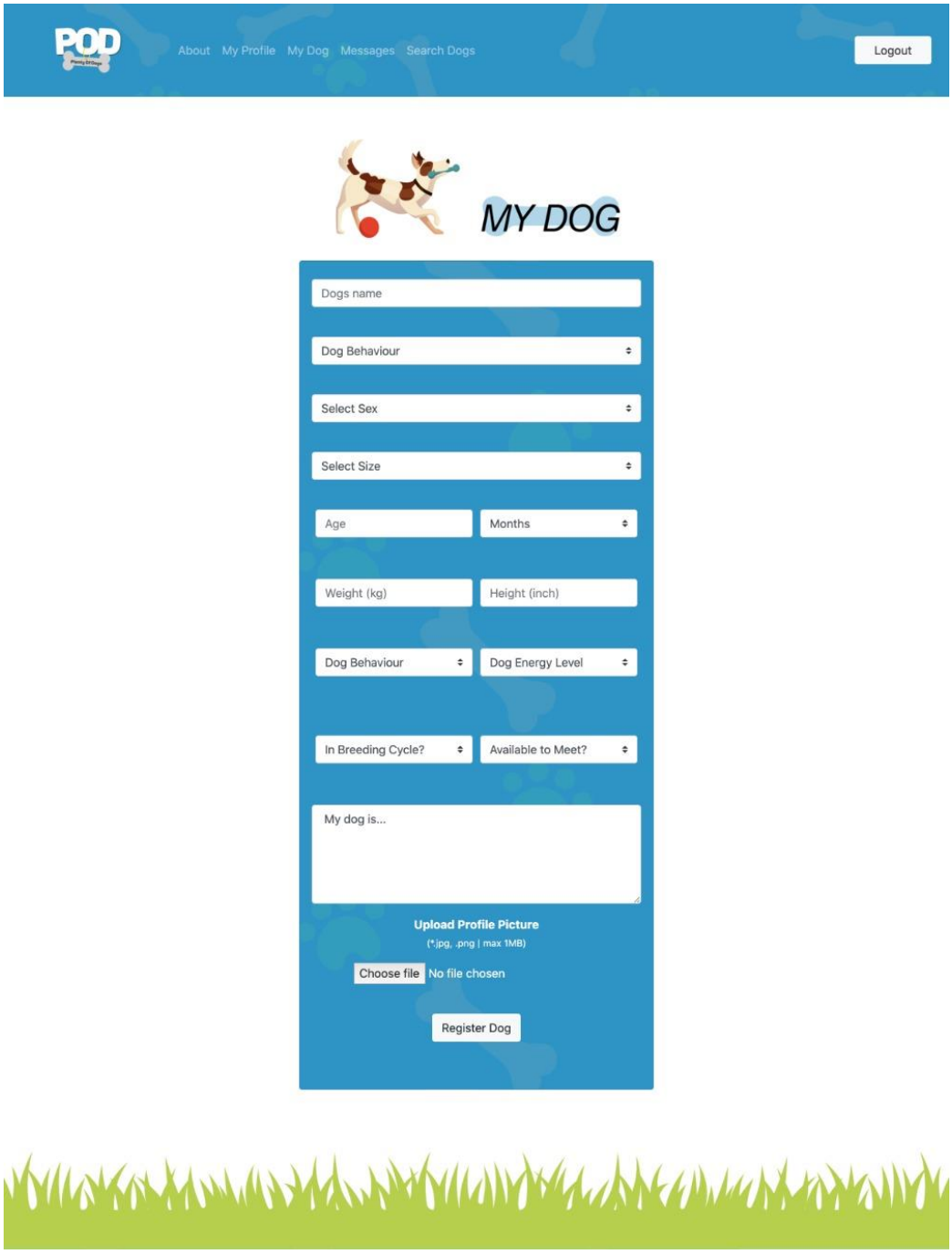


Image 4.4 Add Dog Page

My Dog Page

My Dog Page shows all the information that has been added about a dog, as shown in **Image 4.5**. At the end of the page, there is a button to add more dogs if the owner wishes. At the right top of the page, there is a logout button if a user wants to live the application.

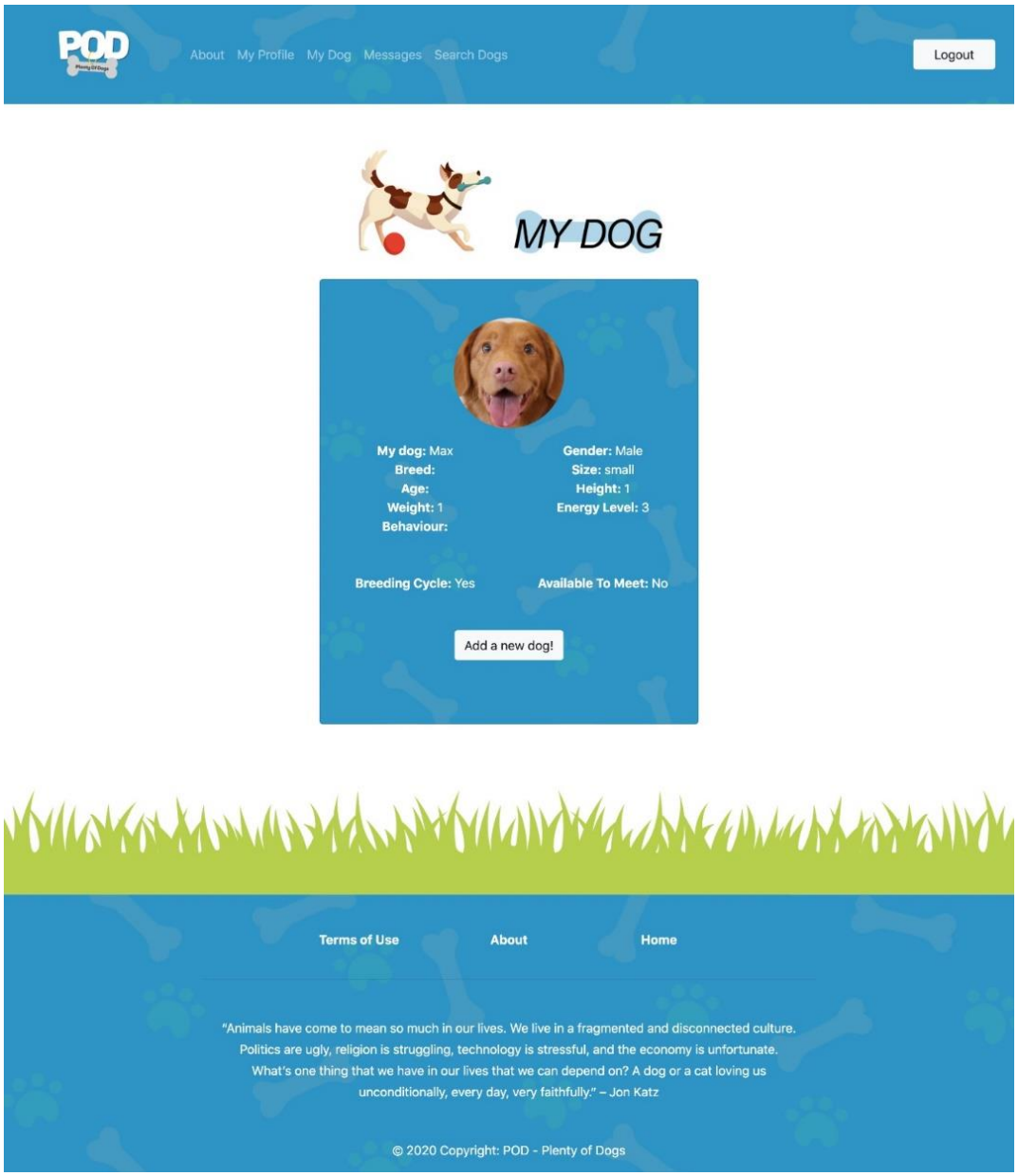


Image 4.5 My Dog Page

Editing My Profile Page

When clicking on the "Edit profile" icon, the editing page will appear with the chosen user's data, which can be modified, as shown in **Image 4.6.**

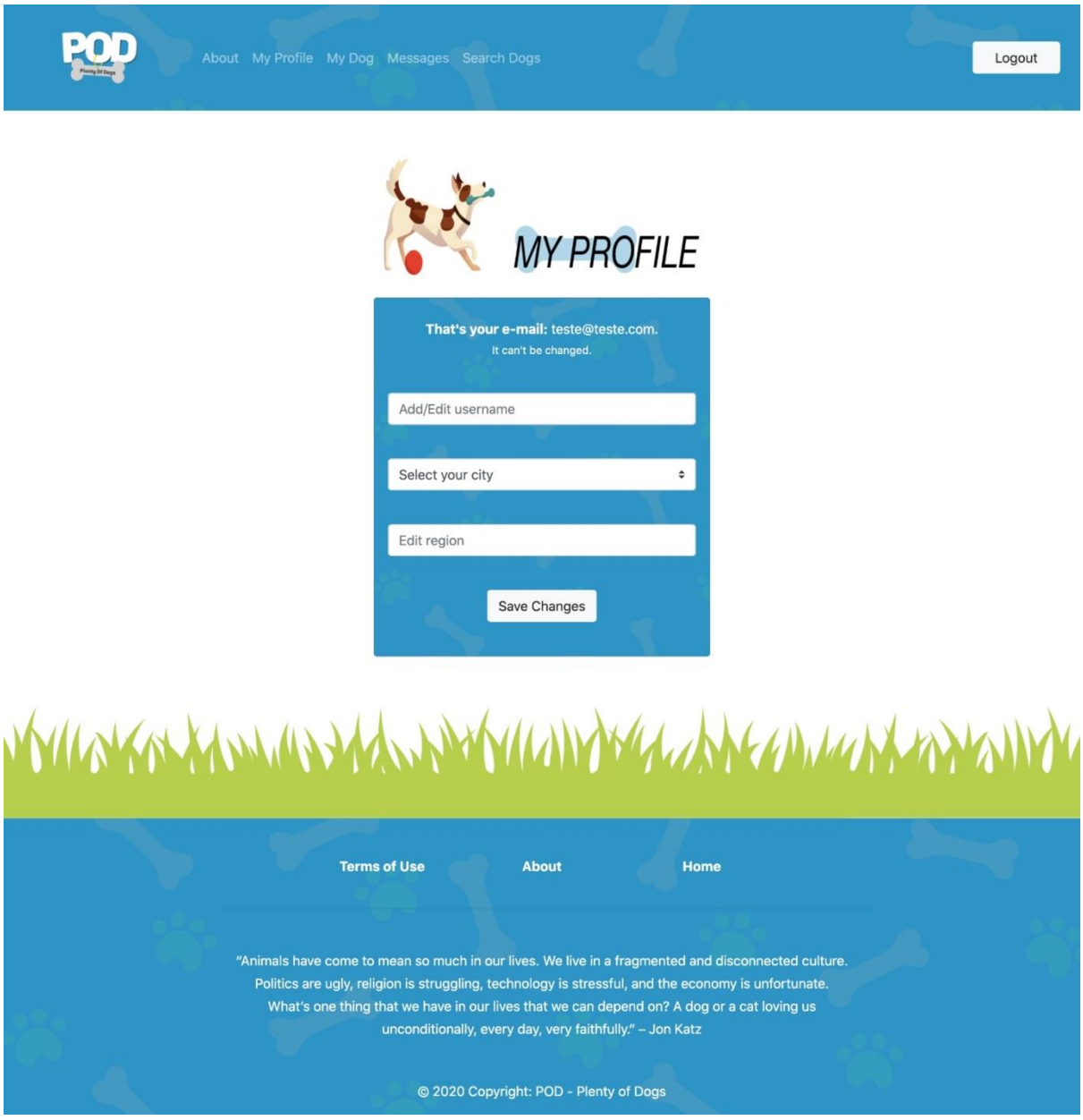


Image 4.6 My Dog Profile Page

About Page

The About Page shows some information about what is POD (Plenty of Dog). It is an opportunity where users get to know about us, as shown in **Image 4.7.**

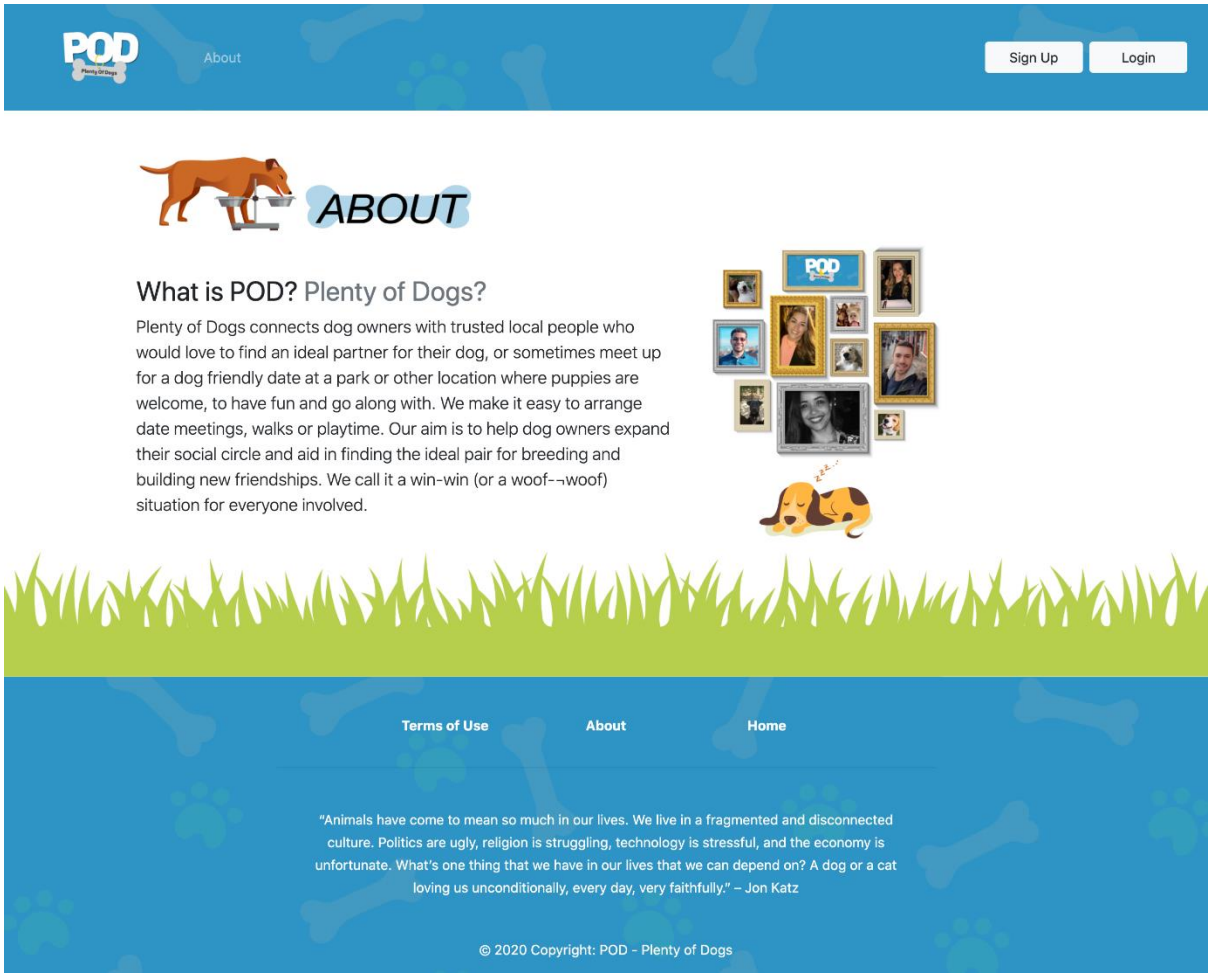


Image 4.7- About Page

Chapter 5 – Testing and Evaluation

Importance of Testing

This chapter aims to describe the test strategy used in the development of the Web application and detail what was used in the testing process by relating them to functional tests and highlighting their importance during the process of creating and verifying the web application.

Every time a program is executed, the user tests, so it is necessary to run the program with the intention of finding errors before it reaches the customer (Pressman, 2000). Tests are actions that require effort and dedication from those involved to ensure the quality of the final product and that this is acceptable. In turn, the tests guarantee the correct functioning of the application developed, safeguarding usability, credibility, performance, among others.

Following the guidelines of the functional requirements outlined, the tests aim to ensure that the application behaves accordingly to the specifications we have defined. Through the tests we can maintain the quality of our product in use, guaranteeing the absence of flaws in our system, satisfying and identifying greater benefits for the end user.

To validate the functionalities according to the access of the application by the user and to evaluate whether the functionalities behaved correctly, the functional tests of the interface were built and adjusted manually.

To validate the functionalities according to the access of the application by the user and to evaluate whether the functionalities behaved correctly, the functional tests of the interface were built and adjusted manually.

In the process of developing any new application, it was necessary to generate manual tests to identify problems generated in the system and ensure the operation of the application was free of errors. It is important to mention that, for manual execution, it is not necessary to know how to use any type of tool, but it requires more effort, time, high analytical skills and a deeper and more critical analysis of the system, aiming at all the minimum cases that must be fully covered.

Reflecting on the choice of the Spiral model, interactive and repetitive, we can notice that the choice of manual test for this project adds to the possibility of reporting the defects and bugs generated in the system, returning to the developer who returns again to the tester to check the quality of the web application ensuring error-free product delivery.

Following our researches, automatic tests require specific knowledge of tools and are better when applied in repetitive tests and for long periods, but when the focus is on the exploration of bugs, practicality, usability and challenge for a better understanding of the development of the project, manual tests stand out because require creativity and analytical knowledge from the tester to navigate the system.

Tests Manual Type

Tests can be divided into three different categories, white, grey and black box testing. To apply the white box method, a lot of work is required, it is also necessary to have access to the application code and an underlying knowledge is essential.

In the grey box test, the tester does not have access to the source code, but he must know the algorithms that were implemented. It is considered a virtual balance point that can be used by mixing the techniques of the white box and black box.

Regarding the black box, the essential functionality of the application is tested right at the end of the process, focusing on the domain of information and based on the specific requirements of the web application, the black box does not require the tester to have internal knowledge of the program, contributing for the action of the system's behavior. For our project, based on the choice to test the functionalities in an objective, quick and practical way, we chose the type of black box.

According to (Araruna, 2017), the expected result through the black box test is to identify errors in the following groups:

- Possible interface errors

- Possible missing or incorrect functions

- Possible errors in accessing external data with the data structure

- Possible behaviour and performance errors

- Detect initialization error and completion of the execution process.

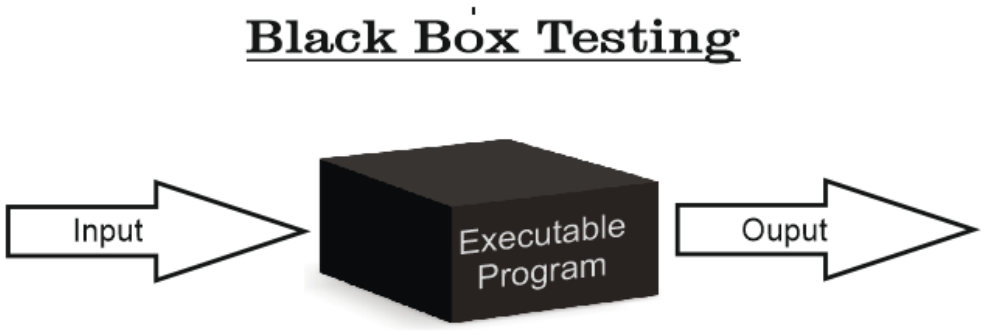


Figure 5.1: Black box testing diagram, by Larissa Fernandes

Test Case and Scenarios

The Test Scenario is the definition of any functionality that can be tested in our web application. Our scenarios were created from the moment we created our Mockup. Hereby, we were able to define the design closest to our final project idea. Sequentially, many other updates were made during the process such as when one of the database keys was updated, entries in the system were changed or even when the Prototype was presented for testing and together the interface was analysed for final adjustments before coding.

Having mentioned that, a model of test cases and scenarios was structured in our documentation. So, the tester could start executing the test cases to ensure that all system process flows were working well. Additionally, setting up the Test Scenarios was necessary to place our team in the end-user's place, including all the possibilities of real-world scenarios and how it would be to use this application in a pre-structured test.

Test Scenarios, which are also known as Test Condition or Test Possibility, can have one or more related test cases. In other words, a scenario can have many associated test cases when only a test case is not enough to represent the detailed level of the presented scenario.

Test Cases are the sets of conditions where we determine the steps that will be performed by the tester to assess the scenario previously defined. The stages that were evaluated involve precondition, post condition and expected results. The test cases are derived from use cases coming from the test scenarios, where the data we want to input and output in the system have been defined (Araruna,2017).

Detailed information included in the model of test cases and scenarios

In the presentation of the scenarios, there was a need to identify other possibilities of cases to be executed and tested. Initially, an identification (ID) and description were created for each of these new entries. Then, the test steps for each test case were created showing what would be necessary to execute in phases obtaining the expected results.

Test Case description in green colours, show the test scenario as positive by doing a prior analysis of actions taken and results completed. On the other hand, Test Case description in red colours, show the test scenario as negative. In this case, all actions performed as typing failures, or not filling in mandatory entries, or requirements left blank are considered actions that will not give positive results. A good example of failures are -when a new user tries to register for the first time and does not enter an email, or when the user is already registered and enters the incorrect password. In both cases, the system should send messages informing the correct entry.

Project Name POD - Plenty of DOG
Created by - Larissa Fernandes - Creation Date 23/03/2020
Reviewed by Claudio Santana - Reviewed date 07/05/2020
Green: positive test cases - PASS
Red: negative test cases - FAIL

Teste Scenario ID	Teste Scenario Descrip	Teste Case ID	Teste Case Description	Test Steps	Preconditi	Test Data	Post Conditions	Expected Result
TS_005	Sign up **Page** - The system allows the user to start a **new registration**	TC_SignUp_001	Enter e-mail, password, repeat password, Password recovery questions, Answer Password recovery questions, Select your city, enter region and I have read the terms and conditions	1. Enter a valid e-mail 2. Enter a password (6 characters +) 3. Repeat password 4. Choose one Password security question	Valid URL Test Data	Email: bradpitt@gmail.com Password: P@ss1234 Repeat password: P@ss1234 Password security question: What is the middle name of your mother?	The user should be able to register	Successfullly register
		TC_SignUp_002	Enter **NULL** e-mail, password, repeat password, Password recovery questions, Answer Password recovery questions, Select your city, enter region and I have read the terms and conditions	1. **NULL** 2. Enter a password (6 characters +) 3. Repeat password 4. Choose one Password security question 5. Answer Password recovery questions 6. Choose a City 7. Enter a Region (It is not mandatory) 8. click on "I have read the terms and conditions" 9. click on REGISTER	Valid URL Test Data	Email: **NULL** Password: P@ss1234 Repeat password: P@ss1234 Password security question: What is the middle name of your mother? Answer Password recovery questions: Maria Choose city: Dublin Enter a Region: Dublin 6 click : " I have read the terms and conditions"	invalid registration.	An error message display "Please fill in this field"
		TC_SignUp_003	Enter e-mail, **NULL** password, repeat password, Password recovery questions, Answer Password recovery questions, Select your city, Enter region and I have read the terms and conditions	1. Enter a valid e-mail 2.**NULL** 3. Repeat password 4. Choose one Password security question 5. Answer Password recovery questions 6. Choose a City 7. Enter a Region (It is not mandatory) 8. click on "I have read the terms	Valid URL Test Data	Email: bradpitt@gmail.com Password: **NULL** Repeat password: P@ss1234 Password security question: What is the middle name of your mother? Answer Password recovery questions: Maria Choose city: Dublin Enter a Region: Dublin 6	invalid registration.	An error message display " please choose password with 6 or more characters"

Image 5.2: Test Case Planning

Project Name: Name of the project POD - Plenty of Dog

Created By: Name of who created the tests - Larissa

Date of Creation: The date the writing of the tests started - 23/03/2020

Reviewed by: Name of the person who reviewed the tests - Claudio Santana

Date of review: Date the tests were reviewed - 07/05/2020

Executed by: Name of the person who performed the tests - Larissa Fernandes

Date of execution: Date when testing started - 07/05/2020

Test Scenario ID: Test Scenario identification (ID)

Test Scenario Description: Description of the scenario test

Test Case ID: Test Case identification (ID). Each test case is represented by a unique ID.

Test Case description: Description of the test case.

Test steps: Test step shows step by step the possible situations of errors and successes that the system may present. It has been described in the order that they can be performed.

Pre-Condition: For each test scenario, we need preconditions that need to be met before starting the test run. In our case, we need a valid URL and connection to a database.

Test Data: Each test step that will be performed, we need a test data to be used as input.

Post-Condition: For each scenario in our test, we need conditions that are positive and that prove that the test was performed successfully.

Expected result: expected results show the result we want when the tests are run.

Actual result: The actual result shows the result of the system being tested.

Status: The status shows whether the results after the test passed or failed. If there is a failure, it needs to go back to be corrected.

Test Execution

The purpose of this test phase is to validate the system in real-time before it is released for approval. In this period it was necessary to apply different methods for evaluation; this activity is very important and crucial to finalize the project.

Test Validation

The validation test aims to validate the functions implemented in the application by identifying possible imperfections in the interface or access to the database. The validation test also assesses the inappropriate implementation and the low performance of the application.

Security testing

Security testing is a test that examines software protection against external attacks when an individual penetrates the system illegally. The tester checks, according to security requirements, that the application is able to keep user data confidential and protects itself from a hacker attack that tried to act in bad faith when using the application (Pressman, 2000).

Following the password policy rules and procedures that we determine as requirements for the POD application, we can observe the situation below during the SIGN UP process, the fictitious users were able to register their passwords in the database without a security lock, that is, with the same username, less than 6 characters, without at least one number, without changing at least one uppercase or uppercase letter.

The result of this test was sent to the developer who will return it with the necessary changes.

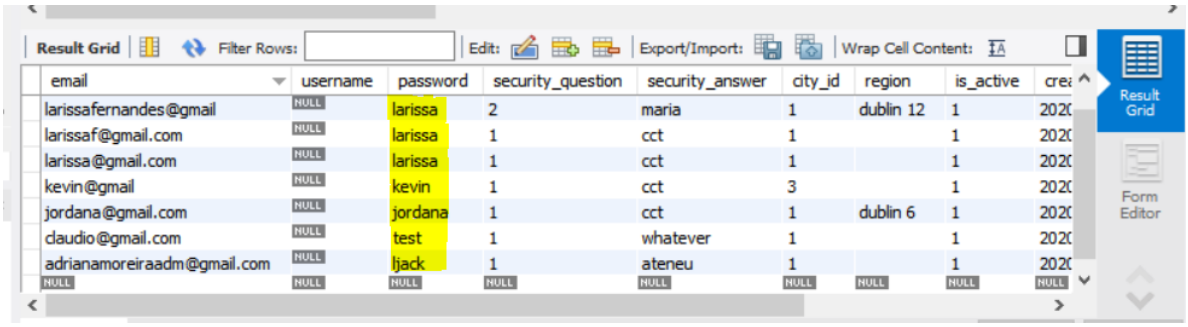
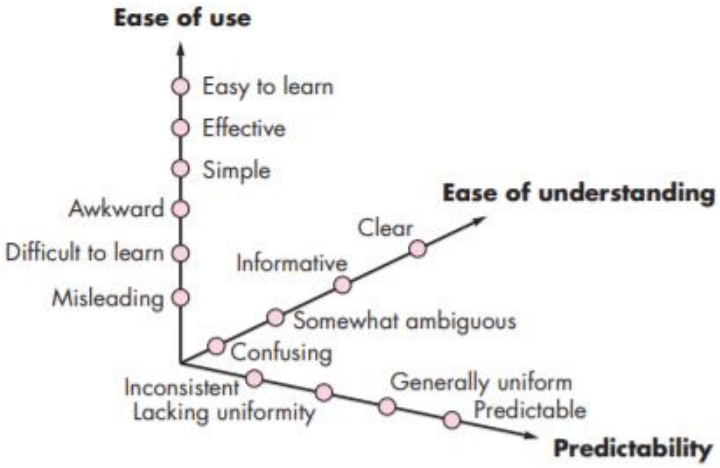


Image 5.3: Security testing

Usability Testing

The purpose of using a usability test in this project was that through this model we can analyse the usability of the interface in order to ensure that the system provides the appropriate navigation to the user.

Through the scenarios applied in the development of the interface, it was possible to assess whether all requirements were adopted and whether the idea of usability was correctly emitted to the user.



[Image 5.4.: The image shows that we must consider the usability assessment for interaction and interface mechanisms, *Software Engineering: A Practitioner's Approach* (New York:Pressman R.S, 2010)]

In the following examples, we are showing how the tests were performed manually. All scenarios and cases were documented in Test Execution analysing the possibilities of pass and fail testing

The system should allow the user to click on the SIGN UP button and be directed to the POD page for the purpose of registering.

Scenario Test: TS_003
Case: TC_AboutButton_001

Steps: 1. click on SIGN IN LinkButton
Post Conditions: The user should be able to see the "SIGN UP" page

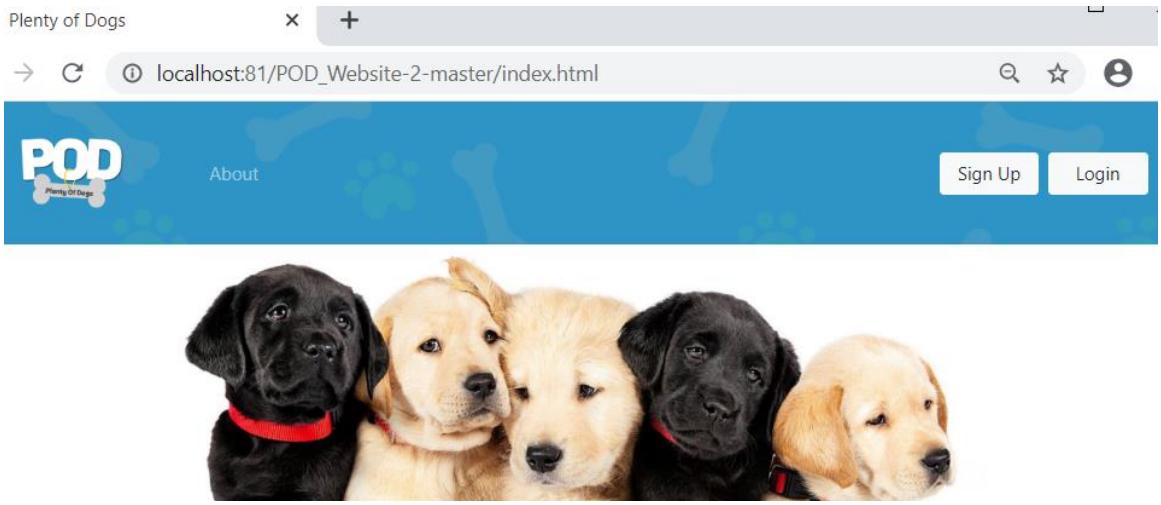


Image 5.5: Sign upt LinkButton

The system should allow the user to register in the POD web application

Scenario Test: TS_005
Case: TC_SignUp_001

Steps:
1. Enter a valid email
2. Enter a password (6 characters +)
3. Repeat password
4. Choose one Password security question
5. Answer Password recovery questions
6. Choose a City
7. Enter a Region (It is not mandatory)
8. click on "I have read and agreed with the “Terms and Conditions“
9. click on REGISTER

Post Conditions: The user should be able to SIGN UP

Image 5.6: Sign up page

The system should send messages to the user when a mandatory field needs to be filled.

Scenario Test: TS_005
Case: TC_SignUp_007
Steps: 4. Do not choose any answer Password recovery questions.
Post Conditions: An error message display "Please, select an item in the list"

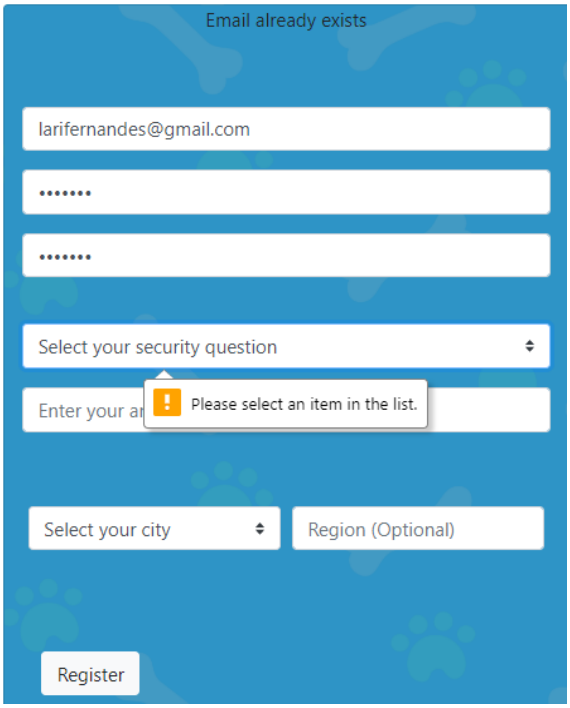


Image 5.7: Select an item in the list

Successfully registered a new user. The message "Welcome to Plenty of Dogs! should be displayed.
Scenario Test: TS_007
Case: TC_WelcomePage_001
Steps: 1. Welcome to Plenty of Dogs!
Post Conditions: The user should be able to see the Welcome page and "Welcome to Plenty of Dogs!

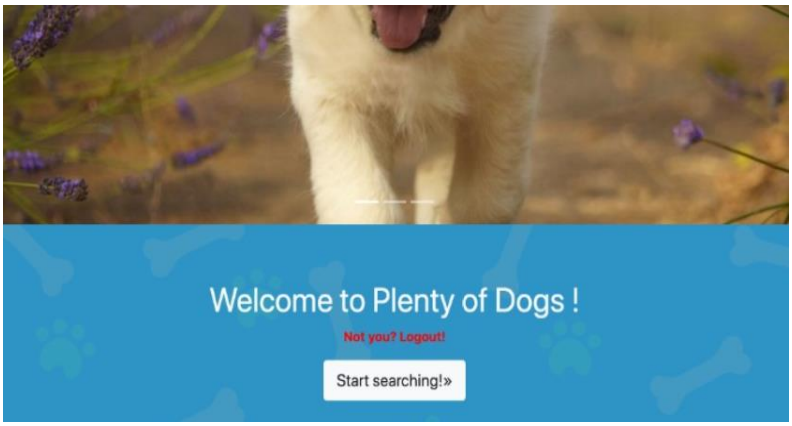


Image 5.8 Welcome to Plenty of Dogs

The system should allow the user to login with the email and password previously registered.

Scenario Test: TS_015

Case: TC_login_001

Steps:

1. Enter a valid email
2. Enter a valid password
4. Click on login button

Post Conditions: The user should be able to login

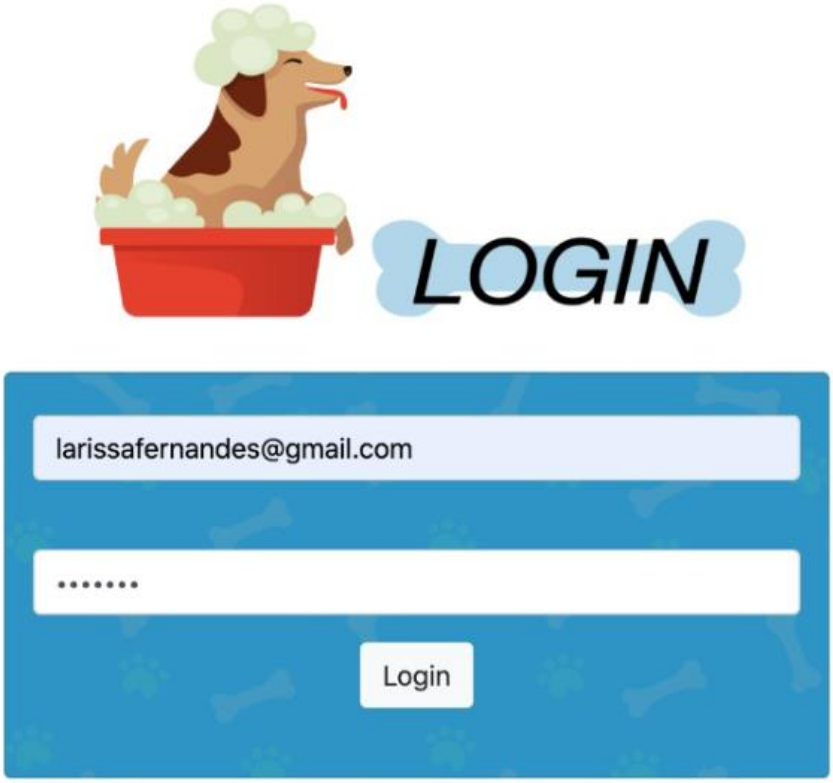


Image 5.9: Login verification

Strategy to Correct Errors

The following figure shows how the tests were performed manually and reported. All scenarios and cases were documented in Test Execution analysing the possibilities of the pass and fail test. To simulate the behaviour of the application, it was estimated that 27 scenarios should be analysed and the different cases within them.

At the end of the test execution, the developer was informed of the positive and negative results. Screenshots were sent where the flaws were shown and a spreadsheet with the description of the errors to be verified. After this process, the development returned the information with the corrected or uncorrected errors, with extra information about the status of the scenarios and evaluated cases.

Then the test was performed again and the developer informed again in a cycle until the end of the project development. The tester and the developer shared access to a virtual spreadsheet where it was possible to follow the changes in real-time.

POD - PLENTY OF DOG
Larissa Fernandes
Green: positive test cases
Red: negative test cases

Teste S. ID	Teste Case ID	Expected Result	Actual Result	Status	Executed By	Executed Date	Comments (if any)	Developer coments	Date	Status
TS_005	TC_SignUp_001	Successfullly register	The data was entered, however it needs adjustments	FAIL	Larissa Fernandes	12/05/2020	The registration was successful, but it is missing buttonLink "I have ready and agree to the Terms & Conditions".	Fixed	16/05/2020	PASS
	TC_SignUp_002	An error message display "Please fill in this field"	An error message is being shown.	PASS	Larissa Fernandes	12/05/2020				PASS
	TC_SignUp_003	An error message display "Email already exists"	An error message is being shown.	PASS	Larissa Fernandes	15/05/2020				PASS
	TC_SignUp_004	An error message display "please choose an password with 6 or more characters"	An error message screen is appearing, but it is incorrect.	FAIL	Larissa Fernandes	12/05/2020	Adjustments were requested : An error message display "please choose an password with 6 or more characters"	Fixed	16/05/2020	PASS
	TC_SignUp_005	A error message display "please confirme password with 6 or more characters"	An error message screen is appearing, but it is incorrect.	FAIL	Larissa Fernandes	12/05/2020	Adjustments were requested: An error message display " please confirme	Fixed	16/05/2020	PASS
	TC_SignUp_006	An error message display "please confirme password with 6 or more characters"	An error message screen is appearing, but it is incorrect.	FAIL	Larissa Fernandes	12/05/2020	Adjustments were requested: An error message display " please confirme password with 6 or more characters"	Fixed	16/05/2020	PASS
	TC_SignUp_007	An error message display "Please, select na item in the list"	An error message is being shown.	PASS	Larissa Fernandes	12/05/2020				PASS
	TC_SignUp_008	An error message display "Please fill in this field"	An error message is being shown.	PASS	Larissa Fernandes	12/05/2020				PASS
	TC_SignUp_009	An error message display "Please, select na item in the list"	An error message display is not appearing	FAIL	Larissa Fernandes	12/05/2020	Adjustments were requested " Please, select na item in the list" *	Fixed	16/05/2020	PASS

Image 5.10: Test case Execution Template

In the following examples, as a result of the test carried out, it was possible to detect that the link button "I have read and agree to the Terms and Conditions" was missing. The user when attempting to register must agree to the "POD Terms and Conditions.

Scenario Test: TS_015
Case: TC_SignUp_011
Errors identified in the Test case Execution: FAIL - It is missing LinkButton "I have ready and agree to the Terms & Conditions".
Executed Date: 12/05/2020
Developer comments: Fixed - PASS
Date:16/05/2020

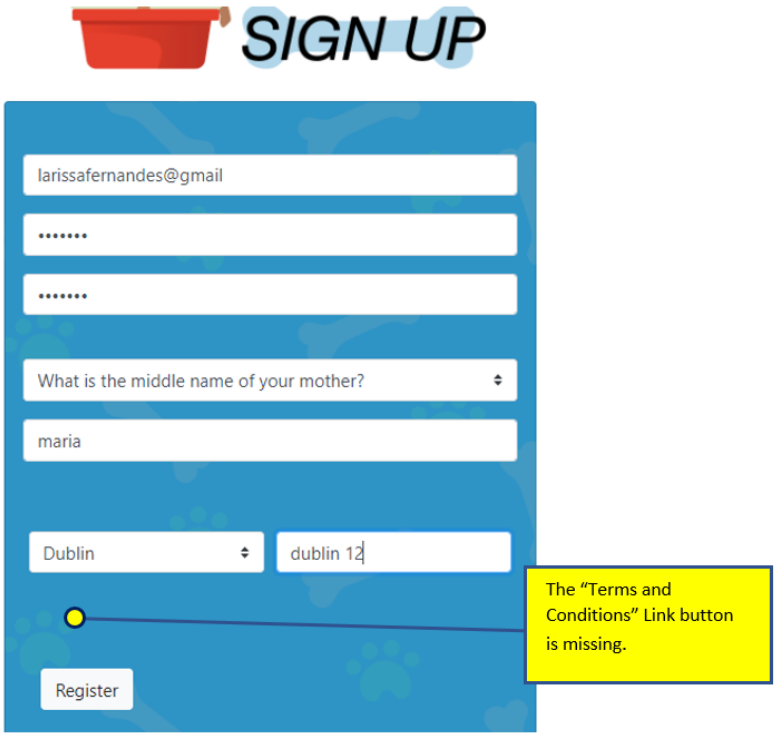


Image 5.11: Terms and conditions LinkButton

The link button "I have read and agree to the Terms and Conditions" has been included in the system and the test has been completed.

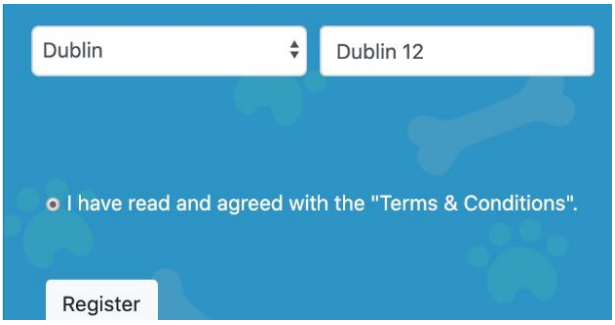


Image 5.12 Terms and conditions LinkButton

Scenario Test: TS_015
Case: TC_SignUp_009
Errors identified in the Test case Execution: FAIL - An error message should be displayed blocking the new user registration with passwords without the necessary security requirements: "Please match the format requested Password (UpperCase, LowerCase, Number/SpecialChar and min 6 Chars) ."
Executed Date: 12/05/2020
Developer comments: Fixed - PASS
Date:16/05/2020

Scenario Test: TS_015
Case: TC_SignUp_006
Errors identified in the Test case Execution: FAIL - An error message should be displayed blocking the new user registration "please confirm your password "
Executed Date: 12/05/2020
Developer comments: Fixed - PASS
Date:16/05/2020

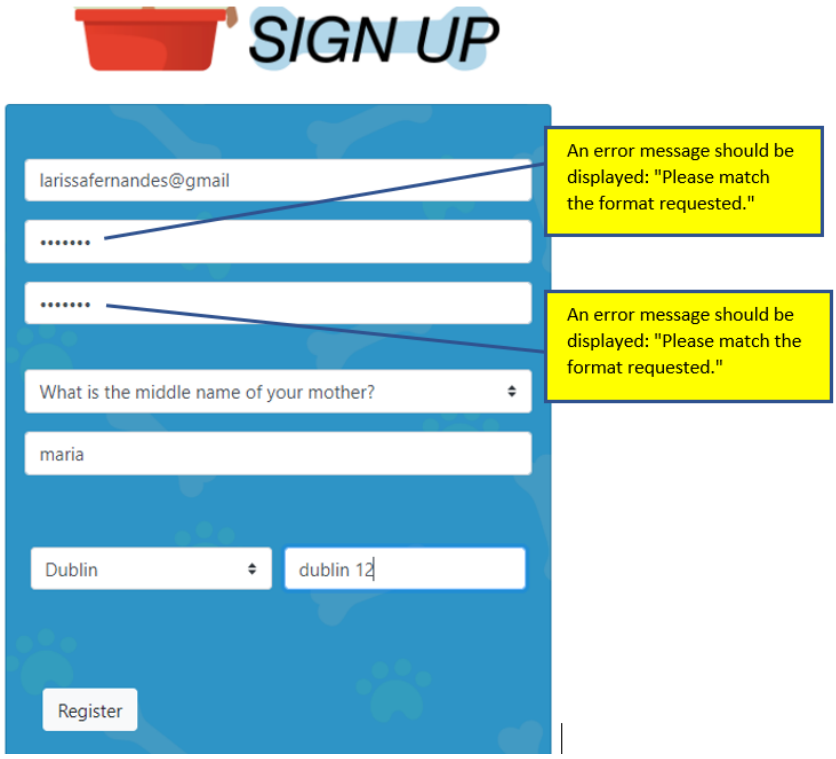


Image 5.13: Terms and conditions LinkButton

The error message was added to the system: "Please match the format requested - Password (UpperCase, LowerCase, Number / SpecialChar and min 6 Chars)." The test is complete.

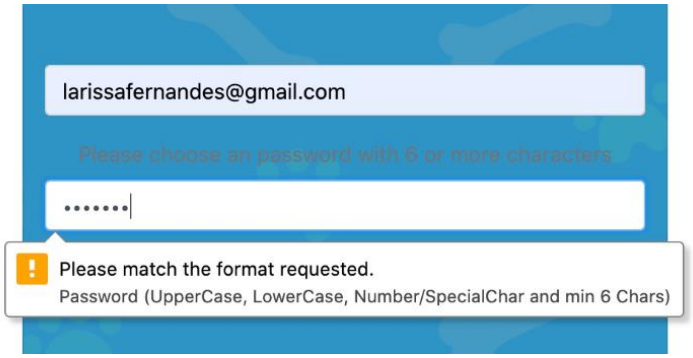


Image 5.14: Terms and conditions LinkButton

The error message was added to the system: "Please match the format requested - "Please confirm your password "" The test is complete.

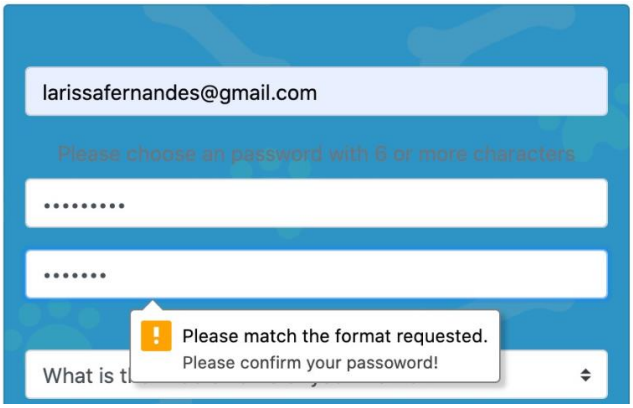


Image 5.15: Terms and conditions LinkButton

Requirements Validation

The Requirements are the basis for the evolution of the development, the behaviour of the software must be analysed pointing out if it is consistent with the information it must process and the functions it must perform. Therefore, it is of great importance that they are reviewed and validated at the end of the tests showing whether the application has achieved what was initially expected. Considering the situation, below is a list of the requirements currently met for the initial purposes of the POD web application system.

REQUIREMENTS CONFIRMATION - PLENTY OF DOG		
Larissa Fernandes		
ID	**Requirements**	**Status**
R01	Acess the application - POD	**Developed**
R02	Register a new user profile	**Developed**
R03	Login of the system	**Developed**
R04	Register one or more dogs	**Developed**
R05	Insert photo of the dog	In Progress
R06	Like a profile	In Progress
R07	Search dogs by breed	**Developed**
R08	Search dogs by sex	**Developed**
R09	Search dogs by size	**Developed**
R10	Find dogs by city	In Progress
R11	Search dogs by available to meet	**Developed**
R12	Search dogs by breeding cycle	**Developed**
R13	Log out of the system	**Developed**
R14	Delete Account	**Developed**

Chapter 6 – Conclusion and Further Work

What Worked Well? Why?

Each adventure describes a story about its destinations, group, timing, and expectations—and it requires point by point arranging course of action and the assistance of the group to get the story right.

Our journey started in November 2019, I Adriana Moreira, Claudio Santana, Jordana Marques, Kevin Cardoso, and Larissa Fernandes, we are signed to develop an application to our final project at CCT College Dublin. We decided to combine our knowledge and venture into planning the Plenty of Dog software application, the initial idea was to bring to Ireland, a unique app that would help pet owners to find the perfect match for their dogs.

During the system analyses process, our first idea was to develop a web application and a mobile app, although, during the process, we identify that create a web application and a mobile app would bring a great challenge to the group, according to our research, develop a mobile app, would require to learn about React Native, as a result, it would have required the learning of new languages about Front-end and Back-end as React Native, which is not compatible with HTML, CSS or Bootstrap. As a result, we decide to focus on the development just of the web application; therefore, we could work through the POD development with more confidence by using HTML, CSS, and Bootstrap, which are the language that we having been developing since our first year at CCT College Dublin.

Initially, the planning action taking to POD was based on the waterfall model, which consist on the development of the application in a downfall direction, meaning that each phase of the development goes in one down direction, never coming back to a previous phase, executing the entire application until the end, and then, just after that, it is possible to go back at some phase of the development, but only by following the downfall direction phase were it is. To follow this planning, we develop our Gantt-Chart model, where we used to plan our actions during the development of the POD web application.

Eventually, during the design of the system, we realized the needed of going in a different direction, that the one settled before. The complexity of the system and human resources, made us change POD system development cycle for the Spiral model development, which helps by given a chance of go further and back on phases during the development, without having to wait until the end of the full application was defined. This action, helped to redirect tasks, to get the application working, and to get a clarify vision of the application phases.

All choices made in regards to technologies and tools were also really well-succeeded. The POD system makes use of GitHub to allocate the project repository, although it was made use of Brackets software to develop the application. The reason for that was the time availability given for GitHub per user to use the software. To implement our database locally, we made used of Workbench. During the implementation and unit tests the application was develop and tested using XAMPP. However, when we started integrating our application, it is important to highlight that the POD database was deployed on AWS.

The POD application testing followed the black box testing model. This model test, brought great gain to the implementation of the system, because it allows to check and address every single error found in the application, given us time to correct errors and re-test the application again to make sure everything pointed was properly corrected.

Finally, as an unexpected last-minute task emerged while executing the integrated tests. Our group made the decision of deploying our application in the cloud, using a PHP web server. For this, our choice was to use another service provided by AWS called Elastic Beanstalk. As part of this result, we got not only our database running in the cloud but, also the POD application. Once again, we overcame a new challenge and learned a lot from this experience.

What Did Not Worked Well? Why?

There is some opportunity to get better on this venture, beginning for the division of the tasks, following by the implementation of the system, and as pointed in the primary passage of this document the human resources individual time commitment to the project.

We accept that the division of tasks impacted the conclusive outcome of the project. At some point, we have people with multiple tasks and orders with only one, which took more than what was planned to be executed.

What Could Have Been Improved? Why?

From our point of view, the system could have been improved in different aspects. If the tasks had been more balanced and finished on time as per plan and complexity, we could have had more people working on the implementation of the system as well as learning about new technologies such as React Native. Thus, we would be able to achieve all requirements gathered in the previous semester and possibly develop POD as a mobile app as well. Examples of some requirements we could have implemented are:

- The functionality of adding more than one dog per user;
- Navigability to make the application friendlier and more attractive to use;
- Progressive images upload;
- Time spend on the whole project in general;

What Was Learned (technically, personally, professionally)

For discloser, the development of this system has made it possible to analyse how custom software can improve the personal life of a society in general. Besides, it also allowed a field analysis to obtain more consistent data on relationships between pups and their owners and the difficulties encountered over time, to find a match.

The strongest part of our application was certainly the planning and the system analyses, which cared a lot of responsibility by trying to get the project development on track, and, by given support on research, revision of tasks, grammar revision, and by developing a step to step guidance of personal development.

Therefore, the key point of this learning lesson on this particularly project, was the importance of understanding that even the smallest individual task might generate a delay over the next task. Moreover, when working in a team, every single attitude counts to the growth or fall of the whole project and consecutively the whole group.

APPENDICES

Appendix A: Project Planning

Gantt-Chart

The use of the Gantt-Chart was a useful way to track our tasks and to plan according to the goals set up during the System Development Life Cycle. By using the diagram below it was possible to predict how long each task was going to take and put in order the best way to complete them.

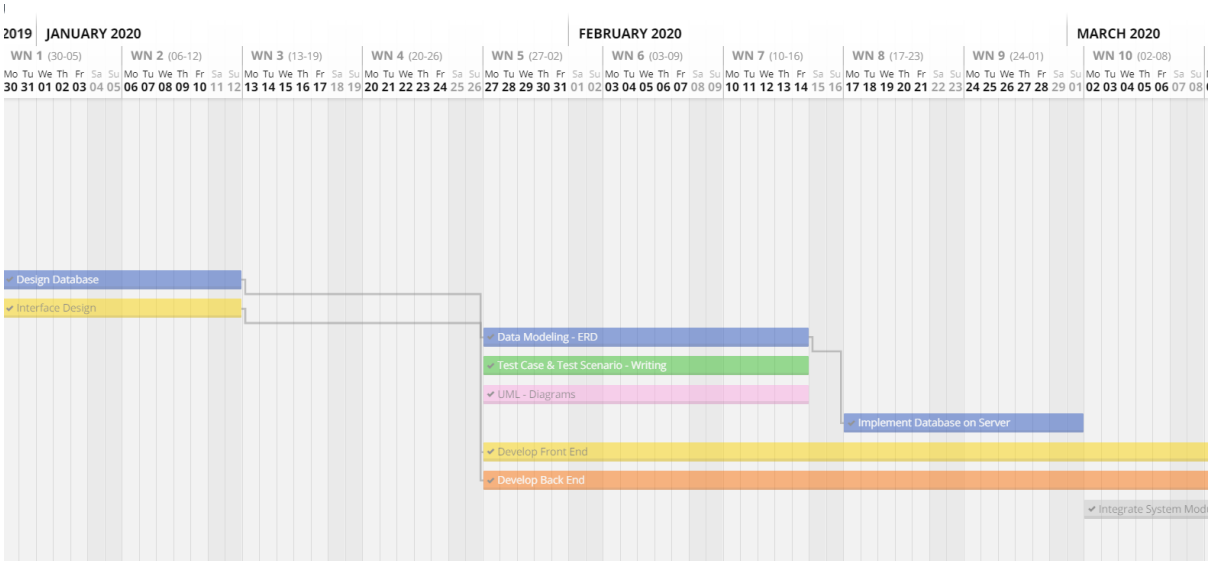


Image 2.3: Gantt-Chart Diagram From January until March – Agantty Project Management Tool

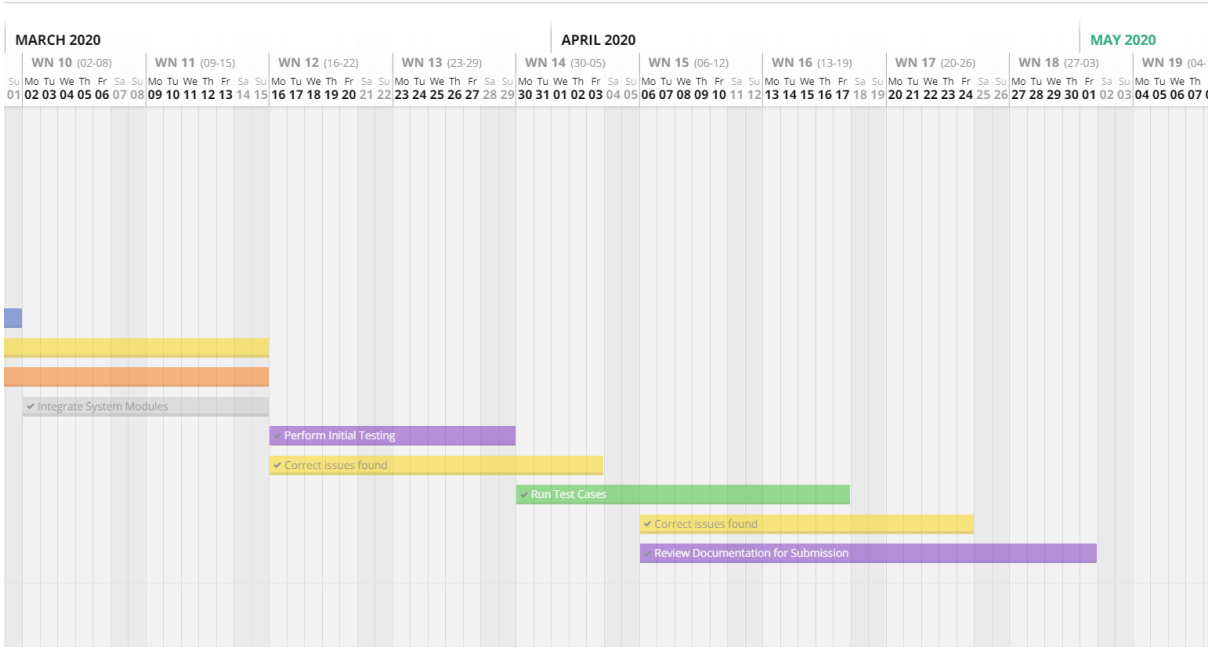


Image 2.4: Gantt-Chart Diagram From January until March – Agantty Project Management Tool

Appendix B: Supplementary Documentation

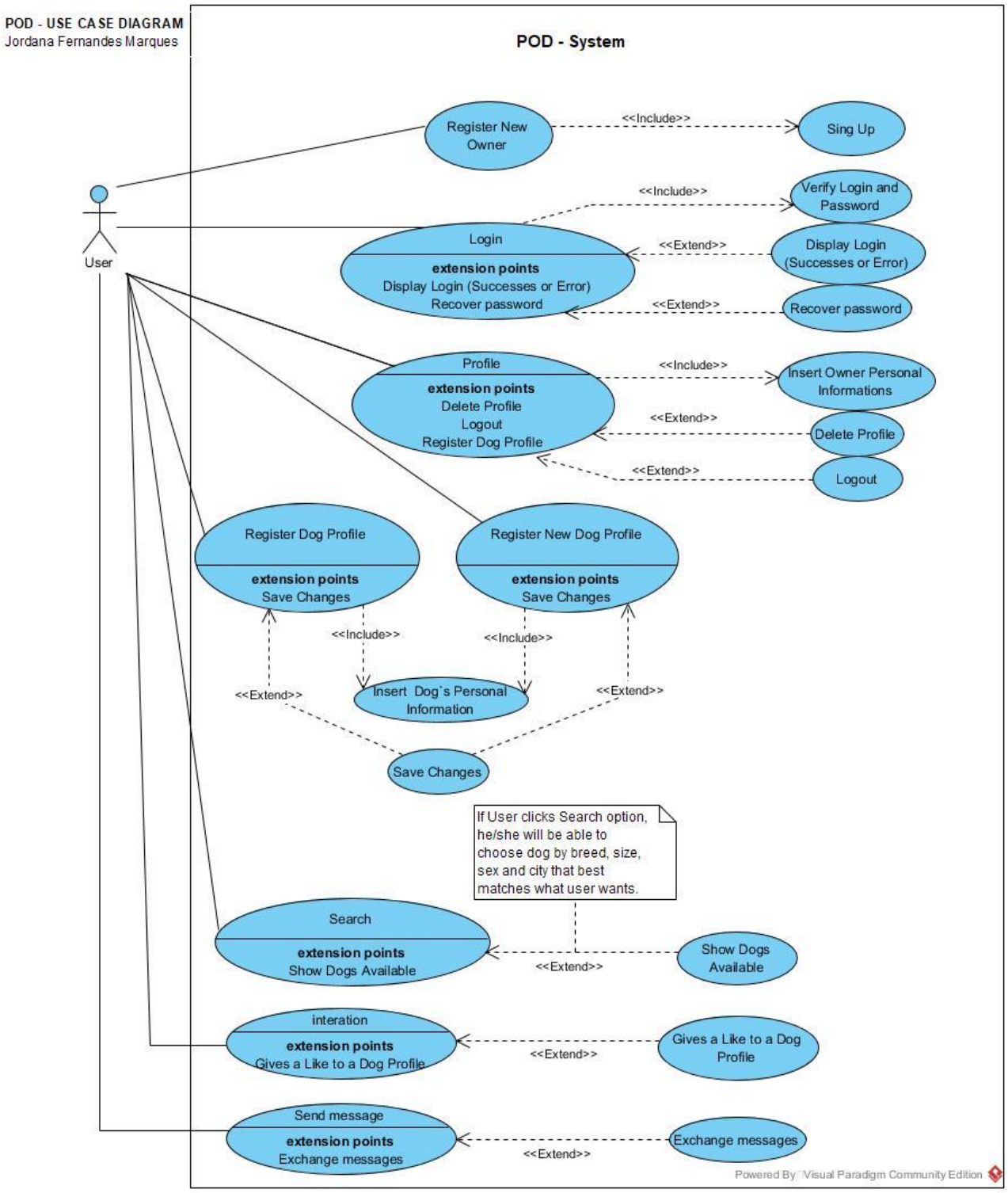
This appendix consists of Diagrams and Excel spread sheets. This document is intended to help the understanding of issues addressed throughout this documentation, giving a clearer and more accurate view of the documents abort on chapters 3 – System Design, chapter 4 – Implementation of the System and Chapter 5 – Testing and Evaluation.

Each element presented here is a reflection of documents presented throughout this documentation which includes directions on where to find each dated item.

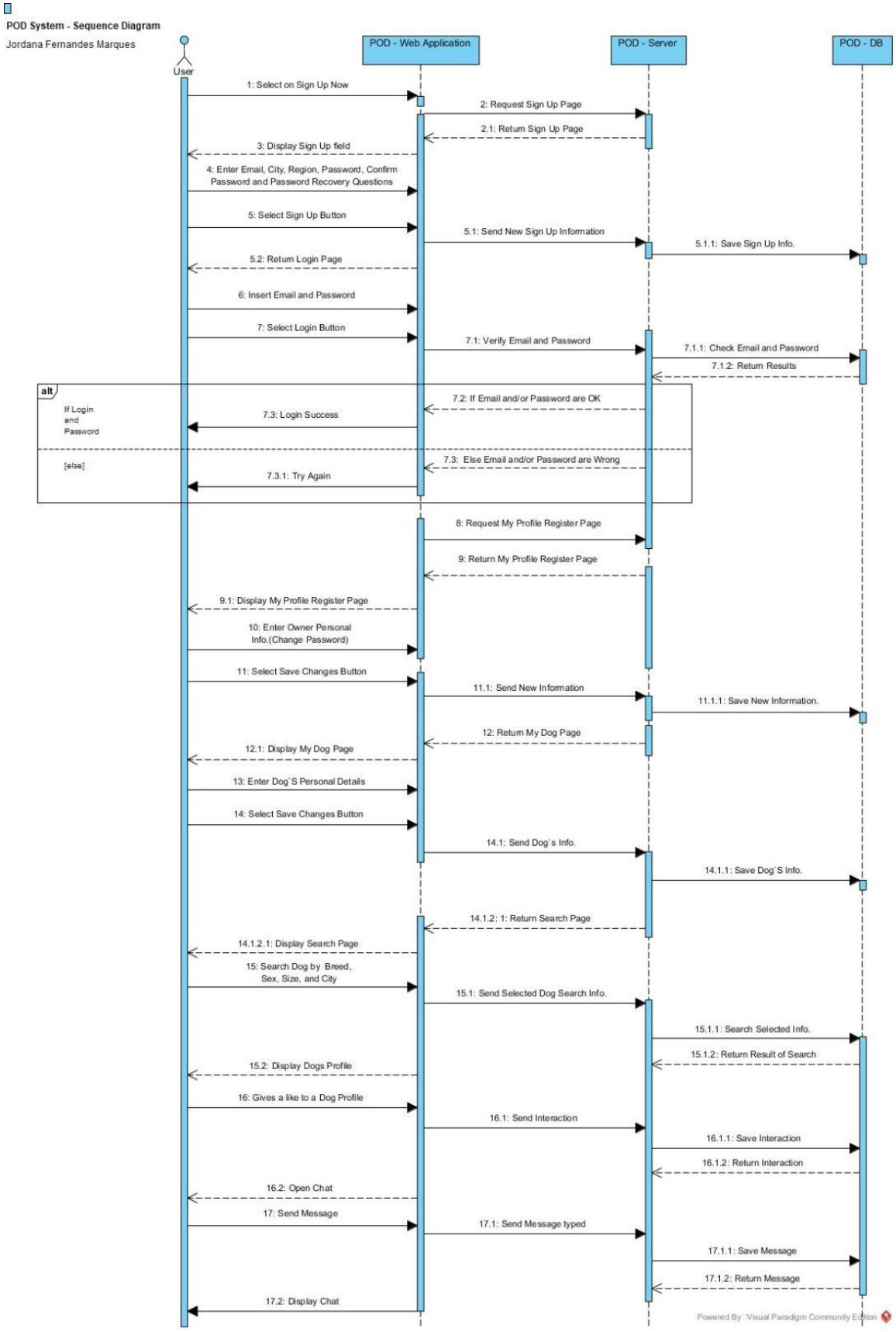
Chapter 3 – System Design

UML Diagrams

Use case (A full description of this Use Case Diagram can be found on page 24 of this document).



Sequence Diagram (A full description of this Sequence Diagram can be found on page 26).



Full Description of the Database Tables

A more informed view of the DB Table description can be found on page 28 of this document.

A full description of the table's city and owner table

Project Name: POD - Plenty of DOG

Documentation: SQL Table description

Created by: Adriana Moreira

Creation Date: 09/04/2020

Last Updated: 29/04/2020

Table Name	Table Description	Column Name	Data Type	PK	Not Null	Unique Number	Auto Increment	Description
city	stores details about cities	city_id	INT	Yes	Yes	Yes	No	unique identification number of a city
city	stores details about cities	city	VARCHAR(50)	No	Yes	No	No	stores the name of a city
city	stores details about cities	last_update	TIMESTAMP	No	Yes	No	No	current timestamp that shows the row most recent update
owner	stores details about owner	email	VARCHAR(50)	Yes	Yes	No	No	e-mail that identifies an owner as unique
owner	stores details about owner	username	VARCHAR(45)	No	No	No	No	stores username
owner	stores details about owner	password	VARCHAR(45)	No	Yes	No	No	stores username password
owner	stores details about owner	security_question	TINYINT	No	Yes	No	No	stores 3 security questions about the user password 1 - "What primary school did you attend?" 2 - "What is the middle name of your mother?" 3 - "What is the name of your pet?"
owner	stores details about owner	security_answer	VARCHAR(45)	No	Yes	No	No	store security answer about the user password
owner	stores details about owner	city_id	INT	No	Yes	Yes	No	foreign key attribute that garantees referencial integrity with the table city
owner	stores details about owner	region	VARCHAR(45)	No	No	No	No	shows generic information about region
owner	stores details about owner	is_active	TINYINT	No	Yes	No	No	indicates if the owner profile is active or not 0- False 1-True
owner	stores details about owner	create_date	DATETIME	No	Yes	No	No	shows what time and data the row owner was created
owner	stores details about owner	last_update	TIMESTAMP	No	Yes	No	No	current timestamp that shows the row most recent update

A full description of the tables Behaviour and breed table.

Project Name: POD - Plenty of DOG

Documentation: SQL Table description

Created by: Adriana Moreira

Creation Date: 09/04/2020

Last Updated: 29/04/2020

Table Name	Table Description	Column Name	Data Type	PK	Not Null	Unique Number	Auto Increment	Description
behaviour	stores details about dog behaviour	behaviour_id	INT	Yes	Yes	Yes	Yes	unique identification number of a dog behaviour
behaviour	stores details about dog behaviour	behaviour	VARCHAR(50)	No	Yes	No	No	stores breeds of dog
behaviour	stores details about dog behaviour	last_update	TIMESTAMP	No	Yes	No	No	current timestamp that shows the row most recent update
breed	stores details about all types of dogs breed	breed_id	INT	Yes	Yes	No	Yes	unique identification number of a dog type breed
breed	stores details about all types of dogs breed	breed_name	VARCHAR(50)	No	No	No	No	stores breed names

A full description of the image table

Project Name: POD - Plenty of DOG

Documentation: SQL Table description

Created by: Adriana Moreira

Creation Date: 09/04/2020

Last Updated: 29/04/2020

Table Name	Table Description	Column Name	Data Type	PK	Not Null	Unique Number	Auto Increment	Description
image	stores details about dog images	owner_email	VARCHAR(50)	Yes	Yes	No	No	foreign key from table Owner that represents a unique identification of an Owner and integrates the composed key
image	stores details about dog images	dog_id	INT	Yes	Yes	Yes	No	foreign key from table Dog that represents a unique identification of a dog and integrates the composed key
image	stores details about dog images	image_id	INT	Yes	Yes	Yes	No	primary key that represents a unique identification of an image and integrates the composed key
image	stores details about dog images	file_name	VARCHAR(100)	No	Yes	No	No	store the name of a file
image	stores details about dog images	file_path	VARCHAR(200)	No	Yes	No	No	store the path to find the image
image	stores details about dog images	file_type	VARCHAR(100)	No	Yes	No	No	store the type of image
image	stores details about dog images	last_update	TIMESTAMP	No	Yes	No	No	current timestamp that shows the row most recent update

A full description of the interaction table

Project Name: POD - Plenty of DOG

Documentation: SQL Table description

Created by: Adriana Moreira

Creation Date: 09/04/2020

Last Updated: 29/04/2020

Table Name	Table Description	Column Name	Data Type	PK	Not Null	Unique Number	Auto Increment	Description
interaction	stores interactions details between owner and dog	interaction_id	INT	Yes	Yes	Yes	Yes	unique identification number of an interaction, between dog owner and dog
interaction	stores interactions details between owner and dog	owner_email	VARCHAR(50)	No	Yes	No	No	attribute from table Owner that represents a unique identification of a owner
interaction	stores interactions details between owner and dog	dog_owner_email	VARCHAR(50)	No	Yes	No	No	attribute from table Dog that represents a unique identification of a dog
interaction	stores interactions details between owner and dog	dog_dog_id	INT	No	Yes	Yes	No	attribute from table Dog that represents a unique identification of a dog
interaction	stores interactions details between owner and dog	last_update	TIMESTAMP	No	Yes	No	No	current timestamp that shows the row most recent update

A full description of the message table

Project Name: POD - Plenty of DOG

Documentation: SQL Table description

Created by: Adriana Moreira

Creation Date: 09/04/2020

Last Updated: 29/04/2020

Table Name	Table Description	Column Name	Data Type	PK	Not Null	Unique Number	Auto Increment	Description
message	stores details of messages send and received by a dog owner	message_id	INT	Yes	Yes	Yes	Yes	unique identification number of table message, that represant an interaction between owners, sending and receving messages about their dogs
message	stores details of messages send and received by a dog owner	sender_email	VARCHAR(50)	No	Yes	No	No	attribute from table Dog that represents a unique identification of an owner who sends a message
message	stores details of messages send and received by a dog owner	sender_dog_id	INT	No	Yes	Yes	No	attribute from table Dog that represents a unique identification of an owner who sends a message
message	stores details of messages send and received by a dog owner	receiver_email	VARCHAR(50)	No	Yes	No	No	attribute from table Dog that represents a unique identification of an owner who recevies a message
message	stores details of messages send and received by a dog owner	receiver_dog_id	INT	No	Yes	Yes	No	attribute from table Dog that represents a unique identification of an owner who recevies a message
message	stores details of messages send and received by a dog owner	message	VARCHAR(255)	No	Yes	No	No	holds messages received and sent
message	stores details of messages send and received by a dog owner	last_update	TIMESTAMP	No	Yes	No	No	current timestamp that shows the row most recent update

A full description of the dog table

Project Name: POD - Plenty of DOG

Documentation: SQL Table description

Created by: Adriana Moreira

Creation Date: 09/04/2020

Last Updated: 29/04/2020

Table Name	Table Description	Column Name	Data Type	PK	Not Null	Unique Number	Auto Increment	Description
dog	stores dog details	owner_email	VARCHAR(50)	Yes	Yes	No	No	foreign key from table Owner that represents a unique identification of a owner and integrates the composed key
dog	stores dog details	dog_id	INT	Yes	Yes	Yes	No	unique identification of a dog
dog	stores dog details	dog_name	VARCHAR(45)	No	Yes	No	No	stores name of a dog
dog	stores dog details	gender	ENUM ('M','F')	No	No	No	No	store a dog gender
dog	stores dog details	breed_id	INT	No	Yes	No	No	atrribute from table Breed that represents a unique identification of a breed
dog	stores dog details	size	ENUM ('S','M','L','XL')	No	No	No	No	store dog size
dog	stores dog details	age_months	TINYINT	No	No	No	No	store dog age by months
dog	stores dog details	age_years	TINYINT	No	N	No	No	stores dog age by years
dog	stores dog details	height	DECIMAL	No	No	No	No	stores dog height
dog	stores dog details	weight	DECIMAL	No	No	No	No	stores dog weight
dog	stores dog details	energy_level	TINYINT	No	No	No	No	stores dog energy level, 1 to 5
dog	stores dog details	behaviour_id	INT	No	No	Yes	No	attribute from the tables breed, gender and behaviour, that represents a unique identification of a dog behaviour
dog	stores dog details	is_breeding_cycle	TINYINT	No	No	No	No	show if dog is in his breed cycle or Not (0 - No 1 - Yes)
dog	stores dog details	is_available_meeting	TINYINT	No	No	No	No	show if dog is available for a meeting or Not (0 - No 1 - Yes)
dog	stores dog details	description	VARCHAR(255)	No	No	No	No	holds dog description
dog	stores dog details	create_time	DATETIME	No	Yes	No	No	show when the table was create on the database
dog	stores dog details	last_update	TIMESTAMP	No	Yes	No	No	current timestamp that shows the row most recent update

Chapter 5 – Testing and Evaluation

Test case Planning

This comprehensive document was designed to set up particularly test scenarios for POD system. This document helped to find errors in the system and to correct them during the development of the back-end of the system. The scenario present bellow, show the expectations during navigate on the POD Login page. A full explanation about the Test case planning and how it was applied to guarantee the results expected, can be found on page 49 of this document.

Project Name POD - Plenty of DOG								
Created by - Larissa Fernandes								
Creation Date 23/03/2020								
Reviewed by Claudio Santana								
Reviewed date 07/05/2020								
Green: positive test cases - PASS								
Red: negative test cases - FAIL								
Teste Scenario ID	**Teste Scenario Description**	**Teste Case ID**	**Teste Case Description**	**Test Steps**	**Preconditions**	**Test Data**	**Post Conditions**	**Expected Result**
TS_001	About **LinkButton** - The system allows the user to view the page about us.	TC_AboutButton_001	click on ABOUT button	1. click on ABOUT	Valid URL Test Data	About page	The user should be able to see the "ABOUT" page	"About button" successfully
TS_002	Login **LinkButton** - The system allows the user to see the login page	TC_LoginButton_001	click on Login button	1. click on LOGIN	Valid URL Test Data	Login page	The user should be able to see the "LOGIN" page	"LOGIN button" successfully
TS_003	Sign up **LinkButton** - The system allows the user to see the Sign up page	TC_SignUpButton_001	click on SIGN UP button	1. click on SIGN IN	Valid URL Test Data	sign up page	The user shoud be able to see the "SIGN UP" page	"Sign up button" successfully
TS_004	Already a member **LinkButton** - The system allows the user to logn in	TC_AlreadyButton_001	click on ALREADY A MEMBER button	1. click on ALREADY A MEMBER	Valid URL Test Data	Login	The user should be able to see the "ALREADY A MEMBER" page	"Alread a member button" successfully
TS_005	Sign up **Page** - The system allows the user to start a **new registration**	TC_SignUp_001	Enter e-mail, password, repeat password, Password recovery questions, Answer Password recovery questions, Select your city, enter region and I have read the terms and conditions	1. Enter a valid e-mail 2. Enter a password (6 characters +) 3. Repeat password 4. Choose one Password security question 5. Answer Password recovery questions 6. Choose a City 7. Enter a Region (It is not mandatory)	Valid URL Test Data	Email: bradpitt@gmail.com Password: P@ss1234 Repeat password: P@ss1234 Password security question: What is the middle name of your mother? Answer Password recovery questions: Maria Choose city: Dublin Enter a Region: Dublin 6 click : " I have read the terms and	The user should be able to register	Successfullly register
		TC_SignUp_002	Enter **NULL** e-mail, password, repeat password, Password recovery questions, Answer Password recovery questions, Select your city, enter region and I have read the terms and conditions	1. **NULL** 2. Enter a password (6 characters +) 3. Repeat password 4. Choose one Password security question 5. Answer Password recovery questions 6. Choose a City	Valid URL Test Data	Email: **NULL** Password: P@ss1234 Repeat password: P@ss1234 Password security question: What is the middle name of your mother? Answer Password recovery questions: Maria Choose city: Dublin	invalid registration.	An error message display "Please fill in this field"
		TC_SignUp_003	Enter **(EMAIL ALREADY REGISTRED)** e-mail, password, repeat password, Password recovery questions, Answer Password recovery questions, Select your city, enter region and I have read the terms and conditions	1. **EMAIL ALREADY REGISTRED** 2. Enter a password (6 characters +) 3. Repeat password 4. Choose one Password security question 5. Answer Password recovery questions 6. Choose a City 7. Enter a Region (It is not mandatory) 8. click on "I have read the terms and conditions" 9. click on REGISTER	Valid URL Test Data	Email: **EMAIL ALREADY REGISTRED** Password: P@ss1234 Repeat password: P@ss1234 Password security question: What is the middle name of your mother? Answer Password recovery questions: Maria Choose city: Dublin Enter a Region: Dublin 6 click : " I have read the terms and conditions"	invalid registration.	An error message display "Email already exists"

		TC_SignUp_004	Enter e-mail, **NULL** password, repeat password, Password recovery questions, Answer Password recovery questions, Select your city, Enter region and I have read the terms and conditions	1. Enter a valid e-mail 2.**NULL** 3. Repeat password 4. Choose one Password security question 5. Answer Password recovery questions 6. Choose a City 7. Enter a Region (It is not mandatory) 8. click on "I have read the terms and conditions" 9. click on REGISTER	Valid URL Test Data	Email: bradpitt@gmail.com Password: **NULL** Repeat password: P@ss1234 Password security question: What is the middle name of your mother? Answer Password recovery questions: Maria Choose city: Dublin Enter a Region: Dublin 6 click : " I have read the terms and conditions"	invalid registration.	An error message display " please choose password with 6 or more characters"
		TC_SignUp_005	Enter e-mail ,**INVALID** password, repeat password, Password recovery questions, Answer Password recovery questions, Select your city, Enter region and I have read the terms and conditions	1. Enter a valid e-mail 2. **INVALID (+ 6 characters)** 3. Repeat password 4. Choose one Password security question 5. Answer Password recovery questions	Valid URL Test Data	Email: bradpitt@gmail.com Password: **INVALID (+ 8 characters**) Repeat password: P@ss1234 Password security question: What is the middle name of your mother? Answer Password recovery	invalid registration.	An error message display " please confirme password with 6 or more characters"
		TC_SignUp_006	Enter e-mail, password, **NULL** repeat password, Password recovery questions, Answer Password recovery questions, Select your city, Enter region and I have read the terms and conditions	1. Enter a valid e-mail 2. Enter a password (8 characters +) 3. **NULL** 4. Choose one Password security question 5. Answer Password recovery questions	Valid URL Test Data	Email: bradpitt@gmail.com Password: P@ss1234 Repeat password: **NULL** Password security question: What is the middle name of your mother? Answer Password recovery questions: Maria	invalid registration.	An error message display "please confirm your password "
		TC_SignUp_007	repeat password, **NULL** Password recovery questions, Answer Password recovery questions, Select your city, Enter region and I have read the terms and	1. Enter a valid e-mail 2. Enter a password (6 characters +) 3. Repeat password 4. **NULL** 5. Answer Password recovery questions	Valid URL Test Data	Email: bradpitt@gmail.com Password: P@ss1234 Repeat password: P@ss1234 Password security question: **NULL CHOICE** Answer Password recovery questions: Maria	invalid registration.	An error message display " Please, select na item in the list"
		TC_SignUp_008	Enter e-mail, password, repeat password, Password recovery questions, **NULL** Answer Password recovery questions, Select your city, Enter region and I have read the terms and conditions	1. Enter a valid e-mail 2. Enter a password (6 characters +) 3. Repeat password 4. Choose one Password security question 5. **NULL** 6. Choose a City 7. Enter a Region (It is not mandatory)	Valid URL Test Data	Email: bradpitt@gmail.com Password: P@ss1234 Repeat password: P@ss1234 Password security question: What is the middle name of your mother? Answer Password recovery questions: **NULL** Choose city: Dublin Enter a Region: Dublin 6	invalid registration.	An error message display " Please fill in this field"
		TC_SignUp_009	Enter e-mail, password, repeat password, Password recovery questions, Answer Password recovery questions, **NULL** Select your city, enter region and I have read the terms and conditions	1. Enter a valid e-mail 2. Enter a password (6 characters +) 3. Repeat password 4. Choose one Password security question 5. Answer Password recovery questions 6. **NULL** 7. Enter a Region (It is not mandatory) 8. click on "I have read the	Valid URL Test Data	Email: bradpitt@gmail.com Password: P@ss1234 Repeat password: P@ss1234 Password security question: What is the middle name of your mother? Answer Password recovery questions: Maria Choose city: **NULL** Enter a Region: Dublin 6 click : " I have read the terms and conditions"	invalid registration.	An error message display " Please, select na item in the list"
		TC_SignUp_010	Enter e-mail, password, repeat password, Password recovery questions, Answer Password recovery questions, Select your city, **NULL** enter region and I have read the terms	1. Enter a valid e-mail 2. Enter a password (6 characters +) 3. Repeat password 4. Choose one Password security question 5. Answer Password	Valid URL Test Data	Email: bradpitt@gmail.com Password: P@ss1234 Repeat password: P@ss1234 Password security question: What is the middle name of your mother? Answer Password recovery	The user shoud be able to login	Successfullly register

(By scanning this QR-Code, it is possible to find a full version of this Excel spreadsheet).

Test case execution

By following the guidance brought from the Test Case Planning, it was possible to put in action all the tests, which brought results of Pass or Fail to each POD scenario. The scenario present bellow, show the expectations during navigate on the POD Sign up, Login and My Dog page.

A full explanation about the Test case execution and how this strategy was applied to correct errors can be found on page 58 of this document.

TEST CASE EXECUTION										
POD - PLENTY OF DOG										
Larissa Fernandes and Kevin Cardoso										
Green: positive test cases - PASS										
Red: negative test cases - FAIL										
Teste S. ID	**Teste Case ID**	**Actual Result**	Status 1	**Executed By**	**Executed Date**	**Comments (if any)**	**Developer Coments**	**Date**	Status 2 16/05/2020	Status 2 18/05/2020
TS_001	TC_AboutButton_001	**I was directed to the correct page**	PASS	Larissa Fernandes	11/05/2020			18/05/2020	PASS	PASS
TS_002	TC_LoginButton_001	**I was directed to the correct page**	PASS	Larissa Fernandes	11/05/2020			18/05/2020	PASS	PASS
TS_003	TC_SignUpButton_001	**I was directed to correct the page**	PASS	Larissa Fernandes	11/05/2020			18/05/2020	PASS	PASS
TS_004	1	**I was directed to the correct page**	PASS	Larissa Fernandes	11/05/2020			18/05/2020	PASS	PASS
TS_005	TC_SignUp_001	**needs adjustments**	PASS	Larissa Fernandes	12/05/2020	but it is missing buttonLink "I	**fixed**	16/05/2020	PASS	PASS
	TC_SignUp_002	**An error message is being shown.**	PASS	Larissa Fernandes	12/05/2020			18/05/2020	PASS	PASS
	TC_SignUp_003	**An error message is being shown.**	PASS	Larissa Fernandes	12/05/2020	**An error**		18/05/2020	PASS	FAIL
	TC_SignUp_004	**message screen is appearing, but it is**	FAIL	Larissa Fernandes	12/05/2020	An error	**Fixed**	16/05/2020	PASS	PASS
	TC_SignUp_005	**message screen is appearing, but it is**	FAIL	Larissa Fernandes	12/05/2020	**An error message display "**	**fixed**	16/05/2020	PASS	PASS
	TC_SignUp_006	**message screen is appearing, but it is**	FAIL	Larissa Fernandes	12/05/2020	An error message display "	**fixed**	16/05/2020	PASS	PASS
	TC_SignUp_007	**An error message is being shown.**	PASS	Larissa Fernandes	12/05/2020			18/05/2020	PASS	PASS
	TC_SignUp_008	**An error message is being shown.**	PASS	Larissa Fernandes	12/05/2020			18/05/2020	PASS	PASS
	TC_SignUp_009	**error message display is not appeari**	FAIL	Larissa Fernandes	12/05/2020	" Please, select na item in the	**fixed**	16/05/2020	PASS	PASS
	TC_SignUp_010	**Region is not mandatory to fill**	PASS	Larissa Fernandes	12/05/2020	**It is being included in the database, but it i s not being shown in My Profile**		18/05/2020	PASS	PASS
	TC_SignUp_011	**appearing.**	FAIL	Larissa Fernandes	12/05/2020		**fixed**	16/05/2020	PASS	PASS
TS_006	TC_TermButton_001	**I was directed to the correct page**	PASS	Larissa Fernandes	12/05/2020			18/05/2020	PASS	PASS
TS_007	1	**The welcome page was successful.**	PASS	Larissa Fernandes	12/05/2020			18/05/2020	PASS	PASS
TS_008	TC_SeachDog_001	**/POD_Website-2-master**	FAIL	Larissa Fernandes	12/05/2020	Adjustments were requested	**Fixed and working**	16/05/2020	FAIL	PASS
TS_009	1	**/POD_Website-2-master**	FAIL	Larissa Fernandes	12/05/2020	Adjustments were requested	**Fixed and working**	16/05/2020	FAIL	PASS
TS_010	TC_MsgButton_001	**/POD_Website-2-**	FAIL	Larissa Fernandes	12/05/2020	Adjustments were requested	**Not Implemented**	18/05/2020	FAIL	FAIL
TS_011	TC_AboutButton_001	**I was directed to the correct page**	PASS	Larissa Fernandes	11/05/2020			18/05/2020	PASS	PASS
TS_012	001	**I was directed to the correct page**	PASS	Larissa Fernandes	12/05/2020			18/05/2020	PASS	PASS
TS_013	TC_MyDogButton_00 1	**I was directed to the correct page and I was able to view My Dog page**	PASS	Larissa Fernandes	12/05/2020			18/05/2020	PASS	PASS
TS_014	TC_logoutButton_001	**I was directed to the correct page, logged out and managed to view the login page again**	PASS	Larissa Fernandes	12/05/2020			18/05/2020	PASS	PASS
TS_015	TC_login_001	**I was directed to the correct page and I was able to view Welcome page**	PASS	Larissa Fernandes	12/05/2020			18/05/2020	PASS	PASS
	TC_login_002	**error message display is not appeari**	FAIL	Larissa Fernandes	12/05/2020	Adjustments were requested	**fixed**	16/05/2020	FAIL	PASS
	TC_login_003	**error message display is not appeari**	FAIL	Larissa Fernandes	12/05/2020	Adjustments were requested	**fixed**	16/05/2020	FAIL	PASS
	TC_login_004	**error message display is not appeari**	FAIL	Larissa Fernandes	12/05/2020	Adjustments were requested	**fixed**	16/05/2020	FAIL	PASS
TS_016	TC_loginFP_001	**Button link forgot password was not found on the login page**	FAIL	Larissa Fernandes	12/05/2020	Adjustments were requested		18/05/2020	FAIL	FAIL
	TC_loginFP_002	**Button link forgot password was not found on the login page**	FAIL	Larissa Fernandes	12/05/2020	Adjustments were requested		18/05/2020	FAIL	FAIL

Teste S. ID	Teste Case ID	Actual Result	Status 1	Executed By	Executed Date	Comments (if any)	Developer Coments	Date	Status 2 16/05/2020	Status 2 18/05/2020
	TC_loginFP_002	Button link forgot password was not found on the login page	FAIL	Larissa Fernandes	12/05/2020	Adjustments were requested		18/05/2020	FAIL	FAIL
	TC_loginFP_004	Button link forgot password was not found on the login page	FAIL	Larissa Fernandes	12/05/2020	Adjustments were requested		18/05/2020	FAIL	FAIL
	TC_loginFP_005	Button link forgot password was not found on the login page	FAIL	Larissa Fernandes	12/05/2020	Adjustments were requested		18/05/2020	FAIL	FAIL
TS_017	TC_MyProfileEdit_001	Some information is missing and it was not possible to edit	FAIL	Larissa Fernandes	12/05/2020	city of Dublin is being shown, th	fixed - The only option a	18/05/2020	FAIL	FAIL
	TC_MyProfileEdit_002	Some information is missing and it was not possible to edit	FAIL	Larissa Fernandes	12/05/2020	Adjustments were requested	aible to update are User	18/05/2020	FAIL	FAIL
TS_018	TC_MyDogPage_001	Some breeds missing, exchange pounds for kilos, include more Behaviors, include more dog energy level, LEAVE OPTIONS NOT REQUIRED FOR EDITING	FAIL	Larissa Fernandes	13/05/2020	Adjustments were requested	fixed	18/05/2020	FAIL	PASS
	TC_MyDogPage_002	error message display is not appeari	FAIL	Larissa Fernandes	13/05/2020	Adjustments were requested	fixed	18/05/2020	FAIL	PASS
	TC_MyDogPage_003	error message display is not appeari	FAIL	Larissa Fernandes	13/05/2020	Adjustments were requested	fixed	18/05/2020	FAIL	FAIL

(By scanning this QR-Code, it is possible to find a full version of this Excel spreadsheet).

Appendix C: 1st Semester Individual Contribution Report

Student Name: Adriana Moreira

Student Number: 2017081

During the periodically learning process of this first part of the project, I could extract a lot of new information and I could find my passion in the IT area.

I was first designed with the Gant-chart (which got another person responsible for it, during the process), Table of Contents, to put together our final documentation to be submitted and the research to explain our choice of the back end platform (JavaScript), that we are using in our web application.

Among, with my individual responsibilities with the group, intending to help the group to achieve their maximum potential, I shared at Basecamp, everything that I found relevant to our project to achieve their goal. As fallow bellow, it is possible to see all the messages shared at Basecamp, all the material shared by me at Basecamp was fallow by detailed instructions and links to how to use every single tool.

1. Ideas: How to come up With A business name (My contribution, inspire with 20 ways, how to come up with a business name);

2. How to register a Domain Name (My contribution on that research, points with detail how to register a Domain Name and I shared a list of FREE web hosting providers);

3. Gant Chart (My contribution research, along With Claudio, found a German App, completely free, and that accepts as many individuals as we needed, that was a great gain to the team because we are all able to access that information wherever we are);

4. Harvard Reference Style Generator(My contribution research, demonstrate an online tool, to generate almost automatically all references need to the project in a Harvard Style, Which helped to save time);

5. Grammarly (My contribution researched, explain the use of that digital writing tool that uses artificial intelligence that can help with our writing);

6. QR – Code (My contribution researched, explain how the use of QR_Code can enhance our project, QR_Code is a machine-readable optical label that contains information about the item to which it is attached).

(Check out all the details about the tools shared by me on Basecamp, by scanning the QR code)

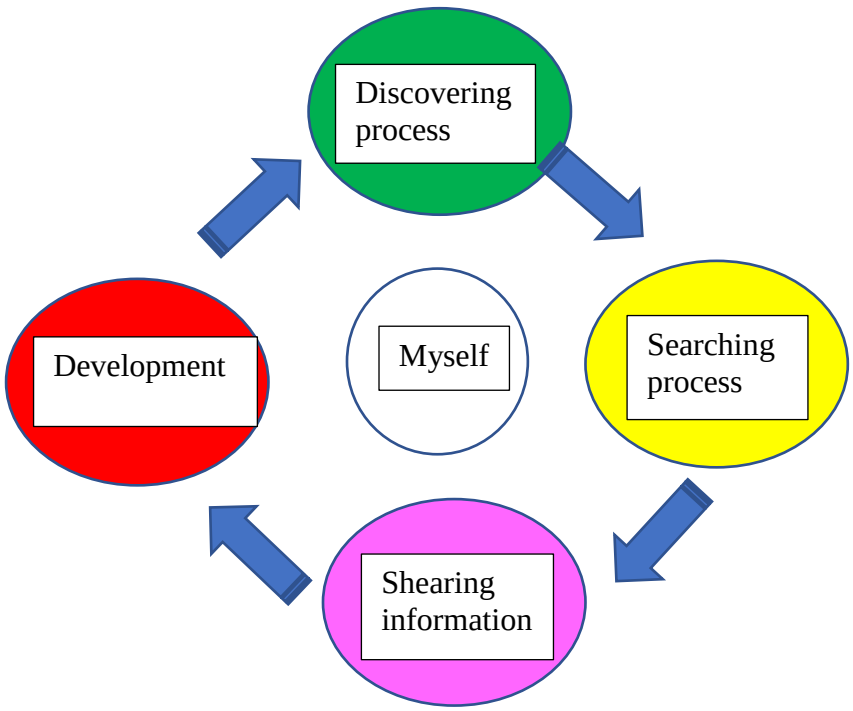
After several meetings with the team, which happened regularly every Wednesday at CCT, on 16:00, which I was present in every single one, our roles at the project got more refined, and we all could finally focus on individual areas that everyone in the group agreed with the changes during the meetings. I would like to emphasize, that our meetings were always smooth, clearly and focus on the main objective, to get the project done

At the beginning of the project, we were are all working as team; coming up with new ideas to enhance the performance of the group. We had several brainstorms to come up with the final name of the project POD (Plenty of Dogs) and with the name of the group L-JACK, which is the initials of everyone involved in the group. I would definitively say that the name of the project as the name of the team was a good example of teamwork.

During the period of time following, our roles at the project was modified so we could all focus in specific areas that we are all comfortable with, we now have people specifically responsible for the front end, people responsible for the development of the back end, others responsible for the documentation of the project and so on.

I would say, how proud I am with my group, we all worked hard to get our assignments done, we all helped each other every time it was needed it, I could not have chosen a better group to work with the Final project at CCT. Every single member of the group was respectful to each other, and as my role at the team, as the person responsible for putting together all our documentation in order to generate our final documentation, to make the most of the feedback, I always report the group before submitting any final work.

My personal evolution and learning process at this group for this point:



Student name: Claudio Santana

Student Number: 2017180

For this first submission of the final project, I was in charge of researching about which database would be the best one to be used in our application. Although since the first moment, it was clear to everyone in the project that MySQL would be one of the best options in the market, after doing a good research, some benefits came up making this choice even stronger.

Some solid aspects were found such as PHP has built in support API for interacting with MySQL and it has better performance on simple queries such as primary key lookups, range queries, and so on. Those were two really important findings as our application is going to use PHP in the back end to access the database. Also, our application will not consist of really complex queries, what suits us really well the use of MySQL. Moreover, part of our documentation to be produced such as the ER model will be easily created through MySQL Workbench, a unified visual tool that provides data modelling, SQL development, and comprehensive administration tools for server configuration, user administration, backup, and much more.

In addition, I am the Project Manager of this project and carried out the task of planning all our activities for both semester giving to each activity realistic timeframes and sharing them equally among all members of the project. In order to be as much assertive as possible, I had to take in consideration all our strengths, weaknesses and points to be concerned. In result of this task, I produced our Gantt Chart that will reflect our timeframe to execute all our activities and allow us to keep on track of them. This task has a crucial impact to the whole project, once without a solid and reachable plan is impossible to make it work.

At last but not least, I carried out the task of managing people and conflicts, supporting the whole team with their individual tasks and ensuring that every single member can keep working in a really good environment, feeling comfortable with their tasks and making all of us as much productive as possible in order to reach our best results.

Student name: Jordana Marques

Student Number: 2017320

Each member of the group has its strengths and weaknesses. Our group is structured and each of the members is contributing all of the assigned tasks 100 percent. Additionally, I will address my contribution to our group project called POD (Plenty of Dogs).

I helped decide what would be the scope of our web application, which initially would be several things on our web application, including the possibility of doing some meeting events, and as well do some pop-ups on the screen about health tips. So, I suggested that initially, we could keep it as simple as possible, and if we have extra time ahead, we could add more functionalities for it. Aiming that the main functionalities for POD will be, create a new user profile, login, register new breeds, find dogs by age, gender, size, breed, and distance, log out and delete a user account.

I was also in charge of doing the first draft for the introduction of our project POD, which I explained our project concept including step by step of how our web application should work, why we are doing this project, the problem solution, and what category of people will be reached by our project.

I researched about React Native advantages, disadvantages, and functionalities, that it is linked with Java Script. However, we had decided that we are not going to use React Native for our front end, but we decided to include the research about it and the difference between them. In case we are going to use Java Scrip.

My contribution helped make this “Draft Chapter 1” of our project a success. I encouraged the group members with a brainstorm and provided suggestions and ideas to put inputs on it. Even at the beginning when we were deciding the project name and proposal. I was present at all our meetings and spent a considerable amount of time helping my group with the tasks that were assigned to me, concerning my area of expertise, to help the group achieve project goals.

Everyone holds distinct standards and values. The standards for each group member to follow should be patience, gentleness, and open-mindedness. These values and standards are not ways of criticizing others or judging. All standards and values are important and useful in a diverse society.

Student name: Kevin Cardoso

Student Number: 2107183

I research the technologies we are going to use in our project. From the back, front and databases, I looked through many tools and applications we could use and based on that, I could come up with the right ones. With that, we could build our project architecture describing each application and functions to be developed for our project.

I also researched in-depth about PHP and Node.js that was one of our concerns as we only had PHP in class and not Node. js. I found out that Node.js is a great technology that is basically on the way to replace PHP but still has some cons while PHP has more time in the market and wide resources available online. Based on that research, I could bring to my team the pros and cons of each language and decided which one to choose. In this case, we decided to go with PHP.

I could bring valuable points and suggestions to my team, as we were developing the first steps of the project.

Student name: Larissa Fernandes

Student Number: 2017319

I am going to describe my own role in helping the team to achieve its goal in relation to finish the "Draft Chapter 1" of our Project.

At the beginning of the semester when the weekly meetings with my group began, I was able to give my opinion on the project's definition, purpose, and name after our project was accepted, I started researching the technologies we could use in our project from the back, front and databases.

Among the research I did, I could bring to my team “React Native” and showed the group as a suggestion of technology to use as a front end of our project. After the analysis and more research we decided not to use the react React Native.

As I helped research technologies, I could help to build our project architecture which made it possible to characterise each application and functions to be developed for our project.

Based on the meetings and decisions made by the group I was able to build our list of Functional requirements, describing the service that the software must offer.

Through this semester, I brought good ideas, proposals and suggestions to my team and I learned a lot about new tools and applications that we will use, but in parallel I learned about several aspects of collaboration that need to be in place in order for a group to smoothly and successfully reach their goal.

Appendix D: 2nd Semester Individual Contribution Report

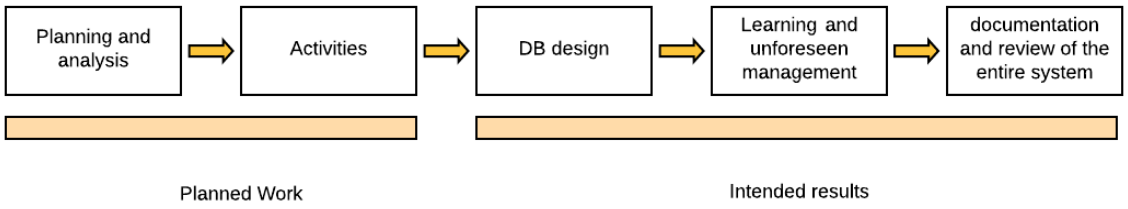
Student Name: Adriana Moreira

Student Number: 2017081

It would be difficult or even impossible to begin this self- evaluation without marked about the worldwide reality at the moment.

In the phase of social isolation brought by the pandemic time, that hunt us brought by the Covid-19, the whole way of the learning process, personal development, and social contact as changed. To be able to complete this task and so on I had to adapt to this new reality so that I could develop productively and efficiently at all the time.

To appraise my role at this stage of the POD development project, I had designed a logical symmetrical model to show how I have planned myself, to get the results needed for the development of the project.



Logical symmetrical model personal development – Designed by Adriana Moreira

To begin describing my participation in this second semester of the development of the POD project, in agreement with the group I was assigned to work on the development of the database, I was also responsible for the final documentation, I wrote about *chapters 2, 3, 6*, and *Appendix A and B* and I also on earlier stage I had explained in detail about *JavaScript* which is part of the project front-end, this information can be found in *chapter 1*. Since the begging the cchapter 4 and 5 were assigned to another member of the team.

These tasks were of great help for my personal and professional development, as it made me have an even more detailed and broad view of the whole operation. Therefore, to be able to write about the development, design phases, system implementation I had to be aware and participate in each decision made so that I could reach a level of precise detail.

The Database

I was involved in the development of the *Database design* and *Database development* used on the POD system, for this process I brought knowledge about MySQL data types to be used in the attributes in the classes, and moreover, with ideas about classes and their relationships to be implemented. An example of this: I came with the idea of the tables behaviour and dog breeds, which I was also responsible for the data to be deployed in the DB.

Part of my contributions to the database can be finding on the links below:
https://3.basecamp.com/3853367/buckets/14098939/documents/2640574098
https://3.basecamp.com/3853367/buckets/14098939/documents/2515715793
https://3.basecamp.com/3853367/search?q=erd

Following the DB progressing development, I was responsible for the evaluation and explanation of the DB Table description used, to do so, I created a detailed list of all system requirements in the DB, which was nominated as *DB Table Description*, which can be found on Chapter 2 of this project.

My contributions for this subject can be finding on the link below:
https://3.basecamp.com/3853367/buckets/14098939/uploads/2552558693#__recording_2592099208

Interface Development

In the urgency of trying to help the team's development fairly, during the interface development process, after the Mockup was developed, I made a detailed *analysis of the interface*, which helped to identified the need of some functionalities, such as a construction of a *password policy* and the development of *data protection.*

From this analysis, I created the password policies requirements of the project, along with the policies I gave an explanation to the group about the importance of password policies to bring security to the system in an overall way and examples of how to implement those policies on the Front-end.

My contributions for this subject can be finding on the link below:
https://3.basecamp.com/3853367/buckets/14098939/messages/2573335776

Regarding data protection, I team up with Larissa and we realized the need for including data protection to the software. Based on that, I made some *research* on the subject, and how to implement that in the project. The data protection had a straight impact in the store of the POD data, from that we had to re-write the DB by deleting some unnecessary attributes; this reduced exponentially the size of some classes.

My contributions for this subject can be finding on the link below:
https://3.basecamp.com/3853367/buckets/14098939/messages/2568177058#__recording_2568457381

Documentation

The table of contents, I would like to point out that, due to a connection problem that I faced in a specific team meeting, I was not able to fully participate in the development of the 2nd semester table of content. Although as the person responsible for this task, I carefully analyzed the version presented and pointed out the necessary adjustments to bring all the issues covered during the planning, started in October 2019.

This information can be finding on the link below:
https://3.basecamp.com/3853367/buckets/14098939/uploads/2634180060#__recording_2640597917

In addition, I was the person responsible for the project documentation, to do so; I had to analyse chapter by chapter, to make sure we were following all the requirements on the Student Hand Book. In addition, I have reviewed the entire reference list to be sure, that the Harvard Style was being followed, and with the intention of bringing more information to this documentation process I add *QR-codes* through the document, so anyone can have a look of a full version of spreadsheet, diagram or even have access to our application.

During the documentation writing process, I came if the idea of creating an *Acronym List* to help anyone in the future to understand the project in a full way.

Chapter 2

In the process of building chapter2, I gladly explained about the SDLC module used in the life cycle of the project. I designed the Spiral Model used in the SDLC based, what's more, I explained about the SDLC implementation phases during the project, and so more I explained about the use of the Requirement list and it impacts on the Mockup interface.

Chapter 3

To be able to write chapter3, I have learned the complexity of UML diagrams and how they are apply in the process of system development.

Based on the UMLs images posted on Basecamp, I had explained what is UML, and I gave a detailed explanation about the Use Case Diagram, Class Diagram, Sequence Diagram, and, Entity-Relationship Diagram-ERD. In addition, I wrote about the knowledge that I learned about Password policies and data protection and I gave an explanation of how those functionalities impact the development process.

Chapter 6

I wrote about the completion of the project and, for this task, I tried to synthesize the 100 pages of the project in just 3 pages, trying all the time, to write without jeopardizing the meaning of all the evolution made, by providing an overview of the entire project development process, from start to finish, and giving more work to be implemented in the future.

Appendix A

I explained the evolution of the project by using the Gantt-Chart and how the use of this tool, helps the team to develop the project SDL.

Appendix B

I carefully took care of creating this appendix, so that it was possible to have a detailed view of the UMLs and the DB table description used in chapter 2 -System design.

Planning and Analyses

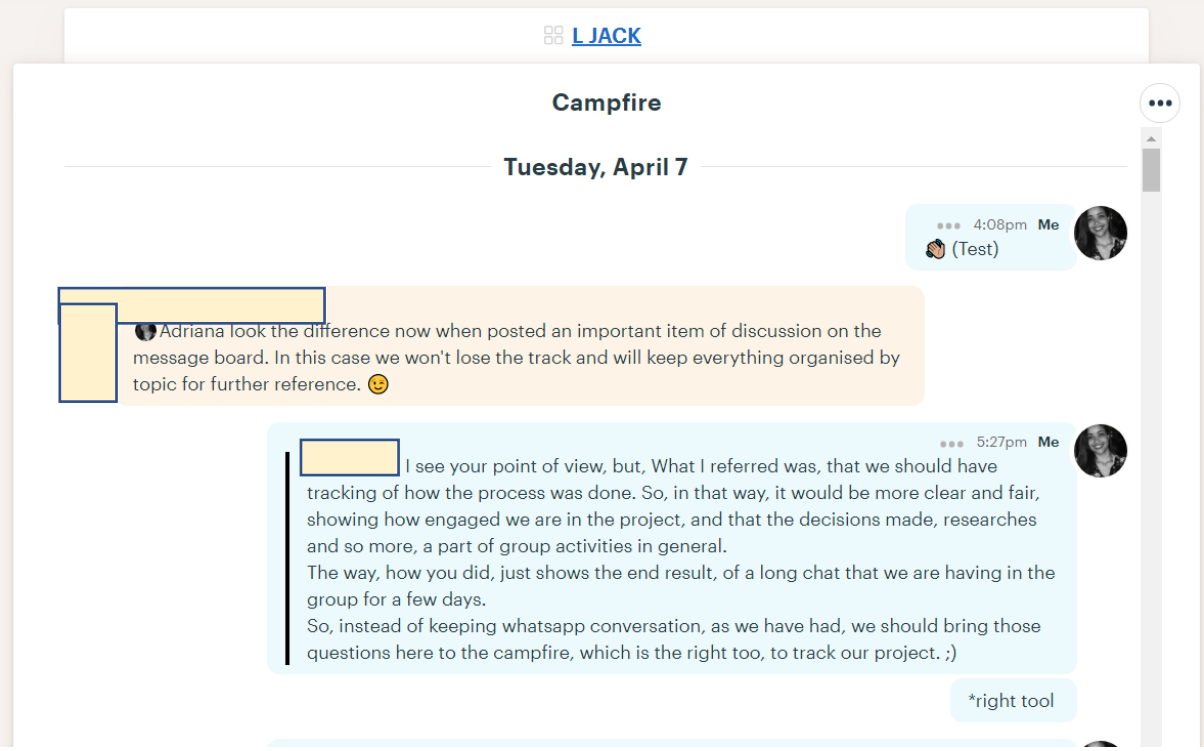
In order to bring more focus on group time management, I developed an assignment tracker. By doing these analyses, I could bring to my team a vision of when we should have every task done to be able to finish the project on time.

Despises the Gantt-Chart, this assignment tracker, helped to understand how our application was developing, by given an explanation of any task overdue, for how long was the overdue and how to work with those issues. This helped to resign some tasks to different people.

Moreover, after I realized the need of a close approach of having the tasks tracker, I suggested to the group that we should start making use of the Basecamp, so we could have a better view of the project development, this was a game change to the development of the application, it brought a more organized involvement of the tasks, with clear ideas and more active participation of all members

These changes were clearly reflected through Basecamp, where after my suggestion, our group at Basecamp started to be populated with new ideas almost daily.

For privacy reasons, and to respect another person's data, I covered the name of any other person involved in the conversation below.



ASSIGNMENT TRACKER

Assigned to:	Subject	From	Until	Reason
Kevin	**Front end and back end**	01/04/2020	08/04/2020	It would give us two weeks to work on systems integration, testing and fixing problems
kevin and Claudio	**Integrete system model**	09/04/2020	12/04/2020	I would give 3 days to work on the integration process
Adriana	**Testing**	13/04/2020	15/04/2020	2 days to run tests and return results to correct any errors found
Kevin	**Fixing errors**	16/04/2020	22/04/2020	I would give 6 days to work with any errors
All	**Project must be finished**	23/04/2020	27/04/2020	It would give us 6 days to work on the documentation review
Amilcar	**Send the project to Amilcar**	28/04/2020	12/05/2020	It would give Amilcar two weeks to work on our project
All	**Getting the Feedback**	13/05/2020	18/05/2020	It would give us 5 days to work on any necessary adjustments

ASSIGNMENT TRACKER

Assigned to:	Projects overdue	Starting date	Due date		Overdue	Task started?	For how long having you been working on this task
Kevin	Front end and back end		20/03/2020	Reason: ???	58	Yes	
Larissa	Test case scenario	13/03/2020	20/03/2020	Reason: waiting for the front end and back end	58	Yes	65
Jordana	UML	13/03/2020	20/03/2020	Reason: ???	58	Yes	65
Jordana	Introduction	13/03/2020	20/03/2020	Reason: ???	58	Yes	65
Adriana	Testing	16/03/2020	29/03/2020	Reason: waiting for the front end, back end, and the test case scenario to finish	49	No	

During all time of the project, I tried to be involved in as much area as possible, I was a really active member of the team. I never stopped just on the tasks that were signed to me, and this is proven by my line of development presented in this self-evaluation.

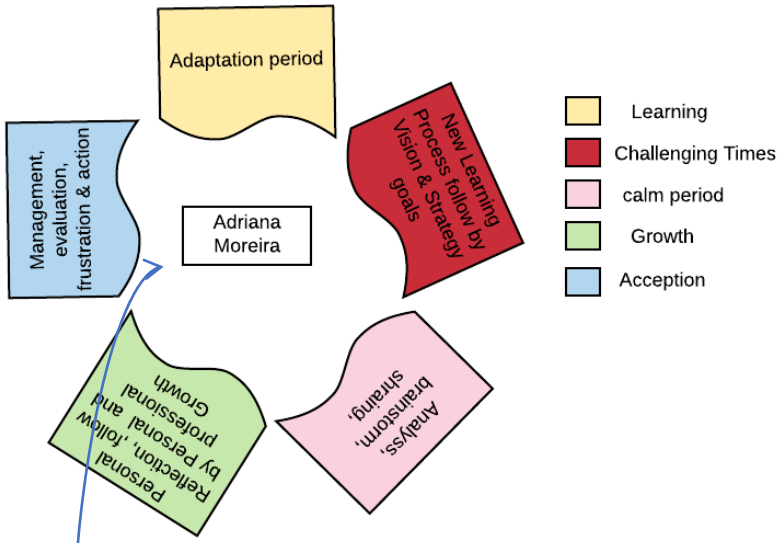
I understand that working as a team, requires a full commitment and respect with the other group members, especially with their times. Having this in mind, I always tried to be as much prepared as possible before the group meetings, so I could bring my knowledge to develop over the past 3 years at CCT – College.

Throughout this cycle, I have learned the importance of setting goals, this helped to identify or own mistakes/time management in time and correct them. And even more, the importance of being professional, taking into consideration that, this is a group project, and it is important to address to the members of the group any issues that are impacting the going of the project, to get the results expected.

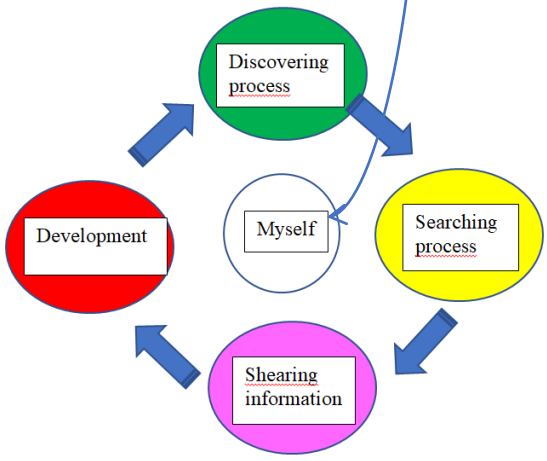
Last but not least, I would like to thanks all the professors involve in this project, and in special I am grateful to Amilcar Pontes, for accepting the task of conducting this project. Thank you for your help at various times during the project, your knowledge shared with us was essential for its completion.

My final personal evolution and learning process at this group for this point, the waves represent the challenging periods presented throughout this process.

To the 2nd semester



From the 1st semester



Student name: Claudio Santana

Student Number: 2107180

During the first semester of our project, I was able to work on several activities related to the Planning phase, as mentioned in the previous Individual Contribution Report. Those tasks played now an important role in this second semester. Based on the System Development Life Cycle of our software, I will describe all tasks performed by me and also tasks I was eventually in charge of to guarantee better results in the whole areas of the *Plenty Of Dogs - POD* project. To begin, it is important to name all phases involved in this second semester, as shown in the image below.

- **System Analysis**

This is the phase where I had to revisit all documents produced in the first semester during the planning of our project. In this case, I could notice that a few documents such as the Requirement List, for example, could be improved to guarantee that our prototype would reflect all functionalities described by our team during the requirement gathering stage.

At that moment, I saw the necessity of adopting a methodology, which if applied, would elevate the standard of our documents to a higher level, making them always as accurate as possible and reflecting the real picture of our project. Then, after carrying out a few pieces of research I was inclined to follow the Spiral model. When comparing to the previous Waterfall model, I could understand that if we were able to revisit a few times different stages of our development, setting a design goal for each iteration and end with the final prototype, our team would be able to produce our documents with the expected quality.

Although it is not advisable for small projects because it might generate an expensive cost to them and also there are risks of not meeting schedule or budget, it is relevant to mention that this is definitely not our case. Besides *POD* is a small project of low to medium complexity, it is an academic project with no budget involved. Also, during the planning, our tasks were scheduled in a suitable timeframe that would cover possible risks and impacts. Additionally, when monitoring the plan and analysing risks, it becomes easier to identify in advance any possible issue. As a positive result of this, I am happy to say that none of the necessary changes that happened during any of the development stages had a high impact that affected the development of our application in any circumstances.

- **System Design**

After analysing the impacts and risks, it was time to design our database following our Requirement List. As mention in the previous semester, I decided to use MySQL Workbench for being a really useful tool to elaborate the Entity-Relationship Diagram (ERD), generate and run database scripts, populate the database with all relative data and monitor it executing queries locally and in the cloud.

The first step was to gather all necessary attributes, drawing in a piece of paper possible tables and their relationships. After that, I designed our first ERD on Workbench. Then, I applied the necessary normalisations in order to follow the best practices of data modeling, avoid data redundancy, and improve data integrity.

The next step was to create our database, running the database script, locally to start the first unit tests. It is important to mention that during this phase a few relevant changes were pointed to our supervisor. The risks and impacts were balanced and the necessary changes were accomplished with a low impact over a few documents of the project. So, our documents were adjusted accordingly.

It is also relevant to say that I had to work close to our Interface Mockup to ensure that our database would always reflect all the necessities pointed by peers during our meetings. In addition, still, during this phase, I corrected all our UML diagrams and Table Description to guarantee that our final documents, as planned, would reflect the real picture of our Web application.

- **Implementation**

This phase, as I could experience, was one of the most important and complex phases of the whole development of our application. At this moment, everything started making more sense and our design came to life.

During this phase, I got involved in the integration of our system. Whilst our front and back-ends were being integrated, I had to carry a few pieces of research to choose which cloud platform would be the most suitable to deploy our database on. The results pointed to Google Cloud and Amazon as the main options. Although Cloud SQL, a relational database service from Google seemed to be interesting, I was more inclined to go for the Amazon Relational Database Service (Amazon RDS) for being a really easy and straight forward web service. Another relevant point was the possibility of also uses AWS Elastic Beanstalk (EB) to deploy our application. Finally, after a “few clicks”, as our supervisor said, our *DB instance* was created in the AWS Cloud.

- **Testing**

After carrying a few tests in our Database already in the cloud, I created the database connection in our back-end to connected our application to it. So, our team could start their first integrated tests.

Besides that, in this phase, I corrected the test cases and scenarios produced during previous phases to guarantee that the integrated tests would follow the necessary level of complexity.

- **Final Report – Writing**

Initially, as per the plan, I was not supposed to participate in this task. However, due to a few delays in some of our tasks during this semester, I had to jump on and effectively produce a few chunks of our Final Report as mentioned below:

- ✓ Table of contents: bringing on the structure and main points of our project;
- ✓ Introduction: adapting it to a more accurate academic language, correcting it and adding essential information that represents what *POD* is;
- ✓ Chapter 1: correcting and rewriting it to improve our first draft submitted during the previous semester;
- ✓ Chapter 4: fully writing the introduction of this chapter and the *Plan x Reality* main topic;
- ✓ Supporting the whole team correcting chapters in general.

- **Prototype**

Despite the fact that I was indirectly involved in this task as I designed and created *POD*'s database, this is one of the parts of the project I wish I could have participated even more, especially in regards to the front and back-end development. Strategically, as I had to support and cover other tasks, I had to step back a little bit, balance, and prioritise what would be the most important to our group to deliver the most of our prototype and report, respecting its deadline.

However, I still can mention that I was able to provide patterns to be used in the front end, necessary queries to be added to the back-end to retrieve the expected results from our database, dropdown list code to be integrated to the front and back-end, encrypt password code, message and adding a dog's picture functionalities source codes to be implemented.

- **Conclusion**

All in all, as described in this Individual Contribution Report, since the previous semester, I have played an important role in our *POD* Web application development. I can proudly mention that I was involved in crucial tasks such as planning, elaboration of our Gantt-Chart, requirement gathering, UML diagrams, design and creation of our database, and so on. In addition, I had the amazing opportunity of working effectively in all the different phases of the SDLC of our project, directly or indirectly.

Furthermore, all this experience brought me great knowledge of the whole process of software development and will certainly be useful during my professional career. As all we know, the IT area is a really large area with loads of different opportunities in the market. This project helped me to identify possible areas of interest, making my choices even easier in a foreseeable future.

It is relevant to mention that even having a great time and enjoying all tasks, to work as a Project Manager is not the easiest role to play. It requires a high level of commitment, analytical skills, respect for others' boundaries, tolerance, understanding, be a good team player, and other skills necessaries to develop a great relationship with all members of the group. Moreover, I can say that I always tried my best to spread knowledge around the whole group, balancing the project's necessities to our strengths and flaws.

I wish I could have worked more directly especially in the development of the back-end, but I am happy and grateful for being able to carry other tasks in parallel prioritising the full success of the whole team. Professionally, I will carry with me to my future opportunities that a plan cannot be failed if it is not followed. If you stick to the plan and it did not work, the plan might be wrong but, if you do not follow the plan, it does not mean the plan is wrong, but your own decisions might be. Also, when working in a group, every single individual action matters.

Student name: Jordana Marques

Student Number: 2017320

Over the course of the first semester, I was able to benefit from a variety of new tasks in regards to the second part of our project, which was to put into practice all of the ideas and plans we had since the beginning, related to the development of our application.

I was in charge of creating and developing all of our UML diagrams, and with that, we were able to aim at a better structuring of the software, as well as a standardization of the modelling process to facilitate communication with the group members. The following is a list of some of the tasks from which I benefitted:

- *Class diagram*, which showed the set of classes that we created to carry out the program, detailing attributes and operations (methods) present, as well as relationships between the structures.
  https://docs.google.com/document/d/1ImKzxMarBgaaajH0J159Q3zHVqebySP8eNvwnKhSZtw/edit?usp=sharing (Google Docs link where the diagram is located)

- *Use Case Diagram*, which focused on presenting the features and characteristics of our system, which are: register new owner, login, profile, register dog, search, interaction and send message.
  https://docs.google.com/document/d/1isNHJuiYPkPH3qB2hI8gvbIZSzH-_SCJVdHjbHEO5NI/edit?usp=sharing(Google Docs link where the diagram is located)

- *Sequence Diagram*, which demonstrated the interactions between different objects in the execution of each operation of our application, also highlighting the order in which each action took place over some time. I addressed this sequence in which operations were performed, which occurred vertically, from top to bottom, starting with the user, interacting with the web application, which interacts with the server and lastly the POD database. https://docs.google.com/document/d/1JcDwO8j5guSfaT1Q4pogUJ5MX6J5AFRUTjUHbDu_ENU/edit?usp=sharing (Google Docs link where the diagram is located)

Subsequently, in relation to our first meeting with our supervisor Amilcar Aponte for this second stage of the development of our project, he provided us with essential feedback regarding what we could improve for future work. After that meeting, all members of the group realized and agreed that changes to the *Introduction* and *Chapter1* should be imposed. Based on this, I was assigned to readjust those chapters, including the *Abstract* and dividing the *Introduction* and *Chapter 1- Literature Review*, making them two independent chapters.

Introduction

I was responsible for the creation and development of the Introduction, which is the part of the documentation where I was able to present what our project is about as a whole. Indicating the objectives, purpose and justification of the work

Chapter 1- Literature Review

Based on our first group meeting, I was responsible of research about a few tools, such as HTML, CSS and Bootstrap, which we used to run our front-end. Following these premises, our web application will provide a user-friendly interface with easy navigation and a well-presented appearance.

Since the beginning of the project planning, we have researched a lot about the concepts of this project. We thoroughly researched the market about possible applications that have similar concepts to our project - we wanted to create an application that was focused only on the dog's reproduction or making friends. Although our findings were only related to applications whose main focus is either dog's care, wellness, or adoption, there were no applications found whose purpose is similar to ours. I was responsible for doing more research on some applications that were similar to ours As part of the results from our research , we found *Tindog*, *MyDoggy*, *DogsApp* and *Petfinder*, whose purpose is similar to ours, as I mentioned earlier, POD is primarily focused on helping dog owners to find a particular kind of dog for breeding also with the feature of searching for dogs just to socialize with.

Chapter 4 - Implementation of System

I was also responsible for *Chapter 4 - Implementation of System* which in my conception was very important for my own personal development, as even though I was not directly involved in the development of the application, (front-end and back-end source codes), I was able to familiarize myself and understand the step-by-step of how our web application was developed, including tools used such as Brackets, which was used for the coding of our project, and MAMP, which was the tool we used to run the PHP language through Apache, thereby creating an environment whereby our application could make the local connection with our database. Our Database is in the cloud (AWS) whilst the application server is local, which is why we had to run Apache through MAMP.

In parallel, subsequent to the completion of the prototype, I was able to help in the development of the design by creating the written parts of the application pages, for example on the home page I created the step by step of how our application will work and also wrote about its purpose. I was also responsible for creating the About page, where I was able to introduce "What POD (Plenty of Dog) is about". Therefore, when users have access to our application, they will know exactly what purpose they will have registered for. It is an opportunity where our visitors get to know about us.

Our group was structured and all members were essential for the development of POD "Plenty of Dog". Each member of the group was delegated specific tasks with that, weekly meetings were held throughout the application evolution process. My contribution helped make POD "Plenty of Dog" a success. I encouraged the group members with a

brainstorm and provided suggestions and ideas to build into POD. I was present at all our meetings and spent a considerable amount of time helping my group with the tasks that were assigned to me, concerning my area of expertise, to help the group achieve project goals.

The biggest challenge for me was the time management, as we had a substantial amount of activities to finish, and limited time to complete all tasks successfully. I spent a lot of time doing research and watching several video lessons in order to learn some tools used to develop our application.

Personal Growth

My personal growth during this project was very important to me, allowing me to become a better person personally and professionally.

I learned to deal with the things that inspired me and my obligations, developing skills to deal with the actions, decisions and reactions that guide my life.

A big challenge for me was to deal with my frustrations in a sincere and mature way. Understanding that things do not always happen the way we planned and it was in those moments that I needed not to lose my motivation.

This image below shows some key points that add my individual development:

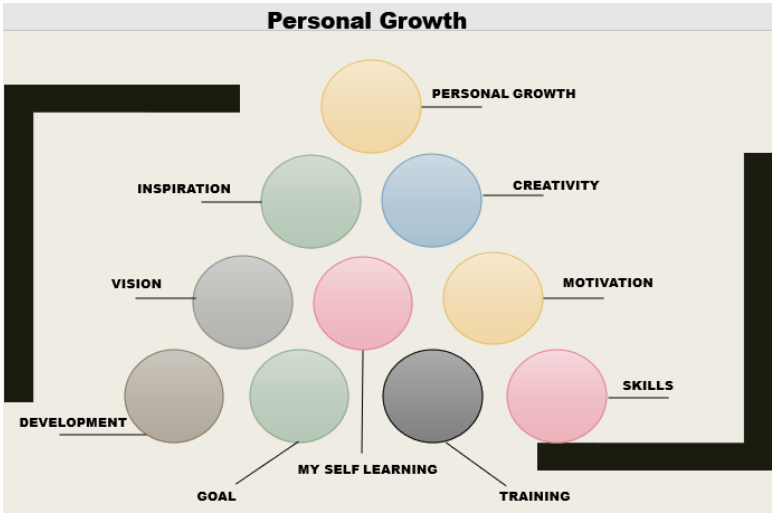


Image 1: My Personal Growth

I would to give thanks to CCT for opening its doors to me, being my second home during these 3 years, providing an excellent structure and learning outcomes - my experience was incredible and unforgettable, it couldn't have been better.

I would also like to thank the teachers who shared their knowledge, especially my supervisor Amilcar Aponte, for his guidance and constant encouragement during the development of the POD, as his collaboration was essential for the completion of the project.

I am especially grateful to all the members of the group, for all the help, attention and affection, and for not sparing any effort so that I could carry on with my studies and research.

Student name: Kevin Cardoso

Student Number: 2017183

When this project started, back in September-October and we first created our group, I was assigned to research the web development languages and to start our application development. We start doing market research to find the best original idea to focus on and create our project. From that, we came up with Plenty of Dogs, or simply, POD. The idea of the application is to help dog owners to find other dogs to be friends with their pet. My very first big contribution to the group was designing the logo, I was excited at the opportunity to use my graphic design skills. With the logo set, we finally had our identity, and I got a really good response from my team which made me feel comfortable and happy to be working with them and increased my motivation.

In the following weeks, I started to do research on similar applications so I could have a better idea of what we needed to do. Tinder was the main app where I could study more about, analysing user's data, how the user can interact with it, and also its purpose. Since the beginning, I always tried to bring the best solutions and examples to our project. Despite the fact that I had some web development classes in the second year, for me, it was not enough so I started some online courses so I could learn a bit more about web development and languages such as HTML, CSS, PHP, Bootstrap, jQuery, JavaScript and also databases.

Approaching the end of the first semester and also the first submission of this project, I already had a wider idea of what we needed to do and I went deep into more research about PHP which I knew would be the main language that we would use. However, at that time, we didn't know exactly what to expect we would need for sure, so our research as a group was more than this. Besides PHP, I also looked for Node.js that seemed to be a good language to use if we had more knowledge of it but as we only had PHP in class it was not so advantageous to use a new language that we didn't have the proper knowledge of.

Starting the second and final semester, we had most of the application features and needs already sorted out and we were ready to go. Since the beginning, we were always united to define the project roles, deadlines and help each other. With the use of the Gant-

Chart, Basecamp, WhatsApp group and our weekly meetings, we were able to organize ourselves and set deadlines according to each task and for each member. That was a great thing to do as everybody could see exactly what was happening and the progress of the group as a whole.

I came up with the first wireframes of our web application and could show what we could expect in terms of what it might look like when ready. From that, we took some notes and brought more ideas to complement the project interface and with that, I started designing proper interfaces showing what colours we would use, our logo, banners and other visual features.

I started coding as soon as we had our second interface approved by the group. I used HTML and bootstrap to start the application body. Bootstrap was something that I had heard of in the past but never had the chance to have a better look into that until our supervisor, Amilcar, suggested the use of it. I went to the website, read the documentation and followed the first steps to get started. I must say that it really surprised me as it can help developers a lot and allow us to start and give that better looking touch on our projects with some simple clicks from the beginning. The homepage was the first one to get ready. I implemented a navbar with our logo and the menu and then a rotating carousel with content to be dynamically displayed.

The frontend is by far where my skills lied in this project, as I have previous experience working with that and as a graphic designer in my actual job. I did my best to give the best visual experience to our users and also make it as user-friendly as possible. The development of the other pages such as the signup and login page were easy to do using forms, input fields and buttons. The hardest part of the whole project for me was the backend.

As I mentioned before, I had previous knowledge of PHP and I dedicated myself to many long hours studying this language and practising it to speed up and boost the development and functionality of our project. However, the backend was extremely challenging to work with and really frustrating when I spent hours coding and the application did not work and then I had to go through the whole code to troubleshoot it. It was exhausting

but very rewarding when everything started to work and all the commands started doing what they were meant to do.

I spent plenty of time watching tutorials and reading forums where I could find answers and suggestions on how I could implement our ideas and fix what was not working. This was a great experience as I could interact with other developers and get suggestions of how I could improve my coding skills.

The team was really great about updating and informing each other throughout the process and this is something that was important to me. Through screenshots, videos and even sharing my screen during our weekly meetings, I could show them how the web application was getting on and looking like. They also gave me more ideas and suggestions to be implemented and most importantly, they always gave me support and helped me with whatever I needed.

In this project, I learned much more about databases as I had to make the connection of the application to our databases locally and on the cloud. The implementation of queries together with the PHP variables and statements was also something extremely difficult for me as I got stuck several times in many parts of the development process. At one point, the clock was ticking really fast and we were getting too close to the deadline and I had to rush with a lot of things also in order to help my team with the documentation and providing information about the whole coding and implementation process.

Unfortunately, I could not finish some parts of the application such as the development of a message chat where users could talk to each other. Our main concern was to work harder to make sure the main requirements could be done in time and that is what we aimed for. I worked really hard to provide the best but sometimes things do not go in the way we expect and the result was not exactly what we hoped for. We aimed very high. I felt really upset and frustrated when we put a lot of effort into something and it did not go as we expected. It made me feel very insecure and I started to doubt myself in terms of my skills and capabilities but again, my team had my back and kept me motivated to keep trying and moving on. I tried to support them and be there for them whenever I could too. We really had

a team spirit. Also in the end, I was responsible for recording and editing the screencast of our project.

In conclusion, I can say that working shoulder to shoulder with this team, all this time, made me feel really comfortable, happy and engaged to do my best. They are the most helpful, hardworking, bright and trustworthy team that I could ask for. Also, our supervisor Amilcar, who was always helpful, kind and cheerful. Thank you very much for your patience and passion for teaching. I learned so many things in the course of this project in many aspects, from being patient and open-minded to learn how to organize myself and be ready to

solve any unexpected issue and help my teammates. This is something that was added to my personal growth, the way I can work under pressure, in a group and deal with deadlines, get to know my limitations and yet learn how dealing with all these situations can lead to a perfect result in a project. I am glad and thankful for everything that I learned and all the experiences that this project provided me.

GitHub link with all the coding: https://github.com/Kevulis/POD_Website-2

Screencast recording: https://youtu.be/4-v2quly6Vw

Interface Design *(Mockups, Wireframe, Building progress and final screenshots*): https://3.basecamp.com/3853367/buckets/14098939/vaults/2490239500

Student name: Larissa Fernandes

Student Number: 2017319

I would like to start this reflective report by saying that I am completely grateful to have participated in this final project at TCC with all the support of the professors and the faculty and also to have participated in such a dedicated and united team.

Looking back, I will critically describe my experience with reference to my work in developing this project. I will detail my team participation, the learning process and the personal evolution process.

At the start, the choice of those who would participate in our group was definite - we believed that we needed responsible and hard-working team members , However, the factor that was most relevant was the loyalty and friendship created throughout the school period. I believed that a pre-established trust was essential or at least extremely beneficial when creating security. During the development of the project, we were able to work in a united team and establish a good relationship and open communication, producing effective solutions, especially when we shared moments of stress at some stage of the project.

After defining the group participants during the first semester, when we started the project, we evaluated and respected each other's strengths and weaknesses, so that we could all work comfortably, happily and develop a project based on a common group agreement All of this allowed each member to work with what they had acquired best during the years of study and plans to continue as a professional career.

I thoroughly researched information that was valid and that I could share with my group, adding positive points to start building the project.

I consider the initial phase to have been an opportunity for great learning and personal evolution, due to ample information that I was able to acquire in research carried out. Until then, I could not have imagined how much closer the future of this project could bring me in relation to my personal and professional development.

From the beginning, our idea for developing the final project of the course was to develop an application. The presence of everyone in weekly meetings was defined as a mandatory factor since the beginning of the project, in which I was present and was able to contribute with very important ideas. During Brainstorming, in the first meetings, the idea of creating a web application to help dog owners to find other dogs with the aim of breeding or just to find new friends for their pets came up. A few days later, in the meetings where I was faithfully present, I also participated in deciding the name of our web application, which resulted in the named POD - Plenty of Dog.

My participation was also fundamental with regard to other important initial steps such as the creation of Mockup, our project architecture, which made it possible to characterize each application and functions to be developed for our project I also contributed to the choice of technologies to be used, initially proposing the use of React Native, although in the end we opted for another language.

I offered to initially work on Scenario Analysis, Case Analysis and Requirements Analysis as I felt that this was an area in which I could make an important contribution and achieve good results. I immediately started collecting necessary data, recognizing and evaluating problems, describing the requirements of the system, establishing how the system should act and determining a user's expectations for our application.

As a result of this study, I was able to complete our Functional Requirements in the first stage of our project, which was of great importance to facilitate the understanding of the functions of the system in the second stage of development and to start the Database Design and the Design of interface.

In view of this, in the second semester, I thoroughly enjoyed Strategic Software Planning, System Analysis and Planning, Interface Analysis and mainly Test Planning and Software Test Execution. These tasks allowed me to test and develop my job creation in an environment where I was able to show the best of my production capacity and in search of high-quality work completion.

Always seeking to help the group with improvements where the maximum results were achieved, all ideas, research, information and documents were promptly shared, through Basecamp and our group on Whatsapp, thus creating a strong integration between the group, where everyone could share the same level of knowledge.

When I started planning the tests and decided what would be included in our database, I decided on my own initiative to work doing Interface Analysis in parallel to the time it was being molded. After each weekly meeting I would suggest new ideas to add to the development of the app and after Kevin’s Interface Design updates, I carefully analyzed each step in order to facilitate the user experience and encourage better interaction, certifying friendly and intuitive solutions for our project. The deep analysis of the interface brought many positive benefits for the development of the application, often showing hidden points, but very important for the interaction of the scenarios.

Simple but essential examples that had to be modified:

-Sign up Page: Adjust the username entry when registering

- I showed the group that some registration data in the system should be mandatory and others not mandatory, and in a meeting, we decided together which ones would be adjusted.

- My profile page: I presented the group with the hypothesis of removing the telephone and address registration, pointing out the need to keep only essential data for filing.

- Dog Details: Behavior and Available to meet are data that we decided would be shown in the dog's profile, were registered in the database, but were not being shown in the interface design.

- It was communicated to the group that the number of photos that were being shown in the interface design for registering a new dog, were not matching in relation to the number of photos that would be shown in the search (3 photos for registration and 4 photos for sampling in the search result).

- Search Page: in one of the interface design updates, I could see that "My Friends" was included without a real objective presented. In a meeting I showed this to the group we decided that this feature would not be developed, I also introduced the idea of removing the dog's colour, since this would be of great variety and without great need for development.

- Message Page - This page was not included in the interface design, in analysis, I showed the group the importance of creating a new page where they had a view of the profiles that were marked with like and a view of the messages exchanged between users.

- Search page: The search for gender was not included in the search filters. With the justification that the main point of the application is the meeting of soul gems between the same races, this information would be of great importance and would also meet the initial requirements outlined.

However, other complementary and no less important information I carried out in external research such as:

- Size: It would be important to define whether offspring would be of small, medium or large size should a cross between two dogs meeting through the service occur.

- Age of the dog: In the registration, I pointed out that it was valid for the user to be able to define the age of the dog in months and years, since looking at the female the ideal age for reproduction would be at 18 months.

The planning and execution of tests were the tasks that I dedicated myself the most to over the course of the project. Throughout the planning of the tests I was able to have a very comprehensive and deep view about each component of our application that was being developed, I was also able to improve my knowledge of database and AWS deployment since to verify the data that it was necessary to have access to.

Every week I was able to bring to the meetings positive points found during the weekly test planning update. To improve my knowledge, and to improve my understanding of this new challenge that I had accepted, I spent a lot of time reading academic books and articles on software engineering, I also watched a lot of video classes on Youtube, which was of great help to my development during this process, as this module "Software testing" was not part of our academic curriculum.

Through the test planning template, you can see exactly how every application functionality was thought out and detailed and thereby have a complete view of our desire to finalize the application. The test execution process was a great challenge because, with limited time to finish the application I also had little time to perform this task, my initial idea was to do automatic tests, but with little time to finish the project, I couldn't stop and dedicate myself to learn how to use a new tool, so the execution was done manually. At the same time that the application was being finalized,

I started the test execution. Working together with Kevin, I put together a test results spreadsheet that could be accessed and used in real-time, where we could visualize the tests with positive and negative results, exchanging the necessary information for the final adjustments.

In addition, in order to have a broader view on this task a week before the end of the project, I offered to write chapter 5 in parallel with the execution of the tests, since I had already worked on the requirements and tests since the beginning of the project.

In conclusion, as part of this team, I can say that I am very proud to have worked with each member involved as well as our advisor and teacher Amílcar Pontes, who has always guided us clearly and objectively, present in all moments of our journey and weekly meetings. I learned many new things and the cooperation ever-present amongst the group ensured that whatever decision was made, it was discussed and respected by all members. each member had a very important and decisive role, the Database was carefully designed, the development of the application was crafted with great attention and all documentation was produced with substantial dedication.

Detailed demonstration of my personal growth journey as a result of the development of this project:

Through the links below, you can find out more about my work during the development of this project.

- Functional Requirements - POD

https://docs.google.com/document/d/1gSnS8mrsjGONFxh4GGFSFupk6Qg-Dp2XA0OB3387_-k/edit?usp=sharing (Google Docs Links where the Functional requirements is located)

- Test Case Planning

https://docs.google.com/spreadsheets/d/1ixjz5JLzY7LJYrXcKnmnDQ87jVyJxnJDDivXuPSX_aM/edit?usp=sharing (Google Docs Links where the Test Case Planning is located)

- Test Case Execution

https://docs.google.com/spreadsheets/d/1WhTGb-6Iku1nmOTt6K1LoR22KsxAKcZh3hW992w06LU/edit?usp=sharing (Google Docs Links where the Test Case Execution is located)

- Requirement Confirmation

https://docs.google.com/spreadsheets/d/1usCXCMDjcddj3yLCSTZG-UDis4lMIMDfzaBkOQMrjAM/edit?usp=sharing (Google Docs Links where the Requirement Confirmation is located)

Acronym List

Uma demonstração da lista de representação dos termos e acrônimos usados nesta documentação.

Abbreviation	Explanation
AI	Auto Incrimination
AUT	Application Under Test
AWS	Amazon Web Services
BBT	Black Box Testing
CSS	Cascading Style Sheets
DB	Database
ERD	Entity-Relationship Diagram
FK	Foregin Key
GUI	Graphical User Interface
HTML	Hyper Text Markup Language
JS	JavaScript
MySQL	My Structure Query Language
PHP	Hypertext Pre-processor
PK	Primary Key
POD	Plenty of Fish
SDLC	System Development Life Cycle
UK	Unique Key
UML	Unified Modelling Language
UML	Unified Modelling Language
W3C	World Wide Web Consortium

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