FINAL YEAR PROJECT:

Personal trainer to client service

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Abstract:

The main goal of the project is to develop a personal training software with implemented personal trainer (PT) to client tools. This will be achieved via a piece of software delivered through the medium of a website where a user can sign up and create an account. Moreover, the website will have information on nutrition, training, a personal trainer page and their GDPR rights. The main home page holds general information about the webpage, it's purpose and what each section covers. The nutrition section aims to educate users on calories, macros, weight loss, muscle gain, maintenance, supplements, vitamins and MyFitnessPal. Furthermore, the training section aims to guide users in the training ventures and inform them on various training styles. The nutrition and training information can be used by PT's as a guideline and reference to use for clients as well as drawing in more users and clients. Finally, when a user creates an account and signs up, they can either chose to create a personal trainer account or client account. Depending on the account type they will have different home page's and be able to do different things.

The following report will cover:

- A general overview of the project and its primary deliverables / goals.
- How the project was developed, its scope and achievements.
- A critical review of the project as a whole.

Contents

Introduction:

The aim of this project was to develop software for personal trainers primarily and clients secondary. Moreover, the primary goal was for personal trainers to be able to manage clients and keep track of progress. The secondary objective was to provide information for clients and personal trainers in terms of training programs and nutrition. For a breakdown of how requirements were gathered please refer to requirements gathering and for an analysis of requirements refer to requirements. A use case diagram can be found here. This section will outline the main project goals and achievements of the set-out project:

Home section:

The home page will feature a brief explanation of what the websites purpose is and what a user can do, as well as, what each page covers. Upon registration and log in the user will be greeted by a page unique to them. If they have created client type account, they will be able to upload their info in 2 stages; weekly progress and personal information. Weekly progress will be used to track their progress (e.g. weight loss), this will only be accessible by them and their respective trainer (if they have one). Moreover, there is a visual representation of their data (e.g. weight) to showcase progress. A client is also able to access training & nutrition programs uploaded by respective trainer (if they have one). If they so desire, they can also access their PT's information (if the trainer has opted to upload it). Finally, they are able to book online or in person training sessions; i.e. online would be more of a consultation or face to face / voice call chat. However, if they have created a PT account, they will be able to upload clients training or nutrition programs.

Nutritional Guide:

The primary goal of this section of the website is for clients and personal trainers to inform themselves on the basics of nutrition. In regard to personal trainer, though they should already hold a strong foundation on nutrition as part of their diploma, this section can serve to refresh their memory and as a quick reference guide. For clients this section can aid them on their fitness journey. This section has:

- an introduction to nutrition through calories & macro nutrition.
- weight loss, muscle gain, maintenance through food manipulation.
    - a brief cover of supplements, what they do and are used for.
    - MyFitnessPal (a food tracking app) and how to use it.

Training Programs:

The training section holds training programs that clients or personal trainers can use as references and guide them in training, as well as, being able to download the programs. Training programs cover bodybuilding training and a style that combines bodybuilding and strength (labelled hybrid).

GDPR:

The GDPR page is primarily there to inform users of their rights and how the websites handle their data. Moreover, this is to outline that the website is in fact GDPR compliant.

OBJECTIVE OVERVIEW:

1)	**PERSONAL TRAINER TO CLIENT MANAGEMENT TOOLS**
2)	**RESOURCES TO AID PERSONAL TRAINERS; I.E. NUTRITION & TRAINING TOOLS & PROFILE**
3)	**CLIENT (USER) RESOURCES TO AID IN THEIR FITNESS JOURNEY**

Methodology:

Project Management:

Project methodology approach:

For this project I have chosen to take a comprehensive Agile methodology with mixed variations in the approach. This approach was chosen over a standard Waterfall approach as the project by nature is dynamic. Moreover, this is due to the deliverables evolving and changing with the development of the project and its scope. These changes came from user input / feedback (client or personal trainer), time frame and skill set. For instance, the original plan was for users to sign up as either a PT or client upon registration, however, this was changed twice as is covered in the problems encountered section. In this instance the Agile approach meant I could amend the deliverables and timetable to reflect these changes and further implement them.

Moreover, as the Agile approach involves a short-fixed timeline (sprints) the project can adapt from given feedback and testing. These sprints will also be covered in a scrum with the project manager to raise any issues, questions and feedback; in accordance with agile these will take place in biweekly meetings. This came in particularly handy as issues that arose that were out of the current field of knowledge or where guidance was simply needed could be given. In addition, this meant that at times simple advice, such as, how to the best approach a problem or the correct direction to head in next could be discussed and covered further leading to a successful project.

Agile's primary purpose is to reduce risk in the development process. If not properly followed projects could fail due to deliverables/functions not fully developing, implemented and tested by the set due date. Agile eliminates this possibility because it enables the adaptation of work in the face of failure. In the case of this project this was the correct approach as certain deliverables simply could not be met in the set time frame. Whether this was due to the skill set, other pieces of university coursework, illness, or external circumstances. This can clearly be seen in sprint 5 which was completed around Christmas time and many of the deliverables were not completed and pushed back due to being sick for 3 weeks and all coursework being put on hold. Moreover, these deliverables were pushed back into sprint 10 and were successfully further implemented. Another key feature was the breakdown of deliverables into Must, Should and Could which enable a further breakdown of tasks into more achievable goals in a set time frame. With the deliverables broken down in such a manor the project could be driven by priority driven deliverables that if not complete would not be a detriment to the project. For instance, an extremely important feature such as the website being responsive (should) was successfully achieved, however, a drop-down menu (could) that would have helped for general navigation was pushed back due to the amount of time taken to complete the task.

Moreover, when designing the sprints and breaking down deliverables into must, should, could a few things had to be taken into account. Notably a realistic time frame to complete them, this is where the skill set, and research becomes apparent; as discussed in the PHP problem section. Having never built a front and back end website a lot of prior research had to be conducted in order to determine what is achievable and how to achieve it. For example, how to get a database talking to a website by using MySQL, PHP and HTML. Furthermore, if a waterfall approach had been taken many of the deliverables would have never been completed as when challenges were met, they would have massively held back the entirety of the project. For instance, in sprint 8 when implementing user inputted data, the entirety of the database had to be rebuilt and designed. Moreover, the issues with PHP experience, this is covered in the PHP problem section.

Requirement gathering:

This section will discuss the process of how requirements were gathered, and the tools used. For a further break down of what was found please refer to product description / requirements.

Brainstorming:

The first step involved brainstorming the main ideas and concepts behind the project. Furthermore, this was broken down into general sections and they're respective deliverables. This built the foundation of what the project was going to be and a main overview of the scope. As a decisive individual, these deliverables were developed with in-depth knowledge of the chosen field, a personal investment of time and concrete experience involved in running one's own business in the personal training field.

Survey / Interview:

The next step involved reaching out to fellow personal trainers and pitching the main concepts behind the project and furthermore, what they wanted from the project or a tool that would later become available on the market. This was done through direct messages to personal trainers I'd worked with in the past, friends still in the business and a couple posts on online forums.

Market research:

When considering the project scope and research a key component is what other pre-existing products are already available on the market. Though on the surface a website may not seem all that original, especially a personal training website vs an app. From hands on experience and market research conducted there is little to no product out there. Moreover, when looking at what is already available almost all products are application available as mobile or desktop apps and once again due to the skill level going into this project that was another consideration to take into account.

Hands on experience:

As previously mentioned, I have 2 years as a personal trainer with multiple diplomas and this was a major strength going into this project and finding deliverables. Having used various methods to manage clients and having researched and or used some of the tools available I knew what a PT would be looking for in such a project and what others were missing.

Development tools:

Brackets:

The primary IDE used in the development of this project was brackets as it is a great open source text editor for web development.

GitHub:

GitHub was used as a management tool and back up tool. GitHub meant code could be version controlled and track progress of the development of the project. Moreover, if at any point software was corrupted or lost on a computer system a backup was available on GitHub.

Brighton Domains:

When it came to hosting the website, Brighton holds its own domains and hosting system, therefore, it was logical to host the project on Brighton domains. XAMPP was another possibility (amongst many others) but Brighton domains met all needed criteria and 24/7 hosting capabilities. XAMPP would require a computer hosting the server which was not possible at this time.

Programming language experience:

Having come into computer science with a personal training background and no prior experience or coding experience. This has resulted in acquiring an intermediate level of programming through a steep learning curve over the course of 3 years. When approaching this project, it was taken into consideration that lack of experience and trying to implement 1 language (PHP) with no prior programming knowledge and though similar a relatively different MySQL vs the taught at university SQL server. Though it can be argued that coding is self-taught this had to be taken to a new level when implementing it at a high level for a final year project.

Language:	**Experience with language:**
HTML5	1 module in first year.
CSS	1 module in first year.
JavaScript	1 module in first year.
PHP	None
SQL server	2 modules in first year, 2 modules in second year.
MySQL	None

Testing:

This section will cover and discuss various methodology of testing taken into the project development life cycle. Furthermore, there are many available prospective methods of testing and ensuring a fully functional piece of software under any circumstance in the current scope and delivery time it was either obsolete, unnecessary or did not apply and therefore only the primary, relevant and most appropriate methods were taken into consideration and applied. Any evidence and screenshots of testing results can be found here:

https://jv148.brighton.domains/testing/

Unit testing:

As part of the testing element, unit testing was used to ensure all deliverables and functionality were met at a high standard. Moreover, all unit testing tables, and information can be found in Appendix B where the process information is documented. For this process each major function of the project (i.e. individual software component or module) was taken and tested individually to ensure it was fully functional without any errors. Furthermore, this testing was taken at the end of each sprint relative to the deliverable to ensure full functionality and the tests were designed to reflect if the deliverable was truly met and working fully. For instance, a major feature of the website was to have a responsive top navigation menu; i.e. functional and responsive on mobile and desktop devices. To ensure this was the case this was broken down into 2 test case; 1 for mobile and 1 for desktop users. In regard to the tables, they were constructed in such a way to be readable and succinct; clearly stating the date of completion, the deliverable they relate to and if they were successful or not.

Back end testing:

The back-end testing was performed twofold:

- firstly, by myself testing all the PHP and MySQL queries were functional and responsive in manor acceptable and at a high level of performance directly within the database.
- secondly all code was responsive and functional from a user standpoint, i.e. inputting user data on the webpage rather than directly into the database and checking all information was correctly inputted into the correct database.

Browser Compatibility Testing:

To ensure complete and utter comp ability and functionality the website was also tested on multiple browsers and operating systems. For this measure of testing the website was run and all functionalities were completed on mobile and desktop on Chrome, Firefox, internet explorer, Safari.

Security Testing:

Security testing was taken in multiple areas and steps in accordance with the processes involved in the website and potential areas for cyber-attacks. The type of security steps taken are covered in the security section in more depth, but overall the main sections there were exposed to potential attacks were:

- sign-up / log-in.
- uploading user data.

These were tested by trying to inject SQL statement into the fields which would in turn be injected into the database and lead to security flaws. Moreover, the user's privileges in the database were limited to inserting and updating. As well as, users trying to access the website as a logged in user without having created an account and bypassing the process in the URL.

Usability testing & User acceptance testing:

Usability was tested with a short survey completed by user's going through the process of using the website in its entirety; i.e. from signing up and creating an account to inputting their info and navigating the website. The survey included questions that were aimed at testing overall user experience, functionality and navigability. For instance, how easy they found it to create an account and log-in on a desktop or mobile version (half the participants were asked to use the website on a mobile and the other half on a computer so both spectrums were tested). Therefore, yielding a wider range of accurate result and testing.

In the case of user acceptance testing I could not conduct this testing myself as it is meant to be conducted by the client to verify that the flow of the system from end to end meets the business requirements. Moreover, this is meant to be done once all functionalities and features are completed and therefore was done at the very end of the project. This was also tested using a survey to test that all requirements were met at a high level and functionality. The questions that were used to question this were aimed towards the flow of the website and its content; i.e. if the implemented features made sense, obvious and were logical.

Product Description:

In this section I will cover what has successfully been created and implement as a project, a breakdown and explanation of the requirements and their origin, how they were implemented and an evaluation of the outcomes and choices. For a full breakdown of the sprint list and numbered deliverables please refer to Appendix A: sprint sheet.

What has been created:

In its current state the project reflects the creation of a fully responsive website with personal training tools, nutrition and training information, users GDPR rights and a functioning login / signup system. Moreover, the websites boast's a reactive menu, tables, images and forms that flow both on mobile and desktop devices. The desktop features a top navigation menu where if the user is signed in, they will see the top navigation buttons and a log out button, however, if they are signed out, they will see the boxes to sign in or sign up. The mobile version behaves the same way in terms of the signed in or not features and also holds a drop-down burger styled menu. Moreover, all tables, images and forms will resize to the appropriate sizes depending on the screen resolution.

Home page:

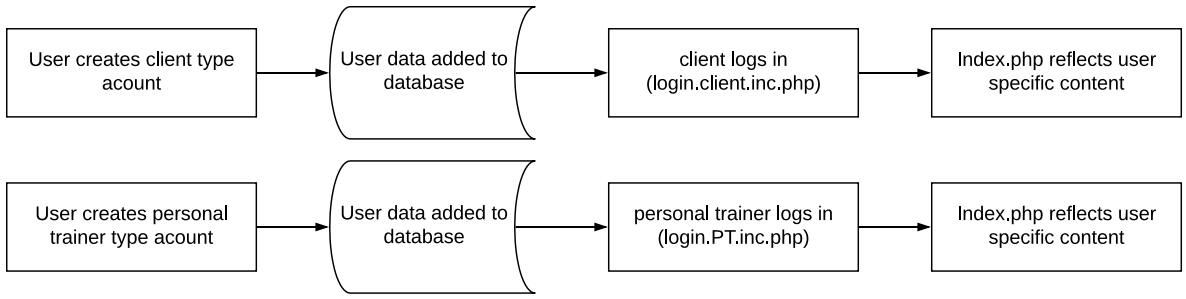
The website includes a home page where a user can find out what the website is about, where to find various information and what they can do. The user will also be greeted with a message depending if they are signed in or not; i.e. "you have successfully logged in" or "you are currently logged out; create an account and log in to access your account". The menu buttons to login or signup will also change to a sign-out button instead.

If a user has signed up and logged in as a client type user there home page will show:

- a form where they can update their weekly progress information; i.e. weight, any notes or feedback for themselves or a PT and their current goal.
- their personal information; i.e. gender, phone number, country of residence, any health problems, height and date of birth.

If a user has signed up and logged in as a personal trainer type user there home page will show:

- a contact form where they can input all their information that will be sent to an admin for approval.



Nutrition page:

The nutrition page currently holds a section where users can download the entirety of the nutrition information in the format of a word or pdf document. Moreover, there is a section where they can find recent studies on nutrition and helpful resources. The page also features an introduction to nutrition through food groups and the Eatwell plate in accordance with the NHS guidelines.

The next section covers and breaks down calories and their role in a diet; including:

- what a BMR is & a BMR calculator.
- what a TDEE is and a TDEE calculator.
- a break down table of caloric values in a table to emphasise the importance of calories.
- pros & cons of tracking calories.

A section that covers macro-nutrition, this section covers:

- a macros value in calories, macro vs micro, what each macro does.
- macro food values.
- pros and cons of tracking macro intake.

Weight (fat) loss section that covers:

- introduction to how to lose weight and what it in tales.
- weight loss with caloric tracking.
- weight loss with macro tracking.

A muscle gaining section that covers:

- introduction to how to gain muscle and what it in tales.
- muscle gain with caloric tracking.
- muscle gain with macro tracking.

Finally, there is a section that discusses general types of dieting and their pros and cons, a section that covers different supplements and their pros and cons. There is also a short guide on using MyFitnessPal.

Training page:

The training page currently holds a section where users can download the entirety of the training programs in the format of a word or pdf document. Moreover, there is a section where they can find recent studies on sports / exercise studies and helpful resources. However, the main feature of this page is pre-built training programs (referred to as blocks) that clients and trainers can user. Moreover, personal trainers can use this as a base and guide to build clients training programs and clients can use them as a guide to begin their fitness journey.

Personal Trainer page:

As a client type user, the main interest of this page is to search for a potential personal trainer to hire and this can be done with personal trainer profiles

GDPR page:

As the website handles sensitive and personal user data, it is my responsibility in accordance with GDPR to inform users of their GDPR rights. These rights include but are not limited to:

- what data is collected and how it is collected.
- where and how it is stored and for how long.
- why it is collected and stored.
- the procedure to have their data removed or find out more.

Requirements:

As previously mentioned in the requirements gathering section, the requirements were gathered from personal experience, market research and user requirement gathering techniques. In this section I will explore the findings and process, as well as, explain the requirements.

Brainstorming:

The first method involved brainstorming from hands on experience; this experience comes from a 2-year full time personal training career and 3 years of study at university for computer science. Furthermore, this led to a basic overview of the scope and its deliverables. In the context of the pre-alpha initial development phase of this project, this experience gave a firm grounding and knowledge base to guide the direction of the project.

During my career as a personal trainer I saw the benefit of simply having a profile on the gym company's website as it brought in clients organically. Moreover, this is why one of the main deliverables is a personal training profile with their information; such as, pricing, training style and experience. Furthermore, as the client base grew and it became difficult to manage all the payments, training sessions availability, times and many other management issues. As a result, I found myself searching for a better way to manage all these issues which led me down the path of apps / websites to manage clients. Due to these factors the original base scope involved a form of software were personal trainers could manage their clients and attract further clients with a customised profile. Once this base frame was set, I begun looking more at the computer science side of the project and what my best approach would be; this led to weighing an app vs a website-based approach.

This is where the intermediate experience in coding comes into play, though very limited, I did have some exposure to web development in first year and none in any application-based languages. As a result, I was leaning more towards a website-based platform rather than a mobile app. For a further breakdown of research into what other software is available on the current market please refer to the research personal training software section.

Survey / interview:

With the above-mentioned base scope and template, I was able to approach contacts in the personal training industry and attain further deliverables and concepts to develop during the life cycle of the project. They were highly interested in a website-based platform as most of the work they do requires a computer, for instance creating a training program in Microsoft excel on a mobile device is extremely difficult. Moreover, this led the project to become a client to business project rather than just a project inspired by my previous experience.

One key component that would was partially requested was the management of payment. Though there are some pieces of software out there that do hold this feature, many do not. In the case of this project it was not feasible and realistic for many reasons. This is discussed in depth in the payment feature section.

Evaluation:

I will be evaluating the choices I made and their impact they had on the project's completion. For an in-depth analysis and review of the projects success and failures please refer to the critical review section.

Risk analysis:

This section aims to cover the various impact of external factors on the project, these were covered in the interim report and that have arisen as the project developed, discussing if the mitigating steps taken were successful and to what degree.

Below is an outline of potential risks:

1. Loss of software & Version control.
2. Deliverable not completed by due date.
3. Checking if PT has recognised degrees.
4. Sign up & log in system.
5. User uploaded data.
6. Legal & ethical issues with nutritional & training section (disclaimer).
7. Linking clients to PT's and accessing client's information.
8. How to book sessions online.

1. Loss of software & Version control:

To combat the potential loss of software a few steps had to be taken. Firstly, a regular commit to GitHub, by doing so not only could version control be achieved, but if any catastrophic failure occurred with a computer or hard drive the project was backed up online. Moreover, for this back-up to truly be a back-up it was downloaded and run off a different machine to test if it functioned fully with no errors. In this instance a regular commit meant every 2 weeks or upon completion of a major deliverable (i.e. a must). Secondly, due to the project being worked on from home and university the main content was worked on using an external hard drive. As a result, if this hard drive was lost or damaged it would be detrimental to the project and this is where a backup would become essential. Finally, when it came to version control being key there were multiple instances were a component was broken or changed to a point that is was no longer functional. Thanks to version control, many headaches were avoided, and I was able to go back to a previous version without overwriting it and finding myself working backwards.

2. Deliverable not completed by due date:

As previously mentioned in the project methodology approach an Agile approach was taken to mitigate the impact of not completing a task in time. As a result, when planning on the developmental scope required the time needed to complete other modules was factored in and a 1 one-week block leading up the deadline was set. This was to enable and ensure that if needed any extra time and energy could be committed. Moreover, the potential risk of being sick or other external factors impacting productivity were factored in. This meant that if even 2 entire sprints were not completed beyond the must deliverables there would still be enough time to complete everything. In the case of this project, this became extremely vital as during the Christmas break, I found myself bed ridden and unable to work. Moreover, during this lockdown and pandemic one would be a fool to not admit the grave impact it had over the project and it's time frame.

3. *Checking if PT has recognised degrees:*

Another massive issue when approaching this project was the personal training title. As mentioned in the abstract the title of personal training is not protected like a doctor title and therefore anyone can claim to be a personal trainer. Moreover, this also applies to the title of dietitian vs nutritionist where a dietician requires to be registered with the Commission on Dietetic Registration (CDR). To combat these measures had to be taken which are further reflected in personal trainer title challenges section. This issue was overcome by having a personal trainer register on the website under a personal trainer account, then once they have logged in on their home page, they will be able to fill in a form with all the necessary information. This form is then emailed to an admin who will verify the information by sending them an email requesting photographic evidence of their qualifications and upon receiving those an admin will create a personal trainer profile on the personal trainer page of the website.

4. *Sign up & log in system:*

A major feature of the project being a user's ability and requirement to be able create an account and log in to see clients, their personal trainer and or their data. For this particular aspect the inexperience was a cause for concern and therefore required extra thought, planning and timing. This was reflected in the Gantt chart where the time required to complete this deliverable set was allocated more time. Moreover, further time was allocated to allow for research and learning.

5. *User uploaded data:*

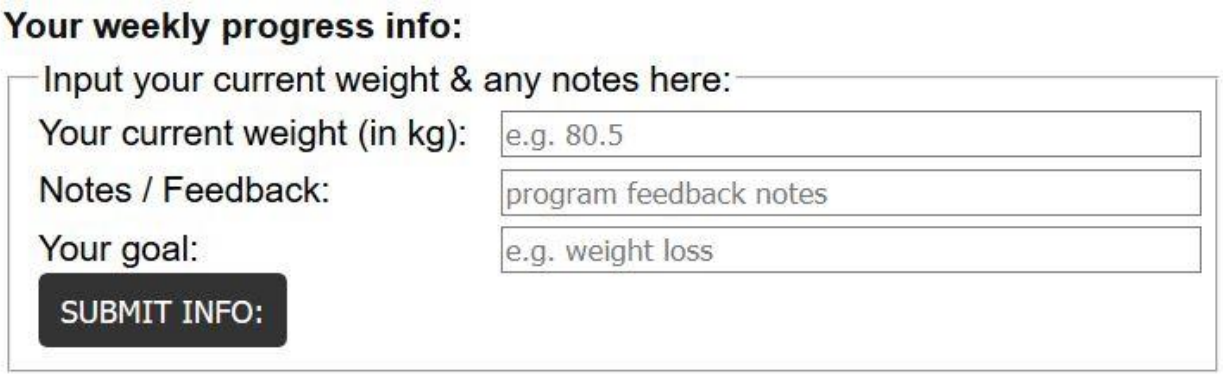
When developing this project and it's features another major component was the ability for users (both personal trainers and clients) to input their data. In the case of this project the data involved but was not limited to weight, age, height, gender, any health issues and more. This data was broken down into various sections and processes. The first time and place user data is collected is upon a user signing up and creating an account where they input their username, email and password into the database. The next stage where a user inputs data depends on the type of user, either as a client or personal trainer. If they are a client there will 2 stages:

Stage 1: weekly progress information:

In this section the client will input:

- their current weight.
- any notes or feedback about progress, thoughts or concerns about their progress or struggles.
- their goal, e.g. weight loss.

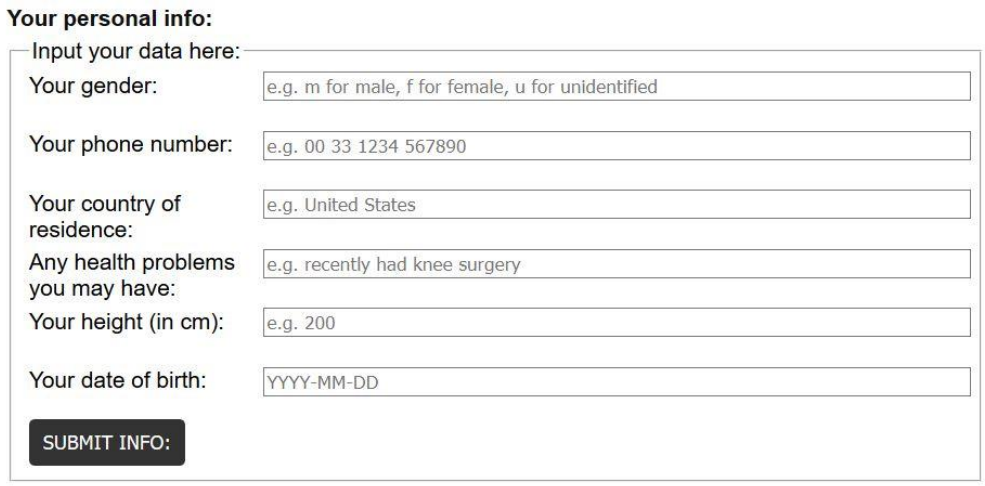
This data will be used by a personal trainer to track their progress and to check up on how the client is progressing on their goal. This is due to the data being updated weekly to reflect progress.



Stage 2: personal information:

This section collects:

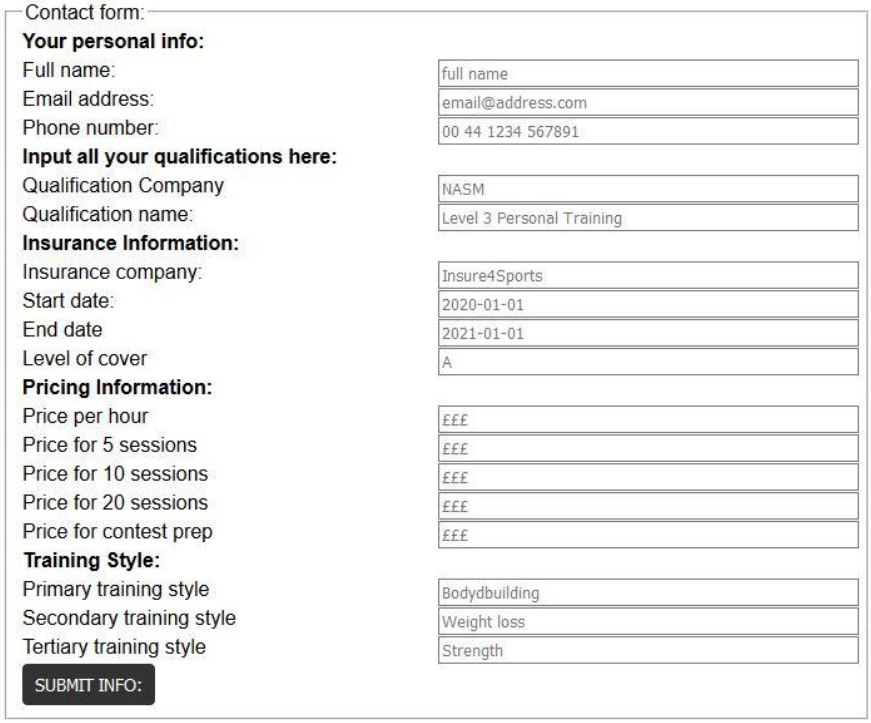
- data that is unlikely to change, such as, country of residence any health issues
- data that will should not change but can; such as, gender, height.
- data that will not change, e.g. date of birth.



This data input is cause for concern as user inputted data should not be trusted under any circumstances; for example, if a user is required to input their date of birth in the format of "YYYY-MM-DD" but are from the U.K. they might instinctively input it as "DD-MM-YYYY" and this will cause an error in the database. Moreover, if the user is a personal trainer their data will be inputted as follows:

Stage 1: applying for a PT account

As mentioned int the checking PT qualifications section a PT's information is collected via a form that emails the information to an admin.

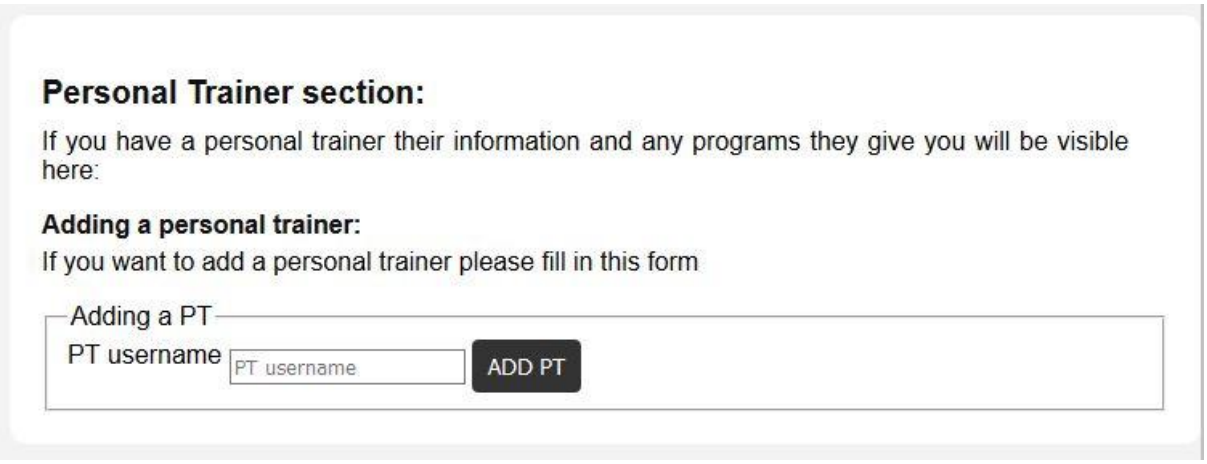


6. *Legal & ethical issues with nutritional & training section (disclaimer):*

When providing a training program and sessions as a personal trainer one must take into consideration the potential for legal and ethical issues, such as, a client becoming injured and taking legal actions against the PT. To combat this the website comes with a disclaimer for user when they agree to use any of the information provided it is at their own risk and consequences.

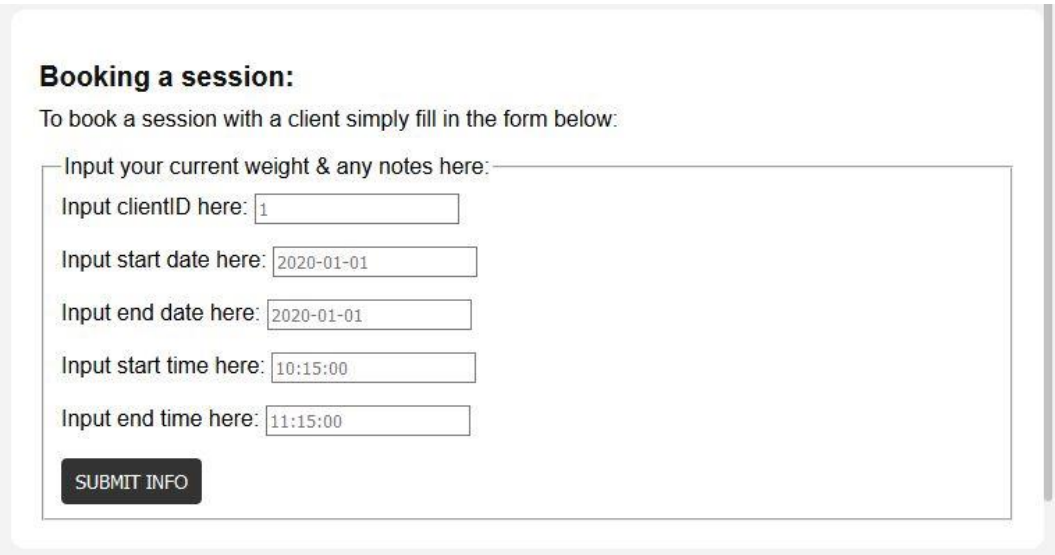
7. *Linking clients to PT's and accessing client's information :*

A client or PT could both easily abuse a badly implemented system for adding a client to a PT or a PT to a client. To combat this a 2-step verification method could be implemented, resulting in both a PT and a client having to confirm the connection. Moreover, this can be achieved via an email confirmation from both parties.



8. *How to book sessions online.*

Much like linking PT and client accounts, another function that could be easily abused without the correct implementation is client or personal trainers booking sessions. To overcome this the database was made to reflect one of the steps taken to counter act this, notably the booking table that needs a clientID and personalTrainerID to confirm the booking. Moreover, a unique constraint can be added requiring a unique personalTrainerID and clientID combination for a booking to be made changing the flag to true.



Critical Review:

In this section I will be critically reviewing my project as a whole, discussing and evaluating the areas of success in the project, the key problems and solutions encountered as well as areas of improvement.

Project success:

At face value the project is a website that holds some nutrition and training information, a log in system and some client or PT functions. However, at its core the project is so much more as outlined in the previous sections. In this section I will outline the main successes and achievements of this project.

Topnav & Login / Signup:

Firstly, the website would not be functional, reactive or user friendly if it wasn't for the topnav and its features. Moreover, in my personal opinion the burger menu is one of the key features of the website that took a lot of effort and time. This is due to the fact that it does not rely on any third-party software for the icon, it is purely coded in with CSS, JavaScript and HTML. This is better than using a 3rd party software as some companies do not allow this and it pushes my learning to better understand what it takes to make JavaScript and CSS work together to yield the desired result. Furthermore, the menu reflects an easy to use menu for users to navigate the website and be able to sign up or log.

Nutrition & Training section:

Although it is not truly a computer science related section and application, the nutrition and training section required me to research the needed information and implement the gained knowledge to produce a high-level product that a personal training website would hold. For instance, in the nutrition section I could not simply list knowledge I had learned and would often give to clients. It had to be broken down into clear and concise section to aid in digesting the information for optimal learning. The information and scientific knowledge are all supported by research and references.

Personal Trainer section:

As previously mentioned, the main problem being the title not being protected and this called for careful consideration.

PHP:

Having to learn PHP with no prior experience was quite a challenge and one I believe I overcame and handled well. With that said, a fully functioning signup and login system where a user can register as either a personal trainer or client which at first felt like a task that I would not be able to achieve and would have to find another way to implement. After taking some more time to learn PHP and better understand how the script works, I realised how "simple" it would be to add further steps. However, this still left the issue of the database design and extra steps to manage personal trainers. All in all the system reflects a professional approach and thought out system that though can be improved (like anything) has had a huge amount of effort and thought to take it as far as possible within the scope

Security:

Though cyber security was never covered in a university course or few tutorials give much thought to implementing security and rather focus on teaching material and the basics. It would be foolish not to take into consideration the potential for malicious intent taken towards the software, especially when a database holds sensitive user data (though for the purpose of this project and demo it does not for legal and ethical reasons). Moreover, one key issue and the most common type of attack would be SQL injections. To combat this a few measures were taken, notably prepared statements which were used inside the signup and login system and reinforced with error handlers. These error handlers were used to ensure that users could not access logged in information by typing in SQL or links into the URL as well as ensuring information was entered correctly, e.g. both password match. Another method used was the implementation of code to escape special characters in a string; i.e. injecting SQL statements in forms that would input that SQL into the database resulting in unauthorised access. This was overcome by using “mysqli_real_escape_string”. Furthermore, security approaches were taken database side by hashing all user passwords and setting the database permissions of users to only be able to “insert” and “update”; i.e. they cannot create or alter tables.

Problems encountered:

In this section I will discuss the major issues and problems I faced and overcame during this project and its development.

PHP:

Login & signup:

A major component of the project and one that causes many issues was the login system, the primary cause being the skill and knowledge level. The first hurdle that had to be overcome was a login system for users to create an account and log in. This begun with a rather simple single user log in system, however, it evolved into a slightly more complex system where a user can register as a personal trainer or a client and log in accordingly. As mentioned in the project management section this login system was amended multiple times due to skill level and deliverable demands. The original system was designed in such a way for a user to create an account following the sign-up form and their information would be registered into a table called "*users*" rather than it being broken down into client or personal trainer. Moreover, this was then amended to reflect the deliverables and requirements better as on the second attempt my level of PHP was much higher, and I was able to approach with a clearer grasp of the methodology. These changes also meant changing the entire sign up process and log in process as now a user would need to be able to select what user type they wanted to be and run the appropriate PHP script. This also had an impact on the layout of the website, I will discuss this further in the CSS section.

Another issue I faced during this project's login and signup was learning the importance and functionality of placeholders. These hold a vital position as they are used for security, storing information and many more features I was using in this project. For instance, when it came to displaying information depending on the user type that is logged in these placeholders and session variables were key.

User data:

Another major component of the project was the user's data input, such as, a client's progress information or a personal trainer's information for their profile and verification. The two biggest issued faced for this part of the project were:

1) Users cannot be trusted to input information.
2) How to handle that data.

To combat this wherever a user has to input their own data a *placeholder* is used to give an example of the format the data should be inputted in.

Accessing database information:

A considerable portion of this project was storing user data, how to store it and how to handle it; with the majority of this happening in PHP I discuss the MySQL issues later on. Moreover, this meant getting a better understanding of how PHP handles variables and accesses them within a database to get the desired result, notably considerable attention also needed to be made in regard to error messages to better understand what I was doing wrong and why. I started with revisiting the log in script and understanding variables and how to pass them with data, notably using "*$_SESSION*" to store user information upon login to then pass on later on when necessary. For example, when a user logs in as a client or a personal trainer the index page will show information based on the user ID type.

Personal Training Title:

Finally, when a user signs up they are automatically assigned as a client type, if a user desires to use the software as a personal trainer they will need to take a few extra steps. Firstly, they will need to create an account (if they haven't done so already) and navigate to the trainer page. On this page they will be able to apply to become a registered personal trainer which is covered in more depth in the checking PT qualification section. This is due to, the fact that as a title personal training is not protected (like doctor is) and therefore anyone can claim the title of personal trainer. To combat this, I have added these extra steps. Here they will be able to submit all relevant needed information. In the instance of this project PT refers to a Personal Trainer and a client refers to a user that is linked to a certain PT.

CSS:

In the development life cycle of this project CSS has caused its fair share of issues notably the general responsiveness aspect of the website. For this project I decided to take a mobile first approach; i.e. designing the websites look on a mobile device first and then other screen ratios. This approach was completely new to me and meant a lot of tutorials available were outdated and had to be massively adapted. Moreover, the initial design and implementation of the log in system in the menu was not mobile first and this meant having to adapt the project.

As mentioned in the login & sign up issues, changes had to be made to the process a user goes through during registration. Due to this, this meant implementing a new design on the webpage for a user to login and register as the previous system made it rather complex to implement. The original format held a log in form and sign up button within the menu and the new system implemented a log in page rather than in the menu (shown in Appendix D).

Whilst developing the responsive features of the webpage implementing the multiple features the way I wanted them to look and for them to be functional caused a few cases that required extensive problem solving. For instance, implementing the burger icon without any 3rd party software and holding the login / signup options separate from other menu links on the desktop version. Moreover, another issue was the use of a *<header>* tag rather than a *<topnav>* tag, which regrettably created a rather large set of issues and challenges that could have perhaps been avoided and implemented better.

MySQL:

When it came to the database side of this project, I had to learn MySQL, and although it shares many similarities to SQL server (which we were taught at university) it was different enough that there was a learning curve that needed to be taken into consideration. When I began this project and was learning PHP, I wasn't even aware of this difference, so I had to take a step back and do some more research. Moreover, the primary and secondary difference were data types and Primary or Foreign Keys. In the instance of this database it meant researching what data types are "best" suited for the specific function needed in this database and how to apply them. For instance, when it came to a client gender the best method of approach used "*enum*" or weight and height using "*decimal*", the key learning outcome was how to correctly use them and implement them compared to SQL server or tutorials that typed them wrong. Furthermore, in MySQL I could not simply refer to a foreign key like in SQL server this once again meant further research and learning how to implement and user "engine=innodb".

Illness, Mental Health & Covid-19:

In a major project like this one, time management, human error, illness and many more factors will always have a massive impact on a project. In the case of this project it cannot be ignored of the staggering impact the global lockdown and pandemic has had on productivity, mental health and burn out. Moreover, during the Christmas period I found myself bed ridden with the flu and these 3 weeks of getting no work done pushed not only the final year project back 3 weeks but also all other coursework which has had a knock-on effect on my university work as a whole.

GDPR:

When developing a website, it is vital to make sure it follows all applicable GDPR laws and during this project I had to ensure that was the case. This meant researching what the laws were and which ones applied to this project then implementing them in respect to the way that the project (database) hands user information, gathers information and their rights to that information.

Areas for improvement:

Payment feature:

One area of improvement for this project that it lacks compared to other software out there is the option to manage payments and keep track of them. This would however require a SSL certificate and this what not possible as it would have to be bought and implemented into Brighton domains. Moreover, as the webpage is being run off Brighton domains, I cannot personally fully test how secure it is and potential vulnerabilities. This also infers with the need for a complex secure database to hold any card details and payment methods.

Better calculators:

Another key improvement would have been better designed calculators, i.e. the TDEE and BMR calculators to allow for different units of measure; e.g. pounds as well as kilograms. This would be a nice addition as not all countries function off the metric system and will not require further user conversion. This could also mean the user is more interested in using the full spectrum of resources within the project.

Booking sessions:

In its current state only, a personal trainer can book a session with a client. In a future version the system would reflect a 2-way verification system to so both clients and PT's can book sessions. This verification can be done by a email confirmation from both recipients. Moreover, currently the PT needs to take the client ID that is given to them from the list of clients (placed above the booking form) and insert it along with start and end date / time for the session which is added to the database. Further improvement could also have it so instead of inputting an ID they could do it based off email / username and have a script that takes the username / email. This will run a php script that searches for the ID linked to that username / email and stores it to then make a booking as bookings are made via an ID. Although the ID could also be changed to username / email as all username or emails should be unique just like the ID. Another improvement would be to have this booking emailed to confirm for both participants and have a reminder on their logged in page.

Personal Trainer to Client link:

In this version the client adds the personal trainer using the "adding a PT" form, this will then link the PT to the client by adding that PT's ID as a foreign key into the client table; i.e. the client insert's the PT's username they found on the "personal trainer profile" page. Furthermore, a better system, would be to have a "add PT" button underneath a PT's profile that way the user doesn't need to do the above-mentioned steps. This would be implemented by adding another logged in only apparent button upon log in and a 2-step email verification to avoid abuse or malicious intent.

Better error messages:

In its current state the website's error messages can not be the clearest or most helpful, this is due to the main focus being on completing deliverables to do the task they were meant to rather than focusing on extremely concise error messages. Although the signup and login system do have extensive error handlers and error messages, other ones such as the client information update form does not return what they have done wrong, simply that their records were not updated. Moreover, the placement of these error message could be better designed as right underneath is not always best practice.

Client personal info form & error message:

The contact form user inputted data with an example (placeholder) to guide them as to the format in which information needs to inputted. Although this is a simple guide so users can input information in the right format it is easy for users to input data in the wrong format. For example, the date format follows “YYYY-MM-DD” to be correctly be input into the database. Moreover, if a user were to input in the style many Europeans are familiar with “DD-MM-YYYY” or the American style of “MM-DD-YYYY” without carefully looking at the placeholder this will result in an error and the user may not know why. A better way of implementing this feature would be to have users select the date with a drop-down box.

Furthermore, another feature that would be of great benefit would be for more accurate error messages to be returned. For example, rather than “Data not successfully added” and a URL message saying, “data not added”. This would require a slightly more complex PHP script that returns errors depending on the SQL error type or takes the user inputted information and runs it through some error handlers, for example like what was done in the login and signup script.

Personal Trainer profile:

In this current set up, a PT must fill in a form on their logged in index page that will email a database admin who will reply to the email asking for photographic evidence of qualifications and insurance. Upon receiving this information an admin will add this information to the PT’s database profile and create a profile of them on the personal trainer webpage. A better system would have the PT do all of this themselves then an admin will email the PT asking for verification and upon receiving this evidence they will approve the profile. Adding this feature would make the overall website and features more user friendly and overall easier to follow.

Password reset & Deleting account:

Although not overly complex now that I understand the process of adding individuals to a database with PHP, error handling, session variables and placeholders adding a feature for users to delete their account or reset their password would not be unfeasible as it was previously. However, in the current time frame and scope of the project this was not possible and in a future version this would be a great addition.

Menu drop-down & side nav:

One of the deliverables that was not complete was the implementation of a side navigation menu. Although an early version of the project did feature one, the change to mobile first and implementing all the menu features the side menu feature got pushed aside and later revisited as a drop-down menu instead. In a future version a desktop platform would feature a side navigation menu on the pages that are relevant for ease of access and reduce large amounts of scrolling as well as a drop-down menu to quickly access the exact section a user wants. Where a drop-down menu refers to the main topnav menu holding a drop-down styled feature; i.e. a user hovers the mouse over nutrition and a menu displays showing all the sections of the nutrition page, such as, weight loss. Moreover, a side nav refers to a navigation pane on the left of the website holding the main section headings for ease of access. The mobile version would feature only the drop-down feature.

Learning Outcomes:

In this section I will cover the impact the gained knowledge, experience and overall development of this project will have on future projects. Moreover, covering the impact on future projects such as setting out deliverables, time management, scope and more.

Impact on future projects:

Order of deliverables:

Due to the developmental cycle of the project I could not implement user inputted data function until I had users on the system; i.e. I could not implement a client uploading their weekly progress information until I had implemented a method for users to have an account linked to their information. In an ideal scenario this would have been implemented first as this is where I really started to understand and make progress with PHP's methodology and how to implement things with greater ease and at a higher level of complexity.

Documentation / report:

In hindsight writing down in more depth the issues I faced, how I overcame them and what I learned in greater detail whilst it was still fresh in mind rather than just short bullet points. This meant that later on do not make as much sense or meant I had to fill in the blanks later on in the report.

Learning a new language / API:

In any future projects I would allocate much more time to learning a fuller spectrum of knowledge and skill with a language before embarking on a project of this scale. And therefore, rather than focusing on learning only what is needed and how to do the tasks I had to set out. Furthermore, this would mean in the long term that a projects progression would be much more stable, efficient and easier to undertake as the skills and understanding would be much better grounded and routed.

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Appendices:

Appendix 1 (meeting record):

30/10/2019:

- First meeting to discuss project proposal idea.
- Discussed use of Brighton Domains.

13/11/19:

- Discussed interim report & Gantt Chart issues.
- Covered research and progress of project scope.

Viva Project feedback (27/11/2019):

- Discussed potential problem areas and how to combat them such as personal information being accessed by PT's.
- Add webpage to about use and management of data (GDPR).
- Requirements need to be numbered & prioritised into Must, Should, Could.
- Potential API to convert responsive website to app; e.g. PhoneGap.

11/12/2019:

- Discussed agile approach and impact on increments (sprints).
- Discussed approach to showing different content on a page depending on user type.
- Covered concern for project complexity and potential for expansion.
    - change to sprint increment to allow for this.

22/01/2020:

- Discuss updating sprint chart to reflect what has been completed or pushed back.
- Discussed calculator functions (already covered in sprint).
- Advice for creating a responsive website (CI345 web dev).
- Discussed GDPR page and adding data dictionary to identify personal and sensitive information.

24/02/2020:

- Reviewed amended sprints sheet and deliverables.
- Discussed testing tables / test cases and related sprint to test number.
- Covered CSS progress and issues with menu, using browser inspect to narrow down issue.

09/03/2020:

- Reviewed sprint sheet and progress advised to move none completed (pushed back) into new sprint).
- Covered testing in more depth, unit vs integration.
- Covered version control that has been implemented.
- Discussed taking mobile first approach to project & breakpoints.

23/03/2020:

- Discussed menu implementation, testing & sprint progress.
    - amendments to mobile first approach.

30/03/2020:

- Covered menu & media queries being fully implemented and removing all 3rd party software.
- Designing burger menu using pure CSS & HTML.
- Implement client and PT page into next sprint and take any uncompleted deliverables into new sprint at the end of project life cycle.
- Discussed PT title not protected and how to implement relationship between client & PT.

02/04/2020:

- Discussed validating HTML & CSS for any issues to find any errors, including fatal ones.

27/04/2020:

- Discussed new application of database and ERD to better reflect project requirements.
- Covered documentation table.

04/05/2020:

- Advised on changes to database, merging some redundant tables and consider impact on PHP.
- Advised to refer to rubric to ensure all elements are covered for highest grade possible.

Appendix 2: GitHub

https://github.com/JohnDVos/Final-Year-Project--John-Vos

Appendix 3: Presentation

https://web.microsoftstream.com/video/53da388b-705d-47bd-a8af-2cf1f20e5d55

Further Appendices:

Appendix A: Sprint plan

Sprint:	Deliverable:	Must / Should / Could:	Completed?	Working & Tested:
Sprint 1: (general set up)	1. Home web page	M	Yes	Yes
	2. Nutrition web page	M	Yes	Yes
	3. Training web page	M	Yes	Yes
	4. Personal Trainer web page	M	Yes	Yes
	5. FAQ web page	M	Yes	Yes
	6. GDPR web page	M	Yes	Yes
	7. Header & footer on all pages.	S	Yes	Yes
	8. CSS	C	Yes	Yes
Sprint 2: (nutrition & training)	9. Nutrition document	M	Yes	Yes
	10. Bodybuilding document	M	Yes	Yes
	11. Nutrition web page	S	Yes	Yes
	12. Bodybuilding training web page	S	Yes	Yes
	13. Hybrid training web page	C	Yes	Yes
Sprint 3: (log in & sign up)	14. Sign up (database)	M	Yes	Yes
	15. Sign up client page	M	Yes	Yes
	16. Sign up personal trainer page	M	Yes	Yes
	17. Log in client page	M	Yes	Yes
	18. Log in personal trainer page	S	Yes	Yes
	19. Log out	S	Yes	Yes
	20. Log in CSS	C	Yes	Yes
	21. Sign up CSS	C	Yes	Yes

Sprint:	Deliverable:	Must / Should / Could:	Completed?	Working & Tested:
Sprint 4: (nutrition)	22. Disclaimer; GP, legal & ethical.	M		
	23. Intro to nutrition, calories.	M	Yes	N/A
	24. Intro to nutrition, macros.	M	Yes	N/A
	25. Weight loss section.	S	Yes	N/A
	26. Weight gain section.	S	Yes	N/A
	27. Weight maintenance section.	S	No	N/A
	28. Supplements section	C	No	N/A
	29. MyFitnessPal	C	No	N/A
Sprint 5: (training)	30. Bodybuilding training program.	M	Yes	N/A
	31. Hybrid training program.	M	Yes	N/A
	32. Can download training programs.	M	Yes	N/A
	33. 1 rep max calc (more than 1 rep function).	S	No	N/A
	34. Abbreviation dictionary.	S	No	N/A
	35. Explanation of training block.	S	Yes	N/A
	36. Create own training program.	C	No	N/A
	37. Reminder when training blocks start & end.	C	No	N/A
Sprint 6: (GDPR & Index Page)	38. GDPR relevant article	M	Yes	N/A
	39. GDPR laws compliant	M	Yes	Yes
	40. Links & contact info for laws	S	Yes	Yes
	41. Links & short write up	C	Yes	Yes
Sprint 7: (Responsiveness)	42. Top navigation menu	M	Yes	Yes
	43. Log In system menu integrated	M	Yes	Yes
	44. Table	S	Yes	Yes
	45. Images	S	Yes	Yes
	46. Side navigation menu	C	No	No
	47. Forms	C	Yes	Yes

Sprint:	Deliverable:	Must / Should / Could:	Completed?	Working & Tested:
Sprint 8: (Client page)	48. Upload data; e.g. weight, height, etc…	M	Yes	Yes
	49. Visual representation of data; e.g. graph.	S	No	No
	50. Access to training programs.	S	No	No
	51. Access to diet programs.	S	No	No
	52. Book training session.	S	No	No
	53. Access to PT information.	C	No	No
Sprint 9: (PT page)	54. Upload personal info	M	Yes	Yes
	55. Check for valid degrees.	M	Yes	Yes
	56. Upload diet programs.	S	No	N/A
	57. Upload training programs.	S	No	N/A
	58. Book training sessions.	S	No	N/A
	59. Upload contact info.	C	No	N/A
Sprint 10: (Pushed back)	60. Weight maintenance section.	S	Yes	N/A
	61. Supplements section	C	Yes	N/A
	62. MyFitnessPal	C	Yes	N/A
	63. 1 rep max calc (more than 1 rep function).	S	Yes	Yes
	64. Abbreviation dictionary.	S	Yes	N/A
	65. Create own training program.	C	Yes	N/A
	66. Reminder when training blocks start & end.	C	No	N/A
	67. Side navigation menu	C	No	N/A
	68. Visual representation of data; e.g. graph.	S	No	N/A
	69. Access to training programs.	S	Yes	N/A
	70. Access to diet programs.	S	Yes	N/A
	71. Book training session.	S	Yes	N/A
	72. Access to PT information.	C	No	N/A
	73. Upload programs.	S	No	N/A
	74. Upload contact info.	C	Yes	N/A

Appendix B Unit testing:

1) Sign Up test cases:

1.1 Sign up success (client):

Test Number:	1.1	Name:	Sign up success client
Requirement Number:	19, 20		
Start Date:	26/02/2020	End Date:	26/02/2020
Pre-condition:	1. User has successfully opened the website and found the sign-up page following links in the main menu.		
Steps: 1. Has chosen to sign up as a client. 2. Fill in unique username. 3. Fill in unique e-mail. 4. Fill in password. 5. Fill in identical repeat password. 6. Click “SIGNUP”.			
Expected Result:	User is greeted with a sign-up success message; user’s data is added to database.		
Actual Result:	User is greeted with a sign-up success message; user’s data is added to database.		
Pass / Fail:	Pass		

1.2 Sign up success (PT):

Test Number:	1.2	Name:	Sign up success PT
Requirement Number:	19, 20		
Start Date:	26/02/2020	End Date:	26/02/2020
Pre-condition:	1. User has successfully opened the sign-up page following links in the main menu.		
Steps: 1. Has chosen to sign up as a PT. 2. Fill in unique username. 3. Fill in unique e-mail. 4. Fill in password. 5. Fill in identical repeat password. 6. Click “SIGNUP”.			
Expected Result:	User is greeted with a sign-up success message; user’s data is added to database.		
Actual Result:	User is greeted with a “sign up success” message.		
Pass / Fail:	Pass		

1.3 Sign up fail username already taken (client):

Test Number:	1.3	Name:	Sign up fail username already taken (client)
Requirement Number:	19, 20		
Start Date:	26/02/2020	End Date:	26/02/2020
Pre-condition:	1. User has successfully opened the sign-up page following links in the main menu.		
Steps: 1. Has chosen to sign up as a Client. 2. Fill in username that is already taken. 3. Fill in unique e-mail. 4. Fill in password. 5. Fill in identical repeat password. 6. Click “SIGNUP”.			
Expected Result:	User is greeted with a sign-up error message; username already taken.		
Actual Result:	User is greeted with a sign-up error message; username already taken.		
Pass / Fail:	Pass		

1.4 Sign up fail username already taken (PT):

Test Number:	1.4	Name:	Sign up fail username already taken (PT)
Requirement Number:	19, 20		
Start Date:	26/02/2020	End Date:	26/02/2020
Pre-condition:	1. User has successfully opened the sign-up page following links in the main menu.		
Steps: 1. Has chosen to sign up as a PT. 2. Fill in username that is already taken. 3. Fill in unique e-mail. 4. Fill in password. 5. Fill in identical repeat password. 1. Click “SIGNUP”.			
Expected Result:	User is greeted with a sign-up error message; username already taken.		
Actual Result:	User is greeted with a sign-up error message; username already taken.		
Pass / Fail:	Pass		

1.5 Sign up fail password repeat (client):

Test Number:	1.5	Name:	Sign up fail password repeat (client)
Requirement Number:	19, 20		
Start Date:	26/02/2020	End Date:	26/02/2020
Pre-condition:	1. User has successfully opened the sign-up page following links in the main menu. 2. Has chosen to sign up as a client.		
Steps: 1. Fill in unique username. 2. Fill in unique e-mail. 3. Fill in password. 4. Fill in not-identical repeat password. 5. Click “SIGNUP”.			
Expected Result:	User is greeted with an error message saying, “passwords do not match”.		
Actual Result:	User is greeted with an error message saying, “passwords do not match”.		
Pass / Fail:	Pass		

1.6 Sign up fail password repeat (PT):

Test Number:	1.6	Name:	Sign up fail password repeat (PT)
Requirement Number:	19, 20		
Start Date:	26/02/2020	End Date:	26/02/2020
Pre-condition:	1. User has successfully opened the sign-up page following links in the main menu. 2. Has chosen to sign up as a PT.		
Steps: 1. Fill in unique username. 2. Fill in unique e-mail. 3. Fill in password. 4. Fill in not-identical repeat password. 5. Click “SIGNUP”.			
Expected Result:	User is greeted with an error message saying, “passwords do not match”.		
Actual Result:	User is greeted with an error message saying, “passwords do not match”.		
Pass / Fail:	Pass		

1.7 Sign up fail blank field (client):

Test Number:	1.7	Name:	Sign up fail blank field (client)
Requirement Number:	19, 20		
Start Date:	26/02/2020	End Date:	26/02/2020
Pre-condition:	1. User has successfully opened the sign-up page following links in the main menu. 2. Has chosen to sign up as a client.		
Steps: 1. Fill in unique username (or leave blank). 2. Fill in unique e-mail (or leave blank). 3. Fill in password (or leave blank). 4. Fill in not-identical repeat password (or leave blank). 5. Click “SIGNUP”.			
Expected Result:	User is greeted with an error message saying, “fill in all fields”.		
Actual Result:	User is greeted with an error message saying, “fill in all fields”.		
Pass / Fail:	Pass		

1.8 Sign up fail blank field (PT):

Test Number:	1.8	Name:	Sign up fail blank field (PT)
Requirement Number:	19, 20		
Start Date:	26/02/2020	End Date:	26/02/2020
Pre-condition:	1. User has successfully opened the sign-up page following links in the main menu. 2. Has chosen to sign up as a PT.		
Steps: 1. Fill in unique username (or leave blank). 2. Fill in unique e-mail (or leave blank). 3. Fill in password (or leave blank). 4. Fill in not-identical repeat password (or leave blank). 5. Click “SIGNUP”.			
Expected Result:	User is greeted with an error message saying, “fill in all fields”.		
Actual Result:	User is greeted with an error message saying, “fill in all fields”.		
Pass / Fail:	Pass		

2) Login test cases:

2.1 Login success (client):

Test Number:	2.1	Name:	Login success (client)
Requirement Number:	21		
Start Date:	26/02/2020	End Date:	26/02/2020
Pre-condition:	1. User has successfully created an account with a unique username / email and password. 2. User has remembered correct email address or username & password.		
Steps: 1. User fills in their unique username or email into the username / email field & their unique password correctly. 2. User clicks the log in button or enter key.			
Expected Result:	1. User is able to log in successfully & is prompted by a "you have successfully logged in" message on home screen. 2. User has client relative information displayed on the index page & login / Sign up buttons change to log out.		
Actual Result:	1. User is able to log in successfully & is prompted by a "you have successfully logged in" message on home screen. 2. User has client relative information displayed on the index page & login / Sign up buttons change to log out.		
Pass / Fail:	Pass		

2.2 Login success (PT):

Test Number:	2.2	Name:	Login success (PT)
Requirement Number:	21		
Start Date:	26/02/2020	End Date:	26/02/2020
Pre-condition:	1. User has successfully created an account with a unique username / email and password. 2. User has remembered correct email address or username & password.		
Steps: 1. User fills in their unique username or email into the username / email field & their unique password correctly. 2. User clicks the log in button or enter key.			
Expected Result:	1. User is able to log in successfully & is prompted by a "you have successfully logged in" message on home screen. 2. User has PT relative information displayed on the index page & login / Sign up buttons change to log out.		
Actual Result:	1. User is able to log in successfully & is prompted by a "you have successfully logged in" message on home screen. 2. User has PT relative information displayed on the index page & login / Sign up buttons change to log out.		
Pass / Fail:	Pass		

2.3 Login failure – incorrect email / username (client):

Test Number:	2.3	Name:	Login failure – incorrect email / username (client)
Requirement Number:	21		
Start Date:	26/02/2020	End Date:	26/02/2020
Pre-condition:	1. User has successfully created an account with a unique username / email and password.		
Steps: 1. User fills in their unique username or password in the email / username field incorrectly. 2. User has entered a password into the password field. 3. User clicks the log in button or enter key.			
Expected Result:	1. User is not logged in and home page displays not logged in message. 2. Navigation bar displays "https://jv148.brighton.domains/final_year_project/index.php?login=wronguidpwd"		
Actual Result:	1. User is not logged in and home page displays not logged in message. 2. Navigation bar displays "https://jv148.brighton.domains/final_year_project/index.php?login=wronguidpwd		
Pass / Fail:	Pass		

2.4 Login failure – incorrect email / username (PT):

Test Number:	2.4	Name:	Login failure – incorrect email / username (PT)
Requirement Number:	21		
Start Date:	26/02/2020	End Date:	26/02/2020
Pre-condition:	1. User has successfully created an account with a unique username / email and password.		
Steps: 1. User fills in their unique username or password in the email / username field. 2. User has entered a password into the password field. 3. User clicks the log in button or enter key.			
Expected Result:	1. User is not logged in and home page displays not logged in message. 2. Navigation bar displays "https://jv148.brighton.domains/final_year_project/index.php?login=wronguidpwd		
Actual Result:	1. User is not logged in and home page displays not logged in message. 2. Navigation bar displays "https://jv148.brighton.domains/final_year_project/index.php?login=wronguidpwd		
Pass / Fail:	Pass		

2.5 Login failure – incorrect password (client):

Test Number:	2.6	Name:	Login failure – incorrect password (client):
Requirement Number:	21		
Start Date:	26/02/2020	End Date:	26/02/2020
Pre-condition:	User has successfully created an account with a unique username / email and password.		
Steps: 1. User fills in their unique username or password in the email / username field. 2. User has entered a wrong password into the password field. 3. User clicks the log in button or enter key			
Expected Result:	1. User is not logged in 2. Navigation bar reads "https://jv148.brighton.domains/final_year_project/index.php?error=wrongpwd"		
Actual Result:	1. User is not logged in 2. Navigation bar reads "https://jv148.brighton.domains/final_year_project/index.php?error=wrongpwd		
Pass / Fail:	Pass		

2.6 Login failure – incorrect password (PT):

Test Number:	2.6	Name:	Login failure – incorrect password (PT):
Requirement Number:	21		
Start Date:	26/02/2020	End Date:	26/02/2020
Pre-condition:	User has successfully created an account with a unique username / email and password.		
Steps: 1. User fills in their unique username or password in the email / username field. 2. User has entered a wrong password into the password field. 3. User clicks the log in button or enter key			
Expected Result:	1. User is not logged in 2. Navigation bar reads "https://jv148.brighton.domains/final_year_project/index.php?error=wrongpwd		
Actual Result:	1. User is not logged in 2. Navigation bar reads "https://jv148.brighton.domains/final_year_project/index.php?error=wrongpwd		
Pass / Fail:	Pass		

2.7 Login failure – PT username for client login:

Test Number:	2.7	Name:	Login failure – PT username for client login:
Requirement Number:	21		
Start Date:	26/02/2020	End Date:	26/02/2020
Pre-condition:	User has successfully created an account with a unique username / email and password.		
Steps: 1. User fills in a PT unique username or password in the email / username field. 2. User has entered a correct password into the password field. 3. User clicks the log in button or enter key			
Expected Result:	1. User is not logged in 2. Navigation bar reads "https://jv148.brighton.domains/final_year_project/index.php?error=wrongpwd"		
Actual Result:	1. User is not logged in 2. Navigation bar reads "https://jv148.brighton.domains/final_year_project/index.php?error=wrongpwd		
Pass / Fail:	Pass		

2.8 Login failure – client username for PT login:

Test Number:	2.8	Name:	Login failure – client username for PT login:
Requirement Number:	21		
Start Date:	26/02/2020	End Date:	26/02/2020
Pre-condition:	User has successfully created an account with a unique username / email and password.		
Steps: 1. User fills in a client username or password in the email / username field. 2. User has entered a correct password into the password field. 3. User clicks the log in button or enter key			
Expected Result:	1. User is not logged in 2. Navigation bar reads "https://jv148.brighton.domains/final_year_project/index.php?error=wrongpwd		
Actual Result:	1. User is not logged in 2. Navigation bar reads "https://jv148.brighton.domains/final_year_project/index.php?error=wrongpwd		
Pass / Fail:	Pass		

3) Logging out test cases:

3.1 Log Out (client & PT):

Test Number:	3.1	Name:	Log out (client & PT)
Requirement Number:	22		
Start Date:	26/02/2020	End Date:	26/02/2020
Pre-condition:	1. User has successfully logged in. 2. User is still logged in. 3. Users session hasn't timed out.		
Steps: 1. User clicks the log out button.			
Expected Result:	User is logged out, log out message displays and log in specific information no longer shows.		
Actual Result:	User is logged out, log out message displays and log in specific information no longer shows.		
Pass / Fail:	Pass		

4) Responsiveness test cases:

4.1.1 Top Navigation Menu Responsive (mobile menu functional):

Test Number:	4.1.1	Name:	Top Navigation Menu Responsive (mobile menu functional):
Requirement Number:	42, 43		
Start Date:	03/04/2020	End Date:	03/04/2020
Pre-condition:	1. User is on a mobile device with a screen resolution smaller than 750px. 2. User is on the index.php page.		
Steps: 1. User ‘s clicks burger menu icon.			
Expected Result:	1. User can only see the “HOME:” menu option and the burger menu icon. 2. If burger menu is clicked, reveals remainder of links.		
Actual Result:	1. User can only see the “HOME:” menu option and the burger menu icon. 2. If burger menu is clicked, reveals remainder of links.		
Pass / Fail:	Pass		

4.1.2 Top Navigation Menu Responsive (desktop menu functional):

Test Number:	4.1.2	Name:	Top Navigation Menu Responsive (desktop menu functional):
Requirement Number:	42, 43		
Start Date:	03/04/2020	End Date:	03/04/2020
Pre-condition:	1. User is on a desktop device with a screen resolution wider than 750px. 2. User is on the index.php page.		
Steps: 1. User ‘s menu reflects desktop device without burger menu.			
Expected Result:	User can see all menu links, login and sign up buttons.		
Actual Result:	User can see all menu links, login and sign up buttons.		
Pass / Fail:	Pass		

4.2.1 Table Responsive (mobile):

Test Number:	4.2	Name:	Table Responsive (mobile)
Requirement Number:	44		
Start Date:	03/04/2020	End Date:	03/04/2020
Pre-condition:	1. User is on a mobile device (screen smaller than 750px) looking at a table.		
Steps: 1. User navigates to their logged in index page. 2. User navigates to nutrition page. 3. User navigates to training page.			
Expected Result:	The table resizes to fit all content within the mobile screen.		
Actual Result:	The table resizes to fit all content within the mobile screen.		
Pass / Fail:	Pass		

4.2.1 Table Responsive (desktop):

Test Number:	4.2	Name:	Table Responsive (desktop)
Requirement Number:	44		
Start Date:	03/04/2020	End Date:	03/04/2020
Pre-condition:	User is on a desktop device (screen wider than 750px) looking at a table.		
Steps: 1. User navigates to their logged in index page. 2. User navigates to nutrition page. 3. User navigates to training page.			
Expected Result:	The table resizes to fit all content within the desktop screen.		
Actual Result:	The table resizes to fit all content within the desktop screen.		
Pass / Fail:	Pass		

4.3 Forms Responsive:

Test Number:	4.3	Name:	Forms responsive
Requirement Number:	47		
Start Date:	03/04/2020	End Date:	03/04/2020
Pre-condition:	User is on a mobile or desktop device .		
Steps: 1. User navigates to their logged in index page. 2. User navigates to nutrition page. 3. User navigates to training page.			
Expected Result:	The forms resize to fit all content within the screen.		
Actual Result:	The forms resize to fit all content within the screen.		
Pass / Fail:	Pass		

4.4 Images Responsive:

Test Number:	4.4	Name:	Images Responsive
Requirement Number:	45		
Start Date:	03/04/2020	End Date:	03/04/2020
Pre-condition:	User is on a mobile or desktop device .		
Steps: 1. User navigates to nutrition page. 2. User navigates to training page. 3. User navigates to personal trainer page.			
Expected Result:	The forms resize to fit all content within the screen.		
Actual Result:	The forms resize to fit all content within the screen.		
Pass / Fail:	Pass		

5) Calculator Test Cases:

5.1 BMR Calculator:

Test Number:	5.1	Name:	BMR Calculator
Requirement Number:	23		
Start Date:	06/04/2020	End Date:	06/04/2020
Pre-condition:	1. User is on the nutrition page of website.		
Steps: 1. User inputs their weight in kg. 2. User inputs their height in cm. 3. User inputs their age. 4. User presses the calculate button.			
Expected Result:	User is told their BMR.		
Actual Result:	User is told their BMR.		
Pass / Fail:	Pass		

5.2 TDEE Calculator:

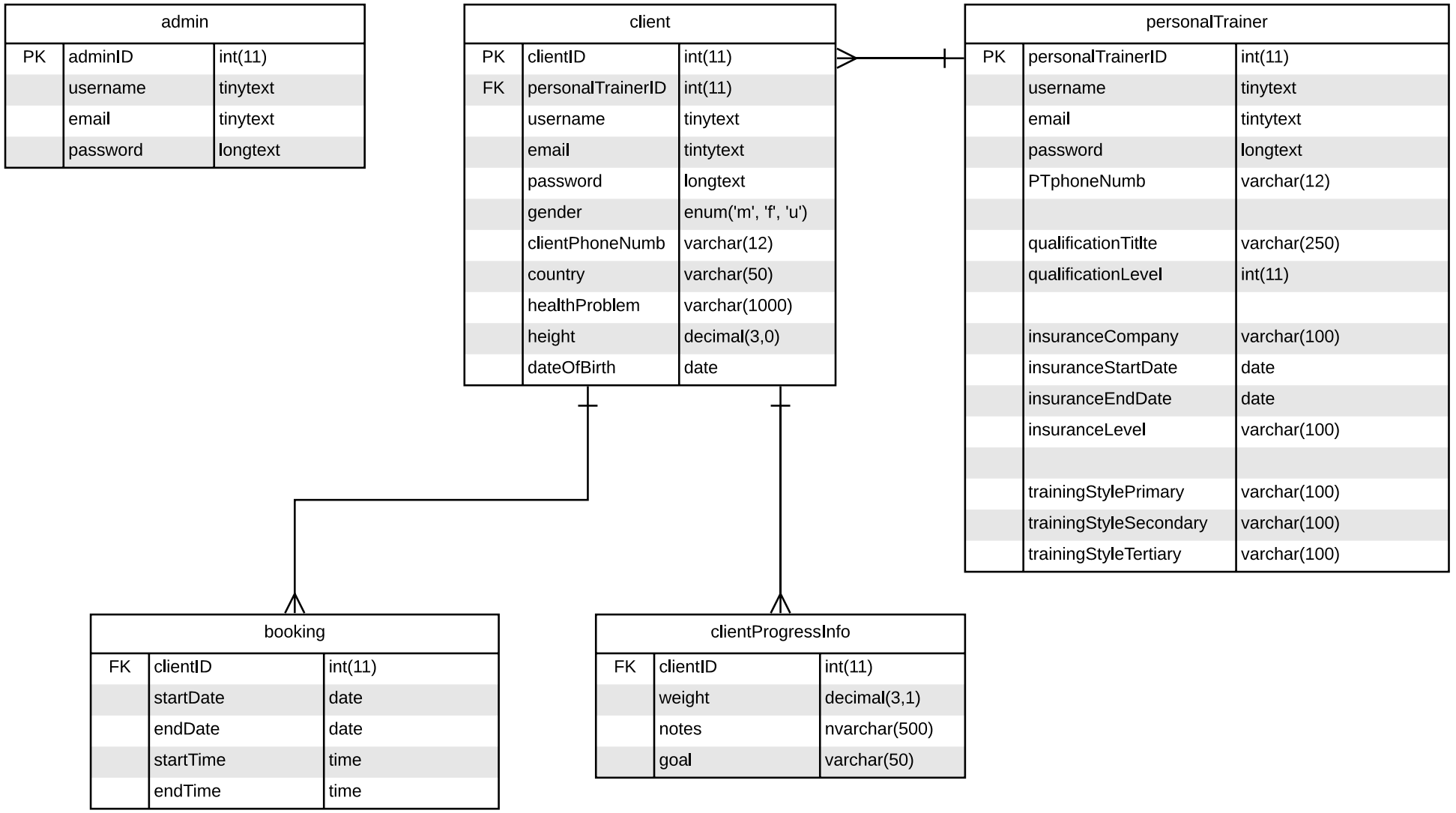
Test Number:	5.2	Name:	TDEE calculator
Requirement Number:	23		
Start Date:	06/04/2020	End Date:	06/04/2020
Pre-condition:	1. User is on the nutrition page of website. 2. User knows their BMR (either from previously or calculated using BMR Calculator provided on website).		
Steps: 1. User inputs their BMR. 2. User selects the appropriate activity level. 3. User press the calculate button.			
Expected Result:	1. User is shown their maintenance calories. 2. User shown calories required to lose weight.		
Actual Result:	1. User is shown their maintenance calories. 2. User shown calories required to lose weight.		
Pass / Fail:	Pass		

5.2 1 Rep Max Calculator:

Test Number:	5.2	Name:	1 Rep Max Calculator
Requirement Number:	33		
Start Date:	06/04/2020	End Date:	06/04/2020
Pre-condition:	User is on the training page of website.		
Steps: 1. User inputs their weight & rep number.			
Expected Result:	User is told their 1 rep max.		
Actual Result:	User is told their 1 rep max.		
Pass / Fail:	Pass		

Appendix C: Database:

Entity Relationship Diagram:



Database design:

Entity Relationship:

From Entity	To Entity:	Relationship Name:	Reason for relationship:	Multiplicity:
Personal Trainer	Personal Trainer Qualifications	Personal Trainer to PT qualification.	One PT may have many qualifications.	1 : M
Personal Trainer	Client	Personal Trainer to Client.	One PT may have many clients.	1 : M
Client	Client Progress Info	Client to Client Progress Info.	One Client may have many logs of progress info.	1 : M
Client	Booking	Client to Booking	One client may have multiple bookings.	1 : M

Entity Documentation Form:

Entity Name:	Description:
admin	An admin table to handle and overview the database.
client	Client information is stored here upon creating an account and signing up, linked to client general info and client progress info.
clientProgressInfo	Client information that will change often, e.g. weight (can be weekly).
personalTrainer	Personal Trainer information for account log in.
personalTrainerQualification	Information about the qualification a personal trainer holds.
booking	Information for a booking between client and a personal trainer.

Attribute Documentation Form:

Table:	Attribute Name:	Description:
Admin	admindID	A unique PK to identify an admin.
	username	A unique username to identify an admin used for logging in.
	email	A unique email to identify an admin used for logging in.
	password	A password used for logging in.
Personal Trainer	personalTrainerID	A unique PK to identify a PT.
	username	A unique username to identify a PT used for logging in.
	email	A unique email to identify a PT used for logging in.
	password	A password used for logging in.
Personal Trainer Qualification	qualificationTitle	The designated title of the qualification(s) a personal trainer holds.
	qualificationLevel	The level of that qualification.
Personal Trainer Info	insuranceCompany	The company a personal trainer holds their insurance with.
	insuranceStartDate	The date the insurance covering them starts on.
	insuranceEndDate	The date the insurance covering them ends on.
	PTphoneNumb	A PT's phone number, can be used to stay in contact with clients.
Client	clientID	A unique PK to identify a client.
	personalTrainerID	A FK to link a PT to a client.
	username	A unique username to identify a client used for logging in.
	email	A unique email to identify a client used for logging in.
	password	A password used for logging in.
Client Progress Info	weight	A client can log and track their weight.
	notes	Notes that can be left by a client about their progress, feedback, experience, etc…
	goals	Notes that a client can leave about their goals, e.g. a certain weight, lifting a certain amount, etc…
Client Personal Info	gender	The client's gender.
	clientPhoneNumb	The client's phone number, can be used to stay in contact with their PT.
	country	The country a client is in.
	healthProblem	If the client has any health problems the PT needs to be aware of.
Client Set Info	height	The client's height.
	dateOfBirth	The client's date of birth.
Booking	startDate	The start date for a session between a client and a PT, e.g. a video call or a training session.
	endDate	The end date for a session between a client and a PT, e.g. a video call or a training session.
	startTime	The start time for a session between a client and a PT, e.g. a video call or a training session.
	endTime	The end time for a session between a client and a PT, e.g. a video call or a training session.

Table Definition & Data Dictionary:

Table: Admin						
Field Name:	**Datatype:**	**Format:**	**Example:**	**Validation Rule:**	**Required:**	**Key:**
admindID	int(11)	1	1	AUTO_INCREMENT	Y	PK
username	tinytext	abcd	admin1	NOT NULL	Y	N/A
email	tinytext	aa@aa.com	admin1@email.com	NOT NULL	Y	N/A
password	longtext		Password123	NOT NULL	Y	N/A
Table: personalTrainer						
Field Name:	**Datatype:**	**Format:**	**Example:**	**Validation Rule:**	**Required:**	**Key:**
personalTrainerID	int(11)		1	AUTO_INCREMENT	Y	PK
username	tinytext		PT1	NOT NULL	Y	N/A
email	tinytext		PT1@email.com	NOT NULL	Y	N/A
password	longtext		Password123	NOT NULL	Y	N/A
qualificationTitle	varchar(250)		Diploma in Fitness Instructing & Personal Training	N/A	N	N/A
qualificationLevel	int(11)		3	N/A	N	N/A
insuranceCompany	varchar(100)		Insure4Sport	N/A	N	N/A
insuranceStartDate	date	YYYY-MM-DD	2020-01-01	N/A	N	N/A
insuranceEndDate	date	YYYY-MM-DD	2021-01-01	N/A	N	N/A
PTphoneNumb	varchar(12)		00 44 1234 5678910	N/A	N	N/A
Table: client						
Field Name:	**Datatype:**	**Format:**	**Example:**	**Validation Rule:**	**Required:**	**Key:**
clientID	int(11)		1	AUTO_INCREMENT	Y	PK
personalTrainerID	int(11)		1		N	FK
username	tinytext		client1	NOT NULL	Y	N/A
email	tinytext		client1@email.com	NOT NULL	Y	N/A
password	longtext		Password123	NOT NULL	Y	N/A
gender	enum('m', 'f', 'u')		m for male, f for female, u for unique	N/A	N	N/A
clientPhoneNumb	varchar(14)		00 44 1234 5678910	N/A	N	N/A
country	varchar(50)		UK	N/A	N	N/A
healthProblem,	varchar(250)		recent surgery on back	N/A	N	N/A
height	decimal(3,0)		200	N/A	N	N/A
dateOfBirth	date	YYYY-MM-DD	1990-01-01	N/A	N	N/A

Table Definition & Data Dictionary (continued):

Table: clientProgressInfo						
Field Name:	**Datatype:**	**Format:**	**Example:**	**Validation Rule:**	**Required:**	**Key:**
clientID	int(11)		1	NOT NULL	Y	FK
weight	decimal(4,1)		100.0	N/A	Y	N/A
notes	varchar(500)		Enjoyed training and on track.	N/A	Y	N/A
goal	varchar(50)		Lose 10kg.	N/A	Y	N/A
Table: booking						
Field Name:	**Datatype:**	**Format:**	**Example:**	**Validation Rule:**	**Required:**	**Key:**
clientID	int(11)		1	N/A	Y	FK
startDate	date	YYYY-MM-DD	03-03-1997	N/A	Y	N/A
endDate	date	YYYY-MM-DD	10-04-2020	N/A	Y	N/A
startTime	time	HH-MM-SS	10:00	N/A	Y	N/A
endTime	time	HH-MM-SS	18:00	N/A	Y	N/A

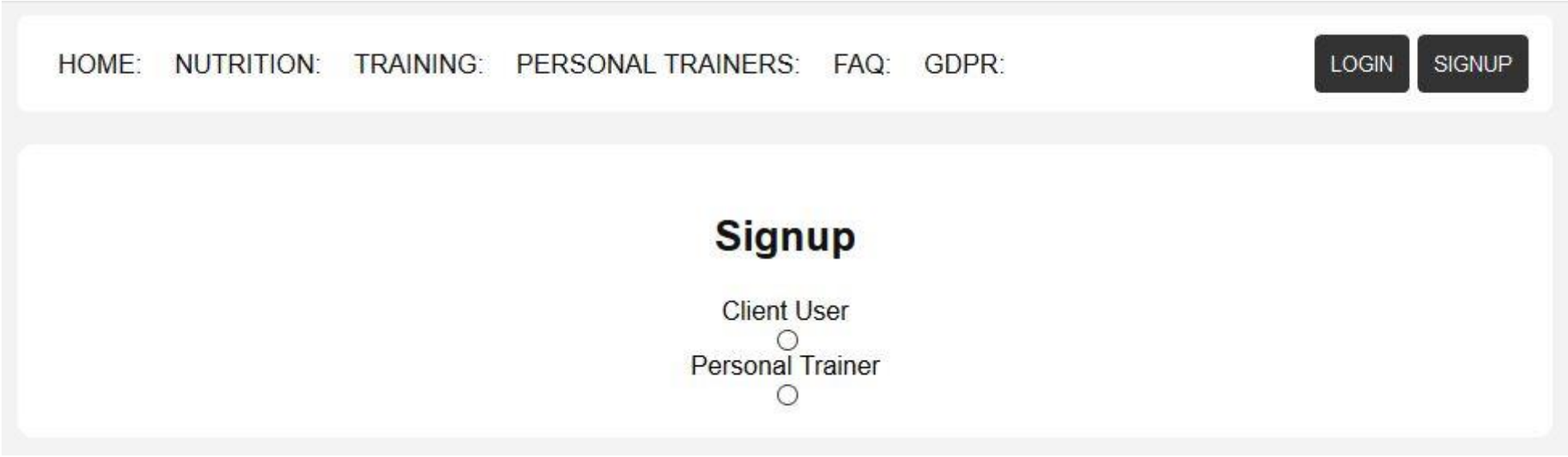
Log in system Users:

User:	**Privileges:**
jv148_admin	all
jv148_user	Update

Appendix D: Login / Signup system

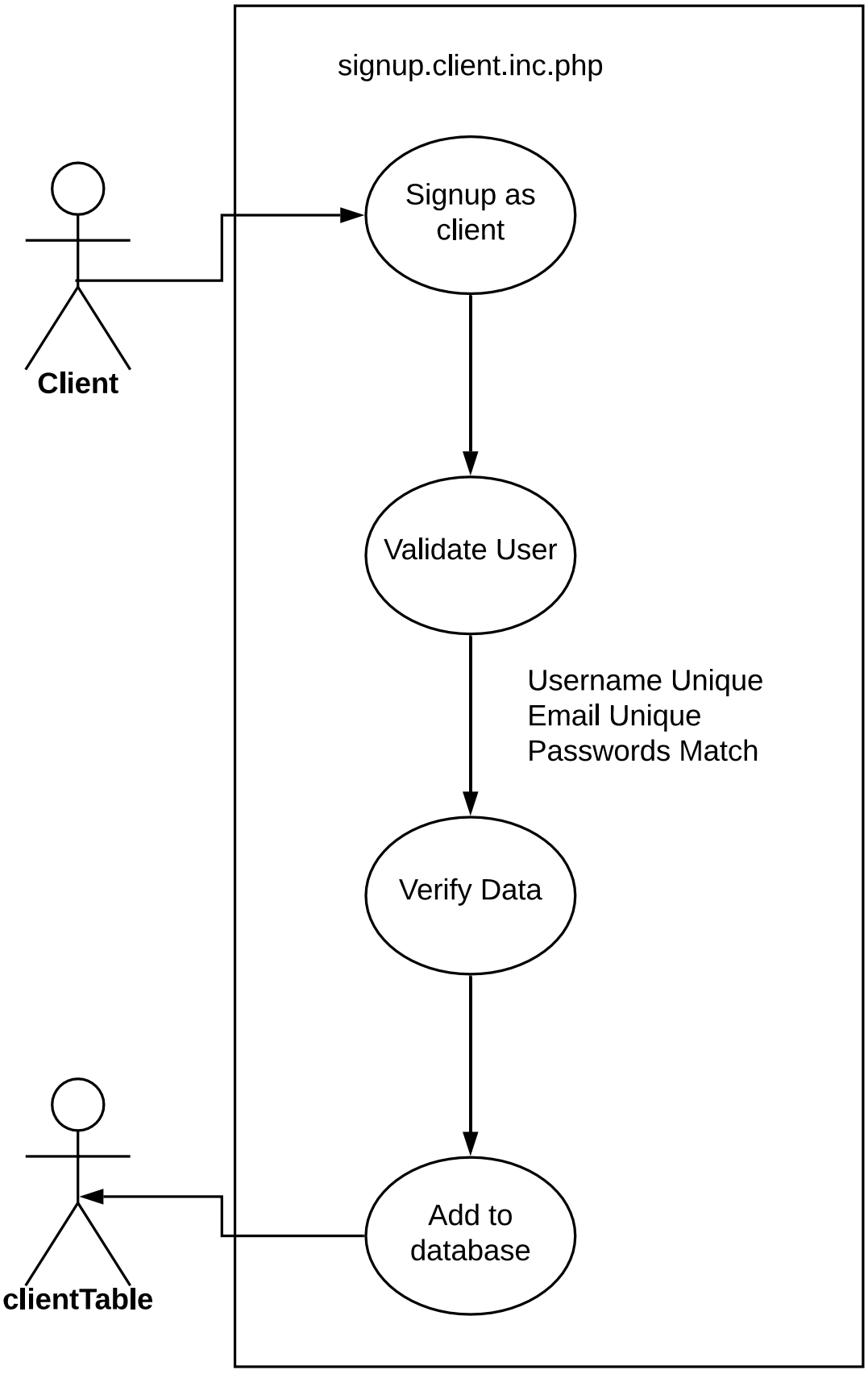
Original Design:

New Design:

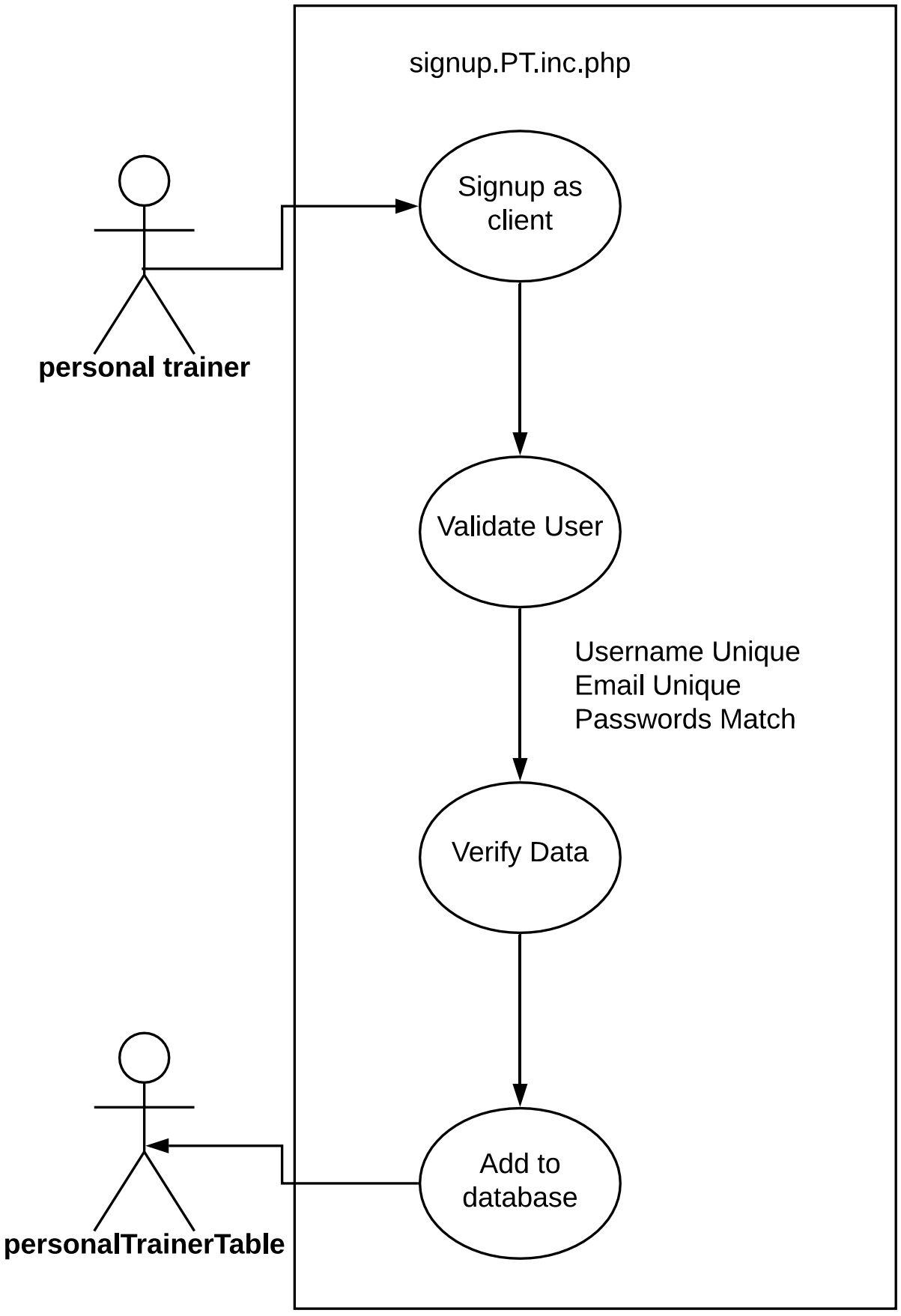


Appendix E: User case Diagram:

Client Signup process:



Personal Trainer Signup process:



Client Weekly progress update: