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Course Name

30th November 2021	Dr Hamid Alinejad-Rokny
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Submission Date

Course Coordinator/Lecturer

Major Project Report

Assignment Title

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GRADUATE SCHOOL OF BIOMEDICAL ENGINEERING



Major Project Report: A Web-Based Medication and Diet Regime Management System

Group Members:

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1. Introduction

This report will summarise the tasks undertaken, and approaches adopted to implement a web-based Medication and Diet Regime Management System that would be suitable for use by a qualified health practitioner in an aged-care facility. This includes the database design and user interface descriptions, as well as a brief user's manual.

2. Tasks Undertaken and Approaches

There are a number of tasks that were done, and this can be summarised in Figure 1 below:

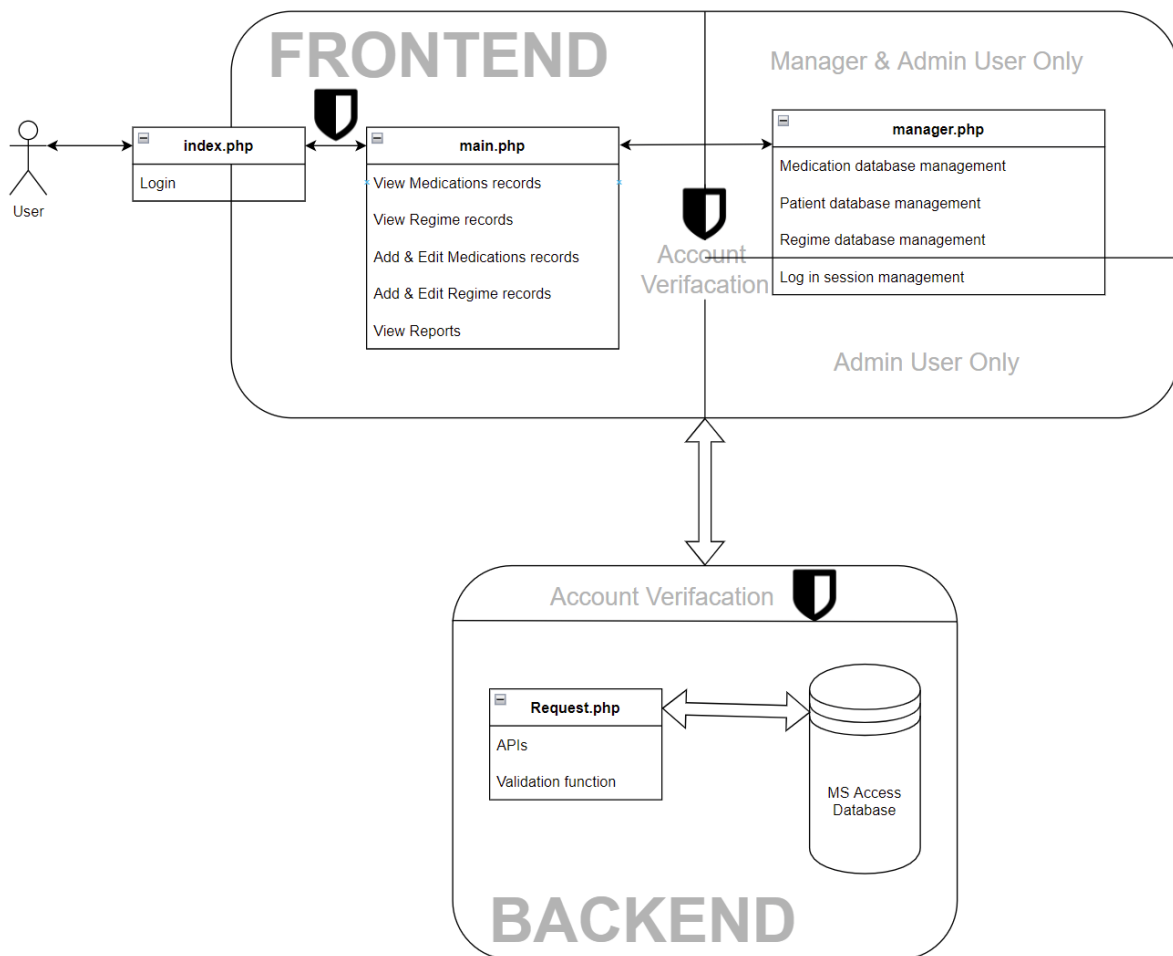


Figure 1: Overview of system.

As seen from the figure, the Medication and Diet Regime Management System is separated into a frontend and a backend part, each with different roles. The user interacts with the system with the help of the frontend system, where all of the customisation options appear, and users can choose what they want to see. This includes the medications and diet regime records for every patient in the system.

There is an additional part to the frontend system which authorises users to access certain information. As some information may be sensitive or private in nature, only certain users are able to access these data, giving an additional layer of security to

the system. There are also functions to add or remove certain medications and/or diet regimes and so these should only be handled by experienced practitioners.

In order to obtain the required data, the frontend system communicates with the backend system where the database is located. This is vital part of the system as any data about patients, medications and diet regimes are all located in this part. The database also shows the relationship between each component. For example, a certain patient would have a certain cycle of medications and a strict diet regime to follow, and this would be noted by a single practitioner. Hence, a careful construction of relationships between tables are needed.

The overview of the database can be seen in Figure 2 below:

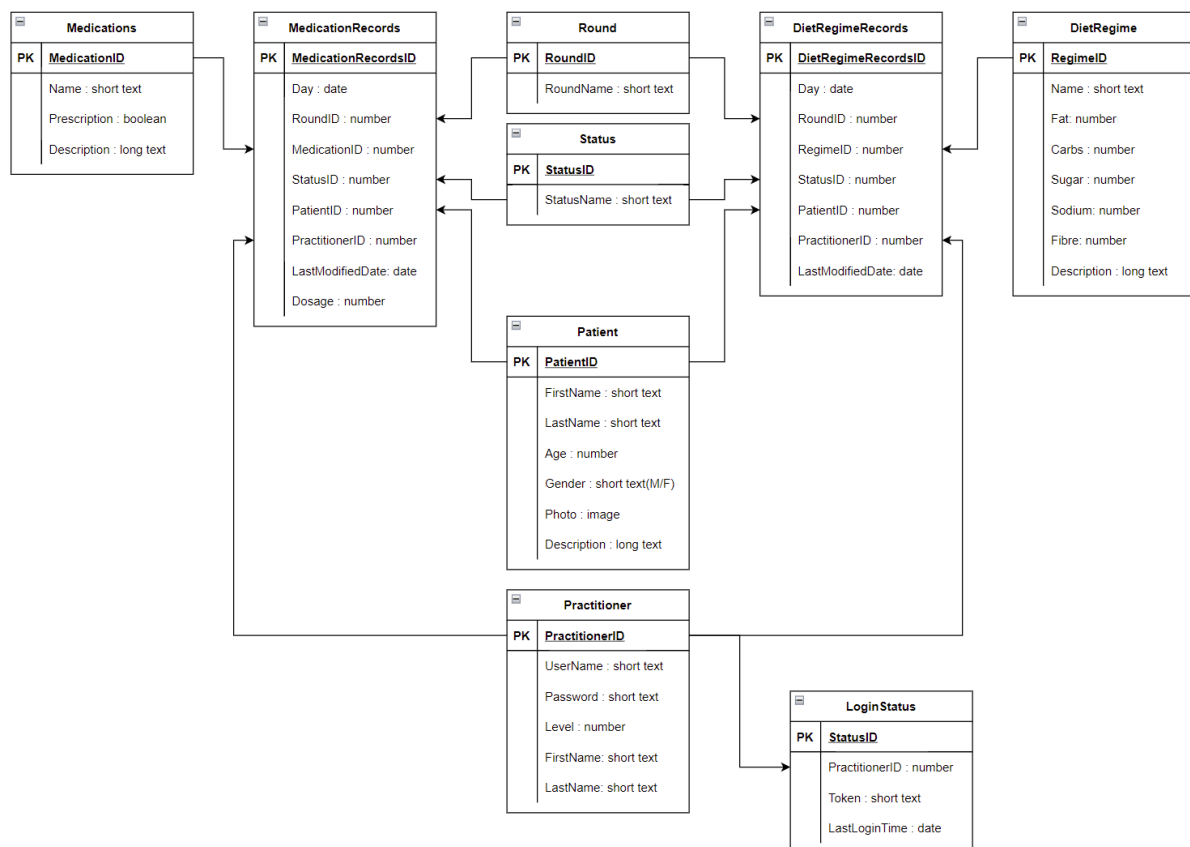


Figure 2: Database relationship table.

The relationship table is designed in this way in order to keep each table to a reasonable length while having a meaningful heading. For example, the practitioner table is linked to the patient table through their diet regime and medication records. This is because practitioners are not directly linked to each patient, but supervises the patients daily needs. These tables are then linked through the PatientID and the PractitionerID for ease of identification and zero risk of overlap.

From there, the frontend is designed using JavaScript (JS), Cascading Style Sheets (CSS) and PHP in order to have a meaningful user experience while using the web service. The frontend is separated in this way for style clarity and functionality.

Firstly, the JS part is used to provide the general look of the website, including the company logo and the tabs used for the different functions. This gives the web service

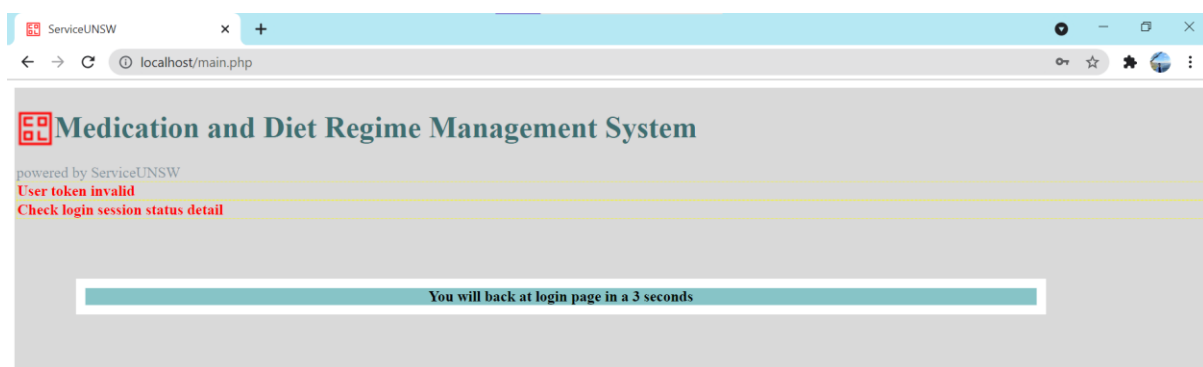
a sleek look that is clear in task and function. JavaScript also control the function on make the website work as a single page application therefore can give user a real time feedback.

Secondly, the CSS part is mainly used to design the pop-up tables that appear whenever a practitioner wants to check on a patient, diet regime or a medication. This allows for the practitioner to easily view and modify the patient, diet regime and medication details without any confusion and will be able to easily navigate through the many entries.

Lastly, the PHP part is used to communicate with the backend database by confirming actions taken by the practitioner on the web service and modifying the corresponding table in the database. It also keeps track of the login session of each practitioner and notes their authority to change certain details. With the right authorisation, practitioners can view and modify all patient entries without ever having to look at the database, presenting data in a clearer way and reducing the number of mistakes that could be made.

2.1. Error Checking and Validation

Error checking is done at login, where if there is an unauthorised login the following Figure 3 will appear:



Only Qualified ServiceUNSW Employee are allowed to access this site || Customer Services: 12-34-56

Figure 3: Login error page.

The key to the validation is the token that is generated when user has successfully logged in. The token is stored in the cookie and automatically destroyed when the browser is closed as shown.

Validation process is also performed on each time when user used the API by verification the token. Both JavaScript, PHP, and DATABASE constraints work together to limit the user action and avoid invalid input.

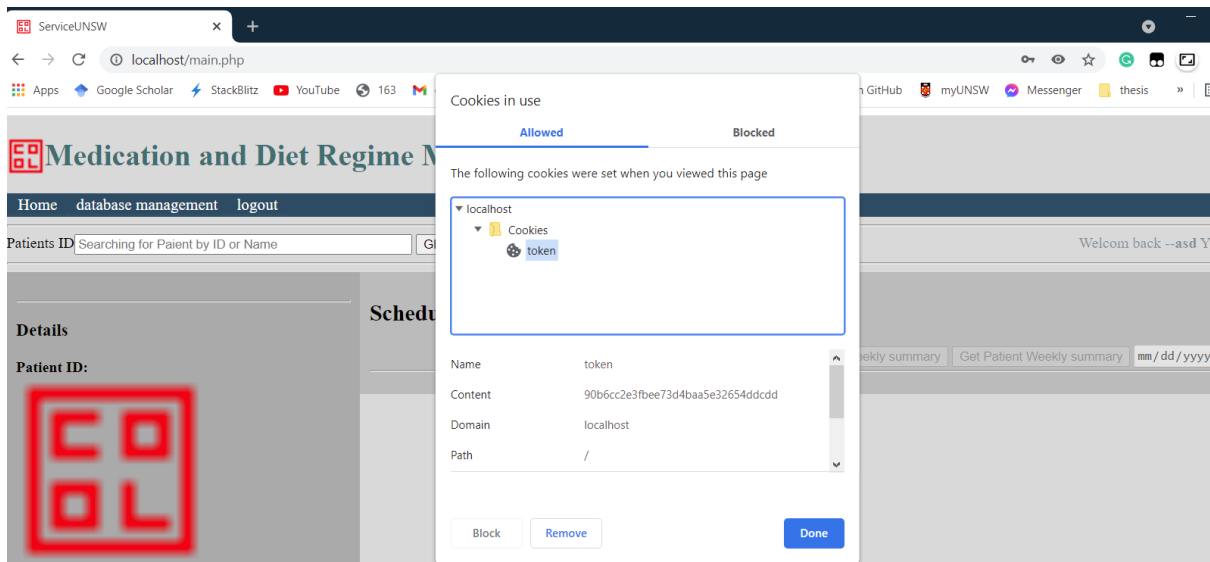


Figure 4 Token storage position

User's password is also not stored in the text format but a SHA256 hashed value, this can provide better safety and privacy as shown in Figure 5.

Practitioner	UserName	Password
1	asd	688787d8ff144c502c7f5cffaaf2cc588d86079f9de88304c26b0cb99ce91c6
2	qwe	489cd5dbc708c7e541de4d7cd91ce6d0f1613573b7fc5b40d3942ccb9555cf35
3	zxc	657f18518eaa2f41307895e18c3ba0d12d97b8a23c6de3966f52c6ba39a07ee4

Figure 5 Hashed user password

2.2. Web Interface, Design and Presentation

The interface is designed in this way to have a simple overview of all the patients in the database. The colour theme is chosen based on its readability and style. As the design of the webpage has already been implemented in previous assignments, this specific design was chosen for its portability and its already separated CSS code.

The overview of the patient is given in the main page of the service so that practitioners can easily look for the patient that they are taking care of and get an overview of their needs for a one-week period. This enables them to be quicker at responding to changes in plans, diets or medications and it would also be easier to spot mistakes that occur.

The other parts of the system like the medications and diet database, along with the patient and practitioners database, are moved to a different part of the system. This is done so that new products and diets stored in the database would not be easily overwritten or deleted, requiring higher authorisation to enable these functions.

These design choices will be explained further in the next sections where the User Manual is described.

3. Website User Manual

This section details the functions of each part of the system, with images taken from the frontend of the web service.

3.1. Web Functionality

3.1.1. Login

The login details for all personnel are shown in Table 1 below:

Table 1: List of practitioner usernames and passwords.

Level	Username	Password
3 (Admin)	asd	asd
2 (Manager)	zxc	zxc
1 (Staff)	qwe	qwe

The higher level of authorisation would increase the number of tasks that can be performed within the service. In this example, a Level 3 Admin will be used. The login page with the admin account is thus shown in Figure 6 as follows:

The screenshot displays a web browser window with the address bar showing 'localhost/index.php'. The page title is 'Medication and Diet Regime Management System' with a sub-header 'Medication and Diet Regime Management System (Employee Only)'. The page is powered by ServiceUNSW. The login form contains the following fields and buttons:

Field	Value
Username	asd
Password	***
Button	Login

At the bottom of the page, there is a footer: 'Only Qualified ServiceUNSW Employee are allowed to access this site || Customer Services: 12-34-56'.

Figure 6: Login page for employees only.

3.1.1. Main Page

Upon successful login, the main page with patient details can be seen. A logout button also appears above once the practitioner is finished with their tasks. A patient name or ID can be typed into the search bar above in order to get the patient's schedule. A drop-down box also appears while searching to match all of the possible selections while typing an ID or name at the same time. A successful search brings up Figure 7 below:

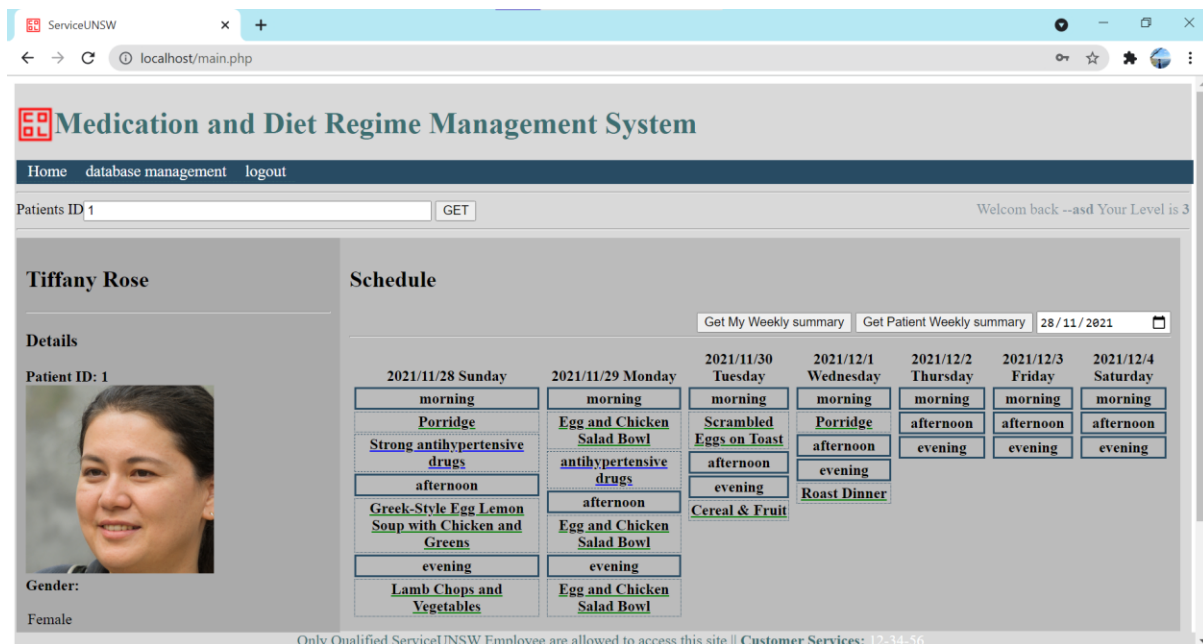


Figure 7: Main patient page.

The patient search is complete with the patient details, diet regime, and medications for morning, afternoon, and evening for a week. Diet regime and medications can be administered and dispensed at the same time by clicking on the morning, afternoon, or evening tabs according to the patient's requirements. A sample is demonstrated in Figure 8 below:

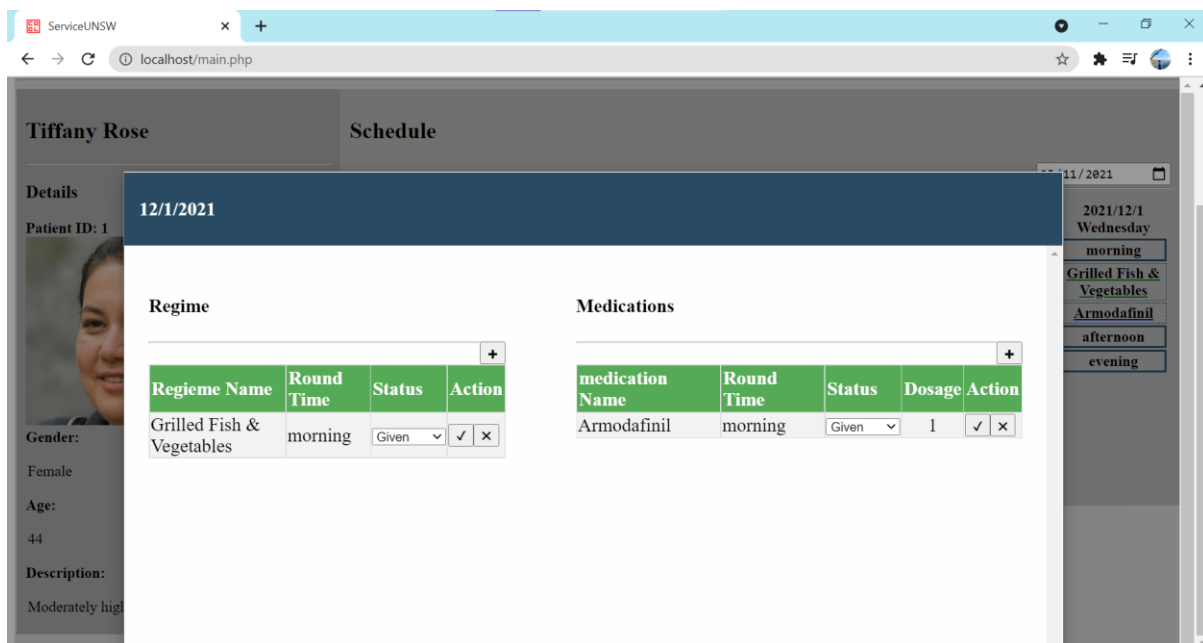


Figure 8: Adding diet regimes and medications to a patient.

The diet regimes, medications, round time, and status will instantly be updated once the tick button is clicked in the patient overview for ease of monitoring. Existing entries can also be deleted using the cross button.

An overall summary can also be accessed from the Get My Weekly Summary and Get Patient Weekly Summary button above. These give the practitioners and patients weekly reports respectively. This can be seen in Figure 9 and Figure 10 below:



Figure 9: Practitioner weekly summary.

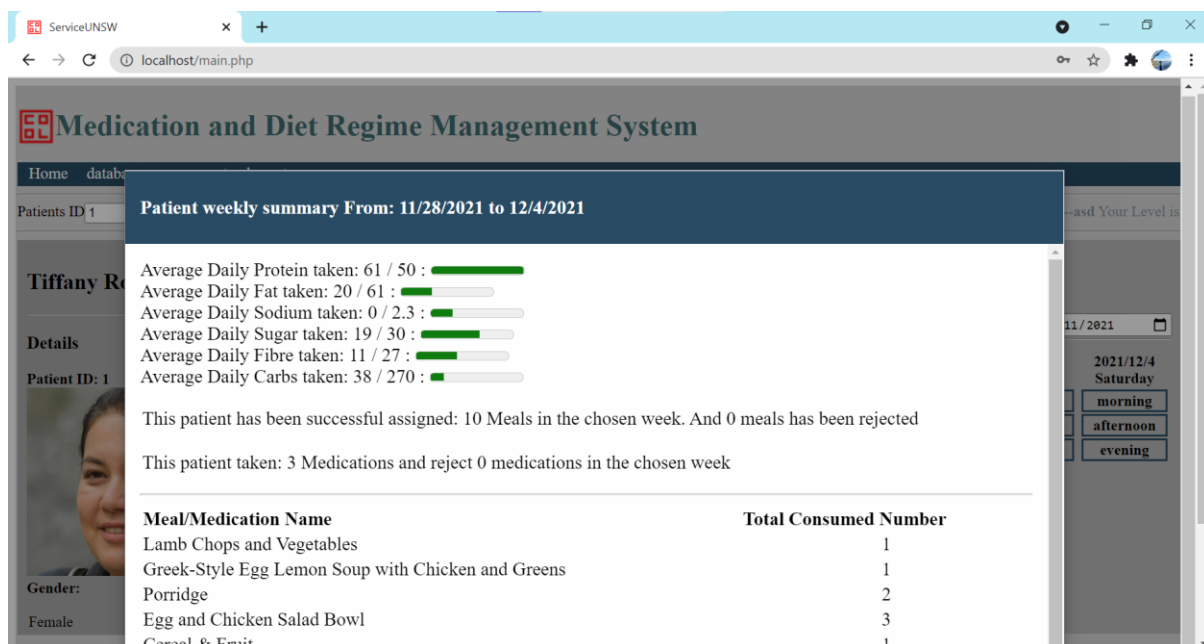


Figure 10: Patient weekly summary.

3.1.1. Database Management

A practitioner may also view the diet regime and medications report, and this is done using the database management tab at the top of the page. This gives numerous functions as seen in Figure 11 below:



Figure 11: Database management page.

3.1.1. Medications

Similar to the main page, the medications can be searched using the search bar and hitting the “GET” button. This is shown in Figure 12 below:

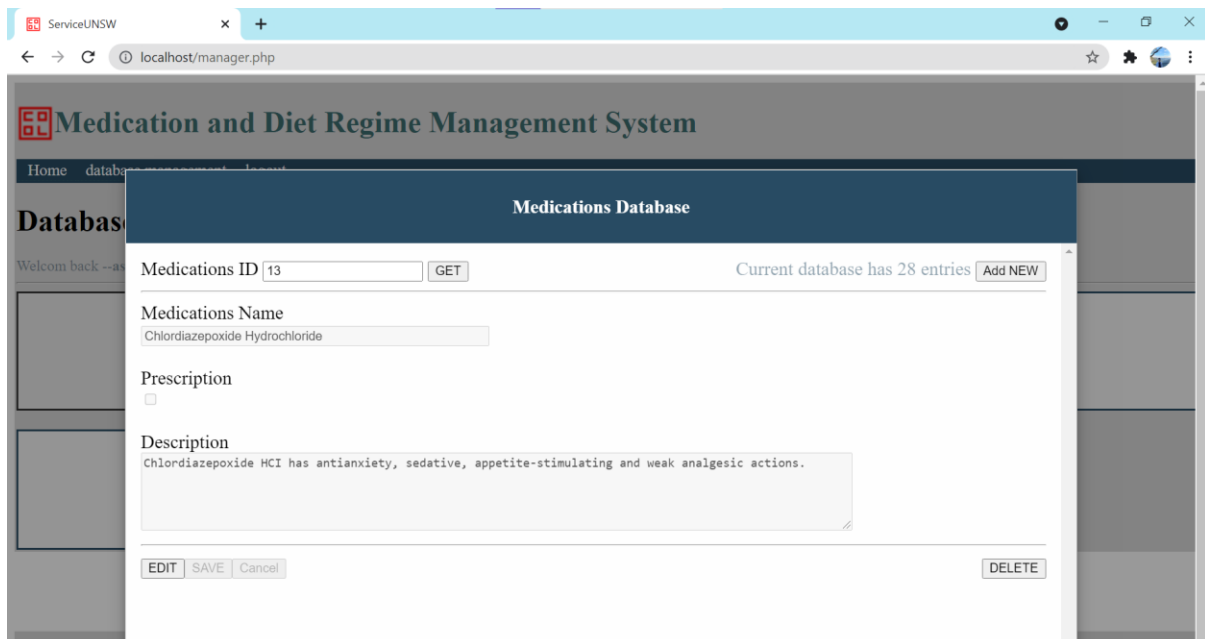


Figure 12: Medications database page.

As seen from the figure, a brief description of the medication can be seen along with its name and whether it is a prescription medication. New medications can be inserted using the “Add NEW” button while old ones can be deleted using the “DELETE” button.

3.1.2. Diet Regime

This feature is similar to the medications tab but with the added benefit of seeing the nutritional value of the food. This is shown in Figure 13 below:

Medication and Diet Regime Management System

Home database management login

Diet regime Database

regime ID GET Current database has 21 Reigiemes [Add NEW](#)

Reigiemes Name

Protein <input type="text" value="41.2"/>	Fat <input type="text" value="4.1"/>	Carbs <input type="text" value="34.6"/>
Sugar <input type="text" value="1.4"/>	Sodium <input type="text" value="0.256"/>	Fibre <input type="text" value="7.4"/>

Description

Figure 13: Diet regimes database page.

These details will give practitioners a general idea of the nutritional contents of each dish in the database, and can use this information to plan out a customised diet regime for each patient. Again, similar to the medications page, there is an option to add and remove new dishes.

3.1.3. Patients

This patients tab is slightly different from the main page as it gives the capability to add new patients to and remove old patients from the database. This is done in a similar manner to the medications and diet regime databases as shown in Figure 14 below:

Medication and Diet Regime Management System


Home database management login

Patients Database

Patient ID GET Current database has 51 Patients [Add NEW](#)

First Name

Last Name



Age <input type="text" value="44"/>	Gender <input type="text" value="Female"/>
--	---

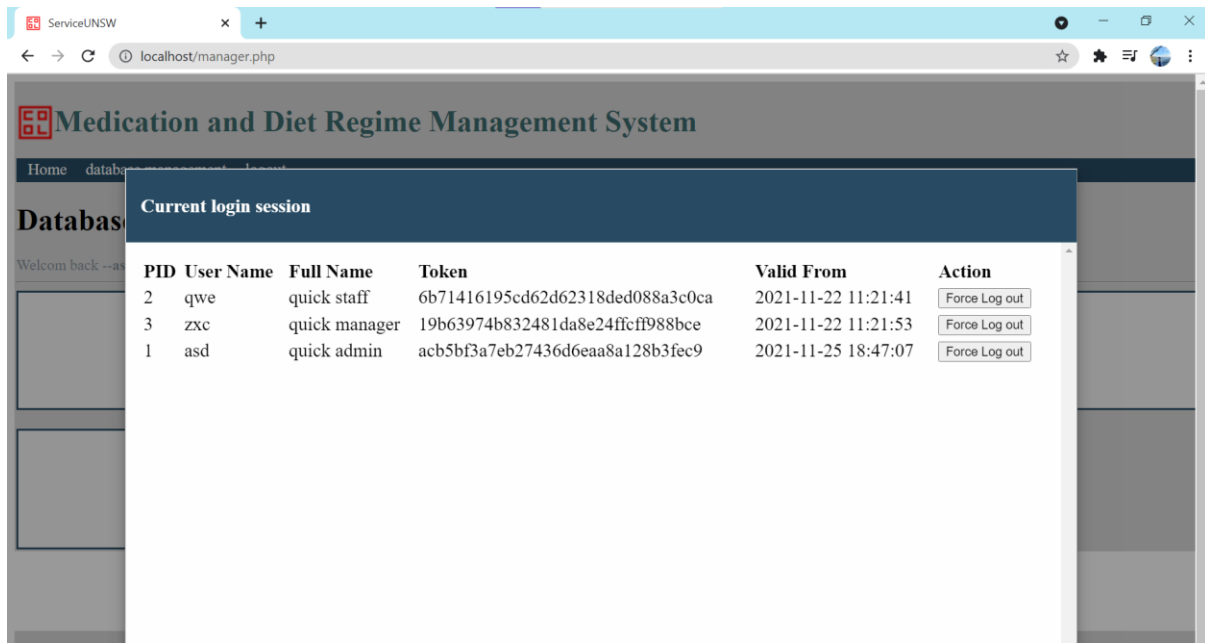
Description

Figure 14: Patients database page.

3.1.4. Login Session

Logins are implemented with the help of a cookie token that tracks who has logged in at what time, enabling an accountability among practitioners as to who has accessed their account at any point in time. It is also a safety measure to detect where practitioners' accounts have been hacked or compromised and can be rectified quickly.

The management system is shown in Figure 15 below:



Medication and Diet Regime Management System					
Current login session					
PID	User Name	Full Name	Token	Valid From	Action
2	qwe	quick staff	6b71416195cd62d62318ded088a3c0ca	2021-11-22 11:21:41	Force Log out
3	zxc	quick manager	19b63974b832481da8e24ffcf988bce	2021-11-22 11:21:53	Force Log out
1	asd	quick admin	acb5bf3a7eb27436d6eaa8a128b3fec9	2021-11-25 18:47:07	Force Log out

Figure 15: Practitioners login database page.

As seen from the figure, a force logout option has been added to ensure the safety of the patients' details due to unauthorised access.

4. Conclusion

This report summarises a web-based medication and diet regime management system that would be suitable for use by a qualified health practitioner in an aged-care facility. A brief explanation on the tasks undertaken and approaches as well as a website user manual has been given in order to fully understand the services provided.