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The Development of Daddy Hero Fitness Center using Web Based System

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Abstract: The development of this project is to implement the legacy system from Daddy Hero Fitness center. The category of users are owner, trainer and trainee. The owner record and register the trainer and trainee, edit payment and view payment. For trainer is to edit workout details and create program for trainee. For trainee, is to view the program details, health status and payment details. The management system in Daddy Hero Fitness is use of notebook to record trainer and trainee. Problem for the notebook that record data on risk if notebook damage or missing. Next, the management for trainer to trainee need to use other software to make trainee workout program. Its is no effective for data input and make similar program for each trainee. Addition, trainee unable to know how much workout they done and payment details for their payment. So, this system will record all data on online database with a web-based management system. Next, provide exercise and foods details for trainer to make diet and workout plan to customize program for trainee. For trainee, it will display the program with trainer name, health status data and payment details for them. This system is developed by waterfall method. For development and implementation, by using Hypertext Preprocessor, JavaScript, HyperText Markup Language and Cascading Style Sheets to make a web-based system. In addition, perform system functionality testing and evaluation. Finally, discuss the achievement for objectives and future works for this system.

Keywords: Web-based, Management System, Health and Fitness

1. Introduction

Fitness and Health Management is management software that help a gym owner, trainer and trainee to manage their gym activity and gym management. According to [1] in 2007, systems and strategies for the application of a fitness network method are seen. The management system for the fitness business is important. It is a platform of users can manage their lifestyle or gym through browser that the website provided the function and information that bring to users a healthy lifestyle information and exercise.

This fitness and health management website system will provide users a platform to improve their fitness and health information and let them exercise in correct way based on trainer program. For the

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system to work in right way, it requires users to connect to the website and follow the exercise and diet plan set according by user health status and trainer program.

Lastly, user need to log in into the log in system for them to get the fitness and health information and the exercise plan and diet plan set by workout program. This fitness and health management website system, users can achieve healthy lifestyle and manage the gym anytime and without go to the gym.

For problem statements are the legacy management system in Daddy Hero Fitness Centre is only record to a notebook and it on rick for lost data. Next, the trainer reinput of workout and diet plan for trainee is ineffective. The payment details for owner and trainee on notebook is not clear and it on rick to be damage.

That is 4 scopes for this project, to use only programming language to develop the system, database connection to support this system for health status database, display exercise plan according the program created by trainer to users and use functionality testing and usability testing for the developed model.

2. Related Work

2.1 Fitness and health management system

In term of management system, is a system to manage something to replace documentation management and decrease the human resources use in an organization and to improve the overall performance of organization. According to [2] in 2018, getting an integrated patient care and diagnostic approach is an essential aspect of the operating life cycle of a facility, considering the developments in current technical capabilities.

In general, according to [3] in 2011, a well fitness and health management system come with clinical examination and automatic assessment of vital statistics as assessed at the local station, such as weight, blood pressure and body structure.

2.2 Current management system for Hero Daddy fitness

Current management system in Hero Daddy fitness is a notebook to record the trainer and trainee details as record method for membership. Only data recorded in the notebook is the name, phone number and IC number as proof for the trainer and trainee in the gym as membership. For trainee health status record is not systematic management for the gym. In addition, it could happen accident on the notebook and lose all data.

2.3 Comparison of existing systems with Daddy Hero Fitness Management System

For the comparison of existing system with my proposed system with be compare by trainee module, trainer module, admin module, SSL certificate, programming languages, application platform, 3 click rule, nutrition calculator, database and sign up method for trainee and trainer.

Table 1: Comparison between existing system with proposed system

Item	Function System	My PT Hub	TrueCoach	Daddy Hero Fitness Management System	PTminder
1	Trainee module	View register program, payment details, book for program, message function	View register program, payment details, book for program, message function	View register program, payment details, view health status	View register program, payment details, book for program, message function

Table 1: (cont.)

Item	Function System	My PT Hub	TrueCoach	Daddy Hero Fitness Management System	PTminder
2	Trainer module	View and edit exercise, program, view trainee details	View and edit exercise, program, view trainee details	View and edit exercise, program, view trainee details, record trainee health status history	View and edit exercise, program, view trainee details
3	Admin module	No admin module	No admin module	Register trainer and trainee, view and edit payment details	No admin module
4	SSL certificate	Using SSL for security	Using SSL for security	Using SSL for security	Using SSL for security
5	Programming languages	Using PHP as main	Using Java as main	Using PHP as main	Using PHP as main
6	Application platform	Phone and website	Phone and website	Only Website	Phone and website
7	3 click rule	Maximum 3 clicks to user desire function	Maximum 3 clicks to user desire function	Maximum 3 clicks to user desire function	Maximum 4 clicks to user desire function
8	Nutrition calculator	Can calculate nutrition when select food	Can calculate nutrition when select food	Cannot calculate nutrition when select food	Can calculate nutrition when select food
9	Database	Using MySQL	Using MySQL	Using MySQL	Using MySQL
10	Sign up method for trainee and trainer	Invitation email	Invitation email	Direct sign up by admin	Invitation email

3. Methodology

The method that use for this system is waterfall model. Waterfall model is a sequel by sequel development model, it develops system sequential in the 6 phases are analysis, design, development, testing, implementation and maintenance.

3.1 Waterfall model

Waterfall model is start from collect requirements from user and perform requirements analysis. Next is system design for design the interface, system function and database. After system design, implement the design to actual system. After system implementation, start testing the system in the gym and perform evaluation at same time. Lastly, deploy the system on platform as a service website to finish this deployment.

3.2.1 Phase 1: Requirement analysis

For phase 1 is for user requirements collect through the interview. Interview is asking the user the critical questions to get the requirement for this system. I do interviews with owner, trainer and trainee from Daddy Hero Fitness to collect their requirements.

3.2.2 Phase 2: System Design

For this phase, the system will be design according to the user requirements. The owner can assign the trainer and client account, view the payment and edit the nutrition data from database since need to update new product to the gym. Next, the trainer can assign as personal trainer for client, create workout plan and nutrition plan for client, view client health status and view client health history. Lastly, client can view own health history, booking class and make payment.

The user interface should put the Daddy Hero Fitness logo, owner detail, Daddy Hero Fitness details and some banner from the Daddy Hero Fitness event. The database will contain as design that owner, trainer, client, payment, workout, nutrition, history and log table.

3.2.3 Phase 3: System Development

For this phase, the system development will start by the owner module. First, use database connection to load and save the data. The owner module can assign the trainer and client account, view the payment and edit the nutrition data from database since need to update new product to the gym. Next is trainer module that can assign as personal trainer for client, create workout plan and nutrition plan for client, view client health status and view client health history. Last, client can view own health history, booking class and make payment. All database connection function will be code by PHP programming language. The HTML and CSS will use setting the user interface including images, form size, text size, button size and etc.

3.2.4 Phase 4: System Testing

The testing phase will include the functional test and usability test. For functional test will test the owner module can assign the trainer and client account, view the payment and edit the nutrition data from database since need to update new product to the gym. Next is trainer module that can assign as personal trainer for client, create workout plan and nutrition plan for client, view client health status and view client health history. Last, client can view own health history, booking class and make payment. The usability test will test the owner, trainer and client can use this system at which level.

3.2.5 Phase 5: System Implementation

This phase will use to implement the database like payment addition, product and promotion. The function implementation will follow the addition requirements from owner, trainer and client.

The web browser implement will be done here since this is web-based system to ensure the system can run in gym, trainer and client mobile and computer browser. Also the configuration for the owner computer can receive payment and connect to bank account.

3.2.6 Phase 6: System Evaluation

This phase will evaluation the system, from the functions, database connection, interface design and performances. The functions will evaluate success if functions work. The database connection will be evaluating with the success of save and load the data from database. The interface design will be

evaluating by owner, trainer and client. According to [4] in 2005, a successful design of the user interface facilitates a normal and engaging relationship between a user and a device in the East and enables users to perform their requisite tasks. The evaluation is done in the Daddy Hero Fitness by owner, trainer and trainee for functionality and usability testing.

4. Results and Discussion

This section is to discuss the analysis and design result for entity relationship diagram, context diagram and data flow diagram level 0.

4.1 Requirement Analysis

The result of requirement analysis will be show here to show the functional requirements and non-functional requirements from owner, trainer and trainee to increase the quality for this system. According to the [5] in 2002, comprehension of user expectations is an important part of the architecture of information systems and is key to the performance of interactive systems.

4.1.1 Functional analysis requirement

For functional analysis requirements from owner, trainer and trainee will be show as a table form. Analysis requirements is important function can be performing by owner, trainer and trainee in this system. Table 2 show the functional requirement collected from user.

Table 2: Functional requirements for this system

Number	Module		Functionalities
1	Register	I.	Only two accounts for owner and also the counter worker
		II.	Only register in the gym when trainee register at the counter
		III.	Only owner module can register trainer and trainee
2	Login	I.	User input valid ID and password
		II.	System alert for any invalid input
3	Workout plan design	I.	Trainer can design the workout plan from the exercises and food database
		II.	Trainer can edit the weight, rest time and reps for each exercise for the workout plan
4	Exercise and food setting	I.	Owner and trainer can add, delete, read and update the exercises and food database.
5	Program booking	I.	Trainee will be assign to program
6	Payment	I.	Trainee can pay for the workout plan
		II.	Owner can view and payment status
7	Workout history	I.	Trainer can view the assigned trainee workout history
		II.	Trainee can view their own workout history

4.1.2 Non-functional analysis requirement

For non-functional analysis requirements from owner, trainer and trainee will be show as a table form. Analysis requirements is important function can be performing by owner, trainer and trainee in this system. Table 3 show the non-functional requirement collected from user.

Table 3: Non-functional requirements for this system

Number	Module		Functionalities
1	Performance of the system	I.	system should perform fast redirection when web page to other web page
2	Operational	I.	The system only function when connected with internet
3	Security	I.	Only correct username and password will login to this system
		II.	When login, need encryption to protect the user input view by other
		III.	password must contain alphabet, number and capital alphabet
4	The design interface	I.	Gym logo and owner details should put on all interface

4.2 Data flow diagram

This section is discussing about the data flow diagram (DFD) for this system, contain level 0 and level 1 DFD. According to [6] in 2009, for organized information research and design, the Data Flow Diagram (DFD) is commonly used. In the world of business management, it is still prevalent. For addition, data flow diagram shows the data flowing overview for the system.

4.2.1 Context diagram

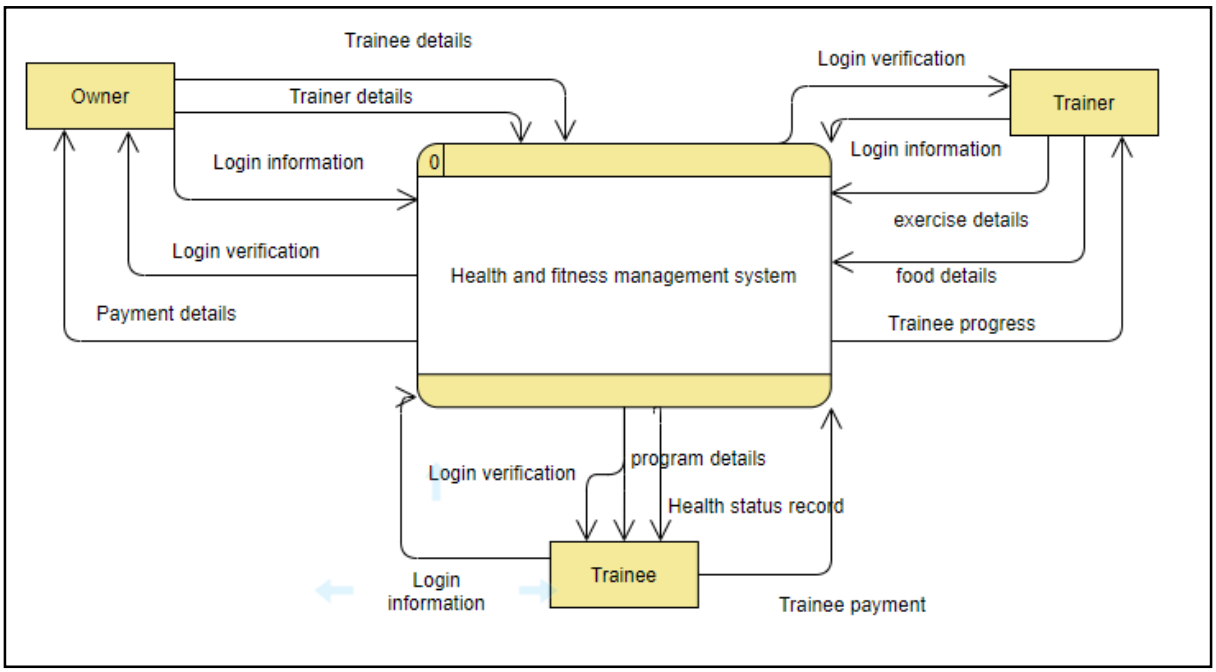

Figure 1: Context diagram for Daddy Hero Fitness Center management Web Based System

The owner will send trainee and trainer details in the system and system will output the payment to owner, login verification and login information is for login page. The trainee can make payment to system and system output program details and workout history. The trainer can input food, workouts details, plan and program and system will output workout list and food list to trainer to design the plan.

4.2.2 Data flow diagram (DFD) level 0

This is DFD level 0 for this system, overview for data flow in this system. Figure 3 show the level 0 DFD for this system.

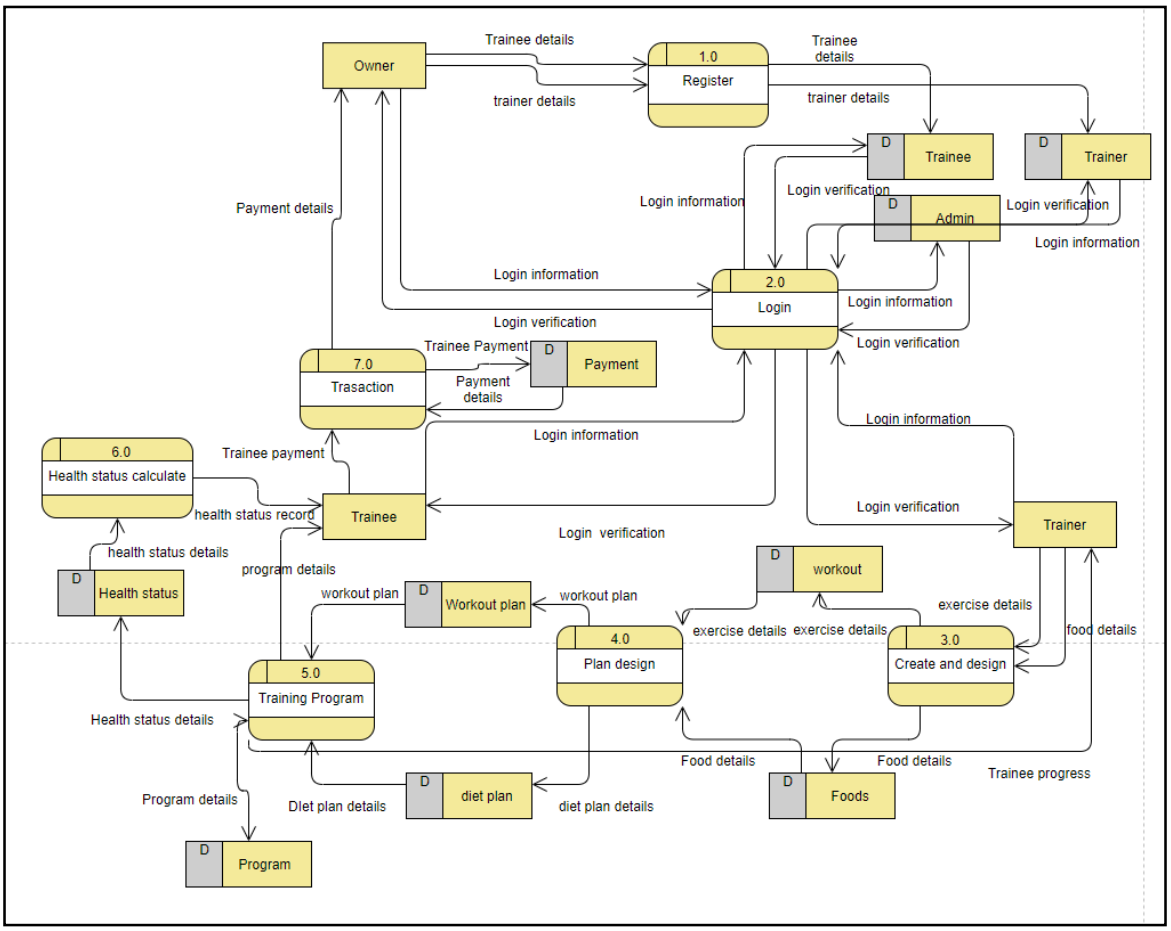

Figure 2: Level 0 DFD for fitness and health management system

From first process, the register is only for owner to register new trainee or new trainer and save the detail in database. The login process will be use by all user because every user need to login to use the system. Then the third process is create and design for trainer to create and design the exercise details like weight and rent time. After design the exercise details will go into the related databases. The next process is plan design to design the exercise and food into a plan that contain exercises and foods then go into the related databases. After this is the last process for trainer, trainer design the program based on the plan they have and set the start time and end time to let trainee assess the program. The program detail will go into the program database, health status detail is contain in the plans and the program will calculate the each plan to a total burned calories to the health status database for trainee. The next process is health status calculate, this is the calculator to calculate the burned calories ,trainee current calories and trainee body fat after the burned calories. Then the trainee can get the result from this process to know how much calories they burned. Last process is transaction process the let trainee to make payment. The payment details will update to payment database and the transaction process will retrieve the payment record to owner to view the payment record from trainee

4.3 Entity relationship diagram

This section is to show the entity relationship diagram design in the system. Entity relationship diagram can use to analyse the databases problems such as logic or deployment. According to [7], Entity relationship diagram is a common technique for data structures and database systems design. Figure 4 show the entity relationship diagram for this system.

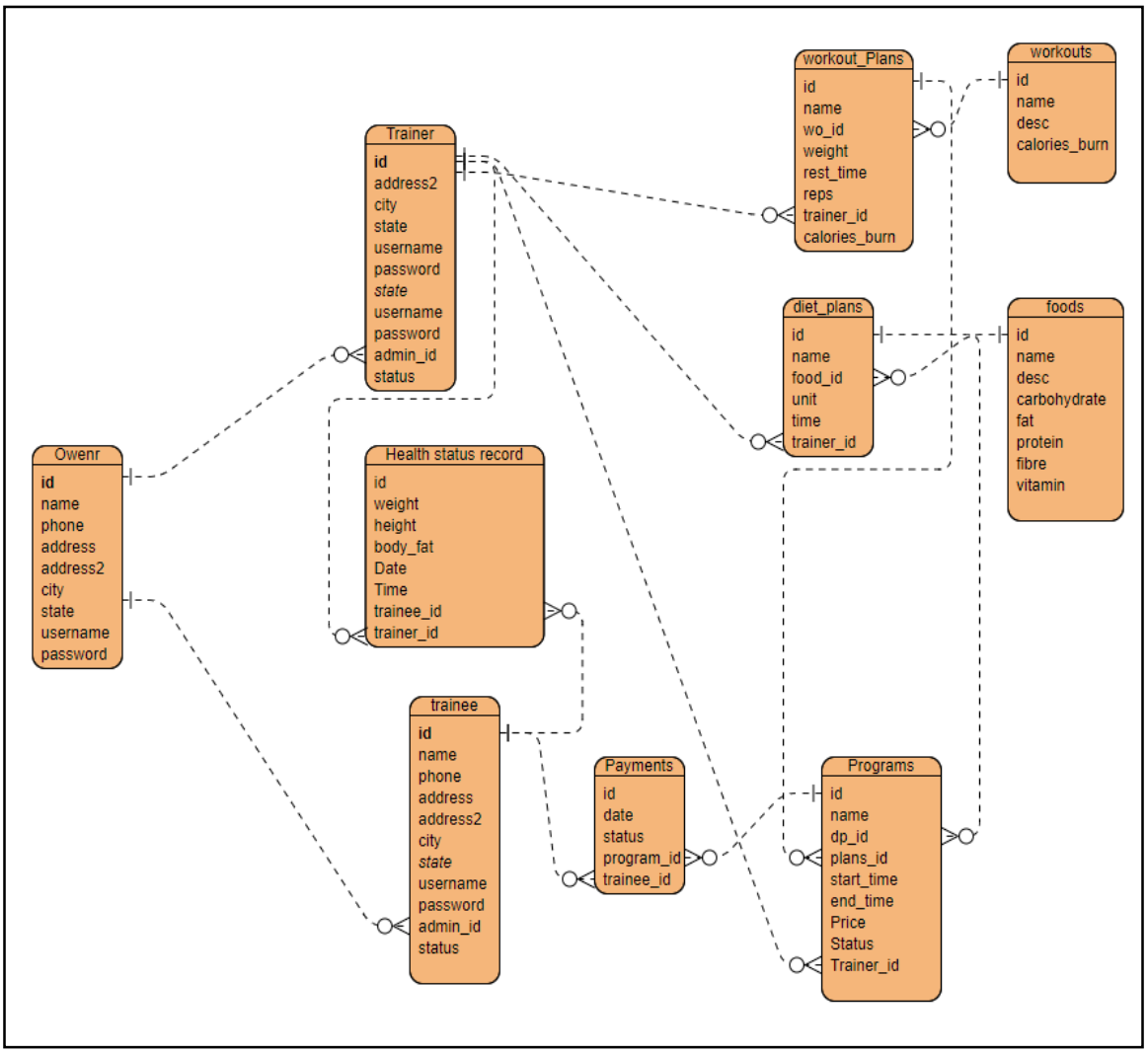

Figure 3: Entity relationship diagram for this system

This ERD diagram will explain from the owner entity, each owner can assign many trainer and trainee so it is one to many relation. The next entity is trainer to diet plans, workout plan, health status record and program. Each trainer can create many workout plan, diet plan, health status record and program but a workout plan, diet plan, health status record and program only create by one trainer, so it is one to many relation. Next is diet plans entity, the relation to foods entity is many to one because each diet plan contain one type of that food like apple and 3 units but each food only can choose once when designing diet plan. Same goes to workout plan entity, each workout plans contain many workouts but each workout can be choose once when designing the workout plan. Next is the program entity, the program is related to trainer, diet plan, workout plan and payment. Each program can contain many diet plan and workout plan but each diet plan and workout plan can be choose once when deigning the program. Each program can make one payment but each payment can pay to many program once trainee make payment like pay by classes. Then we reverse to trainee entity, trainee entity relationship with payments and health status record is one to many. Each trainee can make many payment but each payment only make by a trainee and each trainee contain more health status but each health status only belong to a trainee. For health status record is create by one trainer for each trainee. It mean trainer and trainee created and have many record but one record only has one trainer and trainee.

4.4 Developed model

Figure 4 shows the interface for login page for developed model. It needs user input ID, position and password to login this system.

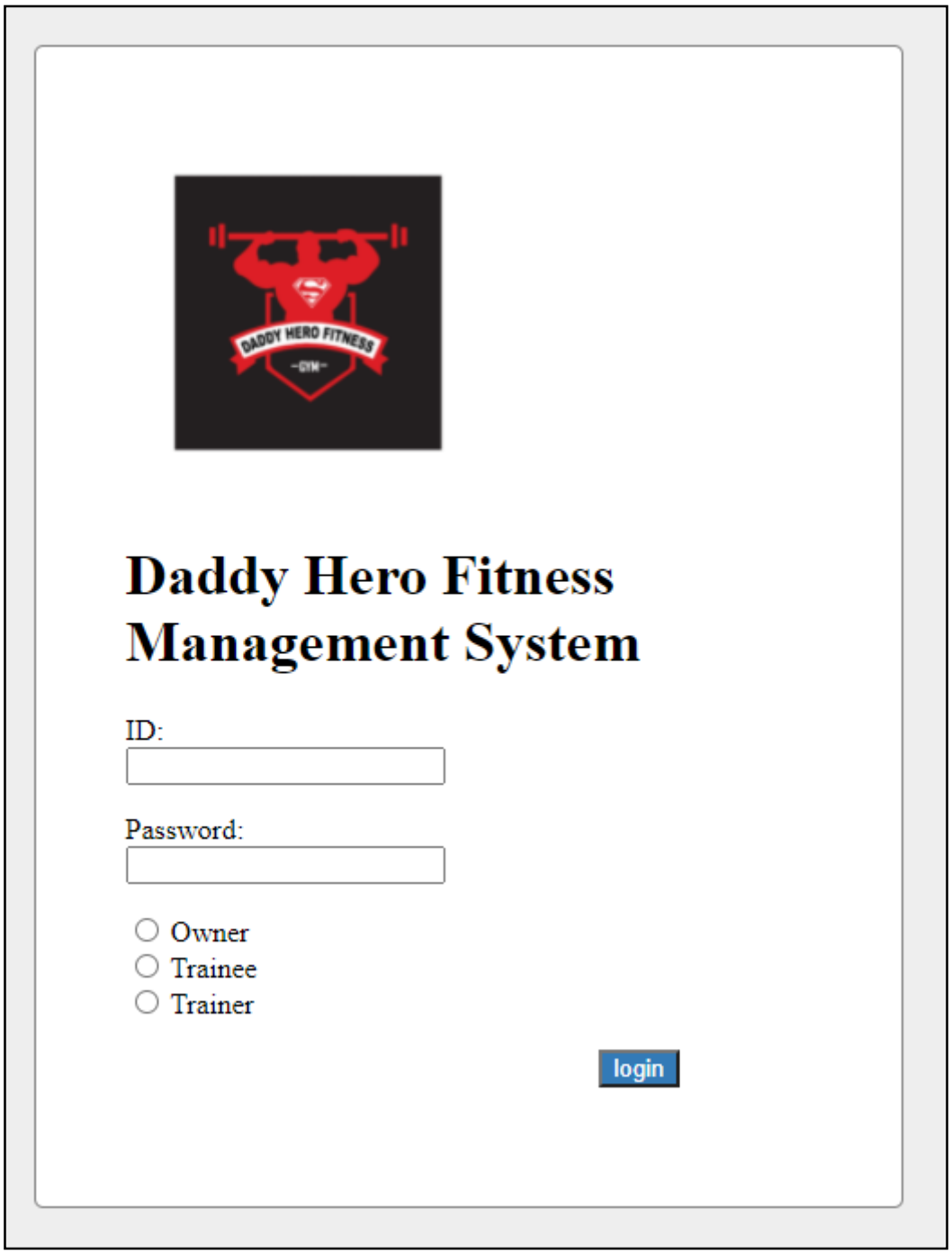

Figure 4: Login page for this system

Figure 5 shows the interface for admin page. Admin can edit the trainer and trainee account and record payment for each payment from trainee. Admin can check the total amount for earning for gym by view total earning function.

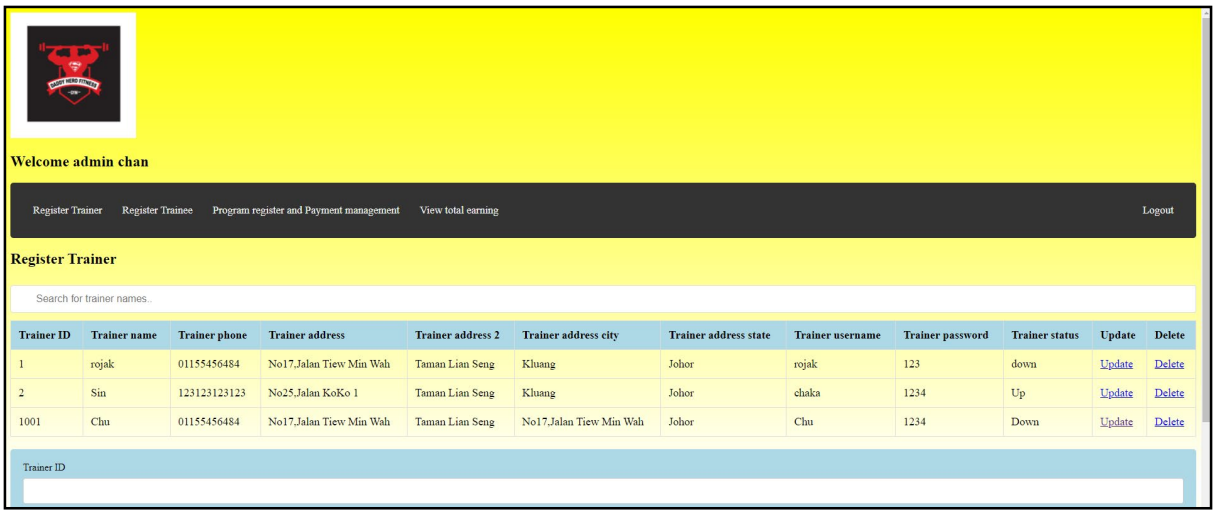

Figure 5: Admin interface for this system

Figure 6 shows the interface for Trainer. Trainer can edit exercise, food, workout plan, diet plan and program. After a lecture with trainee, trainer will weight the trainer to input the trainee health status record. The trainee management function is to manage the trainee for each program, it will display the trainee name and ID and which program he assigned.

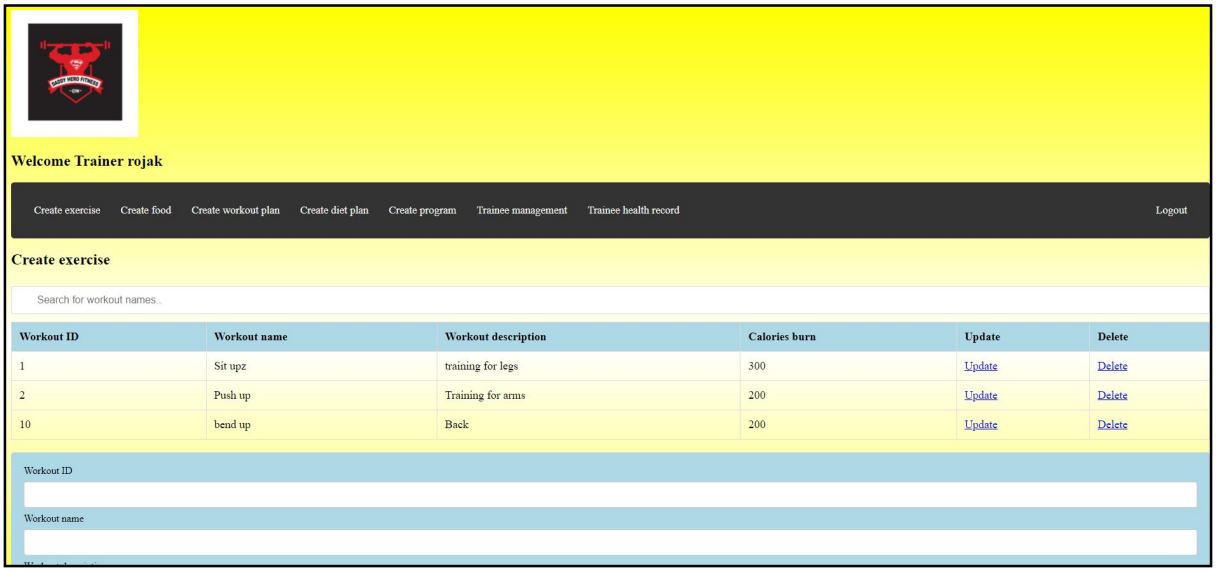

Figure 6: Trainer interface for this system

Figure 7 shows the interface for Trainee. Trainee can view registered program, workout history and payment details.

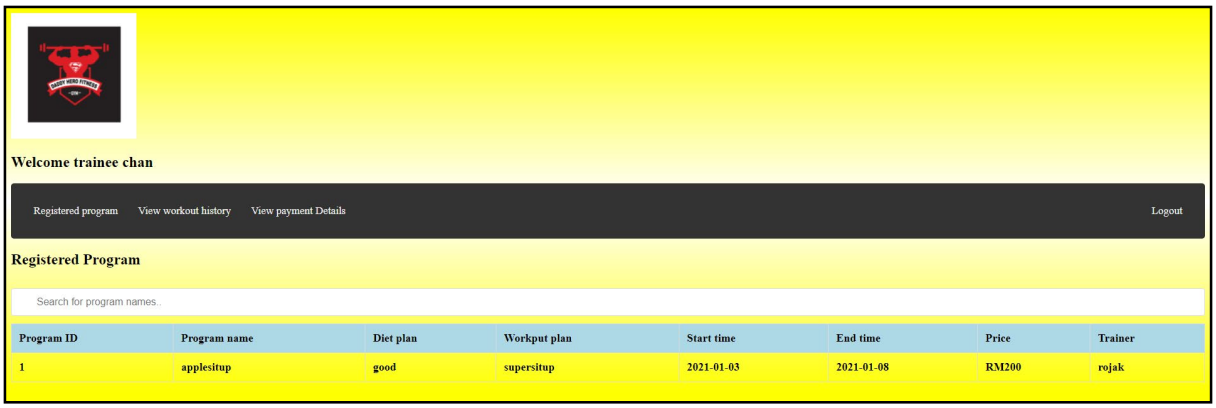

Figure 7: Trainee interface for this system

4.4 Testing results

Table 4 shows the testing result from the gym owner, trainer and trainee which is tested the functionality of the system and is manipulated the data from admin module, trainer module and trainee module. The proposed system manages to pass all the tests with the expected results.

Table 4: Table of Test Plan results

Number	Description	Expected Results	Result
1	Make new trainer: I. Input trainer details. II. Select up or down status. III. Click submit and view the data. IV. Search by trainer name	I. Can input trainer details. II. Can select up or down status. III. Can click submit and view the data. IV. Can Search by trainer name	Pass
2	Make new trainee: I. Input trainee details II. Select up or down status III. Click submit and view the data IV. Search by trainee name	I. Can input trainee details II. Can select up or down status III. Can click submit and view the data IV. VIII. Can search by trainee name	Pass
3	Make payment record: I. Input payment details. II. Select program name. III. Click submit and view the data. IV. Search by trainee ID	I. Can input payment details. II. Can select program name. III. Can click submit and view the data. IV. Can search by trainee ID	Pass
4	View total earning: I. XIII. Input start and end date to search earning between 2 dates	I. Can input start and end date to search earning between 2 dates	Pass
5	Make new exercise: I. Input and edit exercise details. II. Click submit and view the data. III. Search by workout name	I. Can input and edit exercise details. II. Can click submit and view the data. III. Can search by workout name	Pass

Table 4: (cont.)

Number	Description	Expected Results	Result
6	Make new food: I. Input and edit food details II. Click submit and view the data III. Search by workout plan	I. Can input and edit food details II. Can click submit and view the data III. VI. Can search by workout plan	Pass
7	Make new workout plan: I. Input and edit workout plan details. II. Select workout name. III. Click submit and view the data. IV. Search by workout name	I. Can input and edit workout plan details. II. Can select workout name. III. Can click submit and view the data. IV. Can search by workout name	Pass
8	Make new diet plan: I. Input and edit diet plan details. II. Select food name. III. Click submit and view the data. IV. Search by food name	I. Can input and edit diet plan details. II. Can select food name. III. Can click submit and view the data. IV. Can search by food name	Pass
9	Make new program: I. Input and edit program details. II. Select diet and workout plan. III. Click submit and view the data. IV. Search by program name	I. Can input and edit program details. II. Can select diet and workout plan. III. Can click submit and view the data. IV. Can search by program name	Pass
10	View trainee and program: I. View trainee and program II. Search by program name	I. Can view trainee and program II. Can search by program name	Pass
11	Make new trainee health record: I. Input and edit trainee health record details. II. Select date. III. Click submit and view the data. IV. Search by trainee name	I. Can input and edit trainee health record details. II. Can select date. III. Can slick submit and view the data. IV. Can search by trainee name	Pass
12	View registered program: I. View registered program II. Search by program name	I. Can view registered program II. Can search by program name	Pass
13	View workout history: I. View workout history II. IV. Search by date	I. Can view workout history II. IV. Can search by date	Pass
14	View payment detail: I. View payment detail II. Search by program name	I. Can view payment detail II. Can search by program name	Pass

5. Conclusion

For future recommendations are online payment connected with bank or user pay with their online wallet. Next, make encryption function for every data enter in database and decryption when retrieve from database to increase the security of this system. In addition, system can perform visual graph from data to make user to understand the data. Lastly, make live monitoring function with gym Closed-circuit television (CCTV) cameras when owner want to monitor his gym from other location.

In conclusion, 3 of the objectives achieved and system testing passed.

i. To design a fitness and health management website system based on programming language.

ii. To develop a health status database.

iii. To perform testing for the developed model.

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