

Web searchable database for exercise

Bawal Purvi Bhupendra, Mordan-McCombs Sarah, Chitnis Tanvi Prashant

ABSTRACT

Exercise has numerous benefits including but not limited to increase in life expectancy, stress relief, depression management, improved sleep and weight control. As schedules become increasingly busy, time and commitment to fitness is more important but more difficult to maintain. Access to a web searchable database that can provide information about exercise options, gym locations and class times, and calorie burn can help them plan their exercise routines. The goal of this project is to create a web accessible and searchable database for possible exercise routines, including number of calories burned with each activity. This should also help maintain details of gym, instructors, exercises (benefits and calories burned), and equipment (availability in each facility). The system will be developed using MySQL for database management. PHP will be used to create the web interface, pull and maintain data from the database and logically display it to the end user using HTML, CSS, Javascript, etc. The outcome of this project will be a web searchable database which will maintain details of gym facilities, members, equipment, instructor, exercises, weight and unit calories burned. This system will allow addition, deletion, modification and search of the data. It will also provide a calorie calculator which will help people know the calories they would burn with each activity in gym so that they can analyze the effects of their routine exercise and modify those if needed.

INTRODUCTION

In 2015, nearly one in three adult Americans was considered overweight, and an additional one-third of adult Americans was considered obese (Flegal et al., 2016). Additionally, one in six children and adolescents between the ages of 2-19 were considered overweight. Consequences of being overweight or obese include type II diabetes, high blood pressure, heart disease, arthritis, sleep apnea, cancer, and even premature death (Ogden et al., 2016). Weight control can be achieved through dietary restriction as well as physical activity. However, many people may not know what exercise regimens to follow or where to go for specific types of exercise.

The first documentation of a recommendation for an exercise regimen dates to 400 BC from Hippocrates, and can be found in the American College of Sports Medicine Health and Physical Activity Database (www.acsm.org). Web-based or smartphone applications to aid in tracking diet and exercise are abundant today, and include such programs as: MyFitnessPal, Lose it!, Fooducate, My Food Diary, and others (Whiteman, 2017). These programs are especially appealing because they are easy to access, offer privacy, are cost effective (often free), and do not require users to attend meetings or doctor's visits for use. In a study in the UK in 2013, 128 overweight volunteers used either a web-based application, smartphone application, or paper diary as a tool for weight management and intervention over the course of 6 months. Retention in the study and adherence to the weight management program was significantly higher in patients who used the web-based or smartphone app as compared to those using the paper diary. Further, weight loss and reduction in BMI was better in individuals using the application compared to those using the paper diary (Carter et al., 2013). A meta-analysis of studies comprising over 11,000 patients showed that web-based therapies for weight loss result in improved outcomes for patients in the areas of knowledge and behavior change (Wantland et al., 2004). Importantly, weight loss maintenance over the course of 18-months, participation in healthcare, knowledge of nutritional status, and increased exercise time were all improved in patients using web-based applications versus those using non-web-based strategies (Wantland et al., 2004).

The majority of web-based applications for weight maintenance and exercise are national or international in their scope, and so do not focus on resources in a specific area. A web search for “Indianapolis exercise” yielded over 33 million hits, most of which are individual gyms or fitness centers. However, there is no available database that combines the multitude of gym, fitness center, and outdoor options for exercise in the greater Indianapolis area. For individuals who are new to the area, and for whom exercise and fitness is important, the task of finding the right gym with the right classes could be extremely onerous. Thus, our database will compile this information into one, easily-accessible website, so users do not need to search each gym individually.

The benefit of exercise is clear, and the use of web-based management tools has been shown in many studies. Depending on location, availability of gym facilities versus outdoor options varies. Outdoor exercise provides additional health benefits, particularly in terms of exposure to vitamin D, which is known to play a role in cancer prevention, bone health, as well as both immune and mental health (Grant and Holick, 2005). To fully promote a healthy lifestyle, our database will also include options for outdoor walking or hiking trails, easily searchable along with the gym and fitness center information.

DATA

The data will be collected from different resources for all the attributes mentioned in the ER diagram as all this data cannot be obtained from one common source. In case, we do not get data for a particular attribute, it will be self created, considering that the goal of our project is how well we can implement the web development module rather than collecting legitimate data. For example, the data for members of gym, instructors, their exercise plans and all the personal information will not be available for publicly. This data will be self created for the sole purpose of using it for the project implementation.

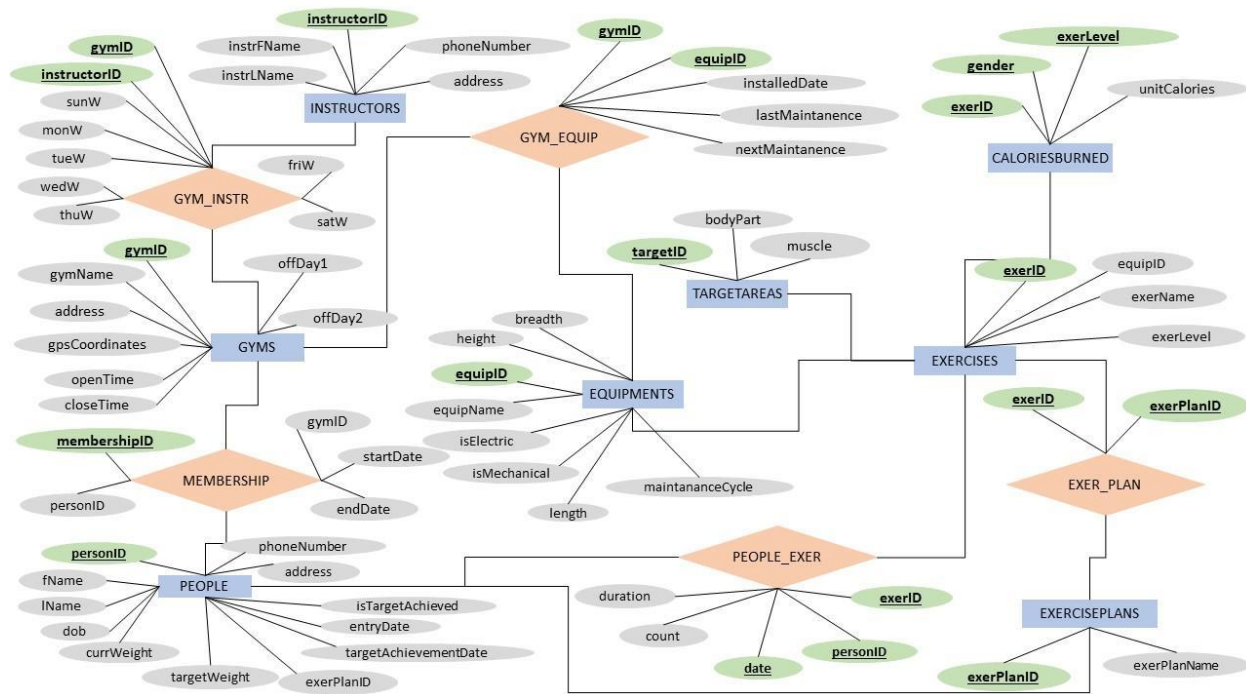
Some of the websites that will be used for collecting the data for entity and relationship are as follows

1. Calories burnt with Activity/Exercise
<https://www.health.harvard.edu/diet-and-weight-loss/calories-burned-in-30-minutes-of-leisure-and-routine-activities>
2. Target Areas
<https://www.jefit.com/routines/workout-routine-database.php?id=25371>
3. Equipments
http://www.marforres.marines.mil/Portals/116/Docs/MCCS/SemperFit/Docs/Fitness/Gym_Equipment_Descriptions.pdf
4. Exercises
<https://www.jefit.com/routines/workout-routine-database.php?id=25371>

All this data will be collected and maintained in an excel file which will be used for the database.

METHODS

Entity Relationship Diagram



GREEN primary key attribute/s GRAY non-key attributes BLUE entities ORANGE relationship

Figure 1 : Entity Relationship Diagram

Database Design Language(DBDL)

Entity tables

1. gyms(gymID, gymName, address, gpsCoordinates, openTime, closeTime, offDay1, offDay2)
2. equipments(equipID, equipName, isElectric, isMechanical, maintenanceCycle, length, breadth, height)
3. targetAreas(targetID, bodyPart, muscle)
4. exercises(exerID, exerName, equipID, exerLevel, targetID)

FK targetID -> targetArea

FK equipID -> equipments

5. exercisePlans(exerPlanID, exerPlanName)
6. caloriesBurned(exerID, gender, exerLevel, unitCalories)

FK exerID -> exercises

7. instructors(instructorID, instrFName, instrLName, phoneNumber, address)
8. people(personID, fName, lName, phoneNumber, address, dob, currWeight, targetWeight, exerPlanID, entryDate, isTargetAchieved, targetAchievementDate)

FK exerPlanID -> exercisePlans

Relationship tables

1. gym_equip(**gymID**, **equipID**, installedDate, lastMaintenance, nextMaintenance)

FK gymID -> gyms

FK equipID -> equipments

2. gym_instr(**gymID**, **instructorID**, sunW, monW, tueW, wedW, thuW, friW, satW)

FK gymID -> gyms

FK instructorID -> instructors

3. membership(**membershipID**, personID, gymID, startDate, endDate)

FK personID -> people

FK gymID -> gyms

4. people_exer(**personID**, **exerID**, **date**, duration, count)

FK personID -> people

FK exerID -> exercises

5. exer_plan(**exerPlanID**, **exerID**)

FK exerID -> exercises

FK exerPlanID -> exercisePlan

Explanation of the database design:

This database design is close to a 3rd normal form. The design covers most of the aspects of an exercise database. This design has eight entities coloured blue. The relationships between the entities are described below:

Table 1 : Explanation of database design

Sr#	Entity 1	Entity 2	Cardinality	Comments
-----	----------	----------	-------------	----------

1	Gyms	Equipments	Many to Many	A gym can have many equipments and a type of equipment can be present in multiple gyms.
2	Gyms	Instructors	Many to Many	A gym can have multiple instructors. An instructor can work at multiple gyms.
3	People	Gyms	Many to Many	A person may be a member of multiple gym facilities and a gym may have more than one members.
4	People	Exercises	Many to Many	A person may do multiple exercises and an exercise may be done by multiple people.
5	Exercises	ExercisePlans	Many to Many	An exercise can be a part of multiple exercise plans. An exercise plan may have more than one exercise.
6	Exercises	Equipments	Many to One	A given exercise can be done on one equipment. An equipment may facilitate multiple exercises on them.
7	Exercises	CaloriesBurned	One to Many	An exercise can have multiple entries of burned calories based on speed or resistance on an equipment.
8	People	ExercisePlans	Many to One	A person may have one exercise plan. An exercise plan may be shared by multiple people.

9	Exercises	TargetAreas	Many to One	An exercise can have a target area but a target area may be same for multiple exercises.
---	-----------	-------------	-------------	--

We can keep record of below data in this database:

- The different gym facilities and their details
- Instructors and their schedules. Also maintains which instructor works at which gym on which days
- Keeps a list of equipments commonly used in gyms along with which gym has which equipment options
- Notes the maintenance schedules of various equipment, dimensions and power requirements of each equipment
- List of people, their membership with gyms along with target weight and exercise plan details
- List of exercises, calories burned with each of them, target area of each exercise
- People can keep a track of each exercise they perform along with duration or count and keep track of their exercise plan
- The above details can be inserted, deleted and viewed by users

Web Application Structure

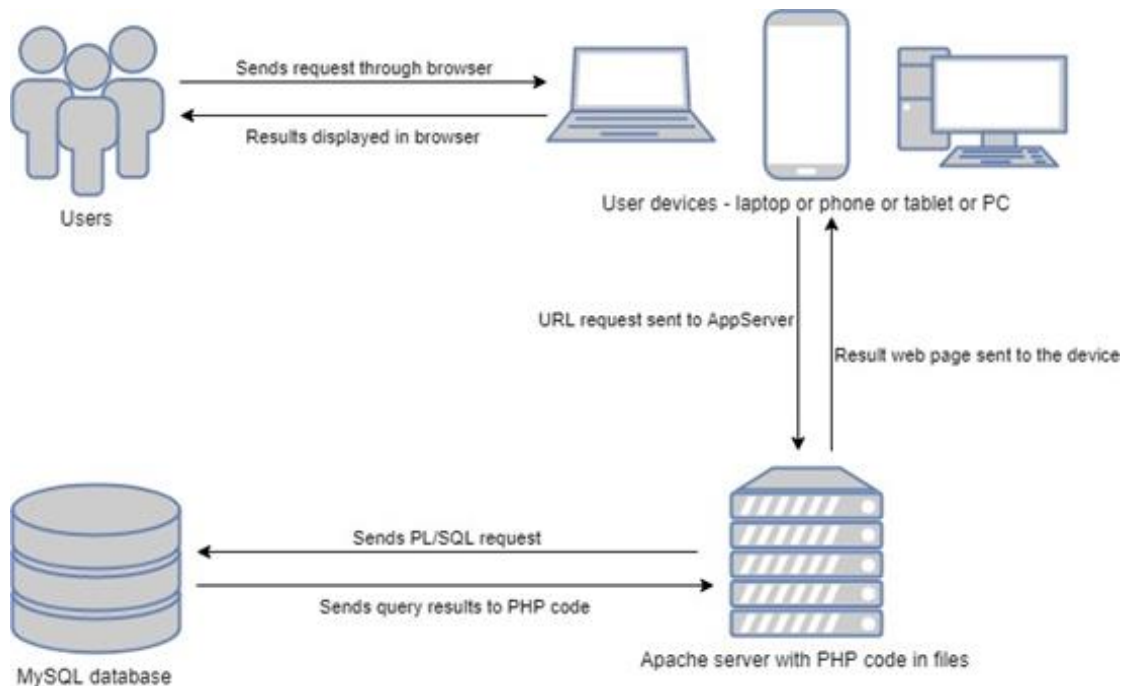


Figure 2 : Web Application Structure

The architecture of the web database for exercise project is described in the image below. It comprises of four major components, users, browsers, middleware and a database.

1. Users:

Users are the end users of the product developed at the end of this project. These are the people who will search and update data in the website created for exercises. This group will typically be system admins who update data for users and share information regarding their exercise routine with users upon request.

2. Browsers:

Since the application developed is a web application, only a browser on mobile phone, tablets, laptops, personal computers would be needed to access the web application over internet.

3. Middleware:

The middleware would mainly consist of Apache server which would contain the PHP files. These files will hold the code to display the web pages and also request data from database or render data received from the database in a well formatted way. These files contain the code to connect to database as well.

4. Database:

The database used in this web application is MySQL. WAMP is used for ease of accessing the database. MySQL includes components such as the **InnoDB** storage engine that adhere closely to the ACID model, so that data is not corrupted and results are not distorted by exceptional conditions such as software crashes and hardware malfunctions. When you rely on ACID-compliant features, you do not need to reinvent the wheel of consistency checking and crash recovery mechanisms.

Atomicity: Atomicity requires that each transaction be "all or nothing": if one part of the transaction fails, then the entire transaction fails, and the database state is left unchanged. An atomic system must guarantee atomicity in each and every situation, including power failures, errors and crashes.

Consistency: The consistency property ensures that any transaction will bring the database from one valid state to another. Any data written to the database must be valid according to all defined rules, including constraints, cascades, triggers, and any combination thereof.

Isolation: The isolation property ensures that the concurrent execution of transactions results in a system state that would be obtained if transactions were executed sequentially, i.e., one after the other. Providing isolation is the main goal of concurrency control.

Durability: The durability property ensures that once a transaction has been committed, it will remain so, even in the event of power loss, crashes, or errors. In a relational database, for instance, once a group of SQL statements execute, the results need to be stored permanently (even if the database crashes immediately thereafter).

RESULTS

The results displays all the front end web pages that are designed using WAMP, which is a software that includes PHP-Apache-MySQL for linking database to front end.

Below is the home page of the web searchable database. This page has links to all the pages in the application.

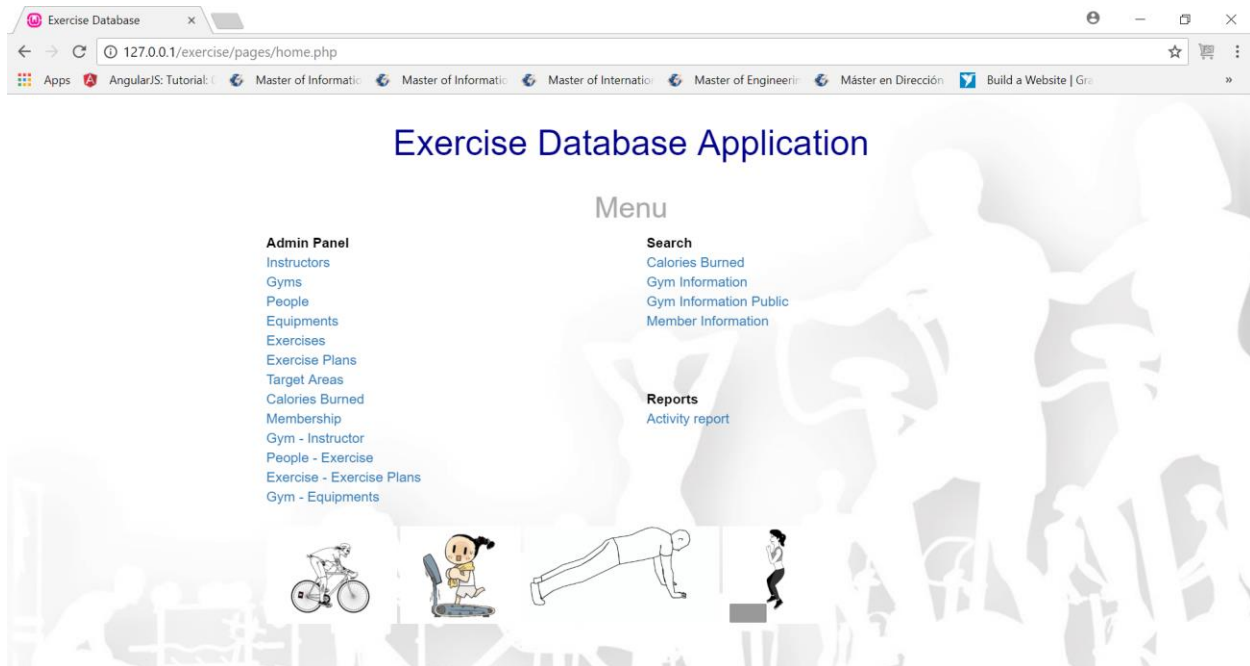


Figure 3 : Main Homepage

Below are the screenshots of the pages prepared so far for insert, update, delete operations on all tables. This comprises of the Admin Panel of the application.

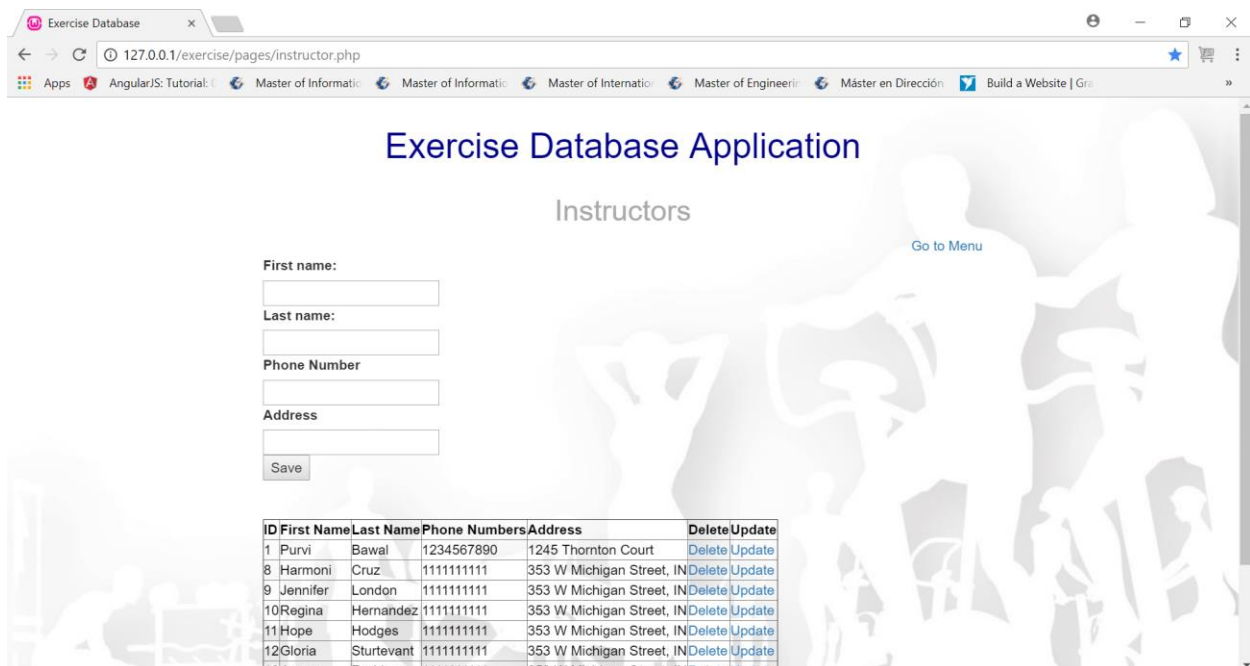


Figure 4 : Insert/Update/Delete Instructors records in database

The screenshot shows a web browser window titled 'Exercise Database' with the URL '127.0.0.1/exercise/pages/gym.php'. The page is titled 'Exercise Database Application' and 'Gyms'. It features a form for adding or updating gym records with fields for Gym name, Address, Zip Code, Open Time, Close Time, Off Day 1, and Off Day 2. A 'Save' button is at the bottom of the form. Below the form is a table listing existing gyms with columns for Gym ID, Gym Name, Address, Zip Code, Open Time, Close Time, Off Day 1, Off Day 2, and Delete/Update links.

Gym ID	Gym Name	Address	Zip Code	Open Time	Close Time	Off Day 1	Off Day 2	Delete/Update
3	IUPUI Gym	353 W Michigan St	47201	0900	1900	Sunday		Delete/Update
5	YMCA City Market	242 E Market St Ste 100	46204	500	2000	Sunday		Delete/Update
6	Baxter YMCA	7900 S Shelby St	46227	500	2200			Delete/Update
7	Ransburg YMCA	501 N Shortridge Rd	46219	500	2200			Delete/Update
8	Irsay Family YMCA	430 S Alabama St	46225	500	2200			Delete/Update
9	Avondale Meadows YMCA	3908 Meadows Drive	46205	600	2100			Delete/Update
10	Pike YMCA	7114 Lakeview Parkway W Dr	46268	500	2100			Delete/Update
11	YMCA at the Athenaeum	401 E Michigan St	46204	500	2200			Delete/Update

Figure 5 : Insert/Update/Delete Gym records in database

The screenshot shows a web browser window titled 'Exercise Database' with the URL '127.0.0.1/exercise/pages/people.php'. The page is titled 'Exercise Database Application' and 'People'. It features a form for adding or updating individual records with fields for First name, Last name, Phone Number, Address, Date of birth, Initial Weight, Target Weight, Exercise Plan, is Target achieved?, Target Achievement date, and a 'Save' button. Below the form is a table listing existing individuals with columns for ID, First Name, Last Name, Phone Numbers, Address, Date of Birth, Initial weight, Target Weight, Exercise Plan, Target Achieved?, Target Achievement date, and Delete/Update links.

ID	First Name	Last Name	Phone Numbers	Address	Date of Birth	Initial weight	Target Weight	Exercise Plan	Target Achieved?	Target Achievement date	Delete/Update
10	John	Smith	1111111111	353 W Michigan Street, IN	1990-12-12	170	185	Medium - Muscle Building	No		Delete/Update
11	Rose	Jones	1111111111	353 W Michigan Street, IN	1990-12-12	235	165	Medium - Weight Loss	No		Delete/Update
12	Amber	Yonkers	1111111111	353 W Michigan Street, IN	1990-12-12	160	145	Easy - Weight Loss	No		Delete/Update

Figure 6 : Insert/Update/Delete records for individual person in database

Exercise Database Application

Equipments

Equipment name:

Electric/Mechanic:

Maintenance Cycle:

Length:

Breadth:

Height:

Equipment ID	Equipment Name	Electric/Mechanic	Maintenance Cycle	Length	Breadth	Height	Delete	Update
1	Leg Press	Electric	90				Delete	Update
2	Leg Extension	Electric	90				Delete	Update
3	Leg Curl	Electric	90				Delete	Update
4	Chest Press	Electric	90				Delete	Update
5	Triceps Press	Electric	90				Delete	Update
6	Lat Pull down	Electric	90				Delete	Update
7	Seated Row	Electric	90				Delete	Update
8	Bicep Curl	Electric	90				Delete	Update
9	Functional Trainer	Electric	90				Delete	Update

Figure 7 : Insert/Update/Delete Equipment records in database

Exercise Database Application

Exercises

Exercise name:

Exercise Level:

Equipment:

Target Area:

ID	Exercise Name	Equipment	Target	Level	Delete	Update
5	Weight Lifting: general	Dumbbells	internal oblique-torso	Medium	Delete	Update
6	Aerobics: water	Lat Pull down		Medium	Delete	Update
7	Stretching: Hatha Yoga		deltoid-shoulder	Low	Delete	Update
8	Calisthenics: moderate		trapezius-back	Medium	Delete	Update
9	Riders: general			Medium	Delete	Update
10	Aerobics: Low impact		biceps-arm	Low	Delete	Update
11	Stair Step Machine: general	Step Mill		Medium	Delete	Update
12	Teaching aerobics			High	Delete	Update
13	Weight Lifting: vigorous	Dumbbells	biceps-arm	High	Delete	Update
14	Aerobics: Step: Low impact			Low	Delete	Update
15	Aerobics: High impact		biceps-arm	High	Delete	Update
16	Bicycling: Stationary: moderate	Upright Bike		medium	Delete	Update
17	Rowing: Stationary: moderate			Medium	Delete	Update
18	Calisthenics: vigorous			High	Delete	Update
19	Circuit Training: general			Medium	Delete	Update

Figure 8 : Insert/Update/Delete Exercises in database

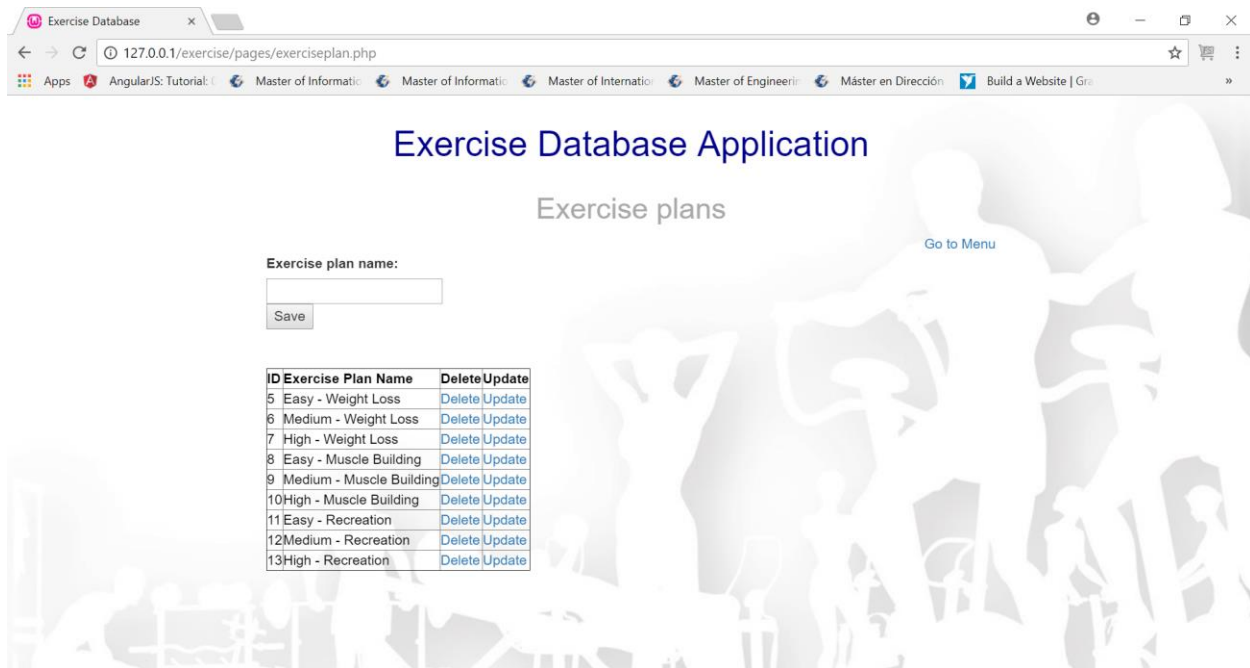


Figure 9 : Insert/Update/Delete Exercise plans for a gym in database

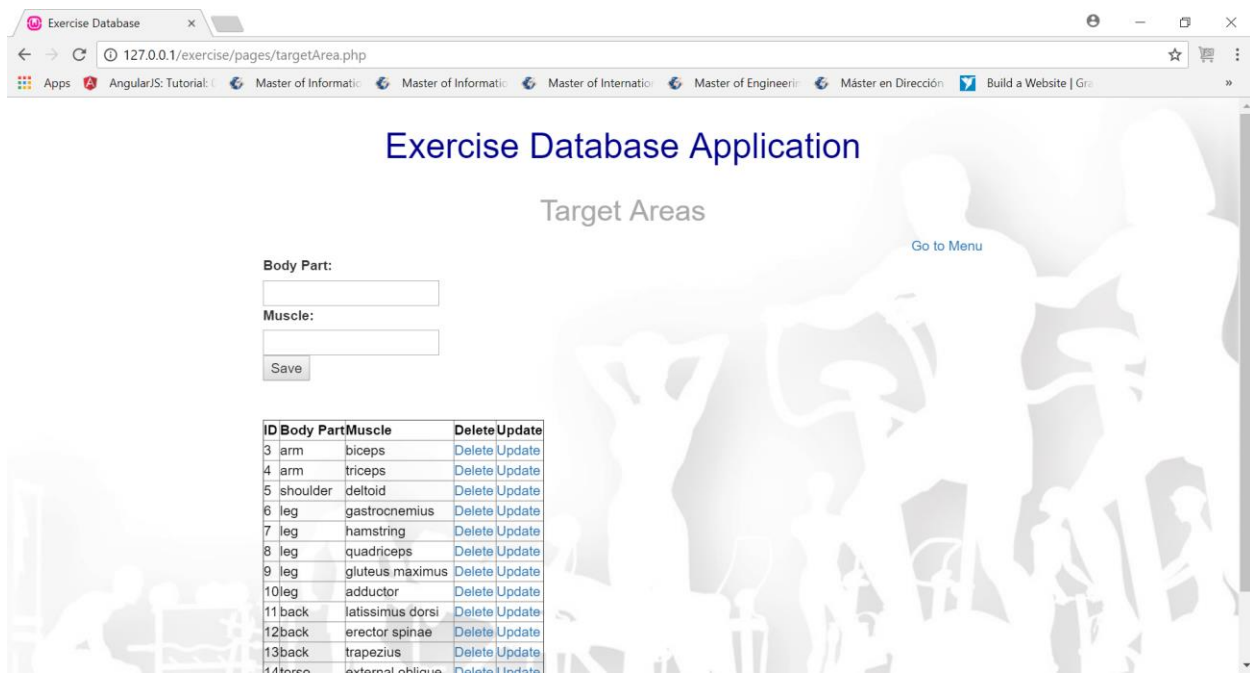


Figure 10 : Insert/Update/Delete Target areas for exercise in database

Exercise Database Application

Calories Burned

[Go to Menu](#)

Exercise:

Gender:

Exercise Level:

Unit calories burned per hour:

Exercise ID	Exercise Name	Gender	Exercise Level	Unit Calories per hour	Delete Update
5	Weight Lifting: general	Male	Medium	112	Delete Update
6	Aerobics: water	Female	High	100	Delete Update
6	Aerobics: water	Male	Medium	149	Delete Update
7	Stretching, Hatha Yoga	Male	Low	149	Delete Update
8	Calisthenics: moderate	Male	Medium	167	Delete Update
9	Riders: general	Male	Medium	186	Delete Update

Figure 11 : Insert/Update/Delete Exercise with calories burnt in database

Exercise Database Application

Memberships

[Go to Menu](#)

Person:

Gym:

Start Date:

End Date:

Membership ID	Person Name	Gym	Start Date	End Date	Delete Update
13	John Smith	Avondale Meadows YMCA	2018-01-02		Delete Update
6	Rose Jones	YMCA City Market	2016-12-11		Delete Update
12	Jim Jamesin	Ransburg YMCA	2017-02-08		Delete Update
17	Jim Jamesin	Baxter YMCA	2018-04-11		Delete Update
7	Archie Crean	Planet Fitness - 38th St	2018-04-03		Delete Update
8	Abigail Myers	Pike YMCA	2012-12-31		Delete Update
10	Rusty Cramer	YMCA at the Athenaeum	2015-03-28		Delete Update

Figure 12 : Insert/Update/Delete membership of people in database

Exercise Database Application

Gym - Instructors

[Go to Menu](#)

Instructor:

Gym:

Availability on days:

Sunday:

Monday:

Tuesday:

Wednesday:

Thursday:

Friday:

Saturday:

Instructor	Gym	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Update	Delete
13-Jonna Rodriguez	5-YMCA City Market	No	Yes	No	Yes	No	No	Yes	Update	Delete
12-Gloria Sturtevant	6-Baxter YMCA	No	No	Yes	Yes	Yes	No	No	Update	Delete
8-Jennifer London	7-Ransburg YMCA	No	Yes	Yes	No	No	No	No	Update	Delete
15-Harry Napier	7-Ransburg YMCA	No	Yes	Yes	No	No	No	No	Update	Delete
10-Regina Hernandez	8-Irasy Family YMCA	No	Yes	Yes	Yes	Yes	Yes	No	Update	Delete
1-Puri Basall	9-Avonale Meadows YMCA	No	No	Yes	No	Yes	No	No	Update	Delete
10-Regina Hernandez	21-LA Fitness - Greenwood	No	Yes	No	Yes	No	No	No	Update	Delete
12-Gloria Sturtevant	31-Planet Fitness - Kentucky Ave	No	Yes	Yes	Yes	Yes	No	No	Update	Delete

Figure 13 : Insert/Update/Delete Instructors for each gym in database

Exercise Database Application

People Exercise tracking

[Go to Menu](#)

Person:

Exercise:

Date:

Duration:

Person	Exercise	Date	Duration	Delete
10-John Smith	5-Weight Lifting: general	2018-04-24	30	Delete
10-John Smith	11-Stair Step Machine: general	2018-04-24	30	Delete
11-Rose Jones	8-Calisthenics: moderate	2018-04-05	45	Delete
12-Amber Yonkers	11-Stair Step Machine: general	2018-04-10	10	Delete
13-Jim Jamesin	8-Calisthenics: moderate	2018-04-22	30	Delete
13-Jim Jamesin	11-Stair Step Machine: general	2018-04-22	70	Delete
14-Archie Crean	5-Weight Lifting: general	2018-04-10	50	Delete
15-Abigail Myers	5-Weight Lifting: general	2018-04-13	45	Delete
15-Abigail Myers	8-Calisthenics: moderate	2018-04-10	45	Delete
15-Abigail Myers	24-Bicycling, Stationary: vigorous	2018-04-10	10	Delete
18-Frank Strain	30-Water Volleyball	2018-04-10	20	Delete

Figure 14 : Insert/Update/Delete track of exercises performed in database

Exercise Database Application

Exercise - Exercise plans

[Go to Menu](#)

Exercise plan name:
 5-Easy - Weight Loss

Exercise name:
 5-Weight Lifting: general

Exercise Plan Name	Exercise Name	Delete
8-Easy - Muscle Building	5-Weight Lifting: general	Delete
9-Medium - Muscle Building	13-Weight Lifting: vigorous	Delete
5-Easy - Weight Loss	14-Aerobics: Step: Low impact	Delete
5-Easy - Weight Loss	15-Aerobics: High impact	Delete
7-High - Weight Loss	15-Aerobics: High impact	Delete
7-High - Weight Loss	18-Calisthenics: vigorous	Delete
11-Easy - Recreation	22-Ski Machine: general	Delete
11-Easy - Recreation	26-Bowling	Delete
7-High - Weight Loss	27-Dancing: sLow, waltz, foxtrot	Delete
11-Easy - Recreation	32-Golf: using cart	Delete
8-Easy - Muscle Building	37-Tai Chi	Delete

Figure 15 : Insert/Update/Delete mapping details of exercise and exercise plans database

Exercise Database Application

Gyms - Equipments

[Go to Menu](#)

Gym:
 3-IUPUI Gym

Equipment:
 1-Leg Press

Installation Date:
 dd-mm-yyyy

Last Maintenance:
 dd-mm-yyyy

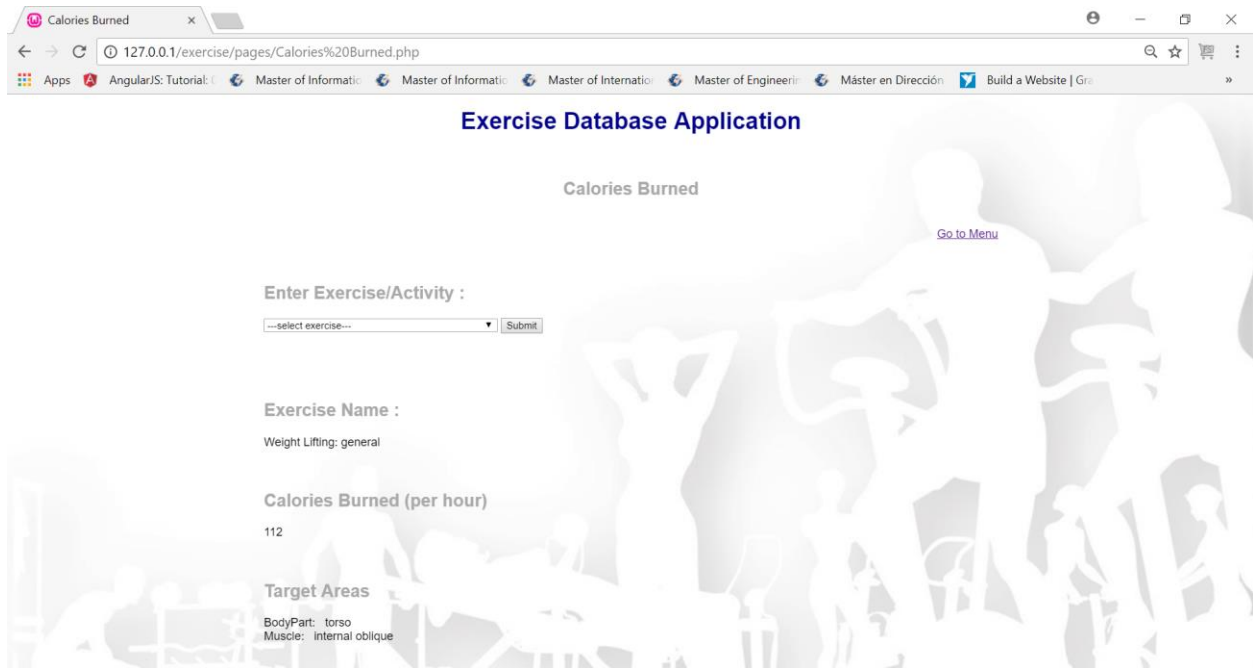
Next Maintenance:
 dd-mm-yyyy

Gym	Equipment	Installation Date	Last Maintenance	Next Maintenance	Delete	Update
3-IUPUI Gym	1-Leg Press	2017-04-17	2018-04-03	2018-12-01	Delete	Update
3-IUPUI Gym	8-Bicep Curl	2018-04-11	2018-04-19	2019-04-19	Delete	Update
3-IUPUI Gym	9-Functional Trainer	2018-04-25	2018-04-26	2019-04-27	Delete	Update
3-IUPUI Gym	14-Medicine Balls	2018-03-29	2018-04-07	2019-04-07	Delete	Update
6-Baxter YMCA	1-Leg Press	2018-04-18	2018-04-18	2019-04-18	Delete	Update
6-Baxter YMCA	4-Chest Press	2018-04-04	2018-04-04	2019-04-04	Delete	Update
6-Baxter YMCA	7-Seated Row	2018-04-11	2018-04-12	2019-04-12	Delete	Update
7-Ransburg YMCA	1-Leg Press	2018-04-12	2018-04-12	2019-04-12	Delete	Update

Figure 16: Insert/Update/Delete equipment for each gym in database

To view the inserted data in the above Admin panel, we have created 3 different web pages under the search and report heading. These web pages are as follow;

1. Calories Burned
2. User Information
3. Gym Information



Calories Burned

Go to Menu

Enter Exercise/Activity :

...select exercise... Submit

Exercise Name :
Weight Lifting: general

Calories Burned (per hour)
112

Target Areas
BodyPart: torso
Muscle: internal oblique

Figure 17: Check calories burnt with exercise

In the above page, the users can check the calories burnt with each exercise or activity recorded in the database. The exercises will also provide the target areas and the muscles of the body that are mostly affected by the exercises or activity.

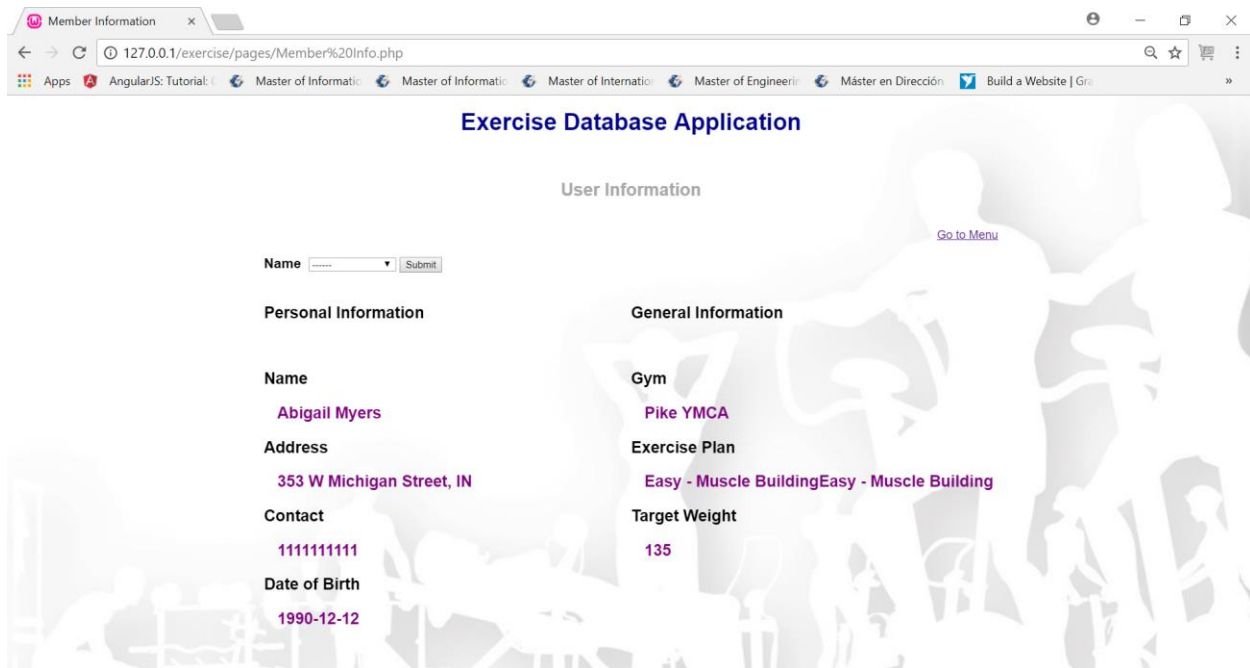


Figure 18: View all data for individual user in database

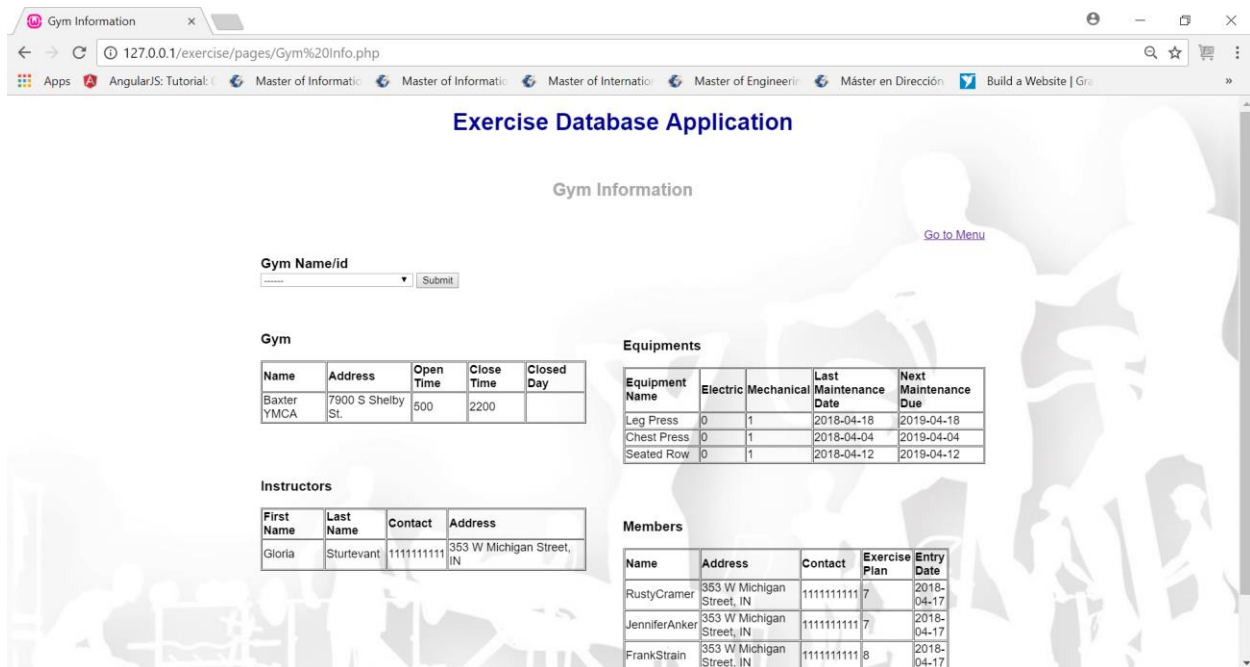


Figure 19a: View all gym information (Instructors, equipments, and members)

The above webpage will contain the information about all the gyms, their instructors, their equipments and their members. We are assuming to run this webpage in admin mode, so for now it will display all this information related to each gym that we select.

Exercise Database Application

Gym Information - Public

[Go to Menu](#)

Gym Name/id:

Gym

Name	Address	Open Time	Close Time	Closed Day
Baxter YMCA	7900 S Shelby St.	500	2200	

Equipments

Equipment Name	Electric	Mechanical	Last Maintenance Date	Next Maintenance Due
Leg Press	0	1	2018-04-18	2019-04-18
Chest Press	0	1	2018-04-04	2019-04-04
Seated Row	0	1	2018-04-12	2019-04-12

Instructors

First Name	Last Name	Contact	Address
Gloria	Sturtevant	1111111111	353 W Michigan Street, IN

Figure 19b: View all gym information (Instructors, equipments, and members)

To view the report of exercise performed by individuals and calories burned each day can be viewed in the below report screen. There is an option to filter data by person name as well as print this page.

Exercise Database Application

Person Activity Report

[Go to Menu](#)

Person:

Person	Date	Exercise	Duration	Unit	Calories Burned	Total Calories Burned
John Smith	2018-04-24	Weight Lifting: general	30	112		56.0000
John Smith	2018-04-24	Stair Step Machine: general	30	223		111.5000
Rose Jones	2018-04-05	Calisthenics: moderate	45	167		125.2500
Amber Yonkers	2018-04-10	Stair Step Machine: general	10	223		37.1667
Jim Jamesin	2018-04-22	Calisthenics: moderate	30	167		83.5000
Jim Jamesin	2018-04-22	Stair Step Machine: general	70	223		260.1667
Archie Crean	2018-04-10	Weight Lifting: general	50	112		93.3333
Abigail Myers	2018-04-13	Weight Lifting: general	45	112		84.0000
Abigail Myers	2018-04-10	Calisthenics: moderate	45	167		125.2500
Abigail Myers	2018-04-10	Bicycling, Stationary: vigorous	10	391		65.1667
Frank Strain	2018-04-10	Water Volleyball	20	112		37.3333

Figure 20: View/Print/Filter exercise report of all users along with calories burned

DISCUSSIONS

Below are a few suggested future enhancements :

1. This application can be enhanced to add individual login page for each user to view his or her activities and reports.
2. GPS can be plugged into the application to help navigate to a gym.
3. Motivational notifications of fellow members to be displayed to other members. This can help encourage people to achieve their targets.
4. BMI calculator can be added as one of the screens.

CONCLUSION

This web searchable database for exercise developed as a part of this project can be used at Gym Facilities to track the progress of each member. This will help maintain all information about the gym, members, instructors, exercise plans, etc electronically. This can also help pull real time reports for individuals with a history of their exercise routines.

REFERENCES

Carter MC, VJ Burley, C Nykjaer, JE Cade. 2013. *Adherence to a Smartphone Application for Weight Loss Compared to Website and Paper Diary: Pilot Randomized Controlled Trial*. J Med Internet Res. 15(4):e32.

Flegal KM, Kruszon-Moran D, Carroll MD, Fryar CD, Ogden CL. 2016. *Trends in obesity among adults in the United States, 2005 to 2014*. JAMA. 315(21):2284–2291.

Grant WB and MF Holick. 2005. *Benefits and Requirements of Vitamin D for Optimal Health: A Review*. Alternative Medicine Review. 10(2):94-111.

Ogden C, Carroll MD, Lawman, HG, Fryar CD, Kruszon-Moran D, et al. 2016. *Trends in obesity among children and adolescents in the United States, 1988- 1994 through 2013- 2014*. JAMA. 2016;315(21):2292–2299.

Wantland DJ, CJ Portillo, WL Holzemer, R Slaughter, and EM McGhee. 2004. *The Effectiveness of Web-Based vs. Non-Web-Based Interventions: A Meta-Analysis of Behavioral Change Outcomes*. J Med Internet Res. 6(4):e40.

Whiteman H. 2017. *The best apps for dieting and weight loss*. Medical News Today. 12 May 2017.

Calories burnt with Activity/Exercise

<https://www.health.harvard.edu/diet-and-weight-loss/Calories-burned-in-30-minutes-of-leisure-and-routine-activities>

Target Areas <https://www.jefit.com/routines/workout-routine-database.php?id=25371>

Equipments

http://www.marorres.marines.mil/Portals/116/Docs/MCCS/SemperFit/Docs/Fitness/Gym_Equipment_Descriptions.pdf

“Free Flowchart Maker and Diagrams Online.” Flowchart Maker & Online Diagram Software, www.draw.io/.

“Home.” AppServ Apache + PHP + MYSQL, www.appserv.org/.

“MySQL 5.6 Reference Manual :: 14.2 InnoDB and the ACID Model.” MySQL, dev.mysql.com/doc/refman/5.6/en/mysql-acid.html.

“ACID.” Wikipedia, Wikimedia Foundation, 28 Feb. 2018, en.wikipedia.org/wiki/ACID.