

***Graduation project (comp 411)***

***Department of computer science***

***Project Progress Report 2018***

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**Title of Project:** Nutrition Mobile Application(Android App)

**Project No:**

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K**ey Areas:**

**Student Signature:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **Date Submitted:**

**First Supervisor Name: Dr. Samer**

**First Supervisor Signature: Date Approved: \_\_\_\_ / \_\_\_\_ / \_\_\_\_**

***Abstract***

*The aim of this project is to develop a nutrition mobile app using Android. Nutrition apps are an important aspect to promote healthy life style by maintaining a perfect weight and to avoid diseases resulting from overweight. The general idea is to develop an app that uses a calorie counter and diet tracker for lose weight, gain or maintain.*

*The features in our app will developed to be as the user want, in other words we mapped to make a simple app that can be understandable by human with different ages. Develop a friendly user interface that can be used any time and in any condition even if you don’t have time, the app interface and features will help you to reach what you want fast. Finally the app will work even in offline condition.*

*A calorie counter mapped to work on equations depends on the data entry, so data entry on this app must be specific and real which makes the app works efficiently. After data had been entered, the equations will find your budget calories counter for a day; then the users will enter them daily meals and snacks until they reach the specific calories required .This means that you take your calorie range in that day and calorie counter will track your food and your exercise to create a balance between your burned calories and your gained calories .Finally by using this app which tracks your food you can manage your daily meals until you reach your weight goal.*

***Chapter 1: Introduction***

***1.1 Brief Introduction***

*Recently, nowadays smart phones are the most spread technological devices all over the world which is used by 44% of the world population (Linda Sui, 2016). A huge number of apps which are software applications designed to run in these smart phones or other devices, and there is a variety categories of these apps one of them is healthcare and nutrition apps.*

*Due to the variety of apps relating to diet, nutrition and weight control, common techniques like weigh tracking, goal-setting for health eating are required because it helps people regulate their health behavior, which is really hard to do. So 1 of 5 persons uses nutrition and health apps, so that's the reason why it’s necessary to develop an application which is effective in promoting healthy diet and nutrition (healthcare apps).*

*Based on the features provided in some health apps as (Fat Secret, Lose IT and MyNetDiary) there are several services provided by those apps. Such as “activity tracking service” which is track uses physical activity- everything the user does during the day. “Diet and nutrition service” help users to monitor their food habits, count the number of calories taken/burned, control water balance, and body weight).*

*Finally, “Workout or exercise tracking service” provide a user with a set of exercises, however these apps don’t provide these three types of services together, but our app will be developed to provide them together to maintain a good diet , and help the users to keep their diet healthy by the calculation of calories in point .*

*Collecting data with apps for health can help individuals work with health professionals to set safe and reasonable goals, and can increase individuals’ confidence when making lifestyle changes to achieve health-related goals. As well, individuals can share their personal results with loved ones and friends, thereby obtaining encouragement and support while working toward wellness.*

***1.2 The Aim of the project***

*The main idea behind this project is to make a calorie counter tracker uses food and exercise to manage user weight. The aim is to make a nutrition app help user maintain a good diet and exercise routines through tracking your weight, by selecting the main goals from the user why he/she uses the app depends on the current weight (lose, maintain or gain weight).*

*In the first phase of the app is to track what you eat for a while by manual data entry from the user for all meals and snacks that he/she eats all the day, and in specific quantity with specific number of calories for each meal.*

*Later on, the app will start providing guidance based on specific designed algorithms for users on what to eat; in order to decrease consumed calories and maintain the main goal of using the application.Also it has an exercise feature which help to put all the activity done by the user with its specific calories burned by this exercise, then make a calculations of the target calorie of the day from the calories gained and burned.*

***1.3Objectives***

*1.3.1) We start studying about the health techniques which we will be used in our app, reading about android app nutrition in general and the usability of it. Reading about the algorithms and equations and how it works in the health application, then we start using some of the most spread nutrition apps and it’s features.*

*1.3.2) Build an algorithm that can calculate the total energy requirements “total calories” (TER) by using the physical activity level (PAL) factor, which is an assessment tool that it used to express a person’s daily physical activity as a number from (1.2-1.9 or higher ).*

*By entering the physical activity status (extremely inactive, sedentary , moderately active , very active, extremely active ) which is entered by the user in the registration form ,also by using the resting metabolic rate (RMR) which will calculated by Mifflin equation .*

*So, (TER) is ready, then by using body mass index (BMI) which decide if the user weight status (underweight, normal, overweight, obese class 1, obese class 2, obese class 3), if the user categorized underweight range, the daily TER will be increased by 600 calories, if the user categorized normal, it will give the user diet according to the TER, if the user categorized overweight or obese ranges the app will decrease 600 calories from TER.*

*1.3.3) Build an algorithm that can calculate the percentage of each nutrient the body need such as (carbohydrates, fat, protein) which can plan your daily diet.*

*1.3.4) Develop a prototype for UI in specific standards we will use it to develop a friendly UI and to be easy to use.*

*1.3.5) Test this prototype by the audience and check if we need to make any changes later on.*

*1.3.6) Develop server side web application.*

*1.3.7) Develop the nutrition health app.*

***1.4 Features:***

* *Our application works online and offline.*
* *It can make weekly calorie analysis based on the specific algorithms which developed based on the user current weight.*
* *The application contains timer used while exercising, and it must be turned on 5 times a week for 30 minutes for each time.*
* *The application contain a calorie counting, calculating IBW, find BMI.*
* *The application help the user lose, gain or maintain weight.*
* *The application has reminders to drink water, and reminders to enter every meal on time.*
* *The application provide social site to connect with Facebook, contacts and email.*
* *The application contains a photo album and it will ask you to update it every six month.*

***1.5 Technologies:***

*1.5.1) Android 7.0 Nougat*

*It introduces a notable change to the operating system and its development platform; including the ability to display multiple app on-screen at once in a split screen view and it has many features (user experience, platform, security).*

*1.5.2) SQL light*

*It is a local storages works like a data base program, it is the most widely deployed database engine, as it is used today by several widespread browsers, operating systems, and embedded systems (such as mobile phones), among others, and it is a part of local/client storage in application software such as web browsers, and it is embedded into the end program.*

*1.5.3) PHP*

*It is one of the most popular programming language used in web sites, the web server interprets and executes its code, and sends the result to be displayed in the user browser, and it is used to create dynamic web pages (variable content pages) this content changes as a result of interaction with the user.*

*PHP is an open source language and is constantly being developed by a group of volunteers under the PHP license and this is one of the main reasons for its popularity.*

*1.5.4) Android Studio 2.3*

*It’s the official integrated development environment (IDE) for Google’s android operating system, based on IntelliJ IDEA software. Android Studio offers even more features that enhance the productivity when building Android apps such as:Extensive testing tools and frameworks,*a *fast and feature-rich emulator, a flexible Gradle-based build system.*

*1.5.5) RESTful Web Services*

*It’s “Representational state transfer” It is called this name because it mainly depends on what happens from the source (program) to the user (client) through the HTTP protocol ,and introduces all the operations , transactions and understanding between (client) and (server),As well as guidance on pages (Request and respond).*

*1.5.6) Axure RP:Pro* *is a*[*wire framing*](https://en.wikipedia.org/wiki/Website_wireframe)*,*[*rapid prototyping*](https://en.wikipedia.org/wiki/Software_prototyping#Throwaway_prototyping)*,*[*documentation and specification*](https://en.wikipedia.org/wiki/Functional_specification)*software tool aimed at web and desktop applications. It offers drag and drop placement, resizing, and formatting of widgets, and it supports prototyping*[*Rich Internet Applications*](https://en.wikipedia.org/wiki/Rich_Internet_Applications)*by mapping desired interface behaviors (such as displaying or hiding an element) in response to actions like mouse clicks or touch .*

***Chapter 2:Background***

***2.1)What is Android?!***

*Android is a*[*mobile operating system*](https://en.wikipedia.org/wiki/Mobile_operating_system)*developed by*[*Google*](https://en.wikipedia.org/wiki/Google) *, based on the*[*Linux kernel*](https://en.wikipedia.org/wiki/Linux_kernel)*.it’s designed primarily for*[*touch screen*](https://en.wikipedia.org/wiki/Touchscreen)*mobile devices such as smartphones and*[*tablets*](https://en.wikipedia.org/wiki/Tablet_computer) *.It’s developed in many sides also such as (Android TV, Android Auto, and Android Wear). And now it’s an official platform uses by public in different sides and around the world, (Rubin) described the Android project as “tremendous potential in developing smarter mobile devices that are more aware of its owner's location and preferences”(J.F DiMarzio).Since 2008, Android has seen*[*numerous updates*](https://en.wikipedia.org/wiki/Android_version_history)*which have incrementally improved the operating system, adding new features and fixing*[*bugs*](https://en.wikipedia.org/wiki/Software_bug)*in previous releases (Wikipedia).*

***2.1.1)The Android Architecture:***

*There are 4 layers that makeup the Android OS:*

* *Applications*
* *Application framework*
* *Libraries*
* *Linux kernel*

*The android OS is roughly divided into five sections in four main layers:*

* *Linux kernel: this layer contains all the low-level device drivers.*
* *Libraries: these contain the code that provides the main features of an Android OS.*
* *Android runtime: it’s located in the same layer with the libraries and provides a set of core libraries that enable developers to write Android apps using the Java programming language.*
* *Application framework: The application framework exposes the various capabilities of the Android OS to application developers so that they can make use of them in their applications.*
* *Application: at this top layer are the applications that ship with the Android device (such as browser). (J.F Dimarzio )*

***2.1.2)Google Play:***

*Google play is an application that is pre-installed on user Android devices to directly download third-party applications to their devices. Both paid and free applications are available in the Google Play Store, although paid applications are available only to users in certain countries because of legal issues.*

***2.1.3)Android features and usability:***

*Powerful and usability appears furthermore in the Android OS which supports many features, including:*

1. *Connectivity.*
2. *Messaging—Both SMS and MMS.*
3. *Hardware support.*
4. *Multi-touch—Multi-touch screens*
5. *Multi-tasking—Multi-tasking applications.*
6. *Tethering—Sharing of Internet connections as a wired/wireless hotspot.*

*We chose the Android Os to develop our app because its powerful, free and open operating system, we inference those feature from those points , Android is the world popular mobile platform, it’s the largest installed base of any mobile platform, and android give you a world-class platform for creating apps and games for Android users everywhere , those in general from user side , moreover in developer side Android innovation lets you build powerful, differentiated application that use the latest mobile technology .In other wise Android is the default operating system for most of the phones that manufacturers offer.*

***2.1.4)Main components of Android:***

* *Activities: applications have one or more activities. The main purpose of an activity is to interact with the user. From the moment an activity appears on the screen to the moment it is hidden, it goes through a number of stages. These stages are known as an activity’s life cycle .Each activity class loads its user interface (UI) component using the XML file.*

*So, the Activity base class defines a series of events that govern the life cycle of an activity.*

***2.2) what is restful web services:***

*Our work will include a restful web services with plain PHP. Rest(representational state transfer) define architectural principle by design web services, including how  resource states are addressed and transferred over HTTP by clients .In restful services ,URIS are used to access the resource via services, resource are data and function .*

*In general we need client side and server side ,client side which contain client is connected with server side which contain restful web services ,the process done between those two side by http request from client then server respond by http respond .*

*a restful web server use explicitly http protocol to return the data format and used to extend the functionality of the web site ,this mean that web server use http data producing that created to be used by client side to get data from web server.*

*In server side which is coded to be hidden from client, the main purpose of it to access resources on the web server, so how this server work the server , server contain different technology for creating web applications and the technology we depended in server-side PHP script, so server will extinction PHP interpreter .*

*REST Web service URIs should be intuitive to the point where they are easy to guess. Think of a URI as a kind of self-documenting interface that requires little, if any, explanation or reference for a developer to understand what it points to and to derive related resources. To this end, the structure of a URI should be straightforward, predictable, and easily understood.*

*URIs should also be static so that when the resource changes or the implementation of the service changes, the link stays the same. This allows bookmarking. It's also important that the relationship between resources that's encoded in the URIs remains independent of the way the relationships are represented where they are stored.*

***Chapter 3:Literature Review***

***3.1) summarize Article***

*Depends on the related article that we read and summarize, we specify the contents that support our main goal and support our information on Android and nutrition dietary mobile app.*

***Comparison of traditional versus mobile app self-monitoring of physical activity and dietary intake among overweight adults participating in an mass Health weight loss program***

*There are two important behavioral weight loss programs, Self-monitoring of physical activity (PA) and dietary intake.*

*The PA can be add to participant burden, and the diet you want to record each food consumed and its energy by using a book listing the caloric values of common foods to assess the caloric value of their daily diets.*

*With advances in mobile technologies, studies have started to employ electronic devices for self-monitoring. Using mobile devices for self-monitoring holds promise for making self-monitoring and presents an opportunity for real-time self-monitoring and it does not consuming time like using paper recording.*

*The purpose of this study was to if the method of PA (app vs no app) and diet (app, website, or paper journal), monitoring is related to changes in self-monitoring frequency, dietary outcomes, energy expenditure, body mass index (BMI), and body weight. We assumed that mobile methods of self-monitoring would be associated with greater self-monitoring frequency, greater energy expenditure, lower energy intake, lower BMI, and greater percent weight loss. We assume that mobile methods of self-monitoring would be associated with greater self-monitoring frequency, greater energy expenditure, lower energy intake, lower BMI, and greater percent weight loss. This is what we need to be sure of, to know if we need to do our idea as an application or not.*

*The study was conducted between 2010 and 2011, and the Participants were randomized 96 overweight and obese men and women (BMI=25–45 kg/m2, 18–60 years old),that using e-mail listservs, newspaper, and television ads, Participants were excluded if they had an unstable medical status or they had a history of myocardial infarction or stroke and had to obtain physician consent, the do I many experiments they have helped to understand the importance of this study, using several methods like ANOVA, x^2 and GLM, to know the difference between,and there are three most popular diet tracking apps used in the study were Fat Secret's Calorie Counter, My Fitness Pal, and Lose it. As a result there were no difference in baseline demographics, BMI, or energy intake or expenditure between exercise app users and non-users,but diet apps used more frequently by men and less by black participants than other monitoring methods,those who used an app to self-monitor PA recorded exercise more frequently over the 6-month study (as reported on weekly questionnaires) than those who did not (2.6±0.5 days/week for app users versus 1.2±0.5 days/week for non-app users; p=0.001) and PA app users also had a significantly lower BMI at 6 months (31.5±0.5 kg/m2) than non-users (32.5±0.5 kg/m2; p=0.02), Change in PA (adjusting for race, age, gender, and randomized group) was significantly related to percent weight loss, Post hoc analyses showed a lower energy intake at 6 months among app users (1437±188 kcal/day) as compared to paper journal users, but the number of podcasts downloaded was significantly related to both the average days/week diet (F=71.8; p<0.001) and PA (F=65.5; p<0.001) were self-monitored. This suggests that was related to both diet and PA self-monitoring frequency and use of a PA app.*

*This study discovered an important relationship between the diet and self-monitoring method of the PA but we need to explore whether mobile surveillance methods give advantages over the Internet or paper journal methods. In addition, research is needed to explore ways to provide people with a self-monitoring method that works best for them. In general, this study refers to some of the advantages of self-monitoring methods for both the diet and the PA. However, adherence to any form of monitoring in this self-study was low, so future studies should examine ways to make self-monitoring technology more attractive or less burdensome to increase commitment. Ways are also needed to predict the self-monitoring method that best results in individual performance.*

*1.*<https://doi.org/10.1136/amiajnl-2012-001510>

***Health App use among US mobile phone owner :***

***A national survey.***

*The article talk about health apps and the number of people are interested to use those type of apps , and the main purpose of this article is to examine health app use among mobile phone in United State , and this related to my research by improving our app idea is needed ,and to prove that people are interested to use health apps, then to reach the purpose of study methods used :study design and sample, survey items and data analysis is used , to recognize that there is a big problem facing the users when they want to use the health app , Pricing and data entry problems also emerged as important to be concerned ,therefore , there are a huge number of user who uses those apps but they cant give specific number because Data is limited with regard to consumer opinions ,and developers do not release the number of users and the extent to which consumers continue to use apps over time so in collect data they use the method that I mentioned before .*

*And because of mobile health app is still in a nascent stage and is characterized by number of limited the study find those problem, in most app for health as they find that functionality is limited and apps do not offer tracking and data input option so in our research we are going to try face those type of problem.*

*This study apply health app in the diverse sample of society who use health app from mobile users . and by using above method the study find that over half of mobile phone users had downloaded a health mobile app, and the result show that Fitness and nutrition are the most app customer download and use in health app domain , with range of daily use for user , even though there a large proportion of respondents not used health apps ,for Common reasons as lack of interest, cost, and concern about apps collecting their data.*

*Finally , as we see apps that connect with activity and weight-loss domain, have a critical problems and those problem will not fixed if we don’t think seriously of make a health system which benefit a large number of population With particular consideration the price and data entry problems witch are a main reason why user stop using those app , so our app will be free for all in any time and have a High privacy for data entry.*

*1.* [*https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4704953/*](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4704953/)

***Availability & quality of mobile health app privacy policies***

*Both operating system for android and apple have global platforms for mobile health apps, although sensors of users devices and those mobile health it can collect all data for the user and storing it, the user also like to be privacy policies for his/her data so little attention has been paid to the information security and privacy policies and practices of mobile health app vendors.*

*This are the method use to improve the study, in iOS and Android both app store uses dynamically generated HTML pages so that the HTML texts displayed in the browser do not contain much useful information, which is dynamically loaded from an underlying database ,so  Hence, we used a third-party open-source interface, the android-market-api, for retrieving app information.*

*-discovery and evaluation of privacy policies*

*They used 3 steps for privacy policies discovery, first, they checked for a privacy policy on the app store web site for the particular app. Then they checked the web page maintained by the developer to advertise and introduce the company and its products. Finally, they reviewed the first 30 results of a Google search for the query ‘$APPNAME “privacy” “policy”’.*

*They surveyed the 300 most frequently rated apps in our sample; they instead selected apps for privacy policy assessment based on their rating count. For Android apps, rating count and download count are strongly positively correlated (Spearman r=0.89, p<0.001), indicating that rating count is a good proxy for download count.*

*Finally Because of the mobile health privacy policies limited and not available for all these apps and only 600 from 35,000 had a privacy policies , this study show that the mobile health developers fail to provide app privacy policies.*

*3.2) The main point of Articles:*

*\* From the articles summarizing we find that:*

*1) A huge number of people prefer self monitoring method for diet and PA ,and this point improve why our app idea is effective and satisfied user Requirements .*

*2) We find that health app more efficient in smart phones then other device .*

*3) health app in general suffer of privacy policies so we have to success in providing app privacy policies that protect user data entry .*

*4) As a crowded life we live user prefer efficient mobile app for diet rather than go to nutrition center or doctor.*

*\*Finally after we find those points from articles our job is:*

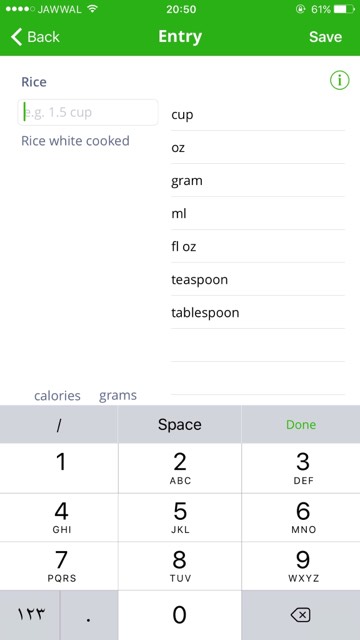
*1) create nutrition mobile app that make self monitoring for diet and PA.*

*2) make android mobile app simple to use.*

*3)make mobile app provide privacy policies as possible as we can.*

***3.3) Apps***

***MyNetDiaryApp***

*This app allow the user to set his/her main goal of using it by choose what they want from the app (lose, maintain or gain weight) and by choosing the gender ,current weight target weight of the user it will give them the target daily calories exactly the weekly rate kg’s of lose or gain and target date .s  
This app allow the user to input all the meals with its calories budget (breakfast, lunch, dinner, snacks) by search for these meals or scan it or add custom food with the specific quantity for this item , After you complete all these steps it will also give the user the quantity of fats, carbs and proteins .*

*-This app has a friendly UI and easy to use.*

*-Allow the user to connect with friends and family.*

*-Allow the user make healthy food choices and get more active.*

***FatSecret app***

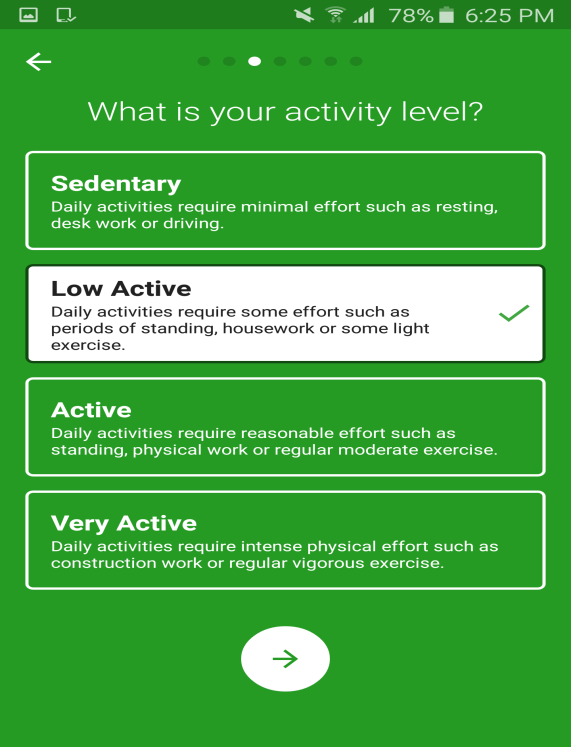
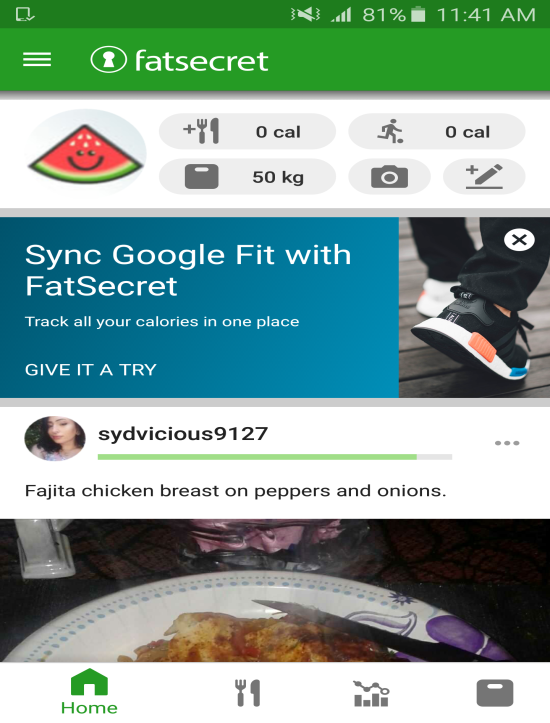
*About fat Secret :*

*Fat secret is a health app that can be specify as a nutrition app , that use calorie counter and diet tracker for weight loss ,and because it has a good feature we use it to support our project idea and it support our idea by give us how we can to improve nutrition app in fitness and diet domain and how we can Distinguished.*

*To specify how it work :*

*Firstly after install app you have to answer question that arranged sequentially And to go from question to another you can move forward and backward so if u need to change any entered information its seem for us easy ,therefore , the way it move we find that the questions content are relate to the aim of app and they were clear , and those question are : my goal ,weight, gender, activity level and every think were specified about this question ,height and my birthday, then we sign up so from these steps we find that app have a friendly user interface and have a simplicity feature , so I wish we could start in a same way with interface encourage user to answer the hole questions without filing back using our app.*

*After sign up in the bottom of screen you will find home which is a place to share people your status so you  Connect with a global community of people looking to make a change for the better and start losing weight the healthy way so I think its a good feature support you to Achieve your goals, you will find beside first choice a diary choice which is the place that you enter your daily meal and it supported with ready choice you can choice it by search feature in the top of screen and after you enter your daily the app will track your meal to count the calories then you will find the report witch contains your daily report , finally you will find weight choice which contain weight changes in every month.*

**

*The app also support exercise tracker to count your burned calories to give be shore that calorie tracker is a real tracker give you overall burned calorie and gained calories.*

*After we gain how fatSecret work we find this app contain feature as:*

*-This app has a friendly UI and easy to use.*

*-Allow the user to connect with friends and family.*

*-Allow the user make healthy food choices and get more active.*

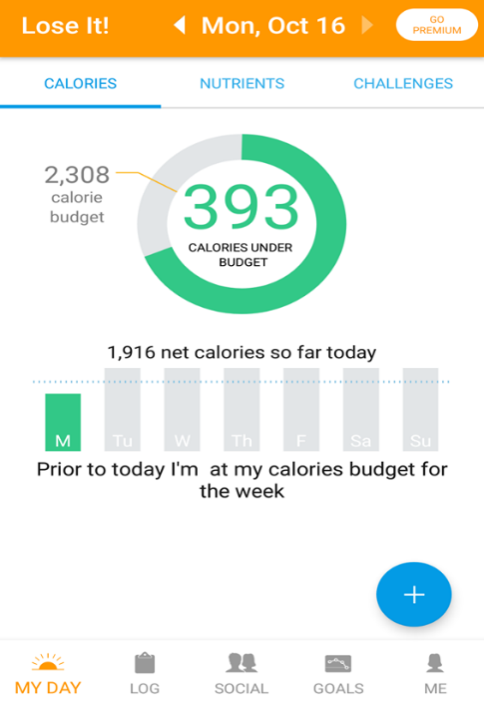
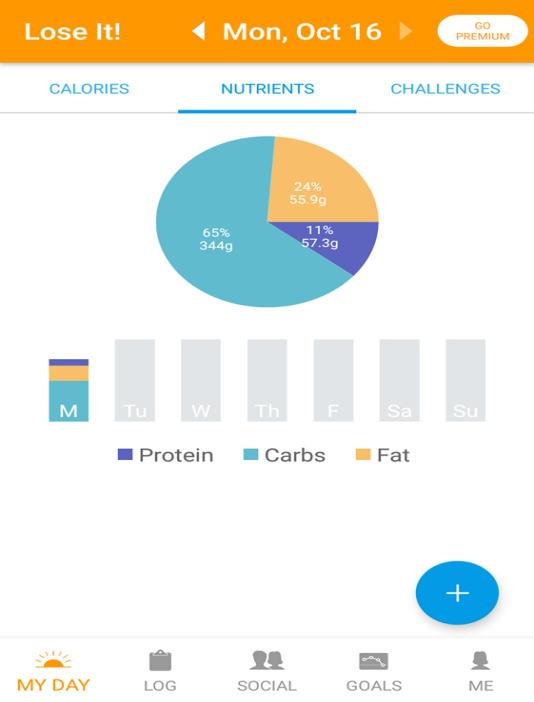
***Lose It***

*This app works online and some features works offline, it allow the user to set his/her to just losetheir weight, and by adding the height, current weight, gender, goal weight and then choose how quickly you’d like to reach your goal (slower – faster)of the user it will give them the date to reach this weight, daily calories budget, total weight loss and weekly weight loss.*

*This app allow the user to input if he/she do any exercises by searching and all the meals with its calories budget (breakfast, lunch, dinner, snacks) by search for these meals or scan it. After all steps you can find your body fat, hydration, sleep, body measurements, exercise calories, blood glucose, top food, daily calories chart, daily email report, meal planning, fats, sugar, sodium, fiber, protein, and carbohydrates and all that related to health.*

*It has a friendly UI easy to use, and he/she can add friends and share their friends that can be a challenge and access the diet.*

*This application is about how to lose weight as you read up and our application is a Nutrition App, we sure want to use losingweightIn addition toraise your wright or to be normal.*

*3.4) Challenges of our App:*

*1)develop app that distinguish in user interface side by make it friendly as possible ,simple to use in any time and any condition.*

*2)develop app contains ability to mange lose weight, gain or maintain by depending on your goal and your idol wait, so this app will mange your weight in any condition .*

*3)develop app help user to select the best goal of there weight, and this feature not supported in other apps .*

*4)develop app to provide activity tracking service, Diet and nutrition service and Workout or exercise tracking service together.*