

Pregacare: A Pregnancy Care Android Application

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APPROVAL

This Project titled “**Pregacare: A Pregnancy care Android Application**” submitted by Mithun rana, ID No: 143-15-4320, and Mesbah hasan, ID No: 143-15-4564 to the Department of Computer Science and Engineering, Daffodil International University has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Computer Science and Engineering and approved as to its style and contents. The presentation has been held on 25th Nov, 2018.

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DECLARATION

We hereby declare that, this project has been done by us under the supervision of **Rubaiya Hafiz, Lecturer, Department of CSE** Daffodil International University. We also declare that neither this project nor any part of this project has been submitted elsewhere for award of any degree or diploma.

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ABSTRACT

All pregnant women need easy access to pregnancy-related personalized information, on-time quality healthcare services and effective communication links with healthcare providers. Smartphone-based devices, communication systems and eHealth applications can play an important role in facilitating some of these services to pregnant women in a fast and efficient way and can thus prevent most of the pregnancy-related complications. The goal of this project is to develop a self-help Android application to aid pregnant women in achieving proper health tips and expert consult during pregnancy. And to strengthen communication links between health professionals and pregnant women and increase education, awareness and quality of care during pregnancy and childbirth.

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CHAPTER 1

Introduction

1.1 Introduction

With the rapid growth in communication and information technologies (ICT), the field of eHealth has now emerged in many forms, and its potentials have been experimented on and discussed globally. eHealth is frequently becoming an essential part of people's everyday lives and has the ability to improve the delivery and cost of healthcare and the quality of the patient experience. It enables the exchange of clinical information, physiological signals, and medical imagery and laboratory results and has the capacity to revolutionize healthcare systems by delivering life-saving information even in the most remote and low-resource settings. With the development of communication technologies and eHealth applications, it is now reasonable to expect that in coming years, everyone living on our Earth will, from any location and at any time, be able to access the World Wide Web and will benefit from cost-effective, automated and personalized healthcare. Improvement in data speeds, miniaturization of computers and smart devices with higher levels of reliability and security, decreasing costs and increasingly user-friendly features are becoming the main reasons for adopting eHealth solutions in our daily lives. However, the usefulness of eHealth applications does not lie in the underlying technology itself, but in the ability to develop effective networks among health professionals and patients and increase awareness in the field of health.

1.2 Motivation

At this day and age, one thing we all consider is an essential part of our life. Undoubtedly, almost everything and everything can be done using smartphones. And we know that it will be helpful for a mother if she can help her with the closest thing in her pregnancy time, so we try our best with our programming knowledge to develop an application that can help a mother.

1.3 Objectives

Our objective is to making a pregnancy care app which will help all the pregnant mothers for maintaining their health during the time of pregnancy. This application will provide the exact way that helps a mother to care about herself and her upcoming child. It helps them by giving weekly updates and tips on their baby growth and changes to their prenatal body. In this present market there are exist a lots of health related application. They have a lots of good contents. But the main problem is the apps can not specify the health care during the time of pregnancy. So we are going to make the pregnancy care app. This will help to promote, protect and maintain the health of the mother during pregnancy. It detects “high risk” case and give them special attention. We try to provide the mother to remove anxiety and dread associated with delivery by the app.

1.4 Expected Outcome

The expected outcomes are creating a pregnancy care application that helps all pregnant mothers to maintain their health during pregnancy. This application will provide the right way to help a mother take care of herself and her upcoming child. It helps to increase their child and provide weekly updates and tips on changes in their previous body.

Users can find out the symptoms of their pregnancy and this app compares to other pregnant mothers. They can monitor the weight of their pregnancy stage. Using this app they can see the rest of the week and day delivery. We give a specific date calculator to the app so that users can see and remember the delivery date by the app. We also provide weight tracking system in the app so that users can track the weight of their pregnancy and learn the weight of their healthy pregnancy. The doctor's appointment is also included in the app so that users can easily remember their appointment date.

1.5 Report Layout

Chapter 1: This chapter has given something about this application. Motivation is also given in this chapter. Why should users use the application? Then some sections and expected results are given in this chapter.

Chapter 2: It will provide backgrounds about this type of application. It provides related work related to this application. The scope of the problem and the challenge is given in this chapter.

Chapter 3: First, this section will provide information about the business model process (BPM). Then it will need to collect and analyze. In that case model and logical model will be provided in this chapter. Then the requirement is given in this chapter.

Chapter 4: In this chapter, all the design processes are given in front-end design, back-end design and interaction design. This chapter requires the implementation of the last thing.

Chapter 5: This chapter discusses databases, implementation and interaction, implementation of examinations and implementation of project results.

Chapter 6: In this chapter, we discussed about our application, limitations and opportunities for further development of our project.

CHAPTER 2

Background

2.1 Introduction

Our system will be an interactive Android application that can be opened with any Android supported smartphone [1]. Our application user may be registered by email. Registered users can get full advantage through our application. They can easily get appointment by a doctor with our application. By using our application, they can easily discover the medicines that require time during their pregnancy. Users can get important tips through our application during their pregnancy.

2.2 Related Works

We searched a lot of documents related to the pregnancy. We've made some observations about top-level applications related to this application. They provide daily and weekly details about growing children, counting a specific date and other topics. But there is no soil sector among these applications for her body care during pregnancy. So, during this pregnancy, we are trying to create this application for the care of the mother and the care of their baby.

2.3 Comparative Studies

Our application is different from other Android applications. Our application is monitored by a pregnant soil with proper maintenance chart for her body and her upcoming baby. He can get every situation alert by our application. She can also save important notes of our applications so that she can become more aware of her body during pregnancy. Using our application, he can easily meet his next doctor. In the status option, he can easily see his current status. So, she can learn something related to her body and take care of her child.

2.4 Scope of Problems

Some applications about pregnant mother care during pregnancy provide a lot of information to the data query. But for this time it is very difficult to do. To make this application, we had to question the huge survey of data collection about our pregnant mother. On the other hand, we had to learn Photoshop, CSS, HTML and other technologies. That's why we cannot add additional features to the application. Google Leaderboard is a great feature for every application. This is a long-term process that we cannot add this feature to this application.

2.5 Challenges

Developing this application is our first challenge to learn about the development of Android applications. Then more research on soil health during pregnancy, such as this application can meet user's expectations. We will make the right tips for this application. This is a challenge. With this, we should make proper survey for our pregnant soil. For online features we need to learn JavaScript and other programming languages. To search for databases, we will have to enter the data in database using our Fire Base Database Server. It was a big challenge for us.

CHAPTER 3

Requirement Specification

3.1 Business Process Modeling:

There are two entities in our project system, first user and secondly the system itself. After installing the application, you need to sign up for the first time to use the application. The sign-up user must provide a valid email address and password. After successfully signing up the application can log in. Then all functionality will be made available to the user. Our profile system is completely online base. If the user does not need regular updates, it will automatically update from online database.

It will automatically calculate the current time from the online database.

Notes feature users can save their important things. Users will receive a single or multiple notification from drug reminder such as the user to set it. It almost reminds me of time and medicines. Recruitment reminder reminds the user about doctor appointment time in doctor's name. The status attribute gives a user height and weight and gets bpm status. It is easy to understand with bar charts, it is normal or low or extra weight. Tips: Users will get all the information about pregnancy. It supports two types of languages such as English as primary language and secondly Bangla.

3.2 Requirement Collection & Analysis

- There are some requirements for data processing for software implementation and data analysis. Some of them are below:-
- Required internet access permission.
- Required call log permission.
- Required storage permission.
- Required valid email to sign-up.
- Required valid password to sign-up.
- Required registered email and password to sign-in.
- Required date of birth to find age.
- Required last monthly period for finding conceived.
- Required proper doctor's name and time to get notification
- Required proper medicine's name and time to get notification.
- Required alert window permission.
- Required boom menu supported phone.
- Required proper height and weight to know BPM.
- Required proper title to add note.

3.3 Use Case Diagram

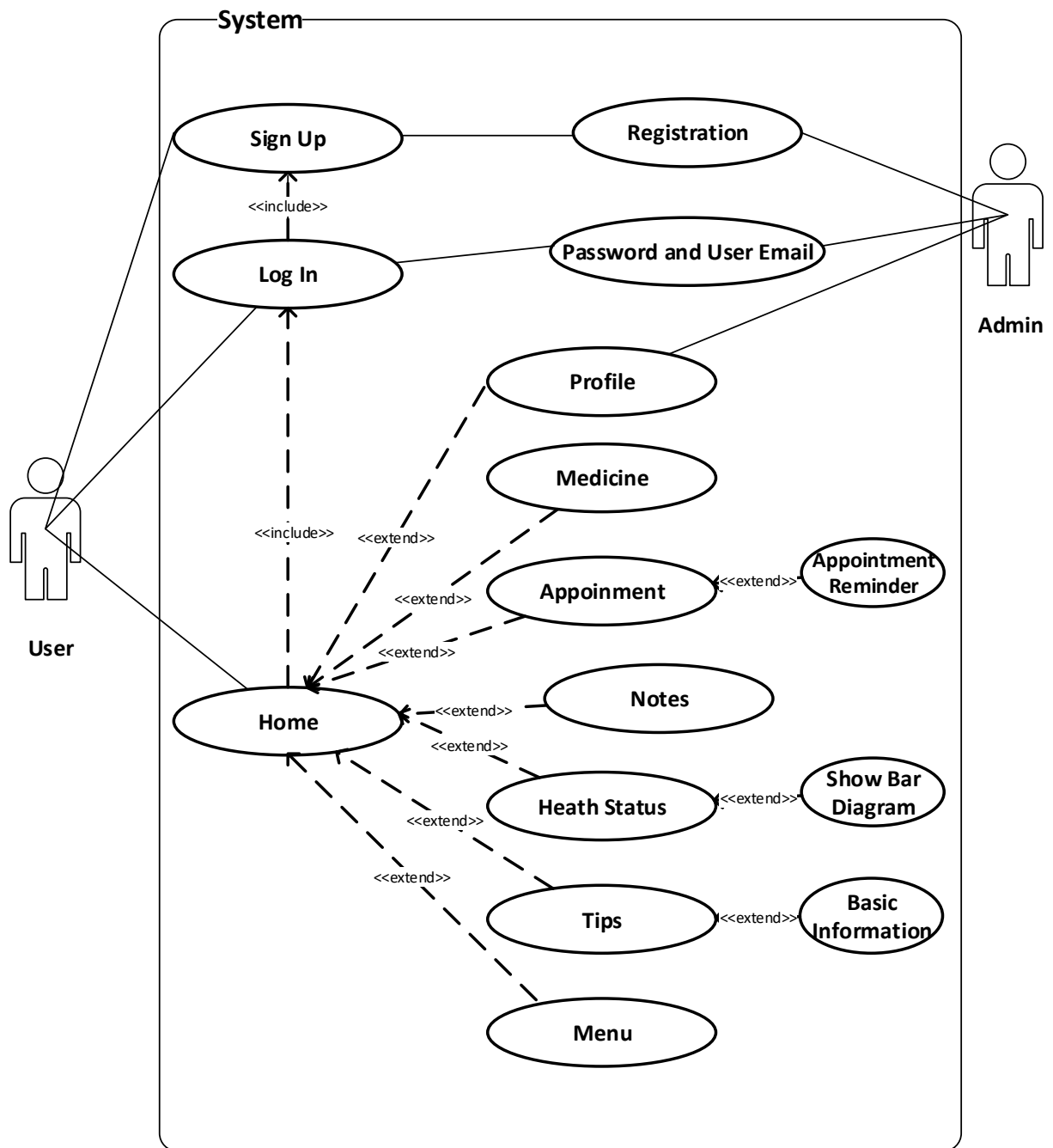


Figure 3.2.1: Use Case Diagram (part-1)

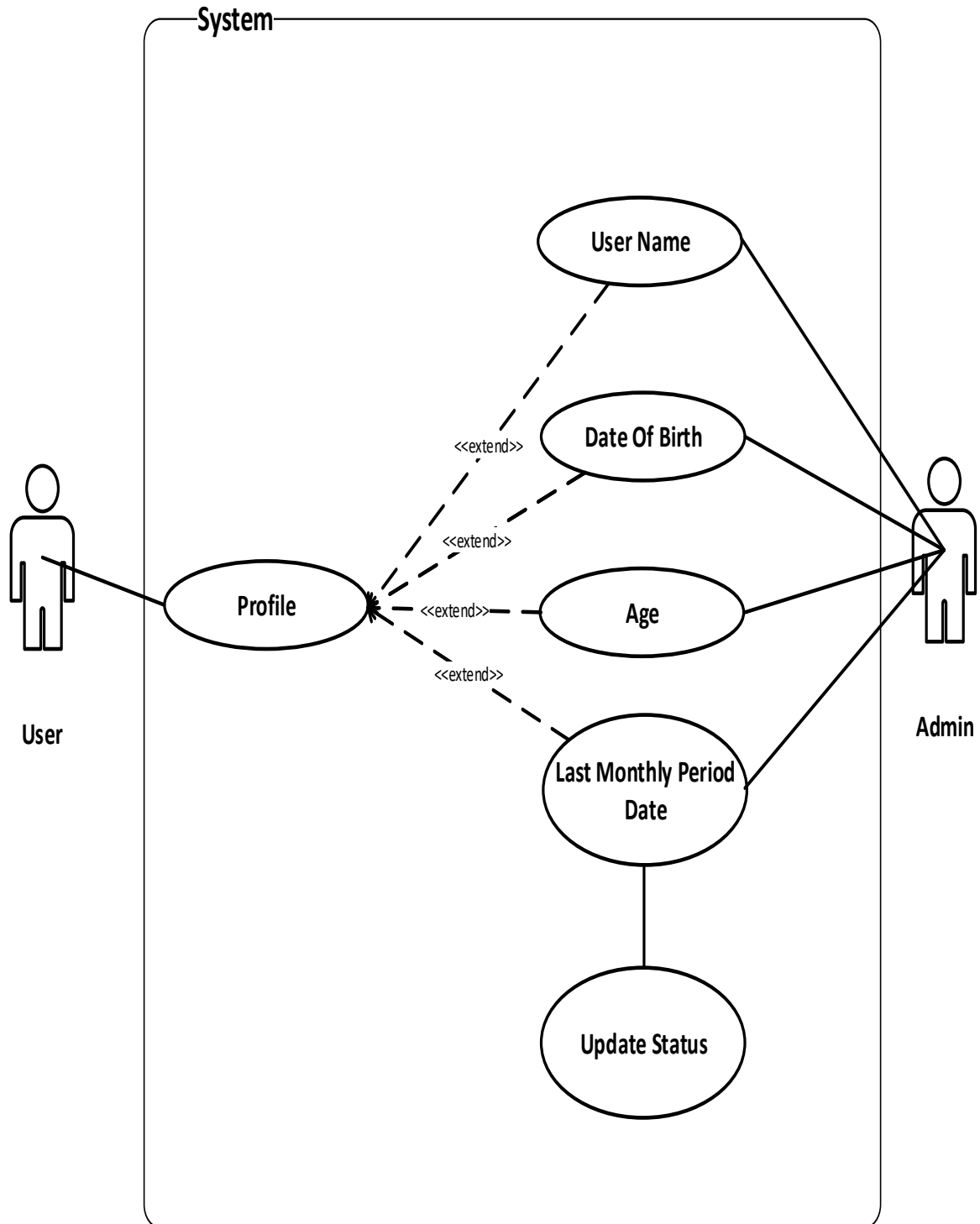


Figure 3.2.2: Use Case Diagram (part-2)

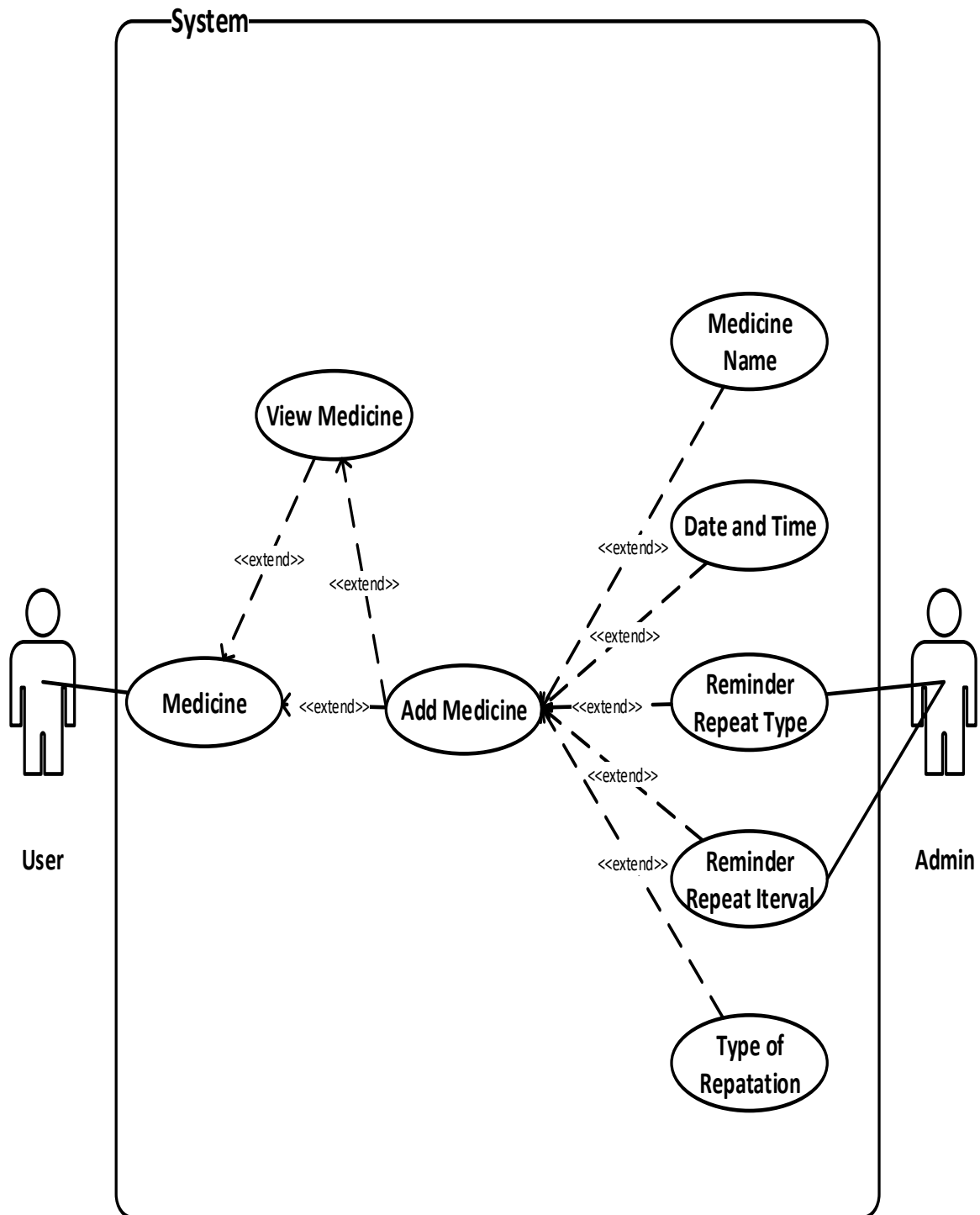


Figure 3.2.3: Use Case Diagram (part-3)

3.4 Description of Use Case

Here, we have shown the details of our use case which we have shown above:

Table 3.3.1: Use Case description of “Sign-up”

Name of Use Case	Sign Up
Primary Actor	User
Secondary Actor	Firebase Authentication
Pre-Condition	Go to Application
Scenario	1.Valid Email Address 2.Enter Password 3.Click to Create Account Button
Post-Condition	Registration complete or failed

Table 3.3.2: Use case description of “Sign-in”

Name of Use Case	Sign In
Primary Actor	User
Secondary Actor	Firebase Authentication
Pre-Condition	Go to Application
Scenario	1.Valid Email Address 2.Enter Password 3.Click to Create Account Button
Post-Condition	Sign in failed or successful

Table 3.3.3: Use case description of “Profile”

Name of Use Case	Profile
Primary Actor	User
Secondary Actor	Firebase Database
Pre-Condition	Go to Profile Activity
Scenario	1.Enter name 2.Enter Valid Birth Date 3.Enter Valid Last Monthly Period Date 4.Click on Save Button
Post-Condition	Data update successfully or failed

Table 3.3.4: Use Case description of “Medicine”

Name of Use Case	Medicine
Primary Actor	User
Secondary Actor	System
Pre-Condition	Go to Medicine Activity
Scenario	<ol style="list-style-type: none"> 1. Click add button 2. Enter medicine name 3. Select valid date 4. Select valid time 5. Select repetition mode 6. Select type of repetition 7. Select repetition interval 8. Select type of repetition
Post-Condition	Set reminder successfully or failed

Table 3.3.5: Use Case description of “Appointment”

Name of Use Case	Appointment
Primary Actor	User
Secondary Actor	System
Pre-Condition	Go to Appointment Activity
Scenario	1.Enter doctor name 2.Select valid date 3.Select valid time
Post-Condition	Set reminder successfully or not

Table 3.3.6: Use Case description of “Health Status”

Name of Use Case	Health Status
Primary Actor	User
Secondary Actor	System
Pre-Condition	Go to Status Activity
Scenario	1.Enter height in centimetre 2.Enter weight in kilogram 3.Press calculate button 4.Press add to chart 4.Show in chart
Post-Condition	Calculate BMI successfully and show data successfully or not

Table 3.3.7: Use Case description of “Tips”

Name of Use Case	Tips
Primary Actor	User
Secondary Actor	System
Pre-Condition	Go to Tips Activity
Scenario	1.Select an item 2.Show tips for selected item
Post-Condition	Give Tips successfully or not

Table 3.3.8: Use Case description of “Menu”

Name of Use Case	Menu
Primary Actor	User
Secondary Actor	System
Pre-Condition	Click on menu button
Scenario	1.Select language setting 2.Select account setting 3.Emergency 4.Change Password 5.Change Email
Post-Condition	Select successfully or not

3.5 Logical Data Model

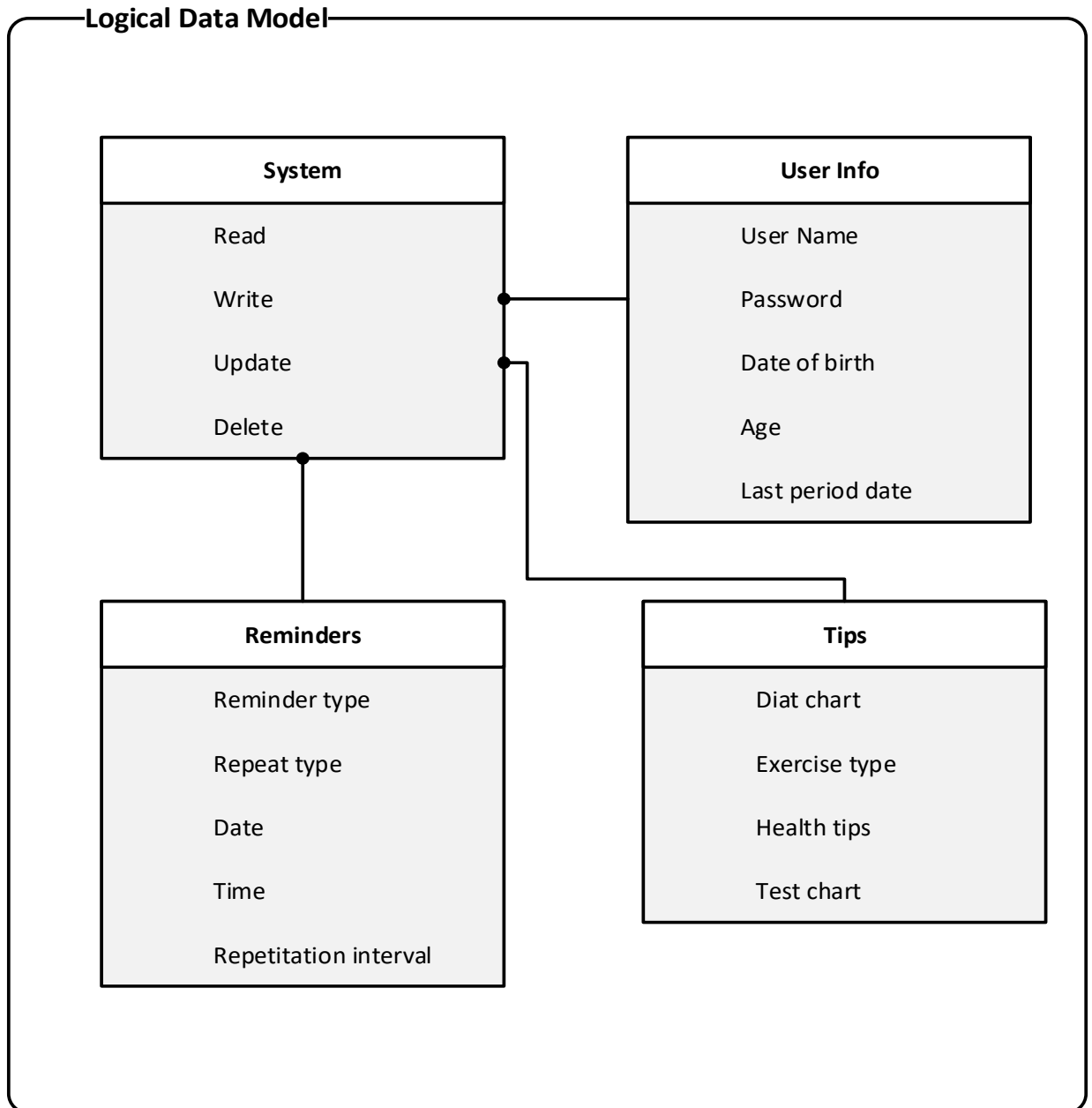


Figure 3.5: Logical Data Model

3.6 Design Requirements

For designing purpose, we have to use lots of materials. Some of them are given bellow:

- XML:
XML stands for extensible markup language it is use for designing purpose.
- JAVA:
We were also use java for our design that is dynamic so the application can change design during runtime.
- Draw able:
We were using some image some logo some and we store them in draw able.
- Color:
We were using many kind of color that we were save at colors.
- Dimens:
Using the resource, we were specifying size of the view.
- String:
Here we stored both Bangla and English language with their constant ID, Name.
- Min Map:
Using that resource, we were stored our app icon in different regulation.
- Menu:
We were use boom menu for our app.
- Style:
We can define all the view's text color, background color, border color, visibility.

CHAPTER 4

Design Specification

A design specification provides general information about the requirements for a product and how to put the product together. For example, a design specification contains all the information and information needed above, which is listed above like above information, software information, front-end design and so on. In this section of design specification, we are going to display the end design of our mobile application.

4.1 Front-end Design:

Front-end design is the most important part of any software or application. Because, this is the sector that will contact the user. Because of that, we have given attention to our front-end designs and tried to make the design as easy but effective. So, users can easily access them.

Tools for our design:

1. Android studio IDE [2]

Some of front-end design is given bellow.

4.1.1 Splash Screen:

When a user will open the application then a screen is occurred. That is called splash screen. We Use android material design [3] to attractive our application

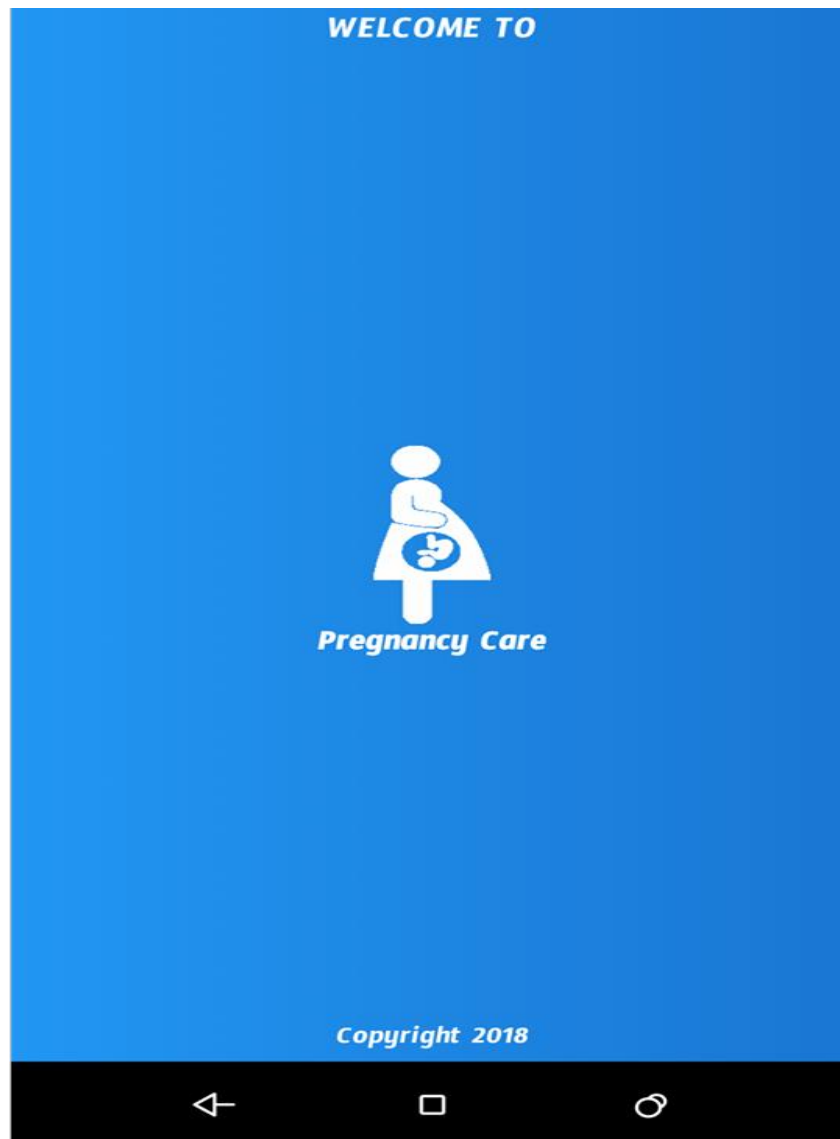


Figure 4.1.1: Splash Screen

4.1.2 Sign-up:

- Need to provide email address.
- Need to provide valid password.
- Need to provide age.

Sign Up Here

Email

Password

CREATE ACCOUNT

Already Have an Account?

SIGN IN

Figure 4.1.2: Sign-up

4.1.3 Sign-in:

- Need to provide registered email address.
- Need to provide valid password.
- Need to sign-up again if cache data cleared

Sign In Here

Email

Password

SIGN IN

Don't have an account?

SIGN UP

Figure 4.1.2: Sign-up

4.1.4 Home Page:

- All card view Home page activity is given here.
- We use here grid view to better preview. [4]
- User can see their profile.
- User can save their appointment with the doctor.
- User can see their medicine list.
- User can write short note.
- User can see their health tips.

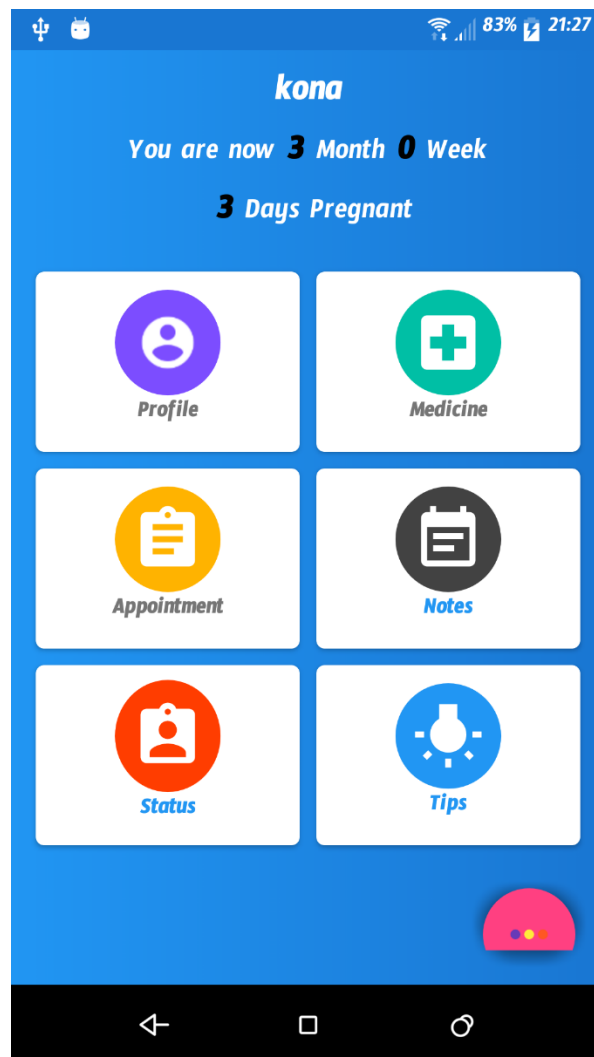


Figure 4.1.4: Home Page

4.1.5 Profile:

- User can save their detailed information.
- User can save their last date of period.
- User can save their date of birth to see their age.
- We use here recycler view [5] and android date picker [6].

Profile

Name: kona

Date Of Birth: 10/5/1994

Age: 24

Last Monthly Period: 1/8/2018

SAVE

Figure 4.1.5: Profile

4.1.6 Appointment:

- User can save their appointment with a doctor by using the adding button.
- User can set the time for appointment to get alarm.
- User can edit the repeat of alarm.
- User can also add or delete any appointment if they want.
- We use here custom list view [7] [8], floating action button [9].

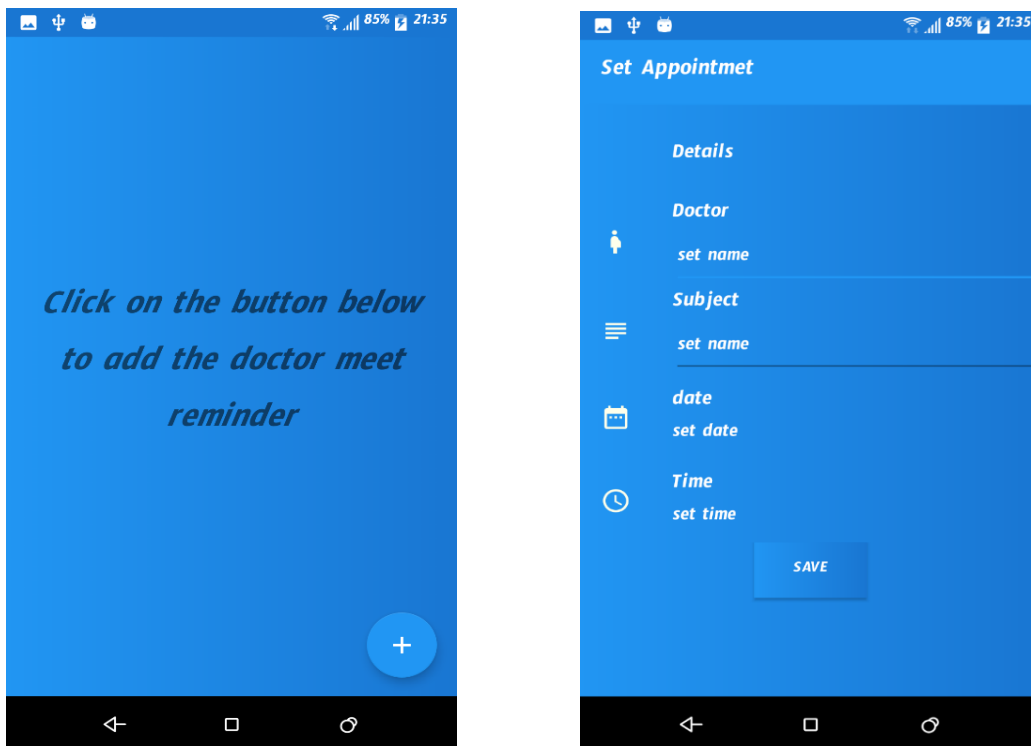


Figure 4.1.6: Appointment

4.1.7 Medicine:

- User can save their medicine list by using the adding button.
- User can set the time for taking medicine to get alarm.
- User can edit the repeat of alarm.
- User can also delete any medicine if they want.
- We use here alarm reminder [10] .

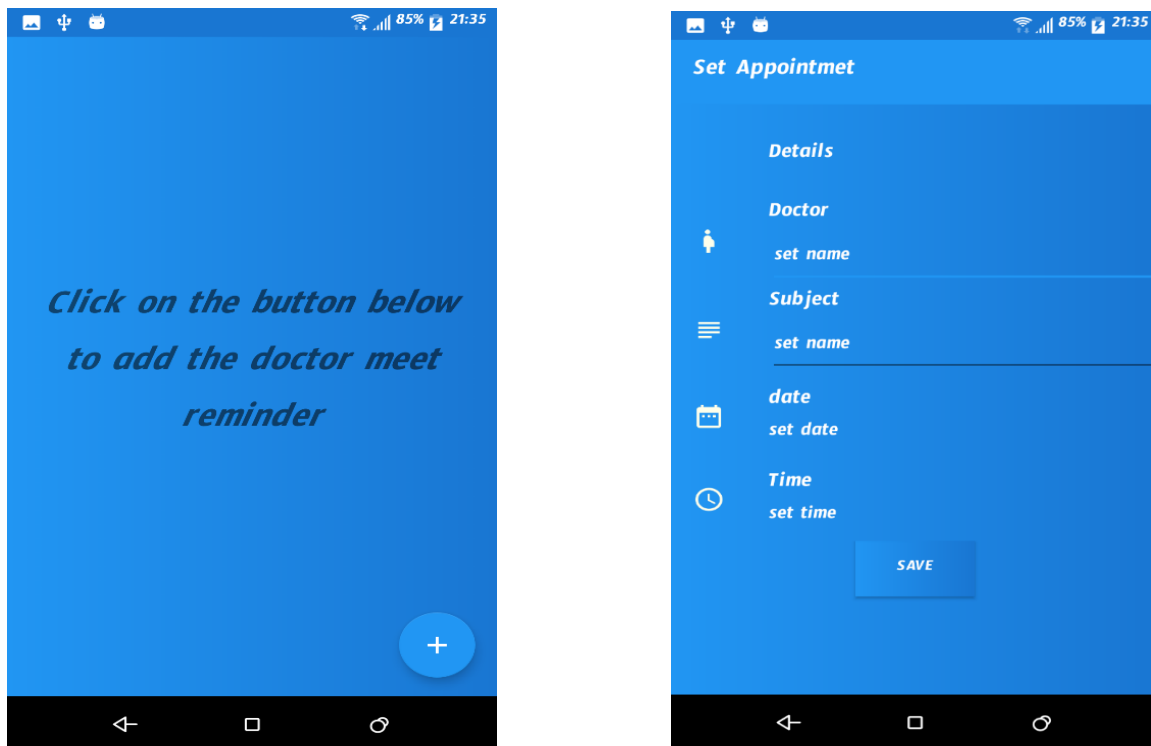


Figure 4.1.7: Medicine

4.1.7.1 View Medicine List:

- User can show their medicine list and also edit, delete or update it from here.
- User can edit, delete or update their medicine list for reminder.
- User can also add new medicine for reminder.

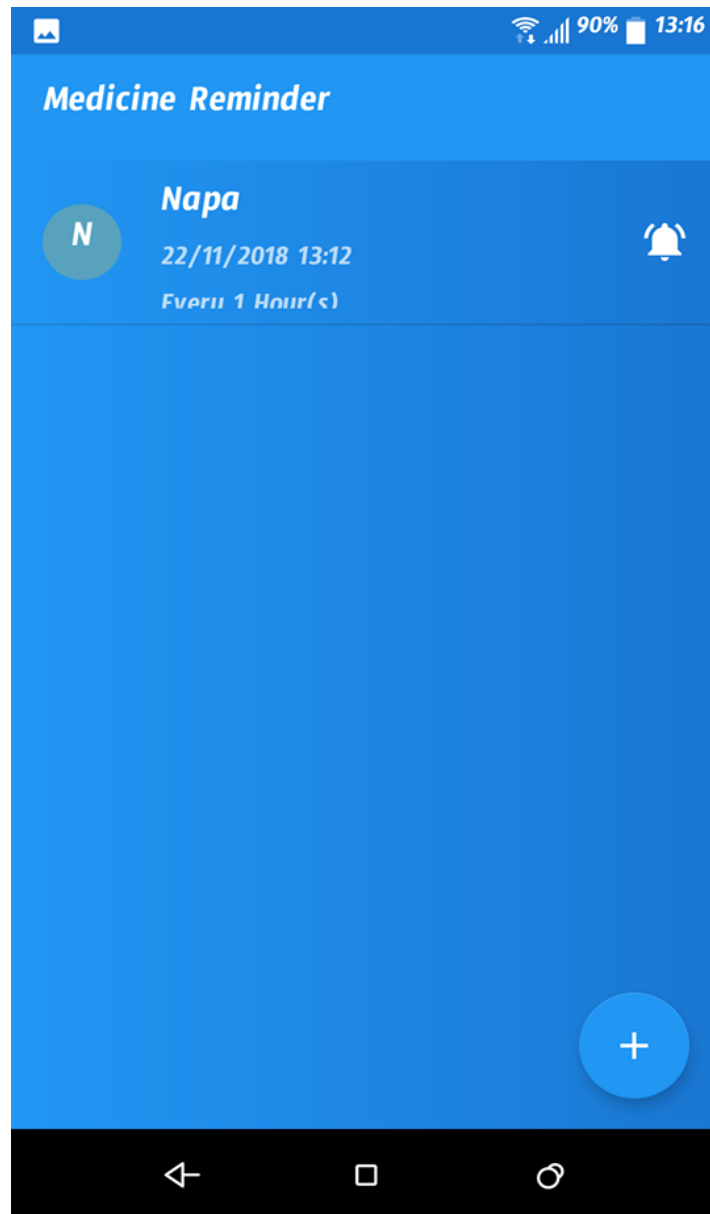


Figure 4.1.7.1: Medicine View

4.1.8 Status:

- User can input their height and weight to calculate Body Mass Index (BMI) in the status bar [5].

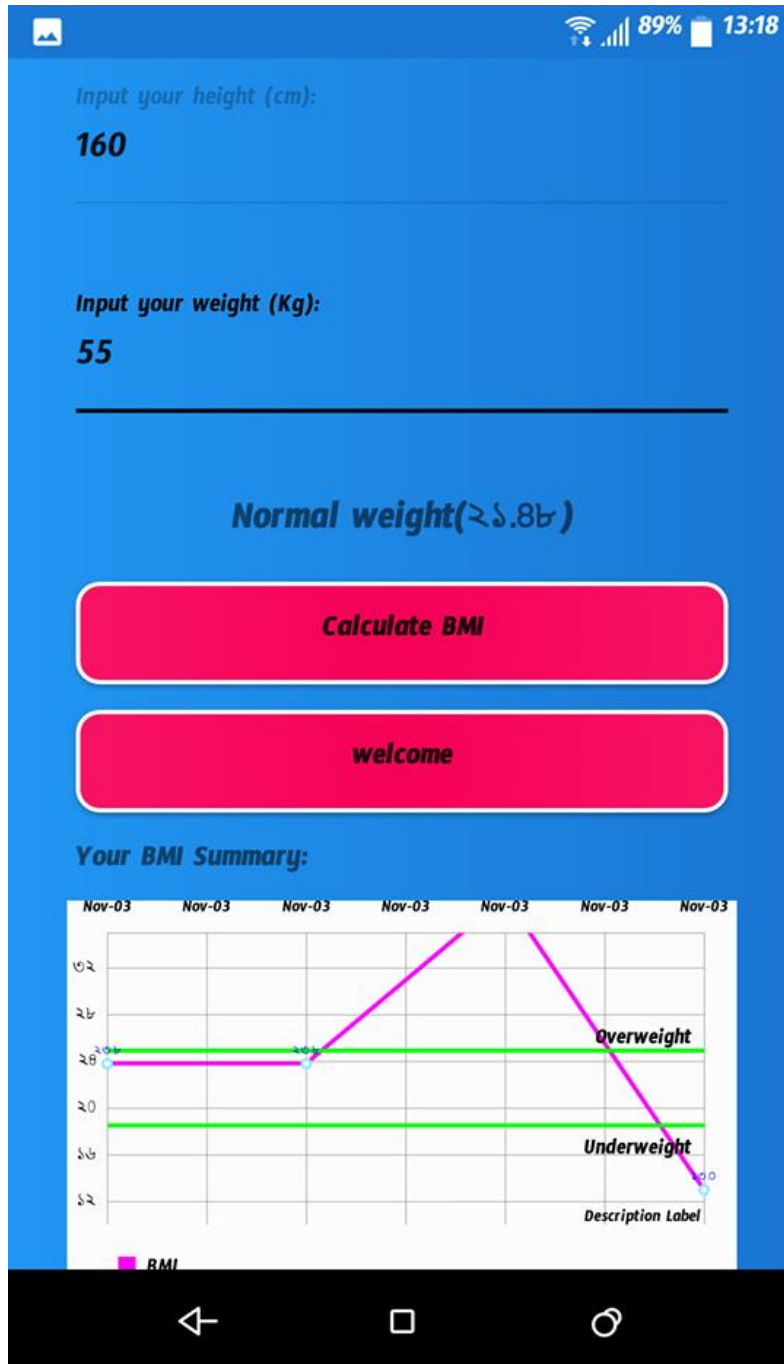


Figure 4.1.8: Status

4.1.9 Tips

- User can maintain their health using tips information.

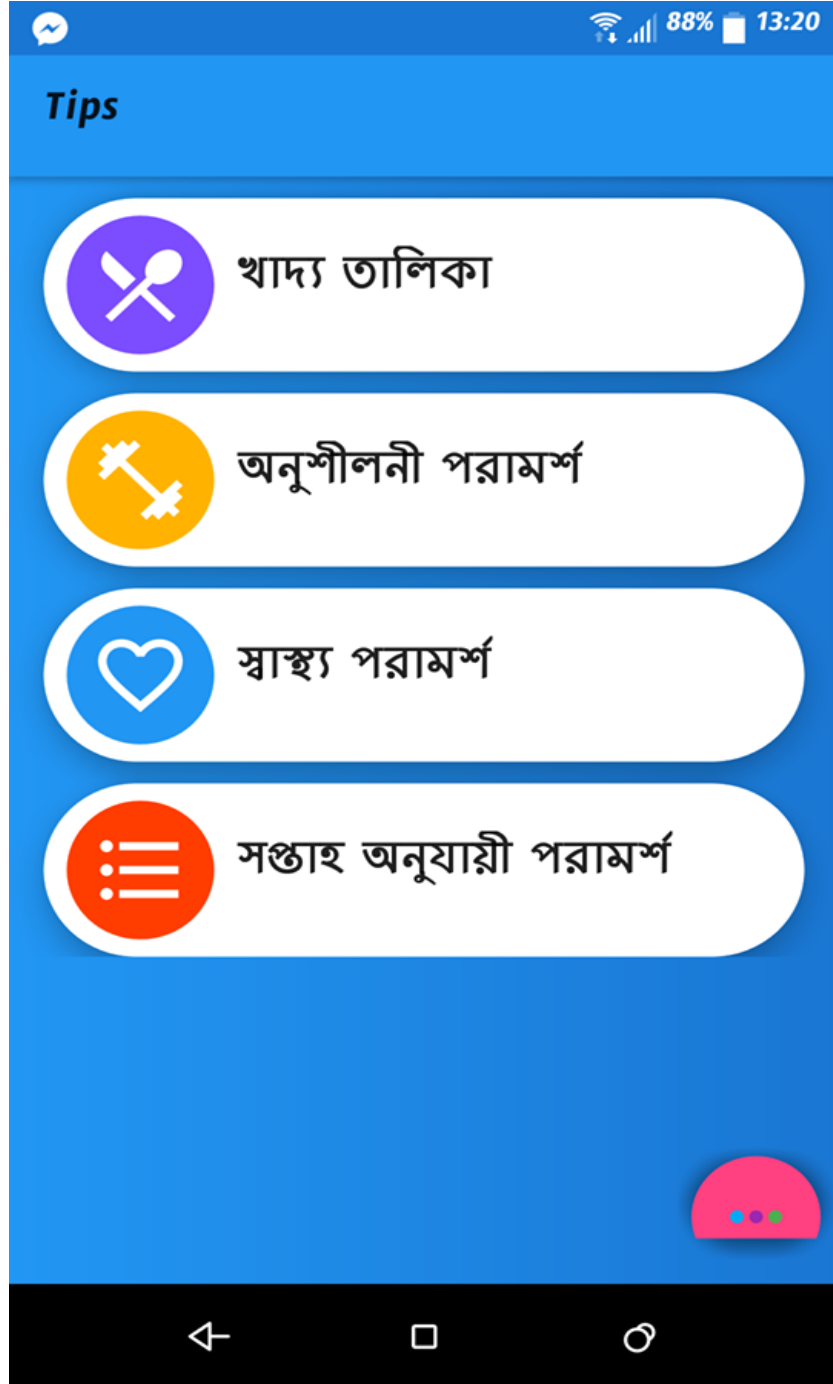


Figure 4.1.9: Tips

4.2 Back-end Design:

Back-end design is the most important part of any software or application. Because, it is the sector that will interact with admin. For that reason, we have concentrate in our back-end design and tried to make design simple but effective as possible. So that, admin can use them easily. In this case we were using firebase database for our back-end, it is very easy to use. For notification we uses some android services [11] [12].

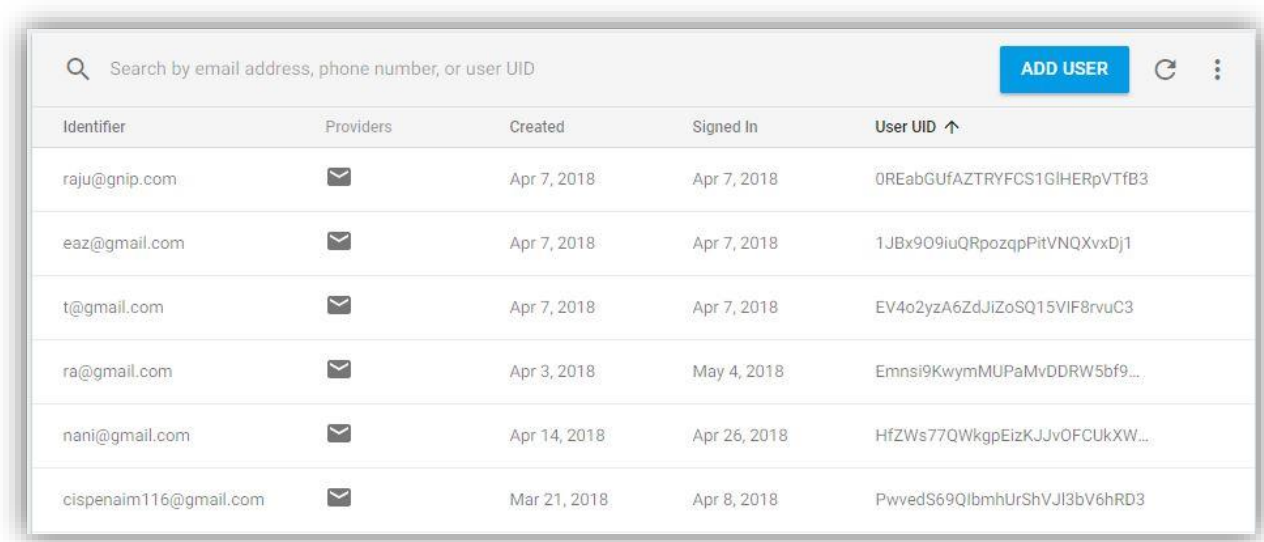
4.2.1 Firebase Authentication:

Most apps need to know the identity of a user. Knowing a user's identity allows an app to securely save user data in the cloud and provide the same personalized experience across all of the user's devices.

Firebase Authentication provides backend services, easy-to-use SDKs, and ready-made UI libraries to authenticate users to your app [13]. It supports authentication using passwords, phone numbers, popular federated identity providers like Google, Facebook and Twitter, and more.

Firebase Authentication integrates tightly with other Firebase services, and it leverages industry standards like OAuth 2.0 and OpenID Connect.

So we easily integrated it with our custom backend.



The screenshot shows the Firebase Authentication console interface. At the top, there is a search bar with the placeholder text "Search by email address, phone number, or user UID". To the right of the search bar is a blue "ADD USER" button, followed by a refresh icon and a menu icon. Below the search bar is a table with the following columns: "Identifier", "Providers", "Created", "Signed In", and "User UID" (with an upward arrow icon). The table contains six rows of user data:

Identifier	Providers	Created	Signed In	User UID ↑
raju@gnip.com	✉	Apr 7, 2018	Apr 7, 2018	0REabGUfAZTRYFCS1GIHERpVTfB3
eaz@gmail.com	✉	Apr 7, 2018	Apr 7, 2018	1JBx9O9iuQRpozqpPitVNQXvxDj1
t@gmail.com	✉	Apr 7, 2018	Apr 7, 2018	EV4o2yzA6ZdJiZoSQ15VIF8rvuC3
ra@gmail.com	✉	Apr 3, 2018	May 4, 2018	Emnsi9KwymMUPaMvDDRWSbf9...
nani@gmail.com	✉	Apr 14, 2018	Apr 26, 2018	HfZWs77QWkgpEizKJJvOFCUkXW...
cispennaim116@gmail.com	✉	Mar 21, 2018	Apr 8, 2018	PwvedS69QIbmhUrShVJI3bV6hRD3

Figure 4.2.1: Firebase Authentication

4.2.2 Firebase Real-time Database:

The Firebase Real-time Database is a cloud-hosted database. Data is stored as JSON and synchronized in real time to every connected client. When you build cross-platform apps with our ios, Android, and JavaScript SDKs, all of your clients share one Real-time Database instance and automatically receive updates with the newest data.

It's a NoSQL cloud database. Data is synced across all clients in real time, and remains available when our app goes offline.

So we were using it in our app.

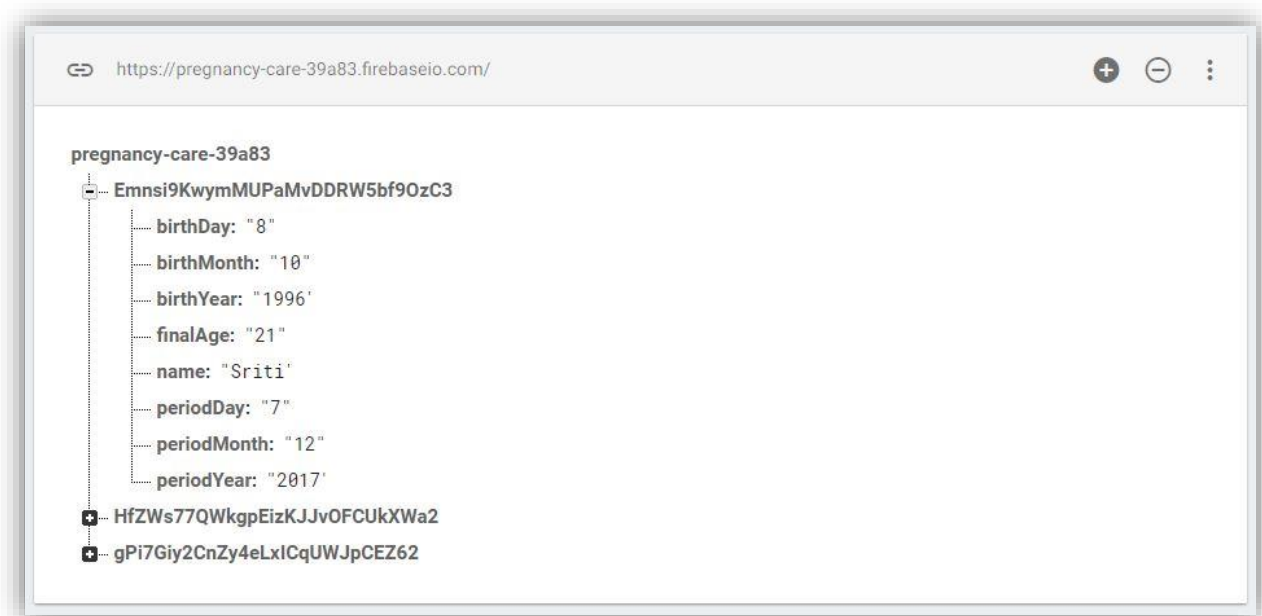


Figure 4.2.2: Firebase Real-time Database

4.3 Interaction Design and UX:

For any application, maintaining better and easy interaction between the user and system. It is very important for any application especially for mobile application. In our app “Pregnancy follow up”, user needs to see the updates regularly. In such cases clumsy user interaction can lose user interest and can be fatal for the future of the application.

In this project we have tried hard to make our app as much interactive as possible with user. We shared our app with some of our friends, relatives and teachers also. Most of them liked the UI and gave positive feedback and suggestions.

CHAPTER 5

Implementation and Testing

5.1 Implementation of Database

Database is the area, where we collect the data. The database implementation is the process of installation of database software, configuration, and running, testing, integrating with applications and training the user [14]. There are different stages and processes of database implementation. Such as: choosing the vendor for DBMS, training to use data manipulation language and other things. In every project, developer needs data to use in various works. So, it is very important to implement database as efficient as possible. Because, each one information is important for user. That is why it is very important to secure the database. That is why, we have tried our best to secure the database. In our application we use firebase database server.

5.2 Implementation of User Interactions

Interaction is the branch of user experience design that illuminates the relationship between machines they use. While interaction has a firm foundation in the theory, practice and methodology of traditional user interface design, its focus is on defining the complex dialogues that occur between people and interactive devices of many types from computers to mobile communication devices to appliances. For us User is the main aspects for using the app. So, how the app interacts with the user is main aspect for us. For that reason, we have tried to make our project as simple as possible. So that, user can easily enter into the app. We hope our app will be effective for the user. So, we assume that, user will easily accept our app and will be benefited by using our app.

5.3 Testing Implementation

System testing is a layer of software testing where system testing is tested in a complete software. The purpose of the examination is to assess the compliance of the system with specific requirements. The implementation of testing is a process of testing software or equipment in all necessary components of a software.

Table 5.3.1: Test case evaluation for Sign-up

Test Case No.	Test Input	Expected Outcome	Obtained Outcome	Pass/Fail	Tested On
1.	Valid Email	Successfully Sign-up	Sign-up successfully	Yes	02-02-2018
2.	Invalid Email	Unsuccessful	Sign-up Failed	Yes	02-02-2018
3.	Valid Password	Successfully Sign-up	Sign-up successfully	Yes	02-02-2018
4.	Invalid Password	Unsuccessful	Sign-up Failed	Yes	02-02-2018

Table 5.3.2: Test case evaluation for Login

Test Case No.	Test Input	Expected Outcome	Obtained Outcome	Pass/Fail	Tested On
1.	Registered Email and valid password	Successfully Login	Login successfully	Yes	04-02-2018
2.	Registered Email and invalid password	Failed	Login Failed	Yes	04-02-2018
3.	Unregistered Email and valid password	Failed	Login Failed	Yes	04-02-2018
4.	Unregistered email and invalid email	failed	Login failed	yes	04-02-2018

Table 5.3.3: Test case evaluation for Profile

Test No.	Case	Test Input	Expected Outcome	Obtained Outcome	Pass/Fail	Tested On
1.		Date and Name	successfully add in firebase	Successfully add in firebase	yes	10-02-2018
2.		Last period time greater than 1 year	Unsuccessfully add	Unsuccessfully add	yes	10-02-2018
3.		Last period Smaller than 1 year	Successfully add in firebase	Successfully add	yes	10-02-2018

Table 5.3.4: Test case evaluation for Update Status

Test No.	Case	Test Input	Expected Outcome	Obtained Outcome	Pass/Fail	Tested On
1.		Valid period Date	Right calculation	Right calculation	yes	12-03-2018
2.		Invalid period date	Not stored and not calculated	Not stored and not calculated	yes	12-03-2018
3.		Valid period Without net connection	Not store	Not store	yes	12-03-2018

Table 5.3.5: Test case evaluation for full application

Test No.	Case	Test Input	Expected Outcome	Obtained Outcome	Pass/Fail	Tested On
1.		Run in various devices	Successfully run	Run successfully	yes	24-03-2018
2.		Installed in various devices	Successfully installed	Installed successfully	yes	24-03-2018
3.		Checking 19 to 27	Support in all version	Support successfully	yes	24-03-2018
4.		Interface testing	Automatically Same view in all size devices	Same view in all size devices	yes	24-03-2018
5.		Internet connection	Not update data without internet	Not updated data	yes	24-03-2018
6.		Reminder just time	Give notification in just time	Give notification in just time	yes	24-03-2018
7.		Note activity	Successfully add note without internet	Successful add note	yes	24-03-2018

5.4 Test Results and Reports

The test report is formally required to reflect the examinations, which gives an opportunity to quickly guess the test results. This is a type of document that has properly examined the entire test. In the previous section we have shown all the test case such as: sign-up, login, profile, updated status and the evaluation of entire application. Finally, we find the result and we have seen that all the test results are quiet successful. So, we think our application is satisfied by the user. Usability testing examines the following feature of our application.

- How easy is it to use the app?
- How easy is it to learn by the app?
- How easy it is use to see about the present status?
- How suitable is the app to the end user?

So at the end of the application we can carry out the results after the test by the end user.

- Good application.
- Good UI for design.
- Very user Friendly.

CHAPTER 6

Conclusion and Future Scope

6.1 Discussion and Conclusion

All the thanks go to almighty of ALLAH who has blessed me with this innovative idea. Thanks to our supervisor who have help us a lot to complete this project successfully.

The goal of this project is to develop a self-help Android application to aid pregnant women in achieving proper health tips and expert consult during pregnancy. And to strengthen communication links between health professionals and pregnant women and increase education, awareness and quality of care during pregnancy and childbirth.

We tried our best to achieving this goal. And we hope our project help pregnant women during their pregnancy

6.2 Scope for further developments

- Adding more additional features in this application in future.
- We can introduce real time chat option with the doctor.
- Social feed option for sharing experience among pregnant women.
- Making this app usable for all platforms like windows, iOS, and web.
- In future sign-up and sign-in process can be more restricted and protected.
- Adding more information for the users.

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