DESIGN AND DEVELOPMENT OF A MOBILE APPLICATION FOR MOTHER AND BABY CARE

Submitted By

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A Project documentation submitted in partial fulfillment of the requirement for the degree of Bachelor of Science in Software Engineering

Department of Software Engineering
DAFFODIL INTERNATIONAL UNIVERSITY
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APPROVAL

This project titled on "**Design and Development of A Mobile Application for Mother and Baby Care**", submitted by **Mst. Umme Kulsum**, **161-35-1591** to the Department of Software Engineering, Daffodil International University has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of Bachelor of Science in Software Engineering and approval as to its style and contents.

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DECLARATION

It hereby declere that this project has been done by **me** under the supervission of **Dr.Md. Mostafijur Rahman, Assistant Professor,** Department of Software Engineering, Daffodil International University. It also declere that nithor this project nor any part of this has been submitted elesewhere for award of any degree.

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ACKNOWLEDGEMENT

First of all I would like to express my cordial gratefulness to Almighty ALLAH for HIS Kindness, for which thing I successfully completed my project.

While working on this project I have received many invaluable help from a large number of people. I would like to take this opportunity to express my deepest gratitude to everyone who helped us. I felt grateful to express my boundless honor and respect to my supervisor, Dr. Md. Mostafijur Rahman, Assistant Professor, Department of Software Engineering, Daffodil International University for her deep knowledge and keen interest in the field of software development that influenced me to carry out of this project. Her endless patient helps, friendly support, which have guided me throughout our work and showed the path of achievement.

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ABSTRACT

This project reflects on the issue of maternity of Bangladesh. We developed a compact solution that can assists people as well as educated people on the issues of maternity particular in Bangladesh. The goal of this project is spreading maternity awareness through mobile application. We have integrated some module for our system which can assists user during the pregnancy time. The category of this module such as: Mother Care, Baby Care, Place Component, Extra Care, Doctor Consultation, Community, Food Indicator Tools, Medicine Component. This component are connected to each other. We also compared our system with other existing solutions. Lastly, we also predicted the health status of our respondents by calculating their BMI scale.

CHAPTER 1

INTRODUCTION

1.1 Project Overview

This project reflects on the issue of maternity of Bangladesh. We developed a compact solution that can assists people as well as educated people on the issues of maternity particular in Bangladesh. The goal of this project is spreading maternity awareness through mobile application. We have integrated some module for our system which can assists user during the pregnancy time. The category of this module such as: Mother Care, Baby Care, Place Component, Extra Care, Doctor Consultation, Community, Food Indicator Tools, Medicine Component. This component are connected to each other. We also compared our system with other existing solutions. Lastly, we also predicted the health status of our respondents by calculating their BMI scale.

1.2 Project Purpose

Therefore, the purpose of this project is to spread maternity awareness and assistance using a mobile application and analyze the usability of a proposed system for the people of Bangladesh. This project shows and discusses the architecture of our proposed solution. It also discusses the system usability score of our policy to rapidly assist and create awareness on various maternity topics for a large number of android users in Bangladesh.

1.2.1 Background

Bangladesh is experiencing a fall in maternal mortality due to the improvement in healthcare quality. One of many ways maternal mortality can fall is due to check-ups made by healthcare workers to ensure the mother and her child is healthy. This is also known as Antenatal care (ANC). According to Bangladesh Maternal Mortality and Health Care Survey [1], the rate of mortality fell to 13.1 percent in 2016 in contrast to 20.2 in 2001. However, there is still a difference in the level of maternity care in rural and urban areas. The percentage of women in urban areas who sought doctors was 53 percent, whereas it was 25.6 percent for rural mothers and rural women have fewer

chances for maternal care due to poor awareness of maternal care [1]. Other reasons were shyness when male healthcare workers were involved. Most of the pregnancy-related deaths occurred due to a lack of medical attention [2]. Regular awareness programs, as well as the involvement of government and non- government, is stated to be a practical approach to informing and educating people on maternity issues in Bangladesh [3]. Therefore, it is clear that a feasible plan is required to solve the problem of maternity awareness and assistance in times when healthcare experts is not around. So, it is a matter of great concern about maternity related issues for women in Bangladesh. This is our key motto to develop an android application that will provide information on maternity issues and assist users in the case when doctors or health advisers are not around.

Android applications is very popular. According to a survey report [4], 62.3% of mobile users use both mobile-data and Wi-Fi connection. Therefore, it is a practical approach if an android application is used as a weapon to address maternity issues. This is a critical idea and motivation for our work so that we have chosen android technology as a solution to increase awareness and care about maternity issues for the women in Bangladesh. This project shows implementing a mobile application which mainly focused on awareness about maternity issues and assisting users. Therefore, the objective of this paper is to spread maternity awareness and assistance using a mobile application and analyze the usability of a proposed system for the people of Bangladesh. This research shows and discusses the architecture of our proposed solution. It also discusses the system usability score of our policy to rapidly assist and create awareness on various maternity topics for a large number of android users in Bangladesh.

In this field, there are many works has been done. Everyone try to solve problem by using mobile application. Some of the latest works are shown in the table I. The details sequence and comparison are shown in Table 1.1

Table 1.1: Related works

App Name	Platform	Features
Mother and baby care	Android	Tips and tricks about pregnancy.

Mother and baby Health Care	Android	Tips for women and newborn baby
The Bump	Android	Daily pregnancy and baby editorial articles, real-time answers to all your questions, a registry, a photo album to document that growing belly
Pregnancy Tracker	Android	Pregnancy news feed, food and nutrition ideas, exercise advice, weekly checklists and reminders
Sprout Pregnancy	Android	Daily and weekly information about your growing baby and changing body, a personalized pregnancy timeline
Pregnancy calculator	Android	Handy pregnancy book. Use it as a tool during pregnancy period.
Pregnancy Care	Android	Tips and tricks about food during pregnancy time
Pregnancy Advice, Parenting Tips & Baby Care App	Android	Childcare tips, baby milestones, vaccination schedule, baby feeding & nutrition, sleeping remedies, motherhood skills & more.
Pregnancy Exercise and workout at home	Android	Pregnancy exercises, women can also follow different tips to remain safe and sound while doing these exercises.
My Pregnancy day by day	Android	Doctor control, nearby hospital, food advice, pregnancy exercises tips, health tips etc.

1.2.2 Benefits & Beneficiaries

The benefits of this project will be aided during pregnancy. Several modules are designed for mothers and newborns. The mother will get different information based on the maternity and newborn baby.

1.2.3 Goals

The goal of this project is to assess the applicability and usability for spreading importance of maternity awareness as well as assisting pregnant women during emergencies.

1.3 Stockholders

The stockholders of this project is female user.

1.4 Proposed System Model

Figure 1.1 shows the Proposed System Model. There are nine inter connected module of this system. Such as Mother care, Baby care, Doctor Consultation, Extra care, Pregnancy exercise, Community, Place component, Food indicator tools, Medicine component.
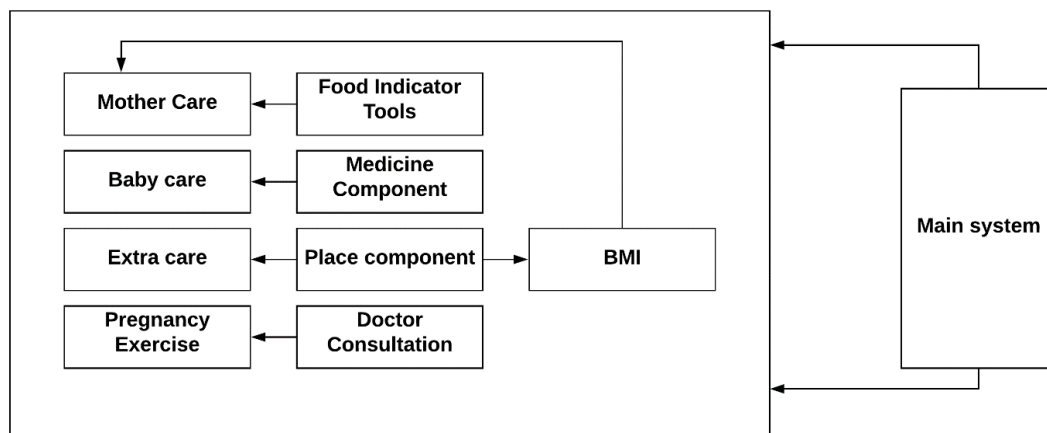
Figure 1.1: Block diagram of this proposed system

1.5 Project Schedule

The project schedule indicate that what needs to be done, which resource must be utilized and when project is due. In short, it is a timetable. Project schedule are divided by 2 category such as Gantt chart and Release plan.

1.5.1   Gantt chart
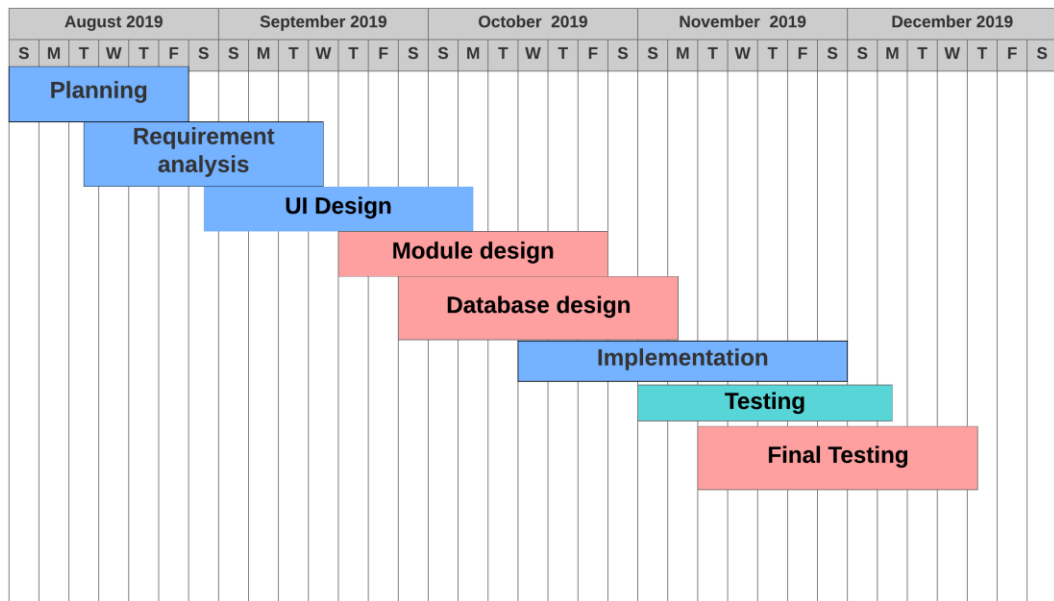
Figure 1.2: Gantt chart

Table 1.2: Timetable

Task Name	Start Date	End Date
Requirement Analysis	August 01	August 20
Project Planning	August 22	September 15
UI Design	September 16	October 20
Module Design	October 20	October 25
Database Design	October 26	October 28
Implementation	October 29	November 15
Testing	November 15	November 29
Final Testing	November 30	December 4

1.5.2 Release Plan /Milestone

Milestones, a timeline of a project, will clarify the task. This project milestones are as follows:

Table 1.5.2.1: Release Plan

Task No	Task Name	Time
01	Requirement Analysis	2 week
02	Project Planning	2 week
03	UI Design	3 week
04	Module Design	3 week
05	Database Design	1 week
06	Implementation	3 week
07	Testing	2 week

08	Final Testing	1 week

1.5.3 Software Deliverable

The main deliverables of this project is the complete system and the system document that will include

- Software requirements and specification
- Software design document

1.5.4 Project Scope

Mother and Baby care application mainly designed on the issue of maternity. During the pregnancy time mother can find various information such as maternity related question. We have added various component such as, Mother care, Doctor Care, Extra Care, Doctor Consultation, Food Indicator Tools, Medicine Component, Place component etc. This project is designed and development on the android platform. The language used for developing the project is JAVA as it is quite advantageous than other language in terms of performance, tools available, cross platform compatibility, libraries, cost, and development process.

CHAPTER 2

SOFTWARE REQUIREMENT SPECIFICATION

2.1 Functional Requirements

The whole project have to develop on the basis of the following requirements:

2.1.1 BMI Calculator

FR01	BMI Calculator
Description	User must give input height and weight for BMI calculate.
Stakeholder	User

2.1.2 Registration

FR02	Registration
Description	User need to signup first for access this system.
Stakeholder	User

2.1.3 Login

FR03	Age Calculator
Description	User must user id and password for access the system. Then system will show the homepage.
Stakeholder	User

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2.2 Non Functional Requirement

2.2.1 Security

Medicine taking time, BMI Calculating Data must be confidential.

2.2.2 Availability

The application is available for 24 hours a day. It is always available for stakeholder.

2.2.3 Usability

It has good user interface. It is user friendly. So user feel easy to use.

2.3 Performance Requirement

It's very important to maintain the performance of the project. To ensure a good performance, this project have to meet some requirements which will ensure a good performance.

2.3.1 Speed and latency requirements

While inserting or viewing the system in the web application, system need a minimum amount of speed to perform the task.

SLR-01	The system will be faster
Description	While the user and admin run the application then the application will be up. It also depends on internet connection
Stakeholders	User

2.3.2 Precision and accuracy requirements

System have to ensure the precision and accuracy of the data

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SLR-02	Data accuracy
Description	Data should have to accurate at the time of inputting. If the data will not accurate system will not allow to perform action.
Stakeholders	User

2.3.3 Capacity Requirements

System is able to inserting data.

SLR-03	Capacity Requirement
Description	System will store all inserting data to offline database.
Stakeholders	User

2.4 Dependability requirement

By the terms of dependability, it does not mean that this project is totally rely on something. Here, dependability means the running time of this project.

2.4.1 Reliability and Availability

RAR-01	The system must be available 24x7
Description	- The system must be available 24 hours in a day. - The system must be updated regularly.

2.4.2 Robust and fault tolerance requirement

In every system, there will have some person for destroying something. System will have to handle this type of person easily.

RFT-01	The system handle over access and detect error
Description	Handle all user access.

2.4.3 Safety critical requirements

There are no specific safety critical requirements.

2.5 Security requirements

There are no access requirements beside those that have been outlined in the below:

SR-1. Log in as a user

SR-2. Log out as a user

To get access to this system or a specific module the system must provide a central authentication technique. In order to prevent anyone to exploit stolen participants all participants password must be encrypted in hash process

2.5.1 Access requirements

To get access to the system, the system provides authorization/authentication way. This system uses various modules.

AR-01	The system provide security
Description	The system is designed in way that allows all modules to access a mechanism that provides security services.
Stakeholders	User

2.5.2 Integrity requirement

To protect credentials of user from being stolen, all passwords are stored in encrypted form. The Requirements significantly reduces the value of stolen user credentials, it's not easy to decrypt the password.

2.5.3 Privacy requirements

The system provides a protection of the database in the server. However, the system will have to increment this level of protection because of the personal data mode available on the system & the larger share of people that will be having access to it

through the system's registration. The user's privacy will be granted by the limited access that the log in process is going to give to the database.

PR-01	All data will be protected
Description	The main requirement is data analysis
Stakeholders	Admin

2.6 Look and Feel

There should not exist any unnecessary things on this project.

2.6.1 Appearance Requirement

There are is no appearance Requirement of this project.

2.6.2 Style Requirements

User interface will be mobile application. For styling the interface and making lucrative, I need to use Layout framework, v4 compact library, v4 fragment library, v7 card view, v7 recylerview, vector drawable library.

SR-01	The look and feel must be controllable using style sheet.
Description	The styling of the elements of the android application user interface will be defined using layout framework, v4 compact library, v4 fragment library, v7 cardview v7 recylerview vector drawable library.
Stakeholders	User, Admin

2.7 Operational and Environmental Requirements

Operational and environmental requirements is very important because this project may not work in every environment and its operation may not accurate in every time.

2.7.1 Expected Physical Requirements

There is no specific expected physical requirements.

2.7.2 Requirement for Interfacing with Adjacent System

There is no specific interfacing with adjacent system requirements.

2.7.3 Release Requirements

There are no specific release requirements but in the project schedule section it was described briefly.

CHAPTER 3

SYSTEM ANALYSIS

3.1 Introduction

Design is the first step in the development phase for any techniques. Software system design is important thing for an application. If design is not proper then application could be problematic. System should have good design. Software design is a process to

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transform user requirements into some suitable form, which helps the programmer in software coding and implementation.
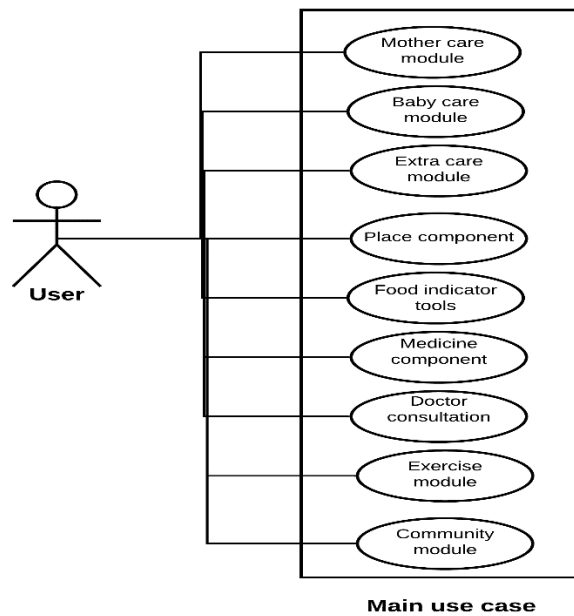
3.2 Use Case Diagram

Diagram 1: Use Case

3.3 Use case Description

3.3.1 Mother Care

Use Case ID	UCID1
Use Case Name	Mother Care
Created by	Umme Kulsum
Date Created	05 December 2019
Description	This use case allow user to access the Baby Care module.
Primary Actor	Female
Secondary Actor	None
Main flow	Display menu successfully
Pre-Condition	1. Must install this apps.
Post Condition	1.System will show menu category
Main flow	1.The user install the apps successfully 2.Ensure all necessary permission 3.Open apps 4.Select menu 5.Use case end
Alternative flow	1. Cannot install apps successfully. 2.Cannot ensure all permission 3.Cannot select menu 4.Cannot open app successfully

3.3.2 Baby Care

Use Case ID	UCID2
Use Case Name	Baby Care
Created by	Umme Kulsum
Date Created	December 5, 2019
Description	Use will see the Baby Care module.
Primary Actor	User
Secondary Actor	None
Pre-Condition	1.Must install apps
Post Condition	1. System will show the baby care module option.
Main flow	1. Must install this apps. 2. Ensure all necessary permission. 3. Select menu 4. Select and enter
Alternative flow	1.Cannot install successfully 2. Cannot give necessary permission. 3. Cannot select menu properly. 4. Cannot understand about the system usage.

3.3.3 Pregnancy Exercise

Use Case ID	UCID3
Use Case Name	Pregnancy Exercise
Created by	Umme Kulsum
Date Created	05, December, 2019
Description	This module provide women pregnancy exercise information. During the pregnancy then women have understand about pregnancy exercise. User need to install apps and ensure necessary permission so that user can see the Pregnancy Exercise module.
Primary Actor	Female
Secondary Actor	None
Pre-Condition	1.Install apps
Post Condition	1.User will see the module output
Main flow	1.Ensure necessary permission 2.Open apps 3. Select menu and enter. 4.Use case end
Alternative flow	1. Cannot ensure necessary permission. 2. Cannot open apps properly. 3. Cannot select menu

3.3.4 Doctor Consultation

Use Case ID	UCID4
Use Case Name	Doctor Consultation
Created by	Umme Kulsum
Date Created	05, December, 2019
Description	This module ensure doctor consultation.
Primary Actor	User
Secondary Actor	None
Pre-Condition	1. Must allow internet connection.
Post Condition	1. User will see the Doctor Consultation module option.
Main flow	1. Must allow internet connection. 2.Ensure necessary permission 3.Open apps 4. Choose menu and enter. 5. Use case end.
Alternative flow	1. Cannot ensure internet connection. 2. Cannot open apps properly. 3. Cannot understand about module. 4.Internet connection problem

3.3.5 Place Component

Use Case ID	UCID5
Use Case Name	Place Component
Created by	Umme Kulsum
Date Created	05, December, 2019
Description	This module ensure searching features. User can search nearby place such as nearby hospital by this module. First of all user need to enable GPS and active internet connection. Then user can search nearby place by this component.
Primary Actor	User
Secondary Actor	None
Pre-Condition	1.Must enable GPS
Post Condition	1. User will see the display for place component.
Main flow	1.Enable GPS 2. Active internet connection. 3.Search place
Alternative flow	1.Cannot enable GPS 2.Cannot active internet connection 3. Cannot search place.

3.3.6 Medicine Component

Use Case ID	UCID6
Use Case Name	Medicine component
Created by	Umme Kulsum
Date Created	05, December, 2019
Description	This module ensure medicine searching. User can search medicine information by this module. User need to active internet connection for access this module.
Primary Actor	User
Secondary Actor	None
Pre-Condition	1.Must active internet connection
Post Condition	1.Successfully display module output
Main flow	1.Install apps 2.Open apps 3.Ensure permission 4.Select menu 5.Use case end
Alternative flow	1.Cannot install apps 2.Cannot open apps 3.Cannot ensure permission 4.Cannot select menu

3.3.7 Extra Care

Use Case ID	UCID7
Use Case Name	Extra care
Created by	Umme Kulsum
Date Created	05, December, 2019
Description	This module ensure extra care of mother. Women can get some advantage by this module Such as BMI calculator, Age calculator, and Medicine reminder. By BMI calculator, user can calculate their health status, age calculator ensure and counting baby age, medicine reminder ensure medicine taking alarm or notification.
Primary Actor	Female
Secondary Actor	None
Pre-Condition	1.Input necessary information properly
Post Condition	1. Successfully display module output.
Main flow	1.Open apps 2.Select menu 3.Enter 4. Input height and weight for BMI calculate. 5. Input medicine taking time for medicine reminder.
Alternative flow	1.Cannot open apps 2.Cannot select menu 3.Cannot enter properly 4. Cannot understand about module category or module necessary input field. 5. Cannot input height and weight properly. 6. Cannot input data for medicine reminder.

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3.3.8 Community

Use Case ID	UCID8
Use Case Name	Community
Created by	Umme Kulsum
Date Created	05, December, 2019
Description	This module provide community. By this module user can asking question to community about maternity and get answer. User need to active internet connection and then they can use this features.
Primary Actor	Female
Secondary Actor	None
Pre-Condition	1.Must active internet connection
Post Condition	1.Successfuly display community
Main flow	1.Active internet connection 2.Open menu 3.Enter the community module 4.Use case end
Alternative flow	1.Cannot active internet connection 2.Cannot open menu 3.Cannot enter community module 4. Internet connection lose.

3.3.9 Food Indicator Tools

Use Case ID	UCID9
Use Case Name	Food indicator tools
Created by	Umme Kulsum
Date Created	05, December, 2019
Description	This module provided food information. During the pregnancy time, women cannot understand which food should eat or which food should avoid. This module ensure all of information. User just need to select category and enter the category.
Primary Actor	Female
Secondary Actor	None
Pre-Condition	1.Must open apps
Post Condition	1.Successfully display module output
Main flow	1.Open apps 2.Select menu 3.Enter 4.Use case end
Alternative flow	1.Cannot open apps 2.Cannot select menu 3.Cannot understand about category 4.Cannot enter

3.4 Activity Diagram

Diagram 2: Activity Diagram

CHAPTER 4

SYSTEM DESIGN SPECIFICATION

4.1 Class Responsibilities Collaboration (CRC) Cards

4.1.1 Registration class

Registration	
User Email User Password	All modules information

4.1.2 Admin Class

Admin	
Admin Id Admin Password	All modules information

4.1.3 Component Class

Modules	
Modules Id Modules Name Modules Type Modules Category	User

4.1.3 Consultation Class

Consultation	
Consultation Id Consultation Name Consultation Type Consultation Category	User

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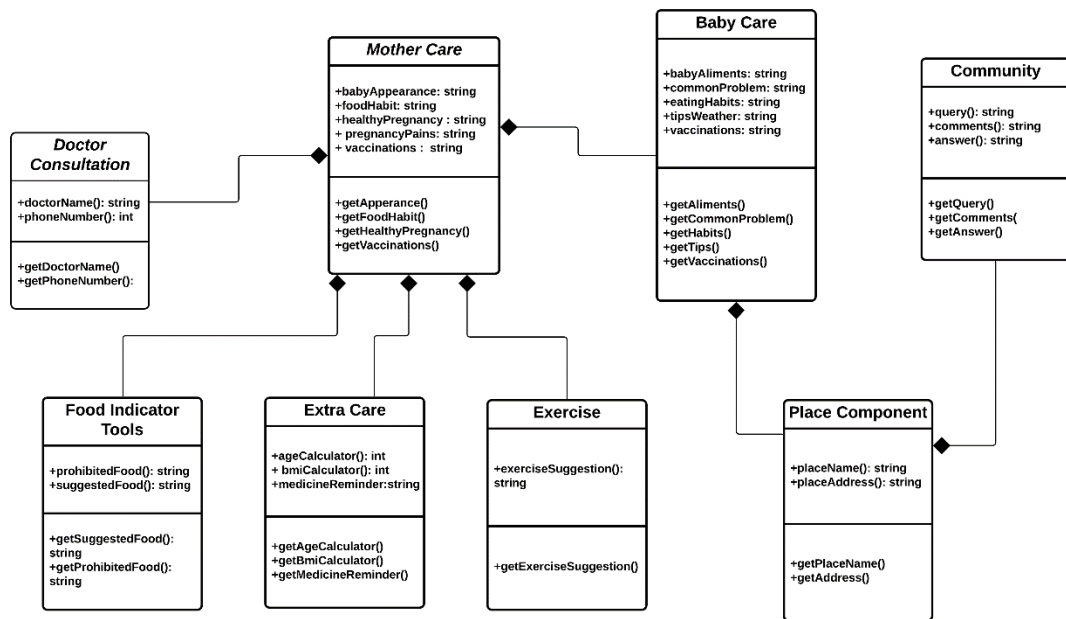
4.2 Class Diagram

Diagram 3: Class Diagram

4.3 Database design Diagram

Diagram 4: ER Diagram
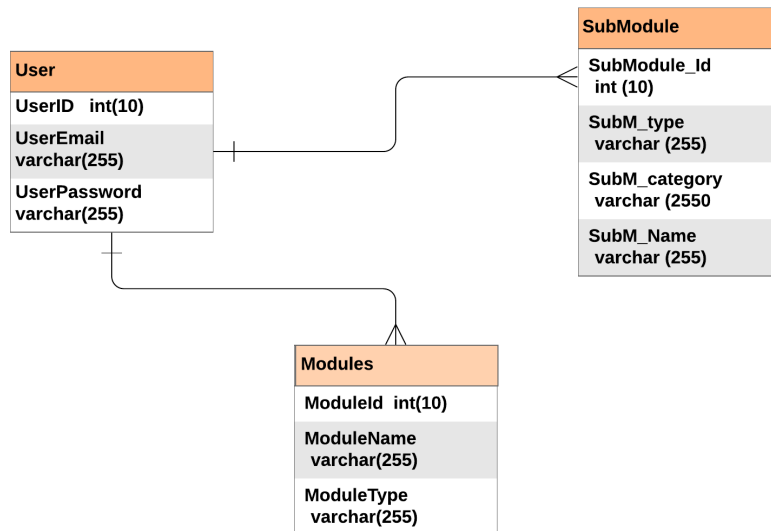
4.4 Development Tools and Technology

4.4.1 User Interface and Technology

- Android studio design library

4.4.2 Implementation Tools and Platform

- Operating System Windows 10
- Platform Android Studio
- Language JAVA
- Database Firebase and SQLite

CHAPTER 5

SYSTEM TESTING

5.1 Importance of Testing

- Testing is find errors on this application program.
- It is used for both validation and verification to develop a product.
- It is used for effective error identification.
- It make sure customer reliability and satisfaction.
- Make sure quality of this application.
- Make sure great performance of this application.
- Required to stay in software business.

5.2 Testing Feature

Feature testing is the process of making changes in software system to add one or more new features or to make modifications in the already existing features. Each of these feature is said to have a characteristics that is designed to be useful, intuitive, and effective.

5.3 Testing Strategies

A testing strategy is a general approach to the testing process rather than a method of devising particular system or component tests. Different testing strategies may be adopted depending on the type of system to be tested and the development process used.

5.4 Testing Environment (hardware/software requirements)

- Test data
- Mobile Application
- Firebase database, SQLite
- Operating System (OS)

5.5 Test Cases

5.5.1 Test Case Module-1 Registration

Test Case ID: TID1	Test Designed By: Mst. Umme Kulsum
Test priority : High	Test Design Date: 12/09/2019
Module Name: Registration	Test Execute By: : Mst. Umme Kulsum
Description: This section covers the functionality of registering new users.	Test Design Date: 12/09/2019

Precondition: User has no precondition

Dependencies: Enter input required information

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Step	Test Case	Test Data	Expected Result	P/F	Actual Result
01	Enter empty value for any required Field		Display Error Message	Pass	Display Error Message
02	Enter different email format instead of xxx@xxx.xx	Gmail.com - ptz.dm	Display error Message "Invalid email address"	Pass	Display error Message "Invalid email address"
03	New user registration	NA	Display massage "signup" successfully	Pass	Display massage "signup" successfully

5.5.2 Test Case Module-2 Login

Test Case ID: TID2	Test Designed By: Mst. Umme Kulsum
Test priority : High	Test Design Date: 12/09/2019
Module Name: Login	Test Execute By: : Mst. Umme Kulsum
Description: This section covers the functionality of login new users.	Test Design Date: 12/09/2019

Precondition: User has no precondition

Dependencies: Enter input required information

Step	Test Case	Test Data	Expected Result	P/F	Actual Result
01	Enter empty value for username and password	NA	Please enter username and password	Pass	Please enter username and password
02	Enter correct value for username and password	User name and password	Accept	Pass	Accept
03	After giving input click submit button	NA	Direct on Home Page	Pass	Direct on Home Page

5.5.3 Test Case Module-3 BMI Modules

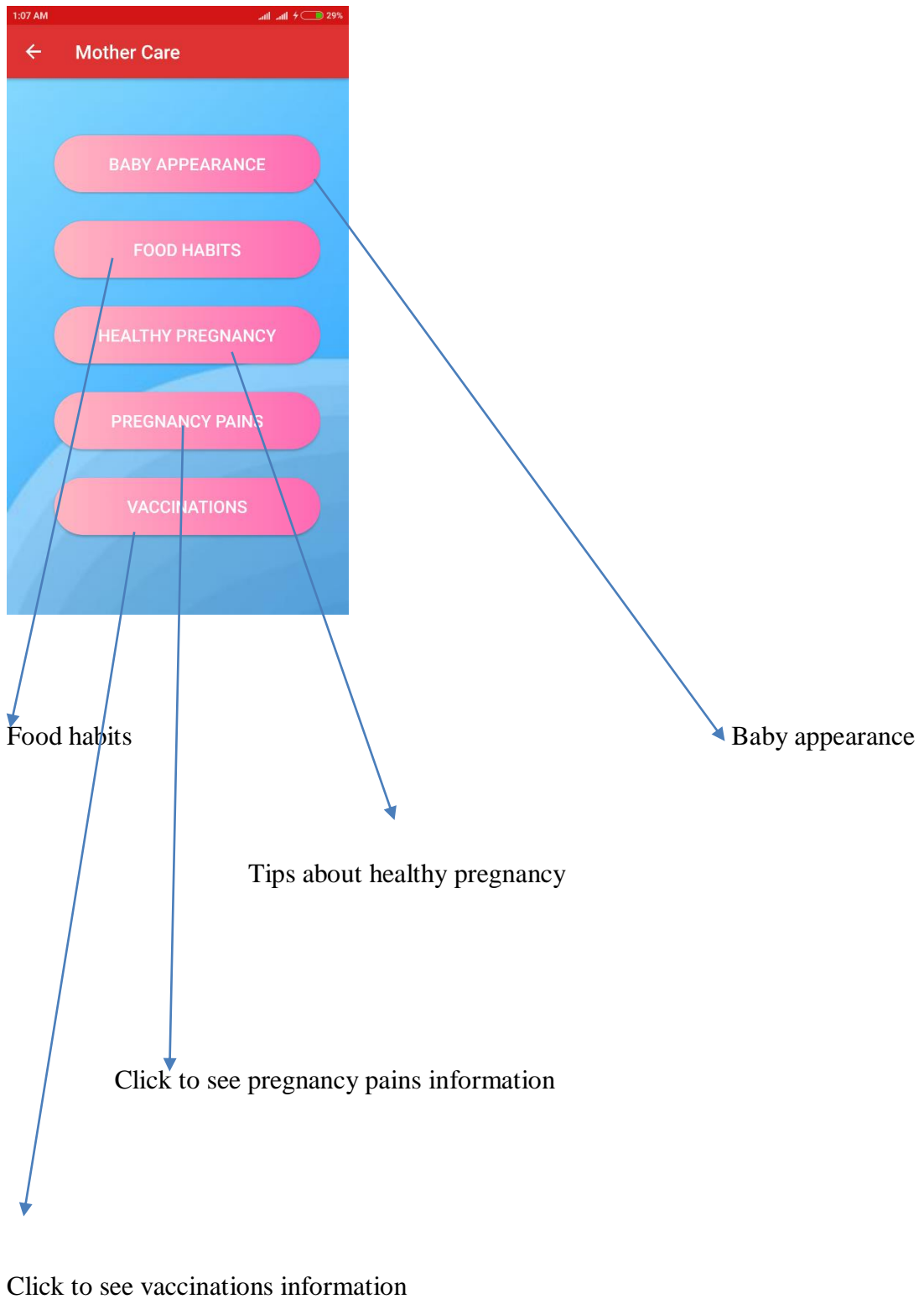|	
Test Case ID: TID3	Test Designed By: Mst. Umme Kulsum
Test priority : Medium	Test Design Date: 12/09/2019
Module Name: BMI Calculator	Test Execute By: : Mst. Umme Kulsum
Description: This section covers the functionality of BMI Calculating.	Test Design Date: 12/09/2019

Precondition: User has no precondition

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Dependencies: Enter input required information

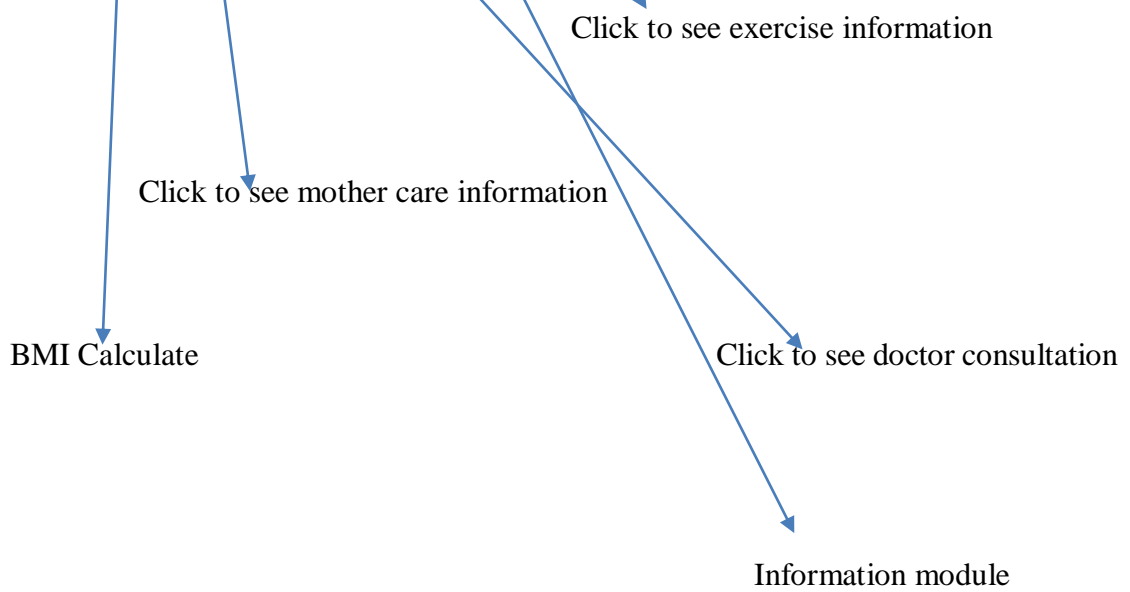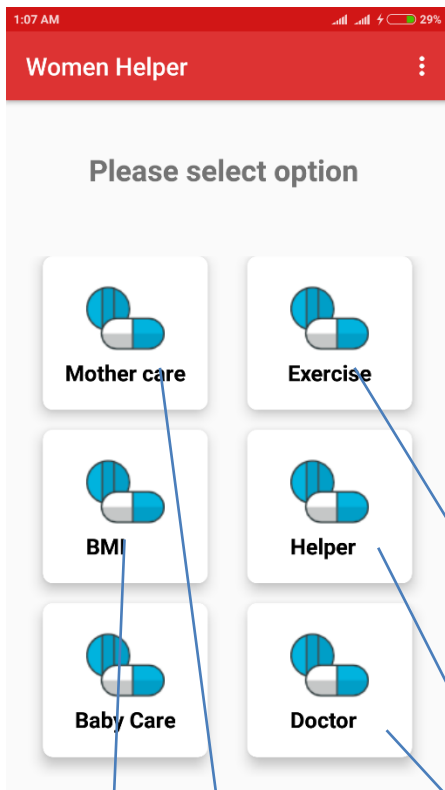| Step	Test Case	Test Data	Expected Result	P/F	Actual Result
01	Enter empty value for height and weight	NA	Please enter height and weight	Pass	Please enter height and weight
02	Enter correct data(height and weight)	Height and weight	Show result	Pass	Show result
03	Enter random data	Height and weight	Show error	Pass	Show error

CHAPTER 6

USER MANUAL

6.1 Mother Care Module

Food habits

Baby appearance

Tips about healthy pregnancy

Click to see pregnancy pains information

Click to see vaccinations information

6.1 Home page

Click to see exercise information

Click to see mother care information

BMI Calculate

Click to see doctor consultation

Information module

CHAPTER 7

CONCLUSION

7.1 Critical Evolution

If user is not comfortable with android smart phone he/she should have problem with this application. User must know English because whole application is in English. He/she should have good knowledge of Google play store. User should be registered and ten he/she can login the system.

7.2 Limitation

It is very hard to develop something without any limitations. This project has some limitations. Limitation are as follows

- Not highly secure
- No map facility

7.3 Future Scope

If this software use properly and user can understand its usability It can use for other things like daily foot step counting. It can use in daily life. It can improve for other things if it is useful for user and they got help from this.

7.4 Final Synopsis

It has been a great pleasure to work on this project. This project help to know new technology. This project thing is some kind of weird thing but this is helping people. Helping people with developing an application make a better world.

Reference

To complete this application, I have taken help from many places. Some references are given bellow:

[1] "Bangladesh Maternal Mortality and Health Care Survey 2016" [Online].Available:https://www.measureevaluation.org/resources/publications/tr-17-218. [Accessed: 02-Dec.-2019].

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