

HOME TUTOR: An Android Based Mobile Application

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This Report Presented in Partial Fulfillment of the Requirements for the Degree of Bachelor of Science in Computer Science and Engineering.

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APPROVAL

This Project titled “**HOME TUTOR: An Android Based Mobile Application**”, submitted by Md.Hasanuzzaman, ID No: 162-15-8025; Muin Mahmud, ID No: 162-15-7983 and Md.Monir Hossain, ID No: 162-15-8033 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 02/05/2019.

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DECLARATION

We hereby declare that; this project has been done by us under the supervision of **Anup Majumder, 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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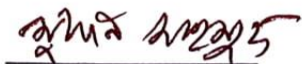


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ABSTRACT

This project is based on tutor and student communication system. This project aims to create an easy, faster and smooth communication system between the tutors and the students. This project also offers some opportunities that will help both the tutors and the students on their educational purpose. So, for the better communication system we developed our project that will help the users a lot. This project will boost the confidence of the students in studying, communicating and so on. Mostly students are not willing to waste their valuable times, or a large number of students just feel shy or some introvert to talk to their respective teachers. In this case home tutor can helps students. Because of home tutoring is a form of tutoring that occurs in the home. Tutoring is receiving guidance or instruction by a tutor. Most often the tutoring relates to an academic subject or test preparation. This is in contrast to tutoring centers or tutoring provided through after-school programs. The service most often involves one-on-one attention provided to the pupil; otherwise, is called small group tuition, in which the tutor and a small number of pupils gather at one of their homes for tutoring. our project will bring a smart solution for them. Our projects recreate the whole system online but it will help the users offline too. It will save time and students mustn't have to worry about their study problems. This system is make and supervised by the experts and satisfying by the students and tutor. XML, JAVA, Firebase, Android Studio are used to develop the system. This system is tasted by over 5 tutors and 100 students, and 80% of them found the system useful.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

A **Home Tutor** is a one kind of teacher, who provides assistance or tutelage to one or more people on certain subject areas or skills. The tutor spends a few hours on a daily, weekly, or monthly basis to transfer their expertise on the topic or skill to the student. Tutoring can take place in different settings, such as comment's, chat, a formal tutoring center, or the home of the tutor or learner. As a teaching-learning method, tutoring is characterized by how it differs from formal teaching methods on the basis of the (in) formality of the setting as well as the flexibility in pedagogical methods in terms of duration, pace of teaching, evaluation and tutor-tutee rapport.

1.2 Motivation

The motivation to work in this project is actually our real-life experience. As a student we face many difficulties in our study. We also need guidance to build a good career. Tutors can help students a lot to continue their study life and to build career. So, communication with teachers is very much important for a student. But the problem is to get teachers when they are free as they have a lot of work to do. Though, teachers have counseling hour for students but they may not be available for some important work like meeting, seminar or some personal issues. Sometimes teachers don't receive anonymous phone calls or cannot receive the call for some reason. Then the student can't freely share their problems to teacher. This situation motivates us to make an android app to communicate with the tutors and students. Using the app students can find their useful tutors and make a post to find tutor/student as per need.

1.3 Objective

The main objective of this project is to build a platform where student and tutor can communicate with each other.

- Home tutors provide one-on-one attention
- They can work on learning easily
- Student can easily share problems
- Home Tutor teach them more than the syllabus
- Student get a flexible and convenient space
- A Home Tutor can help your child have goals, objectives and dreams
- Any time answer to students' questions by online chat

1.4 Expected Outcome

The outcome of this project is very simple but important. Some points are mentioned below

- Using this app, tutors can manage their tuitions and student can easily find their expected tutors. It will remind them of their works to be done. Students can also compare tutors using the app.
- Develop systematic methods for learning from problem sets, including: how to apply and transfer conceptual knowledge; identify common obstacles and errors; and contextualize individual problems within the themes and concepts of the course.
- Creating groups tutors will be able to contact with a group of students. Using notification tutor will let students know about their upcoming tutors.

1.5 Report Layout

We developed an application which name is “**Home Tutor**”. We make sure that the project complete in time. Respect to our workflow we design our project report.

In chapter 2 named Background discuss about the Introduction, Related Works, Comparative Studies, Scope of the Problem, Challenges.

In Chapter 3 named Requirement Specification we discuss about the Business Process Modeling, Requirement Collection and Analysis, Use Case Modeling and Descriptions, Logical Data Model, Design Requirements.

In chapter 4 named Design Specification we discuss about the Front-end Design, Back-end Design, UI Design and UX and Implementation Requirements.

In chapter 5 named Implementation and Testing we discuss about the Implementation of Database, Implementation of Front-end Design, Testing Implementation, Test Results and Reports.

In chapter 6 named Discussion and Conclusion we discuss about the Future Scope, Discussion and Conclusion of the whole project.

CHAPTER 2

BACKGROUND

2.1 Introduction

Communication between teacher and student is very much important in teaching process. As teachers are the best guide of the students, students have to communicate with teachers. Not only about study but also a good career and future plan students have many questions in their mind. Students face problems everyday while they are study or do some work related to study or their career. To know the answers of their questions or to find the solutions of their problems students go to their teachers first. This is why communicating with teachers is so important. On the other hand, teacher may need to contact a student or a group of students or some reason. A medium or media that is fully dedicated for teachers and students can help both tutors and students to communicate with each other.

2.2 Related Works

There are some applications available related to this project but no one is totally similar. Some of the applications that are similar are mentioned below.

To tell about related works which name come first is Google Classroom. It is only available for teachers and students of an educational institute that has provided Google apps for Education account. Teachers can create classroom here and students join in the classroom using classroom code. Teacher can post Announcement for selected students or for all students. Teacher also can give individual Assignments in classroom.

Another app that is very similar is Buzz Mob. It is a communicating app among teachers, students and parents. Joining school or classroom a user can send or receive message, share photos, videos or other files. It sends important notifications about assignments, event dates or general updates. BuzzMob.com account is needed for a school or classroom to use this service.

There is a school messaging app that is named Remind. It provides real time messaging to the users. Remind also allows users to add reminder. Using Remind it is possible to send text messages to any phone.

There are other apps to help teacher organize classes, manage student information like attendance, grade etc. Teacher Kit, Teacher App & Grade Book are this kind of app. There are also some class scheduler apps available in Play Store like My Class Schedule: Timetable, Teacher Schedule, Class Schedule etc.

2.3 Comparative Studies

There are a lot of communication systems [1] currently available now. By using those both teachers and students become beneficial. Every educational institute especially the universities have their own strategy to communicate with their teachers and students. As the world is going faster so there is always a hunger to communicate faster and effectively. But still now in the age of internet, we are still looking for a platform that makes us comfortable to communicate.

So that we wish to offer such a communication system that will help us a lot. Using one communication platform is more comfortable than using three or four communication platforms. As internet reach everywhere, we can easily interact with everyone anytime, anywhere they live. In this competitive world we will say that, our system will keep people together and save their valuable time too.

2.4 Scope of the Problem

As we said, teachers and students face some difficulties to communicate with each other. Our current communication system isn't as fast as the demand is going. So, we can discuss some problems here;

- Using android development platforms may not be suitable for every student or tutor.
- There is some manual system to communicate, but this is fully online based.
- Sometimes students face to share some information face to face with their respected teachers.

According to these problems, our application offers solutions that will help both the teachers and students no doubt. We will look after this from two perspectives; one with the students and another with the teachers.

For students, helps

1. To get communicate faster
2. To select study plan with tutor
3. Easy option to make a question to the tutor
4. Get alarming before every task
5. Stay up to date

For tutors, helps

1. To inform students easily
2. Reduce the work pressure
3. Smart way of communication

2.5 Challenges

Every work has some challenges. As communication is our main purpose so we have to face several challenges too.

1. As it's an android based mobile application, so if a student doesn't have an android phone then this app will not help him.
2. After getting notification's if a user doesn't check his phone for full information then the main motto of this app will be failed.

CHAPTER 3

REQUIREMENT SPECIFICATION

3.1 Business Process Modeling:

BPM or Business Process Modeling is a process [2] of constructing a structural view of a system or process. It includes some process, starts and symbol, condition as like a flow chart. In this process we can see the student can send request to a teacher to show that the student is interested to take tuition from that tutor. And again, the same system goes for the tutor, if the tutor likes a student then the tutor can send request to the student to show that the tutor is interested to teach that student.

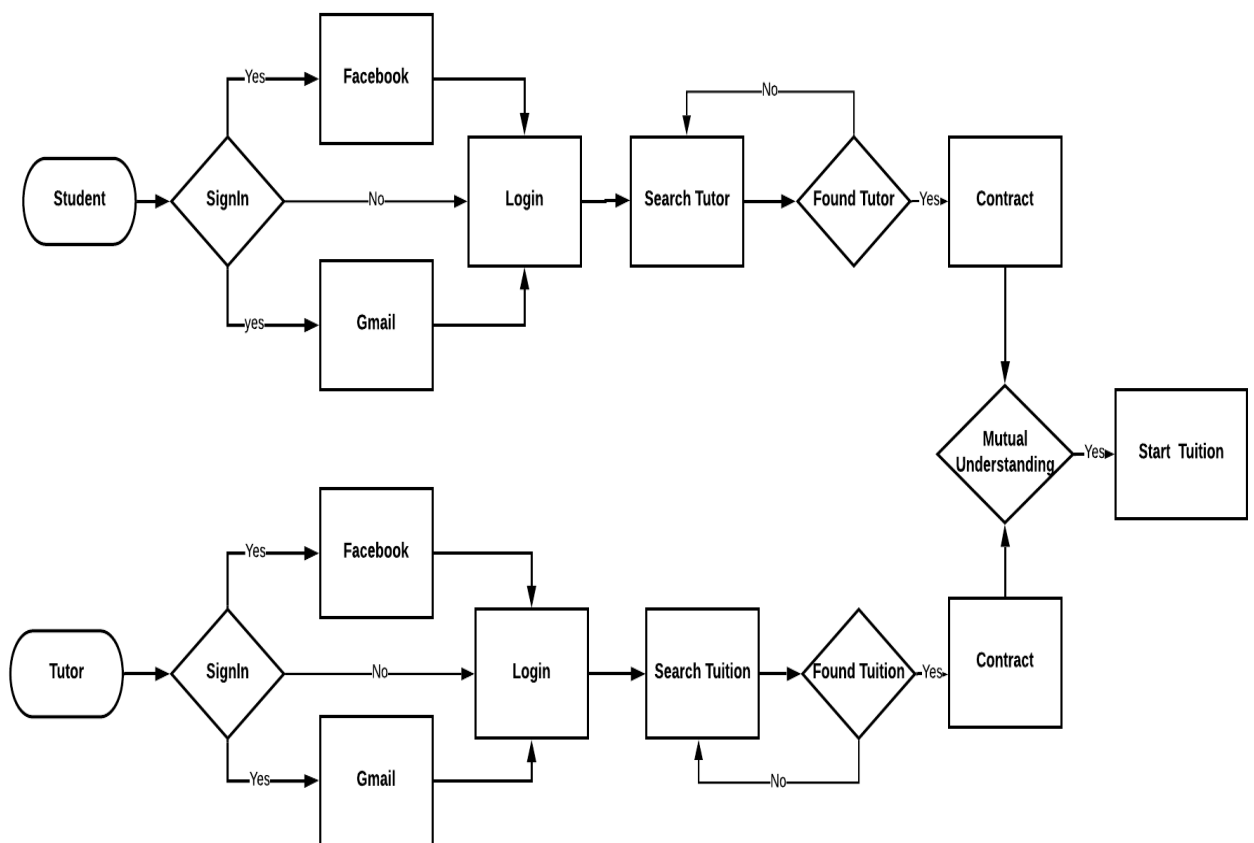


Figure 3.1: BPM of Home Tutor

3.2 Requirement Collection and Analysis

When we are working on a project, a delivery time of the project has already given. That's why project works must be planned and executed to deliver timely with the solutions that are both relevant and realistic to the project problem.

Our project is an online based tutor and student communication system. So, the process of collection requirements must incorporate and address all the realities. It's because to identify the requirements at all levels and perceptions [3].

Software Requirements:

- Students
- Log in system for the tutors
- Log in system for the students
- Time convenience
- Easily accessible

Hardware and Software Requirements for our system:

Whenever you purchase software or hardware for your computer, you should first make sure your computer supports the system requirements. These are the necessary specifications your computer must have in order to use the software and hardware to be used efficiently; all computer software needs certain hardware components or other software resources to be present on a computer [4].

In development stage the system requires for all tools and platforms describe to advance the new system like.

- XML
- JAVA
- Android Studio 3.0
- Firebase Database.

3.3 Use Case Modeling and Description:

A use case model is a graphic description of the interactions among the elements of a system. A use case is a methodology used in system analysis to identify, clarify and organizing system requirements [5].

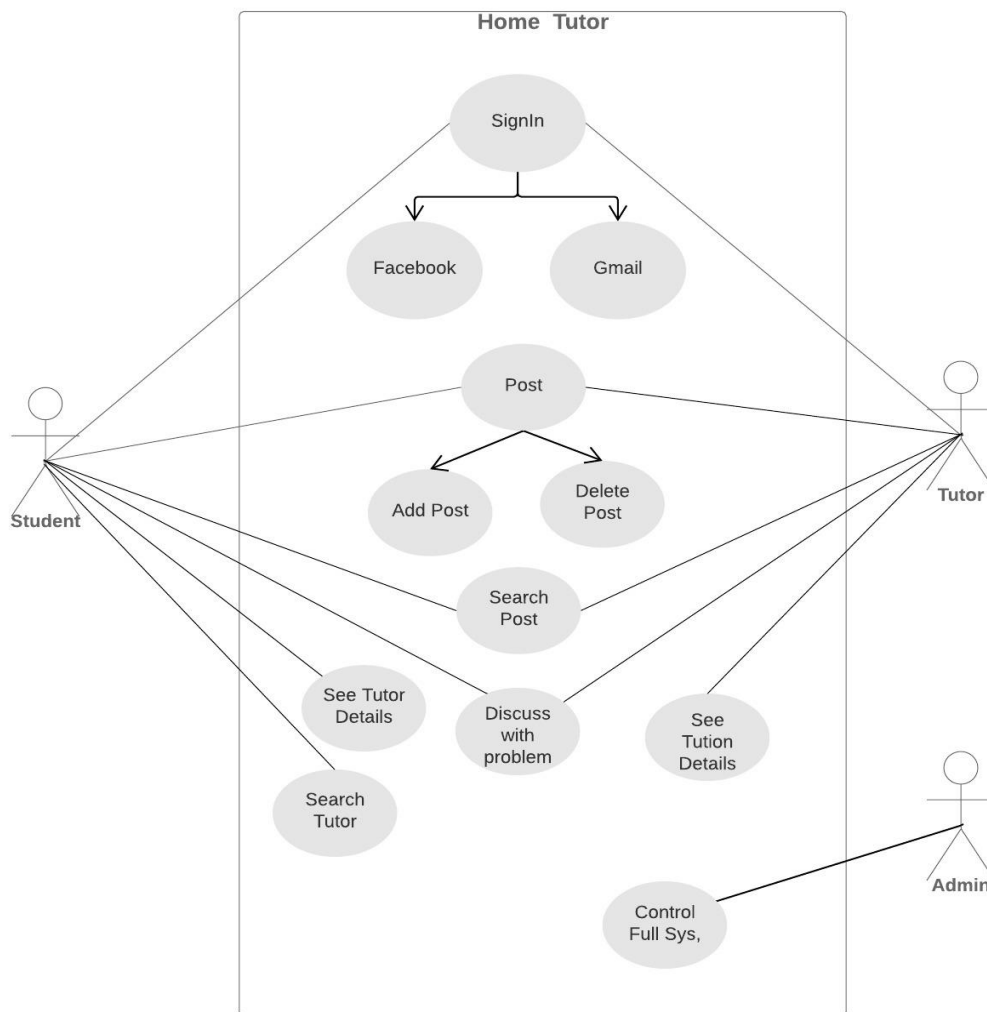


Figure 3.2: Use case diagram of Home Tutor

Use Case Description of Home Tutor

Use Case: Sign-In

Actor: Student

Pre-condition: NULL

Primary Path

- Choose sign in as student
- Fill the data fields
- Click the registration button
- Take to the home page

Alternate Path

- Didn't choose sign in as student
- Data field is empty
- Connection error

Post-condition

- If sign-in successful
- If home page is loaded

Use Case: Student Login

Actor: Student

Pre-condition: Sign-In

Primary Path

- Choose sign in
- Fill the data fields
- Click the log in button
- Take to the home page

Alternate Path

- Didn't choose sign in page
- Data field is empty
- Connection error

Post-condition

- If sign-in successful
- If home page is loaded

Use Case: Post

Actor: Student

Pre-condition: Login

Primary Path

- Add post
- Delete post

Alternate Path

- Didn't any post
- Connection error

Post-condition

- If post was loaded

Use Case: Search post

Actor: Student

Pre-condition: Login

Primary Path

- Choose search button
- Type subject or tutor name

Alternate Path

- Didn't choose search button
- Didn't typed subject or tutor name
- Typed wrong type of search
- Connection error

Post-condition

- If search is successful

Use Case: Can Discuss with Problem

Actor: Student

Pre-condition: Login

Primary Path

- Find problem
- Click on the post

Alternate Path

- Didn't solve problem
- Didn't click on the post

Use Case: See Tutor details

Actor: Student

Pre-condition: Login

Primary Path

- Find the tutor
- Click on the tutor profile

Alternate Path

- Didn't found tutor
- Didn't click on the tutor profile

Use Case: Search Tutor

Actor: Student

Pre-condition: Login

Primary Path

- Find the tutor
- Search on the tutor list

Alternate Path

- Didn't find out tutor
- Didn't search on the tutor list

Use Case: Sign-In

Actor: Tutor

Pre-condition: Null

Primary Path

- Choose sign in as tutor
- Fill the data fields
- Click the login button
- Take to the home page

Alternate Path

- Didn't choose sign in as tutor
- Data field is empty
- Connection error

Post-condition

- If sign-in successful
- If home page is loaded

Use Case: Login

Actor: Teacher

Pre-condition: Sign-in

Primary Path

- Choose login
- Fill the data fields
- Click the login button
- Take to the home page

Alternate Path

- Didn't choose sign in page
- Data field is empty
- Connection error

Post-condition

- If log in successful
- If home page is loaded

Use Case: Post

Actor: Tutor

Pre-condition: Login

Primary Path

- Add post
- Delete post

Alternate Path

- Didn't any post
- Connection error

Post-condition

- If post was loaded

Use Case: Search post

Actor: Tutor

Pre-condition: Login

Primary Path

- Choose search button
- Type tuition or subject

Alternate Path

- Didn't choose search button
- Didn't typed tuition or subject name
- Typed wrong type of search
- Connection error

Post-condition

- If search is successful

Use Case: Can Discuss with Problem

Actor: Tutor

Pre-condition: Login

Primary Path

- Find problem
- Click on the post

Alternate Path

- Didn't solve problem
- Didn't click on the post

Use Case: See tuition details

Actor: Teacher

Pre-condition: Login

Primary Path

- Choose list of the tuition

Alternate Path

- Didn't choose list of the tuition
- Connection error

Post-condition

- If tuition list was loaded

Use Case: Control Full System

Actor: Admin

Pre-condition: Null

Primary Path

- Choose the Real-time Database
- Type Firebase database connection

Alternate Path

- Didn't choose Real-time Database
- Didn't typed Firebase database connection
- Connection error

Post-condition

- Null

3.4 Logical Data Model

Logical Data Modeling is a process used to define and analyses requirement needed to support the business processes within the scope of corresponding information systems in organizations. The Entity-Relationship model or Entity-Relationship diagram (ERD) [6] is a logical data models, it includes the entity, attributes, table and relationships.

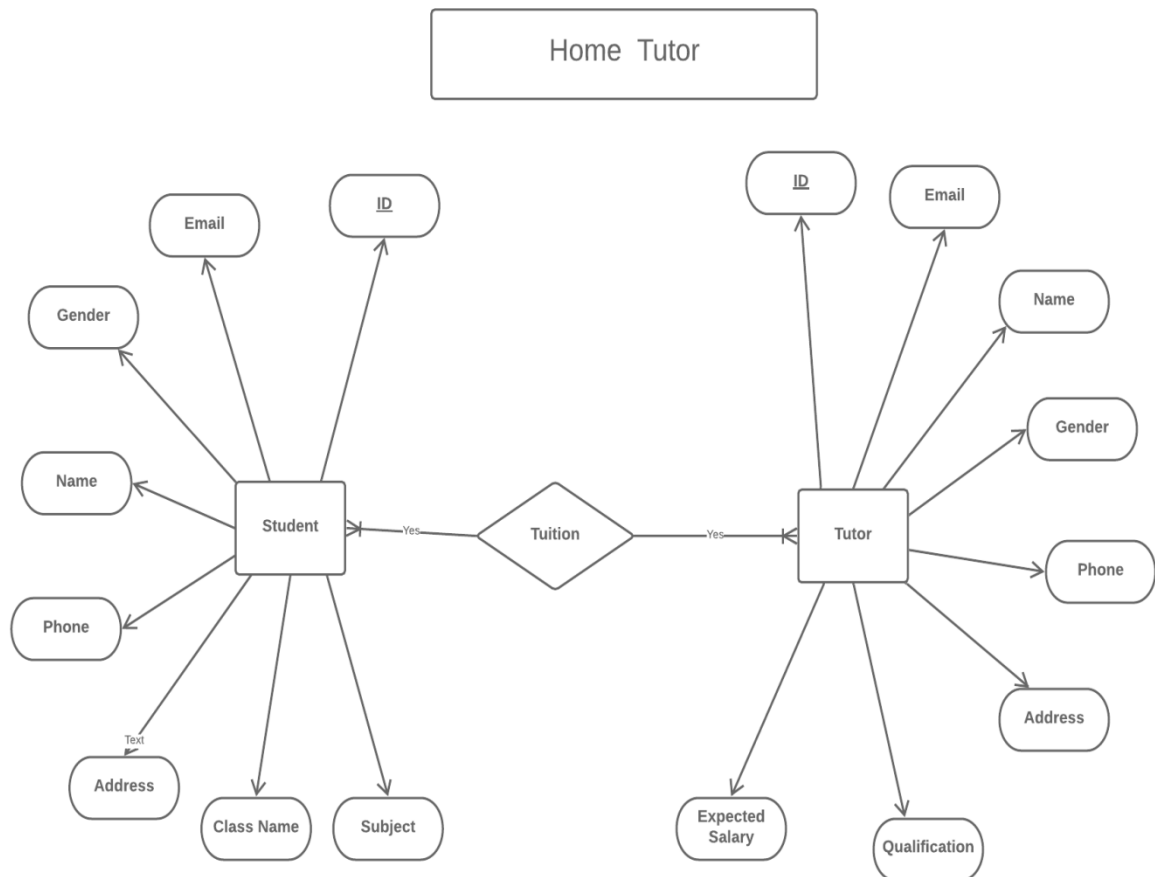


Figure 3.3: ER Diagram of Home Tutor

3.5 Design Requirements

When we design a software or system, we consider some requirements to make the project efficient. The following requirements are almost mandatory to do.

Ensure the system Easy Facile and Flexible: This system will be designed in such a easy way that the users feel satisfaction, easy way to facile and flexible to use it.

Make the system Balanced: This system must be suitable in the whole system and future maintenance.

Efficiency: The most important thing of software is its efficiency. The system must be capable to run and work with a minimal level of hardware resource available with a good use of time.

CHAPTER 4

DESIGN SPECIFICATION

4.1 Front-end Design

The front end usually designed by two parts Application design and front-end Application development. In present time, it has been cleared that there is a difference between Photoshop designed UI and XML design. It has become more significant when people start working with XML and Java [7].

Everything that we can see is a combination of XML and Java. These include things like fonts, button, notification bar, image etc.

We use XML for our application design.

4.2 Back-end Design

The backend usually designed of two parts: a server. An application and a database. If you student then you can post for want to any tutor, you usually open the tutor and interact with the frontend. Once you have input the data that needed, the application stores it in a database [8] that was created on a server.

So, in our back-end system, we create the database to store data that the server gets through users. We basically used JAVA & Android Studio for our application development.

4.3 Interaction Design and UX

Interaction Design is most important part with User Experience (UX) design. Application fruition depends on User satisfaction. How an application is more attractive to user is depends on interaction and Design part. In our application we used useful model of Interactive design.

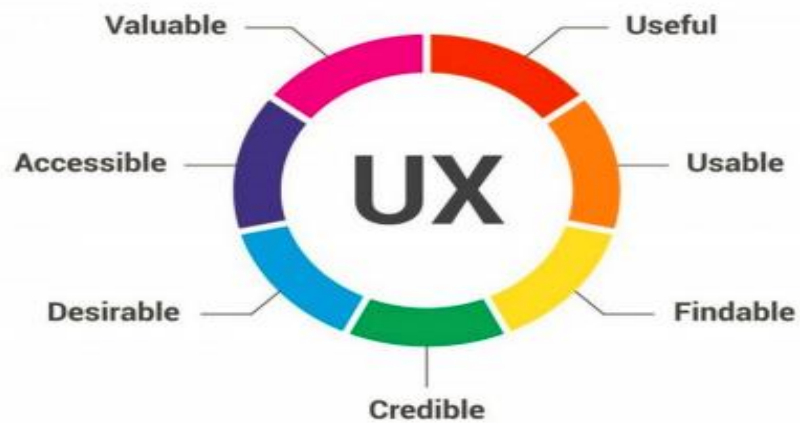


Figure 4.1: UX of Home Tutor

4.4 Implementation Requirements

The implementations Requirements was given us a very good idea. The main task of this part is to make the entire things easier, user friendly. The list of implementation requirements is given bellow;

- Easily can create account
- Easily can maintains account
- Easily can analysis account
- Dynamic pages
- Simple and User-friendly

CHAPTER 5

IMPLEMENTATION AND TESTING

5.1 Implementation of Database

We are using Firebase as the real time database for this project. As Firebase [9] stores all the data as JSON tree format, the whole database of our project is stored as JSON file. The whole database is a JSON object and the entity of the database is the children of the object. The entities have their own child JSON objects which are the instances of individual entity. These JSON objects have unique ids. In these objects the attributes are stored as key value pairs. There are also JSON arrays for multi-valued attributes. Firebase is easily traceable but there is some problem too. As this is a non-SQL database, the queries are not like regular SQL queries. There is no concept of Primary Key or Foreign Key. But this can be obtained by the design of the JSON tree. As this is a new concept in database, this seemed a little confusing but this can be a great way to store data in a large scale in near future.

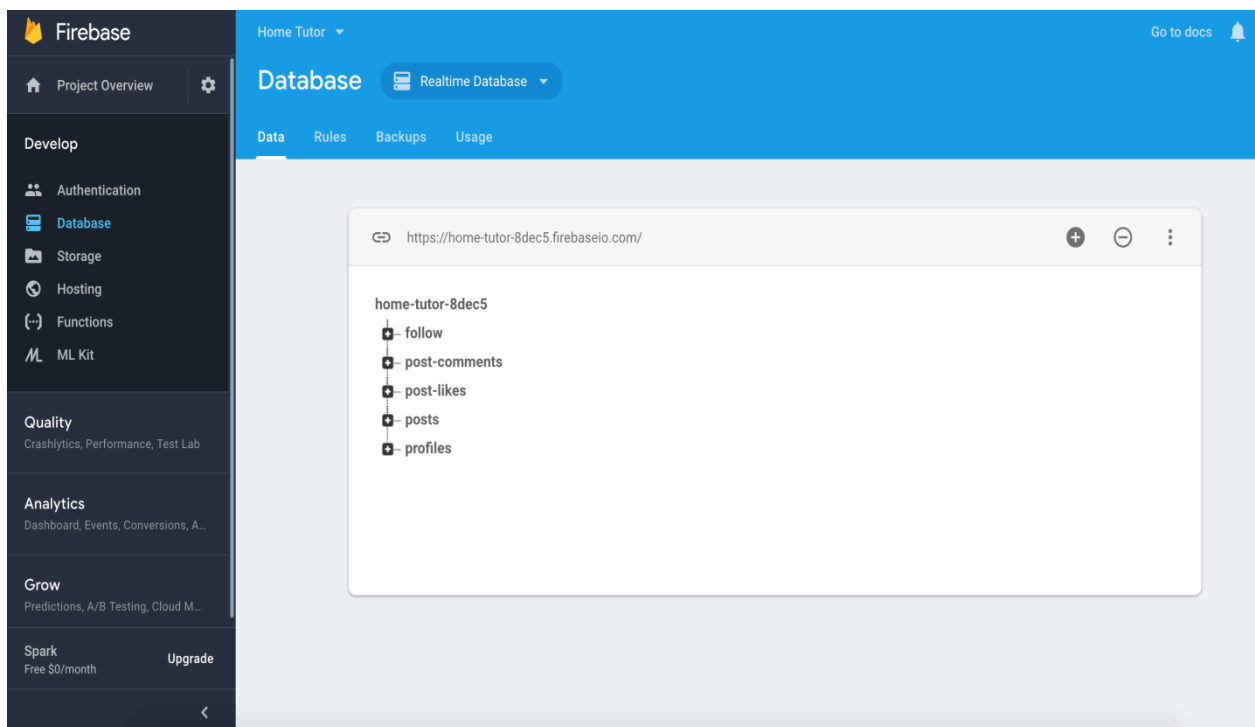


Figure 5.1: Firebase Database Connection

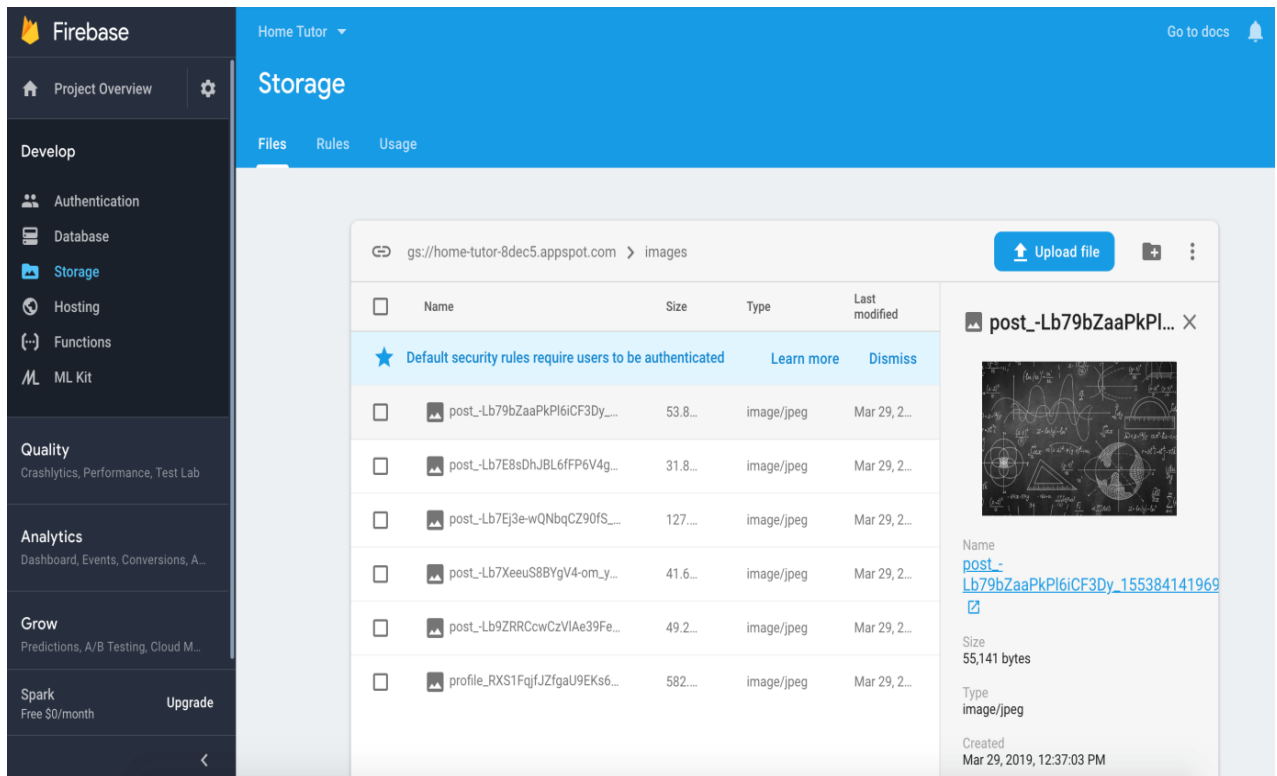


Figure 5.2: Firebase Storage

5.2 Implementation of Front-end Design

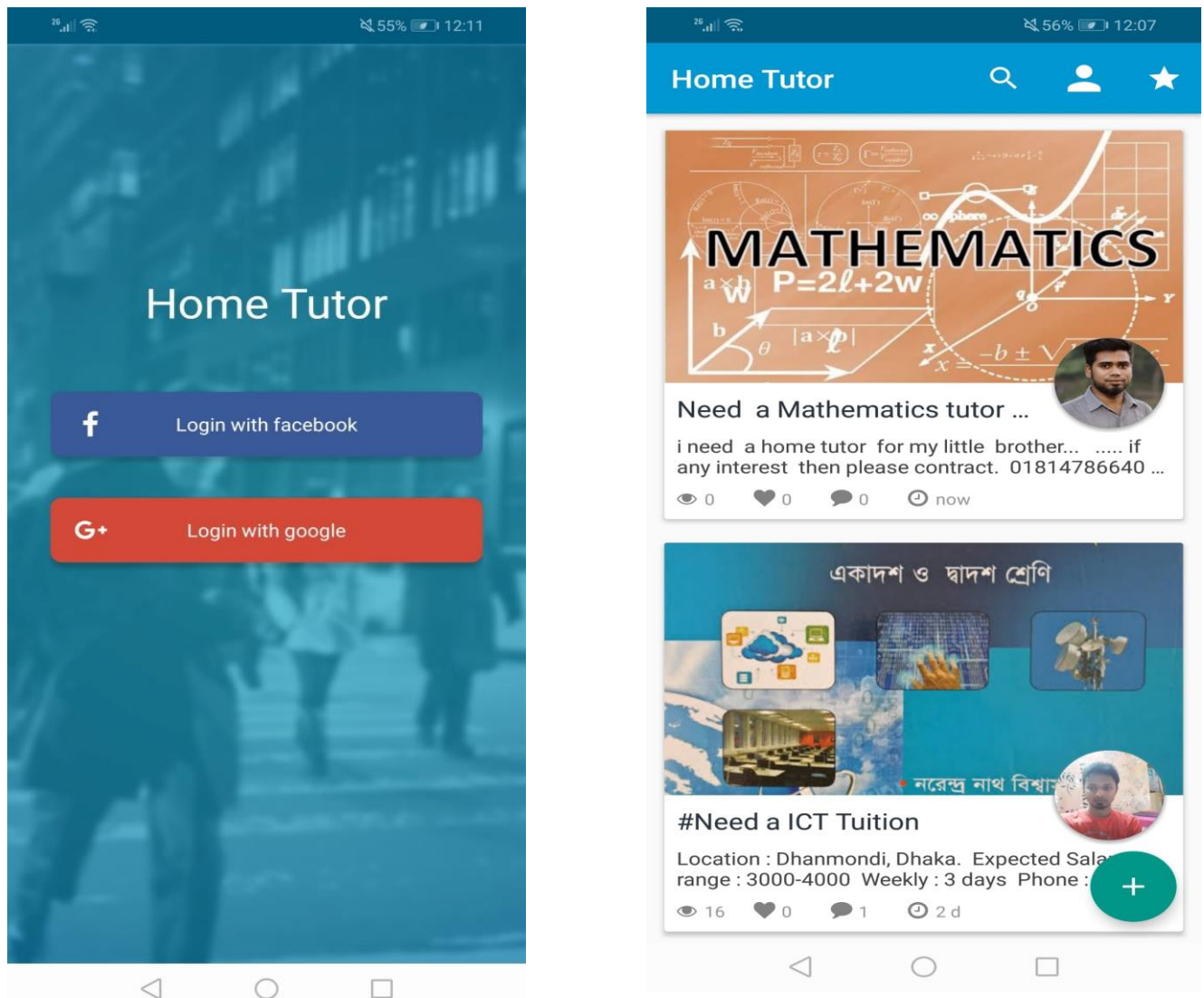


Figure 5.3: User Sign In & Home Screen

In Figure 5.3, a user need to be sign in get to access the home screen.

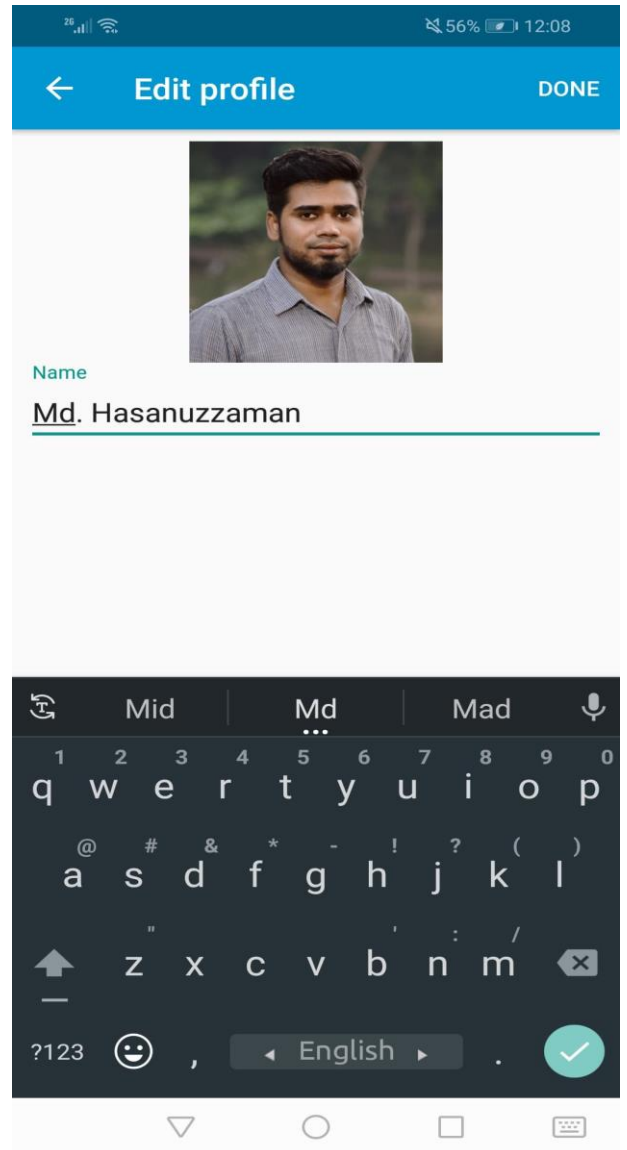
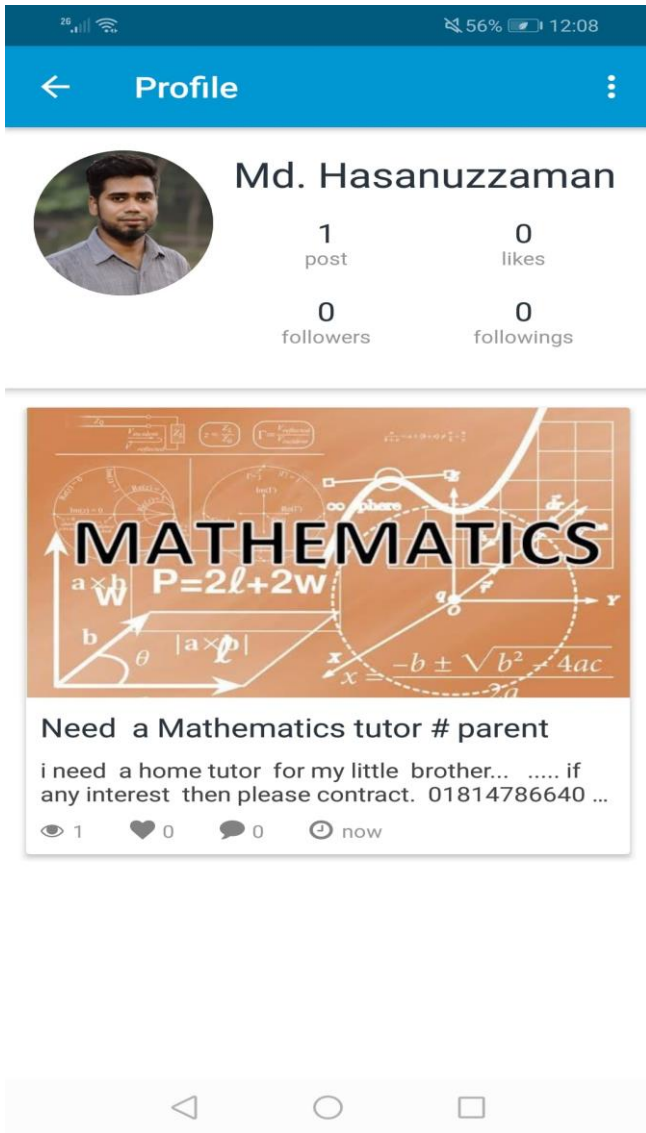


Figure 5.4: User Profile & Edit Profile

In Figure 5.4, a user can easily view his or her profile and can edit profile.

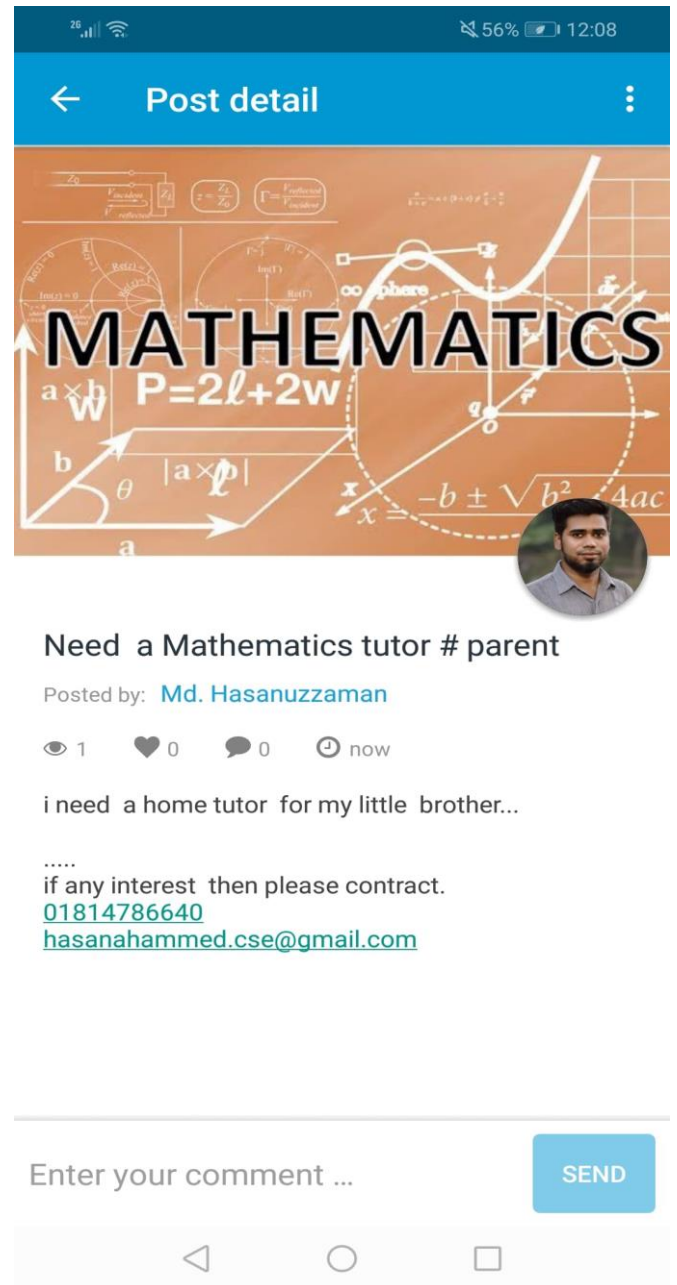


Figure 5.5: Create Post& Post by Parent

In Figure 5.5, user can create post as a parent or student.

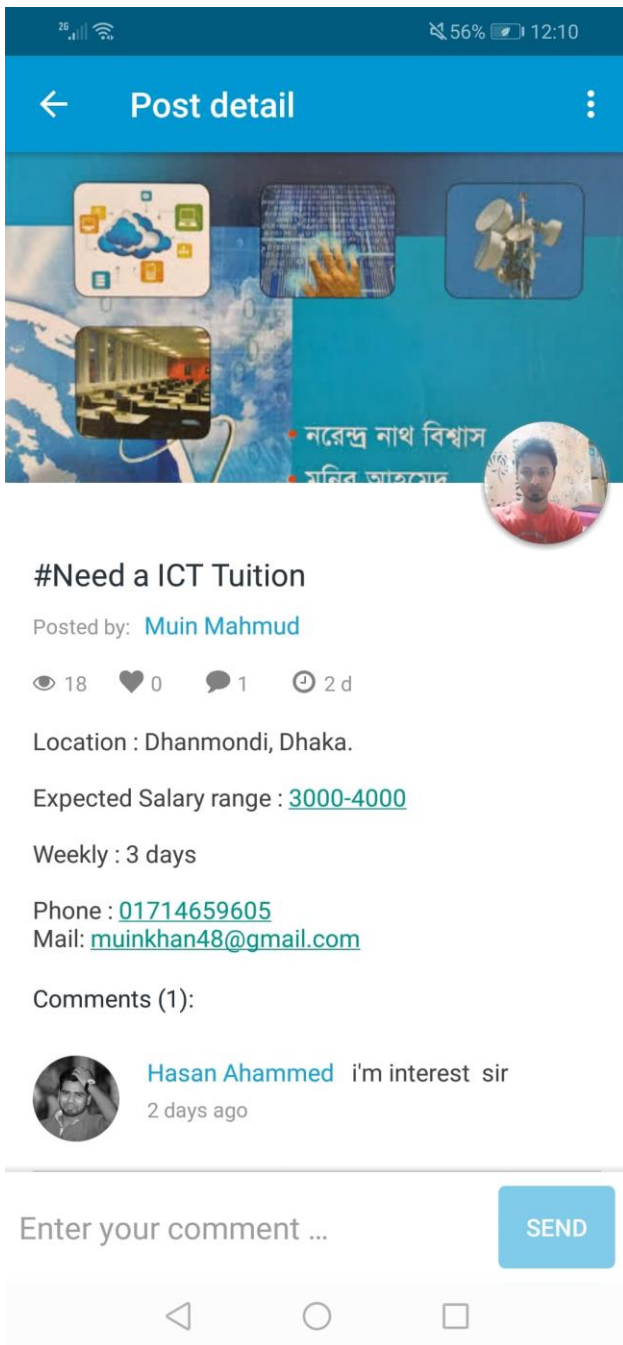


Figure 5.6: Post by Tutor & Edit Post

In Figure 5.6, Tutor easily creates a post and can edit post.

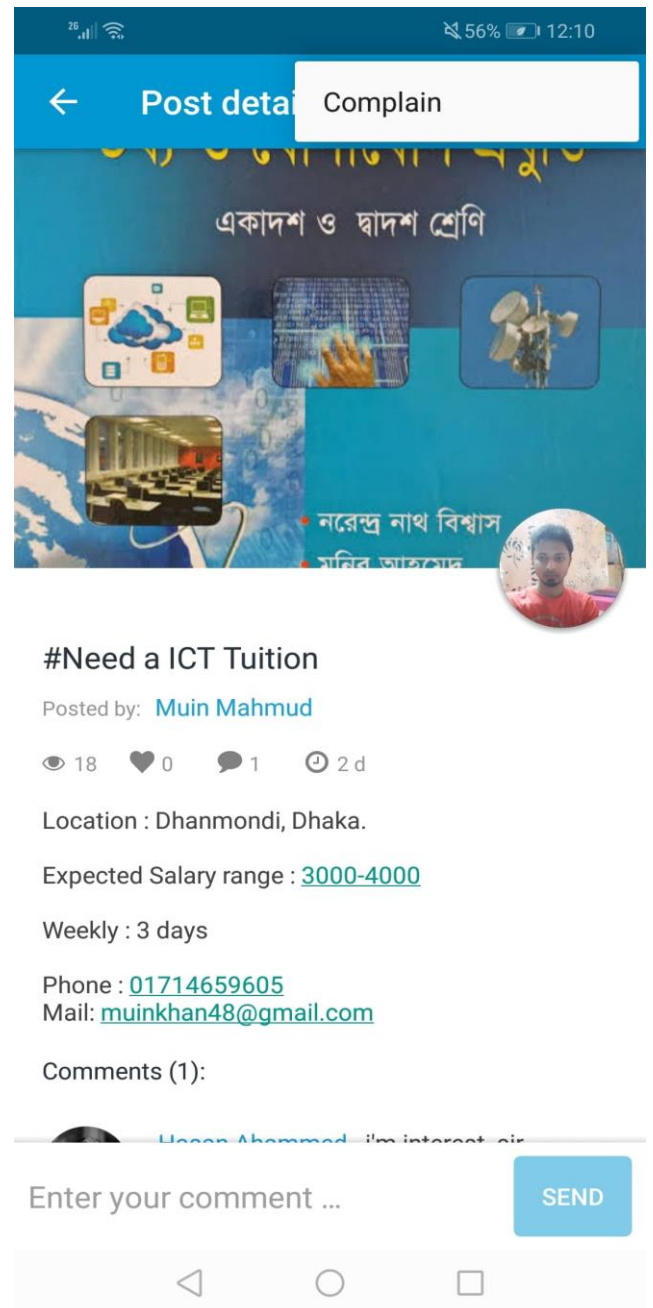
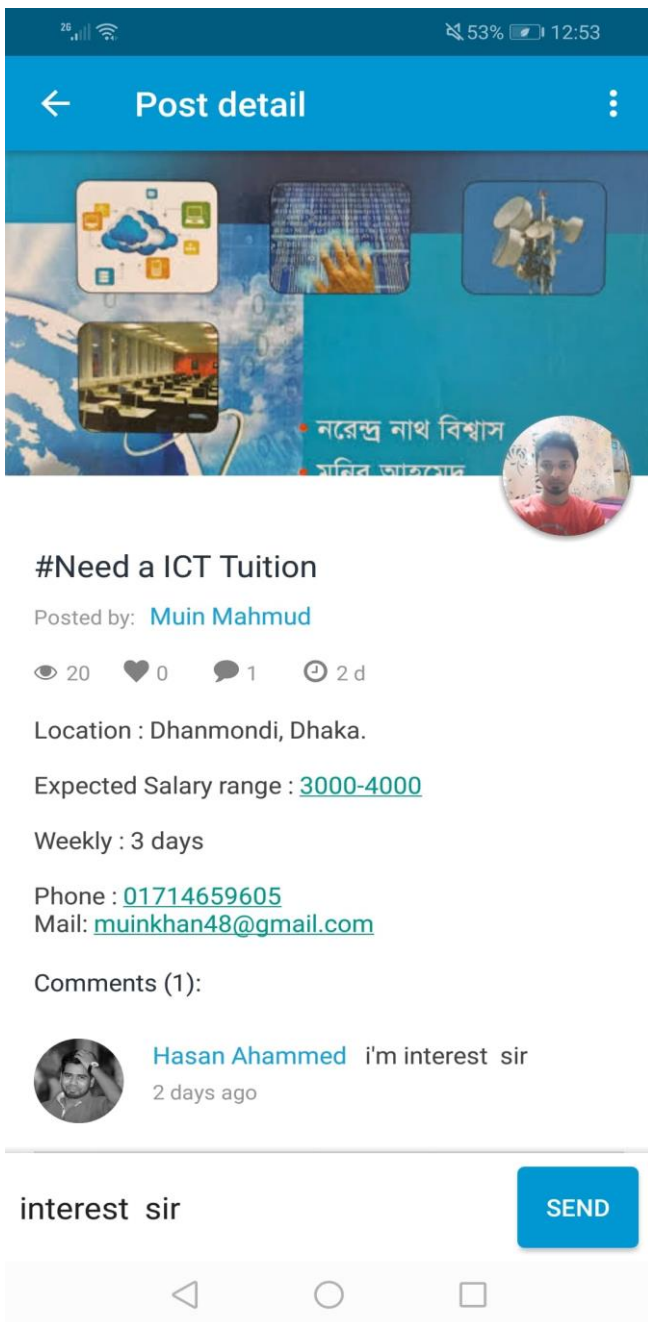


Figure5.7: Post Comment &Complain Post

In Figure 5.7, users can easily comments and complain of any post.

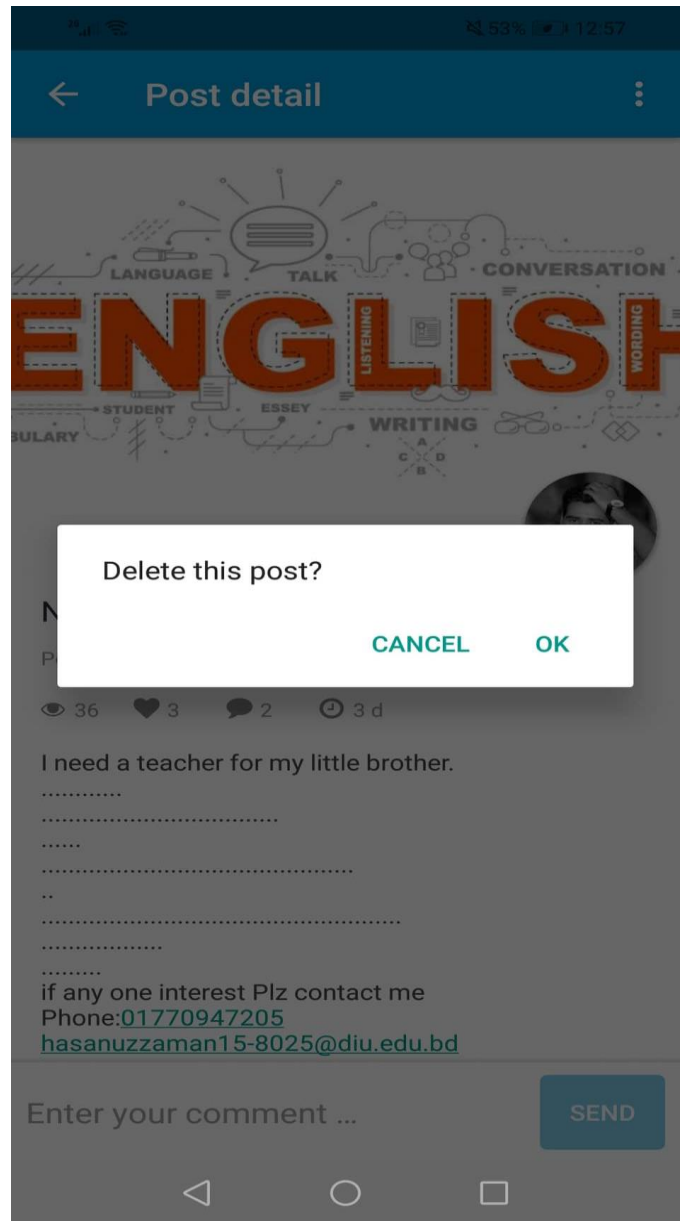


Figure 5.8: Follow Post & Delete Post

In Figure 5.8, user can follow post and delete his or her post.

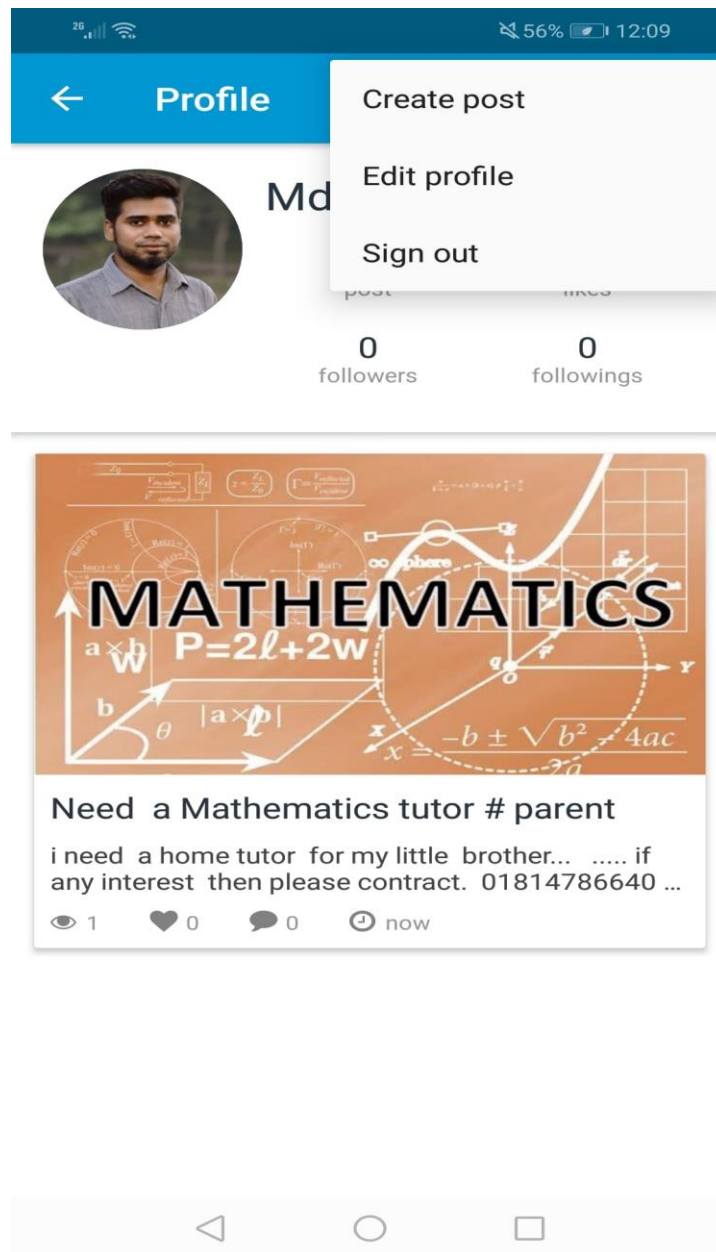


Figure 5.9: Sign Out

In Figure 5.9, user can sign out from app.

5.3 Implementation of Interactions

Interactions are the common thing in today's communication system [10]. It happens because of easy way communication Tutor and Student. When the users are on a certain page but have to do others thing which is on other activity then interaction helps us. It should be done such a way that attracts the users.

5.4 Testing Implementation

5.4.1 Testing

Testing is an essential part of any system developing project. The main goal of testing is validating the contribution, authenticity, reliability and quality of the application. This project is to implement an android based application that related to Student & Tutor communication system.

5.4.2 Unit Test

Every part of software is tasted to make sure that the design is exactly completed. This make us ensure that each part of the application run as per the requirement.

5.4.3 Unit Test Case

Unit test case can be divided into two parts. Database handler and interface handler. We use some basic function in our application that's addingpost,editpost and delete post. Database handler will check these three functions. And now our database handler test cases will be like this.

- Tutor or Student easily can add post or not.
- Tutor or Student easily can edit post or not.
- Tutor or Student easily can delete post or not.

5.4.4 Implementation Test

The final and the most significant phase is the implementation. Engage users training, system testing and successful running of developed system.

5.5 Test Result and Reports

To enhance a system's proficiency of all the tests and integration can be completed through software way where each error can be found and solved. We will be demonstrated screenshots of test results of our system in bellow.

CHAPTER 6

CONCLUSION AND FUTURE SCOPE

6.1 Discussion and Conclusion

Tutor and Student Communication System is a very exciting topic to work. After going through the work, we faced many challenging tasks that are surprisingly related to our educational system.

We researched so many communication tools that showed us the direction how to develop our system. We interact with the students that what type of problems they are facing. They were very happy to take this application as it will give them some relief in modern online era.

We talked with several teachers, took some guideline that helped us a lot to develop this application. They encouraged a lot to do this project.

Despite everything we achieved, we faced many challenges to finish this project. After all it's an online based system so in real life both teacher and student needs to follow the using rules otherwise its goal will be failed.

It's an innovative idea. The opportunities that provided through this application are huge. We interact with too many students, list their problems, try to understand the communication gap and come up with this application. Hope it will help them a lot.

6.2 Scope of Further Development

Communication system is always a changeable system. It develops day by day, getting better and better. Today what's look good is tomorrow becomes old. So, we have to update this system from time to time. It can useable not only for universities but also for all the educational institutes from all over the world. To fulfill that goal, we have several ideas to do.

1. We want to develop it for all the tuition educational system.
2. We want to make this application more suitable, flexible, user friendly, keep update the users time to time.
3. Now it has only text messaging option to its user but we want to start the voice messaging, video sharing etc.

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APPENDIX

Appendix A: Project Reflection

The purpose of this Appendix is to provide an introduction to Project reflection. The group research project was a challenging and enjoyable experience typical of the course as a whole. We have had little exposure to group work at university. So, it was a nice change to be part of an effective and dynamic team. We complemented one another quite well both in bringing together interdisciplinary perspectives and in balancing the work at hand.

The experience taught us that planning and crafting responses takes a longer time in teams than on your own. The extensive effort required was ultimately a good thing. When working alone, we can end up with a result that is identical to our initial plans. In our group we are constantly developing and refining one another's ideas. It was fascinating just how productive our group meetings were. The time seemed to fly and yet we always got a lot done and manage to help another along the way towards the end point of having a substantive policy.