Major Project Report on

PRASNOTTAR: E-Learning Class Module

Submitted in partial fulfillment of the requirements for the degree of

Bachelors of Engineering in Computer

under Pokhara University

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Last, but not the least, we would like to thank our teachers and colleagues who have been knowingly or unknowingly the part of this project with their views during the entire development time.

ABSTRACT

Prasnottar: E-learning Class Module is an android-based question answer application that is designed to provide users specially students with a platform to ask questions and get answers. Sometimes students get confused with small things. They can seek help from teachers and friends. But teachers and friends may not be available all the times so Prasnottar will be the one they will seek for. Surfing through the internet is the easiest way nowadays but the same internet might be insecure to share the information so Prasnottar assures security as well. Questions can be asked by any users and multiple users can answer the questions if they know it. Feature of chatting will be integrated as well so that anyone can freely interact with tutor regarding their doubts. Prasnottar will have the study materials feature where anyone can share their for the purpose of sharing knowledge.

Pranottar is intended to be user friendly android application being developed with the Django RestAPI as backend and Android Studio as frontend. There are other many similar platforms for QA, so combining advantages and improving disadvantages this project have been proposed.

Keywords: Prasnottar, RestAPI, QA, Study materials, Tutor

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LIST OF ABBREVIATIONS

DFD: Dataflow Diagram

QA: Question Answer

SDLC: Software Development Life Cycle

ER: Entity Relationship Diagram

UI: User Interface

IDE: Integrated Development Environment

M: Many

UML: Unified Modeling Language

API: Application Program Interface

REST: Representational state transfer

1. INTRODUCTION

Prasnottar: E-learning class module is an android based networking application that provides the user with ease to sharing and gaining the knowledge about different subject matter. This project deals with asking and answering the questions and queries of students of different programs. It also contains various notes uploaded by tutors of different programs and subjects. Here, a student can also become a tutor if they want to, so that knowledge can be shared to others. In this section, problem and motivation, objectives and project scope and limitations will be described in detail.

1.1.PROBLEM STATEMENT

With the advancement in the technology, android has been one of the most effective platform for day to day applications . In the existing system, the students need to wait for teachers in order to ask questions. However, if the teacher is not able to provide appropriate time to the students then they are oblige to rely on internet to find the answers. In such cases, the students browse various sites to view the answers and may be involved in involuntarily sharing their personal information to unknown websites. They may not obtain notes according to the syllabus or they may not understand the contents.

Mostly, during the examination time, students may get confused about the information given in websites since they appear to be very complex to understand. Similarly, students may become quite busy in their own study as a result of which they don't get enough time to response to others queries.

1.2.OBJECTIVES

The drawbacks mentioned in problem statements need to be solved, for which a new and easier method to better link the teachers and students needs to be derived. Prasnottar : e-learning class module is such an app where the students can present their queries and receive answers from the users. Following are the objectives of this project:

1. To develop app for asking and answering the questions related to various faculties of the college and upgrade knowledge.
2. To upload and download necessary notes.
3. Develop an interactive android application with user friendly search interface.

4. To allow people to communicate to increase flow of information among them.

1.3.PROJECT SCOPE AND LIMITATIONS

The scope of this project is to provide user with all the services through an android-based networking service. In this project, an app will be developed where users of the college will be able to ask and answer questions, as well as, upload and download notes.

1.3.1. SCOPE

i. The targeted people are the teachers and students of the college.
ii. This app can be modified and used for various college/school or even universities.

1.3.2. LIMITATIONS

i. This is only app not a website.
ii. This app is mainly focus to students.

1.4.SIGNIFICANCE OF STUDY

This project is proposed with the intention to develop an Android Application of the QA platform where users can ask the questions of their concern and obtain answers from other users. The existing platform provides the QA platform however this project will have some additional features regarding the study materials and chat feature. So this project is meant for providing user friendly Android application in efficient way.

2. LITERATURE REVIEW

2.1.PREVIOUS SIMILAR WORKS

Quora is a Q&A platform that empowers people to share and grow the world's knowledge. People come to Quora to ask questions about any subject, read high quality knowledge that's personalized and relevant to them, and share their own knowledge with others. Quora is a place to share knowledge and better understand the world. [5]

Pros

- In Quora application you just not become a good reader but also becomes a good writer. [6]
- It always find very effective answer for your questions which is written on the basis of true experience and event. [6]
- An additional feature here is that you can create your own blog, group where you can share articles and lift up your and others' life. [6]

Cons

- There is no service to search inside this answers. [4]
- Sometimes get comment without notification about it. [4]
- There is no option to prevent flow of answer request from people that are not follow. [4]

Stack overflow is a network of question-and-answer websites on topics in diverse fields to enable users to post questions and answer them. Users can vote on both answers and questions, and through this process users earn reputation points. Users can also add comments to the questions and answers, as well as, edit text written by others. [2]

Pros

- It helps to ask questions, get answers, no distractions. [2]
- Tags make it easy to find interesting questions. [2]
- You earn reputation when people vote on your posts. [2]

Cons

- The web page blocked user if they didn't have enough reputation as a new user . [7]
- Its biggest weakness is that it is not a very good platform for facilitating discussions. [7]
- Its second biggest weakness is the unbalanced reputation system. [7]

Yahoo Answers is one of the most popular Quora alternatives. It's free to sign up for, and includes a sort of "game" system where you gain points for answering other people's questions. This increases the number of questions that you can ask or answer per day. [3]

Pros

- You are able to ask any question. [1]
- You are able to get any answer, whether it's the best or the worst. [1]

Cons

- Yahoo Answers isn't quite as professional or heavily-moderated . [3]
- Certain questions may be poorly formed or trivial, and answers may not necessarily correct. [3]
- There is often a limited amount of time to answer a question. [3]

3. TEAM MEMBERS AND DIVIDED ROLES

Name	Roles	Responsibilities
Ashmita Bhatta	Backend developer	• Development of the backend API and testing.
	Documentation	• Development of documentation.
	Database	• Timely review of database data.
Saruna Maharjan	UI Designer	• User friendly interface for Android device.
	Frontend and backend developer	• Integration of backend API to frontend Android and testing.
	Documentation	• Development of documentation.
Shrena Bajiko	Backend developer	• Development of the backend API and testing.
	Documentation	• Development of documentation.
	Database Management	• Manage Database data.

Table 1: Divided roles and responsibilities

4. METHODOLOGY

In this section we have described about the method that we will be using to meet the requirement of the project.

4.1.SOFTWARE DEVELOPMENT LIFE CYCLE

The model to be used for developing of this project is Iterative model of SDLC. Iterative model is simple and emphasizes on initial and simple implementation and with progress in the project it gains more feature. It is advantageous since it has unique feature of repetitive nature i.e. during development phase one can go back to check out the previous works without any complications and flaws can be improved if any. Further explanation about the model has been described below.

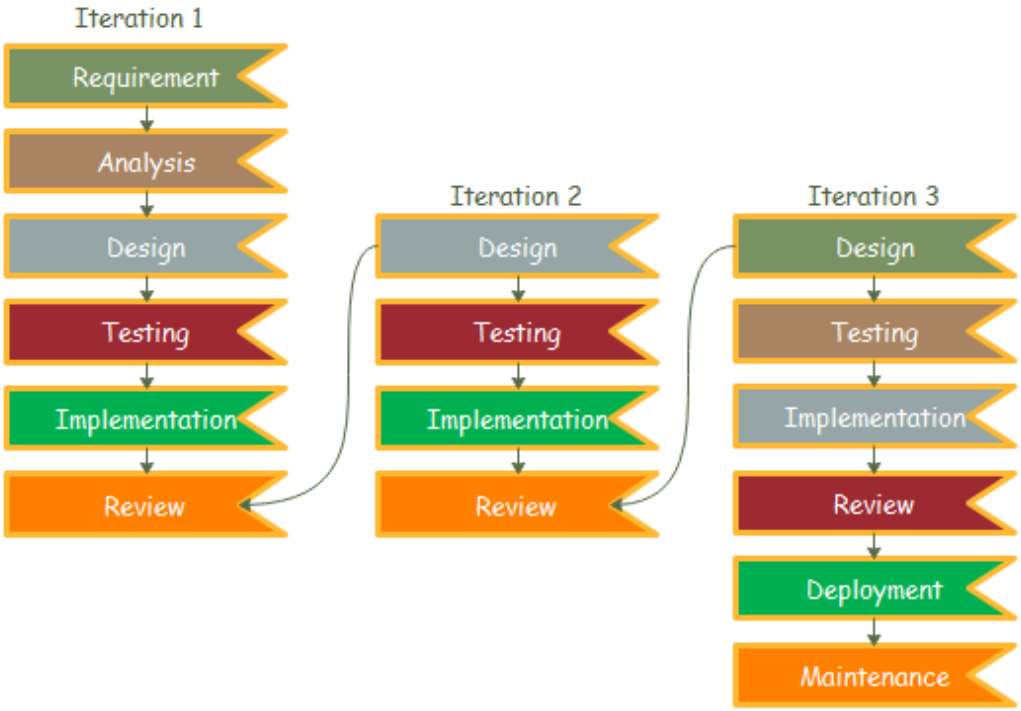

Figure 1: Iterative model of software development life cycle

4.1.1. REQUIREMENT PHASE

In this phase, all the necessary requirements are analysed. Till now necessary requirement for further analysis of project is gathered from end-user, Internet and teachers. And as a result, final specification of the project will be gained.

4.1.2. ANALYSIS AND DESIGN PHASE

In this phase, the specification gathered is designed as per the requirement. Further the database models, technical requirement and the logic will be implemented in the project.

4.1.3. IMPLEMENTATION

After the analysis and design the coding is done according to the specifications. Coding is in progress and hence a working system will be obtained in this phase.

4.1.4. TESTING

Once a system is developed series of testing will be performed in order to remove bugs and errors. Till now some of the functionalities have been developed and tested which is described below in the testing section of this project. Also in this phase certain changes, if necessary, will also be applied to obtain complete and successful system.

4.1.5. EVALUATION

Evaluation is the last step performed after all the prior steps, where the project will be evaluated to check if it meets the specification or not.

Our project which implements iterative model comprises of three iterations which are discussed below:

- **ITERATION 1: Develop Full-fledged Android Application**

  In this phase we focused on the analysis and design of our system with the help of the objectives of our project. A full-fledged android application was developed at this phase. We developed an initial project plan to help us in our future iterations. The system which is an essential part was developed in this iteration. The artifacts to be produced in this phase are:

  - Actors and use cases

- System Modules
- Risk Assessment
- ER Diagram
- Context Diagram
- Activity Diagram
- Feasibility Study

The modules created during this phase are:

- Login
- Sign up
- Profile
- Ask and answer questions
- Search questions

- **ITERATION 2: Recommendation**

  In this phase, we worked on validating the system architecture with our backend. Some conclusions from the previous iteration were helpful in the further development of the system. Here, we seek to develop a platform that seeks to predict the "rating" or "preference" that a user would give an item, especially the question. Recommendation Systems produce a list of recommendations in either of the two ways – Collaborative or Content-based filtering. We seek to build a model from the user's past behaviour as well as similar decisions made by the other users. However, due to time-constraint and insufficient resources, we couldn't implement Recommendation Algorithm in this version.

- **ITERATION 3: System Deployment**

  In this phase, we worked on finalising our deployment of the Android system for the initial part. We also made few changes to the system architecture as per our need. The artifacts to be produced in this phase are:

  - Class diagram
  - Integrated System Module

4.2.WHY ITERATIVE MODEL?

- Requirements can be changed if necessary by going back to the previous phases without any effect to the further ongoing process.
- This project is based on API so, iterative testing and implementation is required.

4.3.TOOLS USED

TOOLS	PURPOSE
Android Studio	Official IDE for Android App Development
Github	To manage Source Code
Adobe Photoshop CS6	Logo Design
Pycharm	Text Editor for backend
Android device	For Testing

Table 2: Tools used

4.4.TECHNOLOGIES

- Rest API used as functioning backend.
- Java for the backend and frontend development in Android studio.
- Django framework for the development of backend API.
- HTML for the form development of API.
- Sqlite3, for database to store all application data.
- JSON, to transmit data objects consisting of key-value pairs.

5. REQUIREMENT ANALYSIS

Requirement analysis, in software engineering encompasses those tasks that go into determining the need and conditions to meet for a new or altered product, taking account of possibly conflicting requirements of the various stakeholders, such as beneficiaries and users.

5.1.SYSTEM REQUIREMENT SPECIFICATION

5.1.1. FUNCTIONAL REQUIREMENTS

ID	REQUIREMENT	PRIORITY
1	User is able to view questions	High
2	User is able to view answers	High
3	User must be logged in to ask or answer questions	Essential
4	User can manage profile	Optional
5	User is able to sign out of the application	Optional
6	User must be connected to the internet	Essential
7	Provide an interface for the user to search and view the questions	Essential
8	User is able to view notes	Low

Table 3: Functional Requirements

5.2.NON FUNCTIONAL REQUIREMENTS

The correct specification and adherence of non-functional requirements similarly plays at least an equal, if not a greater role in the success of mobile applications. This is due to the following reasons:

Mobile devices are uniquely constrained in several dimensions such as the processor speed, memory, multi-tasking support, available network bandwidth, screen real estate, etc. These constraints translate into strict bounds being imposed on the operating characteristics of an application running on a mobile device.

ID	REQUIREMENT	PRIORITY
1	The system works on Android Phone	Essential
2	The application should be user friendly	Essential
3	Applications need to operate successfully within a wide spectrum of operating conditions, such as a range of supported screen resolutions and form factors, network bandwidth situations and network types, etc.	Desirable
4	Application should emphasize on High Performance, High Responsiveness, Good Scalability, Good Usability, High Reliability, Good Security, Modifiability and Maintainability.	Desirable

Table 4: Non-functional Requirements

5.3.INPUT REQUIREMENTS

Data Required

The data to be input are:-

- User information

  This contains user's full name, username, email and password.
- Questions

  This contains the question details input by the user.

Source of data

- The information will be given by user themselves.
- Recommender System.

5.4.INPUT LIST AND VALIDATION

The user inputs, for each, are categorized on the basis of entry by the user. They are tabulated below along with data description, validation and data length which would be helpful in Design Phase.

S.N.	INPUT	DATA TYPE	LENGTH	DESCRIPTION
1.	Username	Character	30 characters	It is the username that is addressed by the web application
2.	Email	Character	30 characters	It is the mailing address of the user
3.	Password	Character	15 characters	It is the password of the user for the system

Table 5: Input list and validation

5.5.OUTPUT REQUIREMENT

The user requires following outputs from the system:

1. The questions and answers related to their course of study.
2. The notes of the course.
3. The medium to personally contact the tutors.

5.6.SECURITY REQUIREMENTS

Users are to sign up and then only get access to the information regarding the notes, questions, answers and tutors that are related to their course. Therefore each user has been given their own account with username and password to login. Password informations are kept safe from intruders as well as those who are authorized to manage database only.

6. SYSTEM DESIGN AND UML MODELS

6.1.SYSTEM ARCHITECTURE

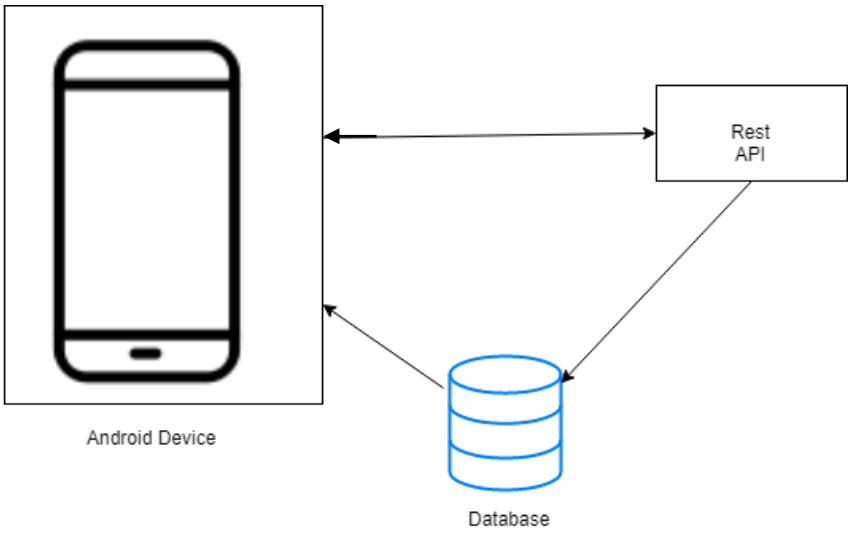

Figure 2: System Architecture

Above architecture skeleton shows overview of the concept used in this project. Rest API is the backend for the project which will be consumed in Android platform. The Rest API contains the database of the project. Similarly, the database data will be displayed in the device. The device retrieves the Rest API for functioning of various entities.

6.2.USE CASE DIAGRAM

A use case diagram summarizes the relationship and use cases between user and the system. There are altogether three actors: user, system and admin. The below figure depicts the relationship between these actors.

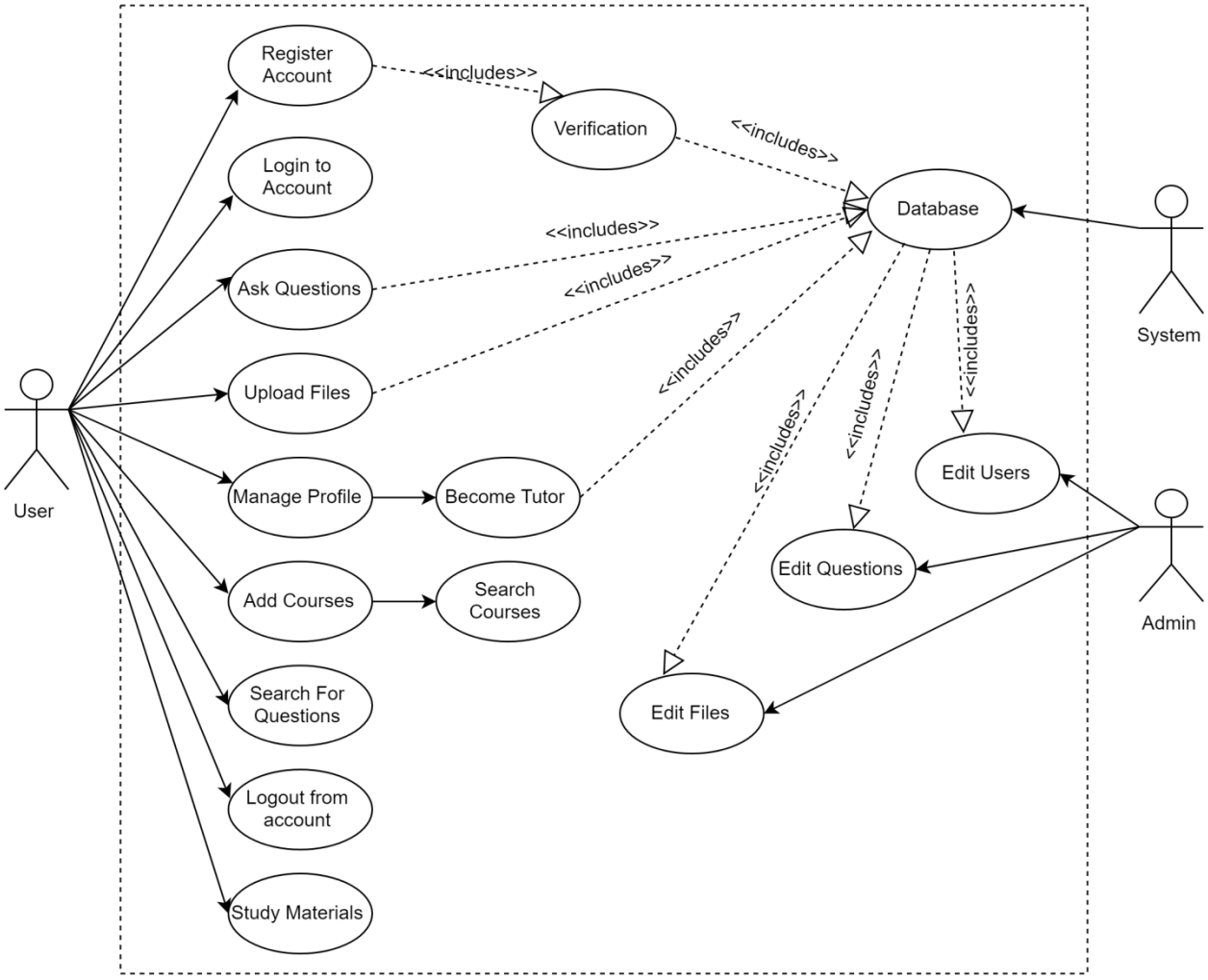

Figure 3: Use Case Diagram

6.3.ER DIAGRAM

ER diagram pictures detailed relationship existing between various entities of the project. The entities are represented in the rectangle, their attributes are represented in the oval and the attribute that are underlined are the primary keys in the below figure.

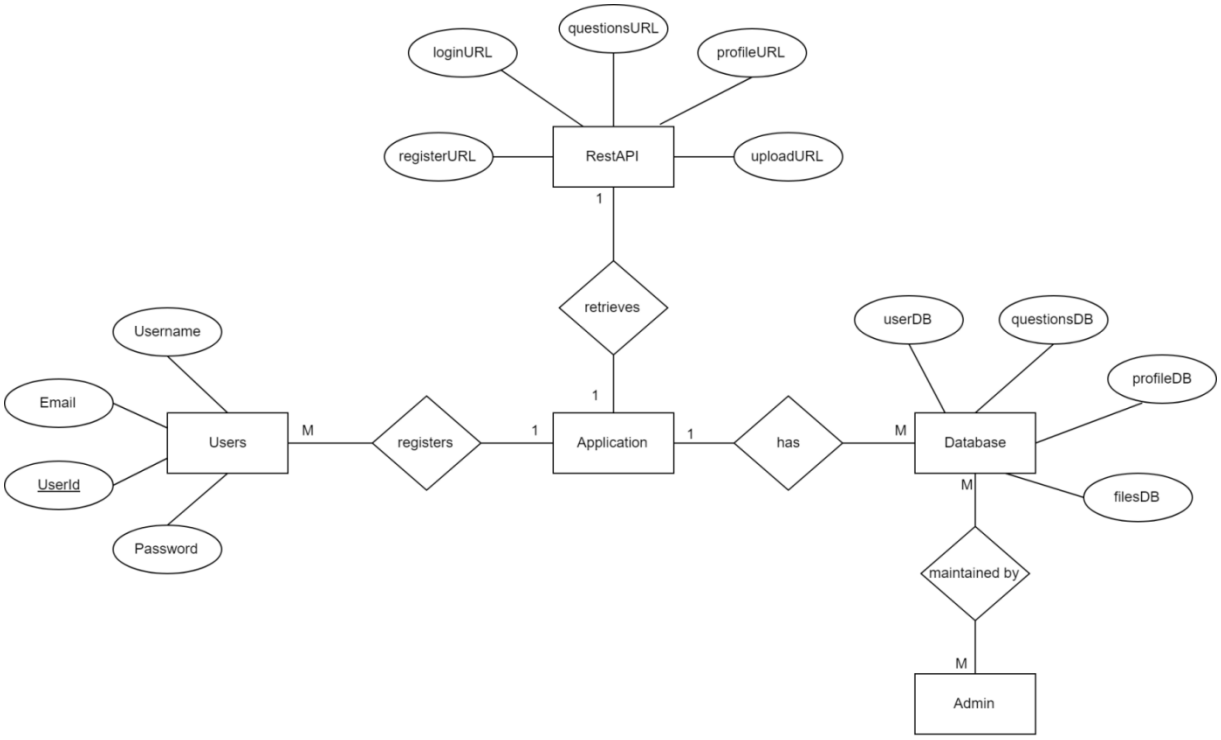

Figure 4: ER Diagram

6.4.CONTEXT DIAGRAM

The Context diagram shows boundaries of the system and also depicts the flow of information among entities. The diagrammatic representation is as below:

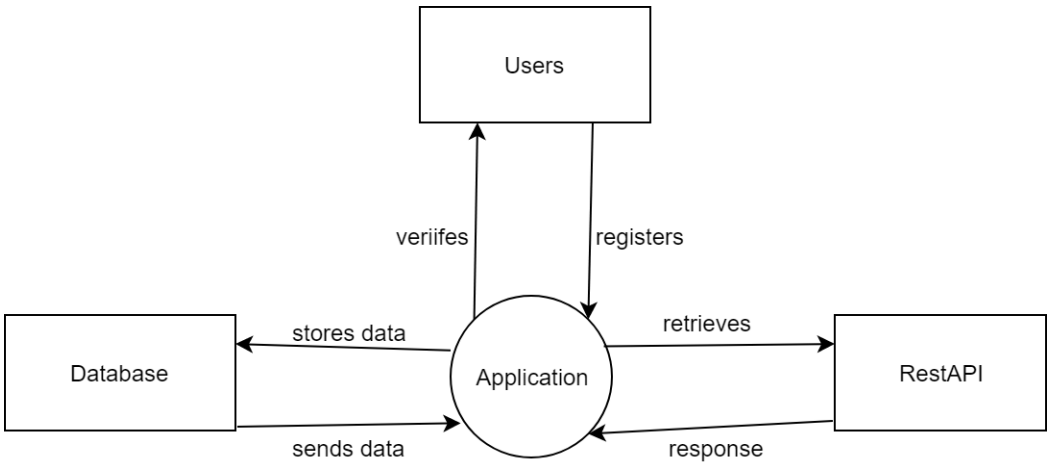

Figure 5: Context Diagram

6.5.DATAFLOW DIAGRAM

Through Dataflow Diagram it is clearer to understand the general overview of the project and the diagrammatic representation of the DFD is given below:

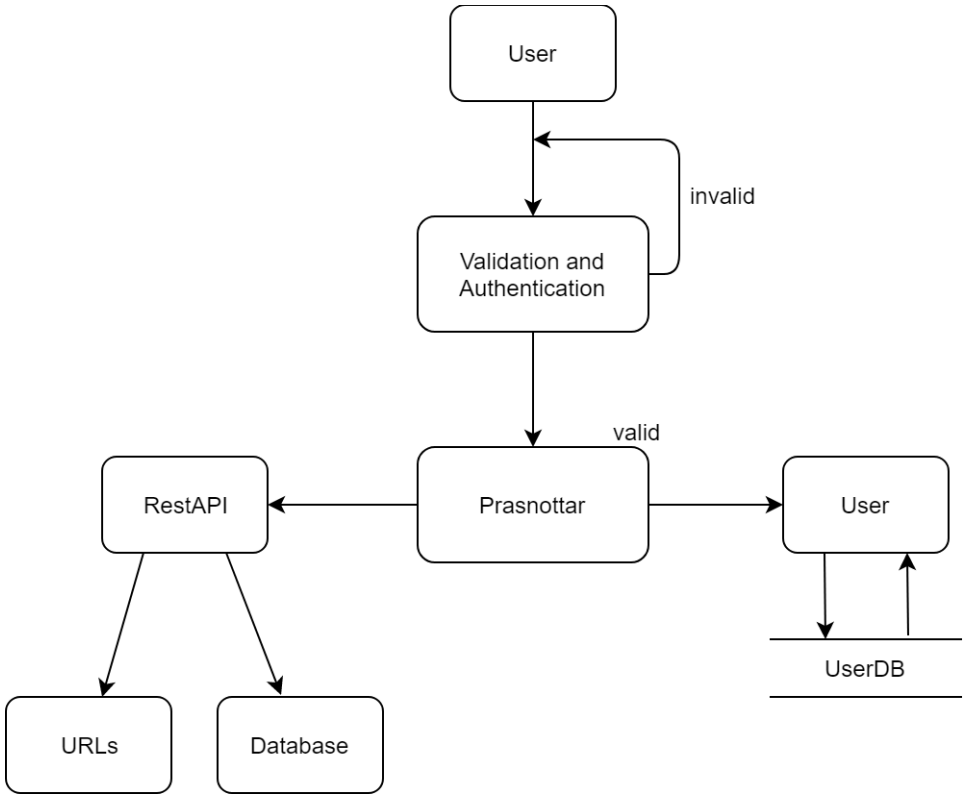

Figure 6: Dataflow Diagram

6.6.DOMAIN MODEL DIAGRAM

The domain model given below shows both the relation among the systems and the particular tasks performed by the systems. The relation is shown as 1(one) and *(many). Like; application has one-many relationship with the users.

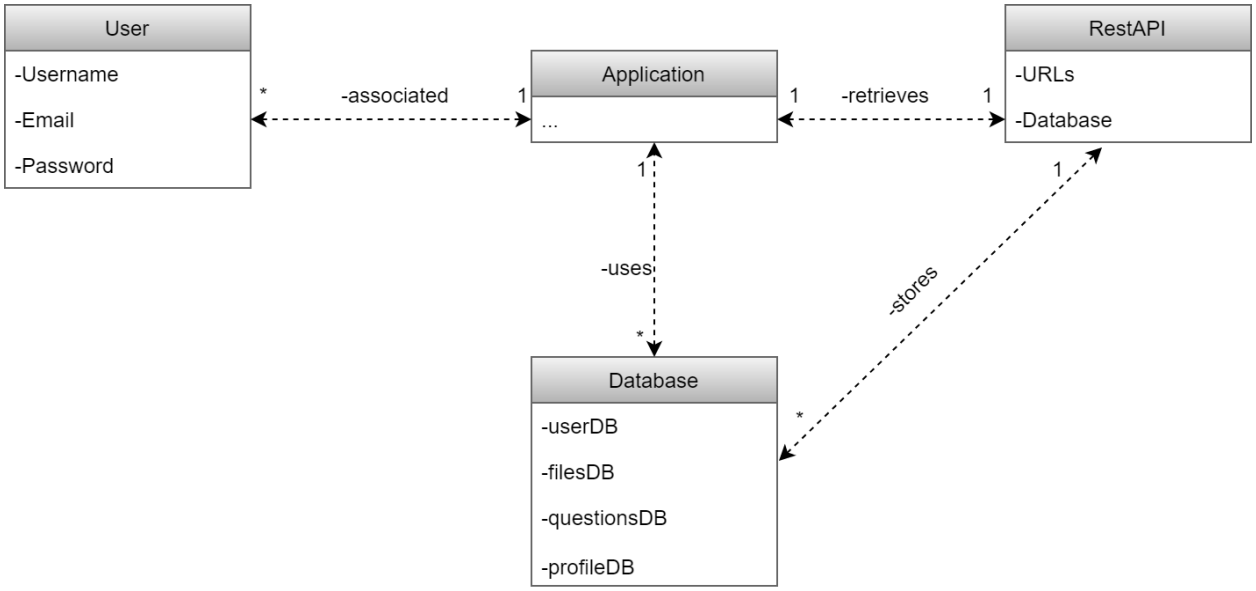

Figure 7: Domain Model

6.7.ACTIVITY DIAGRAM

6.7.1. ACTIVITY DIAGRAM FOR ASKING QUESTION

The below figure gives detail about the workflow and sequences of activity. There is user, database and application involved while asking the questions and the detailed activity is shown as:

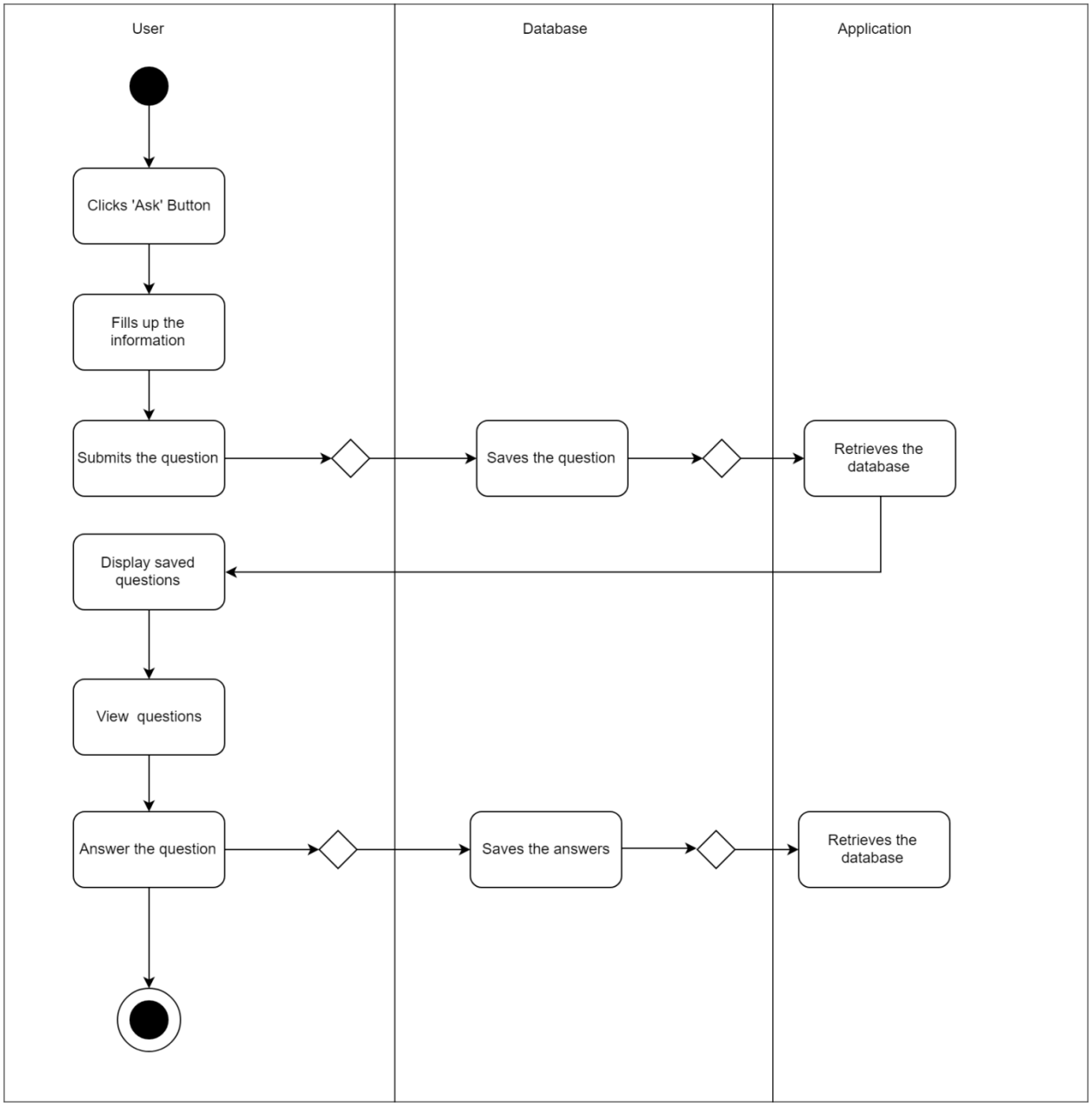

Figure 8: Activity Diagram for 'Ask'

6.7.2. ACTIVITY DIAGRAM FOR UPLOADING

Similarly, the below figure shows how user upload's task is carried out throughout the system and database.

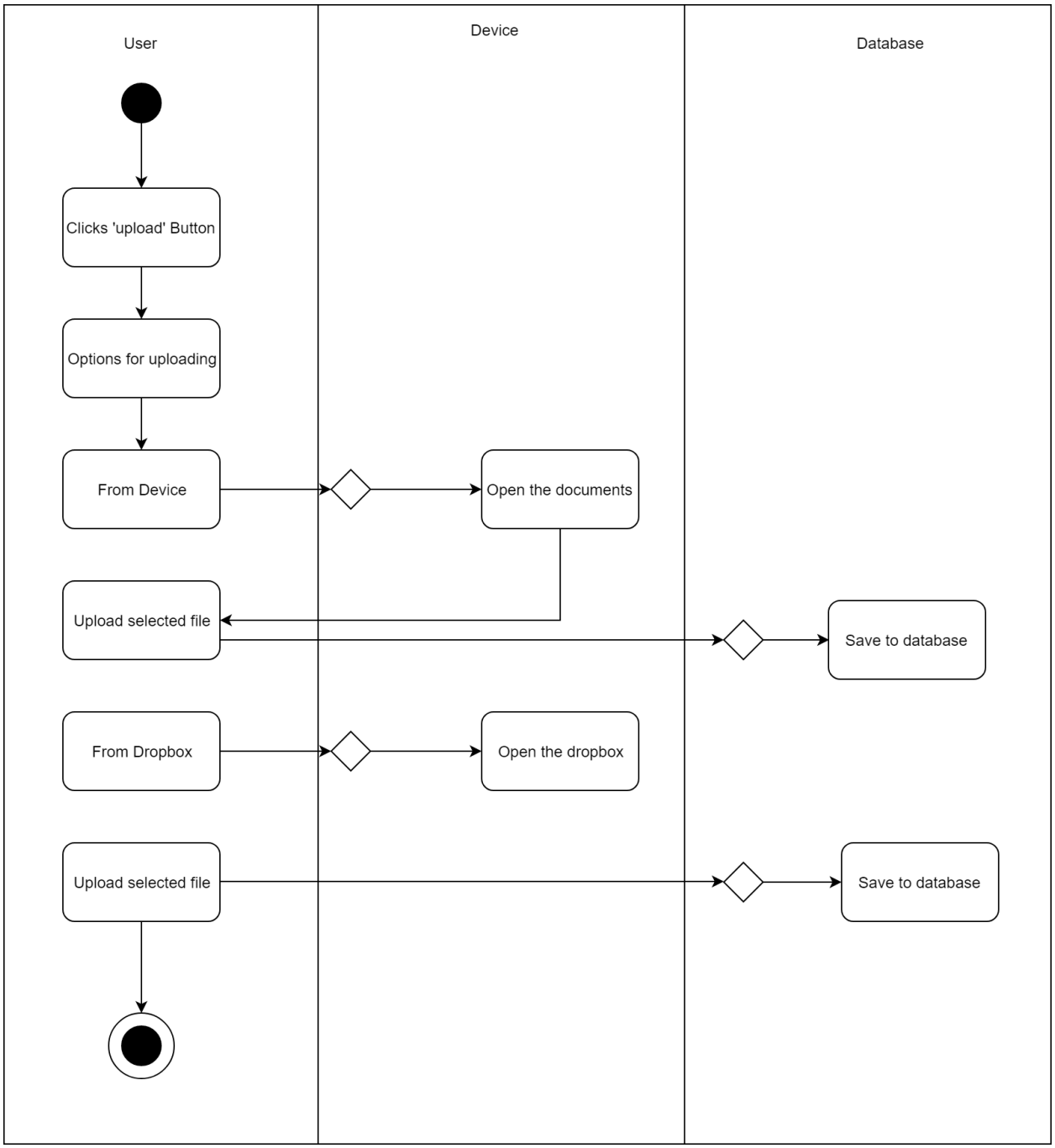

Figure 9: Activity Diagram for 'Upload'

6.7.3. ACTIVITY DIAGRAM FOR PROFILE ACTIVITY

In profile activity, User's can update their profile and add themselves as a tutor. Detail is depicted in the figure below.

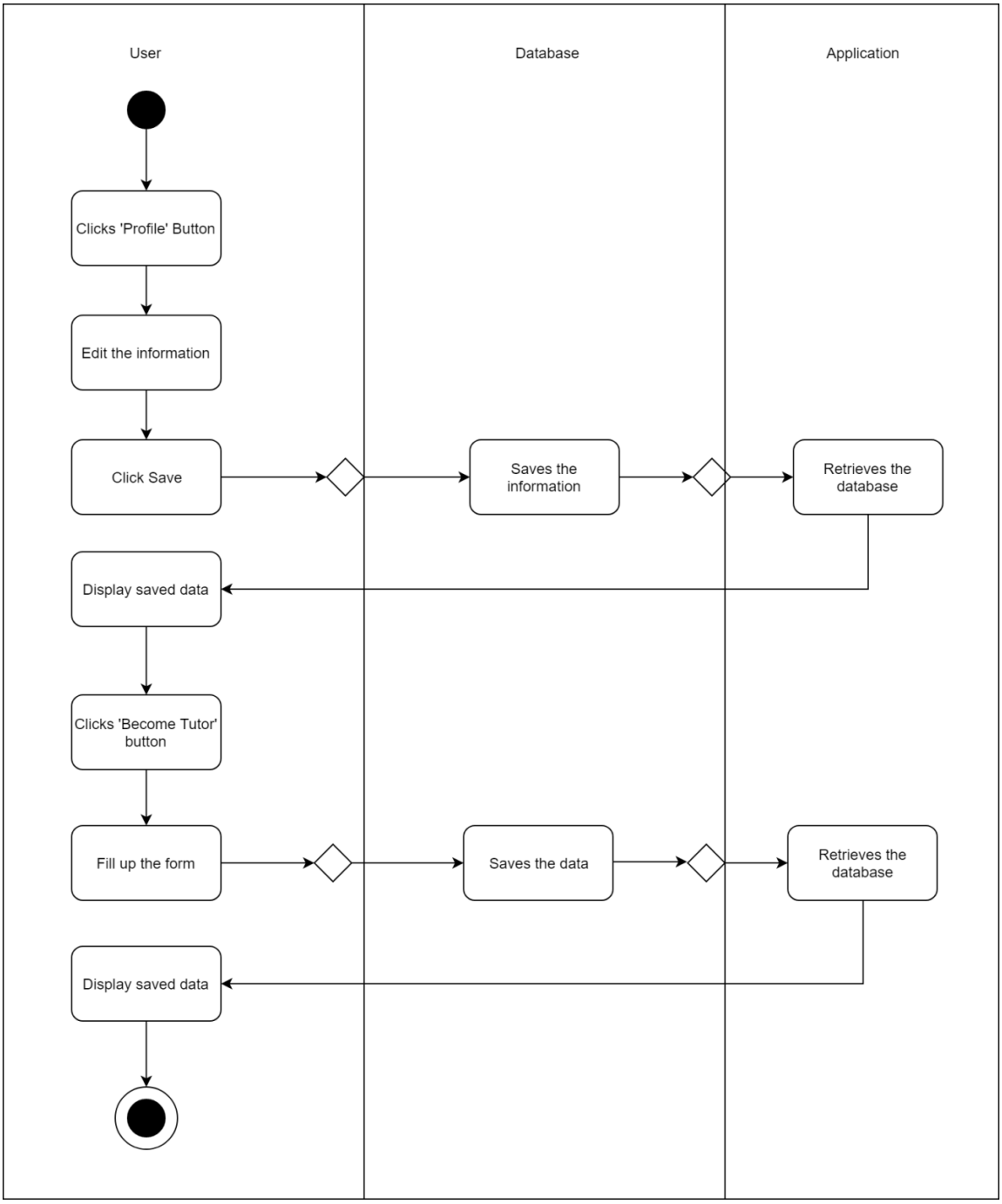

Figure 10: Activity diagram for profile activity

6.7.4. ACTIVITY DIAGRAM FOR COURSES

The below figure gives detail about the task carried out when the users will add the course. User and application have close relation regarding the course activity.

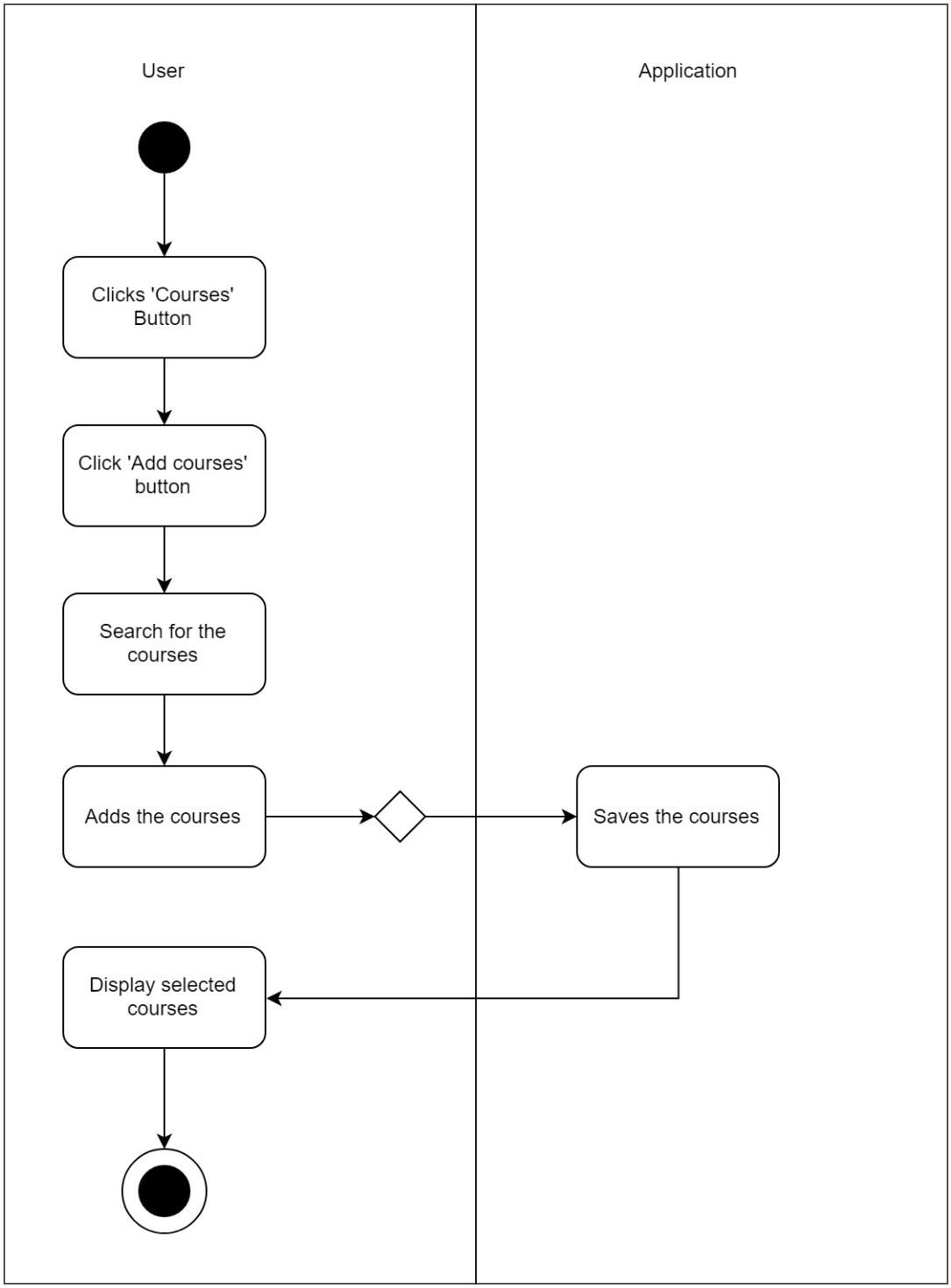

Figure 11: Activity diagram for adding course

6.8.SEQUENCE DIAGRAM

Sequence Diagram is an interaction diagram. It shows how the user can interface with the device and in turn device with the internal system and database.

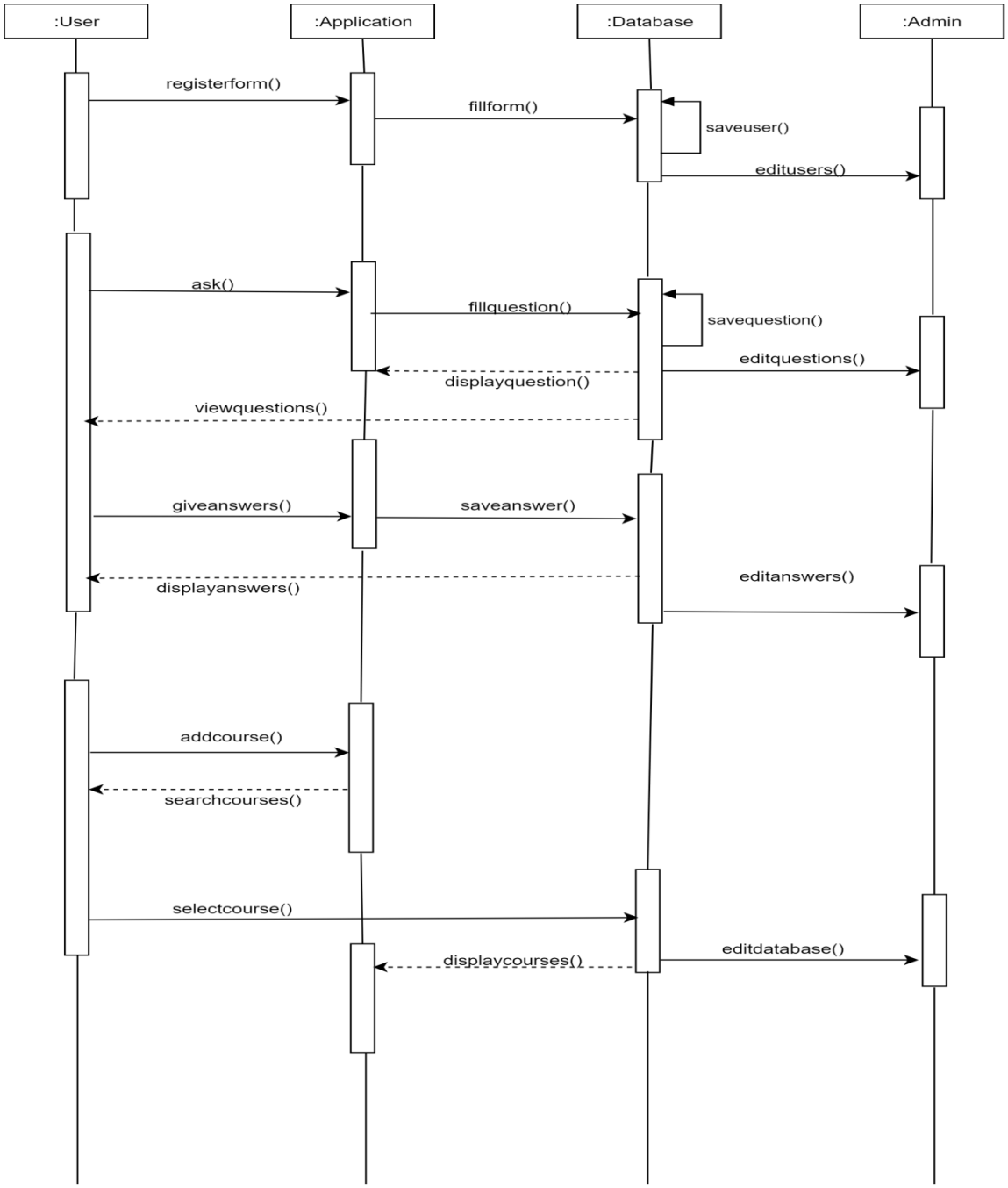

Figure 12: Sequence Diagram

7. TESTING

The task done so far has been tested. The below table shows the detailed explanation of the testing carried out.

7.1.TESTING TABLE

Test No.	Unit	Test	Expected Result	Test Outcome	Evidence
1	Register API	Tested signing up the users	User successfully signed up and added in database	Successful	Figure 15
2	Register	Register with Android Device	Successfully registered to application	Failed	Figure 16
3	Add Question API	Tested whether questions will be added or not	Question successfully added to database	Successful	Figure 13
4	Home Page	Consuming data from database	Data display in homepage	Successful	Figure 17

Table 6: Testing Table

7.2.TESTING EVIDENCE THROUGH SNAPSHOTS

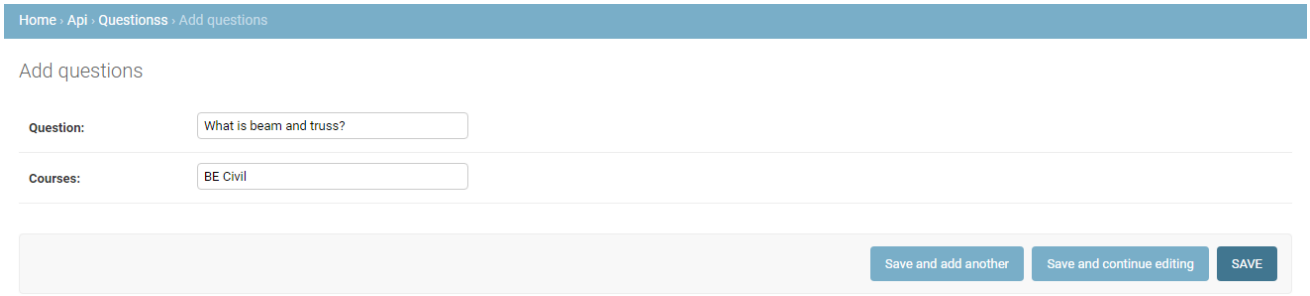

Figure 13: Question adding API

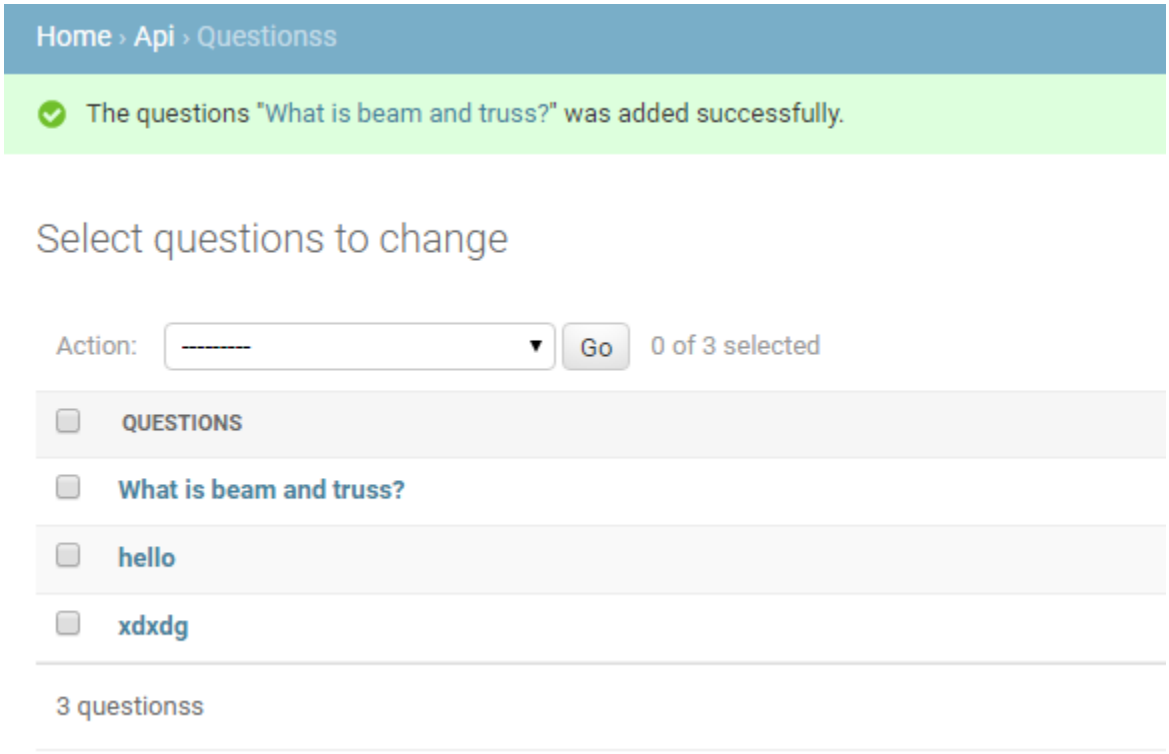

Figure 14: Successfully added question

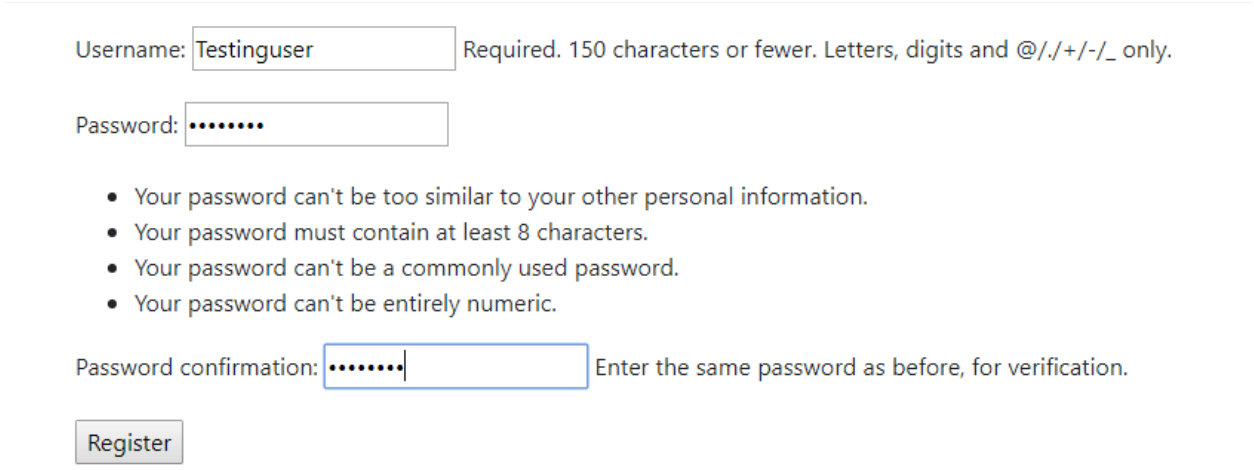

Figure 15: User registration API

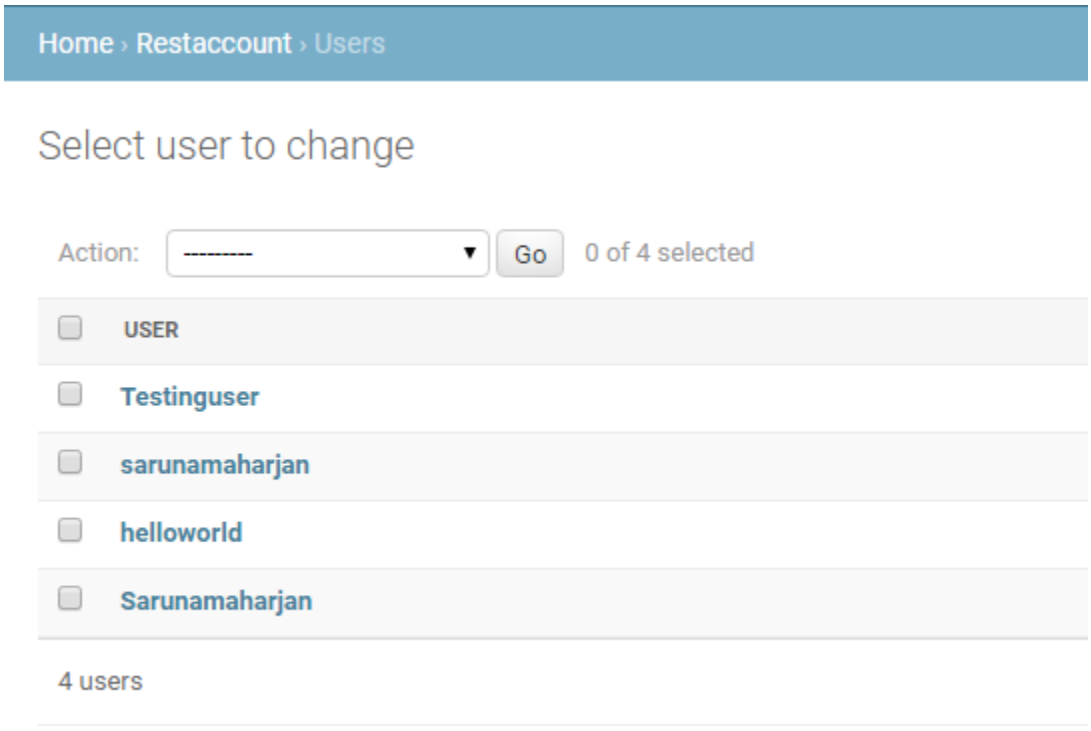

Figure 16: User added successfully

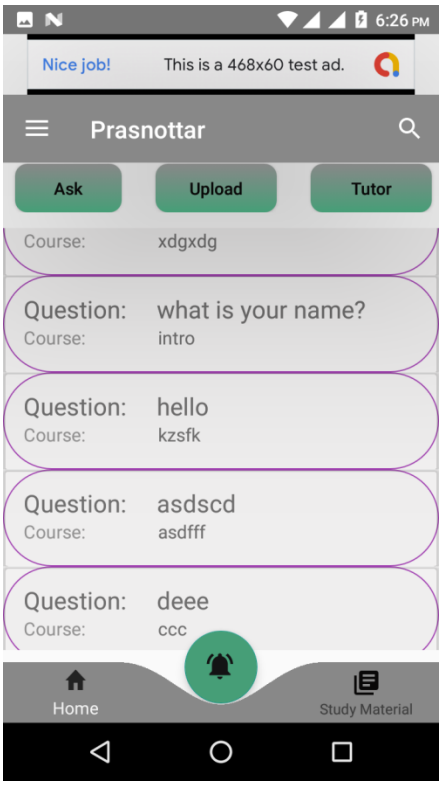

Figure 17: Home Page

8. PROJECT TASK AND TIME SCHEDULE

The project schedule has been designed as per requirements of the project. Various tasks have been enlisted in the table as per the requirements. Debugging and testing is to be done prior to the completion of the project. Similarly, approximate duration has been scheduled as per the tasks.

TASK	**First Iteration**	**Second Iteration**	**Third Iteration**	**APPROX DURATION in days**
Preliminary Investigation	10	5	7	22
Problem and requirement analysis	11	8	10	29
Project study	12	9	16	37
System design	15	7	21	60
Debugging and Testing	5	5	10	20
Implementation	17	9	20	46
Documentation	40	20	25	85

Table 7: Project Task and Time Schedule

8.1.GANTT CHART

The Gantt chart below has been constructed on the basis of the above project schedule. According to the table the project is estimated to be completed in 3 months. The task is started from preliminary investigations and the other tasks are scheduled in accordance.

Task Name	11-20 Jul	20-31 Jul	1-12 Aug	12-20 Aug	21-31 Aug	1-10 Sep	11-15 Sep
Preliminary Investigation							
Problem and Requirement Analysis							
Project Study							
System Design							
Testing							
Implementation							
Documentation							

Table 8: ITERATION 1: Develop Full-fledged Android Application

Task Name	16-20 Sep	21-26 Sep	27-30 Sep	1-7 Oct	8-12 Oct	13-15 Oct	20-22 Nov
Backend System Analysis and Specification							
Design/Implement Recommendation Algorithm							
Implement Collaborative Filtering Algorithm							
Test and Debug backend modules							
Test Overall System Modules							
Risk Assessment							
Update Documentation							

Table 9: ITERATION 2: Recommendation

Task Name	24-27 Oct	28-31 Oct	1-7 Nov	8-13 Nov	13-16 Nov	17-19 Nov	20-22 Nov
System Deployment Analysis and Preparation							
Overall Analysis and Undertake analysis of the modules							
Produce Required Specifications							
Test and Debug the prepared system modules							
Integration Testing							
Overall System Deployment Test							
Update Documentation							

Table 10: ITERATION 3:System Deployment

9. CONCLUSION AND FUTURE EXTENSIONS

The Prasnottar app is now at the initial state having most of the basic functionalities discussed before. All the modules have been integrating and are ready for the demo. However it is not complete with the ideas we have put through and may need more improvisation in the coming days as well. So, various extensions can be implemented in this application. Some of the extensions we have planned are:

1. Hybrid Recommender Systems (Content based and collaborative based) for intelligent recommendations of questions.
2. Get notified when questions related to the chosen course are added.

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APPENDIX

SYSTEM SNAPSHOTS

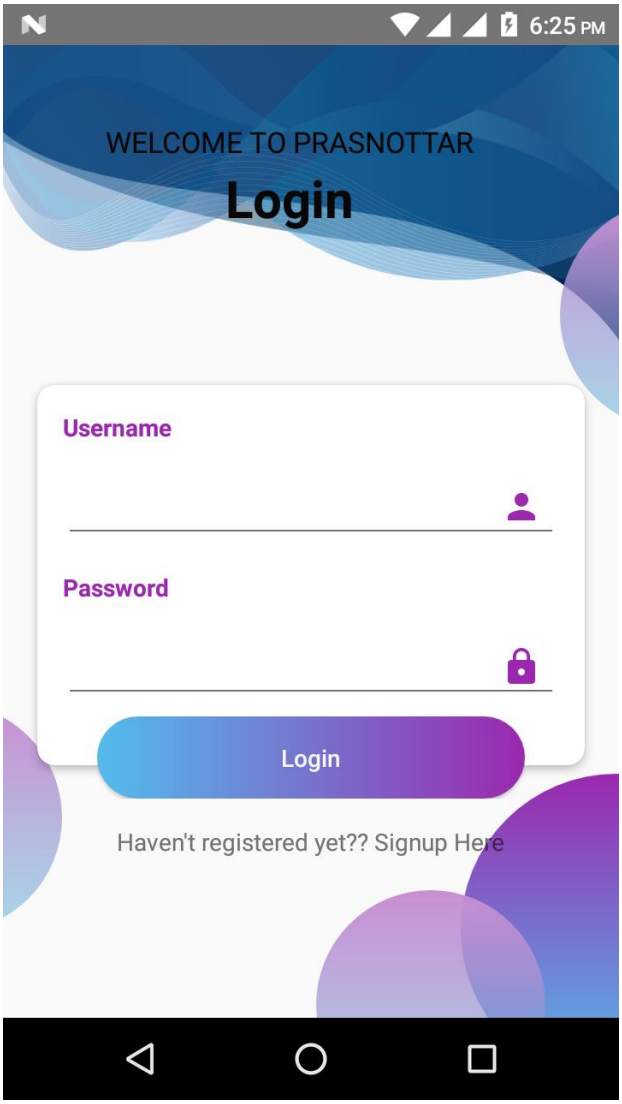

Figure 18: Login

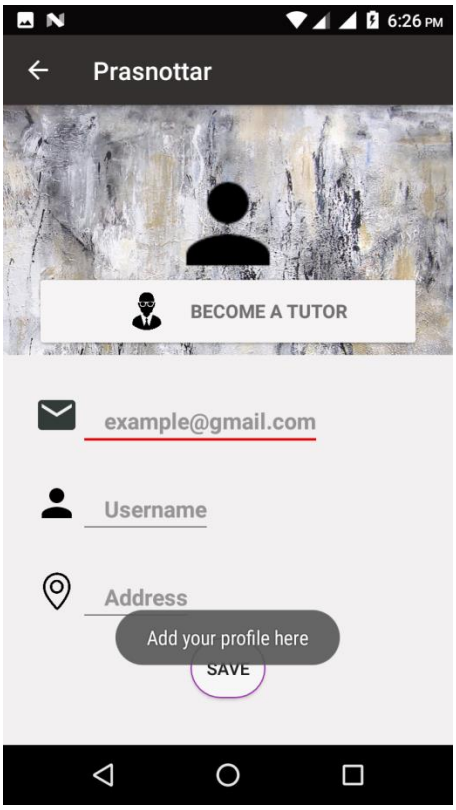

Figure 19: Profile

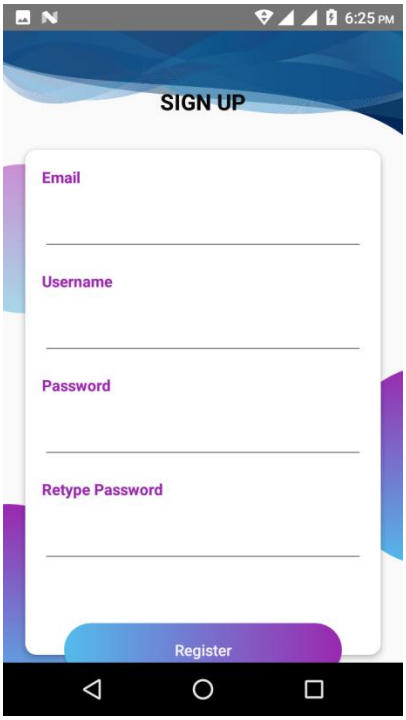

Figure 20: Sign Up

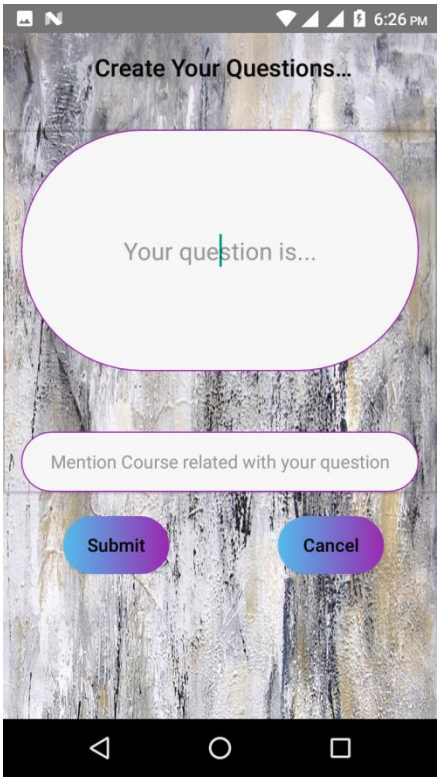

Figure 21: Create Question

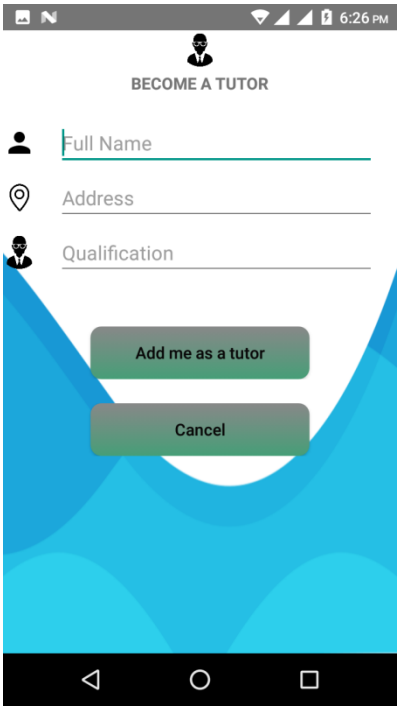

Figure 22: Add As Tutor

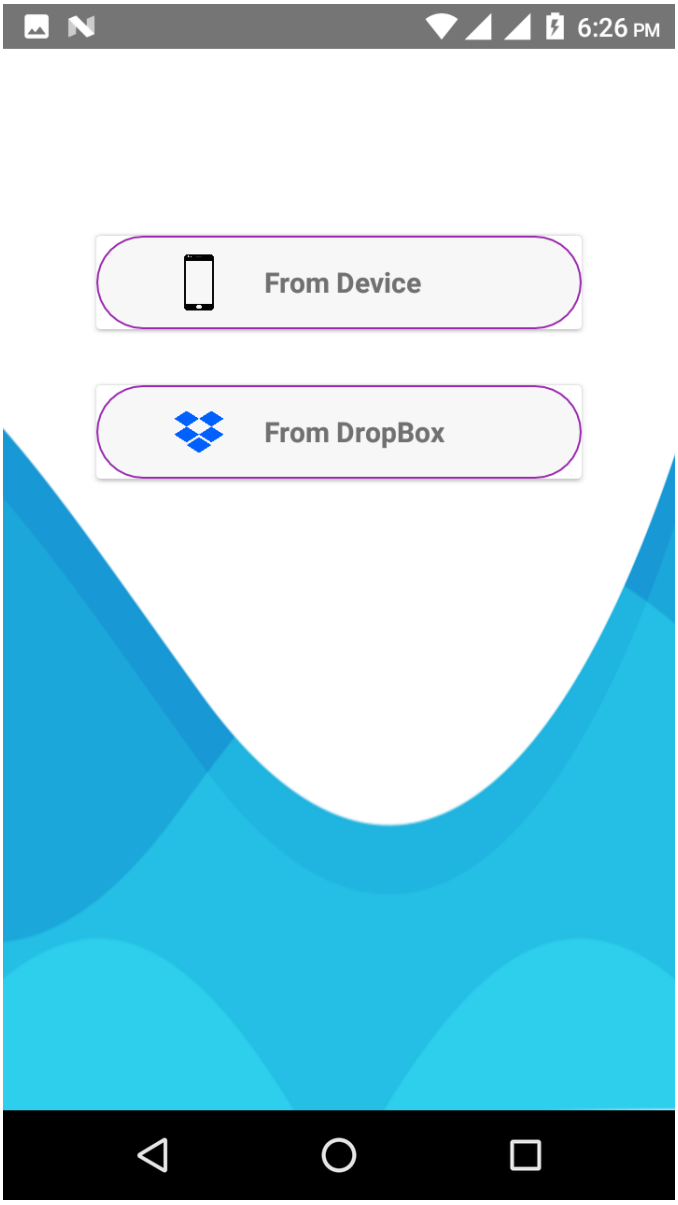

Figure 23: Add Note