

IITB Summer Internship 2014



Project Report *i-Class* Application

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Project Approval Certificate

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Date: July 01, 2014

Declaration

I declare that this written submission represents my ideas in my own words and where others' ideas or words have been included, I have adequately cited and referenced the original sources. I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission. I understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

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Date: July 02, 2014

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Abstract

The ‘**i-Class**’ application package, true to its name is developed as a digital equivalent of a real time interaction between the professor and the student in a classroom. The application caters to be useful in a classroom which consists of a large number of students(approx. 200).The application mainly consists of three parts, the i-class Client, i-class server and the i-class forum which is a website consisting of all the text doubts asked during a particular lecture session. The application caters to all high school and college students.

1. The ‘i-Class’ Client:

The Audio Doubt:

Instead of raising a hand in the classroom, the users can directly send an audio request to the lecturer by clicking on the audio icon in the main screen of the i-Class Application built specially for Aakash tablets.

The Text Doubt:

If a user wants to ask a question without speaking, he can do so by typing into the text doubt topic field and the main subject field of the text doubt in the main screen of the **i-Class** Application built for Aakash tablets.

2. The ‘i-Class’ Server:

The ‘i-Class’ server serves as the receiving end for audio as well as text doubts. The lecturer can any time give permission for audio doubts to those present in the waiting queue. The lecturer can also view all the received text doubts and can answer to any of the text doubt he wishes to.

3. The ‘i-Class’ Forum:

The ‘i-Class’ forum has been built up alongside with the application. This forum is basically a website which will contain all the text doubts asked by all the students in the class for a particular lecture session. The lecturer can answer to the questions which were left un-answered in the class due to lack of time. The lecturer can also edit/delete his answered questions in the forum.

LIST OF FIGURES

FIGURE	PAGE NO.
fig 3.1.1 use case diagram for i-class client application	26
fig 3.1.2 use case diagram for new user Registration	27
fig 3.1.3 use case diagram for registered login	28
fig 3.1.4 use case diagram for doubt main screen	29
fig 3.1.5 use case diagram for Audio Doubt	30
fig 3.1.6 use case diagram for text Doubt	31
fig 3.1.7 Class diagrams for signup page and splash screen	32
fig 3.1.8 Class diagrams for login page	33
fig 3.1.9 Class diagrams for swipe delete	34
fig 3.1.10 Class diagrams for Test Connection, Notification and Help	35
fig 3.1.11 Class diagrams for Audio doubt screen	36
fig 3.1.12 Class diagrams for settings and view history	37
fig 3.1.13 Dafa flow diagram for login screen	38
fig 3.1.14 Dafa flow diagram for Audio Doubt	39
fig 3.1.15 Dafa flow diagram for Text Doubt	39
fig 3.1.16 Dafa flow diagram for view history	40

fig 3.1.17 Sequence Diagram for i-Class logging in, Sending Text	41
doubt and audio doubt and logout	
fig 3.1.18 Activity diagram for i-Class Application	43
fig 3.2.1 Use case diagram for server interface	53
fig 3.2.2 Activity diagram for server interface	54
fig 3.2.3 Sequence diagram for server interface	55
fig 3.2.4 Class diagram for server main splash screen	56
fig 3.2.5 Class diagram for server welcome screen	57
fig 3.2.6 Class diagram for server server audio and text doubt	58
fig 3.2.7 Class diagram for server user interface	59
fig 3.2.8 Class diagram for print in file	60
fig 3.2.9 Class diagram for notification to speak	60
fig 3.2.10 data flow diagram for server	61
fig 3.3.1 data flow diagram for i-Class forum	69
fig 3.3.2 use case diagram for i-Class forum	70
fig 3.3.3 sequence diagram for i-Class forum	71
fig 3.3.4 Activity diagram for i-Class forum	72
Fig. 4.1.1.1 Accounts Screen	76
Fig. 4.1.1.2 creating a new Account	77
Fig. 4.1.1.3 choosing a profile picture	78

Fig. 4.1.1.4 Profile picture selected	79
Fig. 4.1.2.1 Forgot Password link	80
Fig. 4.1.2.2 Forgot Password page	81
Fig. 4.1.3.1 Login Page	82
Fig. 4.1.3.2 Page after successfully logging	83
Fig. 4.1.4.1 Swipe to delete demonstration	84
Fig. 4.1.4.2 Account Deletion Page	85
Fig. 4.1.5.1Details to connect to the server	86
Fig. 4.1.5.2Connection Successful with the Server	87
Fig. 4.1.5.3 The Main Activity	88
Fig. 4.1.6.1 Entering details of text doubt	89
Fig. 4.1.6.2 Confirmation Screen	90
Fig. 4.1.7.1 View History button	92
Fig. 4.1.7.2 Text Doubt History Page	93
Fig. 4.1.8.1 Microphone icon on the Main Activity	95
Fig. 4.1.8.2 Topic of Audio Doubt	96
Fig. 4.1.8.3 Waiting screen	97
Fig. 4.1.8.4 Sending text doubt from waiting screen	98
Fig. 4.1.8.5 Start Speaking button displayed after permission is accepted	99
Fig. 4.1.8.6 Disconnecting from Audio Streaming	100

Fig. 4.1.8.7 Request rejected screen	101
Fig. 4.2.1.1 Server starting screen	103
Fig. 4.2.1.2 Entering session information	104
Fig. 4.2.1.3 Entering other Department names	105
Fig. 4.2.1.4 Submitting information for session	105
Fig. 4.2.1.5 The Main Screen	106
Fig. 4.2.2.1 Displaying IP Address and Session ID	108
Fig. 4.2.2.2 Changing number of doubts visible	109
Fig. 4.2.2.3 Accepting a text doubt	111
Fig. 4.2.2.4 Removing a text doubt from the list	112
Fig. 4.2.2.5 Searching for text doubts with topic 'Android'	114
Fig. 4.2.2.6 Searching for doubts with name 'Prakhar'	115
Fig. 4.2.2.7 Accepting an Audio Doubt	117
Fig. 4.2.2.8 Removing an Audio Doubt	118

CONTENTS

1) Introduction	1
1.1 Purpose	2
1.2 Scope	3
2) SRS	
 2.1 i-Class Client	5
2.1.1 Introduction	5
2.1.2 Document Purpose	6
2.1.3 Product Scope	6
2.1.4 Intended Audience	7
2.1.5 Product Perspective	8
2.1.6 Product functions	8
2.1.7 User Characteristics	9
2.1.8 Constraints	9
2.1.9 Assumptions and Dependencies	10
2.1.10 Glossary	11
 2.2 i-Class Forum	12
2.2.1 Introduction	12

2.2.2 Document Purpose	13
2.2.3 Product Scope	13
2.2.4 Product Perspective	14
2.2.5 Product Functions	14
2.2.6 User Characteristics	14
2.2.7 Constraints	15
2.2.8 Assumptions and Dependencies	15
2.3 References	16
3) Software Design Description	17
3.1 i-class client	18
3.1.1 External Interface Requirements	19
3.1.1.a user interfaces	19
3.1.2 Hardware Interfaces	20
3.1.3 Software Interfaces	20
3.1.4 Functional requirements	20
3.1.4.1 Audio Doubt	20
3.1.4.1.a Audio	21
3.1.4.1.b Disconnect	21

3.1.4.1.c Emergency Text Doubt	21
3.1.4.1.d Position/Status Field	22
3.1.4.2 Text Doubt	22
3.1.4.2.a Subject	22
3.1.4.2.b Doubt	23
3.1.4.2.c Doubt Remaining Field	23
3.1.4.2.d View History button	23
3.1.5 Non-Functional requirements	23
3.1.5.1 Performance Requirements	24
3.1.5.2 Maintainability	24
3.1.5.3 Reliability	24
3.1.5.4 Safety Requirements	24
3.1.5.5 Security Requirements	25
3.1.5.6 Software Quality Attributes	25
3.1.6 Behavioral Requirements	26
3.1.6.1 Use Case Diagram	26
3.1.6.2 Class Diagrams	32
3.1.6.3 Data flow diagrams	38
3.1.6.4 Sequence Diagram	41

3.1.6.5 Activity Diagram	42
3.2 i-Class server	44
3.2.1 External Interface Requirements	45
3.2.1.1 User Interfaces	45
3.2.1.2 Hardware Interfaces	46
3.2.1.3 Software Interface	46
3.2.2 Functional Requirements	47
3.2.2.1 i-Class Server interface	48
3.2.3 Non-functional requirements	49
3.2.3.1 Performance Requirements	49
3.2.4 Behavioral Diagrams	50
3.2.4.1 Use Case Diagram	53
3.2.4.2 Activity Diagram	54
3.2.4.3 Sequence Diagram	55
3.2.4.4 Class diagram	56
3.2.4.5 Data flow diagram	61
3.3 i-Class Forum	62

3.3.1 External Interface Requirements	63
3.1.1.1 User Interfaces	63
3.1.1.2 Hardware Interface	63
3.1.1.3 Software Interface	64
3.3.2 Functional Requirements	65
3.3.2.1 Login tab	65
3.3.2.2 Contact us tab	65
3.3.2.3 Home tab	65
3.3.2.4 Department panel	65
3.3.2.5 Professor panel	66
3.3.2.6 Lecture panel	66
3.3.2.7 doubt page	66
3.3.2.8 Logout tab	66
3.3.3 Non Functional Requirements	67
3.3.3.1 Performance Requirements	67
3.3.3.2 Safety requirements	67
3.3.3.3 Security requirements	68
3.3.4 Behavioral Diagrams	69
3.3.4.1 Data Flow Diagram	69

3.3.4.2 Use Case Diagram	70
3.3.4.3 Sequence Diagram	71
3.3.4.4 Activity Diagram	72
4) User Manual	73
4.1 i-Class Android Application	75
4.1.1 Creating An Account	76
4.1.2 Changing Password of an Existing Account	80
4.1.3 Logging In Using an Existing Account	82
4.1.4 Deleting An Account	84
4.1.5 Connecting with the local server	86
4.1.6 Sending a Text Doubt	89
4.1.7 Viewing Text Doubt History	92
4.1.8 ASKING AN AUDIO DOUBT	95
4.2 i-Class Server	102
4.2.1 Launching the Server	103
4.2.2 Components in the Server	107
4.2.2.1 IP Address and Session ID	108
4.2.2.2 View	108
4.2.2.3 Text Doubts	109

4.2.2.4 Search Box	110
4.2.2.5 Audio Doubt	111
4.3 i-Class forum	120
4.3.1 i-Class Forum Home Page	121
4.3.1.1 Components of Home Page	121
4.3.3 Procedure for a professor to login	122
5) Conclusion and future enhancements	143
5.1 Summary and conclusions	144
5.2 Future enhancements	146

Chapter 1 :

Introduction

1.1 Purpose

The ‘i-Class’ client application is an Android Application that enhances the communication between a professor and the students in a classroom.

Basically, this application acts both as a microphone and a messaging system, for sending audio doubts and text doubts respectively. This application is open source and designed to be preferably used on tablets.

The ‘i-Class’ server serves as the receiving end for audio as well as text doubts.

The ‘i-Class’ forum stores all the text doubts asked during a particular session. Teacher can later answer these questions anytime.

1.2 Scope

The dual feature of this application enables it to be used flawlessly by high school and college students alike. Users can implement both audio and text doubts to give an elaborate description of any topic. In addition to ease of use, it is eco-friendly and timesaving. This application is unique owing to its dual feature property. It not only gives comfort but also prevents unwanted chaos in a class.

Chapter2:

Software

Requirements

Specification

2.1 : i-Class Client

2.1.1 Introduction:

The document aims at defining the overall software requirements for i-Class Application. Efforts have been made to define the requirements exhaustively and accurately. The final product contains only those features/functionalities mentioned in this document. Assumption for any additional functionality/feature should not be made by any of the parties involved in developing /testing/implementing the product. In case it is required to have some additional features, a formal change request will need to be raised and subsequently a new release of this document and/or product will be produced.

2.1.2 Document Purpose:

The purpose of this document is to present a detailed description of the **i-Class** Application. It will explain the purpose and features of the application and what the application will do. This document is intended for developers, testers and users.

2.1.3 Product Scope:

The '**i-Class'** Application is an Open source software product. The main goal of this Android application is to facilitate the communication between teacher and the students. i-Class Application is going to be freely available for anyone to download. It is intended to be used on mobiles and tablets that run on Android only.

2.1.4 Intended Audience:

Our application's target audience includes:

- High School Students
- College students
- Teachers and Professors

Note:

This Application is dependent on a local server. A server has also been developed which accepts the user's requests regarding the kind of doubts they will pose. The users of the application will send their audio and text doubts to this server computer, which will be available to the teacher in a classroom.

2.1.5. Product Perspective:

This product is developed keeping in mind the problems faced in a large strength classroom, such as transferring a single microphone from one corner to another one, or using a large number of costly mics, also it helps to those students who are quite shy in standing up and asking a question in a class. i-class android application for Aakash tablet is a highly cost-effective solution which will resolve all the above mentioned class problems.

2.1.6 Product Functions:

The **i-Class** contains both Audio and Text doubt functionality. And they can be used concurrently. The application output is either the live audio streaming to the server (Lecturer's computer), or text message sending to the server, which will be visible in the lecturer's computer. It is designed primarily for the Aakash tablet but can be downloaded onto any Android device.

Note: Along with the application's apk file, one has to also download the server program and install it on any PC for running the application.

2.1.7 User Characteristics:

The intended users will be high school students, college students and Professors. Users are not expected to have a very high level of technical expertise to use the application.

2.1.8 Constraints:

The user will not be able to use the application as a standalone product. The application is fully dependent on a server program as well as high bandwidth wifi network connection in order to work through its expectations. The product is developed only for devices that support Android and cannot be used on any other platform.

2.1.9 Assumptions and Dependencies:

The only assumption in this application is that the user should be well versed with the android operating system. The major dependency of this application is that it needs a server program to connect to inorder to share informations (particularly the messages related to their doubts). Also there should be high bandwidth wifi network connection.

2.1.5 Glossary:

Term	Definition
Android	Linux based operating system mainly for smartphones and tablets.
Server Program	It is a java program which is built alongside the i-Class android Application. The application and the server program will be working together inorder to fully implement the main purpose of the Software, Interactive Classroom.
Software Requirements Specification	A document that completely describes all of the functions of a proposed system and the constraints under which it must operate. For example, this document.

2.2 The i-Class Forum

2.2.1 Introduction

The document aims at defining the overall software requirements for I-Class package. Efforts have been made to define the requirements exhaustively and accurately. The final product contains only those features/functionalities mentioned in this document. Assumption for any additional functionality/feature should not be made by any of the parties involved in developing /testing/implementing the product. In case it is required to have some additional features, a formal change request will need to be raised and subsequently a new release of this document and/or product will be produced.

2.2.2 Document Purpose :

The purpose of this document is to present a detailed description of the I-Class package. It will explain the purpose and features of the I-Class Forum and what the web application will do. This document is intended for developers, testers and users.

2.2.3 Product Scope :

“i-Class Forum” is an Open source software product. The main goal of this Web application is to learn, raise Doubts and increase curiosity among the youth. I-Class Forum website is going to be freely available for access to anyone . It is intended to be used on mobiles or Tablet or Laptop.

2.2.4 Product Perspective:

I-Class Forum is developed to enhance or spread Knowledge beyond boundaries.

It aims at revolutionizing Education in terms of Technology.

2.2.5 Product Functions:

I-Class Forum has functions that have privileges according to user. Student or any Viewer can watch various doubt sessions in the Forum while the Editing Authority and giving solution to a doubt will be handled by professor only.

2.2.6 User Characteristics:

The intended users will be students, people around world and Professors. Users are not expected to have a very high level of technical expertise to use this package .They are user friendly and easy to access.

2.2.7 Constraints:

I-Class Forum will not be accessed without Internet.

Its usage is online. In case of any technical constraints, user can complain Admin.

2.2.8 Assumptions and Dependencies:

Assumptions for I-Class Forum will be a proper Internet connection with latest browser. Its assumed that professor will first request for login details to admin, then he will get his login credentials.

2.3 References:

IEEE STD 830-1998. (Revision of. IEEE STD 830-1993).

IEEE Recommended Practice for Software Requirements.

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Chapter 3:

Software Design

Description

Section 3.1:

i-Class Client

Application

3.1.1 External Interface Requirements:

The application is not a stand-alone, single-user system. The application demands a server program. The application can run on any Android mobile device and tablets. A wifi router with high bandwidth and connection capacity.

3.1.1.a User Interfaces:

- Inputs:

The user generates his/her doubt request for text/audio doubt.

- Outputs:

The application responds by forwarding the request to the server and displaying the position of the user in the waiting queue.

- Operating Systems:

Android.

3.1.2 Hardware Interfaces:

- Any android operating system supported device.
- High bandwidth router with large connection capacity.

3.1.3 Software Interfaces:

- Eclipse IDE shall be used as development environment for implementing the modules
- Designing of modules and diagrams is done in UML using MS word and createley.com website.

3.1.4 Functional requirements

3.1.4.1 Audio Doubt

3.1.4.1.a Audio:

Before raising hand (sending request for audio doubt) the user has to specify a topic about which the user intends to ask a specific doubt. This will be helpful for the lecturer to decide, whether to allow or not ,that particular person to ask question.

3.1.4.1.b Disconnect

If the user thinks that his/her doubt has already been solved then he/she can directly tap on disconnect button to pull himself out of the queue and thus give others chance to ask their own doubts.

3.1.4.1.c Emergency Text Doubt

If a user is waiting in the queue for audio doubt and he has another question in mind which he can simply ask by sending text then he need not to withdraw his audio doubt request. He can simply press emergency text doubt icon and send that doubt while still being in the queue.

3.1.4.1.d Position/Status Field

This field constantly shows the current position of the user in queue and also updates in real time as more and more users in queue withdraw. If the lecturer gives permission then a button of 'Start Speaking' appears in that field.

3.1.4.2 Text doubt

3.1.4.2.a Subject :

Fill the subject field with the topic that your doubts belongs to.

3.1.4.2.b Doubt:

The doubt field is to be filled with the elaborate description of the topic which the user has entered in the subject field.

3.1.4.2.c Doubt Remaining Field :

You are allowed to ask 5 doubts per session. This field shows the number of doubts remaining for that particular session.

3.1.4.2.d View history button :

Users can view their text doubt history by clicking on the view history button provided. They can also withdraw their request if they think that they already got their answer or they just don't want to ask that doubt anymore.

3.1.5 Non-functional requirements :

3.1.5.1 Performance Requirements:

The application will need to provide a responsive interface. There should be minimal delay in sending doubts as well as audio streaming should be as clear and fast as possible.

3.1.5.2. Maintainability:

Software needs to be upgraded if required in future.

3.1.5.3 Reliability:

System must be reliable and data should persist even after suffering some system crashes or booting of some Android devices. Also the server and client should remain independent of each other when it comes to crashing and exception handling.

3.1.5.4 Safety Requirements:

There is no safety requirements associated with this application.

3.1.5.5 Security Requirements

The password should be kept secret as anybody else can login with your account and ask anything vulgar/unacceptable.

3.1.5.6 Software Quality Attributes

The software is planned to be robust and complete. Also the user interface is kept as simple as possible in order to let it be used by even users with minimal tablet knowledge.

3.1.6 Behavioral Requirements:

3.1.6.1 Use Case Diagram:

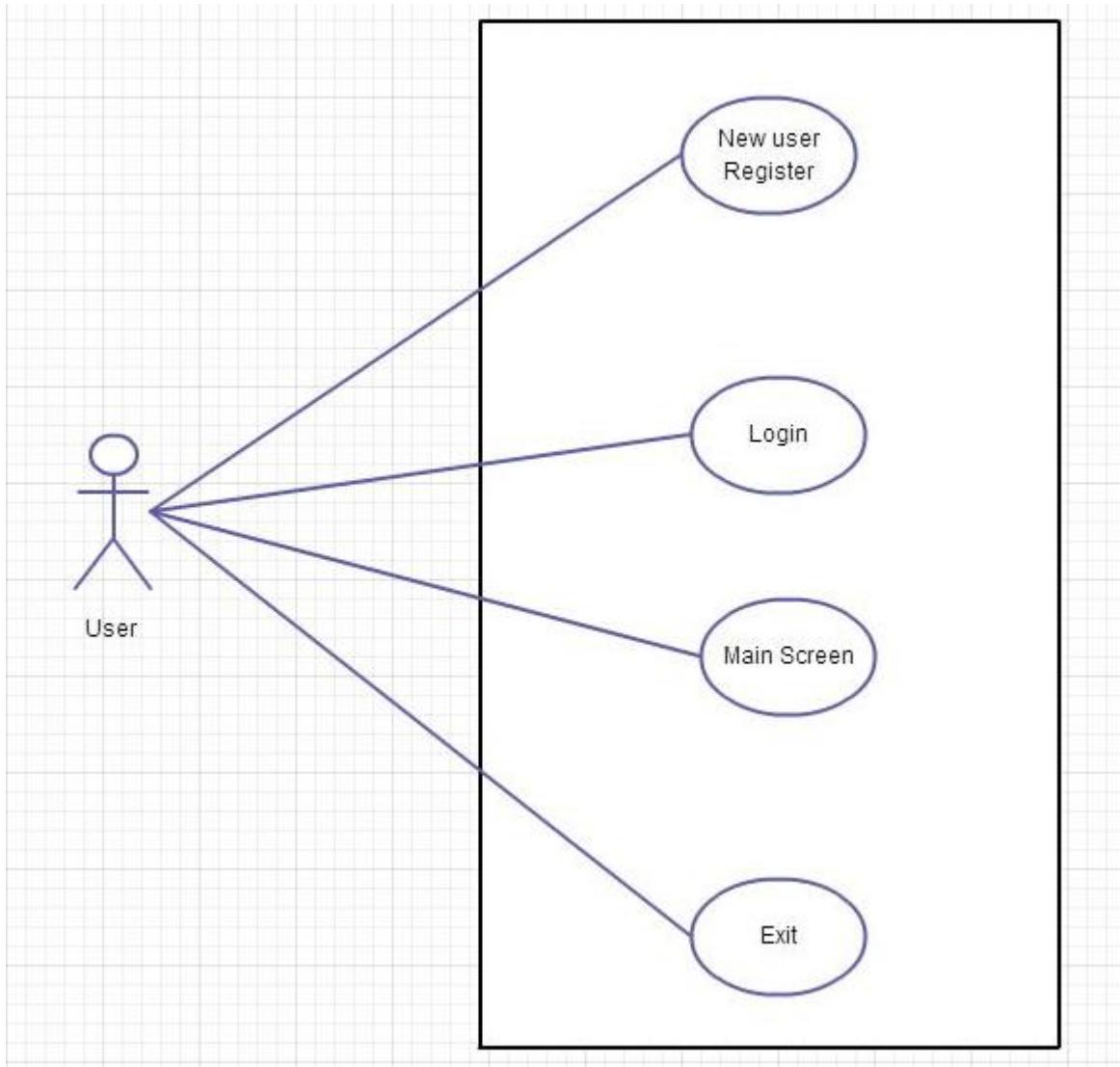


Fig 3.1.1 Use Case Diagram for i-Class Client Application

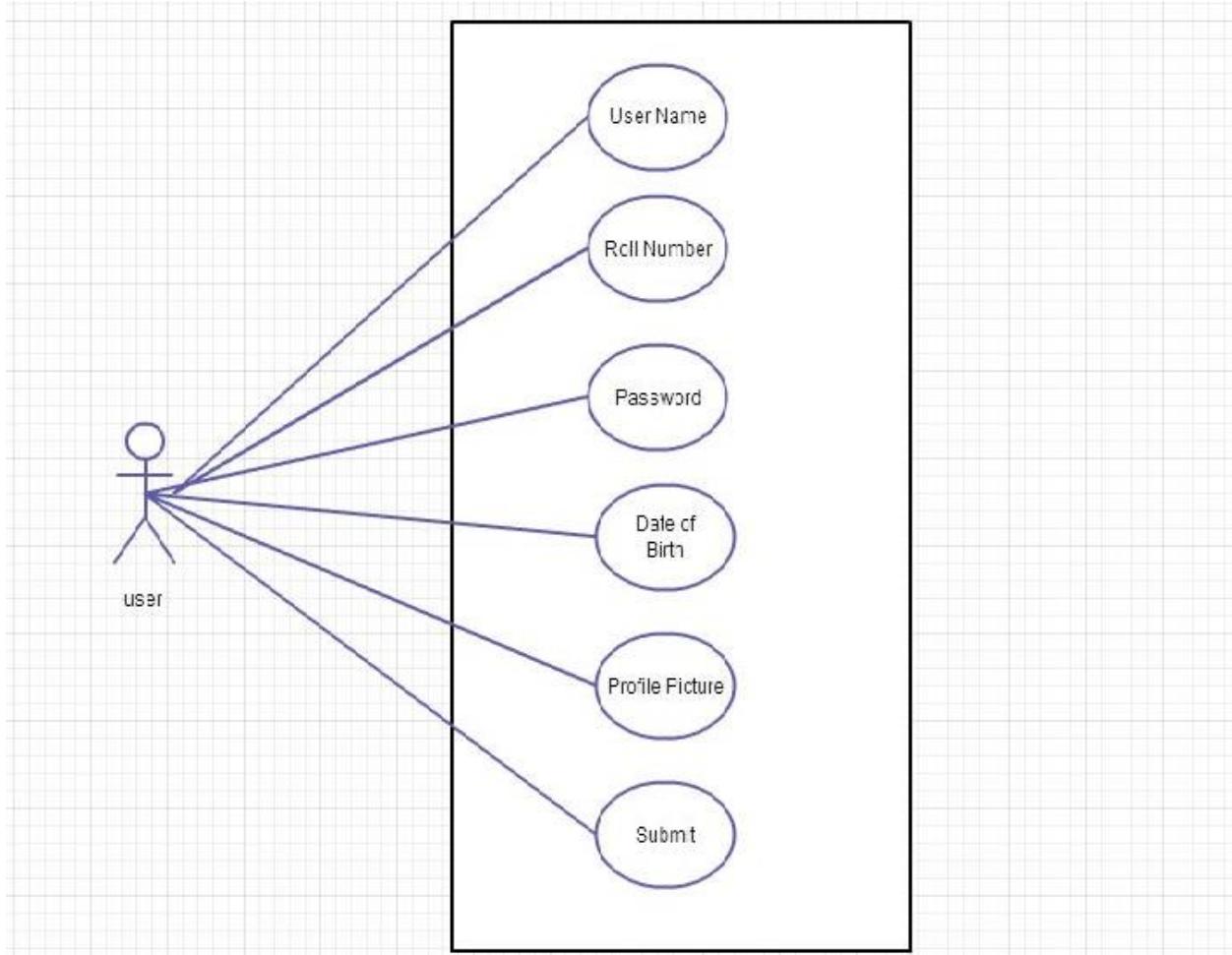


Fig 3.1.2 Use Case Diagram for new user registration

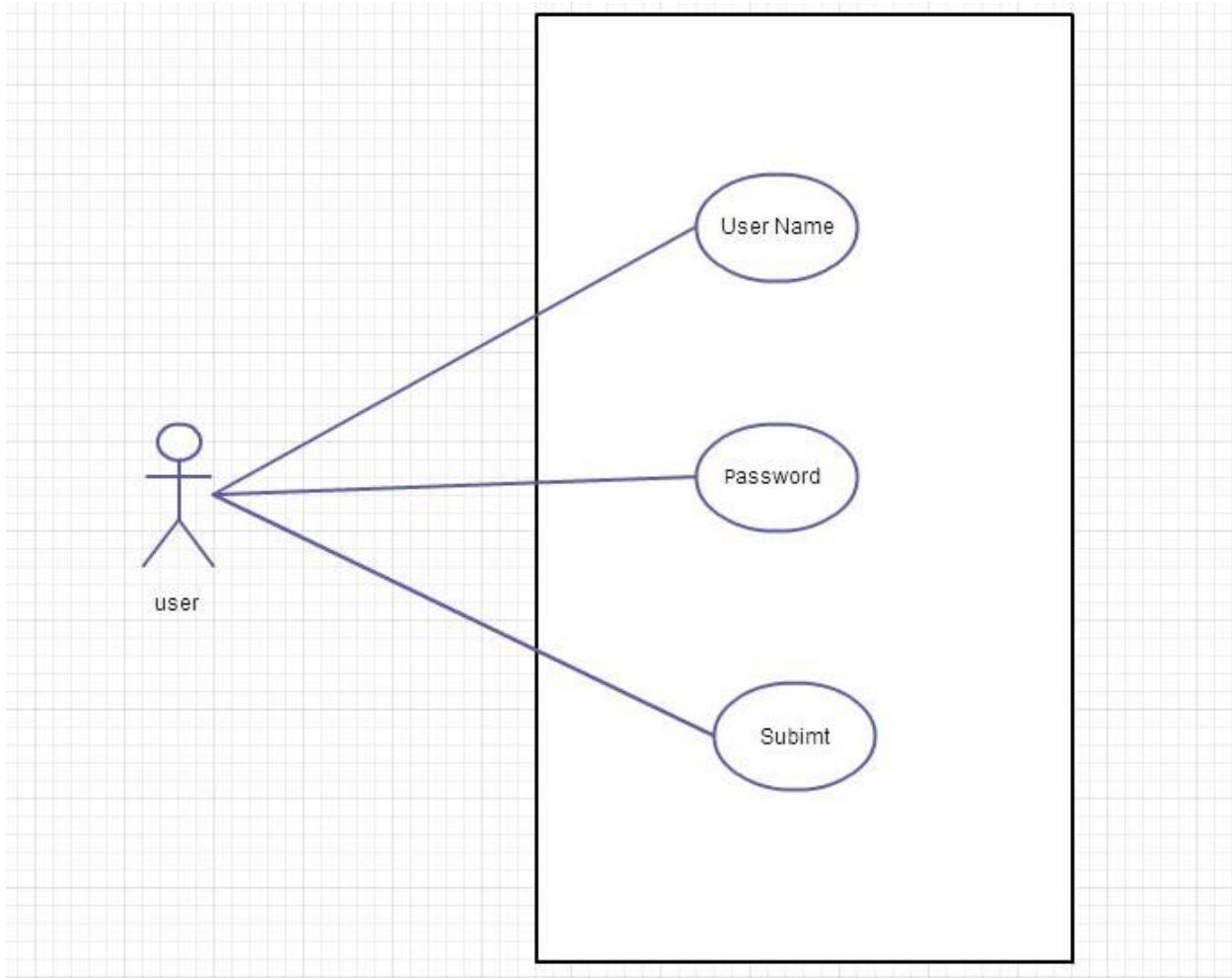


Fig 3.1.3 Use Case Diagram for registered user login

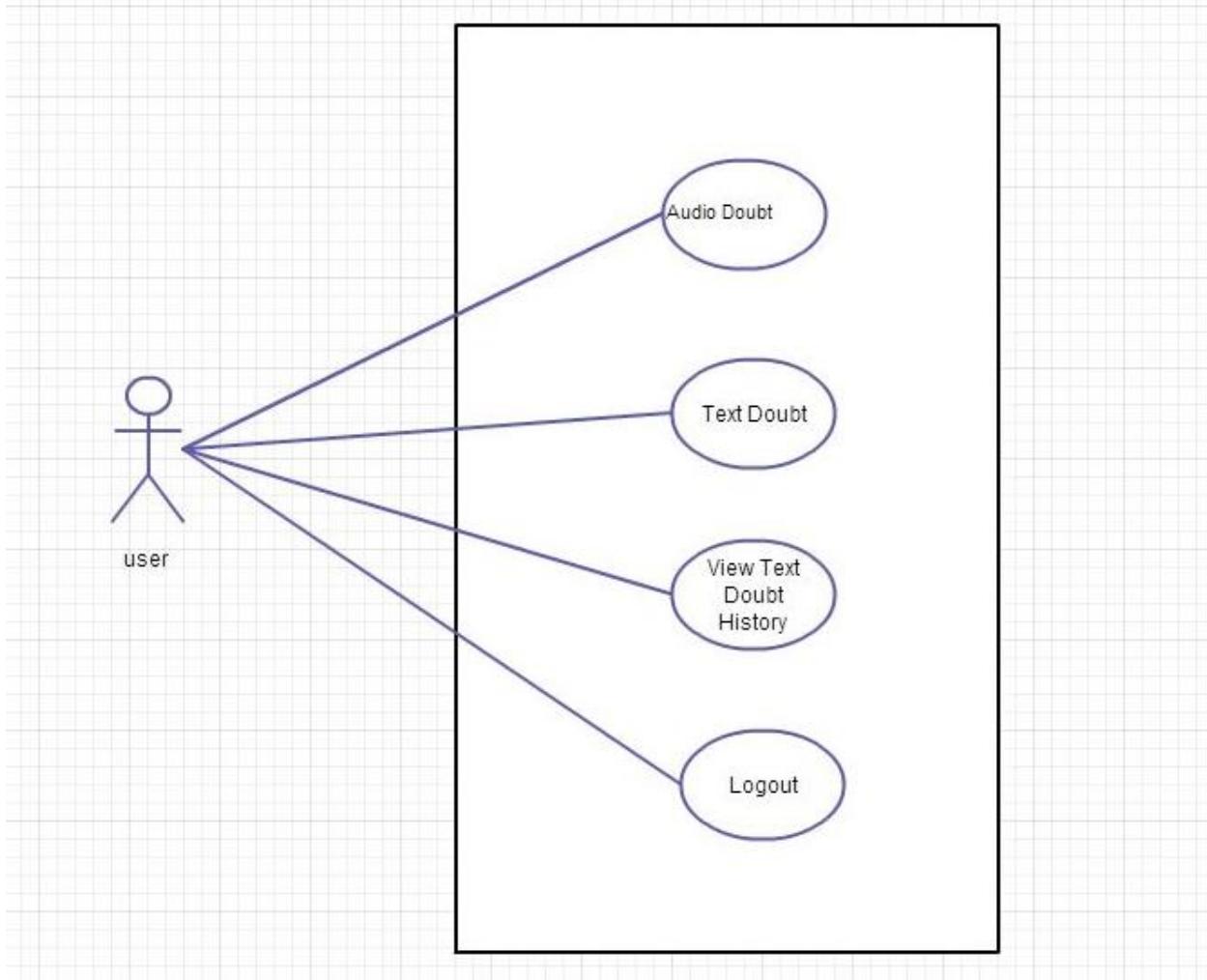


Fig 3.1.4 Use Case Diagram for Doubt main screen

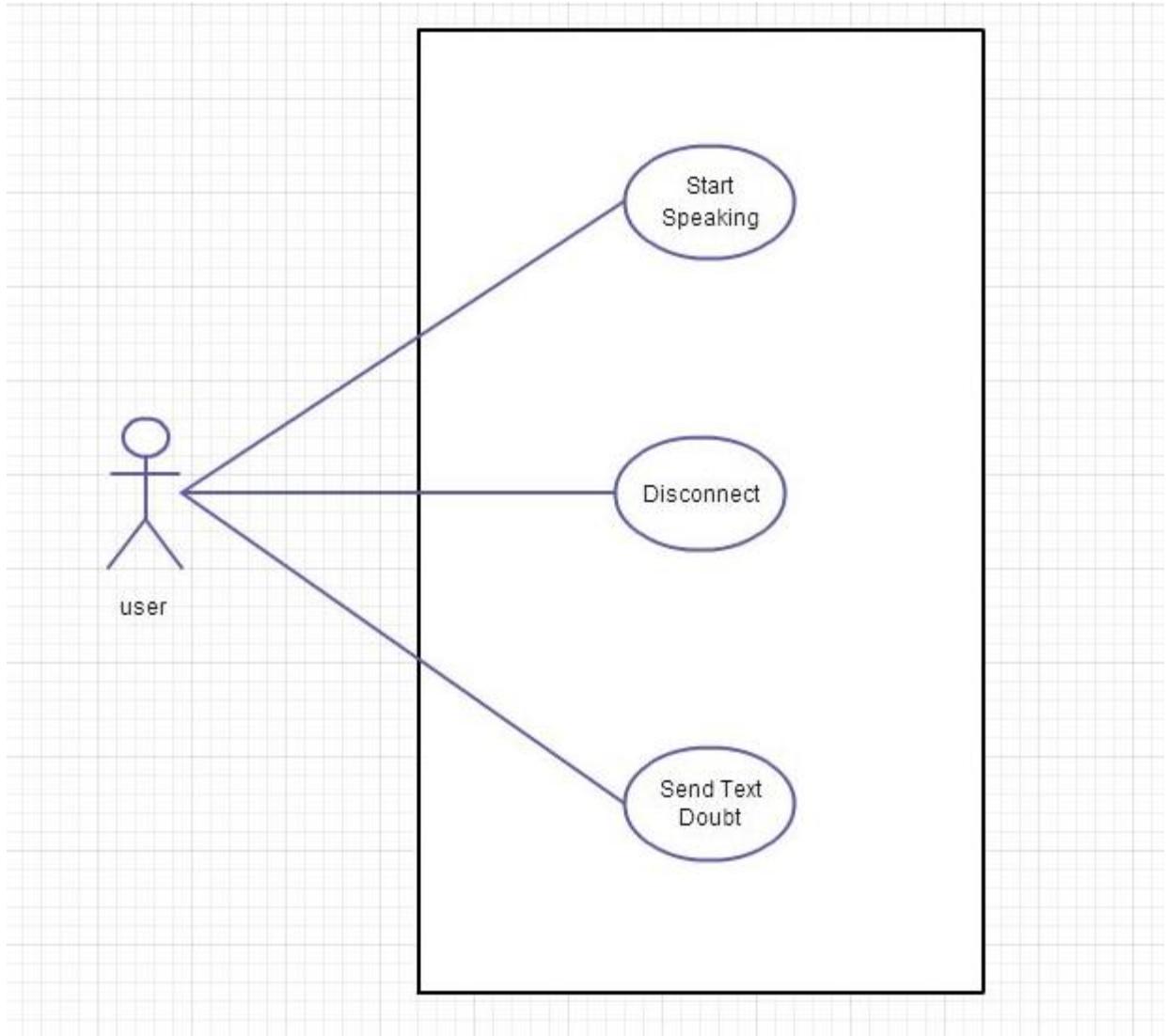


Fig 3.1.5 Use Case Diagram for Audio Doubt

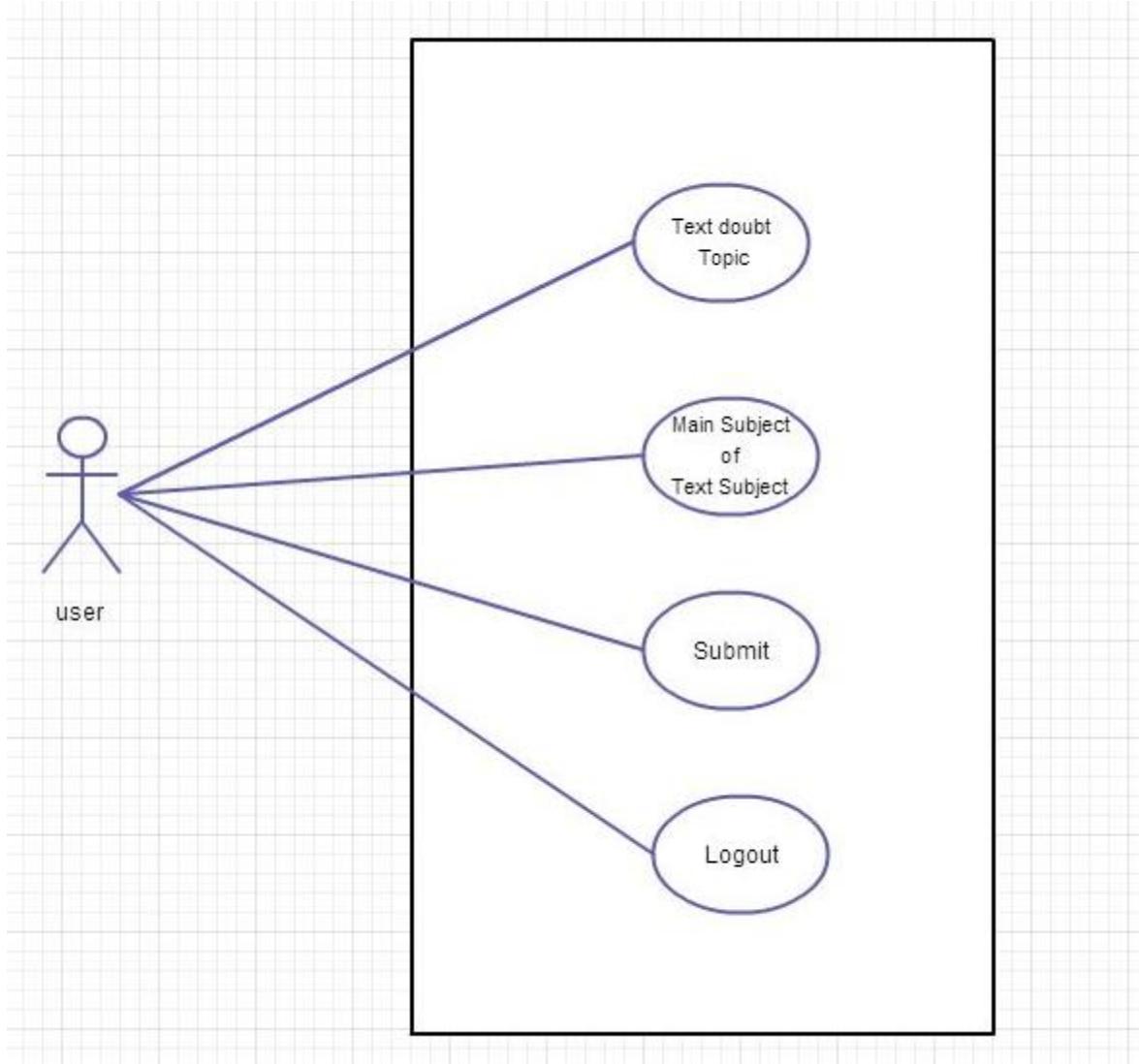


Fig 3.1.6 Use Case Diagram for Text Doubt

3.1.6.2 Class Diagrams:

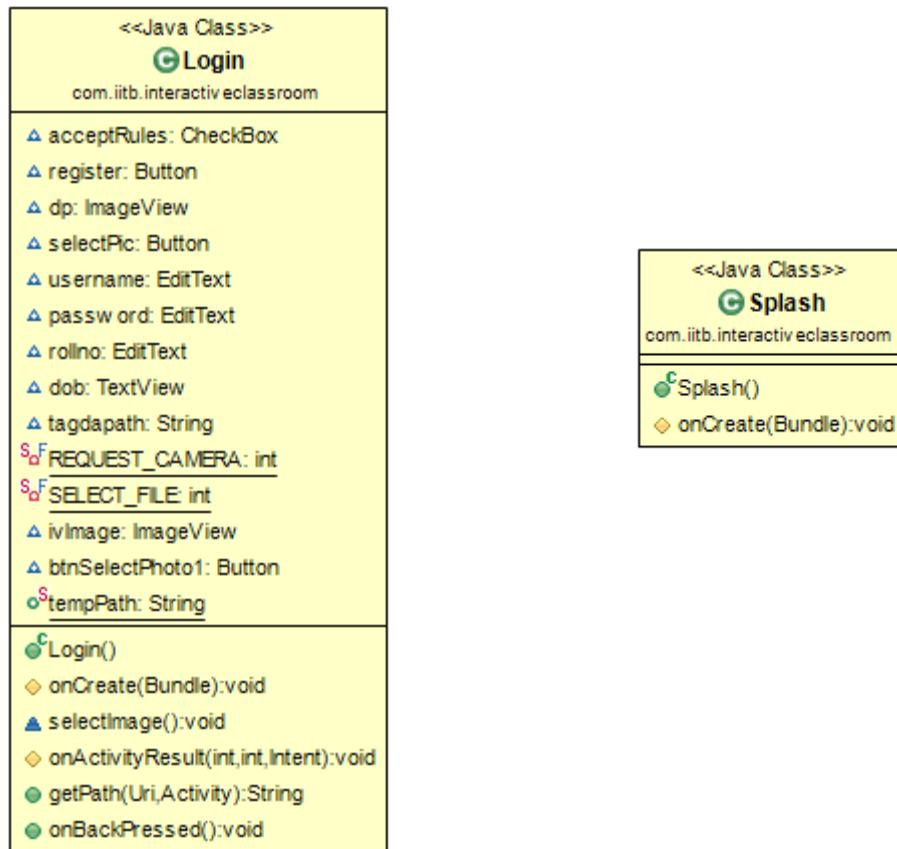


Fig 3.1.7 Class Diagrams for SignUp Page And Splash Screen

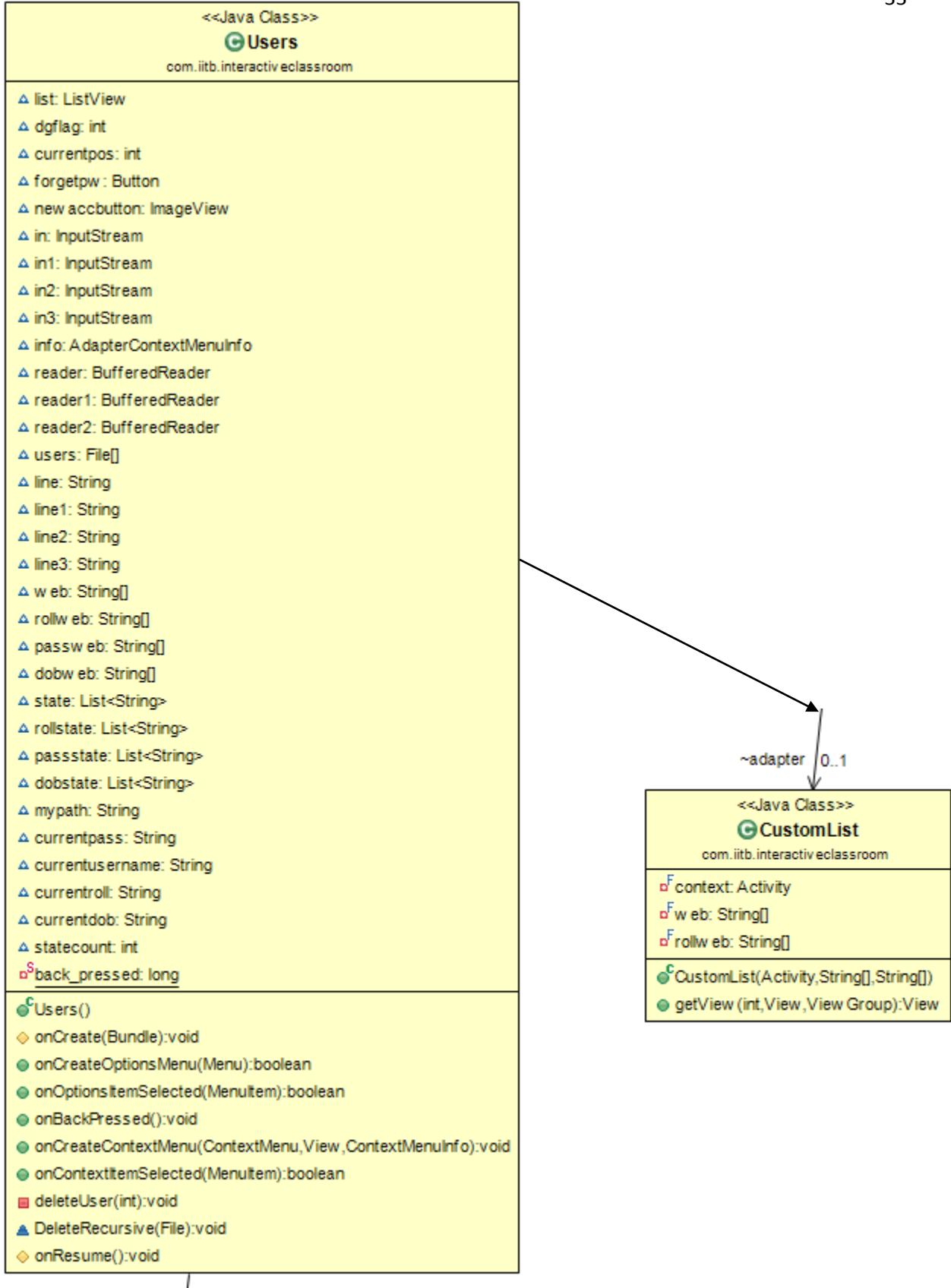


Fig 3.1.8 Class Diagram for Login page

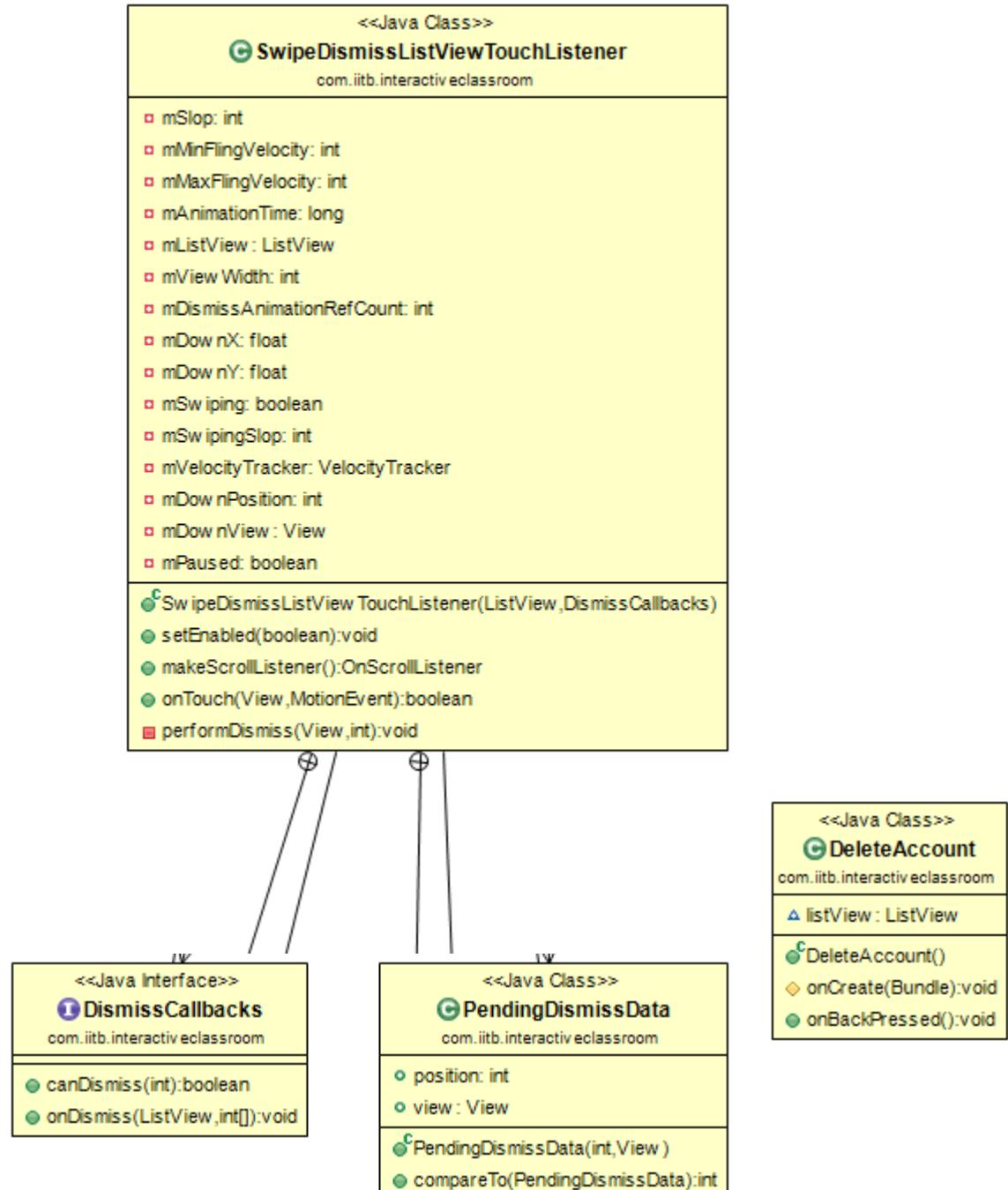


Fig 3.1.9 Class Diagram for Swipe to delete

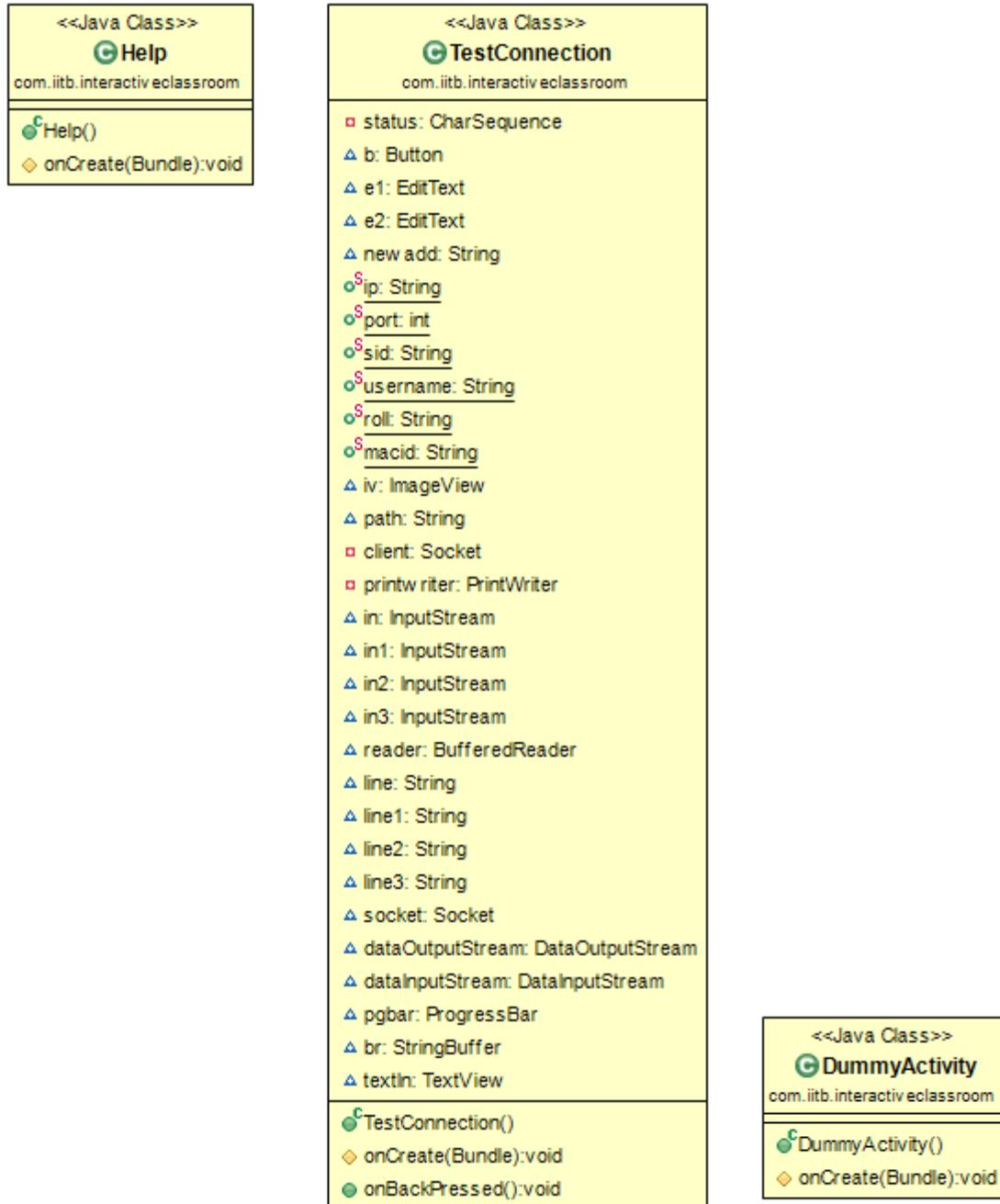


Fig 3.1.10 Class Diagrams for TestConnection,
Notification and Help

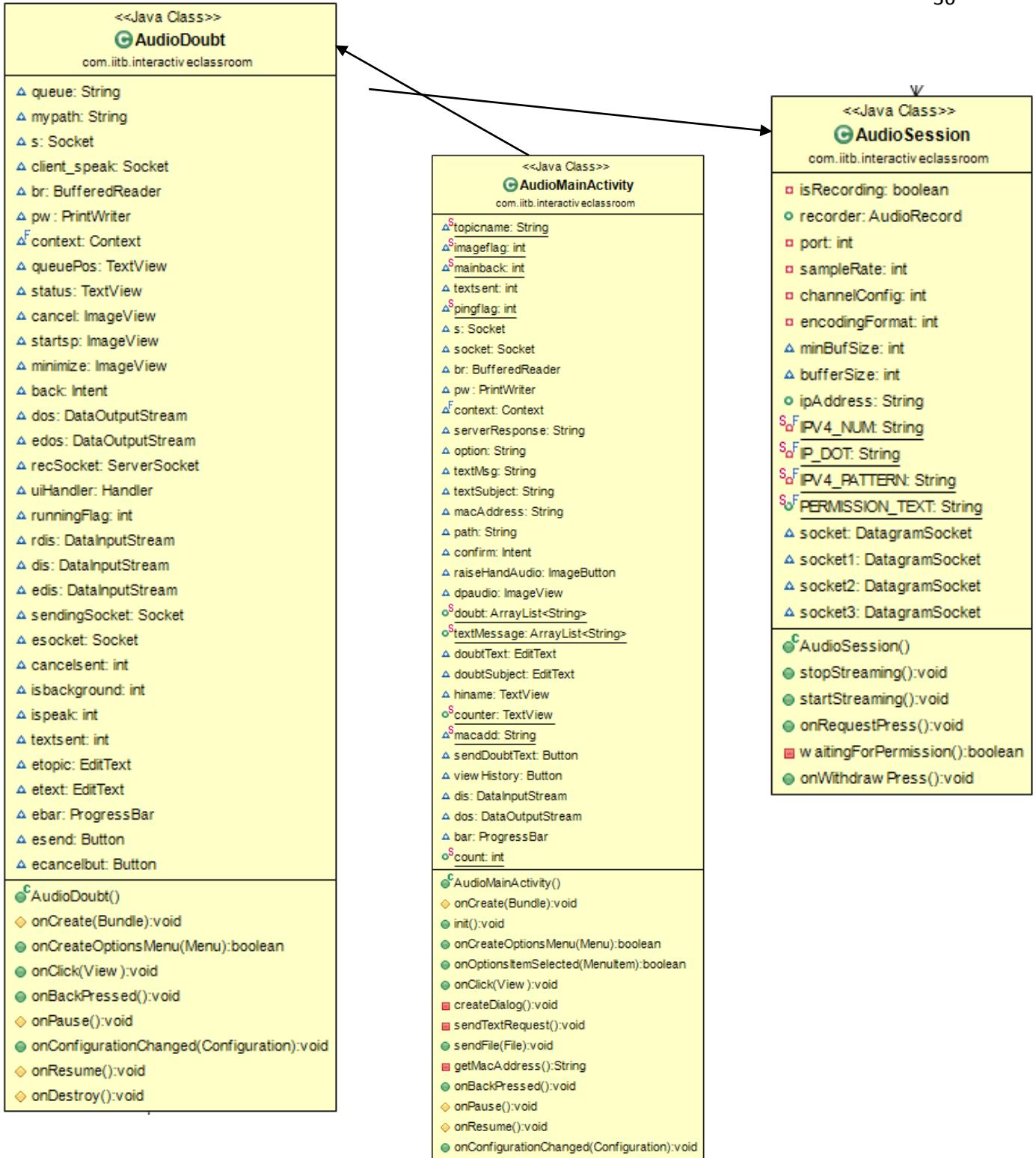


Fig 3.1.11 Class Diagrams for Audio doubt screen

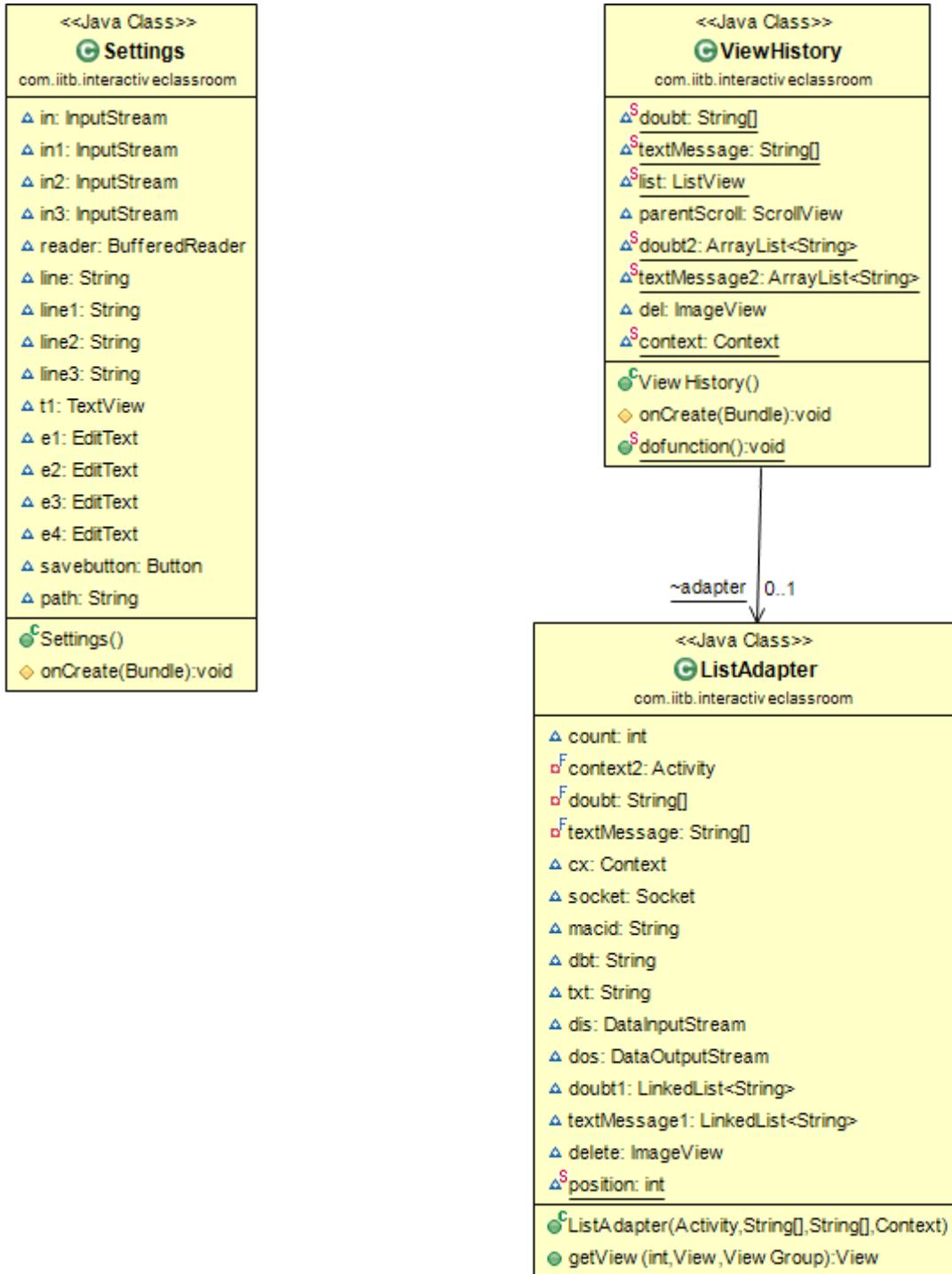


Fig 3.1.12 Class Diagrams for settings and view history

3.1.6.3 Data Flow Diagrams

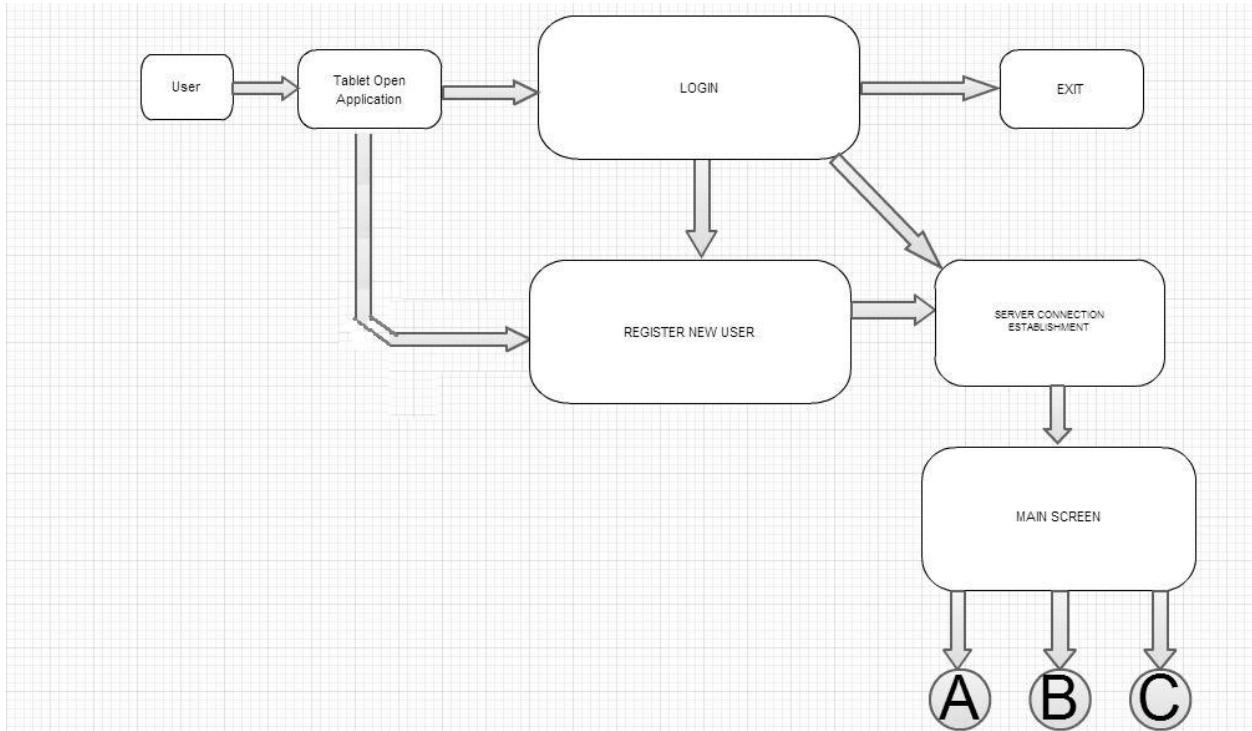


Fig 3.1.13 Data flow diagram for login screen

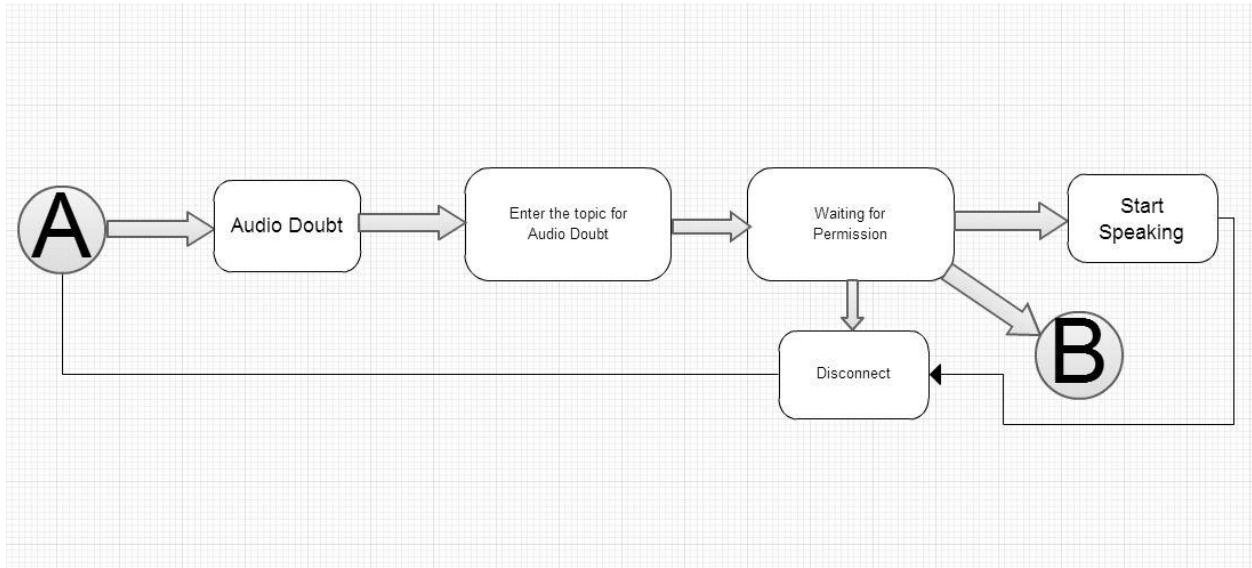


Fig 3.1.14 Data flow diagram for Audio Doubt

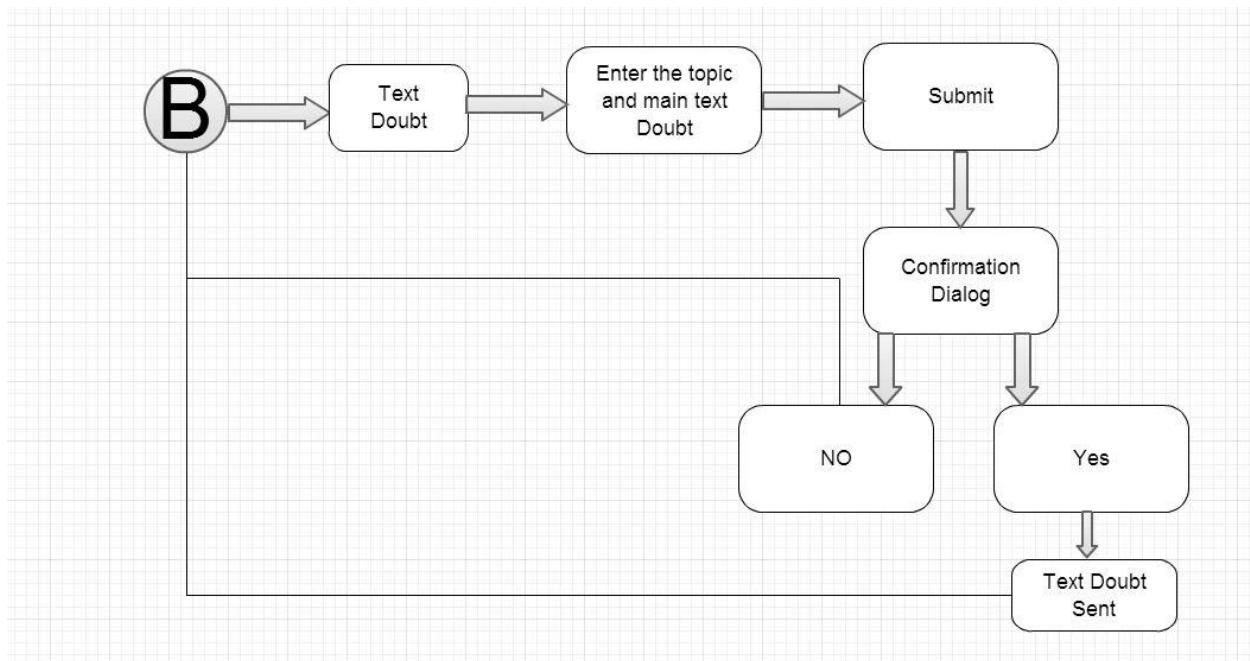


Fig 3.1.15 Data flow diagram for Text Doubt

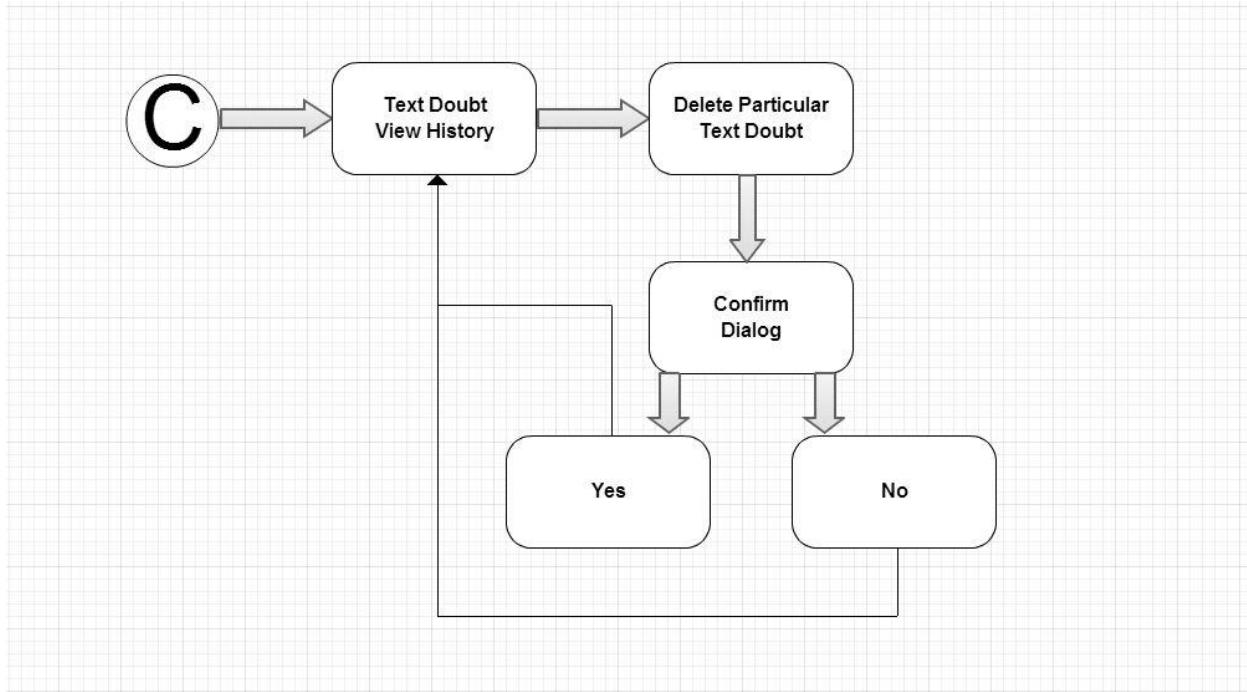


Fig 3.1.16 Data flow diagram for View History

3.1.6.4 Sequence Diagram

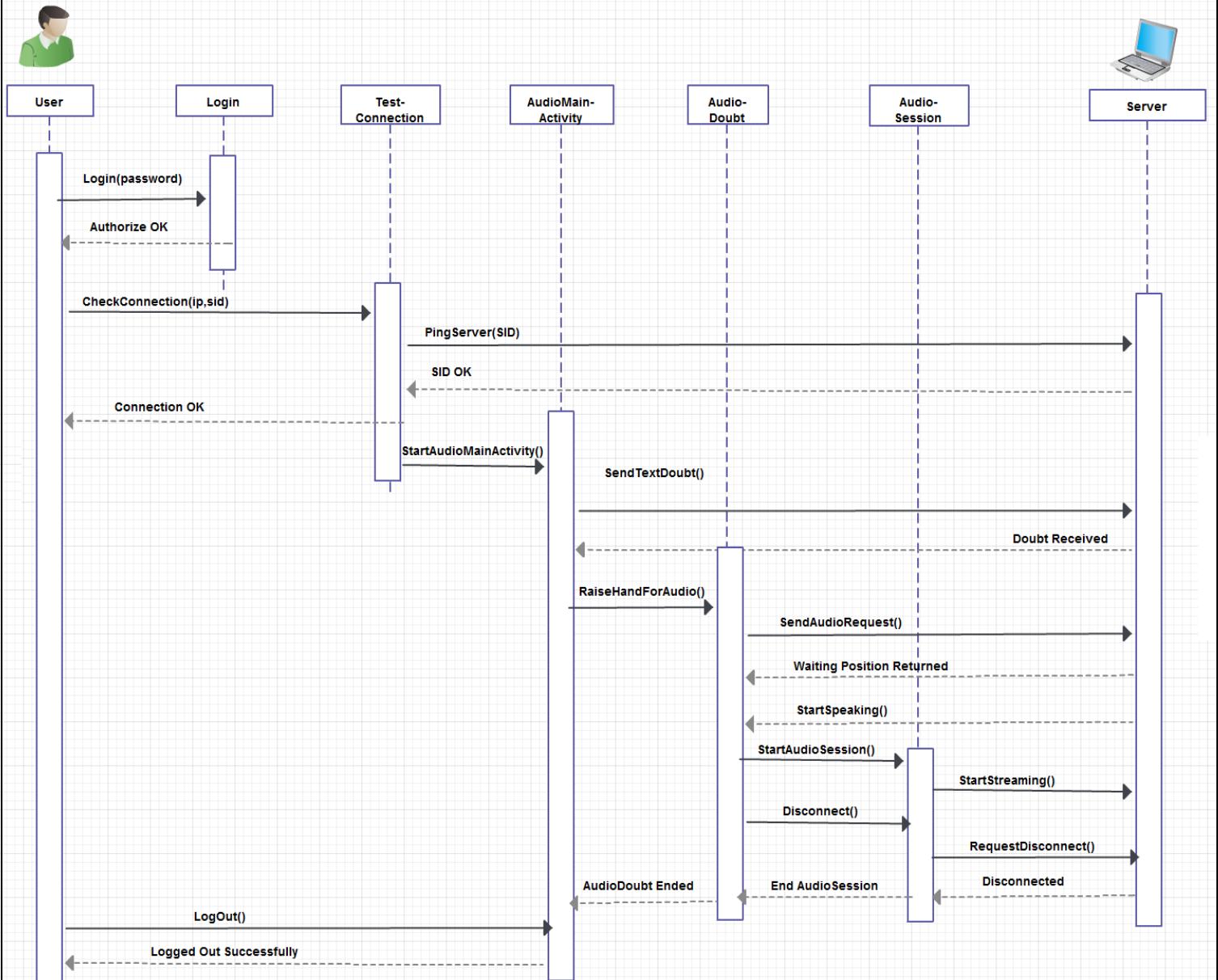
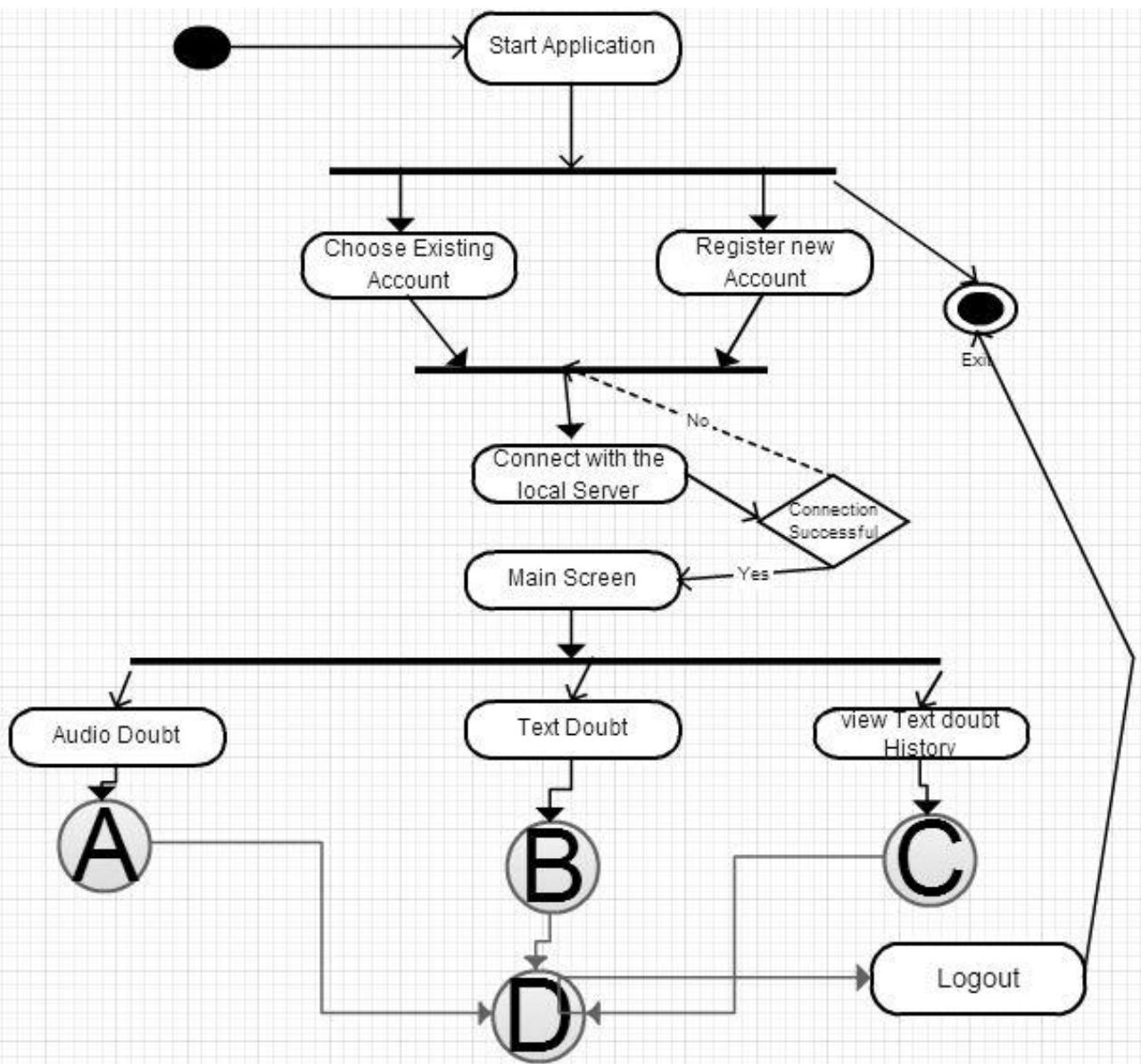


Fig 3.1.17 Sequence Diagram for Logging in, Sending Text Doubt and Audio Doubt and Logout

3.1.6.5 Activity Diagram



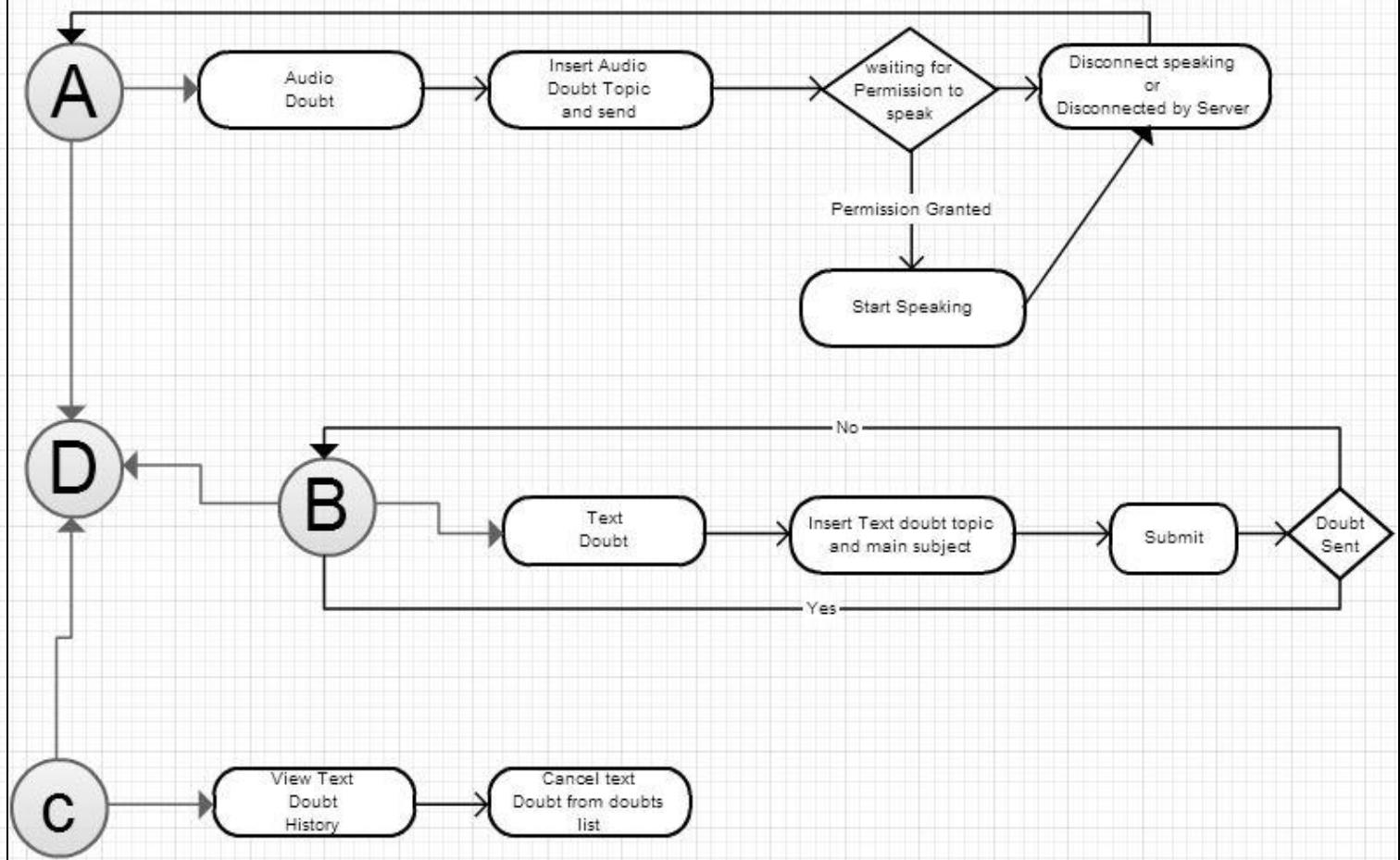


Fig 3.1.18 Activity Diagrams for i-Class client Application

Section 3.2:

i-Class Server

3.2.1. External Interface Requirements:

The application will run on any operating system like Windows, Linux Mac OSx installed with java (Java Virtual Machine). No further hardware devices or interfaces will be required.

3.2.1.1 User Interfaces:

- **Inputs:**

The user enters information (Professor's name, doubt subject, Doubt text ,department)and connects to available network .

- **Outputs:**

Server can receive doubt and audio text from client through the socket established.

- Operating Systems :

Windows, Linux, Mac book etc.

3.2.1.2 Hardware Interfaces:

- 32 bit operating system

3.2.1.3. Software Interfaces:

- JAVA
- ETHERNET /WIFI

3.2.2 Functional requirements

3.2.2.1 i-Class Server Interface

a) New Server:

The user can start a new server from the menu option for a new session.

b) View:

The user can select number of entries that he want to view in the panel.

c) Search:

The user can search on basis any keyword (topic , username)to view their doubt.

d) Audio:

The user can view all the audio doubt in a single panel.

e) Text:

The user can view all the text doubt in a single panel.

f)Select:

The user can select any doubt from audio or text just by clicking on tick button.

g)Delete:

The user can delete any doubt from audio or text just by clicking on cross button.

h)Export:

The user can upload the all doubt text to a website by clicking on export button from menu.

i)Exit:

The user can close the server by clicking on exit button from menu.

3.2.3Non-functional requirements

3.2.3.1Performance Requirements:

TCP connection has been to send data from client to server or vice-versa .The application provides a responsive interface. There is a minimal delay in retrieving data from the linklist.

a) Maintainability:

Software needs to be upgraded if required in future.

b)Reliability:

Data of the session is saved in .txt file and at the end of session it is uploaded in forum.

3.2.4 Behavioral Requirements:

UML:

The **Unified Modeling Language (UML)** is a general-purpose modeling language in the field of software engineering, which is designed to provide a standard way to visualize the design of a system. The Unified Modeling Language (UML) offers a way to visualize a system's architectural blueprints in a diagram. Different type of UML diagram are as follows:

1. Use Case:

A **use case diagram** at its simplest is a representation of a users interaction with the system and depicting the specifications of a use case

2. Activity Diagram:

Activity diagrams are graphical representations of workflows of stepwise activities and actions with support for choice, iteration and concurrency

3. Sequence Diagram:

A **sequence diagram** is an interaction diagram that shows how processes operate with one another and in what order. It is a construct of a Message Sequence Chart.

4. Class Diagram:

A **class diagram** is a type of static structure diagram that describes the structure of a system by showing the system's classes, their attributes, operations (or methods), and the relationships among objects.

5. Data Flow Diagram:

A **data flow diagram (DFD)** is a graphical representation of the "flow" of data through an information system, modeling its *process* aspects

3.2.4.1 USE CASE DIAGRAM

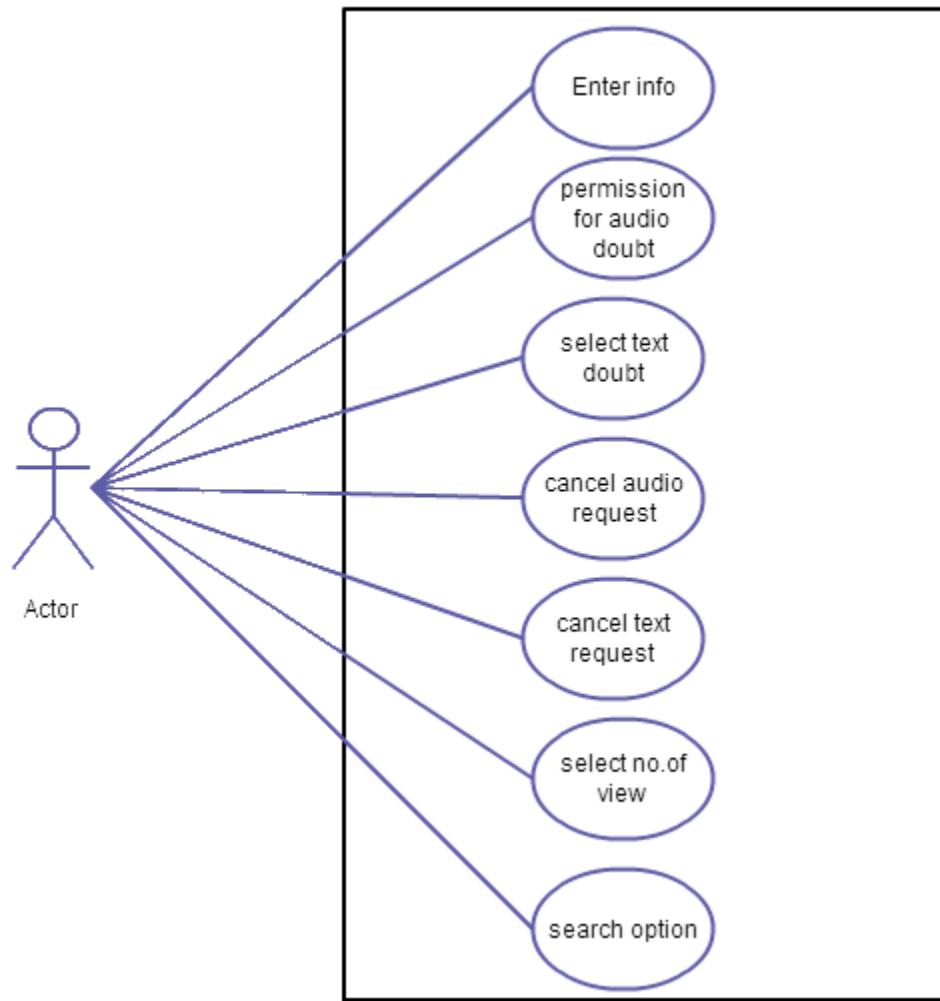


Fig 3.2.1 Use case diagram for server interface

3.2.4.2 ACTIVITY DIAGRAM

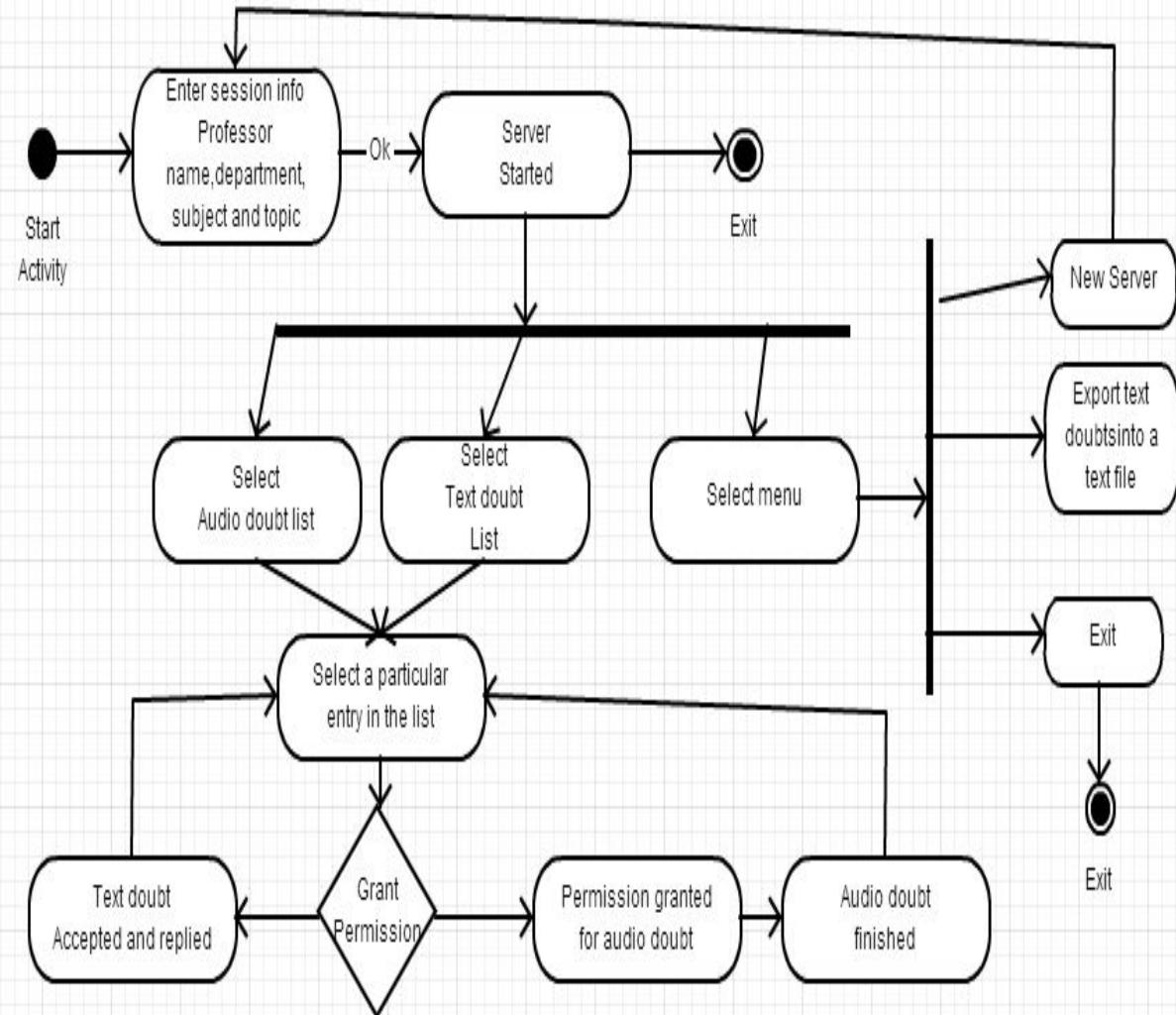


Fig 3.2.2 Activity diagram for server interface

3.2.4.3 Sequence diagram

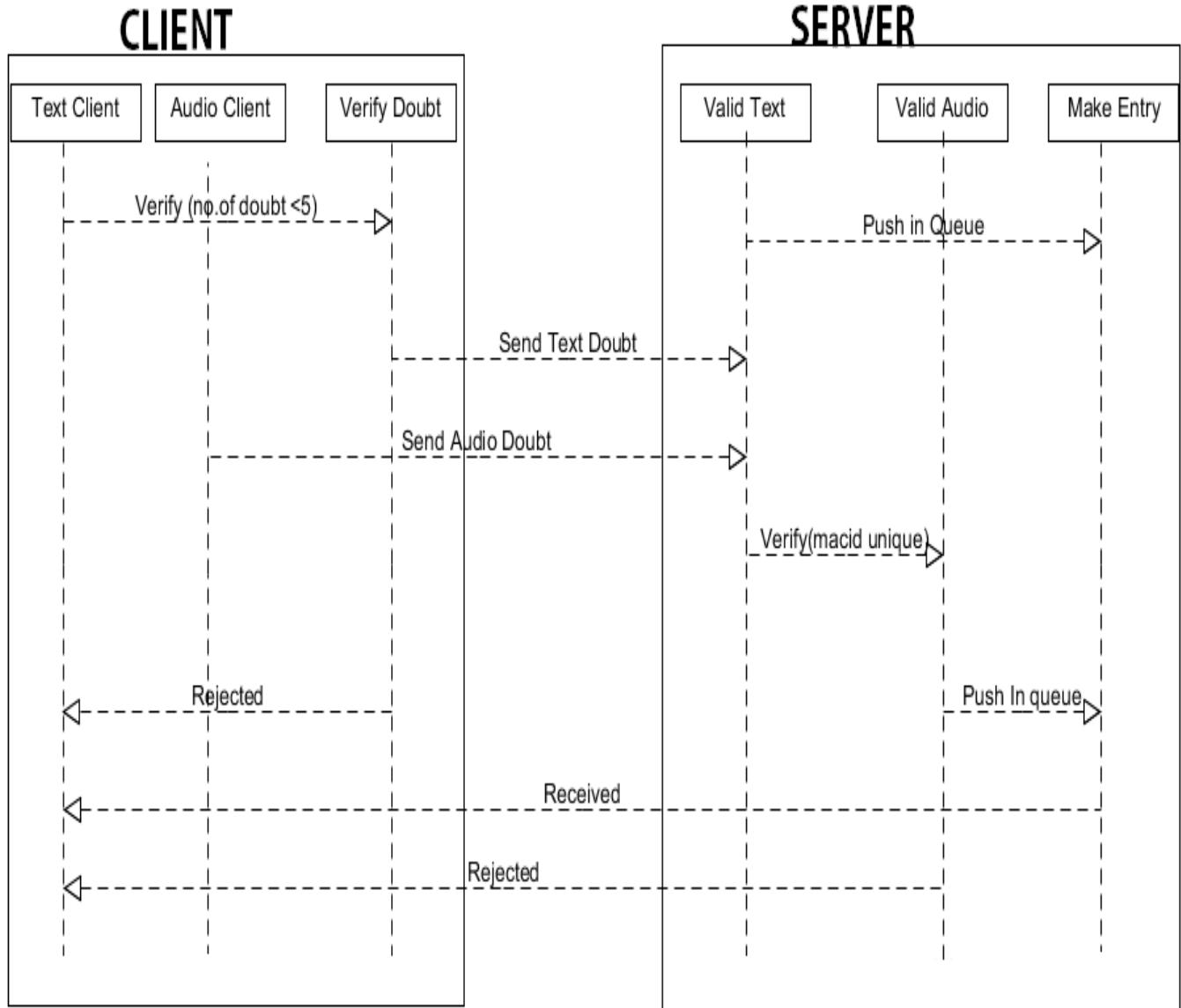


Fig 3.2.3 Sequence diagram for server interface

3.2.4.4 Class Diagrams

a)Splash mainscreen

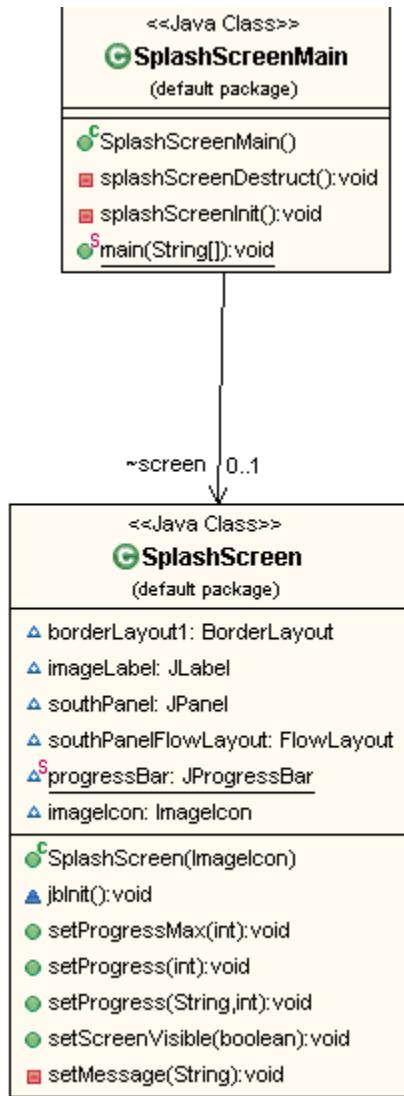
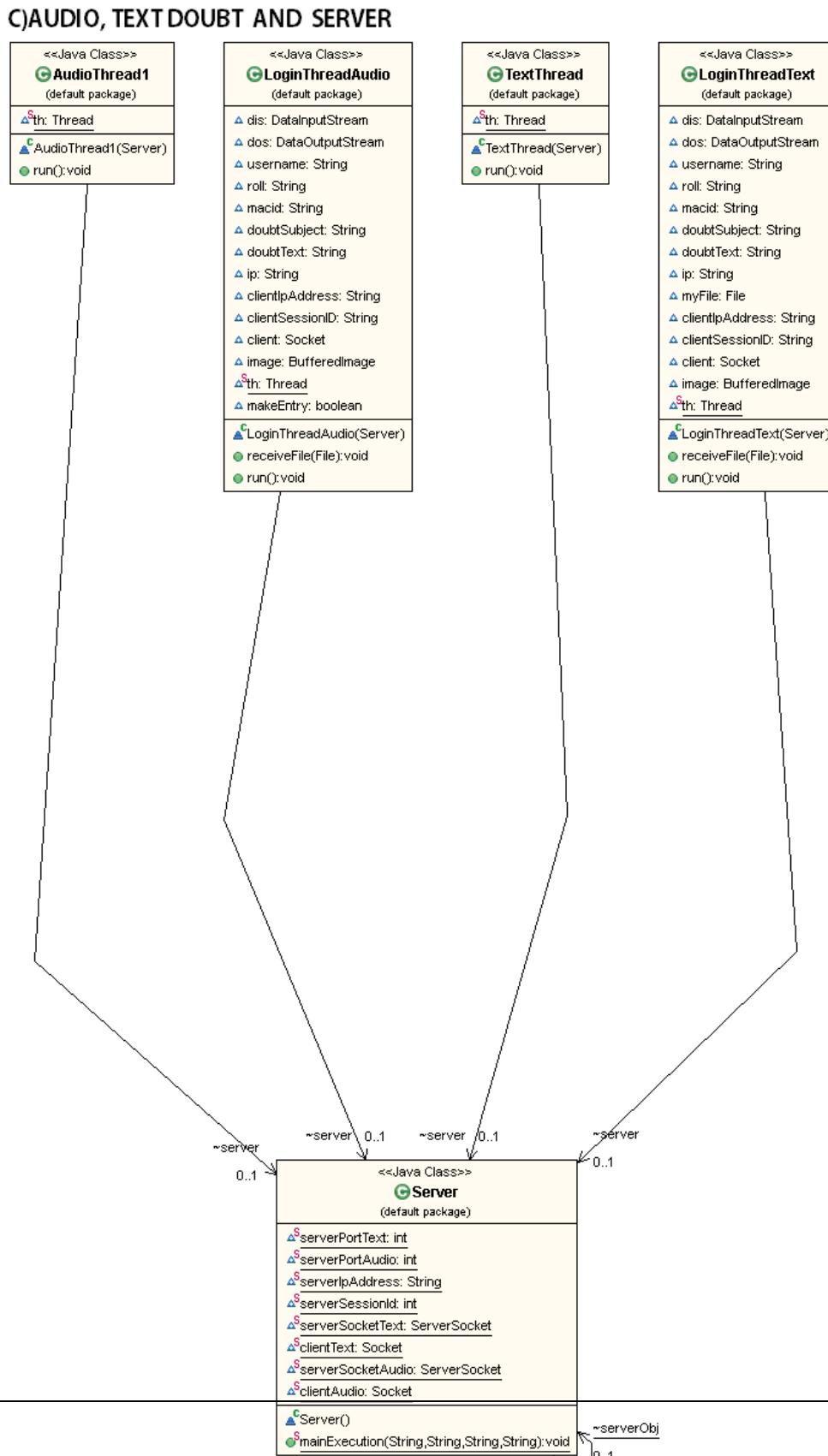


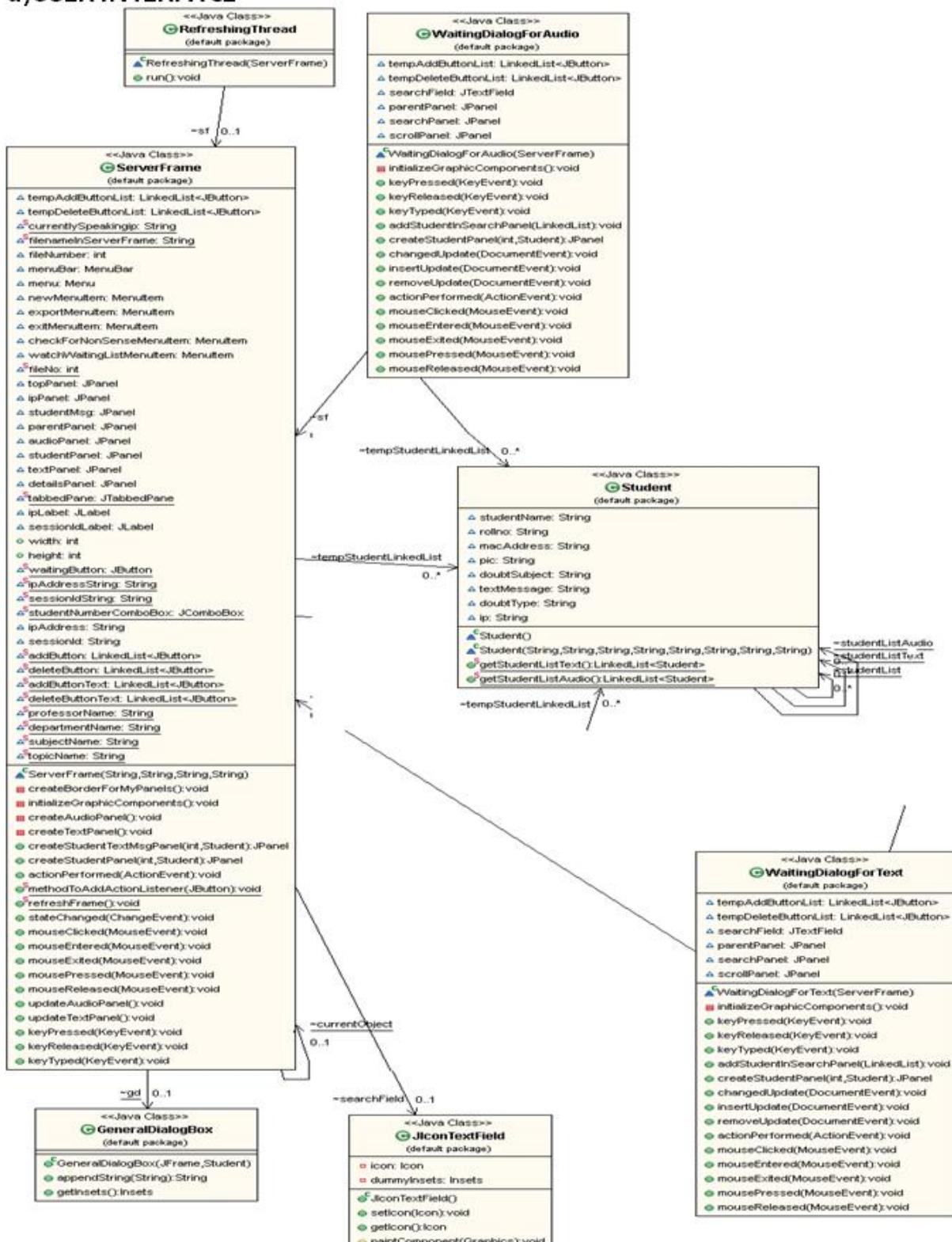
Fig 3.2.4

b)WELCOME SCREEN:**Fig 3.2.5**

Fig 3.2.6



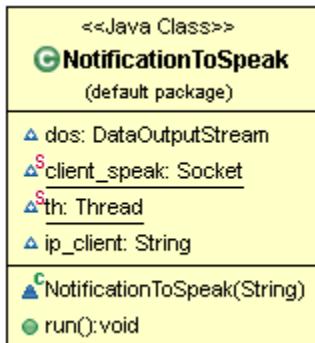
d) USER INTERFACE



e)PRINT IN FILE: (Fig 3.2.8)



f)NOTIFICATION TO SPEAK: (Fig 3.2.9)



3.2.4.5 DATA FLOW DIAGRAM

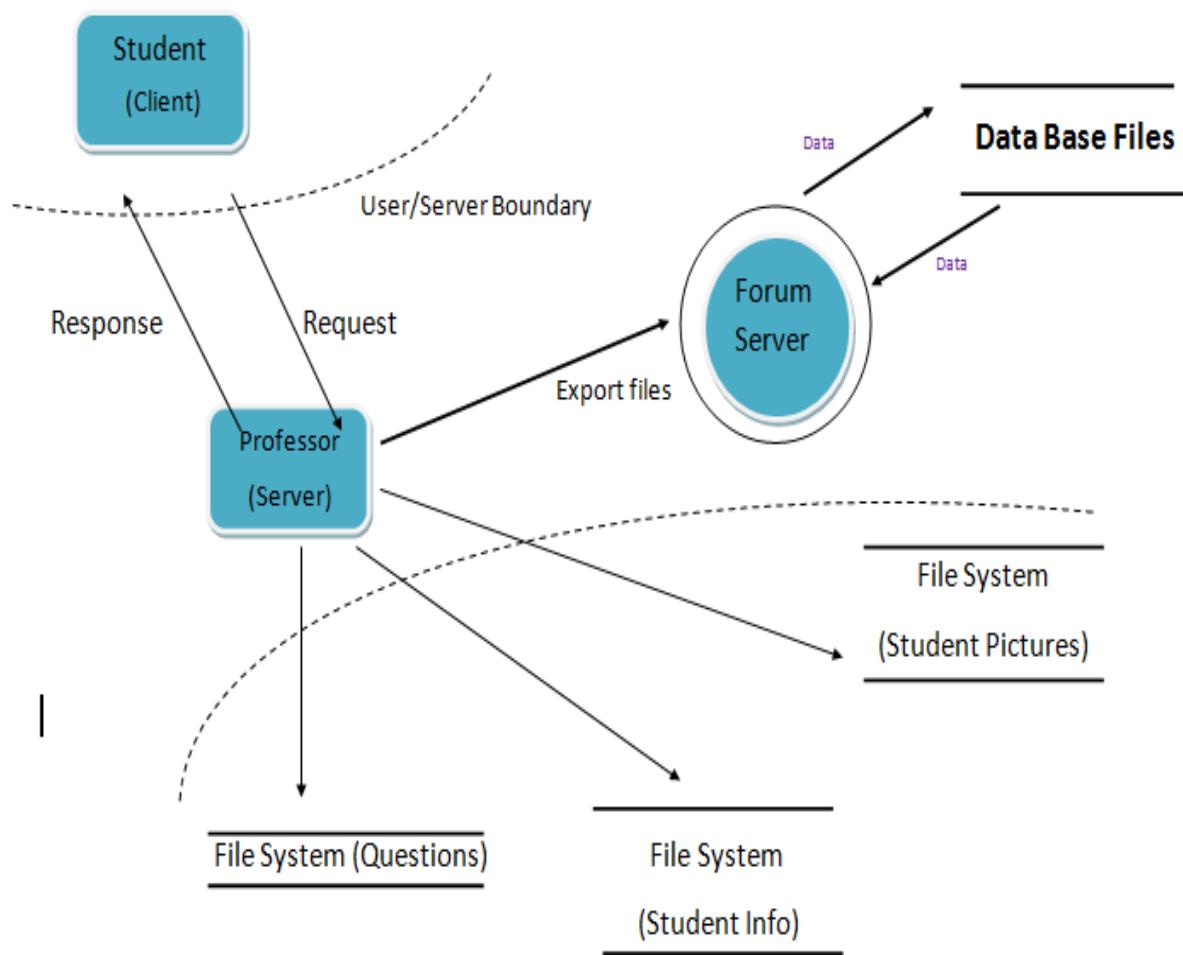


Fig 3.2.10 Data flow diagram for server

Section 3.3

i-Class Forum

3.3.1 External Interface Requirements:

i-Class Forum will depend on External interface I-Class Application and I-Class Server. Doubts discussed through I-Class Application will be uploaded by Professor via I-Class Server in the Forum.

3.3.1.1. User Interfaces:

- **Inputs**: The user need not give any input except choosing a department and professor of his choice.
Professor needs to Input his login details to access the contents and he needs to input solutions of unanswered doubts.
- **Outputs**: The Forum responds to the input by displaying the list of desired Department ,Professor or lecture.
- **Operating Systems** : Any O.S which supports web browser.

3.3.1.2 Hardware Interfaces:

Any System with minimum RAM 256 MB and web browser.

3.3.1.3 Software Interfaces:

NetBeans IDE, Apache Server and MySQL shall be used as development environment for implementing the modules of I-Class Forum. Designing of modules and diagrams is done in UML using MS word and createley.com

3.3.2. Functional requirements

3.3.2.1. Login Tab

The user i.e. Professor can click this tab and fill in his details to log in.

3.3.2.2. Contact Us Tab

New Professor who hasn't been registered in I-Class Forum can send Request to admin via Contact Us Tab.

3.3.2.3. Home Tab

To Return back to home screen.

3.3.2.4. Department Panel:

A list which displays list of department.

3.3.2.5. Professor Panel:

A list which displays list of Professor.

3.3.2.6. Lecture Panel:

A list which displays list of lectures

3.3.2.7. Doubts page:

A page where all the discussions and doubts occurred during class room session is uploaded.

3.3.2.8. LogOut Tab:

Professor can log out by clicking this tab and return back to home screen.

3.3.3 Non-functional requirements

3.3.3.1 Performance Requirements:

The forum will need to provide a responsive interface. There should be minimal delay in retrieving any content or associated detail.

a) Maintainability:

Forum may be modified to satisfy needs in future.

b) Reliability:

Uninterrupted Internet connectivity

3.3.3.2 Safety Requirements

There is no safety requirements associated with this application.

3.3.3.3 Security Requirements

There is no security requirements associated with this application.

3.3.4 Behavioural Requirements:

3.3.4.1 DATA FLOW DIAGRAM

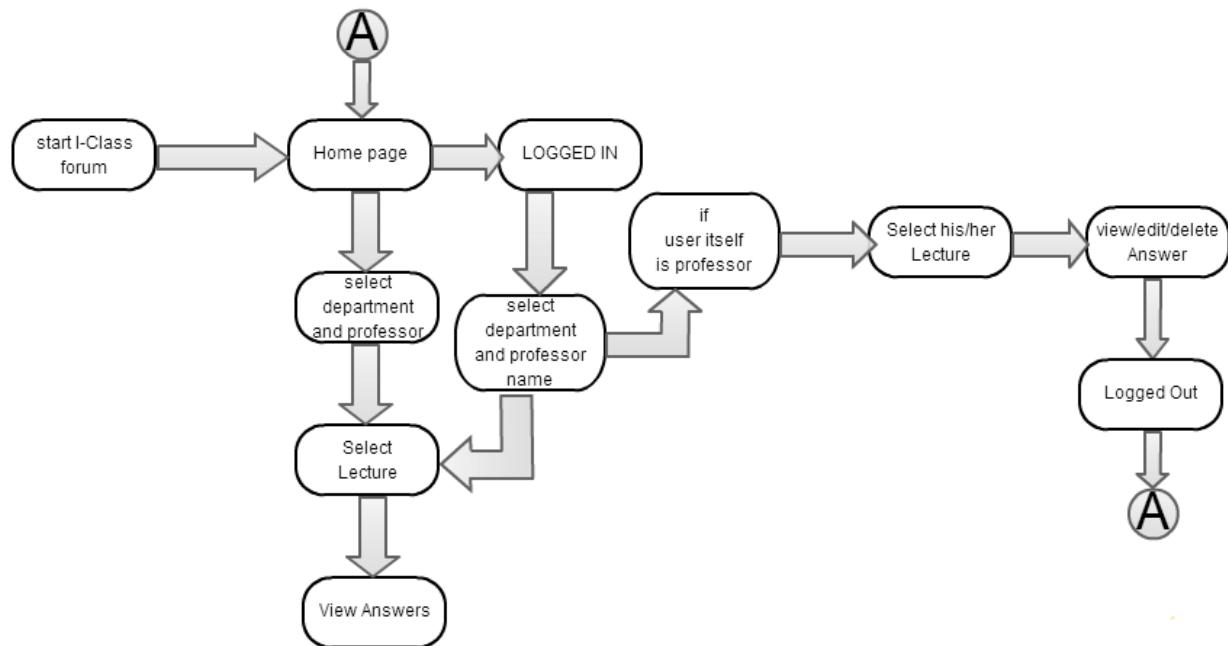


Fig 3.3.1 Data flow diagram for i-Class forum

3.3.4.2 Use Case Diagram

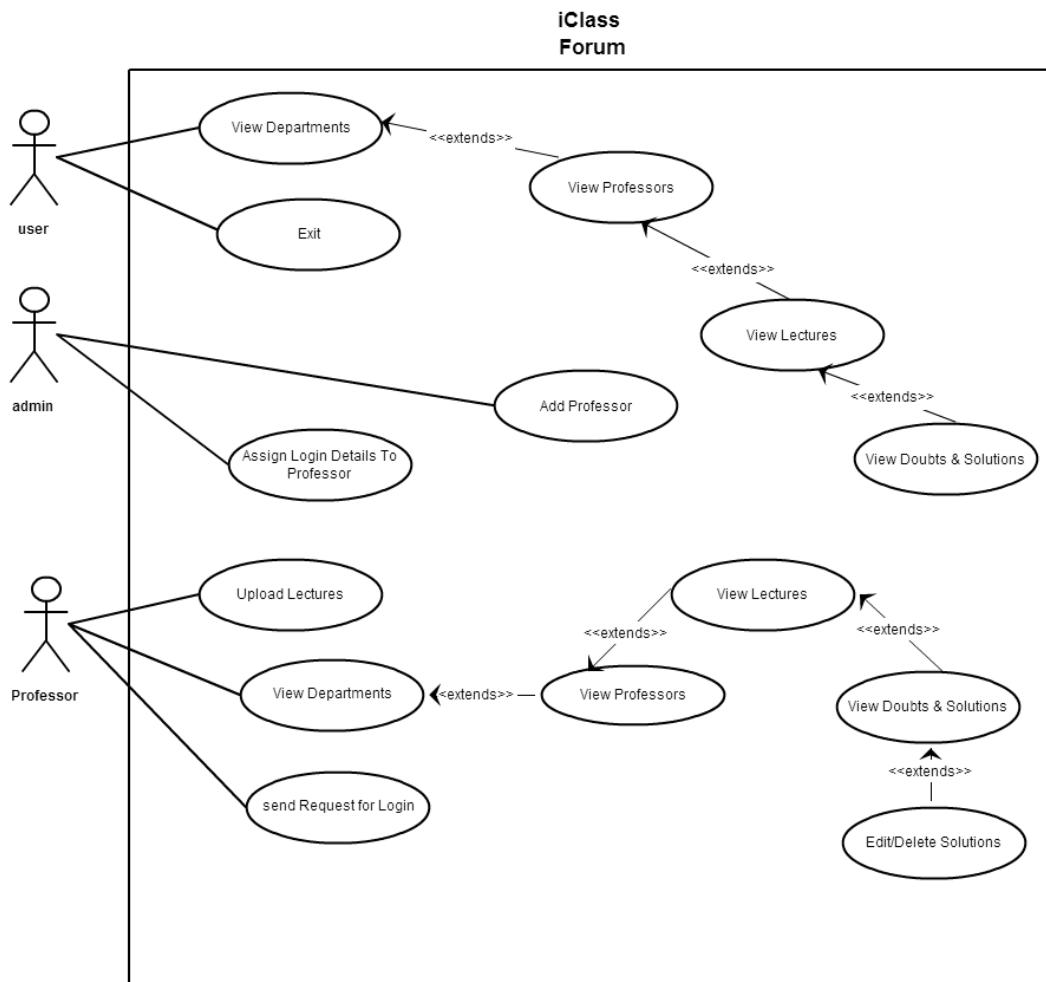


Fig 3.3.2

3.3.4.3 SEQUENCE DIAGRAM

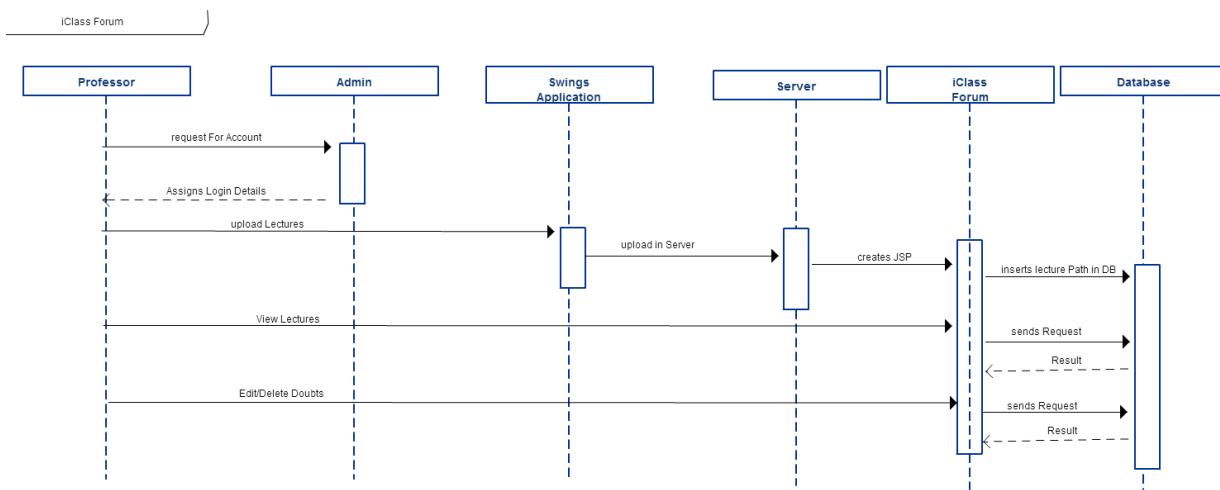


Fig 3.3.3

3.3.4.4 ACTIVITY DIAGRAM

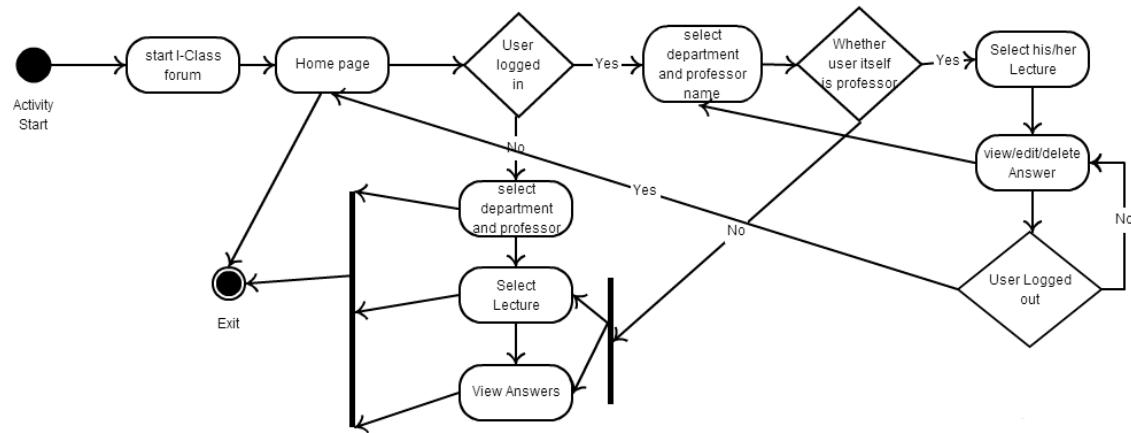


Fig 3.3.4

Chapter 4:

User Manual

i-CLASS

Interactive Classroom Live Audio Streaming System

USER MANUAL

*REVOLUTIONIZING THE EDUCATION
SYSTEM IN INDIA*

SECTION 4.1

**i-CLASS
Android
Application**

4.1.1 Creating An Account

If there is no account present in the tab then you will be, by default, redirected to the 'Create Account' page. Otherwise, you can also click on the 'Add Account' icon on the 'Login' page to go to the 'Create Account' page.

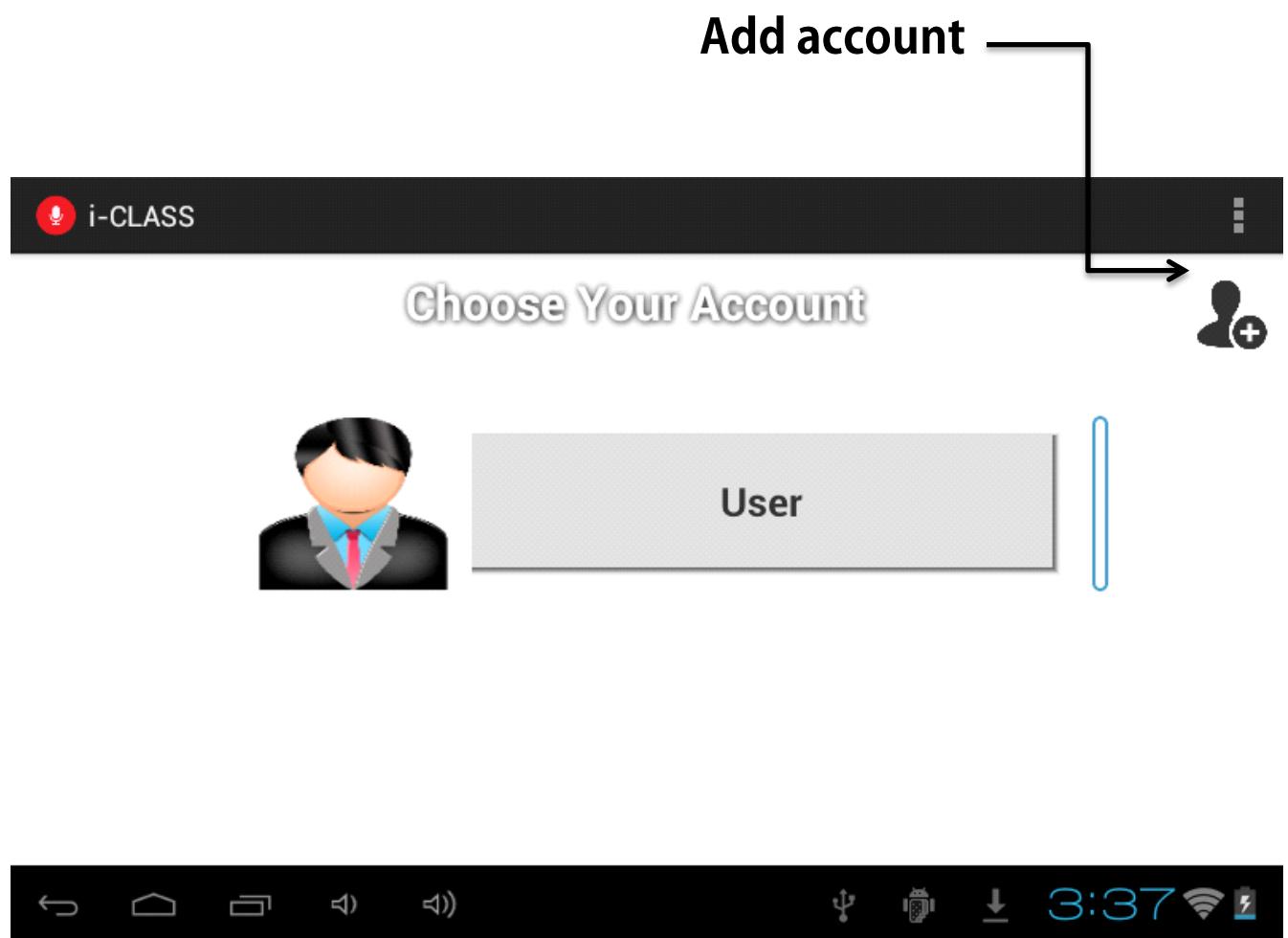


Fig. 4.1.1.1 Accounts Screen

The 'Create Account' Page has the following fields:-

- **Name**
- **Roll Number**
- **Date Of Birth**
- **Password**

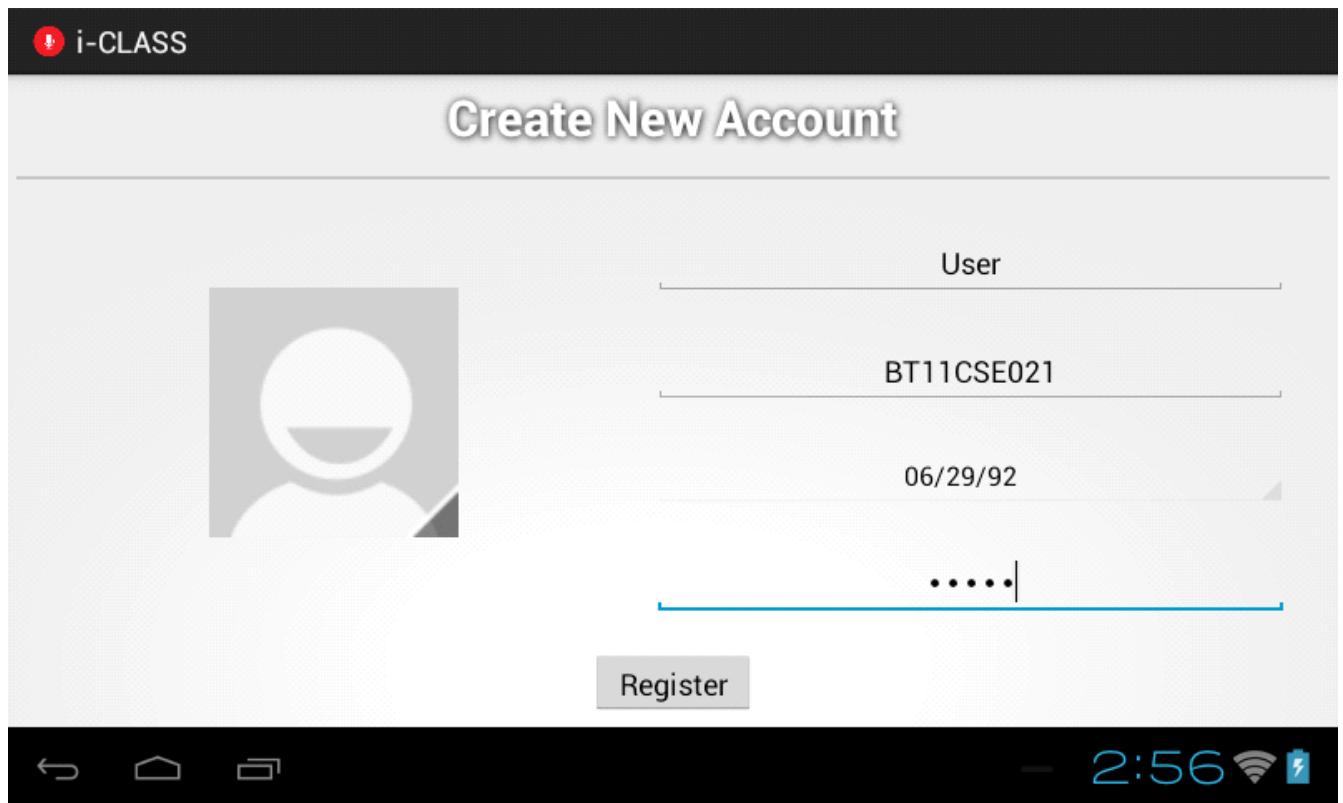


Fig. 4.1.1.2 creating a new Account

Click on the profile picture icon to select one.

Once you click on it, you will be presented with options as follows:-

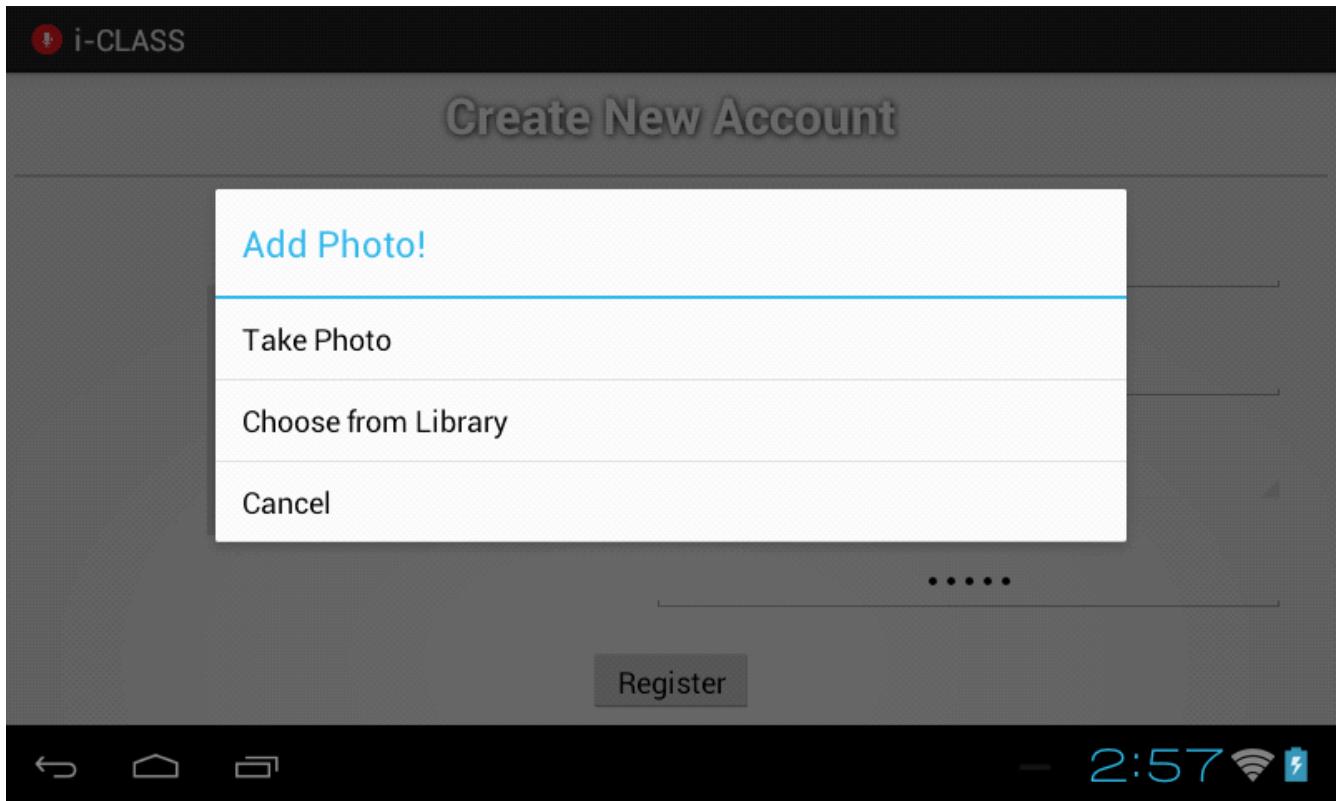


Fig. 4.1.1.3 choosing a profile picture

You can directly take the photo using camera of tablet or choose one from gallery if the lighting conditions are not good.

Once you select your photo the page will look like this:-

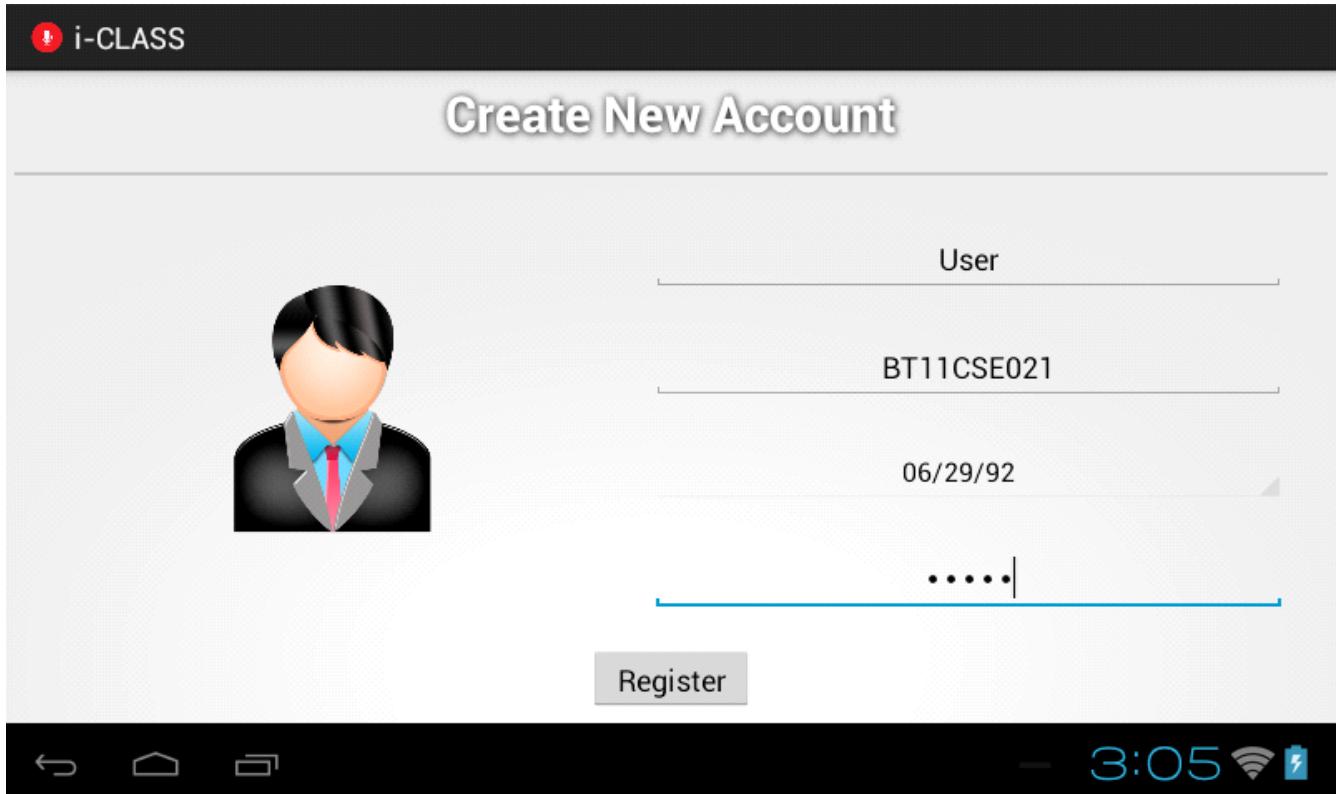


Fig. 4.1.1.4 Profile picture selected

Now click on the 'Register' button to create your account.

Congratulations!!! You have just successfully created your first account.

4.1.2 Changing Password of an Existing Account

What if you forgot your password?

What if any of your friends get to know about your current password?

Don't worry. Here we are with an easy solution for you.

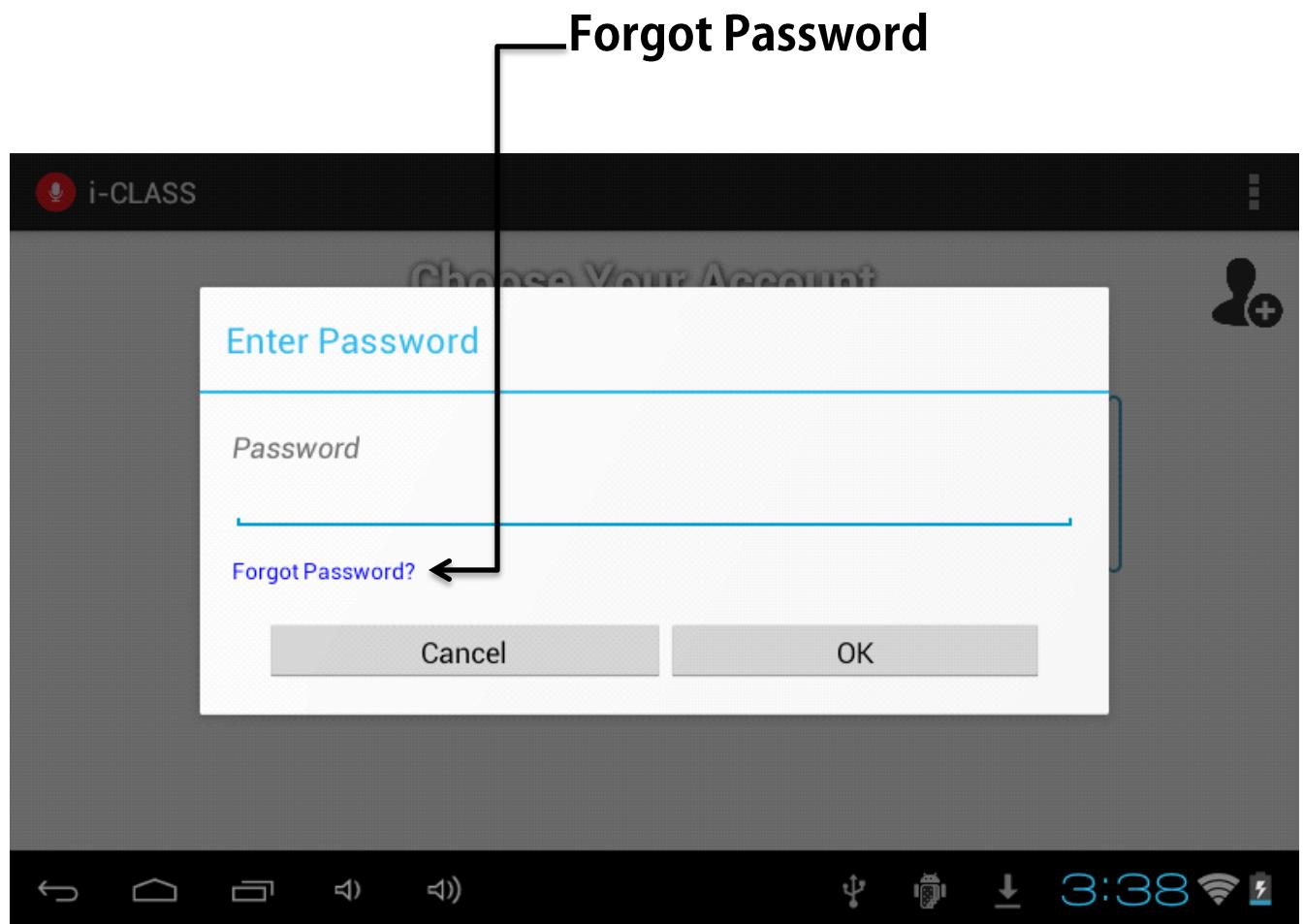


Fig. 4.1.2.1 Forgot Password link

To change the password of an existing account just click on the account. You will see the following Dialog Box.

Simply click on the 'Forgot Password' link.

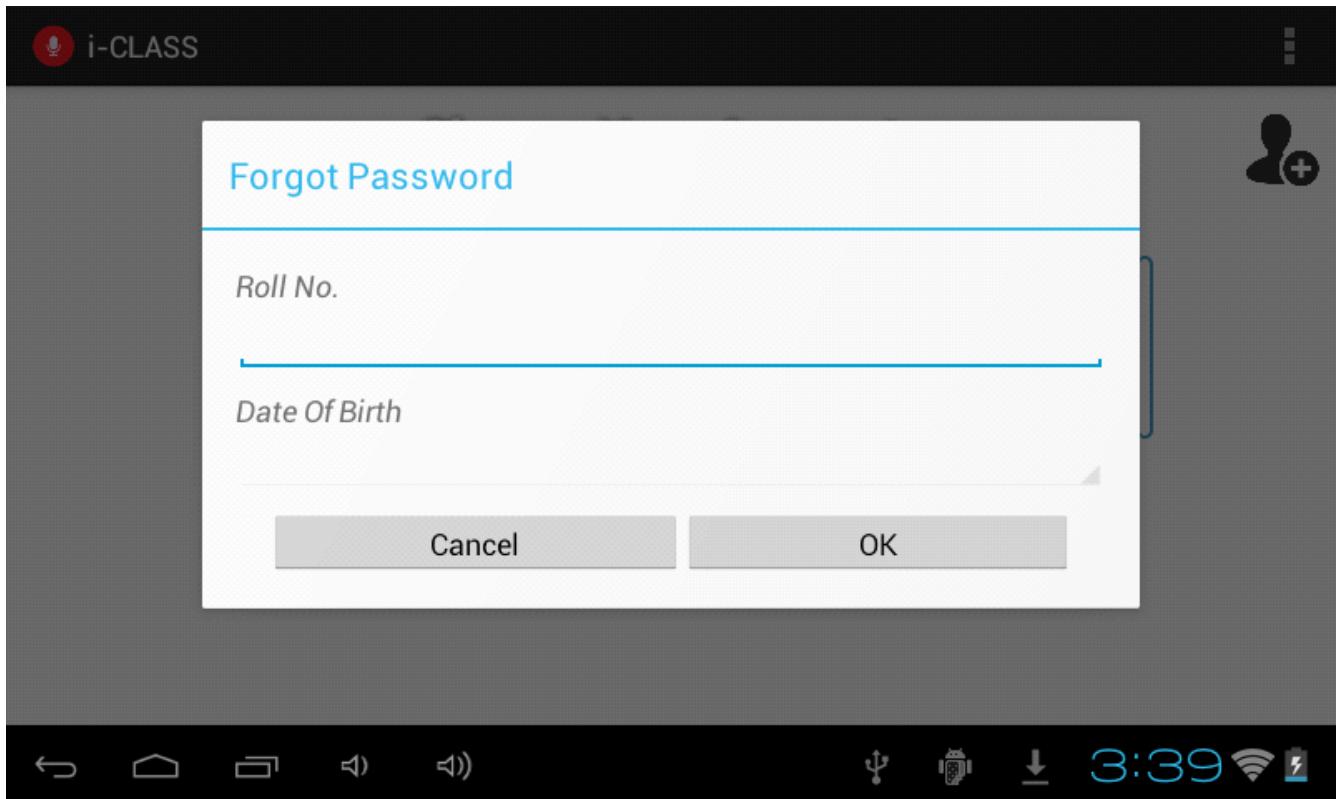


Fig. 4.1.2.2 Forgot Password page

Enter the Roll Number and Date of Birth provided during the time of creation of account for verification.

Once you enter the correct credentials, you will get a dialog box to enter a new password.

4.1.3 Logging In Using an Existing Account

To log in, just click on that particular account and you will be prompted for password.

Enter the correct password.

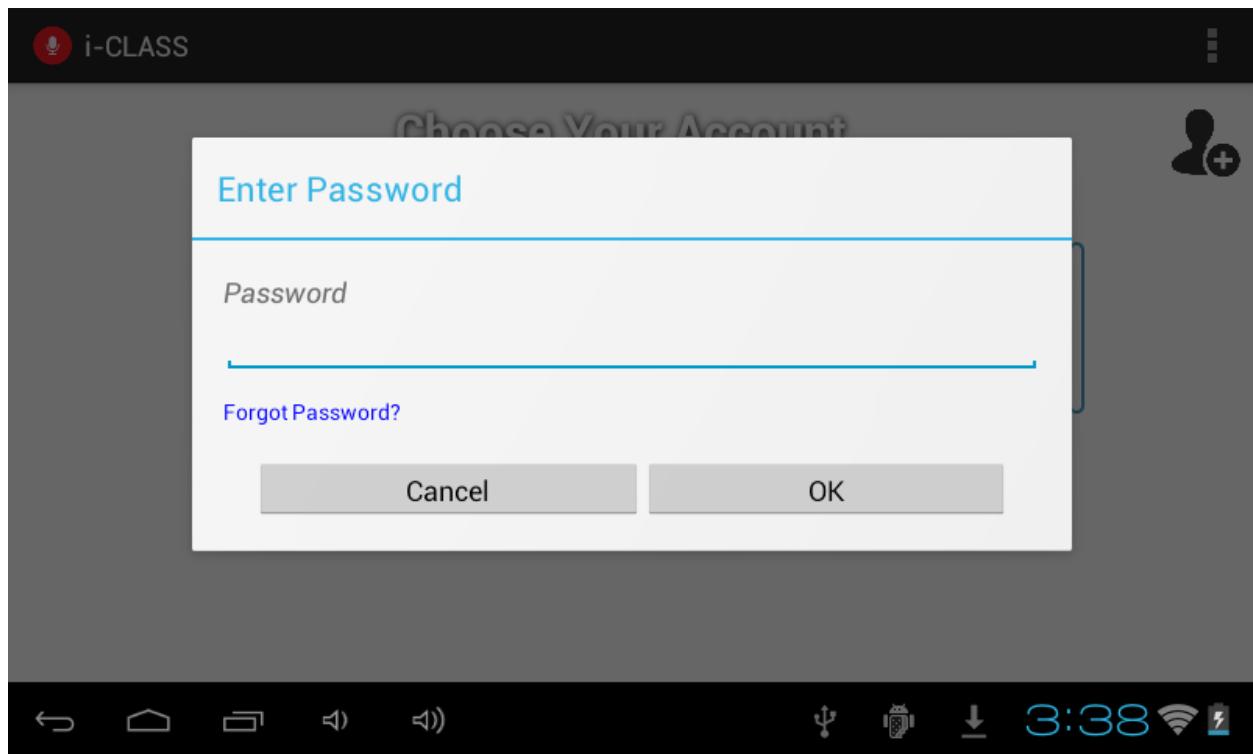


Fig. 4.1.3.1 Login Page

After entering password click on Ok. You will be redirected to next page with a notification of successful login as follows:

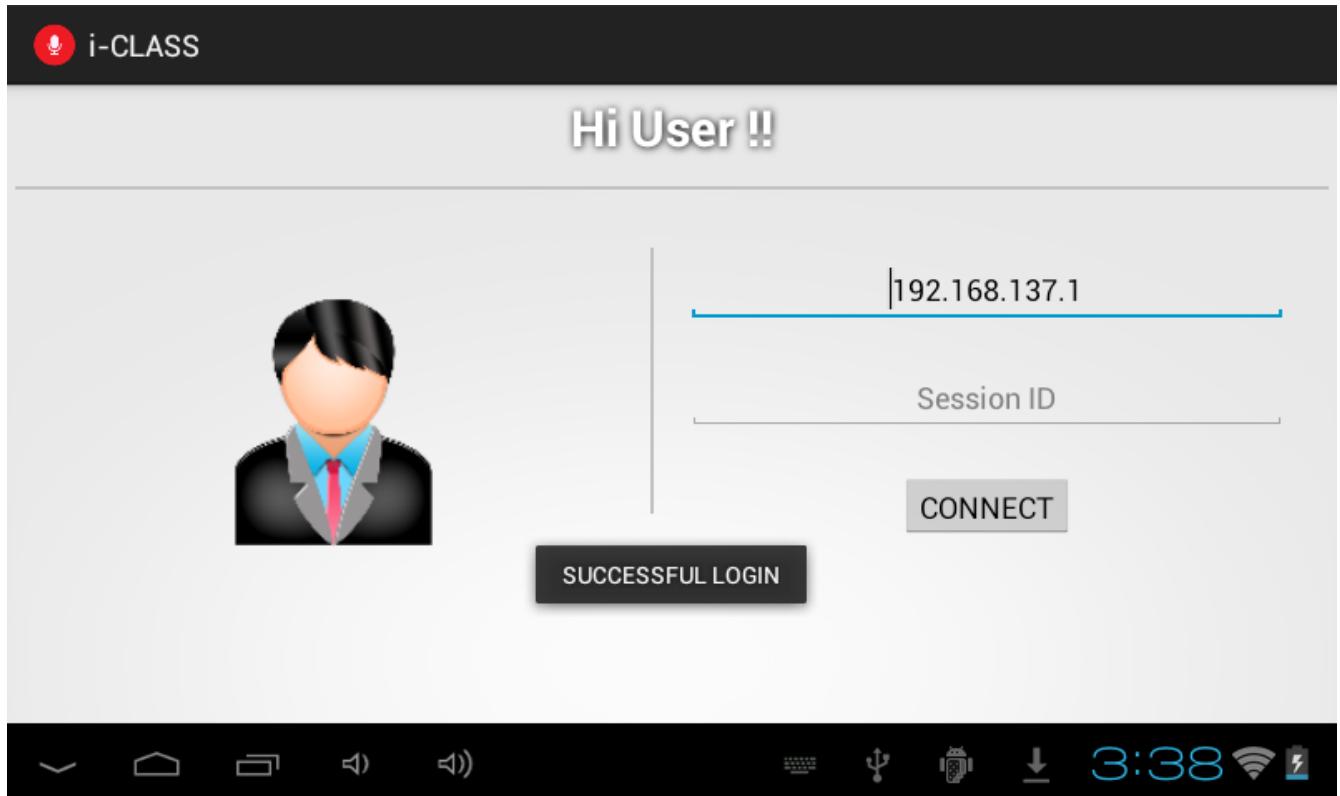


Fig. 4.1.3.2 Page after successfully logging in

4.1.4 Deleting An Account

For deleting an existing account, simply swipe the particular account tab to either side to delete it.

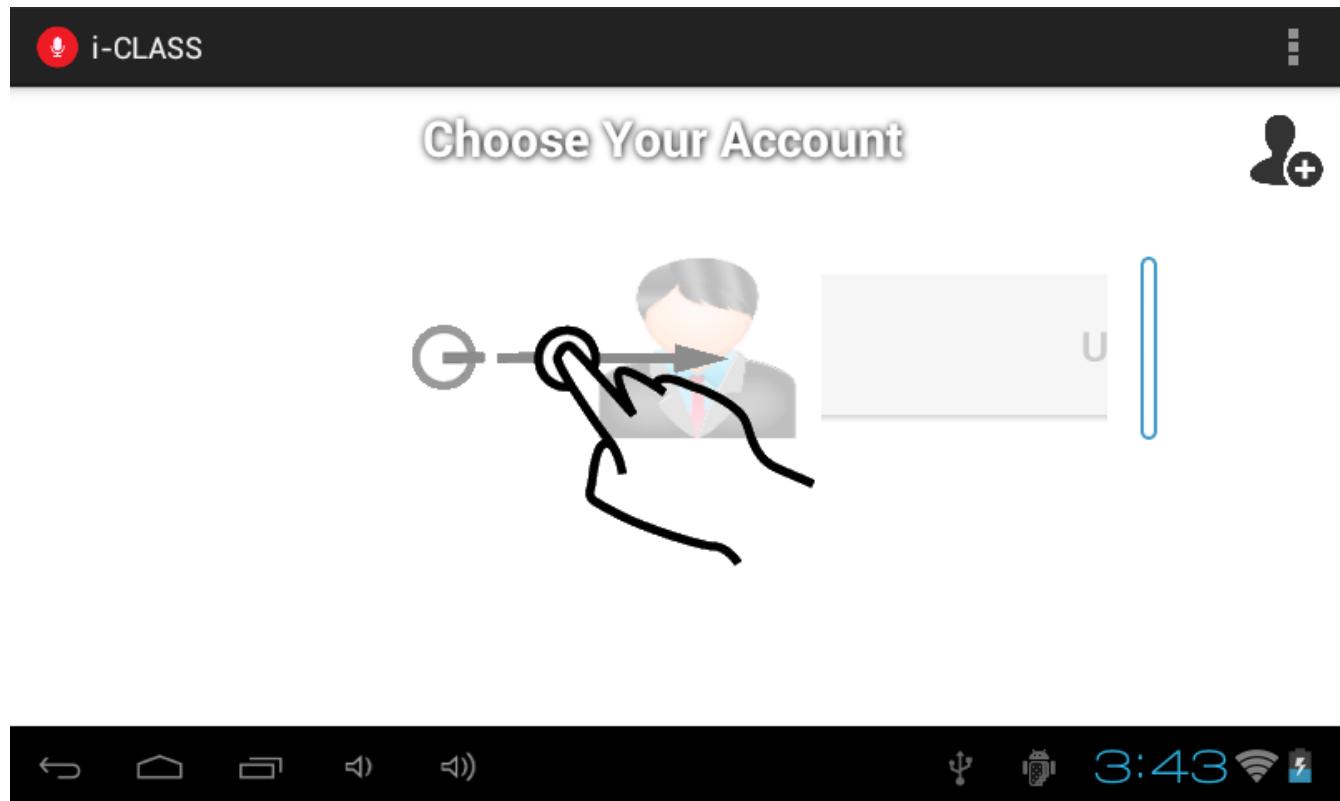


Fig. 4.1.4.1 Swipe to delete demonstration

Once you swipe it to either side, you will get a prompt asking for password authorization in order to delete the account.

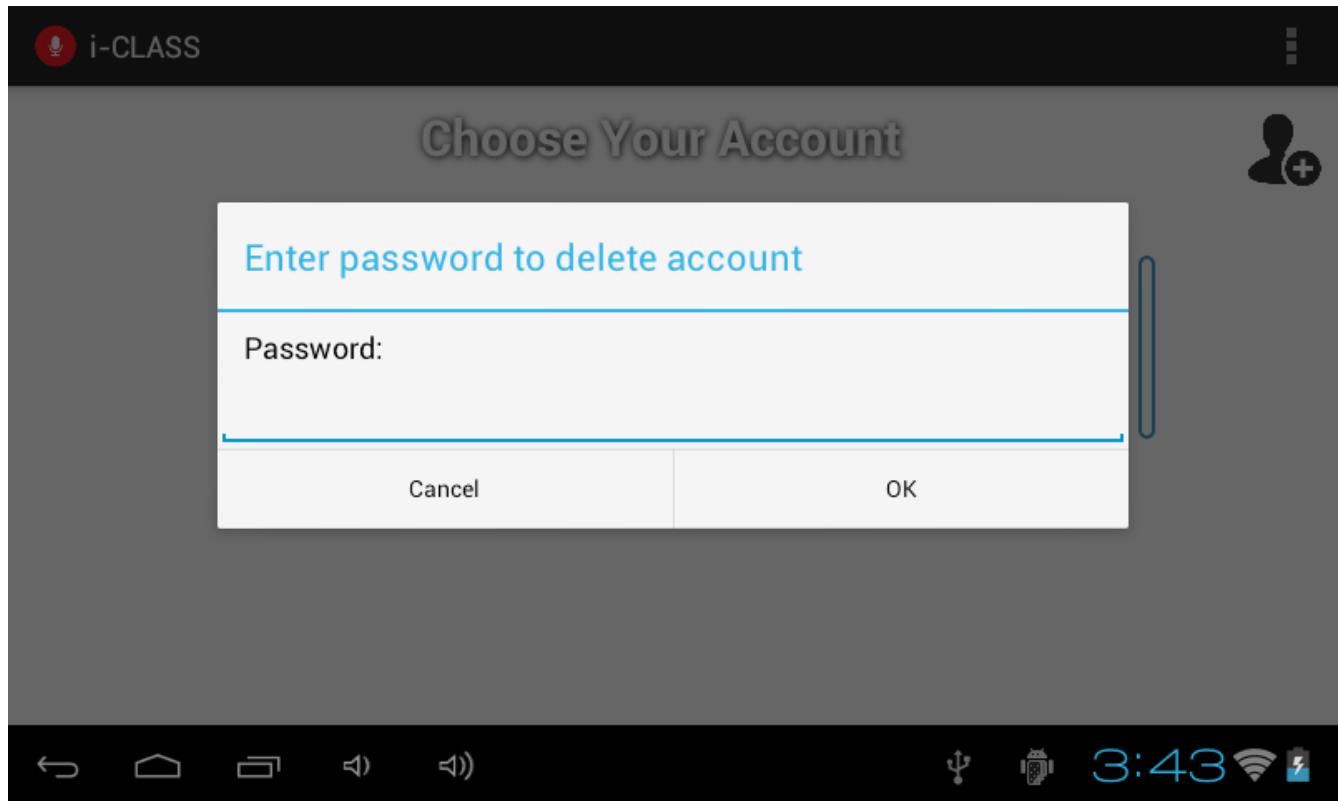


Fig. 4.1.4.2 Account Deletion Page

If you provide the password correctly, the account will be deleted successfully and toast will be shown.

4.1.5 Connecting with the local server (Lecturer's computer)

The user has to connect to the local server in order to send his doubts (Audio and text) to the professor.

He does so by filling in the IP Address field and the session id field as shown below.

Then click on the connect button.

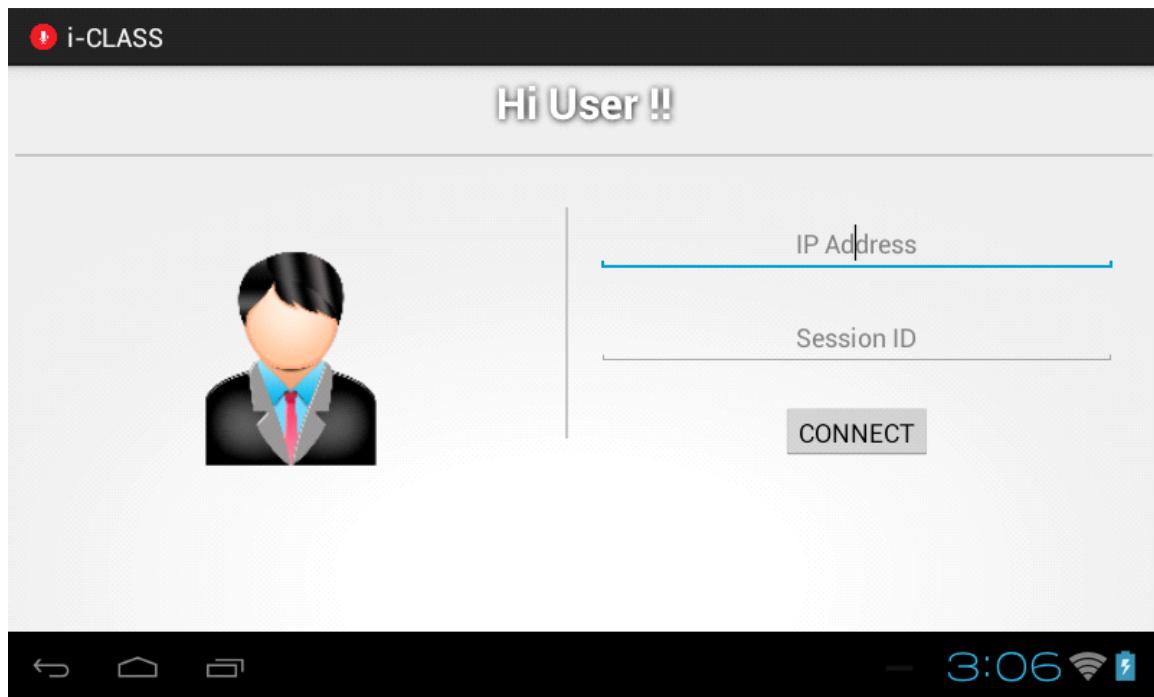


Fig. 4.1.5.1 Details to connect to the server

If the connection is successful, then a message will appear on the screen showing that the user's device is successfully connected to the server.

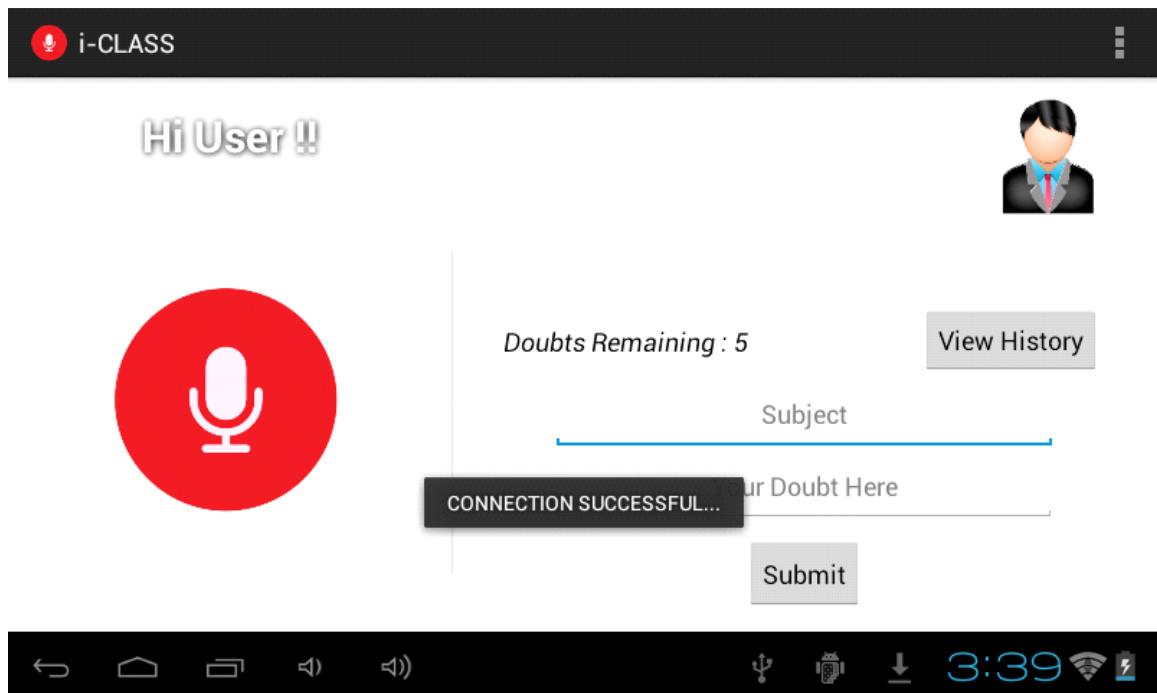


Fig. 4.1.5.2 Connection Successful with the Server

After successful connection with the server, the user is brought to the main screen of the application.

Here the user has got two choices, either he/she can go for a text doubt , or can press the microphone icon in the left, in order to ask a question live through audio streaming.

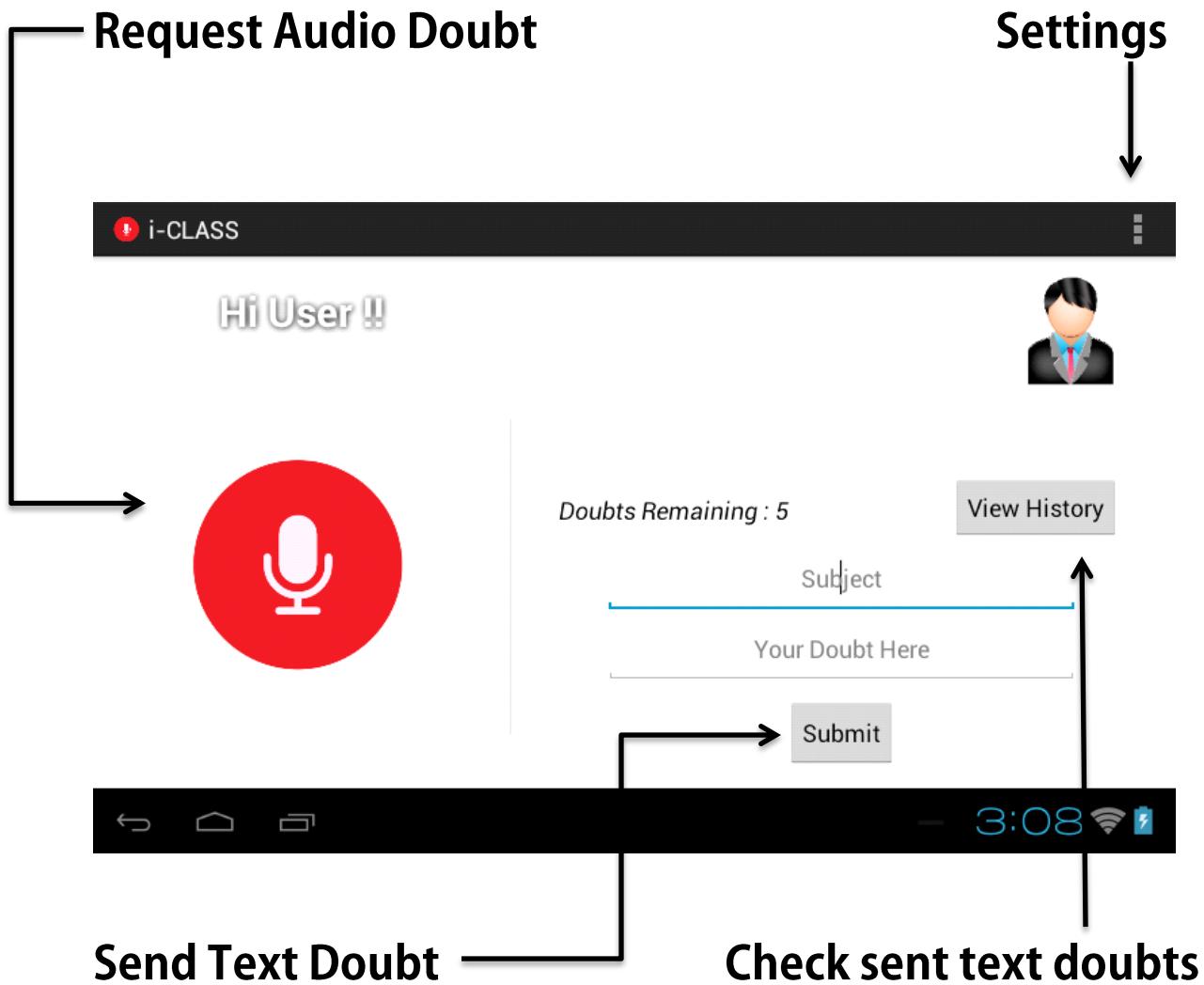


Fig. 4.1.5.3 The Main Activity

4.1.6 Sending a Text Doubt

In order to send a doubt in the text form, the user has to first fill in the topic (subject) of the doubt and then the main doubt in the next field.

After filling in both the fields, click the ‘Submit’ button to send the text message.

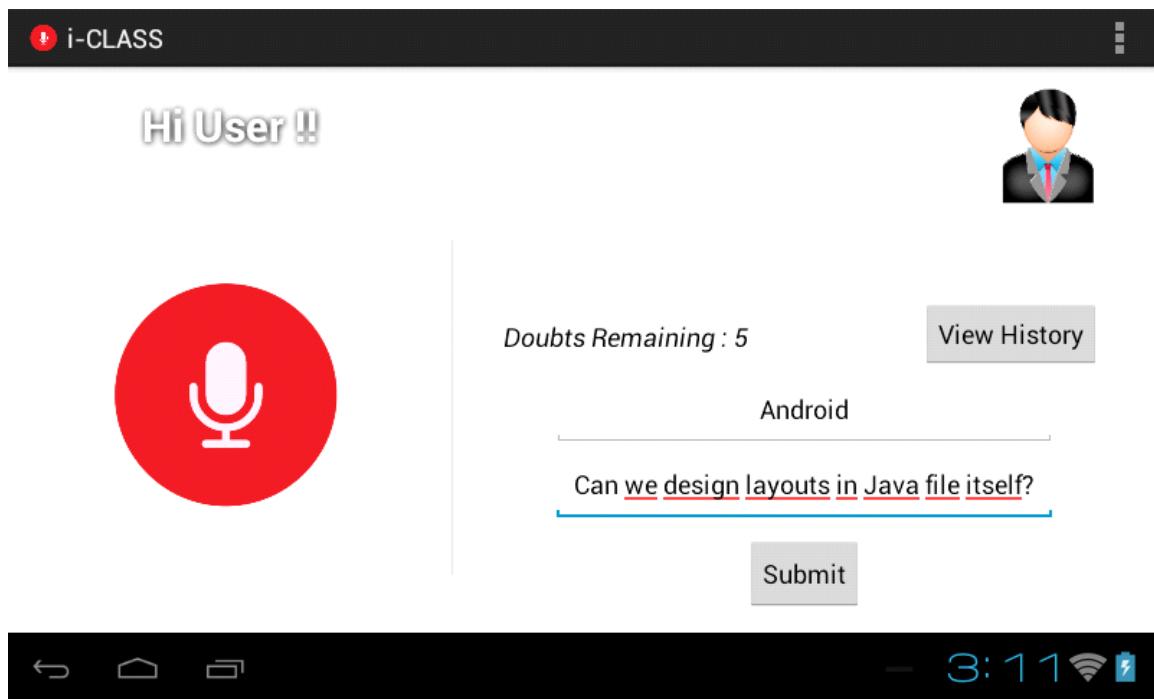


Fig. 4.1.6.1 Entering details of text doubt

A confirmation dialog box will appear to the user regarding whether he/she really wants to send the doubt as shown below:

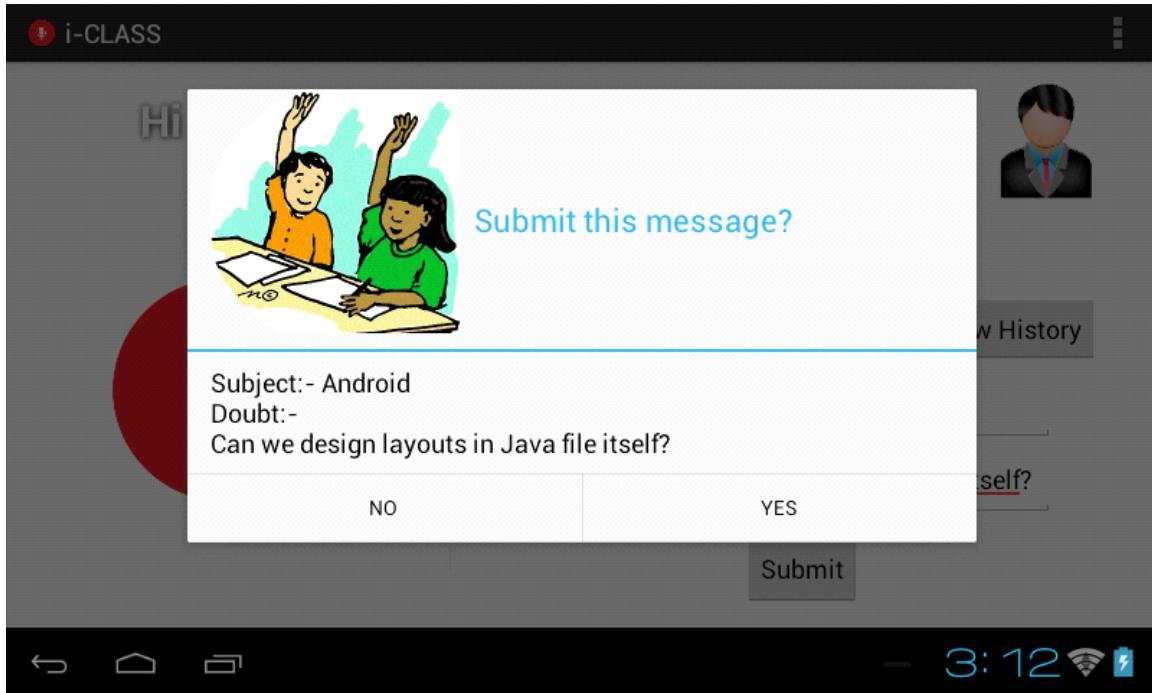


Fig. 4.1.6.2 Confirmation Screen

After confirmation, the text doubt will go into the waiting queue in the Lecturer's server.

Depending on the state of the lecturer at the Server's side, the professor may or may not reply to the text doubt. It is totally on the lecturer whether to accept a doubt waiting in a queue or to simply reject it.

4.1.7 Viewing Text Doubt History

All the text doubts which a user has asked can be seen by clicking the view history tab as shown below:-

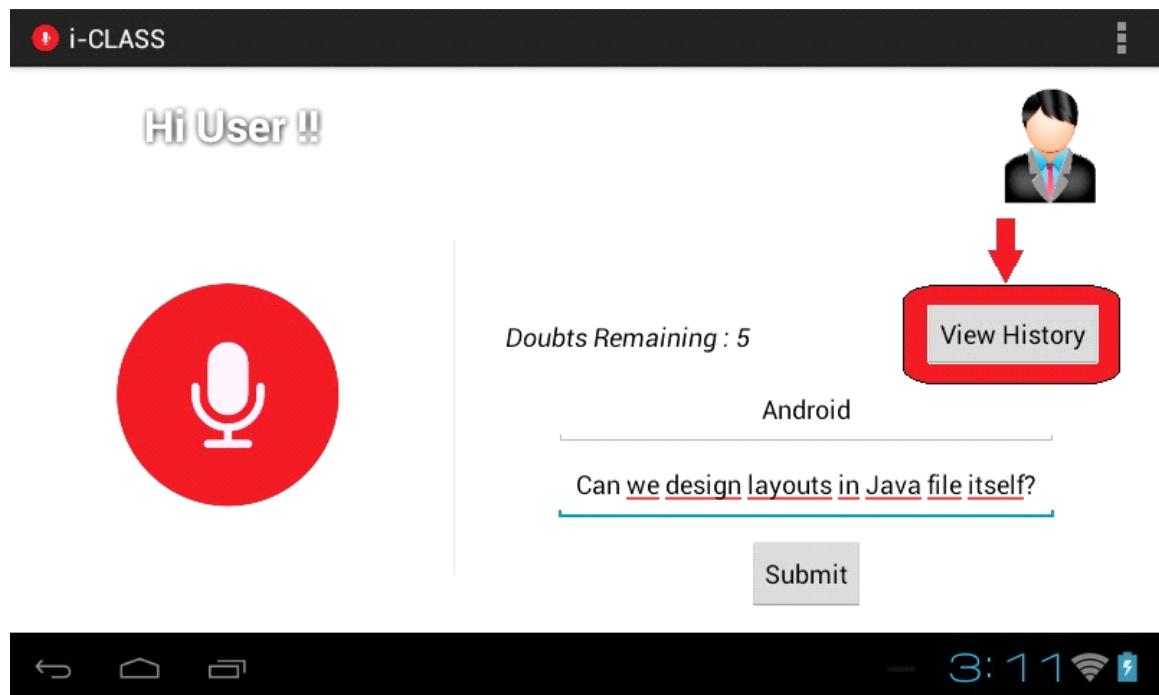


Fig. 4.1.7.1 View History button

After clicking on the view history the following screen will appear.

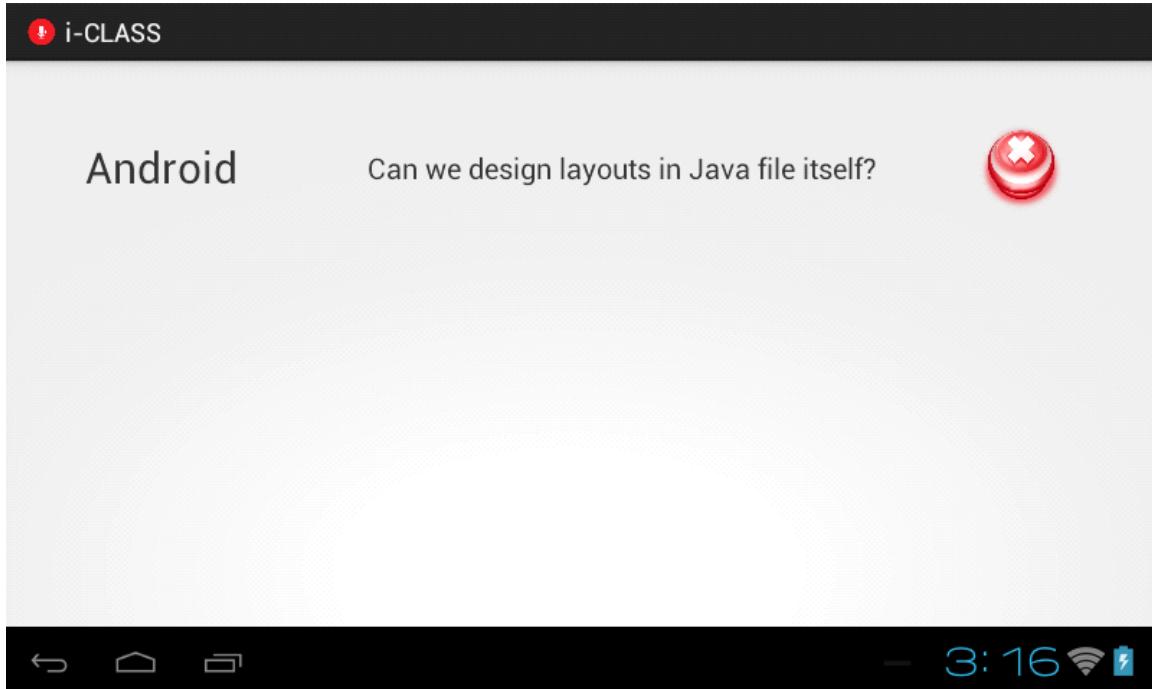


Fig. 4.1.7.2 Text Doubt History Page

The user can click on the cross as shown above in order to cancel the text doubt.

It will be removed from the server's list also.

Note: All the text doubts which were asked in a particular server session are being maintained in a forum where anyone can view the questions anytime. The Lecturer or any assistant of him can answer those questions which were not answered in the classroom in this forum.

4.1.8 ASKING AN AUDIO DOUBT

To ask an audio doubt,

1. Tap the red ‘Microphone’ icon on the main screen.

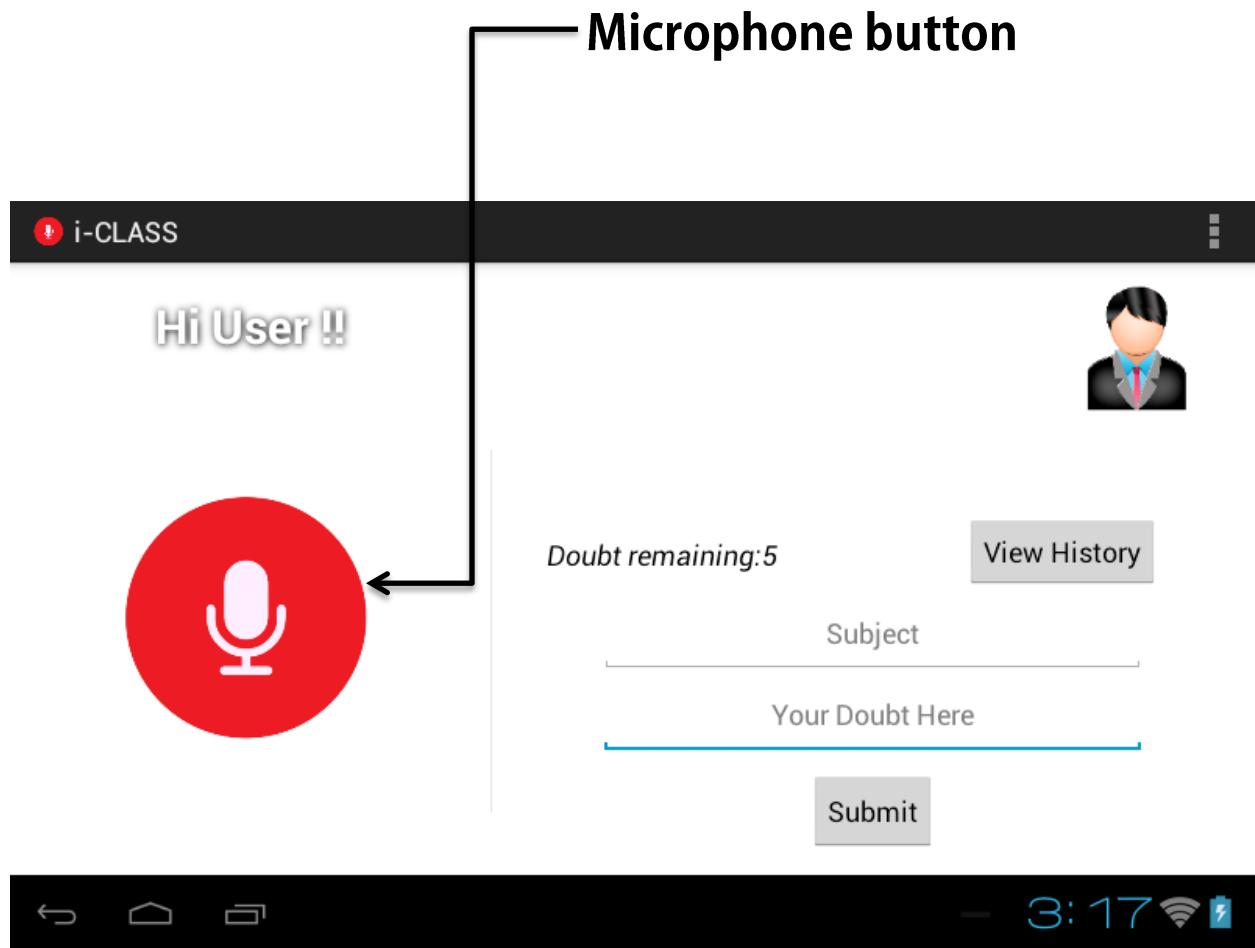


Fig. 4.1.8.1 Microphone icon on the Main Activity

2. Now, the user has to enter the topic to provide the professor a gist of what the doubt might be about.

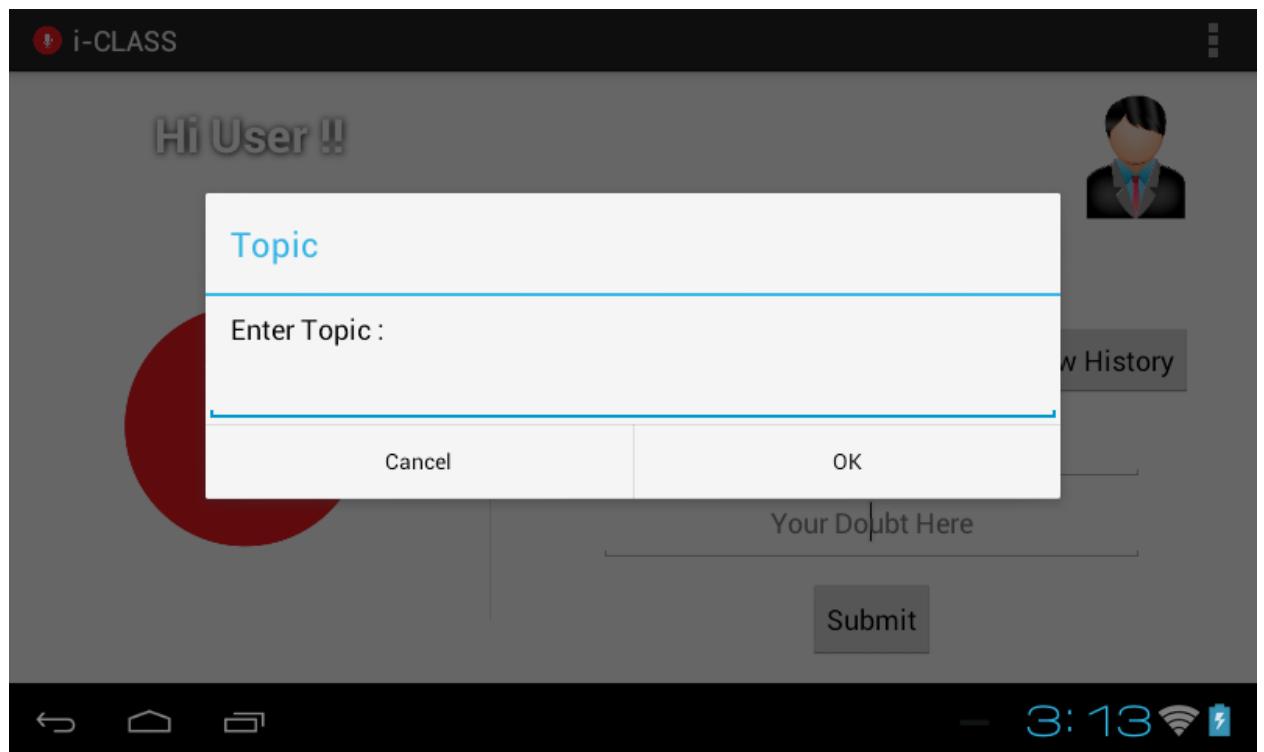


Fig. 4.1.8.2 Topic of Audio Doubt

NOTE: This field is compulsory. Leaving it empty won't allow the user to send the doubt.

3. Then, the following activity appears on the screen.



Fig. 4.1.8.3 Waiting screen

Here, your position number in the waiting queue is displayed. The waiting queue consists of all the audio requests sent to the server from various users. The professor can select any of the audio requests.

Here, the user has various options.

- a. If he wants to discontinue at any point of time during his waiting, he can press the ‘Disconnect’ button to exit to the main screen.
- b. If he wants to ask a text doubt as well while waiting in the queue, he can press the ‘Text Doubt’ button, which on result opens the following activity.

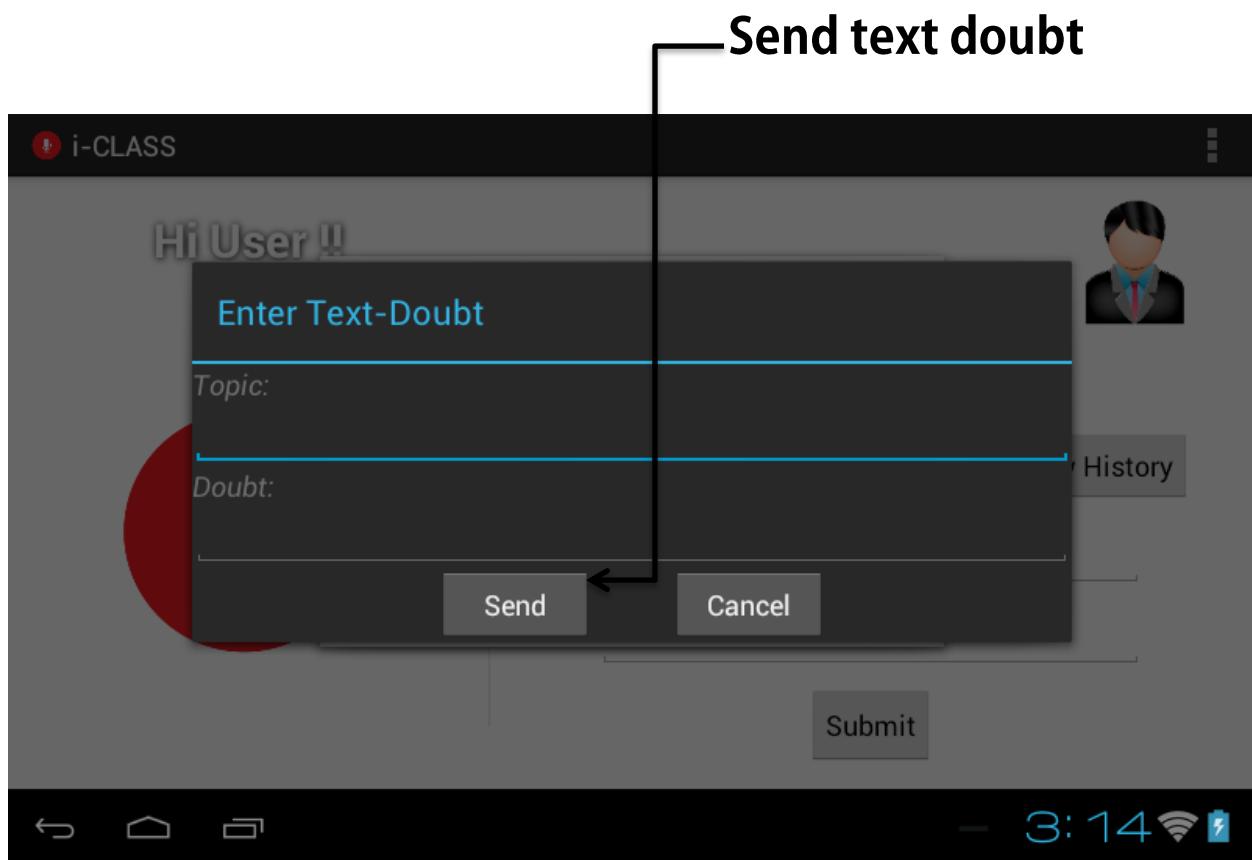


Fig. 4.1.8.4 Sending text doubt from waiting screen

The user should enter the topic and the doubt details in the fields provided and press the ‘Send’ button to send the doubt.

- c. If the audio doubt request is accepted by the professor, you get a ‘Start Speaking’ button on your screen, as a confirmation from the professor that your request has been accepted.

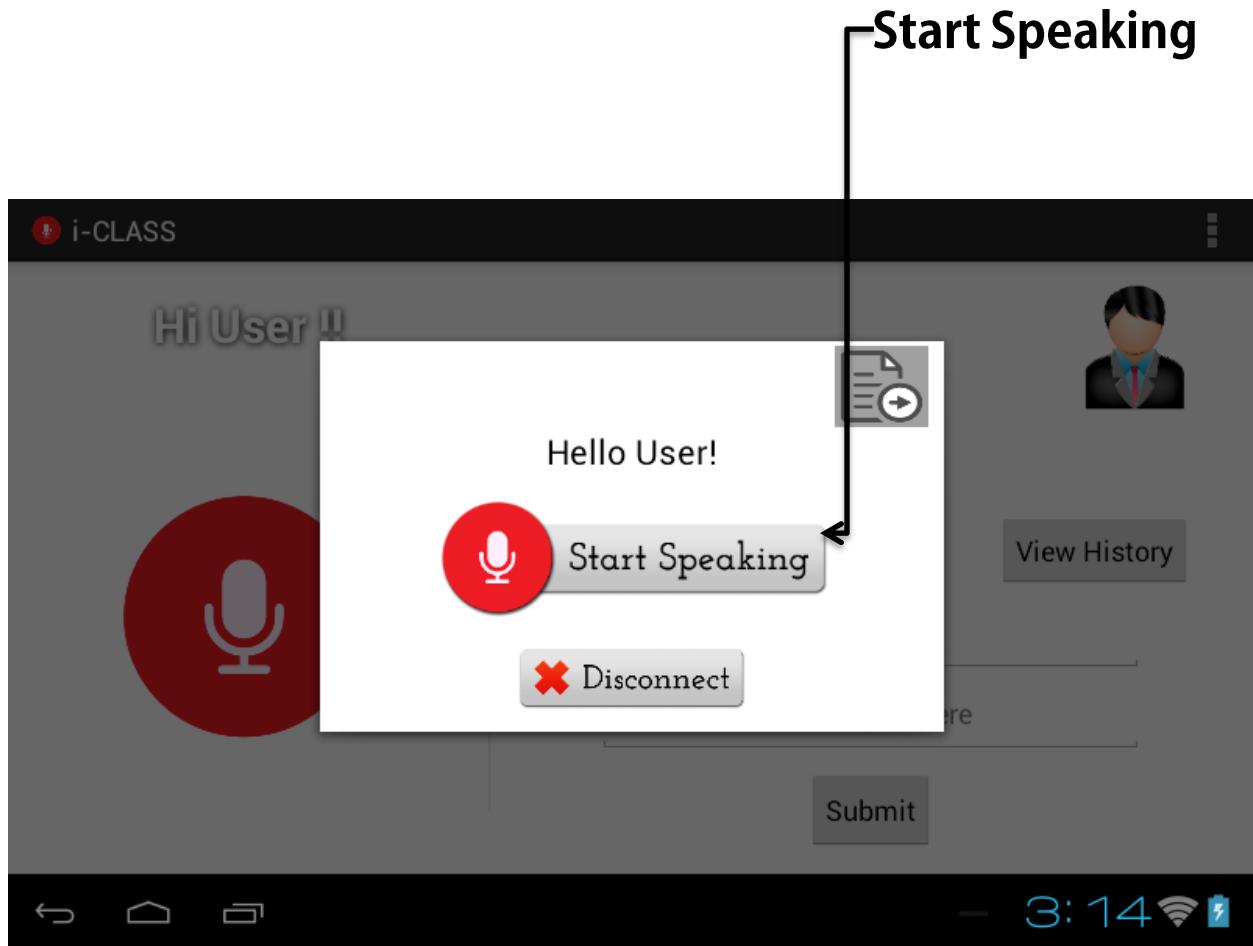


Fig. 4.1.8.5 Start Speaking button displayed after permission is accepted

If the user presses this button, his audio streaming starts and he can continue to speak as long as he wishes.

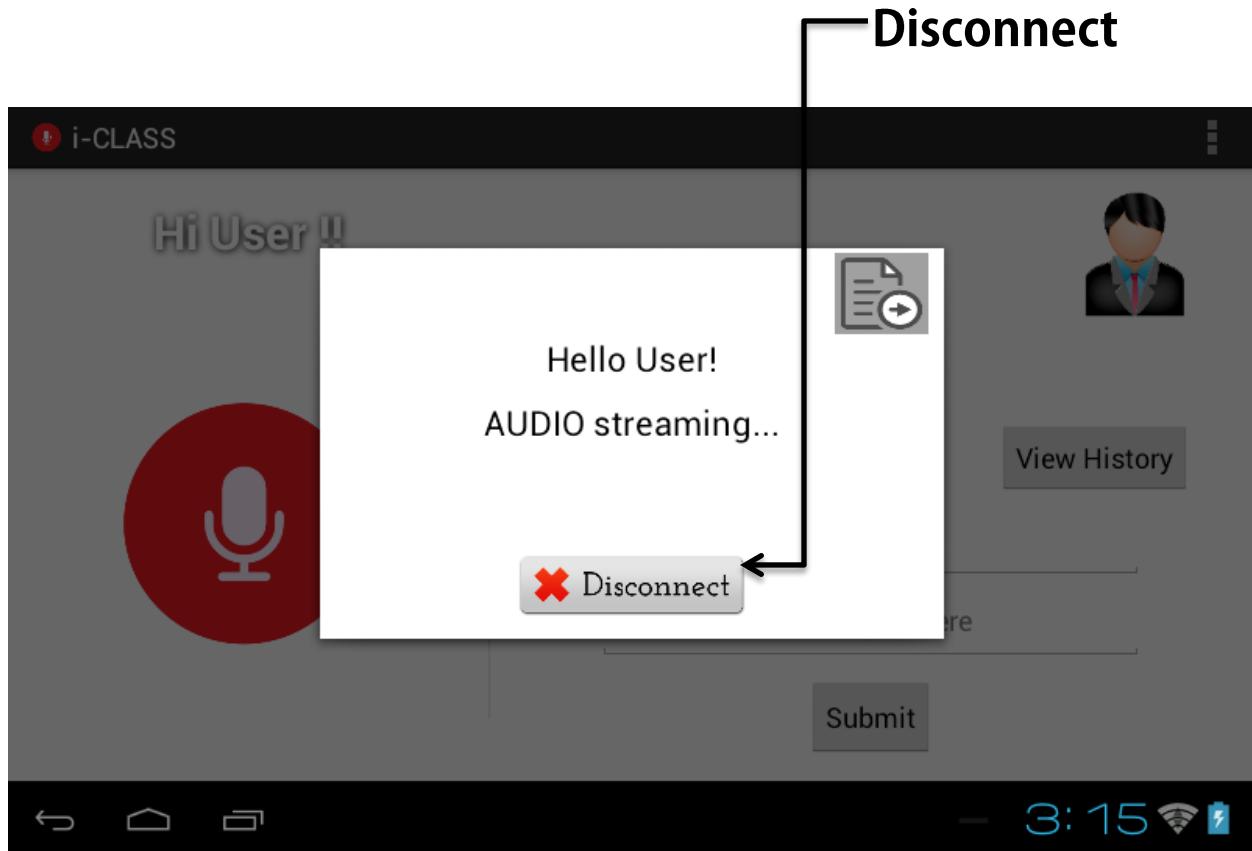


Fig. 4.1.8.6 Disconnecting from Audio Streaming

When the user wishes to stop, he can press the 'Disconnect' button and go back to the main screen.

- d. If the professor rejects your request, the following dialog shows up on your screen.

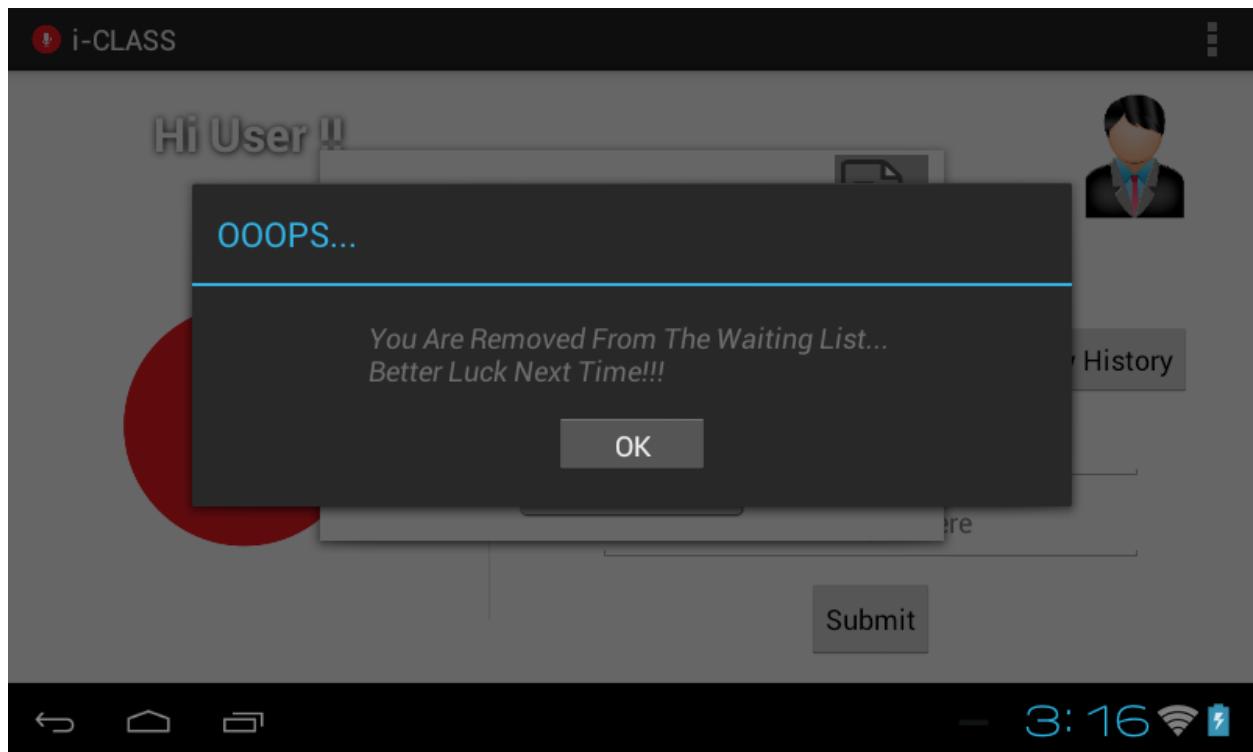


Fig. 4.1.8.7 Request rejected screen

Section 4.2

i-CLASS

Server

4.2.1 Launching the Server

To start the server,

1. Double-click the server icon on your desktop to launch the server.

A screen similar to this appears, loading the various files to start the server.

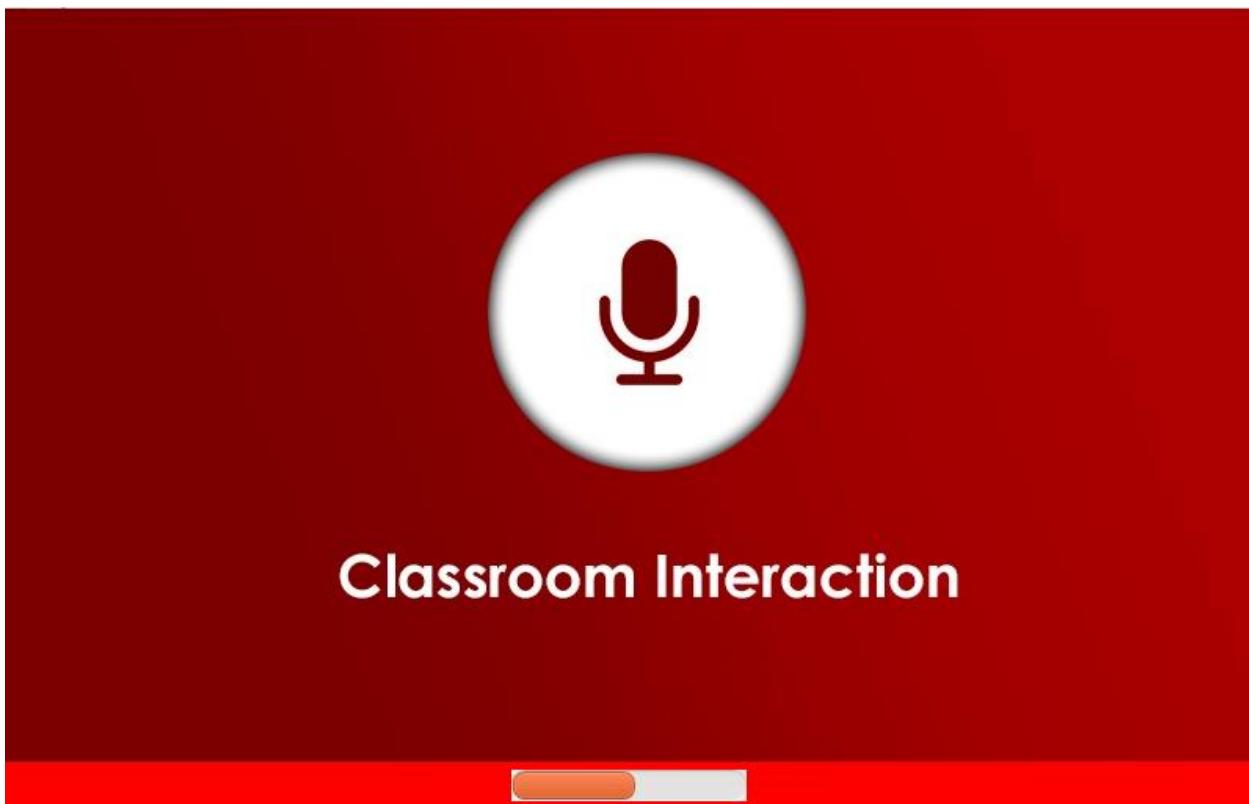


Fig. 4.2.1.1 Server starting screen

2. A login page appears where the following fields have to be filled:-

1. Professor' s Name

2. Department

3. Subject

4. Topic

Here, the 'Department' field is a drop-down list where one can select his/her department.

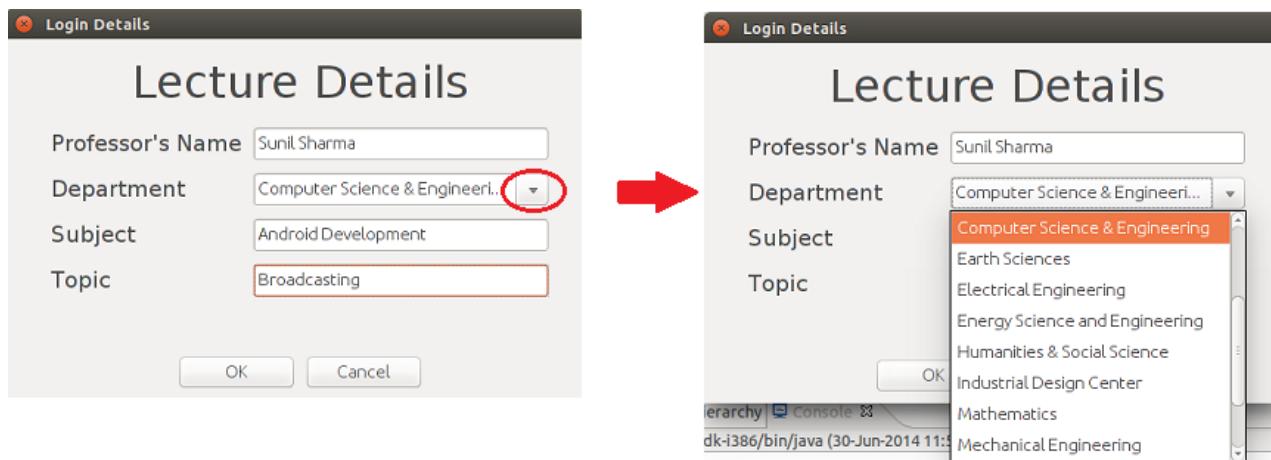


Fig. 4.2.1.2 Entering session information

If due to some unforeseen errors, a department name is not present in the list, an ‘Others’ option is provided. Selecting that option opens a dialog box, where a person can fill his/her desired department.

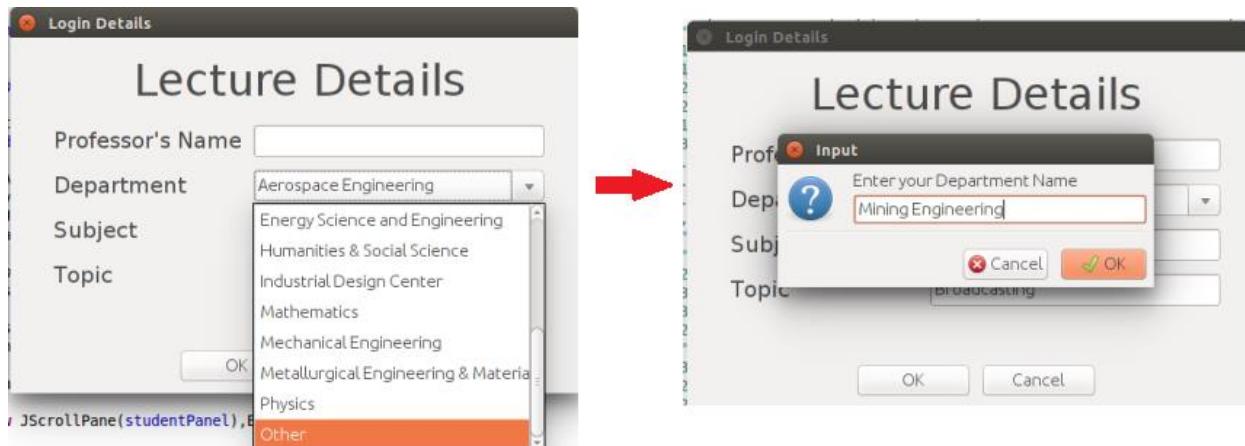


Fig. 4.2.1.3 entering other Department names

3. After filling the details, press the ‘Ok’ button to start the server.

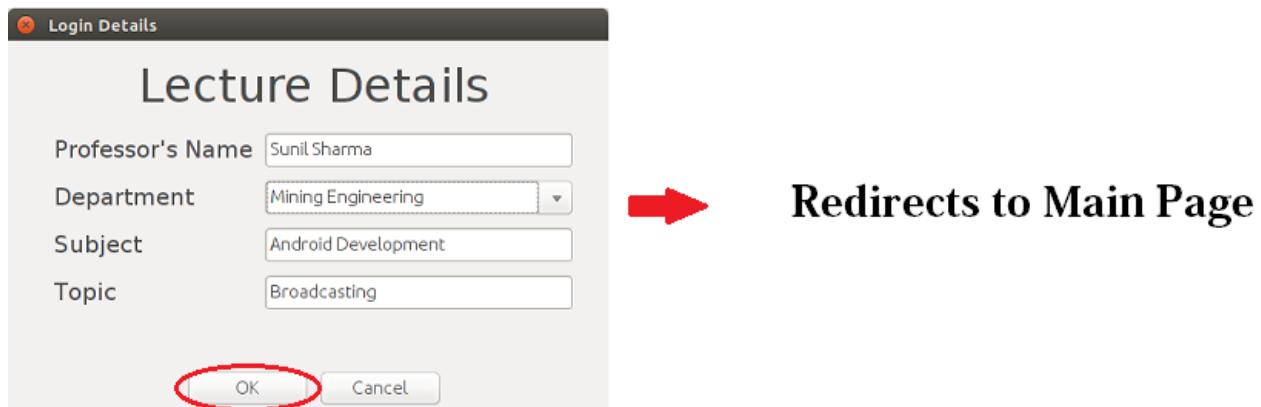


Fig. 4.2.1.4 Submitting information for session

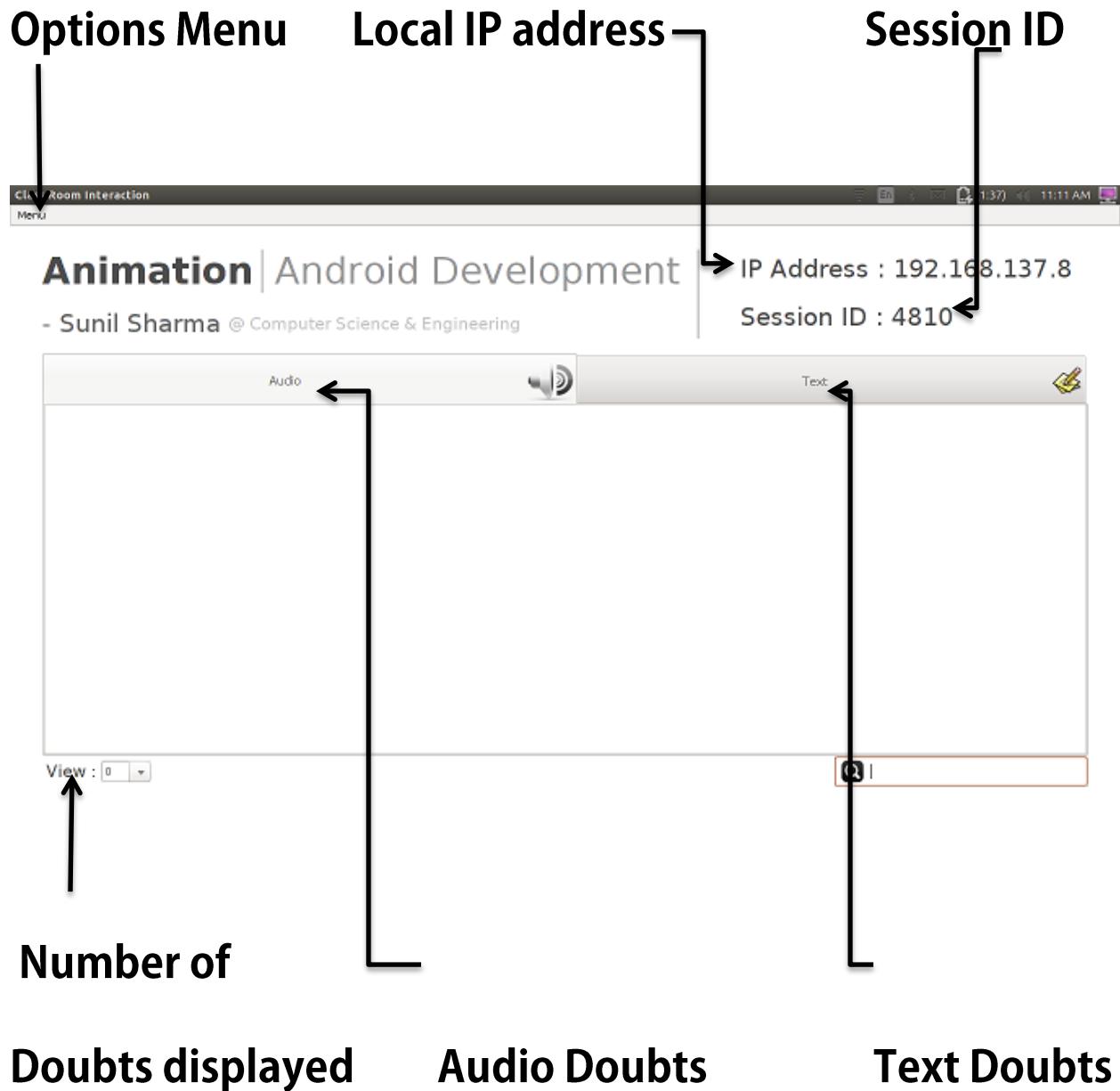


Fig. 4.2.1.5 The Main Screen

4.2.2 Components in the Server

The various components of the server are:-

1) IP Address and Session ID:-

IP Address and Session ID play a very crucial role in the client-server interaction. The students who use the ‘I-Class’ Android application validates their connection with the server by entering the IP Address of the server (Lecturer’s local machine) and the session ID, to uniquely identify a lecture. If the IP Address field is clicked, it opens up in a large font in a dialog for the students to see if the server screen is projected through a server.

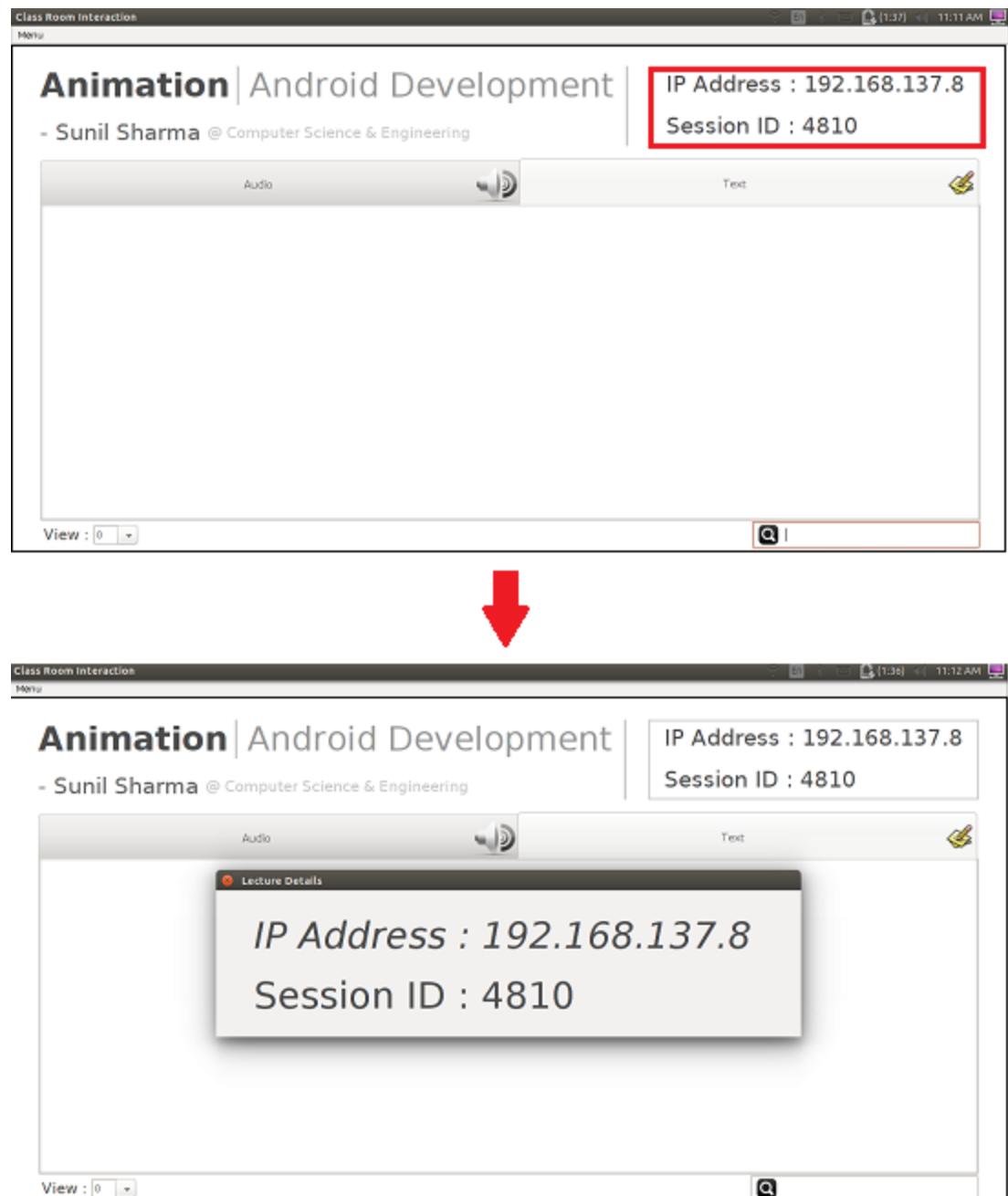


Fig. 4.2.2.1 Displaying IP Address and Session ID

2) View :-

The ‘View’ feature at the bottom-left corner of the server gives the flexibility of choosing the number of to be displayed at once. The doubt sent first by a user is displayed above compared to a person sending a doubt later. This feature works for audio as well as text doubts, which will be discussed later.

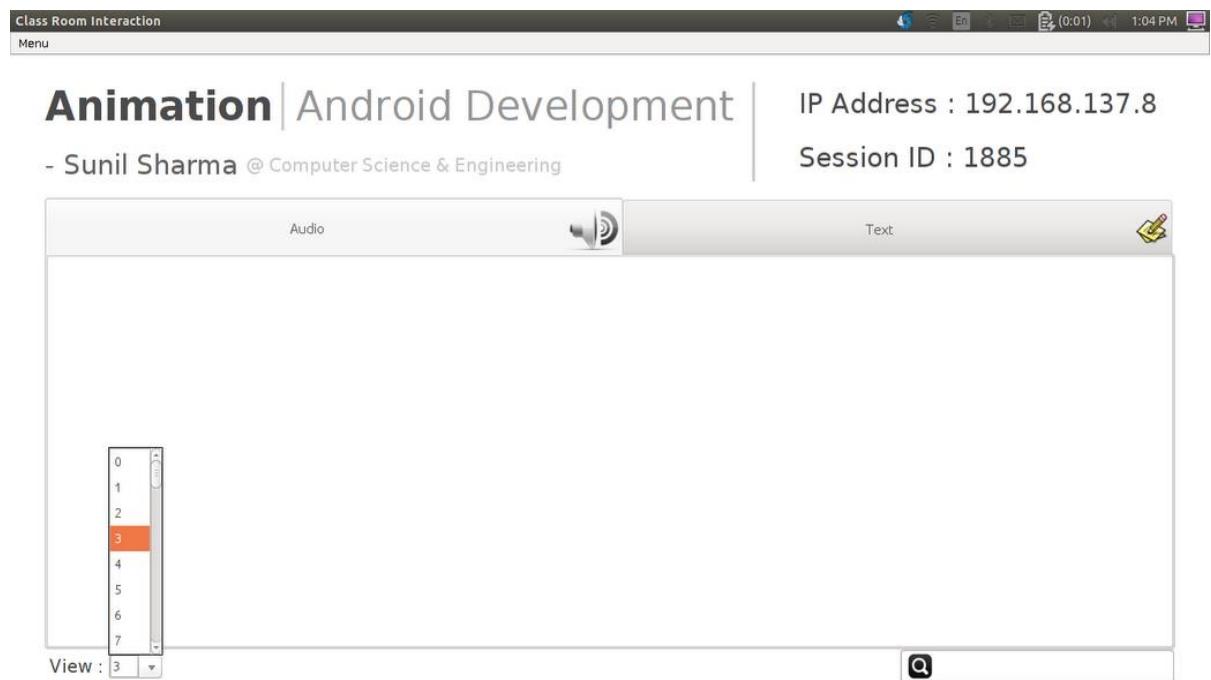


Fig. 4.2.2.2 Changing number of doubts visible

3) **Text doubts:-**

Clicking on the ‘Text’ tab displays the text doubts received.

The data displayed in a row of text doubt is as follows:-

- i. Doubt sender’s Name and Picture**
- ii. Topic of doubt**
- iii. Main text doubt**

The number of text doubts visible at an instance depends on the value chosen from the ‘View’ option. If a tick corresponding to a doubt is clicked, the doubt opens up enlarged in a new dialog box.

Thus, if the server is displayed on a large screen, the text doubt would be visible to the whole class.

Class Room Interaction
Menu

Animation | Android Development

- Sunil Sharma @ Computer Science & Engineering

IP Address : 192.168.137.8
Session ID : 3398

	Audio	Text
	utwal	basic intent animation
	ankit	andriod
	mohit	android

View : 3

A red circle highlights the green checkmark icon next to the "andriod" entry for user ankit.



Class Room Interaction
Menu

Animation | Android Development

- Sunil Sharma @ Computer Science & Engineering

IP Address : 192.168.137.8
Session ID : 3398

	Audio	Text
	utwal	andriod
	ankit	moving car animation
	mohit	game engine

A modal dialog box is displayed over the list, showing a larger image of user ankit and his text entry "andriod moving car animation".

Fig. 4.2.2.3 Accepting a text doubt

If the cross is selected, the doubt is removed from the list.

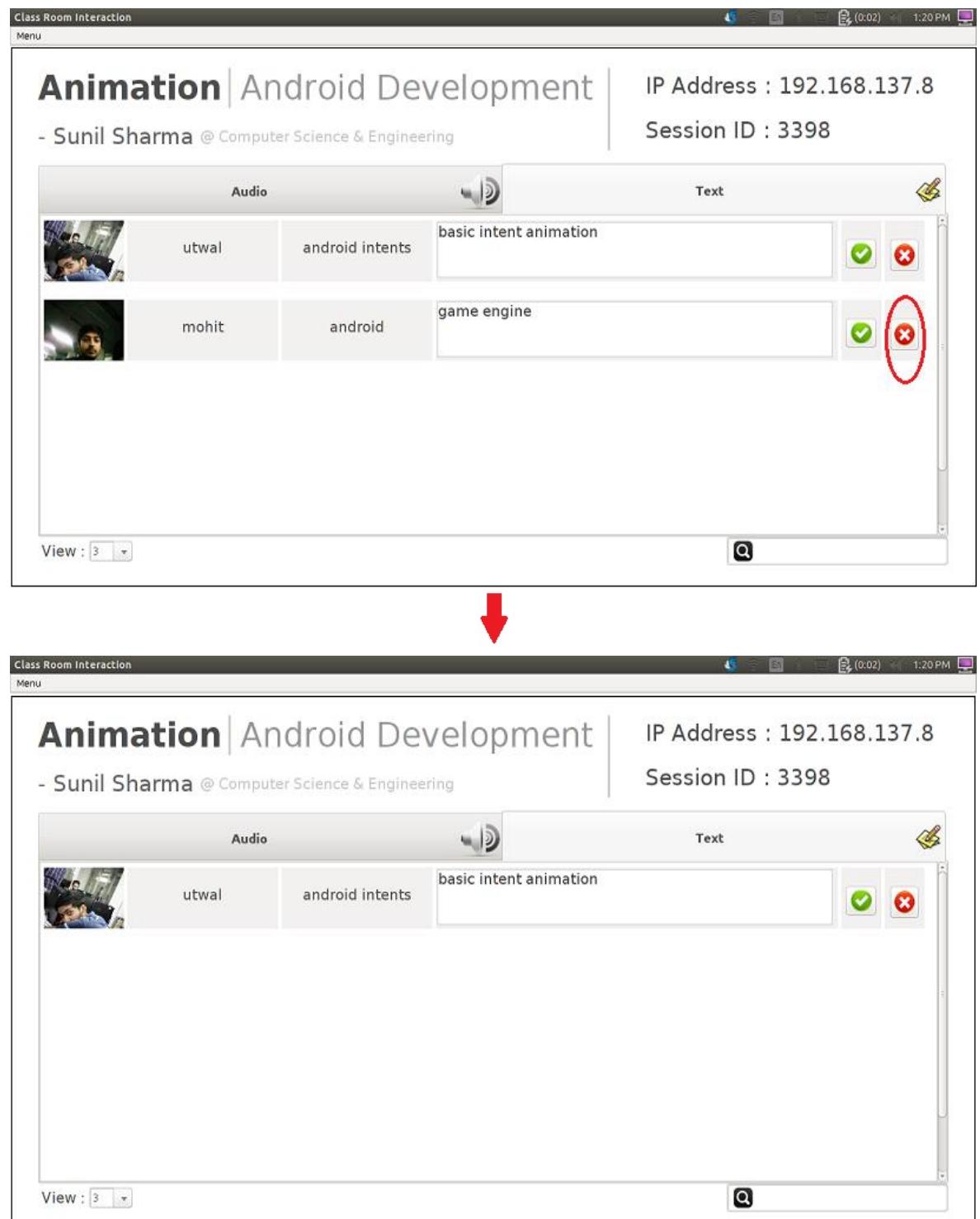


Fig. 4.2.2.4 Removing a text doubt from the list

4) Search Box:-

The Search box provides the feature of filtering the doubt list based on topic as well as even by name. For example, if you want to filter the doubts based on the topic ‘Android’ then the following happens:

Class Room Interaction | **Menu** | **(0:44)** | **11:18 AM**

Animation | Android Development

Sunil Sharma @ Computer Science & Engineering

	Audio	Text	
	Prakhar Sethi Java	moving a car	<input checked="" type="checkbox"/> <input type="checkbox"/>
	Prakhar Sethi Android	How to animate a ball collision with ground?	<input checked="" type="checkbox"/> <input type="checkbox"/>
	Lavish Java	moving object frame	<input checked="" type="checkbox"/> <input type="checkbox"/>
	Lavish Android	how to handle animation in different fragments	<input checked="" type="checkbox"/> <input type="checkbox"/>
	Adil Hussainn Android	Move a bot	<input checked="" type="checkbox"/> <input type="checkbox"/>

View :



Class Room Interaction | **Menu** | **(0:41)** | **11:18 AM**

Animation | Android Development

Sunil Sharma @ Computer Science & Engineering

	Audio	Text	
	Prakhar Sethi Android	How to animate a ball collision with ground?	<input checked="" type="checkbox"/> <input type="checkbox"/>
	Lavish Android	how to handle animation in different fragments	<input checked="" type="checkbox"/> <input type="checkbox"/>
	Adil Hussainn Android	Move a bot	<input checked="" type="checkbox"/> <input type="checkbox"/>

View : **Android**

Fig. 4.2.2.5 Searching for text doubts with topic ‘Android’

Or, if you search for the name ‘Prakhar’, then:

The screenshot shows a web-based application titled "Class Room Interaction". At the top, there's a header bar with "Class Room Interaction" and "Menu" on the left, and system status icons like battery level, signal strength, and time (11:07 AM) on the right. Below the header, the title "Animation | Android Development" is displayed, along with the author "Sunil Sharma @ Computer Science & Engineering". To the right, the IP address "IP Address : 10.105.22.1" and session ID "Session ID : 5508" are shown. The main content area is a table with two rows. The first row has a thumbnail of a person, the name "Prakhar Sethi", the subject "Java", and the text "moving a car". The second row has a thumbnail, the name "Prakhar Sethi", the subject "Android", and the text "How to animate a ball collision with ground?". Each row includes a pair of green and red checkmark buttons. At the bottom left, there's a "View : 5" dropdown, and at the bottom right, a search bar with a magnifying glass icon and the text "Prakhar".

Fig. 4.2.2.6 Searching for doubts with name ‘Prakhar’

5) **Audio Doubt:-**

Clicking on the ‘Audio’ tab displays the audio doubts received.

The data displayed in a row of audio doubt is as follows:-

- i. Doubt sender’ s Name and Picture**
- ii. Topic of doubt**

The number of audio doubts visible at an instance depends on the value chosen from the ‘View’ option. If a tick corresponding to a doubt is clicked, the doubt opens up enlarged in a new dialog box.

Class Room Interaction | **Menu**

Animation | Android Development

Sunil Sharma @ Computer Science & Engineering

IP Address : 10.105.22.1
Session ID : 5508

Audio	Text
	Prakhar Sethi draw a saucer <input checked="" type="checkbox"/> <input type="checkbox"/>
	Lavish animate a car <input checked="" type="checkbox"/> <input type="checkbox"/>

View : 5



Class Room Interaction | **Menu**

Animation | Android Development

Sunil Sharma @ Computer Science & Engineering

IP Address : 10.105.22.1
Session ID : 5508

	Prakhar
	Lavish

animate a car



Lavish

View : 5

Fig. 4.2.2.7 Accepting an Audio Doubt

If the cross is selected, the doubt is removed from the list.

Class Room Interaction | IP Address : 10.105.22.1
Menu Session ID : 5508

Animation | Android Development

Sunil Sharma @ Computer Science & Engineering

	Audio	Text	
	Prakhar Sethi	draw a saucer	<input checked="" type="checkbox"/> <input type="checkbox"/>
	Lavish	animate a car	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>

View : 5

Class Room Interaction | IP Address : 10.105.22.1
Menu Session ID : 5508

Animation | Android Development

Sunil Sharma @ Computer Science & Engineering

	Audio	Text	
	Prakhar Sethi	draw a saucer	<input checked="" type="checkbox"/> <input type="checkbox"/>

View : 5

Fig. 4.2.2.8 Removing an Audio Doubt

Section 4.3

i-CLASS

Forum

4.3.1 i-Class Forum Home Page:

4.3.1.1 Components of Home Page are

- Contact Us
- Login
- Choose your department



Fig 4.3.1 Home Page of i-Class Forum

- **Contact Us:** This Tab is used to open Contact Us web page which consist of Admin Details as shown below.



- **Login:**

This tab is used to open Login Page where any Professor who is registered with iClass Forum can Login as shown above.

- **Choose Your Department:**

Select any department you wish to view as shown in fig 4.3.1.1. Number inside the bubble represents count of professor in that department.

Computer Science	(13)	Civil	(0)
Mechanical	(0)	Information Technology	(0)
Aerospace	(0)	Production	(0)
Extc	(0)	Mettallurgy	(0)
Electronics	(0)	BioTechnology	(0)

Fig 4.3.1.1 List of Departments

4.3.2 If a Student or user wishes to see all the doubts and their solutions discussed in the classroom, follow these Steps:

Step 1.

As Shown in fig 4.3.2, user needs to choose any department he wish to see. Then List of Prof will be displayed as shown in next figure 4.3.2.2.

Computer Science	(13)
Mechanical	(0)
Aerospace	(0)
Extc	(0)
Electronics	(0)
Civil	(0)
Information Technology	(0)
Production	(0)
Mettallurgy	(0)
BioTechnology	(0)

Fig 4.3.2 List of departments

The screenshot shows the homepage of iClassForum. At the top right are navigation links for "Home", "Contact Us", and "Login". The main title "Choose Your Department" is centered above a grid of 12 blue rectangular boxes arranged in three columns. Each box contains a department name and a small circular icon with a number. The first column contains: Computer Science (13), Mechanical (0), Aerospace (0), Extc (0), and Electronics (0). The second column contains: Civil (0), Information Technology (0), Production (0), Metallurgy (0), and BioTechnology (0). The third column contains: Environmental Science (0), Mathematics (0), Electrical (0), Textile (0), and Mining (0).

Fig 4.3.2.1 Home Page



The screenshot shows a list of professors for the Computer Science department. At the top right are navigation links for "Home", "Contact Us", and "Login". The title "List of Prof. in Department Computer Science" is centered above a grid of 12 blue rectangular boxes arranged in three columns. Each box contains a professor's name and a small circular icon with a number. The first column contains: Sachdev (1), Bhalla (0), Dayal (0), Swati (2), and Ankit (0). The second column contains: Ankita (0), Narayan (0), Bhatia Sir (0), Suresh (1), and Anuresh (0). The third column contains: Anuradha (0), Kalidas (1), and Kaalidas (0). A vertical scroll bar is visible on the right side of the grid.



Fig 4.3.2.2 List of Professors

localhost:8084/Aakash/index.jsp#

Step 2.

Now, next step is, user needs to select a Professor whose lectures he wish to observe. He has an optional back button below the List of Professor if incase he wish to change the department. He can choose any professor as shown in the below fig 4.3.2.3.

List of Prof. in Department

Sachdev	1
Bhatia	0
Dayal	0
Swati	2
Ankit	0

Fig 4.3.2.3 List of Professors

After choosing a professor, List of lectures will be displayed as shown in next figure 4.3.2.5. Bubble indicates count of lectures under that professor.

 iClass Forum

[Home](#) [Contact Us](#) [Login](#)

List of Prof. in Department Computer Science

Sachdev	1
Bhatia	0
Dayal	0
Swati	2
Ankit	0
Ankita	0
Narayan	0
Bhatia Sir	0
Suresh	1
Anuresh	0
Anuradha	0
Kalidas	1
Kaalidas	0



localhost:8084/Aakash/index.jsp#



 iClass Forum

[Home](#) [Contact Us](#) [Login](#)

List of Lectures by Prof. Swati

Java	mon 2/2/3
Android	mon 2/2/5



localhost:8084/Aakash/lec.jsp#

Fig 4.3.2.5 Transition from Professor list to lecture list

Step 3.

As shown in this figure 4.3.2.6, user can select any lecture.

A new webpage displaying Doubts and solutions will be displayed (fig 4.3.2.8).

There is an optional back button as shown below if incase user wish to view lectures of another professor. (fig 4.3.2.6)



Fig 4.3.2.6

List of Lectures by Prof. Swati

Java	mon 2/2/3
Android	mon 2/2/5

Fig 4.3.2.7 List of Lectures

Step 4. Finally, User can View Doubts and their solutions as discussed during the lecture in classroom as shown in fig 4.3.2.8.

The user can switch back to home page by clicking home tab.

The screenshot shows a web interface for the 'iClass Forum' under the 'Department of Computer Science'. At the top right, there are 'Home' and 'Login' links. Below the header, the word 'Android' is displayed. The main content area contains two user posts:

- Kaushik**
What is computer?
hahahahohohohhihihi
- mohit**
What is computer?
asdfsdfsdf
asdf

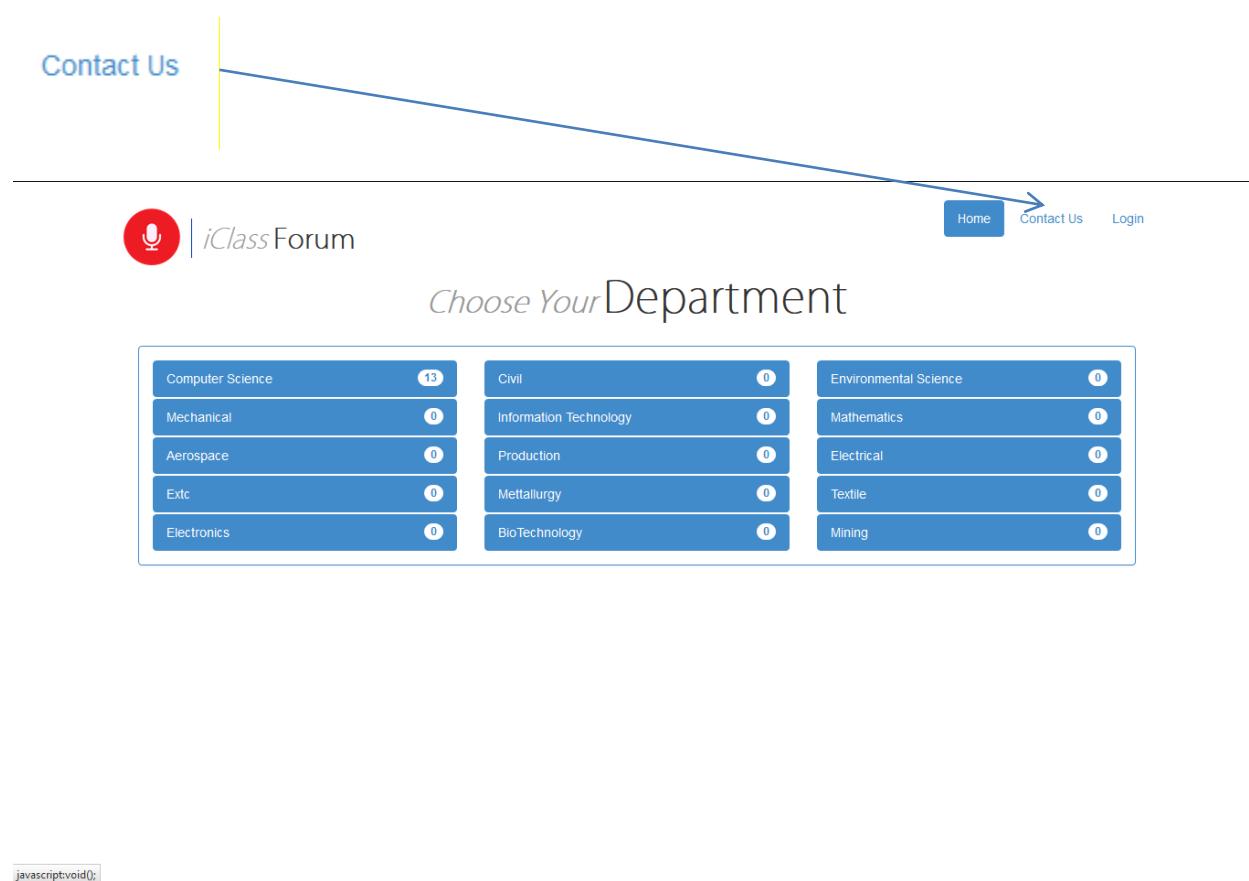
Fig 4.3.2.8 Lecture home page

4.3.3 Procedure for a professor to obtain his Login Details, review Doubts, give their solutions or delete unwanted doubts are given as follows:

Note: Step 1 and Step 2 are required initially, after acquiring login details follow from Step 3.

Step 1.

Click on Contact Us Tab to send Request to Admin as shown in fig 4.3.3.



Contact Us

Home Contact Us Login

Choose Your Department

Computer Science	13
Mechanical	0
Aerospace	0
Extc	0
Electronics	0
Civil	0
Information Technology	0
Production	0
Metallurgy	0
BioTechnology	0
Environmental Science	0
Mathematics	0
Electrical	0
Textile	0
Mining	0

javascript:void();

Fig 4.3.3 List of Departments

Step 2.

Once this New page is opened, Professor can click this “Send Request” Button to send Request to Admin for details as shown in fig 4.3.3.1.

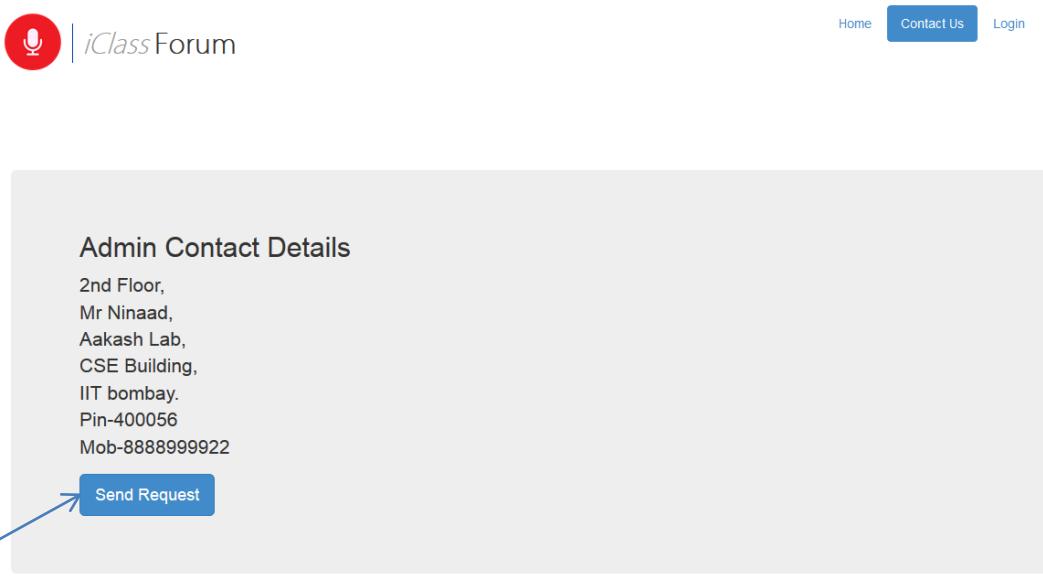


Fig 4.3.3.1 Contact Us page

Step 3.

If the Professor has his login Details, he can click Login Tab to Sign in as shown in fig 4.3.3.2.

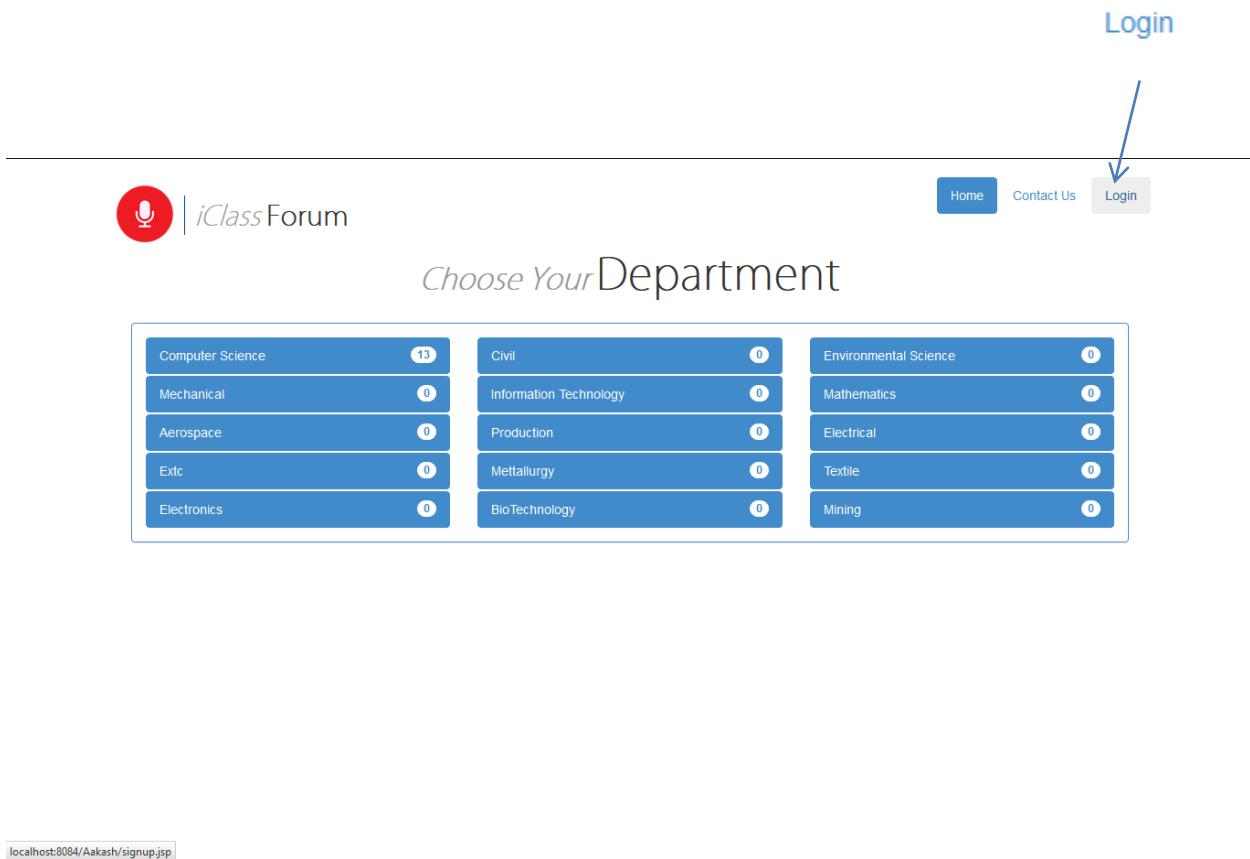


Fig 4.3.3.2 Department list

Step 4.

Professor should fill in his email id and password and click Login button as shown in fig 4.3.3.4.

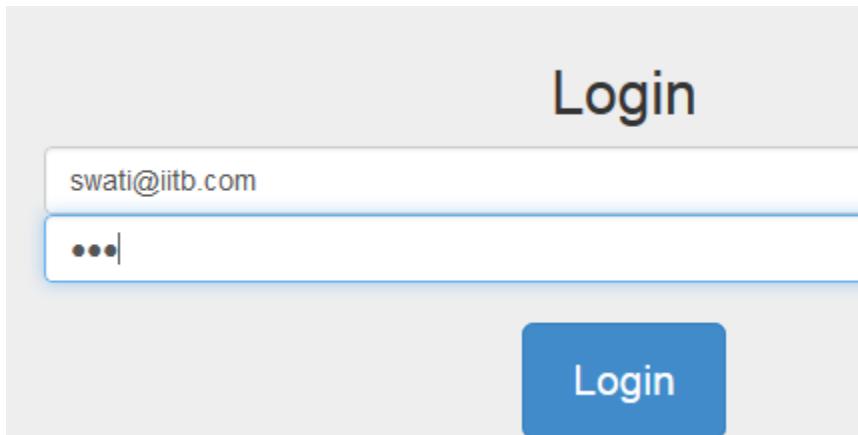


Fig 4.3.3.4 Login module

Step 5. A welcome home screen appears as shown in Fig 4.3.3.5. Now professor needs to choose his department.

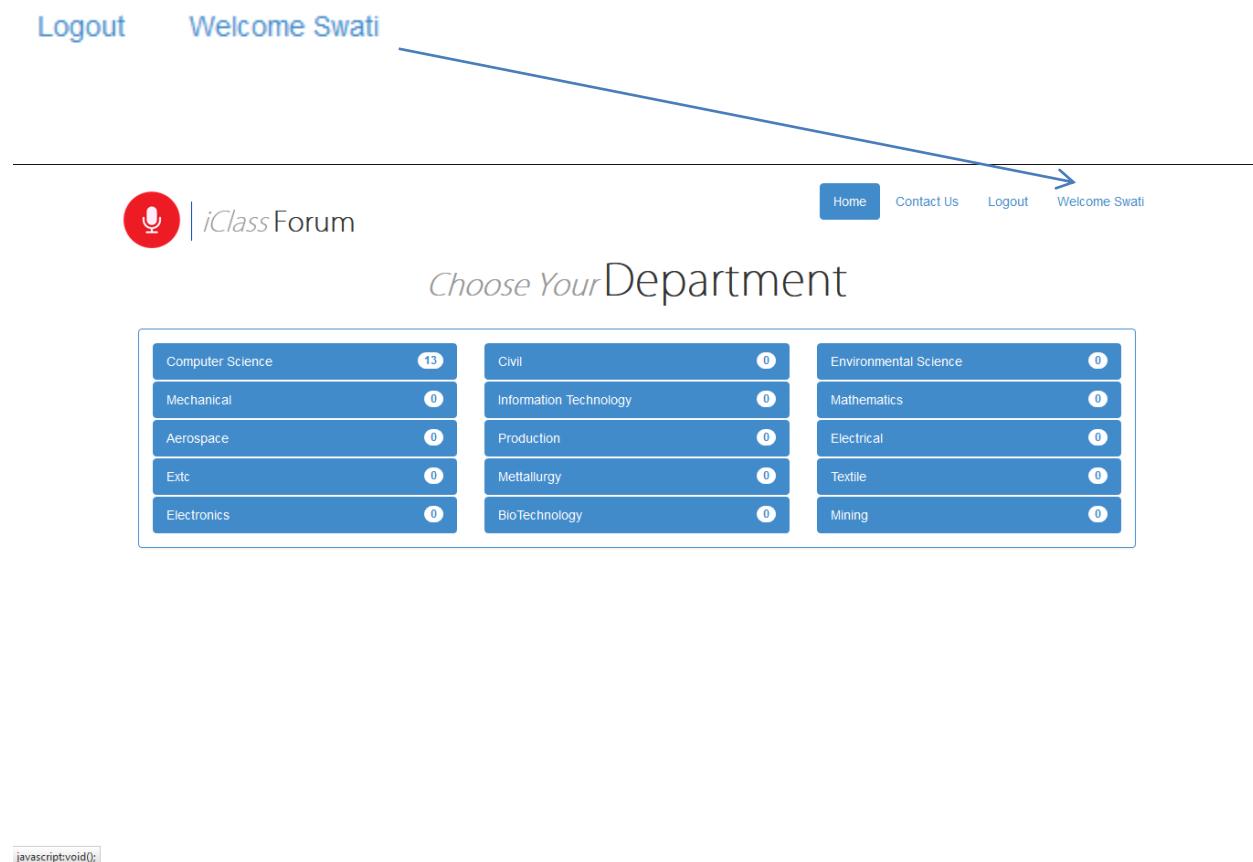


Fig 4.3.3.5 Department list

Step 6.

List of Professor is displayed in that department as shown in fig 4.3.3.6. Now, Professor needs to choose his respective department.

List of Prof. in Department

Sachdev	1
Bhatia	0
Dayal	0
Swati	2
Ankit	0

 | iClass Forum

[Home](#) [Contact Us](#) [Logout](#) [Welcome Swati](#)

List of Prof. in Department Computer Science

Sachdev	1
Bhatia	0
Dayal	0
Swati	2
Ankit	0
Ankita	0
Narayan	0
Bhatia Sir	0
Suresh	1
Anuresh	0
Anuradha	0
Kalidas	1
Kaalidas	0

Fig 4.3.3.6 List of Professor in Computer Department

Step 7.

His/her lectures will be displayed. Whichever lecture he/she needs to modify should be clicked.

List of Lectures by Prof. Swati

Java	mon 2/2/3
------	-----------

Android	mon 2/2/5
---------	-----------

Fig 4.3.3.7 List of Lectures

Step 8.

List of Various Doubts discussed in that lecture will be displayed. Professor can Edit the answer or delete them.

The screenshot shows a web-based application interface for managing student doubts. At the top, it displays the title "Department of Computer Science" and "Prof.Swati". Below this, there is a heading "Android". The main content area contains two entries, each representing a student's question and their answer. The first entry is for "Kaushik", who asked "What is computer?" and answered "hahahahohohohihih". The second entry is for "mohit", who also asked "What is computer?" and answered "asdfsdfsdf". Each entry includes a blue "Edit Answer" button and a blue "Delete" button. A vertical scroll bar is visible on the right side of the page.

Fig 4.3.3.8 List of Doubts

In order to edit answer of a particular question, he needs to click “Edit Answer” button as shown in fig 4.3.3.8.

A dialog will be opened as shown in fig below (fig 4.3.3.9).

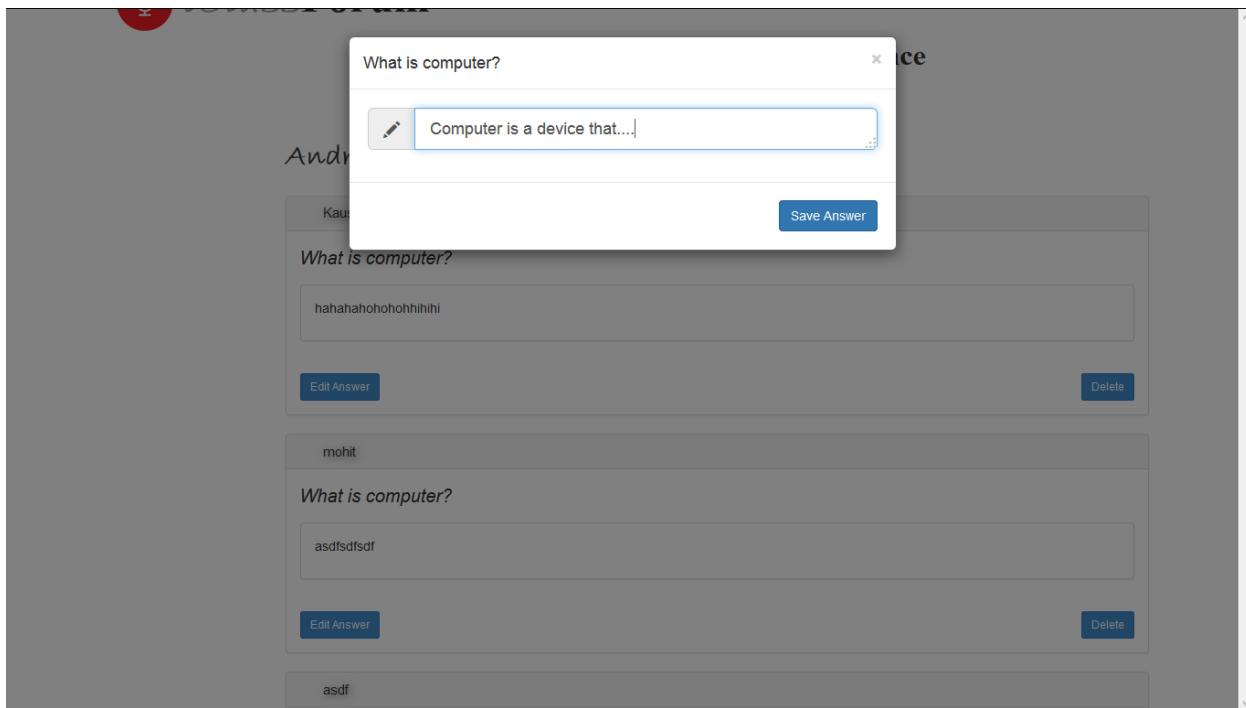


Fig 4.3.3.9 Editing solution of a Question

Write down the answer and click “Save Answer” Button as shown in fig 4.3.3.10.



Fig 4.3.3.10 Saving Answer

In order to delete any unwanted doubt. He simply needs to click delete button below that question as shown in fig 4.3.3.11.

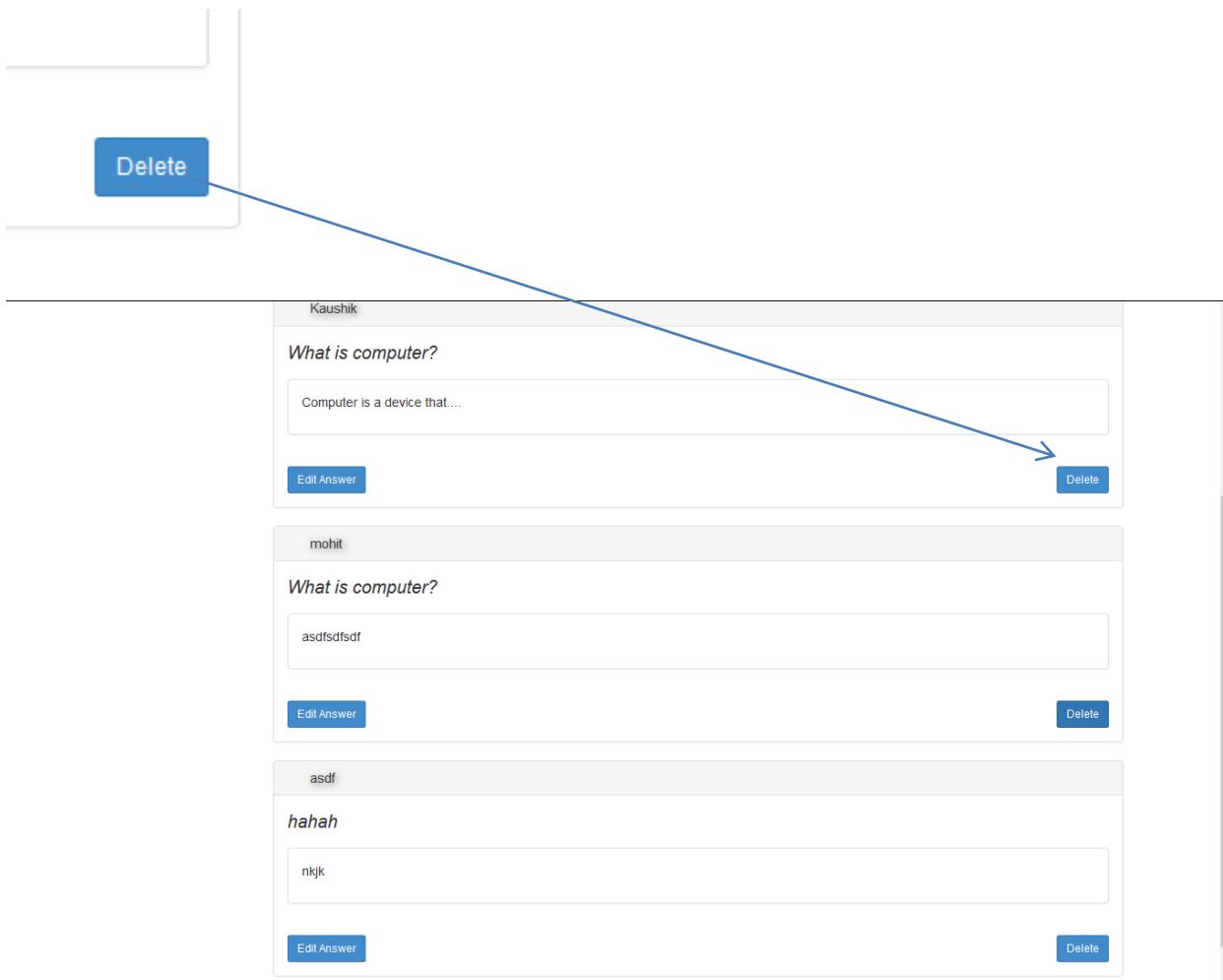


Fig 4.3.3.11 Delete Button to delete a question

After clicking Delete button, that question will be removed as shown below. (Fig 4.3.3.12)

The screenshot shows a 'Doubts' page from a mobile application. At the top, it displays 'Department of Computer Science' and 'Prof.Swati'. Below this, there are two entries listed under the heading 'Android'.

Entry 1: User 'Kaushik' asked 'What is computer?'. The answer provided is 'Computer is a device that....'. There are 'Edit Answer' and 'Delete' buttons next to this entry.

Entry 2: User 'asdf' asked 'hahah'. The answer provided is 'nkjk'. There are 'Answer' and 'Delete' buttons next to this entry.

Fig 4.3.3.12 Doubts page

Step 9.

Once he is done editing and deleting the doubts,

he can click Logout tab to exit his session as shown in fig

4.3.3.13.

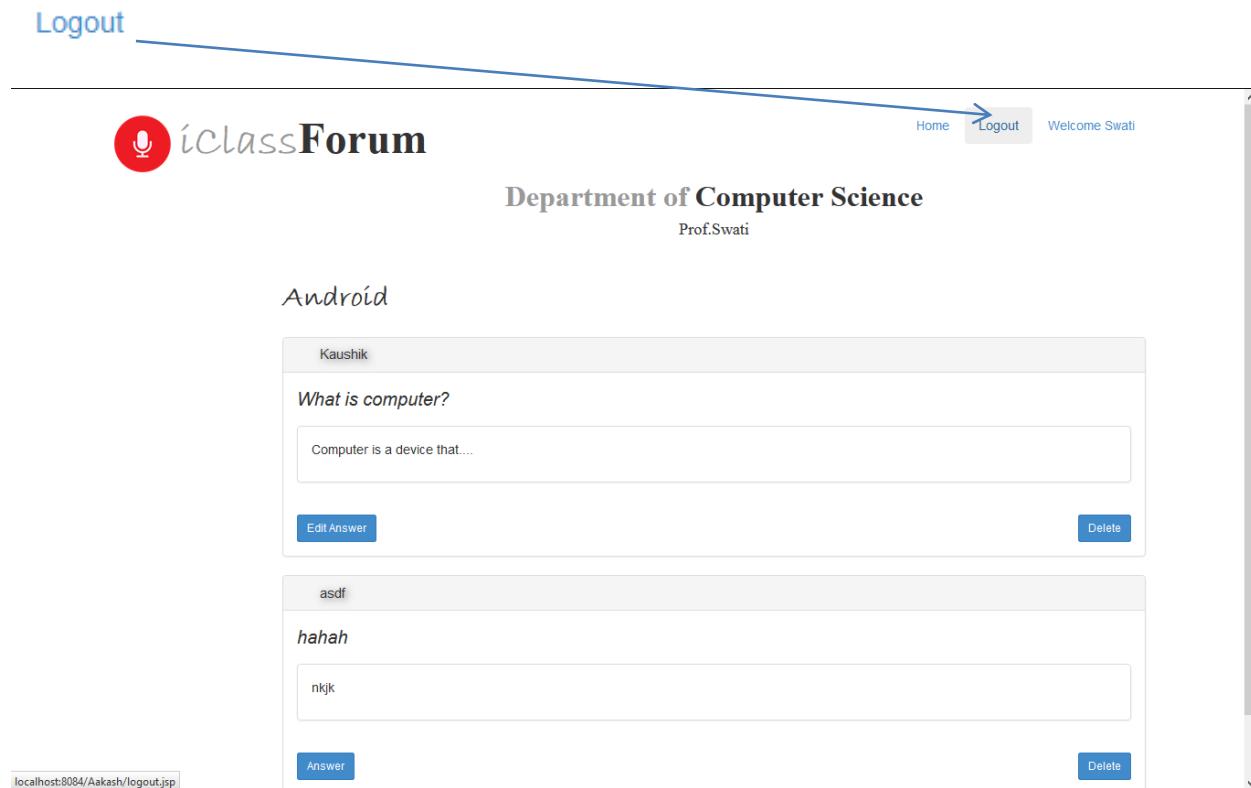


Fig 4.3.3.13 Logout button

Chapter 5:

Conclusion and

Future

Enhancements

5.1 Summary and Conclusion

A divide and conquer approach was taken for the completion of this application package. All the three different parts of these project package namely i-Class Android client, the i-Class server and i-Class forum were worked upon separately just specifying minimum requirements from the other counterpart in order to make all of them work in a synchronized way.

Further each of these parts were divided in separate modules in order to facilitate the further changes as per requirements much easier.

The android client was gradually coded starting from the login module and going through Connection establishment, text-doubt sending and audio streaming modules respectively. Further a substantial period of time was also spent in research

for cancelling of echo in audio stream using Speex open source library.

The server was implemented using Java swing so that it can run on any machine irrespective of the operating system. The server was coded simultaneously along with the client adding corresponding functionality in server side.

The main idea behind the development of forum was to not waste the precious doubts that came in students' mind while in classroom but could not be answered due to time constraints. Hence all the doubts are stored in a file and automatically converted in a web page at the end of session to be uploaded on forum site. A teacher assistant or lecturer himself can later review and answer the doubts through forum.

5.2 Future Enhancements

One of the main enhancements that we can do now is improve the voice transmission quality further as well as reduce the slight delay in audio streaming.

All other future enhancements can be done based on feedback from users as well as future requirements.