

**TO DESIGN AND DEVELOP A VIRTUAL SCHOOLING SYSTEM BASED ON
ANDROID**

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

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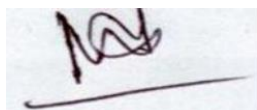
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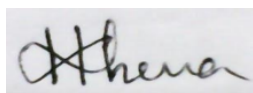
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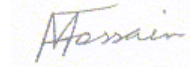
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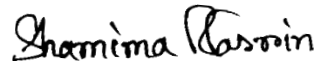
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ABSTRACT

During the pandemic COVID-19, academic activities are greatly hampered all over the world. Already it's affected the educational system of 213 countries. Though the institutes of higher studies of Bangladesh are using online education system to fulfill the study gap. Mobile Learning is one of the best ways to conduct online education. But it's not properly used in the stage of secondary & higher secondary level. So, the key purpose of this project is to help the students, teachers, schools & the moderators of the school. So that they can interact with the students properly. It's an ad-free mobile application that can be accessed via internet connection. Using real-time database system, the application will contain a collection of questions of previous years so that the students can get an idea about the question. They can prepare for the upcoming exam and discuss with teachers or mates. On the other hand, they can also contribute to build up the database which will make them more confident. By using this application students can get their academic notices by sitting at home without depending on any other social media platform which means this software can change the outlook of traditional system. Above all, this virtual schooling system can build an interactive learning environment in which we can ensure to conduct academic activities properly in Bangladesh.

TABLE OF CONTENT

APPROVAL	I
DECLARATION	III
ACKNOWLEDGEMENT	V
ABSTRACT	VI
LIST OF FIGURES	XI
CHAPTER 1	1
INTRODUCTION	1
1.1 Background of the project	1
1.2 Existing System	1
1.3 Problem Statements	2
1.4 Aim of the Project	2
1.5 Research Methodology	3
1.6 Proposed System	3
1.7 Conclusion	4
CHAPTER 2	5
REQUIREMENT ANALYSIS	5
2.1 Introduction	5
2.2 Requirements analysis	5
2.3 Conclusion	8

CHAPTER 3	9
LITERATURE REVIEW	9
3.1 Introduction	9
3.2 Literature review	9
3.3 Research Methodology	10
3.4 Conclusion	12
CHAPTER 4	13
SYSTEM ANALYSIS AND DESIGN	13
4.1 Introduction	13
4.2 System Analysis	13
4.3 System Design	14
4.3.1 Block Diagram	15
4.3.2 Flow chart	15
4.3.2.1 Student Module Flow-Chart	16
4.3.2.2 Teacher Module Flow-Chart	17
4.4 Conclusion	17
CHAPTER 5	18
SYSTEM EVOLUTION/DEVELOPMENT	18
5.1 Introduction	18
5.2 Front end development	18
5.2.1 User interface Design	18
5.2.1.1 Student Registration:	19

5.2.1.2 Teacher Registration:	20
5.2.1.3 Authentication:	21
5.2.1.4 Dashboard Design:	22
5.3 Back End development	26
5.3.1 Database Design	26
5.4 Conclusion	29
CHAPTER 6	30
TESTING AND IMPLEMENTATION	30
6.1 Introduction	30
6.2 Testing	30
6.3 Implementation	30
6.4 Result and Discussion	32
6.5 Conclusion	32
CHAPTER 7	33
CRITICAL APPRAISAL	33
7.1 Introduction	33
7.2 SWOT Analysis	33
7.2.1 Strength	33
7.2.2 Weakness	34
7.2.3 Opportunity	35
7.2.4 Thread	35
7.3 Conclusion	36

CHAPTER 8	37
CONCLUSION	37
8.1 Conclusion	37
8.2 Further Suggested Work	37
REFERENCES	39
APPENDIX	A1-C2
Appendix-A Backend Code	A1 to A6
Appendix-B Database Design	B1 to B2
Appendix-C GUI Design	C1 to C2

LIST OF FIGURES

Figure 2.1: Course contents providing and collecting softwares	7
Figure 2.2: Users satisfaction level for academic purpose	8
Figure 2.3: Response percentage for individual software.....	8
Figure 3.1: Use Case Diagram	10
Figure 4.1: Waterfall model.....	14
Figure 4.2: Flowchart of Student module	16
Figure 4.3: Flowchart of Teacher module.....	17
Figure 5.1: Student Registration UI.....	19
Figure 5.2: Teacher Registration UI	20
Figure 5.3: Login Screen UI	21
Figure 5.4: Student Dashboard UI	22
Figure 5.5: Teacher Dashboard UI.....	23
Figure 5.6: Previous Question List UI.....	23
Figure 5.7: Firebase realtime database.....	27
Figure 5.8: Firebase authentication page	28
Figure 5.9: Firebase realtime database of student.....	28
Figure 5.10: Firebase realtime database of teacher.....	29
Figure 6.1: Password recovery UI	31

Chapter 1

Introduction

1.1 Background of the project

A country's education sector plays a powerful role in alleviating poverty and strengthening economic growth. And by the study, we mean traditional learning where students are taught by an institution, classroom, books, etc. With the advent of technology, the environment of various professional sectors is improving. Nowadays most of the work is being shifted from manual system to automation system. And the education sector is not lagging behind. The world's education system is advancing day by day in the development of technology. Examples of modern education systems such as smart classes, video conferencing, e-books, etc. Nowadays mobile-learning has added a new dimension to the teaching and learning process, creating a better learning environment for students in the classroom and making the learning environment easier. Students can learn independently at any time and in any location and teachers can teach online at the same time using mobile phones. But though the students of the university have a clear idea about technology and m-learning, the primary, secondary, and higher secondary levels of our country have not yet used technology properly or have not reached them completely.

With this in mind, we are thinking of developing a mobile application that will help keep academic activities active at the secondary and higher secondary levels. In this system, there are a collection of previous years question and it will help students for self-study. Also, students can download those questions, answer those questions, and discuss with their teacher as there is a list of teachers in this system.

1.2 Existing System

Even though we are now living in the age of science and technology, most of the schools and colleges in our country still conduct various academic and administrative activities in the traditional system. And the maximum activities of the traditional education system are paper-based. As the register book is used for attendance, the register book contains the list of names and class roles of the students according to the class and section, this is how attendance is taken. A school's academic resources and previous year's exam questions are under the library of that institution. The library stores these question papers and academic resources according to the class. Students and teachers have to collect questions and other academic resources from the library before any exam to give students an idea of the question pattern. Again, the various emergency notices of the school are delivered to the students, teachers, and the rest of the school staff of the school through the notice board or if there is any school website or software then the notices are published through website and software. Moreover, the lists of teachers and students are kept

through registers book. Those register books store the phone numbers, addresses and all the information of the students, teachers, and other staff of the school.

1.3 Problem Statements

In traditional system most of the time students get suffered for collecting previous questions and answers and sometimes this procedure becomes too expensive for the poor students. They face trouble to know the pattern of questions. They don't get academic notification in time. Even teachers remain unknown about academic notice. Again, in manual system attendance system is so disturbing. Because keep tracking of all student's attendance and making report of attendance percentage everything has to do at hand. Report making is another trouble for teachers. Cause making result sheet of every student and comparing among them is such a mess. In manual system teacher can't easily reach to the students as well as students don't get reach to the teachers. They have no such a contact list. So, there are so many disturbances in traditional system.

1.4 Aim of the Project

In the current context, everything is now online based. The education sector is not lagging behind. So, in order to keep pace with the evolution of the age, we have to deal with the situation from our respective positions and come up with something up-to-date. Since the Corona epidemic, we have been confined to our own homes. So, for this purpose, we are feeling the need for an online platform but most of the schools still follow the manual system to manage schools' activity even the schools which have their own website or software are not sophisticated. Moreover, students face various problems in the traditional education system. The traditional education system is in some cases time-consuming. And in some cases, students are afraid to talk face to face with teachers. Again, they worry about the question patterns during the exam, because they do not have the question paper of the previous year. And they have to waste a lot of time collecting this question paper.

Usually, the question papers are in the form of document format in the library which is a manual paper base and it takes a long time to find it and if we convert it to an automation system then the librarian can use it and students can search from anywhere in the country. So, to resolve the problem of manual systems and make online learning better we have built a virtual schooling system. Our aim is to ensure that students can get exam preparation properly through mobile learning and that teachers can guide them as well. Because through our application, teachers will be able to check the solution of the previous year's question which is provided by students.

1.5 Research Methodology

Already we have mentioned that in traditional system academic and administrative works done by manual work which is too much time costly and difficult to get the information on the picked time. So, this application is 24 hours service system where all the actors (teachers, students) are connected by authenticate in the system. Though the actor's type is different so this system contains different dashboard according to user. If the user is a student, then he can access only those features whose are implemented for him. But if we talk about the teachers then the number of functionalities is more than student's dashboard. When user register to this system he must check the user field otherwise he can't explore the system. For store the content and information we have used realtime database provided by Firebase which is a backend system. In the further chapter we will discuss more about this where we have used JAVA as programming language. We want to mention that our full system design implemented by Extensible Markup Language.

1.6 Proposed System

The proposed system is an android application for efficient management of academic activities and concurrently it takes care of the limitation in the existing system. First and foremost, the system is a mobile application native to android platform but it's also exchangeable to cross pulpit software as well. The intercommunication of each user with the application depend on who the end user is.

The motive of an admin user to compose this system as a collective product thus enabling it to be reused over the years. Solving the backend problem of the details stored in the system is the actual aim. The administrator has right to update student information, add/remove users, course list, Previous questions materials, notices. The matured system will be conduct by three types of users. They are Teachers, Students and the administrator. Mainly functionalist of the proposed system can be divided into four well defined modules.

- a) **Registration and Login:** First of all, after download the style user must be register providing some information. After registration user can sign in into the application providing email ID (Gmail, Hotmail, yahoo) and a strong password. During registration, there are two kinds of entities. One is personal data and another is academic details.
- b) **Discussion Forum:** This module is actually app messaging system with friends or groups. Students can make conversation with one another by texting, audio/video chatting.
- c) **Evaluation and Preparation:** This module is divided into two sections. One is for taking preparation for upcoming examination by getting previous years question. Another is participation in the quiz to judgement.
- d) **Virtual Notice Board:** Notices can be uploaded by teachers or administrator and can be viewed on a virtual notice board section of the app with proper heading.

Except this module, all other modules need authentication to access. The Use Case Diagram of this automation system is attached below,

1.7 Conclusion

Undoubtedly, we are living in the era of mobile-learning. So, to facilitate the way of education system specially to develop the level of secondary and higher secondary we have built a system. Because in conventional system there are lots of limitation. Among them one of the problem is that student can't gather their required materials during examination. After studying on this problem, we have customized this system which is able to overcome this obstacle.

Chapter 2

Requirement Analysis

2.1 Introduction

Many schools around the country are hampered by manual procedures and paperwork, which are very time-consuming and difficult to track and maintain records of all important information. Paper-based systems increase the workload of school staff and teachers for a number of management tasks such as creating class schedules, publishing various notices, storing past year's question papers, etc. Though it wastes a lot of time so it's a big challenge to school management.

2.2 Requirements analysis

For changing the manual system into an automation system, a survey is required. That's why we have made some question. Actually, we wanted to know about their feelings out of online system. We have asked to teachers and students some multiple questions and their answer gave us a great realization about the educational system. Through the survey, we learn that those schools face a number of problems in performing academic and administrative tasks in the manual system. So we listed their various requirements to convert the manual system into an automated system.

We have surveyed 7 schools in different districts of Bangladesh. Those schools are:

1. Dhanmondi Govt. Boys' high school, Dhaka
2. Agrani Girls' high school and college, Dhaka
3. Amtola Kazipara high school, Panchagarh
4. Panchagarh Govt. Girls' high school, Panchagarch
5. Panchagarh BP Govt. high school, Panchagarch
6. Kundagram Girls' High School, Bogura
7. Kundagram Boys' High School, Bogura

From the survey the following requirements have been highlighted.

1. Academic Notice:

Relying on a manual system to issue any emergency notice is often time-consuming. Some emergency notices such as school closure, class routine change, extra class schedule change, exam schedule change need to reach the students very quickly but it is almost impossible to get the notice in time in the manual system. So a system is needed so that everyone gets notices in a timely manner without depending any other social media platform.

2. Students' performance analysis:

It is very important to keep track of the performance of any student to find out their progress rate. In this way, there will be a record of which students are weak in which subjects or whose performance is good in which subjects. It's difficult to keep eye on every student's performance in the manual system. And some schools are using social media for this purpose. And their opinion was not so much satisfactory. So the automation system will have the history of the student so that the progress rate of any student can be easily calculated from it.

3. Attendance:

In traditional attendance system there are so much trouble. Taking note of which students are present and which students are absent is kind of inconvenience. Because there is no chance to correct the fault. Again listing of all students name and roll is a waste of time, pen and papers also. It is very difficult and time-consuming to calculate the percentage of each student attendance. Moreover, due to various reasons, attendance sheets are often misplaced, lost, or information is incorrectly entered. An online attendance through smartphone can be a great way to solve this problem.

4. Report making:

The traditional approach used in publishing exam results is quite difficult. Preparing final results or reports based on each student's attendance percentage, half-yearly exam mark percentage, final exam mark percentage, and quiz or assignment percentage is quite time-consuming and complicated. So a report making feature is needed in which if you insert the mark of mid, final, quiz, or assignment, an automatic report will be created. This will reduce the hassle of teachers and will also help in publishing the results on time.

5. Evaluation:

Evaluation is the main key to test students. Weekly test can be the proper way to evaluate students. Teachers can create random question paper set for random students. But in the manual process, it is messy and inconvenient for teachers. As well as waste of paper and time. So evaluation feature is needed for those schools to easily evaluate their students.

6. Emergency Contact List:

For contacting to any students or staff members there is need to keep emergency contact list. So that in any situation students can contact to teachers as well as teachers can contact to students. Even guardians will be able to keep track of their children condition.

7. Previous question set:

The most important thing to complete the preparation for the exam is to understand the pattern of the previous year's question paper which is very difficult to store the last year's question paper of all the classes of the manual procedure. It wastes a lot of time and it is very difficult to find

the time needed and it is very difficult for students to collect last year's question papers specially in holiday or pandemic situations it becomes more difficult to collect last year's question papers from seniors. So a feature is needed to store last year's question papers so that it can be easily found by searching the question papers of a particular class.

8. Feedback and solution:

Students should be given a solution along with the question paper to give a better idea or clear idea about the exam so that they get an idea about the solution of that particular question and perform better in the exam. And the feedback feature is needed to show how appropriate the solution is, so if any answer is wrong, it will be removed from the system. So the school needs a feature that will have both feedback and a solution to the question paper.

We have learned from the survey that some schools follow social media for providing academic resources and notices. Then we asked about those software which are being used. Again we asked students how they collect their academic resources. Then we find that most of them use social media sites for providing and collecting those resources.

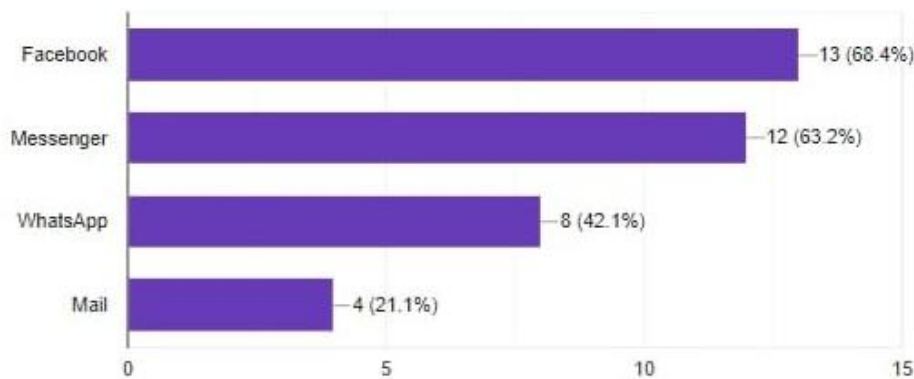


Figure 2.1: Course contents providing and collecting softwares

After that according to the last answer our next question was how much appropriate to use those application for educational purpose. Almost 84.2% responses was averaged and 5.3% responses was highly recommended.

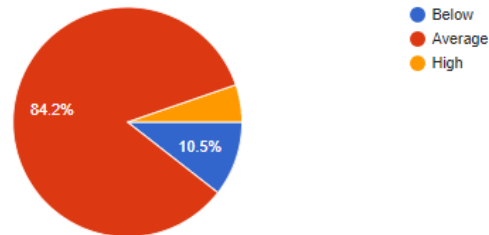


Figure 2.2: Users satisfaction level for academic purpose

At last we asked that whether they need an individual school registered android automation system or not. Most of the responses was Yes and the percentage was 81.8% only 18.2 percentage was not sure.

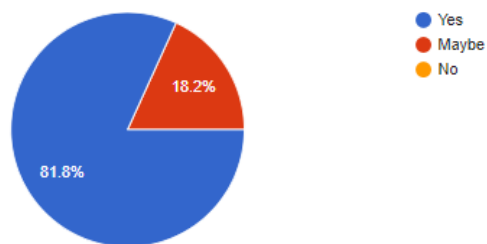


Figure 2.3: Response percentage for individual software

2.3 Conclusion

Based on the information we have received from the survey, these requirements are more important in school management. Managing all school work in a manual system is both time-consuming and inconvenient. Moreover, a lot of paper is wasted in paper based works which is also expensive. So even though we are not able to fulfill all the requirements mentioned above, we have given solutions to some of the major problems in this application such as Academic Notification, Feedback and solution, Previous question set, Class routine, and Emergency contact list. This will reduce the work of the school staff as well as the students will be much benefited.

Chapter 3

Literature review

3.1 Introduction

Our application is all about academic and administrative activities related. We have found out some problem from different documentation which is related to our application. And we have tried to solve these problems. We hope that these solutions will be helpful for students and teachers and education system will be easier. Our system is able to provide some services specially contribution of previous question paper where teacher can upload those questions. Thus, student can easily understand the question pattern. In our system having two types of actors, one is teacher and another is student. And most importantly authentication system must be needed for both actors. It will be more clear on the figure 3.1 Use case diagram To design UI of our application we have used XML and JAVA for backend development. We have used Firebase Realtime feature for storing the information. Overall, we have tried to provide a complete educational system for students.

3.2 Literature review

Nowadays many mobile applications are being developed to perform different types of academic activities. Which is used by many educational institutions worldwide. Some of the great contributions to this topic are mentioned below:

Mritunjay Ojha, Shantamol Sojan, Frezy Roy, Lijo P Varghese [1] proposed an android based application that can store the student's routine data, notify students, can mark student attendance. Parents can easily view their children's academic progress. School bus GPS tracking is available and all the data stored in a central database.

Rakhi Joshi, V. V. Shete, S. B. Somani [2] proposed the android application that contains academic calendar, notice, study material, performance report, online examination reminder and so on. Teachers can take attendance using mobile and can record students' progress reports.

D.Vimala, A.Sindhu, S.K.Manikandan [3] proposed the android application where students can update their circular data such as vacations, assignments, events, etc. Students can also see their subject-based marks, check the availability of staff members and check the final date for payment of examination fees.

Prashant K Gupta, Manvi Madan, Kajal Puri, Abhishek Gulati [4] proposed another android based mobile application where students can participate in the exam using mobile. The application also contains other features like question banks, result generation, and evaluation systems.

Parthasarathy. M, R. Ananthasayanam [5] proposed a web-based question bank system that can store the past examination questions and it contains search functions that will allow quick access to the question bank.

M. Lakshmi, Abhinayaa E., Aiswariyaa Sruthi E [6] proposed an android-based application for a university that stores previous year's questions. Additionally, students can easily search for and download existing question papers.

Hosam F. El-Sofany, Noor Al-Jaidah, Shaima Ibrahim, Salha Al-kubaisi [7] proposed a web-based questions-bank system for school that will allow the school's teacher to create a question bank database. Students at the school were able to take quizzes, free exercises, and exams, as well as download course reviews and previous exams, via the system.

Prasanna Pillai, Sonal Singh, Shreya Thakare [8] proposed a library management software based on android that keeps records of and controls transactions in a library. This library automation system primarily focuses on common library operations such as viewing available books, viewing total books, searching books, updating information, and reserving, requesting, and returning books.

3.3 Research Methodology

According to the survey from the problem statement subchapter we have solved only academic and administrative problems of manual system of an organization. As we said this software is an online based application that means mobile data or internet connection must be established on the device. The actual actors of our project are teacher and student. The services of the system established by the participation on the both sides. The services are: search questions, search students, post notices, contribute questions, reports, and contribute answers, search answers and view academic notices.

If we look on the use case diagram then it will be clearer to us,

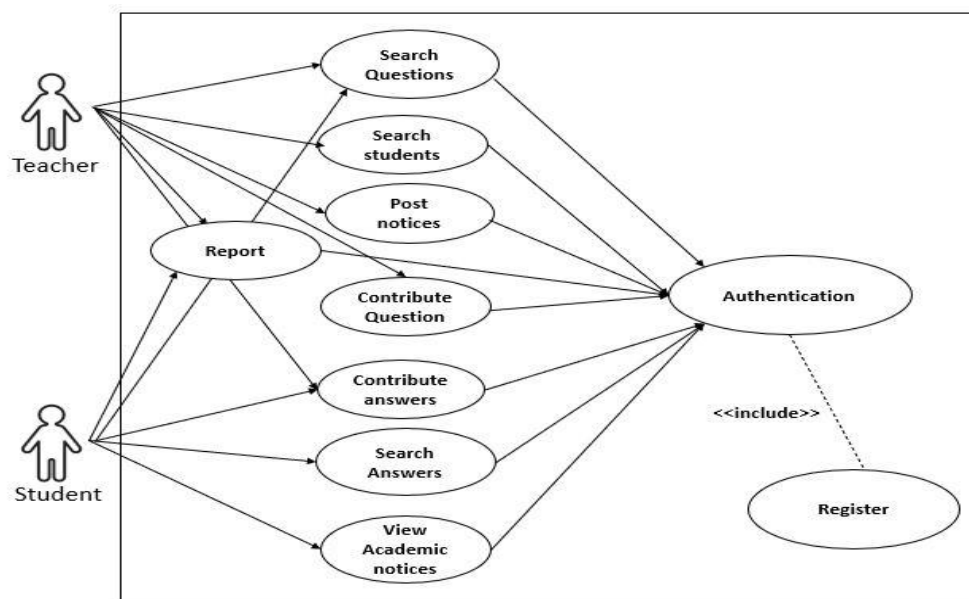


Figure 3.1: Use Case Diagram

Here the actors are teacher and students as we have said before. Teachers can search and contribute previous questions so that the arrow is direct to that particular feature. But if we look on the student then students can only view access of the question and answers. Though both users can contribute answers of the provided questions. Important factor is for getting all kinds of services user must be authenticated successfully.

Use Case 1: Login

Primary Actor: Teacher and Student

Precondition: Must have registered Email and Password in the system

Main Success Scenario:

1. The actor places the email id in the email section
2. The actor places the password id in the password section
3. Must select the user type clicking on radiobutton
4. Press the Login button

Exception Scenario:

1. The email id must be registered on the system
2. Provided email must be verified by the user
3. Incorrect password, password must be more than 6 characters

Use Case 2: Register

Primary Actor: Teacher and Student

Precondition: Must have registered Email and Phone Number

Main Success Scenario:

1. The actor must provide a clear profile picture
2. The actor must provide the academic information
3. The actor places the email id in the email section
4. The actor places the password id in the password section
5. Must select the user type clicking on radiobutton
6. Press the Register button

Exception Scenario:

1. The email id must be registered on the system
2. Provided email must be verified by the user
3. Incorrect password, password must be more than 6 characters
4. Must give the profile picture

5. Correct user type must be checked
6. Academic information can't be empty

For implementing the system UI, we have used XML (Extensible Markup Language) where we have made a combination of RecyclerView and Cardview where android material design is present. On the backend section we have used JAVA language because of object oriented. To store the information and contents we have used Firebase realtime features which is called "Realtime Database".

Actually, the backend of our project is divided into three parts, one server, one database and most importantly one application, if you book an air ticket in a travel agency, you usually open the ticket booking website and interact with the frontend because frontend contains useful navigation to navigate a user. When the data user need is inputted, the application saves it to a database created on a server. Therefore, in our back-end system we create a database to store the data that the server receives through the users. We used JAVA for our application development.

3.4 Conclusion

In this chapter we have discussed about the Literature review and research methodology. From the literature review, we observed that most of the applications mentioned above are designed to control various school and college activities. They have given their focus on providing learning materials and those systems are playing a vital role in the online education sectors. On the other hand, from the Research methodology, we have shown a use case diagram where two cases were discussed. From the cases we have got a great idea about the main success scenario and exception scenario. These scenarios have some precondition also depending on the actors. On the last part we have mentioned the backend system of our project.

Chapter 4

System Analysis and Design

4.1 Introduction

Systems Analysis and Design (SAD) is a term for describing system methodologies for developing quality automation System. It combines information technology. It is a methodical process which includes some phases such as planning, analysis, design, deployment, and maintenance. It includes the development process as well as the system future maintenance work. The basic SAD methodology is the waterfall model which is very easy to implement following the model steps. hence the focus is on programming.

It has some objectives. These are:

- Most importantly, it focuses with systems where the other minor systems may have clashing destinations and it also enables in intellect of critical structures.
- System analysis assists with accomplishing similarity and solidarity of the other systems.
- This kind of analysis gives a fortunate position of intelligence and contrasting the other systems sizes, capacities and complete system.

4.2 System Analysis

It is a process of collecting and interpreting data's, identifying the existing problem, and sepsis of an automation system into its some components.

This kind of analysis is conducted for the purpose of studying a manual problem or its parts in order to identify its necessities or objectives. It is a problem-solving fetch that improves the method and ensures that all other components of the automation system work perfectly to accomplish their purpose.

The main important part of system analysis is software development and life cycle (SDLC). Software Development Life Cycle is a procedure that help to produce software containing the highest quality and lowest cost in price in the shortest time possible. This life cycle provides a structured flow of steps that help an organization to quickly produce software which is well-tested. There are a lot of models for describing SDLC. But in our project, we will use Waterfall Model.

WATERFALL MODEL is a sequential or pursuant model. This model divides software development into some steps. There is no overlap between the phases so each phase must be

completed before the next phase begin. Each phase is designed for performing specific task or activity during the life cycle phase. This model was introduced in 1970 by Winston Royce [9].

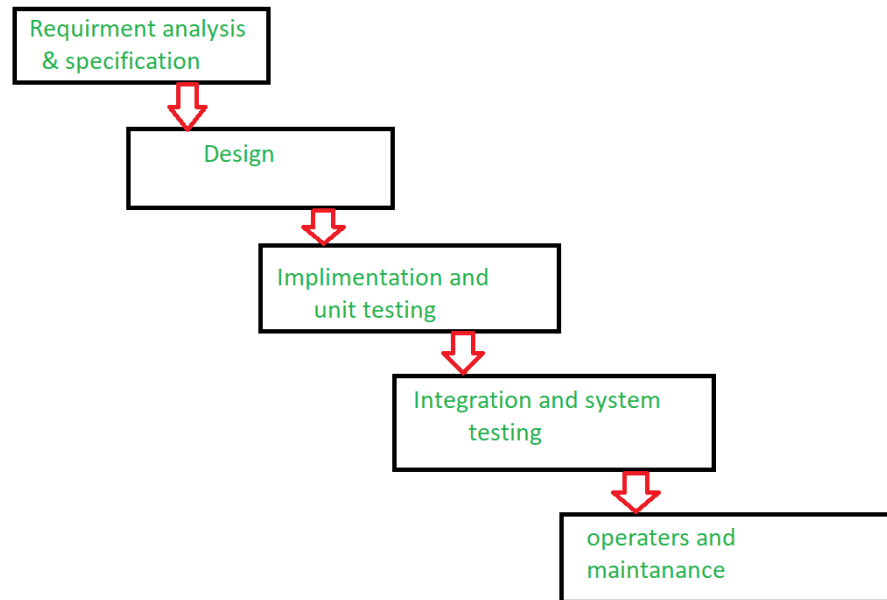


Figure 4.1: Waterfall model

The great advantage of this model is before the next phase of development, each phase must be completed. On the other hand, Project is completely dependent on project team with minimum client intervention.

But in this model the problem or disadvantage is Documentation occupies a lot of time of developers and testers. During implementation this project small changes or errors that arise in the completed software may cause a lot of problems. Though there are some difficulties in this model, we have chosen this model. Because of requirements are not changing frequently, application is not so much complicated and big, requirement is clear and environment is suitable and the most important thing is Technology and tools.

4.3 System Design

Systems design is that the procedure of defining components of a system like modules, architecture, elements and their user interfaces and knowledge for a system supported the required requirements. This is the method of defining, developing and designing methods which pleased the actual needs and requirements of an application.

4.3.1 Block Diagram

When we represent the principal parts or functions of a system by blocks connected by lines is called block diagram. This is a diagram of a system which is used to show the relationship of the blocks. It contains the operating of the system, what are its intakes or inputs according the given inputs what are the outputs and the most important thing is how the information, findings or materials flow through it. The block diagram of our application is presenting below-

This academic activity application has a client server architecture. All the information of the users is kept in Real-time database server. Now the question is what real-time database server is. This is a database system which uses a special way to handle the data and the special way is Real-time processing. In this case if the state is constantly changing, there has no effect on database accessing. Anyway, this information can be accessed by users but before that they must install the application on their smartphone.

Each client will observe different UI (User Interface) depending on client type. That means, each category of user will have a different user interface on basis of the authorization given upon him.

4.3.2 Flow chart

First of all, a proposed system needs a blue print which helps to guide a programmer through the progression of the development. This blue print is called flowchart. It's an excellent way to communicate the details of a system to others. Without drawing process flow development is impossible.

There is different flowchart in our system depending on different module. Each module has different conditions, process or flow. But most of the process in different module is almost same according to logic. Here we are described two main module of our system-

4.3.2.1 Student Module Flow-Chart

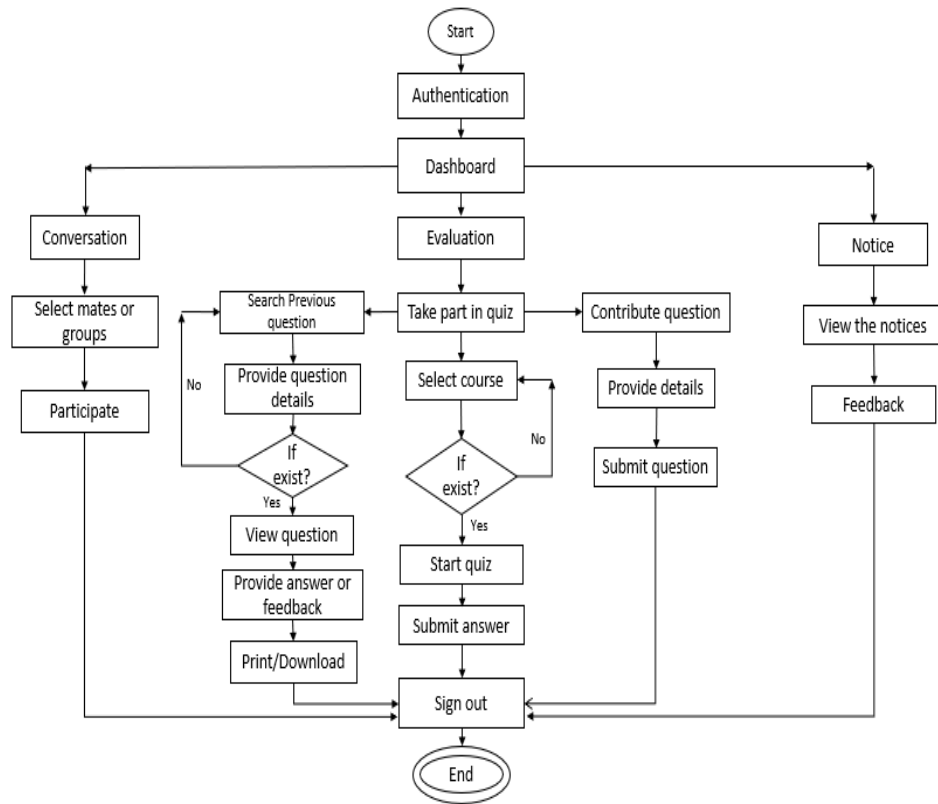


Figure 4.2: Flowchart of Student module

4.3.2.2 Teacher Module Flow-Chart

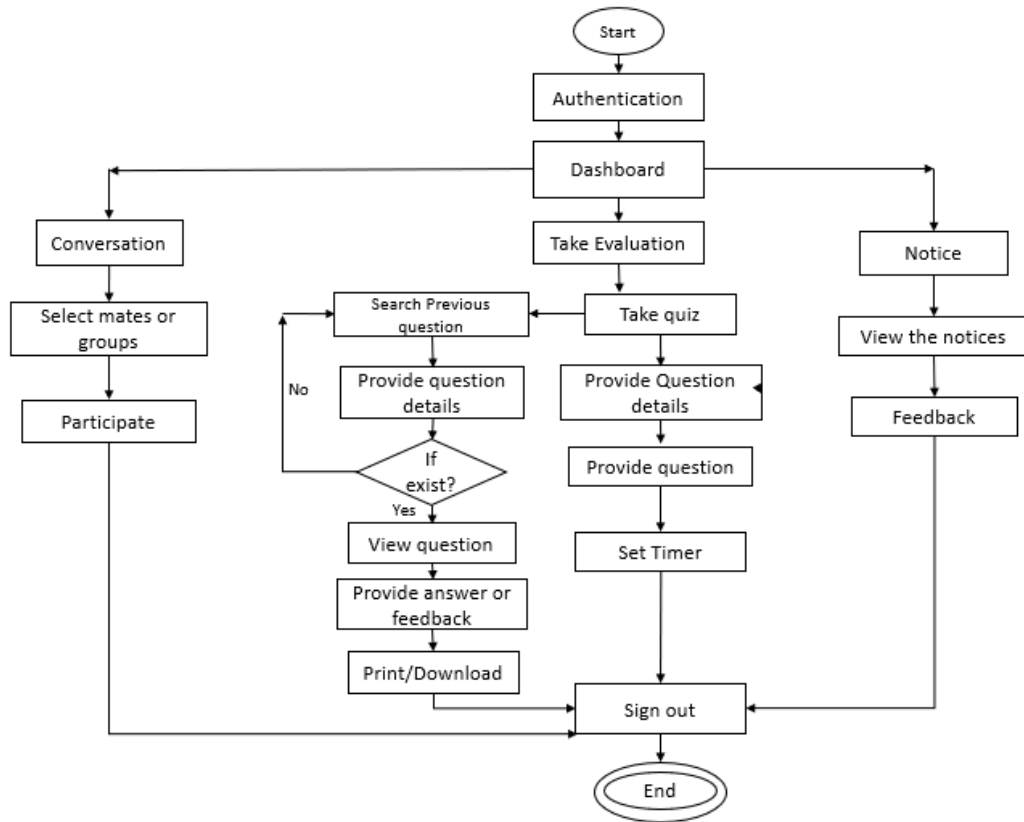


Figure 4.3: Flowchart of Teacher module

4.4 Conclusion

Overall, the whole chapter has focused on the system analysis and the design which is followed to implement this application. The system research of this app is the detailed evaluation of a particular system to identify areas for improvements and make any enhancements if necessary. When a system analysis is correctly performed, it makes certain that the right path is crazy regards to applications and it helps to attenuate errors which reduce future IT requirements for fixing problems. If the above process is performed properly, it'll not only save the corporate money up front but ensures that the proper application path is being taken the first time, growth and business charge considerations have been accounted to accommodate future plans, and errors are kept to a minimum thereby mitigating future IT overhaul requirements which is less costly efficient and flexible. Proper system design like block diagram, flowchart allows for better management through changing the software to suit any business changes, this means that the final product will be totally controllable. If changes or enhancements are required, the need of rewriting the entire software are going to be removed, which is generally costly.

Chapter 5

System Evolution/Development

5.1 Introduction

System evolution or system development is the process of defining, designing or the implementation of a system according to system analysis and design. It's an essential structure in the field of building a software, because this is the overall structure of how a system is developed or maintained. Every phase of the system development is crucial to the success of any information system [10].

5.2 Front end development

There are a lot of IDEs for developing android apps like Android Studio, Visual Studio, and Droid script. In our project we've used android studio. Because Android Studio is one of the best IDE for Android development. This development tool is made by Google and has received raved reviews by mobile app developers everywhere the planet. There are a lot of advantages to using Android Studio as an Android development environment. Using this software front end and back-end development can be done in a smooth environment.

5.2.1 User interface Design

Using xml, we have designed our project interface for making the project. If we talk about xml, it stands for Extension Markup Language. It's a markup language like HTML used to describe data. Xml is well legible both by human and machine. In Android we use xml for designing our layouts because xml is lightweight language so it doesn't make our layout heavy. Actually, the whole concept of xml is defined using the hierarchy of View and View Group objects.

A ViewGroup is an inconspicuous container that arranges child views. These child views are other widgets which are wont to make the various parts of UI. Here the UI is different according to the user. We have two types of interfaces to demonstrate this application. The view of student's activity and the teacher's activity is totally different because of their role are different.

When a user registered in this application to get the service, he must select the type of registration. This type will classify the user type. Overall, the UI is very user friendly [11].

Here some screenshot has been attached to describe the interface of our project more clearly.

Some UI Screenshot:

5.2.1.1 Student Registration:

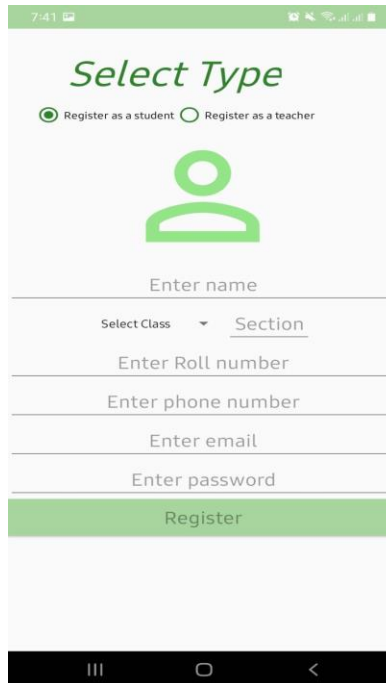
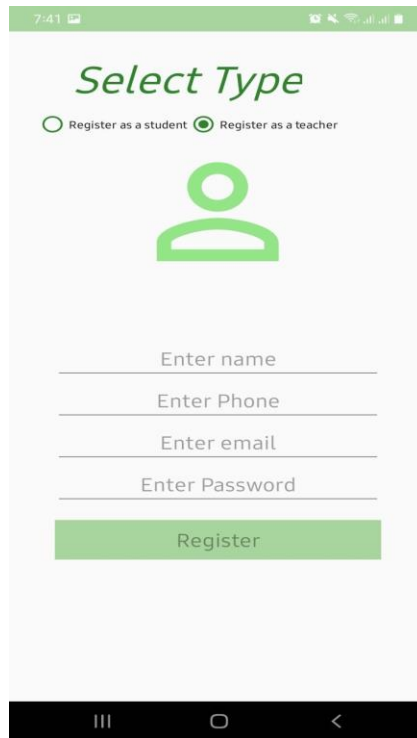
A mobile application screenshot titled "Select Type" in green. It features two radio buttons: "Register as a student" (selected) and "Register as a teacher". Below is a green person icon. The form includes input fields for "Enter name", "Select Class" (dropdown), "Section" (text), "Enter Roll number", "Enter phone number", "Enter email", and "Enter password". A green "Register" button is at the bottom. The status bar shows 7:41 and various icons.

Figure 5.1: Student Registration UI

This student registration UI and teachers' registration UI is basically presents in one activity. Whenever user try to register, he or she must select the type. If user select "Register as a student" then the form will show as follow as Figure: 5.1. If user select "Register as Teacher" then the teachers form will arrive in the screen as like as Figure: 5.2.

5.2.1.2 Teacher Registration:



The image shows a mobile application interface for teacher registration. At the top, there is a status bar with the time 7:41 and various icons. Below the status bar, the title "Select Type" is displayed in a green, italicized font. Underneath the title, there are two radio buttons: "Register as a student" (unselected) and "Register as a teacher" (selected). Below the radio buttons is a green icon of a person. Under the icon, there are four text input fields: "Enter name", "Enter Phone", "Enter email", and "Enter Password". At the bottom of the form is a green button labeled "Register". The entire form is set against a light gray background. At the very bottom, there is a black navigation bar with three white icons: a hamburger menu, a home icon, and a back arrow.

Figure 5.2: Teacher Registration UI

5.2.1.3 Authentication:

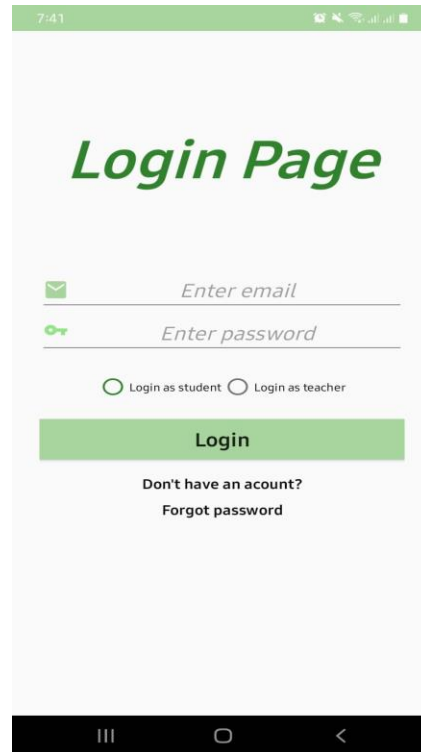


Figure 5.3: Login Screen UI

After completing the registration process, user must be login to verify the account. During login registered email and valid password is required. If login successful then user move to the next dashboard which is actually the main page as like as Figure: 5.4.

5.2.1.4 Dashboard Design:

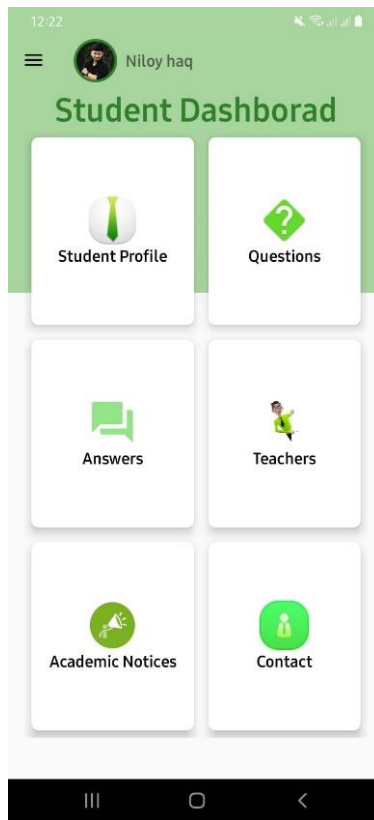


Figure 5.4: Student Dashboard UI

Students Dashboard UI and the teacher's dashboard UI is almost same at looking but there is a little bit different due to the difference of activities. Both activities have a navigation drawer where placed some shortcut options which will make the system too much flexible to use.

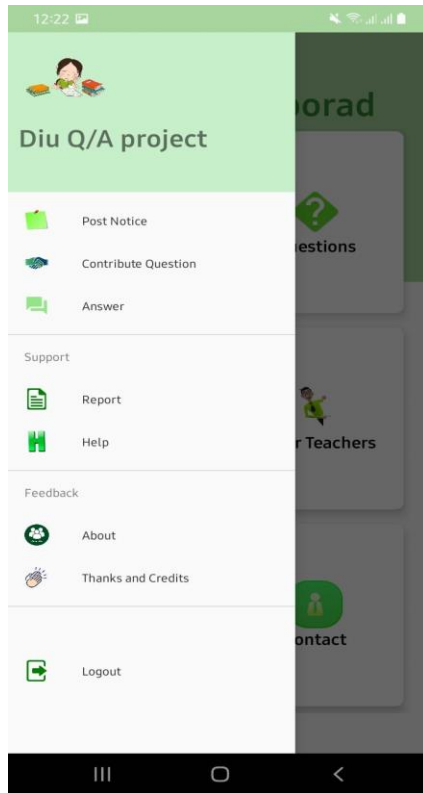


Figure 5.5: Teacher Dashboard UI

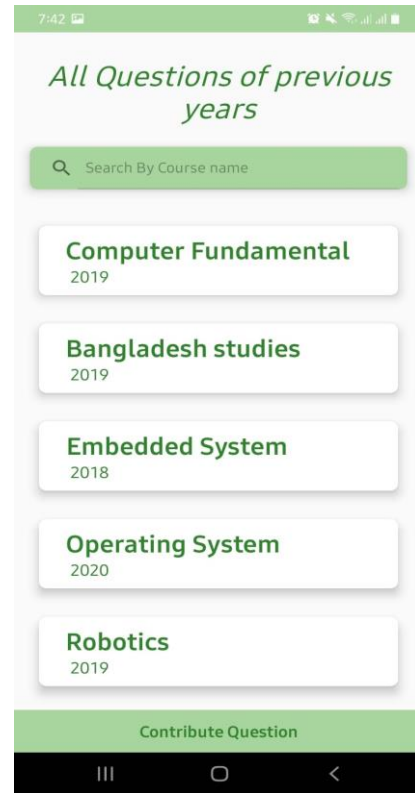


Figure 5.6: Previous Question List UI

On the navigation drawer, the shortcuts are actually Contribute questions and answers. Actually, user can go from the dashboard but though our primary target is question so we force on this feature like Figure: 5.5. There is some another menu in the navigation drawer like Report, help, Logout.

These menus are actually common for both kind of users. In the system we have used Share preference technology to hold the authentication process continue. If any user logout, then the shared Preference is cleared.

XML Code:

Dashboard:

Here a single portion of that activity xml is included to understand the design.

```
<androidx.cardview.widget.CardView
    android:layout_width="100sp"
    android:layout_height="wrap_content"
    android:layout_row="0"
    android:layout_column="0"
    android:layout_gravity="fill"
    android:layout_rowWeight="1"
    android:layout_columnWeight="1"
    android:layout_margin="8dp"
    app:cardCornerRadius="8dp"
    app:cardElevation="8dp"
>

    <LinearLayout
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:orientation="vertical"
        android:gravity="center"
        android:layout_gravity="center_horizontal|center_vertical"
    >
        <Button
            android:layout_width="60sp"
            android:layout_height="60sp"
            android:id="@+id/studentProfileBTNid"
            android:background="@drawable/profile"/>
        <TextView
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:text="Profile"
            android:textSize="20sp"
            android:textStyle="bold"
            android:textAlignment="center"/>
    </LinearLayout>
</androidx.cardview.widget.CardView>
```

Question List Activity:

```
<androidx.recyclerview.widget.RecyclerView
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:layout_margin="10sp"
    android:layout_below="@+id/cardviewID"
    android:id="@+id/questionRVID"/>

<Button
    android:layout_width="match_parent"
```

```

android:layout_height="wrap_content"
android:text="Contribute Question"
android:textAllCaps="false"
android:layout_alignParentBottom="true"
android:background="@color/primaryLightColor"
android:textColor="@color/primaryDarkColor"
android:textStyle="bold"
android:textSize="20sp"
android:id="@+id/contributeQuestionID"/>

```

For display the questions we have used recyclerview to show the list to the users. The reason behind of the recyclerview is to add the listener with the single question. The look of a single question is looked according to this xml code:

```

<LinearLayout
    android:layout_width="match_parent"
    android:orientation="vertical"
    android:layout_margin="10sp"
    android:layout_height="match_parent">

    <TextView
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Networking"
        android:layout_marginLeft="20sp"
        android:id="@+id/questionCourseTVID"
        android:textSize="30sp"
        android:textColor="@color/primaryDarkColor"
        android:textStyle="bold"
        android:gravity="center"/>

    <TextView
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Year"
        android:layout_marginLeft="25sp"
        android:textColor="@color/primaryDarkColor"
        android:id="@+id/questionYearTVID"
        android:textSize="20sp"
        android:gravity="center"/>

</LinearLayout>

```

5.3 Back End development

We have used JAVA as programming language for developing the back-end part of our project. Java is an object-oriented language. It is class based all purposed language and runs on any platform. It requires a few dependencies as possible which is very fancy. The run time code operates within the Java Virtual Machine (JVM) as compiled code. Basically, Android Application are mostly developed in JAVA language using Android SDK (Software Development Kit). It is most preferred and mostly used programming language for Android App Development.

Actually, the main reason behind Android enlargement application was to create a platform application environment that can run on every device. It's very easy to make the app as dynamic system. As we all know java has this kind of standard so java was chosen for android development.

5.3.1 Database Design

A database is an organized collection of structured information, or data, typically stored electronically in a computer system. Database security, and data protection, are stringently regulated. A secured database contains the heart of an automation system. In our project we are using Firebase database under room database to store data.

Firebase is a software backend system. It is software that allows users to interact with a relational database. It's a Google developed platform which is used to interactive mobile app and web applications. That's why we can say that it's a Google backend application which provides great service like fixing app crashes, analytics report and tracking feature. In Firebase, a database is stored in a single file — a trait that distinguishes it from other database engines.

The main reason of using firebase is to make the application as real-time. Because firebase is the actual beginning platform where we can get the service of real-time read and write service. The database table is stored here as hierarchical method that's why it's very easy to access the primary key by calling the root data. On the other hand, it has some separate fragment like authentication, storage, cloud firestore and realtime database.

By using the firebase advantage, we have also attached report problem feature. Whenever any user faces any kind of systematical problem or unauthorized bugs then he can report to the developers. For this he must input the subject name and details. Inside the method his ID will also send with the report systematically with real time and date. By using the ID developer can identify the person and fix the bug. In the following screenshot of databases, we can explain the details easily.

These are used to handle the data very nicely. In this project we are using the following features:

- 1) Realtime storage
- 2) Realtime read and write data

- 3) Authentication system
- 4) Account Verification
- 5) Push notification

For further development we can use app messaging service from this firebase.

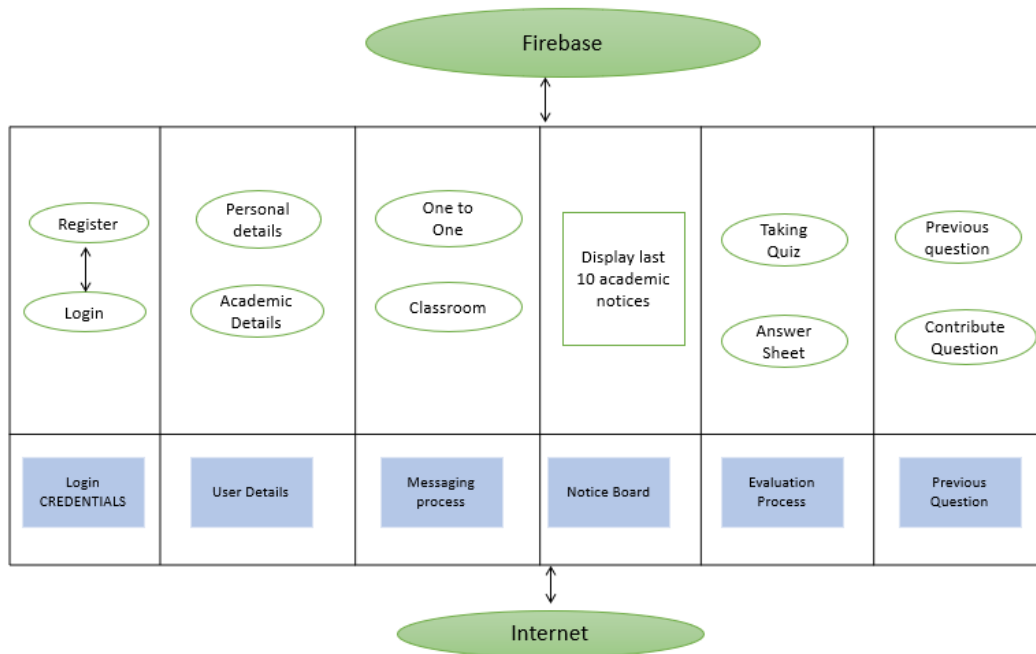


Figure 5.7: Firebase realtime database

Authentication

Users Sign-in method Templates Usage

Search by email address, phone number or user UID					Add user	↺	⋮
Identifier	Providers	Created ↓	Signed in	User UID			
sejuti@gmail.com	✉	27 Jul 2021	27 Jul 2021	FGsYfaStFQVvWwzWtSq8DKLQ9Tx2			
bisai@gmail.com	✉	25 Jul 2021	25 Jul 2021	I8SUaYzviyUA4Q4RfnZo0QtEXmt2			
asru@gmail.com	✉	25 Jul 2021	25 Jul 2021	Lj8Z39EQBOOvS0cuqvgiNrN1sTw2			
shraboni@gmail.com	✉	25 Jul 2021	27 Jul 2021	ie8IFChDFhQqD3Bwb2sEcTdRLXQ2			
fahad@gmail.com	✉	25 Jul 2021	28 Jul 2021	R9NQmg8E9xN6riaetCLXoVc9xw1			

Figure 5.8: Firebase authentication page

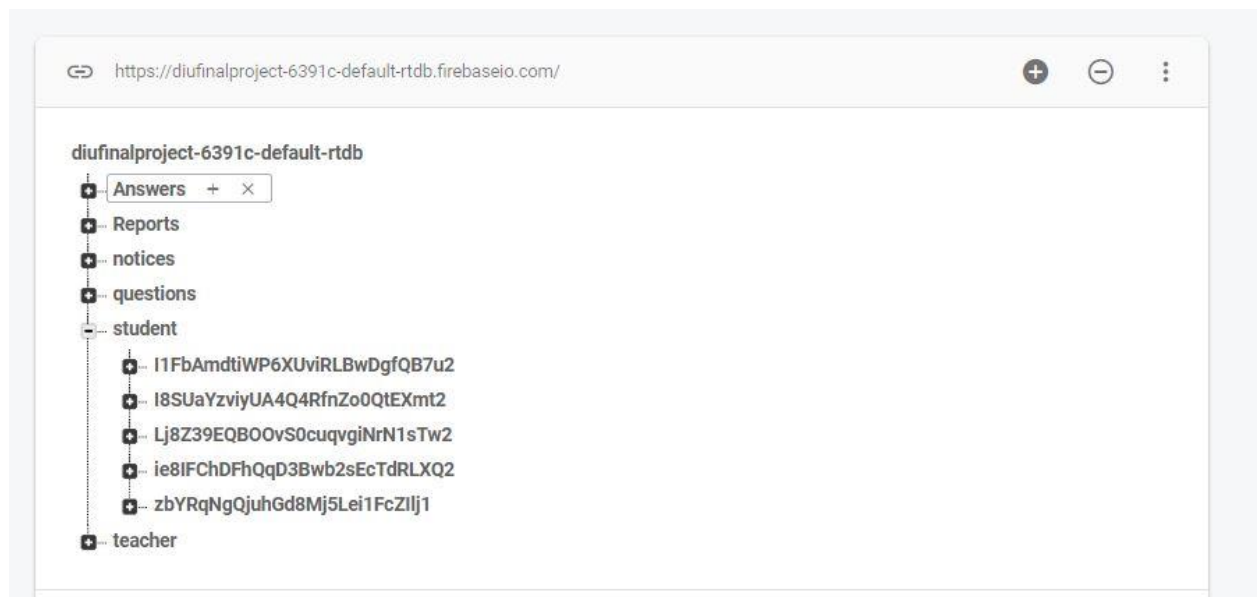


Figure 5.9: Firebase realtime database of student

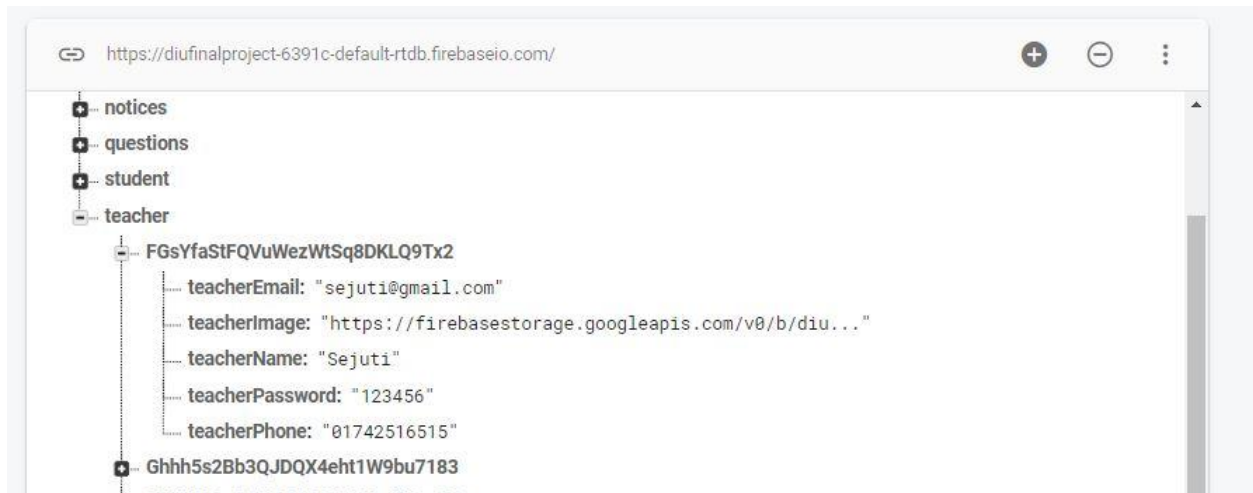


Figure 5.10: Firebase realtime database of teacher

5.4 Conclusion

From this chapter we have understood about the front-end design and according to front end the back-end development has been build. For making user interface here are mentioned xml (Extension Markup Language) which uses human not computer language. It is also readable and understandable, even by novices, and no more difficult to code. For making the backend development to make the front-end components as user listener we are using java which is very popular language due to its awesome features and performance. The first and foremost advantage of using Java for app development is that Java supports OOPS (Object Oriented Programming) concepts and is more competent as they are scalable, extensible, and flexible.

Chapter 6

Testing and Implementation

6.1 Introduction

At first implementation means the process of putting an action for the formulated plan. The implementation phase involves putting the project plan into action. On the other hand, after implementation project testing is a crucial phase for bring the success of the project.

6.2 Testing

Software Testing is a method to check whether the actual software product matches expected requirements and to ensure that software product is Defect free. The purpose of software testing is to identify errors, gaps or missing requirements in contrast to actual requirements.

Basically, in our project, the testing result is dependent on the proper transaction of the database. As we have already known that students can search the question as their queries. So, whenever they search or upload the question, data should be modified in the database according to SQL command. At the same time, here a great authentication system is attached. So, testing result almost depends on the authentication system. During testing, all the exception should perform due to any error. All the toast and error message must be shown perfectly.

In our project there are some points which should be run perfectly because success is dependent on them perfectly. Like authentication system, fragment shown, button listener should listen perfectly, intent from one activity to another activity etc. The most important point is proper internet connectivity. Without Internet connection our system will not be able to access. We have taken the permission from manifest file of android studio. Internet connectivity is must for app messaging, quiz participation or view previous question. Because already we have told that we are using live server as Realtime database. If the internet connection is off, users cannot hit the database. As a result, they will not get notification properly at the proper time.

6.3 Implementation

Here we discuss about the implementation process of the testing result. As an example, Incorrect Login Credentials. For instance, it can be because of the wrong login username and password being used to access the admin panel. If the login credentials have changed recently, you will not be able to access your database with the old ones. So, your first order of business should be to confirm that the login credentials you're entering are accurate. In our project during sign up, user must provide some basic details and unique details to make an account. If anybody deny to provide the actual

information or wrong information then an exception message will show. After successful sign up, during sign in username and password is required. If anybody give wrong authentic information then exception message will show. For making the application more secure this type of authentication system normally is used over all the system. If anyone forget the password then there is an option which is forget password. User must input the email and at the same time an email will send to that mail.

Then another part is on click listener. All the method are dependent on the button click listener. When a user clicks on any button appropriate method will perform. On the other hand, for making the app easier and more standardized we have used fragment.in some cases during functionally moving there occurs some problem. Because they behave different per Android version and are buggy. Though its buggy A Fragment represents a reusable portion of your app's UI. On the dashboard page we have also used cardview to give a look like a card system button which makes the app too much user friendly.

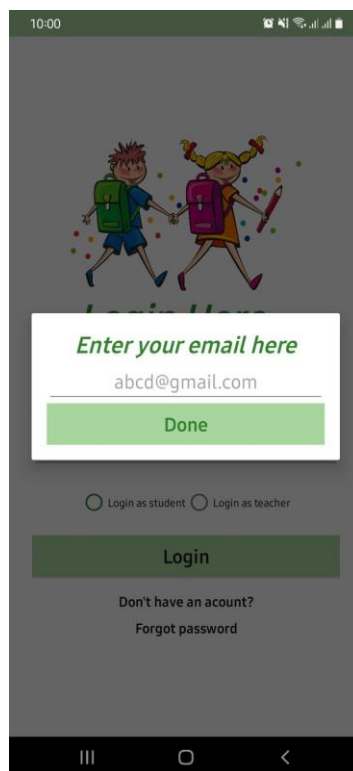


Figure 6.1: Password recovery UI

6.4 Result and Discussion

All the testing result and implementation process define the result of this project. Question searching by appropriate query, previous question with solution, contribution all these events hit the database directly. Specially if we talk about contribution system, user need to be login first then in the contribution fragment he must provide necessary details of the question, then browse the question from his hard drive of that device. After uploading to the database, it will be public for all the users that's why they can search data or retrieve from database by searching. This is the actual algorithm of this application.

All the task should be performed more clearly if the UI is simple and good. In this project UI is very user friendly and there is also a helping guide for the user where user can get every information about the system. There is also attached contact activity of the authority by which user can contact easily if they face any problem to access the application.

From the above chapter we have already known about the room database which Convenience annotations that minimize repetitive and error-prone boilerplate code. It's a very good opportunity for further development of this project. It saves a developer from writing a lot of boilerplate code to create and manage databases. It also provides compile-time validation of SQL queries. There is another fragment class where all the notices are mentioned. All the notices will display is in listview over CustomAdapter.

In Android, Adapter is a bridge between UI component and data source that helps us to fill data in UI component. It holds the data and send the data to an Adapter view then view can take the data from the adapter view and shows the data on different views like as ListView, GridView etc. But here we can use ArrayAdapter easily. Though our main intention was to make the app too much dynamic that's why we have used CustomAdapter.

6.5 Conclusion

Overall, in this chapter, a lot of important topics has cleared related with project. From the first sub point we are discussed about the software testing in functionally and real life where the actual success is dependent. Most of the time functional bug can be solved but real-life bug can't solve which makes unusual exception. Though sometimes errors can mask other errors. That's why proper testing is badly needed. According to the testing procedure, implementation process should be done following the module. Second point of this chapter mentioned about it. Attached screenshot is the actual result of the implementation. Here also mentioned about the smooth working fragment which makes an application up to the mark.

Chapter 7

Critical Appraisal

7.1 Introduction

Critical appraisal is that the process of carefully and systematically examining research to gauge its trustworthiness, and its value and relevance during a particular context. In this chapter a great analysis has presented on this application very deeply. Every project has some limitations, some weakness, extra strength and opportunity. Even there are a lot of thread to reach to the destination of this application. Actually, this type or appraisal allows us to scale back information overload by eliminating irrelevant or weak studies and also assess the usefulness and clinical applicability of the study. This kind of Analysis may be a helpful process for apprehending our Strengths and frailty, and for distinguishing both the Opportunities and therefore the Threats you confront.

7.2 SWOT Analysis

SWOT Analysis is an uncomplicated but useful substructure for analyzing our organization's strengths, weaknesses, opportunities, and threats. It helps us to build on what we do well, to address what we are require, to minimize risks, and to take the greatest possible advantage of chances for success. We can use SWOT Analysis to make the most of what we've got, to our project's best advantage. And we can reduce the chances of failure, by understanding what we're lacking, and eliminating hazards that would otherwise catch us unawares. Better still, we can start to craft a strategy that distinguishes us from our competitors, and so compete successfully in our market.

7.2.1 Strength

Strengths are things that our project does particularly well, or in a way that distinguishes us from our competitors. The main strength of our project is to change the academic activities into modern system. Already mentioned that it's an ad-free mobile application and students can contribute by providing question which enrich the database of the project. Different school has different admin panel to conduct the software.

That's why modification is totally depends up to school committee. Whenever students contribute to the system, this practice will make them more confidence from the school life.

Another strength and target of this project is to make Bangladeshi education system as a collaborative education system. Normally in most if the school there is no any electronic database

which hold the records for a long time of the students. If any school wants, they can customize the database as their needs. On the other hand, online notices are almost depending on social media now a days. But in our country school committee has no any own notification system. It will work as an online notification system.

7.2.2 Weakness

Now it's time to consider our project's weaknesses. Besides outstanding strength there are some drawbacks or weakness is remaining in this application. These are:

1. No academic records: Though it's an application for cutting a good figure in the examination that's why our focus is on the uploading and retrieving the question. There are no any academic records where student's data will store for future. But if that particular school committee want then we can implement the service.
2. No websites: Right now, there is no any websites which will run in browser. Because it improves productivity and give better customer service. With traditional software access is very easy from anywhere with any device. It's also depends on the school admin panel, if they want, we can implement as an online software as their needs.
3. Large file error: This project supports only short pages of question. But if the question size is very high then it will take a long time to upload and to load on the system. We know that time complexity is very important factor for getting good customer service.
4. Supported file format: In this application we have allowed only one supported format which is PDF file. Essentially the format we are using because of files cannot be modified but still need to be easily shared and printed. But it will be very good for users if this system support JPG format. Because most of the school studying user are not familiar with pdf.
5. Supported file format: In this application when a user searches another user, he must put her name but which gives sometime wrong information because same name can contain multiple users. In this case multiple users will show. That's why user need to find out manually the user which is very time costly.

7.2.3 Opportunity

Opportunities are openings or chances for something positive to happen, but we'll need to claim us for ourselves. Basically, this project has a great opportunity to direct the Bangladeshi school system to the next level.

We want to mention that already ICT book is mandatory subject from the school syllabus. Our students are learning basic IT knowledge but they are not connected in practical life. Most of the social media attract them very well which becomes an intoxication for the children. Some waste their valuable time in gaming. But this project can remove this addiction on these platforms.

As an example, the first educational YouTube channel is '10 Minute School' which is very popular in Bangladesh. They changed the outlook of the educational system of our country. They had covered every topic which students need badly. Then a live platform has been created by them and many Youtubers making educational videos on school chapter. Like this, there are no any application where students can get only questions to practice. After near future, students can also work in this projects admin panel which will be a great part time opportunity for students. This project has some wings like database management, question paper review, posting academic notices. These wings will be done perfectly if there work some people. Students has a great opportunity to doing this.

School or Institution center can use this project as their authorized system where they can include many features according to their system. They can customize their database as their needs. That's why they should not develop new application for their organization which makes this project so useful.

7.2.4 Thread

Threats include anything that can gloomily affect our system from the outside, such as supply chain problems, shifts in market requirements, or a shortage of recruits. It's a vital to expect threats and to take steps against them before we become a victim of them and our growth stalls.

Now a days, some tech giant has possessed the market. They can easily launch their software in the market which will be more dynamic more flexible for people. As an example, Facebook has created a platform where students make their private group, share post easily. Google has made Google classroom though it has no categorized option but it's very famous recently.

So, it's a great challenge for us to be a competitor of these giants like Google, Facebook, and Amazon. Though we are dependent mostly on these platforms to advertise or share the application. There are also copyright claim problem is available.

Another thread is weak internet connection. It's true that in this country there are lot of places where internet connection is not available properly. Even on that rural area people can't afford internet easily. Though we will be alert to take minimal bandwidth to run the application but it's a great challenge for us because weak signal can hamper the taste of the application.

7.3 Conclusion

After all we can say that this SWOT investigation is recognizing the key strengths of a project. It provides a sneak peek into the opportunities that dwell ahead. Utilizing this we can draft our vital development arrangements focused around our weaknesses and strengths. These strengths can incorporate a strong brand picture, a lot of working capital, a great status among consumers and even strong dissemination systems. Strength is fundamentally any benefit that an organization has over its real rivals. Nevertheless, companies ought to additionally break down the strengths of their rivals too, which gives a superior appraisal of how an organization can possibly get along in the marketplace.

Moreover, it encourages making supplementary or optional plans, emergency arrangements, and so on. In near future we can solve the weakness and at the same time we should think to contest with other tech giant platform which will boost our weaker areas, head off any threats, and exploit every opportunity.

In fact, this whole SWOT analysis methodology brings to light our resources, and gives inspiration and the essential drive to continue our marketing strategies in spite of all odds.

Chapter 8

Conclusion

8.1 Conclusion

In this technology dependent world, since the advent of android the world of mobile application has witnessed a huge chance. The major reasons behind that are android being an open-source OS. Though in every sector android apps are available, but in our country it's actually absent in educational sector. This automation system can change the outlook of traditional system undoubtedly.

Education system of a country cannot stop due to any kind of undesired situation. From this idea, we want to ensure a virtual relationship among students and teachers. This android application helps to reduce boredom of a student and also provide 24 hours service to connect a student with academic activities. By using this outstanding feature of this automation system, a student can develop their co-operative attitude. On the other hand, it also helps teachers to reduce their work stress by reducing the time. In near future, we will develop this virtual school system as more flexible by bringing incredible feature.

For learning purpose no doubt traditional system or manual system is the best. Because face to face interaction is the actual way to learn something where mobile screen is also harmful for users. But an automation system of a school can makes academic activities of a school very easy and comfortable. Overall, this application can be a virtual friend of a student because he can take a great preparation by getting the sample questions of the students without buying resource content books from the market whose are very costly.

8.2 Further Suggested Work

We have found some drawbacks in our current system. In present system, the whole operation is stored in the Realtime database. The problem arises at the end of the year when teachers cannot find previous report smoothly to make an annual report. Some modules interface is not user friendly and consumes more time to load. Retrieval data processing is very slow. From the traditional system we have implemented only two criteria which are academic and administrative. Another one is finance sector where users can access their payment dashboard. Primarily we have implemented only academic and administrative sector except finance.

If we talk about database, storage capacity of firebase is fixed initially though we will upgrade it after deployment. On the other hand, this system is an android Operating system based application IOS user will be deprived. So, in near future we will develop this system into responsive web

software. Moreover, for ensuring different mobile devices and variety of users we will develop this system. We will also work on interface to make it more user friendly.

References

- [1] M. Ojha, S. Sojan, F. Roy and L. P. Varghese, "An Android Application for School Information System Project Guide," *International Journal of Innovations in Engineering and Technology (IJJET)*, vol. 13, no. 1, 2019.
- [2] R. Joshi, V. V. Shete and S. B. Somani, "Android Based Smart Learning and Attendance Management System," *International Journal of Advanced Research in Computer and Communication Engineering*, vol. 4, no. 6, June 2015.
- [3] D.Vimala, A.Sindhu and S.K.Manikandan, "Developing An Android Application for College Management System," *International Journal of Future Innovative Science and Engineering Research (IJFISER)*, vol. 2, no. 2, pp. 75-80, June 2016.
- [4] P. K. Gupta, M. Madan, K. Puri and A. Gulati, "Student Oriented Mobile Based Examination Process," in *2014 International Conference on Parallel, Distributed and Grid Computing*, 2014.
- [5] P. M and R. Ananthasayanam, "WEB-BASED QUESTION BANK IN INDIAN HIGHER EDUCATION: AN OPEN EDUCATIONAL RESOURCE," *i-manager's Journal of Educational Technology*, vol. 8, no. 4, 2012.
- [6] M. Lakshmi, A. E. and A. S. E, "AN ANDROID APPLICATION FOR EFFICIENT E-QUESTION BANK," *ARPN Journal of Engineering and Applied Sciences*, vol. 11, no. 13, July 2016.
- [7] H. F. El-Sofany, N. Al-Jaidah, S. Ibrahim and S. Al-kubaisi, "Web-based "Questions-Bank" System to Improve E-Learning Web-based "Questions-Bank" System to Improve E-Learning," *Journal of Computer Science*, vol. 5, no. 2, pp. 97-108, 2009.
- [8] P. Pillai, S. Singh and S. Thakare, "ANDROID APPLICATION FOR LIBRARY ANDROID APPLICATION FOR LIBRARY," *International Journal of Technical Research and Applications*, vol. 4, no. 2, pp. 72-74, March-April 2016.
- [9] Software Testing Help, "What Is SDLC Waterfall Model?," 2021. [Online]. Available: <https://www.softwaretestinghelp.com/what-is-sdlc-waterfall-model/>. [Accessed 10 August 2021].
- [10] VERACODE, "What is Systems Development Life Cycle," 2021. [Online]. Available: <https://www.veracode.com/security/what-systems-development-life-cycle>. [Accessed 05 August 2021].
- [11] CloudDefense, "System Development Life Cycle Guide," 2020. [Online]. Available: <https://www.clouddefense.ai/blog/system-development-life-cycle>. [Accessed 03 August 2021].

- [12] UNESCO, "UNESCO survey highlights measures taken by countries to limit impact of COVID-19 school closures," 2020. [Online]. Available: <https://en.unesco.org/news/unesco-survey-highlights-measures-taken-countries-limit-impact-covid-19-school-closures>. [Accessed 10 July 2021].

APPENDIX

Appendix-A Backend Code

This part is an extend part of chapter 5.3: Back-end development. Here we have shown the actual java code of a specific task.

Student Registration process:

```
1. private void studentRegisterMethod() {
    dialog = new ProgressDialog(this);
    dialog.setTitle("File is uploading...");
    dialog.show();

    FirebaseAuth.getInstance().createUserWithEmailAndPassword(studentEmailET.getText().toString(), studentPasswordET.getText().toString())
        .addOnSuccessListener(new OnSuccessListener<AuthResult>() {
            @Override
            public void onSuccess(AuthResult
authResult) {

                FirebaseStorage storage = FirebaseStorage.getInstance();
                StorageReference uploader =
storage.getReference("student"+new Random().nextInt(50));
                uploader.putFile(filepath)
                    .addOnSuccessListener(new
OnSuccessListener<UploadTask.TaskSnapshot>() {
                        @Override
                        public void onSuccess(UploadTask.TaskSnapshot taskSnapshot) {

                            uploader.getDownloadUrl().addOnSuccessListener(new OnSuccessListener<Uri>() {
                                @Override
                                public void onSuccess(Uri uri) {

                                    Student userStudent = new
Student(studentNameET.getText().toString(), classValue, studentSectionET.getText().toString(), studentRollET.getText().toString(), studentPhoneET.getText().toString(), studentEmailET.getText().toString(), studentPasswordET.getText().toString(), uri.toString());

                                    FirebaseDatabase.getInstance().getReference()
                                                                    .child("student")

                                                                    .child(FirebaseAuth.getInstance().getUid())
                                                                    .setValue(userStudent);

                                    dialog.dismiss();
                                    studentNameET.setText("");
                                    studentRollET.setText("");
                                    studentPhoneET.setText("");
                                    studentSectionET.setText("");
                                    studentEmailET.setText("");
                                    studentPasswordET.setText("");

                                    studentClassSpinner.setSelection(0);
                                }
                            });
                        }
                    });
            }
        });
}
```

```

studentImageView.setImageResource(R.drawable.person);

Toast.makeText(registerActivity.this, "Congratulation! You've registered
successfully", Toast.LENGTH_SHORT).show();

startActivity(new
Intent(registerActivity.this, LoginActivity.class));
    }
    });
    }
    }).addOnProgressListener(new
OnProgressListener<UploadTask.TaskSnapshot>() {
    @Override
    public void
onProgress(@NonNull UploadTask.TaskSnapshot snapshot) {
        float percent =
(100*snapshot.getBytesTransferred())/snapshot.getTotalByteCount();
        dialog.setMessage("uploaded: "+(int)percent+"%");
    }
    });
    }
    }).addOnFailureListener(new OnFailureListener() {
    @Override
    public void onFailure(@NonNull Exception e) {
        Toast.makeText(registerActivity.this, "Failed to
register!" + e.getMessage(), Toast.LENGTH_SHORT).show();
    }
    });
}

```

Teacher Registration process:

```

1. private void teacherRegisterMethod() {
    dialog = new ProgressDialog(this);
    dialog.setTitle("File is uploading...");
    dialog.show();

    FirebaseAuth.getInstance().createUserWithEmailAndPassword(tacherEmailET.getTex
t().toString(), teacherPasswordET.getText().toString())
        .addOnSuccessListener(new OnSuccessListener<AuthResult>() {
            @Override
            public void onSuccess(AuthResult
authResult) {
                FirebaseStorage storage = FirebaseStorage.getInstance();
                StorageReference uploader =
storage.getReference("teacher"+new Random().nextInt(50));
                uploader.putFile(filepath)
                    .addOnSuccessListener(new
OnSuccessListener<UploadTask.TaskSnapshot>() {
                        @Override
                        public void onSuccess(UploadTask.TaskSnapshot taskSnapshot) {

                            uploader.getDownloadUrl().addOnSuccessListener(new OnSuccessListener<Uri>() {
                                @Override
                                public void onSuccess(Uri uri) {

                                    Teacher userTeacher = new

```

```

Teacher(teacherNameET.getText().toString(),teacherPhoneET.getText().toString()
,tacherEmailET.getText().toString(),teacherPasswordET.getText().toString(),uri
.toString());

FirebaseDatabase.getInstance().getReference()
                                .child("teacher")

.child(FirebaseAuth.getInstance().getUid())
                                .setValue(userTeacher);

                                dialog.dismiss();
                                teacherPhoneET.setText("");
                                tacherEmailET.setText("");
                                teacherPasswordET.setText("");

teacherImageView.setImageResource(R.drawable.person);

Toast.makeText(registerActivity.this, "Congratulation! You've registered
successfully", Toast.LENGTH_SHORT).show();

                                startActivity(new
Intent(registerActivity.this,LoginActivity.class));
                                }
                                });
                                }
                                }).addOnProgressListener(new
OnProgressListener<UploadTask.TaskSnapshot>() {
                                @Override                                public void
onProgress(@NonNull UploadTask.TaskSnapshot snapshot) {
                                float percent =
(100*snapshot.getBytesTransferred())/snapshot.getTotalByteCount();
                                dialog.setMessage("uploaded: "+(int)percent+"%");
                                }
                                });
                                }
                                }).addOnFailureListener(new OnFailureListener() {
                                @Override                                public void onFailure(@NonNull Exception e) {
                                }
                                });
}

```

Question Adapter for display in the recyclerview:

```

1. package Java_class;

import android.content.Context;
import android.content.Intent;
import android.net.Uri;
import android.view.LayoutInflater;
import android.view.View;
import android.view.ViewGroup;
import android.widget.TextView;

import androidx.annotation.NonNull;

```

```

import androidx.recyclerview.widget.RecyclerView;

import com.example.diufinalproject.R;
import com.example.diufinalproject.viewQuestionPdf;
import com.firebase.ui.database.FirebaseRecyclerAdapter;
import com.firebase.ui.database.FirebaseRecyclerOptions;

public class QuestionAdapter extends
    FirebaseRecyclerAdapter<Questions, QuestionAdapter.MyViewHolder> {
    Context context;

    public QuestionAdapter(@NonNull FirebaseRecyclerOptions<Questions> options) {
        super(options);
    }

    @Override    protected void onBindViewHolder(@NonNull MyViewHolder holder,
    int position, @NonNull Questions model) {

        holder.course.setText(model.getQuestionCourse());
        holder.year.setText(model.getQuestionYear());
        holder.course.setOnClickListener(new View.OnClickListener() {
            @Override    public void onClick(View view) {
                Intent intent = new Intent(holder.course.getContext(),
                viewQuestionPdf.class);
                intent.putExtra("filename", model.getQuestionCourse());
                intent.putExtra("fileUrl", model.getQuestionFile());
                intent.setFlags(Intent.FLAG_ACTIVITY_NEW_TASK);
                holder.course.getContext().startActivity(intent);
            }
        });
    }

    @NonNull    @Override    public MyViewHolder onCreateViewHolder(@NonNull
    ViewGroup parent, int viewType) {
        View view =
        LayoutInflater.from(parent.getContext()).inflate(R.layout.question_list_design, pa
        rent, false);
        return new MyViewHolder(view);
    }
    class MyViewHolder extends RecyclerView.ViewHolder{

        TextView course, year;

        public MyViewHolder(@NonNull View itemView) {
            super(itemView);
            course=(TextView) itemView.findViewById(R.id.questionCourseTVID);
            year=(TextView) itemView.findViewById(R.id.questionYearTVID);
        }
    }
}

```

Question Adapter


```

1. public QuestionAdapter(@NonNull FirebaseRecyclerOptions<Questions> options) {
    super(options);
}

@Override protected void onBindViewHolder(@NonNull MyViewHolder holder, int
position, @NonNull Questions model) {

    holder.course.setText(model.getQuestionCourse());
    holder.year.setText(model.getQuestionYear());

    holder.course.setOnClickListener(new View.OnClickListener() {
        @Override public void onClick(View view) {
            Intent intent = new Intent(holder.course.getContext(),
viewQuestionPdf.class);
            intent.putExtra("filename",model.getQuestionCourse());
            intent.putExtra("fileUrl",model.getQuestionFile());
            intent.setFlags(Intent.FLAG_ACTIVITY_NEW_TASK);
            holder.course.getContext().startActivity(intent);
        }
    });
}

@NonNull @Override public MyViewHolder onCreateViewHolder(@NonNull ViewGroup
parent, int viewType) {
    View view =
    LayoutInflater.from(parent.getContext()).inflate(R.layout.question_list_design
,parent,false);
    return new MyViewHolder(view);
}

class MyViewHolder extends RecyclerView.ViewHolder{

    TextView course,year;

    public MyViewHolder(@NonNull View itemView) {
        super(itemView);
        course=(TextView) itemView.findViewById(R.id.questionCourseTVID);
        year=(TextView) itemView.findViewById(R.id.questionYearTVID);
    }
}

```

Whenever any user will try to contribute this following code will run

```

1. StorageReference reference =
    storageReference.child("questions"+System.currentTimeMillis()+".pdf");
    reference.putFile(data)

```

```

        .addOnSuccessListener(new OnSuccessListener<UploadTask.TaskSnapshot>()
        {
            @Override          public void
onSuccess(UploadTask.TaskSnapshot taskSnapshot) {
                Task<Uri> uri = taskSnapshot.getStorage().getDownloadUrl();
                while (!uri.isComplete());
                Uri uri1 = uri.getResult();
                Questions questions = new
Questions(courseET.getText().toString(),uri1.toString(),userID,yearET.getText(
).toString());

                databaseReference.child(databaseReference.push().getKey()).setValue(questions)
                ;

                dialog.dismiss();
                Toast.makeText(contriuteActivity.this, "Uploaded done!",
Toast.LENGTH_SHORT).show();
                startActivity(new
Intent(contriuteActivity.this,questionListActivity.class));
                finish();
            }
        })
        .addOnProgressListener(new
OnProgressListener<UploadTask.TaskSnapshot>() {
            @Override          public void onProgress(@NonNull
UploadTask.TaskSnapshot snapshot) {
                float percent =
(100*snapshot.getBytesTransferred())/snapshot.getTotalByteCount();
                dialog.setMessage("uploaded: "+(int)percent+"%");
            }
        });
    });

```

Appendix-B Database Design

This section is the extend part of Chapter 4.3.1: Database Design. Here we have shown a multiple table of the firebase which are Realtime. There are only three figure whose are Realtime databases, teachers table and student's table.

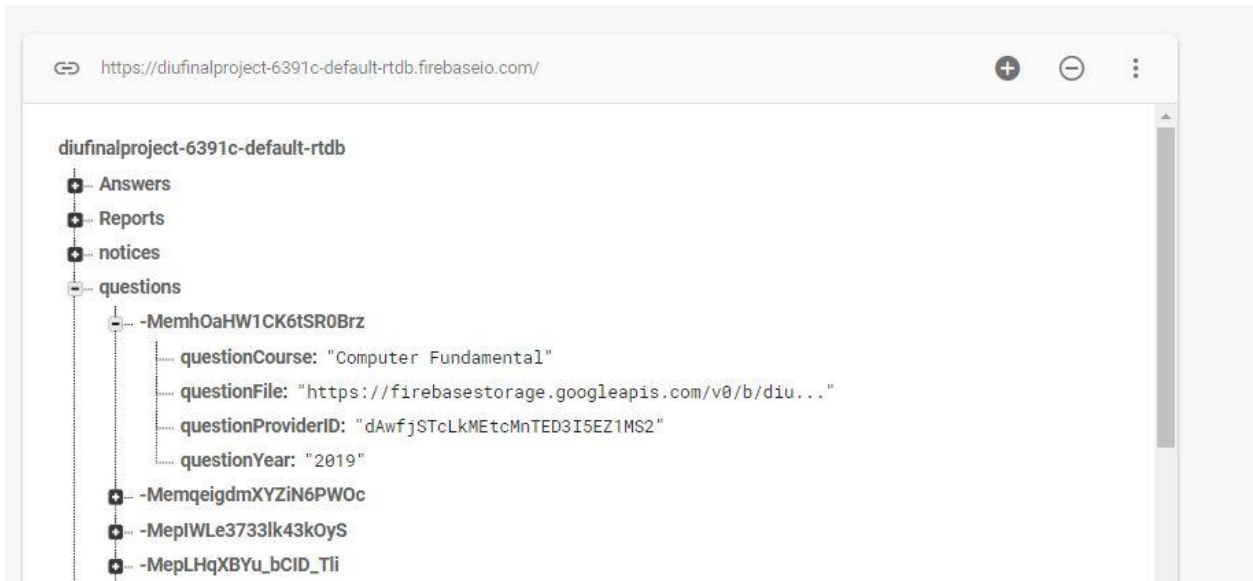


Figure B.1: Realtime Database of QUESTIONS List



Figure B.2: Realtime Database of Question REPORTS List



Figure B.3: Realtime Database of NOTICES List



Figure B.4: Realtime Database of ANSWERS List

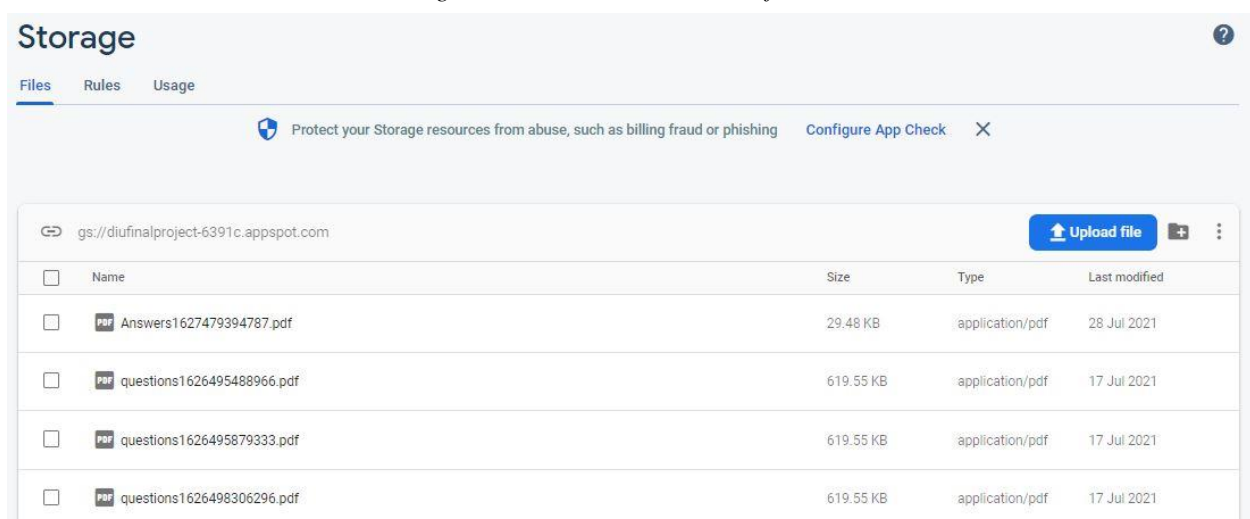


Figure B.5: Firebase Storage

Appendix-C GUI Design

This is the extended part of Front-end development which is Chapter 4.2.1: User Interface Design. On there we have shown some important GUI of our project. Here we have also attached some another interface of sub activity of our project.

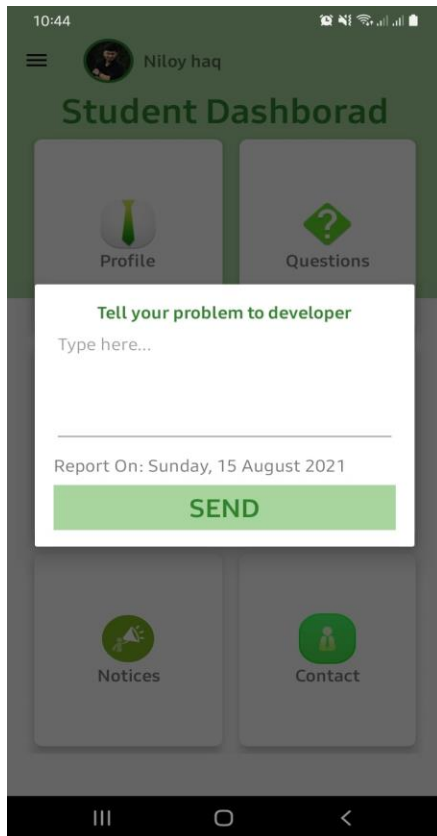


Figure C.1: Report Activity

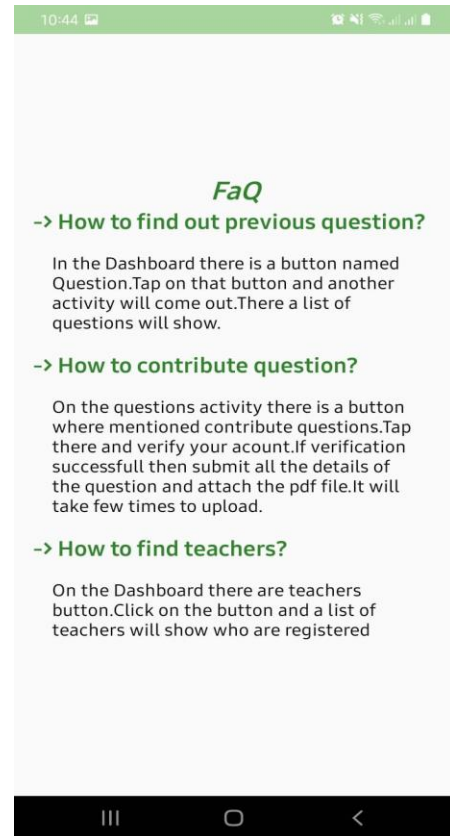


Figure C.2: Help Activity

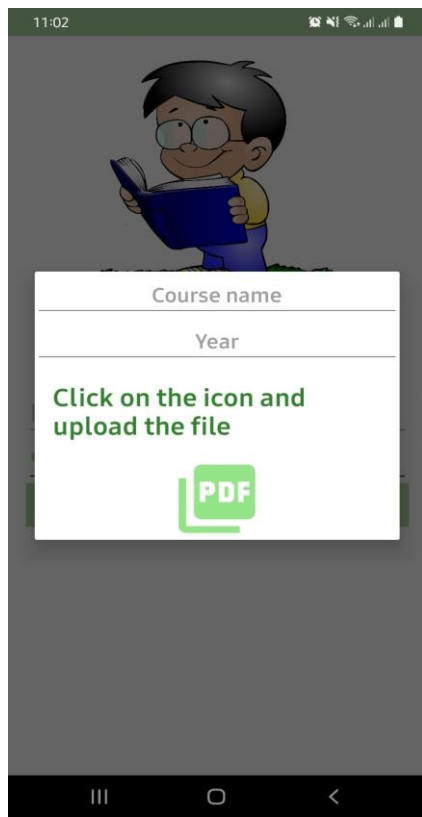


Figure C.3: Provide Question Activity

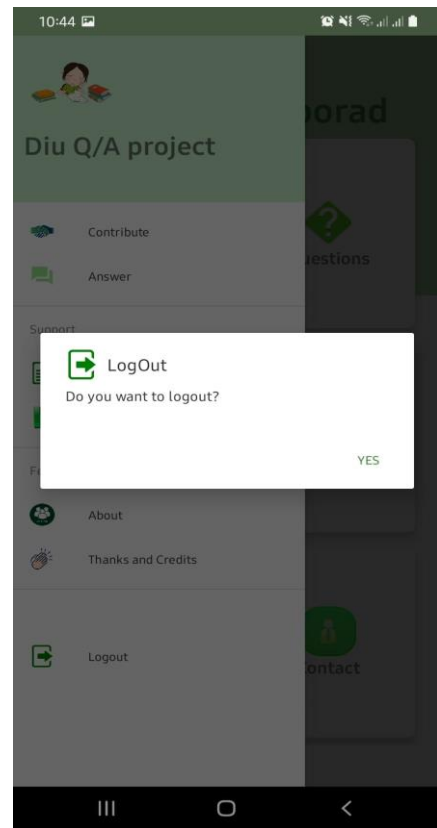


Figure C.4: Logout Activity

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