

Architecture for Mobile Quiz Application using Android Application Framework

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ABSTRACT

Educational Technology is constantly evolving and growing, and this progression will continually offer new and interesting advances in learning environment. Traditional E-Learning systems developed for laptop and desktop computers were based on stand-alone software application and web based application architecture. These applications have many limitations to use efficiently or we cannot use them easily since these applications need a computing device and network connectivity. With the advancement in mobile technology and availability of smart mobile devices and network we can design a system which can be used to check the knowledge level of students in the class room. Since mobile network is available at large geographical area so this can be used for the knowledge testing of any person specially candidates of software companies who need a specific skill for the job. Thus the main objective of the research work is to develop an interactive mobile application based on android framework to conduct quiz sessions in the classroom for the various technical topics. This paper deals with the prototype development of an Mobile quiz system, comprehensive evaluation system for the remote students or in a classroom. On further enhancement this app can be used for the recruitment process of software companies which will be able to save time and efforts to illuminate unwanted candidates to appear for personal interview by travelling a long distance

Keywords:- Android, Mobile Learning, Mobile Evaluation, E- Learning.

1. INTRODUCTION

A learning environment is any environment in which students become totally involved in the learning process. Since the mobile devices support the anytime, anywhere learning, m-learning can faster the growth of the learning. Andro Quiz application enables the learner to access the learning object and interact with the instructor and other learner seamlessly from the mobile / tablet / aakash tablet while in class, from his android mobile phone during travelling or at home. Mobile learning provides the freedom from learning environments, learning devices and learning content format and rather emphasize on the constructivist learning process and cognitive development among learners. With the use of smart mobile devices with wireless networks enables mobility and mobile learning, allowing teaching and learning to extend to spaces beyond the traditional classroom. The evolution of today's mobile devices increases the number of mobile applications developed, and among them the mobile learning applications.

2. ANDROID PLATFORM

2.1 Android Operating System

Android operating system is a project initiated by Google through the Open Handset Alliance, which includes over 30 companies in ICT. Android platform is an open source project, allowing its amendment by any manufacturer of mobile devices [Meier R.(2010)].

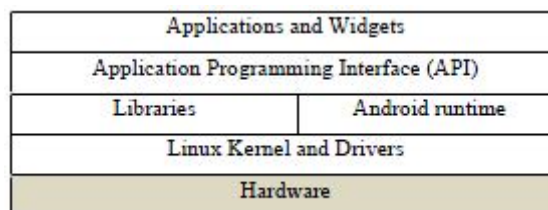


Figure 1 Android Architecture



The operating system is based on Linux kernel version 2.6.x, that is a monolithic kernel. The kernel includes drivers for the mobile device hardware: screen, keyboard, camera, USB, Bluetooth etc. Kernel provides interface hardware and memory management, processes and other resources. Android applications are developed using Java programming language. Applications require an environment to manage their life-cycle. Android Version is 4.2 (API 17) which is an open source SDK. This includes a Java virtual machine and Java class libraries that provide basic support for applications. Android applications are not compatible with Java ME or Java SE. The applications are optimized for mobile devices constraints. The application programming interface allows accessing a framework that includes components used by all Android applications. The application framework includes components for Android application management, windows management and user interface graphical, event handling etc. Application level includes pre-installed applications and user applications. Applications are based on Java technologies and use classes provided through application programming interface. Android operating system is multitasking, each application running in a separate thread.

2.2 Android Application Development

Android applications are developed using one or more basic components [Burnette, E. (2009)]:

- activities (Activity base class),
- services (base class Services),
- content providers (Content Provider base class)
- components that receive and act on messages sent to all applications (the base class Broadcast Receiver)
- messages (class Intent)

A particular importance in application development is the resources that enable separation of interface code. Activities represent the screen associated to an application. An application can have one or more activities. Services are routines that run in parallel with the main thread and do not have GUI. They allow the development of actions in the background without blocking the main thread execution and interaction with such application. Content providers are used for sharing data between applications. Data sharing is done through files, databases or other means. An alternative to content providers is the use of communication between processes. Applications can respond to the occurrence of events in the system by using classes derived from Broadcast Receiver. They do not GUI and an application can have several components of this type. In order to activate components like activities, asynchronous messages encapsulated in objects of Intent type are used. Android applications are developed mainly using Eclipse IDE with Android Development Tools (ADT) plug-in. Android SDK and emulators are necessary for application development.

3. QUIZ APPLICATION

A quiz application can be designed as client server style architecture, multi tier architecture or as an stand alone application. In case of application design with a client server architecture which uses a server to send data continuously to the mobile application system needs bandwidth to run application and load on the server will be depending on the number of applicants using application. One of disadvantage is that we are dependent on network connectivity and in case of network failure complete system will be fail. To overcome some of these issues this application have been designed with slight change in design. In this application SQLite data base is used and all questions and answers are stored in the database. Each time a teacher wants to conduct a quiz. All subject / topic wise questions are stores in the application apk file and distributed to the participants. Distribution can be done using blue tooth / google play / by pen drive also. So dependency of network is reduced. One application apk is usable for once and for one subject / topic only. After the exam is finished user will have to install apk so there is no harm. For the next topic the concern Instructor will set new questions and their answer and will distribute it again. So a student can appear in the test at any time from remote also. The roles of different users in this application are as under. This architecture of application has three actors, which plays key role to run the application.

a. The roles of a trainer/instructor in the and roquiz system are

To decide the subjects, topics, time and number of questions to be asked, marking scheme for the system, prepare tests, Quizzes and their answers for the system. Assess the quiz result submitted by the students/learners. Interacting with students/learners and explain them how to use the tool.

b. The roles of the learner/students in the and roquiz are

Take the course and answer questions asked. Work on assignments related to the course send feedback and queries related to the quiz and inform about problems faced and suggestion about the system. Interact with the trainer and fellow learner/student concerned with the course

c. The roles of the Application Developer in the and roquiz system are

Develop a framework where the content designed by the trainer can be presented in a pre-formatted manner to the learner when they launch the application. Provide pre-defined templates for framing the tests and assignments. Design the user interfaces for accessing the tests related to that course. Calculate the awards and display the number of correct

questions and number of incorrect answers. Calculate the marks awarded and display to the user screen and send the awards / results to the teacher. Application developer will set the questions and answers in the application database and the prepares a error free apk each time to provide the teacher every time.

3.1 Graphical User Interface

The prototype m-learning application developed consists of three activities:

- Quiz Selection
- Designing Questions and Answer
- Result Calculations & Display Results

The user/learner interface is simple and intuitive, without much graphics and drawings. It will reduce the amount of memory required by the application and reduces the time of development. These have been designed with interactive and user-friendly icons and menus. The application targets the mobile devices with touch screen and tablets, but can be accessible by any kind of device running Android platform. As soon as application is launched this first screen appears as under which ask for set a question paper and appear for paper.

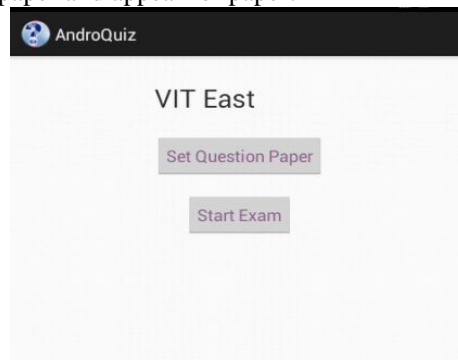


Figure 2 Entry Screen

If user enters to set a question paper, he must have to contact application developer. Since only teachers can set papers. So Learner or student will not be able to enter in the module.

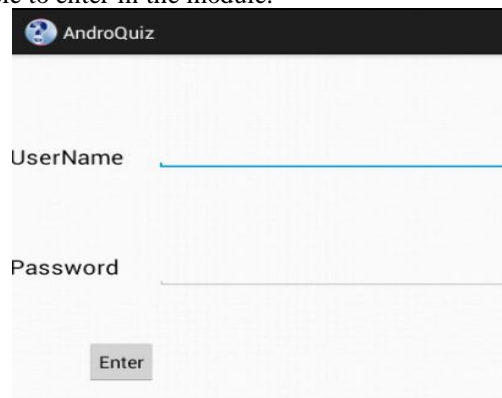


Figure 3 Login Screen

Once username password entered, you can set two other fields also.

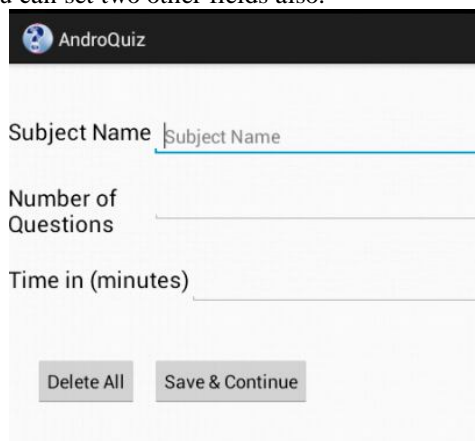
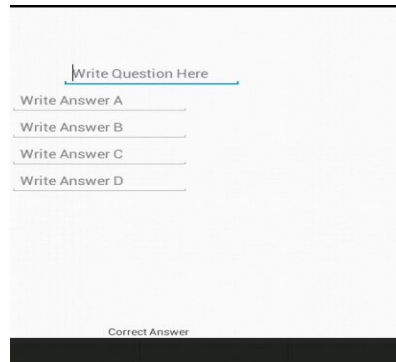


Figure 4 Quiz Details Screen

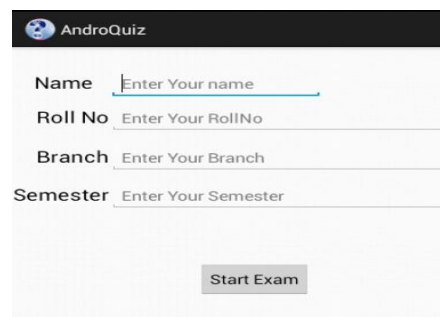
Now it starts asking questions and this is multiple choice quiz so you must enter four options given to user after that it ask for the correct answer also. This will be in loop and ask as many time as you have entered in previous column. All questions will be saved in database with answers.



The screenshot shows a form titled "Quiz Details Screen". It has a text input field labeled "Write Question Here" at the top. Below it are four text input fields labeled "Write Answer A", "Write Answer B", "Write Answer C", and "Write Answer D". At the bottom of the form, there is a label "Correct Answer" above a dark horizontal bar.

Figure 5 Quiz Details Screen

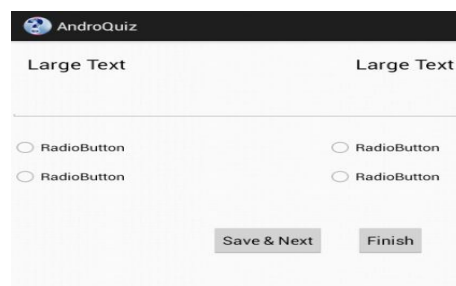
After compilation you will be getting an apk file from the IDE. This apk is installable application with our subject questions and answers. You can distribute it with the media/ network etc. In the next module which is related to students, he enters name and roll numbers and start the quiz session. Here he needs not to be connected to any of the server. Even if connectivity is failed he will be able to continue the quiz.



The screenshot shows the "Quiz attempt Screen" of the "AndroQuiz" application. It features a header with the app name and logo. Below the header are four text input fields: "Name" (placeholder: "Enter Your name"), "Roll No" (placeholder: "Enter Your RollNo"), "Branch" (placeholder: "Enter Your Branch"), and "Semester" (placeholder: "Enter Your Semester"). At the bottom center, there is a "Start Exam" button.

Figure 6 Quiz attempt Screen

As soon as start button is clicked he will start getting questions displayed and four options to select as answers. He will get number of questions as set by teacher / Instructor within given time frame.



The screenshot shows a question displayed on the "Quiz attempt Screen". The question text is "Large Text". Below the question, there are four radio button options arranged in two columns. At the bottom, there are two buttons: "Save & Next" and "Finish".

Figure 7 Quiz attempt Screen

As soon as all questions have been answered, application will start checking the answers, Result will be displayed immediately on the user screen, it is also possible to send result to teacher.

4.CONCLUSION

Andro Quiz is the environment for the comprehensive testing of knowledge of a student/ Learner. This system is currently based on the testing of knowledge using apk. In the current architecture a common server is not required this is an positive point in this architecture. Application and architecture concept is tested for small classroom size of 20 student, results were able to conduct quiz successfully. However there are some constraints each time a quiz is started. In this application we are not using a common server which is an positive point. In the current architecture every time



application developer will set the questions and answers in the apk. So advantage is that every time dependency on the network is removed.

5.FUTURE WORK

In this architecture we can use this system and subject wise learning tools also with small modifications, so users can read or learn contents while they are on moving. This apk is completely not dependent on network so users can use it while they are on move and network connectivity is also not good or not available. In the future this system can be used for the conduction of a pre interview rounds to test specific skills in the candidates which will help to eliminate the unnecessary candidates.

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