Self Learning and Evaluation: An m-Learning System for Android Platform

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ABSTRACT
Past research suggests that learning through self learning is an important tool in the education and is becoming more and more popular within the educational system. Self learning and evaluation facilitates the user to learn and evaluate themselves without any person or instructor. Mobile has become the integral part of everyone's life. Creating an interactive system on a mobile platform is obviously a step towards the right direction for the education system. Android Mobile Operating System is a system which can help developing an m-Learning systems and facilitate the user to get the learning and evaluation on the move. This system combined with good content and programming based learning can be a useful tool for self learning and evaluation. With the support of the educational community there is little limit on the educational benefits of such a mobile learning system. White paper proposed a Self-Learning and Evaluation System for mobile device that facilitate the user to evaluate their knowledge of subject after learning from the tutorial. It also support performance evaluation graphically through chart.

Keywords
M-learning, self learning and evaluation, performance evaluation, Android

1. INTRODUCTION
The mobile devices are getting richer in term of computing resources and penetrating the computer market. The proposed system is a useful tool for higher education institutes.

Mobile learning (m-learning) is a recent area on which work is going on. It is a new domain which takes into account mobile devices and wireless technologies. M-learning facilitates to do the learning on the move[1].

There are very few models for m-learning. [2]. It is needed to make mobile devices suitable for learning and evaluation. Our paper proposed a system to fulfill this requirement by designing learning and evaluation modules which are meant for mobile devices.

2. OBJECTIVES
The primary objective of this system is to use the current technology and make learning easier and simpler for students. This system is developed to fulfill the following objectives:-

1. Learning basic programming languages on the move using user friendly application.
2. Develop self-evaluation system which does not need any supervisor.
3. Evaluate the knowledge of programming languages at different difficulty levels.
4. To check performance of different attempts graphically.
5. An auto complete search option for providing help
6. To make learning available anytime, anywhere.

3. ARCHITECTURE
The Self Learning and Evaluation System is an Android applications designed to support learning of basic programming languages (C, C++ and Java).

The application can be installed on any mobile device available in the market having Android Operating System. Basic block diagram of application is shown in Figure 1.

This system is divided into three modules viz. learning, evaluation and searching. In learning module chapter wise tutorials of three basic programming languages (C, C++ and Java) are given. There is option to select different chapters of these languages and study them.

This application also has an extra feature of self evaluation in which objective questions on the particular topic are provided so that one can evaluate his/her learning for subject. There is option to select the language (C/C++/Java) and then for selection of topic.

In search activity there is searching option about some relevant topic in these languages. Search regarding any program or keywords of that language can be done.
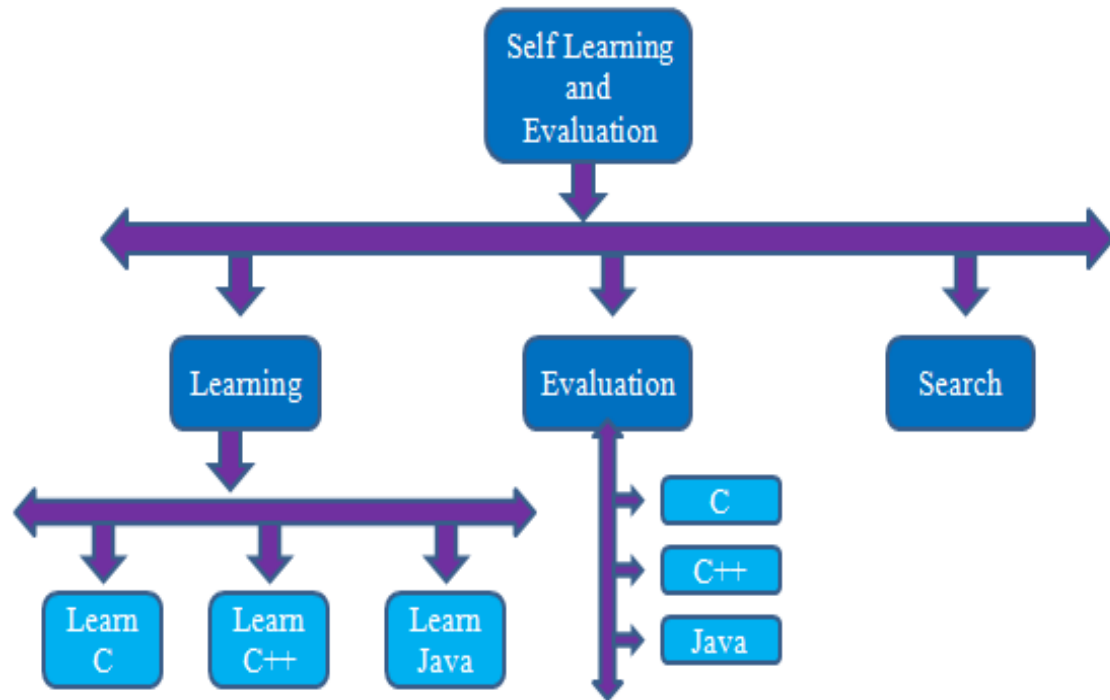
Figure 1: System Block Diagram

4. LITERATURE SURVEY

Use of mobile devices is growing at a very rapid rate. Education field is also a very important domain where mobile device plays an important role. M-learning is an extended version of e-learning.

According to Ghazvini, Earnshaw et al. [3] M-Learning is extension of e-learning. Mobile devices are cheaper than personal computers so they are affordable by more people. Mobile devices are portable and can be carried anywhere with ease. Mobile devices can be a potential device for learning and evaluation on the move.

Our Institution follows the Green University Policy and prefers to have paperless work. Most communication is done through email. Assignments and study material are provided online through Google Group. So this project is developed for learning and evaluation without the need for paper. This system also facilitates to do the work anytime, anywhere.

Student feels many difficulties in learning computer programming. According to Arnold Pears and Moritz Regally [5] Learning can be made easier by using a tool that combines approaches from active learning and visualization.

The study by researcher [6] successfully utilizes self-curriculum planning as a part of self-regulated mobile learning, by allowing the learners to plan exactly what they want to learn; allocating the time and resources and finally evaluating their own planning.

Learners, who participate in the mobile learning course, are usually away from conventional learning places such as classroom or library. Thus the amount of time they can spend on a course and the level of their ability to concentrate on the contents can be different for each learning session, and can be depending on many factors including the capabilities of the device they are using. [7]

Whenever a new method is adopted for teaching and learning, students are excited about it. So they spent more time with learning system. [8] However, Trifonova doubted if this excitement is just a temporal effect [9].

Mobile learning application can be implemented for different version of Android Operating System used in mobile devices, tablets, notebooks, and e-readers. The Pew Research Center is studying how we use this mobile technology. In recent time most of the students in higher education carries the mobile devices. Now many users carry multiple mobile devices which can be used for multiple tasks including personal, professional and educational work.

5. RESULT

This project is having different modules as shown in Figure 2. Three modules of this project were described before are completely interlinked with each other as shown in Figure below.
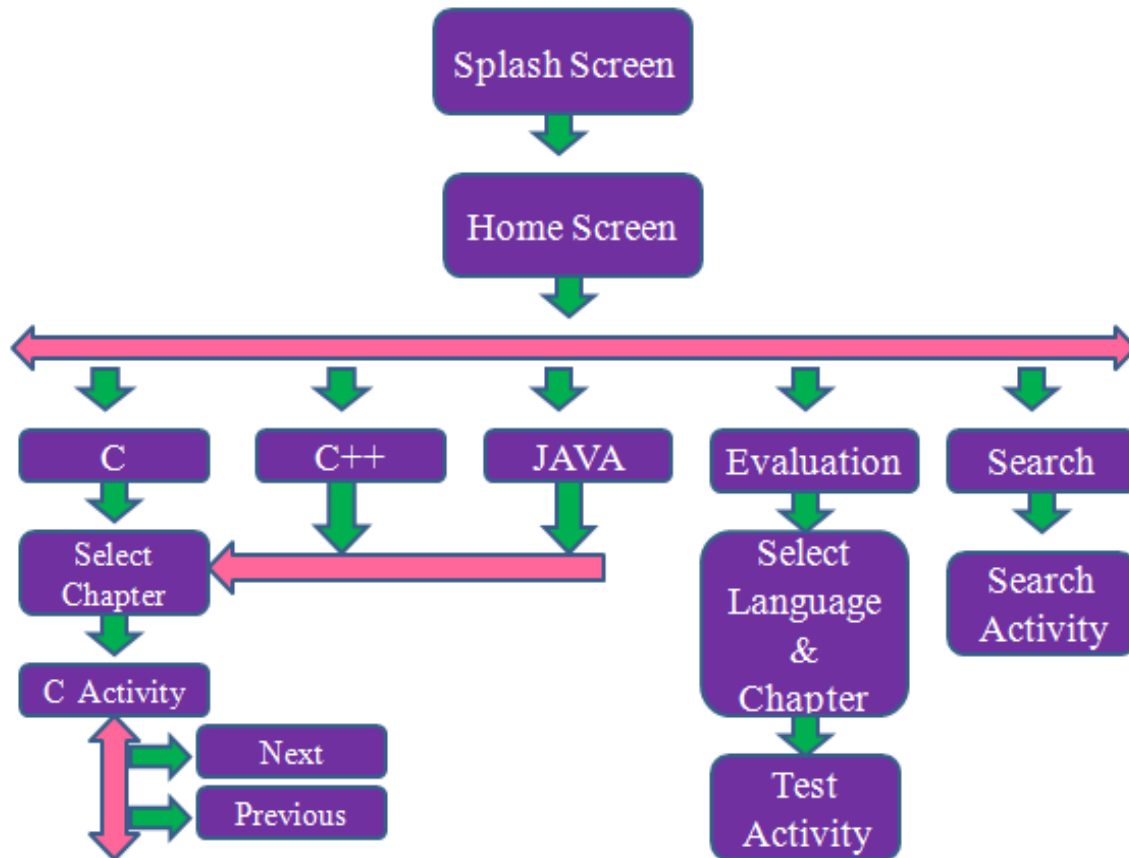
Figure 2: Application Flow

Application started with splash activity and after a while switched to home screen. Home screen is having options to select different modules of this project viz. learning, evaluation and searching. For tutorial user need to select the C/C++/JAVA icon. Once a particular programming language is selected then it switches to next screen which displays the chapters of selected language. User can select the relevant chapter and study through the tutorial. For evaluation and searching, user needs to click on their respective icons.

The modules of the given system are described below. In Android application every screen is known as Activity.

5.1. Splash Activity
Features
- Application Name
- Developer Name
- Version

Figure 3 shows a splash screen. It appears when application starts. This is the first thing users see while opening the application, so it need to be relevant and grab their attention. It mainly contains application name, developer information and current version of application. Whenever background processing is needed during start of application splash screen can be used. This is used for showing developer name and logo. Time event can be given on this screen
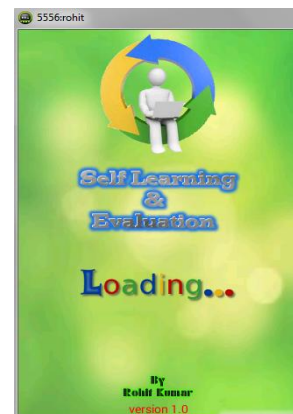

Figure 3: Splash Activity

5.2. Home Activity
This activity has following features as shown in Figure 4.

Features
- C Learning Module
- C++ Learning Module
- Java Learning Module
- Search Module
- Evaluation Module
- Menu

Figure 4: Home Activity

5.2.1. C Learning Module

This module will be opened by clicking on icon for C language. When user click on this icon, a context menu with chapter names appear on screen as shown in Figure 5. In the listed chapters user can select any chapter and can have the detailed study about that topic. User have option to scroll this list vertically.
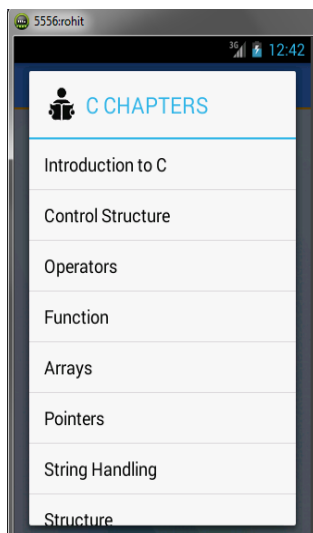

Figure 5: List of chapters for C language

C++ and Java icon does the same as C; they display their list of chapters in context menu.

5.2.2 Search Module Icon

This module will be opened when user will click on search icon. User can search for relevant topic by keyword.

5.2.3. Menu

Menu icon is shown in the upper right corner. When user clicks on this image button he/she gets a list view as shown in Figure 6. Menu icon is visible on every activity to move from one activity to other.

Figure 6: Menu Item List

At the bottom of the list there is an exit icon which works as exit button. By clicking on this, user comes out of our application. And when he again clicks on application it will start from that activity from where user has selected this item.

5.3. C Sub-Module

Taking reference to Figure 5 where user has option to select any chapter for C language. After selection of any chapter an intent has been called to move on C activity where chapter details has been displayed. Suppose user has selected pointer then it will display the details as shown in Figure 7.
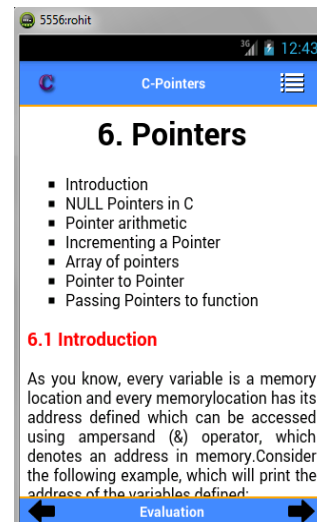

Figure 7: Chapter on Pointer

User can scroll the content of the chapter in vertical direction for easy reading. By clicking on forward or back arrow button user can switch to next or previous chapters as shown in Figure 8 and 9 respectively.
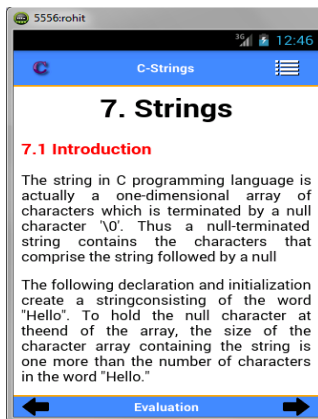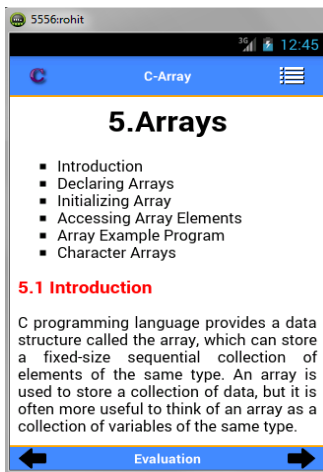
Figure 8: Chapter on Array

Figure 9: Chapter on String

5.4. Search Module

Features
- Select language option
- Auto complete Text Box

5.4.1. Select language option

This module is for selecting the language for searching. Language selection is done through spinners. Through this one value from a set of values can be selected. Touching the spinner displays a dropdown menu with all other available languages. A string array containing name of languages is passed in dropdown.

When user selects a value from spinner it will filter the keyword with respect to that language for auto complete text view as shown in snapshot given in Figure 10.
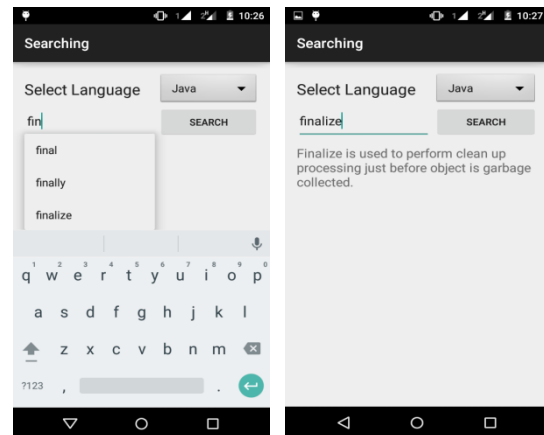

Figure10: Search Activity

5.4.2. Auto Complete Help

This facility is provided to user to search its desired keyword, by suggesting user by typing only 3 to 4 letters on this box. By select a particular keyword name, the keyword name appears on that box. Finally on pressing "SEARCH" button user finds the details of selected keyword.

5.5. Contact Activity

This activity has following features as shown in Figure 11.

Feature
- Voice calling
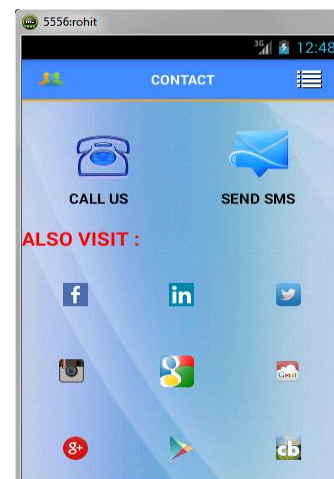- Text Message
- Useful Links & Search Option

Figure 11: Contact Activity

5.5.1. Voice Calling

To support user or solving their queries and for feedback regarding project a "Call Us" icon is given, clicking on it user can make voice call to our support representative

5.5.2. Text Messaging

To support user for solving their queries and for feedback regarding project we have provided a "Send SMS" Image Button. By clicking on it he/she can send a text message to our support representative.

5.5.3. Useful Links

Beside these facilities we have also provided the facility of using some sites like Facebook, Gmail etc.User can check the status on different social networking sites just on a single click and the return back using menu image button.

5.6. Browser Activity

This activity contains wave view which loads the requested URL . Figure 12 shows the Browser activity loading Gmail.
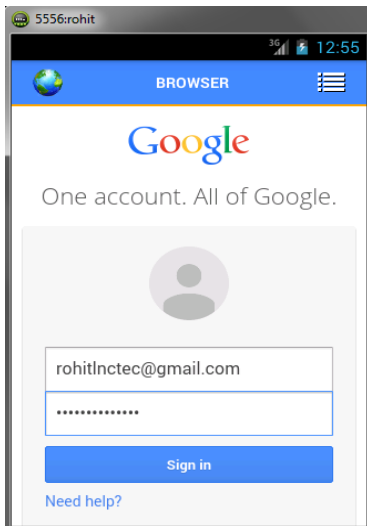

Figure12: Browser Activity loading Gmail

5.7. Evaluation Module

Features

- Selection of Language (C, C++ & Java)
- Selection of level of test (Easy, Medium & Hard)

This activity has three tests in each category (Easy, Medium & Hard) for each language (C, C++ & Java). And every test contains fifteen questions.

First we select the test language and in reference to that language we select the level of the test.

- **Easy**: As the name suggests the questions level is for beginner or who are new to the programming and having experience of 1+ month in programming or having basic idea of C/C++/Java programming. This test is very helpful for beginner who are enrolled in courses like B.E, B.Tech, BCA, B.Sc in Computer and other Computer Science courses.
- **Medium**: Medium level or Intermediate level is for those who have 6+ month experience in programming.
- **Hard:** This level is for experts who have good command on programming, error detection and correction, and output prediction. More than a year experience in programming in particular language can attempt the test of this level.
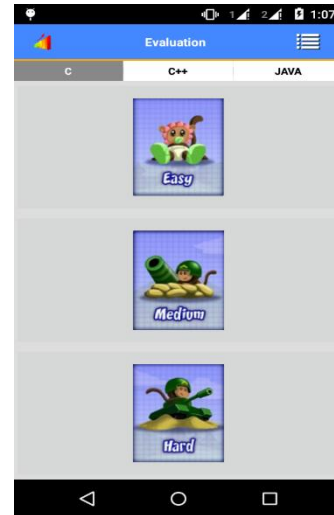

Fig 13: Evaluation Activity

5.8. Rules Activity

Before starting of any test it is necessary to give the instruction to the examinee for the test. Instructions for this tests are:

- This test carry 15 multiple choice question.
- 60 second is provided for each question.
- +1 mark will be given for each correct answer.
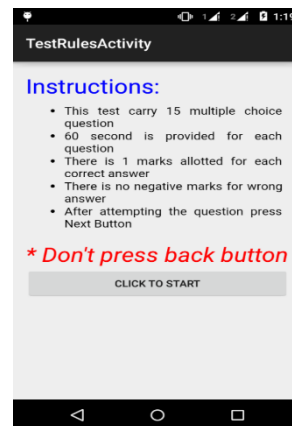- There is no negative marking for wrong answer.

Figure 14: Test Rules Activity

5.9. Test Activity

Features

- Equal time for each question
- Performance Graph

This Activity contains fifteen objective type questions in scroll view with four option containing radio buttons to mark an answer as shown in Figure 15. Radio button are used to select one option from a list. By selecting an appropriate answer of question and then by clicking on next button then next question will appear. User has to make sure that he/she attempts attempt the question within time limit.
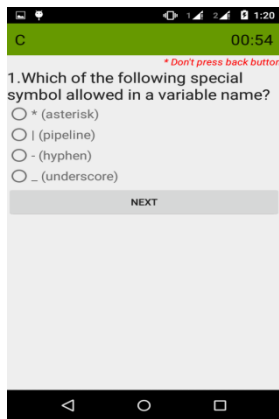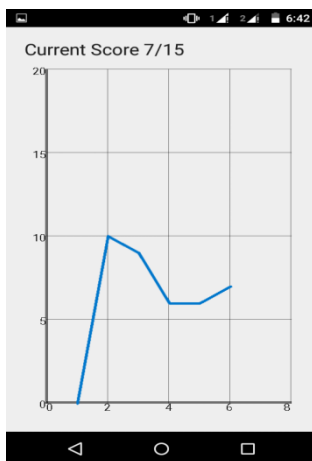
Figure15: Evaluation Activity

Figure 16: Result Activity

- Timer Working: For each question counter with sixty second will run in reverse order from sixty to zero. Once timer completes its count automatically next question will appear and previous question is counted as unattempted. There is no facility to go back so user has maximum fifteen minute for each test.
- Graph Plotting: Once user completes the test, current score with graph of previous score is displayed in result activity as shown in Figure 16. From graph user can check the progress.

6. CONCLUSION

There are variety of mobile platforms and technologies to choose from. Android is chosen because of its huge market share. Mobile devices resources are limited. The objective of this system is to present learning experiences with a mobile device. As the mobile devices are growing and becoming cheaper day by day so every student can afford this. This system comprises chapter wise learning of three basic programming languages (C, C++ and Java).This System also have an extra feature of self evaluation which contain some multiple choice question for different programming languages at different levels(easy, medium & hard) for evaluating users learning. Inclusions of timer which provide equal time for each question make these tests more effective and interesting. After attempting two or more tests performance graph is plotted, by this user can evaluate his learning. This prototype is a part of an m-learning system that will also be developed for other mobile platforms in order to cover a large number of mobile devices and users.

7. FUTURE SCOPE

Following aspects can be included in the future for the developed application.
- At present learning and evaluation for only three languages (C, C++ and Java) are included in the application. In future more languages can be added.
- Currently only fifteen questions for each test are given which can be increased in future.
- In future result of each user can be put on the server and according to performance in test his/her all India rank can be calculated.
- Adding placement papers for different companies can also be useful for those students who are preparing for job in IT sector.
- Users feedback can also be incorporated.

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