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LET'S LEARN – AN E-LEARNING PLATFORM OF PROGRAMMING LANGUAGE USING ANDROID APPLICATION

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Abstract - *Today's generation has become very competitive and advanced with the growth of technology that they need everything in just one click. With the increased popularity of Android applications, the users are finding it very easy to use and hence prefer it for most of their work. Considering this, we have come up with an Android based tutorial application "Lets Program". The proposed application is used to provide an offline tutorial for C, C++, and Java where you can find more than hundreds of programs, sample test papers and video lectures. The contents of this application are entirely based on the syllabus of various universities in Sikkim. This application can be shared via Bluetooth, Shareit, Xender, Hike, etc. The purpose of this application is to provide all the contents of various programming languages in one application which further reduces the user's effort to search for various contents in different applications. The application allows the user to access the content without the internet. The application is developed using Android Studio.*

Keywords: Android, Education, Learning Platform, Programming Language, Tutorials.

1. INTRODUCTION

Android is a Linux based mobile phone operating system. It was originally developed by Android Inc. and later acquired by Google in July 2005. The development and maintenance of Android are overseen by the Android Open Source Project (AOSP), led by Google. At the present scenario, Android is leading the market as a mobile operating system with a market share of 86.6% which is further expected to hover around 87.1% due to launches of several 5G devices and iOS has a share of 13.4% of market share which is expected to drop to 12.9% in the years to come. There are various tutorial applications for programming languages that we can find on google play store like CodeBook, SoloLearn, codeEasy, Anacode IDE, etc. The problems with these apps are that they are online applications, they typically don't follow any pattern or syllabus of any university and they even don't contain every topic. So, it becomes difficult for the users to search for the contents over the Internet. This is the reason we have developed Lets Program an android based application that is an offline application and follows the syllabus of the various university in Sikkim. Now the users can access the content without internet connection and can find all the content is a single application. Let's Program will provide more than hundreds of programs in C, C++ and Java and videos in two languages, i.e. English and Hindi. It also provides sample test papers with few videos to guide the users to use the IDEs for C, C++, and Java.

2. LITERATURE REVIEW

In 2016, Ghazala Shafi Sheikh and Noman Islam did perform work on "A Qualitative Study of Major Programming Languages: Teaching Programming Languages to Computer Science Students". In this paper "A qualitative study of major programming languages: teaching programming languages to computer science students "author has done a comparative study based on criteria such as Simplicity, Writability, Reliability, Appropriate Data Structures, Availability/ Cost to students, Market demand, Community Support, OS/Machine Limitations, Extensions / Libraries available and Coverage have been considered for evaluation of language based on which java programming language has been concluded as the most useful programming language used for teaching computer science concepts.[1]

In 2015, Zakaria Alomari, Oualid El Halimi, Kaushik Sivaprasad and Chitrang Pandit did perform work on "Comparative Studies of Six Programming Language". In this paper "Comparative Studies of Six Programming Language" author has done a comparative study on six programming language: C++, PHP, C#, Java, Python, and VB has been compared under the characteristics of reusability, reliability, portability, availability of compilers and tools, readability, efficiency, familiarity, and expressiveness. The study revealed that each language is suited for specific application domain in which C# based application has performed well in GUI design and writing secure programs, java performed well in web programming and writing secure programs, C++ outperformed other languages in database connectivity and execution time, VB performed well in GUI application development, PHP performed well for web development and database connectivity and lastly python rapid prototyping and to develop enterprise application with less code.[2]

3. HISTORY

In 2003, four technology experts joined forces to establish Android Inc. of Palo Alto, CA: Andy Rubin, Rich Miner, Nick Sears, and Chris White. The four worked to create an operating system for mobile devices that could be aware of both a user's location and their personal preferences. At first, the Android team wanted to implement the system into

digital camera devices, creating cameras that could access computer services. However, the company recognized that there would be low demand for such a computer camera, so the development activities switched to a focus on cellular phones.

In August 2005, Android very quietly became the property of Google, which purchased the start-up firm for an undisclosed price which is estimated to be about $50 million. Although few people at the time thought that the move would result in Google's dominance of the mobile operating system, most understood that Google was trying to make a serious foray into Web-based services on mobile platforms.

The history and versions of android are interesting to know. The code names of android are Cupcake, Donut, Eclair, Froyo, Gingerbread, Honeycomb, Ice Cream Sandwich, Jelly Bean, KitKat, Lollipop, Marshmallow, Nougat, Oreo, Pie and Android 10.

Let's understand the android history in a sequence:

- Initially, Andy Rubin founded Android Incorporation in Palo Alto, California, the United States in October 2003.
- On 17th August 2005, Google acquired android Incorporation. Since then, it is in the subsidiary of Google Incorporation.
- The key employees of Android Incorporation are Andy Rubin, Rich Miner, Chris White and Nick Sears.
- Originally intended for camera but shifted to smart phones later because of low market for camera only.
- Android is the nick name of Andy Rubin given by co-workers because of his love to robots.
- In 2007, Google announces the development of android OS.
- In 2008, HTC launched the first android mobile.

Let's see the android versions, codenames and API Level provided by Google.

Table -1: Android Versions, Codename and API Level Table

Version	Code Name	API Level
1.5	Cupcake	3
1.6	Donut	4
2.1	Eclair	7
2.2	Froyo	8
2.3	Gingerbread	9 and 10
3.1 and 3.3	Honeycomb	12 and 13
4.0	Ice Cream Sandwich	15
4.1, 4.2 and 4.3	Jelly Bean	16, 17 and 18
4.4	KitKat	19
5.0	Lollipop	21
6.0	Marshmallow	23
7.0	Nougat	24-25
8.0	Oreo	26-27
9.0	Pie	28
10	Android 10	29

4. FEASIBILITY STUDY

A feasibility study is performed by a company when they want to know whether a project is possible under given certain circumstances. Feasibility studies are undertaken under many circumstances – to find out whether a company has enough money for a project, to find out whether the product being created will sell, or to see if there are enough human resources for the project. A good feasibility study will show the strengths and deficits before the project is planned or budgeted for. By doing the research beforehand, companies can save money and resources in the long run by avoiding projects that are not feasible. Let's know about the types of feasibility study:

4.1 TECHNICAL FEASIBILITY

This is concerned with specifying equipment and software and hardware that will successfully satisfy the user requirement. The technical needs off the system may vary considerably. In feasibility analysis the technical feasibility of the system is analysed and the technical requirements such as software facilities, procedure, inputs are identified. It is also one of the important phases of the system development activities. The system offers greater levels of user friendliness combined with greater processing speed. Therefore, the cost of maintenance can be reduced. Since, processing speed is very high and the work is reduced in the maintenance point of view management convince that the project is operationally feasible.

4.2 ECONOMIC FEASIBILITY

Economic analysis is the most frequently used technique for evaluating the effectiveness of a proposed system. More commonly known as cost/benefit analysis: the procedure is to determine the benefits and saving that are expected from a proposed system and compare them with cost. If benefits outweigh cost, a decision is taken to design and implement the system. Otherwise, further justification or alternative in the proposed system will have to be made if it is to have a chance of being approved. This is an ongoing effort that improves in accuracy at each phase of the system life cycle. Hence the user will not find any difficulty at the installation time and after installation user also never find difficulties like hang, slow speed or slow response time.

4.3 SCHEDULE FEASIBILITY

A project will fail if it takes too long to be completed before it is useful. Typically this means estimating how long the system will take to develop.

4.4 OPERATIONAL FEASIBILITY

Operational feasibility is dependent on human resources available for the project and involves projecting whether the system will be used if it is developed and implemented. Operational feasibility is a measure of how well a proposed system solves the problems, and takes advantage of the opportunities identified during scope definition and how it satisfies the requirements identified in the requirements analysis phase of system development.

5. APPLICATION DEVELOPMENT

The basic steps for developing applications are shown in Figure 1. There are five different development steps in development phases, they are given below:

• Setup Environment: In this phase, we install and set up our development environment. We also create Android Virtual Devices (AVDs) and connect hardware devices, on which we can install our applications.
• Design and Development: In this phase, we set up, design and develop our Android project, which contains all of the source code and resource files for our application.
• Backend and Database: In this phase, we create tables, database and connect the database with the application using web services.
• Debugging and Testing: In this phase, we build our project into a debuggable .apk package that we can install and run on the emulator or on real time android based device.
• Publishing: In this phase, we configure and build our application for release and distribute our application to users.

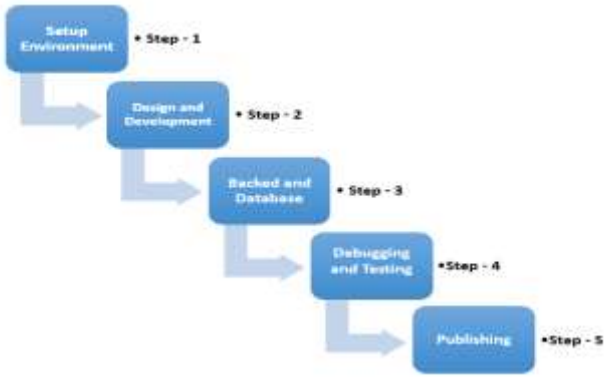

Figure -1: Steps for developing android application

6. PROPOSED METHODOLOGY

6.1 AGILE MOBILE APPLICATION DEVELOPMENT APPROACH

We have selected agile methodology Approach because it is an iterative, rapid application development approach that involves a more 'time-boxed', team-based, sprint action style. According to the top mobile app development companies, this strategy emphasizes on being lean and creating minimum viable products (MVPs) over a desired period while enhancing each particular iteration.

The different phases of the app development cycle can take place in parallel, with a track of expected features and requirements. Thus, teamwork, continuous improvement, constant feedback and adaptability to changes are the key highlights of the agile development strategy.

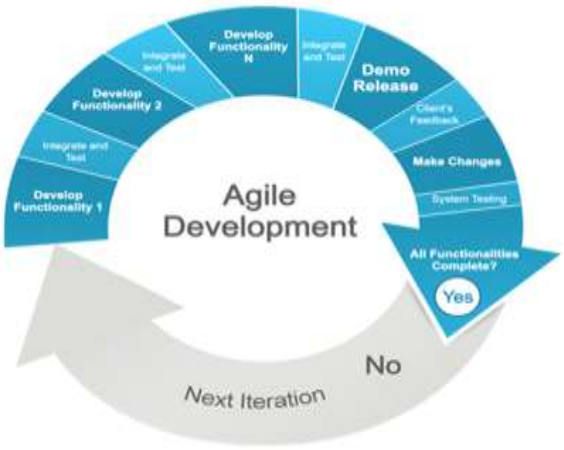

Figure -2: Steps of Agile Development

7. DESIGN METHODOLOGY

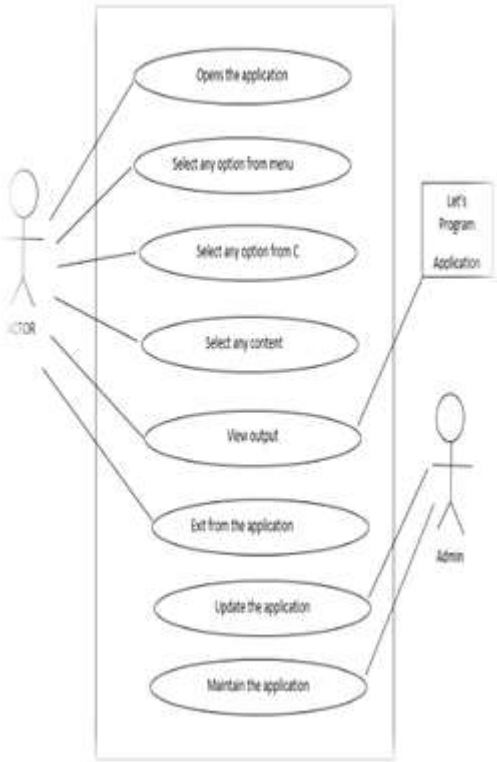

Figure -3: Use Case Diagram

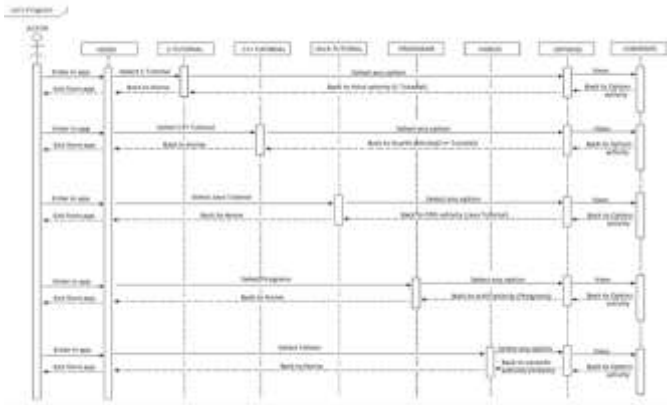

Figure -4: Sequence Diagram

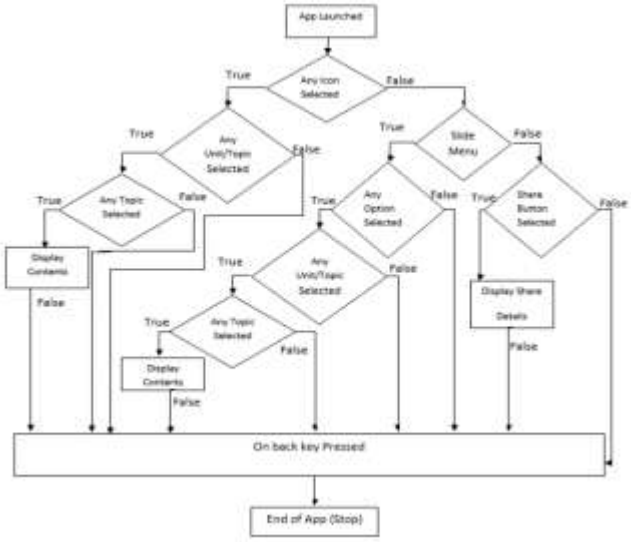

Figure -5: Flow Chart

8. RESULTS AND DISCUSSIONS

8.1 TEST CASE AND RESULTS

The importance of software testing and its impact on software cannot be underestimated. Software testing is a fundamental component of software quality assurance and represents a review of specification, design and coding, the greater visibility of software system and the code associated with software failure are motivating factor of planning, through testing. During development, we tested the application on an Android Virtual Device (AVD) and Android Powered real time device. The aim was to observe that the application is performing as per the requirements given or not.

Table -2: Input and Output Table

INPUT	OUTPUT
Selecting a particular icon of C, C++ and Java	Displaying the details of C, C++ and, Java content individually.
Selecting programs	Displaying the list of programs.
Selecting videos	Displaying the list of videos.
Selecting sample test papers	Displaying the list of sample test papers.
Selecting share	Displaying list of application for sharing, e.g., Bluetooth, Xender, Shareit, etc.

Table -3: Functional Requirements Table

INPUT	OUTPUT
Displaying content	The System should be able to display the contents of C, C++ and Java.
Displaying programs	The system should be able to display the programs for C, C++ and Java.
Displaying videos	The system should be able to display the videos.
Displaying sample test papers	The system should be able to display
Displaying application for sharing purpose	The system should be able to display the list of applications for sharing.

9. SCREENSHOTS

Figure -6: Home Activity

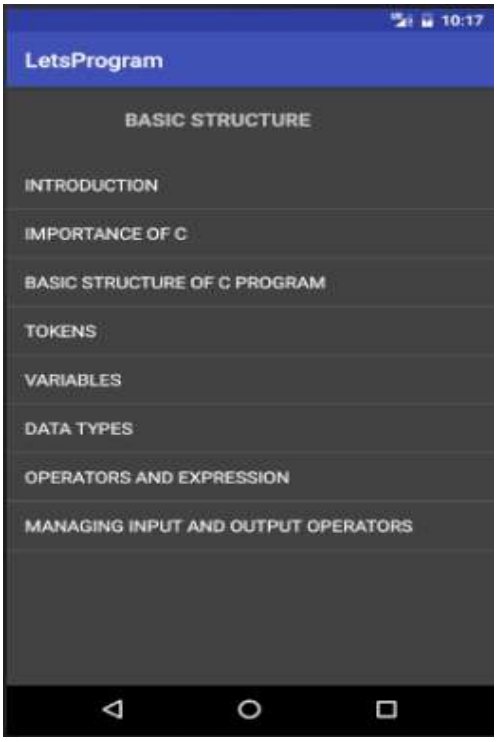

Figure -7: Contents Activity

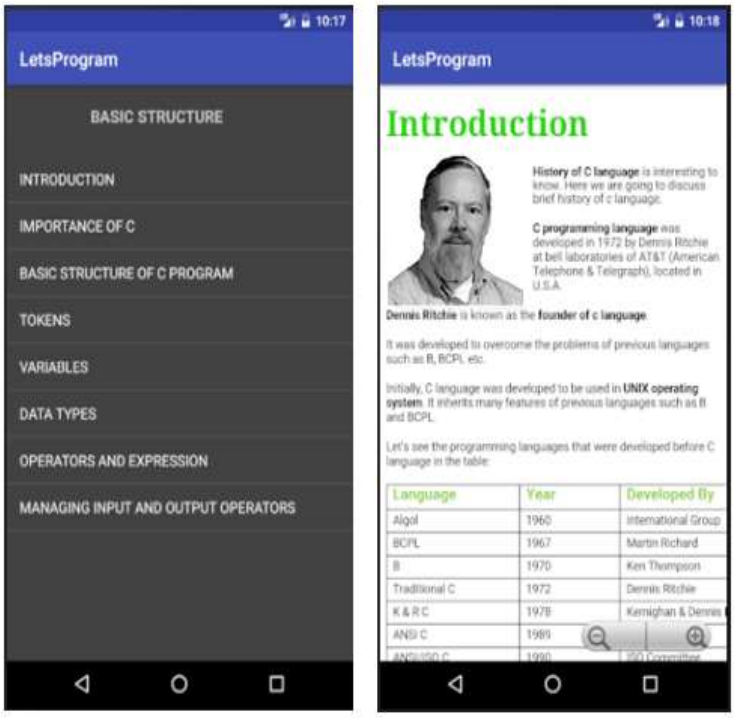

Figure -8: C Tutorial Activity

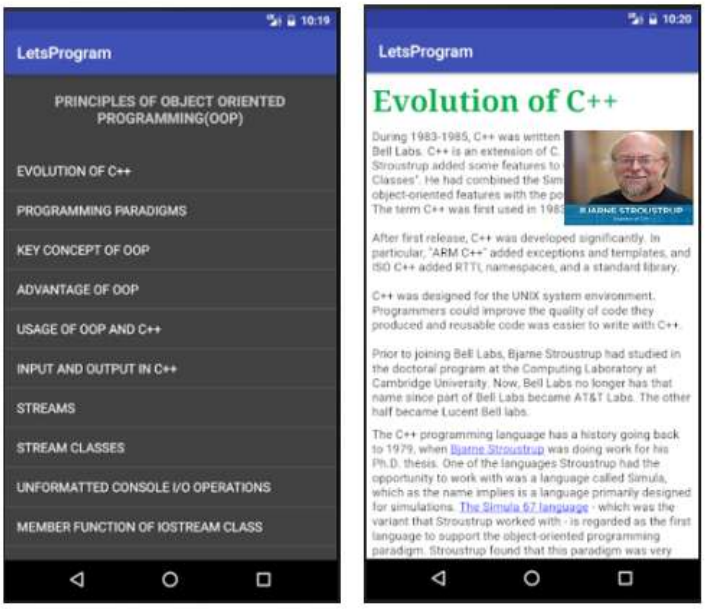

Figure -9: C++ Tutorial Activity

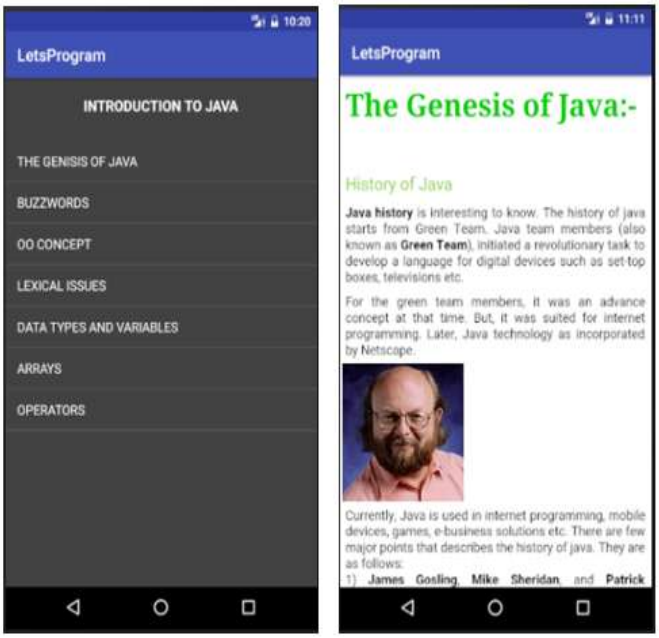

Figure -10: Java Tutorial Activity

3. CONCLUSIONS

When technology is growing faster and people prefer to do most of their work with the help of their smartphones, the mobile application plays a very vital role in inadequately performing their work. Developing Lets program an android based application was very challenging and at the same time, it was self-satisfying. While developing this application a concise effort has been made to make it more user-friendly. This application provides the user with enough content to learn about programming languages like C, C++, and Java without needing an internet connection. Along with that, they can also get video tutorials on how to work with the

IDEs to practice and execute programs. While formulating the content, we focused on the syllabus of different universities and carried out the work.
Now the students need not go through various applications and websites to get the basic knowledge about the mentioned languages. This application has been tested thoroughly and has given a successful output. Now anyone can make use of this application to learn C, C++ or Java.

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BIOGRAPHIES

Mr. Dhiraj Prasad Jaiswal has received his Master of Computer Application (MCA) degree from Sri Ramaswamy Memorial University, Sikkim in 2017. He is currently working as a Lecturer at ICFAI University Sikkim. He has 2+ years of teaching experience for both undergraduate and postgraduate students. He has also worked as a software developer at Cubiq Innovation and has 1+ year of experience. His current field of interest includes Android application development, Internet of Things, Java Programming, and Cloud computing.

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Mr. Gagan Gurung did his Bachelor of Computer Application from The ICFAI University, Sikkim in the year 2012 and did his Master of Computer Application from Bangalore University in the year 2015. Currently he is working in The ICFAI University Sikkim from the year 2016 in the Department of Information Technology and has been publishing a various paper in different national and international journal. His area of interest is in the field of Data Mining, Software Engineering and Artificial Intelligence.

Ms. Devyata Subba joined SRM University Sikkim in the year 2017 as a Lab Assistant in the Department of Information Technology Knowledge Management (ITKM). She also holds 6months experience in teaching at SRM University Sikkim. Her highest qualification is Master in Computer Applications (MCA) from SRM University Sikkim. Her area of expertise include Networking, DBMS and Software Engineering.