

Learn C – An Android based Application

Pooja Kumari¹, Kumari Chettri²

^{1,2}Masters of Computer Application, Department of Information Technology, ICFAI University, Sikkim – Gangtok, East Sikkim, India

Abstract - In the advancing world of technology, mobile applications are a rapidly growing segment of the global mobile market. Based on Android's growing market we have developed 'Learn C – An Android Application' that provides easy access to learning basic C programming at any place, anytime, making it convenient to learners. Learn C allows a student to do self-paced learning. No two learners are the same; with the help of this application, anyone will be able to learn at their own pace. In a classroom scenario, occasionally, there will be a few learners who wouldn't have understood the concepts clearly but hesitate to ask for a re-explanation. This application will be a great help to all the students.

Key Words: Android, C Programming, Programming Language, Learn C.

1. INTRODUCTION

Nowadays, technology is increasingly used by human beings in every field. The increasing popularity of Smart Phones has drawn the attention of almost everybody. A mobile app, short for mobile application or just app is an application which runs on smartphones, tablet or mobile phones. Apps are pre-installed or downloadable pieces of software that can do almost everything. Apps make mobile more like portable computers having multi-core processors, gigabytes of memory, and a real operating system. Originally mobile apps are made for informational purposes that include Gmail, calendar, weather information, etc. With an increase in technology and user demands, developers started to make apps for other purposes like games, banking, video chats, and education, etc. An app can similarly show the data as a website, along with other benefits to download the content that can be used offline, in case the Internet is not available. 'Learn C' will help students to learn the basics of C programming any place, anytime, making it more convenient for learners. It has been specifically built keeping all the important concepts and programs required for a novice learner. Everyone will be able to easily learn and prepare for examinations using this application. This application is not limited to use only by the students of this university but can be used by anyone who wishes to learn basic programming skills using C Programming.

2. LITERATURE SURVEY

"Let's Learn -An E-Learning Platform of Programming Language using Android Application" the author has

developed an android application "Let's Program". This application is used to provide an offline tutorial for C, C++, and Java for the Universities Students. This app contains hundreds of Programs, Sample papers, and videos based on the syllabus of various universities. The application provides students with all the learning materials for languages like C, C++, and Java. [1]

"A Qualitative study of major programming language: Teaching programming Language to computer science students" the author has compared major programming languages for a computer science student. The comparison is done on different factors such as simplicity, writability, reliability availability, market demand, coverage, and it is found that Java is the most appropriate language to be used for teaching computer science concepts. [2]

"Teaching Java Programming on smartphone pedagogy and innovation; proposal of its ontology oriented implementation" the author introduced a new style of teaching computer programming on the smartphone platform. The proposed approach allows the students to develop a product in the form of mobile application while learning their first programming course of the curriculum. [3]

3. ANDROID – CONCEPT USED

3.1 Android

Android is a Linux based operating system that is developed by android Incorporation and later acquired by Google. It is the process by which new applications are created for the Android operating system. Applications are usually developed in Java programming language using the Android software development kit (SDK), but other development environments are also available.

3.2 Android SDK

A software development kit that enables developers to create applications for the Android platform. The Android SDK includes sample projects with source code, development tools, an emulator, and required libraries to build Android applications. Applications are written using the Java programming language and run on Dalvik, a custom virtual machine designed for embedded use which runs on top of a Linux kernel.

3.3 Activity

An activity is an application component and it represents one window, one hierarchy of views. It fills the screen but can be embedded in other activities or appear as a floating window.

3.4 Android UI Widgets

Android UI widgets such as TextView, Buttons, Image view, etc. are used by a developer to design an application and make it more user friendly and convenient for users.

Let's see UI Widgets in detail

3.4.1 TextView

A TextView displays text to the user and optionally allows them to edit it. A TextView is a complete text editor, however, the basic class is configured to not allow editing.

Example:

```
<TextView
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:textAppearance="?android:attr/textAppearanceMedium"
    android:text="@string/prog5"
    android:id="@+id/textView75"
    android:layout_alignParentTop="true"
    android:layout_alignParentLeft="true"
    android:layout_alignParentStart="true"
    android:textStyle="bold"
    android:textSize="15dp" />
```

3.4.2 Button

A standard Android button with text is represented by the Android class android.widget.Button. Button instance can be inserted into GUI either through.xml file or programmatically in.java file. Android Button is the GUI component that is sensitive to taps (click) by the User.

Example:

```
<Button
    android:layout_width="225dp"
    android:layout_height="wrap_content"
    android:text="for "
    android:id="@+id/f"
    android:background="@drawable/demo"
    android:textColor="#ff0505"
    android:layout_marginLeft="80dp"
    android:textAllCaps="false"
    android:layout_marginBottom="10dp"
    android:layout_marginRight="10dp"
    android:layout_marginTop="10dp"
    android:textSize="20dp" />
```

3.4.3 Image View

In Android, android.widget.ImageView class is used to display an image file. Android also has an Image Button. As the name suggests, the Image Button component is a button with an image on. The Image Button is represented by the Android class android.widget.ImageButton. In this app, we're going to implement this component in our application.

Example

```
<ImageView
    android:layout_width="match_parent"
    android:layout_height="300dp"
    android:id="@+id/imageView35"
    android:layout_below="@+id/textView75"
    android:src="@drawable/n8"
    android:layout_alignRight="@+id/textView75"
    android:layout_alignEnd="@+id/textView75" />
```

3.4.4 List View

List View is a view group that displays a list of scrollable items. The list items are automatically inserted to the list using an Adapter that pulls content from a source such as an array or database query and converts each item result into a view that's placed into the list.

Example

```
<ListView
    android:id="@+id/list_view"
    android:layout_width="match_parent"
    android:layout_height="match_parent" />
```

3.4.5 Scroll View

A view group that allows the view hierarchy placed within it to be scrolled. The scroll view may have only one direct placed within it. To add multiple views within the scroll view, make the direct child you add a view group, e.g. linear layout, and place additional views within that linear layout. Scroll View supports vertical scrolling only. For horizontal scrolling, use HorizontalScrollView instead.

Example:

```
<ScrollView
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    xmlns:android="http://schemas.android.com/apk/res/android">
</ScrollView>
```

3.4.6 Toast

Toast is a notification message that pops up for a specific duration. It only fills the amount of space required for the message and the current activity remains visible and interactive. The android.widget.Toast class is the subclass of java.lang.Object class.

Example:

```
Toast.makeText(Algorithm_Activity.this, "Algorithm", Toast.LENGTH_LONG).show();
```

3.5 Android Layout

Layouts are subclasses of view group which specifies how a view should be arranged inside the view groups. It defines the visual structure for a user interface.

We have used RelativeLayout and LinearLayout in our project. Let's see both Layouts in detail

3.5.1 Relative Layout

A relative layout is a view group that displays child views in relative positions. The position of each view can be specified as relative to sibling elements (such as to the left of or below another view) or in position relative to the parent relative layout area (such as aligned to the bottom, left, or center). A relative layout is a very powerful utility for designing a user interface because it can eliminate nested view groups and keep your layout hierarchy flat, which improves performance.

Example:

```
<RelativeLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:tools="http://schemas.android.com/tools" android:layout_width="match_parent"
    android:layout_height="match_parent" android:paddingLeft="6dp"
    android:paddingRight="6dp"
    android:paddingTop="6dp"
    android:paddingBottom="6dp"
    tools:context="com.example.hello.learnnc.FirstActivity"
    android:background="#ff07889b">
```

3.5.2 Linear layout

The linear layout is a simple layout used in android for layout designing. In the Linear layout, all the elements are displayed linearly means all the child/elements of a linear layout are displayed according to its orientation. The value of orientation property can be either horizontal or vertical.

Example:

```
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:tools="http://schemas.android.com/tools" android:layout_width="match_parent"
    android:layout_height="match_parent" android:paddingLeft="6dp"
    android:paddingRight="6dp"
    android:paddingTop="6dp"
    android:paddingBottom="6dp"
    tools:context="com.example.hello.learnnc.Overview_of_C_Activity"
    android:orientation="vertical"
    android:weightSum="1">
    <TextView
        android:layout_width="180dp"
        android:text="C character Set"
        style="@style/subheadings"
        android:id="@+id/textView9" />
```

3.6 Android Project Structure

When you start a new project, Android Studio creates the necessary structure for all your files and makes them visible in the Project window on the left side of the IDE

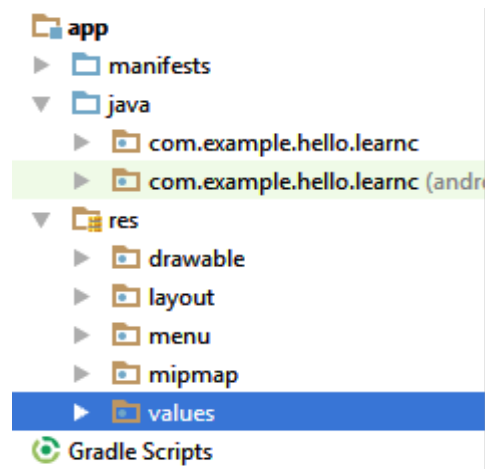


Figure 1: Android Project Structure

4. DESIGN METHODOLOGY

4.1 Use Case Diagram

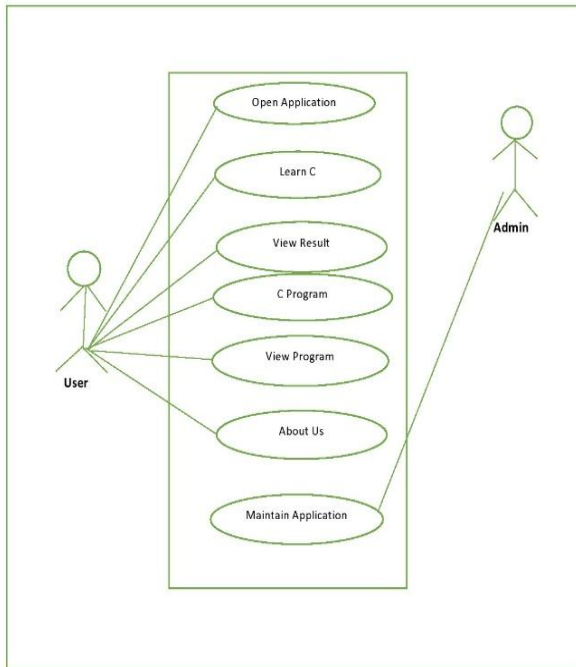


Figure 2: Use case Diagram

4.3 Activity Diagram

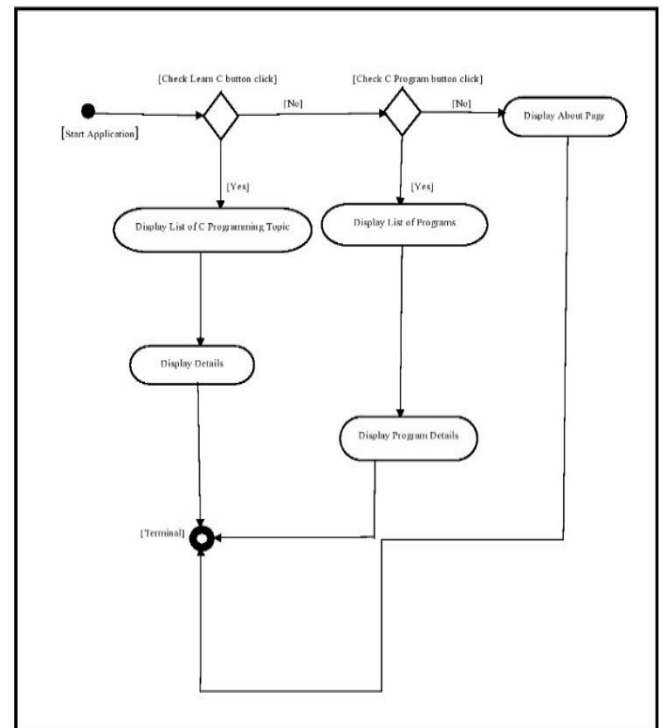


Figure 4: Activity Diagram

4.2 Sequence Diagram

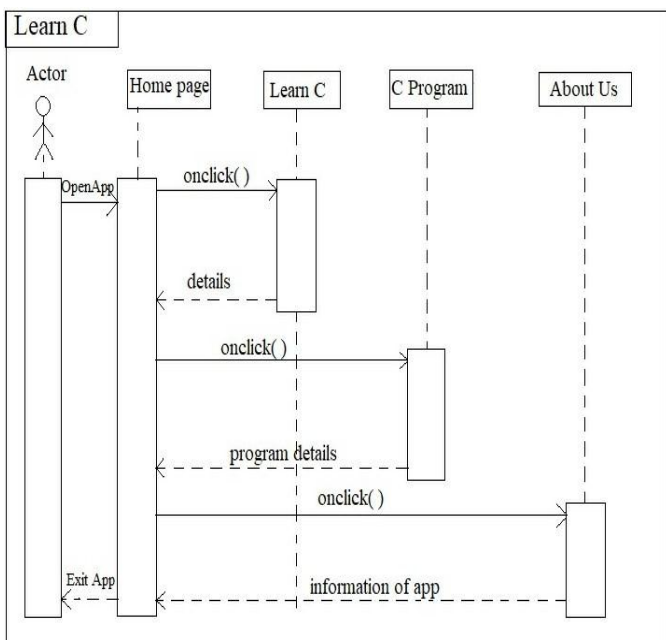


Figure 3: Sequence Diagram

5. SNAPSHOTS

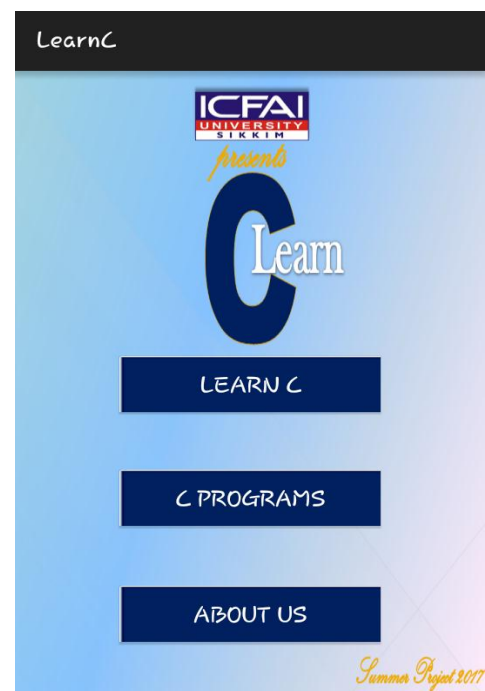


Figure 5: Home Activity

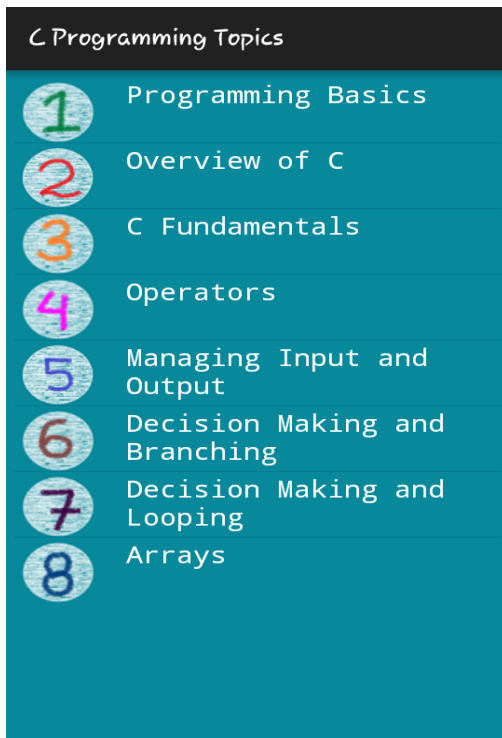


Figure 6: Menu Activity



Figure 8: C Programs Activity

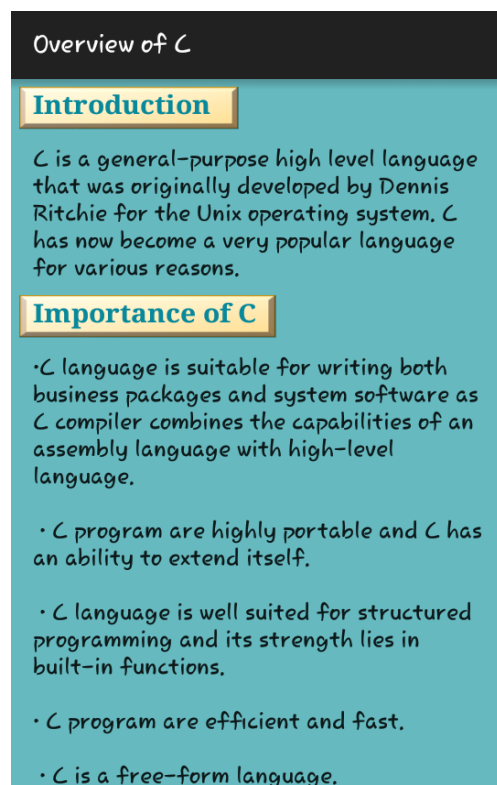
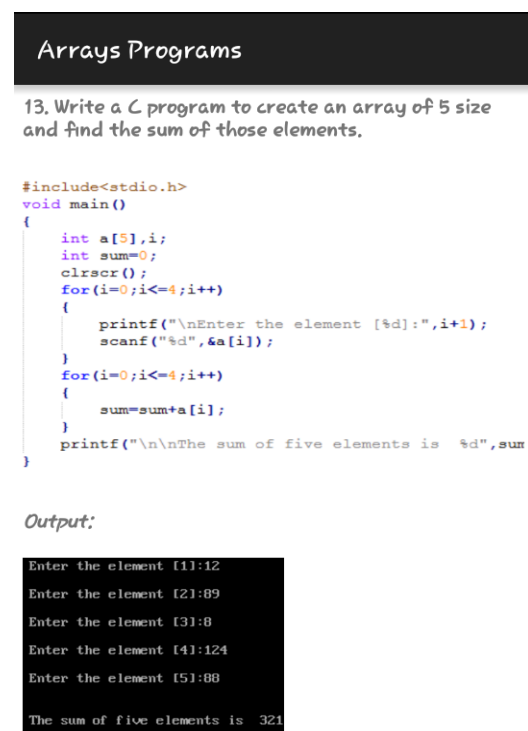


Figure 7: Overview of C Activity



14. Write a C program to find the largest element in an array.

Figure 9: Array Programming Activity

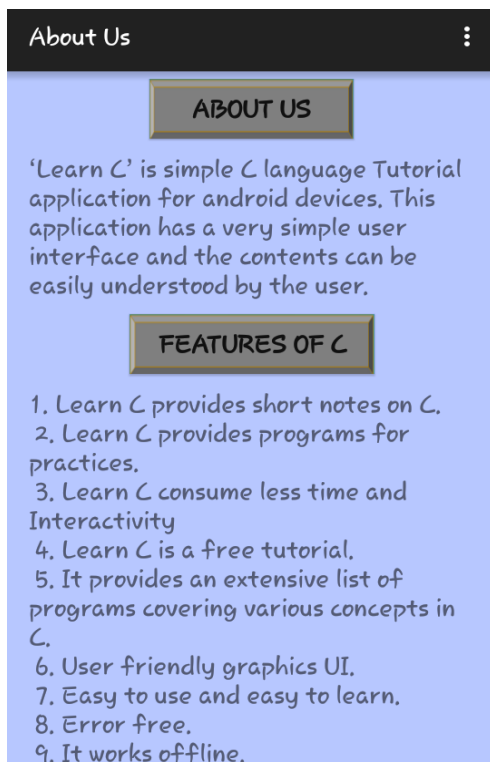


Figure 10: About Us Activity

[3] Santhosh Johna and Mary Shanthi Ran, "Teaching Java Programming on Smartphone-pedagogy and Innovation; Proposal of its Ontology Oriented Implementation", 2015.

[4] E Balagurusamy , "Programming In Ansi C", Tata McGraw-Hill Education Inc.

[5]https://www.tutorialspoint.com/programming/c_arrays.htm

[6] <https://www.programiz.com>

[7] <https://www.studytonight.com>

6. CONCLUSION

Android has been available as open source since October 2008 and is used for mobile app development. Before Android, there were many other Mobile OS which was available but Android has been leading learning development since 2008. Mobile app development is one of the fastest emerging fields in the IT industry and C is one of the most popular and widely used programming languages, used to develop system application software. Combining both the technology 'Learn C' app has been designed for those who want to learn C programming; whether you are a beginner or expert, this tutorial is intended to cover basic concepts straightforwardly and systematically. To learn C programming language you don't require any previous programming knowledge, but the basic understanding of other programming languages will help you to understand the C programming concepts quickly and this app has been designed for providing users will all the concepts in a simple manner

REFERENCES

[1] Dhiraj Prasad Jaiswal, Rahul Shah, Gagan Gurung and Devyata Subba, "Let's Learn - An E-Learning Platform of Programming Language using Android Application", 2020.

[2] Ghazala Shafi Sheikh and Noman Islam, "A Qualitative Study of Major Programming Languages: Teaching Programming Languages to Computer Science Students", 2016.