# Bapuji Educational Association (Regd)

**Bapuji Institute of Engineering & Technology, Davangere.**

# Department of Computer Science and Engg.

**LABORATORY MANUAL 2021-22**



# MOBILE APPLICATION DEVELOPMENT – 18CSMP68



LAB MANUAL

**Hardware and Software Requirements**

Google provides Android Studio for the Windows, Mac OS X and Linux platforms. You can download Android Studio from the Android Studio home page, (<https://developer.android.com/studio/index.html>) where you will also find the traditional SDK’s with Android Studio’s command-line tools. Before downloading Android Studio, make sure your platform meets the following requirements:

**Windows requirements**

* Microsoft Windows 7/8/10 (32 bit or 64 – bit)
* 8 GB RAM minimum and 10 GB of available disk space
* 1280 \* 800 minimum screen resolution
* JDK 8 or higher versions

### Linux OS requirements

* GNOME or KDE desktop, 64-bit distribution capable of running 32-bit applications
* GNU C library (glibc) 2.19 or later
* 3 GB RAM minimum and 1 GB of available disk space
* 1280 \* 800 minimum screen resolution
* JDK 8 or higher versions

### Availabilty of Source Code

Download the source code for Part A programs @ <https://tinyurl.com/18CSMP68-Part-A>

Download the source code for Part B, 1st to 4th program @ <https://tinyurl.com/18CSMP68-Part-B-1-to-4>

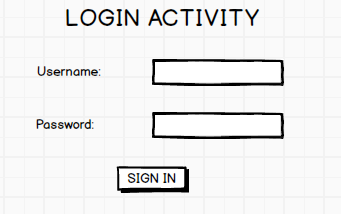
Download the source code for Part B, 5th program @ <https://tinyurl.com/18CSMP68-Part-B-5>

Download the source code for Part B, 6th to 8th program @ <https://tinyurl.com/18CSMP68-Part-B-6-to-8>

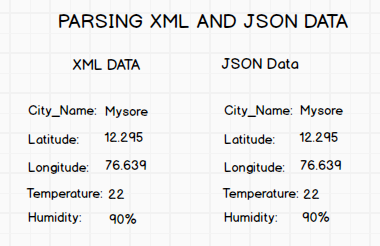
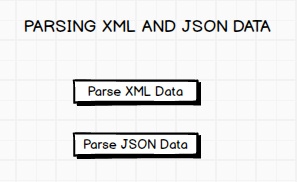
You are encouraged to run each of these programs. All the programs are tested using Android Studio 3.5 on Windows platform.

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| **MOBILE APPLICATION DEVELOPMENT**  **(Effective from the academic year 2018 -2019) SEMESTER – VI** | | | | |
| Subject Code | | **18CSMP68** | IA Marks | 40 |
| Number of Contact Hours/Week | | **0:0:2** | Exam Marks | 60 |
| Total Number of Contact Hours | | **3 Hours/Week** | Exam Hours | 03 |
| **CREDITS – 02** | | | | |
| **Laboratory Objectives:** This laboratory will enable students to | | | | |
| 1. Learn and acquire the art of Android Programming. 2. Configure Android studio to run the applications. 3. Understand and implement Android's User interface functions. 4. Create, modify and query on SQlite database. 5. Inspect different methods of sharing data using services. | | | | |
| **Descriptions (if any):** | | | | |
| **Installation procedure of the Android Studio/Java software must be demonstrated, carried out in groups.**  **Students should use the latest version of Android Studio/Java to execute these programs. All of these diagrams are for representational purpose only. Students are expected to improvise on it.** | | | | |
| **Programs List:** | | | | |
| **PART – A** | | | | |
| **1** | Create an application to design a Visiting Card. The Visiting card should have a company logo at the top right corner. The company name should be displayed in Capital letters, aligned to the center. Information like the name of the employee, job title, phone number, address, email, fax and the website address is to be displayed. Insert a horizontal line between the job title and the phone number. | | | |
| **2** | Develop an Android application using controls like Button, TextView, EditText for  designing a calculator having basic functionality like Addition, Subtraction, Multiplication, and Division. | | | |

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| **3** | Create a SIGN Up activity with Username and Password. Validation of password should happen based on the following rules:   * Password should contain uppercase and lowercase letters. * Password should contain letters and numbers. * Password should contain special characters. * Minimum length of the password (the default value is 8).   On successful **SIGN UP** proceed to the next Login activity. Here the user should **SIGN IN** using the Username and Password created during signup activity. If the Username and Password are matched then navigate to the next activity which displays a message saying “Successful Login” or else display a toast message saying “Login Failed”. The user is given only two attempts and after that display a toast message saying “Failed Login Attempts” and disable the SIGN IN button. Use Bundle to transfer information from one activity to another. |
| **4** | Develop an application to set an image as wallpaper. On click of a button, the wallpaper image should start to change randomly every 30 seconds. |



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| **5** | Write a program to create an activity with two buttons START and STOP. On pressing of the START button, the activity must start the counter by displaying the numbers from One and the counter must keep on counting until the STOP button is pressed. Display the counter value in a TextView control. |
| **6** | Create two files of XML and JSON type with values for City\_Name, Latitude, Longitude, Temperature, and Humidity. Develop an application to create an activity with two buttons to parse the XML and JSON files which when clicked should display the data in their respective layouts side by side. |
| **7** | Develop a simple application with one EditText so that the user can write some text in it. Create a button called “Convert Text to Speech” that converts the user input text into voice. |
| **8** | Create an activity like a phone dialer with CALL and SAVE buttons. On pressing the  CALL button, it must call the phone number and on pressing the SAVE button it must save the number to the phone contacts. |



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| **PART - B** | |
| **1** | Write a program to enter Medicine Name, Date and Time of the Day as input from the user and store it in the SQLite database. Input for Time of the Day should be either Morning or Afternoon or Evening or Night. Trigger an alarm based on the Date and Time of the Day and display the Medicine Name. |
| **2** | Develop a content provider application with an activity called “Meeting Schedule” which takes Date, Time and Meeting Agenda as input from the user and store this information into the SQLite database. Create another application with an activity called “Meeting Info” having DatePicker control, which on the selection of a date should display the Meeting Agenda information for that particular date, else it should display a toast  message saying “No Meeting on this Date”. |

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| **3** | Create an application to receive an incoming SMS which is notified to the user. On clicking this SMS notification, the message content and the number should be displayed on the screen. Use appropriate emulator control to send the SMS message to your application. |
| **4** | Write a program to create an activity having a Text box, and also Save, Open and Create buttons. The user has to write some text in the Text box. On pressing the Create button the text should be saved as a text file in MkSDcard. On subsequent changes to the text, the Save button should be pressed to store the latest content to the same file. On pressing the Open button, it should display the contents from the previously stored files in the Text box. If the user tries to save the contents in the Textbox to a file without creating it, then a toast message has to be displayed saying “First Create a File”. |
| **5** | Create an application to demonstrate a basic media player that allows the user to Forward, |

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|  | Backward, Play and Pause an audio. Also, make use of the indicator in the seek bar to move the audio forward or backward as required. |
| **6** | Develop an application to demonstrate the use of Asynchronous tasks in android. The asynchronous task should implement the functionality of a simple moving banner. On pressing the **Start Task** button, the banner message should scroll from right to left. On pressing the **Stop Task** button, the banner message should stop. Let the banner message be “Demonstration of Asynchronous Task”. |
| **7** | Develop an application that makes use of the clipboard framework for copying and pasting of the text. The activity consists of two EditText controls and two Buttons to trigger the copy and paste functionality. |
| **8** | Create an AIDL service that calculates Car Loan EMI. The formula to calculate EMI is  **E = P \* (r(1+r)n)/((1+r)n-1)**  where  E = The EMI payable on the car loan amount P = The Car loan Principal Amount  r = The interest rate value computed on a monthly basis n = The loan tenure in the form of months  The down payment amount has to be deducted from the principal amount paid towards buying the Car. Develop an application that makes use of this AIDL service to calculate the EMI. This application should have four EditText to read the Principal Amount, Down Payment, Interest Rate, Loan Term (in months) and a button named as “Calculate Monthly EMI”. On click of this button, the result should be shown in a TextView. Also,  calculate the EMI by varying the Loan Term and Interest Rate values. |

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| **Laboratory Outcomes:** After studying these laboratory programs, students will be able to | |
| * Create, test and debug Android application by setting up Android development environment. * Implement adaptive, responsive user interfaces that work across a wide range of devices. * Infer long running tasks and background work in Android applications. * Demonstrate methods in storing, sharing and retrieving data in Android applications. * Infer the role of permissions and security for Android applications. | |
| **Procedure to Conduct Practical Examination** | |
| * Experiment distribution   + For laboratories having only one part: Students are allowed to pick one experiment from the lot with equal opportunity.   + For laboratories having PART A and PART B: Students are allowed to pick one experiment from PART A and one experiment from PART B, with equal opportunity. * Change of experiment is allowed only once and marks allotted for procedure to be made zero of the changed part only. * Marks Distribution (Subjected to change in accordance with university regulations)   + For laboratories having only one part – Procedure + Execution + Viva-Voce: 15+70+15 = 100 Marks   + For laboratories having PART A and PART B     1. Part A – Procedure + Execution + Viva = 6 + 28 + 6 = 40 Marks     2. Part B – Procedure + Execution + Viva = 9 + 42 + 9 = 60 Marks | |
| **Text Books:** | |
| 1. Google Developer Training, **"Android Developer Fundamentals Course – Concept Reference”,** Google Developer Training Team, 2017.  [https://www.gitbook.com/book/google-developer-training/android-developer-](https://www.gitbook.com/book/google-developer-training/android-developer-fundamentals-course-concepts/details) [fundamentals-course-concepts/details](https://www.gitbook.com/book/google-developer-training/android-developer-fundamentals-course-concepts/details)  (Download pdf file from the above link) | |
| **Reference Books:** | |
| 1. Erik Hellman, **“Android Programming – Pushing the Limits”,** 1st Edition, Wiley India Pvt Ltd, 2014. ISBN-13: 978-8126547197 2. Dawn Griffiths and David Griffiths, **“Head First Android Development”,** 1st Edition, | |

O’Reilly SPD Publishers, 2015. ISBN-13: 978-9352131341

3) Bill Phillips, Chris Stewart and Kristin Marsicano, **“Android Programming: The Big Nerd Ranch Guide”,** 3rd Edition, Big Nerd Ranch Guides, 2017. ISBN-13: 978- 0134706054

**CONTENTS**

|  |  |  |
| --- | --- | --- |
| **Sl. No** | **Experimen ts** | **Page No.** |
|  | **PART – A** |  |
| 1 | Create an application to design a Visiting Card. The Visiting card should have a company logo at the top right corner. The company name should be displayed in Capital letters, aligned to the center. Information like the name of the employee, job title, phone number, address, email, fax and the website address is to be displayed.  Insert a horizontal line between the job title and the phone number. | **15** |
| 2 | Develop an Android application using controls like Button, TextView, EditText for  designing a calculator having basic functionality like Addition, Subtraction, Multiplication, and Division. | **18** |
| 3 | Create a SIGN Up activity with Username and Password. Validation of password should happen based on the rules | **28** |
| 4 | Develop an application to set an image as wallpaper. On click of a button, the wallpaper image should start to change randomly every 30 seconds | **35** |
| 5 | Write a program to create an activity with two buttons START and STOP. On pressing of the START button, the activity must start the counter by displaying the numbers from One and the counter must keep on counting until the STOP button is  pressed. Display the counter value in a TextView control. | **38** |
| 6 | Create two files of XML and JSON type with values for City\_Name, Latitude,  Longitude, Temperature, and Humidity. Develop an application to create an activity with two buttons to parse the XML and JSON files | **41** |
| 7 | Develop a simple application with one EditText so that the user can write some text  in it. Create a button called “Convert Text to Speech” that converts the user input text into voice. | **46** |
| 8 | Create an activity like a phone dialer with CALL and SAVE buttons. On pressing  the CALL button, it must call the phone number and on pressing the SAVE button it must save the number to the phone contacts. | **49** |
|  | **PART – B** |  |
| 1 | Write a program to enter Medicine Name, Date and Time of the Day as input from the user and store it in the SQLite database. Input for Time of the Day should be either Morning or Afternoon or Evening or Night. Trigger an alarm based on the  Date and Time of the Day and display the Medicine Name. | **57** |
| 2 | Develop a content provider application with an activity called “Meeting Schedule”  which takes Date, Time and Meeting Agenda as input from the user and store this information into the SQLite database. | **68** |
| 3 | Create an application to receive an incoming SMS which is notified to the user. On clicking this SMS notification, the message content and the number should be  displayed on the screen. Use appropriate emulator control to send the SMS message to your application | **79** |

|  |  |  |
| --- | --- | --- |
| 4 | Write a program to create an activity having a Text box, and also Save, Open and  Create buttons. The user has to write some text in the Text box. On pressing the Create button the text should be saved as a text file in MkSDcard. | **83** |
| 5 | Create an application to demonstrate a basic media player that allows the user to  Forward, Backward, Play and Pause an audio. Also, make use of the indicator in the seek bar to move the audio forward or backward as required. | **88** |
| 6 | Develop an application to demonstrate the use of Asynchronous tasks in android. The asynchronous task should implement the functionality of a simple moving banner. On pressing the **Start Task** button, the banner message should scroll from right to left. On pressing the **Stop Task** button, the banner message should stop. Let  the banner message be “Demonstration of Asynchronous Task”. | **94** |
| 7 | Develop an application that makes use of the clipboard framework for copying and  pasting of the text. The activity consists of two EditText controls and two Buttons to trigger the copy and paste functionality. | **97** |
| 8 | Create an AIDL service that calculates Car Loan EMI. Develop an application that makes use of this AIDL service to calculate the EMI. This application should have four EditText to read the Principal Amount, Down Payment, Interest Rate, Loan Term (in months) and a button named as “Calculate Monthly EMI”. On click of this button, the result should be shown in a TextView. Also, calculate the EMI by  varying the Loan Term and Interest Rate values. | **100** |

# Create your First Android Application

Android applications are written in Java, and use XML extensively. We shall assume that you have basic knowledge of Java and XML. Goto "Android Guides" @ <https://developer.android.com/guide/index.html>. Read "Building your first app".

**Creating a New Android Project Step1:** Launch Android Studio.

**Step 2:** Select File  New  New Project

**Step 3:** In "Choose your project", select "Phone and Tablet" tab  "Empty Activity"  Next. **Step 4:** In "Configure your project"  Set "Name" to "Hello Android" (this will be the "Title" in your phone's application menu)  The "Package name" and "Save Location" will be updated automatically  In "Language", select "Java"  Leave the "Minimum API Level" and the rest to default  Finish.

It could take a few minutes to set up your first app. Watch the "progress bar" at the bottom status bar. Once the progress bar indicates completion, a hello-world app is created by default.

**Setup Emulator (Android Virtual Device (AVD))**

To run your Android application under the emulator, you need to first create an Android Virtual Devices (AVD). An AVD models a specific device. You can create AVDs to emulate different android devices (e.g., phone/tablet, android version, screen size, and etc.).

**Step 1:** In Android studio, select "Tools"  AVD Manager.

**Step 2:** Click "Create Virtual Device".

**Step 3:** In "Choose a device definition"  In "Category", choose "Phone"  In "Name", choose "2.7 QVGA" (the smallest device available - you can try a bigger device later)  Next.

**Step 4:** In "System Image: Recommended"  Select the version with the highest API level

Click "Download"  Next.

**Step 5:** In "AVD Name", enter "2.7 QVGA API 27" (default) Finish.

### Running the Android Application on Emulator

**Step 1:** Select the "Run" menu  "Run app"  Under "Available Virtual Devices", select "2.7 QVGA API 27"  OK.

**Step 2:** It may take a few MINUTES to fire up the app on the emulator. You first see a Google logo  then "Android"  then the "wallpaper"  then the "Hello, world!" message.

**Step 3: DO NOT CLOSE THE EMULATOR**, as it really takes a long time to start. You could always re-run the app (or run a new app) on the same emulator. Try re-run the app by selecting "Run" menu  "Run app".

# MOBILE APPLICATION DEVELOPMENT

## PART – A

### Create an application to design a Visiting Card. The Visiting card should have company logo at the top right corner. The company name should be displayed in Capital letters, aligned to the center. Information like name of the employee, job title, phone number, address, email, fax, website address is to be displayed. Insert a horizontal line between the job title and the phone number.

First, create the android application as discussed in “Create your First Android Application”. Copy an image for logo and save the image in the drawable folder.

Following is the content of the modified res/layout/activity\_main.xml.

### activity\_main.xml

<?xml version="1.0" encoding="utf-8"?>

<androidx.constraintlayout.widget.ConstraintLayout xmlns:android=["http://schemas.android.com/apk/res/android"](http://schemas.android.com/apk/res/android)

xmlns:app=["http://schemas.android.com/apk/res](http://schemas.android.com/apk/res-auto)-[auto"](http://schemas.android.com/apk/res-auto) xmlns:tools=["http://schemas.android.com/tools"](http://schemas.android.com/tools) android:layout\_width="match\_parent" android:layout\_height="match\_parent" android:animateLayoutChanges="true" tools:context=".MainActivity">

<TextView

android:id="@+id/textView" android:layout\_width="wrap\_content" android:layout\_height="wrap\_content" android:layout\_marginStart="11dp" android:layout\_marginLeft="15dp" android:layout\_marginTop="28dp" android:layout\_marginEnd="17dp" android:layout\_marginRight="17dp" android:text=" GOOGLE" android:textColor="@color/colorAccent" android:textSize="38dp"

app:layout\_constraintEnd\_toStartOf="@+id/imageView" app:layout\_constraintStart\_toStartOf="parent" app:layout\_constraintTop\_toTopOf="parent" />

<ImageView

android:id="@+id/imageView" android:layout\_width="wrap\_content" android:layout\_height="wrap\_content" android:layout\_marginTop="4dp" app:layout\_constraintEnd\_toEndOf="parent" app:layout\_constraintStart\_toEndOf="@+id/textView" app:layout\_constraintTop\_toTopOf="parent" app:srcCompat="@drawable/logo" />

<View

android:id="@+id/view" android:layout\_width="wrap\_content" android:layout\_height="4dp" android:layout\_marginTop="103dp" android:layout\_marginBottom="498dp"

android:background="@color/colorAccent" app:layout\_constraintBottom\_toBottomOf="parent" app:layout\_constraintEnd\_toEndOf="parent" app:layout\_constraintHorizontal\_bias="0.07" app:layout\_constraintStart\_toStartOf="parent" app:layout\_constraintTop\_toTopOf="parent" app:layout\_constraintVertical\_bias="0.0" />

<TextView

android:id="@+id/textView3" android:layout\_width="81dp" android:layout\_height="30dp" android:layout\_marginBottom="16dp" android:text="Andy Rubin" android:textStyle="bold"

app:layout\_constraintBottom\_toTopOf="@+id/textView4" app:layout\_constraintEnd\_toEndOf="@+id/view" app:layout\_constraintHorizontal\_bias="0.463" app:layout\_constraintStart\_toStartOf="parent" />

<TextView

android:id="@+id/textView4" android:layout\_width="wrap\_content" android:layout\_height="wrap\_content" android:text="Founder and CEO, Playground Global" android:textStyle="bold" app:layout\_constraintBottom\_toBottomOf="parent" app:layout\_constraintEnd\_toEndOf="parent" app:layout\_constraintHorizontal\_bias="0.448" app:layout\_constraintStart\_toStartOf="parent" app:layout\_constraintTop\_toTopOf="parent" app:layout\_constraintVertical\_bias="0.453" />

<TextView

android:id="@+id/textView6" android:layout\_width="wrap\_content" android:layout\_height="wrap\_content" android:layout\_marginStart="165dp" android:layout\_marginLeft="165dp" android:layout\_marginTop="301dp" android:layout\_marginEnd="187dp" android:layout\_marginRight="187dp" android:layout\_marginBottom="283dp" android:text="Ph:Number: 2019201923" android:textStyle="bold" app:layout\_constraintBottom\_toBottomOf="parent" app:layout\_constraintEnd\_toEndOf="parent" app:layout\_constraintStart\_toStartOf="parent" app:layout\_constraintTop\_toTopOf="parent" />

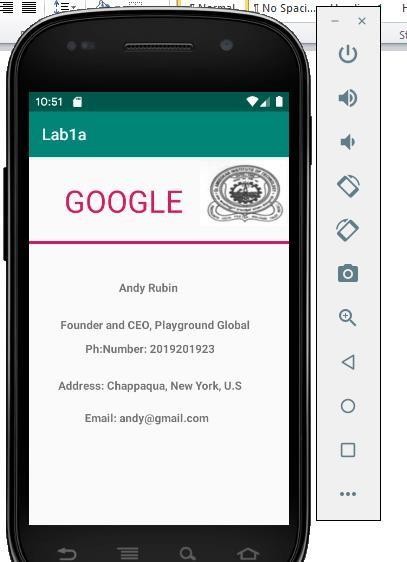
<TextView

android:id="@+id/textView7" android:layout\_width="wrap\_content" android:layout\_height="wrap\_content" android:layout\_marginStart="165dp" android:layout\_marginLeft="165dp" android:layout\_marginTop="346dp" android:layout\_marginEnd="187dp" android:layout\_marginRight="187dp" android:layout\_marginBottom="238dp" android:text="Address: Chappaqua, New York, U.S" android:textStyle="bold" app:layout\_constraintBottom\_toBottomOf="parent" app:layout\_constraintEnd\_toEndOf="parent" app:layout\_constraintStart\_toStartOf="parent" app:layout\_constraintTop\_toTopOf="parent" />

<TextView

android:id="@+id/textView8" android:layout\_width="wrap\_content" android:layout\_height="wrap\_content" android:layout\_marginStart="161dp" android:layout\_marginLeft="161dp" android:layout\_marginTop="386dp" android:layout\_marginEnd="191dp" android:layout\_marginRight="191dp" android:layout\_marginBottom="198dp" android:text="Email: [andy@gmail.com"](mailto:andy@gmail.com) android:textStyle="bold" app:layout\_constraintBottom\_toBottomOf="parent" app:layout\_constraintEnd\_toEndOf="parent" app:layout\_constraintStart\_toStartOf="parent" app:layout\_constraintTop\_toTopOf="parent" />

</androidx.constraintlayout.widget.ConstraintLayout>



### Develop an Android application using controls like Button, TextView, EditText for designing a calculator having basic functionality like Addition, Subtraction, Multiplication, and Division.

First, create the android application as discussed in “Create your First Android Application”.

Following is the content of the modified res/layout/activity\_main.xml

### activity\_main.xml

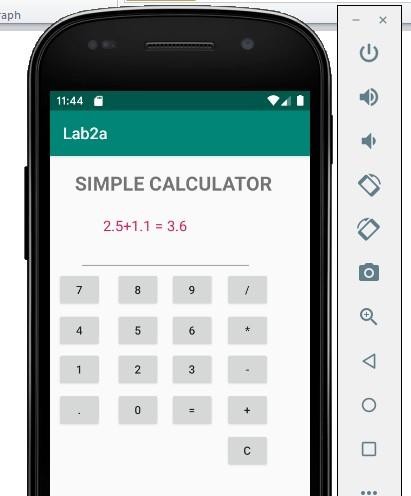
<?xml version="1.0" encoding="utf-8"?>  
<androidx.constraintlayout.widget.ConstraintLayout xmlns:android="http://schemas.android.com/apk/res/android"  
 xmlns:app="http://schemas.android.com/apk/res-auto"  
 xmlns:tools="http://schemas.android.com/tools"  
 android:layout\_width="match\_parent"  
 android:layout\_height="match\_parent"  
 tools:context=".MainActivity">  
  
 <TableLayout  
 android:id="@+id/tableLayout"  
 android:layout\_width="match\_parent"  
 android:layout\_height="wrap\_content"  
 app:layout\_constraintBottom\_toBottomOf="parent"  
 app:layout\_constraintEnd\_toEndOf="parent"  
 app:layout\_constraintStart\_toStartOf="parent"  
 app:layout\_constraintTop\_toBottomOf="@+id/t2">  
  
 <TableRow  
 android:layout\_width="match\_parent"  
 android:layout\_height="match\_parent">  
  
 <Button  
 android:id="@+id/b\_clear"  
  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:layout\_weight="1"  
 android:text="@string/clear" />  
 </TableRow>  
  
 <TableRow  
 android:layout\_width="match\_parent"  
 android:layout\_height="match\_parent">  
  
 <Button  
 android:id="@+id/b7"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:layout\_weight="1"  
 android:text="@string/seven" />  
  
 <Button  
 android:id="@+id/b8"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:layout\_weight="1"  
 android:text="@string/eight" />  
  
 <Button  
 android:id="@+id/b9"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:layout\_weight="1"  
 android:text="@string/nine" />  
  
 <Button  
 android:id="@+id/b\_div"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:layout\_weight="1"  
 android:text="@string/div" />  
 </TableRow>  
  
 <TableRow  
 android:layout\_width="match\_parent"  
 android:layout\_height="match\_parent">  
  
 <Button  
 android:id="@+id/b4"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:layout\_weight="1"  
 android:text="@string/four" />  
  
 <Button  
 android:id="@+id/b5"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:layout\_weight="1"  
 android:text="@string/five" />  
  
 <Button  
 android:id="@+id/b6"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:layout\_weight="1"  
 android:text="@string/six" />  
  
 <Button  
 android:id="@+id/b\_mul"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:layout\_weight="1"  
 android:text="@string/mul" />  
 </TableRow>  
  
 <TableRow  
 android:layout\_width="match\_parent"  
 android:layout\_height="match\_parent">  
  
 <Button  
 android:id="@+id/b1"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:layout\_weight="1"  
 android:text="@string/one" />  
  
 <Button  
 android:id="@+id/b2"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:layout\_weight="1"  
 android:text="@string/two" />  
  
 <Button  
 android:id="@+id/b3"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:layout\_weight="1"  
 android:text="@string/three" />  
  
 <Button  
 android:id="@+id/b\_add"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:layout\_weight="1"  
 android:text="@string/add" />  
 </TableRow>  
  
 <TableRow  
 android:layout\_width="match\_parent"  
 android:layout\_height="match\_parent">  
  
 <Button  
 android:id="@+id/b\_dot"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:layout\_weight="1"  
 android:text="@string/dot" />  
  
 <Button  
 android:id="@+id/b0"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="match\_parent"  
 android:layout\_weight="1"  
 android:text="@string/zero" />  
  
 <Button  
 android:id="@+id/b\_equal"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:layout\_weight="1"  
 android:text="@string/equal" />  
  
 <Button  
 android:id="@+id/b\_sub"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:layout\_weight="1"  
 android:text="@string/sub" />  
 </TableRow>  
 </TableLayout>  
  
 <TextView  
 android:id="@+id/t2"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:text="Simple Calculator"  
 android:textColor="#3F51B5"  
 android:textSize="48sp"  
 app:layout\_constraintBottom\_toBottomOf="parent"  
 app:layout\_constraintEnd\_toEndOf="parent"  
 app:layout\_constraintHorizontal\_bias="0.47"  
 app:layout\_constraintStart\_toStartOf="parent"  
 app:layout\_constraintTop\_toTopOf="parent"  
 app:layout\_constraintVertical\_bias="0.052" />  
  
 <EditText  
 android:id="@+id/et"  
 android:layout\_width="258dp"  
 android:layout\_height="43dp"  
 android:ems="10"  
 app:layout\_constraintBottom\_toBottomOf="parent"  
 app:layout\_constraintEnd\_toEndOf="parent"  
 app:layout\_constraintHorizontal\_bias="0.497"  
 app:layout\_constraintStart\_toStartOf="parent"  
 app:layout\_constraintTop\_toBottomOf="@+id/t2"  
 app:layout\_constraintVertical\_bias="0.185" />  
  
</androidx.constraintlayout.widget.ConstraintLayout>

Following is the content of the modified main activity file src/MainActivity.java

### MainActivity.java

package com.example.mycalculator;  
  
import androidx.appcompat.app.AppCompatActivity;  
import android.view.View;  
import android.widget.Button;  
import android.widget.EditText;  
import android.os.Bundle;  
  
  
  
public class MainActivity extends AppCompatActivity {  
  
 Button b0, b1, b2, b3, b4, b5, b6,  
 b7, b8, b9, b\_add, b\_sub, b\_div,  
 b\_mul, b\_clear, b\_equal, b\_dot;  
 EditText et;  
  
 float mValueOne, mValueTwo;  
  
 boolean add, sub, mul, div;  
  
 @Override  
 protected void onCreate(Bundle savedInstanceState) {  
 super.onCreate(savedInstanceState);  
 setContentView(R.layout.*activity\_main*);  
  
 b0 = (Button) findViewById(R.id.*b0*);  
 b1 = (Button) findViewById(R.id.*b1*);  
 b2 = (Button) findViewById(R.id.*b2*);  
 b3 = (Button) findViewById(R.id.*b3*);  
 b4 = (Button) findViewById(R.id.*b4*);  
 b5 = (Button) findViewById(R.id.*b5*);  
 b6 = (Button) findViewById(R.id.*b6*);  
 b7 = (Button) findViewById(R.id.*b7*);  
 b8 = (Button) findViewById(R.id.*b8*);  
 b9 = (Button) findViewById(R.id.*b9*);  
 b\_add = (Button) findViewById(R.id.*b\_add*);  
 b\_sub = (Button) findViewById(R.id.*b\_sub*);  
 b\_mul = (Button) findViewById(R.id.*b\_mul*);  
 b\_div = (Button) findViewById(R.id.*b\_div*);  
 b\_clear = (Button) findViewById(R.id.*b\_clear*);  
 b\_equal = (Button) findViewById(R.id.*b\_equal*);  
 b\_dot=(Button) findViewById(R.id.*b\_dot*);  
 et = (EditText) findViewById(R.id.*et*);  
  
  
 b1.setOnClickListener(new View.OnClickListener() {  
 @Override  
 public void onClick(View v) {  
 et.setText(et.getText() + "1");  
 }  
 });  
  
 b2.setOnClickListener(new View.OnClickListener() {  
 @Override  
 public void onClick(View v) {  
 et.setText(et.getText() + "2");  
 }  
 });  
  
 b3.setOnClickListener(new View.OnClickListener() {  
 @Override  
 public void onClick(View v) {  
 et.setText(et.getText() + "3");  
 }  
 });  
  
 b4.setOnClickListener(new View.OnClickListener() {  
 @Override  
 public void onClick(View v) {  
 et.setText(et.getText() + "4");  
 }  
 });  
  
 b5.setOnClickListener(new View.OnClickListener() {  
 @Override  
 public void onClick(View v) {  
 et.setText(et.getText() + "5");  
 }  
 });  
  
 b6.setOnClickListener(new View.OnClickListener() {  
 @Override  
 public void onClick(View v) {  
 et.setText(et.getText() + "6");  
 }  
 });  
  
 b7.setOnClickListener(new View.OnClickListener() {  
 @Override  
 public void onClick(View v) {  
 et.setText(et.getText() + "7");  
 }  
 });  
  
 b8.setOnClickListener(new View.OnClickListener() {  
 @Override  
 public void onClick(View v) {  
 et.setText(et.getText() + "8");  
 }  
 });  
  
 b9.setOnClickListener(new View.OnClickListener() {  
 @Override  
 public void onClick(View v) {  
 et.setText(et.getText() + "9");  
 }  
 });  
  
 b0.setOnClickListener(new View.OnClickListener() {  
 @Override  
 public void onClick(View v) {  
 et.setText(et.getText() + "0");  
 }  
 });  
  
 b\_add.setOnClickListener(new View.OnClickListener() {  
 @Override  
 public void onClick(View v) {  
  
 if (et == null) {  
 et.setText("");  
 } else {  
 mValueOne = Float.*parseFloat*(et.getText() + "");  
 add = true;  
 et.setText(null);  
 }  
 }  
 });  
  
 b\_sub.setOnClickListener(new View.OnClickListener() {  
 @Override  
 public void onClick(View v) {  
 mValueOne = Float.*parseFloat*(et.getText() + "");  
 sub = true;  
 et.setText(null);  
 }  
 });  
  
 b\_mul.setOnClickListener(new View.OnClickListener() {  
 @Override  
 public void onClick(View v) {  
 mValueOne = Float.*parseFloat*(et.getText() + "");  
 mul = true;  
 et.setText(null);  
 }  
 });  
  
 b\_div.setOnClickListener(new View.OnClickListener() {  
 @Override  
 public void onClick(View v) {  
 mValueOne = Float.*parseFloat*(et.getText() + "");  
 div = true;  
 et.setText(null);  
 }  
 });  
  
 b\_equal.setOnClickListener(new View.OnClickListener() {  
 @Override  
 public void onClick(View v) {  
 mValueTwo = Float.*parseFloat*(et.getText() + "");  
  
 if (add == true) {  
 et.setText(mValueOne + mValueTwo + "");  
 add = false;  
 }  
  
 if (sub == true) {  
 et.setText(mValueOne - mValueTwo + "");  
 sub = false;  
 }  
  
 if (mul == true) {  
 et.setText(mValueOne \* mValueTwo + "");  
 mul = false;  
 }  
  
 if (div == true) {  
 et.setText(mValueOne / mValueTwo + "");  
 div = false;  
 }  
 }  
 });  
  
 b\_clear.setOnClickListener(new View.OnClickListener() {  
 @Override  
 public void onClick(View v) {  
 et.setText("");  
 }  
 });  
  
 b\_dot.setOnClickListener(new View.OnClickListener() {  
 @Override  
 public void onClick(View v) {  
 et.setText(et.getText() + ".");  
 }  
 });  
  
 }  
}

**Output:**



### Create a SIGN Up activity with Username and Password. Validation of password should happen based on the following rules:

* + **Password should contain uppercase and lowercase letters.**

### Password should contain letters and numbers.

* + **Password should contain special characters.**

### Minimum length of the password (the default value is 8).

**On successful SIGN UP proceed to the next Login activity. Here the user should SIGN IN using the Username and Password created during signup activity. If the Username and Password are matched then navigate to the next activity which displays a message saying “Successful Login” or else display a toast message saying “Login Failed”. The user is given only two attempts and after that display a toast message saying “Failed Login Attempts”**

### and disable the SIGN IN button. Use Bundle to transfer information from one activity to another.

First, create the android application as discussed in “Create your First Android Application”. Following is the content of the modified res/layout/activity\_main.xml.

### activity\_main.xml

<?xml version="1.0" encoding="utf-8"?>

<androidx.constraintlayout.widget.ConstraintLayout xmlns:android=["http://schemas.android.com/apk/res/android"](http://schemas.android.com/apk/res/android)

xmlns:app=["http://schemas.android.com/apk/res](http://schemas.android.com/apk/res-auto)-[auto"](http://schemas.android.com/apk/res-auto) xmlns:tools=["http://schemas.android.com/tools"](http://schemas.android.com/tools) android:layout\_width="match\_parent" android:layout\_height="match\_parent" tools:context=".MainActivity">

<TextView

android:layout\_width="wrap\_content" android:layout\_height="wrap\_content" android:layout\_marginStart="41dp" android:layout\_marginTop="25dp" android:layout\_marginEnd="80dp" android:layout\_marginBottom="172dp" android:text="SIGN UP ACTIVITY" android:textColor="@color/colorAccent" android:textSize="28sp" app:layout\_constraintBottom\_toBottomOf="parent" app:layout\_constraintEnd\_toEndOf="parent" app:layout\_constraintHorizontal\_bias="0.0" app:layout\_constraintStart\_toStartOf="parent" app:layout\_constraintTop\_toTopOf="parent" app:layout\_constraintVertical\_bias="0.0" />

<TextView

android:id="@+id/textView2" android:layout\_width="wrap\_content" android:layout\_height="wrap\_content" android:layout\_marginStart="22dp" android:layout\_marginTop="98dp" android:layout\_marginEnd="346dp" android:layout\_marginBottom="604dp" android:text="Username:" android:textSize="18sp" android:textStyle="bold" app:layout\_constraintBottom\_toBottomOf="parent" app:layout\_constraintEnd\_toEndOf="parent" app:layout\_constraintHorizontal\_bias="0.0" app:layout\_constraintStart\_toStartOf="parent" app:layout\_constraintTop\_toTopOf="parent" app:layout\_constraintVertical\_bias="0.0" />

<EditText

android:id="@+id/editText3" android:layout\_width="166dp" android:layout\_height="39dp" android:layout\_marginStart="124dp" android:layout\_marginTop="88dp" android:layout\_marginEnd="54dp" android:layout\_marginBottom="610dp" android:ems="10" android:inputType="textPersonName" app:layout\_constraintBottom\_toBottomOf="parent" app:layout\_constraintEnd\_toEndOf="parent"

app:layout\_constraintHorizontal\_bias="0.0" app:layout\_constraintStart\_toStartOf="parent" app:layout\_constraintTop\_toTopOf="parent" app:layout\_constraintVertical\_bias="0.0"/>

<TextView

android:id="@+id/textView3" android:layout\_width="wrap\_content" android:layout\_height="wrap\_content" android:layout\_marginStart="22dp" android:layout\_marginTop="148dp" android:layout\_marginEnd="346dp" android:layout\_marginBottom="604dp" android:text="Password:" android:textSize="18sp" android:textStyle="bold" app:layout\_constraintBottom\_toBottomOf="parent" app:layout\_constraintEnd\_toEndOf="parent" app:layout\_constraintHorizontal\_bias="0.0" app:layout\_constraintStart\_toStartOf="parent" app:layout\_constraintTop\_toTopOf="parent" app:layout\_constraintVertical\_bias="0.0" />

<EditText

android:id="@+id/editText1" android:layout\_width="166dp" android:layout\_height="39dp" android:layout\_marginStart="124dp" android:layout\_marginTop="138dp" android:layout\_marginEnd="54dp" android:layout\_marginBottom="610dp" android:ems="10" android:inputType="textPassword" app:layout\_constraintBottom\_toBottomOf="parent" app:layout\_constraintEnd\_toEndOf="parent" app:layout\_constraintHorizontal\_bias="0.0" app:layout\_constraintStart\_toStartOf="parent" app:layout\_constraintTop\_toTopOf="parent" app:layout\_constraintVertical\_bias="0.0" />

<Button

android:id="@+id/button" android:layout\_width="wrap\_content" android:layout\_height="wrap\_content" android:layout\_marginStart="108dp" android:layout\_marginTop="190dp" android:layout\_marginEnd="215dp" android:layout\_marginBottom="517dp" android:text="SIGN UP" app:layout\_constraintBottom\_toBottomOf="parent" app:layout\_constraintEnd\_toEndOf="parent" app:layout\_constraintHorizontal\_bias="0.0" app:layout\_constraintStart\_toStartOf="parent" app:layout\_constraintTop\_toTopOf="parent" app:layout\_constraintVertical\_bias="0.0" />

</androidx.constraintlayout.widget.ConstraintLayout>

Following is the content of the modified src/MainActivity.java. After successful Sign Up activity, it moves to loginactivity.

### MainActivity.java

package com.example.lab3a;

import androidx.appcompat.app.AppCompatActivity; import android.content.Intent;

import android.os.Bundle;

import android.view.View; import android.widget.Button; import android.widget.EditText; import android.widget.Toast; import java.util.regex.Matcher; import java.util.regex.Pattern;

public class MainActivity extends AppCompatActivity { Button signup;

EditText username, password;

@Override

protected void onCreate(Bundle savedInstanceState) { super.onCreate(savedInstanceState); setContentView(R.layout.*activity\_main*);

username = findViewById(R.id.*editText3*); password = findViewById(R.id.*editText1*);

signup = findViewById(R.id.*button*); signup.setOnClickListener(new View.OnClickListener() {

@Override

public void onClick(View view) {

if(password.getText().toString().length()>=8 && validatePassword(password.getText().toString())){

Toast.*makeText*(getBaseContext(),"Successful Sign UP",Toast.*LENGTH\_LONG*).show();

Intent it = new Intent(getBaseContext(), login\_activity.class);

Bundle b = new Bundle(); b.putString("usern",username.getText().toString()); b.putString("pass",password.getText().toString()); it.putExtras(b);

startActivity(it);

}else{

Toast.*makeText*(getBaseContext(),"not VALID",Toast.*LENGTH\_LONG*).show();

}

}

});

}

public boolean validatePassword(String password){ Pattern pattern;

Matcher matcher;

final String PASSWORD\_PATTERN = "^(?=.\*[0-9])(?=.\*[A-Z])(?=.\*[a-

z])(?=.\*[@#$%^&+=!])(?=\\S+$).{8,}$";

pattern = Pattern.*compile*(PASSWORD\_PATTERN); matcher = pattern.matcher(password);

return matcher.matches();

}

}

Following is the content of res/layout/login\_activity.xml. After successful login activtity it moves to success activity.

### login\_activity.xml

<?xml version="1.0" encoding="utf-8"?>

<androidx.constraintlayout.widget.ConstraintLayout xmlns:android=["http://schemas.android.com/apk/res/android"](http://schemas.android.com/apk/res/android)

xmlns:app=["http://schemas.android.com/apk/res](http://schemas.android.com/apk/res-auto)-[auto"](http://schemas.android.com/apk/res-auto) xmlns:tools=["http://schemas.android.com/tools"](http://schemas.android.com/tools) android:layout\_width="match\_parent" android:layout\_height="match\_parent" tools:context=".MainActivity">

<TextView

android:layout\_width="wrap\_content" android:layout\_height="wrap\_content" android:layout\_marginStart="41dp" android:layout\_marginTop="25dp" android:layout\_marginEnd="80dp" android:layout\_marginBottom="172dp" android:text="LOGIN ACTIVITY" android:textColor="@color/colorAccent" android:textSize="28sp" app:layout\_constraintBottom\_toBottomOf="parent" app:layout\_constraintEnd\_toEndOf="parent" app:layout\_constraintHorizontal\_bias="0.0" app:layout\_constraintStart\_toStartOf="parent" app:layout\_constraintTop\_toTopOf="parent" app:layout\_constraintVertical\_bias="0.0" />

<TextView

android:id="@+id/textView2" android:layout\_width="wrap\_content" android:layout\_height="wrap\_content" android:layout\_marginStart="22dp" android:layout\_marginTop="98dp" android:layout\_marginEnd="346dp" android:layout\_marginBottom="604dp" android:text="Username:" android:textSize="18sp" android:textStyle="bold" app:layout\_constraintBottom\_toBottomOf="parent" app:layout\_constraintEnd\_toEndOf="parent" app:layout\_constraintHorizontal\_bias="0.0" app:layout\_constraintStart\_toStartOf="parent" app:layout\_constraintTop\_toTopOf="parent" app:layout\_constraintVertical\_bias="0.0" />

<EditText

android:id="@+id/l\_username" android:layout\_width="166dp" android:layout\_height="39dp" android:layout\_marginStart="124dp" android:layout\_marginTop="88dp" android:layout\_marginEnd="54dp" android:layout\_marginBottom="610dp" android:ems="10" android:inputType="textPersonName" app:layout\_constraintBottom\_toBottomOf="parent" app:layout\_constraintEnd\_toEndOf="parent" app:layout\_constraintHorizontal\_bias="0.0" app:layout\_constraintStart\_toStartOf="parent"

app:layout\_constraintTop\_toTopOf="parent" app:layout\_constraintVertical\_bias="0.0"/>

<TextView

android:id="@+id/textView3" android:layout\_width="wrap\_content" android:layout\_height="wrap\_content" android:layout\_marginStart="22dp" android:layout\_marginTop="148dp" android:layout\_marginEnd="346dp" android:layout\_marginBottom="604dp" android:text="Password:" android:textSize="18sp" android:textStyle="bold" app:layout\_constraintBottom\_toBottomOf="parent" app:layout\_constraintEnd\_toEndOf="parent" app:layout\_constraintHorizontal\_bias="0.0" app:layout\_constraintStart\_toStartOf="parent" app:layout\_constraintTop\_toTopOf="parent" app:layout\_constraintVertical\_bias="0.0" />

<EditText

android:id="@+id/l\_password" android:layout\_width="166dp" android:layout\_height="39dp" android:layout\_marginStart="124dp" android:layout\_marginTop="138dp" android:layout\_marginEnd="54dp" android:layout\_marginBottom="610dp" android:ems="10" android:inputType="textPassword" app:layout\_constraintBottom\_toBottomOf="parent" app:layout\_constraintEnd\_toEndOf="parent" app:layout\_constraintHorizontal\_bias="0.0" app:layout\_constraintStart\_toStartOf="parent" app:layout\_constraintTop\_toTopOf="parent" app:layout\_constraintVertical\_bias="0.0" />

<Button

android:id="@+id/button\_signin" android:layout\_width="wrap\_content" android:layout\_height="wrap\_content" android:layout\_marginStart="108dp" android:layout\_marginTop="190dp" android:layout\_marginEnd="215dp" android:layout\_marginBottom="517dp" android:text="SIGN IN" app:layout\_constraintBottom\_toBottomOf="parent" app:layout\_constraintEnd\_toEndOf="parent" app:layout\_constraintHorizontal\_bias="0.0" app:layout\_constraintStart\_toStartOf="parent" app:layout\_constraintTop\_toTopOf="parent" app:layout\_constraintVertical\_bias="0.0" />

</androidx.constraintlayout.widget.ConstraintLayout>

### login\_activity.java

package com.example.lab3a;

import androidx.appcompat.app.AppCompatActivity; import android.content.Intent;

import android.os.Bundle; import android.view.View; import android.widget.Button; import android.widget.EditText; import android.widget.Toast;

public class login\_activity extends AppCompatActivity { Button lsignin;

EditText lusername, lpassword; int counter = 2;

@Override

protected void onCreate(Bundle savedInstanceState) { super.onCreate(savedInstanceState); setContentView(R.layout.*login\_activity*);

lusername = findViewById(R.id.*l\_username*); lpassword = findViewById(R.id.*l\_password*);

lsignin = findViewById(R.id.*button\_signin*); lsignin.setOnClickListener(new View.OnClickListener() {

@Override

public void onClick(View view) {

Bundle b = getIntent().getExtras(); String suser = b.getString("usern"); String spass = b.getString("pass");

if(suser.toString().equals(lusername.getText().toString()) && spass.toString().equals(lpassword.getText().toString()))

{

Intent it = new Intent(getBaseContext(), success.class); startActivity(it);

}

else

{

Toast.*makeText*(getBaseContext(),"LOGIN FAILED",Toast.*LENGTH\_LONG*).show();

}

counter--; if(counter == 0)

{

Toast.*makeText*(getBaseContext(),"FAILED LOGIN ATTEMPTS",Toast.*LENGTH\_LONG*).show();

lsignin.setEnabled(false);

}

}

});

}

}

### success.xml

<?xml version="1.0" encoding="utf-8"?>

<androidx.constraintlayout.widget.ConstraintLayout xmlns:android=["http://schemas.android.com/apk/res/android"](http://schemas.android.com/apk/res/android)

xmlns:app=["http://schemas.android.com/apk/res](http://schemas.android.com/apk/res-auto)-[auto"](http://schemas.android.com/apk/res-auto) xmlns:tools=["http://schemas.android.com/tools"](http://schemas.android.com/tools)

android:layout\_width="match\_parent" android:layout\_height="match\_parent" tools:context=".MainActivity">

<TextView

android:id="@+id/textView" android:layout\_width="wrap\_content" android:layout\_height="wrap\_content" android:layout\_marginStart="163dp" android:layout\_marginTop="300dp" android:layout\_marginEnd="189dp" android:layout\_marginBottom="412dp" android:text="SUCCESSFULL LOGIN" android:textColor="@color/colorAccent" android:textSize="30sp" app:layout\_constraintBottom\_toBottomOf="parent" app:layout\_constraintEnd\_toEndOf="parent" app:layout\_constraintStart\_toStartOf="parent" app:layout\_constraintTop\_toTopOf="parent" />

</androidx.constraintlayout.widget.ConstraintLayout>

**success.java**

package com.example.lab3a;

import androidx.appcompat.app.AppCompatActivity; import android.os.Bundle;

public class success extends AppCompatActivity {

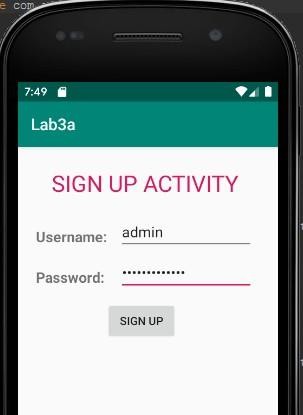
@Override

protected void onCreate(Bundle savedInstanceState) { super.onCreate(savedInstanceState); setContentView(R.layout.*success*);

}

}

### Output:



1. **Develop an application to set an image as wallpaper. On click of a button, the wallpaper image should start to change randomly every 30 seconds.**

First, create the android application as discussed in “Create your First Android Application”. Copy the images and save the images in the drawable folder. Following is the content of the modified res/layout/activity\_main.xml.

### activity\_main.xml

<?xml version="1.0" encoding="utf-8"?>

<androidx.constraintlayout.widget.ConstraintLayout xmlns:android=["http://schemas.android.com/apk/res/android"](http://schemas.android.com/apk/res/android)

xmlns:app=["http://schemas.android.com/apk/res](http://schemas.android.com/apk/res-auto)-[auto"](http://schemas.android.com/apk/res-auto) xmlns:tools=["http://schemas.android.com/tools"](http://schemas.android.com/tools) android:layout\_width="match\_parent" android:layout\_height="match\_parent" tools:context=".MainActivity">

<TextView

android:layout\_width="wrap\_content" android:layout\_height="wrap\_content" android:text="CHANGING WALLPAPER APPLICATION"

android:textColor="@color/colorAccent" android:textStyle="bold" app:layout\_constraintBottom\_toBottomOf="parent" app:layout\_constraintEnd\_toEndOf="parent"

app:layout\_constraintHorizontal\_bias="0.496" app:layout\_constraintLeft\_toLeftOf="parent" app:layout\_constraintRight\_toRightOf="parent" app:layout\_constraintStart\_toStartOf="parent" app:layout\_constraintTop\_toTopOf="parent" app:layout\_constraintVertical\_bias="0.063" />

<Button

android:id="@+id/button" android:layout\_width="wrap\_content" android:layout\_height="wrap\_content" android:layout\_marginStart="72dp" android:layout\_marginTop="53dp" android:layout\_marginEnd="35dp" android:layout\_marginBottom="590dp" android:text="CLICK HERE TO CHANGE WALLPAPER"

app:layout\_constraintBottom\_toBottomOf="parent" app:layout\_constraintEnd\_toEndOf="parent" app:layout\_constraintHorizontal\_bias="0.820" app:layout\_constraintStart\_toStartOf="parent" app:layout\_constraintTop\_toTopOf="parent" app:layout\_constraintVertical\_bias="0.0" />

</androidx.constraintlayout.widget.ConstraintLayout>

Save five images (jpg format) in the drawable folder. In this example one.jpg, two.jpg,three.jpg, four.jpg and five.jpg images are saved in drawable folder.

### MainActivity.java

package com.example.lab4a;

import androidx.appcompat.app.AppCompatActivity; import android.app.WallpaperManager;

import android.graphics.Bitmap;

import android.graphics.BitmapFactory;

import android.graphics.drawable.AnimationDrawable; import android.graphics.drawable.BitmapDrawable; import android.graphics.drawable.Drawable;

import android.os.Bundle; import android.view.View; import android.widget.Button; import android.widget.Toast;

import java.io.IOException; import java.util.Timer; import java.util.TimerTask;

public class MainActivity extends AppCompatActivity {

Button changewallpaper; Timer mytimer;

Drawable drawable; WallpaperManager wpm; int prev=1;

@Override

protected void onCreate(Bundle savedInstanceState) { super.onCreate(savedInstanceState); setContentView(R.layout.*activity\_main*);

mytimer = new Timer();

wpm = WallpaperManager.*getInstance*(this); changewallpaper = findViewById(R.id.*button*);

changewallpaper.setOnClickListener(new View.OnClickListener() { @Override

public void onClick(View view) {

setWallpaper();

}

});

}

private void setWallpaper()

{

mytimer.schedule(new TimerTask() { @Override

public void run() { if(prev==1) {

drawable = getResources().getDrawable(R.drawable.*one*); prev = 2;

}

else if(prev==2) {

drawable = getResources().getDrawable(R.drawable.*two*); prev=3;

}

else if(prev==3) {

drawable = getResources().getDrawable(R.drawable.*three*); prev=4;

}

else if(prev==4) {

drawable = getResources().getDrawable(R.drawable.*four*); prev=5;

}

else if(prev==5) {

drawable = getResources().getDrawable(R.drawable.*five*); prev=1;

}

Bitmap wallpaper = ((BitmapDrawable)drawable).getBitmap(); try {

wpm.setBitmap(wallpaper);

}

catch (IOException e) { e.printStackTrace();

}

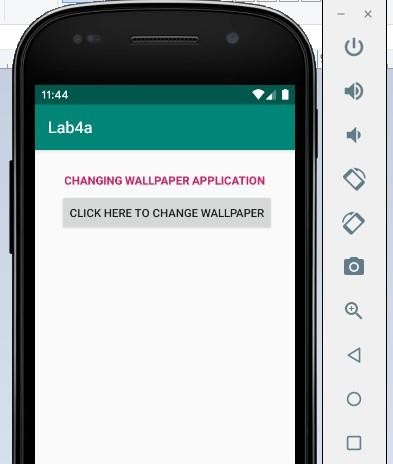
}

},0,30000);

}

}

### Output:



1. **Write a program to create an activity with two buttons START and STOP. On pressing of the START button, the activity must start the counter by displaying the numbers from One and the counter must keep on counting until the STOP button is pressed. Display the counter value in a TextView control.**

First, create the android application as discussed in “Create your First Android Application”. Following is the content of the modified res/layout/activity\_main.xml.

### activity\_main.xml

<?xml version="1.0" encoding="utf-8"?>

<androidx.constraintlayout.widget.ConstraintLayout xmlns:android=["http://schemas.android.com/apk/res/android"](http://schemas.android.com/apk/res/android)

xmlns:app=["http://schemas.android.com/apk/res](http://schemas.android.com/apk/res-auto)-[auto"](http://schemas.android.com/apk/res-auto) xmlns:tools=["http://schemas.android.com/tools"](http://schemas.android.com/tools) android:layout\_width="match\_parent" android:layout\_height="match\_parent" tools:context=".MainActivity">

<TextView

android:layout\_width="wrap\_content" android:layout\_height="wrap\_content" android:text="COUNTER APPLICATION" android:textColor="@color/colorAccent" android:textSize="18sp"

app:layout\_constraintBottom\_toBottomOf="parent" app:layout\_constraintEnd\_toEndOf="parent" app:layout\_constraintHorizontal\_bias="0.498" app:layout\_constraintLeft\_toLeftOf="parent" app:layout\_constraintRight\_toRightOf="parent" app:layout\_constraintStart\_toStartOf="parent" app:layout\_constraintTop\_toTopOf="parent" app:layout\_constraintVertical\_bias="0.071" />

<TextView

android:id="@+id/textView1" android:layout\_width="wrap\_content" android:layout\_height="wrap\_content" android:layout\_marginStart="60dp" android:layout\_marginTop="90dp" android:layout\_marginEnd="79dp" android:layout\_marginBottom="596dp" android:text="Counter Value" app:layout\_constraintBottom\_toBottomOf="parent" app:layout\_constraintEnd\_toEndOf="parent" app:layout\_constraintHorizontal\_bias="0.498" app:layout\_constraintStart\_toStartOf="parent" app:layout\_constraintTop\_toTopOf="parent" app:layout\_constraintVertical\_bias="0.071" />

<Button

android:id="@+id/btn\_start" android:layout\_width="wrap\_content" android:layout\_height="wrap\_content" android:layout\_marginStart="152dp" android:layout\_marginTop="129dp" android:layout\_marginEnd="171dp" android:layout\_marginBottom="542dp" android:text="START" app:layout\_constraintHorizontal\_bias="0.498" app:layout\_constraintBottom\_toBottomOf="parent" app:layout\_constraintEnd\_toEndOf="parent" app:layout\_constraintStart\_toStartOf="parent" app:layout\_constraintTop\_toTopOf="parent" app:layout\_constraintVertical\_bias="0.071"/>

<Button

android:id="@+id/btn\_stop" android:layout\_width="wrap\_content" android:layout\_height="wrap\_content" android:layout\_marginStart="152dp" android:layout\_marginTop="191dp" android:layout\_marginEnd="171dp" android:layout\_marginBottom="542dp" android:text="STOP" app:layout\_constraintHorizontal\_bias="0.498" app:layout\_constraintBottom\_toBottomOf="parent" app:layout\_constraintEnd\_toEndOf="parent" app:layout\_constraintStart\_toStartOf="parent" app:layout\_constraintTop\_toTopOf="parent" app:layout\_constraintVertical\_bias="0.071"/>

</androidx.constraintlayout.widget.ConstraintLayout>

Following is the content of the modified src/MainActivity.java.

### MainActivity.java

package com.example.lab5a;

import androidx.appcompat.app.AppCompatActivity; import android.os.Bundle;

import android.os.Handler; import android.view.View; import android.widget.Button; import android.widget.TextView;

public class MainActivity extends AppCompatActivity { Button btnstart, btnstop;

TextView txtcounter;

int i = 1;

long startTime, timeInMilliseconds = 0; Handler customHandler = new Handler();

@Override

protected void onCreate(Bundle savedInstanceState) { super.onCreate(savedInstanceState); setContentView(R.layout.*activity\_main*);

txtcounter = findViewById(R.id.*textView1*);

btnstart = findViewById(R.id.*btn\_start*); btnstop = findViewById(R.id.*btn\_stop*);

btnstart.setOnClickListener(new View.OnClickListener() { @Override

public void onClick(View view) {

customHandler.postDelayed(updateTimerThread,0);

}

});

btnstop.setOnClickListener(new View.OnClickListener() { @Override

public void onClick(View view) {

customHandler.removeCallbacks(updateTimerThread);

}

});

}

private Runnable updateTimerThread = new Runnable() { @Override

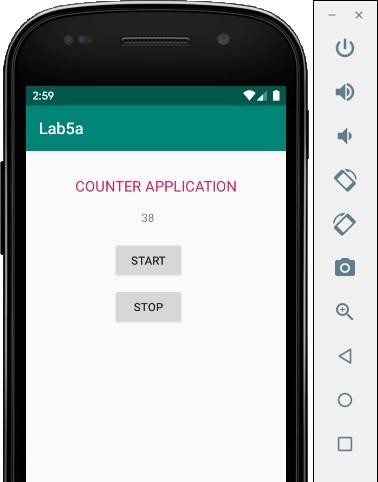
public void run() { txtcounter.setText(""+i); customHandler.postDelayed(this,1000); i++;

}

};

}

### Output:



1. **Create two files of XML and JSON type with values for City\_Name, Latitude, Longitude, Temperature, and Humidity. Develop an application to create an activity with two buttons to parse the XML and JSON files which when clicked should display the data in their respective layouts side by side.**

First, create the android application as discussed in “Create your First Android Application”. Following is the content of the modified res/layout/activity\_main.xml.

### activity\_main.xml

<?xml version="1.0" encoding="utf-8"?>

<androidx.constraintlayout.widget.ConstraintLayout xmlns:android=["http://schemas.android.com/apk/res/android"](http://schemas.android.com/apk/res/android)

xmlns:app=["http://schemas.android.com/apk/res](http://schemas.android.com/apk/res-auto)-[auto"](http://schemas.android.com/apk/res-auto) xmlns:tools=["http://schemas.android.com/tools"](http://schemas.android.com/tools) android:layout\_width="match\_parent" android:layout\_height="match\_parent" tools:context=".MainActivity">

<TextView

android:layout\_width="wrap\_content" android:layout\_height="wrap\_content" android:text="PARSING XML AND JSON DATA"

android:textColor="@color/colorAccent" android:textSize="18sp" app:layout\_constraintBottom\_toBottomOf="parent" app:layout\_constraintEnd\_toEndOf="parent" app:layout\_constraintHorizontal\_bias="0.496" app:layout\_constraintLeft\_toLeftOf="parent" app:layout\_constraintRight\_toRightOf="parent" app:layout\_constraintStart\_toStartOf="parent" app:layout\_constraintTop\_toTopOf="parent" app:layout\_constraintVertical\_bias="0.059" />

<Button

android:id="@+id/buttonxml" android:layout\_width="wrap\_content" android:layout\_height="wrap\_content" android:layout\_marginStart="40dp" android:layout\_marginTop="90dp" android:layout\_marginEnd="33dp" android:layout\_marginBottom="574dp" android:text="Parse XML Data" app:layout\_constraintBottom\_toBottomOf="parent" app:layout\_constraintEnd\_toEndOf="parent" app:layout\_constraintHorizontal\_bias="0.490" app:layout\_constraintStart\_toStartOf="parent" app:layout\_constraintTop\_toTopOf="parent" app:layout\_constraintVertical\_bias="0.05" />

<Button

android:id="@+id/buttonjson" android:layout\_width="wrap\_content" android:layout\_height="wrap\_content" android:layout\_marginStart="40dp" android:layout\_marginTop="150dp" android:layout\_marginEnd="33dp" android:layout\_marginBottom="574dp" android:text="Parse JSON Data" app:layout\_constraintBottom\_toBottomOf="parent" app:layout\_constraintEnd\_toEndOf="parent" app:layout\_constraintHorizontal\_bias="0.490" app:layout\_constraintStart\_toStartOf="parent" app:layout\_constraintTop\_toTopOf="parent" app:layout\_constraintVertical\_bias="0.05" />

<TextView

android:id="@+id/display\_result" android:layout\_width="wrap\_content" android:layout\_height="wrap\_content" android:layout\_marginStart="40dp" android:layout\_marginTop="550dp" android:layout\_marginEnd="33dp" android:layout\_marginBottom="674dp" android:text="Display Results" android:textStyle="bold" app:layout\_constraintBottom\_toBottomOf="parent" app:layout\_constraintEnd\_toEndOf="parent" app:layout\_constraintHorizontal\_bias="0.483" app:layout\_constraintStart\_toStartOf="parent" app:layout\_constraintTop\_toTopOf="parent" app:layout\_constraintVertical\_bias="0.4" />

</androidx.constraintlayout.widget.ConstraintLayout>

Following is the content of the modified src/MainActivity.java.

MainActivity.java

package com.example.lab6a;

import androidx.appcompat.app.AppCompatActivity; import android.os.Bundle;

import android.view.View; import android.widget.Button; import android.widget.TextView; import android.widget.Toast;

import org.json.JSONArray; import org.json.JSONException; import org.json.JSONObject; import org.w3c.dom.Document; import org.w3c.dom.Element; import org.w3c.dom.Node; import org.w3c.dom.NodeList;

import java.io.IOException; import java.io.InputStream; import java.util.ArrayList;

import javax.xml.parsers.DocumentBuilder;

import javax.xml.parsers.DocumentBuilderFactory; public class MainActivity extends AppCompatActivity {

ArrayList<String> numberlist = new ArrayList<>(); Button parsexml, parsejson;

TextView displayResult;

@Override

protected void onCreate(Bundle savedInstanceState) { super.onCreate(savedInstanceState); setContentView(R.layout.*activity\_main*);

displayResult = findViewById(R.id.*display\_result*); parsexml = findViewById(R.id.*buttonxml*);

parsejson = findViewById(R.id.*buttonjson*);

parsexml.setOnClickListener(new View.OnClickListener() { @Override

public void onClick(View view) { try {

InputStream is = getAssets().open("city.xml");

DocumentBuilderFactory dbFactory = DocumentBuilderFactory.*newInstance*();

DocumentBuilder dBuilder = dbFactory.newDocumentBuilder(); Document doc = dBuilder.parse(is);

Element element = doc.getDocumentElement(); element.normalize();

NodeList nList = doc.getElementsByTagName("place"); displayResult.setText(" ");

for (int i = 0; i < nList.getLength(); i++) {

Node node = nList.item(i);

if (node.getNodeType() == Node.*ELEMENT\_NODE*) { Element element2 = (Element) node;

displayResult.setText(displayResult.getText() + "\n Name : " + *getValue*("name", element2) + "\n");

displayResult.setText(displayResult.getText() + " Latitude

: " + *getValue*("lat", element2) + "\n");

displayResult.setText(displayResult.getText() + " Longitude : " + *getValue*("long", element2) + "\n");

displayResult.setText(displayResult.getText() + " Temperature : " + *getValue*("temperature", element2) + "\n");

displayResult.setText(displayResult.getText() + " Humidity

: " + *getValue*("humidity", element2) + "\n");

displayResult.setText(displayResult.getText() + "---------

");

}

}

}

catch (Exception e)

{

e.printStackTrace();

}

}

});

parsejson.setOnClickListener(new View.OnClickListener() { @Override

public void onClick(View view) { String json;

try

{

InputStream is = getAssets().open("example.json"); int size = is.available();

byte[] buffer = new byte[size]; is.read(buffer);

is.close();

json = new String(buffer,"UTF-8"); JSONArray jsonArray = new JSONArray(json);

displayResult.setText(" ");

for(int i = 0; i<jsonArray.length(); i++)

{

JSONObject obj = jsonArray.getJSONObject(i); displayResult.setText(displayResult.getText() + "\n Name :

" + obj.getString("name") + "\n");

displayResult.setText(displayResult.getText() + " Latitude

: " + obj.getString("lat") + "\n");

displayResult.setText(displayResult.getText() + " Longitude : " + obj.getString("long") + "\n");

displayResult.setText(displayResult.getText() + " Temperature : " + obj.getString("temperature") + "\n");

displayResult.setText(displayResult.getText() + " Humidity

: " + obj.getString("humidity") + "\n");

displayResult.setText(displayResult.getText() + "\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* ");

}

}

catch(IOException e)

{

e.printStackTrace();

}

catch (JSONException e)

{

e.printStackTrace();

}

}

});

}

private static String getValue(String tag, Element element) {

NodeList nodeList = element.getElementsByTagName(tag).item(0).getChildNodes(); Node node = nodeList.item(0);

return node.getNodeValue();

}

}

Navigate to the Project Option. Click on app  scr  main folder. Right click on main  new

 Directory. Create a new directory named assets. Create a file example.json in the assets folder. Following is the content of the file assets/example.json

### example.json

[

{

"name": "Mysore ",

"lat": "12.295 ",

"long": "76.639 ",

"temperature":"22 ",

"humidity": "92 %"

},

{

"name": "Bangalore",

"lat": "12.97165 ",

"long": "77.5946 ",

"temperature":"25 ",

"humidity": "74 %"

}

]

Create a file city.xml in the assets folder. Following is the content of the file assets/city.xml

### city.xml

<?xml version="1.0"?>

<records>

<place>

<name>Mysore</name>

<lat> 12.295 </lat>

<long>76.639 </long>

<temperature> 22 </temperature>

<humidity> 90 % </humidity>

</place>

<place>

<name>Bangalore</name>

<lat> 12.97165 </lat>

<long>77.5946 </long>

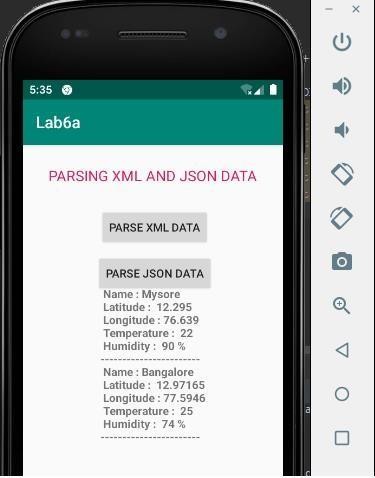
<temperature> 25 </temperature>

<humidity> 74 % </humidity>

</place>

</records>

**Output:**



### Develop a simple application with one EditText so that the user can write some text in it. Create a button called “Convert Text to Speech” that converts the user input text into voice.

First, create the android application as discussed in “Create your First Android Application”. Following is the content of the modified res/layout/activity\_main.xml.

### activity\_main.xml

<?xml version="1.0" encoding="utf-8"?>

<androidx.constraintlayout.widget.ConstraintLayout xmlns:android=["http://schemas.android.com/apk/res/android"](http://schemas.android.com/apk/res/android)

xmlns:app=["http://schemas.android.com/apk/res](http://schemas.android.com/apk/res-auto)-[auto"](http://schemas.android.com/apk/res-auto) xmlns:tools=["http://schemas.android.com/tools"](http://schemas.android.com/tools) android:layout\_width="match\_parent" android:layout\_height="match\_parent" tools:context=".MainActivity">

<TextView

android:layout\_width="wrap\_content" android:layout\_height="wrap\_content" android:text="TEXT TO SPEECH APPLICATION"

android:textColor="@color/colorAccent" android:textSize="18sp" app:layout\_constraintBottom\_toBottomOf="parent" app:layout\_constraintEnd\_toEndOf="parent" app:layout\_constraintHorizontal\_bias="0.498" app:layout\_constraintLeft\_toLeftOf="parent" app:layout\_constraintRight\_toRightOf="parent" app:layout\_constraintStart\_toStartOf="parent" app:layout\_constraintTop\_toTopOf="parent" app:layout\_constraintVertical\_bias="0.071" />

<EditText

android:id="@+id/txt\_input" android:layout\_width="237dp" android:layout\_height="177dp" android:layout\_marginStart="100dp" android:layout\_marginTop="209dp" android:layout\_marginEnd="77dp" android:layout\_marginBottom="437dp" android:inputType="textMultiLine" app:layout\_constraintBottom\_toBottomOf="parent" app:layout\_constraintEnd\_toEndOf="parent" app:layout\_constraintStart\_toStartOf="parent" app:layout\_constraintTop\_toTopOf="parent" />

<Button

android:id="@+id/btn\_txt2spch" android:layout\_width="wrap\_content" android:layout\_height="wrap\_content" android:layout\_marginStart="75dp" android:layout\_marginTop="399dp" android:layout\_marginEnd="51dp" android:layout\_marginBottom="284dp" android:text="Convert Text to Speech" app:layout\_constraintBottom\_toBottomOf="parent" app:layout\_constraintEnd\_toEndOf="parent" app:layout\_constraintStart\_toStartOf="parent" app:layout\_constraintTop\_toTopOf="parent" />

</androidx.constraintlayout.widget.ConstraintLayout>

Following is the content of the modified src/MainActivity.java

### MainActivity.java

package com.example.lab7a;

import androidx.appcompat.app.AppCompatActivity; import android.os.Bundle;

import android.speech.tts.TextToSpeech; import android.view.View;

import android.widget.Button; import android.widget.EditText; import android.widget.Toast;

import java.util.Locale;

public class MainActivity extends AppCompatActivity {

TextToSpeech t1; EditText txtinput; Button txttospeech;

@Override

protected void onCreate(Bundle savedInstanceState) { super.onCreate(savedInstanceState); setContentView(R.layout.*activity\_main*);

txtinput = findViewById(R.id.*txt\_input*); txttospeech = findViewById(R.id.*btn\_txt2spch*);

t1 = new TextToSpeech(getApplicationContext(), new TextToSpeech.OnInitListener() {

@Override

public void onInit(int status) { if(status != TextToSpeech.*ERROR*) {

t1.setLanguage(Locale.*UK*);

}

}

});

txttospeech.setOnClickListener(new View.OnClickListener() { @Override

public void onClick(View view) {

String tospeak = txtinput.getText().toString(); Toast.*makeText*(getBaseContext(),tospeak,Toast.*LENGTH\_SHORT*).show();

t1.speak(tospeak,TextToSpeech.*QUEUE\_FLUSH*,null);

}

});

}

public void onPause()

{

if(t1 != null)

{

t1.stop(); t1.shutdown();

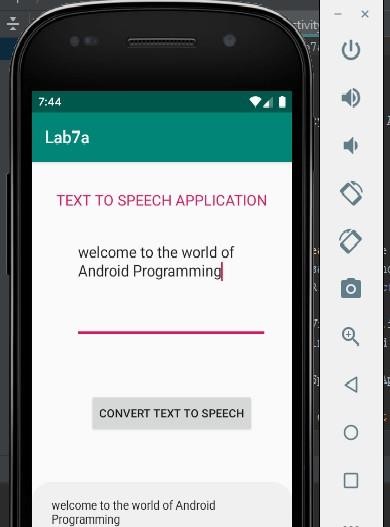
}

super.onPause();

}

}

**Output**



### Create an activity like a phone dialer with CALL and SAVE buttons. On pressing the CALL button, it must call the phone number and on pressing the SAVE button it must save the number to the phone contacts.

First, create the android application as discussed in “Create your First Android Application”. Following is the content of the modified res/layout/activity\_main.xml.

### activity\_main.xml

<?xml version="1.0" encoding="utf-8"?>

<androidx.constraintlayout.widget.ConstraintLayout xmlns:android=["http://schemas.android.com/apk/res/android"](http://schemas.android.com/apk/res/android)

xmlns:app=["http://schemas.android.com/apk/res](http://schemas.android.com/apk/res-auto)-[auto"](http://schemas.android.com/apk/res-auto) xmlns:tools=["http://schemas.android.com/tools"](http://schemas.android.com/tools) android:layout\_width="match\_parent" android:layout\_height="match\_parent" tools:context=".MainActivity">

<TextView

android:id="@+id/textView" android:layout\_width="wrap\_content" android:layout\_height="wrap\_content" android:text="CALL AND SAVE APPLICATION"

android:textAlignment="center" android:textAllCaps="false" android:textColor="@color/colorAccent" android:textSize="18sp" android:textStyle="bold" app:layout\_constraintBottom\_toBottomOf="parent" app:layout\_constraintEnd\_toEndOf="parent" app:layout\_constraintHorizontal\_bias="0.396" app:layout\_constraintLeft\_toLeftOf="parent" app:layout\_constraintRight\_toRightOf="parent" app:layout\_constraintStart\_toStartOf="parent" app:layout\_constraintTop\_toTopOf="parent" app:layout\_constraintVertical\_bias="0.04" />

<EditText

android:id="@+id/editText" android:layout\_width="155dp" android:layout\_height="wrap\_content" android:layout\_marginStart="35dp" android:layout\_marginTop="57dp" android:layout\_marginEnd="97dp" android:layout\_marginBottom="589dp" android:ems="5" android:inputType="number"

app:layout\_constraintBottom\_toBottomOf="parent" app:layout\_constraintEnd\_toEndOf="parent" app:layout\_constraintHorizontal\_bias="0.0" app:layout\_constraintStart\_toStartOf="parent" app:layout\_constraintTop\_toTopOf="parent" app:layout\_constraintVertical\_bias="0.0" />

<Button

android:id="@+id/buttondel" android:layout\_width="55dp" android:layout\_height="45dp" android:layout\_marginStart="227dp" android:layout\_marginTop="57dp" android:layout\_marginEnd="125dp" android:layout\_marginBottom="532dp" android:text="DEL" app:layout\_constraintBottom\_toBottomOf="parent" app:layout\_constraintEnd\_toEndOf="parent" app:layout\_constraintHorizontal\_bias="0.135" app:layout\_constraintStart\_toStartOf="parent" app:layout\_constraintTop\_toTopOf="parent" app:layout\_constraintVertical\_bias="0.0" />

<Button

android:id="@+id/button1" android:layout\_width="55dp" android:layout\_height="45dp" android:layout\_marginStart="35dp" android:layout\_marginTop="122dp" android:layout\_marginEnd="256dp" android:layout\_marginBottom="541dp" android:text="1" app:layout\_constraintBottom\_toBottomOf="parent" app:layout\_constraintEnd\_toEndOf="parent" app:layout\_constraintHorizontal\_bias="0.0" app:layout\_constraintStart\_toStartOf="parent" app:layout\_constraintTop\_toTopOf="parent" app:layout\_constraintVertical\_bias="0.0" />

<Button

android:id="@+id/button2"

android:layout\_width="55dp" android:layout\_height="45dp" android:layout\_marginStart="73dp" android:layout\_marginTop="122dp" android:layout\_marginEnd="126dp" android:layout\_marginBottom="541dp" android:text="2" app:layout\_constraintBottom\_toBottomOf="parent" app:layout\_constraintEnd\_toEndOf="parent" app:layout\_constraintHorizontal\_bias="0.368" app:layout\_constraintStart\_toStartOf="parent" app:layout\_constraintTop\_toTopOf="parent" app:layout\_constraintVertical\_bias="0.0" />

<Button

android:id="@+id/button3" android:layout\_width="55dp" android:layout\_height="45dp" android:layout\_marginStart="157dp" android:layout\_marginTop="122dp" android:layout\_marginEnd="122dp" android:layout\_marginBottom="526dp" android:text="3" app:layout\_constraintBottom\_toBottomOf="parent" app:layout\_constraintEnd\_toEndOf="parent" app:layout\_constraintHorizontal\_bias="0.0" app:layout\_constraintStart\_toStartOf="parent" app:layout\_constraintTop\_toTopOf="parent" app:layout\_constraintVertical\_bias="0.0" />

<Button

android:id="@+id/button4" android:layout\_width="55dp" android:layout\_height="45dp" android:layout\_marginStart="35dp" android:layout\_marginTop="172dp" android:layout\_marginEnd="256dp" android:layout\_marginBottom="541dp" android:text="4" app:layout\_constraintBottom\_toBottomOf="parent" app:layout\_constraintEnd\_toEndOf="parent" app:layout\_constraintHorizontal\_bias="0.0" app:layout\_constraintStart\_toStartOf="parent" app:layout\_constraintTop\_toTopOf="parent" app:layout\_constraintVertical\_bias="0.0" />

<Button

android:id="@+id/button5" android:layout\_width="55dp" android:layout\_height="45dp" android:layout\_marginStart="73dp" android:layout\_marginTop="172dp" android:layout\_marginEnd="126dp" android:layout\_marginBottom="541dp" android:text="5" app:layout\_constraintBottom\_toBottomOf="parent" app:layout\_constraintEnd\_toEndOf="parent" app:layout\_constraintHorizontal\_bias="0.368" app:layout\_constraintStart\_toStartOf="parent" app:layout\_constraintTop\_toTopOf="parent" app:layout\_constraintVertical\_bias="0.0" />

<Button

android:id="@+id/button6" android:layout\_width="55dp" android:layout\_height="45dp" android:layout\_marginStart="157dp"

android:layout\_marginTop="172dp" android:layout\_marginEnd="122dp" android:layout\_marginBottom="526dp" android:text="6" app:layout\_constraintBottom\_toBottomOf="parent" app:layout\_constraintEnd\_toEndOf="parent" app:layout\_constraintHorizontal\_bias="0.0" app:layout\_constraintStart\_toStartOf="parent" app:layout\_constraintTop\_toTopOf="parent" app:layout\_constraintVertical\_bias="0.0" />

<Button

android:id="@+id/button7" android:layout\_width="55dp" android:layout\_height="45dp" android:layout\_marginStart="35dp" android:layout\_marginTop="222dp" android:layout\_marginEnd="256dp" android:layout\_marginBottom="541dp" android:text="7" app:layout\_constraintBottom\_toBottomOf="parent" app:layout\_constraintEnd\_toEndOf="parent" app:layout\_constraintHorizontal\_bias="0.0" app:layout\_constraintStart\_toStartOf="parent" app:layout\_constraintTop\_toTopOf="parent" app:layout\_constraintVertical\_bias="0.0" />

<Button

android:id="@+id/button8" android:layout\_width="55dp" android:layout\_height="45dp" android:layout\_marginStart="73dp" android:layout\_marginTop="222dp" android:layout\_marginEnd="126dp" android:layout\_marginBottom="541dp" android:text="8" app:layout\_constraintBottom\_toBottomOf="parent" app:layout\_constraintEnd\_toEndOf="parent" app:layout\_constraintHorizontal\_bias="0.368" app:layout\_constraintStart\_toStartOf="parent" app:layout\_constraintTop\_toTopOf="parent" app:layout\_constraintVertical\_bias="0.0" />

<Button

android:id="@+id/button9" android:layout\_width="55dp" android:layout\_height="45dp" android:layout\_marginStart="157dp" android:layout\_marginTop="222dp" android:layout\_marginEnd="122dp" android:layout\_marginBottom="526dp" android:text="9" app:layout\_constraintBottom\_toBottomOf="parent" app:layout\_constraintEnd\_toEndOf="parent" app:layout\_constraintHorizontal\_bias="0.0" app:layout\_constraintStart\_toStartOf="parent" app:layout\_constraintTop\_toTopOf="parent" app:layout\_constraintVertical\_bias="0.0" />

<Button

android:id="@+id/buttonstar" android:layout\_width="55dp" android:layout\_height="45dp" android:layout\_marginStart="35dp" android:layout\_marginTop="272dp" android:layout\_marginEnd="256dp" android:layout\_marginBottom="541dp"

android:text="\*" app:layout\_constraintBottom\_toBottomOf="parent" app:layout\_constraintEnd\_toEndOf="parent" app:layout\_constraintHorizontal\_bias="0.0" app:layout\_constraintStart\_toStartOf="parent" app:layout\_constraintTop\_toTopOf="parent" app:layout\_constraintVertical\_bias="0.0" />

<Button

android:id="@+id/button0" android:layout\_width="55dp" android:layout\_height="45dp" android:layout\_marginStart="73dp" android:layout\_marginTop="272dp" android:layout\_marginEnd="126dp" android:layout\_marginBottom="541dp" android:text="0" app:layout\_constraintBottom\_toBottomOf="parent" app:layout\_constraintEnd\_toEndOf="parent" app:layout\_constraintHorizontal\_bias="0.368" app:layout\_constraintStart\_toStartOf="parent" app:layout\_constraintTop\_toTopOf="parent" app:layout\_constraintVertical\_bias="0.0" />

<Button

android:id="@+id/buttonhash" android:layout\_width="55dp" android:layout\_height="45dp" android:layout\_marginStart="157dp" android:layout\_marginTop="272dp" android:layout\_marginEnd="122dp" android:layout\_marginBottom="526dp" android:text="#" app:layout\_constraintBottom\_toBottomOf="parent" app:layout\_constraintEnd\_toEndOf="parent" app:layout\_constraintHorizontal\_bias="0.0" app:layout\_constraintStart\_toStartOf="parent" app:layout\_constraintTop\_toTopOf="parent" app:layout\_constraintVertical\_bias="0.0" />

<Button

android:id="@+id/buttoncall" android:layout\_width="80dp" android:layout\_height="45dp" android:layout\_marginStart="38dp" android:layout\_marginTop="322dp" android:layout\_marginEnd="122dp" android:layout\_marginBottom="526dp" android:text="CALL" app:layout\_constraintBottom\_toBottomOf="parent" app:layout\_constraintEnd\_toEndOf="parent" app:layout\_constraintHorizontal\_bias="0.0" app:layout\_constraintStart\_toStartOf="parent" app:layout\_constraintTop\_toTopOf="parent" app:layout\_constraintVertical\_bias="0.0" />

<Button

android:id="@+id/buttonsave" android:layout\_width="80dp" android:layout\_height="45dp" android:layout\_marginStart="127dp" android:layout\_marginTop="322dp" android:layout\_marginEnd="122dp" android:layout\_marginBottom="526dp" android:text="SAVE" app:layout\_constraintBottom\_toBottomOf="parent"

app:layout\_constraintEnd\_toEndOf="parent" app:layout\_constraintHorizontal\_bias="0.0" app:layout\_constraintStart\_toStartOf="parent" app:layout\_constraintTop\_toTopOf="parent" app:layout\_constraintVertical\_bias="0.0" />

</androidx.constraintlayout.widget.ConstraintLayout>

Following is the content of the modified src/MainActivity.java.

### MainActivity.java

package com.example.lab8a;

import androidx.annotation.NonNull;

import androidx.appcompat.app.AppCompatActivity;

import android.Manifest; import android.content.Intent;

import android.content.pm.PackageManager; import android.net.Uri;

import android.os.Build; import android.os.Bundle;

import android.provider.ContactsContract; import android.view.View;

import android.widget.Button; import android.widget.EditText;

public class MainActivity extends AppCompatActivity {

Button btn1, btn2, btn3, btn4, btn5, btn6, btn7;

Button btn0, btn8, btn9, btnstar, btnhash, btndelete, btncall, btnsave;

EditText txtnumber; int pid = 1;

@Override

protected void onCreate(Bundle savedInstanceState) { super.onCreate(savedInstanceState); setContentView(R.layout.*activity\_main*);

txtnumber = findViewById(R.id.*editText*); btn1 = findViewById(R.id.*button1*);

btn2 = findViewById(R.id.*button2*); btn3 = findViewById(R.id.*button3*); btn4 = findViewById(R.id.*button4*); btn5 = findViewById(R.id.*button5*); btn6 = findViewById(R.id.*button6*); btn7 = findViewById(R.id.*button7*); btn8 = findViewById(R.id.*button8*); btn9 = findViewById(R.id.*button9*); btn0 = findViewById(R.id.*button0*);

btncall = findViewById(R.id.*buttoncall*); btnsave = findViewById(R.id.*buttonsave*); btnstar = findViewById(R.id.*buttonstar*); btnhash = findViewById(R.id.*buttonhash*); btndelete = findViewById(R.id.*buttondel*);

btn0.setOnClickListener(new View.OnClickListener() { @Override

public void onClick(View view) {

txtnumber.append("0");

}

});

btn1.setOnClickListener(new View.OnClickListener() { @Override

public void onClick(View view) { txtnumber.append("1");

}

});

btn2.setOnClickListener(new View.OnClickListener() { @Override

public void onClick(View view) { txtnumber.append("2");

}

});

btn3.setOnClickListener(new View.OnClickListener() { @Override

public void onClick(View view) { txtnumber.append("3");

}

});

btn4.setOnClickListener(new View.OnClickListener() { @Override

public void onClick(View view) { txtnumber.append("4");

}

});

btn5.setOnClickListener(new View.OnClickListener() { @Override

public void onClick(View view) { txtnumber.append("5");

}

});

btn6.setOnClickListener(new View.OnClickListener() { @Override

public void onClick(View view) { txtnumber.append("6");

}

});

btn7.setOnClickListener(new View.OnClickListener() { @Override

public void onClick(View view) { txtnumber.append("7");

}

});

btn8.setOnClickListener(new View.OnClickListener() { @Override

public void onClick(View view) { txtnumber.append("8");

}

});

btn9.setOnClickListener(new View.OnClickListener() { @Override

public void onClick(View view) { txtnumber.append("9");

}

});

btnstar.setOnClickListener(new View.OnClickListener() { @Override

public void onClick(View view) { txtnumber.append("\*");

}

});

btnhash.setOnClickListener(new View.OnClickListener() { @Override

public void onClick(View view) { txtnumber.append("#");

}

});

btndelete.setOnClickListener(new View.OnClickListener() { @Override

public void onClick(View view) {

String num = txtnumber.getText().toString(); if (num.length() > 0) {

num = num.substring(0, num.length() - 1);

}

});

}

txtnumber.setText(num);

btncall.setOnClickListener(new View.OnClickListener() { @Override

public void onClick(View view) { callatruntimepermission();

}

});

btnsave.setOnClickListener(new View.OnClickListener() { @Override

public void onClick(View view) {

String num = txtnumber.getText().toString(); Intent it = new Intent(Intent.*ACTION\_INSERT*,

ContactsContract.Contacts.*CONTENT\_URI*);

it.putExtra(ContactsContract.Intents.Insert.*PHONE*,num); startActivity(it);

}

});

}

private void callatruntimepermission()

{

if(Build.VERSION.*SDK\_INT* >= Build.VERSION\_CODES.*M* &&

checkSelfPermission(Manifest.permission.*CALL\_PHONE*) != PackageManager.*PERMISSION\_GRANTED*)

{

requestPermissions(new String[]{Manifest.permission.*CALL\_PHONE*},pid);

}

else

{

String num = txtnumber.getText().toString(); Intent it = new Intent(Intent.*ACTION\_CALL*); it.setData(Uri.*parse*("tel:" + num));

startActivity(it);

}

}

public void onRequestPermissionResult(int requestCode, @NonNull String[]permissions,@NonNull int[] grantResult)

{

super.onRequestPermissionsResult(requestCode,permissions,grantResult);

if(requestCode==pid)

{

if(grantResult[0]==PackageManager.*PERMISSION\_GRANTED*)

{

callatruntimepermission();

}

}

}

}

Following is the uses-permission added to the AndroidManifest.xml. AndroidManifest.xml

<uses-permission android:name="android.permission.CALL\_PHONE"> </uses-permission>

**Output:**

