INSTALLING AND RUNNING APPLICATIONS ON ANDROID STUDIO

Step 1 - System Requirements

The required tools to develop Android applications are open source and can be downloaded from the Web. Following is the list of software's you will need before you start your Android application programming.

Java JDK5 or later version

Java Runtime Environment (JRE)

6Android Studio

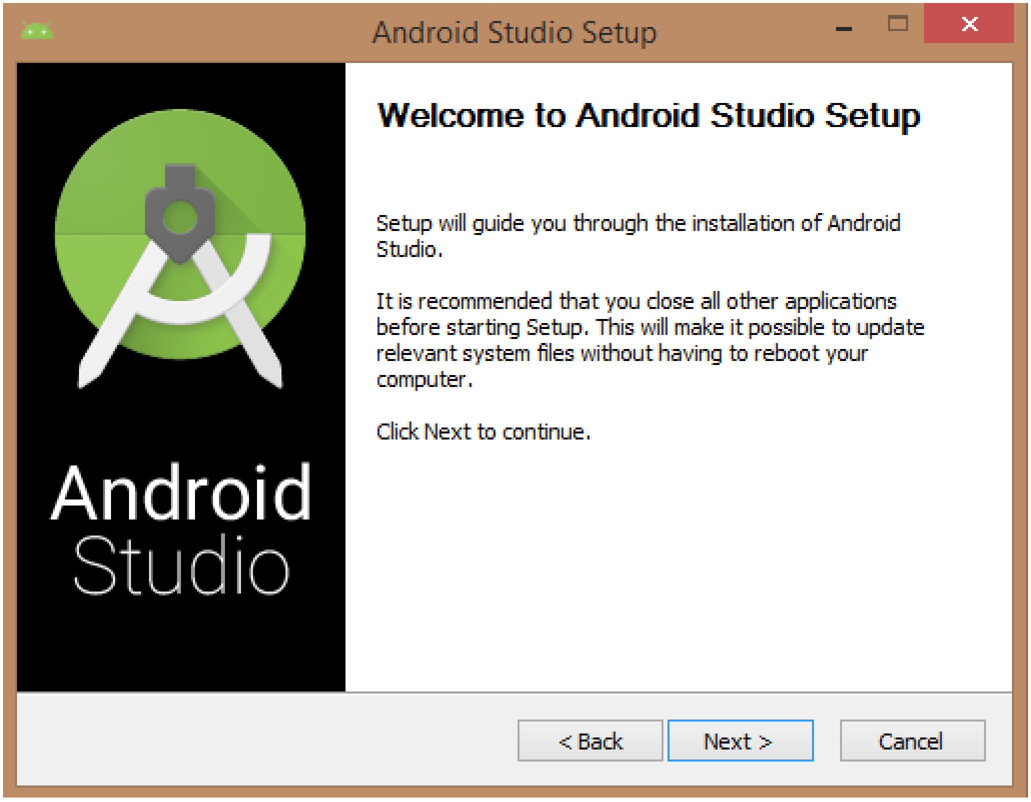
Step 2 - Setup Android Studio

Android Studio is the official IDE for android application development.It works based on IntelliJ IDEA, You can download the latest version of android studio from Android Studio 2.2 Download, If you are new to installing Android Studio on windows,you will find a file, which is named as android-studio-bundle-143.3101438-windows.exe.So just download and run on windows machine according to android studio wizard guideline.

If you are installing Android Studio on Mac or Linux, You can download the latest version from Android Studio Mac Download,or Android Studio Linux Download, check the instructions provided along with the downloaded file for Mac OS and Linux. This tutorial will consider that you are going to setup your environment on Windows machine having Windows 8.1 operating system.

Installation

So let's launch Android Studio.exe,Make sure before launch Android Studio, Our Machine should required installed Java JDK. To install Java JDK,take a references of Android environment setup



Android Studio Setup

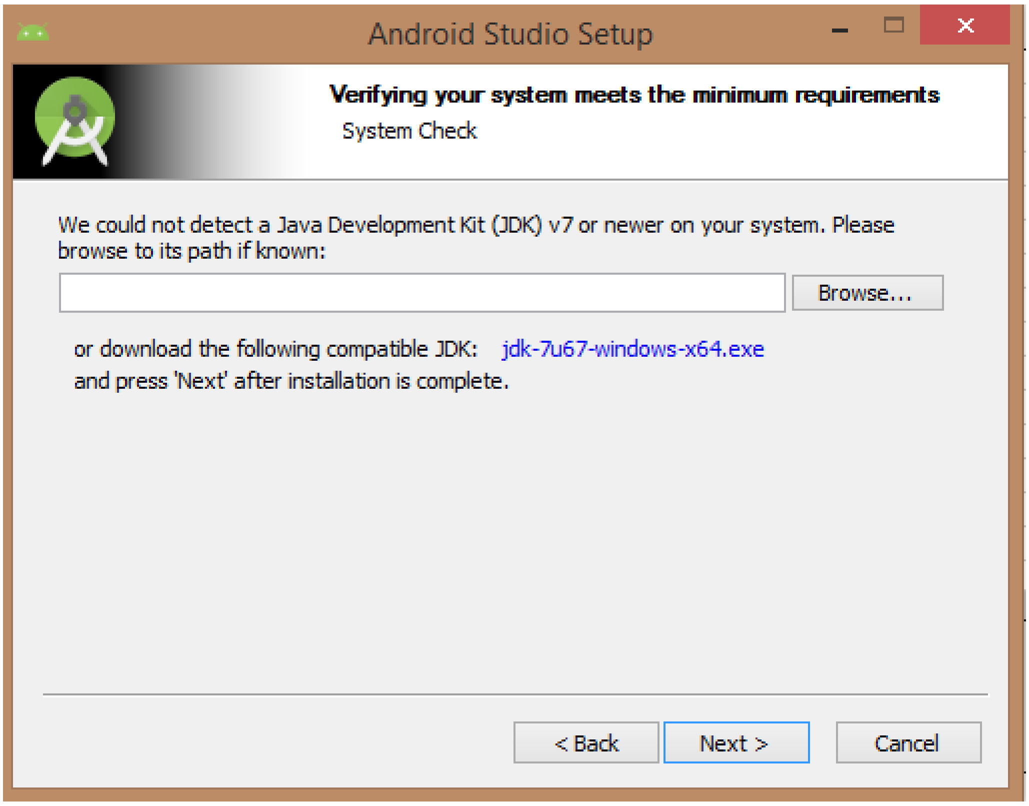
Welcome to Android Studio Setup

Setup will guide you through the installation of Android Studio.

It is recommended that you close all other applications before starting Setup. This will make it possible to update relevant system files without having to reboot your computer.

Click Next to continue.

Once you launched Android Studio, its time to mention JDK7 path or later version in androidstudio installer.



Android Studio Setup

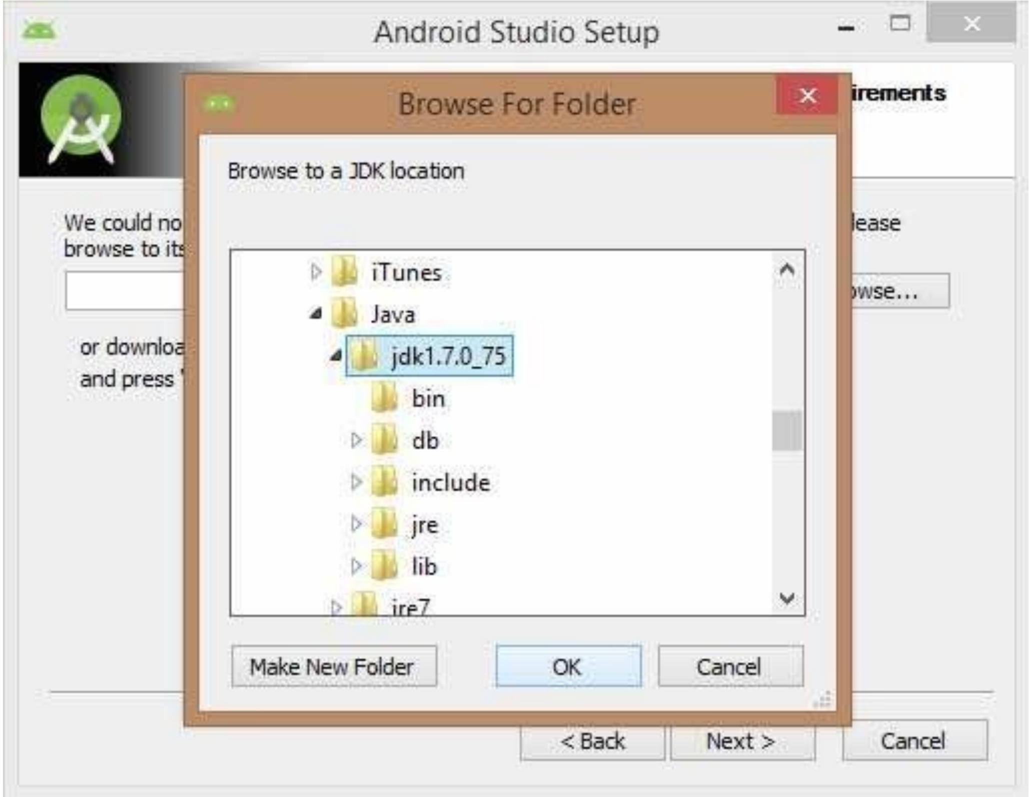
Verifying your system meets the minimum requirements

System Check

We could not detect a Java Development Kit (JDK) v7 or newer on your system. Please browse to its path if known:

or download the following compatible JDK: jdk-7u67-windows-x64.exe and press 'Next' after installation is complete.

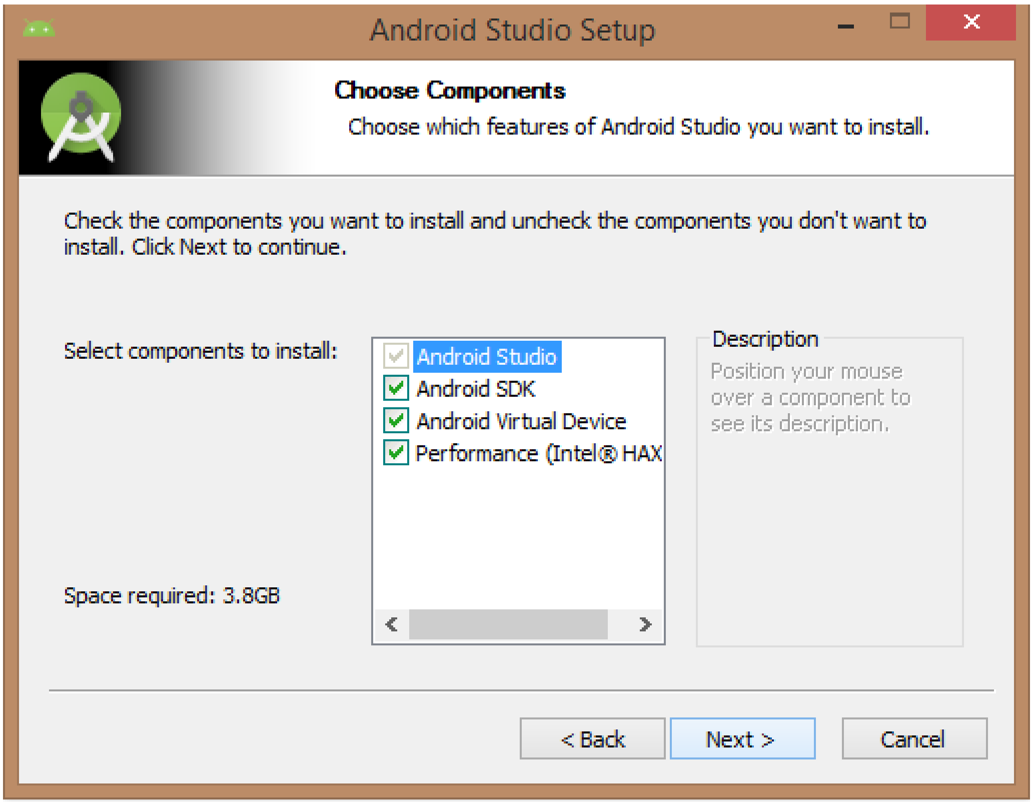
Below the image initiating JDK to android SDK



Browse For Folder

Browse to a JDK location

Need to check the components, which are required to create applications, below the image has selected Android Studio, Android SDK, Android Virtual Machine and performance(Intel chip).



Choose Components

Choose which features of Android Studio you want to install.

Check the components you want to install and uncheck the components you don't want to install. Click Next to continue.

Select components to install:

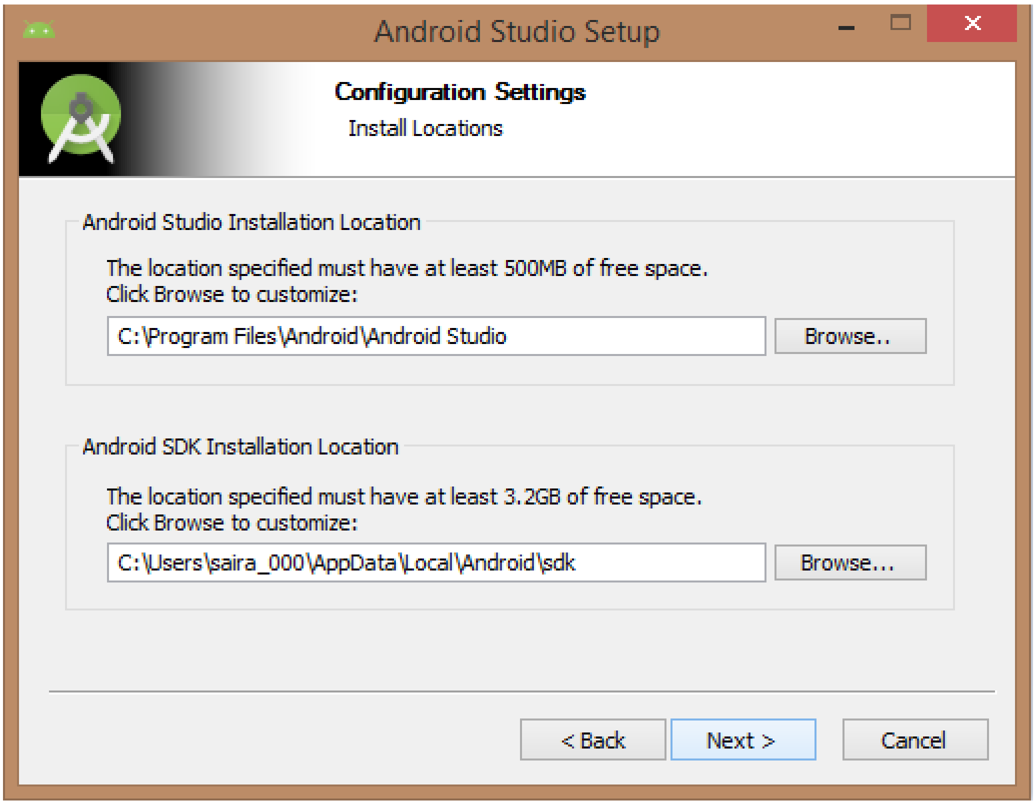
- ☑ Android Studio
- ☑ Android SDK
- ☑ Android Virtual Device
- ☑ Performance (Intel® HAX

Description

Position your mouse over a component to see its description.

Space required: 3.8GB

Need to specify the location of local machine path for Android studio and Android SDK, below the image has taken default location of windows 8.1 x64 bit architecture.



Configuration Settings

Install Locations

Android Studio Installation Location

The location specified must have at least 500MB of free space.
Click Browse to customize:

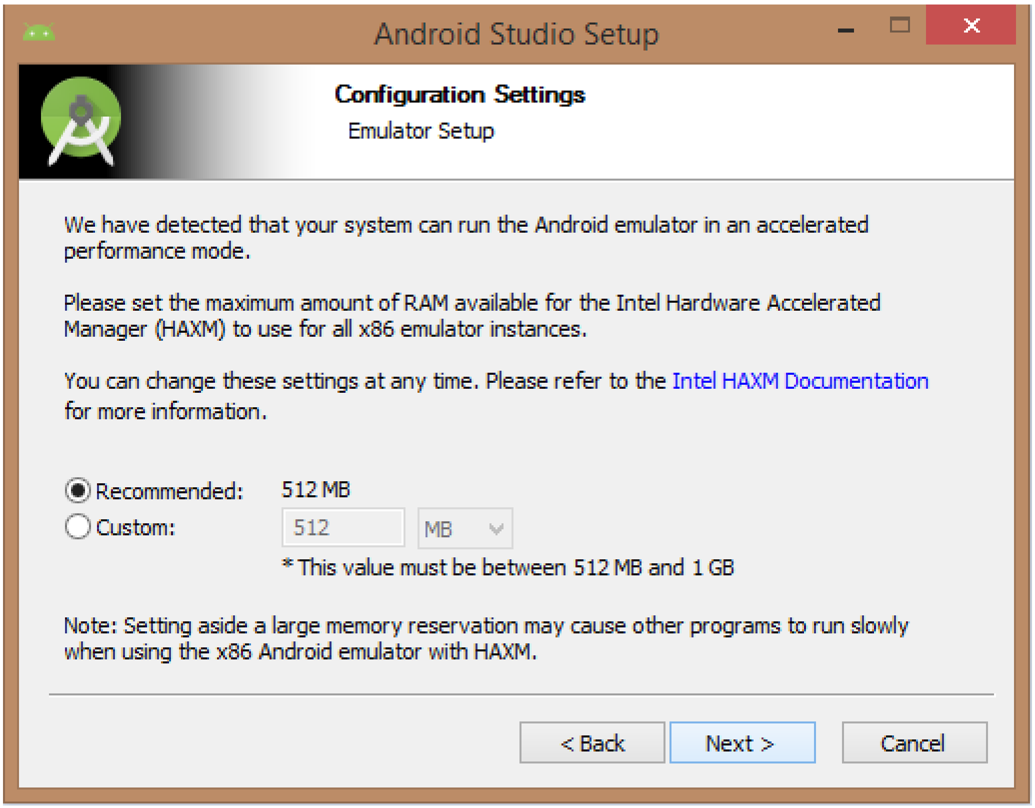
C:\Program Files\Android\Android Studio

Android SDK Installation Location

The location specified must have at least 3.2GB of free space.
Click Browse to customize:

C:\Users\saira_000\AppData\Local\Android\sdk

Need to specify the ram space for Android emulator by default it would take 512MB of local machine RAM.



Configuration Settings

Emulator Setup

We have detected that your system can run the Android emulator in an accelerated performance mode.

Please set the maximum amount of RAM available for the Intel Hardware Accelerated Manager (HAXM) to use for all x86 emulator instances.

You can change these settings at any time. Please refer to the Intel HAXM Documentation for more information.

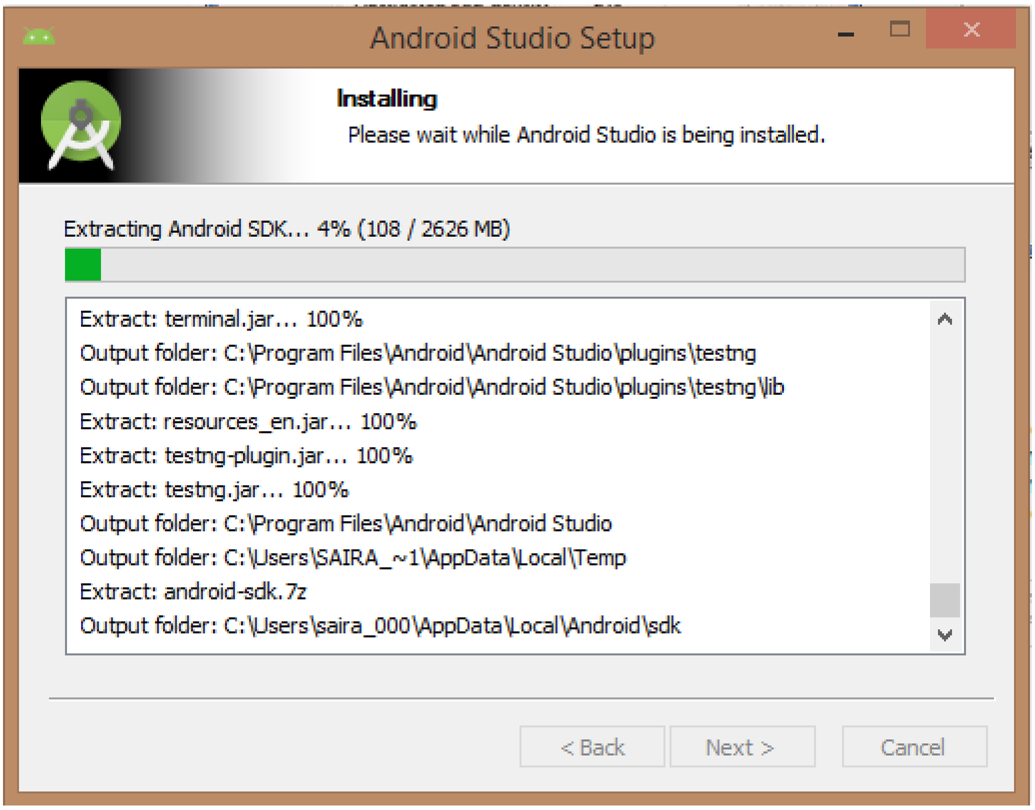
● Recommended: 512 MB

○ Custom: 512 MB

* This value must be between 512 MB and 1 GB

Note: Setting aside a large memory reservation may cause other programs to run slowly when using the x86 Android emulator with HAXM.

At final stage, it would extract SDK packages into our local machine, it would take a while time to finish the task and would take 2626MB of Hard disk space.



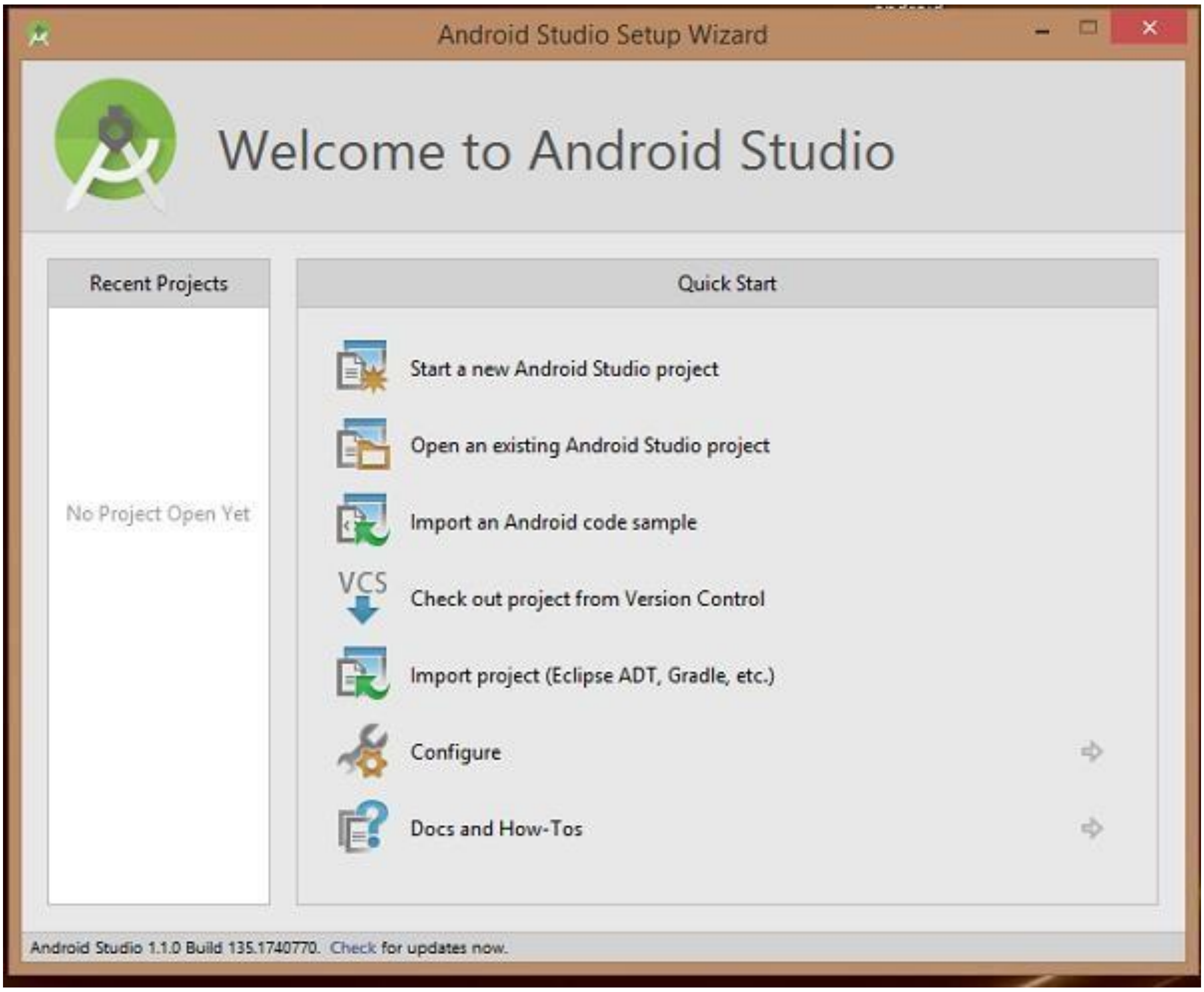
Installing

Please wait while Android Studio is being installed.

Extracting Android SDK... 4% (108 / 2626 MB)

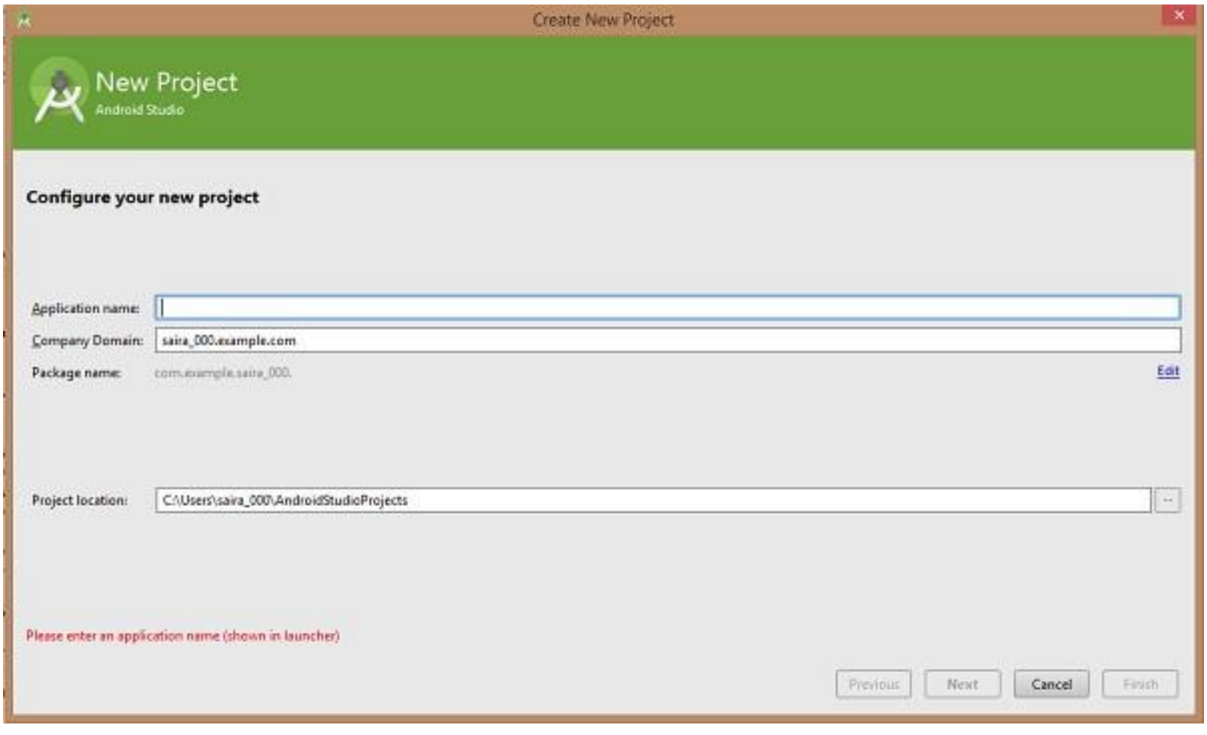
```
Extract: terminal.jar... 100%
Output folder: C:\Program Files\Android\Android Studio\plugins\testng
Output folder: C:\Program Files\Android\Android Studio\plugins\testng\lib
Extract: resources_en.jar... 100%
Extract: testng-plugin.jar... 100%
Extract: testng.jar... 100%
Output folder: C:\Program Files\Android\Android Studio
Output folder: C:\Users\SAIRA_~1\AppData\Local\Temp
Extract: android-sdk.7z
Output folder: C:\Users\saira_000\AppData\Local\Android\sdk
```

After done all above steps perfectly, you must get finish button and it gonna be open androidstudio project with Welcome to android studio message as shown below


Android Studio Setup Wizard
Welcome to Android Studio
Recent Projects
No Project Open Yet
Quick Start
Start a new Android Studio project
Open an existing Android Studio project
Import an Android code sample
VCS
Check out project from Version Control
Import project (Eclipse ADT, Gradle, etc.)
Configure
Docs and How-Tos

Android Studio 1.1.0 Build 135.1740770. Check for updates now.

You can start your application development by calling start a new android studio project. in a new installation frame should ask Application name, package information and location of the project.



Application name:

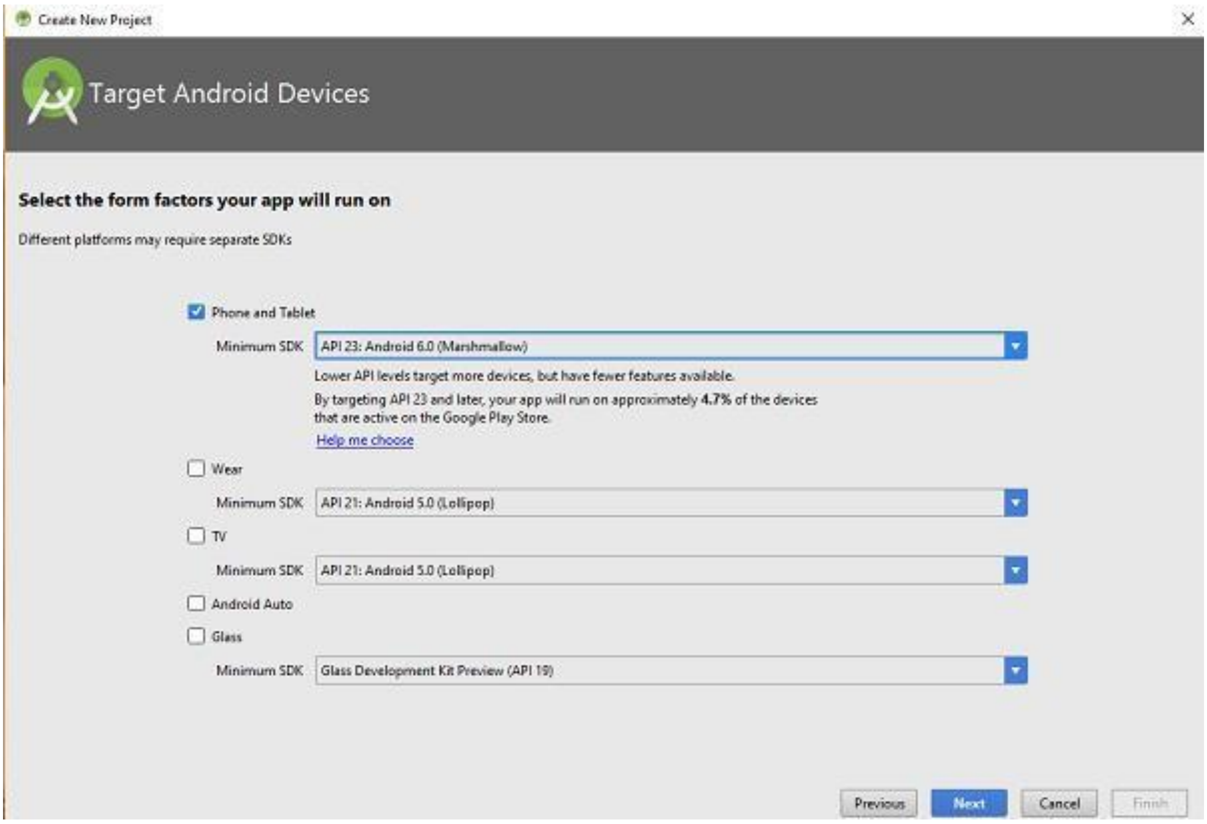
Company Domain: saira_000.example.com

Package name: com.example.saira_000.

Project location: C:\Users\saira_000\AndroidStudioProjects

Please enter an application name (shown in launcher)

After entered application name, it going to be called select the form factors your application runson, here need to specify Minimum SDK, in our tutorial, I have declared as API23: Android 6.0(Mashmallow)



Create New Project

Target Android Devices

Select the form factors your app will run on

Different platforms may require separate SDKs

☑ Phone and Tablet

Minimum SDK API 23: Android 6.0 (Marshmallow)

Lower API levels target more devices, but have fewer features available.

By targeting API 23 and later, your app will run on approximately **4.7%** of the devices that are active on the Google Play Store.

Help me choose

□ Wear

Minimum SDK API 21: Android 5.0 (Lollipop)

□ TV

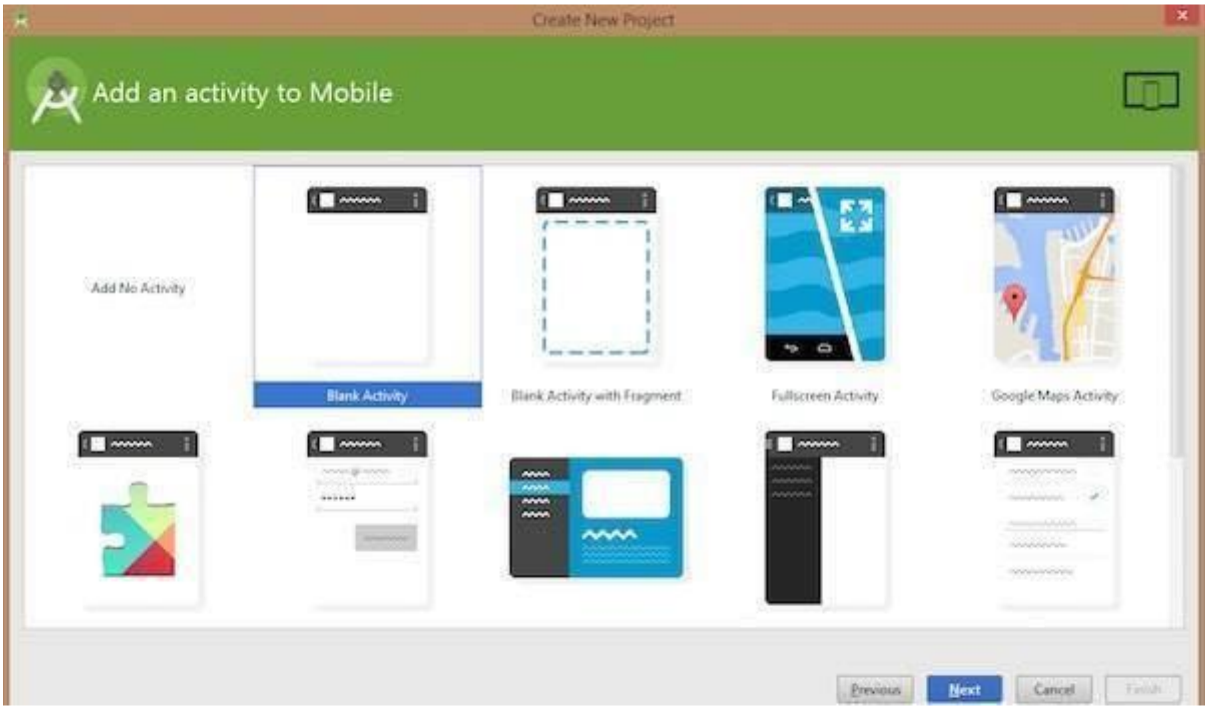
Minimum SDK API 21: Android 5.0 (Lollipop)

□ Android Auto

□ Glass

Minimum SDK Glass Development Kit Preview (API 19)

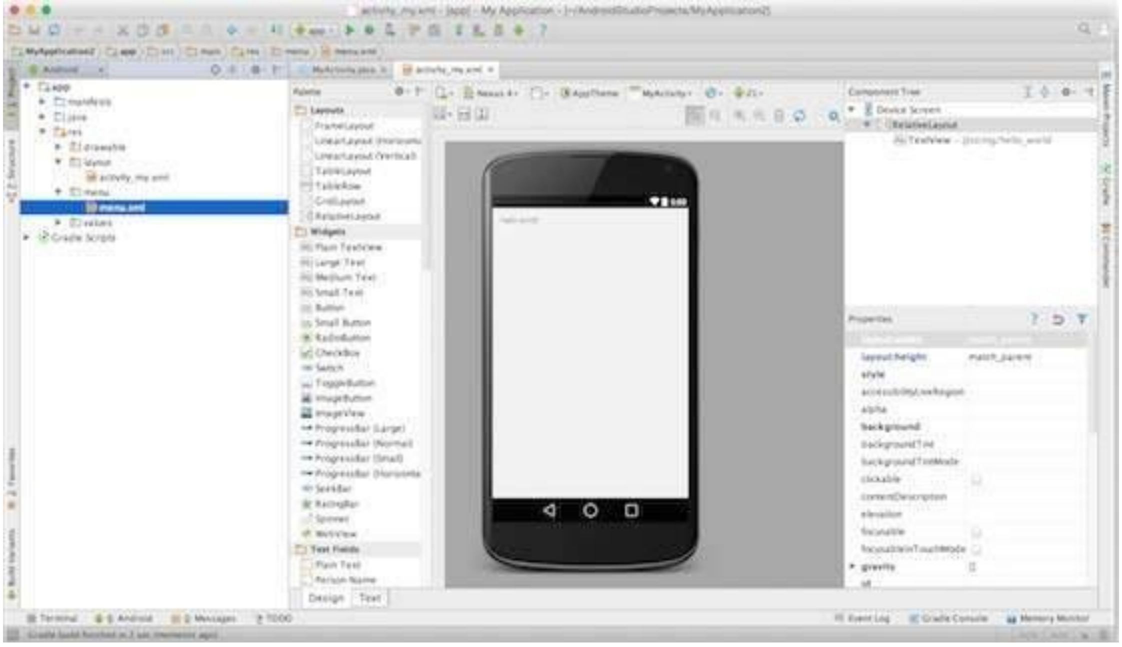
The next level of installation should contain selecting the activity to mobile, it specifies the default layout for Applications



Create New Project

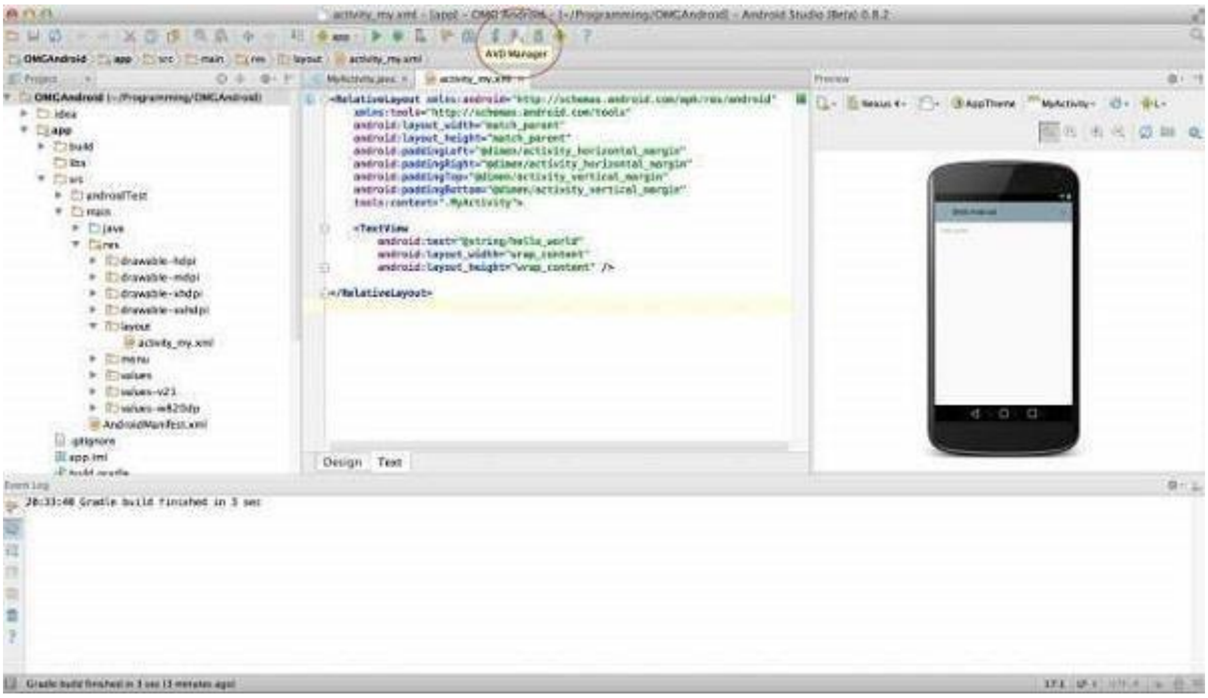
Add an activity to Mobile

At the final stage it going to be open development tool to write the application code.



Step 3 - Create Android Virtual Device

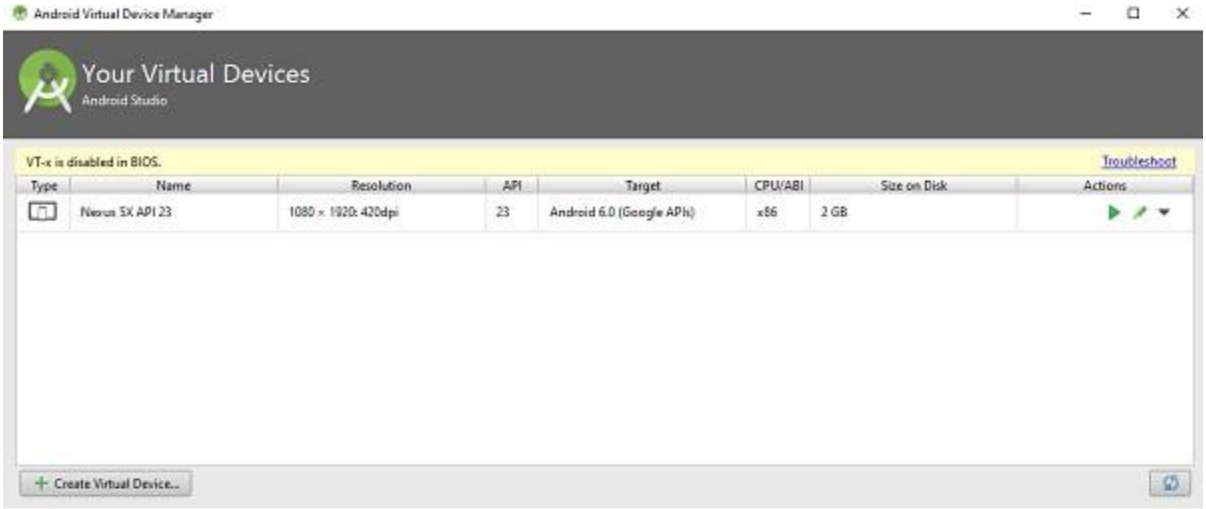
To test your Android applications, you will need a virtual Android device. So before we start writing our code, let us create an Android virtual device. Launch Android AVD Manager Clicking AVD_Manager icon as shown below



```
<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="@dimen/activity_horizontal_margin"
    android:paddingRight="@dimen/activity_horizontal_margin"
    android:paddingTop="@dimen/activity_vertical_margin"
    android:paddingBottom="@dimen/activity_vertical_margin"
    tools:context=".MyActivity">

    <TextView
        android:text="@string/hello_world"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content" />

</RelativeLayout>
```

```
20:33:40 Gradle build finished in 3 sec
```

After Click on a virtual device icon, it going to be shown by default virtual devices which are present on your SDK, or else need to create a virtual device by clicking Create new Virtual device button



Android Virtual Device Manager

Your Virtual Devices

Android Studio

VT-x is disabled in BIOS.

Type	Name	Resolution	API	Target	CPU/ABI	Size on Disk	Actions
	Nexus 5X API 23	1080 × 1920: 420dpi	23	Android 6.0 (Google APIs)	x86	2 GB	

If your AVD is created successfully it means your environment is ready for Android application development. If you like, you can close this window using top-right cross button. Better you re-start your machine and once you are done with this last step, you are ready to proceed for your first Android example but before that we will see few more important concepts related to Android Application Development.

Exercise Program

Write the steps in installing Android Studio in Windows and Linux.

Table of content

Program-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.

XML-CODE

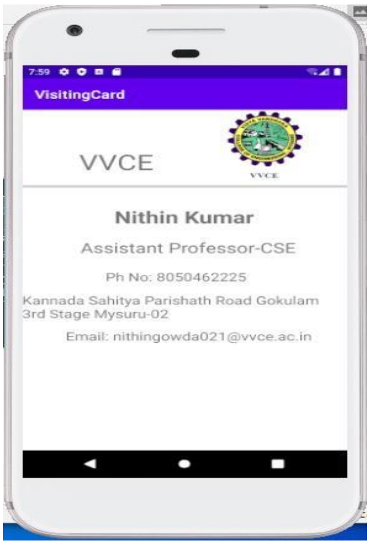
```
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context=".MainActivity">

    <TextView
        android:id="@+id/textView"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignParentEnd="true"
        android:layout_alignParentRight="true"
        android:layout_alignParentBottom="true"
        android:layout_marginStart="17dp"
        android:layout_marginLeft="17dp"
        android:layout_marginTop="17dp"
        android:layout_marginEnd="244dp"
        android:layout_marginRight="244dp"
        android:layout_marginBottom="486dp"
        android:text="VVCE"
        android:textSize="38dp" />

    <ImageView
        android:id="@+id/imageView"
        android:layout_width="231dp"
        android:layout_height="174dp"
        android:layout_alignParentEnd="true"
        android:layout_alignParentRight="true"
        android:layout_alignParentBottom="true"
        android:layout_marginEnd="-14dp"
        android:layout_marginRight="-14dp"
        android:layout_marginBottom="481dp"
        app:srcCompat="@drawable/logo" />

    <View
        android:id="@+id/view"
        android:layout_width="wrap_content"
        android:layout_height="4dp"
        android:layout_alignParentBottom="true"
        android:background="#4444"
        android:layout_marginBottom="466dp" />

    <TextView
        android:id="@+id/textView2"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignParentEnd="true"
        android:layout_alignParentRight="true"
        android:layout_alignParentBottom="true"
        android:layout_marginEnd="117dp"
        android:layout_marginRight="117dp"
        android:layout_marginBottom="394dp"
        android:text="Nithin Kumar"
        android:textSize="30dp"
        android:textStyle="bold" />

    <TextView
        android:id="@+id/textView3"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignParentEnd="true"
        android:layout_alignParentRight="true"
        android:layout_alignParentBottom="true"
        android:layout_marginEnd="64dp"
        android:layout_marginRight="64dp"
        android:layout_marginBottom="343dp"
        android:text="Assistant Professor-CSE"
        android:textSize="25dp" />

    <TextView
```

```
        android:id="@+id/textView4"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignParentEnd="true"
        android:layout_alignParentRight="true"
        android:layout_alignParentBottom="true"
        android:layout_marginEnd="127dp"
        android:layout_marginRight="127dp"
        android:layout_marginBottom="294dp"
        android:text="Ph No: 8050462225"
        android:textSize="20dp" />

    <TextView
        android:id="@+id/textView5"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignParentEnd="true"
        android:layout_alignParentRight="true"
        android:layout_alignParentBottom="true"
        android:layout_marginEnd="10dp"
        android:layout_marginRight="10dp"
        android:layout_marginBottom="229dp"
        android:text="Kannada Sahitya Parishath Road Gokulam 3rd Stage
Mysuru-02"
        android:textSize="20dp" />

    <TextView
        android:id="@+id/textView6"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignParentEnd="true"
        android:layout_alignParentRight="true"
        android:layout_alignParentBottom="true"
        android:layout_marginEnd="44dp"
        android:layout_marginRight="44dp"
        android:layout_marginBottom="189dp"
        android:text="Email: nithingowda021@vvce.ac.in"
        android:textSize="20dp" />
</RelativeLayout>
```

JAVA-CODE(No Change Required)

```
import androidx.appcompat.app.AppCompatActivity;
import android.os.Bundle;
public class MainActivity extends AppCompatActivity {
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
    }
}
```

OUTPUT:



Nithin Kumar

Assistant Professor-CSE

Ph No: 8050462225

Kannada Sahitya Parishath Road Gokulam
3rd Stage Mysuru-02

Email: nithingowda021@vvce.ac.in

Program-2: Develop an Android application using controls like Button, TextView, EditText for designing a calculator having basic functionality like Addition, Subtraction, Multiplication, and Division.

XML-CODE:

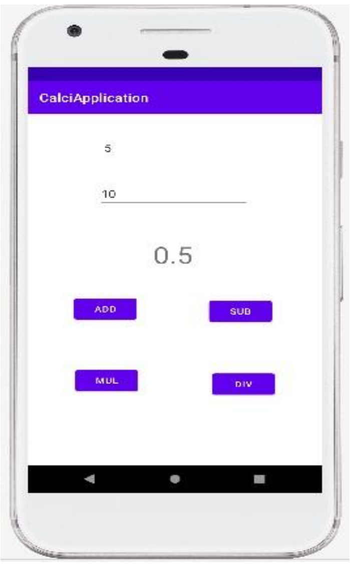
```
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context=".MainActivity">
    <TextView
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignParentEnd="true"
        android:layout_alignParentBottom="true"
        android:layout_marginEnd="98dp"
        android:layout_marginBottom="653dp"
        android:text="SIMPLE CALCI"
        android:textSize="38dp"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintHorizontal_bias="0.498"
        app:layout_constraintLeft_toLeftOf="parent"
        app:layout_constraintRight_toRightOf="parent"
        app:layout_constraintTop_toTopOf="parent"
        app:layout_constraintVertical_bias="0.042" />
    <EditText
        android:id="@+id/editText1"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignParentEnd="true"
        android:layout_alignParentBottom="true"
        android:layout_marginEnd="115dp"
        android:layout_marginBottom="547dp"
        android:ems="10"
        android:hint="Enter the First Number"
        android:inputType="textPersonName"
        android:text="" />
    <EditText
```

```
        android:id="@+id/editText2"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignParentEnd="true"
        android:layout_alignParentBottom="true"
        android:layout_marginEnd="111dp"
        android:layout_marginBottom="455dp"
        android:ems="10"
        android:inputType="textPersonName"
        android:hint="Enter the Second Number"
        android:text="" />
    <TextView
        android:id="@+id/textView1"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignParentEnd="true"
        android:layout_alignParentBottom="true"
        android:layout_marginEnd="203dp"
        android:layout_marginBottom="350dp"
        android:text="0"
        android:textSize="40dp" />
    <Button
        android:id="@+id/button"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignParentEnd="true"
        android:layout_alignParentBottom="true"
        android:layout_marginEnd="274dp"
        android:layout_marginBottom="237dp"
        android:onClick="doAdd"
        android:text="ADD" />
    <Button
        android:id="@+id/button2"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignParentEnd="true"
        android:layout_alignParentBottom="true"
        android:layout_marginEnd="68dp"
        android:layout_marginBottom="233dp"
        android:onClick="doSub"
        android:text="SUB" />
    <Button
        android:id="@+id/button3"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignParentEnd="true"
        android:layout_alignParentBottom="true"
        android:layout_marginEnd="277dp"
        android:layout_marginBottom="115dp"
        android:onClick="doMul"
        android:text="MUL" />
    <Button
        android:id="@+id/button4"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignParentEnd="true"
        android:layout_alignParentBottom="true"
        android:layout_marginEnd="63dp"
        android:layout_marginBottom="104dp"
        android:onClick="doDiv"
        android:text="DIV" />

</RelativeLayout>
```

JAVA-CODE:

```
import androidx.appcompat.app.AppCompatActivity;
import android.os.Bundle;
import android.view.View;
import android.widget.EditText;
import android.widget.TextView;
public class MainActivity extends AppCompatActivity {
    EditText e1,e2;
    TextView tv1;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        e1 =  (EditText)findViewById(R.id.editText1);
        e2 = (EditText)findViewById(R.id.editText2);
        tv1 = (TextView)findViewById(R.id.textView1);
    }
    public void doAdd(View V){
        int a1 = Integer.parseInt(e1.getText().toString());
        int a2 = Integer.parseInt(e2.getText().toString());
        int result= a1+a2;
        tv1.setText(""+result);
    }
    public void doSub(View V){
        int a1 = Integer.parseInt(e1.getText().toString());
        int a2 = Integer.parseInt(e2.getText().toString());
        int result= a1-a2;
        tv1.setText(""+result);
    }
    public void doMul(View V){
        int a1 = Integer.parseInt(e1.getText().toString());
        int a2 = Integer.parseInt(e2.getText().toString());
        int result= a1*a2;
        tv1.setText(""+result);
    }
    public void doDiv(View V){
        int a1 = Integer.parseInt(e1.getText().toString());
        int a2 = Integer.parseInt(e2.getText().toString());
        float result= a1/a2;
        tv1.setText(""+result);
    }
}
```

OUTPUT:



CalciApplication

5

10

0.5

Program - 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.

activity_signup.xml

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

<LinearLayout android="http://schemas.android.com/apk/res/android"

app="http://schemas.android.com/apk/res-auto"

tools="http://schemas.android.com/tools"

layout_width="match_parent"

layout_height="match_parent"

orientation="vertical"

context=".SignUpActivity">

<TextView

layout_width="match_parent"

layout_height="wrap_content"

textSize="48sp"

textAlignment="center"

text="Sign Up" />
```

```
<EditText
id="@+id/emailEditText"
layout_width="match_parent"
layout_height="wrap_content"
xmlns:layout_margin="4dp"
textSize="24sp"
hint="Email ID"
/>
<EditText
id="@+id/passwordEditText"
layout_width="match_parent"
layout_height="wrap_content"
layout_margin="4dp"
layout_marginTop="32dp"
textSize="24sp"
inputType="textPassword"
hint="Password"
/>
<Button
id="@+id/signUpBtn"
layout_width="match_parent"
layout_height="wrap_content"
layout_margin="4dp"
text="Sign Up"
/>
</LinearLayout>
```

SignUpActivity.java

```
import .AppCompatActivity;
import .Intent;
import .Bundle;
import .View;
import .Button;
import .EditText;
import .Toast;
import .Pattern;
public class SignUpActivity extends AppCompatActivity {
EditText emailEditText, passwordEditText;
Button signUpBtn;
@Override
protected void onCreate(Bundle savedInstanceState) {
super.onCreate(savedInstanceState);
setContentView(R.layout.activity_signup);
emailEditText = findViewById(R.id.emailEditText);
passwordEditText = findViewById(R.id.passwordEditText);
signUpBtn = findViewById(R.id.signUpBtn);
signUpBtn.setOnClickListener(new View.OnClickListener() {
@Override
public void onClick(View v) {
String email = emailEditText.getText().toString();
String password = passwordEditText.getText().toString();
if (!isValidPassword(password)) {
Toast.makeText(SignUpActivity.this, "Password doesn't match rules"
, Toast.LENGTH_SHORT).show();
return;
}
Intent intent = new Intent(SignUpActivity.this, LoginActivity.class);
intent.putExtra("email", email);
intent.putExtra("password", password);
startActivity(intent);
}
});
}
Pattern lowerCase = Pattern.compile("^.*[a-z].*$");
Pattern upperCase = Pattern.compile("^.*[A-Z].*$");
Pattern number = Pattern.compile("^.*[0-9].*$");
Pattern specialCharacter = Pattern.compile("^.*[^a-zA-Z0-9].*$");
private Boolean isValidPassword(String password) {
// Checks if password length is less than 8
if (password.length() < 8) {
return false;
}
// Returns false if password doesn't contain a lower case character
if (!lowerCase.matcher(password).matches()) {
return false;
}
// Returns false if password doesn't contain an upper case character
if (!upperCase.matcher(password).matches()) {
return false;
}
// Returns false if password doesn't contain a number
if (!number.matcher(password).matches()) {
```

```
return false;
}
// Returns false if password doesn't contain a special character
if (!specialCharacter.matcher(password).matches()) {
return false;
}
return true;
}
}
```

activity_login.xml

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout android="http://schemas.android.com/apk/res/android"
app="http://schemas.android.com/apk/res-auto"
tools="http://schemas.android.com/tools"
layout_width="match_parent"
android:layout_height="match_parent"
orientation="vertical"
context=".SignUpActivity">
<TextView
layout_width="match_parent"
layout_height="wrap_content"
textSize="48sp"
textAlignment="center"
text="Login" />
<EditText
id="@+id/emailEditText"
layout_width="match_parent"
```

```
layout_height="wrap_content"
layout_margin="4dp"
textSize="24sp"
hint="Email ID"
/>
<EditText
id="@+id/passwordEditText"
layout_width="match_parent"
layout_height="wrap_content"
layout_margin="4dp"
layout_marginTop="32dp"
textSize="24sp"
inputType="textPassword"
hint="Password"
/>
<Button
id="@+id/loginBtn"
layout_width="match_parent"
layout_height="wrap_content"
layout_margin="4dp"
text="Login"
/>
</LinearLayout
```

LoginActivity.java

```
import .AppCompatActivity;
import .Intent;
import .Bundle;
import .View;
import .Button;
import .EditText;
import .Toast;
public class LoginActivity extends AppCompatActivity {
EditText emailEditText, passwordEditText;
Button loginBtn;
@Override
protected void onCreate(Bundle savedInstanceState) {
super.onCreate(savedInstanceState);
setContentView(R.layout.activity_login);
emailEditText = findViewById(R.id.emailEditText);
passwordEditText = findViewById(R.id.passwordEditText);
loginBtn = findViewById(R.id.loginBtn);
String registeredEmail = getIntent().getStringExtra("email");
String registeredPassword = getIntent().getStringExtra("password");
loginBtn.setOnClickListener(new View.OnClickListener() {
@Override
public void onClick(View v) {
String email = emailEditText.getText().toString();
String password = passwordEditText.getText().toString();
if (registeredEmail.equals(email) && registeredPassword.equals(passwor
d)) {
Intent intent = new Intent(LoginActivity.this, LoginSuccessActivit
y.class);
startActivity(intent);
} else {
```

```
Toast.makeText(LoginActivity.this, "Invalid Credentials", Toast.LE
NGTH_SHORT).show();
}
}
});
}
}
```

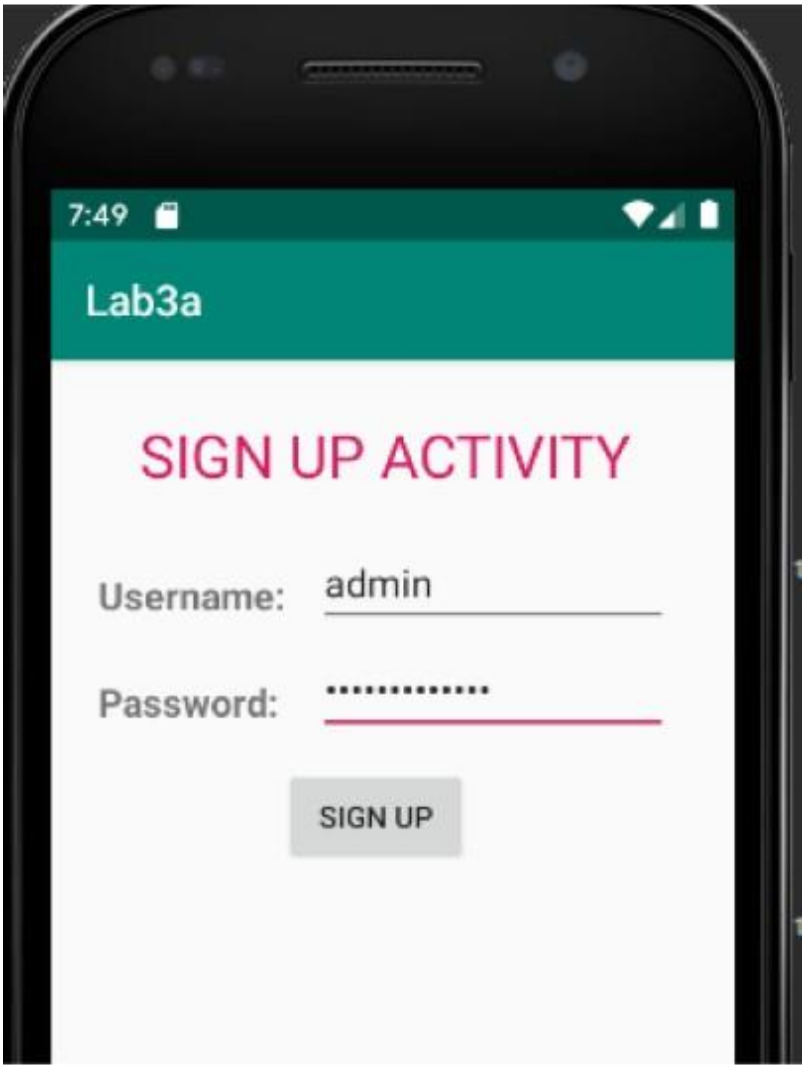
activity_login_success.xml

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout android="http://schemas.android.com/apk/res/android"
app="http://schemas.android.com/apk/res-auto"
tools="http://schemas.android.com/tools"
layout_width="match_parent"
layout_height="match_parent"
orientation="vertical"
context=".LoginSuccessActivity">
<TextView
layout_width="match_parent"
layout_height="wrap_content"
text="Login Successful"
textAlignment="center"
textSize="36sp"/>
</LinearLayout>
```

LoginSuccessActivity.java

```
import .AppCompatActivity;
import .Bundle;
public class LoginSuccessActivity extends AppCompatActivity {
```

```
@Override
protected void onCreate(Bundle savedInstanceState) {
super.onCreate(savedInstanceState);
setContentView(R.layout.activity_login_success);
}
}
```



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.

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

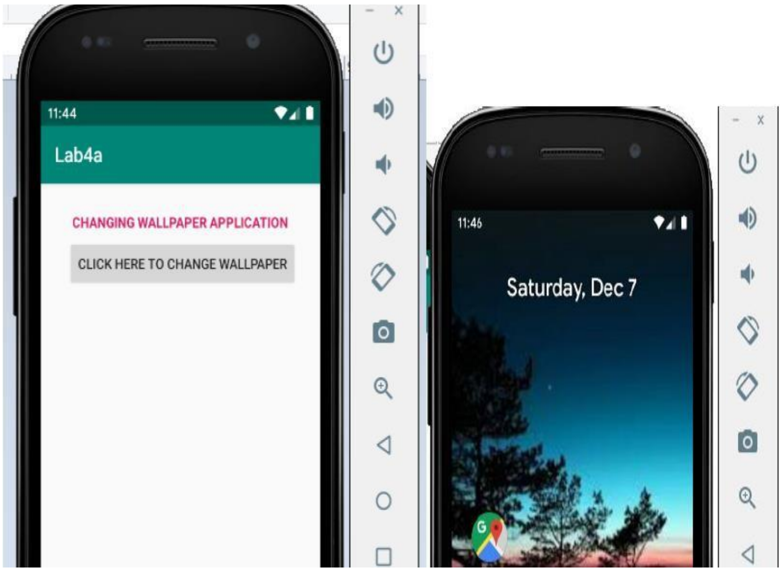
```
<?xml version="1.0" encoding="utf-8"?>
<androidx.constraintlayout.widget.ConstraintLayout
xmlns:android="http://schemas.android.com/apk/res/android"
xmlns:app="http://schemas.android.com/apk/res-auto"
xmlns:tools="http://schemas.android.com/tools"
android:layout_width="match_parent" android:layout_height="match_parent"
tools:context=".MainActivity">

<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); } }
```


11:44
Lab4a
CHANGING WALLPAPER APPLICATION
CLICK HERE TO CHANGE WALLPAPER
11:46
Saturday, Dec 7

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.

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">
<TextView
android:layout_width="wrap_content"
android:layout_height="wrap_content"
android:text="COUNTER APPLICATION"
android:textColor="@color/design_default_color_primary_dark"
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>
```

MainActivity.java

```
package com.example.a5a;
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;
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 final Runnable updateTimerThread = new Runnable() {
@Override
public void run() {
```

```
txtcounter.setText(""+i);
customHandler.postDelayed(this,1000);
i++;
}
};
}
```

Program 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”.

JAVA CODE:

```
import android.os.Bundle;
import android.util.Log;
import android.util.Xml;
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 org.xml.sax.SAXException;
import org.xmlpull.v1.XmlPullParser;
import org.xmlpull.v1.XmlPullParserException;
import java.io.IOException;
import java.io.InputStream;
import java.nio.charset.StandardCharsets;
import javax.xml.parsers.DocumentBuilder;
import javax.xml.parsers.DocumentBuilderFactory;
import javax.xml.parsers.ParserConfigurationException;

public class MainActivity extends AppCompatActivity {

   Button parseXmlBtn, parseJsonBtn;
   TextView displayTextView;

   @Override
   protected void onCreate(Bundle savedInstanceState) {
      super.onCreate(savedInstanceState);
      setContentView(R.layout.activity_main);

      parseJsonBtn = findViewById(R.id.parseJsonBtn);
      parseXmlBtn = findViewById(R.id.parseXmlBtn);

      displayTextView = findViewById(R.id.displayTextView);
```

```
    parseXmlBtn.setOnClickListener(new View.OnClickListener() {
      @Override
      public void onClick(View v) {
        try {
          InputStream is = getAssets().open("city.xml");

          DocumentBuilderFactory documentBuilderFactory =
DocumentBuilderFactory.newInstance();
          DocumentBuilder documentBuilder =
documentBuilderFactory.newDocumentBuilder();
          Document document = documentBuilder.parse(is);

          StringBuilder stringBuilder = new StringBuilder();
          stringBuilder.append("XML Data");
          stringBuilder.append("\n --------- ");

          NodeList nodeList = document.getElementsByTagName("place");

          for (int i = 0; i < nodeList.getLength(); i++) {
            Node node = nodeList.item(i);
            if (node.getNodeType() == Node.ELEMENT_NODE) {
              Element element = (Element) node;

              stringBuilder.append("\nName: ").append(getValue("name", element));
              stringBuilder.append("\nLatitude: ").append(getValue("lat", element));
              stringBuilder.append("\nLongitude: ").append(getValue("long", element));
              stringBuilder.append("\nTemperature: ").append(getValue("temperature",
element));
              stringBuilder.append("\nHumidity: ").append(getValue("humidity", element));
              stringBuilder.append("\n--------- ");
            }
          }
          displayTextView.setText(stringBuilder.toString());

        } catch (Exception e) {
          e.printStackTrace();
          Toast.makeText(MainActivity.this, "Error Parsing XML",
Toast.LENGTH_SHORT).show();
        }
      }
    });

    parseJsonBtn.setOnClickListener(new View.OnClickListener() {
      @Override
      public void onClick(View v) {
        String json;
        StringBuilder stringBuilder = new StringBuilder();
        try {
          InputStream is = getAssets().open("city.json");
```

```
                int size = is.available();

                byte[] buffer = new byte[size];

                is.read(buffer);

                json = new String(buffer, StandardCharsets.UTF_8);

                JSONArray jsonArray = new JSONArray(json);
                stringBuilder.append("JSON Data");
                stringBuilder.append("\n --------- ");
                for (int i = 0; i < jsonArray.length(); i++) {
                    JSONObject jsonObject = jsonArray.getJSONObject(i);
                    stringBuilder.append("\nName: ").append(jsonObject.getString("name"));
                    stringBuilder.append("\nLatitude: ").append(jsonObject.getString("lat"));
                    stringBuilder.append("\nLongitude: ").append(jsonObject.getString("long"));
                    stringBuilder.append("\nTemperature:
").append(jsonObject.getString("temperature"));
                    stringBuilder.append("\nHumidity: ").append(jsonObject.getString("humidity"));
                    stringBuilder.append("\n ---------");
                }
                displayTextView.setText(stringBuilder.toString());

                is.close();
            } catch (IOException | JSONException e) {
                e.printStackTrace();
                Toast.makeText(MainActivity.this, "Error in parsing JSON data from!",
Toast.LENGTH_SHORT).show();
            }
        }
    });
  }

  private String getValue(String tag, Element element) {
      return
element.getElementsByTagName(tag).item(0).getChildNodes().item(0).getNodeValue();
  }
}
```

XML-CODE:

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout 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"
  android:orientation="vertical"
  tools:context=".MainActivity">
  <TextView
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:layout_margin="16dp"
    android:text="Parsing XML and JSON Data"
    android:textAlignment="center"
    android:textSize="32sp" />

  <Button
    android:id="@+id/parseXmlBtn"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:layout_margin="16dp"
    android:text="Parse XML" />

  <Button
    android:id="@+id/parseJsonBtn"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:layout_margin="16dp"
    android:text="Parse JSON" />

  <TextView
    android:id="@+id/displayTextView"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:layout_margin="16dp"
    android:text=""
    android:textAlignment="center" />

</LinearLayout>
```

Program-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.

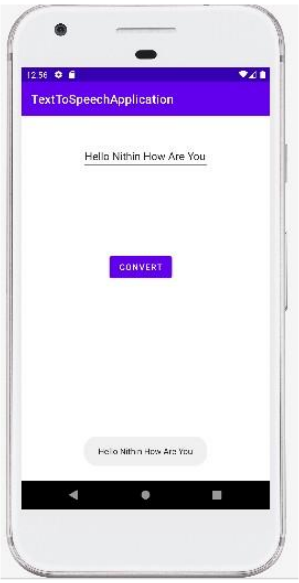
XML-CODE:

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

    <TextView
        android:id="@+id/textView"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignParentEnd="true"
        android:layout_alignParentRight="true"
        android:layout_alignParentBottom="true"
        android:layout_marginEnd="59dp"
        android:layout_marginRight="59dp"
        android:layout_marginBottom="649dp"
        android:text="Text2SpeechApp"
        android:textSize="40dp" />

    <EditText
        android:id="@+id/editText"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignParentEnd="true"
        android:layout_alignParentRight="true"
        android:layout_alignParentBottom="true"
        android:layout_marginEnd="101dp"
        android:layout_marginRight="101dp"
        android:layout_marginBottom="514dp"
        android:ems="10"
        android:hint="Enter the text to be converted"
        android:inputType="textPersonName"
        android:text="" />

    <Button
        android:id="@+id/button"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignParentEnd="true"
        android:layout_alignParentRight="true"
        android:layout_alignParentBottom="true"
        android:layout_marginEnd="162dp"
        android:onClick="convert"
        android:layout_marginRight="162dp"
        android:layout_marginBottom="329dp"
        android:text="Convert" />
</RelativeLayout>
```

JAVA-CODE:

```
import androidx.appcompat.app.AppCompatActivity;
import android.os.Bundle;
import android.speech.tts.TextToSpeech;
import android.view.View;
import android.widget.EditText;
import android.widget.Toast;

import java.util.Locale;

public class MainActivity extends AppCompatActivity {
    TextToSpeech t1;
    EditText e1;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        e1 = (EditText)findViewById(R.id.editText);
        t1 = new TextToSpeech(getApplicationContext(), new
TextToSpeech.OnInitListener() {
            @Override
            public void onInit(int status) {
                if (status!=TextToSpeech.ERROR){
                    t1.setLanguage(Locale.UK);
                }
            }
        });
    }
    public void convert(View view){
        String tospeak = e1.getText().toString();
Toast.makeText(getBaseContext(),tospeak,Toast.LENGTH_LONG).show();
        t1.speak(tospeak,TextToSpeech.QUEUE_FLUSH,null);
    }
}
```

OUTPUT:



Hello Nithin How Are You

Hello Nithin How Are You

Program 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.

JAVA-CODE:

```
import android.content.Intent;
import  android.net.Uri;
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 {
   EditText phoneNumberEditText;
   Button clearBtn, callBtn, saveBtn;

   @Override
   protected void onCreate(Bundle savedInstanceState) {
      super.onCreate(savedInstanceState);
      setContentView(R.layout.activity_main);

      phoneNumberEditText = findViewById(R.id.phoneNumberEditText);

      clearBtn = findViewById(R.id.clearBtn);
      callBtn = findViewById(R.id.callBtn);
      saveBtn = findViewById(R.id.saveBtn);

      clearBtn.setOnClickListener(new View.OnClickListener() {
         @Override
         public void onClick(View v) {
            phoneNumberEditText.setText("");
         }
      });

      callBtn.setOnClickListener(new View.OnClickListener() {
         @Override
         public void onClick(View v) {
            String phoneNumber = phoneNumberEditText.getText().toString();

            Intent intent = new Intent(Intent.ACTION_DIAL);
            intent.setData(Uri.parse("tel:" + phoneNumber));
            startActivity(intent);
         }
      });
```

```
        saveBtn.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                String phoneNumber = phoneNumberEditText.getText().toString();

                Intent intent = new Intent(Intent.ACTION_INSERT);
                intent.setType(ContactsContract.Contacts.CONTENT_TYPE);
                intent.putExtra(ContactsContract.Intents.Insert.PHONE, phoneNumber);
                startActivity(intent);
            }
        });

    }

    public void inputNumber(View v) {
        Button btn = (Button)v;
        String digit = btn.getText().toString();
        String phoneNumber = phoneNumberEditText.getText().toString();
        phoneNumberEditText.setText(phoneNumber + digit);
    }

}
```

XML-CODE:

```
<?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">

    <EditText
        android:id="@+id/phoneNumberEditText"
        android:layout_width="0dp"
        android:layout_height="wrap_content"
        android:layout_margin="16dp"
        android:layout_marginTop="24dp"
        android:inputType="phone"
        android:textSize="24sp"
        app:layout_constraintEnd_toStartOf="@+id/clearBtn"
        app:layout_constraintHorizontal_bias="0.5"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent" />

    <Button
        android:id="@+id/clearBtn"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_margin="16dp"
        android:text="Clear"
        app:layout_constraintBottom_toBottomOf="@+id/phoneNumberEditText"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.5"
        app:layout_constraintStart_toEndOf="@+id/phoneNumberEditText"
        app:layout_constraintTop_toTopOf="@+id/phoneNumberEditText" />

    <TableLayout
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_marginTop="32dp"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@id/phoneNumberEditText">

        <TableRow
          android:layout_width="match_parent"
          android:layout_height="match_parent"
          android:gravity="center_horizontal">

          <Button
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_margin="8dp"
            android:onClick="inputNumber"
            android:text="7" />

          <Button
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_margin="8dp"
            android:onClick="inputNumber"
            android:text="8" />

          <Button
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_margin="8dp"
            android:onClick="inputNumber"
```

```
            android:text="9" />

    </TableRow>

    <TableRow
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:gravity="center_horizontal">

        <Button
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_margin="8dp"
            android:onClick="inputNumber"
            android:text="4" />

        <Button
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_margin="8dp"
            android:onClick="inputNumber"
            android:text="5" />

        <Button
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_margin="8dp"
            android:onClick="inputNumber"
            android:text="6" />

    </TableRow>

    <TableRow
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:gravity="center_horizontal">

        <Button
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_margin="8dp"
            android:onClick="inputNumber"
            android:text="1" />

        <Button
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_margin="8dp"
            android:onClick="inputNumber"
            android:text="2" />

        <Button
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_margin="8dp"
            android:onClick="inputNumber"
            android:text="3" />

    </TableRow>

    <TableRow
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:gravity="center_horizontal">

        <Button
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_margin="8dp"
            android:onClick="inputNumber"
            android:text="*" />

        <Button
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_margin="8dp"
            android:onClick="inputNumber"
            android:text="0" />

        <Button
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_margin="8dp"
            android:onClick="inputNumber"
            android:text="#" />

    </TableRow>

    <TableRow
        android:layout_width="match_parent"
        android:layout_height="match_parent"
        android:gravity="center_horizontal">
```

```
         <Button
            android:id="@+id/callBtn"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_margin="8dp"
            android:text="Call" />

         <Button
            android:id="@+id/saveBtn"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:layout_margin="8dp"
            android:text="Save" />

      </TableRow>
   </TableLayout>


</androidx.constraintlayout.widget.ConstraintLayout>
```

Program 9. (PART-B): 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.

XML-CODE:

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


    <SeekBar
        android:id="@+id/seekBar"
        android:layout_width="255dp"
        android:layout_height="28dp"
        android:layout_alignParentEnd="true"
        android:layout_alignParentBottom="true"
        android:layout_marginEnd="66dp"
        android:layout_marginBottom="311dp" />

    <ImageButton
        android:id="@+id/rewind"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignParentEnd="true"
        android:layout_alignParentBottom="true"
        android:layout_marginEnd="256dp"
        android:layout_marginBottom="219dp"
        app:srcCompat="@android:drawable/ic_media_rew" />

    <ImageButton
        android:id="@+id/playButton"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignParentEnd="true"
        android:layout_alignParentBottom="true"
        android:layout_marginEnd="168dp"
        android:layout_marginBottom="223dp"
        app:srcCompat="@android:drawable/ic_lock_power_off" />

    <ImageButton
        android:id="@+id/forward"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignParentEnd="true"
        android:layout_alignParentBottom="true"
        android:layout_marginEnd="79dp"
        android:layout_marginBottom="220dp"
        app:srcCompat="@android:drawable/ic_media_ff" />


</RelativeLayout>
```

Java CODE:

```
import androidx.appcompat.app.AppCompatActivity;
import android.annotation.SuppressLint;
import android.media.MediaPlayer;
import android.os.Bundle;
import android.os.Handler;
import android.view.View;
import android.widget.ImageButton;
import android.widget.SeekBar;
import android.widget.Toast;

public class MainActivity extends AppCompatActivity {

    private ImageButton playButton,forward,rewind;
    private SeekBar seekbar;
    private MediaPlayer  mediaPlayer;
    private Handler handler = new Handler();
    @SuppressLint("ClickableViewAccessibility")

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        playButton = findViewById(R.id.playButton);
        forward = findViewById(R.id.forward);
        rewind = findViewById(R.id.rewind);
        seekbar = findViewById(R.id.seekBar);
        prepareMediaPlayer();
        seekbar.setMax(100);
        playButton.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                if(mediaPlayer.isPlaying()){
                    handler.removeCallbacks(updater);
                    mediaPlayer.pause();

                }else {
                    mediaPlayer.start();

                    updateSeekBar();
                }
            }
        });
        forward.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                if(mediaPlayer.getDuration()>mediaPlayer.getCurrentPosition() +
10000){
                    mediaPlayer.seekTo(mediaPlayer.getCurrentPosition() + 10000);
                    updateSeekBar();
                }
            }
        });
        rewind.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                if(mediaPlayer.getCurrentPosition()>10000){
                    mediaPlayer.seekTo(mediaPlayer.getCurrentPosition() - 10000);
                    updateSeekBar();
                }
            }
        });
        seekbar.setOnTouchListener((v, event) -> {
            SeekBar s = (SeekBar) v;
            int position = (mediaPlayer.getDuration()/100)*s.getProgress();
            mediaPlayer.seekTo(position);
            return false;
        });
        mediaPlayer.setOnCompletionListener(new
MediaPlayer.OnCompletionListener() {
            @Override
            public void onCompletion(MediaPlayer mp) {
                seekbar.setProgress(0);
                mediaPlayer.reset();
                prepareMediaPlayer();
            }
        });
    }
    private void prepareMediaPlayer (){
        try {
            mediaPlayer =MediaPlayer.create(this,R.raw.poc);
        }catch (Exception e){
            Toast.makeText(this, e.getMessage(), Toast.LENGTH_LONG).show();
        }
    }
    private Runnable updater = new Runnable() {
        @Override
        public void run() {
            updateSeekBar();
        }
    };
    private void updateSeekBar(){
        if(mediaPlayer.isPlaying()){

seekbar.setProgress((int)((float)mediaPlayer.getCurrentPosition()/mediaPlayer.
getDuration()*100));
            handler.postDelayed(updater,1000);
        }
    }
}
```

Program 10: (PART-B): 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".

XML-CODE:

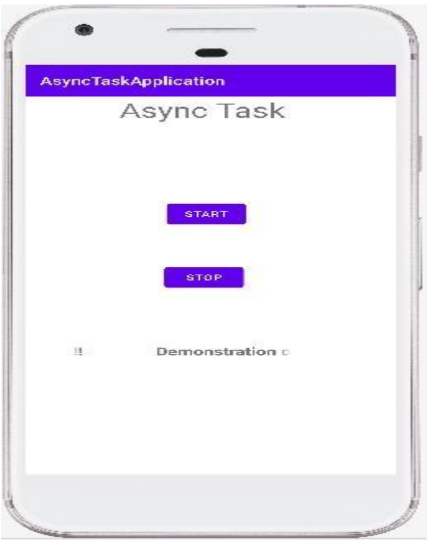
```
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout xmlns:android="http://schemas.android.com/apk/res/android"
   xmlns:app="http://schemas.android.com/apk/res-auto"
   xmlns:tools="http://schemas.android.com/tools"
   android:layout_width="match_parent"
   android:layout_height="match_parent"
   tools:context=".MainActivity">
   <TextView
      android:layout_width="wrap_content"
      android:layout_height="wrap_content"
      android:layout_alignParentEnd="true"
      android:layout_alignParentBottom="true"
      android:layout_marginEnd="123dp"
      android:layout_marginBottom="630dp"
      android:text="Async Task"
      android:textSize="36sp"
      app:layout_constraintBottom_toBottomOf="parent"
      app:layout_constraintLeft_toLeftOf="parent"
      app:layout_constraintRight_toRightOf="parent"
      app:layout_constraintTop_toTopOf="parent" />
   <Button
      android:id="@+id/buttonstart"
      android:layout_width="wrap_content"
      android:layout_height="wrap_content"
      android:layout_alignParentEnd="true"
      android:layout_alignParentBottom="true"
      android:layout_marginEnd="167dp"
      android:layout_marginBottom="441dp"
      android:text="Start" />
   <Button
      android:id="@+id/buttonstop"
      android:layout_width="wrap_content"
      android:layout_height="wrap_content"
      android:layout_alignParentEnd="true"
```

```
        android:layout_alignParentBottom="true"
        android:layout_marginEnd="169dp"
        android:layout_marginBottom="328dp"
        android:text="Stop" />
    <TextView
        android:id="@+id/marqueeText"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignParentEnd="true"
        android:layout_alignParentBottom="true"
        android:layout_marginStart="50dp"
        android:layout_marginTop="250dp"
        android:layout_marginEnd="117dp"
        android:layout_marginBottom="207dp"
        android:ellipsize="marquee"
        android:marqueeRepeatLimit="marquee_forever"
        android:scrollHorizontally="true"
        android:singleLine="true"
        android:text="Demonstration of Asynchronous Task !!!!"
        android:textSize="20sp"
        android:textStyle="bold"
        android:visibility="invisible" />
</RelativeLayout>
```

JAVA-CODE:

```
import androidx.appcompat.app.AppCompatActivity;
import android.os.AsyncTask;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.TextView;
import android.widget.Toast;
public class MainActivity extends AppCompatActivity {
    TextView marqtxt;
    Button btnstart, btnstop;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        marqtxt = (TextView) findViewById(R.id.marqueeText);
        btnstart = (Button) findViewById(R.id.buttonstart);
        btnstop = (Button) findViewById(R.id.buttonstop);
        btnstart.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                ExampleAsyncTask task = new ExampleAsyncTask();
                task.execute();
            }
        });
        btnstop.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                marqtxt.setSelected(false);
                marqtxt.setVisibility(View.INVISIBLE);
            }
        });
    }
    private class ExampleAsyncTask extends AsyncTask<String, String,String>{
        @Override
        protected void onPreExecute() {
            super.onPreExecute();
     Toast.makeText(getBaseContext(),"Async Task
Started!!!!!!!!",Toast.LENGTH_SHORT).show();
        }
       @Override
        protected String doInBackground(String... strings) {
            try {
                Thread.sleep(250);
            }
            catch (InterruptedException e){
                e.printStackTrace();
            }
            return null;
        }
        @Override
        protected void onPostExecute(String s) {
            super.onPostExecute(s);
            marqtxt.setVisibility(View.VISIBLE);
            marqtxt.setSelected(true);
        }
    }
}
```

OUTPUT:


AsyncTaskApplication
Async Task
START
STOP
Demonstration

Program 11: (PART-B): 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.

XML-CODE:

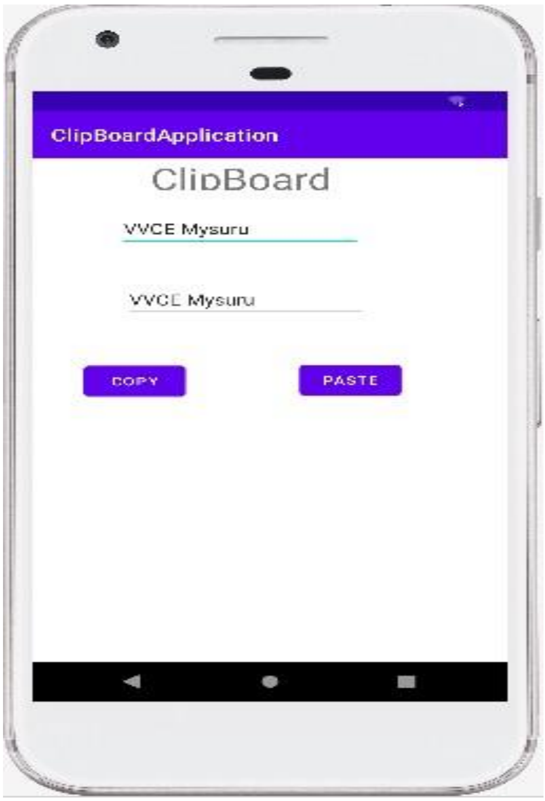
```
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout xmlns:android="http://schemas.android.com/apk/res/android"
   xmlns:app="http://schemas.android.com/apk/res-auto"
   xmlns:tools="http://schemas.android.com/tools"
   android:layout_width="match_parent"
   android:layout_height="match_parent"
   tools:context=".MainActivity">
   <TextView
      android:id="@+id/textView"
      android:layout_width="wrap_content"
      android:layout_height="wrap_content"
      android:layout_alignParentEnd="true"
      android:layout_alignParentBottom="true"
      android:layout_marginEnd="152dp"
      android:layout_marginBottom="564dp"
      android:text="ClipBoard"
      android:textSize="36sp" />
   <EditText
      android:id="@+id/editText1"
      android:layout_width="wrap_content"
      android:layout_height="wrap_content"
      android:layout_alignParentEnd="true"
      android:layout_alignParentBottom="true"
      android:layout_marginEnd="127dp"
      android:layout_marginBottom="496dp"
      android:ems="10"
      android:hint="Enter the text here"
      android:inputType="textPersonName"
      android:text="" />
   <EditText
      android:id="@+id/editText2"
      android:layout_width="wrap_content"
      android:layout_height="wrap_content"
      android:layout_alignParentEnd="true"
      android:layout_alignParentBottom="true"
      android:layout_marginEnd="122dp"
```

```
        android:layout_marginBottom="411dp"
        android:ems="10"
        android:hint="Copied Text"
        android:inputType="textPersonName"
        android:text="" />
    <Button
        android:id="@+id/copy"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignParentEnd="true"
        android:layout_alignParentBottom="true"
        android:layout_marginEnd="279dp"
        android:onClick="copy"
        android:layout_marginBottom="312dp"
        android:text="Copy" />
    <Button
        android:id="@+id/paste"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignParentEnd="true"
        android:layout_alignParentBottom="true"
        android:layout_marginEnd="92dp"
        android:onClick="paste"
        android:layout_marginBottom="313dp"
        android:text="Paste" />
</RelativeLayout>
```

JAVA-CODE:

```
import androidx.appcompat.app.AppCompatActivity;
import android.content.ClipData;
import android.content.ClipboardManager;
import android.os.Bundle;
import android.view.View;
import android.widget.EditText;
public class MainActivity extends AppCompatActivity {
    ClipboardManager cbm;
    ClipData cd;
    EditText e1,e2;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        e1 = (EditText)findViewById(R.id.editText1);
        e2 = (EditText)findViewById(R.id.editText2);
        cbm =(ClipboardManager)getSystemService(CLIPBOARD_SERVICE);
    }
    public void copy(View V){
        String text = e1.getText().toString();
        cd = ClipData.newPlainText("text",text);
        cbm.setPrimaryClip(cd);
    }
    public void paste(View V){
        ClipData cd2 = cbm.getPrimaryClip();
        ClipData.Item item = cd2.getItemAt(0);
        String copied = item.getText().toString();
        e2.setText(copied);
    }
}
```

OUTPUT:



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MOBILE APPLICATION DEVELOPMENT

COURSE CODE:18CSMP68

Sample Viva Questions

1. What is an Android?
2. Illustrate the Android lifecycle Activity.
3. What Is an Android SDK?
4. What is Android "compatibility"?
5. What are the key components Android Architecture?
6. Describe the Android Framework.
7. What are the data types supported by AIDL?
8. What is Gradle Framework ?
9. Why do we need AVD?
10. How do you add gradle dependencies ?
11. What is the difference between Mobile Application Testing and Mobile Testing?
12. What are the different data storage options available on the Android platform?
13. The list of data storage options on the Android platform.
14. Describe Activities.
15. What are Intents? What are the types of Intents?
16. What is Application class?
17. What is a View?
18. What is a view Group?
19. What are these UI components that we can use in our application?
20. Define Constraint Layout.
21. Why did we need Constraint Layout?
22. What are the different types of Android widgets?
23. Which are the files that demonstrate implementing and using of the custom widget?
24. Enumerate the three key loops while monitoring an activity?
25. What are the major steps involved in creating a bounded service through AIDL?

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