JECRC JAIPUR

Department of Information Technology

Academic Year 2020-2021(Even Semester)

SESSION: MARCH 2021 – JULY 2021

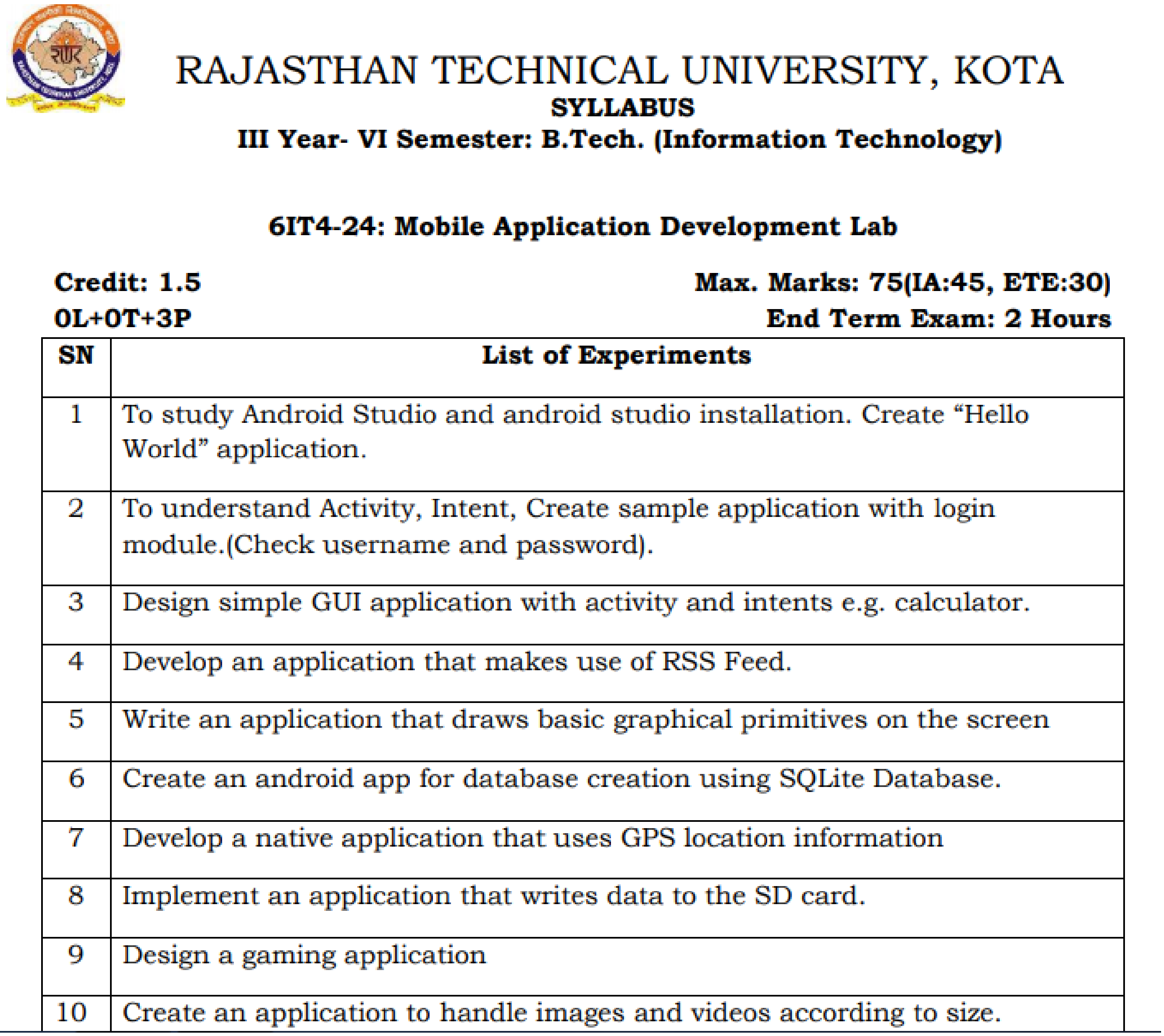
VI
SEMESTER

MOBILE APPLICATION DEVELOPMENT LAB MANUAL

SUBJECT CODE: 6IT4-24

Faculty: Ms. Deepika Bansal

Syllabus by RTU:



RAJASTHAN TECHNICAL UNIVERSITY, KOTA

SYLLABUS

III Year- VI Semester: B.Tech. (Information Technology)

6IT4-24: Mobile Application Development Lab

Credit: 1.5 **Max. Marks: 75(IA:45, ETE:30)**

0L+0T+3P **End Term Exam: 2 Hours**

SN	List of Experiments
1	To study Android Studio and android studio installation. Create “Hello World” application.
2	To understand Activity, Intent, Create sample application with login module.(Check username and password).
3	Design simple GUI application with activity and intents e.g. calculator.
4	Develop an application that makes use of RSS Feed.
5	Write an application that draws basic graphical primitives on the screen
6	Create an android app for database creation using SQLite Database.
7	Develop a native application that uses GPS location information
8	Implement an application that writes data to the SD card.
9	Design a gaming application
10	Create an application to handle images and videos according to size.

Course Objective:

CO1) Learn and Apply essential Android Programming concepts.
CO2) Develop various Android applications related to layouts & rich uses interactive interfaces
CO3) Develop Android applications related to mobile related server-less database like SQLITE

Experiment 1:

To study Android Studio and android studio installation. Create “Hello World” application

Procedure:-

Android Studio is the official integrated development environment for Google’s Android operating system, built on JetBrains’ IntelliJ IDEA software and designed specifically for Android development.

Operating system: Windows, macOS, Linux

Stable release: 3.1.3 (June 2018; 1 month ago)

Preview release: 3.2 Beta 5 (July 30, 2018; 1 day ago)

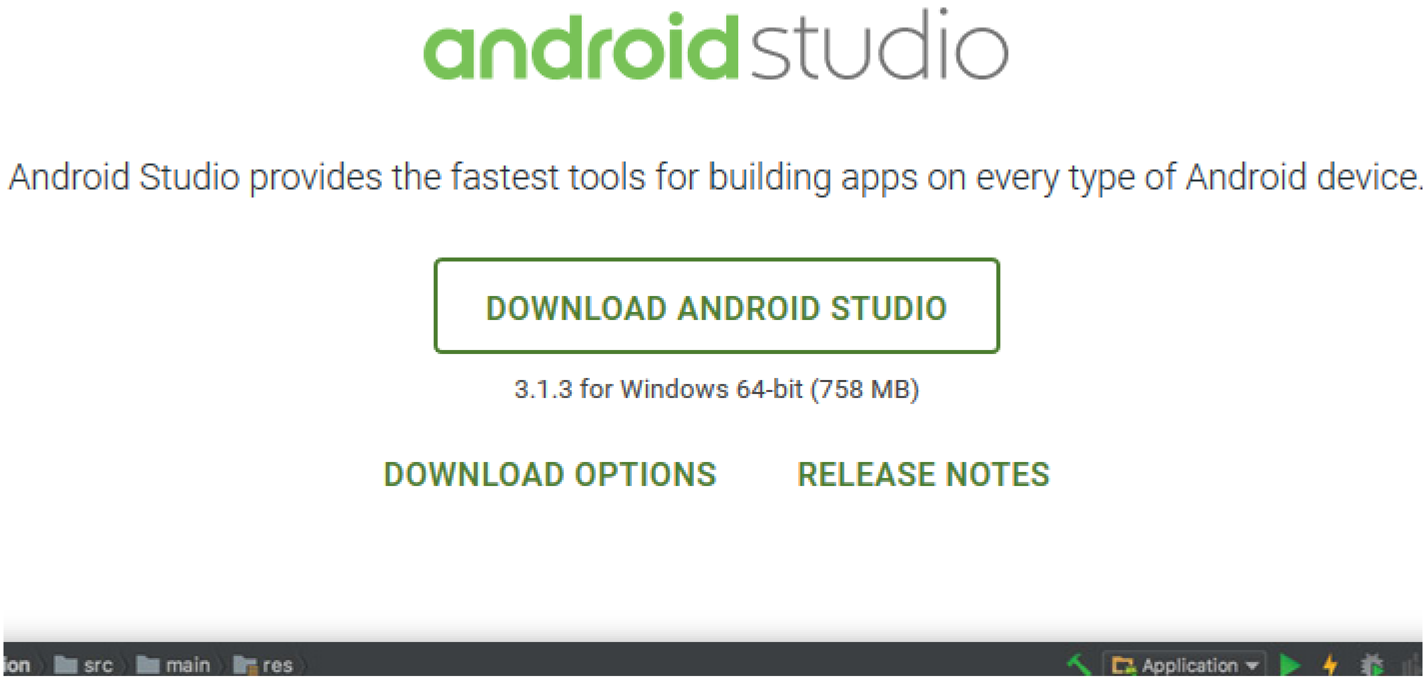
License: Freeware +Source code

Size: 854 MB compressed

Developed by: Google, JetBrains

Installation guide:

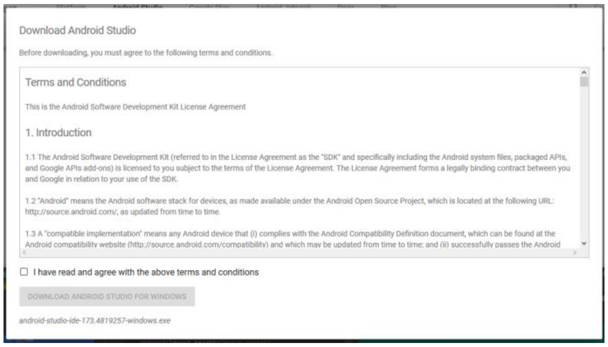
- **Step – 1 :**
  Head over to **this link** to get the Android Studio executable or zip file .
- **Step – 2 :**
  Click on the download android studio button .



android studio

Android Studio provides the fastest tools for building apps on every type of Android device.

Click on the "I have read and agree with the above terms and conditions" checkbox followed by the download button.



Download Android Studio

Before downloading, you must agree to the following terms and conditions.

Terms and Conditions

This is the Android Software Development Kit License Agreement

1. Introduction

1.1 The Android Software Development Kit (referred to in the License Agreement as the "SDK" and specifically including the Android system files, packaged APIs, and Google APIs add-ons) is licensed to you subject to the terms of the License Agreement. The License Agreement forms a legally binding contract between you and Google in relation to your use of the SDK.

1.2 "Android" means the Android software stack for devices, as made available under the Android Open Source Project, which is located at the following URL: http://source.android.com/, as updated from time to time.

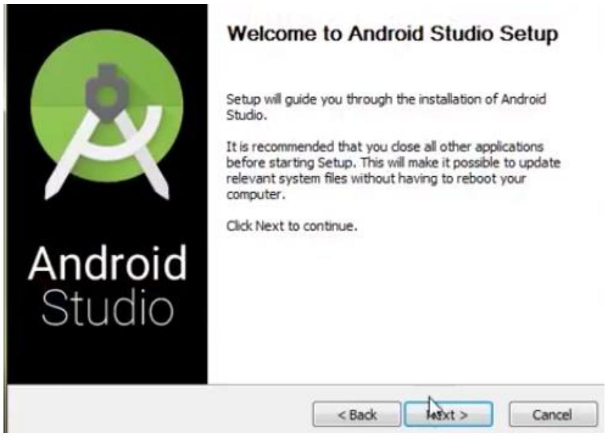
1.3 A "compatible implementation" means any Android device that (i) complies with the Android Compatibility Definition document, which can be found at the Android compatibility website (http://source.android.com/compatibility) and which may be updated from time to time; and (ii) successfully passes the Android

☐ I have read and agree with the above terms and conditions

android-studio-ide-173.4819257-windows.exe

Click on Save file button in the appeared prompt box and the file will start downloading .

- **Step – 3:**
  After the downloading has finished, open the file from downloads and run it .
  It will prompt the following dialogue box .



Welcome to Android Studio Setup

Setup will guide you through the installation of Android Studio.

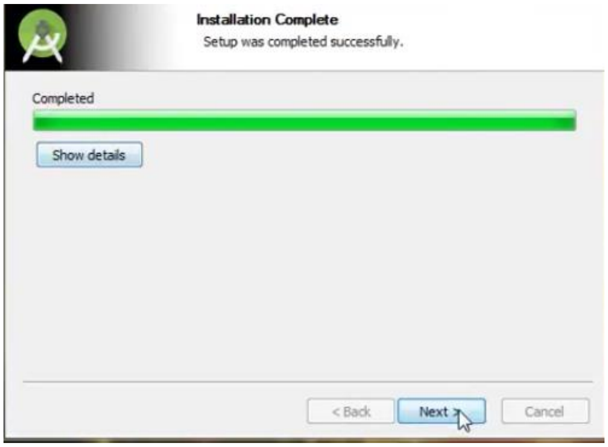
It is recommended that you close all other applications before starting Setup. This will make it possible to update relevant system files without having to reboot your computer.

Click Next to continue.

Click on next .
In the next prompt it'll ask for a path for installation. Choose a path and hit next.

Note : The installation path should have the required minimum space.

- **Step – 4 :**
  It will start the installation, and once it is completed, it will be like the image shown below .

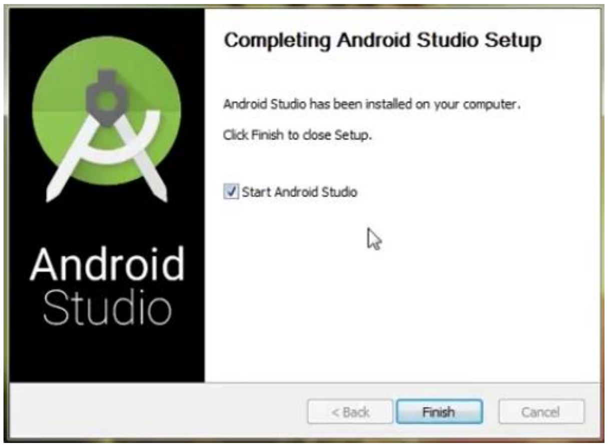


Installation Complete

Setup was completed successfully.

Completed

Click on next .



Completing Android Studio Setup

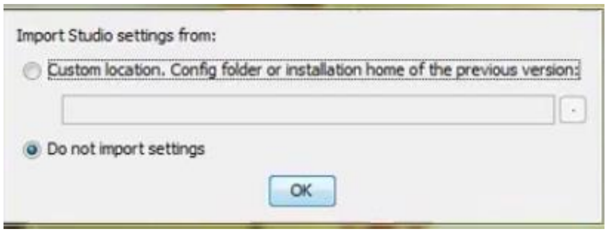
Android Studio has been installed on your computer.

Click Finish to close Setup.

☑ Start Android Studio

- **Step – 5 :**

Once "Finish" is clicked, it will ask whether the previous settings needs to be impoerted [if android studio had been installed earlier], or not.
It is better to choose the 'Don't import Settings option' .



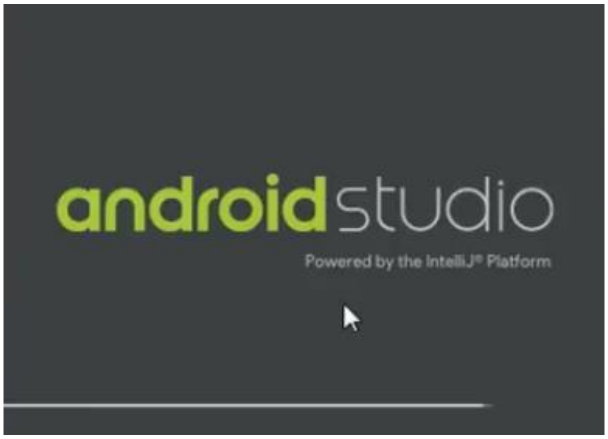
Import Studio settings from:

○ Custom location. Config folder or installation home of the previous version:

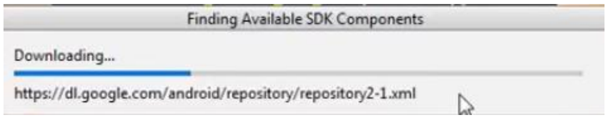
● Do not import settings

Click the OK button.

- **Step – 6 :**
  This will start the Android Studio.



Meanwhile it will be finding the available SDK components .

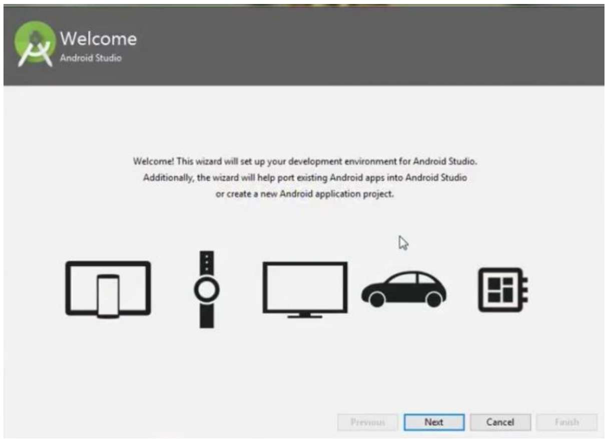


Finding Available SDK Components

Downloading...

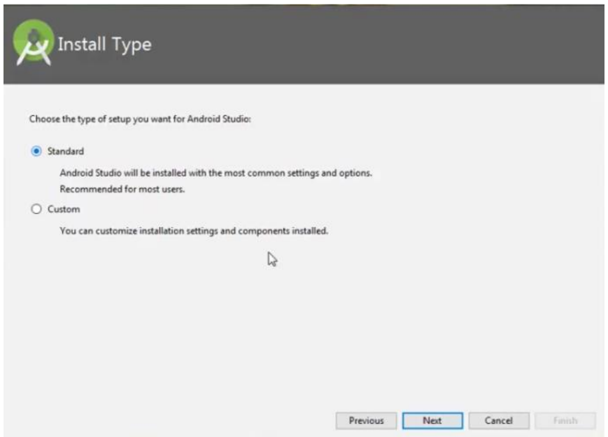
https://dl.google.com/android/repository/repository2-1.xml

- **Step – 7:**
  After it has found the SDK components, it will redirect to the Welcome dialog box .



Welcome! This wizard will set up your development environment for Android Studio. Additionally, the wizard will help port existing Android apps into Android Studio or create a new Android application project.

Click on next .



Choose the type of setup you want for Android Studio:

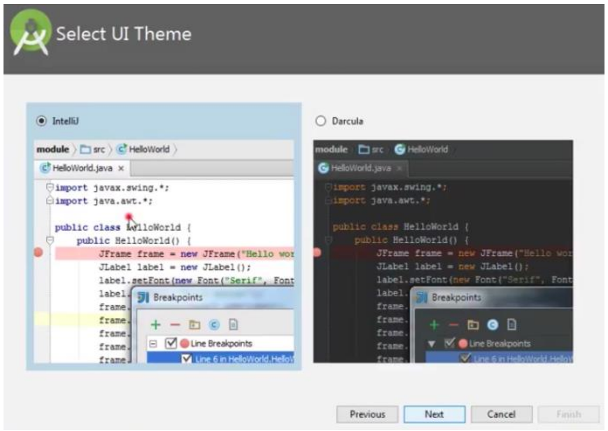
● Standard

Android Studio will be installed with the most common settings and options.
Recommended for most users.

○ Custom

You can customize installation settings and components installed.

Choose Standard and click on Next.
Now choose the theme, whether Light theme or the Dark one .
The light one is called the IntelliJ theme whereas the dark theme is called Darcula .
Choose as required.

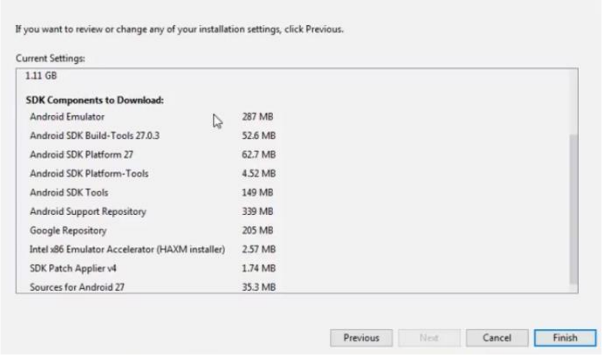


```
import javax.swing.*;
import java.awt.*;

public class HelloWorld {
    public HelloWorld() {
        JFrame frame = new JFrame("Hello wor
        JLabel label = new JLabel();
        label.setFont(new Font("Serif", Font
        label.
        frame.
        frame.
        frame.
        frame.
        frame.
```

Click on the Next button

- **Step – 8 :**
  Now it is time to download the SDK components .



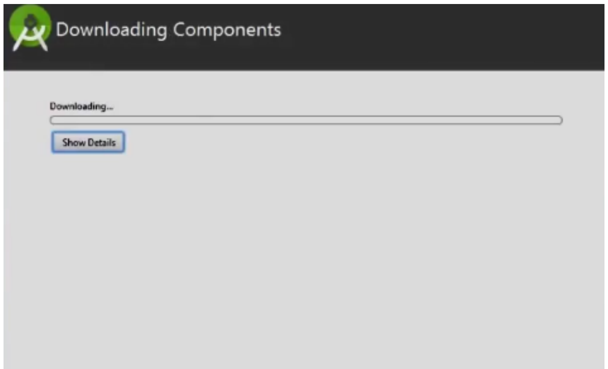
If you want to review or change any of your installation settings, click Previous.

Current Settings:

```
1.11 GB

SDK Components to Download:
 Android Emulator                                  287 MB
 Android SDK Build-Tools 27.0.3                    52.6 MB
 Android SDK Platform 27                           62.7 MB
 Android SDK Platform-Tools                        4.52 MB
 Android SDK Tools                                 149 MB
 Android Support Repository                        339 MB
 Google Repository                                 205 MB
 Intel x86 Emulator Accelerator (HAXM installer)   2.57 MB
 SDK Patch Applier v4                              1.74 MB
 Sources for Android 27                            35.3 MB
```

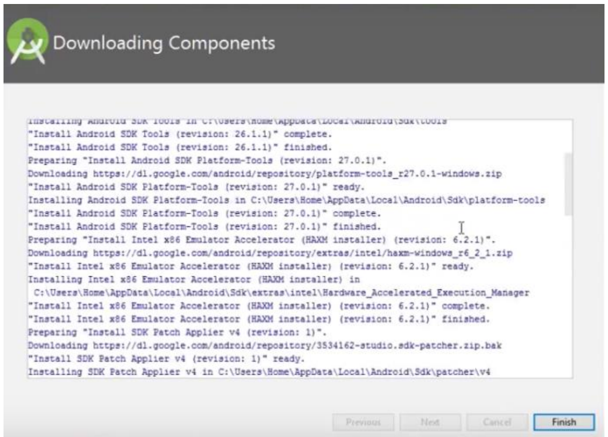
Click on Finish .



Downloading Components

Downloading...

It has started downloading the components



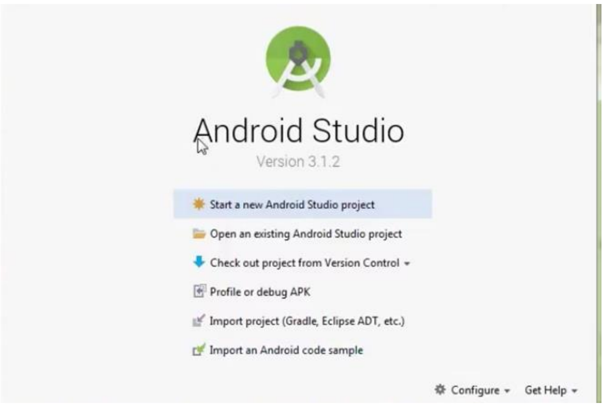
Downloading Components

```
Installing Android SDK Tools in C:\Users\Home\AppData\Local\Android\Sdk\tools
"Install Android SDK Tools (revision: 26.1.1)" complete.
"Install Android SDK Tools (revision: 26.1.1)" finished.
Preparing "Install Android SDK Platform-Tools (revision: 27.0.1)".
Downloading https://dl.google.com/android/repository/platform-tools_r27.0.1-windows.zip
"Install Android SDK Platform-Tools (revision: 27.0.1)" ready.
Installing Android SDK Platform-Tools in C:\Users\Home\AppData\Local\Android\Sdk\platform-tools
"Install Android SDK Platform-Tools (revision: 27.0.1)" complete.
"Install Android SDK Platform-Tools (revision: 27.0.1)" finished.
Preparing "Install Intel x86 Emulator Accelerator (HAXM installer) (revision: 6.2.1)".
Downloading https://dl.google.com/android/repository/extras/intel/haxm-windows_r6_2_1.zip
"Install Intel x86 Emulator Accelerator (HAXM installer) (revision: 6.2.1)" ready.
Installing Intel x86 Emulator Accelerator (HAXM installer) in
 C:\Users\Home\AppData\Local\Android\Sdk\extras\intel\Hardware_Accelerated_Execution_Manager
"Install Intel x86 Emulator Accelerator (HAXM installer) (revision: 6.2.1)" complete.
"Install Intel x86 Emulator Accelerator (HAXM installer) (revision: 6.2.1)" finished.
Preparing "Install SDK Patch Applier v4 (revision: 1)".
Downloading https://dl.google.com/android/repository/3534162-studio.sdk-patcher.zip.bak
"Install SDK Patch Applier v4 (revision: 1)" ready.
Installing SDK Patch Applier v4 in C:\Users\Home\AppData\Local\Android\Sdk\patcher\v4
```

The Android Studio has been successfully configured.Now it’s time to launch and build apps.

Click on the Finish button to launch it.

- **Step – 9 :**
  Click on ‘Start new android project’ to build a new app.


Android Studio
Version 3.1.2
Start a new Android Studio project
Open an existing Android Studio project
Check out project from Version Control
Profile or debug APK
Import project (Gradle, Eclipse ADT, etc.)
Import an Android code sample
Configure
Get Help

Experiment 2 :
To understand Activity, Intent, Create sample application with login module.(Check username and password).

Proceedure :- Activity_Main.xml:

```
<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"
    tools:context=".MainActivity" >

    <TextView
        android:id="@+id/textView1"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignParentLeft="true"
        android:layout_alignParentTop="true"
        android:layout_marginTop="56dp"
        android:text="@string/Username"
        android:textAppearance="?android:attr/textAppearanceMedium" />

    <EditText
        android:id="@+id/editText1"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignBottom="@+id/textView1"
        android:layout_alignParentRight="true"
        android:ems="10"
        android:inputType="text" />

    <TextView
        android:id="@+id/textView2"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignRight="@+id/textView1"
        android:layout_below="@+id/textView1"
        android:layout_marginTop="48dp"
        android:text="@string/Password"
        android:textAppearance="?android:attr/textAppearanceMedium" />

    <EditText
        android:id="@+id/editText2"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignBaseline="@+id/textView2"
        android:layout_alignBottom="@+id/textView2"
        android:layout_alignLeft="@+id/editText1"
        android:ems="10"
        android:inputType="textPassword" >

        <requestFocus />
    </EditText>

    <Button
        android:id="@+id/button1"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_below="@+id/editText2"
        android:layout_marginTop="68dp"
        android:layout_toLeftOf="@+id/editText2"
        android:text="@string/Login" />

    <Button
        android:id="@+id/button2"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignBaseline="@+id/button1"
        android:layout_alignBottom="@+id/button1"
        android:layout_alignLeft="@+id/editText2"
        android:layout_marginLeft="42dp"
        android:text="@string/Cancel"/>

</RelativeLayout>
```

Activity_Second.xml

```
<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" >

    <TextView
        android:id="@+id/textView1"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_centerHorizontal="true"
        android:layout_centerVertical="true"
        android:text="@string/Secondform"
        tools:context=".Second" />

    <Button
        android:id="@+id/button1"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_below="@+id/textView1"
        android:layout_centerHorizontal="true"
        android:layout_marginTop="22dp"
        android:text="@string/Logout" />

</RelativeLayout>
```

MainActivity.java

```
package com.example.loginform;

import android.os.Bundle;
import android.annotation.SuppressLint;
import android.app.Activity;
import android.content.Intent;
import android.view.*;
import android.view.View.OnClickListener;
import android.widget.*;

public class MainActivity extends Activity implements OnClickListener{

            EditText name;
            EditText pass;
            Button login;
            Button cancel;

                @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        name=(EditText )findViewById(R.id.editText1);
        pass=(EditText )findViewById(R.id.editText2);
        login=(Button )findViewById(R.id.button1);
        cancel=(Button )findViewById(R.id.button2);
        login.setOnClickListener(this);
        cancel.setOnClickListener(this);
    }

    @Override
    public boolean onCreateOptionsMenu(Menu menu) {
        getMenuInflater().inflate(R.menu.activity_main, menu);
        return true;
    }

            @SuppressLint("ShowToast") @Override
            public void onClick(View v) {
                        String na=name.getText().toString();
                        String pa=pass.getText().toString();
                        switch(v.getId())
                        {
                        case R.id.button1:
                                                if(na.equals("chaitu") && pa.equals("root") || pa.equals("admin")){
                                                            Intent i = new Intent(this,Second.class);
                                                            i.putExtra("c1", na);
                                                            startActivity(i);
                                                }
                                                else
                                                {
                                    Toast.makeText(this,"check #username or #Password",
3600).show();
                                                }
                                    break;

                        case R.id.button2:
                                    name.setText("");
                                    pass.setText("");
                                    break;

                        default:

                           break;
                        }

                        }

}
```

Second.java

```
package com.example.loginform;
import com.example.loginform.R;
import android.os.Bundle;
import android.app.Activity;
import android.view.*;
import android.view.View.OnClickListener;
import android.widget.*;
import android.content.*;

public class Second extends Activity implements OnClickListener{
	Button Logout;
	@Override
	protected void onCreate(Bundle savedInstanceState) {
		super.onCreate(savedInstanceState);
		setContentView(R.layout.activity_second);
		Intent i=getIntent();
		String str = i.getStringExtra("c1");
		TextView t1 = (TextView )findViewById(R.id.textView1);
		t1.setText("Logged In Successfully ! "+str);
		Logout=(Button )findViewById(R.id.button1);
      Logout.setOnClickListener(this);
	}

	@Override
	public boolean onCreateOptionsMenu(Menu menu) {
		getMenuInflater().inflate(R.menu.activity_second, menu);
		return true;
	}

	@Override
	public void onClick(View v1) {
switch(v1.getId())
		{
		case R.id.button1:
			Intent i = new Intent(this,MainActivity.class);
			startActivity(i);
			finish();
			System.exit(0);
			break;

		default:
			break;
		}

	}

}
```

Experiment 3:
Design simple GUI application with activity and intents e.g. calculator

Proceedure :-

- actibity_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"
    android:background="#8BC34A"
    android:backgroundTint="@android:color/darker_gray"
    tools:context=".MainActivity">

    <!-- Text View to display "gfg_myFirstApp "-->
    <TextView
        android:id="@+id/textView"
        android:layout_width="133dp"
        android:layout_height="28dp"
        android:layout_marginStart="139dp"
        android:layout_marginLeft="139dp"
        android:layout_marginTop="16dp"
        android:layout_marginEnd="139dp"
        android:layout_marginRight="139dp"
        android:layout_marginBottom="559dp"

        <!-- providing the green colour to the background -->
        android:background="#0F9D58"

        android:text="gfg_myFirstApp"
        android:textAppearance="@style/TextAppearance.AppCompat.Medium"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent" />

    <!-- Text View to display our basic heading of "calculator"-->
    <TextView
        android:layout_width="194dp"
        android:layout_height="43dp"
        android:layout_marginStart="114dp"
        android:layout_marginLeft="114dp"
        android:layout_marginTop="58dp"
        android:layout_marginEnd="103dp"
        android:layout_marginRight="103dp"
        android:layout_marginBottom="502dp"
        android:scrollbarSize="30dp"
        android:text="   Calculator"
        android:textAppearance="@style/TextAppearance.AppCompat.Body1"
        android:textSize="30dp"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent" />

    <!-- Edit Text View to input the values -->
    <EditText
        android:id="@+id/num1"
        android:layout_width="364dp"
        android:layout_height="28dp"
        android:layout_marginStart="72dp"
        android:layout_marginTop="70dp"
        android:layout_marginEnd="71dp"
        android:layout_marginBottom="416dp"
        android:background="@android:color/white"
        android:ems="10"
        android:hint="Number1(0)"
        android:inputType="number"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent" />

    <!-- Edit Text View to input 2nd value-->
    <EditText
        android:id="@+id/num2"
        android:layout_width="363dp"
        android:layout_height="30dp"
        android:layout_marginStart="72dp"
        android:layout_marginTop="112dp"
        android:layout_marginEnd="71dp"
        android:layout_marginBottom="374dp"
        android:background="@android:color/white"
        android:ems="10"
        android:hint="number2(0)"
        android:inputType="number"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent" />
```

```
<!-- Text View to display result -->
<TextView
   android:id="@+id/result"
   android:layout_width="356dp"
   android:layout_height="71dp"
   android:layout_marginStart="41dp"
   android:layout_marginTop="151dp"
   android:layout_marginEnd="48dp"
   android:layout_marginBottom="287dp"
   android:background="@android:color/white"
   android:text="result"
   android:textColorLink="#673AB7"
   android:textSize="25sp"
   app:layout_constraintBottom_toBottomOf="parent"
   app:layout_constraintEnd_toEndOf="parent"
   app:layout_constraintStart_toStartOf="parent"
   app:layout_constraintTop_toTopOf="parent" />

<!-- A button to perform 'sum' operation -->
<Button
   android:id="@+id/sum"
   android:layout_width="wrap_content"
   android:layout_height="wrap_content"
   android:layout_marginStart="16dp"
   android:layout_marginTop="292dp"
   android:layout_marginEnd="307dp"
   android:layout_marginBottom="263dp"
   android:backgroundTint="@android:color/holo_red_light"
   android:onClick="doSum"
   android:text="+"
   app:layout_constraintBottom_toBottomOf="parent"
   app:layout_constraintEnd_toEndOf="parent"
   app:layout_constraintStart_toStartOf="parent"
   app:layout_constraintTop_toTopOf="parent" />

<!-- A button to perform subtraction operation. -->
<Button
   android:id="@+id/sub"
   android:layout_width="wrap_content"
   android:layout_height="wrap_content"
   android:layout_marginStart="210dp"
   android:layout_marginTop="292dp"
   android:layout_marginEnd="113dp"
   android:layout_marginBottom="263dp"
   android:backgroundTint="@android:color/holo_red_light"
   android:onClick="doSub"
   android:text="-"
   app:layout_constraintBottom_toBottomOf="parent"
```

```
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toTopOf="parent" />

<!-- A button to perform division. -->
<Button
    android:id="@+id/div"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_marginStart="307dp"
    android:layout_marginTop="292dp"
    android:layout_marginEnd="16dp"
    android:layout_marginBottom="263dp"
    android:backgroundTint="@android:color/holo_red_light"
    android:onClick="doDiv"
    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" />

<!-- A button to perform multiplication. -->
<Button
    android:id="@+id/mul"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_marginStart="16dp"
    android:layout_marginTop="356dp"
    android:layout_marginEnd="307dp"
    android:layout_marginBottom="199dp"
    android:backgroundTint="@android:color/holo_red_light"
    android:onClick="doMul"
    android:text="x"
    app:layout_constraintBottom_toBottomOf="parent"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintTop_toTopOf="parent" />

<!-- A button to perform a modulus function. -->
<Button
    android:id="@+id/button"
    android:layout_width="92dp"
    android:layout_height="48dp"
    android:layout_marginStart="113dp"
    android:layout_marginTop="356dp"
    android:layout_marginEnd="206dp"
    android:layout_marginBottom="199dp"
```

```
        android:backgroundTint="@android:color/holo_red_light"
        android:onClick="doMod"
        android:text="%(mod)"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent" />

    <!-- A button to perform a power function. -->
    <Button
        android:id="@+id/pow"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_marginStart="113dp"
        android:layout_marginTop="292dp"
        android:layout_marginEnd="210dp"
        android:layout_marginBottom="263dp"
        android:backgroundTint="@android:color/holo_red_light"
        android:onClick="doPow"
        android:text="n1^n2"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent" />

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

--main.java---

```
package com.example.gfg_my_first_app;

import androidx.appcompat.app.AppCompatActivity;

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

public class MainActivity extends AppCompatActivity {

    EditText e1, e2;
    TextView t1;
    int num1, num2;

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

    // a public method to get the input numbers
    public boolean getNumbers()
    {

            // defining the edit text 1 to e1
            e1 = (EditText)findViewById(R.id.num1);

            // defining the edit text 2 to e2
            e2 = (EditText)findViewById(R.id.num2);

            // defining the text view to t1
            t1 = (TextView)findViewById(R.id.result);

            // taking input from text box 1
            s1 = e1.getText().toString();

            // taking input from text box 2
            s2 = e2.getText().toString();

            // condition to check if box is not empty
            if ((s1.equals(null) && s2.equals(null))
                || (s1.equals("") && s2.equals(""))) {

                String result = "Please enter a value";
                t1.setText(result);

                return false;
            }
            else {
                // converting string to int.
                num1 = Integer.parseInt(e1.getText().toString());

                // converting string to int.
                num2 = Integer.parseInt(e2.getText().toString());
            }

            return true;
    }

    // a public method to perform addition
    public void doSum(View v)
    {
            // get the input numbers
            if (getNumbers()) {
                int sum = num1 + num2;
                t1.setText(Integer.toString(sum));
            }
    }

    // a public method to perform power function
    public void doPow(View v)
    {

            // get the input numbers
            if (getNumbers()) {
                double sum = Math.pow(num1, num2);
                t1.setText(Double.toString(sum));
            }
    }

    // a public method to perform subtraction
    public void doSub(View v)
    {

            // get the input numbers
            if (getNumbers()) {
                int sum = num1 - num2;
                t1.setText(Integer.toString(sum));
            }
    }

    // a public method to perform multiplication
    public void doMul(View v)
    {

            // get the input numbers
            if (getNumbers()) {
                int sum = num1 * num2;
                t1.setText(Integer.toString(sum));
            }
    }
    // a public method to perform Division
    public void doDiv(View v)
    {

            // get the input numbers
            if (getNumbers()) {

                // displaying the text in text view assigned as t1
                double sum = num1 / (num2 * 1.0);
                t1.setText(Double.toString(sum));
            }
    }
    // a public method to perform modulus function
    public void doMod(View v)
    {

            // get the input numbers
            if (getNumbers()) {
                double sum = num1 % num2;
                t1.setText(Double.toString(sum));
            }
    }
```

Experime4:-
Develop an application that makes use of RSS Feed.

Proceedure

activity_main.xml

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

    <Button
        android:id="@+id/btnRediff"
        android:layout_width="300dp"
        android:layout_height="wrap_content"
        android:layout_alignParentBottom="true"
        android:layout_centerHorizontal="true"
        android:layout_marginBottom="101dp"
        android:text="REDIFF RSS FEED" />

    <Button
        android:id="@+id/btnCinemaBlend"
        android:layout_width="300dp"
        android:layout_height="wrap_content"
        android:layout_alignLeft="@+id/btnRediff"
        android:layout_alignParentBottom="true"
        android:layout_alignStart="@+id/btnRediff"
        android:layout_marginBottom="28dp"
        android:text="CINEMA BLEND RSS FEED" />
</RelativeLayout>
```

MainActivity.java

```
package example.javatpoint.com.androidrssfeed;

import android.support.v7.app.AppCompatActivity;
import android.os.Bundle;
import android.content.Intent;
import android.view.View;
import android.widget.Button;
import java.util.ArrayList;
```

```
public class MainActivity extends AppCompatActivity implements View.OnClickListener {

    ArrayList<String> rssLinks = new ArrayList<>();
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);

        Button btnRediff = findViewById(R.id.btnRediff);
        Button btnCinemaBlend = findViewById(R.id.btnCinemaBlend);
        btnRediff.setOnClickListener(this);
        btnCinemaBlend.setOnClickListener(this);
        rssLinks.add("http://www.rediff.com/rss/moviesreviewsrss.xml");
        rssLinks.add("http://www.cinemablend.com/rss_review.php");
    }

    @Override
    public void onClick(View view) {
        Intent intent = new Intent(getApplicationContext(), RSSFeedActivity.class);
        switch (view.getId()) {
            case R.id.btnRediff:
                intent.putExtra("rssLink", rssLinks.get(0));
                startActivity(intent);
                break;
            case R.id.btnCinemaBlend:
                intent.putExtra("rssLink", rssLinks.get(1));
                startActivity(intent);
                break;
        }
    }
}
```

Create a layout **rss_item_list_row.xml** which contains the fields of a newsletter (page URL, title, publishing date) which are displayed in RSS Feed.

rss_item_list_row.xml

```
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:padding="8dip">
    <TextView
        android:id="@+id/page_url"
        android:layout_width="fill_parent"
        android:layout_height="wrap_content"
        android:visibility="gone" />

    <TextView
        android:id="@+id/title"
        android:layout_width="fill_parent"
        android:layout_height="wrap_content"
        android:paddingBottom="1dip"
        android:textColor="#212121"
        android:textSize="18sp"
        android:textStyle="bold" />

    <TextView
        android:id="@+id/pub_date"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_below="@id/title"
        android:paddingBottom="3dip"
        android:textColor="#9b737775"
        android:textSize="14sp" />

</RelativeLayout>
```

RSSItem.java

```
package example.javatpoint.com.androidrssfeed;

public class RSSItem {
    public String title;
    public String link;
    public String description;
    public String pubdate;
    public String guid;

    public RSSItem(String title, String link, String description, String pubdate, String guid) {
        this.title = title;
        this.link = link;
        this.description = description;
        this.pubdate = pubdate;
        this.guid = guid;
    }
}
```

Create **RSSParser.java** class, in this class; we will use the instance of DocumentBuilderFactory class to parse the XML document.

RSSParser.java

```
package example.javatpoint.com.androidrssfeed;

import android.util.Log;
import org.apache.http.HttpEntity;
import org.apache.http.HttpResponse;
import org.apache.http.client.ClientProtocolException;
import org.apache.http.client.methods.HttpGet;
import org.apache.http.impl.client.DefaultHttpClient;
import org.apache.http.util.EntityUtils;
import org.w3c.dom.Document;
import org.w3c.dom.Element;
import org.w3c.dom.Node;
import org.w3c.dom.NodeList;
import org.xml.sax.InputSource;
import org.xml.sax.SAXException;

import java.io.IOException;
import java.io.StringReader;
import java.io.UnsupportedEncodingException;
import java.util.ArrayList;
import java.util.List;

import javax.xml.parsers.DocumentBuilder;
import javax.xml.parsers.DocumentBuilderFactory;
import javax.xml.parsers.ParserConfigurationException;

public class RSSParser {

    // RSS XML document CHANNEL tag
    private static String TAG_CHANNEL = "channel";
    private static String TAG_TITLE = "title";
    private static String TAG_LINK = "link";
    private static String TAG_DESRIPTION = "description";
    private static String TAG_ITEM = "item";
    private static String TAG_PUB_DATE = "pubDate";
    private static String TAG_GUID = "guid";
```

```
public RSSParser() {
}

public List<RSSItem> getRSSFeedItems(String rss_url) {
    List<RSSItem> itemsList = new ArrayList<RSSItem>();
    String rss_feed_xml;

    rss_feed_xml = this.getXmlFromUrl(rss_url);
    if (rss_feed_xml != null) {
        try {
            Document doc = this.getDomElement(rss_feed_xml);
            NodeList nodeList = doc.getElementsByTagName(TAG_CHANNEL);
            Element e = (Element) nodeList.item(0);

            NodeList items = e.getElementsByTagName(TAG_ITEM);
            for (int i = 0; i < items.getLength(); i++) {
                Element e1 = (Element) items.item(i);

                String title = this.getValue(e1, TAG_TITLE);
                String link = this.getValue(e1, TAG_LINK);
                String description = this.getValue(e1, TAG_DESRIPTION);
                String pubdate = this.getValue(e1, TAG_PUB_DATE);
                String guid = this.getValue(e1, TAG_GUID);

                RSSItem rssItem = new RSSItem(title, link, description, pubdate, guid);
                // adding item to list
                itemsList.add(rssItem);
            }
        } catch (Exception e) {
            // Check log for errors
            e.printStackTrace();
        }
    }
    return itemsList;
}


public String getXmlFromUrl(String url) {
    String xml = null;
    try {
        DefaultHttpClient httpClient = new DefaultHttpClient();
        HttpGet httpGet = new HttpGet(url);
        HttpResponse httpResponse = httpClient.execute(httpGet);
        HttpEntity httpEntity = httpResponse.getEntity();
```

```
            xml = EntityUtils.toString(httpEntity);
        } catch (UnsupportedEncodingException e) {
            e.printStackTrace();
        } catch (ClientProtocolException e) {
            e.printStackTrace();
        } catch (IOException e) {
            e.printStackTrace();
        }
        return xml;
    }

    public Document getDomElement(String xml) {
        Document doc = null;
        DocumentBuilderFactory dbf = DocumentBuilderFactory.newInstance();
        try {

            DocumentBuilder db = dbf.newDocumentBuilder();
            InputSource is = new InputSource();
            is.setCharacterStream(new StringReader(xml));
            doc = db.parse(is);
        } catch (ParserConfigurationException e) {
            Log.e("Error: ", e.getMessage());
            return null;
        } catch (SAXException e) {
            Log.e("Error: ", e.getMessage());
            return null;
        } catch (IOException e) {
            Log.e("Error: ", e.getMessage());
            return null;
        }
        return doc;
    }

    public final String getElementValue(Node elem) {
        Node child;
        if (elem != null) {
            if (elem.hasChildNodes()) {
                for (child = elem.getFirstChild(); child != null; child = child
                        .getNextSibling()) {
                    if (child.getNodeType() == Node.TEXT_NODE || (child.getNodeType() == Node.CDATA_SE
CTION_NODE)) {
                        return child.getNodeValue();
                    }
                }
            }
        }
        return "";
    }

    public String getValue(Element item, String str) {
        NodeList n = item.getElementsByTagName(str);
        return this.getElementValue(n.item(0));
    }
}
```

Now, create an activity **RSSFeedActivity.java** with the following code. This class uses AsyncTask class to load the items of RSS Feed from the URL in the background.

activity_rssfeed.xml

```
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:id="@+id/relativeLayout"
    android:orientation="vertical">

    <ListView
        android:id="@android:id/list"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:dividerHeight="1dp" />
</RelativeLayout>
```

RSSFeedActivity.java

```
package example.javatpoint.com.androidrssfeed;

import android.app.ListActivity;
import android.content.Intent;
import android.os.AsyncTask;
import android.os.Bundle;
import android.view.View;
import android.widget.AdapterView;
import android.widget.ListAdapter;
import android.widget.ListView;
import android.widget.ProgressBar;
import android.widget.RelativeLayout;
import android.widget.SimpleAdapter;
import android.widget.TextView;
import android.widget.Toast;

import java.text.ParseException;
import java.text.SimpleDateFormat;
import java.util.ArrayList;
import java.util.Date;
import java.util.HashMap;
import java.util.List;
import java.util.Locale;

public class RSSFeedActivity extends ListActivity {

    private ProgressBar pDialog;
    ArrayList<HashMap<String, String>> rssItemList = new ArrayList<>();
    RSSParser rssParser = new RSSParser();
    List<RSSItem> rssItems = new ArrayList<>();
    private static String TAG_TITLE = "title";
    private static String TAG_LINK = "link";
    private static String TAG_PUB_DATE = "pubDate";

    @Override
    public void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_rssfeed);

        String rss_link = getIntent().getStringExtra("rssLink");
        new LoadRSSFeedItems().execute(rss_link);
        ListView lv = getListView();

        lv.setOnItemClickListener(new AdapterView.OnItemClickListener() {

            public void onItemClick(AdapterView<?> parent, View view,
                                    int position, long id) {
                Intent in = new Intent(getApplicationContext(), WebActivity.class);
                String page_url = ((TextView) view.findViewById(R.id.page_url)).getText().toString().trim();
                in.putExtra("url", page_url);
                startActivity(in);
            }
        });
    }

    public class LoadRSSFeedItems extends AsyncTask<String, String, String> {
```

```
    @Override
    protected void onPreExecute() {
        super.onPreExecute();
        pDialog = new ProgressBar(RSSFeedActivity.this, null, android.R.attr.progressBarStyleLarge);
        RelativeLayout relativeLayout = findViewById(R.id.relativeLayout);
        RelativeLayout.LayoutParams layoutParams = new RelativeLayout.LayoutParams(
                RelativeLayout.LayoutParams.WRAP_CONTENT,
                RelativeLayout.LayoutParams.WRAP_CONTENT
        );

        layoutParams.addRule(RelativeLayout.CENTER_IN_PARENT);
        pDialog.setLayoutParams(layoutParams);
        pDialog.setVisibility(View.VISIBLE);
        relativeLayout.addView(pDialog);
    }

    @Override
    protected String doInBackground(String... args) {
        // rss link url
        String rss_url = args[0];
        // list of rss items
        rssItems = rssParser.getRSSFeedItems(rss_url);
        // looping through each item
        for (final RSSItem item : rssItems) {
            // creating new HashMap
            if (item.link.toString().equals(""))
                break;
            HashMap<String, String> map = new HashMap<String, String>();

            // adding each child node to HashMap key => value
            String givenDateString = item.pubdate.trim();
            SimpleDateFormat sdf = new SimpleDateFormat("EEE, d MMM yyyy HH:mm:ss Z");
            try {
                Date mDate = sdf.parse(givenDateString);
                SimpleDateFormat sdf2 = new SimpleDateFormat("EEEE, dd MMMM yyyy -
hh:mm a", Locale.US);
                item.pubdate = sdf2.format(mDate);

            } catch (ParseException e) {
                e.printStackTrace();

            }

            map.put(TAG_TITLE, item.title);
```

```
                map.put(TAG_LINK, item.link);
                map.put(TAG_PUB_DATE, item.pubdate);
                // adding HashList to ArrayList
                rssItemList.add(map);
            }

            // updating UI from Background Thread
            runOnUiThread(new Runnable() {
                public void run() {
                    ListAdapter adapter = new SimpleAdapter(
                            RSSFeedActivity.this,
                            rssItemList, R.layout.rss_item_list_row,
                            new String[]{TAG_LINK, TAG_TITLE, TAG_PUB_DATE},
                            new int[]{R.id.page_url, R.id.title, R.id.pub_date});

                    // updating listview
                    setListAdapter(adapter);
                }
            });
            return null;
        }

        protected void onPostExecute(String args) {
            pDialog.setVisibility(View.GONE);
        }
    }
}
```

Create an activity **WebActivity.java** containing WebView, that load the content of the link clicked in the previous activity.

activity_web.xml

```
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:id="@+id/relativeLayout"
    android:layout_height="match_parent">

    <android.support.v4.widget.NestedScrollView
        android:layout_width="match_parent"
        android:layout_height="match_parent">

        <WebView
```

```
            android:id="@+id/webView"
            android:layout_width="match_parent"
            android:layout_height="match_parent" />

    </android.support.v4.widget.NestedScrollView>
</RelativeLayout>
```

WebActivity.java

```java
package example.javatpoint.com.androidrssfeed;

import android.content.Context;
import android.content.Intent;
import android.graphics.Bitmap;
import android.os.Bundle;
import android.support.v7.app.AppCompatActivity;
import android.text.TextUtils;
import android.webkit.WebChromeClient;
import android.webkit.WebResourceError;
import android.webkit.WebResourceRequest;
import android.webkit.WebView;
import android.webkit.WebViewClient;
import android.widget.Toast;

public class WebActivity extends AppCompatActivity {

    WebView webView;
    String url;
    @Override
    public void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_web);
        Intent in = getIntent();
        url = in.getStringExtra("url");
        if (TextUtils.isEmpty(url)) {
            Toast.makeText(getApplicationContext(), "URL not found", Toast.LENGTH_SHORT).show();
            finish();
        }
        webView = findViewById(R.id.webView);
        initWebView();
        webView.loadUrl(url);
    }
    private void initWebView() {
        webView.setWebChromeClient(new MyWebChromeClient(this));
        webView.clearCache(true);
        webView.getSettings().setJavaScriptEnabled(true);
        webView.setHorizontalScrollBarEnabled(false);
        webView.setWebViewClient(new WebViewClient() {
            @Override
            public void onPageStarted(WebView view, String url, Bitmap favicon) {
                super.onPageStarted(view, url, favicon);
            }
            @Override
            public boolean shouldOverrideUrlLoading(WebView view, String url) {
                webView.loadUrl(url);
                return true;
            }
            @Override
            public void onPageFinished(WebView view, String url) {
                super.onPageFinished(view, url);
            }
            @Override
            public void onReceivedError(WebView view, WebResourceRequest request, WebResourceError err
or) {
                super.onReceivedError(view, request, error);
                invalidateOptionsMenu();
            }
        });
        webView.clearCache(true);
        webView.clearHistory();
        webView.getSettings().setJavaScriptEnabled(true);
        webView.setHorizontalScrollBarEnabled(false);
    }
    private class MyWebChromeClient extends WebChromeClient {
        Context context;
        public MyWebChromeClient(Context context) {
            super();
            this.context = context;
        }
    }
}
```

Permission Required

Add the INTERNET permission in **AndroidMenifest.xml** file.

```
<uses-permission android:name="android.permission.INTERNET" />
```

Experiment 5 :
Write an application that draws basic graphical primitives on the screen

Procedure:

activity_main.xml

File: activity_main.xml

```
<RelativeLayout xmlns:androclass="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:paddingBottom="@dimen/activity_vertical_margin"
    android:paddingLeft="@dimen/activity_horizontal_margin"
    android:paddingRight="@dimen/activity_horizontal_margin"
    android:paddingTop="@dimen/activity_vertical_margin"
    tools:context=".MainActivity" >

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

</RelativeLayout>
```

Activity class

File: MainActivity.java

```
package com.example.simplegraphics;

import android.os.Bundle;
import android.app.Activity;
import android.view.Menu;
import android.content.Context;
import android.graphics.Canvas;
import android.graphics.Color;
import android.graphics.Paint;
import android.view.View;

public class MainActivity extends Activity {

    DemoView demoview;
    /** Called when the activity is first created. */
    @Override
    public void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        demoview = new DemoView(this);
    setContentView(demoview);
}

private class DemoView extends View{
    public DemoView(Context context){
        super(context);
    }

    @Override protected void onDraw(Canvas canvas) {
        super.onDraw(canvas);

        // custom drawing code here
        Paint paint = new Paint();
        paint.setStyle(Paint.Style.FILL);

        // make the entire canvas white
        paint.setColor(Color.WHITE);
        canvas.drawPaint(paint);

        // draw blue circle with anti aliasing turned off
        paint.setAntiAlias(false);
        paint.setColor(Color.BLUE);
        canvas.drawCircle(20, 20, 15, paint);

        // draw green circle with anti aliasing turned on
        paint.setAntiAlias(true);
        paint.setColor(Color.GREEN);
        canvas.drawCircle(60, 20, 15, paint);

        // draw red rectangle with anti aliasing turned off
        paint.setAntiAlias(false);
        paint.setColor(Color.RED);
        canvas.drawRect(100, 5, 200, 30, paint);

        // draw the rotated text
        canvas.rotate(-45);

        paint.setStyle(Paint.Style.FILL);
        canvas.drawText("Graphics Rotation", 40, 180, paint);

        //undo the rotate
        canvas.restore();
    }
}
```

```
    @Override
    public boolean onCreateOptionsMenu(Menu menu) {
        // Inflate the menu; this adds items to the action bar if it is present.
        getMenuInflater().inflate(R.menu.main, menu);
        return true;
    }
}
```

Experiment 6 :

Create an android app for database creation using SQLite Database.

MainActivity.java.

```
package com.example.sairamkrishna.myapplication;

import android.content.Context;
import android.content.Intent;
import android.support.v7.app.ActionBarActivity;
import android.os.Bundle;

import android.view.KeyEvent;
import android.view.Menu;
import android.view.MenuItem;
import android.view.View;

import android.widget.AdapterView;
import android.widget.ArrayAdapter;
import android.widget.AdapterView.OnItemClickListener;
import android.widget.ListView;

import java.util.ArrayList;
import java.util.List;

public class MainActivity extends ActionBarActivity {
  public final static String EXTRA_MESSAGE = "MESSAGE";
  private ListView obj;
  DBHelper mydb;

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

    mydb = new DBHelper(this);
    ArrayList array_list = mydb.getAllCotacts();
    ArrayAdapter arrayAdapter=new ArrayAdapter(this,android.R.layout.simple_list_item_1, array_list);

    obj = (ListView)findViewById(R.id.listView1);
    obj.setAdapter(arrayAdapter);
    obj.setOnItemClickListener(new OnItemClickListener(){
      @Override
      public void onItemClick(AdapterView<?> arg0, View arg1, int arg2,long arg3) {
        // TODO Auto-generated method stub
        int id_To_Search = arg2 + 1;
        Bundle dataBundle = new Bundle();
        dataBundle.putInt("id", id_To_Search);

        Intent intent = new Intent(getApplicationContext(),DisplayContact.class);

        intent.putExtras(dataBundle);
        startActivity(intent);
      }
    });
  }

  @Override
  public boolean onCreateOptionsMenu(Menu menu) {
    // Inflate the menu; this adds items to the action bar if it is present.
    getMenuInflater().inflate(R.menu.menu_main, menu);
    return true;
  }

  @Override
  public boolean onOptionsItemSelected(MenuItem item){
    super.onOptionsItemSelected(item);

    switch(item.getItemId()) {
      case R.id.item1:Bundle dataBundle = new Bundle();
      dataBundle.putInt("id", 0);

      Intent intent = new Intent(getApplicationContext(),DisplayContact.class);
      intent.putExtras(dataBundle);

      startActivity(intent);
      return true;
      default:
      return super.onOptionsItemSelected(item);
    }
  }

  public boolean onKeyDown(int keycode, KeyEvent event) {
    if (keycode == KeyEvent.KEYCODE_BACK) {
      moveTaskToBack(true);
    }
    return super.onKeyDown(keycode, event);
  }
}
```

Following is the modified content of display contact activity **DisplayContact.java**

```
package com.example.sairamkrishna.myapplication;
```

```
import android.os.Bundle;
import android.app.Activity;
import android.app.AlertDialog;

import android.content.DialogInterface;
import android.content.Intent;
import android.database.Cursor;

import android.view.Menu;
import android.view.MenuItem;
import android.view.View;

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

public class DisplayContact extends Activity {
   int from_Where_I_Am_Coming = 0;
   private DBHelper mydb ;

   TextView name ;
   TextView phone;
   TextView email;
   TextView street;
   TextView place;
   int id_To_Update = 0;

   @Override
   protected void onCreate(Bundle savedInstanceState) {
      super.onCreate(savedInstanceState);
      setContentView(R.layout.activity_display_contact);
      name = (TextView) findViewById(R.id.editTextName);
      phone = (TextView) findViewById(R.id.editTextPhone);
      email = (TextView) findViewById(R.id.editTextStreet);
      street = (TextView) findViewById(R.id.editTextEmail);
      place = (TextView) findViewById(R.id.editTextCity);

      mydb = new DBHelper(this);

      Bundle extras = getIntent().getExtras();
      if(extras !=null) {
         int Value = extras.getInt("id");

         if(Value>0){
            //means this is the view part not the add contact part.
            Cursor rs = mydb.getData(Value);
            id_To_Update = Value;
            rs.moveToFirst();
            String nam = rs.getString(rs.getColumnIndex(DBHelper.CONTACTS_COLUMN_NAME));
            String phon = rs.getString(rs.getColumnIndex(DBHelper.CONTACTS_COLUMN_PHONE));
            String emai = rs.getString(rs.getColumnIndex(DBHelper.CONTACTS_COLUMN_EMAIL));
            String stree = rs.getString(rs.getColumnIndex(DBHelper.CONTACTS_COLUMN_STREET));
            String plac = rs.getString(rs.getColumnIndex(DBHelper.CONTACTS_COLUMN_CITY));

            if (!rs.isClosed())  {
              rs.close();
            }
            Button b = (Button)findViewById(R.id.button1);
            b.setVisibility(View.INVISIBLE);

            name.setText((CharSequence)nam);
            name.setFocusable(false);
            name.setClickable(false);

            phone.setText((CharSequence)phon);
            phone.setFocusable(false);
            phone.setClickable(false);

            email.setText((CharSequence)emai);
            email.setFocusable(false);
            email.setClickable(false);

            street.setText((CharSequence)stree);
            street.setFocusable(false);
            street.setClickable(false);

            place.setText((CharSequence)plac);
            place.setFocusable(false);
            place.setClickable(false);
          }
      }
   }

   @Override
   public boolean onCreateOptionsMenu(Menu menu) {
      // Inflate the menu; this adds items to the action bar if it is present.
      Bundle extras = getIntent().getExtras();

      if(extras !=null) {
          int Value = extras.getInt("id");
          if(Value>0){
            getMenuInflater().inflate(R.menu.display_contact, menu);
          } else{
            getMenuInflater().inflate(R.menu.menu_main menu);
          }
      }
      return true;
   }

   public boolean onOptionsItemSelected(MenuItem item) {
      super.onOptionsItemSelected(item);
      switch(item.getItemId()) {
          case R.id.Edit_Contact:
          Button b = (Button)findViewById(R.id.button1);
          b.setVisibility(View.VISIBLE);
          name.setEnabled(true);
          name.setFocusableInTouchMode(true);
          name.setClickable(true);

          phone.setEnabled(true);
          phone.setFocusableInTouchMode(true);
          phone.setClickable(true);

          email.setEnabled(true);
          email.setFocusableInTouchMode(true);
          email.setClickable(true);

          street.setEnabled(true);
          street.setFocusableInTouchMode(true);
          street.setClickable(true);

          place.setEnabled(true);
          place.setFocusableInTouchMode(true);
          place.setClickable(true);

          return true;
          case R.id.Delete_Contact:

          AlertDialog.Builder builder = new AlertDialog.Builder(this);
          builder.setMessage(R.string.deleteContact)
            .setPositiveButton(R.string.yes, new DialogInterface.OnClickListener() {
              public void onClick(DialogInterface dialog, int id) {
                mydb.deleteContact(id_To_Update);
                Toast.makeText(getApplicationContext(), "Deleted Successfully",
                  Toast.LENGTH_SHORT).show();
                Intent intent = new Intent(getApplicationContext(),MainActivity.class);
                startActivity(intent);
              }
          })
          .setNegativeButton(R.string.no, new DialogInterface.OnClickListener() {
            public void onClick(DialogInterface dialog, int id) {
              // User cancelled the dialog
            }
          });

          AlertDialog d = builder.create();
          d.setTitle("Are you sure");
          d.show();

          return true;
          default:
          return super.onOptionsItemSelected(item);

      }
   }

   public void run(View view) {
      Bundle extras = getIntent().getExtras();
      if(extras !=null) {
          int Value = extras.getInt("id");
          if(Value>0){
            if(mydb.updateContact(id_To_Update,name.getText().toString(),
              phone.getText().toString(), email.getText().toString(),
                                              street.getText().toString(), place.getText().toString())){
              Toast.makeText(getApplicationContext(), "Updated", Toast.LENGTH_SHORT).show();
              Intent intent = new Intent(getApplicationContext(),MainActivity.class);
              startActivity(intent);
            } else{
              Toast.makeText(getApplicationContext(), "not Updated", Toast.LENGTH_SHORT).show();
            }
          } else{
            if(mydb.insertContact(name.getText().toString(), phone.getText().toString(),
                                              email.getText().toString(), street.getText().toString(),
                                              place.getText().toString())){
                Toast.makeText(getApplicationContext(), "done",
                                                                  Toast.LENGTH_SHORT).show();
            } else{
              Toast.makeText(getApplicationContext(), "not done",
                                                        Toast.LENGTH_SHORT).show();
            }
            Intent intent = new Intent(getApplicationContext(),MainActivity.class);
            startActivity(intent);
          }
      }
   }
 }
```

Following is the content of Database class **DBHelper.java**

```
package com.example.sairamkrishna.myapplication;

import java.util.ArrayList;
import java.util.HashMap;
import java.util.Hashtable;
import android.content.ContentValues;
import android.content.Context;
import android.database.Cursor;
import android.database.DatabaseUtils;
import android.database.sqlite.SQLiteOpenHelper;
import android.database.sqlite.SQLiteDatabase;

public class DBHelper extends SQLiteOpenHelper {

  public static final String DATABASE_NAME = "MyDBName.db";
  public static final String CONTACTS_TABLE_NAME = "contacts";
  public static final String CONTACTS_COLUMN_ID = "id";
  public static final String CONTACTS_COLUMN_NAME = "name";
  public static final String CONTACTS_COLUMN_EMAIL = "email";
  public static final String CONTACTS_COLUMN_STREET = "street";
  public static final String CONTACTS_COLUMN_CITY = "place";
  public static final String CONTACTS_COLUMN_PHONE = "phone";
  private HashMap hp;

  public DBHelper(Context context) {
    super(context, DATABASE_NAME , null, 1);
  }

  @Override
  public void onCreate(SQLiteDatabase db) {
    // TODO Auto-generated method stub
    db.execSQL(
      "create table contacts " +
      "(id integer primary key, name text,phone text,email text, street text,place text)"
    );
  }

  @Override
  public void onUpgrade(SQLiteDatabase db, int oldVersion, int newVersion) {
    // TODO Auto-generated method stub
    db.execSQL("DROP TABLE IF EXISTS contacts");
    onCreate(db);
  }

  public boolean insertContact (String name, String phone, String email, String street,String place) {
    SQLiteDatabase db = this.getWritableDatabase();
    ContentValues contentValues = new ContentValues();
    contentValues.put("name", name);
    contentValues.put("phone", phone);
    contentValues.put("email", email);
    contentValues.put("street", street);
    contentValues.put("place", place);
    db.insert("contacts", null, contentValues);
    return true;
  }

  public Cursor getData(int id) {
    SQLiteDatabase db = this.getReadableDatabase();
    Cursor res =  db.rawQuery( "select * from contacts where id="+id+"", null );
    return res;
  }

  public int numberOfRows(){
    SQLiteDatabase db = this.getReadableDatabase();
    int numRows = (int) DatabaseUtils.queryNumEntries(db, CONTACTS_TABLE_NAME);
    return numRows;
  }

  public boolean updateContact (Integer id, String name, String phone, String email, String street,String place) {
    SQLiteDatabase db = this.getWritableDatabase();
    ContentValues contentValues = new ContentValues();
    contentValues.put("name", name);
    contentValues.put("phone", phone);
    contentValues.put("email", email);
    contentValues.put("street", street);
    contentValues.put("place", place);
    db.update("contacts", contentValues, "id = ? ", new String[] { Integer.toString(id) } );
    return true;
  }

  public Integer deleteContact (Integer id) {
    SQLiteDatabase db = this.getWritableDatabase();
    return db.delete("contacts",
    "id = ? ",
    new String[] { Integer.toString(id) });
  }

  public ArrayList<String> getAllCotacts() {
    ArrayList<String> array_list = new ArrayList<String>();

    //hp = new HashMap();
    SQLiteDatabase db = this.getReadableDatabase();
    Cursor res =  db.rawQuery( "select * from contacts", null );
    res.moveToFirst();

    while(res.isAfterLast() == false){
      array_list.add(res.getString(res.getColumnIndex(CONTACTS_COLUMN_NAME)));
      res.moveToNext();
    }
```

```
      return array_list;
   }
}
```

Following is the content of the **res/layout/activity_main.xml**

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

   <TextView
      android:layout_width="wrap_content"
      android:layout_height="wrap_content"
      android:id="@+id/textView"
      android:layout_alignParentTop="true"
      android:layout_centerHorizontal="true"
      android:textSize="30dp"
      android:text="Data Base" />

   <TextView
      android:layout_width="wrap_content"
      android:layout_height="wrap_content"
      android:text="Tutorials Point"
      android:id="@+id/textView2"
      android:layout_below="@+id/textView"
      android:layout_centerHorizontal="true"
      android:textSize="35dp"
      android:textColor="#ff16ff01" />

   <ImageView
      android:layout_width="wrap_content"
      android:layout_height="wrap_content"
      android:id="@+id/imageView"
      android:layout_below="@+id/textView2"
      android:layout_centerHorizontal="true"
      android:src="@drawable/logo"/>

   <ScrollView
      android:layout_width="wrap_content"
      android:layout_height="wrap_content"
      android:id="@+id/scrollView"
      android:layout_below="@+id/imageView"
      android:layout_alignParentLeft="true"
```

```
    android:layout_alignParentStart="true"
    android:layout_alignParentBottom="true"
    android:layout_alignParentRight="true"
    android:layout_alignParentEnd="true">

    <ListView
      android:id="@+id/listView1"
      android:layout_width="match_parent"
      android:layout_height="wrap_content"
      android:layout_centerHorizontal="true"
      android:layout_centerVertical="true" >
    </ListView>

  </ScrollView>

</RelativeLayout>
```

Following is the content of the **res/layout/activity_display_contact.xml**

```
<?xml version="1.0" encoding="utf-8"?>
<ScrollView xmlns:android="http://schemas.android.com/apk/res/android"
  xmlns:tools="http://schemas.android.com/tools"
  android:id="@+id/scrollView1"
  android:layout_width="match_parent"
  android:layout_height="wrap_content"
  tools:context=".DisplayContact" >

  <RelativeLayout
    android:layout_width="match_parent"
    android:layout_height="370dp"
    android:paddingBottom="@dimen/activity_vertical_margin"
    android:paddingLeft="@dimen/activity_horizontal_margin"
    android:paddingRight="@dimen/activity_horizontal_margin"
    android:paddingTop="@dimen/activity_vertical_margin">

    <EditText
      android:id="@+id/editTextName"
      android:layout_width="wrap_content"
      android:layout_height="wrap_content"
      android:layout_alignParentLeft="true"
      android:layout_marginTop="5dp"
      android:layout_marginLeft="82dp"
      android:ems="10"
      android:inputType="text" >
    </EditText>

    <EditText
      android:id="@+id/editTextEmail"
      android:layout_width="wrap_content"
      android:layout_height="wrap_content"
      android:layout_alignLeft="@+id/editTextStreet"
      android:layout_below="@+id/editTextStreet"
      android:layout_marginTop="22dp"
      android:ems="10"
      android:inputType="textEmailAddress" />

    <TextView
      android:id="@+id/textView1"
      android:layout_width="wrap_content"
      android:layout_height="wrap_content"
      android:layout_alignBottom="@+id/editTextName"
      android:layout_alignParentLeft="true"
      android:text="@string/name"
      android:textAppearance="?android:attr/textAppearanceMedium" />

    <Button
      android:id="@+id/button1"
      android:layout_width="wrap_content"
      android:layout_height="wrap_content"
      android:layout_alignLeft="@+id/editTextCity"
      android:layout_alignParentBottom="true"
      android:layout_marginBottom="28dp"
      android:onClick="run"
      android:text="@string/save" />

    <TextView
      android:id="@+id/textView2"
      android:layout_width="wrap_content"
      android:layout_height="wrap_content"
      android:layout_alignBottom="@+id/editTextEmail"
      android:layout_alignLeft="@+id/textView1"
      android:text="@string/email"
      android:textAppearance="?android:attr/textAppearanceMedium" />

    <TextView
      android:id="@+id/textView5"
      android:layout_width="wrap_content"
      android:layout_height="wrap_content"
      android:layout_alignBottom="@+id/editTextPhone"
      android:layout_alignLeft="@+id/textView1"
      android:text="@string/phone"
      android:textAppearance="?android:attr/textAppearanceMedium" />

    <TextView
      android:id="@+id/textView4"
      android:layout_width="wrap_content"
      android:layout_height="wrap_content"
```

```
        android:layout_above="@+id/editTextEmail"
        android:layout_alignLeft="@+id/textView5"
        android:text="@string/street"
        android:textAppearance="?android:attr/textAppearanceMedium" />

    <EditText
        android:id="@+id/editTextCity"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignRight="@+id/editTextName"
        android:layout_below="@+id/editTextEmail"
        android:layout_marginTop="30dp"
        android:ems="10"
        android:inputType="text" />

    <TextView
        android:id="@+id/textView3"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignBaseline="@+id/editTextCity"
        android:layout_alignBottom="@+id/editTextCity"
        android:layout_alignParentLeft="true"
        android:layout_toLeftOf="@+id/editTextEmail"
        android:text="@string/country"
        android:textAppearance="?android:attr/textAppearanceMedium" />

    <EditText
        android:id="@+id/editTextStreet"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignLeft="@+id/editTextName"
        android:layout_below="@+id/editTextPhone"
        android:ems="10"
        android:inputType="text" >

        <requestFocus />
    </EditText>

    <EditText
        android:id="@+id/editTextPhone"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignLeft="@+id/editTextStreet"
        android:layout_below="@+id/editTextName"
        android:ems="10"
        android:inputType="phone|text" />

</RelativeLayout>
```

```
</ScrollView>
```

Following is the content of the **res/value/string.xml**

```
<?xml version="1.0" encoding="utf-8"?>
<resources>
  <string name="app_name">Address Book</string>
  <string name="action_settings">Settings</string>
  <string name="hello_world">Hello world!</string>
  <string name="Add_New">Add New</string>
  <string name="edit">Edit Contact</string>
  <string name="delete">Delete Contact</string>
  <string name="title_activity_display_contact">DisplayContact</string>
  <string name="name">Name</string>
  <string name="phone">Phone</string>
  <string name="email">Email</string>
  <string name="street">Street</string>
  <string name="country">City/State/Zip</string>
  <string name="save">Save Contact</string>
  <string name="deleteContact">Are you sure, you want to delete it.</string>
  <string name="yes">Yes</string>
  <string name="no">No</string>
</resources>
```

Following is the content of the **res/menu/main_menu.xml**

```
<?xml version="1.0" encoding="utf-8"?>
<menu xmlns:android="http://schemas.android.com/apk/res/android" >

  <item android:id="@+id/item1"
    android:icon="@drawable/add"
    android:title="@string/Add_New" >
  </item>

</menu>
```

Following is the content of the **res/menu/display_contact.xml**

```
<?xml version="1.0" encoding="utf-8"?>
<menu xmlns:android="http://schemas.android.com/apk/res/android" >
  <item
    android:id="@+id/Edit_Contact"
    android:orderInCategory="100"
    android:title="@string/edit"/>

  <item
    android:id="@+id/Delete_Contact"
    android:orderInCategory="100"
    android:title="@string/delete"/>

</menu>
```

This is the defualt **AndroidManifest.xml** of this project

```
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    package="com.example.sairamkrishna.myapplication" >

    <application
        android:allowBackup="true"
        android:icon="@mipmap/ic_launcher"
        android:label="@string/app_name"
        android:theme="@style/AppTheme" >

        <activity
            android:name=".MainActivity"
            android:label="@string/app_name" >

            <intent-filter>
                <action android:name="android.intent.action.MAIN" />
                <category android:name="android.intent.category.LAUNCHER" />
            </intent-filter>

        </activity>

        <activity android:name=".DisplayContact"/>

    </application>
</manifest>
```

Experiment 7 :

Develop a native application that uses GPS location information

MainActivity.java.

```
package com.example.tutorialspoint7.myapplication;

import android.Manifest;
import android.app.Activity;
import android.os.Bundle;
import android.support.v4.app.ActivityCompat;
import android.test.mock.MockPackageManager;
import android.view.View;
import android.widget.Button;
import android.widget.Toast;

public class MainActivity extends Activity {

   Button btnShowLocation;
   private static final int REQUEST_CODE_PERMISSION = 2;
   String mPermission = Manifest.permission.ACCESS_FINE_LOCATION;

   // GPSTracker class
   GPSTracker gps;

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

      try {
         if (ActivityCompat.checkSelfPermission(this, mPermission)
            != MockPackageManager.PERMISSION_GRANTED) {

            ActivityCompat.requestPermissions(this, new String[]{mPermission},
               REQUEST_CODE_PERMISSION);

            // If any permission above not allowed by user, this condition will
               execute every time, else your else part will work
         }
      } catch (Exception e) {
         e.printStackTrace();
      }

      btnShowLocation = (Button) findViewById(R.id.button);

      // show location button click event
      btnShowLocation.setOnClickListener(new View.OnClickListener() {
```

```
      @Override
      public void onClick(View arg0) {
        // create class object
        gps = new GPSTracker(MainActivity.this);

        // check if GPS enabled
        if(gps.canGetLocation()){

          double latitude = gps.getLatitude();
          double longitude = gps.getLongitude();

          // \n is for new line
          Toast.makeText(getApplicationContext(), "Your Location is - \nLat: "
            + latitude + "\nLong: " + longitude, Toast.LENGTH_LONG).show();
        }else{
          // can't get location
          // GPS or Network is not enabled
          // Ask user to enable GPS/network in settings
          gps.showSettingsAlert();
        }

      }
    });
  }
}
```

Following is the content of the modified main activity file **GPSTracker.java**.

```
package com.example.tutorialspoint7.myapplication;

import android.app.AlertDialog;
import android.app.Service;
import android.content.Context;
import android.content.DialogInterface;
import android.content.Intent;
import android.location.Location;
import android.location.LocationListener;
import android.location.LocationManager;
import android.os.Bundle;
import android.os.IBinder;
import android.provider.Settings;
import android.util.Log;

public class GPSTracker extends Service implements LocationListener {

  private final Context mContext;

  // flag for GPS status
  boolean isGPSEnabled = false;
```

```
// flag for network status
boolean isNetworkEnabled = false;

// flag for GPS status
boolean canGetLocation = false;

Location location; // location
double latitude; // latitude
double longitude; // longitude

// The minimum distance to change Updates in meters
private static final long MIN_DISTANCE_CHANGE_FOR_UPDATES = 10; // 10 meters

// The minimum time between updates in milliseconds
private static final long MIN_TIME_BW_UPDATES = 1000 * 60 * 1; // 1 minute

// Declaring a Location Manager
protected LocationManager locationManager;

public GPSTracker(Context context) {
  this.mContext = context;
  getLocation();
}

public Location getLocation() {
  try {
    locationManager = (LocationManager) mContext.getSystemService(LOCATION_SERVICE);

    // getting GPS status
    isGPSEnabled = locationManager.isProviderEnabled(LocationManager.GPS_PROVIDER);

    // getting network status
    isNetworkEnabled = locationManager
      .isProviderEnabled(LocationManager.NETWORK_PROVIDER);

    if (!isGPSEnabled && !isNetworkEnabled) {
      // no network provider is enabled
    } else {
      this.canGetLocation = true;
      // First get location from Network Provider
      if (isNetworkEnabled) {
        locationManager.requestLocationUpdates(
          LocationManager.NETWORK_PROVIDER,
          MIN_TIME_BW_UPDATES,
          MIN_DISTANCE_CHANGE_FOR_UPDATES, this);

        Log.d("Network", "Network");
        if (locationManager != null) {
          location = locationManager
            .getLastKnownLocation(LocationManager.NETWORK_PROVIDER);

          if (location != null) {
            latitude = location.getLatitude();
            longitude = location.getLongitude();
          }
        }
      }

      // if GPS Enabled get lat/long using GPS Services
      if (isGPSEnabled) {
        if (location == null) {
          locationManager.requestLocationUpdates(
            LocationManager.GPS_PROVIDER,
            MIN_TIME_BW_UPDATES,
            MIN_DISTANCE_CHANGE_FOR_UPDATES, this);

          Log.d("GPS Enabled", "GPS Enabled");
          if (locationManager != null) {
            location = locationManager
              .getLastKnownLocation(LocationManager.GPS_PROVIDER);

            if (location != null) {
              latitude = location.getLatitude();
              longitude = location.getLongitude();
            }
          }
        }
      }
    }

  } catch (Exception e) {
    e.printStackTrace();
  }

  return location;
}

/**
  * Stop using GPS listener
  * Calling this function will stop using GPS in your app
* */

public void stopUsingGPS(){
  if(locationManager != null){
    locationManager.removeUpdates(GPSTracker.this);
    }
}

/**
    * Function to get latitude
* */

public double getLatitude(){
    if(location != null){
        latitude = location.getLatitude();
    }

    // return latitude
    return latitude;
}

/**
    * Function to get longitude
* */

public double getLongitude(){
    if(location != null){
        longitude = location.getLongitude();
    }

    // return longitude
    return longitude;
}

/**
    * Function to check GPS/wifi enabled
    * @return boolean
* */

public boolean canGetLocation() {
    return this.canGetLocation;
}

/**
    * Function to show settings alert dialog
    * On pressing Settings button will lauch Settings Options
* */

public void showSettingsAlert(){
    AlertDialog.Builder alertDialog = new AlertDialog.Builder(mContext);

    // Setting Dialog Title
    alertDialog.setTitle("GPS is settings");
```

```
      // Setting Dialog Message
      alertDialog.setMessage("GPS is not enabled. Do you want to go to settings menu?");

      // On pressing Settings button
      alertDialog.setPositiveButton("Settings", new DialogInterface.OnClickListener() {
         public void onClick(DialogInterface dialog,int which) {
            Intent intent = new Intent(Settings.ACTION_LOCATION_SOURCE_SETTINGS);
            mContext.startActivity(intent);
         }
      });

      // on pressing cancel button
      alertDialog.setNegativeButton("Cancel", new DialogInterface.OnClickListener() {
         public void onClick(DialogInterface dialog, int which) {
            dialog.cancel();
         }
      });

      // Showing Alert Message
      alertDialog.show();
   }

   @Override
   public void onLocationChanged(Location location) {
   }

   @Override
   public void onProviderDisabled(String provider) {
   }

   @Override
   public void onProviderEnabled(String provider) {
   }

   @Override
   public void onStatusChanged(String provider, int status, Bundle extras) {
   }

   @Override
   public IBinder onBind(Intent arg0) {
      return null;
   }
}
```

Following will be the content of **res/layout/activity_main.xml** file −

```
<?xml version = "1.0" encoding = "utf-8"?>
<LinearLayout xmlns:android = "http://schemas.android.com/apk/res/android"
```

```
   android:layout_width = "fill_parent"
   android:layout_height = "fill_parent"
   android:orientation = "vertical" >


   <Button
      android:id = "@+id/button"
      android:layout_width = "fill_parent"
      android:layout_height = "wrap_content"
      android:text = "getlocation"/>

</LinearLayout>
```

Following will be the content of **res/values/strings.xml** to define two new constants −

```
<?xml version = "1.0" encoding = "utf-8"?>
<resources>
   <string name = "app_name">Tutorialspoint</string>
</resources>
```

Following is the default content of **AndroidManifest.xml** −

```
<?xml version = "1.0" encoding = "utf-8"?>
<manifest xmlns:android = "http://schemas.android.com/apk/res/android"
   package = "com.example.tutorialspoint7.myapplication">
   <uses-permission android:name = "android.permission.ACCESS_FINE_LOCATION" />
   <uses-permission android:name = "android.permission.INTERNET" />
   <application
      android:allowBackup = "true"
      android:icon = "@mipmap/ic_launcher"
      android:label = "@string/app_name"
      android:supportsRtl = "true"
      android:theme = "@style/AppTheme">

      <activity android:name = ".MainActivity">
         <intent-filter>
            <action android:name = "android.intent.action.MAIN" />

            <category android:name = "android.intent.category.LAUNCHER" />
         </intent-filter>
      </activity>
   </application>

</manifest>
```

Experiment 8 :

Implement an application that writes data to the SD card.

activity_main.xml

```
<?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="example.javatpoint.com.externalstorage.MainActivity">

    <EditText
        android:id="@+id/editText1"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignParentRight="true"
        android:layout_alignParentTop="true"
        android:layout_marginRight="20dp"
        android:layout_marginTop="24dp"
        android:ems="10" >

        <requestFocus />
    </EditText>

    <EditText
        android:id="@+id/editText2"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignRight="@+id/editText1"
        android:layout_below="@+id/editText1"
        android:layout_marginTop="24dp"
        android:ems="10" />

    <TextView
        android:id="@+id/textView1"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignBaseline="@+id/editText1"
        android:layout_alignBottom="@+id/editText1"
        android:layout_alignParentLeft="true"
        android:text="File Name:" />

    <TextView
        android:id="@+id/textView2"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignBaseline="@+id/editText2"
        android:layout_alignBottom="@+id/editText2"
        android:layout_alignParentLeft="true"
        android:text="Data:" />

    <Button
        android:id="@+id/button1"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignLeft="@+id/editText2"
        android:layout_below="@+id/editText2"
        android:layout_marginLeft="70dp"
        android:layout_marginTop="16dp"
        android:text="save" />

    <Button
        android:id="@+id/button2"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignBaseline="@+id/button1"
        android:layout_alignBottom="@+id/button1"
        android:layout_toRightOf="@+id/button1"
        android:text="read" />
</RelativeLayout>
```

Provide permission for the external storage

You need to provide the WRITE_EXTERNAL_STORAGE permission.

```
<uses-permission android:name="android.permission.WRITE_EXTERNAL_STORAGE"/>
```

File: Activity_Manifest.xml

```
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    package="example.javatpoint.com.externalstorage">
    <uses-permission android:name="android.permission.WRITE_EXTERNAL_STORAGE"/>
    <application
        android:allowBackup="true"
        android:icon="@mipmap/ic_launcher"
        android:label="@string/app_name"
        android:roundIcon="@mipmap/ic_launcher_round"
        android:supportsRtl="true"
        android:theme="@style/AppTheme">
        <activity android:name=".MainActivity">
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />

                <category android:name="android.intent.category.LAUNCHER" />
            </intent-filter>
        </activity>
    </application>

```

```
</manifest>
```

Activity class

Let's write the code to write and read data from the android external storage.

File: MainActivity.java

```
package example.javatpoint.com.externalstorage;

import android.support.v7.app.AppCompatActivity;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.EditText;
import android.widget.Toast;

import java.io.BufferedReader;
import java.io.File;
import java.io.FileInputStream;
import java.io.FileNotFoundException;
import java.io.FileOutputStream;
import java.io.IOException;
import java.io.InputStreamReader;
import java.io.OutputStreamWriter;

public class MainActivity extends AppCompatActivity {
    EditText editTextFileName,editTextData;
    Button saveButton,readButton;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);

        editTextFileName=findViewById(R.id.editText1);
        editTextData=findViewById(R.id.editText2);
        saveButton=findViewById(R.id.button1);
        readButton=findViewById(R.id.button2);

        //Performing action on save button
        saveButton.setOnClickListener(new View.OnClickListener(){

            @Override
            public void onClick(View arg0) {
                String filename=editTextFileName.getText().toString();
                String data=editTextData.getText().toString();

                FileOutputStream fos;
                try {
                    File myFile = new File("/sdcard/"+filename);
                    myFile.createNewFile();
                    FileOutputStream fOut = new FileOutputStream(myFile);
                    OutputStreamWriter myOutWriter = new OutputStreamWriter(fOut);
                    myOutWriter.append(data);
                    myOutWriter.close();
                    fOut.close();
                    Toast.makeText(getApplicationContext(),filename + "saved",Toast.LENGTH_LONG).show();
                } catch (FileNotFoundException e) {e.printStackTrace();}
                catch (IOException e) {e.printStackTrace();}
            }
        });

        //Performing action on Read Button
        readButton.setOnClickListener(new View.OnClickListener(){
            @Override
            public void onClick(View arg0) {
                String filename=editTextFileName.getText().toString();
                StringBuffer stringBuffer = new StringBuffer();
                String aDataRow = "";
                String aBuffer = "";
                try {
                    File myFile = new File("/sdcard/"+filename);
                    FileInputStream fIn = new FileInputStream(myFile);
                    BufferedReader myReader = new BufferedReader(
                            new InputStreamReader(fIn));
                    while ((aDataRow = myReader.readLine()) != null) {
                        aBuffer += aDataRow + "\n";
                    }
                    myReader.close();
                } catch (IOException e) {
                    e.printStackTrace();
                }
                Toast.makeText(getApplicationContext(),aBuffer,Toast.LENGTH_LONG).show();
            }
        });
    }
}
```