1)

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/textView"
      android:layout_width="match_parent"
      android:layout_height="match_parent"
      android:text="Shake to switch color" />

</RelativeLayout>
```

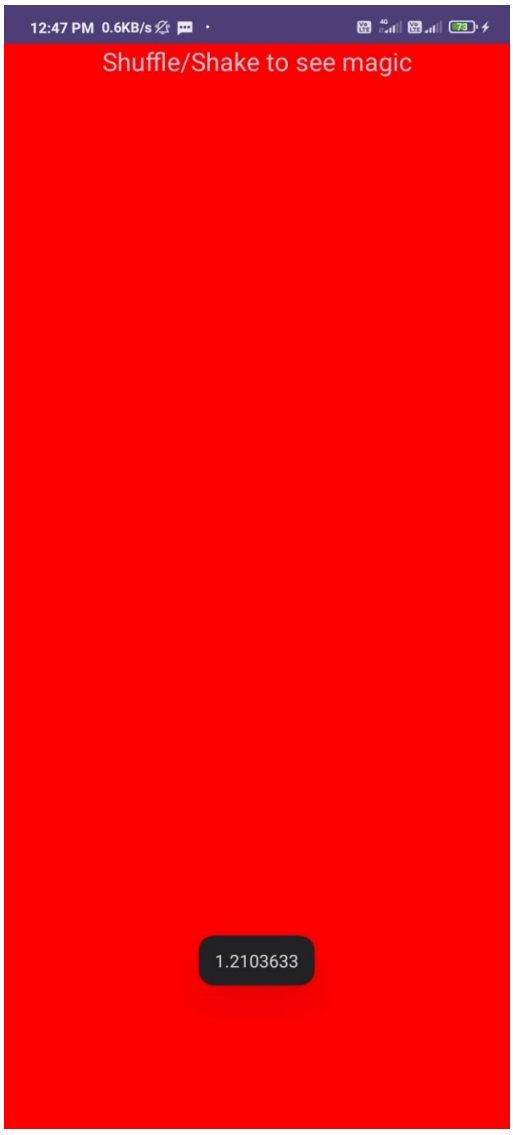
Java:

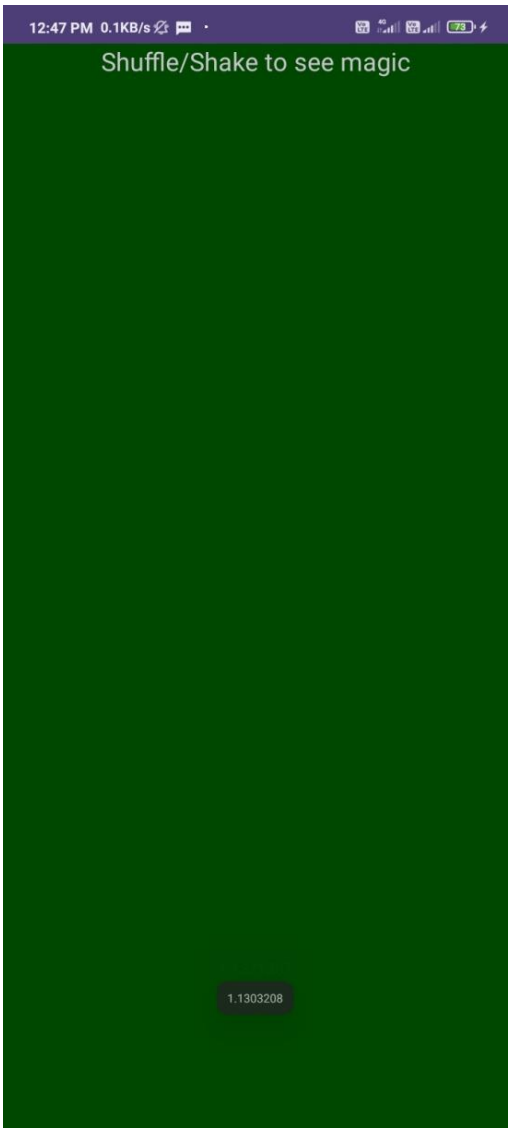
```
package com.example.sensor;

import android.app.Activity;
import android.graphics.Color;
import android.hardware.Sensor;
import android.hardware.SensorEvent;
import android.hardware.SensorEventListener;
import android.hardware.SensorManager;
import android.os.Bundle;
import android.view.View;
import android.widget.Toast;

public class MainActivity extends Activity implements SensorEventListener{
   private SensorManager sensorManager;
    private boolean isColor = false;
    private View view;
    private long lastUpdate;

    @Override
    public void onCreate(Bundle savedInstanceState) {
     super.onCreate(savedInstanceState);
     setContentView(R.layout.activity_main);
     view = findViewById(R.id.textView);
     view.setBackgroundColor(Color.GREEN);
```

```
 sensorManager = (SensorManager) getSystemService(SENSOR_SERVICE);
 lastUpdate = System.currentTimeMillis();
}
@Override
public void onAccuracyChanged(Sensor sensor, int accuracy) {}
@Override
public void onSensorChanged(SensorEvent event) {
 if (event.sensor.getType() == Sensor.TYPE_ACCELEROMETER) {
  getAccelerometer(event);
 }

}

private void getAccelerometer(SensorEvent event) {
 float[] values = event.values;
 float x = values[0];
 float y = values[1];
 float z = values[2];

 float accelationSquareRoot = (x * x + y * y + z * z)
    / (SensorManager.GRAVITY_EARTH * SensorManager.GRAVITY_EARTH);

 long actualTime = System.currentTimeMillis();
 Toast.makeText(getApplicationContext(),String.valueOf(accelationSquareRoot)+" "+
         SensorManager.GRAVITY_EARTH,Toast.LENGTH_SHORT).show();

 if (accelationSquareRoot >= 2)
 {

  if (actualTime - lastUpdate < 200) {
   return;
  }
  lastUpdate = actualTime;
   if (isColor) {
    view.setBackgroundColor(Color.GREEN);

  } else {
    view.setBackgroundColor(Color.RED);
  }
  isColor = !isColor;
 }
}

@Override
protected void onResume() {
```

```
        super.onResume();

sensorManager.registerListener(this,sensorManager.getDefaultSensor(Sensor.TYPE_ACCELEROMETER),
                        SensorManager.SENSOR_DELAY_NORMAL);
    }

    @Override
    protected void onPause() {
      super.onPause();
      sensorManager.unregisterListener(this);
    }
  }
```

Output:





2)

Xml:

```
<?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"
   tools:context=".MainActivity"
   android:orientation="vertical"
   android:padding="20sp">

   <TextView
      android:layout_width="wrap_content"
      android:layout_height="wrap_content"
      android:text=""
      android:id="@+id/view1" />

</LinearLayout>
```

Java:

```
package com.example.sensors;

import androidx.appcompat.app.AppCompatActivity;

import android.annotation.SuppressLint;
import android.content.Context;
import android.hardware.Sensor;
import android.hardware.SensorManager;
import android.os.Bundle;
import android.widget.TextView;
import java.util.*;

public class MainActivity extends AppCompatActivity {

   private TextView t1;
   private SensorManager s1;

   @SuppressLint("MissingInflatedId")
   @Override
```

```
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        t1=(TextView) findViewById(R.id.view1);
        s1=(SensorManager) getSystemService(Context.SENSOR_SERVICE);
            List<Sensor> l1= s1.getSensorList(Sensor.TYPE_ALL);
            StringBuilder sb= new StringBuilder();
            for(Sensor s2: l1){
                sb.append(s2.getName()+"\n");
                t1.setText(sb);
            }
    }
}
```

Output: