



<b>MINI PROJECT MOBILE APPLICATIONS</b> [As per Choice Based Credit System (CBCS) scheme] <b>SEMESTER – V</b>			
Course Code	16MCA58	CIE Marks	20
Number of Practical Hours/Week	02	SEE Marks	80
Number of Instructional Hours/Week	01		
Total Number of Lecture Hours	42	SEE Hours	03
<b>CREDITS – 03</b>			
<b>Laboratory Programs:</b> <i>The laboratory can be carried out only using any mobile application software.</i> <b>Note:</b> 1. Students are required to execute one question from Part A and give demo from Part B. 2. Part A has to be evaluated for 40 marks and Part B has to be evaluated for 40 marks along with the report. 3. The project should be carried out with a team strength of maximum two. 4. Students are expected to work for mini project apart from lab hours also with the contact of guides.			
<b>Course outcomes:At the end of this course, the students will be able to</b> <ul style="list-style-type: none"> <li>• Illustrate effective user interfaces that leverage evolving mobile device capabilities</li> <li>• Develop applications using software development kits (SDKs), frameworks and toolkits</li> <li>• Establish various methods to integrate database and server-side technologies</li> <li>• Design and develop open source software based mobile applications</li> <li>• Build and deploy competent mobile development solutions</li> </ul>			
<b>PART – A</b>			
1. Design an application that contains Phone Contacts in vertical linear manner. Selected contact appears at the top of the list with a large italicized font and a blue background.			
2. Create an application that uses Layout Managers and Event Listeners.			
3. Develop a standard calculator application to perform basic calculations like addition, subtraction, multiplication and division.			
4. Devise an application that draws basic graphical primitives (rectangle, circle) on the screen.			
5. Build an mobile application that create, save, update and delete data in a database.			
6. Devise an application that implements Multi threading.			
7. Develop a mobile application that uses GPS location information.			
8. Create an application that writes data to the SD card.			
9. Implement an application that creates an alert upon receiving a message.			
10. Devise a mobile application that creates alarm clock.			
<b>PART – B</b>			
<b>Mini-Project</b>			
Students should be able to build a complete mobile app using multiple features learnt in Part – A with user interfaces and database connectivity.			
The team must submit a brief project report (25-30 pages) that must include the following			
a. Introduction			



- b. Requirement Analysis
- c. Software Requirement Specification
- d. Analysis and Design
- e. Implementation
- f. Testing

The report must be evaluated for 10 Marks. Demonstration and Viva for 30 Marks.

1. Design an application that contains Phone Contacts in vertical linear manner. Selected contact appears at the top of the list with a large italicized font and a blue background.

### MainActivity.java:

```
package com.example.firstlab;

import android.support.v7.app.AppCompatActivity;
import android.os.Bundle;
import android.view.View;
import android.widget.AdapterView;
import android.widget.AdapterView.OnItemClickListener;
import android.widget.ArrayAdapter;
import android.widget.ListView;
import android.widget.TextView;
import android.widget.Toast;

public class MainActivity extends AppCompatActivity {
    ListView listView;
    TextView display;
    String[] listitems;
    ArrayAdapter adapter;

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        display=(TextView)findViewById(R.id.txtDisplay);
        listView=(ListView)findViewById(R.id.List);
        listitems=getResources().getStringArray(R.array.contactlist);

        final ArrayAdapter<String> adapter=new ArrayAdapter<String>( this,
        android.R.layout.simple_list_item_1,listitems);
        listView.setAdapter(adapter);

        listView.setOnItemClickListener(new AdapterView.OnItemClickListener() {
            @Override
            public void onItemClick(AdapterView<?> adapterView, View view, int i, long l) {
                String value=adapter.getItem(i);
                display.setText(value);
                Toast.makeText(getApplicationContext(),value,Toast.LENGTH_LONG).show();
            }
        });
    }
}
```

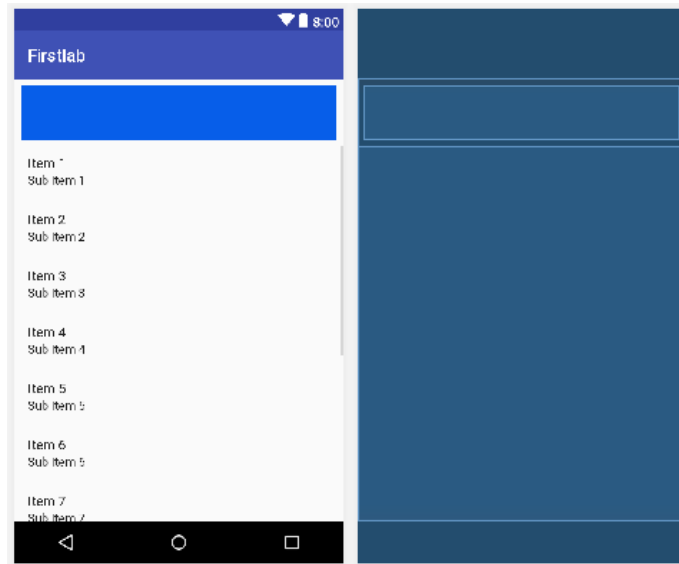
**activity\_main.xml:**

```
<?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">

    <TextView
        android:id="@+id/txtDisplay"
        android:layout_width="match_parent"
        android:layout_height="62dp"
        android:layout_marginBottom="8dp"
        android:layout_marginEnd="8dp"
        android:layout_marginLeft="8dp"
        android:layout_marginRight="8dp"
        android:layout_marginStart="8dp"
        android:layout_marginTop="8dp"
        android:background="#075ee9"
        android:textStyle="italic"
        android:textSize="60dp"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintHorizontal_bias="0.232"
        app:layout_constraintLeft_toLeftOf="parent"
        app:layout_constraintRight_toRightOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent"
        app:layout_constraintVertical_bias="0.016" />

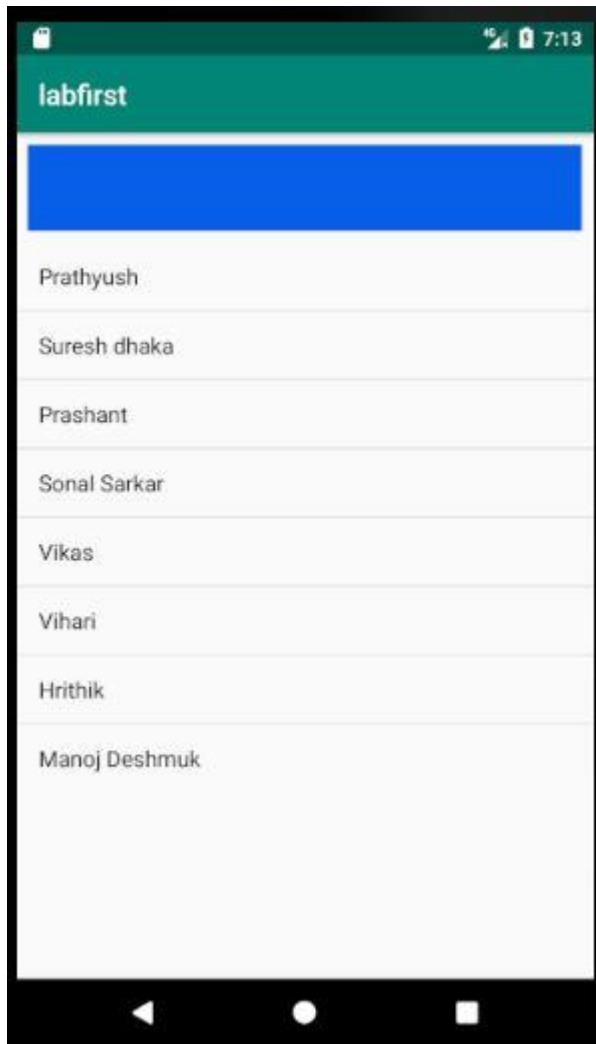
    <ListView
        android:id="@+id/List"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        tools:layout_editor_absoluteX="8dp"
        tools:layout_editor_absoluteY="52dp"
    />

</LinearLayout>
```



### Strings.xml:

```
<resources>
    <string name="app_name">Firstlab</string>
    <string-array name="contactlist">
        <item>Prathyush</item>
        <item>Suresh dhaka</item>
        <item>Prashant</item>
        <item>Sonal Sarkar</item>
        <item>Vikas</item>
        <item>Vihari</item>
        <item>Hrithik</item>
        <item>Manoj Deshmuk</item>
    </string-array>
</resources>
```

**Output:**

## 2. Create an application that uses Layout Managers and Event Listeners.

### MainActivity.java:

```
package com.example.hrithik.third_program;

import android.content.Intent;
import android.support.v7.app.AppCompatActivity;
import android.os.Bundle;
import android.view.View;
import android.widget.AdapterView;
import android.widget.AdapterView.OnItemClickListener;
import android.widget.ArrayAdapter;
import android.widget.LinearLayout;
import android.widget.ListView;

public class MainActivity extends AppCompatActivity {

    ListView listView;
    String[] array;
    ArrayAdapter adapter;

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

        listView=(ListView)findViewById(R.id.dynamic);
        array=getResources().getStringArray(R.array.Layout);

        final ArrayAdapter<String> adapter=new
        ArrayAdapter<String>(this,android.R.layout.simple_list_item_1,array);
        listView.setAdapter(adapter);

        listView.setOnItemClickListener(new AdapterView.OnItemClickListener() {
            @Override
            public void onItemClick(AdapterView<?> parent, View view, int position, long id) {
                String value=adapter.getItem(position);
                if(position==0){
                    Intent i=new Intent(MainActivity.this,Linear_Layout.class);
                    startActivity(i);
                }
                else if (position==1){
                    Intent i1=new Intent(MainActivity.this,Relative_Layout.class);
                    startActivity(i1);
                }
            }
        });
    }
}
```



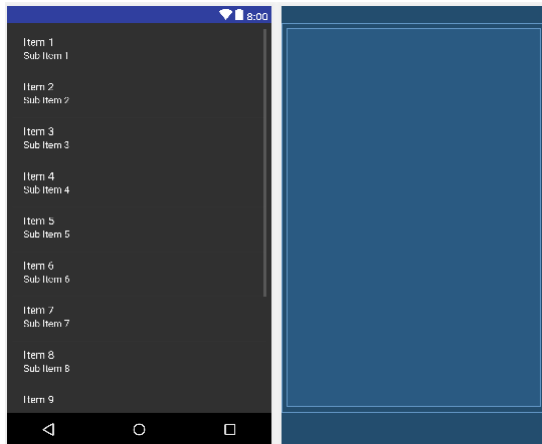
```
Intent i2=new Intent(MainActivity.this,Grid_Layout.class);
startActivity(i2);
```

```
    }
}
});
}
}
```

### activity\_main.xml:

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

<ListView
    android:id="@+id/dynamic"
    android:layout_width="368dp"
    android:layout_height="551dp"
    tools:layout_editor_absoluteX="8dp"
    tools:layout_editor_absoluteY="8dp" />
</android.support.constraint.ConstraintLayout>
```



### Linear\_Layout.Java:

```
package com.example.hrithik.third_program;
```

```
import android.content.Intent;
import android.support.v7.app.AppCompatActivity;
import android.os.Bundle;
```

```
public class Linear_Layout extends AppCompatActivity {
    Intent i=getIntent();
```

**@Override**

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

### activity linear layout.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"  
    android:orientation="vertical"  
    tools:context=".Linear_Layout">  
  
    <TextView  
        android:id="@+id/textView4"  
        android:layout_width="match_parent"  
        android:layout_height="71dp"  
        android:text="Welcome to the Linear Layout"  
        android:textSize="30dp"  
    />  
  
    <TextView  
        android:id="@+id/textView6"  
        android:layout_width="match_parent"  
        android:layout_height="136dp"  
        android:textSize="20dp"  
        android:text="Linear Layout is a viegroup that aligns ll the children in a single direction,  
Vertically or Horizontally." />  
</LinearLayout>
```

### Relative Layout.Java:

```
package com.example.hrithik.third_program;  
  
import android.content.Intent;  
import android.support.v7.app.AppCompatActivity;  
import android.os.Bundle;  
  
public class Relative_Layout extends AppCompatActivity {  
  
    Intent i=getIntent();  
  
    @Override  
    protected void onCreate(Bundle savedInstanceState) {  
        super.onCreate(savedInstanceState);  
        setContentView(R.layout.activity_relative_layout);  
    }  
}
```

```
}  
}
```

### activity relative layout.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=".Relative_Layout">  
  
    <TextView  
        android:id="@+id/textView"  
        android:layout_width="373dp"  
        android:layout_height="wrap_content"  
        android:layout_alignParentStart="true"  
        android:layout_alignParentTop="true"  
        android:text="Welcome to The Relative Layout.\n Relative layout is a view group that displays  
child views in relative positions. If we cahnge one attribute based on that others will get affected."  
        android:textSize="30dp" />  
</RelativeLayout>
```

### Grid Layout.Java:

```
package com.example.hrithik.third_program;  
  
import android.content.Intent;  
import android.support.v7.app.AppCompatActivity;  
import android.os.Bundle;  
  
public class Grid_Layout extends AppCompatActivity {  
  
    Intent i=getIntent();  
    @Override  
    protected void onCreate(Bundle savedInstanceState) {  
        super.onCreate(savedInstanceState);  
        setContentView(R.layout.grid_layout);  
    }  
}
```

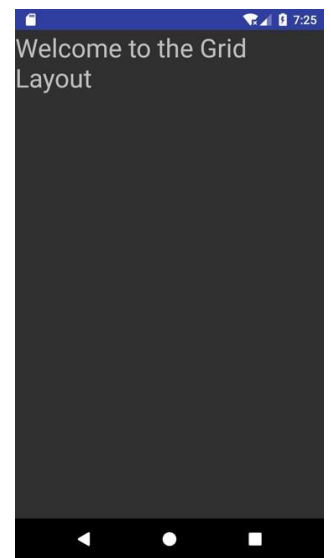
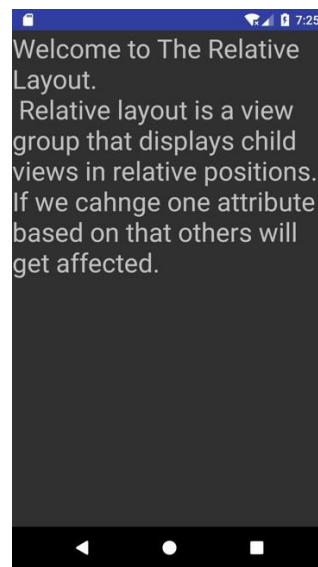
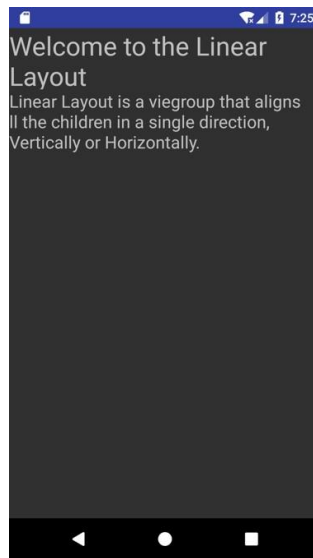
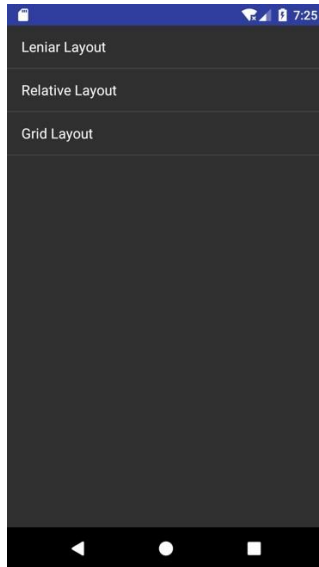
### grid layout.xml:

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

```
android:id="@+id/textView2"  
android:layout_width="match_parent"  
android:layout_height="wrap_content"  
android:text="Welcome to the Grid Layout"  
android:textSize="30dp" />
```

</GridLayout>

### Output:



### 3. Develop a standard calculator application to perform basic calculations like addition, subtraction, multiplication and division.

#### MainActivity.java:

```
package com.example. calculator;
```

```
import android.annotation.SuppressLint;  
import android.support.v7.app.AppCompatActivity;  
import android.os.Bundle;  
import android.view.View;  
import android.widget.Button;  
import android.widget.TextView;
```

```
public class MainActivity extends AppCompatActivity {
```

```
    private Button zero;  
    private Button one;  
    private Button two;  
    private Button three;  
    private Button four;  
    private Button five;  
    private Button six;  
    private Button seven;  
    private Button eight;  
    private Button nine;  
    private Button dec;  
    private Button add;  
    private Button sub;  
    private Button mul;  
    private Button div;  
    private TextView info;  
    private TextView result;  
    private Button equal;  
    private Button clear;
```

```
    private final char ADDITION='+';  
    private final char SUBTRACTION='-';  
    private final char MULTIPLICATION='*';  
    private final char DIVISION='/';  
    private final char EQU='=';
```

```
    private double val1=Double.NaN;  
    private double val2;
```

```
    private char ACTION;
```

```
    @Override
```

```
    protected void onCreate(Bundle savedInstanceState) {
```

```
        super.onCreate(savedInstanceState)
    ;
    setContentView(R.layout.activity_main);

    setupUIViews();

    zero.setOnClickListener(new View.OnClickListener() {
        @SuppressWarnings("SetTextI18n")
        @Override
        public void onClick(View view) {
            info.setText(info.getText().toString() + "0");
        }
    });
    one.setOnClickListener(new View.OnClickListener() {
        @SuppressWarnings("SetTextI18n")
        @Override
        public void onClick(View view) {
            info.setText(info.getText().toString() + "1");
        }
    });
    two.setOnClickListener(new View.OnClickListener() {
        @SuppressWarnings("SetTextI18n")
        @Override
        public void onClick(View view) {
            info.setText(info.getText().toString() + "2");
        }
    });
    three.setOnClickListener(new View.OnClickListener() {
        @SuppressWarnings("SetTextI18n")
        @Override
        public void onClick(View view) {
            info.setText(info.getText().toString() + "3");
        }
    });
    four.setOnClickListener(new View.OnClickListener() {
        @SuppressWarnings("SetTextI18n")
        @Override
        public void onClick(View view) {
            info.setText(info.getText().toString() + "4");
        }
    });
    five.setOnClickListener(new View.OnClickListener() {
        @SuppressWarnings("SetTextI18n")
        @Override
        public void onClick(View view) {
            info.setText(info.getText().toString() + "5");
        }
    });
    six.setOnClickListener(new View.OnClickListener() {
        @SuppressWarnings("SetTextI18n")
```

```
        @Override
        public void onClick(View view) {
            info.setText(info.getText().toString() + "6");
        }
    });
    seven.setOnClickListener(new View.OnClickListener() {
        @SuppressWarnings("SetTextI18n")
        @Override
        public void onClick(View view) {
            info.setText(info.getText().toString() + "7");
        }
    });
    eight.setOnClickListener(new View.OnClickListener() {
        @SuppressWarnings("SetTextI18n")
        @Override
        public void onClick(View view) {
            info.setText(info.getText().toString() + "8");
        }
    });
    nine.setOnClickListener(new View.OnClickListener() {
        @SuppressWarnings("SetTextI18n")
        @Override
        public void onClick(View view) {
            info.setText(info.getText().toString() + "9");
        }
    });

    dec.setOnClickListener(new View.OnClickListener() {
        @SuppressWarnings("SetTextI18n")
        @Override
        public void onClick(View view) {
            info.setText(info.getText().toString() + ".");
        }
    });

    add.setOnClickListener(new View.OnClickListener() {
        @SuppressWarnings("SetTextI18n")
        @Override
        public void onClick(View view) {

            compute();
            ACTION=ADDITION;
            result.setText(String.valueOf(val1)+"");
            info.setText(null);

        }
    });
```

```
sub.setOnClickListener(new View.OnClickListener() {
    @SuppressWarnings("SetTextI18n")
    @Override
    public void onClick(View view) {

        compute();
        ACTION=SUBTRACTION;
        result.setText(String.valueOf(val1)+"-");
        info.setText(null);

    }
});
mul.setOnClickListener(new View.OnClickListener() {
    @SuppressWarnings("SetTextI18n")
    @Override
    public void onClick(View view) {

        compute();
        ACTION=MULTIPLICATION;
        result.setText(String.valueOf(val1)+"*");
        info.setText(null);

    }
});
div.setOnClickListener(new View.OnClickListener() {
    @SuppressWarnings("SetTextI18n")
    @Override
    public void onClick(View view) {

        compute();
        ACTION=DIVISION;
        result.setText(String.valueOf(val1)+"/");
        info.setText(null);

    }
});
equal.setOnClickListener(new View.OnClickListener() {
    @SuppressWarnings("SetTextI18n")
    @Override
    public void onClick(View view) {

        compute();
        ACTION=EQU;
        result.setText(result.getText().toString()+ String.valueOf(val2) + "=" +
String.valueOf(val1));
        // 2 + 4 = 6
        info.setText(null);
    }
});
```



```
    }  
    });  
  
    clear.setOnClickListener(new View.OnClickListener() {  
        @Override  
        public void onClick(View view) {  
            if (info.getText().length() > 0) {  
                CharSequence name = info.getText().toString();  
                info.setText(name.subSequence(0, name.length() - 1));  
            }  
            else {  
                val1 = Double.NaN;  
                val2 = Double.NaN;  
                info.setText(null);  
                result.setText(null);  
            }  
        }  
    });  
}
```

```
private void setupUIViews() {  
    zero = (Button) findViewById(R.id.btn0);  
    one = (Button) findViewById(R.id.btn1);  
    two = (Button) findViewById(R.id.btn2);  
    three = (Button) findViewById(R.id.btn3);  
    four = (Button) findViewById(R.id.btn4);  
    five = (Button) findViewById(R.id.btn5);  
    six = (Button) findViewById(R.id.btn6);  
    seven = (Button) findViewById(R.id.btn7);  
    eight = (Button) findViewById(R.id.btn8);  
    nine = (Button) findViewById(R.id.btn9);  
    add = (Button) findViewById(R.id.btnAdd);  
    sub = (Button) findViewById(R.id.btnsub);  
    mul = (Button) findViewById(R.id.btnmul);  
    div = (Button) findViewById(R.id.btndivide);  
    equal = (Button) findViewById(R.id.btnequal);  
    clear = (Button) findViewById(R.id.btnclear);  
    info = (TextView) findViewById(R.id.tvControl);  
    result = (TextView) findViewById(R.id.tvResult);  
    dec = (Button) findViewById(R.id.btndec);  
}
```

```
private void compute() {  
    if (!Double.isNaN(val1)) {  
        val2 = Double.parseDouble(info.getText().toString());  
  
        switch (ACTION) {  
            case ADDITION:
```

```
        val1=val1+val2;
        break;
    case SUBTRACTION:
        val1=val1-val2;
        break;
    case MULTIPLICATION:
        val1=val1*val2;
        break;
    case DIVISION:
        val1=val1/val2;
        break;
    case EQU:
        break;
    }

}

else {
    val1=Double.parseDouble(info.getText().toString());
}
}
```

### 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=".MainActivity">

    <Button
        android:id="@+id/btn9"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignParentStart="true"
        android:layout_centerVertical="true"
        android:text="9" />

    <Button
        android:id="@+id/btn8"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignTop="@+id/btn9"
        android:layout_toEndOf="@+id/btn9"
        android:text="8" />
```

```
<Button
    android:id="@+id/btn7"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_alignTop="@+id/btn9"
    android:layout_toEndOf="@+id/btn8"
    android:text="7" />

<Button
    android:id="@+id/btn6"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_alignParentStart="true"
    android:layout_below="@+id/btn9"
    android:text="6" />

<Button
    android:id="@+id/btn5"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_alignTop="@+id/btn6"
    android:layout_toEndOf="@+id/btn9"
    android:text="5" />

<Button
    android:id="@+id/btn4"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_alignTop="@+id/btn6"
    android:layout_toEndOf="@+id/btn8"
    android:text="4" />

<Button
    android:id="@+id/btn3"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_alignParentStart="true"
    android:layout_below="@+id/btn6"
    android:text="3" />

<Button
    android:id="@+id/btn2"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_alignTop="@+id/btn3"
    android:layout_toEndOf="@+id/btn9"
    android:text="2" />

<Button
```

```
android:id="@+id/btn1"
android:layout_width="wrap_content"
android:layout_height="wrap_content"
android:layout_alignTop="@+id/btn3"
android:layout_toEndOf="@+id/btn8"
android:text="1" />
```

<Button

```
android:id="@+id/btnclear"
android:layout_width="wrap_content"
android:layout_height="wrap_content"
android:layout_alignParentStart="true"
android:layout_below="@+id/btn3"
android:text="Clear" />
```

<Button

```
android:id="@+id/btn0"
android:layout_width="wrap_content"
android:layout_height="wrap_content"
android:layout_alignTop="@+id/btnclear"
android:layout_toEndOf="@+id/btn9"
android:text="0" />
```

<Button

```
android:id="@+id/btnequal"
android:layout_width="wrap_content"
android:layout_height="wrap_content"
android:layout_alignTop="@+id/btnclear"
android:layout_toEndOf="@+id/btn8"
android:text="=" />
```

<Button

```
android:id="@+id/btndivide"
android:layout_width="wrap_content"
android:layout_height="wrap_content"
android:layout_alignTop="@+id/btn9"
android:layout_toEndOf="@+id/btn7"
android:text="/" />
```

<Button

```
android:id="@+id/btnmul"
android:layout_width="wrap_content"
android:layout_height="wrap_content"
android:layout_alignTop="@+id/btn6"
android:layout_toEndOf="@+id/btn7"
android:text="*" />
```

<Button

```
android:id="@+id/btnadd"
```

```
android:layout_width="wrap_content"  
android:layout_height="wrap_content"  
android:layout_alignTop="@+id/btn3"  
android:layout_toEndOf="@+id/btn7"  
android:text="+" />
```

<Button

```
android:id="@+id/btnsub"  
android:layout_width="wrap_content"  
android:layout_height="wrap_content"  
android:layout_alignTop="@+id/btnclear"  
android:layout_toEndOf="@+id/btn7"  
android:text="-" />
```

<TextView

```
android:id="@+id/tvControl"  
android:layout_width="match_parent"  
android:layout_height="49dp"  
android:layout_above="@+id/btn9"  
android:layout_alignParentStart="true" />
```

<TextView

```
android:id="@+id/tvResult"  
android:layout_width="383dp"  
android:layout_height="137dp"  
android:layout_alignParentTop="true"  
android:layout_marginStart="-264dp"  
android:layout_marginTop="3dp"  
android:layout_toEndOf="@+id/btn7" />
```

<Button

```
android:id="@+id/btndec"  
android:layout_width="wrap_content"  
android:layout_height="wrap_content"  
android:layout_alignParentStart="true"  
android:layout_below="@+id/btnclear"  
android:text="." />
```

</RelativeLayout>



### Output:



#### 4. Devise an application that draws basic graphical primitives (rectangle, circle) on the screen.

##### MainActivity.java:

```
package com.example.hrithik.graphicalprimitives;

import android.graphics.Bitmap;
import android.graphics.Canvas;
import android.graphics.Color;
import android.graphics.Paint;
import android.graphics.drawable.BitmapDrawable;
import android.support.v7.app.AppCompatActivity;
import android.os.Bundle;
import android.widget.ImageView;

public class MainActivity extends AppCompatActivity {

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

        Bitmap bg=Bitmap.createBitmap(720,1280,
            Bitmap.Config.ARGB_8888);

        ImageView i=(ImageView)findViewById(R.id.imageView);
        i.setBackgroundDrawable(new BitmapDrawable(bg));

        Canvas canvas=new Canvas(bg);

        Paint paint=new Paint();
        paint.setColor(Color.BLUE);
        paint.setTextSize(50);

        canvas.drawText("Rectangle",420,150,paint);
        canvas.drawRect(400,200,650,700,paint);

        canvas.drawText("square",160,800,paint);
        canvas.drawRect(50,850,350,1150,paint);

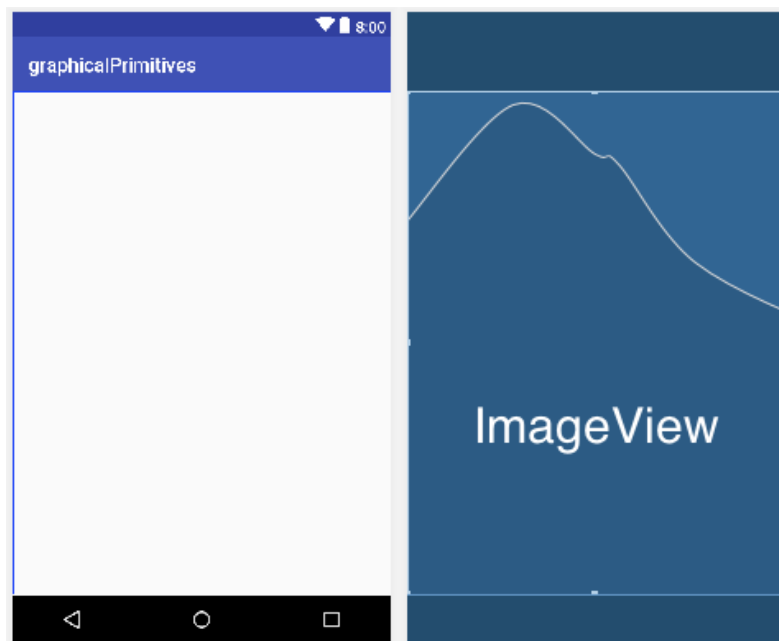
        canvas.drawText("circle",120,150,paint);
        canvas.drawCircle(200,350,150,paint);

        canvas.drawText("Line",480,800,paint);
        canvas.drawLine(520,850,520,1150,paint);
    }
}
```

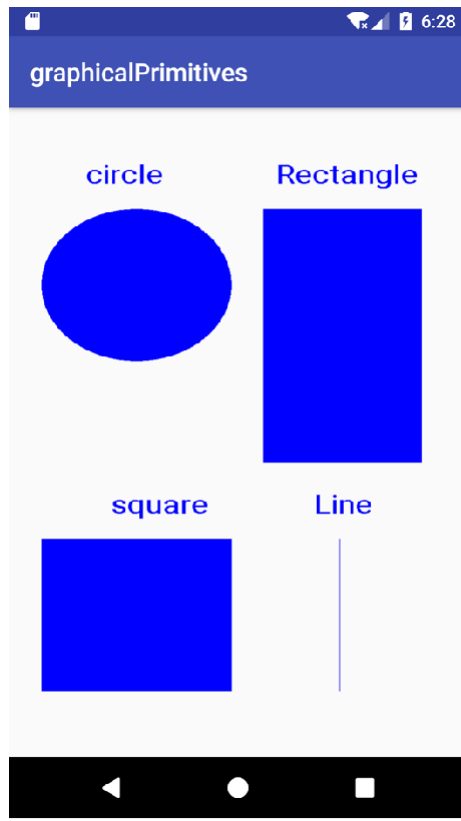
```
}  
}
```

### 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=".MainActivity">  
  
    <ImageView  
        android:layout_width="match_parent"  
        android:layout_height="match_parent"  
        android:id="@+id/imageView" />  
  
</RelativeLayout>
```





**Output:**

## 5. Build an mobile application that create, save, update and delete data in database.

### MainActivity.java:

```
package com.example.databaseexample;
```

```
import android.database.Cursor;
import android.support.v7.app.AlertDialog;
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;
```

```
public class MainActivity extends AppCompatActivity {
```

```
    HelperClass mydb;
    Button b1,b2,b3;
    EditText e1,n1,id;
```

```
    @Override
```

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

```
        mydb=new HelperClass(this);
```

```
        b1=(Button)findViewById(R.id.button);
        b2=(Button)findViewById(R.id.button2);
        b3=(Button)findViewById(R.id.button3);
        e1=(EditText)findViewById(R.id.editText);
        n1=(EditText)findViewById(R.id.editText2);
        id=(EditText)findViewById(R.id.editText3);
```

```
        b1.setOnClickListener(new View.OnClickListener() {
```

```
            @Override
```

```
            public void onClick(View v) {
```

```
                boolean result = mydb.insertData(e1.getText().toString(),n1.getText().toString());
```

```
                if(result==true){
```

```
                    Toast.makeText(MainActivity.this,"Inserted",Toast.LENGTH_LONG).show();
```

```
                }
```

```
            else
```

```
            {
```

```
                Toast.makeText(MainActivity.this,"Not Inserted",Toast.LENGTH_LONG).show();
```

```
            }
```

```
    }  
    });  
  
    b2.setOnClickListener(new View.OnClickListener() {  
        @Override  
        public void onClick(View v) {  
            Cursor res=mydb.getAllData();  
            if (res.getCount()==0){  
                Toast.makeText(MainActivity.this,"No Data",Toast.LENGTH_LONG).show();  
            }  
            else {  
                StringBuffer buffer=new StringBuffer();  
                while (res.moveToNext()){  
                    buffer.append("id :"+ res.getString(0)+"\n");  
                    buffer.append("name :"+ res.getString(1)+"\n");  
                    buffer.append("age :"+ res.getString(2)+"\n");  
                }  
                showMessage("DATA",buffer.toString());  
            }  
        }  
    });  
  
    b3.setOnClickListener(new View.OnClickListener() {  
        @Override  
        public void onClick(View v) {  
            boolean  
result=mydb.updateData(id.getText().toString(),n1.getText().toString(),e1.getText().toString());  
            if (result==true){  
                Toast.makeText(MainActivity.this,"Updated",Toast.LENGTH_LONG).show();  
            }  
            else {  
                Toast.makeText(MainActivity.this,"Not Updated ... try  
again",Toast.LENGTH_LONG).show();  
            }  
        }  
    });  
  
    }  
    public void showMessage(String title,String message){  
        AlertDialog.Builder builder=new AlertDialog.Builder(this);  
        builder.setTitle(title);  
        builder.setMessage(message);  
        builder.show();  
    }  
}
```

**Helperclass.java:**

```
package com.example.hrithik.databaseexample;

import android.content.ContentValues;
import android.content.Context;
import android.database.Cursor;
import android.database.sqlite.SQLiteDatabase;
import android.database.sqlite.SQLiteOpenHelper;
import android.widget.Toast;

public class HelperClass extends SQLiteOpenHelper {
    public static String DATABASE_NAME="Hrithik.db";

    public static String TABLE_NAME="Department";

    public static String ID="id";

    public static String NAME="Name";

    public static String AGE="Age";

    public static String CREATE_TABLE="create table Department(id INTEGER PRIMARY KEY
    AUTOINCREMENT,Name TEXT,Age INTEGER)";

    private Context context;
    public HelperClass(Context context) {
        super(context, DATABASE_NAME, null, 3);
        this.context=context;

        // SQLiteDatabase db= this.getWritableDatabase();

    }

    @Override
    public void onCreate(SQLiteDatabase db) {

        db.execSQL(CREATE_TABLE);

    }

    @Override
    public void onUpgrade(SQLiteDatabase db, int oldVersion, int newVersion) {
        db.execSQL("DROP TABLE IF EXISTS " + TABLE_NAME);
        onCreate(db);

    }

    public boolean insertData(String name,String age){
        SQLiteDatabase db=getWritableDatabase();
```

```
ContentValues cv=new ContentValues();
cv.put(NAME,name);
cv.put(AGE,age);
long result = db.insert(TABLE_NAME,null,cv);

if (result==-1) return false;
else
    return true;

}

protected Cursor getAllData(){
    SQLiteDatabase db=this.getWritableDatabase();
    Cursor res=db.rawQuery("select * from " + TABLE_NAME,null);
    return (res);

}

public boolean updateData(String id,String name, String age){
    SQLiteDatabase db=getWritableDatabase();
    ContentValues cv=new ContentValues();
    cv.put(ID,id);
    cv.put(NAME,name);
    cv.put(AGE,age);
    db.update(TABLE_NAME,cv,"ID=?",new String[] {id});
    return true;
}
}
```

### 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=".MainActivity">

    <EditText
        android:id="@+id/editText"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignParentStart="true"
        android:layout_alignParentTop="true"
        android:layout_marginStart="68dp"
        android:layout_marginTop="45dp"
        android:ems="10"
        android:inputType="textPersonName">
```

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

```
<EditText
```

```
    android:id="@+id/editText2"  
    android:layout_width="wrap_content"  
    android:layout_height="wrap_content"  
    android:layout_alignParentTop="true"  
    android:layout_alignStart="@+id/editText"  
    android:layout_marginTop="117dp"  
    android:ems="10"  
    android:hint="Age"  
    android:inputType="number" />
```

```
<Button
```

```
    android:id="@+id/button"  
    android:layout_width="wrap_content"  
    android:layout_height="wrap_content"  
    android:layout_alignParentBottom="true"  
    android:layout_alignStart="@+id/button2"  
    android:layout_marginBottom="220dp"  
    android:text="Insert" />
```

```
<Button
```

```
    android:id="@+id/button2"  
    android:layout_width="wrap_content"  
    android:layout_height="wrap_content"  
    android:layout_alignParentBottom="true"  
    android:layout_alignStart="@+id/button3"  
    android:layout_marginBottom="144dp"  
    android:text="Display" />
```

```
<Button
```

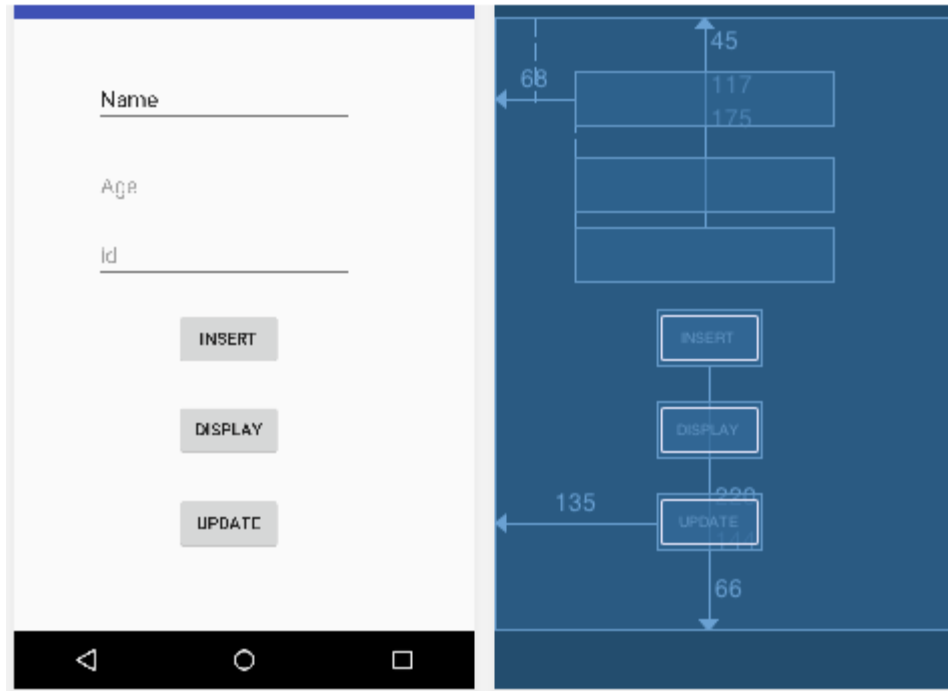
```
    android:id="@+id/button3"  
    android:layout_width="wrap_content"  
    android:layout_height="wrap_content"  
    android:layout_alignParentBottom="true"  
    android:layout_alignParentStart="true"  
    android:layout_marginBottom="66dp"  
    android:layout_marginStart="135dp"  
    android:text="Update" />
```

```
<EditText
```

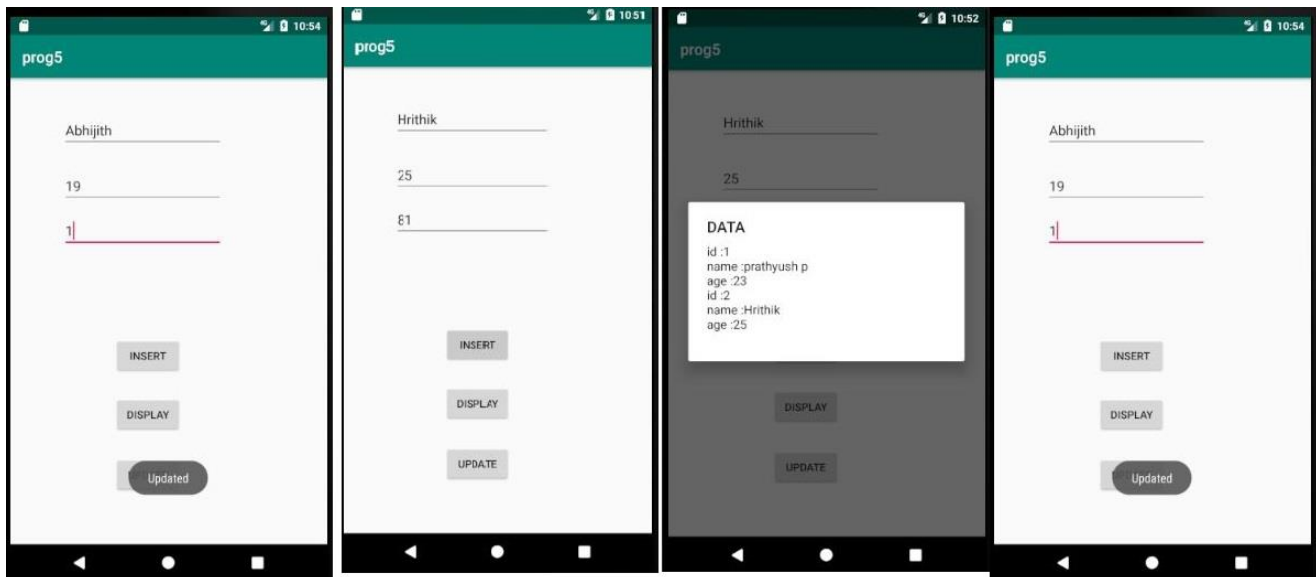
```
    android:id="@+id/editText3"  
    android:layout_width="wrap_content"  
    android:layout_height="wrap_content"  
    android:layout_alignParentTop="true"  
    android:layout_alignStart="@+id/editText"  
    android:layout_marginTop="175dp"  
    android:ems="10"
```

```
android:hint="id"
android:inputType="number" />
```

</RelativeLayout>



## Output:



## 6. Devise an application that implements Multi-threading.

### mainActivity.java:

```
package com.example.hrithik.multithreading1;

import android.content.Intent;
import android.media.MediaPlayer;
import android.os.AsyncTask;
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.TextView;
import android.widget.Toast;

public class MainActivity extends AppCompatActivity {

    EditText data;
    Button musicButton, tableButton;
    TextView result;

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

        data=(EditText)findViewById(R.id.editText);
        musicButton=(Button)findViewById(R.id.button);
        tableButton=(Button)findViewById(R.id.button2);
        result=(TextView)findViewById(R.id.textView);

        tableButton.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                MediaPlayer player=MediaPlayer.create(getApplicationContext(),R.raw.loveralso);
                player.start();
            }
        });

        musicButton.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                new CountingTask().execute(data.getText().toString());
            }
        });
    }

    public class CountingTask extends AsyncTask<String,Integer,Integer> {
        int sum=0;
```



```
@Override
protected Integer doInBackground(String... strings) {
    int value=Integer.parseInt(strings[0]);
    for(int i=value;i<100;i++){
        publishProgress(i);
        try
        {
            Thread.sleep(1000);
        }
        catch (InterruptedException e){
            e.printStackTrace();
        }
    }

    return sum;
}

@Override
protected void onProgressUpdate(Integer... values) {
    super.onProgressUpdate(values);
    result.setText(values[0].toString());
    sum=sum+values[0].intValue();
}

@Override
protected void onPreExecute() {
    super.onPreExecute();
    Toast.makeText(getApplicationContext(), "", Toast.LENGTH_SHORT).show();
}
}
```

### activity\_main.xml:

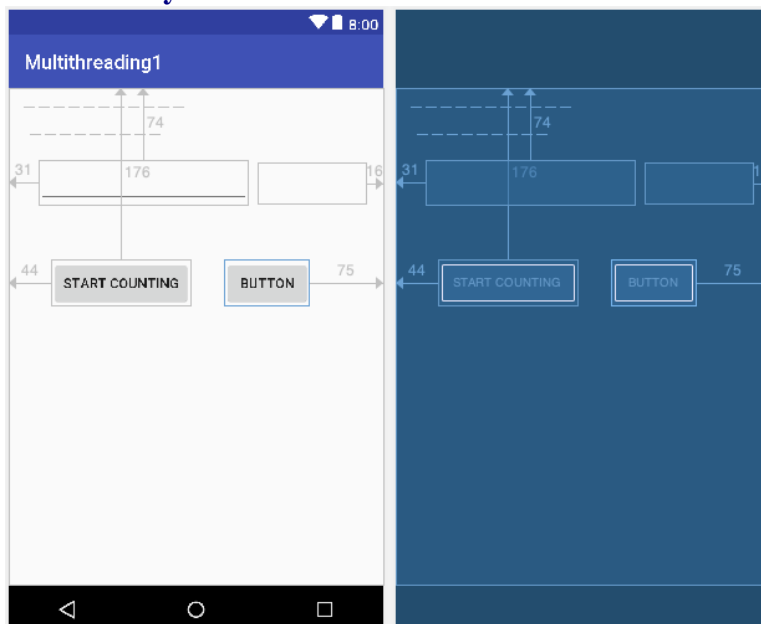
```
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context=".MainActivity">
    <TextView
        android:id="@+id/textView"
        android:layout_width="112dp"
        android:layout_height="43dp"
        android:layout_alignBottom="@+id/editText"
        android:layout_alignParentEnd="true"
        android:layout_marginEnd="16dp"
        android:text=""
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintLeft_toLeftOf="parent"
```

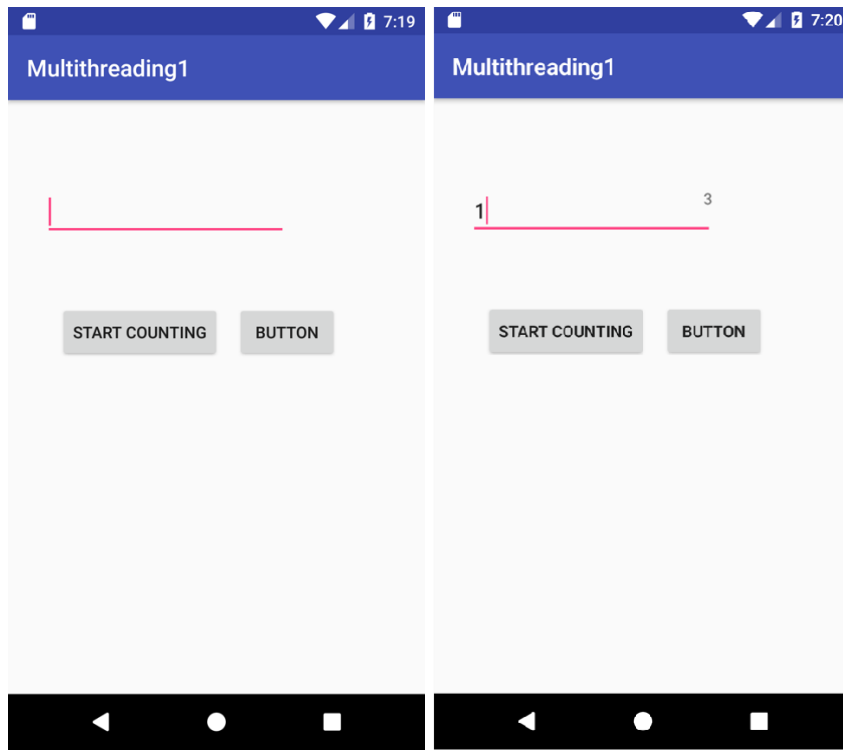
```

app:layout_constraintRight_toRightOf="parent"
app:layout_constraintTop_toTopOf="parent" />
<EditText
    android:id="@+id/editText"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_alignParentStart="true"
    android:layout_alignParentTop="true"
    android:layout_marginStart="31dp"
    android:layout_marginTop="74dp"
    android:ems="10"
    android:inputType="textPersonName" />
<Button
    android:id="@+id/button"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_alignParentStart="true"
    android:layout_alignParentTop="true"
    android:layout_marginStart="44dp"
    android:layout_marginTop="176dp"
    android:text="Start Counting" />
<Button
    android:id="@+id/button2"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_alignParentEnd="true"
    android:layout_alignTop="@+id/button"
    android:layout_marginEnd="75dp"
    android:text="Button" />

```

</RelativeLayout>



**Output:**

## 7. Develop a mobile application that uses GPS location information.

### MapsActivity.Java :

```
package com.example. maps;
import android.Manifest;
import android.content.pm.PackageManager;
import android.location.Address;
import android.location.Geocoder;
import android.location.Location;
import android.location.LocationListener;
import android.location.LocationManager;
import android.support.annotation.NonNull;
import android.support.v4.app.ActivityCompat;
import android.support.v4.app.FragmentActivity;
import android.os.Bundle;
import android.widget.Toast;

import com.google.android.gms.maps.CameraUpdateFactory;
import com.google.android.gms.maps.GoogleMap;
import com.google.android.gms.maps.OnMapReadyCallback;
import com.google.android.gms.maps.SupportMapFragment;
import com.google.android.gms.maps.model.LatLng;
import com.google.android.gms.maps.model.MarkerOptions;

import java.io.IOException;
import java.util.List;
public class MapsActivity extends FragmentActivity implements OnMapReadyCallback {

    private GoogleMap mMap;

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_maps);
        // Obtain the SupportMapFragment and get notified when the map is ready to be used.
        SupportMapFragment mapFragment = (SupportMapFragment) getSupportFragmentManager()
            .findFragmentById(R.id.map);
        mapFragment.getMapAsync(this);

        LocationManager lm = (LocationManager) getSystemService(LOCATION_SERVICE);

        if (ActivityCompat.checkSelfPermission(this, Manifest.permission.ACCESS_FINE_LOCATION)
            != PackageManager.PERMISSION_GRANTED) {
            ActivityCompat.requestPermissions(this, new
                String[]{Manifest.permission.ACCESS_FINE_LOCATION}, 1);
        }
        if (lm.isProviderEnabled(LocationManager.GPS_PROVIDER)) {
            lm.requestLocationUpdates(LocationManager.GPS_PROVIDER, 0, 0, new LocationListener() {
                @Override
```

```
public void onLocationChanged(Location location) {
    if (location != null) {
        double latitude = location.getLatitude();
        double longitude = location.getLongitude();
        LatLng latLng = new LatLng(latitude, longitude);
        Geocoder geocoder = new Geocoder(getApplicationContext());
        try {
            List<Address> address = geocoder.getFromLocation(latitude, longitude, 1);
            String str = address.get(0).getCountryName() + "," +
                address.get(0).getLocality();
            ;
            Toast.makeText(MapsActivity.this, str, Toast.LENGTH_SHORT).show();
            mMap.addMarker(new MarkerOptions().position(latLng).title(str));
            mMap.moveCamera(CameraUpdateFactory.newLatLngZoom(latLng, 7.2f));
        } catch (IOException e) {
            e.printStackTrace();
        }
    }
}

@Override
public void onStatusChanged(String s, int i, Bundle bundle) {
}

@Override
public void onProviderEnabled(String s) {
}

@Override
public void onProviderDisabled(String s) {
}
});
} else
    Toast.makeText(MapsActivity.this, "GPS NOT Enabled", Toast.LENGTH_SHORT).show();
}

@Override
public void onRequestPermissionsResult(int requestCode, @NonNull String[] permissions, @NonNull
int[] grantResults) {
    super.onRequestPermissionsResult(requestCode, permissions, grantResults);
    if (requestCode == 1 && grantResults[0] == PackageManager.PERMISSION_GRANTED) {
        Toast.makeText(getApplicationContext(), "Permission Granted",
        Toast.LENGTH_LONG).show();
        return;
    }
}
```

```
}  
}
```

**@Override**

```
public void onMapReady(GoogleMap googleMap) {  
    mMap = googleMap;  
  
}
```

**@Override**

```
protected void onStop() {  
    super.onStop();  
    Toast.makeText(MapsActivity.this, "Updates stopped by user", Toast.LENGTH_SHORT).show();  
}
```

### activity\_maps.xml:

```
<?xml version="1.0" encoding="utf-8"?>  
<fragment xmlns:android="http://schemas.android.com/apk/res/android"  
    xmlns:map="http://schemas.android.com/apk/res-auto"  
    xmlns:tools="http://schemas.android.com/tools"  
    android:id="@+id/map"  
    android:name="com.google.android.gms.maps.SupportMapFragment"  
    android:layout_width="match_parent"  
    android:layout_height="match_parent"  
    tools:context=".MapsActivity" />
```

### AndroidManifest.xml:

```
<?xml version="1.0" encoding="utf-8"?>  
<manifest xmlns:android="http://schemas.android.com/apk/res/android"  
    package="com.example.hrithik.maps">  
    <uses-permission android:name="android.permission.ACCESS_FINE_LOCATION" />  
    <uses-permission android:name="android.permission.ACCESS_NETWORK_STATE" />  
    <uses-permission android:name="android.permission.INTERNET" />  
    <uses-permission  
        android:name="com.google.android.providers.gsf.permission.READ_GSERVICES" />  
    <uses-permission android:name="android.permission.WRITE_EXTERNAL_STORAGE" />  
  
    <application  
        android:allowBackup="true"  
        android:icon="@drawable/ic_launcher_background"  
        android:label="@string/app_name"  
        android:supportRtl="true"  
        android:theme="@style/AppTheme">
```

```

<meta-data
  android:name="com.google.android.geo.API_KEY"
  android:value="AIzaSyBJSacRiTd7ng-ed2xBj7UeTFxeBdkpIMg" />

<activity
  android:name=".MapsActivity"
  android:label="@string/title_activity_maps">
  <intent-filter>
    <action android:name="android.intent.action.MAIN" />

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

</manifest>

```

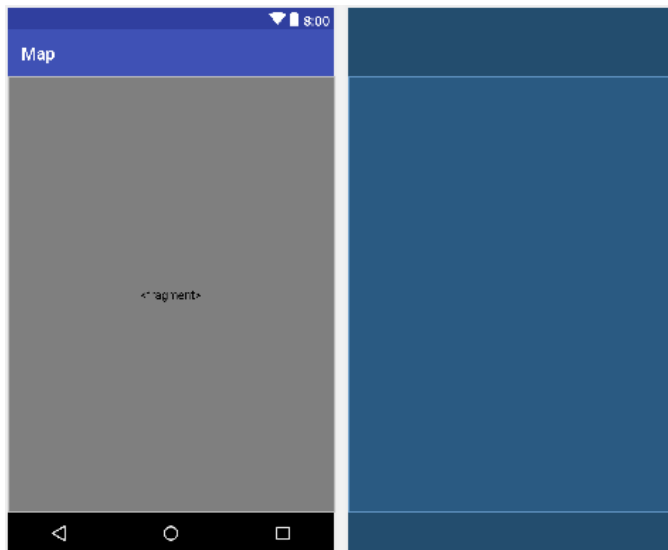
### google\_maps\_api.xml:

```

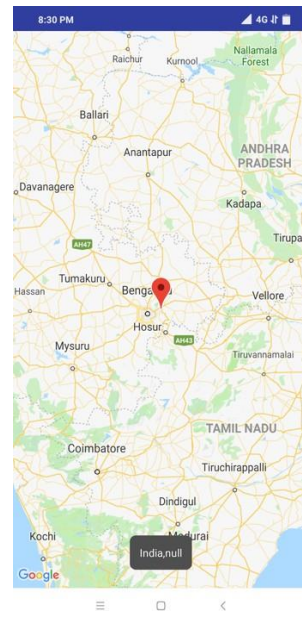
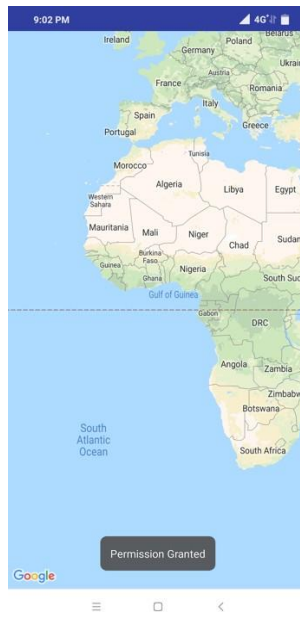
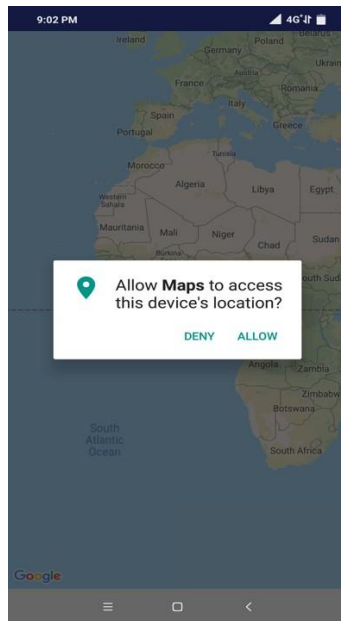
<resources>

  <string name="google_maps_key" templateMergeStrategy="preserve"
    translatable="false">AIzaSyBJSacRiTd7ng-ed2xBj7UeTFxeBdkpIMg</string>
</resources>

```



## OutPut :





## 8. Create an application that writes data to the SD card.

### MainActivity.java:

```
package com.example.hrithik.sdcard;

import android.Manifest;
import android.content.pm.PackageManager;
import android.os.Environment;
import android.support.annotation.NonNull;
import android.support.v4.app.ActivityCompat;
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.TextView;
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;

public class MainActivity extends AppCompatActivity {
    EditText data;
    TextView readdata;
    Button save,read;

    @Override
    public void onRequestPermissionsResult(int requestCode, @NonNull String[] permissions, @NonNull
int[] grantResults) {
        super.onRequestPermissionsResult(requestCode, permissions, grantResults);
        if (grantResults[0]==PackageManager.PERMISSION_GRANTED){
            return;
        }
        else
        {
            Toast.makeText(getApplicationContext(),"Permission not granted
",Toast.LENGTH_LONG).show();
        }
    }

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
```

```
setContentView(R.layout.activity_main);

save=(Button)findViewById(R.id.button);
read=(Button)findViewById(R.id.button1);
readdata=(TextView)findViewById(R.id.textView);
data=(EditText)findViewById(R.id.editText);
if (ActivityCompat.checkSelfPermission(getApplicationContext(),
Manifest.permission.WRITE_EXTERNAL_STORAGE)!=
PackageManager.PERMISSION_GRANTED){
    ActivityCompat.requestPermissions(MainActivity.this,new
String[] {Manifest.permission.WRITE_EXTERNAL_STORAGE},1);

}
save.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View v) {

        String str=data.getText().toString();
        boolean available=isExternalStorageAvailable();
        if (available){
            File sdCard=Environment.getExternalStorageDirectory();
            File dir=new File(sdCard.getAbsolutePath()+ "/Mydir");

            Toast.makeText(getApplicationContext(),dir.toString(),Toast.LENGTH_SHORT).show();
            if (!dir.exists()){
                dir.mkdir();
            }
            File file=new File(dir,"myfile.txt");

            try {
                FileOutputStream fout=new FileOutputStream(file,true);
                try {
                    fout.write(str.getBytes());
                    fout.close();
                    Toast.makeText(getApplicationContext(),"Message is
saved",Toast.LENGTH_SHORT).show();
                } catch (IOException e) {
                    e.printStackTrace();
                }
            } catch (FileNotFoundException e) {
                e.printStackTrace();
            }
        }
    }
});

read.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View v) {
```

```
File sdCard=Environment.getExternalStorageDirectory();
File dir=new File(sdCard.getAbsolutePath()+ "/Mydir");
File file=new File(dir, "myfile.txt");
```

```
String message;
```

```
try {
    FileInputStream fin=new FileInputStream(file);
    InputStreamReader reader=new InputStreamReader(fin);
    BufferedReader bufferedReader=new BufferedReader(reader);
    StringBuffer buffer=new StringBuffer();
    while ((message=bufferedReader.readLine())!=null){
        buffer.append(message+"\n");
    }
    readdata.setText(buffer.toString());
} catch (FileNotFoundException e) {
    e.printStackTrace();
} catch (IOException e) {
    e.printStackTrace();
}
}
});
}
}

public boolean isExternalStorageAvailable(){
    String state= Environment.getExternalStorageState();
    if (Environment.MEDIA_MOUNTED.equals(state)){
        return true;
    }
    return true;
}
}
```

### 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=".MainActivity">
    <EditText
        android:id="@+id/editText"
        android:layout_width="match_parent"
        android:layout_height="131dp"
        android:layout_alignParentStart="true"
        android:layout_alignParentTop="true"
        android:layout_marginTop="5dp"
        android:ems="10"
        android:inputType="textMultiLine" />
```

<Button

```
android:id="@+id/button"
android:layout_width="wrap_content"
android:layout_height="wrap_content"
android:layout_alignParentTop="true"
android:layout_centerHorizontal="true"
android:layout_marginTop="151dp"
android:text="Save" />
```

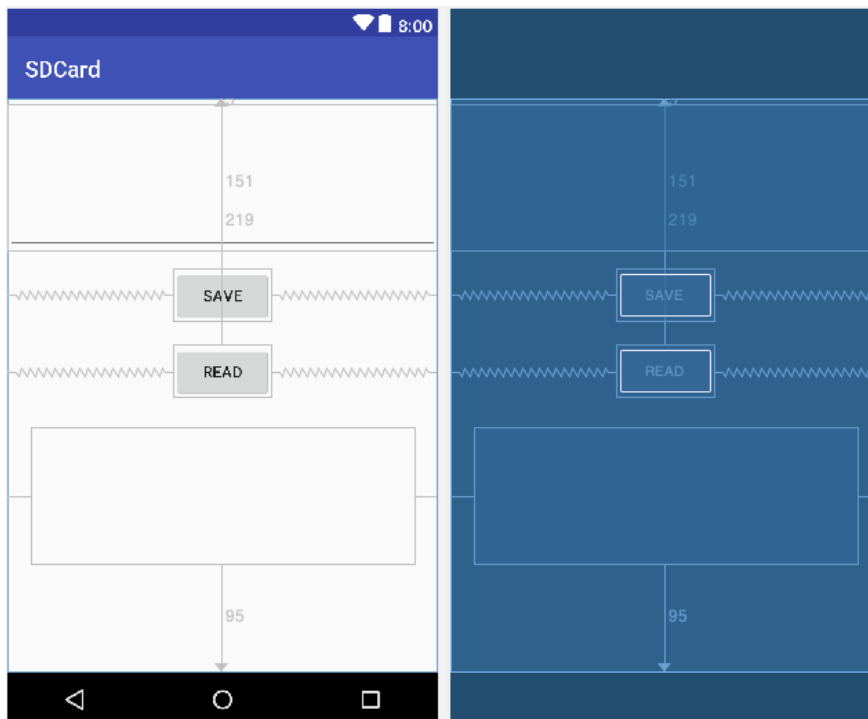
<Button

```
android:id="@+id/button1"
android:layout_width="wrap_content"
android:layout_height="wrap_content"
android:layout_alignParentTop="true"
android:layout_centerHorizontal="true"
android:layout_marginTop="219dp"
android:text="Read" />
```

<TextView

```
android:id="@+id/textView"
android:layout_width="343dp"
android:layout_height="123dp"
android:layout_alignParentBottom="true"
android:layout_centerHorizontal="true"
android:layout_marginBottom="95dp"
android:text=" "
android:textSize="20dp"
android:textColor="#89f515"
android:fontFamily="monospace"/>
```

</RelativeLayout>



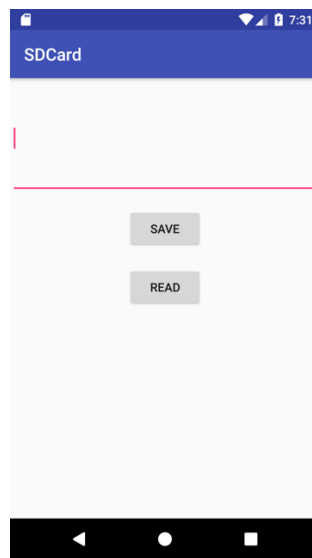
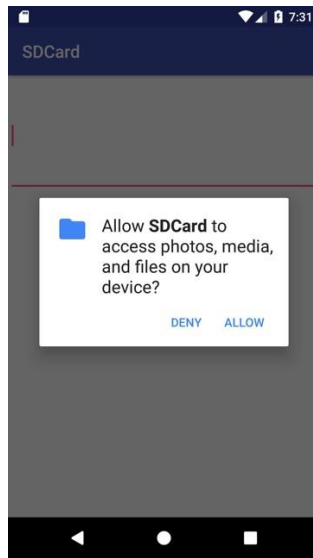
**AndroidManifest.xml:**

```
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    package="com.example.hrithik.sdcard">
    <uses-permission android:name="android.permission.WRITE_EXTERNAL_STORAGE"/>
    <uses-permission android:name="android.permission.READ_EXTERNAL_STORAGE"/>

    <application
        android:allowBackup="true"
        android:icon="@mipmap/ic_launcher"
        android:label="@string/app_name"
        android:roundIcon="@mipmap/ic_launcher_round"
        android:supportRtl="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>
```

## Output:



## 9. Implement an application that creates an alert upon receiving a message.

### ActivityMain.java:

```
package com.example. recievesms;

import android.Manifest;
import android.app.PendingIntent;
import android.content.Intent;
import android.content.pm.PackageManager;
import android.support.annotation.NonNull;
import android.support.v4.app.ActivityCompat;
import android.support.v7.app.AppCompatActivity;
import android.os.Bundle;
import android.widget.Toast;

public class MainActivity extends AppCompatActivity {

    @Override
    public void onRequestPermissionsResult(int requestCode, @NonNull String[] permissions, @NonNull
int[] grantResults) {
        super.onRequestPermissionsResult(requestCode, permissions, grantResults);

        if (grantResults[0]==PackageManager.PERMISSION_GRANTED){
            return;
        }
        else {
            Toast.makeText(getApplicationContext(),"Not granted",Toast.LENGTH_LONG).show();
        }
    }

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

        if (ActivityCompat.checkSelfPermission(this, Manifest.permission.RECEIVE_SMS)!=
PackageManager.PERMISSION_GRANTED){
            ActivityCompat.requestPermissions(this,new String[]{Manifest.permission.RECEIVE_SMS},1);
        }
        Intent ri=new Intent("android.provider.Telephony.SMS_RECEIVED");
        PendingIntent pi=PendingIntent.getBroadcast(MainActivity.this,1,ri,0);

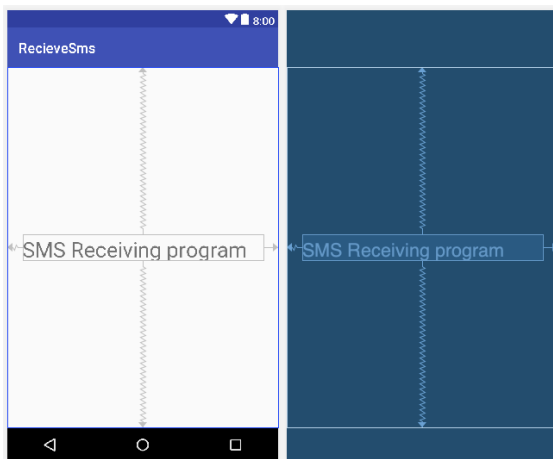
    }
}
```

### activity\_main.xml:

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

    <TextView
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="SMS Receiving program"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintLeft_toLeftOf="parent"
        app:layout_constraintRight_toRightOf="parent"
        app:layout_constraintTop_toTopOf="parent" />

</android.support.constraint.ConstraintLayout>
```



### SmsReceiver.Java:

```
package com.example.hrithik.recievesms;
```

```
import android.app.Notification;
import android.app.NotificationManager;
import android.content.BroadcastReceiver;
import android.content.Context;
import android.content.Intent;
```

```
public class SmsReceiver extends BroadcastReceiver {
    @Override
```



```
public void onReceive(Context context, Intent intent) {
    NotificationManager
nm=(NotificationManager)context.getSystemService(Context.NOTIFICATION_SERVICE);
    Notification.Builder builder=new Notification.Builder(context);
    builder.setSmallIcon(R.drawable.main_background);
    builder.setTitle("MESSAGE");
    builder.setText("You got the message");

    nm.notify(0,builder.build());
}
}
```

### AndroidManifest.xml:

```
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    package="com.example.hrithik.recievesms">
    <uses-permission android:name="android.permission.RECEIVE_SMS"/>

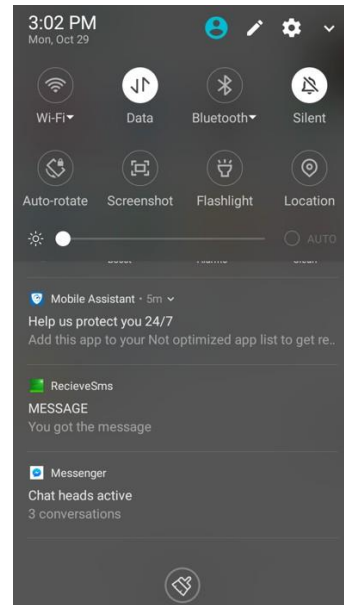
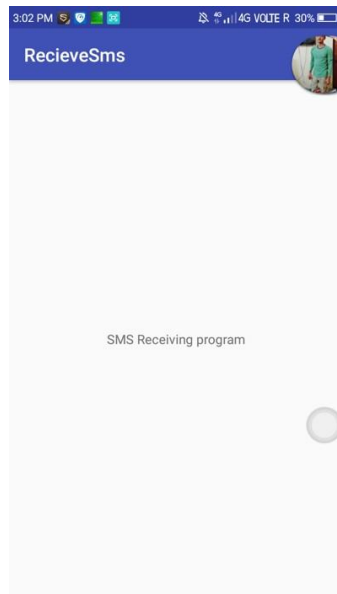
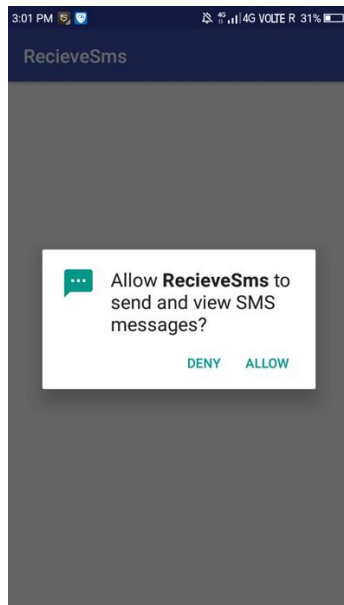
    <application
        android:allowBackup="true"
        android:icon="@drawable/main_background"
        android:label="@string/app_name"
        android:roundIcon="@drawable/main_background"
        android:supportRtl="true"
        android:theme="@style/AppTheme">
        <activity android:name=".MainActivity">
            <intent-filter android:priority="6754328">
                <action android:name="android.intent.action.MAIN" />

                <category android:name="android.intent.category.LAUNCHER" />
            </intent-filter>
        </activity>
        <receiver android:name="SmsReceiver">
            <intent-filter>
                <action android:name="android.provider.Telephony.SMS_RECEIVED"/>
            </intent-filter>
        </receiver>

    </application>

</manifest>
```

## Output:



## 10. Devise a mobile application that creates alarm clock.

### ActivityMain.java:

```
package com.example. alarmclock;

import android.app.AlarmManager;
import android.app.PendingIntent;
import android.content.Intent;
import android.icu.util.Calendar;
import android.support.v7.app.AppCompatActivity;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.TimePicker;
import android.widget.Toast;

public class MainActivity extends AppCompatActivity {

    TimePicker alarmTimepicker;
    PendingIntent pendingIntent;
    Button setButton;
    Button cancelButton;
    AlarmManager alarmManager;

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

        setButton=(Button)findViewById(R.id.button1);
        cancelButton=(Button)findViewById(R.id.button);

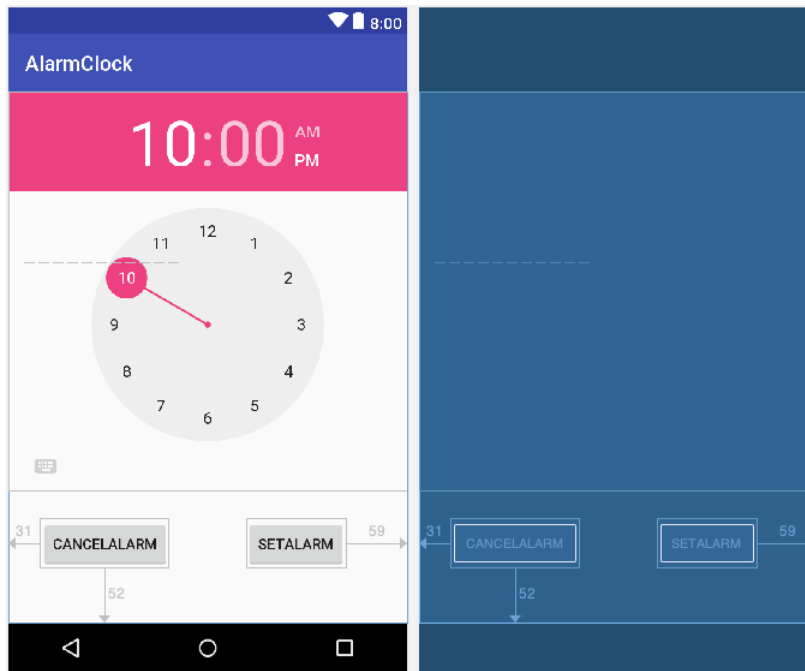
        alarmTimepicker=(TimePicker) findViewById(R.id.timePicker);
        alarmManager=(AlarmManager) getSystemService(ALARM_SERVICE);
        Intent intent = new Intent(this,AlarmReceiver.class);
        pendingIntent = PendingIntent.getBroadcast(this,0,intent,0);

        setButton.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                Calendar c = Calendar.getInstance();
                c.set(Calendar.HOURLY_OF_DAY, alarmTimepicker.getHour());
                c.set(Calendar.MINUTE, alarmTimepicker.getMinute());
                alarmManager.setExact(AlarmManager.RTC_WAKEUP,c.getTimeInMillis(),pendingIntent);
            }
        });
        cancelButton.setOnClickListener(new View.OnClickListener() {
            @Override
```

```
public void onClick(View v) {  
    alarmManager.cancel(pendingIntent);  
    Toast.makeText(getApplicationContext(),"ALARM CANCELLED!!!!",  
    Toast.LENGTH_SHORT).show();  
}  
});  
}  
}
```

### 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"  
    android:orientation="vertical"  
    tools:context=".MainActivity">  
  
    <TimePicker  
        android:id="@+id/timePicker"  
        android:layout_width="wrap_content"  
        android:layout_height="wrap_content"  
        android:layout_gravity="center" />  
  
    <Button  
        android:id="@+id/button"  
        android:layout_width="wrap_content"  
        android:layout_height="wrap_content"  
        android:layout_alignParentBottom="true"  
        android:layout_alignParentStart="true"  
        android:layout_marginBottom="52dp"  
        android:layout_marginStart="31dp"  
        android:text="CancelAlarm" />  
  
    <Button  
        android:id="@+id/button1"  
        android:layout_width="wrap_content"  
        android:layout_height="wrap_content"  
        android:layout_alignParentEnd="true"  
        android:layout_alignTop="@+id/button"  
        android:layout_marginEnd="59dp"  
        android:text="SetAlarm" />  
  
</RelativeLayout>
```



### AndroidManifest.xml:

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

    <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>
        //Change the activity as "receiver" as below:
        <receiver android:name=".AlarmReceiver"></receiver>
    </application>

</manifest>
```

**AlarmReceiver.java:**

```
package com.example.hrithik.alarmclock;

import android.content.BroadcastReceiver;
import android.content.Context;
import android.content.Intent;
import android.widget.Toast;

public class AlarmReceiver extends BroadcastReceiver{

    @Override
    public void onReceive(Context context, Intent intent) {
        Toast.makeText(context, "Alarm wake up! wake up!", Toast.LENGTH_LONG).show();
    }
}
```

**activity alarm receiver.xml:**

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

**Output:**