

# Department of Computer Science and Engineering

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## UCS1711 - Mobile Application Development Lab

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### Exercise 2: Layouts and Event Listeners

**Aim:**

Generate an application to simulate a calculator

**Code:**

**Main Activity:**

**Design:**

```

1 <?xml version="1.0" encoding="utf-8"?>
2 <RelativeLayout xmlns:android="http://schemas.android.com/apk
   /res/android"
3     xmlns:tools="http://schemas.android.com/tools"
4     android:layout_width="match_parent"
5     android:layout_height="match_parent"
6     android:layout_margin="5dp"
7     tools:context=".MainActivity">
8
9
10    <EditText
11        android:id="@+id/edt1"
12        android:layout_width="270dp"
13        android:layout_height="58dp"
14        android:layout_alignParentTop="true"
15        android:layout_centerHorizontal="true"
16        android:layout_marginTop="32dp" />
17
18    <Button
19        android:id="@+id/button1"
20        style="?android:attr/buttonStyleSmall"
21        android:layout_width="wrap_content"
22        android:layout_height="wrap_content"
23        android:layout_below="@+id/edt1"
24        android:layout_alignEnd="@+id/button4"
25        android:layout_alignRight="@+id/button4"
26        android:layout_marginTop="73dp"
27        android:layout_marginEnd="0dp"
28        android:layout_marginRight="0dp"
29        android:text="1" />
30
31    <Button
32        android:id="@+id/button2"
33        style="?android:attr/buttonStyleSmall"
34        android:layout_width="wrap_content"
35        android:layout_height="wrap_content"
36        android:layout_alignTop="@+id/button1"
37        android:layout_alignParentStart="true"
38        android:layout_alignParentLeft="true"
39        android:layout_marginStart="140dp"
40        android:layout_marginLeft="140dp"
41        android:layout_marginTop="-1dp"
42        android:text="2" />
43
44    <Button

```

```

45         android:id="@+id/button3"
46         style="?android:attr/buttonStyleSmall"
47         android:layout_width="wrap_content"
48         android:layout_height="wrap_content"
49         android:layout_alignTop="@+id/button2"
50         android:layout_centerHorizontal="true"
51         android:layout_marginStart="-1dp"
52         android:layout_marginLeft="-1dp"
53         android:layout_marginTop="1dp"
54         android:layout_toEndOf="@+id/button2"
55         android:layout_toRightOf="@+id/button2"
56         android:text="3" />
57
58     <Button
59         android:id="@+id/button4"
60         style="?android:attr/buttonStyleSmall"
61         android:layout_width="wrap_content"
62         android:layout_height="wrap_content"
63         android:layout_below="@+id/button1"
64         android:layout_alignParentStart="true"
65         android:layout_alignParentLeft="true"
66         android:layout_marginStart="90dp"
67         android:layout_marginLeft="90dp"
68         android:layout_marginTop="1dp"
69         android:text="4" />
70
71     <Button
72         android:id="@+id/button5"
73         style="?android:attr/buttonStyleSmall"
74         android:layout_width="wrap_content"
75         android:layout_height="wrap_content"
76         android:layout_alignBottom="@+id/button4"
77         android:layout_alignLeft="@+id/button2"
78         android:layout_alignStart="@+id/button2"
79         android:text="5" />
80
81     <Button
82         android:id="@+id/button6"
83         style="?android:attr/buttonStyleSmall"
84         android:layout_width="wrap_content"
85         android:layout_height="wrap_content"
86         android:layout_below="@+id/button3"
87         android:layout_alignStart="@+id/button3"
88         android:layout_alignLeft="@+id/button3"
89         android:layout_centerHorizontal="true"

```

```

90         android:layout_marginStart="1dp"
91         android:layout_marginLeft="1dp"
92         android:layout_marginTop="0dp"
93         android:text="6" />
94
95     <Button
96         android:id="@+id/button7"
97         style="?android:attr/buttonStyleSmall"
98         android:layout_width="wrap_content"
99         android:layout_height="wrap_content"
100        android:layout_below="@+id/button4"
101        android:layout_alignParentStart="true"
102        android:layout_alignParentLeft="true"
103        android:layout_marginStart="91dp"
104        android:layout_marginLeft="91dp"
105        android:layout_marginTop="2dp"
106        android:text="7" />
107
108     <Button
109         android:id="@+id/button8"
110         style="?android:attr/buttonStyleSmall"
111         android:layout_width="wrap_content"
112         android:layout_height="wrap_content"
113         android:layout_alignLeft="@+id/button5"
114         android:layout_alignStart="@+id/button5"
115         android:layout_below="@+id/button5"
116         android:text="8" />
117
118     <Button
119         android:id="@+id/button9"
120         style="?android:attr/buttonStyleSmall"
121         android:layout_width="wrap_content"
122         android:layout_height="wrap_content"
123         android:layout_below="@+id/button6"
124         android:layout_alignStart="@+id/button6"
125         android:layout_alignLeft="@+id/button6"
126         android:layout_centerHorizontal="true"
127         android:layout_marginStart="0dp"
128         android:layout_marginLeft="0dp"
129         android:layout_marginTop="4dp"
130         android:text="9" />
131
132     <Button
133         android:id="@+id/buttonadd"
134         style="?android:attr/buttonStyleSmall"

```

```

135         android:layout_width="92dp"
136         android:layout_height="wrap_content"
137         android:layout_alignTop="@+id/button3"
138         android:layout_alignEnd="@+id/edt1"
139         android:layout_alignRight="@+id/edt1"
140         android:layout_marginStart="11dp"
141         android:layout_marginLeft="11dp"
142         android:layout_toEndOf="@+id/button3"
143         android:layout_toRightOf="@+id/button3"
144         android:text="+" />
145
146     <Button
147         android:id="@+id/buttonsub"
148         style="?android:attr/buttonStyleSmall"
149         android:layout_width="80dp"
150         android:layout_height="wrap_content"
151         android:layout_below="@+id/buttonadd"
152         android:layout_alignStart="@+id/buttonadd"
153         android:layout_alignLeft="@+id/buttonadd"
154         android:layout_alignEnd="@+id/buttonadd"
155         android:layout_alignRight="@+id/buttonadd"
156         android:layout_marginStart="0dp"
157         android:layout_marginLeft="0dp"
158         android:text="-" />
159
160     <Button
161         android:id="@+id/buttonmul"
162         style="?android:attr/buttonStyleSmall"
163         android:layout_width="wrap_content"
164         android:layout_height="wrap_content"
165         android:layout_below="@+id/buttonsub"
166         android:layout_alignStart="@+id/buttonsub"
167         android:layout_alignLeft="@+id/buttonsub"
168         android:layout_alignParentEnd="true"
169         android:layout_alignParentRight="true"
170         android:layout_marginStart="3dp"
171         android:layout_marginLeft="3dp"
172         android:layout_marginTop="0dp"
173         android:layout_marginEnd="59dp"
174         android:layout_marginRight="59dp"
175         android:text="*" />
176
177     <Button
178         android:id="@+id/button10"
179         style="?android:attr/buttonStyleSmall"

```

```

180         android:layout_width="wrap_content"
181         android:layout_height="wrap_content"
182         android:layout_below="@+id/button7"
183         android:layout_alignParentStart="true"
184         android:layout_alignParentLeft="true"
185         android:layout_marginStart="92dp"
186         android:layout_marginLeft="92dp"
187         android:layout_marginTop="0dp"
188         android:text="." />
189
190     <Button
191         android:id="@+id/button0"
192         style="?android:attr/buttonStyleSmall"
193         android:layout_width="wrap_content"
194         android:layout_height="wrap_content"
195         android:layout_below="@+id/button8"
196         android:layout_alignStart="@+id/button8"
197         android:layout_alignLeft="@+id/button8"
198         android:layout_marginStart="0dp"
199         android:layout_marginLeft="0dp"
200         android:layout_marginTop="2dp"
201         android:text="0" />
202
203     <Button
204         android:id="@+id/buttonC"
205         style="?android:attr/buttonStyleSmall"
206         android:layout_width="wrap_content"
207         android:layout_height="wrap_content"
208         android:layout_below="@+id/button9"
209         android:layout_alignStart="@+id/button9"
210         android:layout_alignLeft="@+id/button9"
211         android:layout_centerHorizontal="true"
212         android:layout_marginStart="1dp"
213         android:layout_marginLeft="1dp"
214         android:layout_marginTop="-1dp"
215         android:text="C" />
216
217     <Button
218         android:id="@+id/buttondiv"
219         style="?android:attr/buttonStyleSmall"
220         android:layout_width="wrap_content"
221         android:layout_height="wrap_content"
222         android:layout_alignEnd="@+id/buttonmul"
223         android:layout_alignLeft="@+id/buttonmul"
224         android:layout_alignRight="@+id/buttonmul"

```

```

225         android:layout_alignStart="@+id/buttonmul"
226         android:layout_below="@+id/buttonmul"
227         android:text="/" />
228
229     <Button
230         android:id="@+id/buttoneql"
231         android:layout_width="241dp"
232         android:layout_height="wrap_content"
233         android:layout_below="@+id/button0"
234         android:layout_alignStart="@+id/button10"
235         android:layout_alignLeft="@+id/button10"
236         android:layout_alignEnd="@+id/buttondiv"
237         android:layout_alignRight="@+id/buttondiv"
238         android:layout_centerHorizontal="true"
239         android:layout_marginStart="4dp"
240         android:layout_marginLeft="4dp"
241         android:layout_marginTop="11dp"
242         android:layout_marginEnd="-1dp"
243         android:layout_marginRight="-1dp"
244         android:text="=" />
245
246 </RelativeLayout>

```

## Behaviour:

```

1 package com.example.calculator;
2
3 import androidx.appcompat.app.AppCompatActivity;
4
5 import android.os.Bundle;
6 import android.view.View;
7 import android.widget.Button;
8 import android.widget.EditText;
9
10 public class MainActivity extends AppCompatActivity {
11
12     Button button0, button1, button2, button3, button4,
13     button5, button6,
14     button7, button8, button9, buttonAdd, buttonSub,
15     buttonDiv,
16     buttonMul, button10, buttonC, buttonEqual;
17     EditText display;
18
19     float mValueOne, mValueTwo;
20

```

```

19     boolean add, sub, mul, div;
20     @Override
21     protected void onCreate(Bundle savedInstanceState) {
22         super.onCreate(savedInstanceState);
23         setContentView(R.layout.activity_main);
24
25         button0 = (Button) findViewById(R.id.button0);
26         button1 = (Button) findViewById(R.id.button1);
27         button2 = (Button) findViewById(R.id.button2);
28         button3 = (Button) findViewById(R.id.button3);
29         button4 = (Button) findViewById(R.id.button4);
30         button5 = (Button) findViewById(R.id.button5);
31         button6 = (Button) findViewById(R.id.button6);
32         button7 = (Button) findViewById(R.id.button7);
33         button8 = (Button) findViewById(R.id.button8);
34         button9 = (Button) findViewById(R.id.button9);
35         button10 = (Button) findViewById(R.id.button10);
36         buttonAdd = (Button) findViewById(R.id.buttonadd);
37         buttonSub = (Button) findViewById(R.id.buttonsub);
38         buttonMul = (Button) findViewById(R.id.buttonmul);
39         buttonDiv = (Button) findViewById(R.id.buttondiv);
40         buttonC = (Button) findViewById(R.id.buttonC);
41         buttonEqual = (Button) findViewById(R.id.buttoneq1);
42         display = (EditText) findViewById(R.id.edt1);
43
44         button1.setOnClickListener(new View.OnClickListener()
45         {
46             @Override
47             public void onClick(View v) {
48                 display.setText(display.getText() + "1");
49             }
50         });
51
52         button2.setOnClickListener(new View.OnClickListener()
53         {
54             @Override
55             public void onClick(View v) {
56                 display.setText(display.getText() + "2");
57             }
58         });
59
60         button3.setOnClickListener(new View.OnClickListener()
61         {
62             @Override
63             public void onClick(View v) {

```



```

61         display.setText(display.getText() + "3");
62     }
63 });
64
65 button4.setOnClickListener(new View.OnClickListener()
66 {
67     @Override
68     public void onClick(View v) {
69         display.setText(display.getText() + "4");
70     }
71 });
72
73 button5.setOnClickListener(new View.OnClickListener()
74 {
75     @Override
76     public void onClick(View v) {
77         display.setText(display.getText() + "5");
78     }
79 });
80
81 button6.setOnClickListener(new View.OnClickListener()
82 {
83     @Override
84     public void onClick(View v) {
85         display.setText(display.getText() + "6");
86     }
87 });
88
89 button7.setOnClickListener(new View.OnClickListener()
90 {
91     @Override
92     public void onClick(View v) {
93         display.setText(display.getText() + "7");
94     }
95 });
96
97 button8.setOnClickListener(new View.OnClickListener()
98 {
99     @Override
100    public void onClick(View v) {
101        display.setText(display.getText() + "8");
102    }
103 });
104
105 button9.setOnClickListener(new View.OnClickListener()

```

```

101         {
102             @Override
103             public void onClick(View v) {
104                 display.setText(display.getText() + "9");
105             }
106         });
107         button0.setOnClickListener(new View.OnClickListener()
108         {
109             @Override
110             public void onClick(View v) {
111                 display.setText(display.getText() + "0");
112             }
113         });
114         buttonAdd.setOnClickListener(new View.OnClickListener
115         () {
116             @Override
117             public void onClick(View v) {
118                 if (display == null) {
119                     display.setText("");
120                 }
121                 else {
122                     mValueOne = Float.parseFloat(display.
123                     getText() + "");
124                     add = true;
125                     display.setText(null);
126                 }
127             });
128         buttonSub.setOnClickListener(new View.OnClickListener
129         () {
130             @Override
131             public void onClick(View v) {
132                 mValueOne = Float.parseFloat(display.getText
133                 () + "");
134                 sub = true;
135                 display.setText(null);
136             });
137         buttonMul.setOnClickListener(new View.OnClickListener
138         () {

```

```

139         @Override
140         public void onClick(View v) {
141             mValueOne = Float.parseFloat(display.getText
142             () + "");
143             mul = true;
144             display.setText(null);
145         }
146     });
147
148     buttonDiv.setOnClickListener(new View.OnClickListener
149     () {
150         @Override
151         public void onClick(View v) {
152             mValueOne = Float.parseFloat(display.getText
153             () + "");
154             div = true;
155             display.setText(null);
156         }
157     });
158
159     buttonEqual.setOnClickListener(new View.
160     OnClickListener() {
161         @Override
162         public void onClick(View v) {
163             mValueTwo = Float.parseFloat(display.getText
164             () + "");
165
166             if (add == true) {
167                 display.setText(mValueOne + mValueTwo + "
168                 ");
169                 add = false;
170             }
171
172             if (sub == true) {
173                 display.setText(mValueOne - mValueTwo + "
174                 ");
175                 sub = false;
176             }
177
178             if (mul == true) {
179                 display.setText(mValueOne * mValueTwo + "
180                 ");
181                 mul = false;
182             }
183         }
184     });

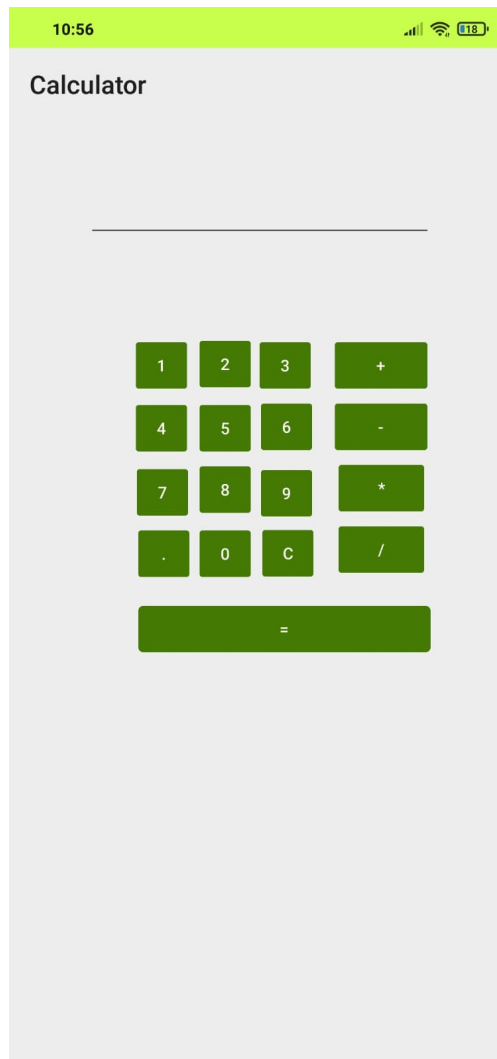
```

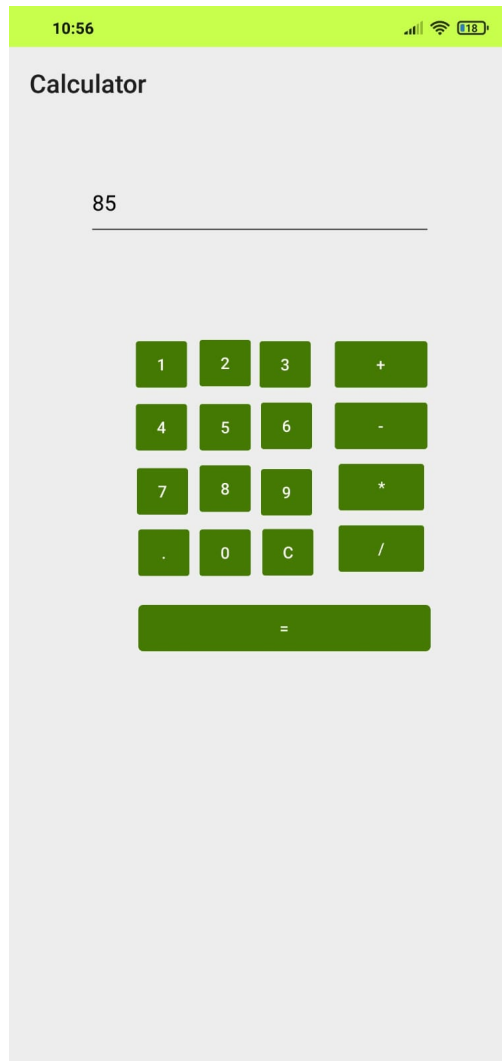
```

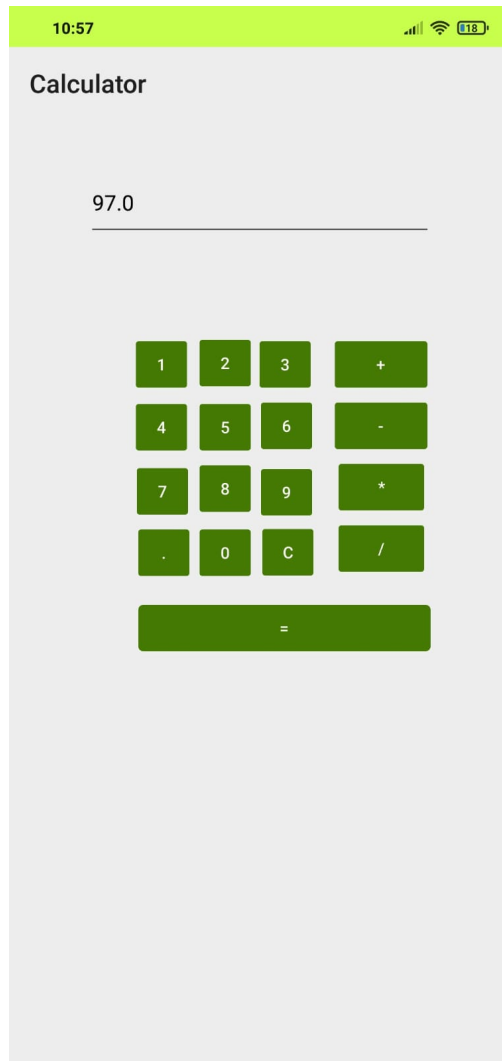
176         if (div == true) {
177             display.setText(mValueOne / mValueTwo + "
178         );
179             div = false;
180         }
181     });
182
183     buttonC.setOnClickListener(new View.OnClickListener()
184     {
185         @Override
186         public void onClick(View v) {
187             display.setText("");
188         }
189     });
190
191     button10.setOnClickListener(new View.OnClickListener
192     () {
193         @Override
194         public void onClick(View v) {
195             display.setText(display.getText() + ".");
196         }
197     });

```

Output:







## Aim:

Generate an application to simulate a keyboard

## Code:

### Keyboard Layout:

### Design:

```
1 <?xml version="1.0" encoding="utf-8"?>
2 <merge xmlns:android="http://schemas.android.com/apk/res/
  android">
3   <LinearLayout
4       android:layout_width="match_parent"
5       android:layout_height="wrap_content"
6       android:orientation="horizontal">
7
8       <Button
9           android:id="@+id/button_1"
10          android:layout_width="0dp"
11          android:layout_height="wrap_content"
12          android:layout_weight="1"
13          android:background="#0000ff"
14          android:textColor="@android:color/white"
15          android:text="1"/>
16
17       <Button
18           android:id="@+id/button_2"
19           android:layout_width="0dp"
20           android:layout_height="wrap_content"
21           android:layout_weight="1"
22           android:background="#0000ff"
23           android:textColor="@android:color/white"
24           android:text="2"/>
25
26       <Button
27           android:id="@+id/button_3"
28           android:layout_width="0dp"
```



```

29         android:layout_height="wrap_content"
30         android:layout_width="1"
31         android:background="#0000ff"
32         android:textColor="@android:color/white"
33         android:text="3"/>
34
35     <Button
36         android:id="@+id/button_4"
37         android:layout_width="0dp"
38         android:layout_height="wrap_content"
39         android:layout_weight="1"
40         android:background="#0000ff"
41         android:textColor="@android:color/white"
42         android:text="4"/>
43
44     <Button
45         android:id="@+id/button_5"
46         android:layout_width="0dp"
47         android:layout_height="wrap_content"
48         android:layout_weight="1"
49         android:background="#0000ff"
50         android:textColor="@android:color/white"
51         android:text="5"/>
52
53     <Button
54         android:id="@+id/button_6"
55         android:layout_width="0dp"
56         android:layout_height="wrap_content"
57         android:layout_weight="1"
58         android:background="#0000ff"
59         android:textColor="@android:color/white"
60         android:text="6"/>
61
62     <Button
63         android:id="@+id/button_7"
64         android:layout_width="0dp"
65         android:layout_height="wrap_content"
66         android:layout_weight="1"
67         android:background="#0000ff"
68         android:textColor="@android:color/white"
69         android:text="7"/>
70
71     <Button
72         android:id="@+id/button_8"
73         android:layout_width="0dp"

```

```

74         android:layout_height="wrap_content"
75         android:layout_weight="1"
76         android:background="#0000ff"
77         android:textColor="@android:color/white"
78         android:text="8"/>
79
80     <Button
81         android:id="@+id/button_9"
82         android:layout_width="0dp"
83         android:layout_height="wrap_content"
84         android:layout_weight="1"
85         android:background="#0000ff"
86         android:textColor="@android:color/white"
87         android:text="9"/>
88
89     <Button
90         android:id="@+id/button_0"
91         android:layout_width="0dp"
92         android:layout_height="wrap_content"
93         android:layout_weight="1"
94         android:background="#0000ff"
95         android:textColor="@android:color/white"
96         android:text="0"/>
97 </LinearLayout>
98
99 <LinearLayout
100     android:layout_width="match_parent"
101     android:layout_height="wrap_content"
102     android:orientation="horizontal">
103
104     <Button
105         android:id="@+id/button_q"
106         android:layout_width="0dp"
107         android:layout_height="wrap_content"
108         android:layout_weight="1"
109         android:background="#0000ff"
110         android:textColor="@android:color/white"
111         android:text="q"/>
112
113     <Button
114         android:id="@+id/button_w"
115         android:layout_width="0dp"
116         android:layout_height="wrap_content"
117         android:layout_weight="1"
118         android:background="#0000ff"

```

```

119         android:textColor="@android:color/white"
120         android:text="w"/>
121
122     <Button
123         android:id="@+id/button_e"
124         android:layout_width="0dp"
125         android:layout_height="wrap_content"
126         android:layout_weight="1"
127         android:background="#0000ff"
128         android:textColor="@android:color/white"
129         android:text="e"/>
130
131     <Button
132         android:id="@+id/button_r"
133         android:layout_width="0dp"
134         android:layout_height="wrap_content"
135         android:layout_weight="1"
136         android:background="#0000ff"
137         android:textColor="@android:color/white"
138         android:text="r"/>
139
140     <Button
141         android:id="@+id/button_t"
142         android:layout_width="0dp"
143         android:layout_height="wrap_content"
144         android:layout_weight="1"
145         android:background="#0000ff"
146         android:textColor="@android:color/white"
147         android:text="t"/>
148
149     <Button
150         android:id="@+id/button_y"
151         android:layout_width="0dp"
152         android:layout_height="wrap_content"
153         android:layout_weight="1"
154         android:background="#0000ff"
155         android:textColor="@android:color/white"
156         android:text="y"/>
157
158     <Button
159         android:id="@+id/button_u"
160         android:layout_width="0dp"
161         android:layout_height="wrap_content"
162         android:layout_weight="1"
163         android:background="#0000ff"

```

```

164         android:textColor="@android:color/white"
165         android:text="u"/>
166
167     <Button
168         android:id="@+id/button_i"
169         android:layout_width="0dp"
170         android:layout_height="wrap_content"
171         android:layout_weight="1"
172         android:background="#0000ff"
173         android:textColor="@android:color/white"
174         android:text="i"/>
175
176     <Button
177         android:id="@+id/button_o"
178         android:layout_width="0dp"
179         android:layout_height="wrap_content"
180         android:layout_weight="1"
181         android:background="#0000ff"
182         android:textColor="@android:color/white"
183         android:text="o"/>
184
185     <Button
186         android:id="@+id/button_p"
187         android:layout_width="0dp"
188         android:layout_height="wrap_content"
189         android:layout_weight="1"
190         android:background="#0000ff"
191         android:textColor="@android:color/white"
192         android:text="p"/>
193 </LinearLayout>
194
195 <LinearLayout
196     android:layout_width="match_parent"
197     android:layout_height="wrap_content"
198     android:orientation="horizontal">
199
200     <Button
201         android:id="@+id/button_a"
202         android:layout_width="0dp"
203         android:layout_height="wrap_content"
204         android:layout_weight="1"
205         android:background="#0000ff"
206         android:textColor="@android:color/white"
207         android:text="a"/>
208

```

```

209 <Button
210     android:id="@+id/button_s"
211     android:layout_width="0dp"
212     android:layout_height="wrap_content"
213     android:layout_weight="1"
214     android:background="#0000ff"
215     android:textColor="@android:color/white"
216     android:text="s"/>
217
218 <Button
219     android:id="@+id/button_d"
220     android:layout_width="0dp"
221     android:layout_height="wrap_content"
222     android:layout_weight="1"
223     android:background="#0000ff"
224     android:textColor="@android:color/white"
225     android:text="d"/>
226
227 <Button
228     android:id="@+id/button_f"
229     android:layout_width="0dp"
230     android:layout_height="wrap_content"
231     android:layout_weight="1"
232     android:background="#0000ff"
233     android:textColor="@android:color/white"
234     android:text="f"/>
235
236 <Button
237     android:id="@+id/button_g"
238     android:layout_width="0dp"
239     android:layout_height="wrap_content"
240     android:layout_weight="1"
241     android:background="#0000ff"
242     android:textColor="@android:color/white"
243     android:text="g"/>
244
245 <Button
246     android:id="@+id/button_h"
247     android:layout_width="0dp"
248     android:layout_height="wrap_content"
249     android:layout_weight="1"
250     android:background="#0000ff"
251     android:textColor="@android:color/white"
252     android:text="h"/>
253

```

```

254     <Button
255         android:id="@+id/button_j"
256         android:layout_width="0dp"
257         android:layout_height="wrap_content"
258         android:layout_weight="1"
259         android:background="#0000ff"
260         android:textColor="@android:color/white"
261         android:text="j"/>
262
263     <Button
264         android:id="@+id/button_k"
265         android:layout_width="0dp"
266         android:layout_height="wrap_content"
267         android:layout_weight="1"
268         android:background="#0000ff"
269         android:textColor="@android:color/white"
270         android:text="k"/>
271
272     <Button
273         android:id="@+id/button_l"
274         android:layout_width="0dp"
275         android:layout_height="wrap_content"
276         android:layout_weight="1"
277         android:background="#0000ff"
278         android:textColor="@android:color/white"
279         android:text="l"/>
280 </LinearLayout>
281
282 <LinearLayout
283     android:layout_width="match_parent"
284     android:layout_height="wrap_content"
285     android:orientation="horizontal">
286
287     <Button
288         android:id="@+id/button_z"
289         android:layout_width="0dp"
290         android:layout_height="wrap_content"
291         android:layout_weight="1"
292         android:background="#0000ff"
293         android:textColor="@android:color/white"
294         android:text="z"/>
295
296     <Button
297         android:id="@+id/button_x"
298         android:layout_width="0dp"

```

```

299         android:layout_height="wrap_content"
300         android:layout_weight="1"
301         android:background="#0000ff"
302         android:textColor="@android:color/white"
303         android:text="x"/>
304
305     <Button
306         android:id="@+id/button_c"
307         android:layout_width="0dp"
308         android:layout_height="wrap_content"
309         android:layout_weight="1"
310         android:background="#0000ff"
311         android:textColor="@android:color/white"
312         android:text="c"/>
313
314     <Button
315         android:id="@+id/button_v"
316         android:layout_width="0dp"
317         android:layout_height="wrap_content"
318         android:layout_weight="1"
319         android:background="#0000ff"
320         android:textColor="@android:color/white"
321         android:text="v"/>
322
323     <Button
324         android:id="@+id/button_b"
325         android:layout_width="0dp"
326         android:layout_height="wrap_content"
327         android:layout_weight="1"
328         android:background="#0000ff"
329         android:textColor="@android:color/white"
330         android:text="b"/>
331
332     <Button
333         android:id="@+id/button_n"
334         android:layout_width="0dp"
335         android:layout_height="wrap_content"
336         android:layout_weight="1"
337         android:background="#0000ff"
338         android:textColor="@android:color/white"
339         android:text="n"/>
340
341     <Button
342         android:id="@+id/button_m"
343         android:layout_width="0dp"

```

```

344         android:layout_height="wrap_content"
345         android:layout_weight="1"
346         android:background="#0000ff"
347         android:textColor="@android:color/white"
348         android:text="m"/>
349     </LinearLayout>
350
351     <LinearLayout
352         android:layout_width="match_parent"
353         android:layout_height="wrap_content"
354         android:orientation="horizontal">
355
356         <Button
357             android:id="@+id/button_delete"
358             android:layout_width="0dp"
359             android:layout_height="wrap_content"
360             android:layout_weight="2"
361             android:background="#0000ff"
362             android:textColor="@android:color/white"
363             android:text="Delete"/>
364
365         <Button
366             android:id="@+id/button_enter"
367             android:layout_width="0dp"
368             android:layout_height="wrap_content"
369             android:layout_weight="3"
370             android:background="#0000ff"
371             android:textColor="@android:color/white"
372             android:text="Enter"/>
373
374     </LinearLayout>
375 </merge>

```

## Behaviour:

```

1 package com.example.keyboard;
2
3 import android.content.Context;
4 import android.text.TextUtils;
5 import android.util.AttributeSet;
6 import android.util.SparseArray;
7 import android.view.LayoutInflater;
8 import android.view.View;
9 import android.view.inputmethod.InputConnection;
10 import android.widget.Button;

```



```

11 import android.widget.LinearLayout;
12
13 public class CustomKeyboard extends LinearLayout implements
    View.OnClickListener {
14
15
16     private Button button1, button2, button3, button4,
17         button5, button6, button7, button8,
18         button9, button0, buttonDelete, buttonEnter;
19
20     private Button buttona,buttonb,buttonc,buttond,buttone,
    buttonf,buttong,buttonh,buttoni,
21         buttonj,buttonk,buttonl,buttonm,buttonn,buttono,
    buttonp,buttonq,buttonr,
22         buttons,buttont,buttonu,buttonv,buttonw,buttonx,
    buttony,buttonz;
23
24     private SparseArray<String> keyValues = new SparseArray
    <>();
25     private InputConnection inputConnection;
26
27     public CustomKeyboard(Context context) {
28         this(context, null, 0);
29     }
30
31     public CustomKeyboard(Context context, AttributeSet attrs
    ) {
32         this(context, attrs, 0);
33     }
34
35     public CustomKeyboard(Context context, AttributeSet attrs
    , int defStyleAttr) {
36         super(context, attrs, defStyleAttr);
37         init(context, attrs);
38     }
39
40     private void init(Context context, AttributeSet attrs) {
41         LayoutInflater.from(context).inflate(R.layout.
    keyboard, this, true);
42         button1 = (Button) findViewById(R.id.button_1);
43         button1.setOnClickListener(this);
44         button2 = (Button) findViewById(R.id.button_2);
45         button2.setOnClickListener(this);
46         button3 = (Button) findViewById(R.id.button_3);
47         button3.setOnClickListener(this);

```

```

48         button4 = (Button) findViewById(R.id.button_4);
49         button4.setOnClickListener(this);
50         button5 = (Button) findViewById(R.id.button_5);
51         button5.setOnClickListener(this);
52         button6 = (Button) findViewById(R.id.button_6);
53         button6.setOnClickListener(this);
54         button7 = (Button) findViewById(R.id.button_7);
55         button7.setOnClickListener(this);
56         button8 = (Button) findViewById(R.id.button_8);
57         button8.setOnClickListener(this);
58         button9 = (Button) findViewById(R.id.button_9);
59         button9.setOnClickListener(this);
60         button0 = (Button) findViewById(R.id.button_0);
61         button0.setOnClickListener(this);
62         buttonDelete = (Button) findViewById(R.id.
button_delete);
63         buttonDelete.setOnClickListener(this);
64         buttonEnter = (Button) findViewById(R.id.button_enter
);
65         buttonEnter.setOnClickListener(this);
66
67         buttona = (Button) findViewById(R.id.button_a);
buttonb = (Button) findViewById(R.id.button_b);
68         buttona.setOnClickListener(this);buttonb.
setOnClickListener(this);
69         buttonc = (Button) findViewById(R.id.button_c);
buttond = (Button) findViewById(R.id.button_d);
70         buttonc.setOnClickListener(this);buttond.
setOnClickListener(this);
71         buttone = (Button) findViewById(R.id.button_e);
buttonf = (Button) findViewById(R.id.button_f);
72         buttone.setOnClickListener(this);buttonf.
setOnClickListener(this);
73         buttong = (Button) findViewById(R.id.button_g);
buttonh = (Button) findViewById(R.id.button_h);
74         buttong.setOnClickListener(this);buttonh.
setOnClickListener(this);
75         buttoni = (Button) findViewById(R.id.button_i);
buttonj = (Button) findViewById(R.id.button_j);
76         buttoni.setOnClickListener(this);buttonj.
setOnClickListener(this);
77         buttonk = (Button) findViewById(R.id.button_k);
buttonl = (Button) findViewById(R.id.button_l);
78         buttonk.setOnClickListener(this);buttonl.
setOnClickListener(this);

```

```

79         buttonm = (Button) findViewById(R.id.button_m);
buttonnn = (Button) findViewById(R.id.button_n);
80         buttonm.setOnClickListener(this);buttonnn.
setOnClickListener(this);
81         buttono = (Button) findViewById(R.id.button_o);
buttonnp = (Button) findViewById(R.id.button_p);
82         buttono.setOnClickListener(this);buttonnp.
setOnClickListener(this);
83         buttonq = (Button) findViewById(R.id.button_q);
buttonnr = (Button) findViewById(R.id.button_r);
84         buttonq.setOnClickListener(this);buttonnr.
setOnClickListener(this);
85         buttons = (Button) findViewById(R.id.button_s);
buttont = (Button) findViewById(R.id.button_t);
86         buttons.setOnClickListener(this);buttont.
setOnClickListener(this);
87         buttonu = (Button) findViewById(R.id.button_u);
buttonv = (Button) findViewById(R.id.button_v);
88         buttonu.setOnClickListener(this);buttonv.
setOnClickListener(this);
89         buttonw = (Button) findViewById(R.id.button_w);
buttonx = (Button) findViewById(R.id.button_x);
90         buttonw.setOnClickListener(this);buttonx.
setOnClickListener(this);
91         buttony = (Button) findViewById(R.id.button_y);
buttonz = (Button) findViewById(R.id.button_z);
92         buttony.setOnClickListener(this);buttonz.
setOnClickListener(this);
93
94         keyValues.put(R.id.button_1, "1");
95         keyValues.put(R.id.button_2, "2");
96         keyValues.put(R.id.button_3, "3");
97         keyValues.put(R.id.button_4, "4");
98         keyValues.put(R.id.button_5, "5");
99         keyValues.put(R.id.button_6, "6");
100        keyValues.put(R.id.button_7, "7");
101        keyValues.put(R.id.button_8, "8");
102        keyValues.put(R.id.button_9, "9");
103        keyValues.put(R.id.button_0, "0");
104        keyValues.put(R.id.button_enter, "\n");
105
106        keyValues.put(R.id.button_a, "a");keyValues.put(R.id.
button_b, "b");
107        keyValues.put(R.id.button_c, "c");keyValues.put(R.id.
button_d, "d");

```

```

108         keyValues.put(R.id.button_e, "e");keyValues.put(R.id.
button_f, "f");
109         keyValues.put(R.id.button_g, "g");keyValues.put(R.id.
button_h, "h");
110         keyValues.put(R.id.button_i, "i");keyValues.put(R.id.
button_j, "j");
111         keyValues.put(R.id.button_k, "k");keyValues.put(R.id.
button_l, "l");
112         keyValues.put(R.id.button_m, "m");keyValues.put(R.id.
button_n, "n");
113         keyValues.put(R.id.button_o, "o");keyValues.put(R.id.
button_p, "p");
114         keyValues.put(R.id.button_q, "q");keyValues.put(R.id.
button_r, "r");
115         keyValues.put(R.id.button_s, "s");keyValues.put(R.id.
button_t, "t");
116         keyValues.put(R.id.button_u, "u");keyValues.put(R.id.
button_v, "v");
117         keyValues.put(R.id.button_w, "w");keyValues.put(R.id.
button_x, "x");
118         keyValues.put(R.id.button_y, "y");keyValues.put(R.id.
button_z, "z");
119     }
120
121     @Override
122     public void onClick(View view) {
123         if (inputConnection == null)
124             return;
125
126         if (view.getId() == R.id.button_delete) {
127             CharSequence selectedText = inputConnection.
getSelectedText(0);
128
129             if (TextUtils.isEmpty(selectedText)) {
130                 inputConnection.deleteSurroundingText(1, 0);
131             } else {
132                 inputConnection.commitText("", 1);
133             }
134         } else {
135             String value = keyValues.get(view.getId());
136             inputConnection.commitText(value, 1);
137         }
138     }
139
140     public void setInputConnection(InputConnection ic) {

```

```

141         inputConnection = ic;
142     }
143 }

```

## Main Activity:

### Design:

```

1  <?xml version="1.0" encoding="utf-8"?>
2
3  <RelativeLayout xmlns:android="http://schemas.android.com/apk
   /res/android"
4      xmlns:app="http://schemas.android.com/apk/res-auto"
5      xmlns:tools="http://schemas.android.com/tools"
6      android:layout_width="match_parent"
7      android:layout_height="match_parent"
8      tools:context="com.example.keyboard.MainActivity">
9
10     <EditText
11         android:id="@+id/display"
12         android:layout_width="match_parent"
13         android:layout_height="wrap_content"
14         android:background="#ffffff"
15         android:textColor="#000000"
16         android:layout_margin="50dp"
17         android:padding="5dp"
18         android:layout_alignParentTop="true"
19     />
20
21     <com.example.keyboard.CustomKeyboard
22         android:id="@+id/keyboard"
23         android:layout_width="match_parent"
24         android:layout_height="wrap_content"
25         android:orientation="vertical"
26         android:layout_marginBottom="30dp"
27         android:layout_marginLeft="5dp"
28         android:layout_marginRight="5dp"
29         android:layout_alignParentBottom="true"
30     />
31
32 </RelativeLayout>

```

## Behaviour:

```
1 package com.example.keyboard;
2
3 import androidx.appcompat.app.AppCompatActivity;
4
5 import android.os.Bundle;
6 import android.text.InputType;
7 import android.view.inputmethod.EditorInfo;
8 import android.view.inputmethod.InputConnection;
9 import android.widget.EditText;
10
11 public class MainActivity extends AppCompatActivity {
12
13     @Override
14     protected void onCreate(Bundle savedInstanceState) {
15         super.onCreate(savedInstanceState);
16         setContentView(R.layout.activity_main);
17
18         EditText editText = (EditText) findViewById(R.id.
display);
19         CustomKeyboard keyboard = (CustomKeyboard)
findViewById(R.id.keyboard);
20         editText.setRawInputType(InputType.TYPE_CLASS_TEXT);
21         editText.setTextIsSelectable(true);
22
23         InputConnection ic = editText.onCreateInputConnection
(new EditorInfo());
24         keyboard.setInputConnection(ic);
25     }
26 }
```

Output:

