Department of Computer Science and Engineering

Shivanirudh S G, 185001146, Semester VII

5 August 2021

UCS1711 - Mobile Application Development Lab

Exercise 1: Layouts and Event Listeners

Objective:

Generate an application to simulate a calculator

Code:

Main Activity:

Design:

```xml
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout xmlns:android="http://schemas.android.com/apk
    /res/android"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:layout_margin="5dp"
    tools:context=".MainActivity">


    <EditText
        android:id="@+id/edt1"
        android:layout_width="270dp"
        android:layout_height="58dp"
        android:layout_alignParentTop="true"
        android:layout_centerHorizontal="true"
        android:layout_marginTop="32dp" />

    <Button
        android:id="@+id/button1"
        style="?android:attr/buttonStyleSmall"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_below="@+id/edt1"
        android:layout_alignEnd="@+id/button4"
        android:layout_alignRight="@+id/button4"
        android:layout_marginTop="73dp"
        android:layout_marginEnd="0dp"
        android:layout_marginRight="0dp"
        android:text="1" />

    <Button
        android:id="@+id/button2"
        style="?android:attr/buttonStyleSmall"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignTop="@+id/button1"
        android:layout_alignParentStart="true"
        android:layout_alignParentLeft="true"
        android:layout_marginStart="140dp"
        android:layout_marginLeft="140dp"
        android:layout_marginTop="-1dp"
        android:text="2" />

    <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="+" />

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="-" />

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="*" />

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,
       button5, button6,
13             button7, button8, button9, buttonAdd, buttonSub,
       buttonDiv,
14             buttonMul, button10, buttonC, buttonEqual;
15     EditText display;
16
17     float mValueOne, mValueTwo;
18
```

```
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.buttoneql);
42        display = (EditText) findViewById(R.id.edt1);
43
44        button1.setOnClickListener(new View.OnClickListener()
      {
45            @Override
46            public void onClick(View v) {
47                display.setText(display.getText() + "1");
48            }
49        });
50
51        button2.setOnClickListener(new View.OnClickListener()
      {
52            @Override
53            public void onClick(View v) {
54                display.setText(display.getText() + "2");
55            }
56        });
57
58        button3.setOnClickListener(new View.OnClickListener()
      {
59            @Override
60            public void onClick(View v) {
```

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

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

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

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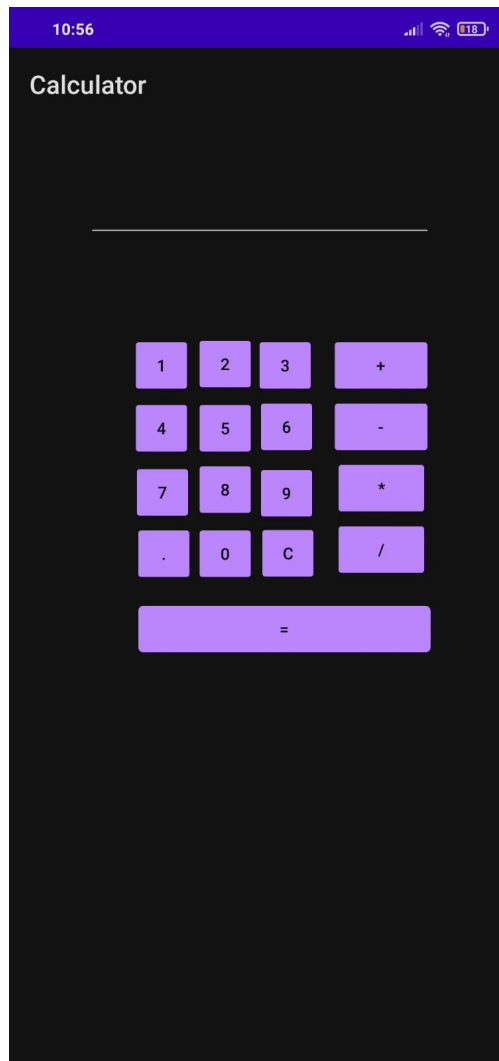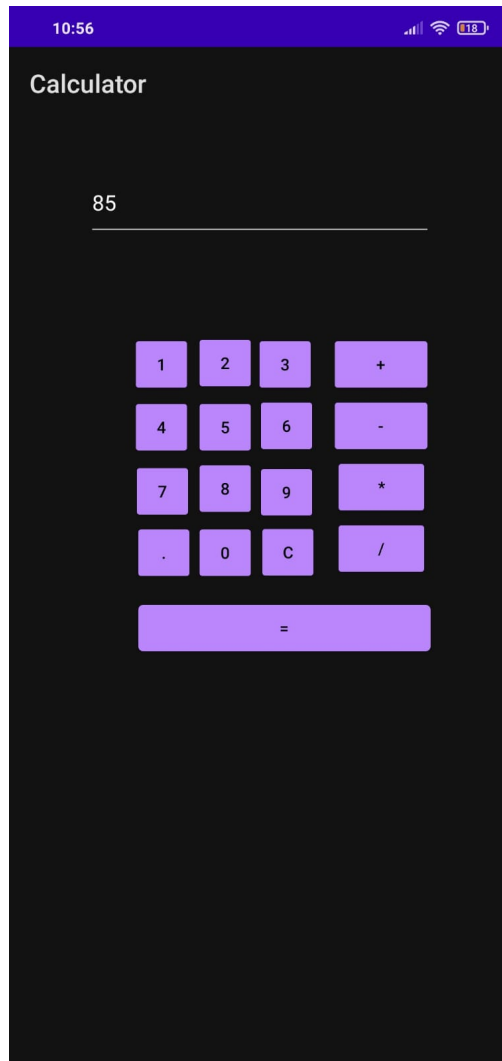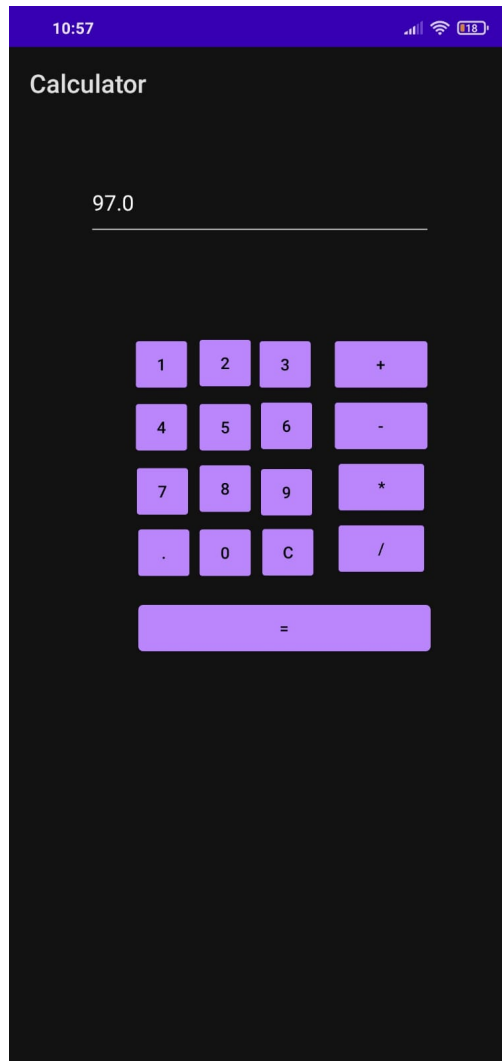
Output:

Calculator

85

1	2	3	+
4	5	6	-
7	8	9	*
.	0	C	/

=

Calculator

97.0

1	2	3	+
4	5	6	-
7	8	9	*
.	0	C	/

=

Objective:

Generate an application to simulate a keyboard

Code:

Keyboard Layout:

Design:

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

        <Button
            android:id="@+id/button_1"
            android:layout_width="0dp"
            android:layout_height="wrap_content"
            android:layout_weight="1"
            android:background="#0000ff"
            android:textColor="@android:color/white"
            android:text="1"/>

        <Button
            android:id="@+id/button_2"
            android:layout_width="0dp"
            android:layout_height="wrap_content"
            android:layout_weight="1"
            android:background="#0000ff"
            android:textColor="@android:color/white"
            android:text="2"/>

        <Button
            android:id="@+id/button_3"
            android:layout_width="0dp"
```

16

```
29          android:layout_height="wrap_content"
30          android:layout_weight="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"/>

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"/>

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>

99  <LinearLayout
100     android:layout_width="match_parent"
101     android:layout_height="wrap_content"
102     android:orientation="horizontal">

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"/>

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;
```

```java
import android.widget.LinearLayout;

public class CustomKeyboard extends LinearLayout implements
    View.OnClickListener {


    private Button button1, button2, button3, button4,
            button5, button6, button7, button8,
            button9, button0, buttonDelete, buttonEnter;

    private Button buttona, buttonb, buttonc, buttond, buttone,
    buttonf, buttong, buttonh, buttoni,
            buttonj, buttonk, buttonl, buttonm, buttonn, buttono,
    buttonp, buttonq, buttonr,
            buttons, buttont, buttonu, buttonv, buttonw, buttonx,
    buttony, buttonz;

    private SparseArray<String> keyValues = new SparseArray
    <>();
    private InputConnection inputConnection;

    public CustomKeyboard(Context context) {
        this(context, null, 0);
    }

    public CustomKeyboard(Context context, AttributeSet attrs
    ) {
        this(context, attrs, 0);
    }

    public CustomKeyboard(Context context, AttributeSet attrs
    , int defStyleAttr) {
        super(context, attrs, defStyleAttr);
        init(context, attrs);
    }

    private void init(Context context, AttributeSet attrs) {
        LayoutInflater.from(context).inflate(R.layout.
    keyboard, this, true);
        button1 = (Button) findViewById(R.id.button_1);
        button1.setOnClickListener(this);
        button2 = (Button) findViewById(R.id.button_2);
        button2.setOnClickListener(this);
        button3 = (Button) findViewById(R.id.button_3);
        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);
```

```java
79         buttonm = (Button) findViewById(R.id.button_m);
    buttonn = (Button) findViewById(R.id.button_n);
80         buttonm.setOnClickListener(this);buttonn.
    setOnClickListener(this);
81         buttono = (Button) findViewById(R.id.button_o);
    buttonp = (Button) findViewById(R.id.button_p);
82         buttono.setOnClickListener(this);buttonp.
    setOnClickListener(this);
83         buttonq = (Button) findViewById(R.id.button_q);
    buttonr = (Button) findViewById(R.id.button_r);
84         buttonq.setOnClickListener(this);buttonr.
    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");
```

```java
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>
```

29

Behaviour:

```
package com.example.keyboard;

import androidx.appcompat.app.AppCompatActivity;

import android.os.Bundle;
import android.text.InputType;
import android.view.inputmethod.EditorInfo;
import android.view.inputmethod.InputConnection;
import android.widget.EditText;

public class MainActivity extends AppCompatActivity {

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

        EditText editText = (EditText) findViewById(R.id.
    display);
        CustomKeyboard keyboard = (CustomKeyboard)
    findViewById(R.id.keyboard);
        editText.setRawInputType(InputType.TYPE_CLASS_TEXT);
        editText.setTextIsSelectable(true);

        InputConnection ic = editText.onCreateInputConnection
    (new EditorInfo());
        keyboard.setInputConnection(ic);
    }
}
```

Output:

Keyboard

f72udjeueks8x52829d63

fdjjsjsuvs

1	2	3	4	5	6	7	8	9	0
Q	Λ	E	R	T	Y	U	I	O	P
A	S	D	F	G	H	J	K	L	
Z	X	C	V	B	N	M			

DELETE   ENTER

Keyboard

f72udjeueks8x52829d63

fdjj

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 |

Q Λ E R T Y U I O P

A S D F G H J K L

Z X C V B N M

DELETE   ENTER