

Department of CSE

SSN College of Engineering

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UCS 1711 - Mobile Application Development Lab

Exercise 2: Application For Calculator and Keyboard Simulation

Aim:

To develop an Android application that performs the functions of a basic calculator and also to develop a custom keyboard to accept numeric input from the user.

Code: Main Activity:

```
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 import android.widget.TextView;
10
11 public class MainActivity extends AppCompatActivity {
12
13     Double input1 = 0.0, input2 = 0.0, result = 0.0;
14     Boolean addFlag = false, subFlag = false, mulFlag = false, divFlag =
false, powFlag = false;
15
16     @Override
17     protected void onCreate(Bundle savedInstanceState) {
18         super.onCreate(savedInstanceState);
19         setContentView(R.layout.activity_main);
20
21         final EditText displayArea = findViewById(R.id.displayArea);
22         final Button num0 = findViewById(R.id.num0);
23         final Button num1 = findViewById(R.id.num1);
24         final Button num2 = findViewById(R.id.num2);
25         final Button num3 = findViewById(R.id.num3);
26         final Button num4 = findViewById(R.id.num4);
27         final Button num5 = findViewById(R.id.num5);
28         final Button num6 = findViewById(R.id.num6);
29         final Button num7 = findViewById(R.id.num7);
30         final Button num8 = findViewById(R.id.num8);
31         final Button num9 = findViewById(R.id.num9);
32         final Button decimal = findViewById(R.id.decimal);
33         final Button clear = findViewById(R.id.clear);
34         final Button power = findViewById(R.id.power);
35         final Button divide = findViewById(R.id.divide);
36         final Button multiply = findViewById(R.id.multiply);
37         final Button subtract = findViewById(R.id.subtract);
38         final Button add = findViewById(R.id.add);
39         final Button equal = findViewById(R.id.equal);
40
41         num0.setOnClickListener(new View.OnClickListener() {
42             @Override
43             public void onClick(View v) {
44                 displayArea.setText(displayArea.getText() + "0");
45             }
46         });
```

```
47
48 num1.setOnClickListener(new View.OnClickListener() {
49     @Override
50     public void onClick(View v) {
51         displayArea.setText(displayArea.getText() + "1");
52     }
53 });
54
55 num2.setOnClickListener(new View.OnClickListener() {
56     @Override
57     public void onClick(View v) {
58         displayArea.setText(displayArea.getText() + "2");
59     }
60 });
61
62 num3.setOnClickListener(new View.OnClickListener() {
63     @Override
64     public void onClick(View v) {
65         displayArea.setText(displayArea.getText() + "3");
66     }
67 });
68
69 num4.setOnClickListener(new View.OnClickListener() {
70     @Override
71     public void onClick(View v) {
72         displayArea.setText(displayArea.getText() + "4");
73     }
74 });
75
76 num5.setOnClickListener(new View.OnClickListener() {
77     @Override
78     public void onClick(View v) {
79         displayArea.setText(displayArea.getText() + "5");
80     }
81 });
82
83 num6.setOnClickListener(new View.OnClickListener() {
84     @Override
85     public void onClick(View v) {
86         displayArea.setText(displayArea.getText() + "6");
87     }
88 });
89
90 num7.setOnClickListener(new View.OnClickListener() {
91     @Override
92     public void onClick(View v) {
93         displayArea.setText(displayArea.getText() + "7");
94     }
95 });
96
97 num8.setOnClickListener(new View.OnClickListener() {
```

```

98         @Override
99         public void onClick(View v) {
100             displayArea.setText(displayArea.getText() + "8");
101         }
102     });
103
104     num9.setOnClickListener(new View.OnClickListener() {
105         @Override
106         public void onClick(View v) {
107             displayArea.setText(displayArea.getText() + "9");
108         }
109     });
110
111     decimal.setOnClickListener(new View.OnClickListener() {
112         @Override
113         public void onClick(View v) {
114             if(!displayArea.getText().toString().contains(".")) {
115                 displayArea.setText(displayArea.getText() + ".");
116             }
117         }
118     });
119
120     clear.setOnClickListener(new View.OnClickListener() {
121         @Override
122         public void onClick(View v) {
123             displayArea.setText("");
124         }
125     });
126
127     add.setOnClickListener(new View.OnClickListener() {
128         @Override
129         public void onClick(View v) {
130             if(displayArea.getText().length() != 0){
131                 input1 = Double.parseDouble(displayArea.getText().
toString());
132                 displayArea.setText("");
133             }
134
135             //if operator was pressed without any new input
136             addFlag = true;
137             subFlag = mulFlag = divFlag = powFlag = false;
138         }
139     });
140
141     subtract.setOnClickListener(new View.OnClickListener() {
142         @Override
143         public void onClick(View v) {
144             if(displayArea.getText().length() != 0){
145                 input1 = Double.parseDouble(displayArea.getText().
toString());
146                 displayArea.setText("");

```

```

147         }
148
149         //if operator was pressed without any new input
150         subFlag = true;
151         addFlag = mulFlag = divFlag = powFlag = false;
152     }
153 });
154
155 multiply.setOnClickListener(new View.OnClickListener() {
156     @Override
157     public void onClick(View v) {
158         if(displayArea.getText().length() != 0){
159             input1 = Double.parseDouble(displayArea.getText().
toString());
160             displayArea.setText("");
161         }
162
163         //if operator was pressed without any new input
164         mulFlag = true;
165         addFlag = subFlag = divFlag = powFlag = false;
166     }
167 });
168
169 divide.setOnClickListener(new View.OnClickListener() {
170     @Override
171     public void onClick(View v) {
172         if(displayArea.getText().length() != 0){
173             input1 = Double.parseDouble(displayArea.getText().
toString());
174             displayArea.setText("");
175         }
176
177         //if operator was pressed without any new input
178         divFlag = true;
179         addFlag = subFlag = mulFlag = powFlag = false;
180     }
181 });
182
183 power.setOnClickListener(new View.OnClickListener() {
184     @Override
185     public void onClick(View v) {
186         if(displayArea.getText().length() != 0){
187             input1 = Double.parseDouble(displayArea.getText().
toString());
188             displayArea.setText("");
189         }
190
191         //if operator was pressed without any new input
192         powFlag = true;
193         addFlag = subFlag = mulFlag = divFlag = false;
194     }

```

```

195     });
196
197     equal.setOnClickListener(new View.OnClickListener() {
198         @Override
199         public void onClick(View v) {
200             if((addFlag || subFlag || mulFlag || divFlag || powFlag)
201             && displayArea.getText().length() != 0){
202                 input2 = Double.parseDouble(displayArea.getText().
203                 toString());
204             }
205
206             if(addFlag){
207                 result = input1 + input2;
208                 displayArea.setText(result + "");
209                 input1 = input2 = result = 0.0;
210             }
211
212             if(subFlag){
213                 result = input1 - input2;
214                 displayArea.setText(result + "");
215                 input1 = input2 = result = 0.0;
216             }
217
218             if(mulFlag){
219                 result = input1 * input2;
220                 displayArea.setText(result + "");
221                 input1 = input2 = result = 0.0;
222             }
223
224             if(divFlag){
225                 result = input1 / input2;
226                 displayArea.setText(result + "");
227                 input1 = input2 = result = 0.0;
228             }
229
230             if(powFlag){
231                 result = Math.pow(input1, input2);
232                 displayArea.setText(result + "");
233                 input1 = input2 = result = 0.0;
234             }
235
236             //set all operations to false
237             addFlag = subFlag = mulFlag = divFlag = powFlag = false;
238         }
239     });

```

Code: MyInputMethodService:

```
1 package com.example.calculator;
2
3 import android.inputmethodservice.InputMethodService;
4 import android.inputmethodservice.Keyboard;
5 import android.inputmethodservice.KeyboardView;
6 import android.text.TextUtils;
7 import android.view.View;
8 import android.view.inputmethod.InputConnection;
9
10 public class MyInputMethodService extends InputMethodService implements
    KeyboardView.OnKeyboardActionListener {
11
12     @Override
13     public View onCreateInputView() {
14         // get the KeyboardView and add our Keyboard layout to it
15         KeyboardView keyboardView = (KeyboardView) getLayoutInflater().
            inflate(R.layout.keyboard_view, null);
16         Keyboard keyboard = new Keyboard(this, R.xml.number_pad);
17         keyboardView.setKeyboard(keyboard);
18         keyboardView.setOnKeyboardActionListener(this);
19         return keyboardView;
20     }
21
22     @Override
23     public void onKey(int primaryCode, int[] keyCodes) {
24
25         InputConnection ic = getCurrentInputConnection();
26
27         if (ic == null) return;
28         switch (primaryCode) {
29             case Keyboard.KEYCODE_DELETE:
30                 CharSequence selectedText = ic.getSelectedText(0);
31                 if (TextUtils.isEmpty(selectedText)) {
32                     // no selection, so delete previous character
33                     ic.deleteSurroundingText(1, 0);
34                 } else {
35                     // delete the selection
36                     ic.commitText("", 1);
37                 }
38                 break;
39
40             default:
41                 char code = (char) primaryCode;
42                 ic.commitText(String.valueOf(code), 1);
43         }
44     }
45 }
```

```
46     @Override
47     public void onPress(int primaryCode) { }
48
49     @Override
50     public void onRelease(int primaryCode) { }
51
52     @Override
53     public void onText(CharSequence text) { }
54
55     @Override
56     public void swipeLeft() { }
57
58     @Override
59     public void swipeRight() { }
60
61     @Override
62     public void swipeDown() { }
63
64     @Override
65     public void swipeUp() { }
66 }
```


Code: Main Activity Layout

```
1 <?xml version="1.0" encoding="utf-8"?>
2 <androidx.constraintlayout.widget.ConstraintLayout xmlns:android="http://
  schemas.android.com/apk/res/android"
3   xmlns:app="http://schemas.android.com/apk/res-auto"
4   xmlns:tools="http://schemas.android.com/tools"
5   android:layout_width="match_parent"
6   android:layout_height="match_parent"
7   android:background="#B388FF"
8   tools:context=".MainActivity">
9
10  <Button
11      android:id="@+id/num3"
12      android:layout_width="wrap_content"
13      android:layout_height="wrap_content"
14      android:layout_marginStart="8dp"
15      android:layout_marginTop="32dp"
16      android:backgroundTint="@color/
  design_default_color_secondary_variant"
17      android:text="3"
18      android:textSize="20sp"
19      android:textStyle="bold"
20      app:layout_constraintStart_toStartOf="parent"
21      app:layout_constraintTop_toBottomOf="@+id/num6" />
22
23  <Button
24      android:id="@+id/num2"
25      android:layout_width="wrap_content"
26      android:layout_height="wrap_content"
27      android:layout_marginStart="16dp"
28      android:layout_marginTop="32dp"
29      android:backgroundTint="@color/
  design_default_color_secondary_variant"
30      android:text="2"
31      android:textSize="20sp"
32      android:textStyle="bold"
33      app:layout_constraintStart_toEndOf="@+id/num3"
34      app:layout_constraintTop_toBottomOf="@+id/num5" />
35
36  <Button
37      android:id="@+id/num1"
38      android:layout_width="wrap_content"
39      android:layout_height="wrap_content"
40      android:layout_marginStart="16dp"
41      android:layout_marginTop="32dp"
42      android:backgroundTint="@color/
  design_default_color_secondary_variant"
43      android:text="1"
```

```

44     android:textSize="20sp"
45     android:textStyle="bold"
46     app:layout_constraintStart_toEndOf="@+id/num2"
47     app:layout_constraintTop_toBottomOf="@+id/num4" />
48
49     <Button
50         android:id="@+id/num0"
51         android:layout_width="wrap_content"
52         android:layout_height="wrap_content"
53         android:layout_marginStart="8dp"
54         android:layout_marginTop="32dp"
55         android:backgroundTint="@color/
design_default_color_secondary_variant"
56         android:text="0"
57         android:textSize="20sp"
58         android:textStyle="bold"
59         app:layout_constraintStart_toStartOf="parent"
60         app:layout_constraintTop_toBottomOf="@+id/num3" />
61
62     <Button
63         android:id="@+id/decimal"
64         android:layout_width="wrap_content"
65         android:layout_height="wrap_content"
66         android:layout_marginStart="16dp"
67         android:layout_marginTop="32dp"
68         android:backgroundTint="@color/
design_default_color_secondary_variant"
69         android:text="."
70         android:textSize="20sp"
71         android:textStyle="bold"
72         app:layout_constraintStart_toEndOf="@+id/num0"
73         app:layout_constraintTop_toBottomOf="@+id/num2" />
74
75     <Button
76         android:id="@+id/clear"
77         android:layout_width="wrap_content"
78         android:layout_height="wrap_content"
79         android:layout_marginStart="16dp"
80         android:layout_marginTop="32dp"
81         android:backgroundTint="@color/
design_default_color_secondary_variant"
82         android:text="C"
83         android:textSize="20sp"
84         android:textStyle="bold"
85         app:layout_constraintStart_toEndOf="@+id/decimal"
86         app:layout_constraintTop_toBottomOf="@+id/num2" />
87
88     <Button
89         android:id="@+id/num9"
90         android:layout_width="wrap_content"
91         android:layout_height="wrap_content"

```

```

92         android:layout_marginStart="8dp"
93         android:layout_marginTop="40dp"
94         android:backgroundTint="@color/
design_default_color_secondary_variant"
95         android:text="9"
96         android:textSize="20sp"
97         android:textStyle="bold"
98         app:layout_constraintStart_toStartOf="parent"
99         app:layout_constraintTop_toBottomOf="@+id/displayArea" />
100
101     <Button
102         android:id="@+id/num6"
103         android:layout_width="wrap_content"
104         android:layout_height="wrap_content"
105         android:layout_marginStart="8dp"
106         android:layout_marginTop="32dp"
107         android:backgroundTint="@color/
design_default_color_secondary_variant"
108         android:text="6"
109         android:textSize="20sp"
110         android:textStyle="bold"
111         app:layout_constraintStart_toStartOf="parent"
112         app:layout_constraintTop_toBottomOf="@+id/num9" />
113
114     <Button
115         android:id="@+id/num5"
116         android:layout_width="wrap_content"
117         android:layout_height="wrap_content"
118         android:layout_marginStart="16dp"
119         android:layout_marginTop="32dp"
120         android:backgroundTint="@color/
design_default_color_secondary_variant"
121         android:text="5"
122         android:textSize="20sp"
123         android:textStyle="bold"
124         app:layout_constraintStart_toEndOf="@+id/num6"
125         app:layout_constraintTop_toBottomOf="@+id/num8" />
126
127     <Button
128         android:id="@+id/num4"
129         android:layout_width="wrap_content"
130         android:layout_height="wrap_content"
131         android:layout_marginStart="16dp"
132         android:layout_marginTop="32dp"
133         android:backgroundTint="@color/
design_default_color_secondary_variant"
134         android:text="4"
135         android:textSize="20sp"
136         android:textStyle="bold"
137         app:layout_constraintStart_toEndOf="@+id/num5"
138         app:layout_constraintTop_toBottomOf="@+id/num7" />

```

```

139
140 <Button
141     android:id="@+id/num8"
142     android:layout_width="wrap_content"
143     android:layout_height="wrap_content"
144     android:layout_marginStart="16dp"
145     android:layout_marginTop="40dp"
146     android:backgroundTint="@color/
design_default_color_secondary_variant"
147     android:text="8"
148     android:textSize="20sp"
149     android:textStyle="bold"
150     app:layout_constraintStart_toEndOf="@+id/num9"
151     app:layout_constraintTop_toBottomOf="@+id/displayArea" />
152
153 <Button
154     android:id="@+id/num7"
155     android:layout_width="wrap_content"
156     android:layout_height="wrap_content"
157     android:layout_marginStart="16dp"
158     android:layout_marginTop="40dp"
159     android:backgroundTint="@color/
design_default_color_secondary_variant"
160     android:text="7"
161     android:textSize="20sp"
162     android:textStyle="bold"
163     app:layout_constraintStart_toEndOf="@+id/num8"
164     app:layout_constraintTop_toBottomOf="@+id/displayArea" />
165
166 <Button
167     android:id="@+id/divide"
168     android:layout_width="71dp"
169     android:layout_height="48dp"
170     android:layout_marginStart="16dp"
171     android:layout_marginTop="40dp"
172     android:layout_marginEnd="16dp"
173     android:backgroundTint="@color/
design_default_color_secondary_variant"
174     android:text="/"
175     android:textSize="20sp"
176     android:textStyle="bold"
177     app:layout_constraintEnd_toEndOf="parent"
178     app:layout_constraintStart_toEndOf="@+id/num7"
179     app:layout_constraintTop_toBottomOf="@+id/displayArea" />
180
181 <Button
182     android:id="@+id/multiply"
183     android:layout_width="71dp"
184     android:layout_height="48dp"
185     android:layout_marginStart="16dp"
186     android:layout_marginTop="32dp"

```

```

187         android:layout_marginEnd="16dp"
188         android:backgroundTint="@color/
design_default_color_secondary_variant"
189         android:text="*"
190         android:textSize="20sp"
191         android:textStyle="bold"
192         app:layout_constraintEnd_toEndOf="parent"
193         app:layout_constraintStart_toEndOf="@+id/num4"
194         app:layout_constraintTop_toBottomOf="@+id/divide" />
195
196     <Button
197         android:id="@+id/subtract"
198         android:layout_width="71dp"
199         android:layout_height="48dp"
200         android:layout_marginStart="16dp"
201         android:layout_marginTop="32dp"
202         android:layout_marginEnd="16dp"
203         android:backgroundTint="@color/
design_default_color_secondary_variant"
204         android:text="-"
205         android:textSize="20sp"
206         android:textStyle="bold"
207         app:layout_constraintEnd_toEndOf="parent"
208         app:layout_constraintStart_toEndOf="@+id/num1"
209         app:layout_constraintTop_toBottomOf="@+id/multiply" />
210
211     <Button
212         android:id="@+id/add"
213         android:layout_width="71dp"
214         android:layout_height="48dp"
215         android:layout_marginStart="16dp"
216         android:layout_marginTop="32dp"
217         android:layout_marginEnd="16dp"
218         android:backgroundTint="@color/
design_default_color_secondary_variant"
219         android:text="+"
220         android:textSize="20sp"
221         android:textStyle="bold"
222         app:layout_constraintEnd_toEndOf="parent"
223         app:layout_constraintStart_toEndOf="@+id/clear"
224         app:layout_constraintTop_toBottomOf="@+id/subtract" />
225
226     <Button
227         android:id="@+id/equal"
228         android:layout_width="wrap_content"
229         android:layout_height="wrap_content"
230         android:layout_marginStart="16dp"
231         android:layout_marginTop="32dp"
232         android:backgroundTint="@color/
design_default_color_secondary_variant"
233         android:text="="

```

```

234         android:textSize="20sp"
235         android:textStyle="bold"
236         app:layout_constraintStart_toEndOf="@+id/decimal"
237         app:layout_constraintTop_toBottomOf="@+id/clear" />
238
239     <Button
240         android:id="@+id/power"
241         android:layout_width="71dp"
242         android:layout_height="48dp"
243         android:layout_marginStart="16dp"
244         android:layout_marginTop="32dp"
245         android:layout_marginEnd="16dp"
246         android:backgroundTint="@color/
design_default_color_secondary_variant"
247         android:text="^"
248         android:textSize="20sp"
249         android:textStyle="bold"
250         app:layout_constraintEnd_toEndOf="parent"
251         app:layout_constraintStart_toEndOf="@+id/equal"
252         app:layout_constraintTop_toBottomOf="@+id/add" />
253
254     <ImageView
255         android:id="@+id/imageView"
256         android:layout_width="215dp"
257         android:layout_height="145dp"
258         android:layout_marginTop="16dp"
259         app:layout_constraintEnd_toEndOf="parent"
260         app:layout_constraintStart_toStartOf="parent"
261         app:layout_constraintTop_toTopOf="parent"
262         app:srcCompat="@drawable/ic_calculate_black_24dp" />
263
264     <EditText
265         android:id="@+id/displayArea"
266         android:layout_width="377dp"
267         android:layout_height="62dp"
268         android:layout_marginStart="8dp"
269         android:layout_marginTop="20dp"
270         android:layout_marginEnd="8dp"
271         android:background="@android:drawable/editbox_background"
272         android:backgroundTint="@color/white"
273         android:ems="10"
274         android:inputType="numberDecimal"
275         android:textAlignment="textEnd"
276         android:textSize="20sp"
277         android:textStyle="bold"
278         app:layout_constraintEnd_toEndOf="parent"
279         app:layout_constraintStart_toStartOf="parent"
280         app:layout_constraintTop_toBottomOf="@+id/imageView" />
281
282 </androidx.constraintlayout.widget.ConstraintLayout>

```

Code: Keyboard View Layout

```
1 <?xml version="1.0" encoding="utf-8"?>
2 <android.inputmethodservice.KeyboardView
3     xmlns:android="http://schemas.android.com/apk/res/android"
4     android:id="@+id/keyboard_view"
5     android:layout_width="match_parent"
6     android:layout_height="wrap_content"
7     android:keyPreviewLayout="@layout/key_preview"
8     android:layout_alignParentBottom="true">
9
10 </android.inputmethodservice.KeyboardView>
```

Code: Key Preview Layout

```
1 <?xml version="1.0" encoding="utf-8"?>
2 <TextView
3     xmlns:android="http://schemas.android.com/apk/res/android"
4     android:layout_width="match_parent"
5     android:layout_height="match_parent"
6     android:gravity="center"
7     android:background="@android:color/white"
8     android:textColor="@android:color/black"
9     android:textSize="30sp">
10 </TextView>
```


Code: Method XML

```
1 <?xml version="1.0" encoding="utf-8"?>
2 <input-method
3     xmlns:android="http://schemas.android.com/apk/res/android">
4
5     <subtype
6         android:imeSubtypeMode="keyboard"/>
7
8 </input-method>
```

Code: Number Pad XML

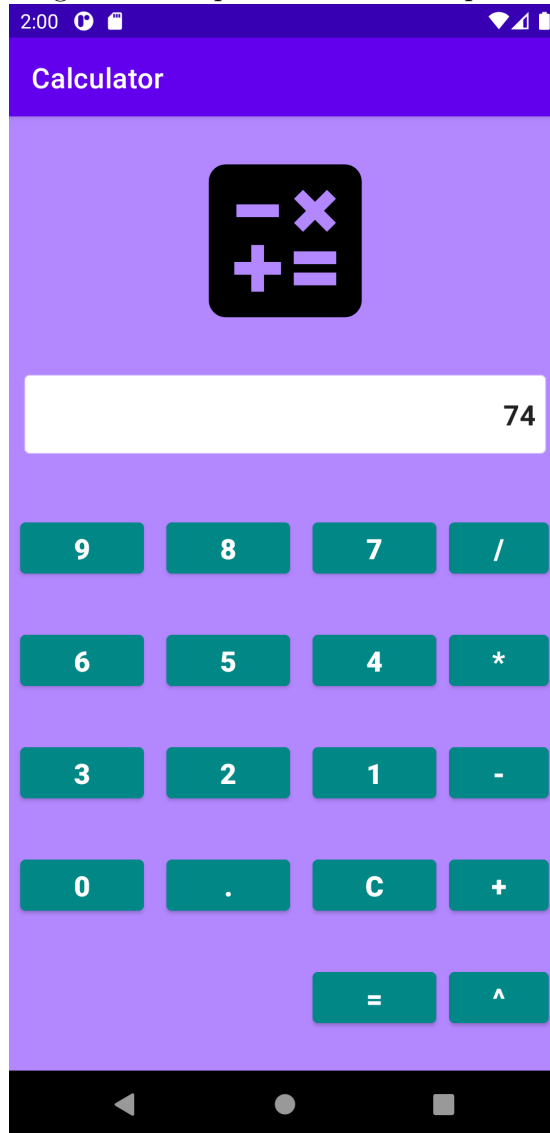
```
1 <?xml version="1.0" encoding="utf-8"?>
2 <Keyboard xmlns:android="http://schemas.android.com/apk/res/android"
3     android:keyWidth="20%p"
4     android:horizontalGap="5dp"
5     android:verticalGap="5dp"
6     android:keyHeight="60dp">
7
8     <Row>
9         <Key android:codes="49" android:keyLabel="1" android:keyEdgeFlags=
10            "left"/>
11         <Key android:codes="50" android:keyLabel="2"/>
12         <Key android:codes="51" android:keyLabel="3"/>
13         <Key android:codes="52" android:keyLabel="4"/>
14         <Key android:codes="53" android:keyLabel="5" android:keyEdgeFlags=
15            "right"/>
16     </Row>
17
18     <Row>
19         <Key android:codes="54" android:keyLabel="6" android:keyEdgeFlags=
20            "left"/>
21         <Key android:codes="55" android:keyLabel="7"/>
22         <Key android:codes="56" android:keyLabel="8"/>
23         <Key android:codes="57" android:keyLabel="9"/>
24         <Key android:codes="48" android:keyLabel="0" android:keyEdgeFlags=
25            "right"/>
26     </Row>
27
28     <Row>
29         <Key android:codes="-5"
30             android:keyLabel="DELETE"
31             android:keyWidth="80%p"
32             android:keyEdgeFlags="left"
33             android:isRepeatable="true"/>
34         <Key android:codes="46"
35             android:keyLabel="."
36             android:keyEdgeFlags="right"/>
37     </Row>
38 </Keyboard>
```

Code: Android Manifest

```
1 <?xml version="1.0" encoding="utf-8"?>
2 <manifest xmlns:android="http://schemas.android.com/apk/res/android"
3     package="com.example.calculator">
4
5     <application
6         android:allowBackup="true"
7         android:icon="@mipmap/ic_launcher"
8         android:label="@string/app_name"
9         android:roundIcon="@mipmap/ic_launcher_round"
10        android:supportsRtl="true"
11        android:theme="@style/Theme.Calculator">
12        <activity android:name=".MainActivity">
13            <intent-filter>
14                <action android:name="android.intent.action.MAIN" />
15
16                <category android:name="android.intent.category.LAUNCHER"
17            />
18            </intent-filter>
19        </activity>
20
21        <service
22            android:name=".MyInputMethodService"
23            android:label="Easy Calc Number Pad"
24            android:permission="android.permission.BIND_INPUT_METHOD">
25            <intent-filter>
26                <action android:name="android.view.InputMethod"/>
27            </intent-filter>
28            <meta-data
29                android:name="android.view.im"
30                android:resource="@xml/method"/>
31        </service>
32    </application>
33
34 </manifest>
```

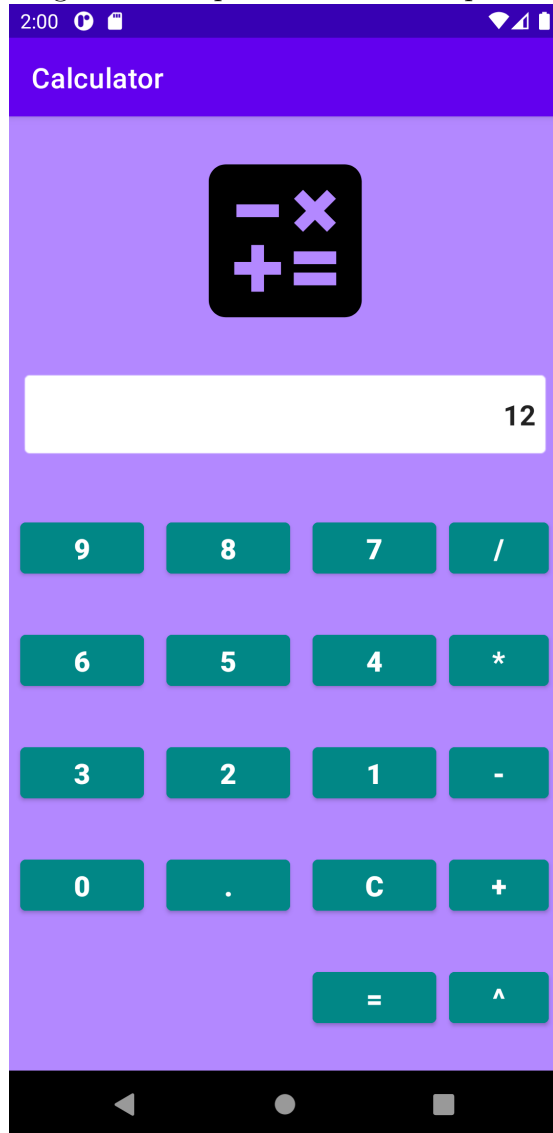
Output: Calculator Input 1:

Figure 1: Output: Calculator Input 1.



Output: Calculator Input 2:

Figure 2: Output: Calculator Input 2.



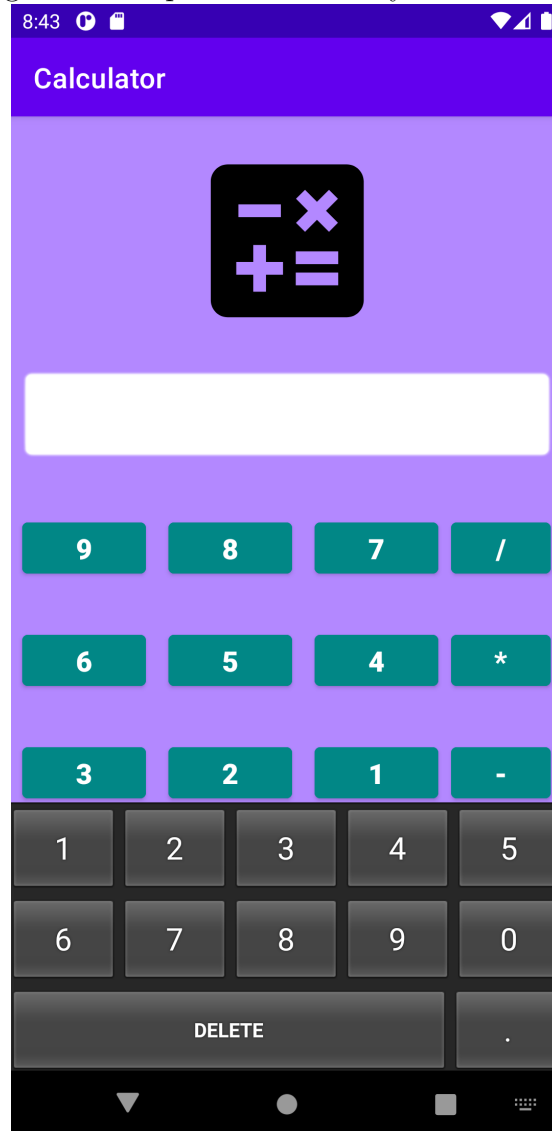
Output: Calculator Result:

Figure 3: Output: Calculator Result.



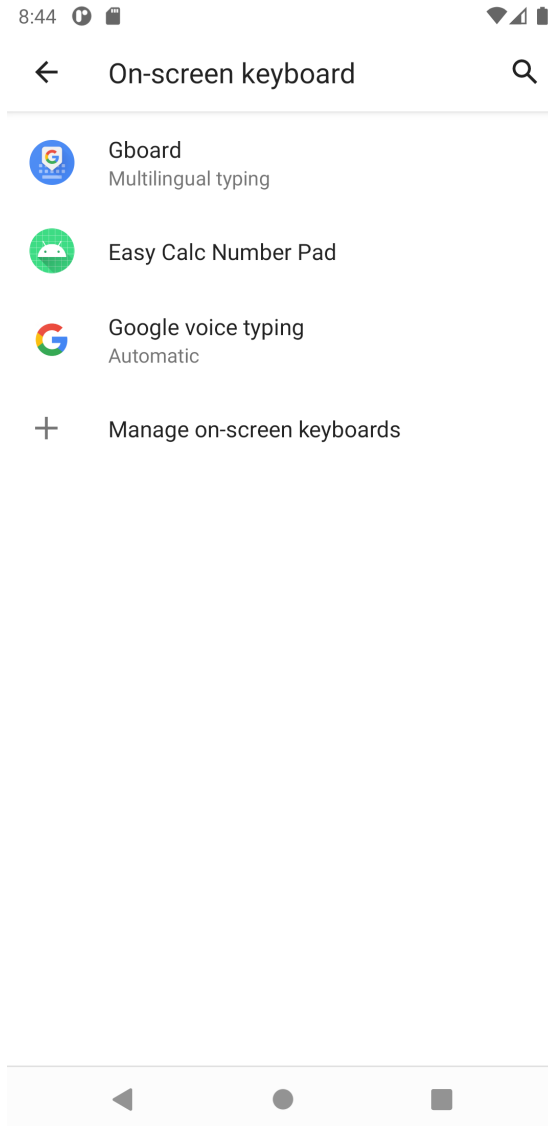
Output: Custom Keyboard Set-Up:

Figure 4: Output: Custom Keyboard Set-Up.



Output: Custom Keyboard In Use:

Figure 5: Output: Custom Keyboard In Use.



Learning Outcome:

- I understood how to set-up a layout for a simple calculator application.
- I implemented the calculator logic with appropriate display functionality.
- I implemented buttons with logic for clearing the display area and include decimal points as well.
- I understood how to design a **custom keyboard** for Android.
- I understood how to map the keyboard keys to appropriate actions using the **Input-MethodService class & OnKeyboardActionListener interface**.
- I implemented functionality to clear the screen using a keypress as well.
- I understood how to style my custom keyboard using XML.
- I understood how to add keys to the custom keyboard using XML definition.
- I learnt that the keyboard service must be exposed to the device through the **Android Manifest** XML file for end-user peruse.
- I understood how to enable the custom keyboard from the front-end layer of the Android device.