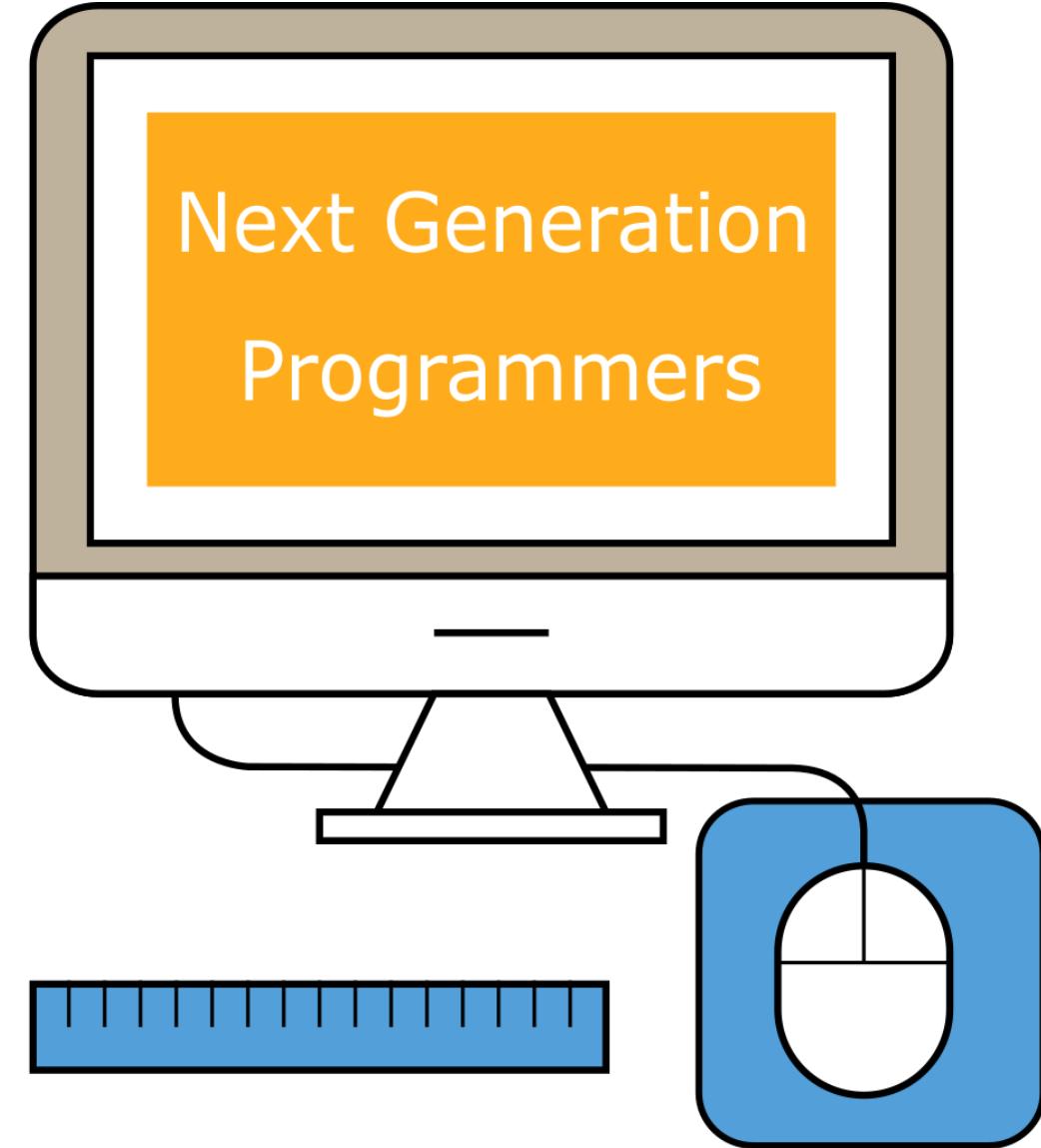
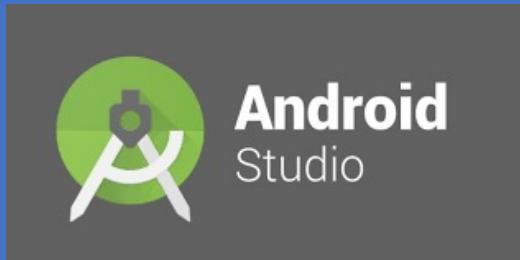


# App development in Android Studio

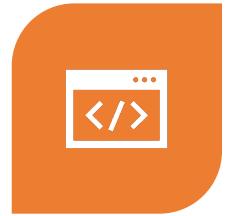
---

David Azpiroz

June 2021



# Helpful glossary



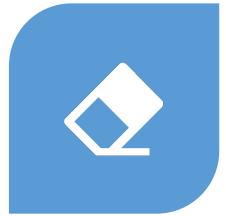
UI / GUI / HMI



DEVELOPMENT



IMPLEMENT



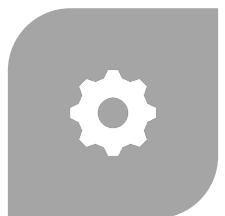
EDIT



TEST



RUN

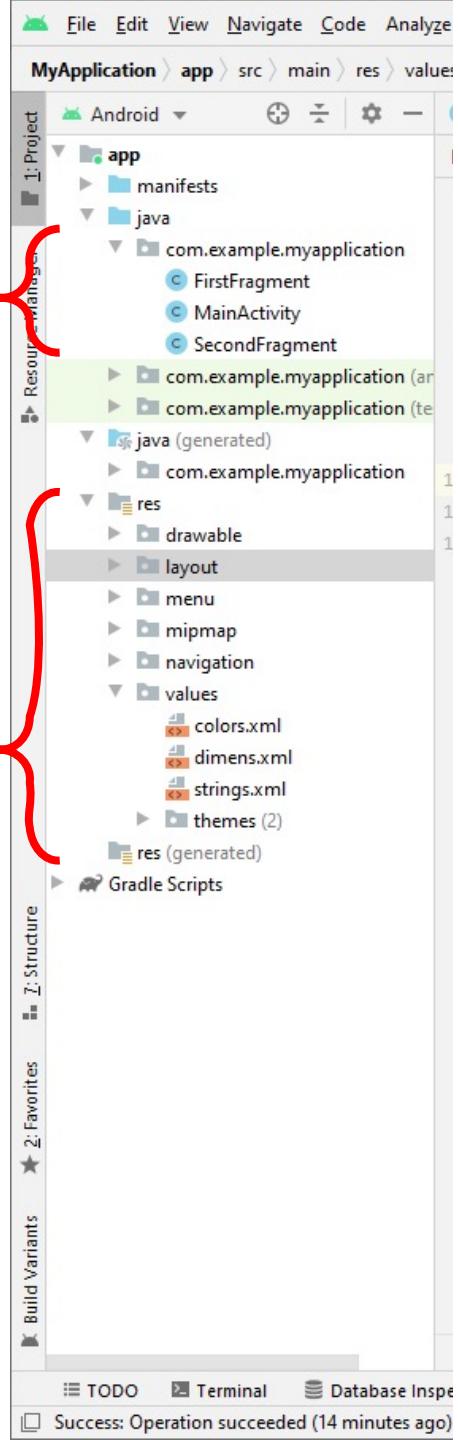
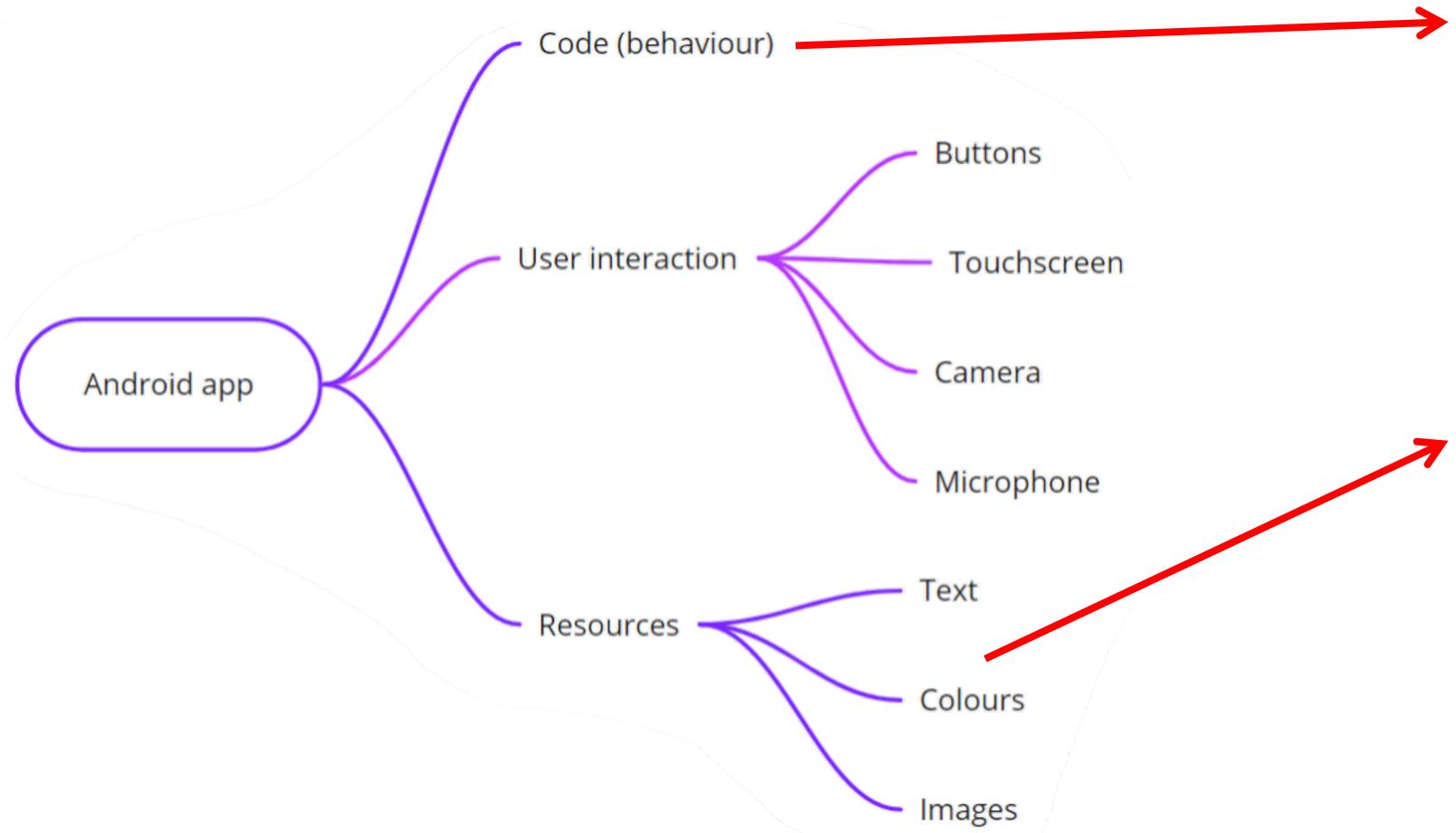


DEBUG



RECAP

# Recap

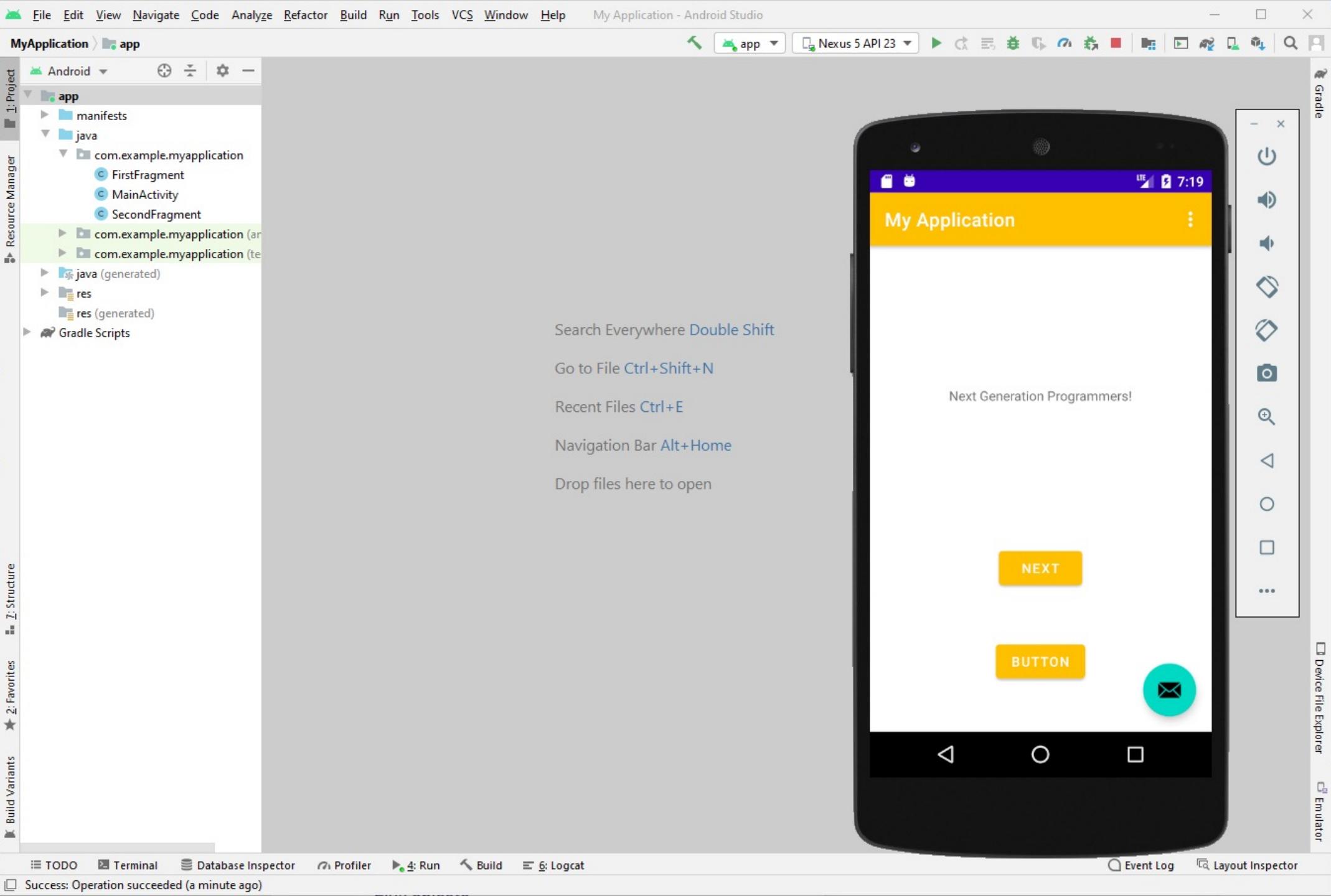


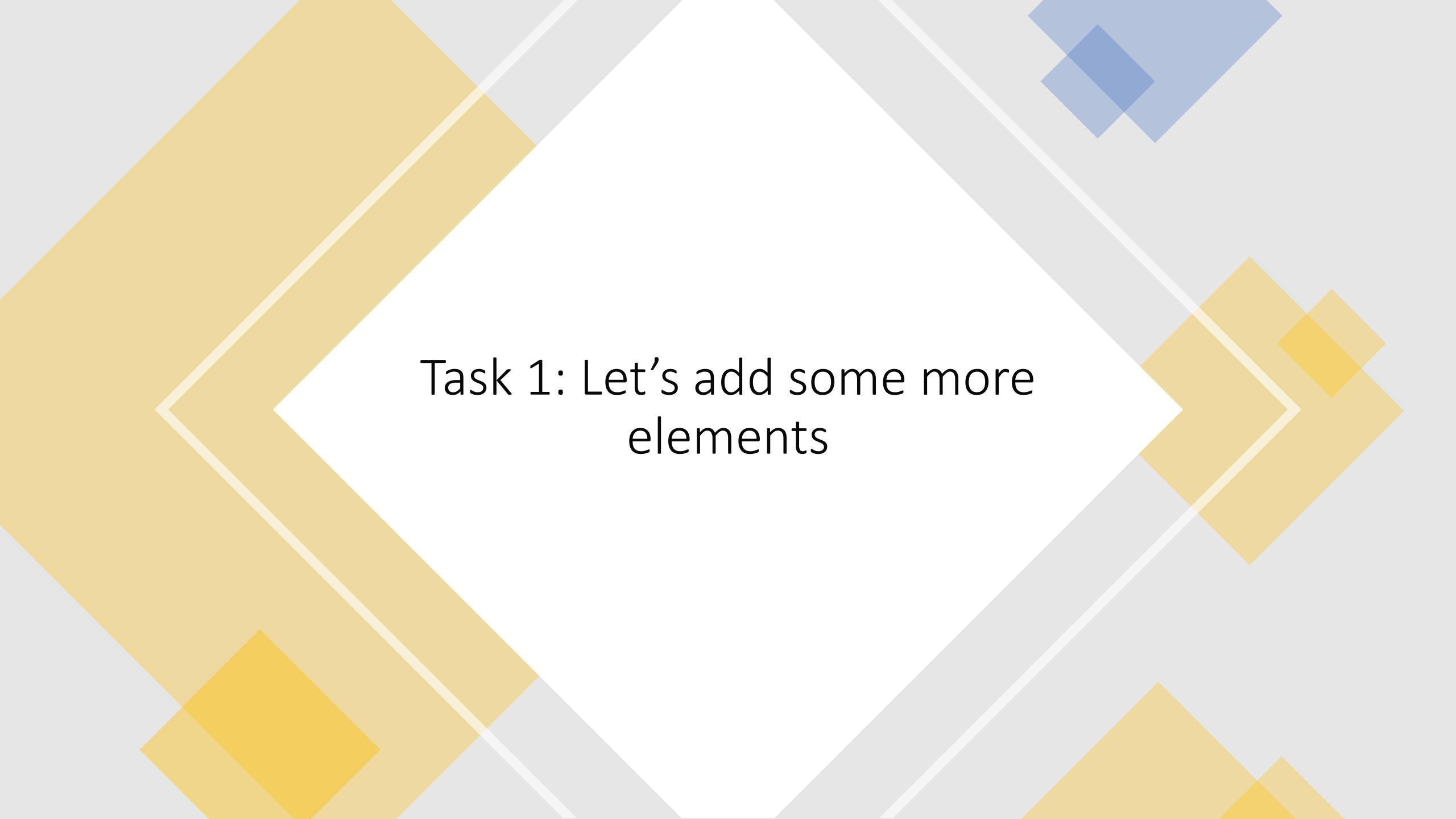
Function



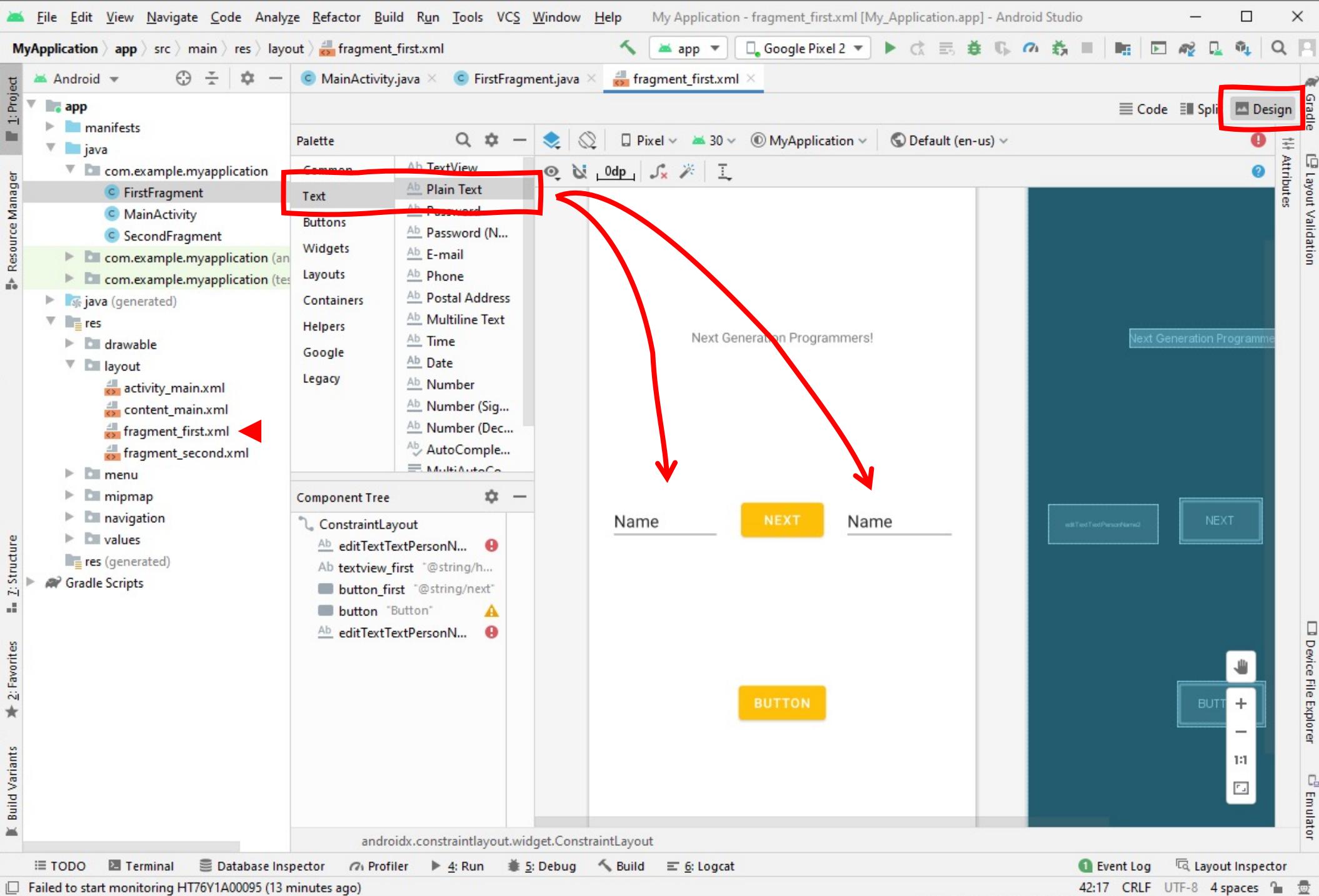
```
1 package com.example.myapplication;
2
3 import android.os.Bundle;
4 import com.google.android.material.floatingactionbutton.FloatingActionButton;
5 import com.google.android.material.snackbar.Snackbar;
6 import androidx.appcompat.app.AppCompatActivity;
7 import androidx.appcompat.widget.Toolbar;
8 import android.view.View;
9 import android.view.Menu;
10 import android.view.MenuItem;
11
12 public class MainActivity extends AppCompatActivity {
13
14     @Override
15     protected void onCreate(Bundle savedInstanceState) {
16         super.onCreate(savedInstanceState);
17         setContentView(R.layout.activity_main);
18         Toolbar toolbar = findViewById(R.id.toolbar);
19         setSupportActionBar(toolbar);
20
21         FloatingActionButton fab = findViewById(R.id.fab);
22         fab.setOnClickListener(new View.OnClickListener() {
23             @Override
24             public void onClick(View view) {
25                 Snackbar.make(view, "Replace with your own action", Snackbar.LENGTH_LONG)
26                     .setAction("Action", null).show();
27             }
28         });
29     }
30
31     @Override
32     public boolean onCreateOptionsMenu(Menu menu) {
33         // Inflate the menu; this adds items to the action bar if it is present.
34         getMenuInflater().inflate(R.menu.menu_main, menu);
35         return true;
36     }
37
38     @Override
39     public boolean onOptionsItemSelected(MenuItem item) {
```

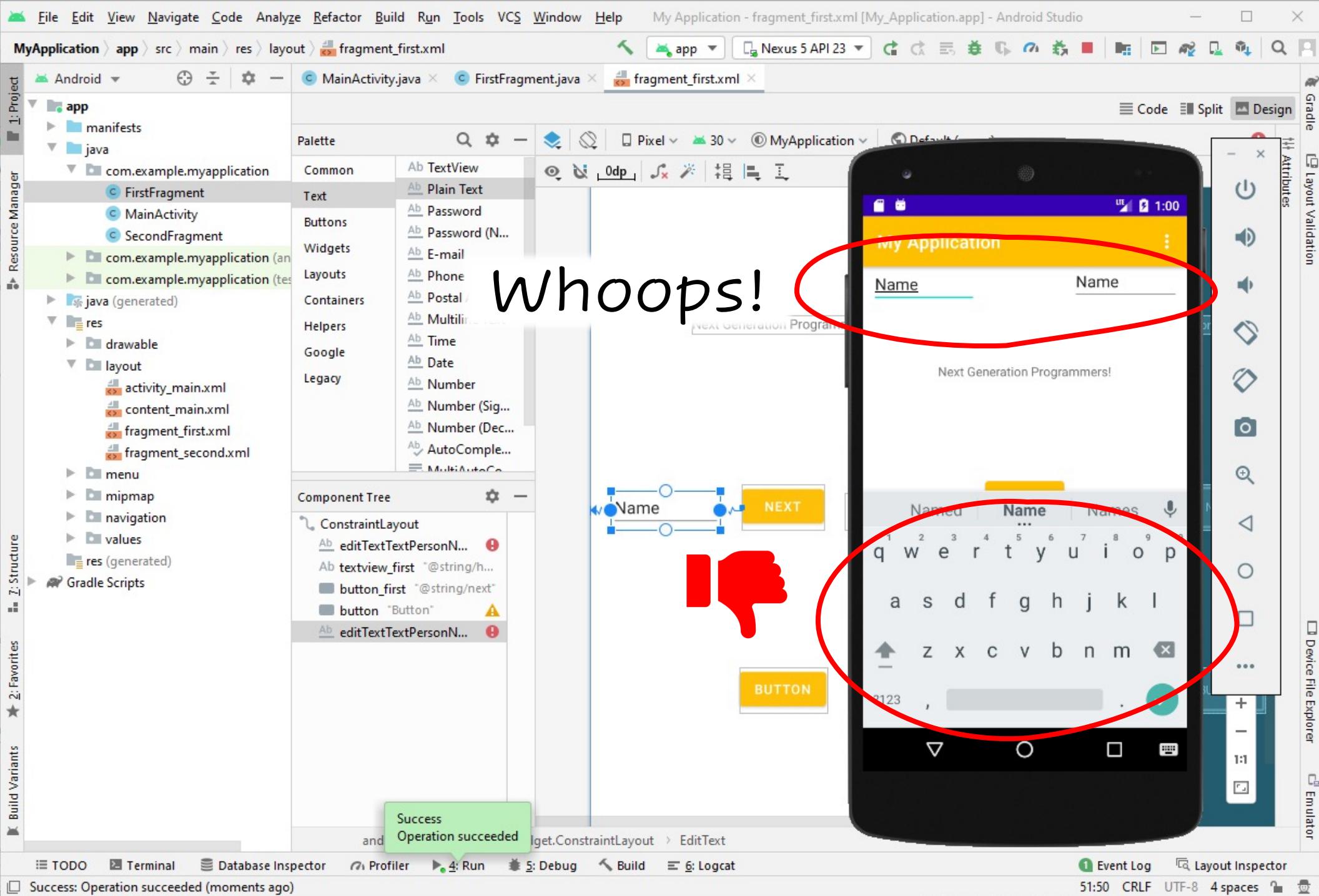
# Where we are at after Lesson 1...





Task 1: Let's add some more elements





1: Project

2: Resource Manager

3: Structure

4: Favorites

5: Build Variants

app

- manifests
- java
  - com.example.myapplication
    - FirstFragment
    - MainActivity
    - SecondFragment
  - com.example.myapplication (an)
  - com.example.myapplication (te)
  - java (generated)
- res
  - drawable
  - layout
    - activity\_main.xml
    - content\_main.xml
    - fragment\_first.xml
    - fragment\_second.xml
  - menu
  - mipmap
  - navigation
  - values
- res (generated)

Gradle Scripts

MainActivity.java

FirstFragment.java

fragment\_first.xml

Palette

Common

- Ab TextView
- Ab Plain Text
- Ab Password
- Ab Password (N...)
- Ab E-mail
- Ab Phone
- Ab Postal Address
- Ab Multiline Text
- Ab Time
- Ab Date
- Ab Number
- Ab Number (Sig...)
- Ab Number (Dec...)
- Ab AutoComple...
- MultiAutoCo...

Text

Buttons

Widgets

Layouts

Containers

Helpers

Google

Legacy

Component Tree

- ConstraintLayout
  - Ab editTextTextPersonN...
  - Ab textView\_first '@string/h...
  - button\_first '@string/next'
  - button "Button"
  - Ab editTextTextPersonN...

Code Split Design

Gradle Layout Validation

Attributes

Next Generation Programmers!

Next Generation Programmers!

NAME

NAME

NEXT

BUTTON

Emulator

Device File Explorer

Event Log Layout Inspector

Failed to start monitoring emulator-5554 (a minute ago)

20:14 CRLF UTF-8 4 spaces

File Edit View Navigate Code Analyze Refactor Build Run Tools VCS Window Help My Application - fragment\_first.xml [My\_Application.app] - Android Studio

MyApplication > app > src > main > res > layout > fragment\_first.xml

MainActivity.java FirstFragment.java fragment\_first.xml

Code Split Design

Resource Manager

Project

1: Project

app manifests java com.example.myapplication FirstFragment MainActivity SecondFragment com.example.myapplication (generated) java (generated) res drawable layout activity\_main.xml content\_main.xml fragment\_first.xml fragment\_second.xml menu mipmap navigation values res (generated) Gradle Scripts

2: Favorites

3: Structure

4: Build Variants

5: Event Log

6: Layout Inspector

7: TODO

8: Terminal

9: Database Inspector

10: Profiler

11: Run

12: Debug

13: Build

14: Logcat

15: CRLF

16: UTF-8

17: 4 spaces

18: Success: Operation succeeded (2 minutes ago)

19: Layout Validation

20: Device File Explorer

21: Emulator

# Delete Name

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

    android:id="@+id/editTextTextPersonName3"
    android:layout_width="119dp"
    android:layout_height="39dp"
    android:ems="10"
    android:inputType="textPersonName"
    android:text="Name"
    app:layout_constraintEnd_toEndOf="parent"
    app:layout_constraintStart_toEndOf="@+id/button_first"
    tools:layout_editor_absoluteY="351dp" />
```

# Replace "textPersonName" with "number"

```
    app:layout_constraintEnd_toEndOf="@+id/button_first"
    app:layout_constraintStart_toEndOf="parent"
    app:layout_constraintTop_toTopOf="parent" />

    <Button
        android:id="@+id/button_first"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content" />
```

fragment\_first.xml

1: Project

Resource Manager

2: Structure

3: Favorites

Build Variants

Success: Operation succeeded (3 minutes ago)

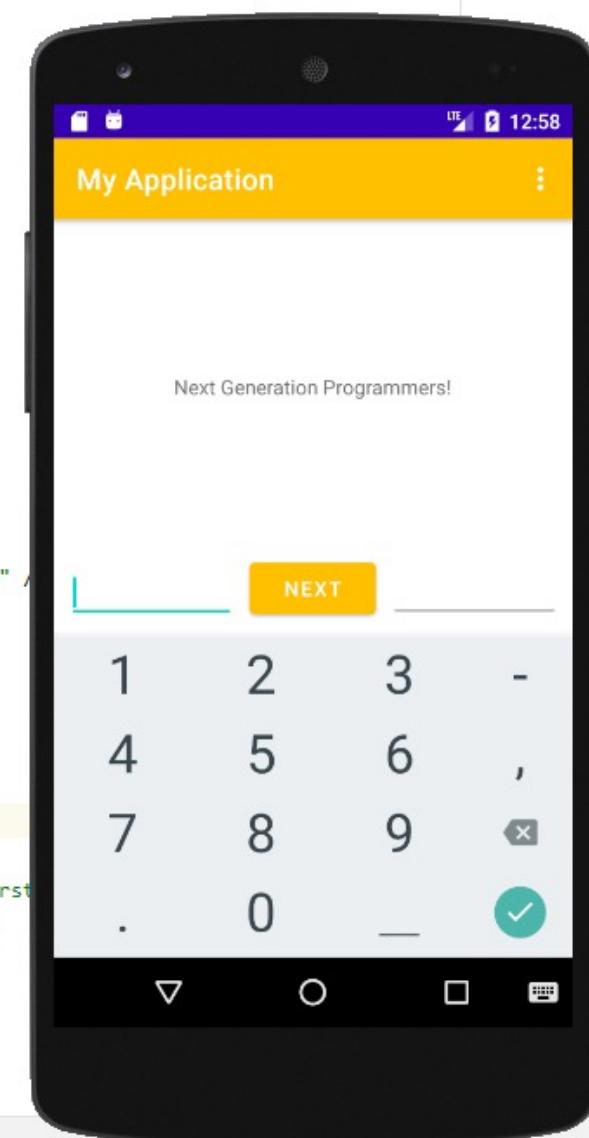


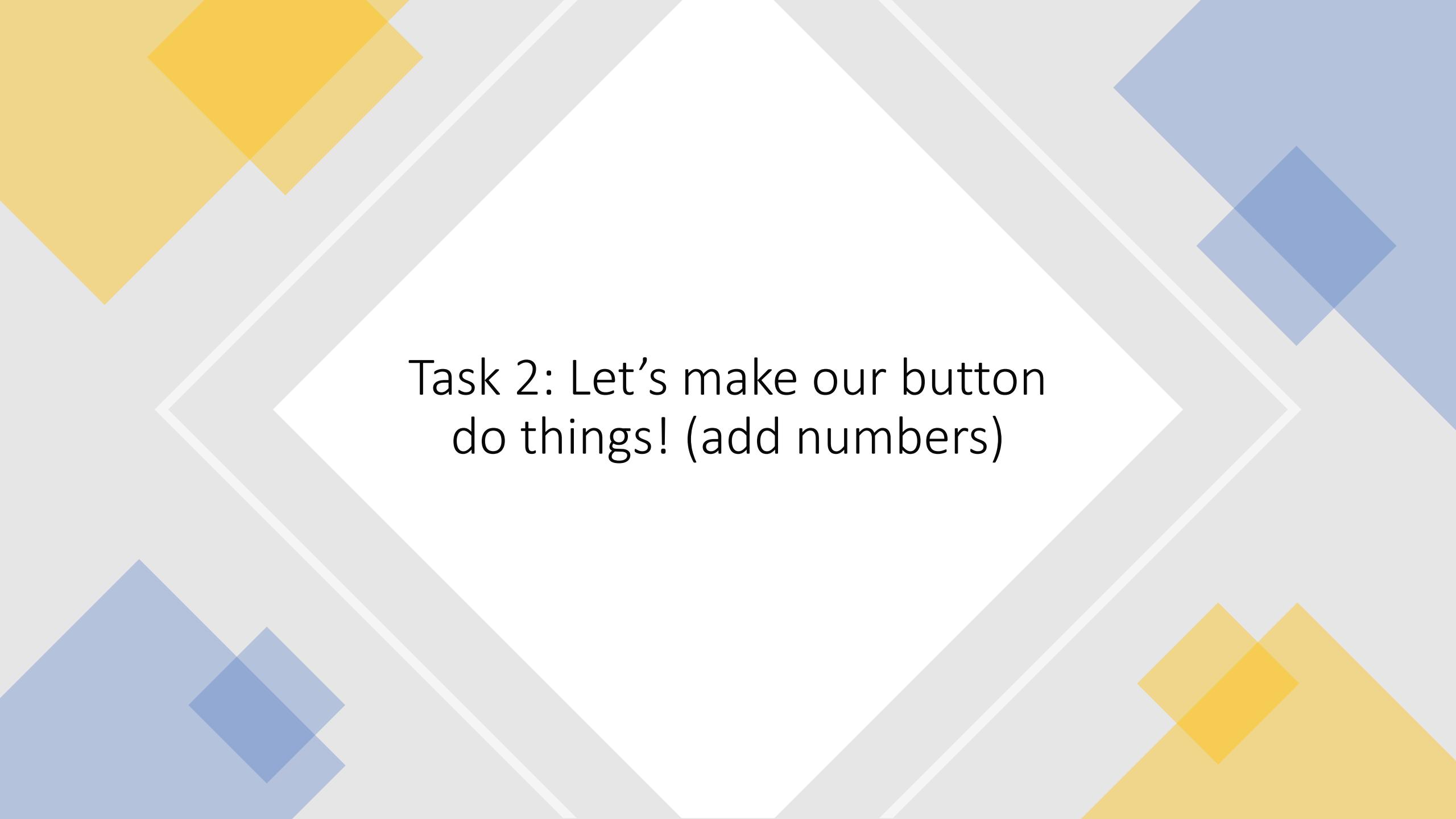
```
        android:id="@+id/button_first"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Next"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toTopOf="parent" />

    <Button
        android:id="@+id/button"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Button"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintEnd_toEndOf="parent"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintTop_toBottomOf="@+id/button_first" />

    <EditText
        android:id="@+id/editTextTextPersonName2"
        android:layout_width="117dp"
        android:layout_height="42dp"
        android:ems="10"
        android:inputType="number"
        android:text=""
        app:layout_constraintBottom_toBottomOf="@+id/button_first"
        app:layout_constraintEnd_toStartOf="@+id/button_first"
        app:layout_constraintStart_toStartOf="parent" />
```

androidx.constraintlayout.widget.ConstraintLayout &gt; EditText





Task 2: Let's make our button  
do things! (add numbers)

File Edit View Navigate Code Analyze Refactor Build Run Tools VCS Window Help My Application - FirstFragment.java [My\_Application.app] - Android Studio

app > src > main > java > com > example > myapplication > FirstFragment > onViewCreated

Android Java Google Pixel 2

1: Project 1: Resource Manager 1: Structure 1: Favorites 1: Build Variants 1: Device File Explorer 1: Emulator

Gradle

FirstFragment.java

```
1 package com.example.myapplication;
2
3 import android.os.Bundle;
4 import android.view.LayoutInflater;
5 import android.view.View;
6 import android.view.ViewGroup;
7
8 import androidx.annotation.NonNull;
9 import androidx.fragment.app.Fragment;
10 import androidx.navigation.fragment.NavHostFragment;
11
12 public class FirstFragment extends Fragment {
13
14     @Override
15     public View onCreateView(
16         LayoutInflater inflater, ViewGroup container,
17         Bundle savedInstanceState
18     ) {
19         // Inflate the layout for this fragment
20         return inflater.inflate(R.layout.fragment_first, container, false);
21     }
22
23     @Override
24     public void onViewCreated(@NonNull View view, Bundle savedInstanceState) {
25         super.onViewCreated(view, savedInstanceState);
26         view.findViewById(R.id.button_first).setOnClickListener(new View.OnClickListener() {
27             @Override
28             public void onClick(View view) {
29                 NavHostFragment.findNavController(fragment: FirstFragment.this)
30                     .navigate(R.id.action_FirstFragment_to_SecondFragment);
31             }
32         });
33     }
34 }
```

Button! Function

File Edit View Navigate Code Analyze Refactor Build Run Tools VCS Window Help My Application - FirstFragment.java [My\_Application.app] - Android Studio

app > src > main > java > com > example > myapplication > FirstFragment > onViewCreated

Android 1: Project Resource Manager 1: Resource Manager 1: Structure 1: Favorites 1: Build Variants 1: Event Log

Gradle Device File Explorer Emulator

FirstFragment.java

```
package com.example.myapplication;
import ...
public class FirstFragment extends Fragment {
    @Override
    public View onCreateView(
        LayoutInflater inflater, ViewGroup container,
        Bundle savedInstanceState
    ) {
        // Inflate the layout for this fragment
        return inflater.inflate(R.layout.fragment_first, container, false);
    }

    public void onViewCreated(@NonNull View view, Bundle savedInstanceState) {
        super.onViewCreated(view, savedInstanceState);

        view.findViewById(R.id.button_first).setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View view) {
                NavHostFragment.findNavController(fragment: FirstFragment.this)
                    .navigate(R.id.action_FirstFragment_to_SecondFragment);
            }
        });
        view.findViewById(R.id.button_first).setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View view) {
                NavHostFragment.findNavController(fragment: FirstFragment.this)
                    .navigate(R.id.action_FirstFragment_to_SecondFragment);
            }
        });
    }
}
```

COPY

Android 1: Project 1: Resource Manager 1: Structure 1: Favorites 1: Build Variants 1: Gradle

```
1 package com.example.myapplication;
2
3 import ...
11
12 public class FirstFragment extends Fragment {
13
14     @Override
15     public View onCreateView(
16         LayoutInflater inflater, ViewGroup container,
17         Bundle savedInstanceState
18     ) {
19         // Inflate the layout for this fragment
20         return inflater.inflate(R.layout.fragment_first, container, false);
21     }
22
23     @Override
24     public void onViewCreated(@NonNull View view, Bundle savedInstanceState) {
25         super.onViewCreated(view, savedInstanceState);
26
27         view.findViewById(R.id.button_first).setOnClickListener(new View.OnClickListener() {
28             @Override
29             public void onClick(View view) {
30                 NavHostFragment.findNavController(fragment: FirstFragment.this)
31                     .navigate(R.id.action_FirstFragment_to_SecondFragment);
32             }
33         });
34         view.findViewById(R.id.button_first).setOnClickListener(new View.OnClickListener() {
35             @Override
36             public void onClick(View view) {
37                 NavHostFragment.findNavController(fragment: FirstFragment.this)
38                     .navigate(R.id.action_FirstFragment_to_SecondFragment);
39             }
40         });
41     }
42 }
```

File Edit View Navigate Code Analyze Refactor Build Run Tools VCS Window Help My Application - fragment\_first.xml [My\_Application.app] - Android Studio

MyApplication > app > src > main > res > layout > fragment\_first.xml

FirstFragment.java fragment\_first.xml

Android Project Resource Manager 1: Project 1: Structure 2: Favorites Build Variants

Palette Common Ab TextView Text Buttons Widgets Layouts Containers Helpers Google Legacy

Code Split Design

Gradle Layout Validation Attributes

Resource Manager

Component Tree

Event Log Layout Inspector

Success: Operation succeeded (36 minutes ago)

18:1 CRLF UTF-8 4 spaces

10 android:id="@+id/textview\_first"  
11 android:layout\_width="wrap\_content"  
12 android:layout\_height="wrap\_content"  
13 android:text="Next Generation Programmers!"  
14 app:layout\_constraintBottom\_toTopOf="@+id/button\_fir"  
15 app:layout\_constraintEnd\_toEndOf="parent"  
16 app:layout\_constraintStart\_toStartOf="parent"  
17 app:layout\_constraintTop\_toTopOf="parent" />  
18  
19 <Button  
20 android:id="@+id/button\_first"  
21 android:layout\_width="wrap\_content"  
22 android:layout\_height="wrap\_content"  
23 android:text="Next"  
24 app:layout\_constraintBottom\_toBottomOf="parent"  
25 app:layout\_constraintEnd\_toEndOf="parent"  
26 app:layout\_constraintStart\_toStartOf="parent"  
27 app:layout\_constraintTop\_toBottomOf="@+id/textview\_f  
28  
29 <Button  
30 android:id="@+id/button"  
31 android:layout\_width="wrap\_content"  
32 android:layout\_height="wrap\_content"  
33 android:text="Button"  
34 app:layout\_constraintBottom\_toBottomOf="parent"  
35 app:layout\_constraintEnd\_toEndOf="parent"  
36 app:layout\_constraintStart\_toStartOf="parent"  
37 app:layout\_constraintTop\_toBottomOf="@+id/button\_fi  
38 </androidx.constraintlayout.widget.ConstraintLayout>

Next Generation Programmers!

Next

Button

Next Generation Programmers!

Next

Button

Button

Emulator

File Edit View Navigate Code Analyze Refactor Build Run Tools VCS Window Help My Application - FirstFragment.java [My\_Application.app] - Android Studio

app > src > main > java > com > example > myapplication > FirstFragment > onViewCreated

Android 1: Project Resource Manager 1: Structure 2: Favorites 2: Favorites Build Variants 1: TODO Terminal Database Inspector Profiler Run Build Logcat Event Log Layout Inspector

Gradle Device File Explorer Emulator

```
1 package com.example.myapplication;
2
3 import ...
4
5
6 public class FirstFragment extends Fragment {
7
8     @Override
9     public View onCreateView(
10         LayoutInflater inflater, ViewGroup container,
11         Bundle savedInstanceState
12     ) {
13
14         // Inflate the layout for this fragment
15         return inflater.inflate(R.layout.fragment_first, container, false);
16     }
17
18
19
20
21
22
23     @Override
24     public void onViewCreated(@NonNull View view, Bundle savedInstanceState) {
25
26         super.onViewCreated(view, savedInstanceState);
27
28         view.findViewById(R.id.button_first).setOnClickListener(new View.OnClickListener() {
29             @Override
30             public void onClick(View view) {
31                 NavHostFragment.findNavController(fragment: FirstFragment.this)
32                     .navigate(R.id.action_FirstFragment_to_SecondFragment);
33             }
34         });
35
36         view.findViewById(R.id.button_first).setOnClickListener(new View.OnClickListener() {
37             @Override
38             public void onClick(View view) {
39                 NavHostFragment.findNavController(fragment: FirstFragment.this)
40                     .navigate(R.id.action_FirstFragment_to_SecondFragment);
41             }
42         });
43     }
44 }
```

Success: Operation succeeded (35 minutes ago) 12 chars 34:44 CRLF UTF-8 4 spaces

**Delete** **Fix**

1 package com.example.myapplication;  
2  
3 import ...  
4  
5 public class FirstFragment extends Fragment {  
6  
7 @Override  
8 public View onCreateView(  
9 LayoutInflater inflater, ViewGroup container,  
10 Bundle savedInstanceState  
11 ) {  
12 // Inflate the layout for this fragment  
13 return inflater.inflate(R.layout.fragment\_first, container, false);  
14 }  
15  
16 public void onViewCreated(@NonNull View view, Bundle savedInstanceState) {  
17 super.onViewCreated(view, savedInstanceState);  
18  
19 view.findViewById(R.id.button\_first).setOnClickListener(new View.OnClickListener() {  
20 @Override  
21 public void onClick(View view) {  
22 }  
23 });  
24  
25 view.findViewById(R.id.button).setOnClickListener(new View.OnClickListener() {  
26 @Override  
27 public void onClick(View view) {  
28 }  
29 });  
30 }  
31}

**Success: Operation succeeded (9 minutes ago)**



Device File Explorer

Emulator

Type this code

```
public View onCreateView(LayoutInflater inflater, ViewGroup container, Bundle savedInstanceState) {
    // Inflate the layout for this fragment
    return inflater.inflate(R.layout.fragment_first, container, false);
}

public void onViewCreated(@NonNull View view, Bundle savedInstanceState) {
    super.onViewCreated(view, savedInstanceState);
    View parent = view;
    view.findViewById(R.id.button_first).setOnClickListener(new View.OnClickListener() {
        @Override
        public void onClick(View view) {
            EditText fieldA = parent.findViewById(R.id.editTextTextPersonName2);
            EditText fieldB = parent.findViewById(R.id.editTextTextPersonName3);
            int a = Integer.parseInt(fieldA.getText().toString());
            int b = Integer.parseInt(fieldB.getText().toString());
            ((TextView)parent.findViewById(R.id.textview_first)).setText("The answer is: "+(a+b));
        }
    });

    view.findViewById(R.id.button).setOnClickListener(new View.OnClickListener() {
        @Override
        public void onClick(View view) {
        }
    });
}
```

File Edit View Navigate Code Analyze Refactor Build Run Tools VCS Window Help My Application - FirstFragment.java [My\_Application.app] - Android Studio

myapplication > FirstFragment > onViewCreated > anonymous OnClickListener > onClick

app Nexus 5 API 23

1: Project 1: Resource Manager 1: Structure 1: Favorites 1: Build Variants

MainActivity.java FirstFragment.java fragment\_first.xml

```
public View onCreateView(LayoutInflater inflater, ViewGroup container, Bundle savedInstanceState) {  
    // Inflate the layout for this fragment  
    return inflater.inflate(R.layout.fragment_first, container, false);  
}  
  
public void onViewCreated(@NonNull View view, Bundle savedInstanceState) {  
    super.onViewCreated(view, savedInstanceState);  
    View parent = view;  
    view.findViewById(R.id.button_first).setOnClickListener(new View.OnClickListener() {  
        @Override  
        public void onClick(View view) {  
            EditText fieldA = parent.findViewById(R.id.editTextA);  
            EditText fieldB = parent.findViewById(R.id.editTextB);  
            int a = Integer.parseInt(fieldA.getText().toString());  
            int b = Integer.parseInt(fieldB.getText().toString());  
            ((TextView)parent.findViewById(R.id.textViewResult)).setText(String.valueOf(a + b));  
        }  
    });  
  
    view.findViewById(R.id.button).setOnClickListener(new View.OnClickListener() {  
        @Override  
        public void onClick(View view) {  
        }  
    });  
}
```

The answer is: 5

2      3

NEXT

BUTTON

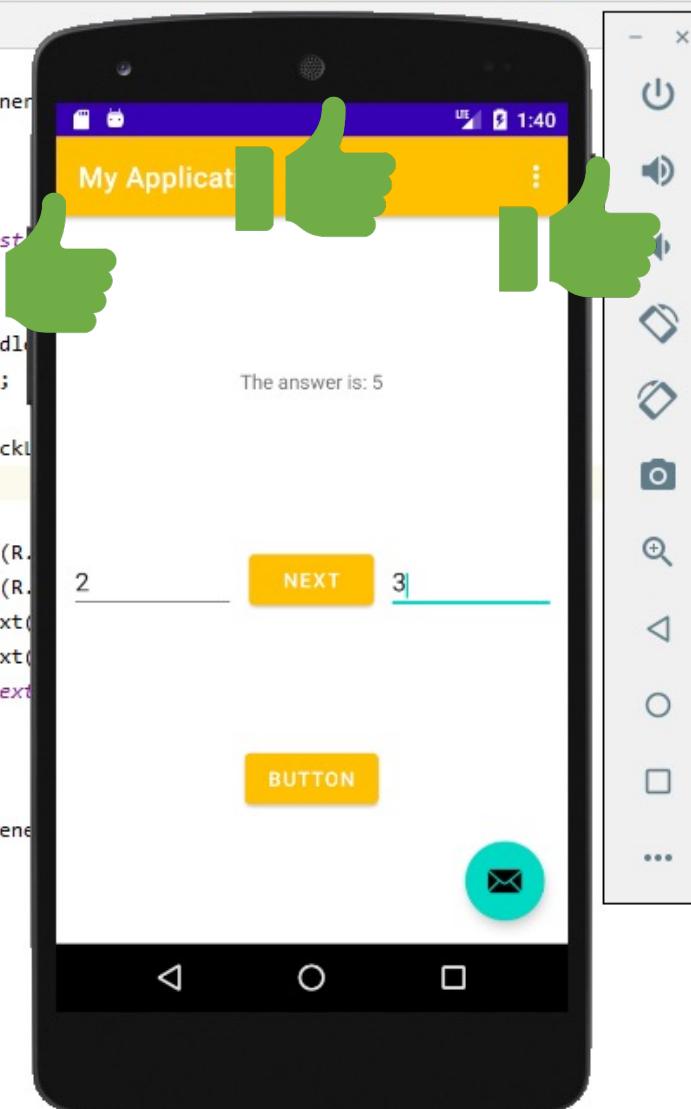
My Application

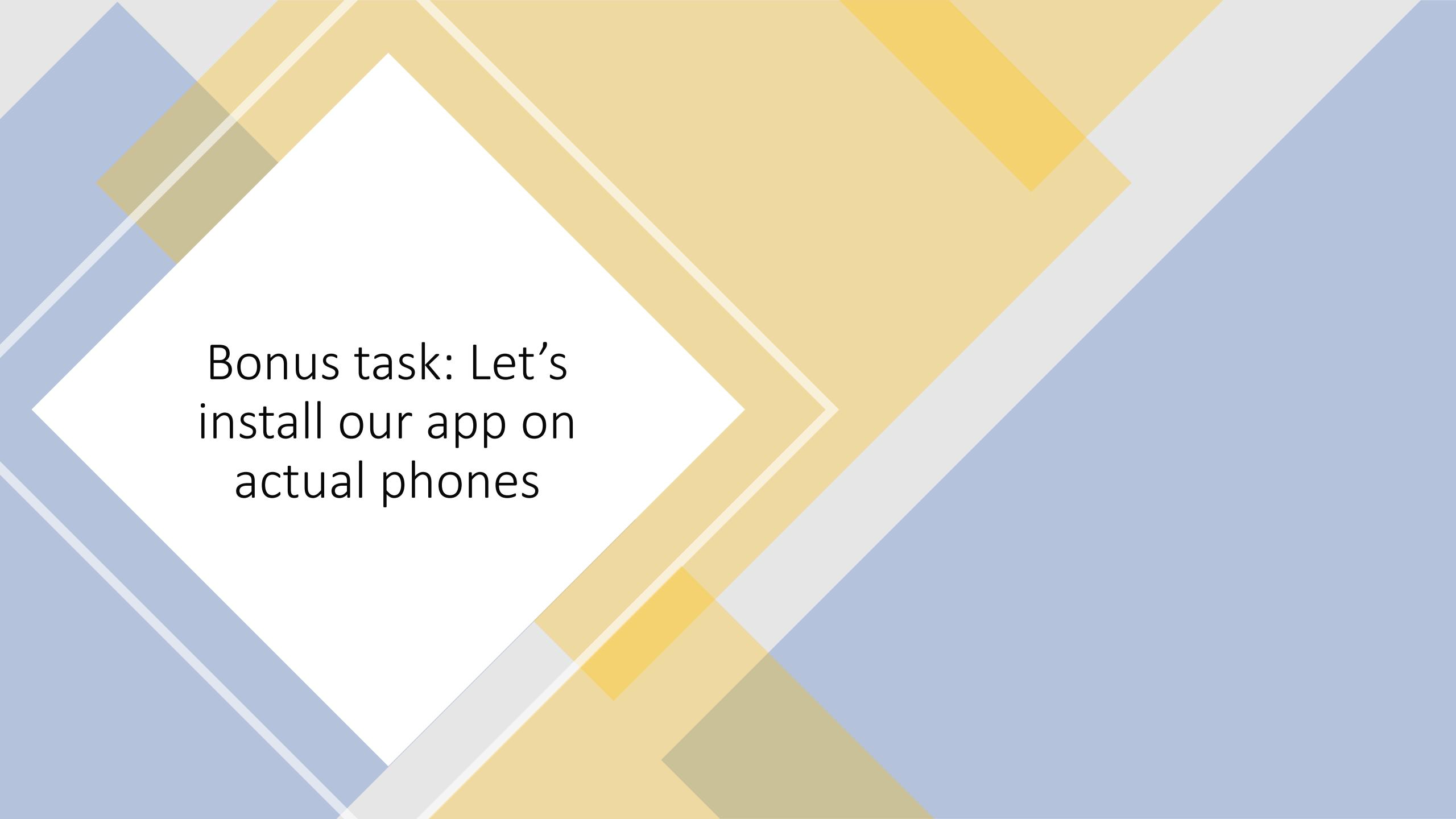
1: Event Log 1: Layout Inspector

Success: Operation succeeded (a minute ago)

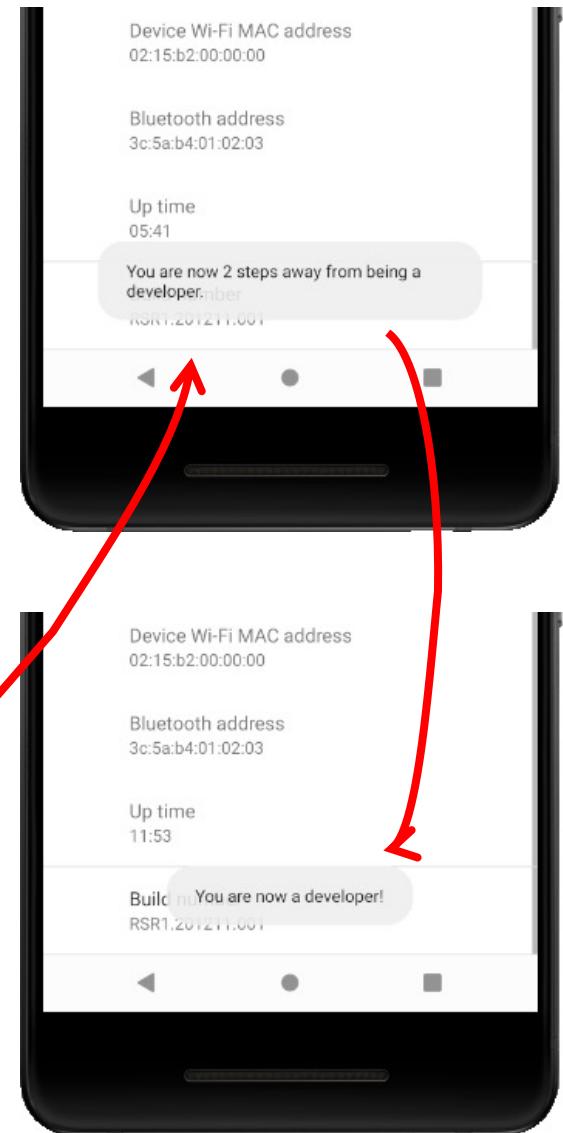
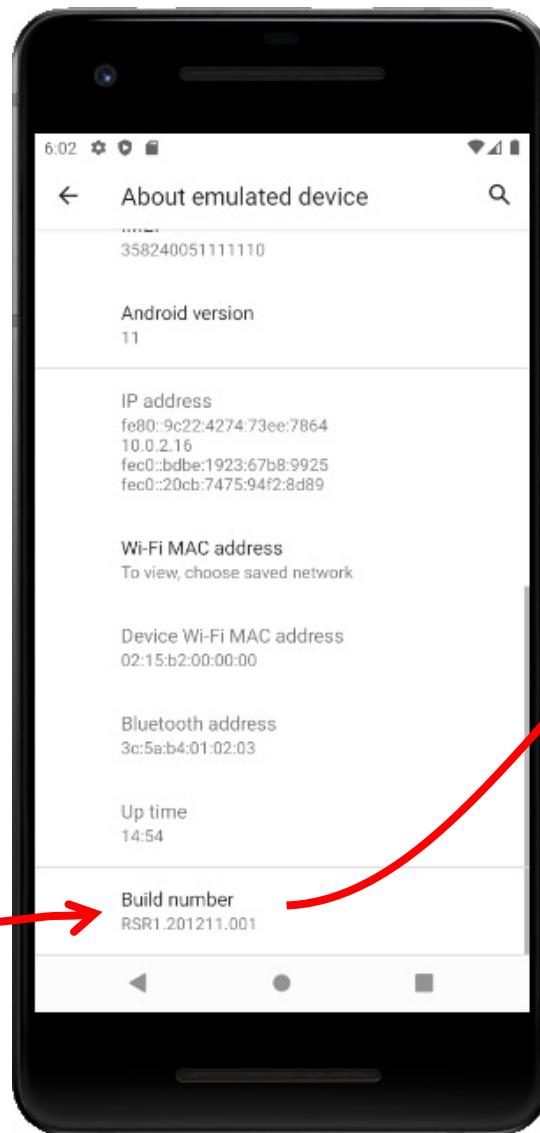
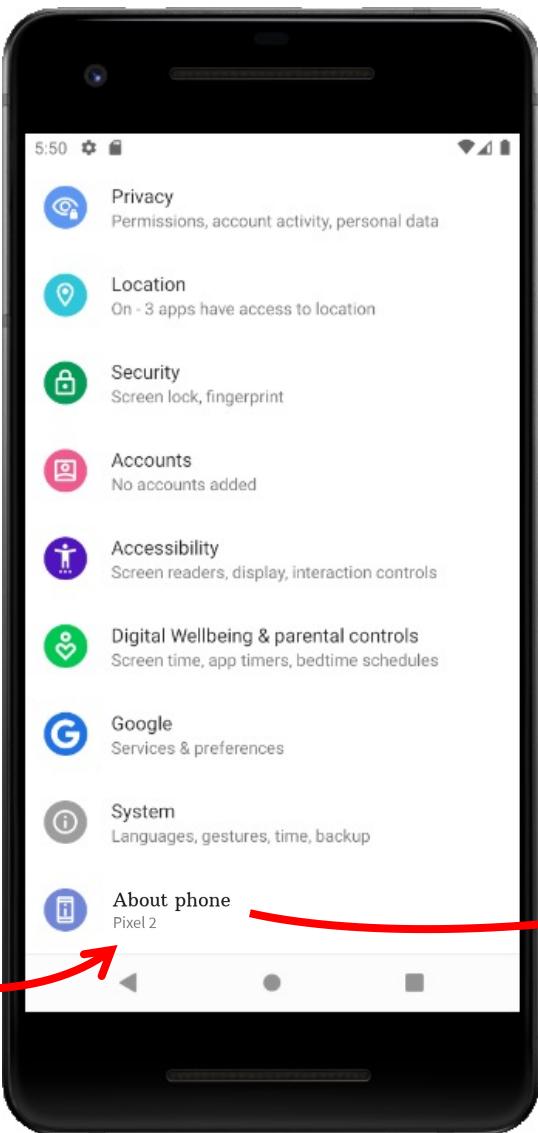
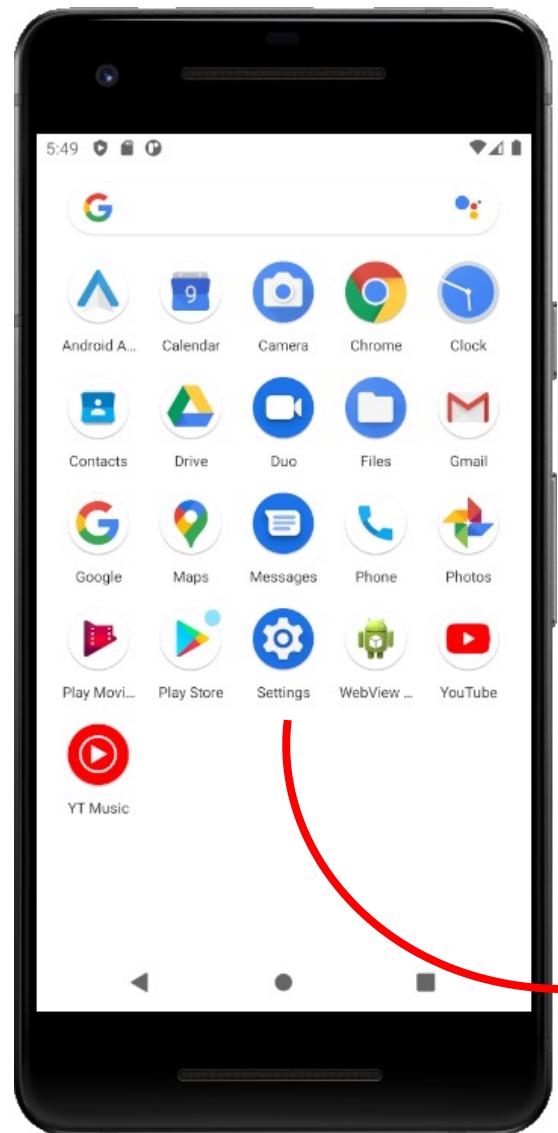
33:22 CRLF UTF-8 4 spaces

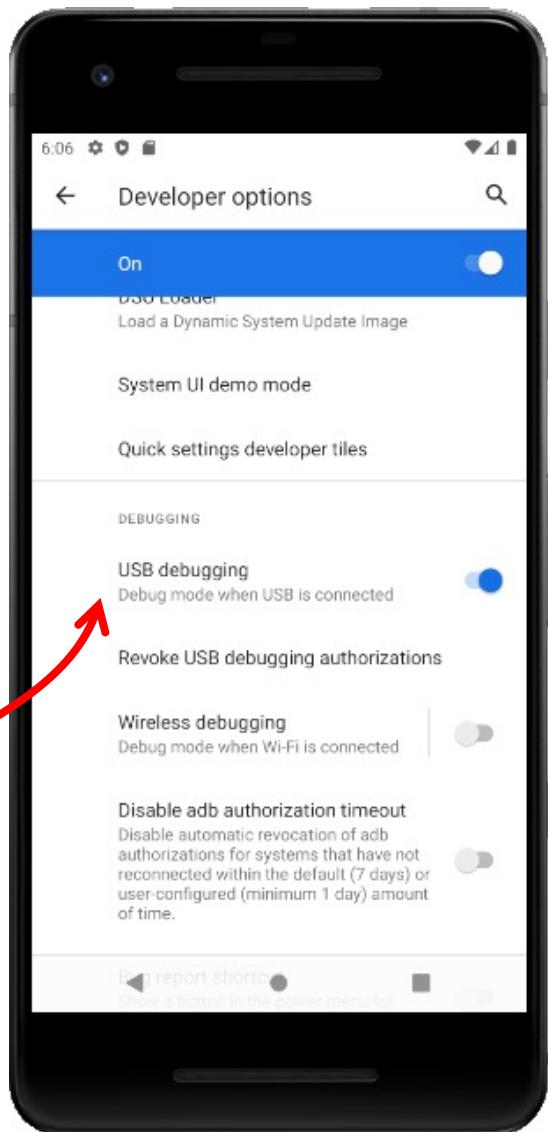
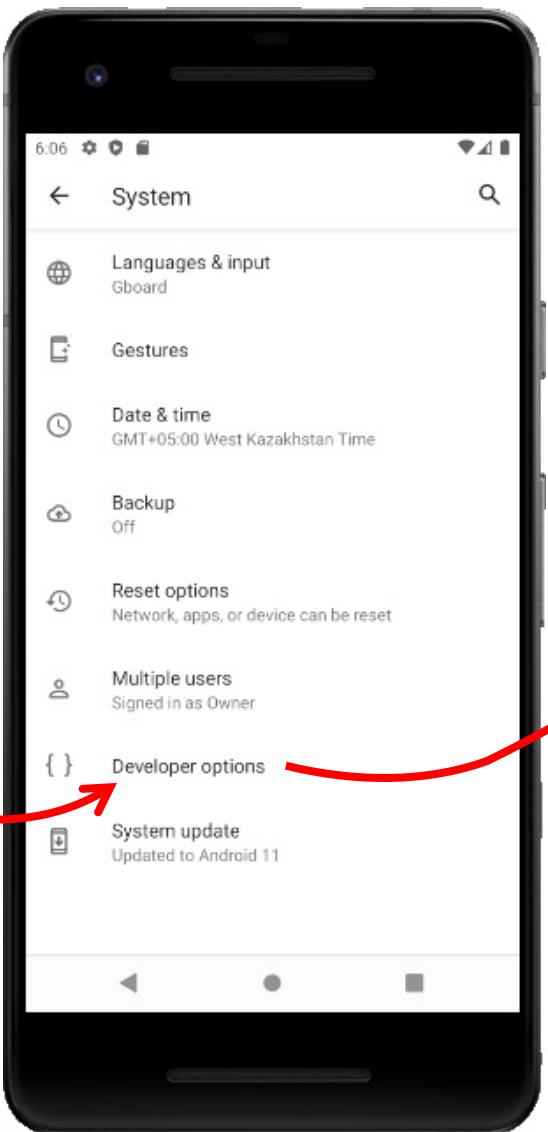
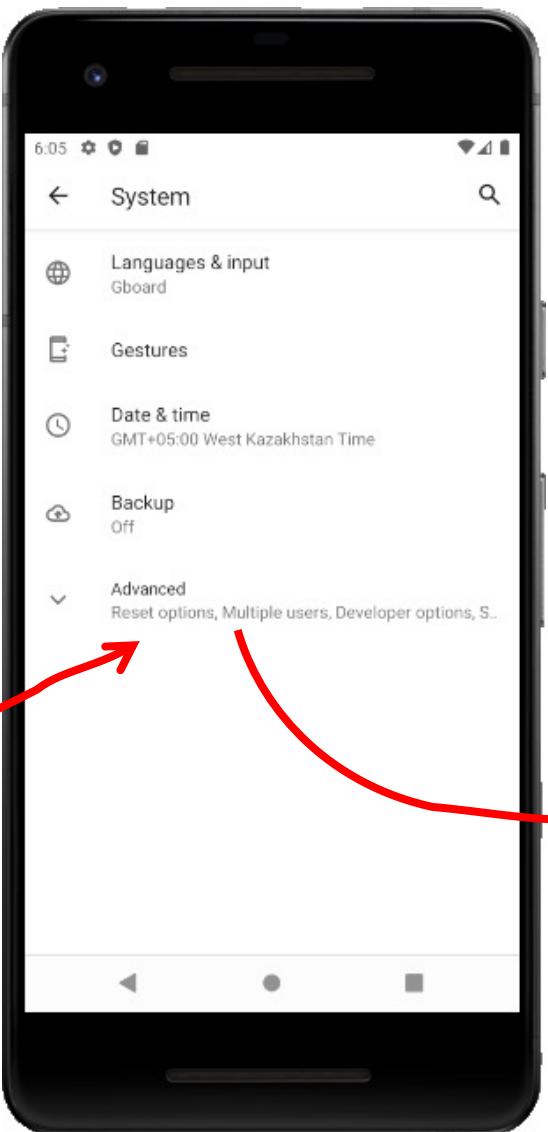
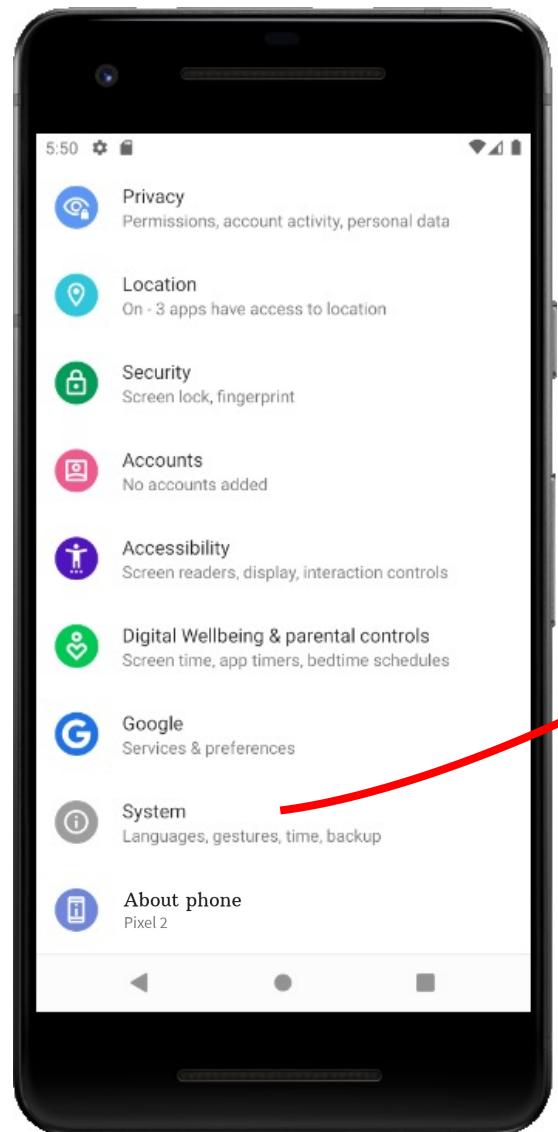
Gradle Scripts Device File Explorer Emulator





Bonus task: Let's  
install our app on  
actual phones





File Edit View Navigate Code Analyze Refactor Build Run Tools VCS Window Help My Application - FirstFragment.java [My\_Application.app] - Android Studio

MyApplication > app > src > main > java > com > example > myapplication > FirstFragment

app Google Pixel 2

Android Project Resource Manager 1: Project 1: Resource Manager 1: Structure 1: Favorites Build Variants

MainActivity.java FirstFragment.java fragment\_first.xml

```
public View onCreateView(LayoutInflater inflater, ViewGroup container, Bundle savedInstanceState) {
    // Inflate the layout for this fragment
    return inflater.inflate(R.layout.fragment_first, container, false);
}

public void onViewCreated(@NonNull View view, Bundle savedInstanceState) {
    super.onViewCreated(view, savedInstanceState);
    View parent = view;
    view.findViewById(R.id.button_first).setOnClickListener(new View.OnClickListener() {
        @Override
        public void onClick(View view) {
            EditText fieldA = parent.findViewById(R.id.editTextTextPersonName2);
            EditText fieldB = parent.findViewById(R.id.editTextTextPersonName3);
            int a = Integer.parseInt(fieldA.getText().toString());
            int b = Integer.parseInt(fieldB.getText().toString());
            ((TextView)parent.findViewById(R.id.textview_first)).setText("The answer is: "+(a+b));
        }
    });

    view.findViewById(R.id.button).setOnClickListener(new View.OnClickListener() {
        @Override
        public void onClick(View view) {
        }
    });
}
```

fragment\_first.xml

activity\_main.xml content\_main.xml fragment\_second.xml

menu mipmap navigation values res (generated)

Gradle Scripts

Device File Explorer Emulator

TODO Terminal Database Inspector Profiler Run Build Logcat Event Log Layout Inspector

Failed to start monitoring emulator-5554 (moments ago)

28:1 CRLF UTF-8 4 spaces