[Tutorial #4] Fragments and Layouts

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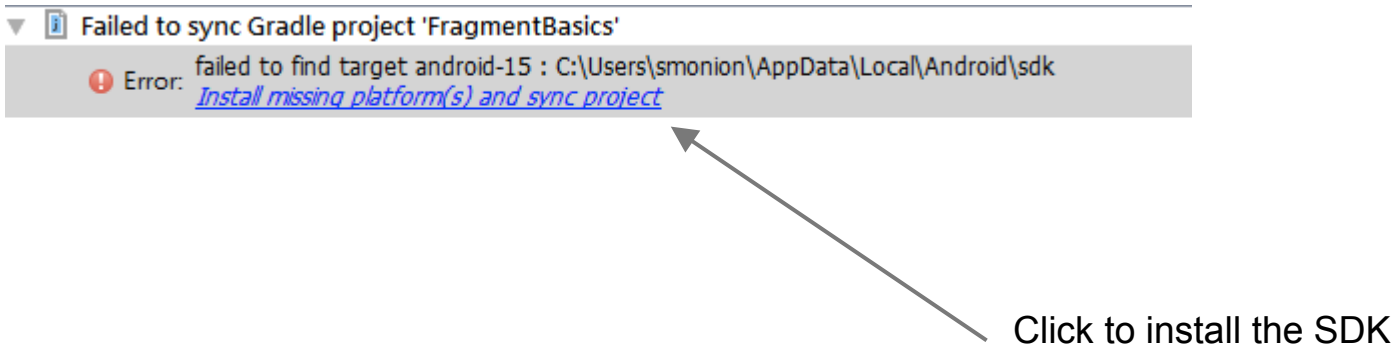
Download the Sample Code

- 140.114.79.79/dropbox/FragmentBasics.zip
- You may get an error after importing the project



What's a Fragment

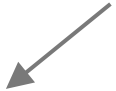
- A Fragment represents a portion of user interface in an Activity
- Combining multiple fragments in a single activity makes you able to
  - Build a multi-pane UI
  - Reuse a fragment in multiple activities

Create a Fragment

- To create a fragment, extend the Fragment class, then override key lifecycle methods to insert your app logic

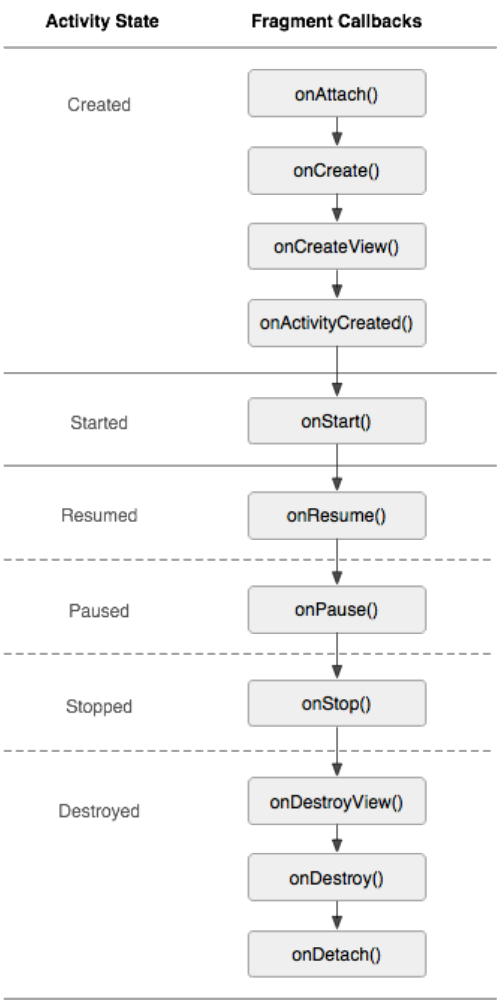
```
public class ArticleFragment extends Fragment {
    @Override
    public View onCreateView(LayoutInflater inflater, ViewGroup container,
        Bundle savedInstanceState) { // Inflate the layout for this fragment
        return inflater.inflate(R.layout.article_view, container, false);
    }
}
```

From the activity's layout



Fragment Lifecycle

- A fragment needs to be attached on an activity
- You can add fragments in “onCreate” state of the activity
- While the state of the activity is changed, the attached fragment(s) will switch to the same state



Adding a Fragment Statically Using XML

A view of your main activity

Class name of you fragment

```
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    android:orientation="horizontal"
    android:layout_width="fill_parent"
    android:layout_height="fill_parent">
    <fragment android:name="com.example.android.fragments.HeadlinesFragment"
            android:id="@+id/headlines_fragment"
            android:layout_weight="1"
            android:layout_width="0dp"
            android:layout_height="match_parent" />
    <fragment android:name="com.example.android.fragments.ArticleFragment"
            android:id="@+id/article_fragment"
            android:layout_weight="2"
            android:layout_width="0dp"
            android:layout_height="match_parent" />
</LinearLayout>
```

Add a Fragment at Runtime

- To perform add or remove a fragment, you must use the FragmentManager to create a FragmentTransaction
- Adding fragments at runtime is that your activity layout must include a View in which you can insert the fragment

```
<FrameLayout xmlns:android="http://schemas.android.com/apk/res/android"
    android:id="@+id/fragment_container"
    android:layout_width="match_parent"
    android:layout_height="match_parent" />
```

The Workflow of Adding a Fragment

- Inside your activity, call getSupportFragmentManager() to get a FragmentManager
- Call beginTransaction() to create a FragmentTransaction and call add() to add a fragment
- Multiple fragment transactions can be included in the same FragmentTransaction
- When you're ready to make the changes, you must call commit()

An Example of Adding a Fragment

```
public class MainActivity extends FragmentActivity {
    @Override
    public void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.news_articles);
        // Check that the activity is using the layout version with the fragment_container FrameLayout
        if (findViewById(R.id.fragment_container) != null) {
            // Create a new Fragment to be placed in the activity layout
             HeadlinesFragment firstFragment = new HeadlinesFragment();
             // Add the fragment to the 'fragment_container' FrameLayout
            getSupportFragmentManager().beginTransaction().add(R.id.fragment_container,firstFragment).commit();
        }
    }
}
```

Replacing A Fragment

- To allow the user to navigate backward through the fragment transactions, you must call addToBackStack() before you commit the FragmentTransaction
- The fragment that is removed is stopped (not destroyed) if you add it to the back stack
  - If the user navigates back to restore the fragment, it restarts.
  - If you do not add the transaction to the back stack, then the fragment is destroyed when removed or replaced

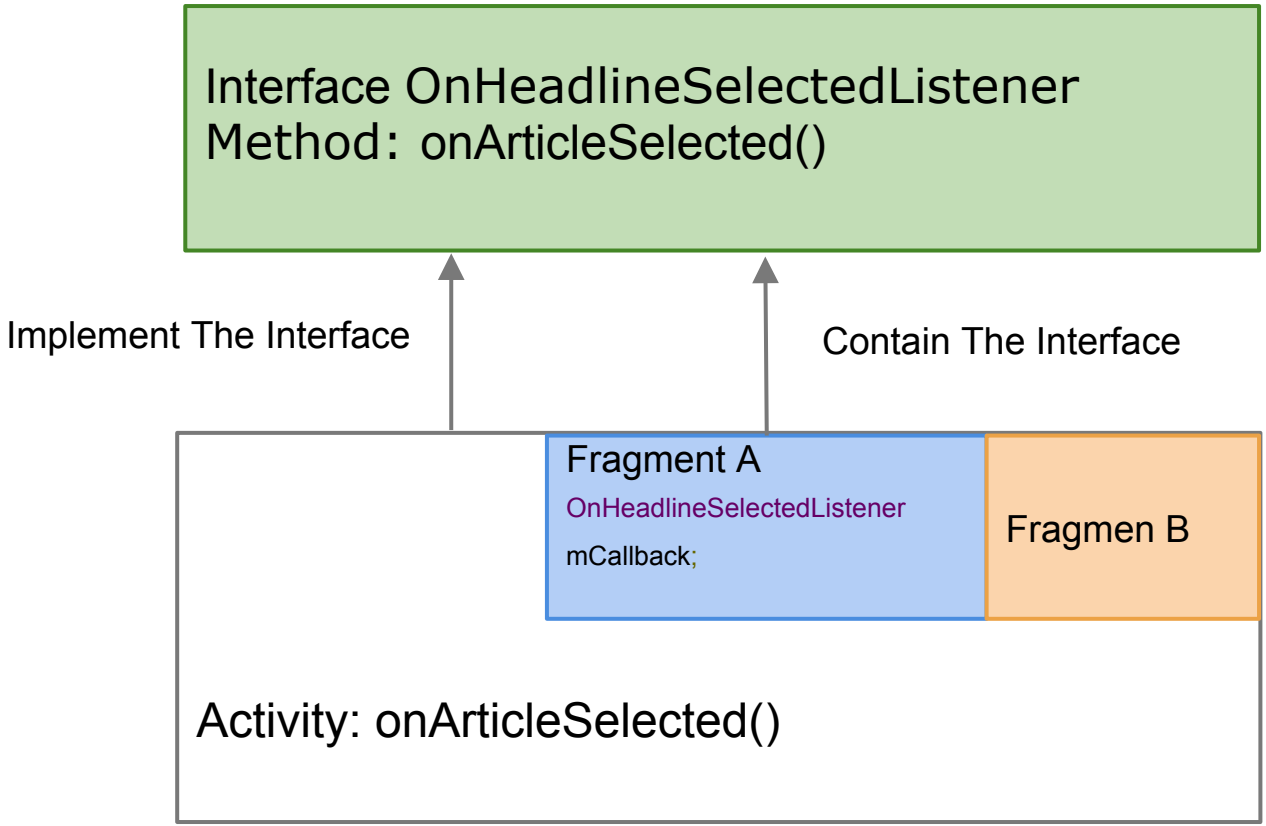
An Example of Replacing a Fragment

```
// Create fragment and give it an argument specifying the article it should show
ArticleFragment newFragment = new ArticleFragment();
Bundle args = new Bundle();
args.putInt(ArticleFragment.ARG_POSITION, position);
newFragment.setArguments(args);
FragmentTransaction transaction = getSupportFragmentManager().beginTransaction();
// Replace whatever is in the fragment_container view with this fragment,
// and add the transaction to the back stack so the user can navigate back
transaction.replace(R.id.fragment_container, newFragment);
transaction.addToBackStack(null);
// Commit the transaction
transaction.commit();
```

Communication between Fragments

- All Fragment-to-Fragment communication is done through the associated Activity
- In Java if we want to decouple two classes we can use an interface.
- Fragments in Android can be regarded as separated classes
- So, we use interface to implement a callback function here

An Example of a Callback



A Fragment with Callback

```
public class HeadlinesFragment extends ListFragment {
    OnHeadlineSelectedListener mCallback;
    public interface OnHeadlineSelectedListener {
    // Container Activity must implement this interface
        public void onArticleSelected(int position);
    }
}
```

Pass Messages to The Activity

- For example, the following method in the fragment is called when the user clicks on a list item
- The fragment uses the callback interface to deliver the message to the parent activity

```
@Override
public void onListItemClick(ListView l, View v, int position, long id) {
    // Send the event to the host activity
    mCallback.onArticleSelected(position);
}
```

Trigger Another Fragment

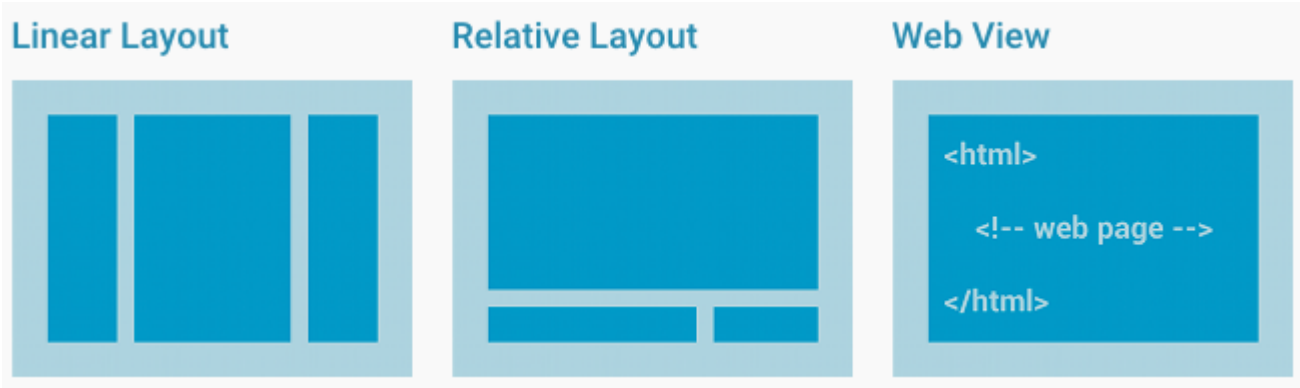
```
public static class MainActivity extends Activity implements
HeadlinesFragment.OnHeadlineSelectedListener{
    public void onArticleSelected(int position) {
        // The user selected the headline of an article from the HeadlinesFragment
        // Do something here to display that article
        ArticleFragment articleFrag = (ArticleFragment)
                getSupportFragmentManager().findFragmentById(R.id.article_fragment);
        if (articleFrag != null) {
            // If article frag is available, we're in two-pane layout...
            // Call a method in the ArticleFragment to update its content
            articleFrag.updateArticleView(position);
        }
```

The function called by the fragment is implemented in your main activity

```
else {
        // Otherwise, we're in the one-pane layout and must swap frags...
        // Create fragment and give it an argument for the selected article
        ArticleFragment newFragment = new ArticleFragment();
        Bundle args = new Bundle();
        args.putInt(ArticleFragment.ARG_POSITION, position);
        newFragment.setArguments(args);
        FragmentTransaction transaction = getSupportFragmentManager().beginTransaction();
        // Replace whatever is in the fragment_container view with this fragment,
        // and add the transaction to the back stack so the user can navigate back
        transaction.replace(R.id.fragment_container, newFragment);
        transaction.addToBackStack(null);
        transaction.commit(); // Commit the transaction
    }
  }
}
```

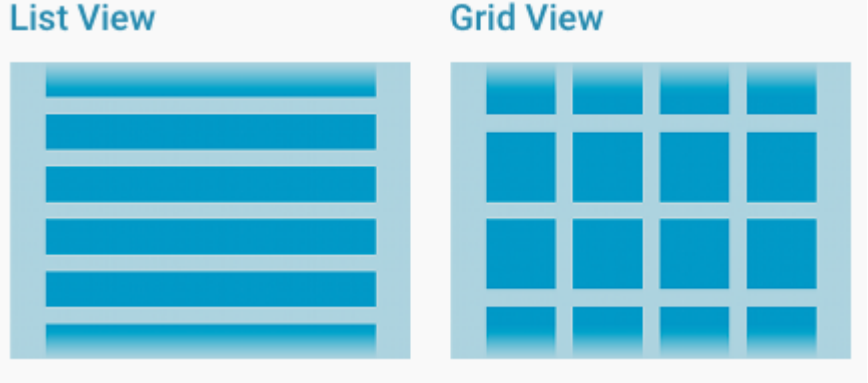
Common Layouts

- Linear Layout: A layout that organizes its children into a single horizontal or vertical row
- Relative Layout: Enables you to specify the location of child objects relative to each other
- Webview: particularly for web pages



Layouts with an Adapter

- Listview: Displays a scrolling single column list
- Gridview: Displays a scrolling multiple columns and rows



Filling ListView With Data

- Binding a ListView instance to an Adapter so that it can retrieve data from an external source and creates a View that represents each data entry
- ArrayAdapter: Use this adapter when your data source is an array
- SimpleCursorAdapter: Use this adapter when your data comes from a Cursor

ListView with ArrayAdapter

- For example, if you have an array of strings you want to display in a ListView, initialize a new ArrayAdapter to specify the layout for the string array

```
// We need to use a different list item layout for devices older than Honeycomb int
layout = Build.VERSION.SDK_INT >= Build.VERSION_CODES.HONEYCOMB ?
android.R.layout.simple_list_item_activated_1 : android.R.layout.simple_list_item_1;

// Create an array adapter for the list view, using the Ipsum headlines array

setListAdapter(new ArrayAdapter<String>(getActivity(), layout, Ipsum.Headlines));
```