Programming with Android:
Android for Tablets

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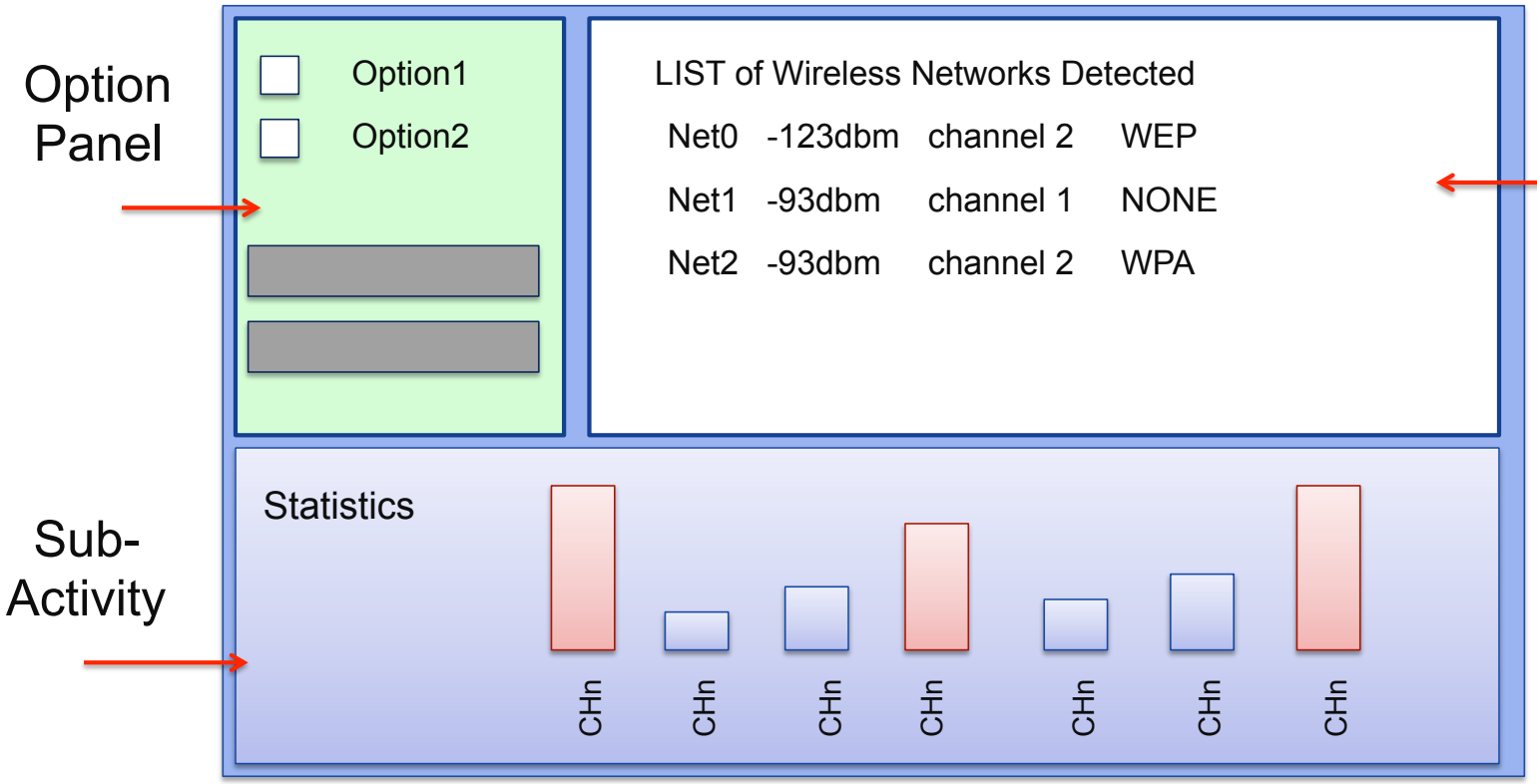
Outline

- **Android for Tablets:** *A Case Study*
- **Android for Tablets:** *Fragments Design Philosophy*
- **Android for Tablets:** *Fragments Creation*
- **Android for Tablets:** *Fragments Layout*
- **Android for Tablets:** *Fragments Lifecycle*
- **Android for Tablets:** *Fragments Transactions*
- **Android for Tablets:** *Fragments Back State*

Android: Application Case Study



Android: Fragments

Fragment → A portion of the user interface in an Activity.

Introduced from **Android 3.0** (API Level 11)

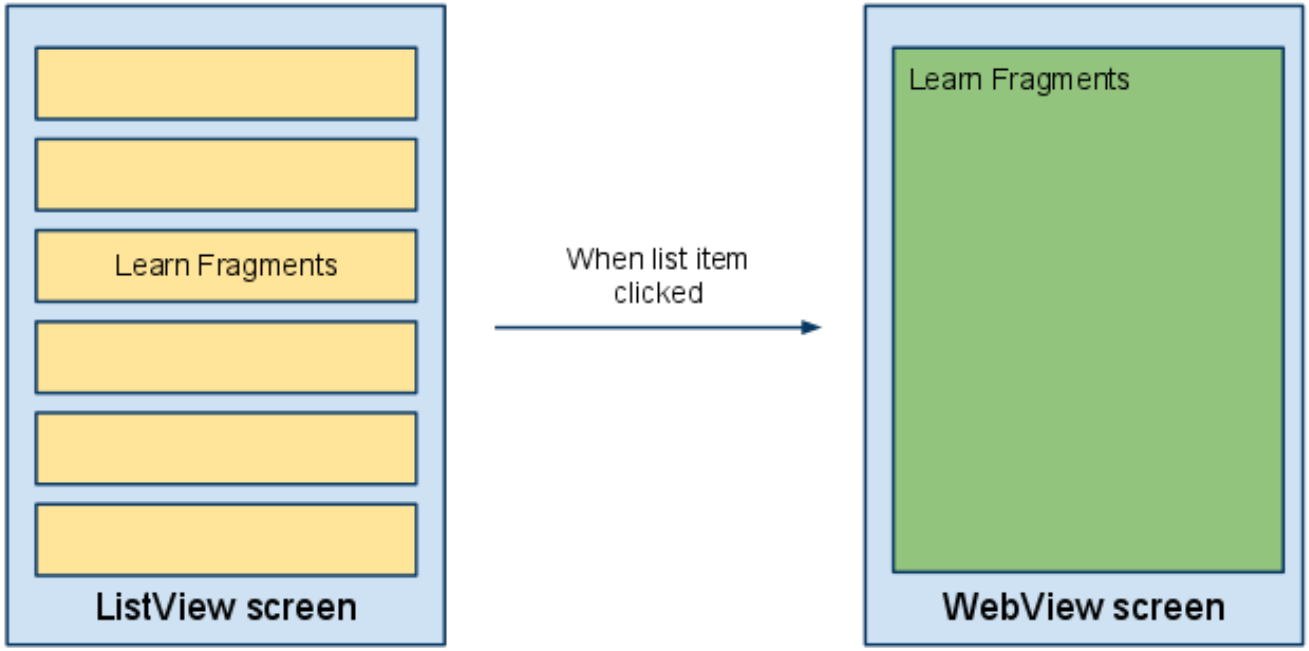
Practically, a Fragment is a modular section of an Activity.

DESIGN PHILOSOPHY

- **Structure** an Activity as a collection of Fragments.
- **Reuse** a Fragment on different Activities …

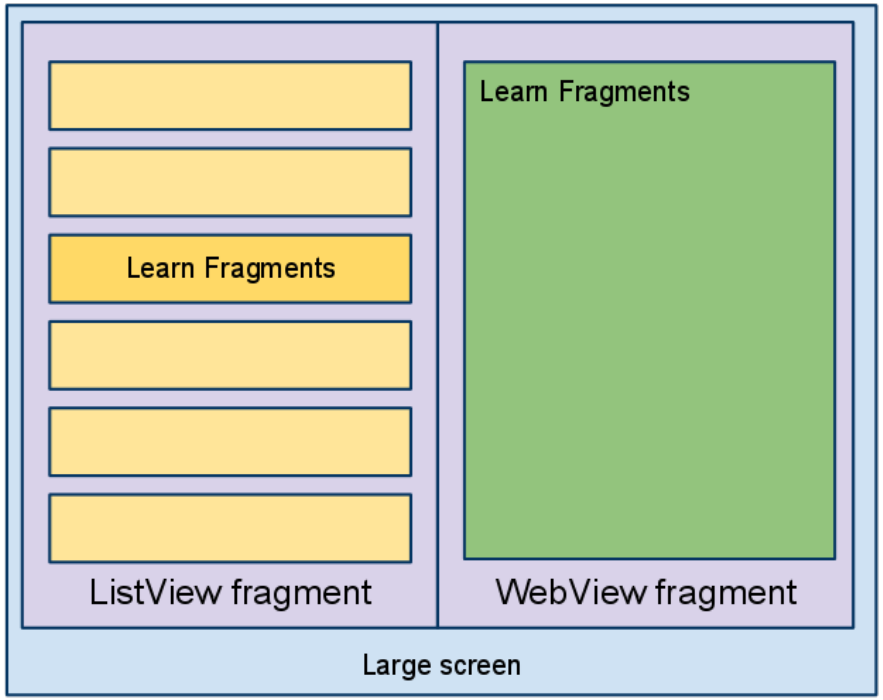
Android: Fragments Design Philosophy

EXAMPLE: Structuring an Application using multiple Activities.



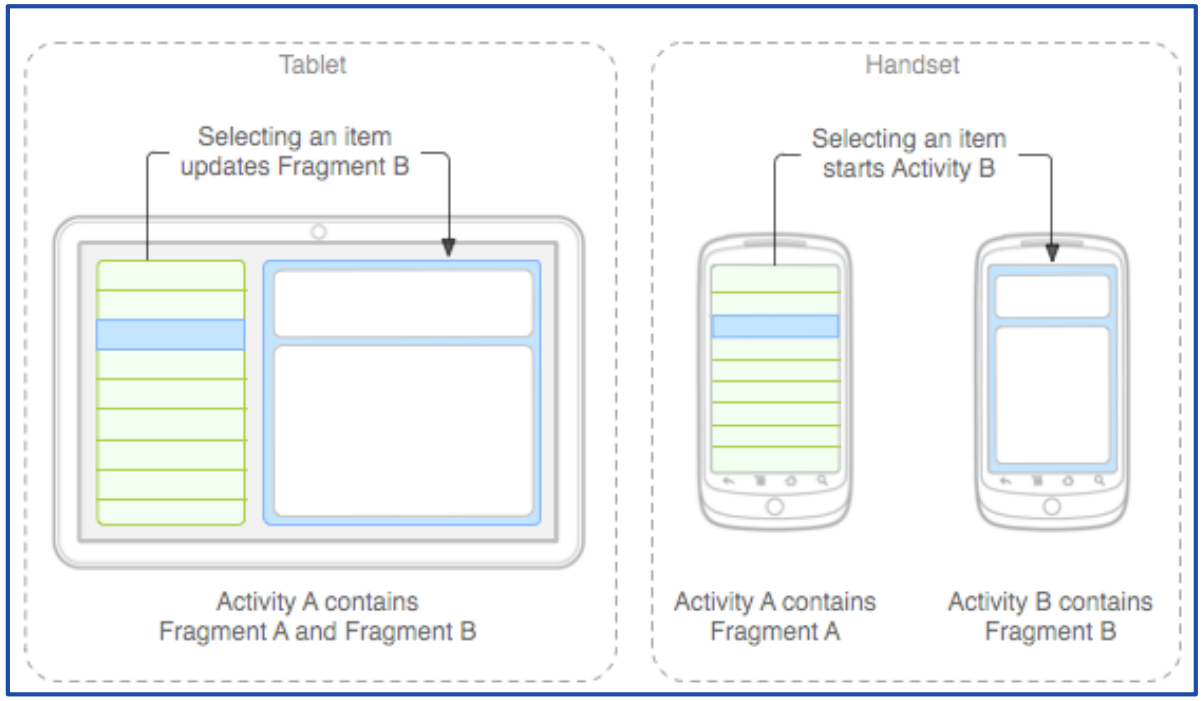
Android: Fragments Design Philosophy

EXAMPLE: Structuring an Application using 1 Activity and 2 Fragments.



Android: Fragment Transactions

EXAMPLE: Using Fragments on Different Devices (Smartphone/Tab)



Android: Fragment Creation

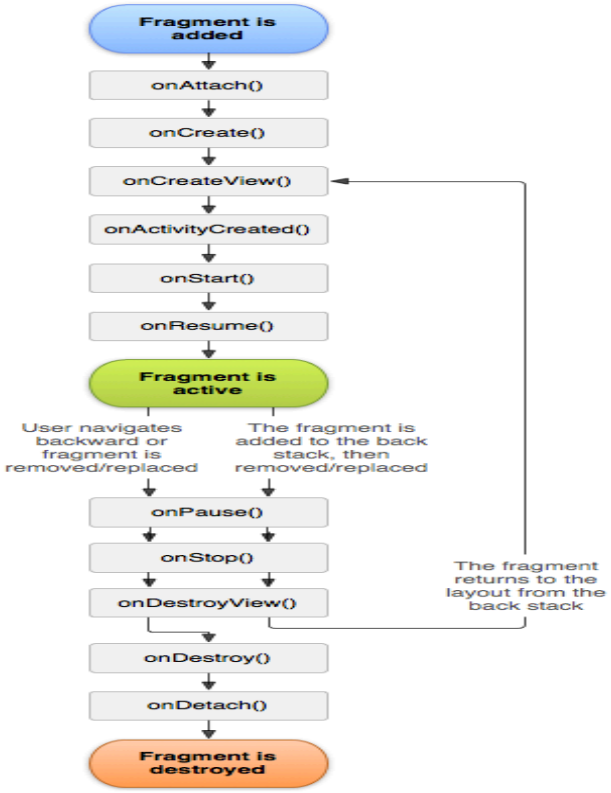
To define a new Fragment → create a subclass of Fragment.

```
public class MyFragment extends Fragment { …}
```

PROPERTY of a Fragment:

- Has its own **lifecycle** (partially connected with the Activity lifecyle)
- Has its own **layout** (or may have)
- Can receive its own **input events**
- Can be added or removed while the Activity is running.

Android: Fragment Lifecycle



Several **callback methods** to handle various stages of a Fragment lifecycle:

onCreate() → called when creating the Fragment.

onCreateView() → called when it is time for the Fragment to draw the user interface the first time.

onPause() → called when the user is leaving the Fragment.

Android: Fragment Creation

onCreateView() → must return the **View** associated to the UI of the Fragment (if any) …

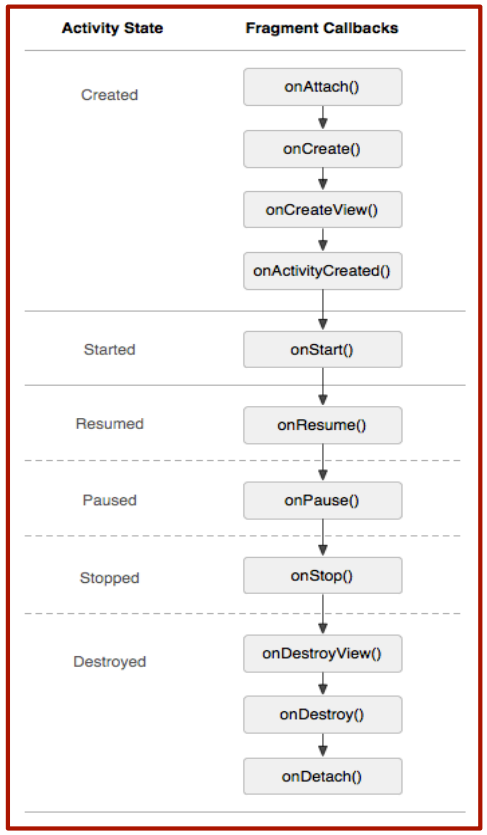
```
  public class ExampleFragment extends Fragment {

 @Override
 public View onCreateView(LayoutInflater inflater,
ViewGroup container, Bundle saved) {

  return inflater.inflate
(R.layout.example_fragment, container, false);

 }
```

Android: Fragment Lifecycle



The lifecycle of the Activity in which the Fragment lives directly affects the lifecycle of the Fragment.

onPause (Activity) → **onPause** (Fragment)

onStart (Activity) → **onStart** (Fragment)

onDestroy (Activity) → **onDestroy** (Fragment)

Fragments have also extra lifecycle callbacks to enable runtime creation/destroy.

Android: Adding a Fragment to the UI

Specify layout properties for the Fragment as it were a View.

```
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="fill_parent"
    android:layout_height="fill_parent"
    android:orientation="horizontal" >
   <fragment android:name="it.cs.android30.FragmentOne"
       android:id="@+id/f1"
       android:layout_width="wrap_content"
       android:layout_height="fill_parent"
       />
   <fragment android:name="it.cs.android30.FragmentTwo"
       android:id="@+id/f2"
       android:layout_width="wrap_content"
       android:layout_height="fill_parent"
       />
</LinearLayout>
```

Android: Managing Fragments

A **Fragment** can get a reference to the Activity …

```
Activity getActivity()
```

An **Activity** can get a reference to the Fragment …

```
ExampleFragment fragment=(ExampleFragment)
getFragmentManager().findFragmentById
(R.id.example_fragment)
```

The **FragmentManager** manages the Fragment associated to the current Activity.

Android: Managing Fragments

In some cases, a Fragment must share an event with the Activity … how to do it?

1. Define a **callback** interface inside the Fragment

```
public interface OnArticleSelectedListener {
   public void onArticleSelected(Uri uri);
   …
}
```

2. Require that the host Activity implements it

Android: Fragment Transactions

- Fragments can be added/removed/replaced while the Activity is running …
- Each set of changes to the Activity is called a **Transaction**.
- **Transaction** can be saved in order to allow a user to navigate backward among Fragments when he clicks on the “Back” button.

Android: Fragment Transactions

1. **ACQUIRE** an instance of the FRAGMENT MANAGER

```
FragmentManager man=getFragmentManager();
FragmentTransaction transaction=man.beginTransaction();
```

2. **CREATE** new Fragment and Transaction

```
FragmentExample newFragment=new FragmentExample();
transaction.replace(R.id.fragment_container, newFragment);
```

3. **SAVE** to backStack and **COMMIT**

```
transaction.addToBackState(null);
```

```
transaction.commit();
```

Android: Fragment Transactions

- A Transaction is not performed till the **commit** …
- If **addToBackStack()** is not invoked → the Fragment is destroyed and it is not possible to navigate back.
- If **addToBackStack()** is invoked → the Fragment is stopped and it is possible to resume it when the user navigates back.
- **popBackStack**() → simulate a Back from the user.