10. Lesson 03/04/23

Navigation & Implicit Intents

Navigation

The majority of the apps will include more than one Activity.

Since, few things frustrate users more than basic navigation that behaves in inconsistent and unexpected ways.

Consistent navigation is an essential component of the overall user experience.

Two forms of navigation

Android system supports **two different forms of navigation strategies** for your app:

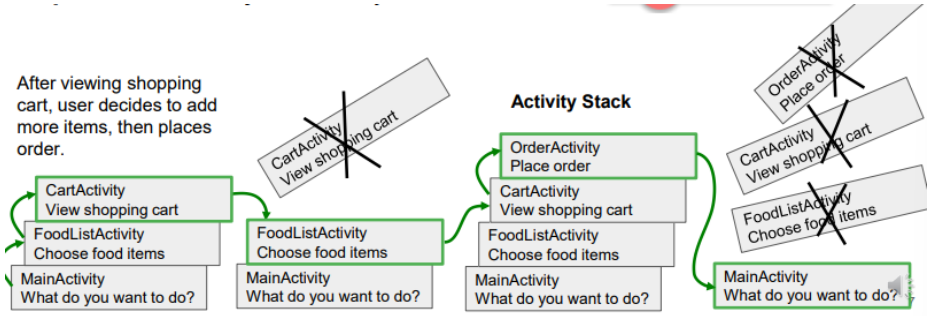
Back (or temporal) navigation

Up (or ancestral) navigation

Back Navigation

Allows to return to the previous Activity by tapping the device **back button.** (Also called temporal navigation)

- Controlled by the Android system's back stack.
- Preserves history of recently viewed screens.



Up navigation

Is used to navigate within an app based on the explicit hierarchical relationships between screens. (Sometimes referred to as ancestral or logical navigation)

- Navigate to parent of current Activity.
- The Activity parent defined in Android Manifest using parentActivityName.

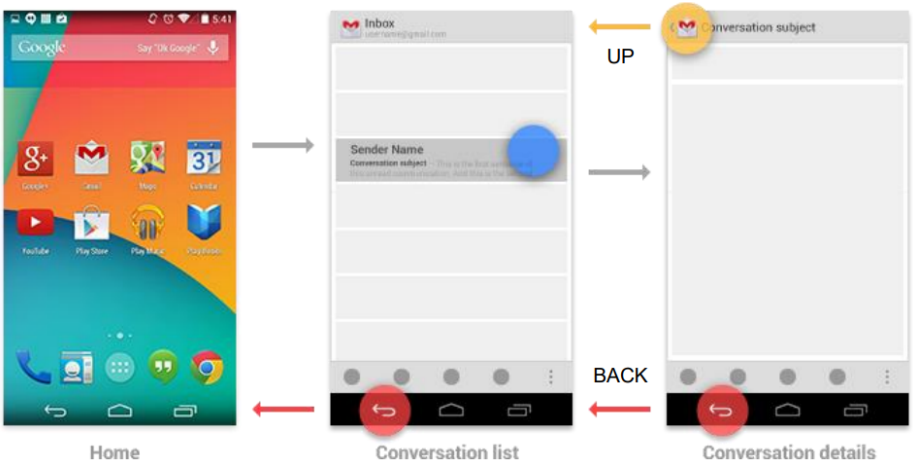
Example for ChildActivity

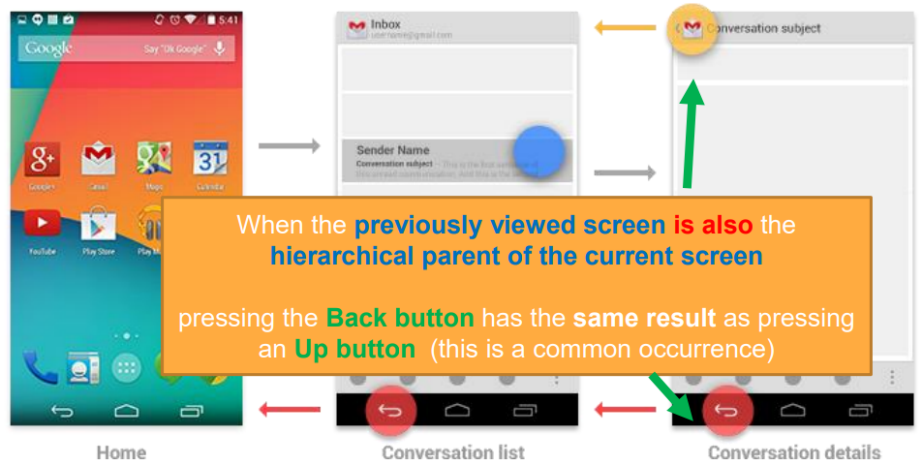
```
<activity
   android:name=".ChildActivity"
   android:parentActivityName=".MainActivity" >
</activity>
```

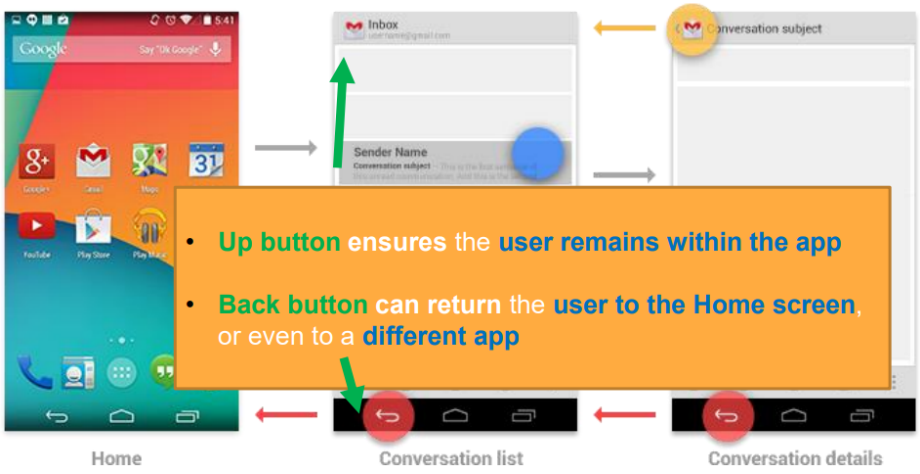
Up Navigation - Manifest

```
<application ... >
    ...

    <!-- The main/home activity (it has no parent activity) -->

    <activity
        android:name="com.example.myfirstapp.MainActivity" ...>
        ...
    </activity>

    <!-- A child of the main activity -->
    <activity
        android:name="com.example.myfirstapp.MyChildActivity"
        android:label="@string/title_activity_child"
        android:parentActivityName="com.example.myfirstapp.MainActivity" >

        <!-- Parent activity meta-data to support 4.0 and lower -->
        <meta-data
            android:name="android.support.PARENT_ACTIVITY"
            android:value="com.example.myfirstapp.MainActivity" />
    </activity>
</application>
```

Back vs. Up Navigation



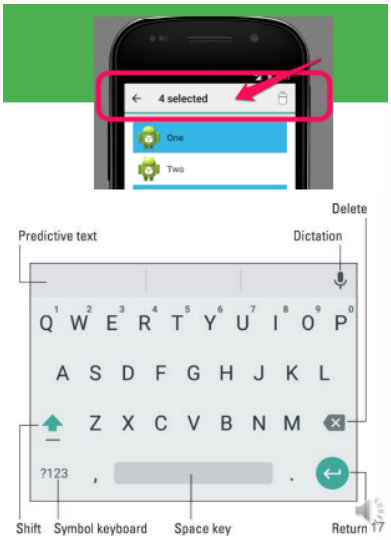




Back Button

Back button also supports some different behaviors (not directly tied to screen-to-screen navigation):

- Dismisses floating windows (dialogs, popups).
- Dismisses contextual action bars, and removes the highlight from the selected items.
- Hides the onscreen keyboard (IME).

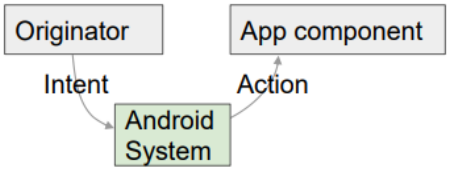


Implicit Intents

Additional Details and Receiving an implicit Intent.

What is an Intent?

An **Intent** is:



- **Description** of an operation to be performed.
- **Messaging object** used to request an action from another app component via the Android system.

Explicit vs. Implicit Intent

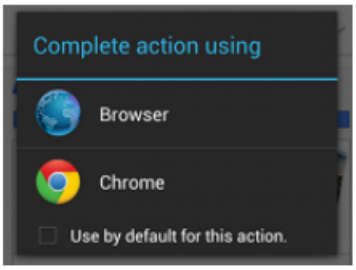
- **Explicit Intent:** starts an Activity of a specific class.
- **Implicit Intent:** asks system to find an Activity class with a registered handler that can handle this request.

Implicit Intent

- **Start an Activity** in another app by **describing an action you intend to perform**.

- **Specify an action and optionally provide data** with which to perform the action.
- Android runtime **matches** the **implicit intent request with registered intent handlers**.
- If there are multiple matches, an **App Chooser** will open to let the user decide.

App Chooser



When the Android runtime finds multiple registered activities that can handle an implicit Intent —> it **displays an App Chooser to allow the user to select the handler.**

How does Implicit Intent works?

- The **Android Runtime keeps a list of registered Apps.**
- Apps have to **register via AndroidManifest.xml**
- Runtime **receives the request and looks for matches uses Intent filters** for matching from AndroidManifest.xml.
- If **more than one match shows a list of possible matches** and lets the user choose one.
- Android runtime **starts the requested activity.**

Implicit Intent examples (Invocation)

Show a web page:

```
Uri uri = Uri.parse("http://www.google.com");
Intent it = new Intent(Intent.ACTION_VIEW,uri);
startActivity(it);
```

Dial a phone number:

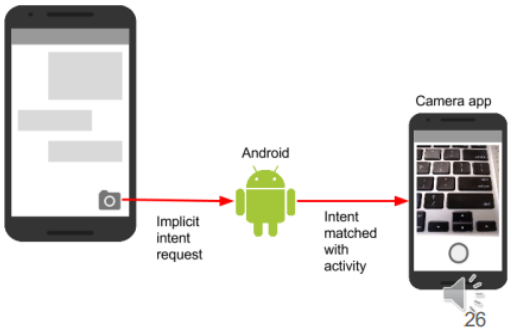
```
Uri uri = Uri.parse("tel:8005551234");
Intent it = new Intent(Intent.ACTION_DIAL, uri);
startActivity(it);
```

Receiving an Implicit Intent

Register your app to receive an Intent

If an **Activity** in your app **have to respond to an implicit Intent** (from your own app or other apps):

—> **Declare one or more Intent filters in the AndroidManifest.xml file.**



- Each **Intent filter specifies the type of Intent it accepts based on the action**, data, and category for the Intent.
- The system will **deliver an implicit Intent to your app component only if that Intent can pass through one of your Intent filters.**

Intent action, data and category

- **Action:** is the generic action the receiving Activity should perform. The available Intent actions are defined as constants in the Intent class and begin with the word ACTION_.
- **Category (optional):** provides additional information about the category of component that should handle the Intent. Intent categories are also defined as constants in the Intent class and begin with the word CATEGORY_.
- **Data type:** indicates the MIME type of data the Activity should operate on. Usually, the data type is inferred from the URI in the Intent data field, but you can also explicitly define the data type with the setType() method.

Intent actions, categories, and data types are used both by:

- The Intent object you crate in your sending Activity.
- In the Intent filters you define in the AndroidManifest.xml file for receiving Activity.

The Android system uses this information to match an implicit Intent request with an Activity or other component that can handle that Intent.

Intent filter in AndroidManifest.xml

```
<activity android:name="ShareActivity">
  <intent-filter>
```

```
    <action android:name="android.intent.action.SEND"/>
    <category android:name="android.intent.category.DEFAULT"/>
    <data android:mimeType="text/plain"/>
  </intent-filter>
</activity>
```

Intent filters: action and category

- **action** - Match one or more action constants
  - android.intent.action.VIEW — matches any Intent with ACTION_VIEW
  - android.intent.action.SEND — matches any Intent with ACTION_SEND
- **category** - Additional information (list of categories)
  - android.intent.category.BROWSABLE—can be started by web browser
  - android.intent.category.LAUNCHER—Show activity as launcher icon
- **data** - Filter on data URIs, MIME type
  - android:scheme="https"—require URIs to be https protocol
  - android:host="developer.android.com"—only accept an Intent from specified hosts
  - android:mimeType="text/plain"—limit the acceptable types of documents

An Activity can have multiple filters

```
<activity android:name="ShareActivity">
  <intent-filter>
    <action android:name="android.intent.action.SEND"/>
    ...
  </intent-filter>
  <intent-filter>
    <action android:name="android.intent.action.SEND_MULTIPLE"/>
    ...
  </intent-filter>
</activity>
```

A filter can have multiple actions & data

```
<intent-filter>
  <action android:name="android.intent.action.SEND"/>
  <action android:name="android.intent.action.SEND_MULTIPLE"/>
  <category android:name="android.intent.category.DEFAULT"/>
  <data android:mimeType="image/*"/>
  <data android:mimeType="video/*"/>
</intent-filter>
```

Receiving an Implicit Intent

Once the Activity is successfully launched with an implicit Intent, from that Activity it is possible to handle the Intent and its data in the same way you did for an explicit Intent, by:

1. Getting the Intent object with **getIntent()**
2. Getting Intent data or extras out of that Intent
3. Performing the task the Intent requested
4. Returning data to the calling Activity with another Intent, if needed