CS 193A

Multiple Activities and Intents
Many apps have **multiple activities**.

- Example: In an address book app, the main activity is a list of contacts, and clicking on a contact goes to another activity for viewing details.
- An activity A can launch another activity B in response to an event.
- The activity A can pass data to B.
- The second activity B can send data back to A when it is done.
Adding an Activity

- in Android Studio, right click "app" at left: **New -> Activity**
  - creates a new *.XML file in res/layouts
  - creates a new *.java class in src/java
  - adds information to **AndroidManifest.xml** about the activity
    (without this information, the app will not allow the activity)
Every activity has an entry in project's `AndroidManifest.xml`, added automatically by Android Studio:

```xml
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
  package="com.example.myusername.myapplication">
  <application android:allowBackup="true"
    android:icon="@drawable/ic_launcher"
    android:label="@string/app_name"
    android:theme="@style/AppTheme">
    <activity android:name=".MainActivity"
      android:label="@string/app_name">
      <intent-filter>
        <action android:name="android.intent.action.MAIN"/>
        <category android:name="android.intent.category.LAUNCHER"/>
      </intent-filter>
    </activity>
    <activity android:name=".SecondActivity"
      android:label="@string/title_activity_second"
      android:parentActivityName=".SecondActivity">
      <meta-data android:name="android.support.PARENT_ACTIVITY"
        android:value="com.example.myusername.myapplication.MainActivity"/>
    </activity>
  </application>
</manifest>
```
**Intents**

- **intent**: a bridge between activities; a way for one activity to invoke another
  - the activity can be in the same app or in a different app
  - can store **extra data** to pass as "parameters" to that activity
  - second activity can "**return**" information back to the caller if needed
Creating an Intent

- To launch another activity (usually in response to an event), create an Intent object and call `startActivity` with it:

  ```java
  Intent intent = new Intent(this, ActivityName.class);
  startActivity(intent);
  ```

- If you need to pass any parameters or data to the second activity, call `putExtra` on the intent.
  - It stores "extra" data as key/value pairs, not unlike a Map.

  ```java
  Intent intent = new Intent(this, ActivityName.class);
  intent.putExtra("name", value);
  intent.putExtra("name", value);
  startActivity(intent);
  ```
In the second activity that was invoked, you can grab any extra data that was passed to it by the calling act.

- You can access the Intent that spawned you by calling `getIntent`.
- The Intent has methods like `getExtra`, `getIntExtra`, `getStringExtra`, etc. to extract any data that was stored inside the intent.

```java
public class SecondActivity extends Activity {
    ...
    public void onCreate(Bundle savedState) {
        super.onCreate(savedState);
        setContentView(R.layout.activity_second);
        Intent intent = getIntent();
        String extra = intent.getStringExtra("name");
        ...
    }
}
```
Waiting for a result

If calling activity wants to wait for a result from called activity:

- Call `startActivityForResult` rather than `startActivity`.
  - `startActivityForResult` requires you to pass a unique ID number to represent the action being performed.
  - By convention, you declare a final int constant with a value of your choice.
  - The call to `startActivityForResult` will not wait; it will return immediately.

- Write an `onActivityResult` method that will be called when the second activity is done.
  - Check for your unique ID as was passed to `startActivityForResult`.
  - If you see your unique ID, you can ask the intent for any extra data.

- Modify the called activity to send a result back.
  - Use its `setResult` and `finish` methods to end the called activity.
Sending back a result

- In the second activity that was invoked, send data back:
  - Need to create an Intent to go back.
  - Store any extra data in that intent; call setResult and finish.

```java
public class SecondActivity extends Activity {
    ...
    public void myOnClick(View view) {
        Intent intent = new Intent();
        intent.putExtra("name", value);
        setResult(RESULT_OK, intent);
        finish();  // calls onDestroy
    }
}
```
public class FirstActivity extends Activity {
    private static final int REQ_CODE = 123;  // MUST be 0-65535

    public void myOnClick(View view) {
        Intent intent = getIntent(this, SecondActivity.class);
        startActivityForResult(intent, REQ_CODE);
    }

    protected void onActivityResult(int requestCode, int resultCode, Intent intent) {
        super.onActivityResult(requestCode, resultCode, intent);
        if (requestCode == REQ_CODE) {
            // came back from SecondActivity
            String data = intent.getStringExtra("name");
            Toast.makeText(this, "Got back: " + data, Toast.LENGTH_SHORT).show();
        }
    }
}
Implicit Intent

- **implicit intent**: One that launches another app, without naming that specific app, to handle a given type of request or action.
  - examples: invoke default browser; load music player to play a song

```java
// make a phone call
Uri number = Uri.parse("tel:5551234");
Intent callIntent = new Intent(Intent.ACTION_DIAL, number);

// go to a web page in the default browser
Uri webpage = Uri.parse("http://www.stanford.edu/");
Intent webIntent = new Intent(Intent.ACTION_VIEW, webpage);

// open a map pointing at a given latitude/longitude (z=zoom)
Uri location = Uri.parse("geo:37.422219,-122.08364?z=14");
Intent mapIntent = new Intent(Intent.ACTION_VIEW, location);
```
Activities and Action Bar

- **action bar**: A top-level menu of actions in an activity.
  - replaces older "menu" button in past versions of Android
  - identifies current activity/app to user
  - make common actions prominent and available
  - make less common actions available through a drop-down menu

- If your activity is specified to have a "parent" activity on creation and in AndroidManifest.xml, you will have a **back** button to return to the calling activity.