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Activity state and preferences

Activity instance state

- **instance state:** Current state of an activity.

- Which boxes are checked
- Any text typed into text boxes
- Values of any private fields
- ...

- Example: In the app at right, the instance state is that the Don checkbox is checked, and the Don image is showing.



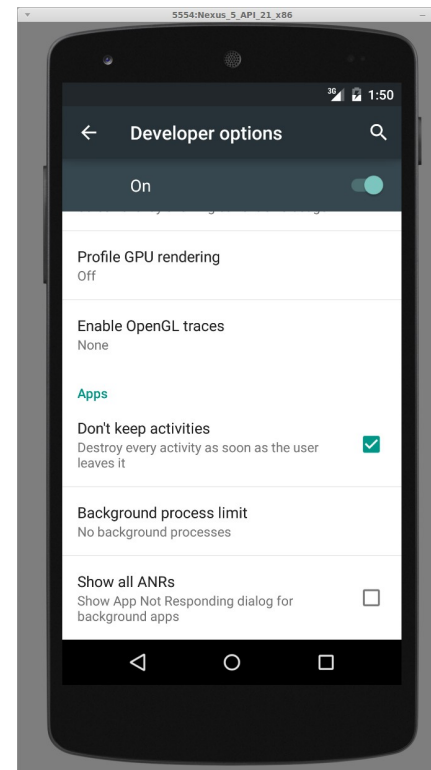
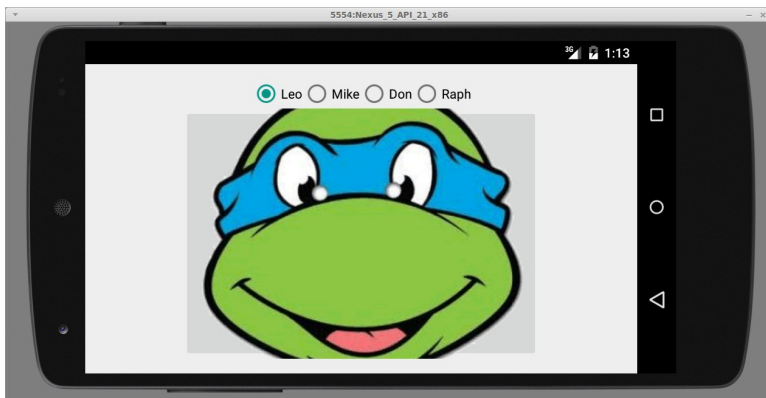
Lost activity state

- Several actions can cause your activity state to be lost:
 - When you go from one **activity** to another and back, within same app
 - When you launch another **app** and then come back
 - When you rotate the device's **orientation** from portrait to landscape
 - ...



Simulating state change in AVD

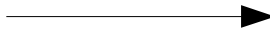
- Testing orientation change: press **Ctrl-F11** ([link](#))
- Testing activity shutdown (onDestroy):
 - Settings → Developer options → **Don't keep activities**
 - Developer options → Background process limit → **No bg processes**



Handling rotation

- A quick way to retain your activity's GUI state on rotation is to set the **configChanges** attribute of the activity in **AndroidManifest.xml**.
 - This doesn't solve the other cases like loading other apps/activities.

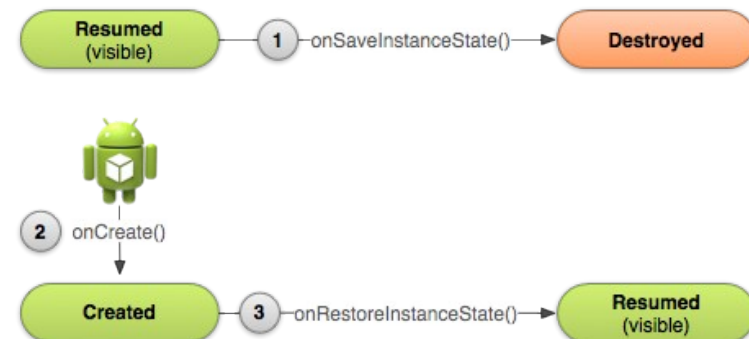
```
<activity android:name=".MainActivity"  
    android:configChanges="orientation|screenSize"  
    ...>
```



onSaveInstanceState method

- When an activity is being destroyed, the event method **onSaveInstanceState** is also called.
 - This method should save any "non-persistent" state of the app.
 - **non-persistent state**: Stays for now, but lost on shutdown/reboot.
- Accepts a **Bundle** parameter storing key/value pairs.
 - Bundle is passed back to activity if it is recreated later.

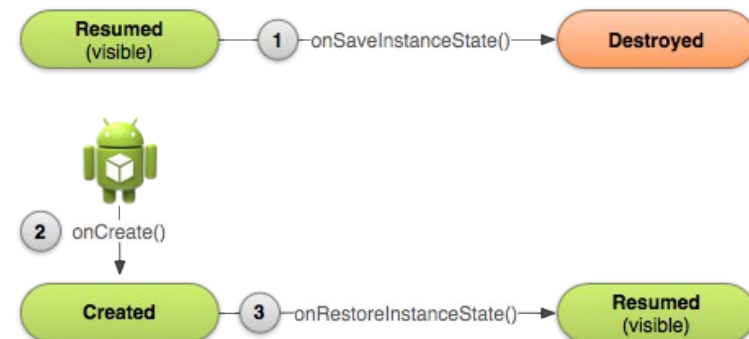
```
public void onSaveInstanceState(Bundle outState) {  
    super.onSaveInstanceState(outState); // always call super  
    outState.putInt("name", value);  
    outState.putString("name", value);  
    ...  
}
```



onRestoreInstanceState method

- When an activity is recreated later, the event method **onRestoreInstanceState** is called. *
 - This method can restore any "non-persistent" state of the app.
 - **Bundle** from onSaveInstanceState from before is passed back in.
 - * older versions of Android put this code in onCreate; don't do that any more

```
public void onRestoreInstanceState(Bundle inState) {  
    super.onRestoreInstanceState(inState); // always call super  
    int name = inState.getInt("name");  
    String name = inState.getString("name");  
    ...  
}
```



Saving your own classes

- By default, your own classes can't be put into a Bundle.
- You can make a class able to be saved by implementing the (methodless) `java.io.Serializable` interface.

```
public class Date implements Serializable {  
    ...  
}
```

```
public class MainActivity extends Activity {  
    public void onSaveInstanceState(Bundle outState) {  
        super.onSaveInstanceState(outState);  
        Date d = new Date(2015, 1, 25);  
        outState.putSerializable("today", d);  
    }  
}
```


Preferences

- SharedPreferences object can store permanent settings and data for your app.
 - stores key/value pairs similar to a Bundle or Intent
 - pairs added to SharedPreferences persist after shutdown/reboot (*unlike savedInstanceState bundles*)
- Two ways to use it:
 - per-activity (getPreferences)
 - per-app (getSharedPreferences)

SharedPreferences example

- Saving preferences for the **activity** (in onPause, onStop):

```
SharedPreferences prefs = getPreferences(MODE_PRIVATE);
SharedPreferences.Editor prefsEditor = prefs.edit();
prefsEditor.putInt("name", value);
prefsEditor.putString("name", value);
...
prefsEditor.apply();    // or commit();
```

- Loading preferences later (e.g. in onCreate):

```
SharedPreferences prefs = getPreferences(MODE_PRIVATE);
int i = prefs.getInt("name", defaultValue);
String s = prefs.getString("name", "defaultValue");
...
```

Multiple preference files

- You can call `getSharedPreferences` and supply a file name if you want to have multiple pref. files for the same activity:

```
SharedPreferences prefs = getPreferences(MODE_PRIVATE);  
SharedPreferences prefs = getSharedPreferences(  
    "filename", MODE_PRIVATE);  
SharedPreferences.Editor prefsEditor = prefs.edit();  
prefsEditor.putInt("name", value);  
prefsEditor.putString("name", value);  
...  
prefsEditor.commit();
```