Programming with Android: Activities

Luca Bedogni **Marco Di Felice**

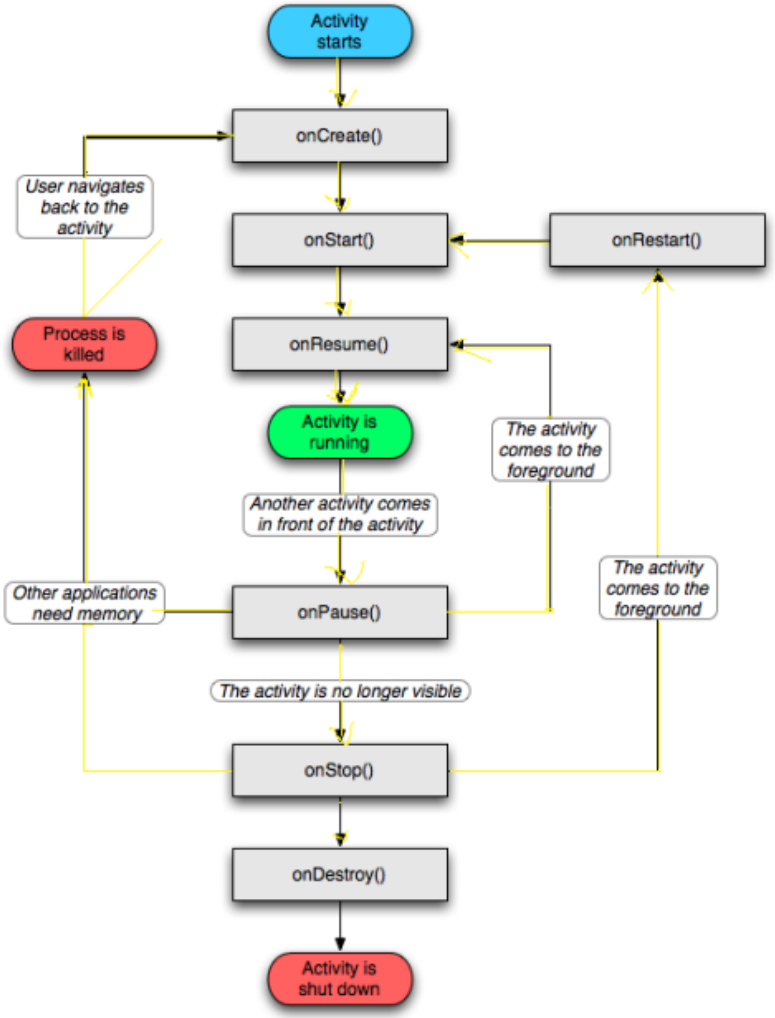
Dipartimento di Informatica: Scienza e Ingegneria

Università di Bologna

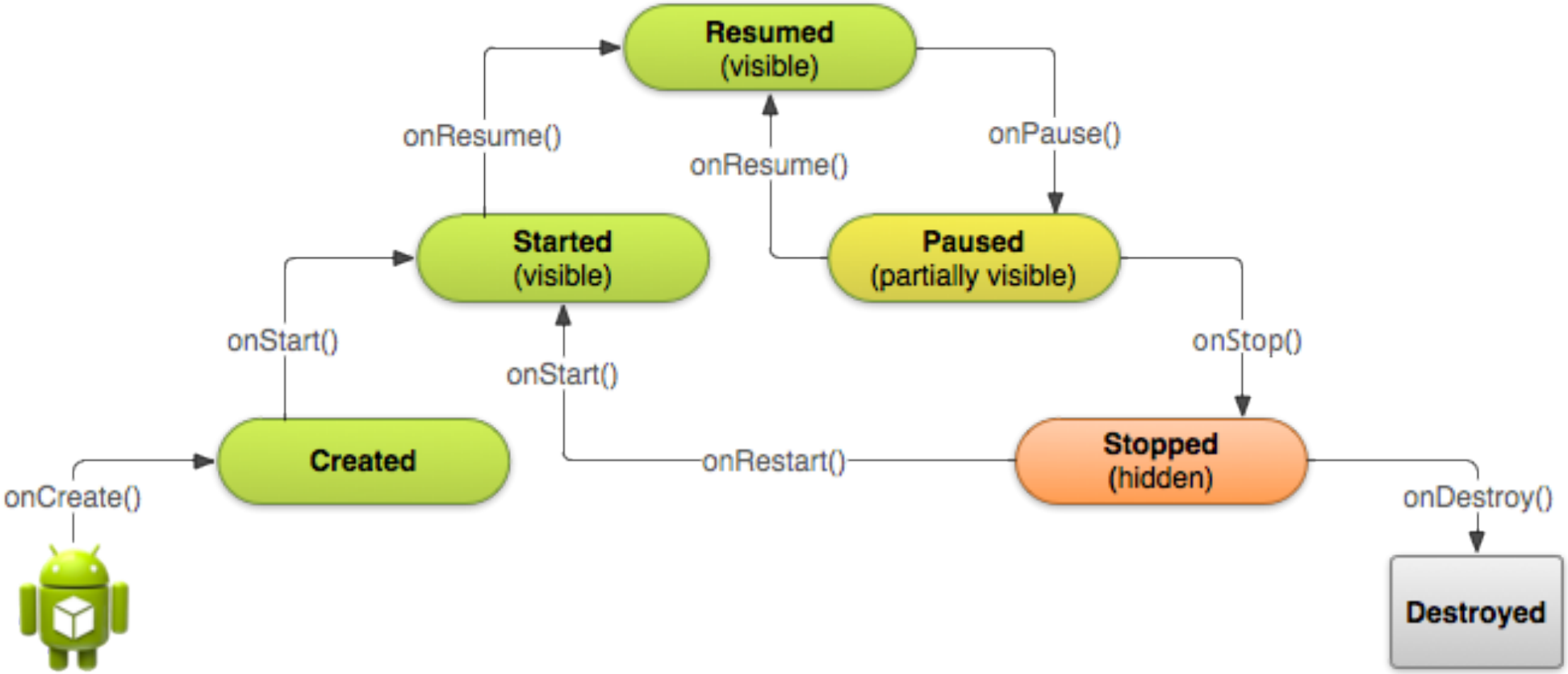
Activity

- What is started by the device
- It contains the application's informations
- Has methods to answer certain events
- An application could be composed of multiple activities

Activity lifecycle



Activity lifecycle



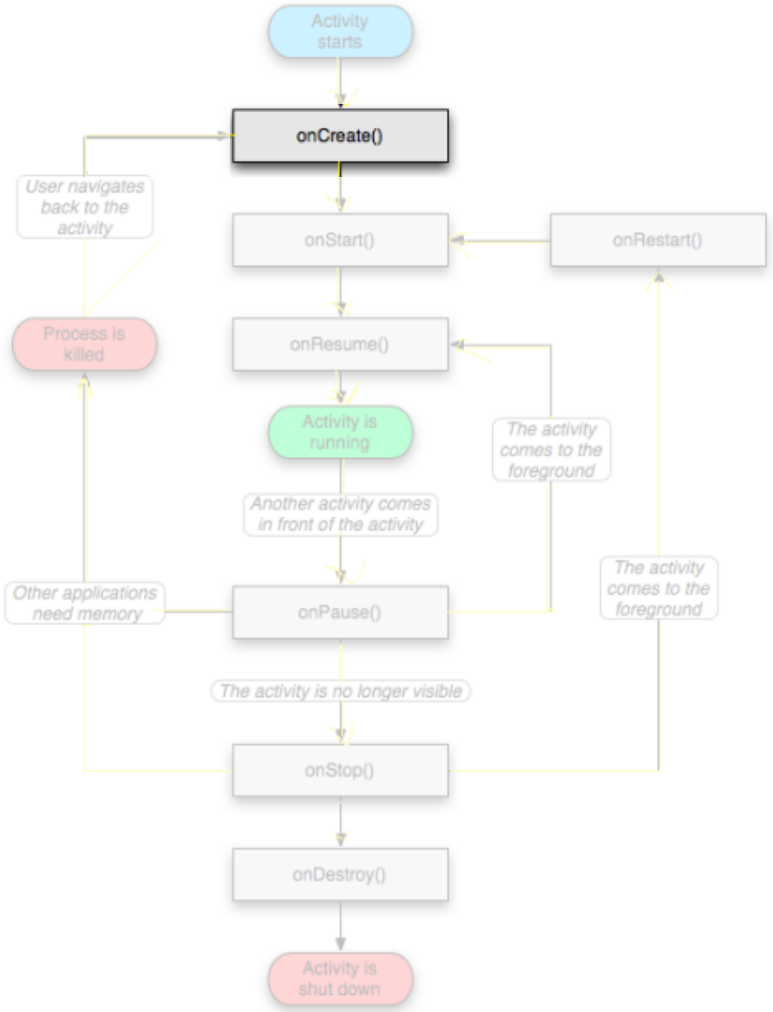
Activities

- Need to implement every single method? No!
  - It depends on the application complexity
- Why it is important to understand the activity lifecycle?
  - So your application does not crash (or do funny things) while the user is running something else on the smartphone
  - So your application does not consume unnecessary resources
  - So the user can safely stop your application and return to it later

Activities states

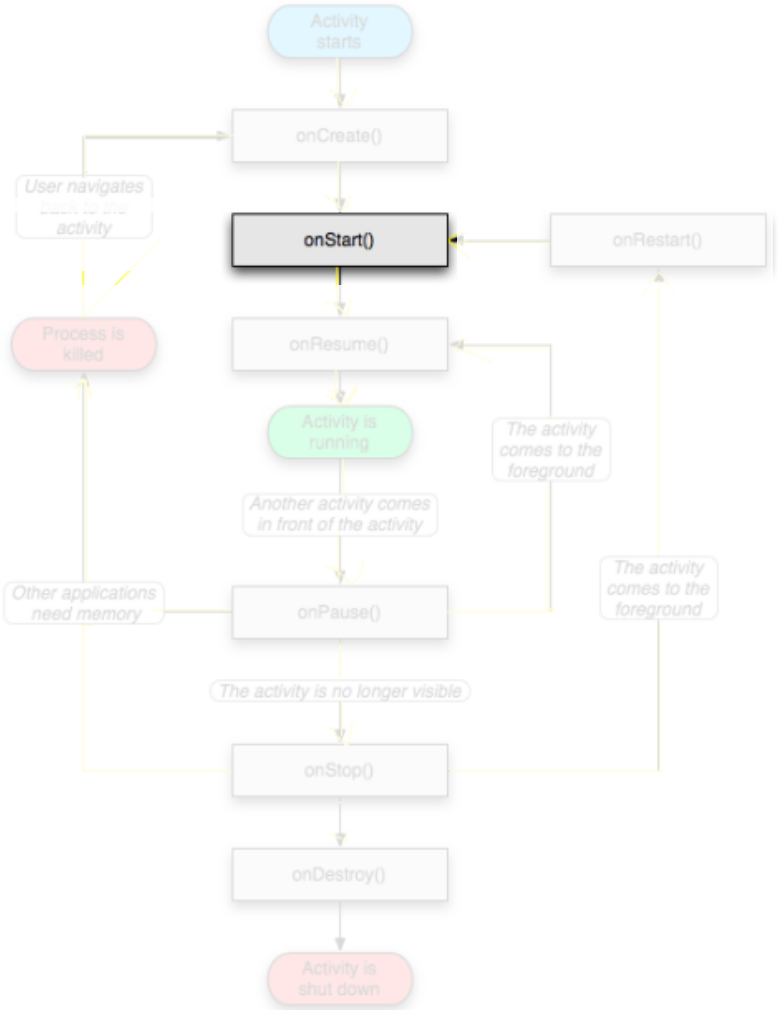
- Resumed
  - The activity is in the foreground, and the user can interact.
- Paused
  - The activity is partially overlayed by another activity. Cannot execute any code nor receive inputs.
- Stopped
  - Activity is hidden, in the background. It cannot execute any code.

Activity lifecycle



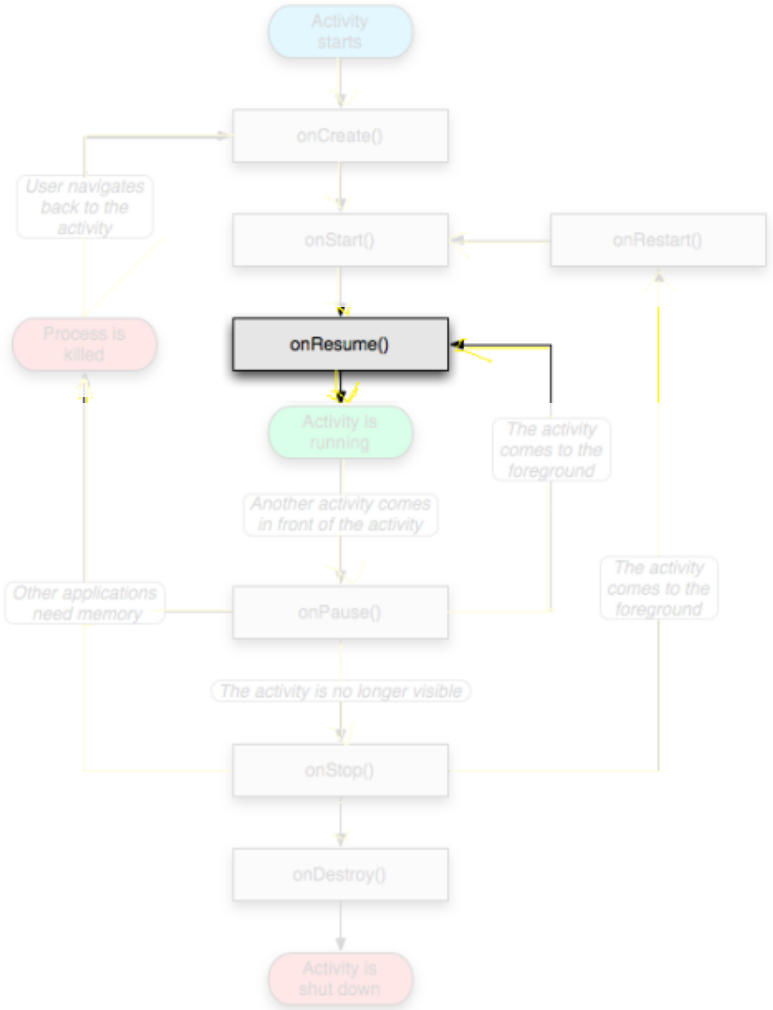
- OnCreate()
  - Called when the activity is created
  - Should contain the initialization operations
  - If onCreate() succesfull terminates, it calls onStart()

Activity lifecycle



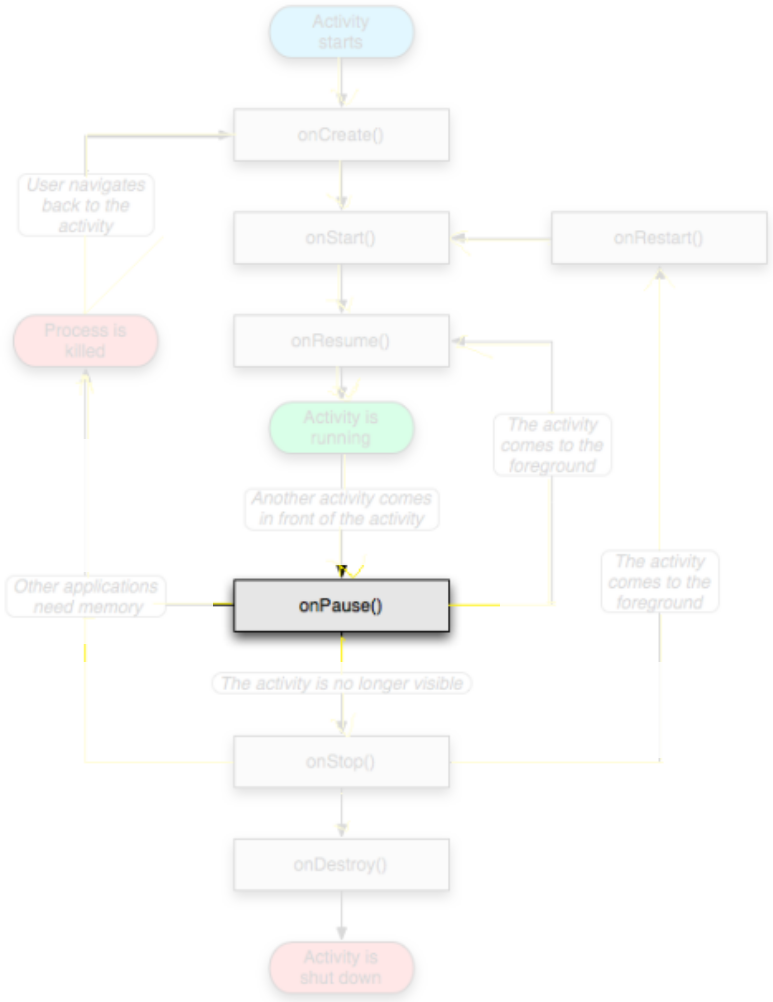
- OnStart()
  - Called when onCreate() terminates
  - Called right before it is visible to user
  - Then onResume is called

Activity lifecycle



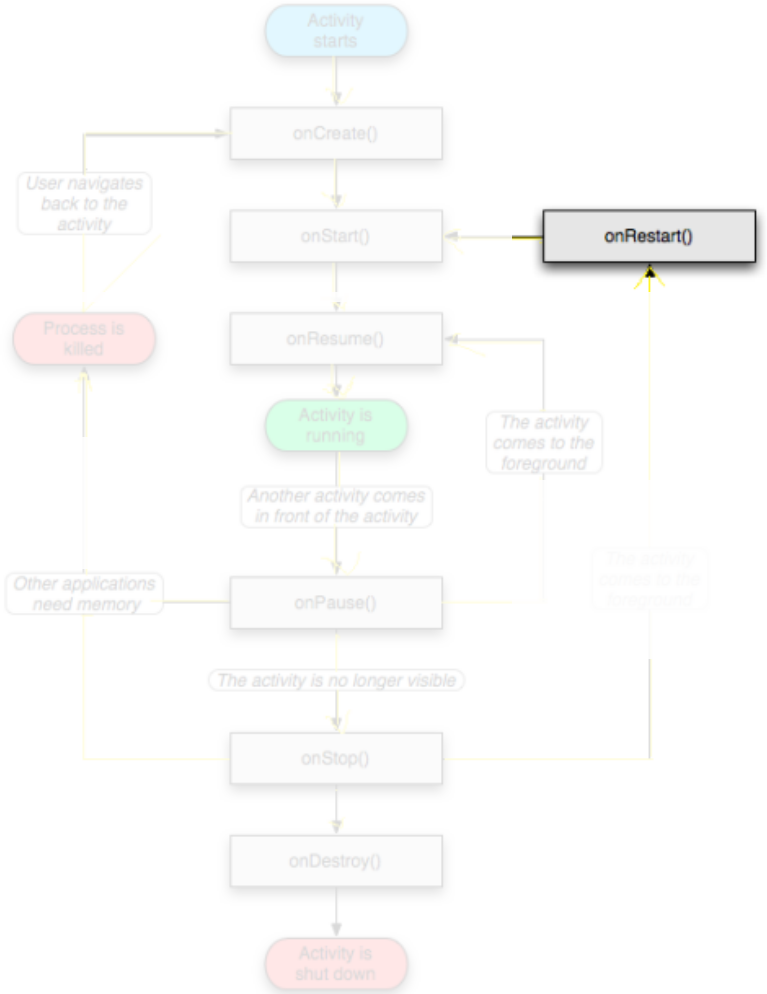
- OnResume()
  - Called when the activity is ready to get input from users
  - Called when the activity is resumed too
  - If it succesfully terminates, then the Activity is RUNNING

Activity lifecycle



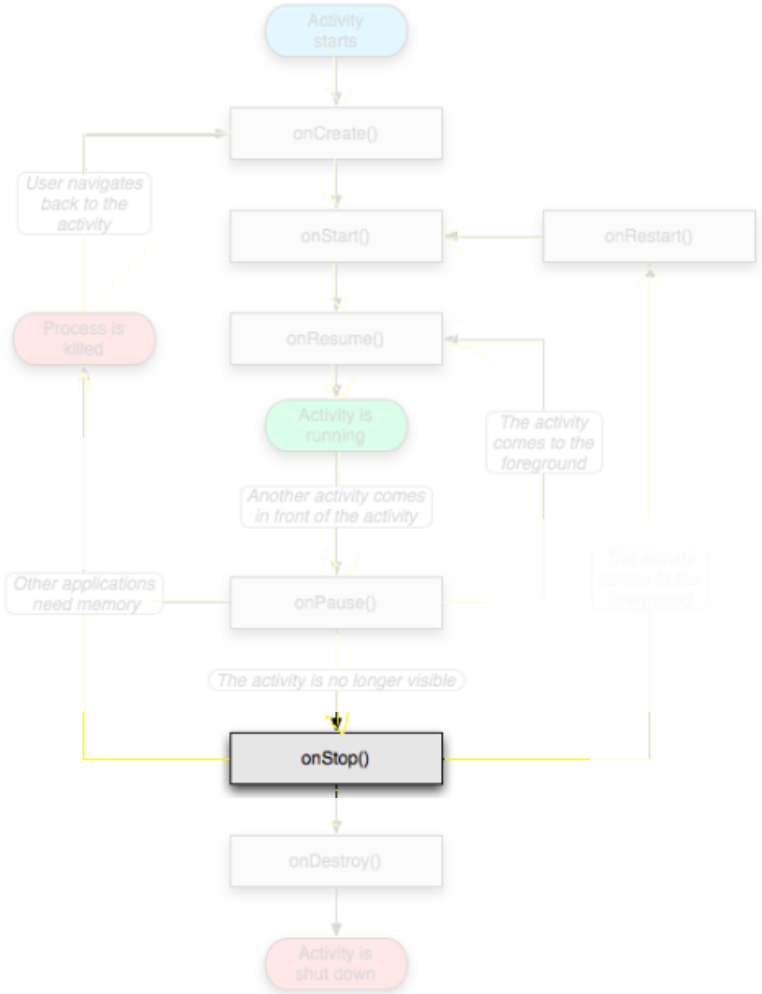
- OnPause()
  - Called when another activity comes to the foreground, or when someone presses back
  - Commit unsaved changes to persistent data
  - Stop cpu-consuming processes
  - Make it fast

Activity lifecycle



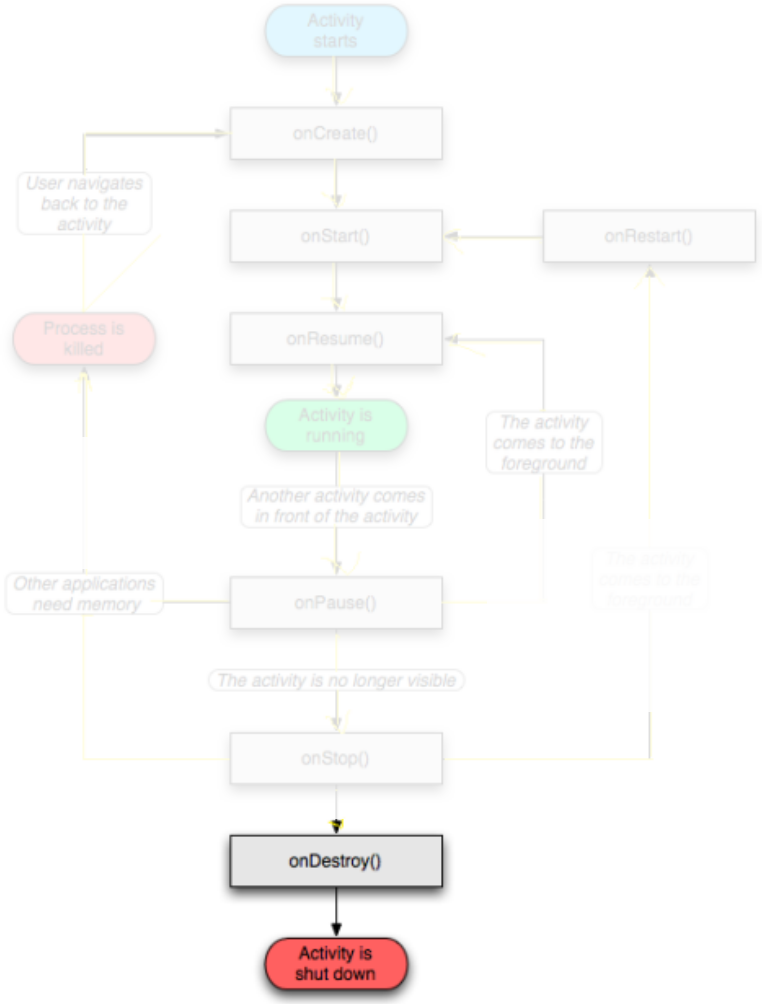
- OnRestart()
  - Similar to onCreate()
  - We have an activity that was previously stopped

Activity lifecycle



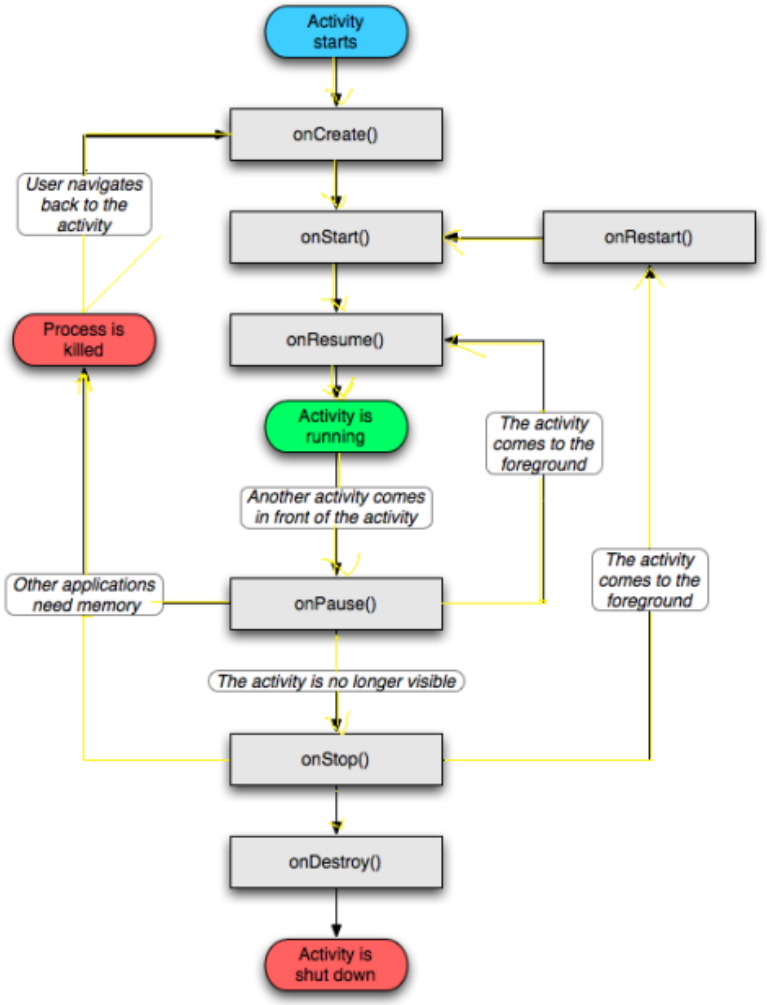
- OnStop()
  - Activity is no longer visible to the user
  - Could be called because:
    - the activity is about to be destroyed
    - another activity comes to the foreground

Activity lifecycle



- OnDestroy()
  - The activity is about to be destroyed
  - Could happen because:
  - The systems need some stack space
    - Someone called finish() method on this activity
    - Could check with isFinishing()

Activity loops



- Mainly 3 different loops
- **Entire lifetime**
  - Between onCreate() and onDestroy().
  - Setup of global state in onCreate()
  - Release remaining resources in onDestroy
- **Visible lifetime**
  - Between onStart() and onStop().
  - Maintain resources that have to be shown to the user.
- **Foreground lifetime**
  - Between onResume() and onPause().
  - Code should be light.

Activities in the manifest

Declare them before running them

```
<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>
```

Why “MAIN” and “LAUNCHER”?

To show the application in the menu

Recreating Activities

Recreating Activities

- Android keeps the state of each view
  - Remember to assign unique Ids to them
  - So, no code is needed for the “basic” behavior
- What if I want to save more data?
  - Override onSaveInstanceState() and onRestoreInstanceState()

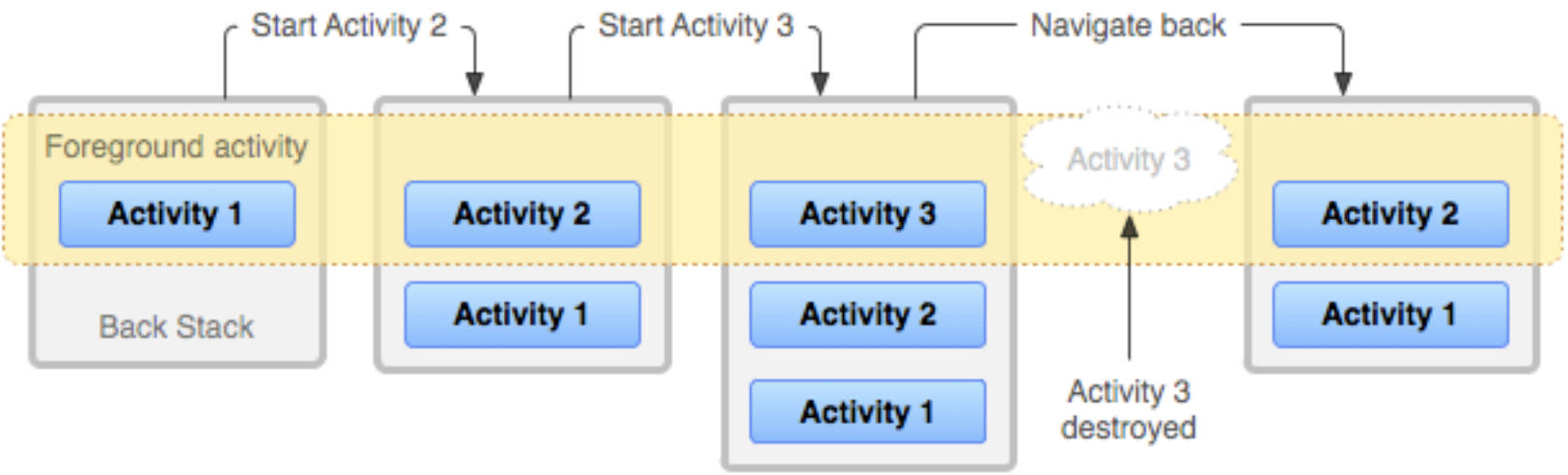
```
static final String STATE_SCORE = "playerScore";
@Override
public void onSaveInstanceState(Bundle savedInstanceState) {
        savedInstanceState.putInt(STATE_SCORE, mCurrentScore);
        super.onSaveInstanceState(savedInstanceState);
}
```

Recreating Activities

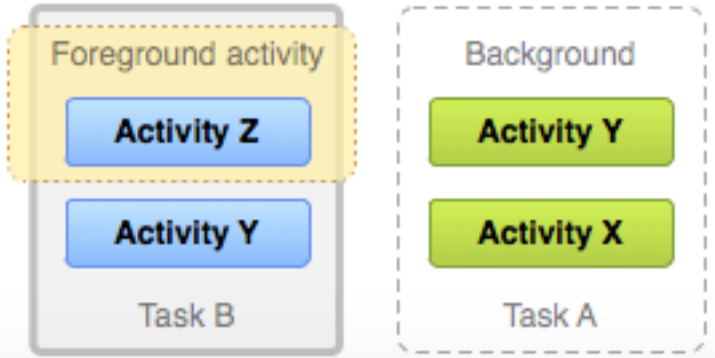
```
@Override
protected void onCreate(Bundle savedInstanceState) {
    super.onCreate(savedInstanceState); // Always call the superclass first
       if (savedInstanceState != null) {
        // Restore value of members from saved state
        mCurrentScore = savedInstanceState.getInt(STATE_SCORE);
    } else {
        // Probably initialize members with default values for a new instance
    }
}

public void onRestoreInstanceState(Bundle savedInstanceState) {
    super.onRestoreInstanceState(savedInstanceState);
    mCurrentScore = savedInstanceState.getInt(STATE_SCORE);
}
```

Tasks



A task is a collection of activities that users interact with when performing a certain job. The activities are arranged in a stack (the back stack), in the order in which each activity is opened.



Activity: Conclusions

- Activities should be declared in the Manifest
- Extend the Activity class
- Code wisely
  - Put your code in the right place
  - Optimize it
  - Test even on low-end devices