Programming
Handheld systems
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Application Fundamentals
APPLICATION COMPONENTS

Activity
Service
Broadcastreceiver
Contentprovider
Applications

Apps are made from components
Android instantiates and runs them as needed
Each component has its own purpose and APIs
Activity

Primary class for user interaction

Usually implements a single, focused task that the user can do
Service

Runs in the background to perform long-running operations to support interaction with remote processes
BroadcastReceiver

Component that listens for and responds to events
The subscriber in publish/subscribe pattern
Events represented by the Intent class and then Broadcast
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Component that listens for and responds to events.
The subscriber in publish/subscribe pattern.
Events represented by the Intent class and then Broadcast.
BroadcastReceiver receives and responds to broadcast event.
**Content Providers**

**Store & share data across applications**

Uses database-style interface

Handles interprocess communication
Map Location

User enters an address
App displays a map of area around the address
BUILDING AN APPLICATION

See:

HTTP://DEVELOPER.ANDROID.COM/GUIDE/DEVELOPING/BUILDING
Creating an Android App

1. Define resources
2. Implement application classes
3. Package application
4. Install & run application
1. Defining Resources

Resources are non-source code entities
Many different resource types, such as Layout, Strings, Images, Menus, & animations
Allows apps to be customized for different devices and users

See:
http://developer.android.com/guide/topics/resources
Strings

Types: String, String Array, Plurals
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Typically stored in res/values/*.xml

Specified in XML, e.g.,

```xml
<string name="hello">Hello World!</string>
```

Can include formatting and styling
Strings

Accessed by other resources as:
@string/string_name

Accessed in Java as:
R.string.string_name
[2013-05-16 15:14:04 - MapLocation] Success!
Customizing Strings

If your default language is Italian, @string/location_string is

“Digita l’indirizzo”

Otherwise,

“Enter Location”
User Interface Layout

UI layout specified in XML files
Some tools allow visual layout
XML files typically stored in
res/layout/*.xml

Accessed in Java as:
R.layout. layout_name

Accessed by other resources as:
@layout/layout_name
Using Multiple layout files

Can specify different Layout files based on your device’s orientation, screen size, etc.
At compilation time, resources are used to generate the `R.java` class. Java code uses the `R` class to access resources.
2. Implement Classes

Usually involves at least one Activity
Activity initialization code usually in `onCreate()`
2. Implement Classes

Typical onCreate() workflow

- Restore saved state
- Set content view
- Initialize UI elements
- Link UI elements to code actions
3. Package Application

**System packages application components & resources into a .apk file**

**Developers specify required application information in a file called AndroidManifest.xml**
Information includes:

- Application Name
- Components
- Other
  - Required permissions
  - Application features
  - Minimum API level
4. Install & Run

From Eclipse run in the emulator or device

From command line

Enable USB Debugging on the device

    Settings > Applications > Development > USB debugging

% adb install <path_to_apk>
Next Time

The Activity Class