

PROGRAMMING HANDHELD SYSTEMS

ADAM PORTER

APPLICATION FUNDAMENTALS

APPLICATION COMPONENTS

ACTIVITY

SERVICE

BROADCASTRECEIVER

CONTENTPROVIDER

APPLICATIONS

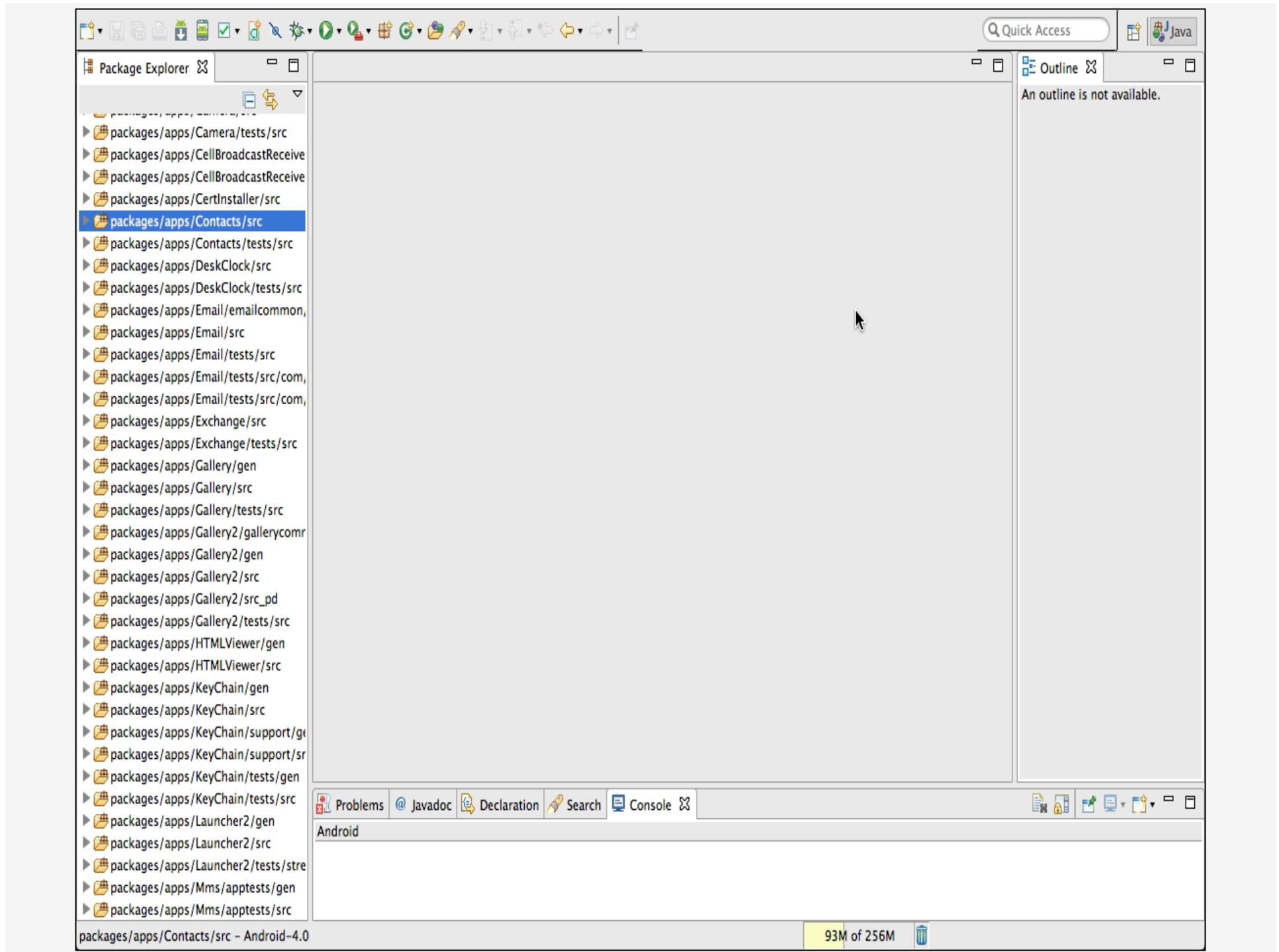
APPS ARE MADE FROM COMPONENTS

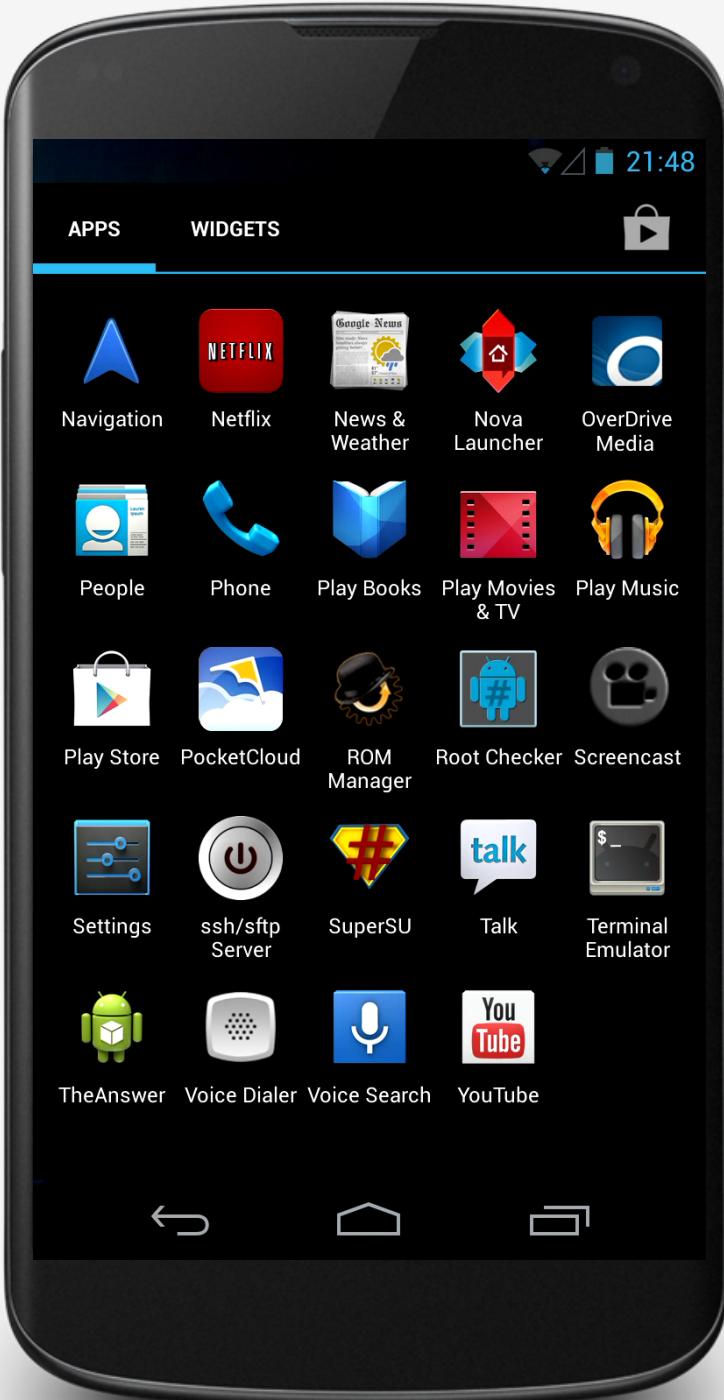
ANDROID INSTANTIATES AND RUNS THEM AS
NEEDED

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



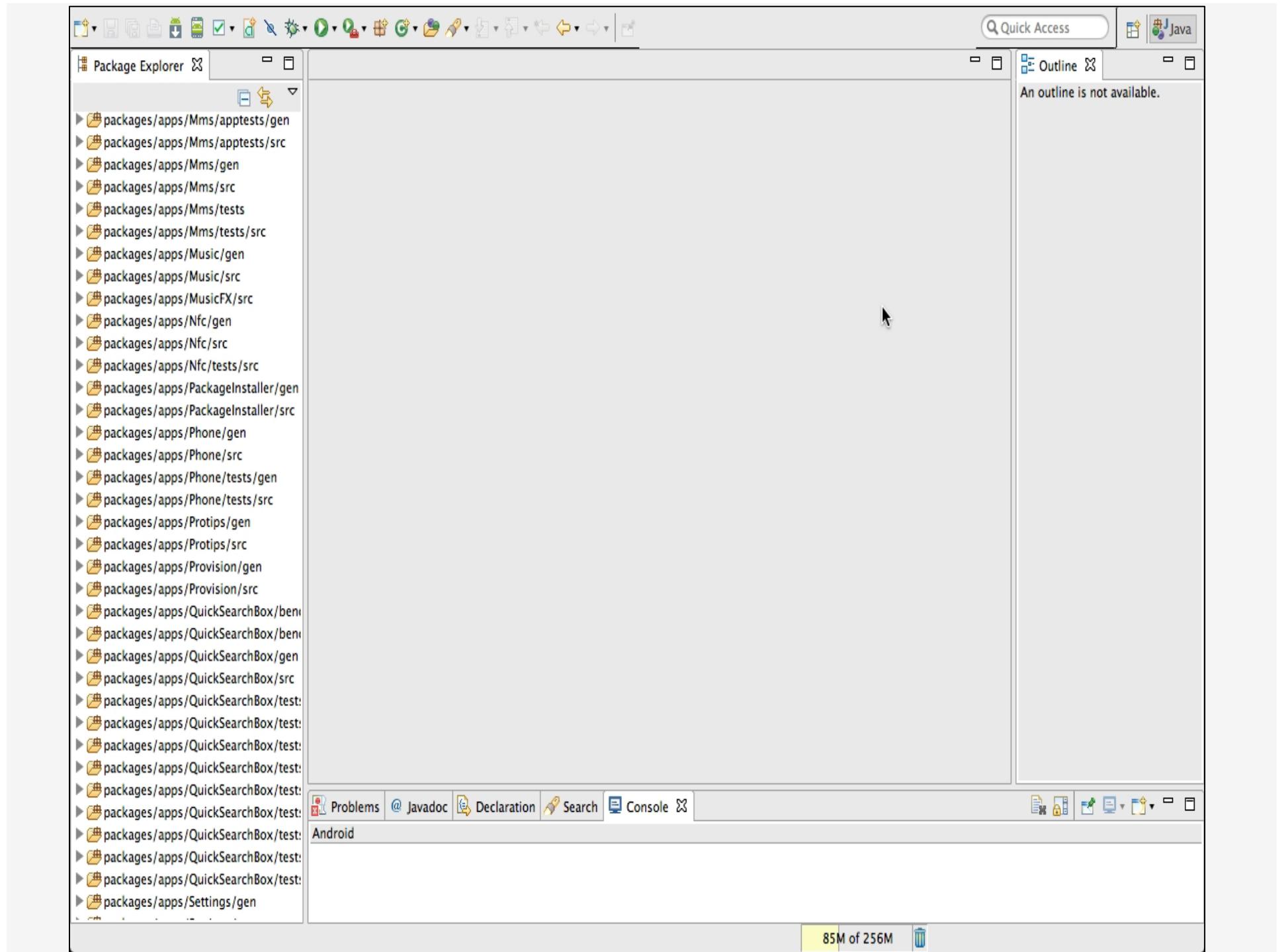


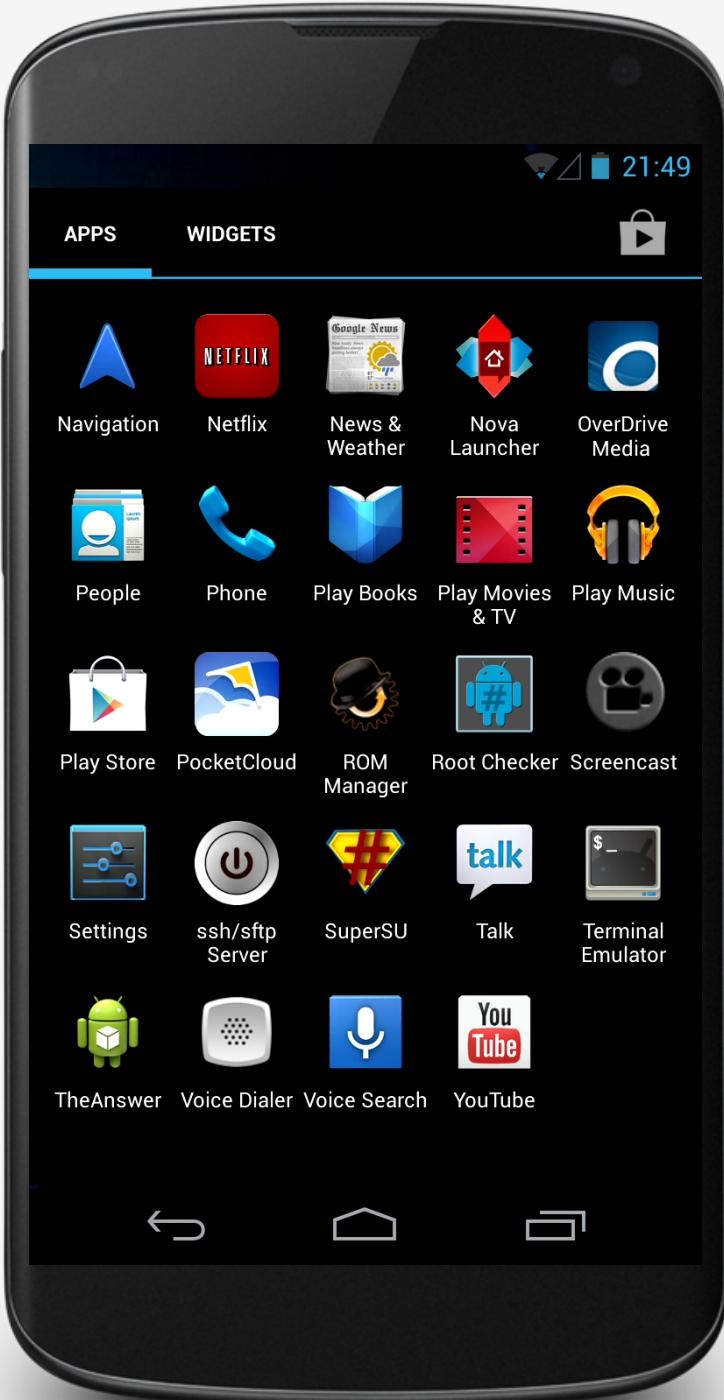
SERVICE

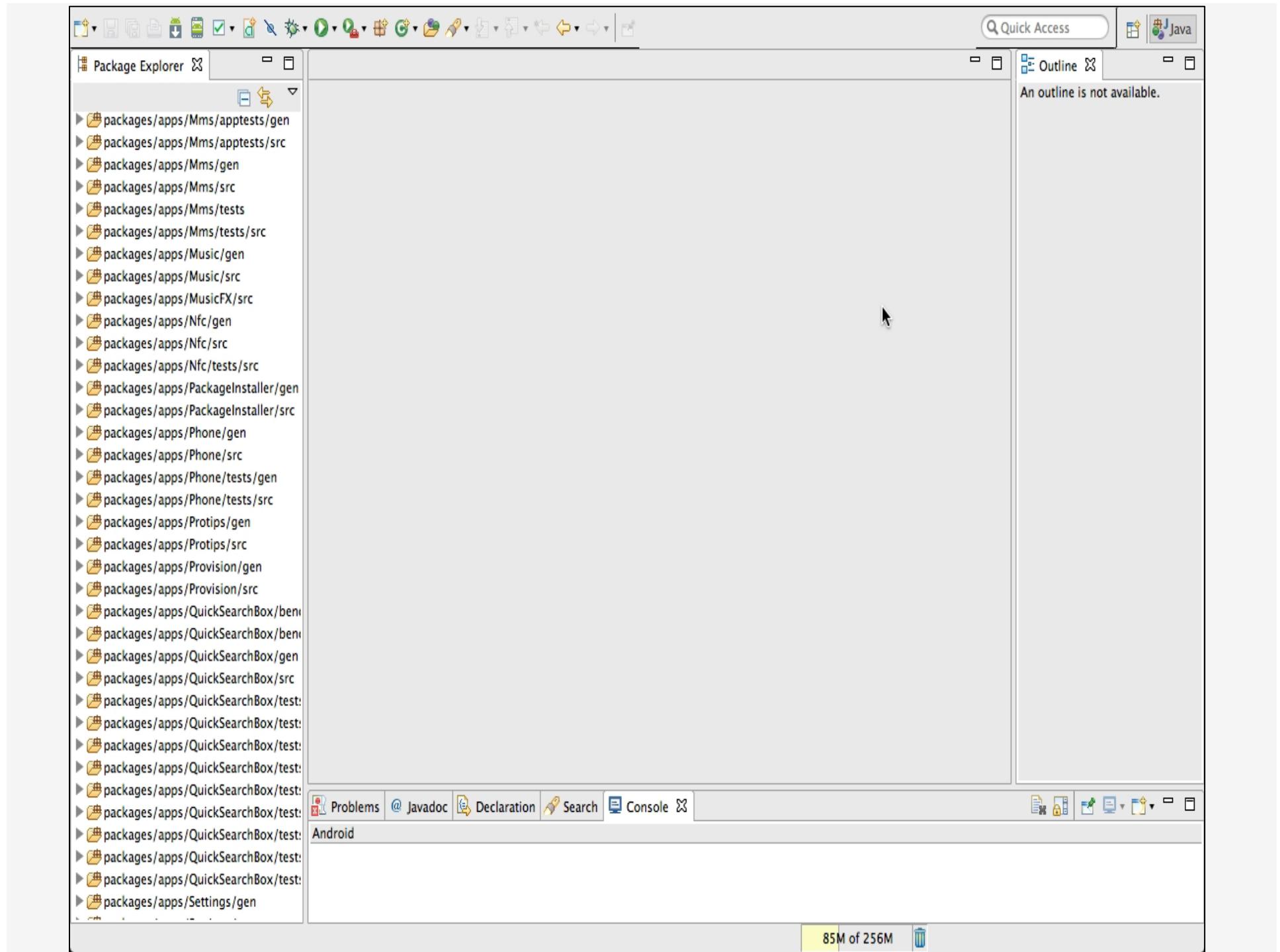
RUNS IN THE BACKGROUND

TO PERFORM LONG-RUNNING OPERATIONS

TO SUPPORT INTERACTION WITH REMOTE
PROCESSES







BROADCAST RECEIVER

COMPONENT THAT LISTENS FOR AND RESPONDS TO EVENTS

THE SUBSCRIBER IN PUBLISH/SUBSCRIBE PATTERN

EVENTS REPRESENTED BY THE INTENT CLASS AND THEN BROADCAST

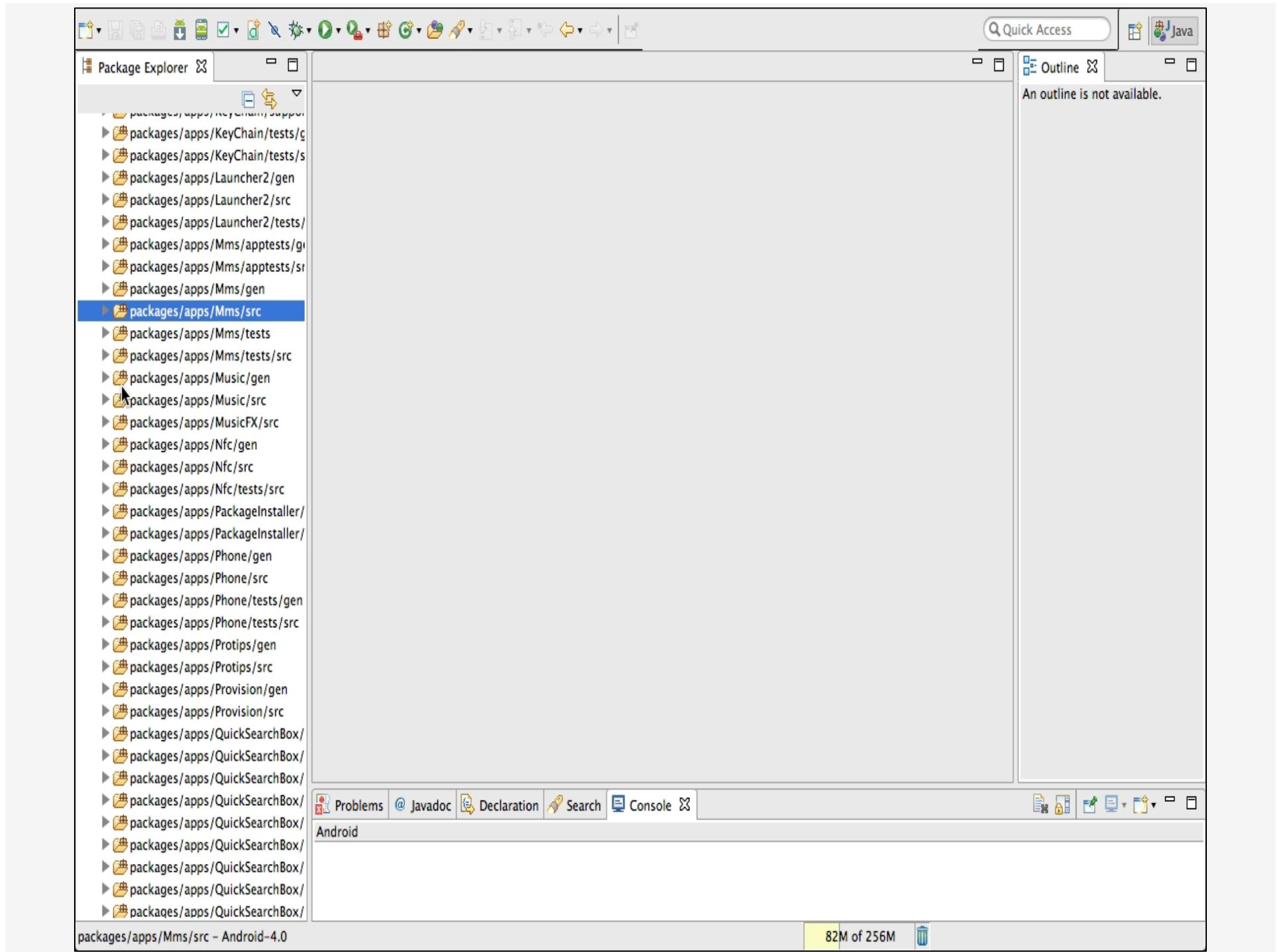
BROADCASTRECEIVER

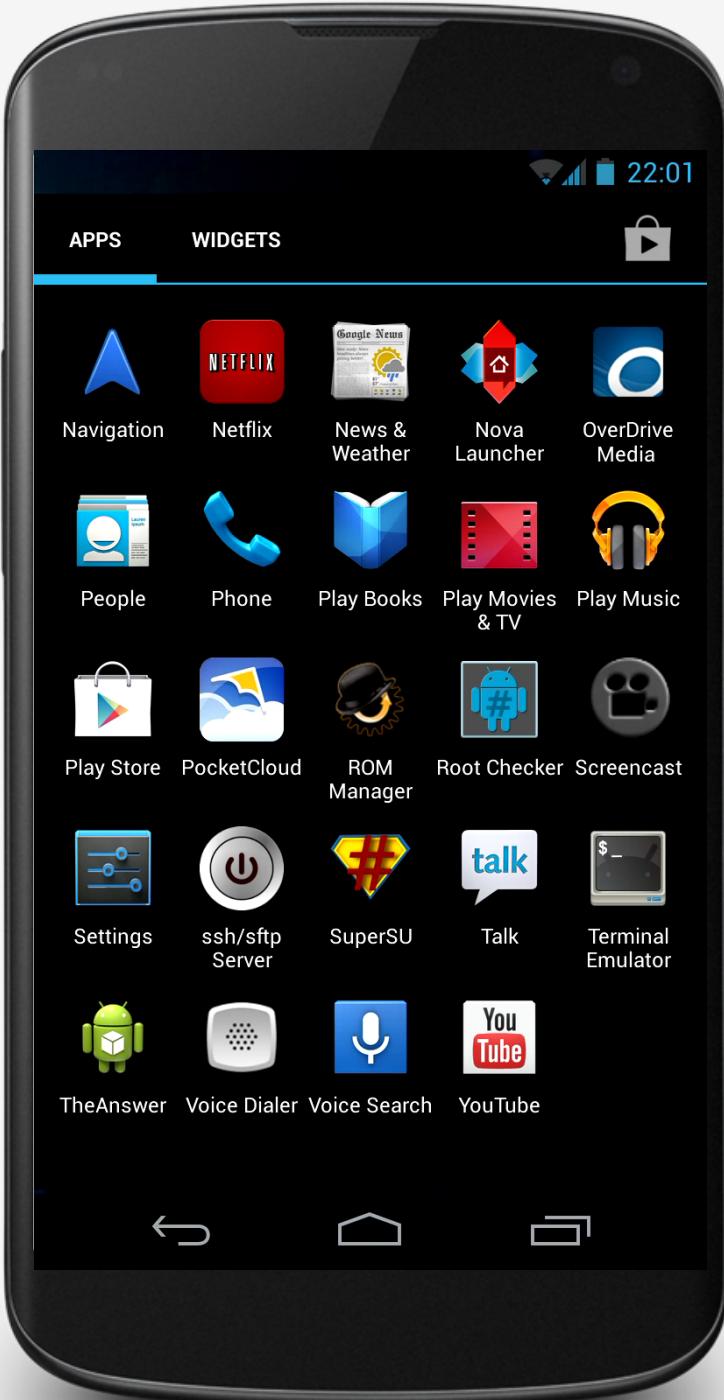
COMPONENT THAT LISTENS FOR AND RESPONDS TO EVENTS

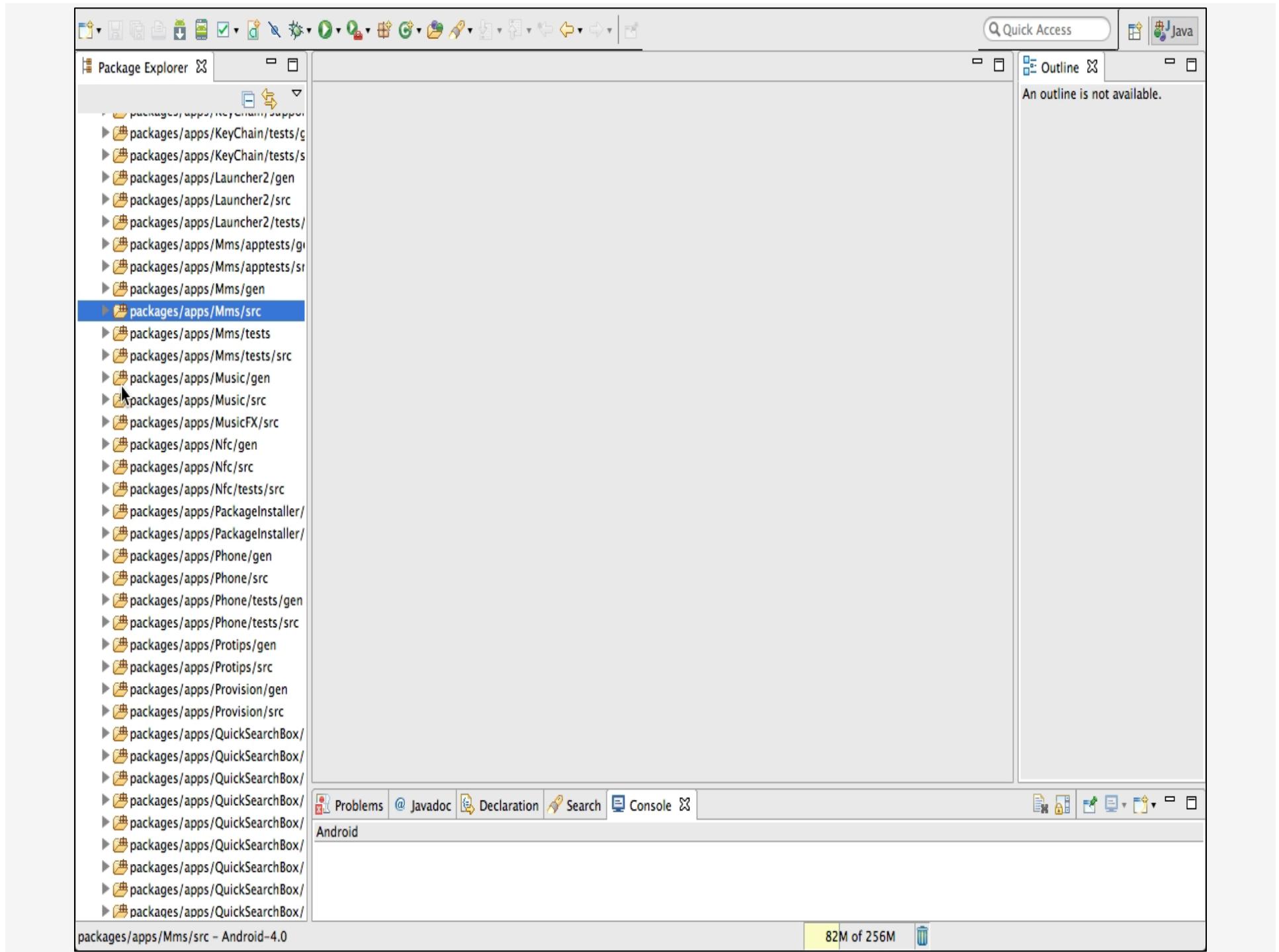
THE SUBSCRIBER IN PUBLISH/SUBSCRIBE PATTERN

EVENTS REPRESENTED BY THE INTENT CLASS AND THEN BROADCAST

BROADCASTRECEIVER RECEIVES AND RESPONDS TO BROADCAST EVENT





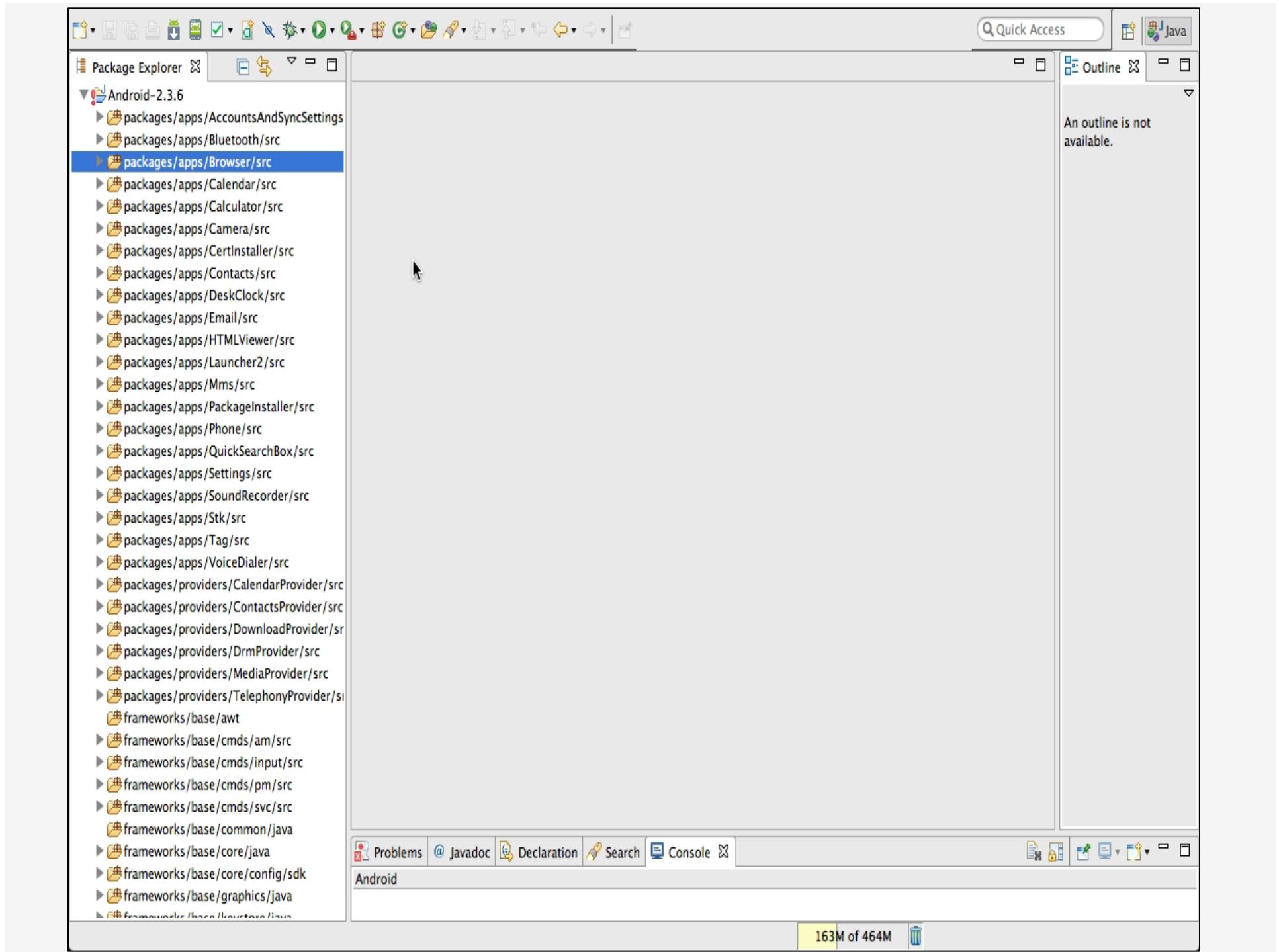


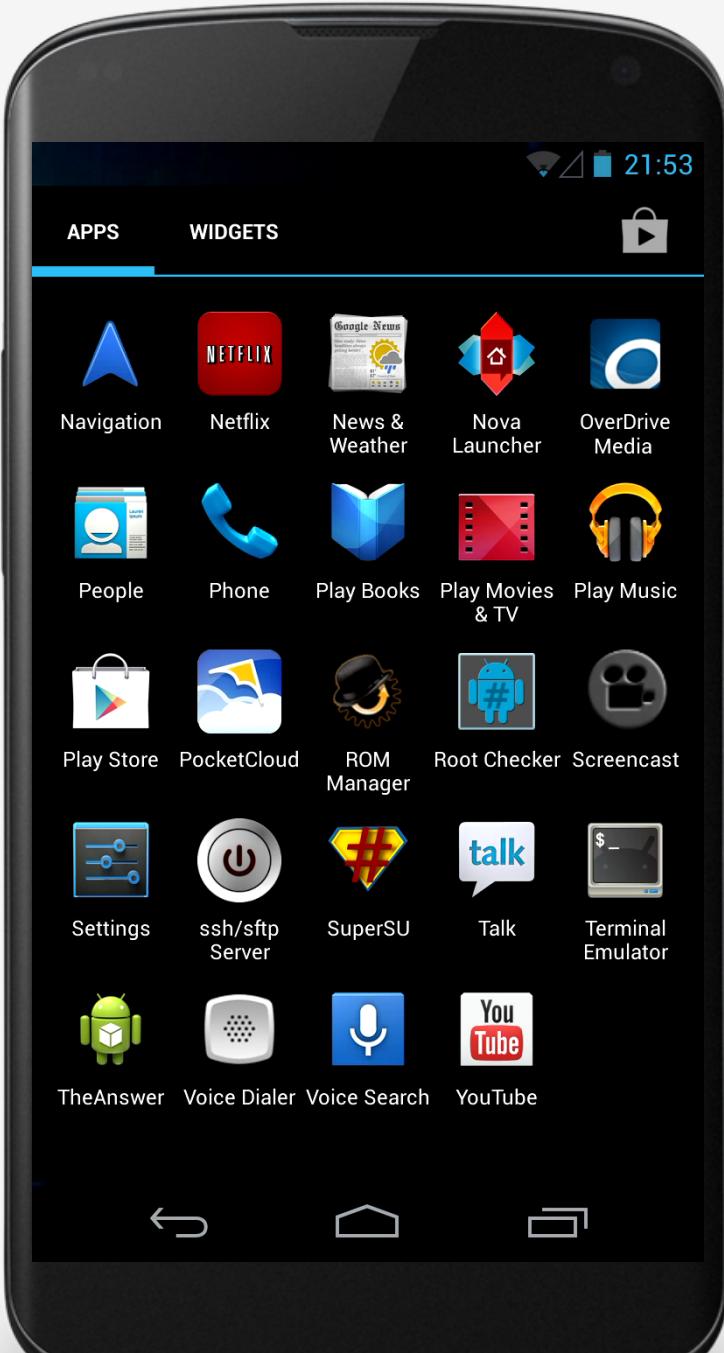
CONTENT PROVIDERS

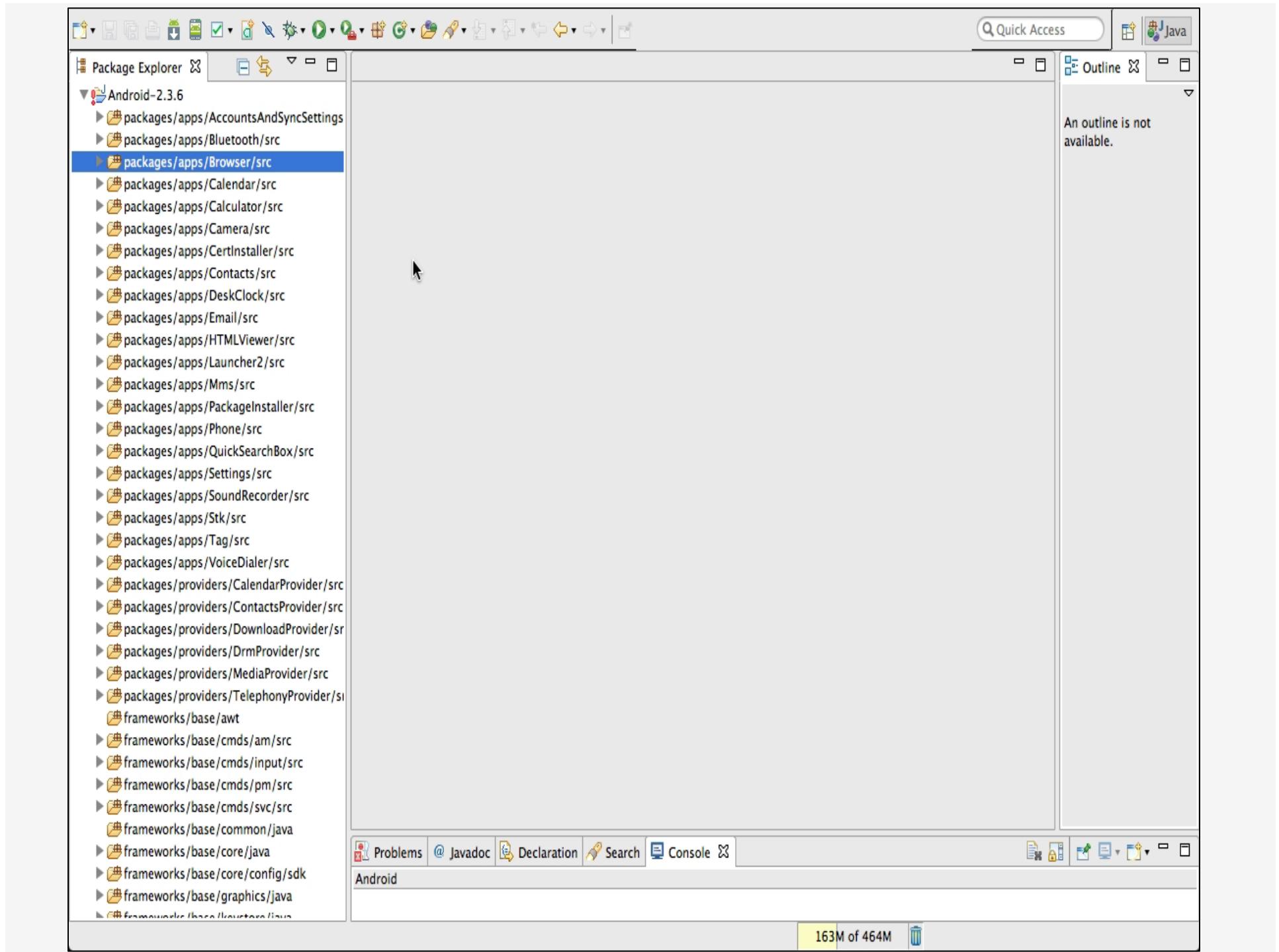
STORE & SHARE DATA ACROSS APPLICATIONS

USES DATABASE-STYLE INTERFACE

HANDLES INTERPROCESS COMMUNICATION







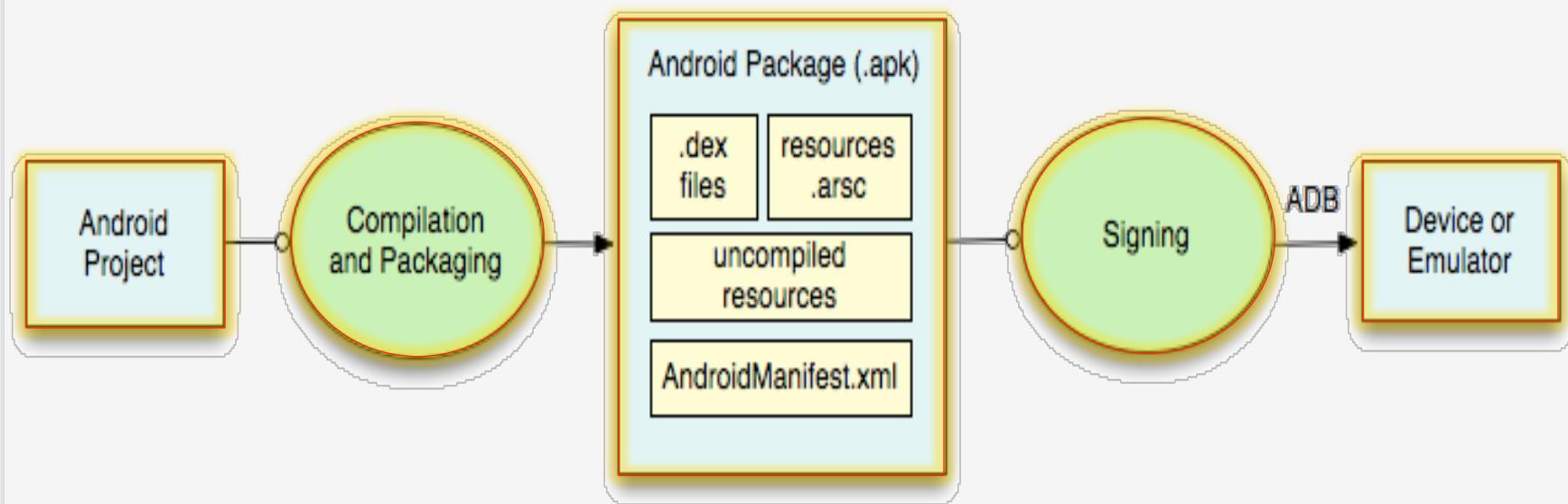
MAPLOCATION

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](http://developer.android.com/guide/topics/resources)

STRINGS

TYPES: STRING, STRING ARRAY, PLURALS

STRINGS

TYPES: STRING, STRING ARRAY, PLURALS

TYPICALLY STORED IN RES/VALUES/*.XML

SPECIFIED IN XML, e.g.,

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

CAN INCLUDE FORMATTING AND STYLING

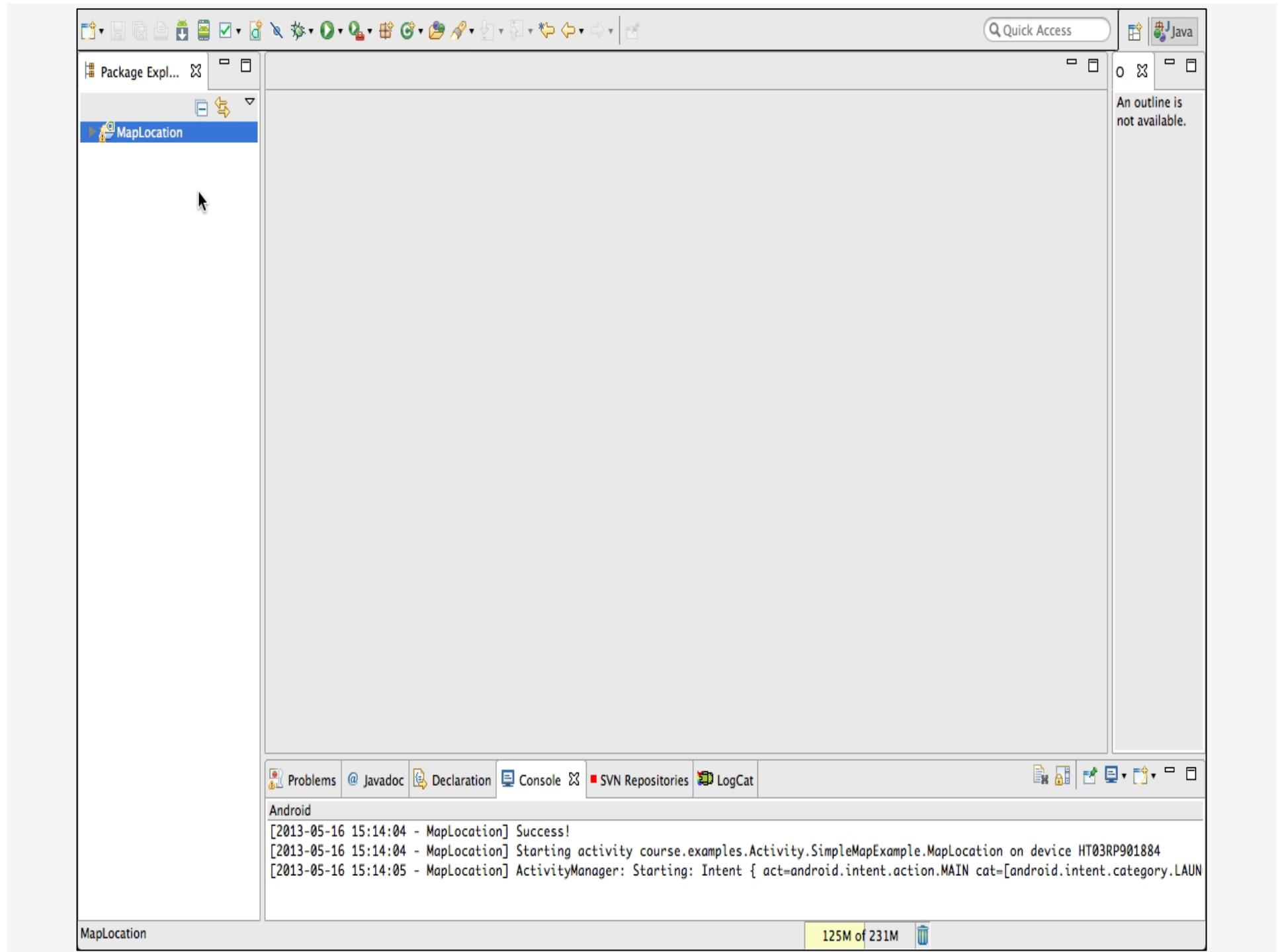
STRINGS

ACCESSED BY OTHER RESOURCES AS:

`@string/string_name`

ACCESSED IN JAVA AS:

`R.string.string_name`



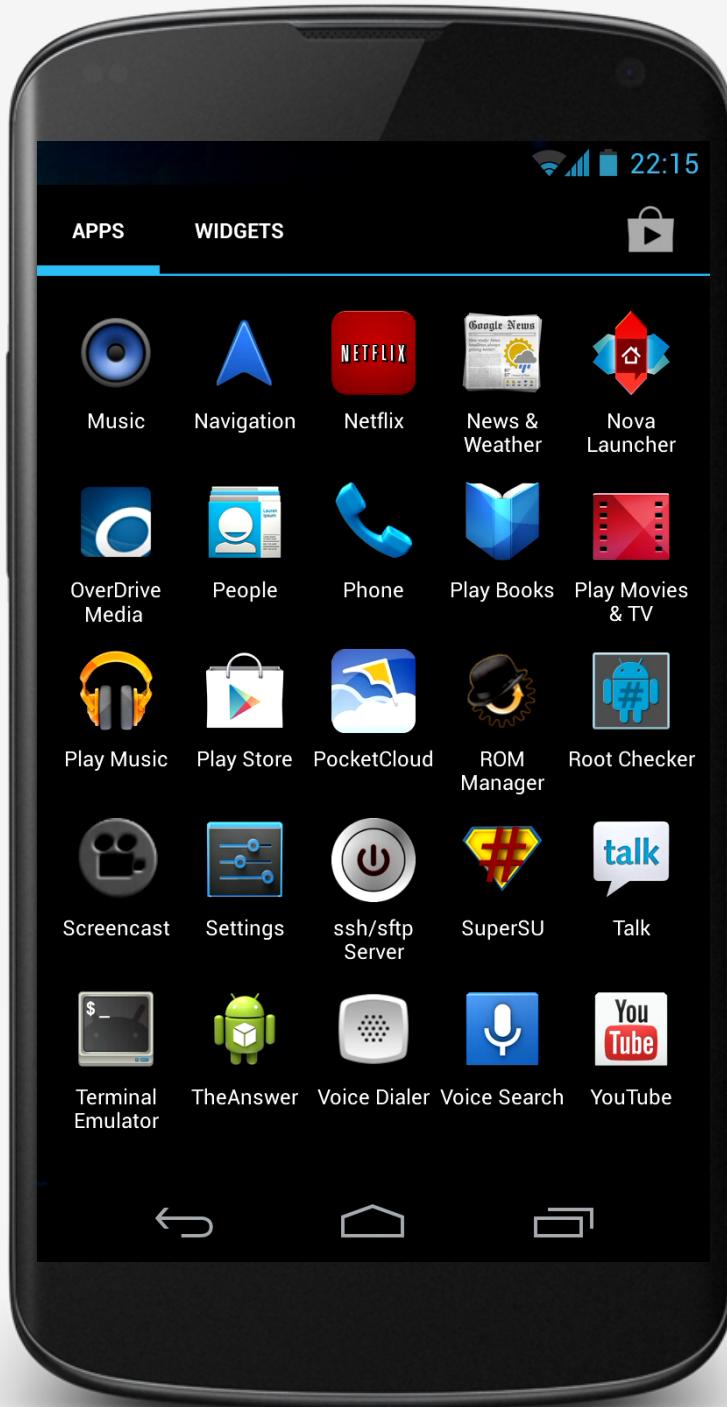
CUSTOMIZING STRINGS

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:

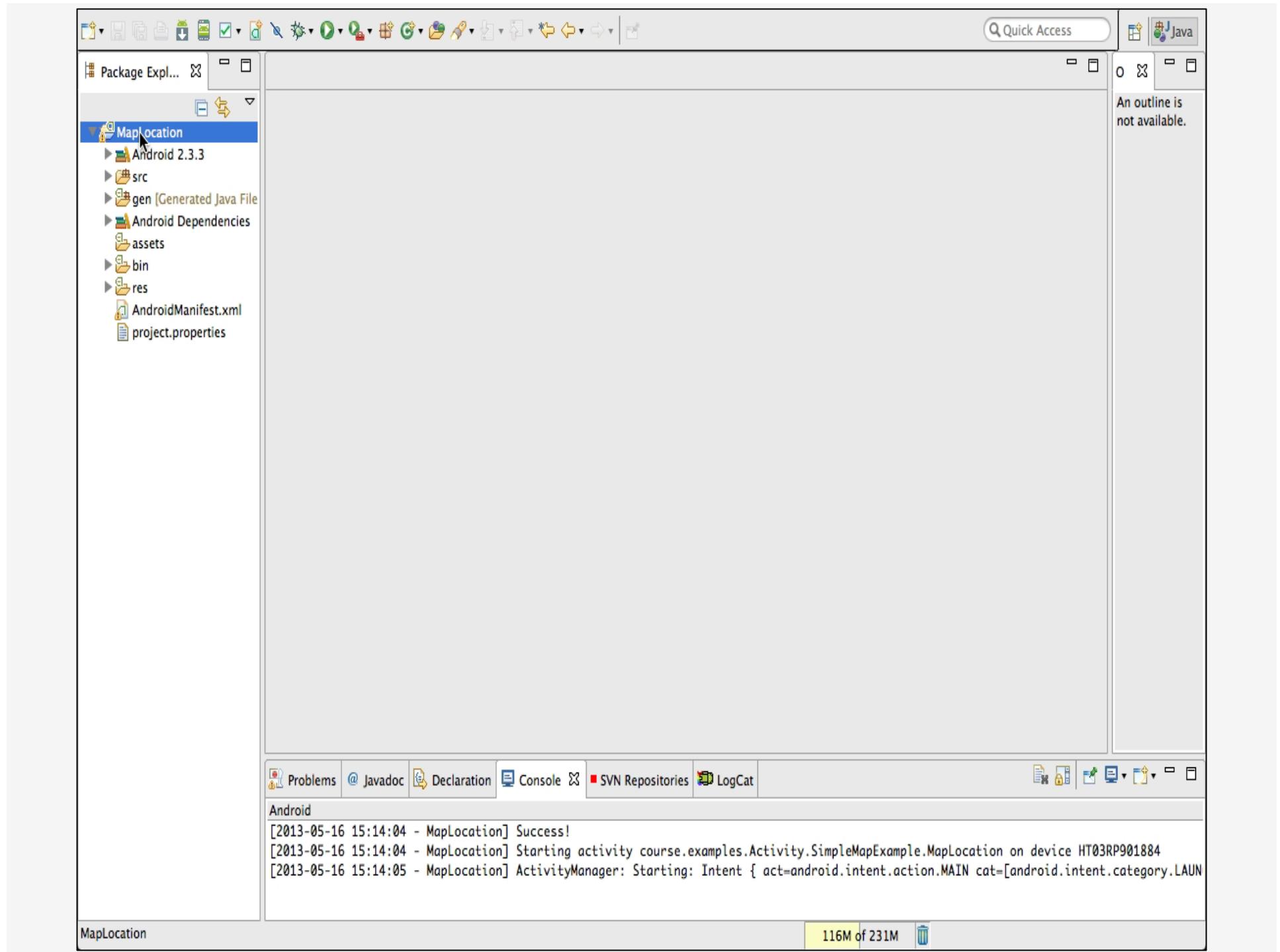
R.layout.layout_name

ACCESSED BY OTHER RESOURCES AS:

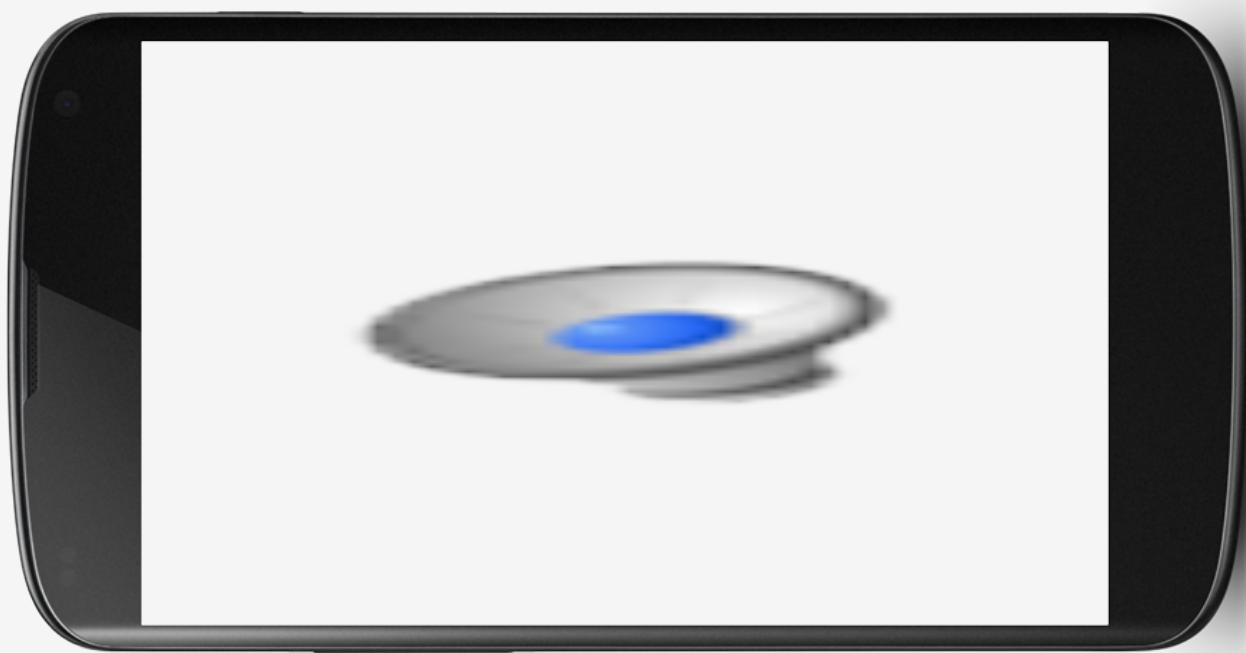
@layout/layout_name

USING MULTIPLE LAYOUT FILES

CAN SPECIFY DIFFERENT LAYOUT FILES BASED
ON YOUR DEVICE'S ORIENTATION, SCREEN SIZE,
ETC.



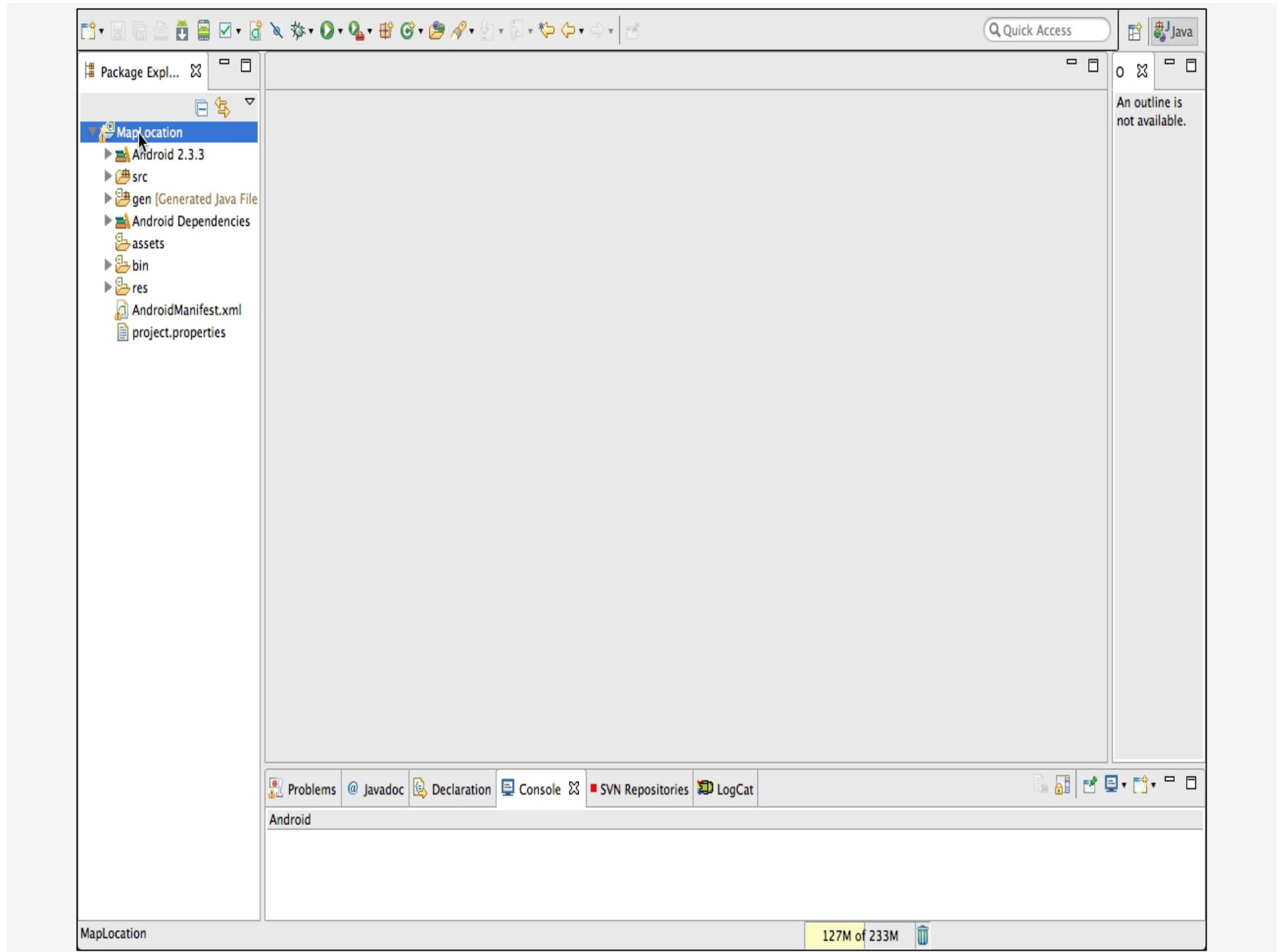




R.JAVA

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

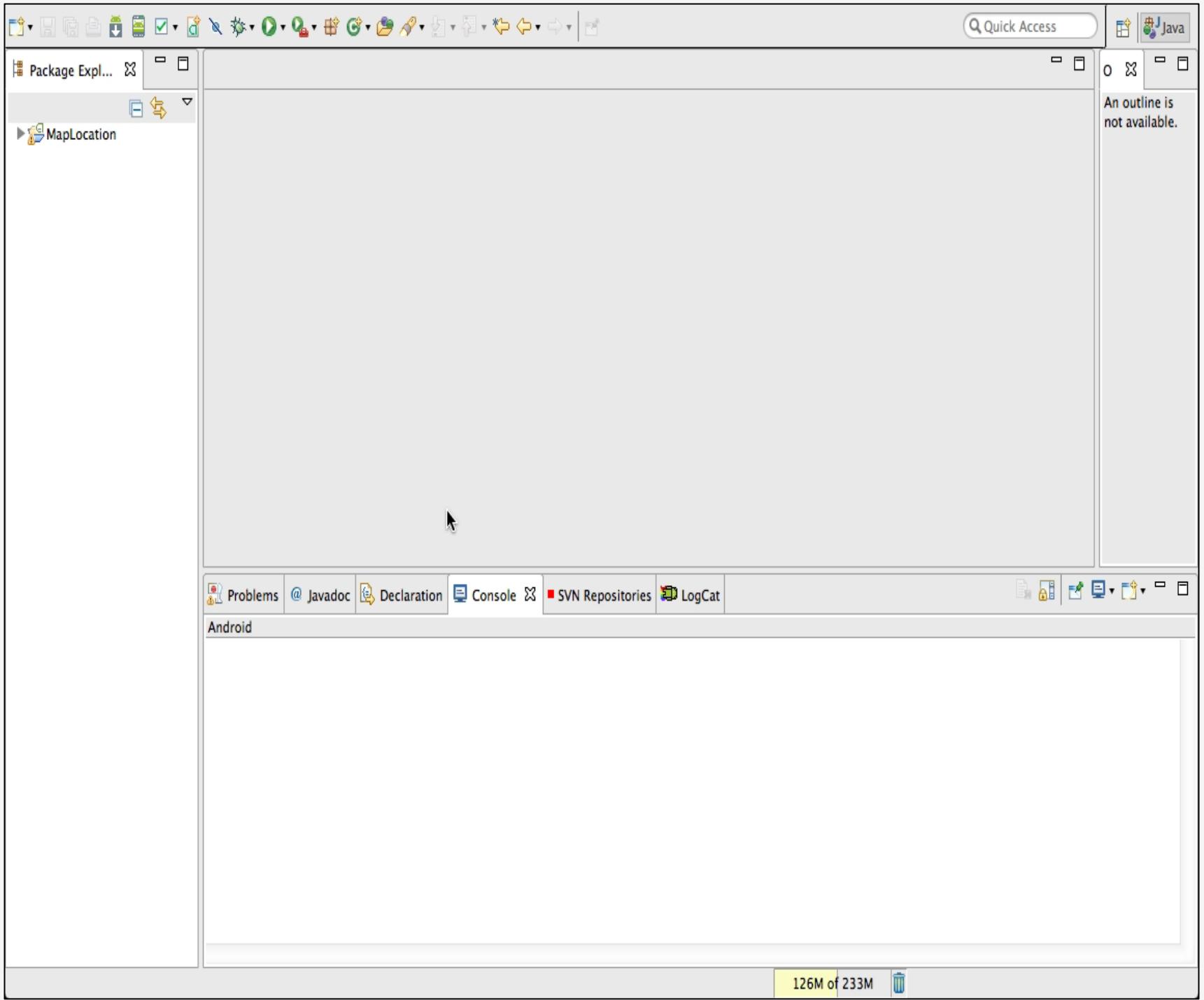
TYPICAL ONCREATE() WORKFLOW

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

ANDROIDMANIFEST.XML

INFORMATION INCLUDES:

APPLICATION NAME

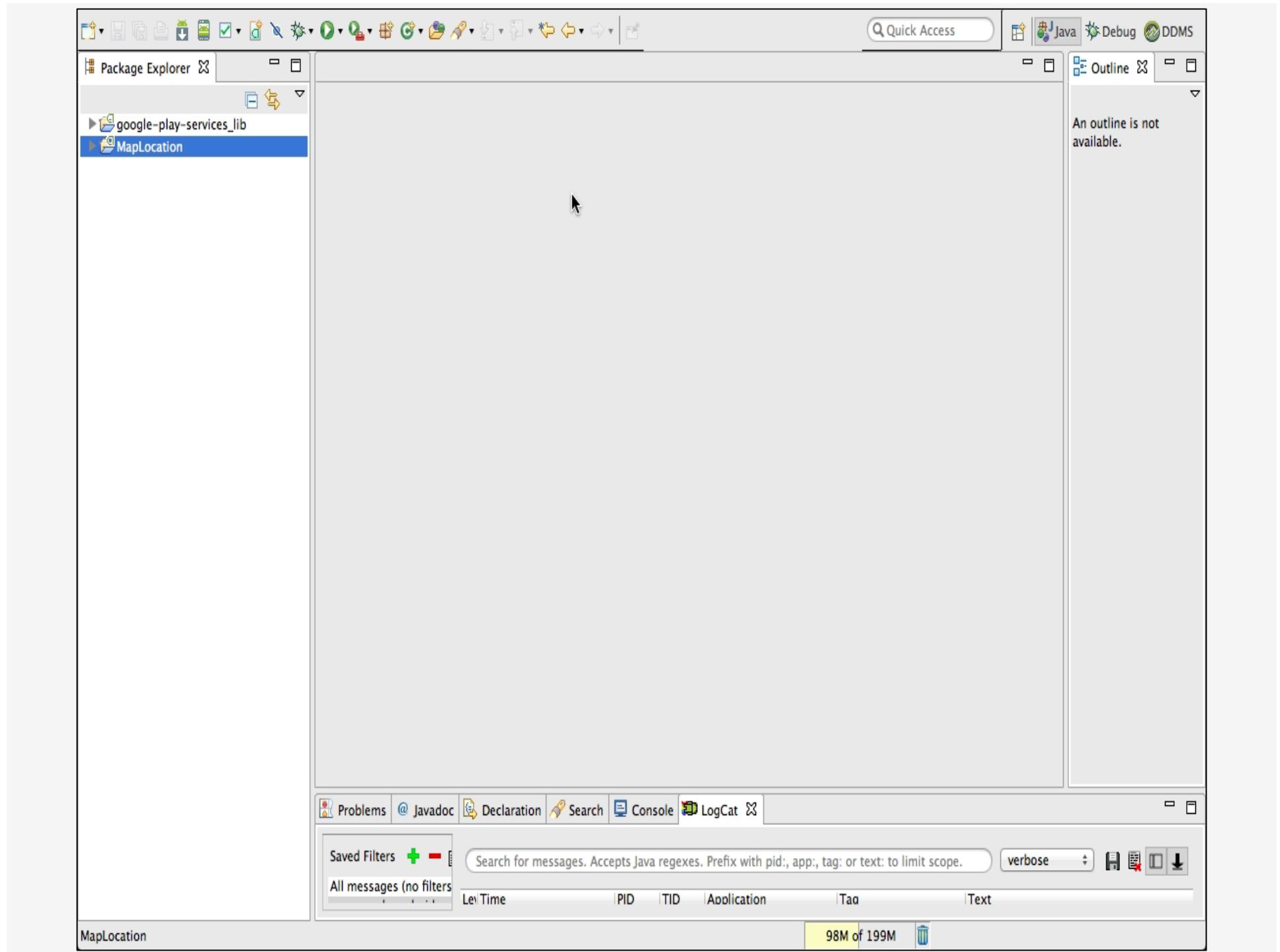
COMPONENTS

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