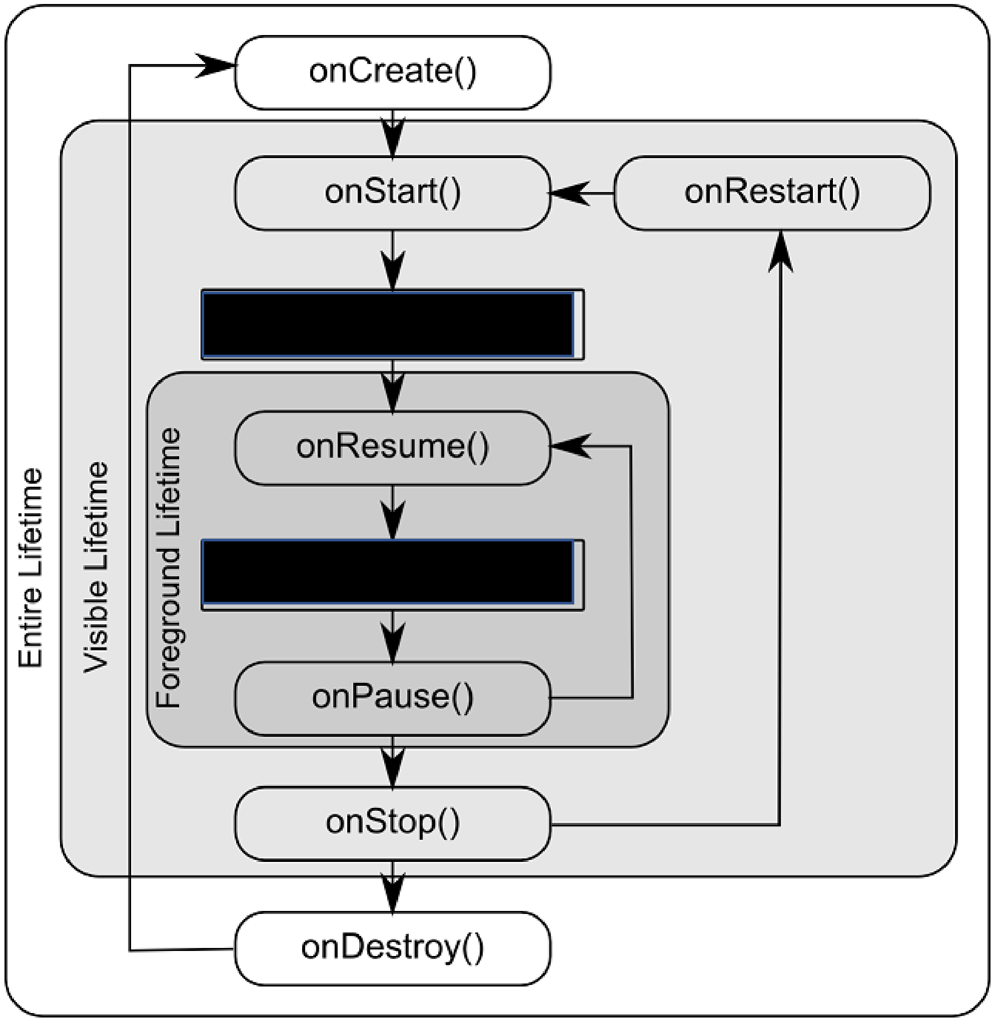
Summer 2, 2019 - CS 4520/CS5520 – Mobile Application Development

Pratheep Kumar Paranthaman, Ph.D.,

What happens when you rotate your device?

Activity Lifecycle



[engineering.letsnurture.com/maintaining-states-across-the-lifecycle-of-android-app/]

onCreate()— Called when the activity is first created

onStart()— Called when the activity becomes visible to the user

onResume()— Called when the activity starts interacting with the user

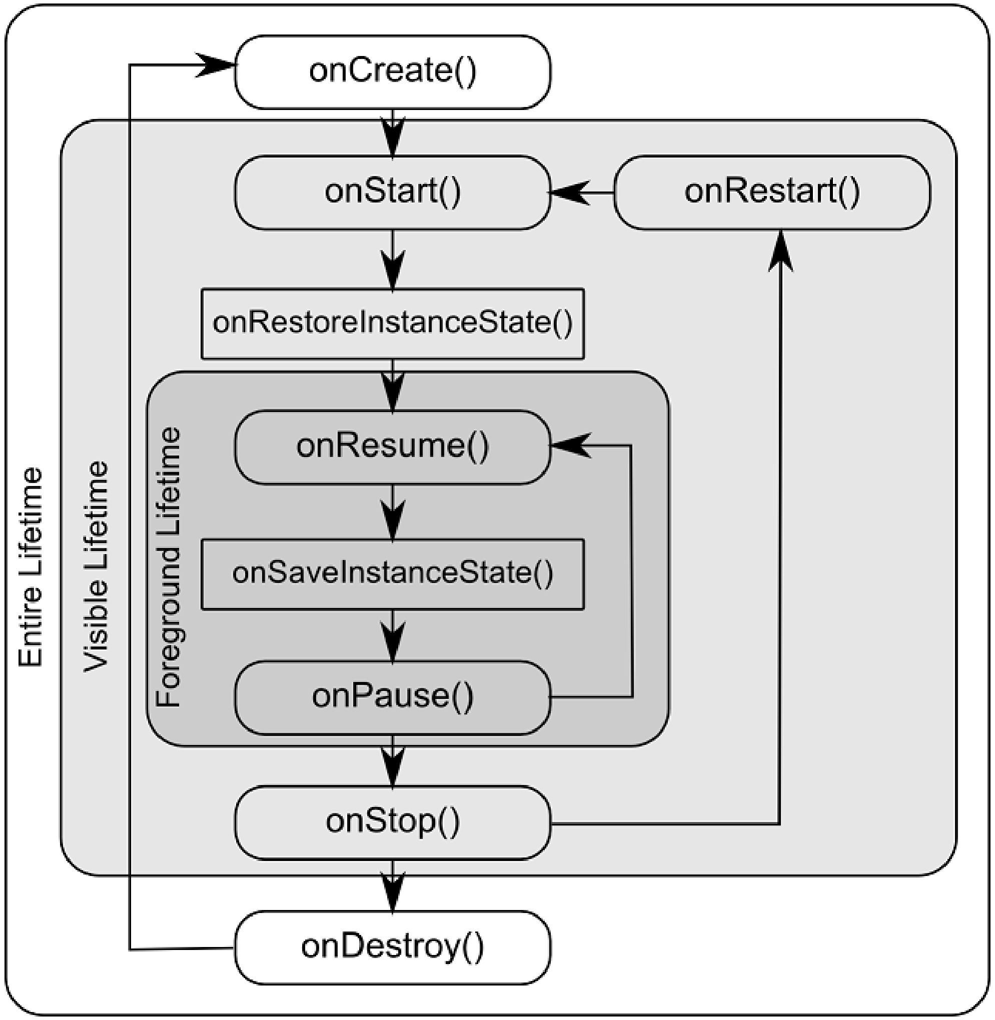
onPause()— Called when the current activity is being paused and the new activity is being resumed

onStop()— Called when the activity is no longer visible to the user

onDestroy()— Called before the activity is destroyed by the system (either manually or by the system to conserve memory)

onRestart()—Called when the activity has been stopped and is restarting again

Activity Lifecycle



[engineering.letsnurture.com/maintaining-states-across-the-lifecycle-of-android-app/]

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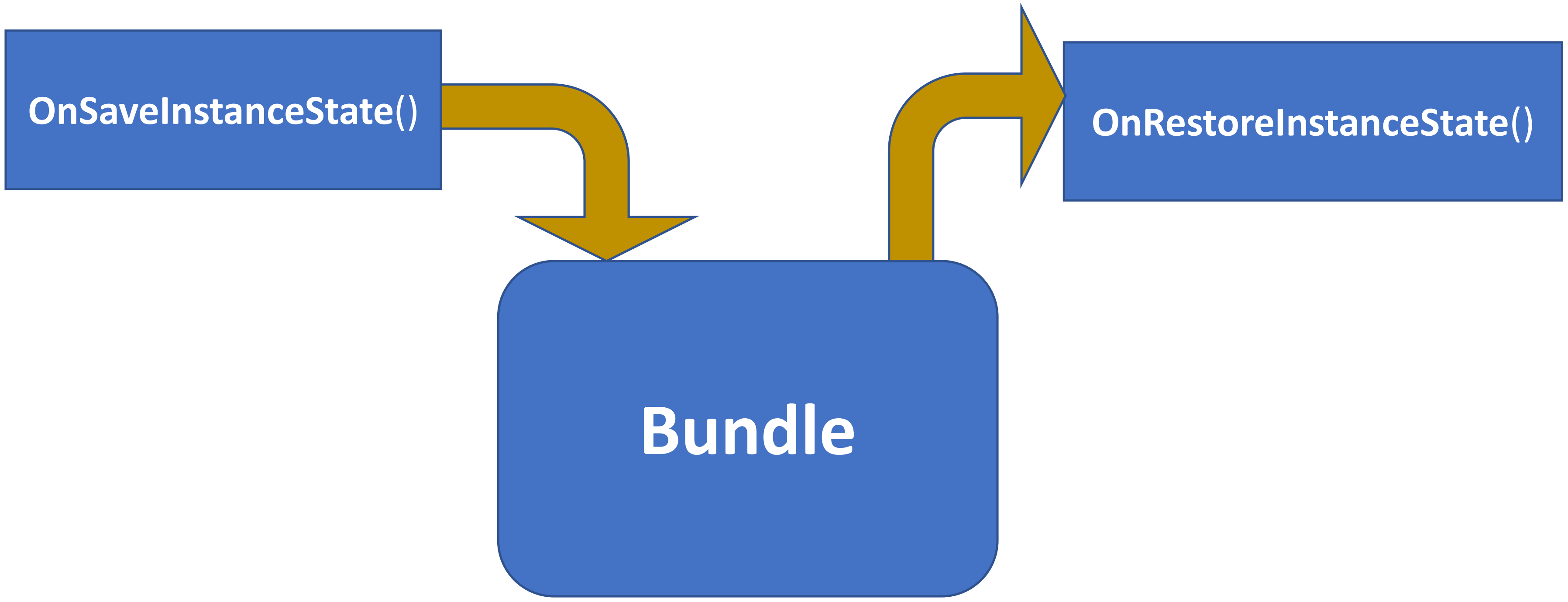
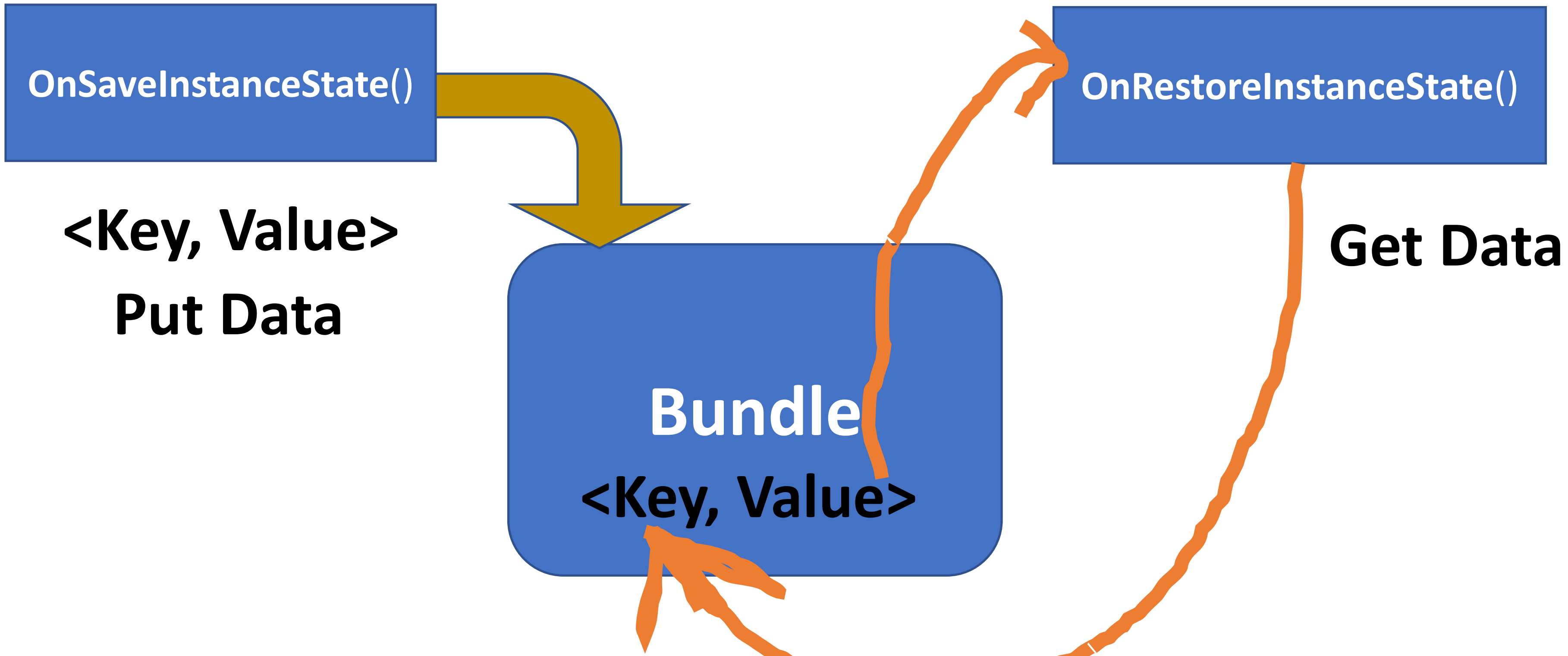
Data persistence within UI states

Bundle – used for transmitting data between UI states and activities



Data persistence within UI states



OnSaveInstanceState()

- Used to store data before the paused state
- Input the data in Key Value pairs
- Choose the Variable Type and put it into the Bundle

- putInt (Key, Value)
- putBoolean (Key, value)
- putByte (Key, value)
- putChar (Key, Value)
- putFloat (Key, value)
- putLong (Key, Value)
- putShort (Key, value)

OnRestoreInstanceState()

- Used to retrieve data when the activity is destroyed and recreated
  - NOTE: during screen orientation, even though your activity is destroyed and recreated your app still exists in the memory.
- Use the key that you provided in OnSaveInstance() and get the data value back from the Bundle

- getInt (Key) -> returns the integer value
- getBoolean (Key) -> returns the boolean value
- getByte (Key) -> returns the byte value
- getChar (Key) -> returns the char value
- getFloat (Key) -> returns the float value
- getLong (Key) -> returns the long value
- getShort (Key) -> returns the short value

Let’s update our code in Movie player App

What happens if your phone shuts down while watching a movie?

Data and File Storage in Android

- Internal Storage
- External Storage
- **Shared Preferences**
- Databases

Shared Preferences

- Limited data storage(data values in your app) – light weight
- allows you to read and write persistent key-value pairs of primitive data types: Booleans, floats, ints, longs, and strings.
- You can retrieve the data even when your app is killed

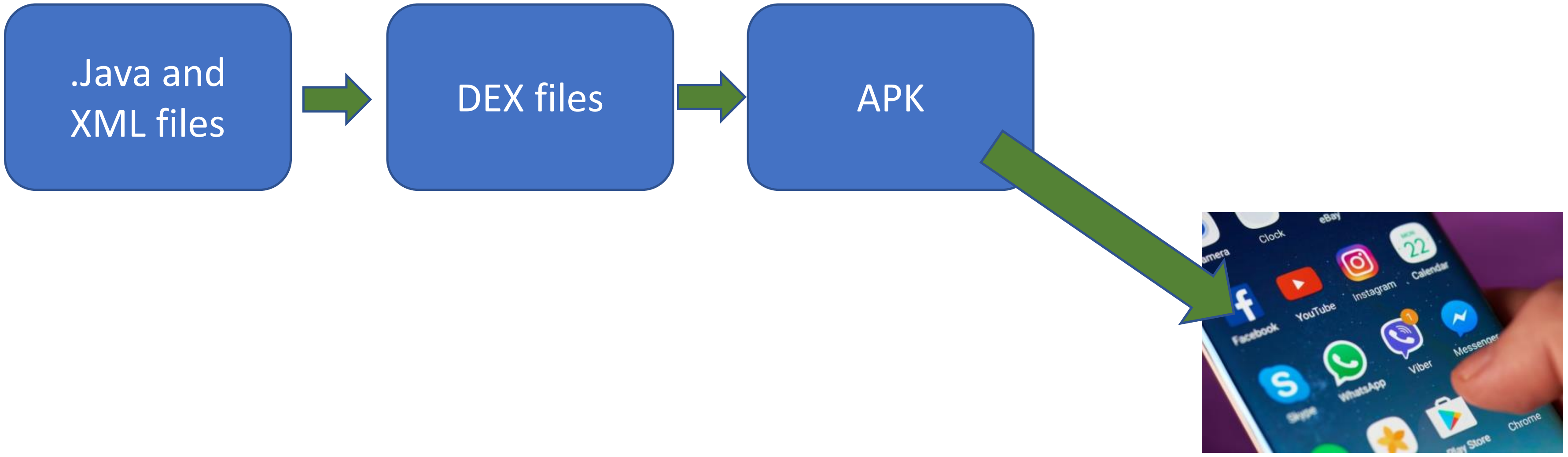
Steps to save data using Shared Preferences

- Step 1:
  - **Initiate Shared Preferences**
    - **Name:** Specify the name of preferences
    - **Mode:** Set the mode type to Private
- Step 2:
  - **Initiate the editor**
    - **Provide edit privileges to your preferences file**
- Step 3:
  - **Put the data into Preferences variable**
- Step 4:
  - Use Apply() to save the changes

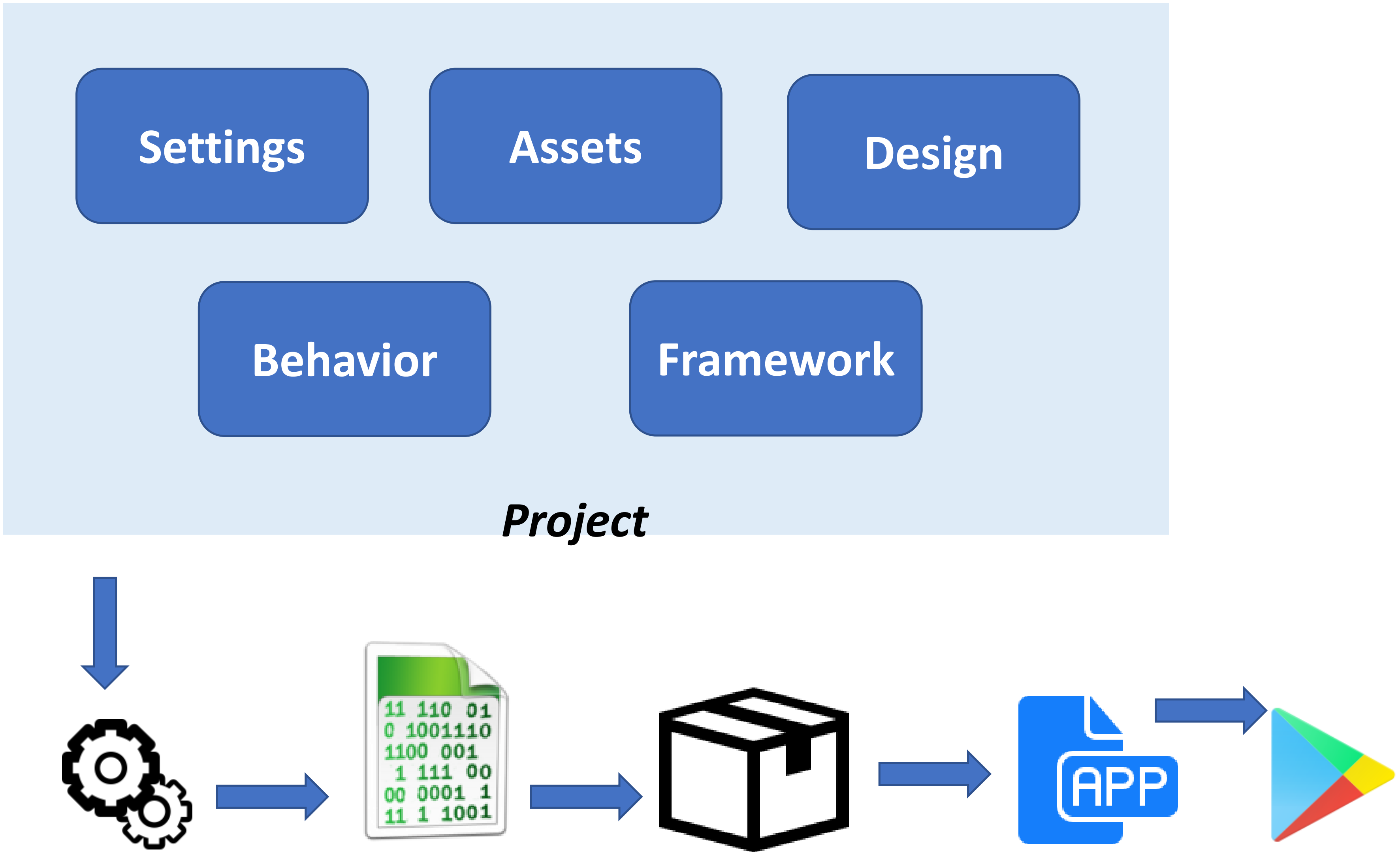
Steps to retrieve data using Shared Preferences

- Step 1:
  - **Initiate Shared Preferences**
    - **Name:** Specify the name of preferences
    - **Mode:** Set the mode type to Private
- Step 2:
  - **Get the data and store to a variable (onCreate())**

What is Gradle?



How does the build and export work?



Debugging???

Today’s topics

- Android components
- Intents

Android Components

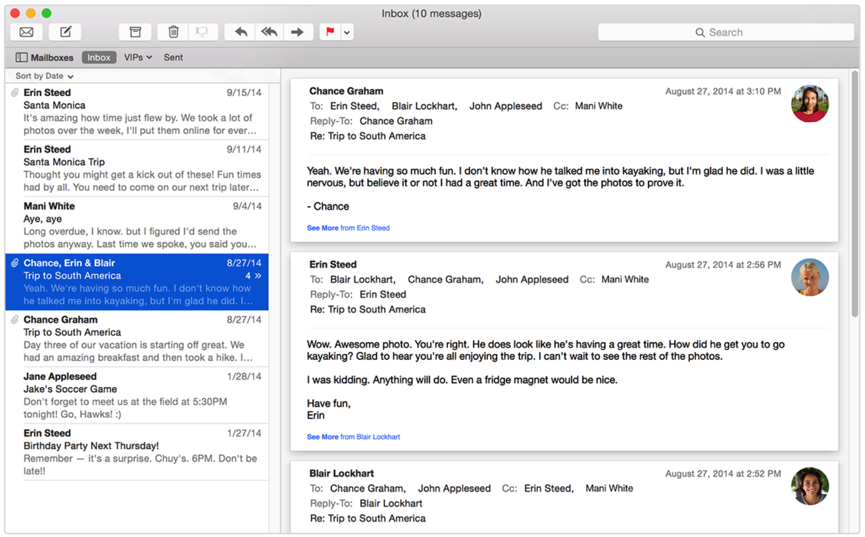
- Activity
- Intents
- Fragments
- Services
- Content providers
- Broadcast receivers
- Views
- Context

Android Components

- **Activity**
- Intents
- Fragments
- Services
- Content providers
- Broadcast receivers
- **Views**
- Context

Android Components

- **Activities:**
  - A user interface screen
  - Responsible for storing its own states
- **Fragments (introduced in Android 3.0- Honeycomb)**
  - Component of an activity – you can think of it as a mini-activity



Erin Steed 9/15/14
Santa Monica
It's amazing how time just flew by. We took a lot of photos over the week, I'll put them online for ever...

Erin Steed 9/11/14
Santa Monica Trip
Thought you might get a kick out of these! Fun times had by all. You need to come on our next trip later...

Mani White 9/4/14
Aye, aye
Long overdue, I know. but I figured I'd send the photos anyway. Last time we spoke, you said you...

Chance, Erin & Blair 8/27/14
Trip to South America 4 »
Yeah. We're having so much fun. I don't know how he talked me into kayaking, but I'm glad he did. I...

Chance Graham 8/27/14
Trip to South America
Day three of our vacation is starting off great. We had an amazing breakfast and then took a hike. I...

Jane Appleseed 1/28/14
Jake's Soccer Game
Don't forget to meet us at the field at 5:30PM tonight! Go, Hawks! :)

Erin Steed 1/27/14
Birthday Party Next Thursday!
Remember — it's a surprise. Chuy's. 6PM. Don't be late!!

Chance Graham August 27, 2014 at 3:10 PM
To: Erin Steed, Blair Lockhart, John Appleseed Cc: Mani White
Reply-To: Chance Graham
Re: Trip to South America

Yeah. We're having so much fun. I don't know how he talked me into kayaking, but I'm glad he did. I was a little nervous, but believe it or not I had a great time. And I've got the photos to prove it.

- Chance

See More from Erin Steed

Erin Steed August 27, 2014 at 2:56 PM
To: Blair Lockhart, Chance Graham, John Appleseed Cc: Mani White
Reply-To: Erin Steed
Re: Trip to South America

Wow. Awesome photo. You're right. He does look like he's having a great time. How did he get you to go kayaking? Glad to hear you're all enjoying the trip. I can't wait to see the rest of the photos.

I was kidding. Anything will do. Even a fridge magnet would be nice.

Have fun,
Erin

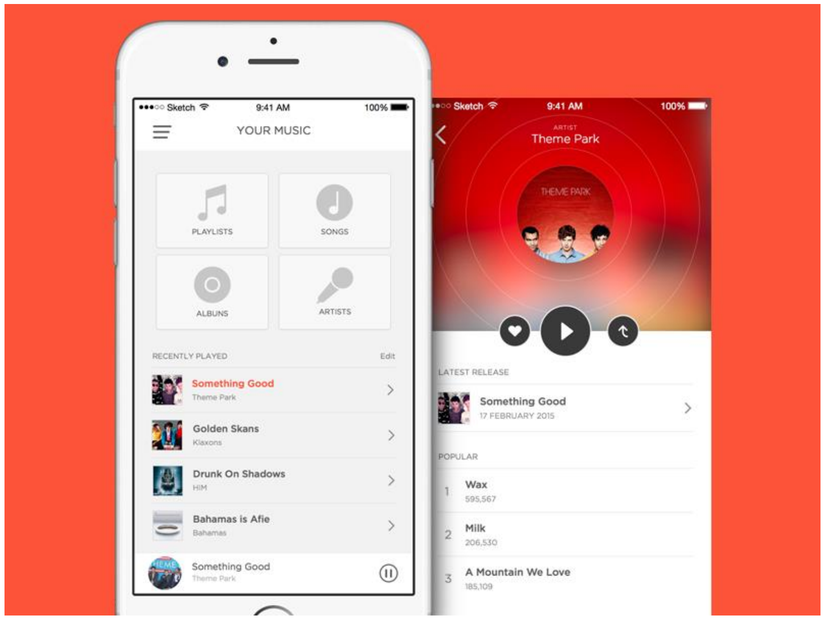
See More from Blair Lockhart

Blair Lockhart August 27, 2014 at 2:52 PM
To: Chance Graham, John Appleseed Cc: Erin Steed, Mani White
Reply-To: Blair Lockhart
Re: Trip to South America

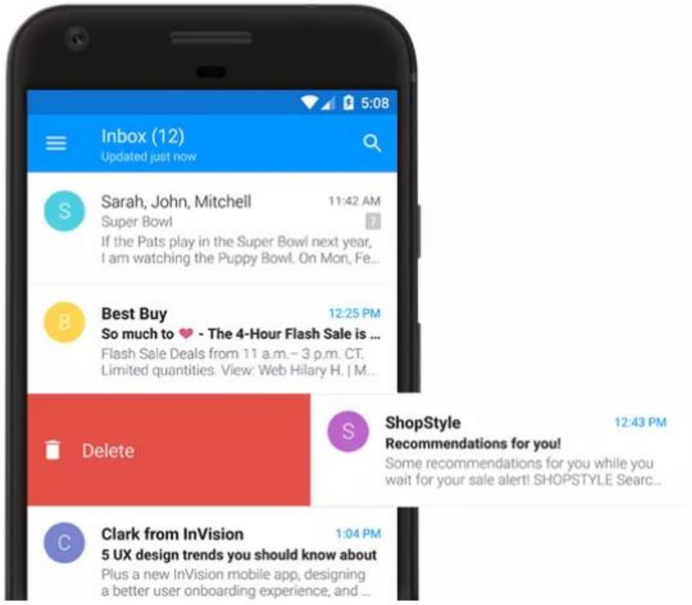
[zapier.com/blog/best-email-app/]

Android Components

- **Services**
  - Tasks that run in background without user's direct interaction



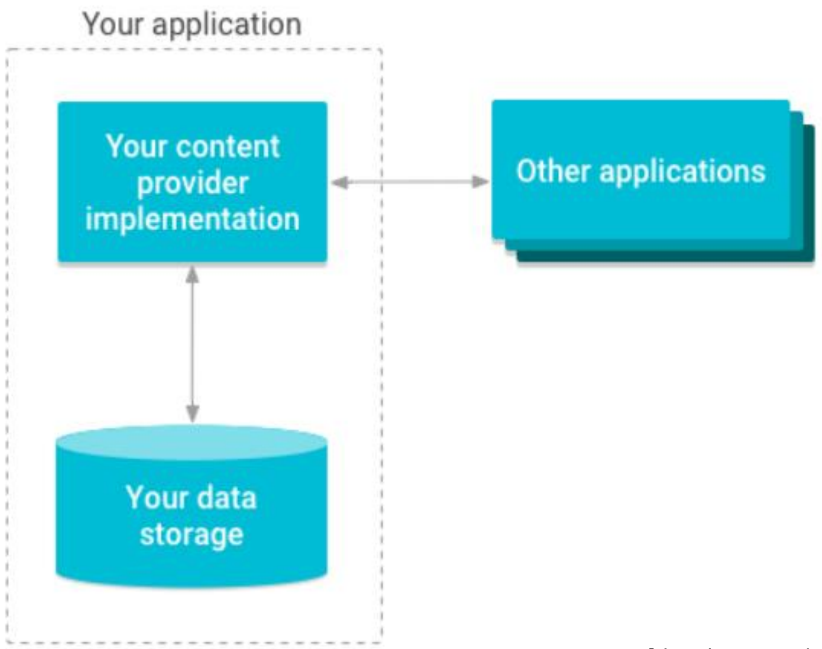
[dribbble.com/shots/1940970-Music-App-Artist-View]



[theverge.com/2017/2/16/14642944/easilydo-email-available-android-play-store]

Android Components

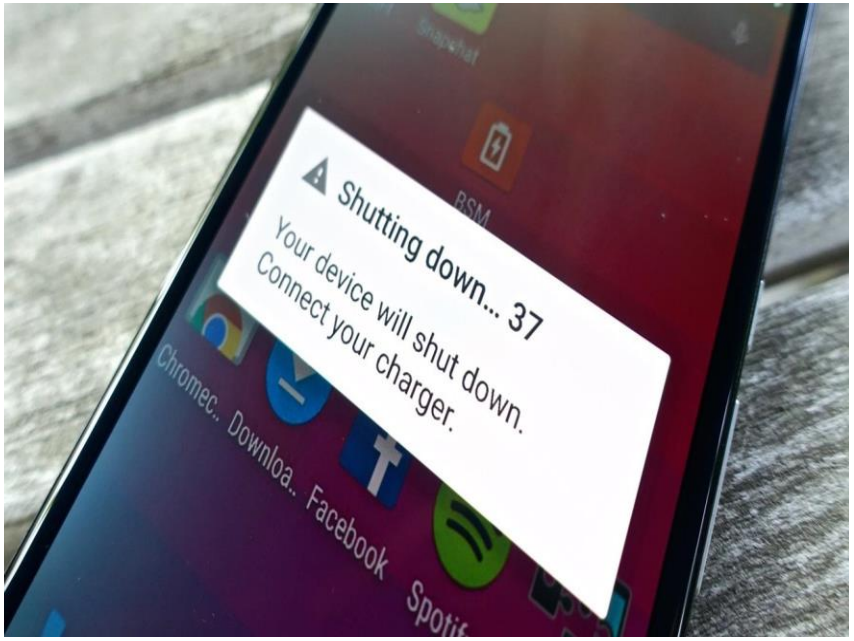
- **Content Providers**
  - Provides data from one application to another(the one which requests)
  - Interface that connects data from one app with code running in another app



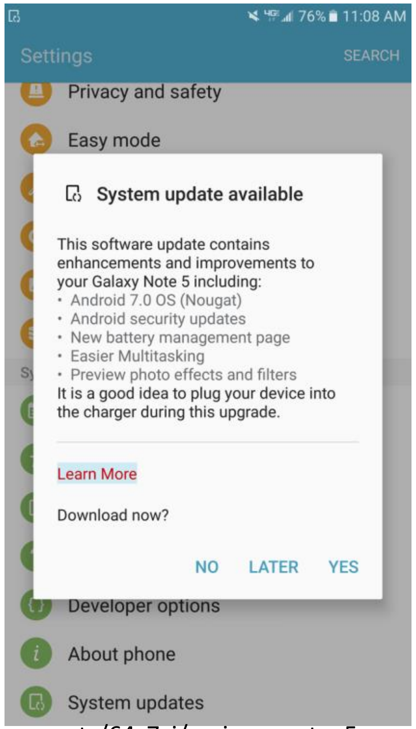
[developer.android.com/guide/topics/providers/content-providers]

Android Components

- **Broadcast receivers**
  - Apps can send or receive broadcast messages from Android OS or other apps



[developer.android.com/guide/components/broadcasts]



System update available

This software update contains enhancements and improvements to your Galaxy Note 5 including:
- Android 7.0 OS (Nougat)
- Android security updates
- New battery management page
- Easier Multitasking
- Preview photo effects and filters

It is a good idea to plug your device into the charger during this upgrade.

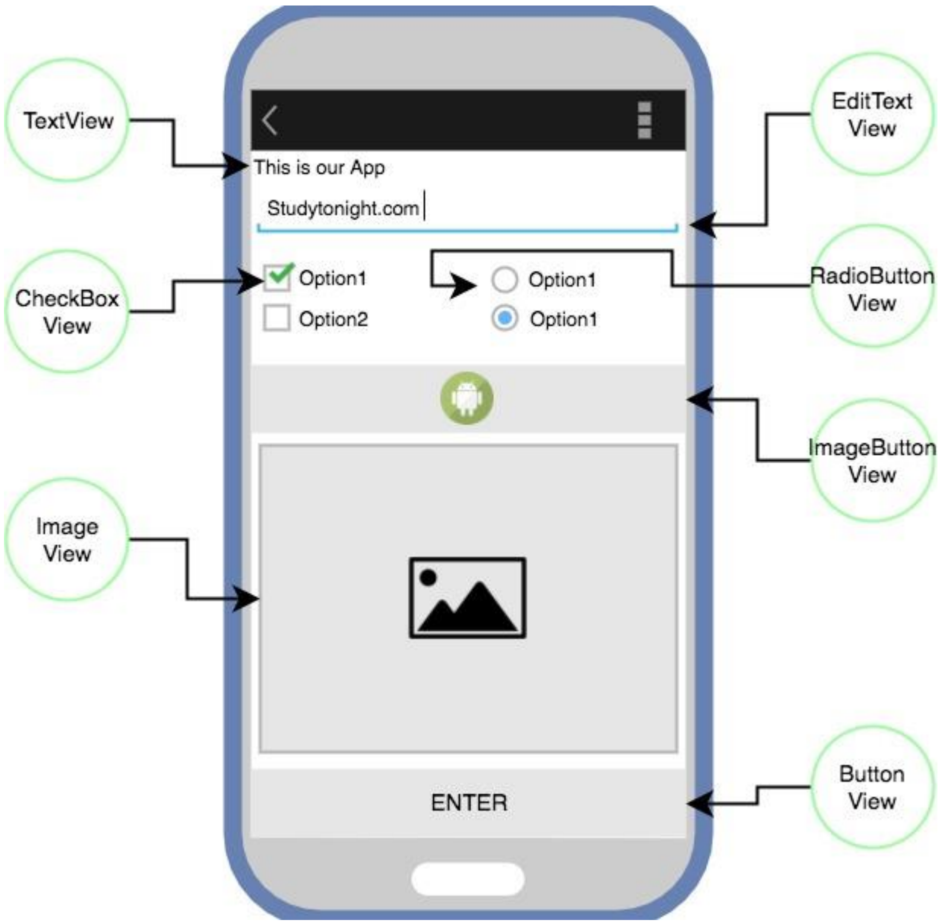
Learn More

Download now?

[reddit.com/r/galaxynote5/comments/64z7cj/verizon_note_5_nougat_update_available/]

Android Components

- **Views**
  - Smallest unit of a user interface
  - Created by Java code/XML Layouts
  - Each view has series of attributes.

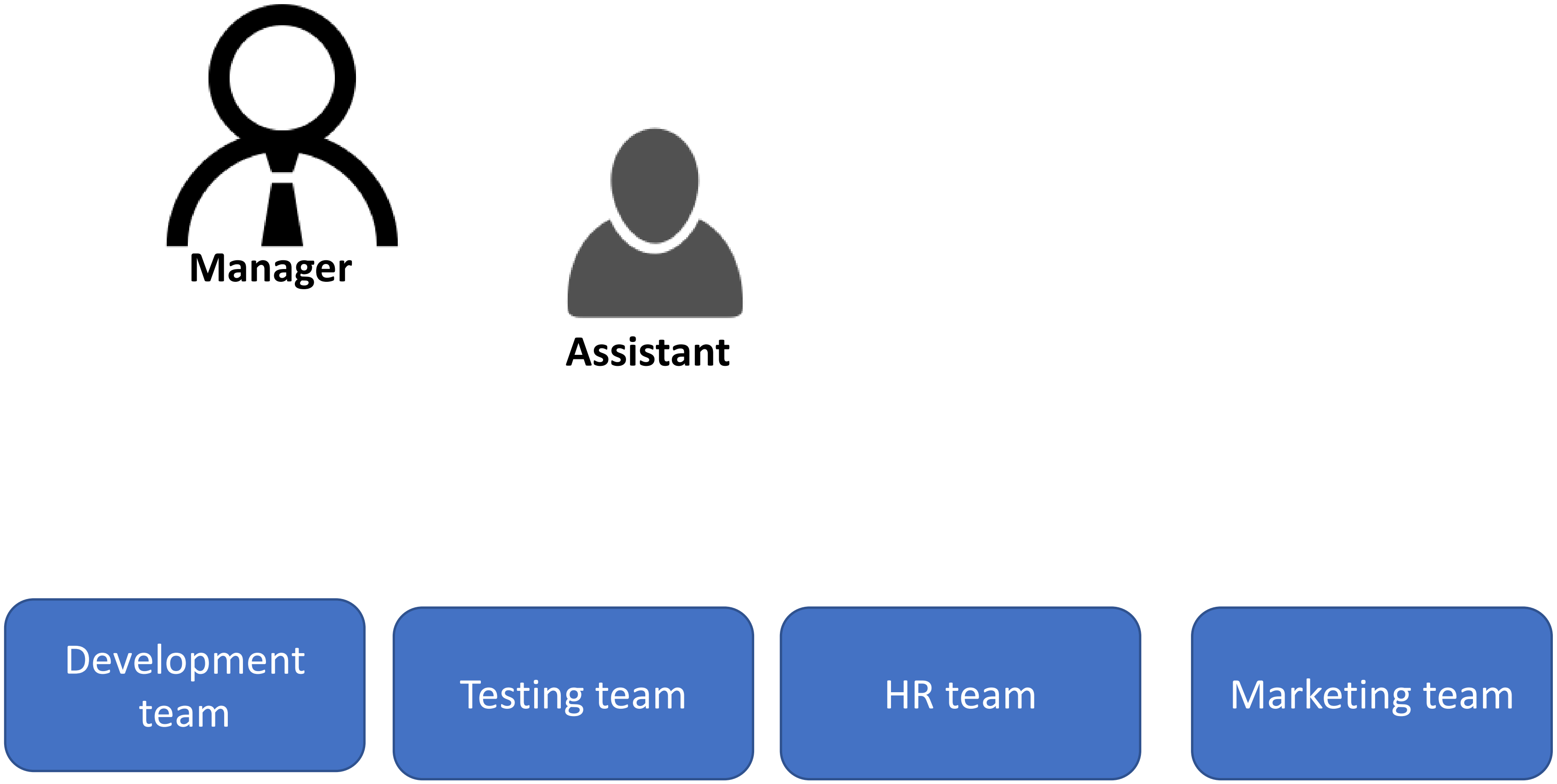


[studytonight.com/android/introduction-to-views]

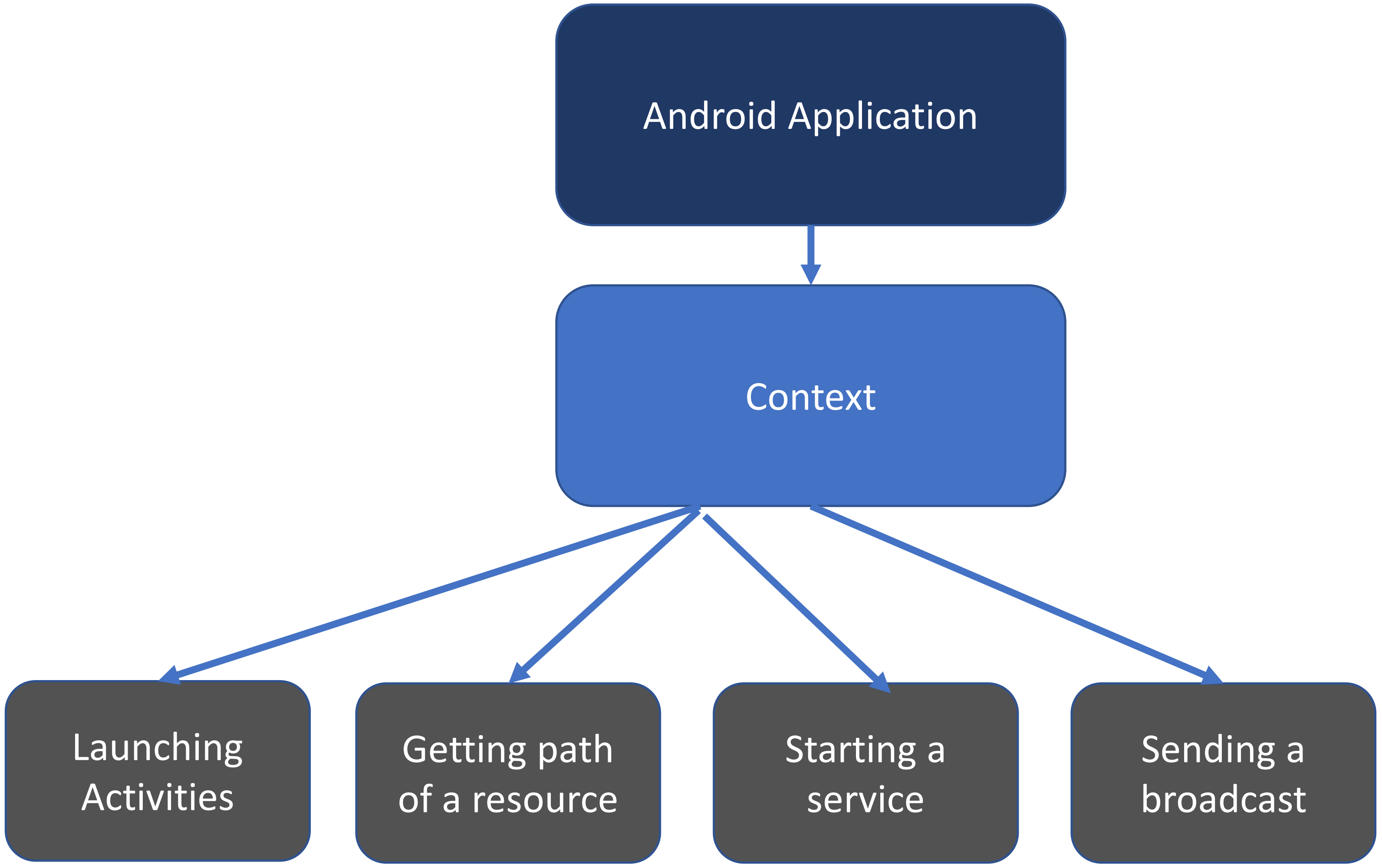
Android Components

- **Context**
  - Definition from Android Documentation:
    - Interface to global information about an application
    - Allows access to application specific resources

Context Analogy



Context Analogy



Context

- **Context**

  "Current state of the application"

- How retrieve Application Context?

```
Context context = getApplicationContext();
```

Context

- Predominantly used to access or load resources
  - getResources()
  - getString()

Context

- getApplicationContext()
- getContext()
- getBaseContext()
- this
- getAssets()
- getResources()
- getPackageManager()
- getPackageName()
- getString()
- getSharedPrefsFile()

Intents

Intents

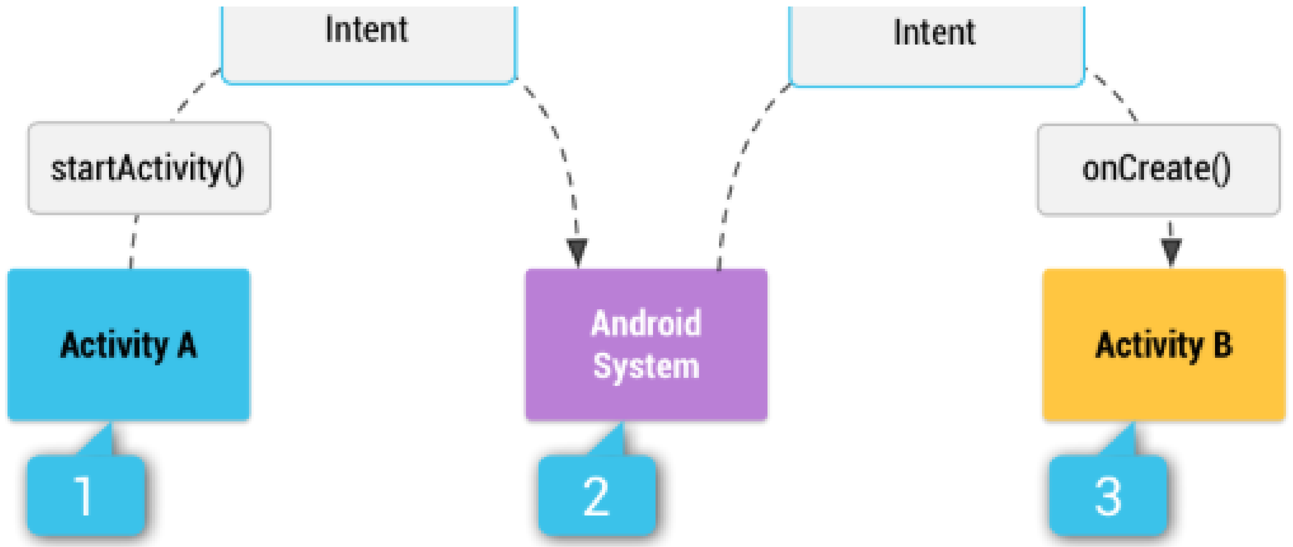
- **A tool to pass message between Android components (Activities, Services, Content Providers, and Broadcast receivers)**

- What can you do with an Intent?
  - Open another activity/service from the current activity
  - Pass data between activities and services
  - Deliver a broadcast

Using Intents to Start an activity

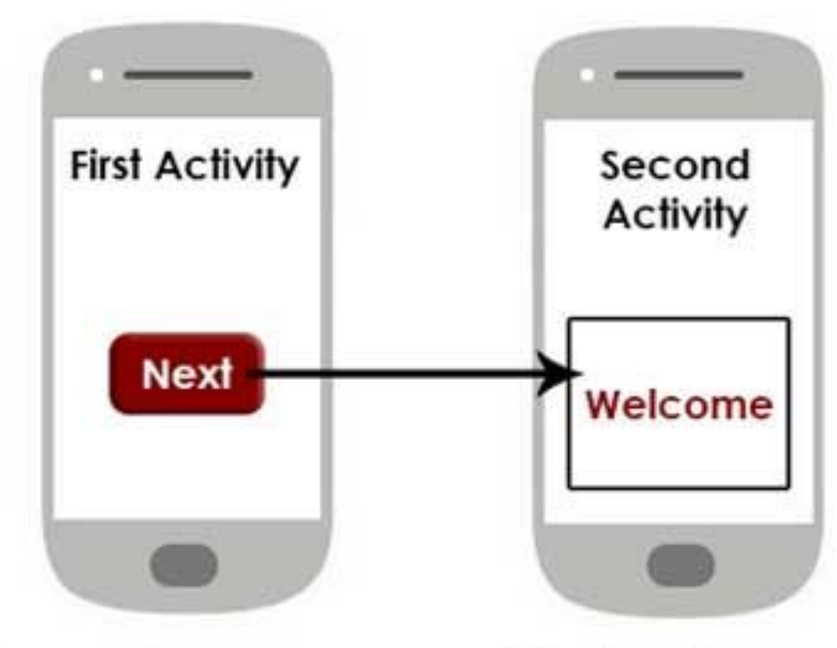
Steps:

1. create an object of intent and pass the details of the current and next activity
2. Use startActivity() to initiate this task



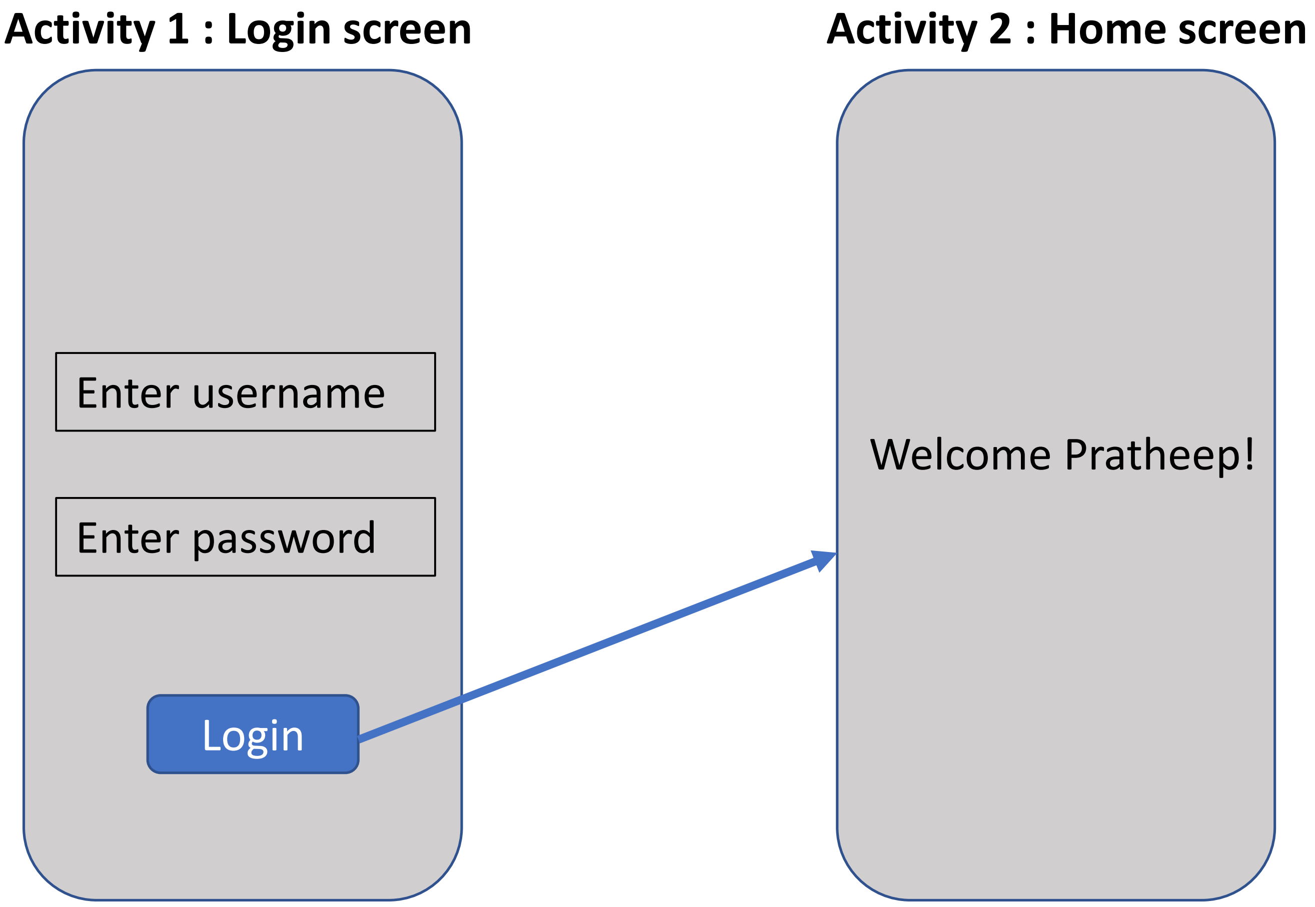
Types of Intents

- **Explicit Intent:**
  - Activity that you want to call is known
  - Typically used to start a component(activity/service) in your app



[interviewquestionanswer.com/android-questions/what-is-an-explicit-intent]

Example – Explicit Intent



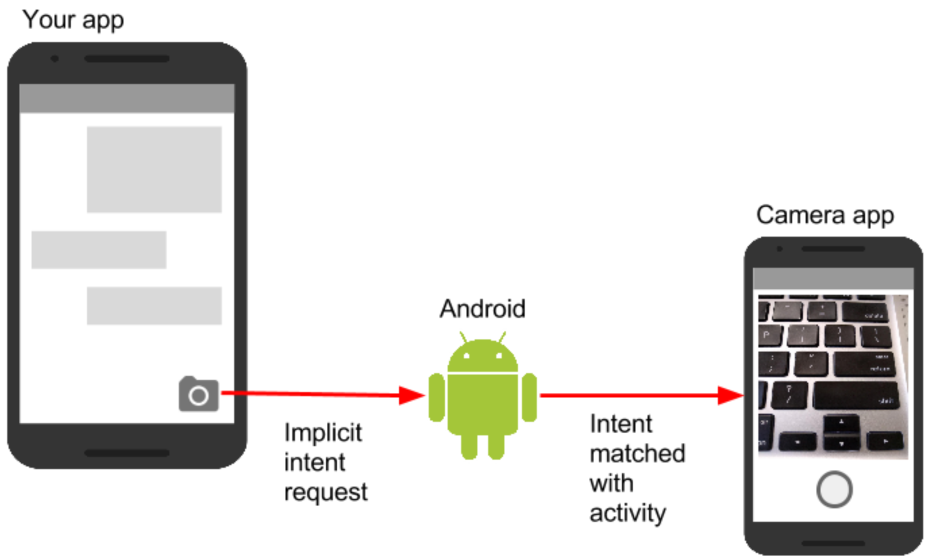
Passing data between activities

Passing data

- putExtra(Key,Value)
- getIntent().getExtra(Key)

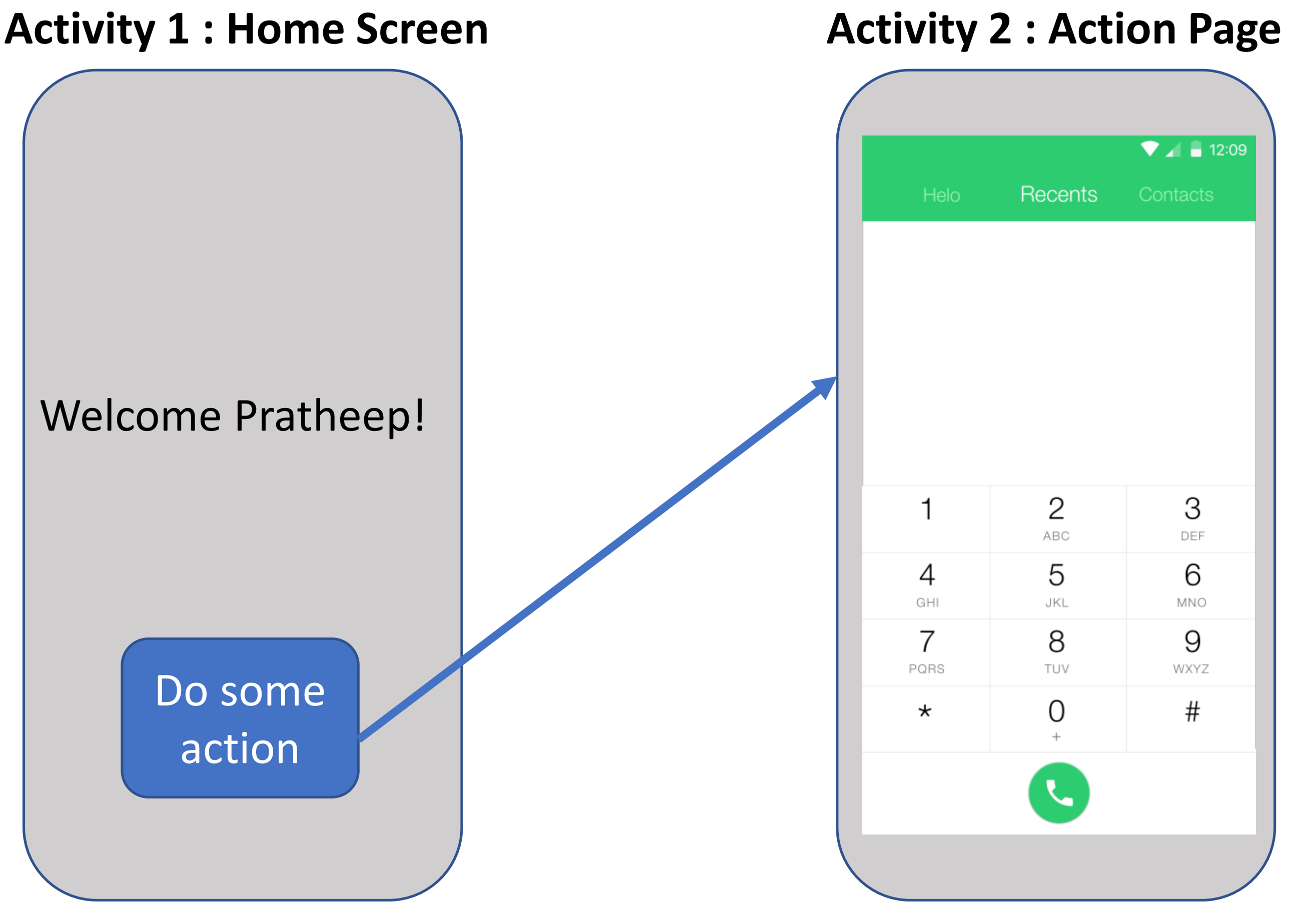
Types of Intents

- **Implicit Intent:**
  - Exact name of activity/service to run is unknown
  - **Declare general action** to perform and the component in another app will handle it.



[google-developer-training.github.io/android-developer-fundamentals-course-concepts/en/Unit%201/23_c_activities_and_implicit_intents.html]

Example – Implicit Intent


Activity 1 : Home Screen
Welcome Pratheep!
Do some action
Activity 2 : Action Page
12:09
Helo
Recents
Contacts
1
2 ABC
3 DEF
4 GHI
5 JKL
6 MNO
7 PQRS
8 TUV
9 WXYZ
*
0 +
#