CS 473 – MDP
Mobile Device Programming

Maharishi International University

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MS.CS PROGRAM

DEPARTMENT OF COMPUTER SCIENCE

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LESSON 5

INTENTS

Maharishi International University

WHOLENESS

- In this lesson we will examine the usage of intents. An intent is a communication bridge between app component (activity, service or broadcast) via the android system to perform actions. You can also use intents return information to your original activity. *With the help of Transcendental one can communicate easily with inner self like how Android can communicate from one activity to another activity to perform actions with the help of Intents.*

AGENDA

- Activities
- Implicit intents
- Explicit intents
- Hands on example
  - Explicit event - send a message from one activity to another activity.
  - Implicit event – sending message through e-mail, dial up screen and WhatsApp
- Intent Filters
- Getting result from the activity

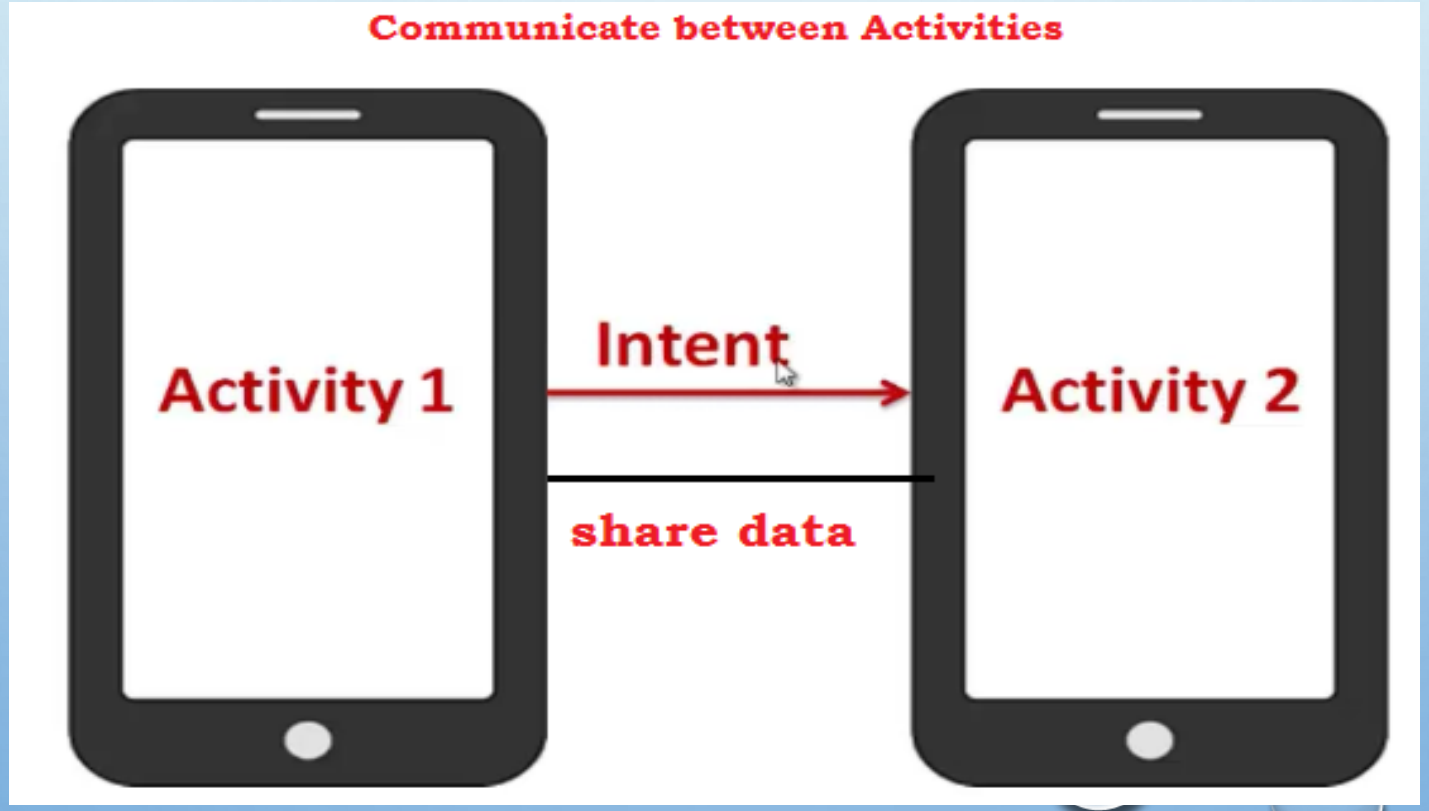
ACTIVITY & INTENT

- An Activity is an application component
- First activity user sees is typically called “Main activity"
- Implement new activities
  1. Define layout in XML
  2. Define Activity Kotlin class
     - extends AppCompatActivity
  3. Connect Activity with Layout
     - Set content view in onCreate()
  4. Declare Activity in the Android manifest

- An Intent is a messaging object used to request an action from another app component (activity, service or broadcast) via the android system.
- An Intent can be used to:
  - start an Activity
  - start a Service
  - deliver a Broadcast

Introduction to Intents

- We're going to show you how to build apps with multiple activities, and how you can get your apps talking to each other using intents.
- Intents are multi-purpose communication tools, and the Intent class provides different constructors depending on what you are using the intent to do.



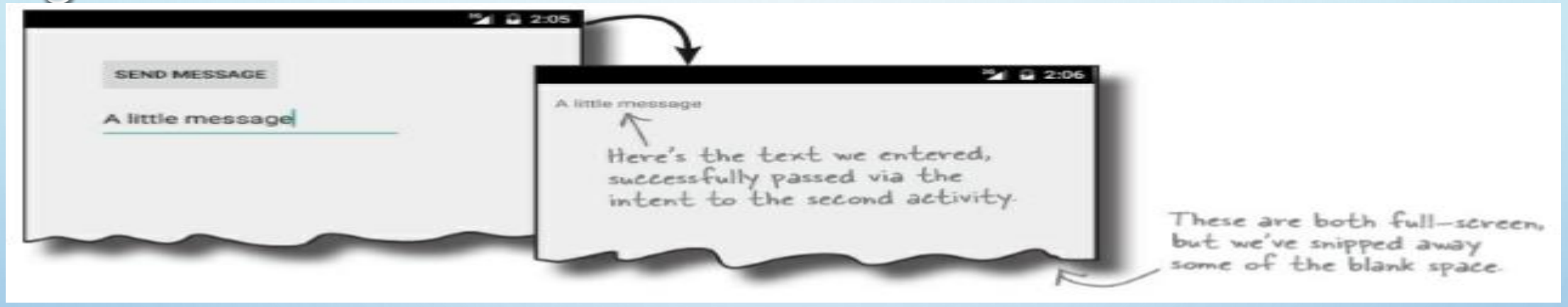
Types of intents

- **Explicit intents[user defined]** specify the component to start by name (the fully-qualified class name). You'll typically use an explicit intent to start a component in your own app, because you know the class name of the activity or service you want to start. For example, you can start a new activity in response to a user action or start a service to download a file in the background.
- **Implicit intents[API]** An implicit intent allows you to start an activity in another app by describing an action you intend to perform, such as "share an article", "view a map", or "take a picture“. An implicit intent specifies an action and may provide data with which to perform the action. Implicit intents do not specify the target activity class, just the intended action.
- Intents are created using **Intent** class. Following are the major methods in Intents class.

setAction()	setData()	putExtra()
setComponent()	setType()	getExtra()

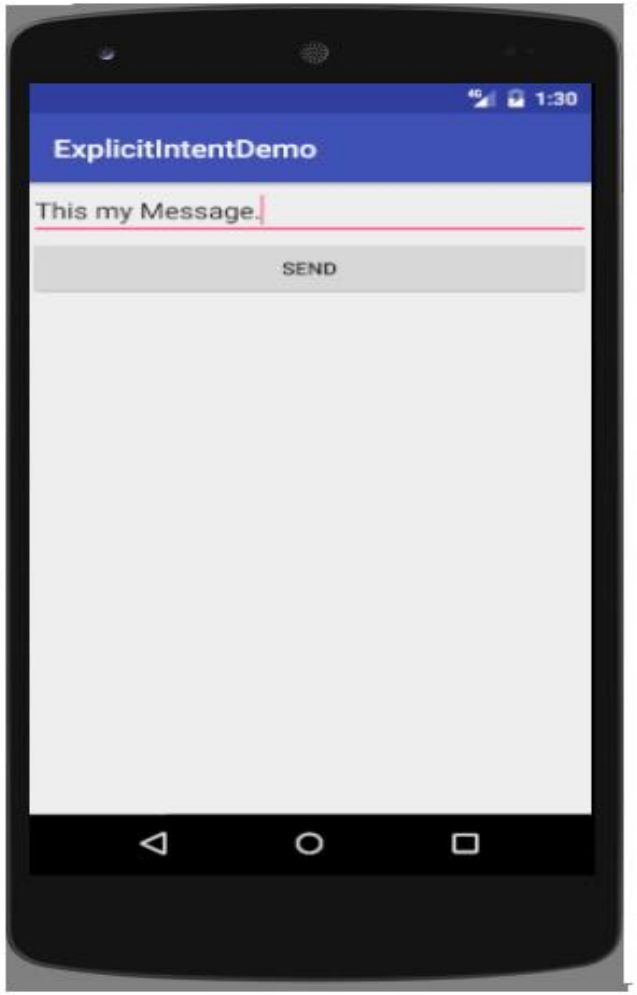
Hands on Example 1 – Explicit Intent

Problem : Send a message from one activity to another activity.

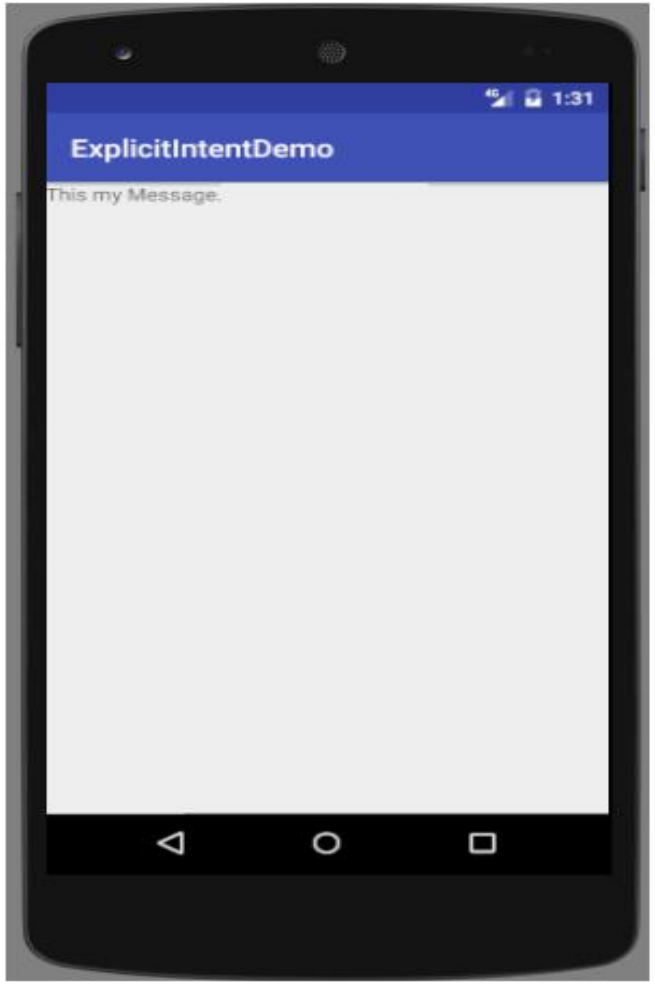


Problem Requirement

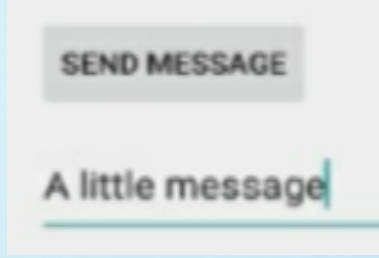
First Activity



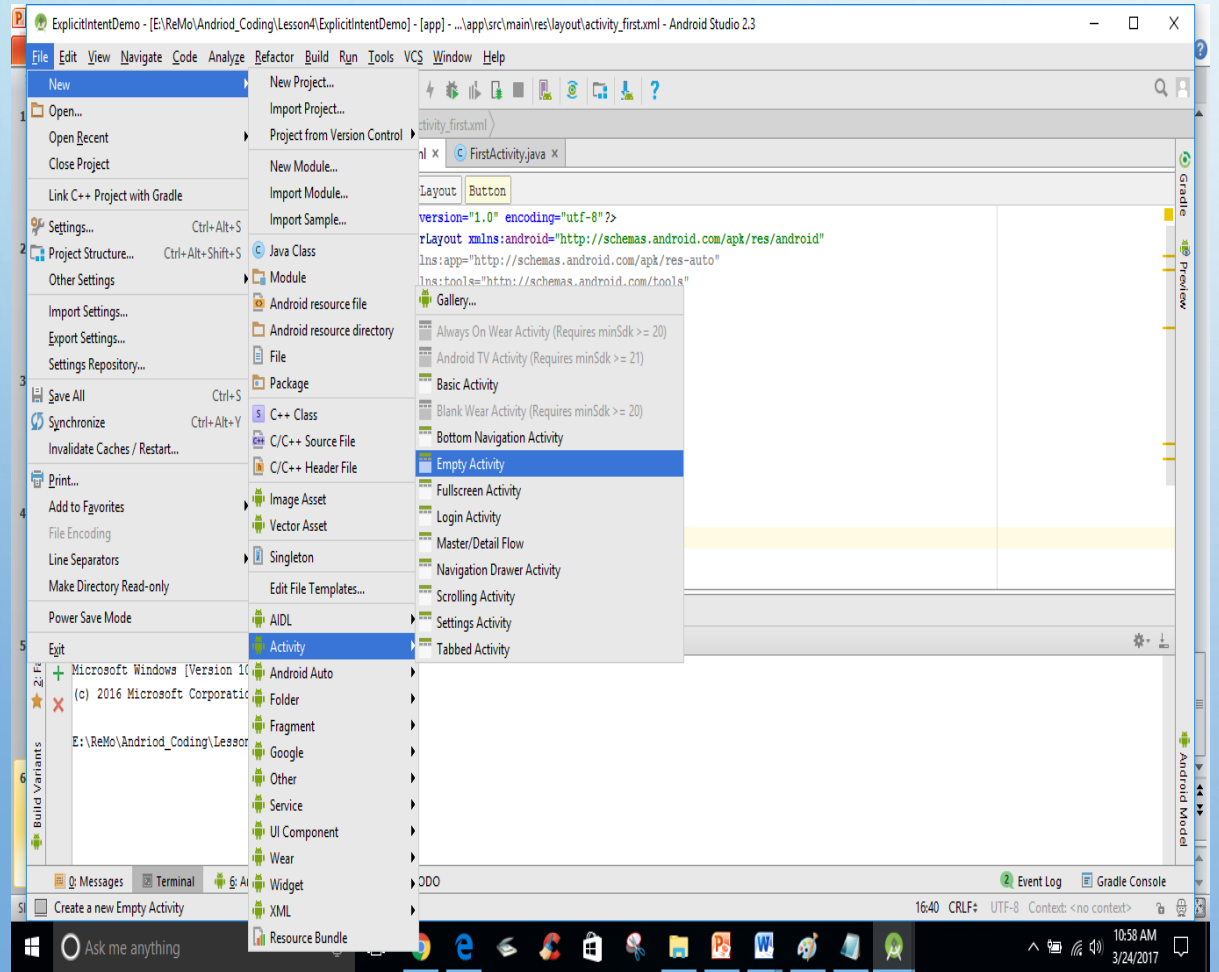
Second Activity

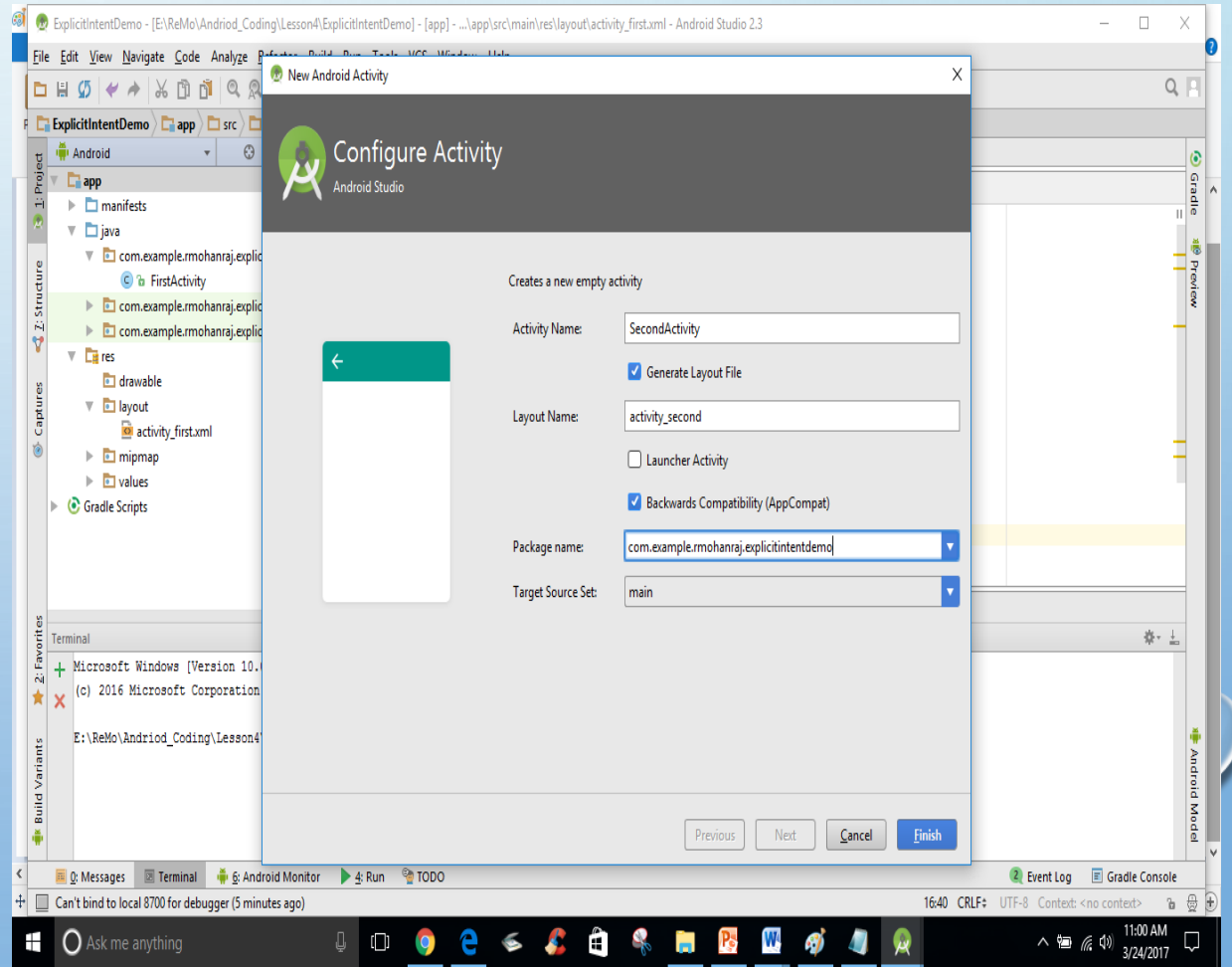


Steps to find the solution



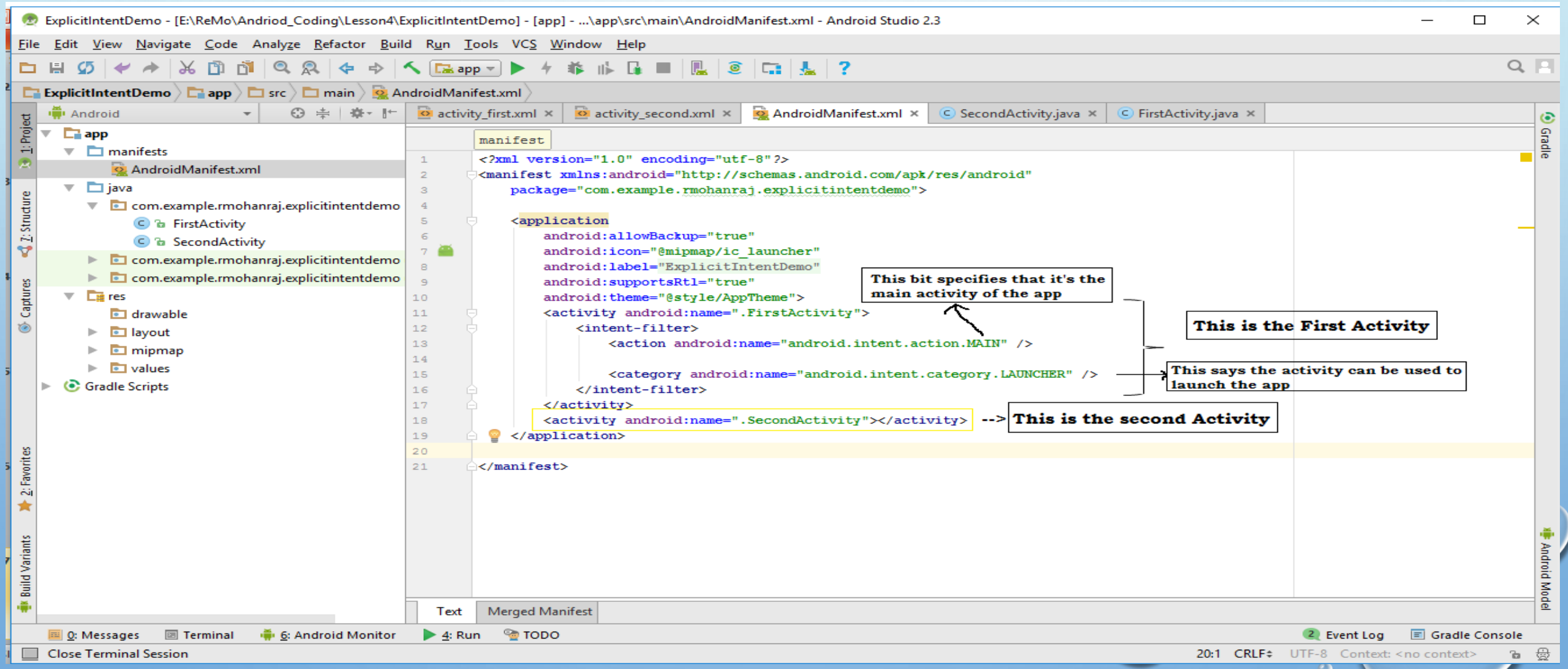
- Step 1: Create your first activity with the controls of one text box and one button.
- Step 2 : Create a second activity with one Text view to receive message from the first activity in the same project by choosing File→ New → Activity and choose the option for Blank Activity





- Step : 3 If new activity not configured automatically at AndroidManifest.xml, Configure Second Activity in manifest folder → AndriodManifest.xml and include

  <activity android:name=".SecondActivity"></activity> as per the screenshot.



- **Step : 4 : Create an Intent and StartActivity**

You can create and send an intent using just a couple of lines of code. You start by creating the intent like this:

val intent = Intent(this, SecondActivity::class.java)

similar like in java code **Intent intent = new Intent(this,TargetClassname.class);**

The first parameter tells Android which object the intent is from, and you can use the word this to refer to the current activity. The second parameter is the class name of the activity that needs to receive the intent. Once you've created the intent object, you pass it to Android like this:

startActivity(intent);

This tells Android to start the activity specified by the intent. Once Android receives the intent, it checks everything's OK and tells the activity to start. If it can't find the activity, it throws an ActivityNotFoundException.

```
fun onSendMessage(view:View){
        var input = smsg.text.toString()
        val intent = Intent(this, SecondActivity::class.java)
        startActivity(intent)
}
```

- Step 5:Pass text to the Second Activity from the First Activity.
  - Put the data into the intent as Key/Value pairs. To do this, you use the putExtra() method

    intent.putExtra("message", value);
  - Change the onSendMessge() with putExtra().

```
fun onSendMessage(view:View){
        var input = smsg.text.toString()
        val intent = Intent(this, SecondActivity::class.java)
        intent.putExtra("message",input ) // Here message is a key to retrieve the input text in the second activity
        startActivity(intent)
    }
```

The putExtra() method is overloaded so value has many possible types. As an example, it can be a primitive such as a boolean or int, an array of primitives, or a String. You can use putExtra() repeatedly to add numerous extra data to the intent. If you do this, make sure you give each one a unique name.

- STEP 6 : Retrieve extra information from an intent in the Second Activity
- There are a couple of useful methods that can help with this. The first of these is **getIntent();**
- getIntent() returns the intent that started the activity, and you can use this to retrieve any extra information that was sent along with it.
- How you do this depends on the type of information that was sent.
- As an example, if you know the intent includes a string value with a name of “message”, you would use the following:

```
val intent = getIntent()
val output = intent.getStringExtra("message")
```

You’re not just limited to retrieving String values. As an example, you can use

int intNum = intent.getIntExtra("name", default_value);

to retrieve an int with a name of name. default_value specifies what int value you should use as a default.

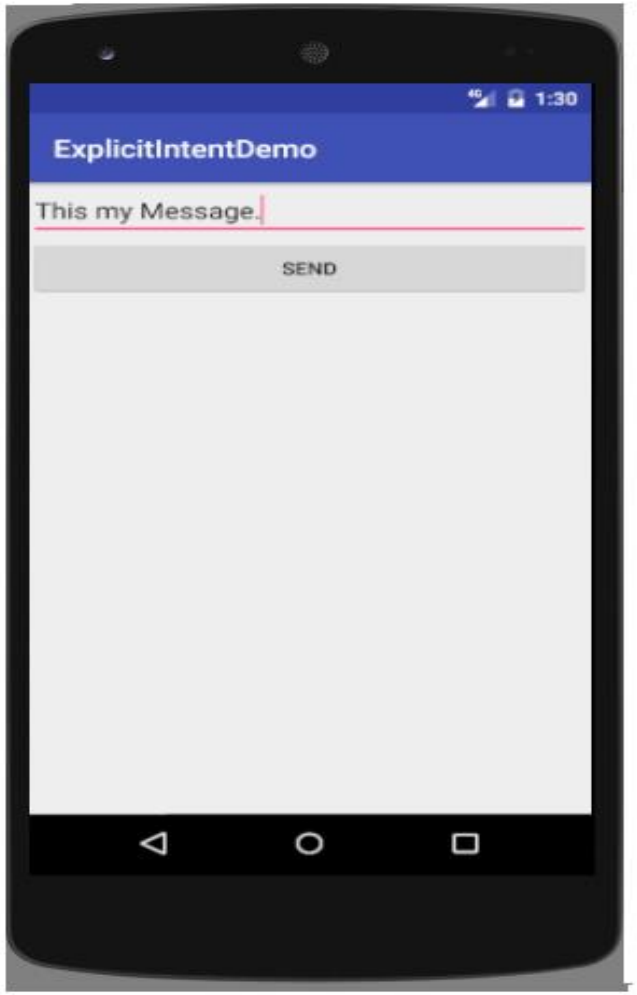
- **Write this code in the second activity class.**

```
class SecondActivity : AppCompatActivity() {
    override fun onCreate(savedInstanceState: Bundle?) {
        super.onCreate(savedInstanceState)
        setContentView(R.layout.activity_second)
        val intent = getIntent()
        val output = intent.getStringExtra("message")
        rmsg.text = output
    }
}
```

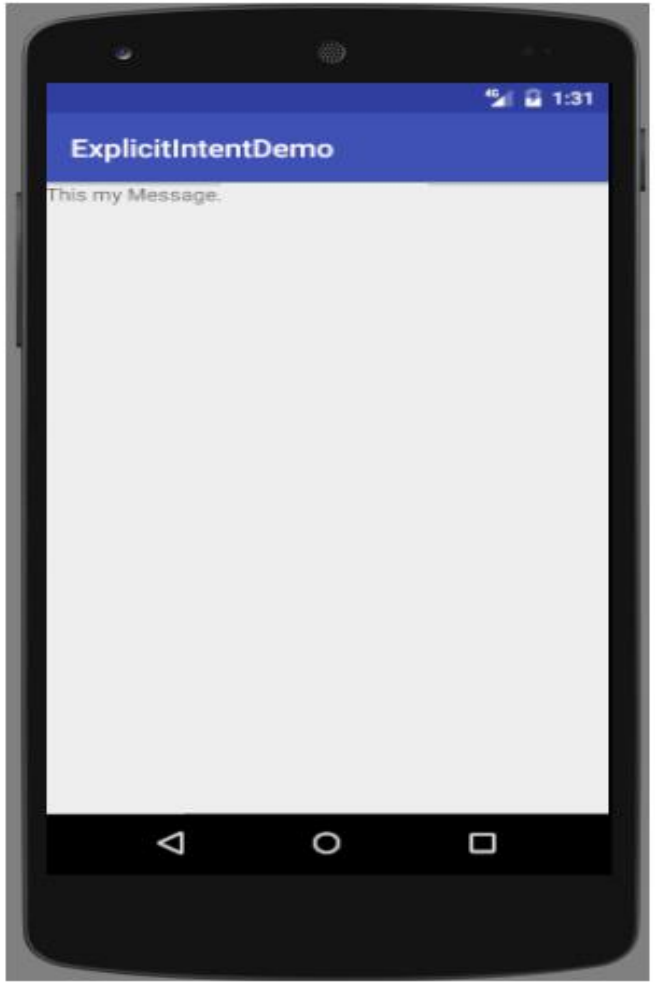
Refer:ExplicitIntentDemo, EmplicitIntentObjectDemo (Share a UserAcocunt Object)

- Step 7 : Run your code. After running the app, you will get result as below.

First Activity



Second Activity

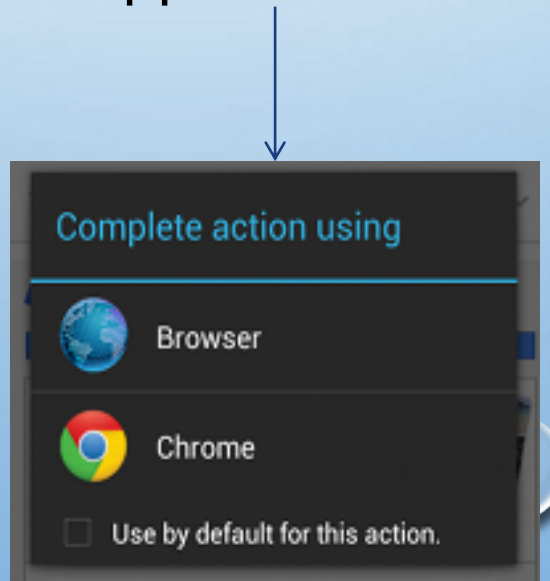


Main Point 1

- While creating an Intent object when we explicitly specify and pass on the target component name directly in the intent, it's an explicit intent. Science of Consciousness: "Wise in the skill of action are those who explicitly first pull the arrow back before they proceed to shoot it ahead. As the mind becomes established in their own consciousness.

Implicit intents

- Implicit intents do not specify the target activity class, just the intended action
- Android runtime matches the implicit intent request with registered intent handlers
- If there are multiple matches, an app chooser will open to let the user decide
  - When the android runtime finds multiple registered activities that can handle an implicit intent, it displays an app chooser to allow the user to select the handler.



Implicit Intents - Examples

Java Code

Show a web page

```
Uri uri = Uri.parse("http://www.google.com");
Intent it = new Intent(Intent.ACTION_VIEW,uri);
startActivity(it);
```

Dial a phone number

```
Uri uri = Uri.parse("tel:8005551234");
Intent it = new Intent(Intent.ACTION_DIAL, uri);
startActivity(it);
```

Open a Map

```
// Iowa latitude and longitude
Uri uri = Uri.parse("geo:41.8780,93.0977");
Intent it = new Intent(Intent.ACTION_VIEW,uri);
startActivity(it);
```

Kotlin Code

Show a web page

```
val uri = Uri.parse("http://www.google.com");
val  it = Intent(Intent.ACTION_VIEW,uri);
startActivity(it);
```

Dial a phone number

```
val uri = Uri.parse("tel:8005551234");
val  it = Intent(Intent.ACTION_DIAL, uri);
startActivity(it);
```

Open a Map

```
// Iowa latitude and longitude
val uri = Uri.parse("geo:41.8780,93.0977");
Intent it = Intent(Intent.ACTION_VIEW,uri);
startActivity(it);
```

Avoid exceptions and crashes

- Before starting an implicit activity, use the package manager to check that there is a package with an activity that matches the given criteria.

Example

```
Intent intent = new Intent(Intent.ACTION_DIAL);

intent.setData(Uri.parse("tel:8005551234"));

if (intent.resolveActivity(getPackageManager()) != null) {

        startActivity(intent);

}
```

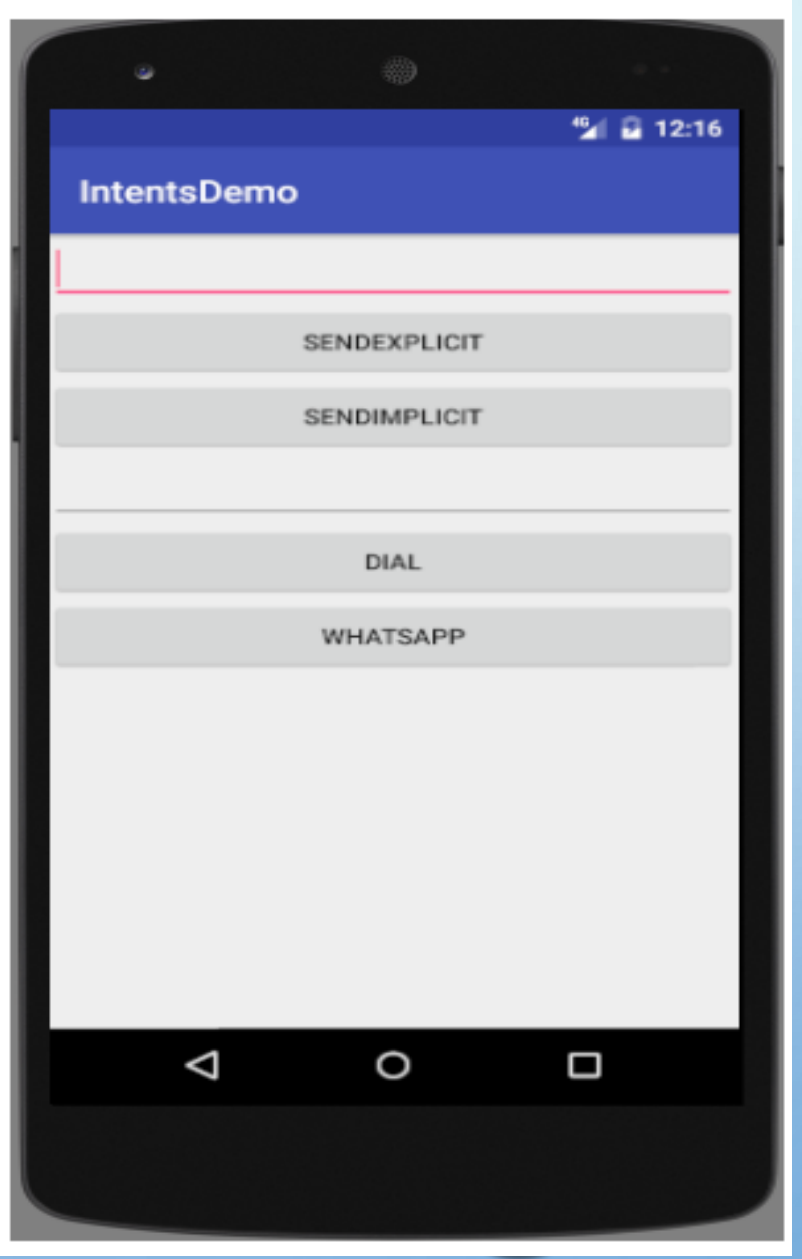
Hands on Example 2 – Implicit Intent

- However, you can also start up activities from the API or third-party apps. In those cases, though, you will not have specific Intent object representing the other activity in your project, so you cannot use the Intent constructor to initiate.
- Instead, you will use what are referred as the “Implicit” Intent structure.
- Lets enhance the previous example by introducing implicit intents to perform the following.
  - Sending message to the particular person through Email
  - Showing a Dial screen App (**INTENT.ACTION_DIAL)**
  - Showing a WhatsApp App

DESIGN SCREEN

Refer : IntentsDemo

Shows both Explicit and Implicit



IMPLICIT INTENT TO SEND MESSAGE

XML Code for the Button SendImplicit

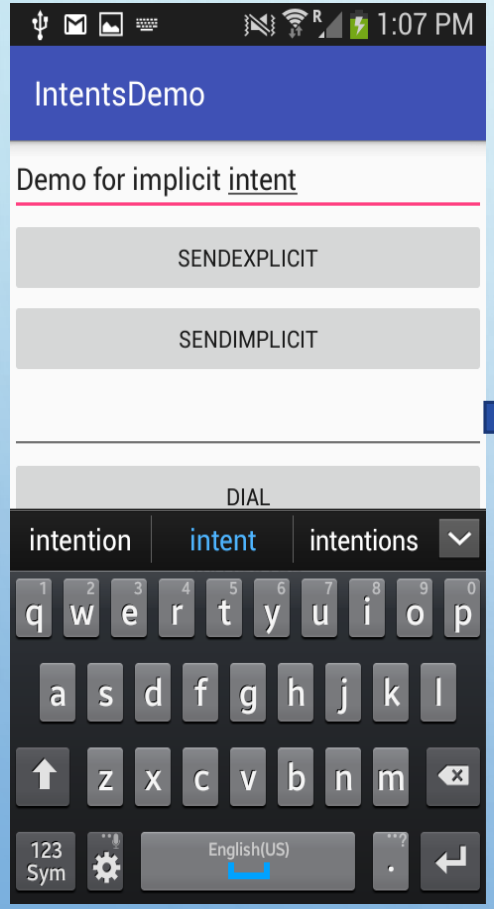
```
<Button
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:id="@+id/send2"
        android:onClick="onSendMessageImplicit"
        android:text="SendImplicit"/>
```

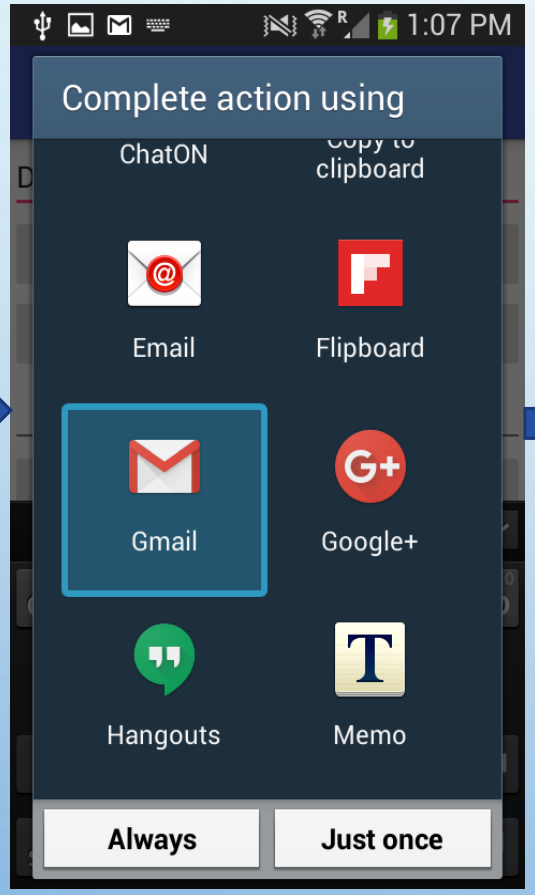
Kotlin Code for the Button Click Event

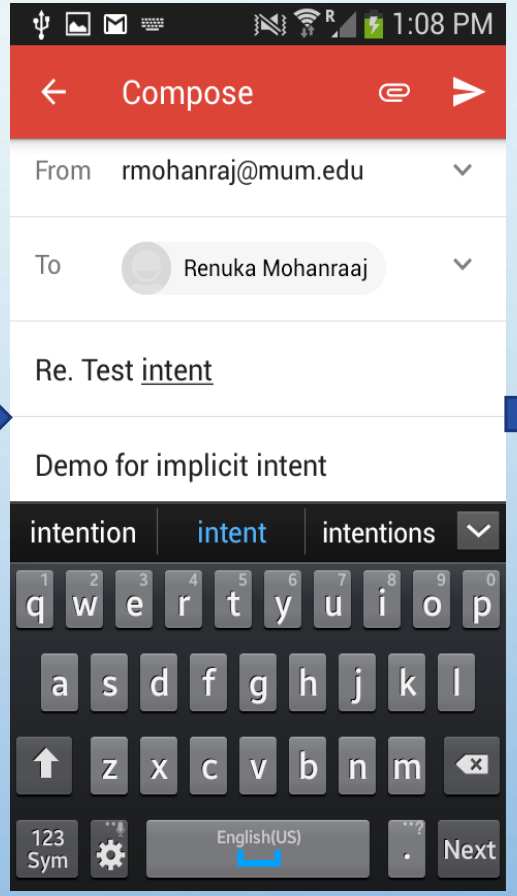
```
fun onSendMessageImplicit(view: View) {
        var input = smsg.text.toString()
        val intent = Intent()
        intent.action = Intent.ACTION_SEND
        intent.type = "text/plain"
        intent.putExtra(Intent.EXTRA_TEXT, input)
        startActivity(intent)
    }
```

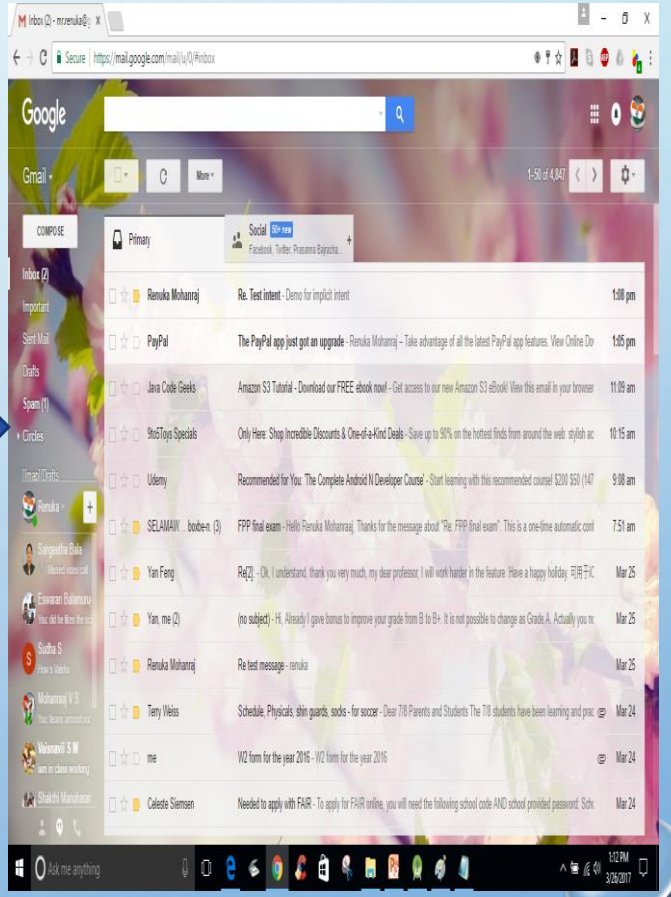
The intent specifies an action of ACTION_SEND, and a MIME type of text/plain.

After clicking **SENDIMPLICIT** button









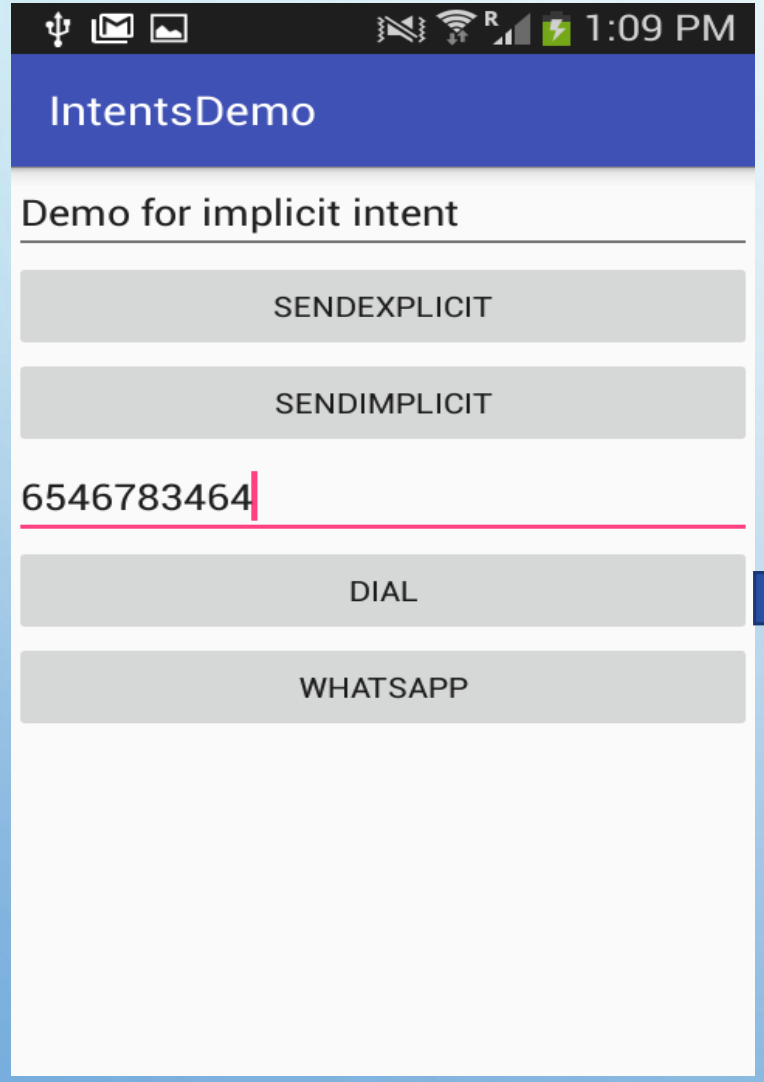
IMPLICIT INTENT – DIAL SCREEN

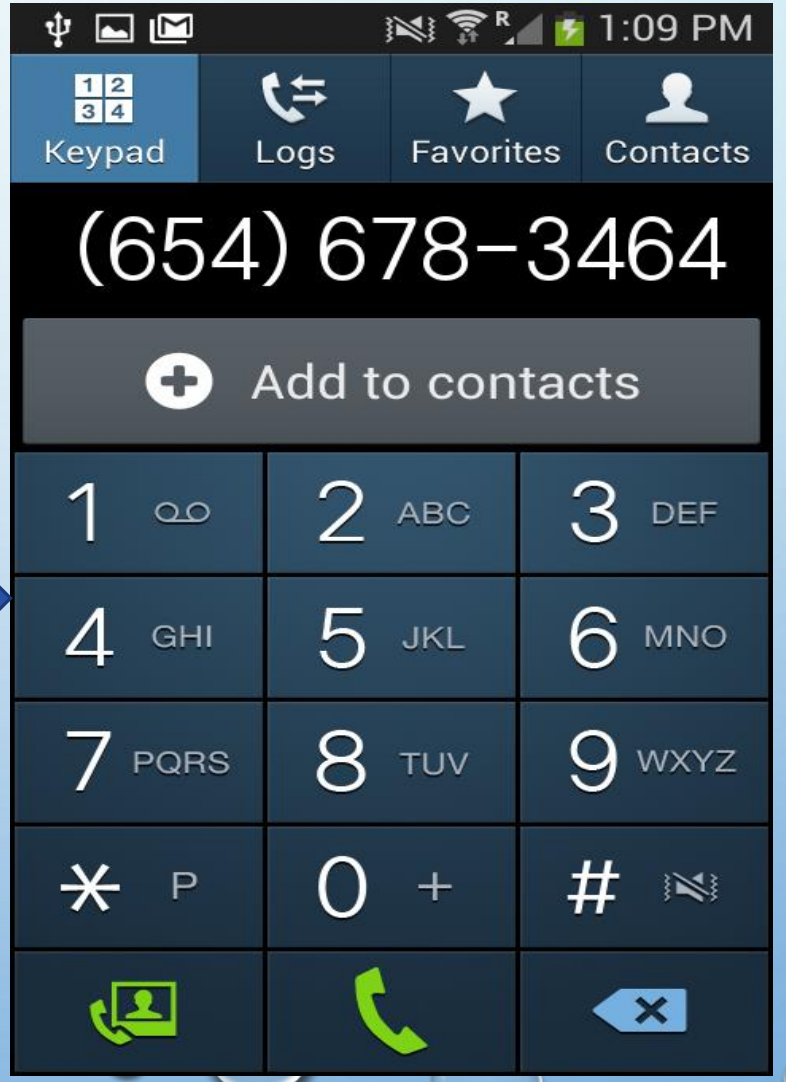
```
<EditText
        android:id="@+id/tel"
        android:layout_width="match_parent"
        android:layout_height="wrap_content" />
 <Button
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:id="@+id/dl"
        android:onClick="dial"
        android:text="Dial"/>
```

```
fun dial(view: View) {
        val i = Intent()
        i.action = Intent.ACTION_DIAL
        val et2 = tel.text.toString()
        i.data = Uri.parse("tel:" + et2)
        startActivity(i)
    }
```

- Whenever the user clicks the DIAL button, calling built-in dial screen by invoking Intent.ACTION_DIAL to call number when the application is launched.
- To send any data to the built in activity use setData(), the parameter for this method is Uri component. To get the Uri component use Uri.parse() method which takes the String input along with what type of data we are sending. Here we are sending telephony type of data which accepts number, #, and *. Ordinary number accepts 0-9.
- tel : A data representing kind of telephone number.

After clicking **DIAL** button

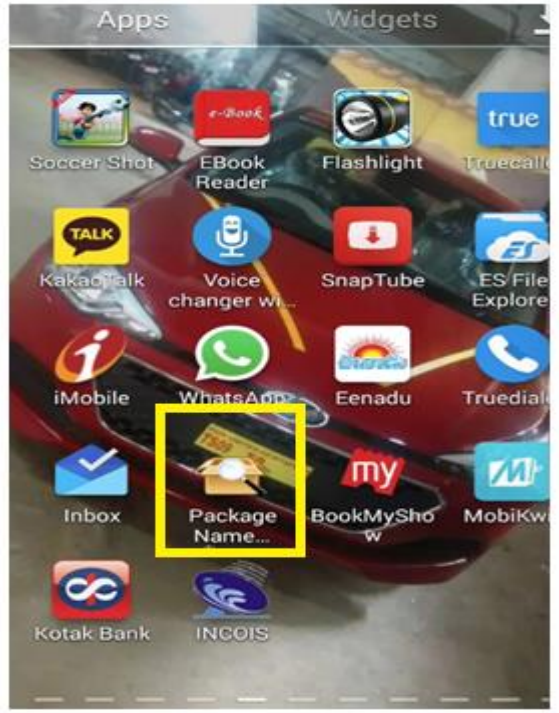


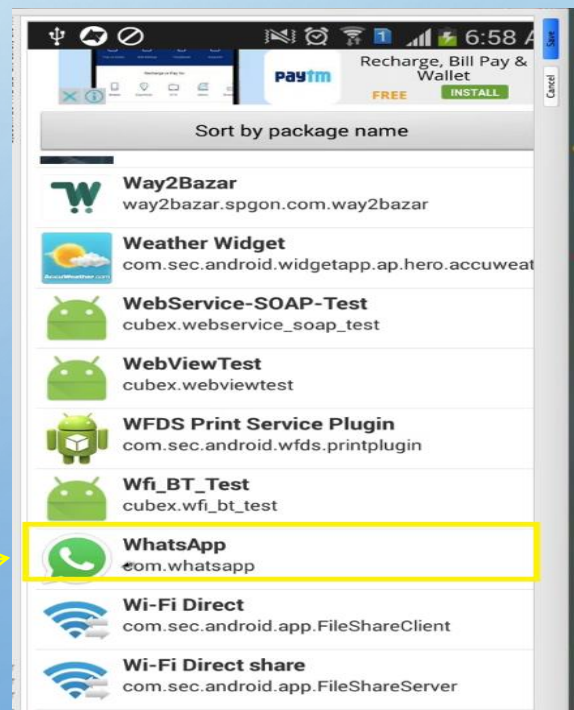


IMPLICIT INTENT-WHATSAPP

```
<Button
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:onClick="whatsapp"
        android:text="WhatsApp"/>
```

```
fun whatsapp(view: View) {
        val i = packageManager.getLaunchIntentForPackage("com.whatsapp")
        startActivity(i)
    }
```





How to know the installed app package name – Method 1

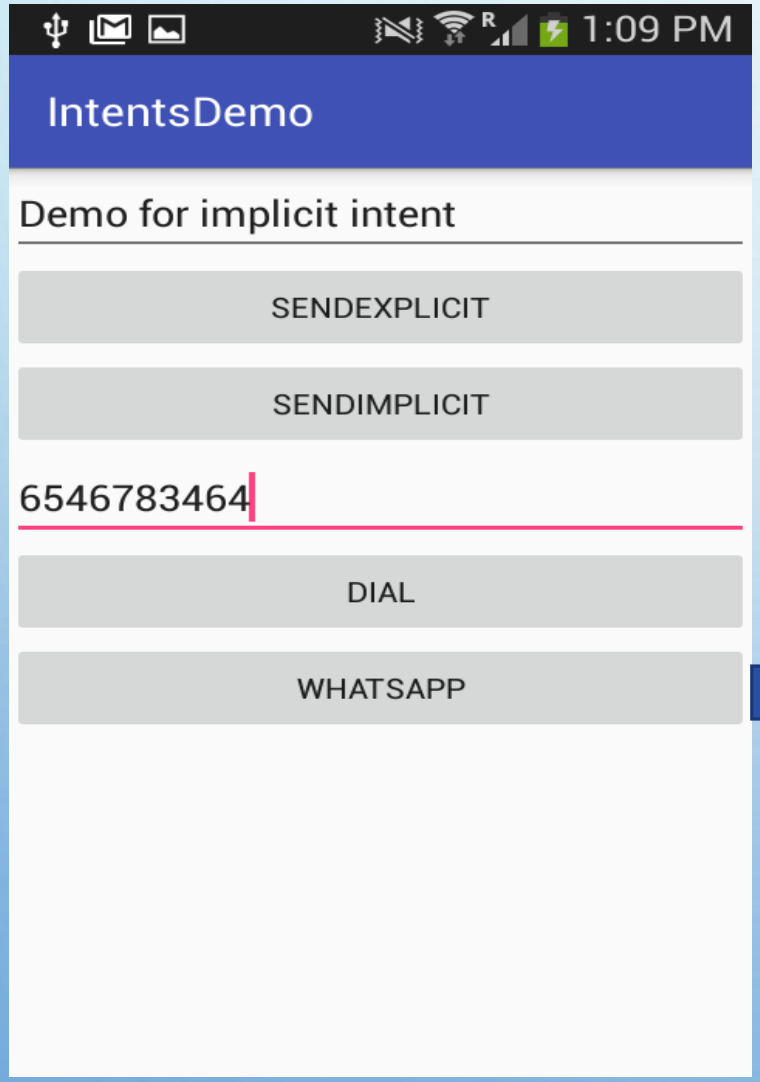
If you want to call any third party application in your logic, first you should get the package name from your App called as PackageNameViewer. If you don't have the application install the app from play store. Then see package name and use that in the

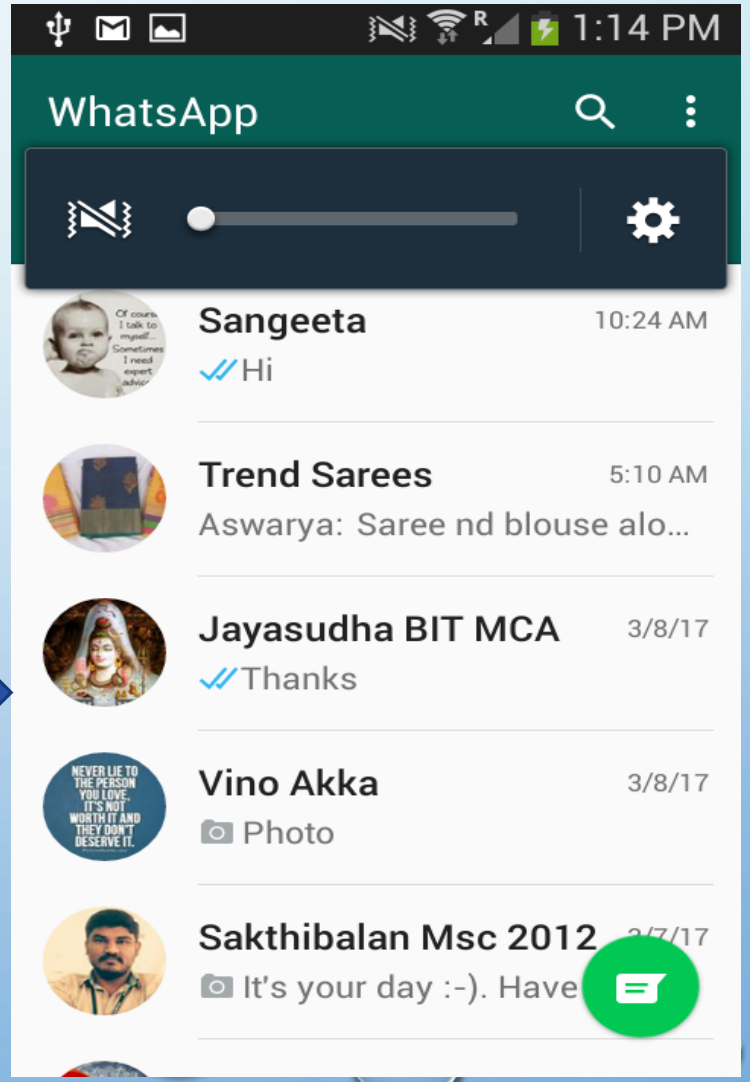
How to know the installed app package name

- **METHOD 2**

- Open play.Google.Com in your web browser.
- Use the search bar to look for the app for which you need the package name.
- Open the app page and look at the url. The package name forms the end part of the URL i.E. After the *id=?*. Copy it and use it as needed.
- Example https://play.google.com/store/apps/details?id=com.whatsapp

After clicking **WHATSAPP** Button

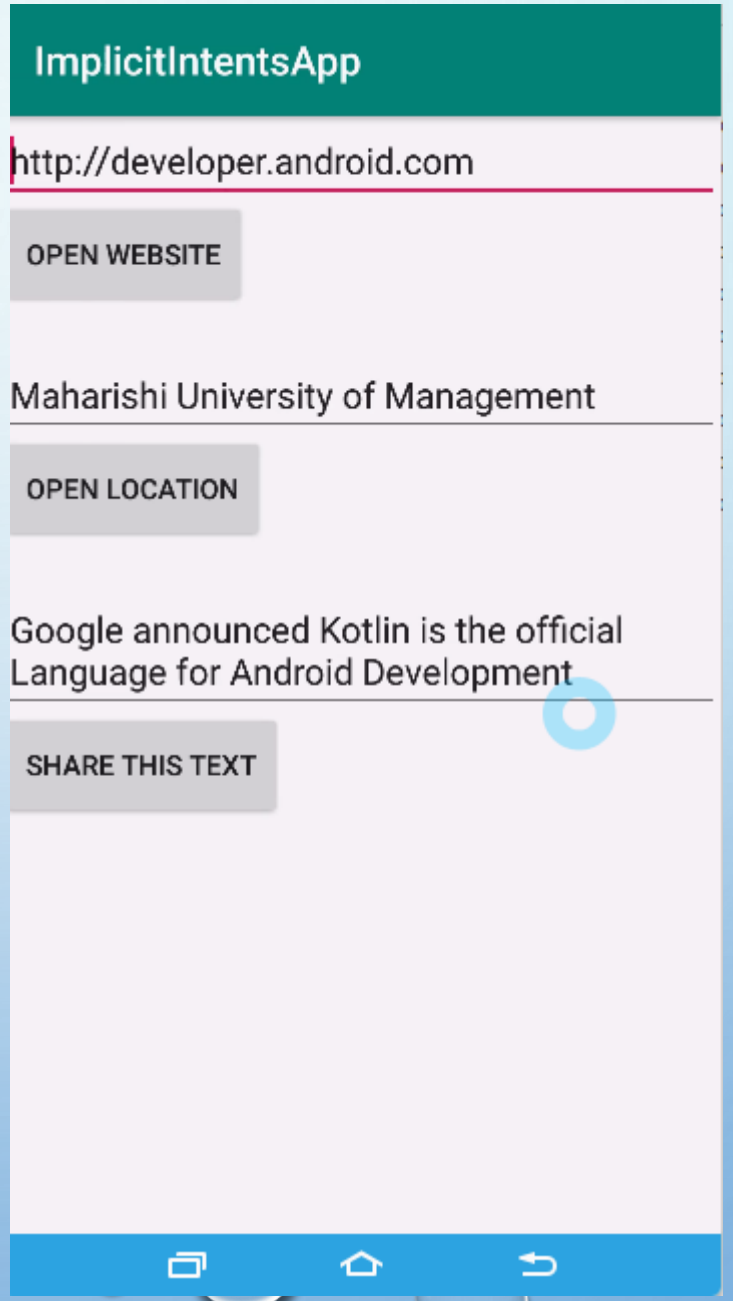




Hands on Example - 3

ImplicitIntentsApp

In this example Share the Text using ShareCompat.IntentBuilder



Frequently used Implicit Intents

- **Web browser**
- **Email**
- **Alarm clock**
- **Calendar**
- **Camera**
- **Contacts/people app**
- **File storage**
- **Maps**
- **Music or video**
- **Phone**
- **Settings**
- **Text messaging**

Refer for complete information **: https://developer.android.com/guide/components/intents-common.html**

Main Point 2

- In implicit intents we delegate the task of evaluating the registered components to Android based on the intent data and the intended action (like send an email, capture a photo, pin location on a map, etc.) that we pass. So Android will automatically fire up the component from the same app or some other app that can handle the intent message. Science of Consciousness: “Support of Natural Law will render all thought, speech, and action free from stress and strain—life will automatically progress to greater levels of achievement and fulfillment; life will naturally be easy, without problems or failures.

Getting a result back from a child activity

- Starting another activity doesn't have to be one-way. You can also start another activity and receive a result back. To receive a result, call startActivityForResult() (instead of startActivity()).
- For example, your app can start a camera app and receive the captured photo as a result. Or, you might start the People app in order for the user to select a contact and you'll receive the contact details as a result.
- Of course, the activity that responds must be designed to return a result. When it does, it sends the result as another Intent object. Your activity receives it in the onActivityResult() callback.
- When you want to hear back from the child activity, you call the following Activity method:

public void startActivityForResult(Intent intent, int requestCode)

- An Intent that carries the result data.
- A result code specified by the second activity. This is either RESULT_OK if the operation was successful or RESULT_CANCELED if the user backed out or the operation failed for some reason.

Fetching the result

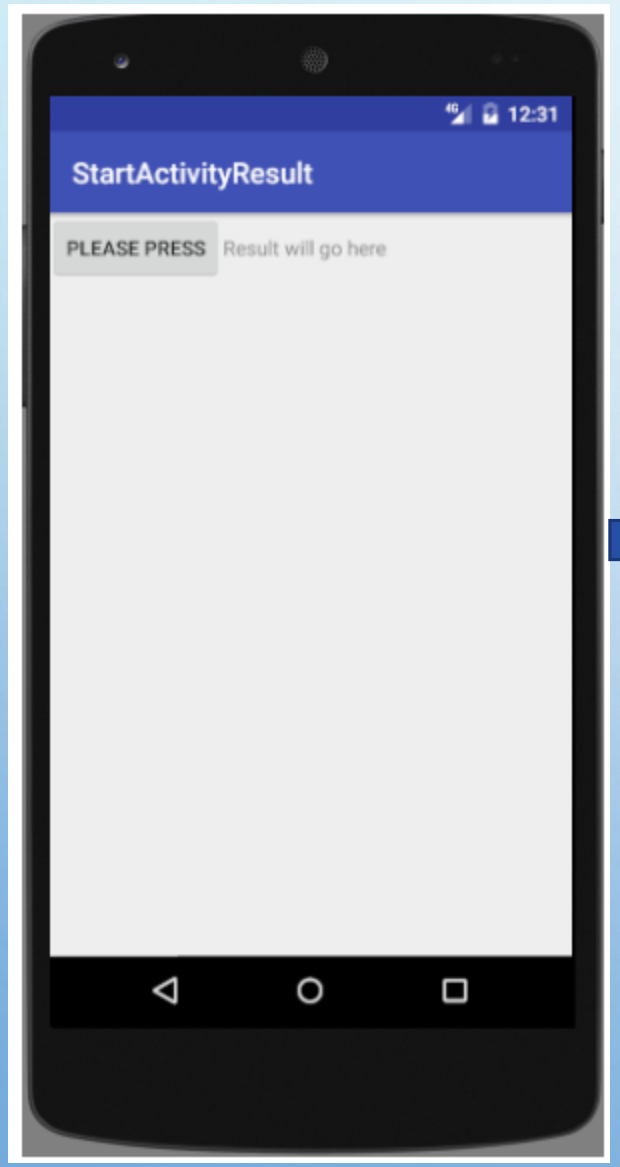
- In the first activity, when the result has been returned, the

  onActivityResult(int resultCode, int requestCode, Intent intent)

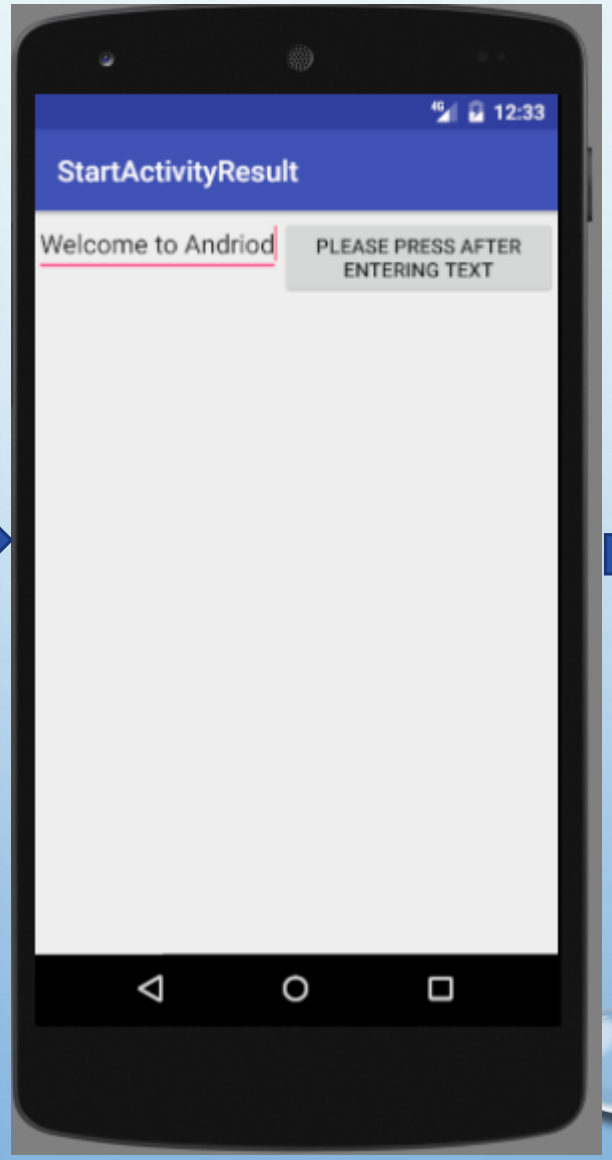
  method will be called.
- Check resultCode for Andriod.RESULT_OK
- Check requestCode to see if it matches the int you passed to startActivityForResult.
- Retrieve the data from the intent, and use it.

Fetching Result from Activity B to Activity A

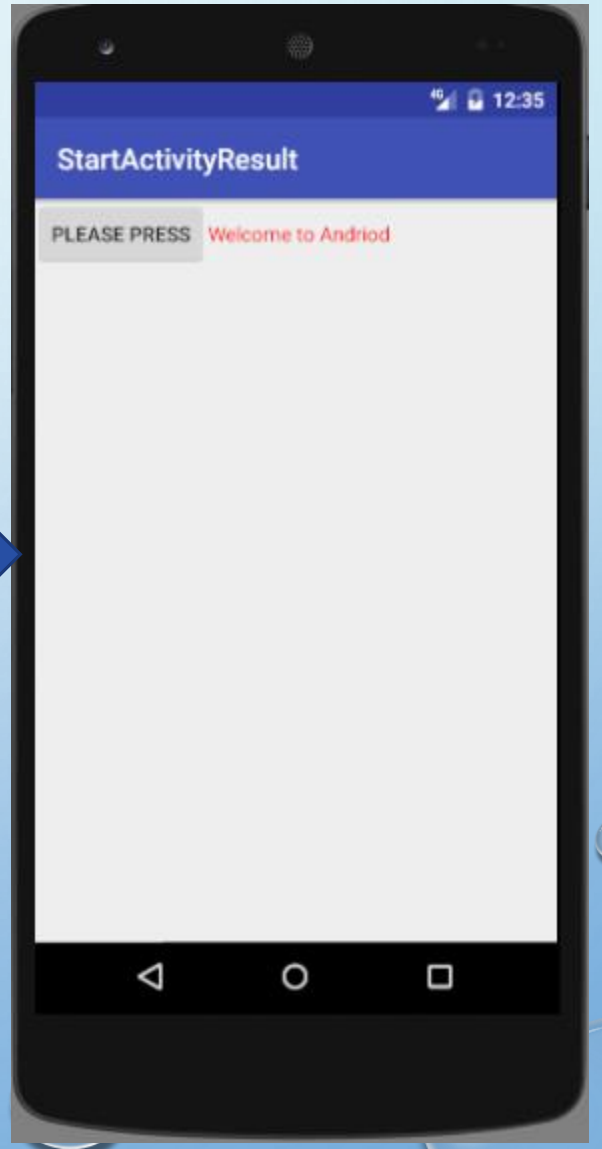
Activity A



Activity B



Activity A



Getting a result back from a child activity

```
// Partial Coding part from the MainActivity.java
View.OnClickListener bListener = new View.OnClickListener(){
        @Override
        public void onClick(View v)
        {
            var intent=Intent(this, SecondActivity::class.java);
            startActivityForResult(intent, 1); //  Here 1 is the request code
        }
    };
// You should implement this below method in your MainActivity.java, file to need to retrieve the result
public override fun onActivityResult(requestCode: Int, resultCode: Int, data: Intent?) {
        super.onActivityResult(requestCode, resultCode, intent);
        if (requestCode == 1) {
            if (resultCode == Activity.RESULT_OK) {
                t?.setTextColor(Color.RED)
                val returnedResult = data!!.data!!.toString()
                t?.text = returnedResult
            }
        }
    }
```

Getting a result back from a child activity

```
// Partial Coding part from the SecondActivity.java
var bListener: View.OnClickListener = View.OnClickListener {
        val data = Intent()
        val text = input?.text.toString()
        //---set the data to pass back
        data.data = Uri.parse(text)
        setResult(Activity.RESULT_OK, data)
        //---close the activity---
        finish()
    }
// Find the complete code from demo :StartActivityResultApp folder
```

Intent Filters

Why do you need Intent Filters

- To allow other apps to start your activity, you need to add an <intent-filter> element in your manifest file for the corresponding <activity> element.
- For example, if you build a social app that can share messages or photos with the user's friends, it's in your best interest to support the ACTION_SEND intent so users can initiate a "share" action from another app and launch your app to perform the action.
- When your app is installed on a device, the system identifies your intent filters and adds the information to an internal catalog of intents supported by all installed apps. When an app calls startActivity() or startActivityForResult(), with an implicit intent, the system finds which activity (or activities) can respond to the intent.

Registering activity in Manifest

AndroidManifest.xml

```
<activity android:name=".HelloWorld"
    android:label="@string/app_name">
    <intent-filter>
        <action android:name="android.intent.action.VIEW"/>
        <category android:name="android.intent.category.DEFAULT"/>
        <category android:name="android.intent.category.BROWSABLE"/>
        <data android:scheme="http" android:host="androidium.org"/>
    </intent-filter>
</activity>
```

HelloWorld.kt

```
val intent = Intent (Intent.ACTION_VIEW,Uri.parse("http://androidium.org"));
startActivity(intent);
```

Intent Filters: Action, Category and Data

action — Match one or more action constants

android.intent.action.VIEW — matches all intents with ACTION_VIEW

android.intent.action.SEND — matches all intents with ACTION_SEND

category — additional information (list of categories)

android.intent.category.BROWSABLE—can be started by web browser

android.intent.category.LAUNCHER—Show activity as launcher icon

android.intent.category.CATEGORY_DEFAULT -In order to receive implicit intents, you must include the CATEGORY_DEFAULT category in the intent filter.

data — Filter on data URIs, MIME type

android:scheme="https"—require URIs to be https protocol

android:host="developer.android.com"—only accept intents from specified hosts

android:mimeType="text/plain"—limit the acceptable types of documents

An activity can have Multiple filters

```
<activity android:name=“.ShareActivity">
  <intent-filter>
    <action android:name="android.intent.action.SEND"/>
    ...
  </intent-filter>
  <intent-filter>
    <action android:name="android.intent.action.SEND_MULTIPLE"/>
    ...
  </intent-filter>
</activity>
```

A filter can have multiple actions & data

```
<intent-filter>
   <action android:name="android.intent.action.SEND_MULTIPLE"/>
  <category android:name="android.intent.category.DEFAULT"/>
  <data android:mimeType="image/*"/>
  <data android:mimeType="video/*"/>
</intent-filter>
```

Main Point 3

- Intent Filters describe what ACTION, DATA, or CATEGORIES that component can handle. It defined inside your Android Manifest file also dynamically registered in code. It says what Intent can be handled by the event. *Through regular practice of TM, Thought leads to action, action leads to achievement in daily activities, and achievement leads to fulfillment.*