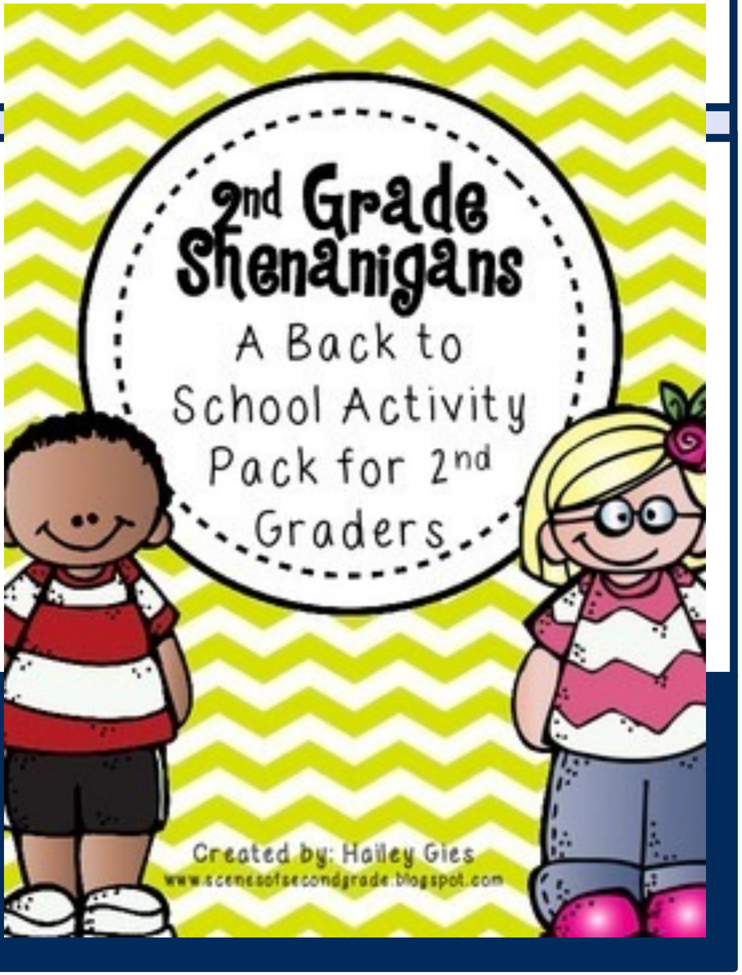
Mobile Applications CSCI 448 Lecture 22

Starting A Second Activity


2nd Grade Shenanigans
A Back to School Activity Pack for 2nd Graders
Created by: Hailey Gies
www.scenesofsecondgrade.blogspot.com

Learning Outcomes For Today

- Create an app that uses multiple activities and send data between activities
- Discuss the difference between explicit and implicit intents
- List uses of intents
- List the components of an intent
- Discuss the OS role in the activity life cycle

On Tap For Today

- Starting A Second Activity
  - Explicit Intents
  - Implicit Intents
- Practice

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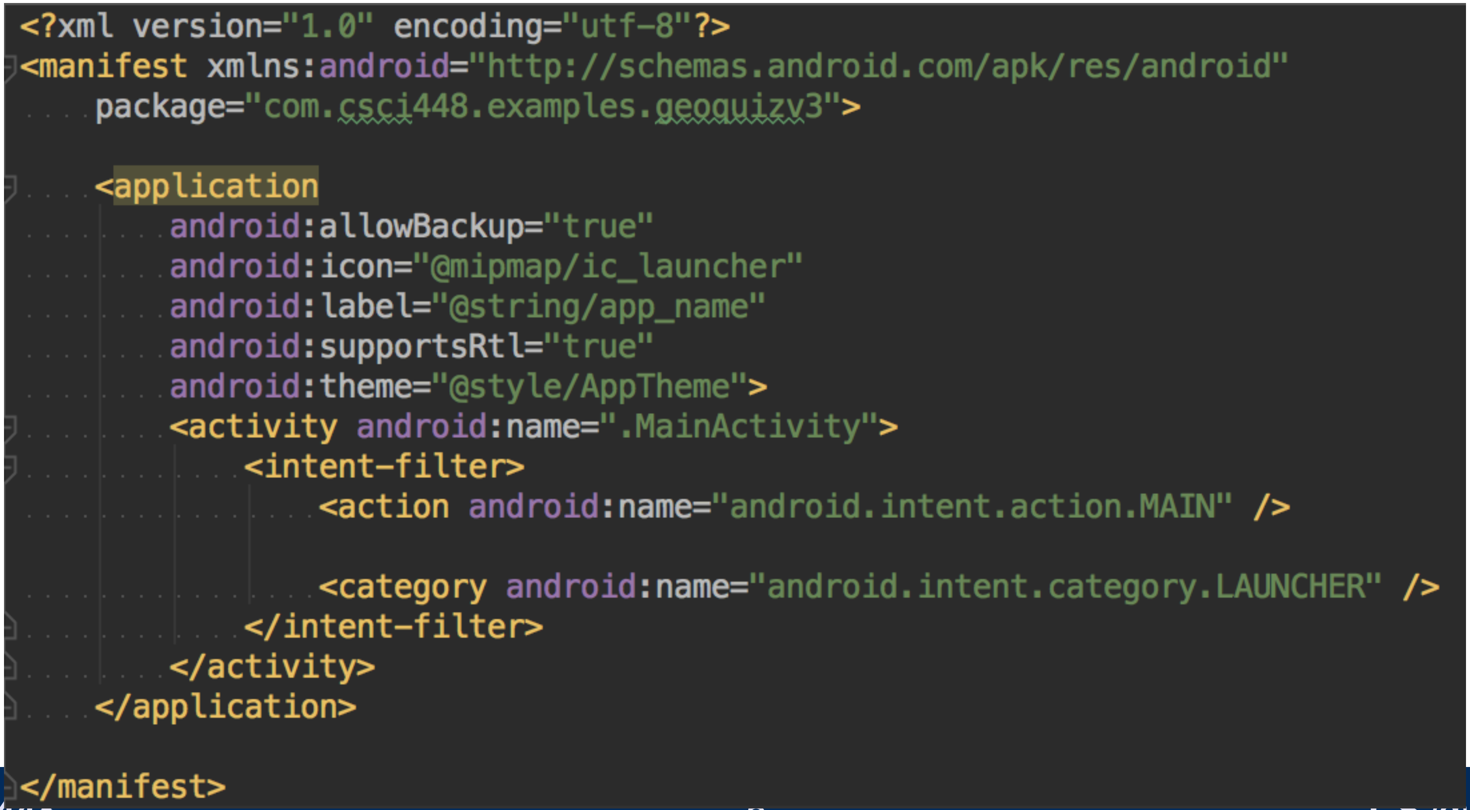
Starting Your App

- How does OS know what to launch?
- Check the Manifest!



```
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    package="com.csci448.examples.geoquizv3">

    <application
        android:allowBackup="true"
        android:icon="@mipmap/ic_launcher"
        android:label="@string/app_name"
        android:supportsRtl="true"
        android:theme="@style/AppTheme">
        <activity android:name=".MainActivity">
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />

                <category android:name="android.intent.category.LAUNCHER" />
            </intent-filter>
        </activity>
    </application>

</manifest>
```

How Does OS Start Activity?

- Via an Intent!
  - Abstract description of operation to be performed
- Contains
  - Action to be performed
  - Associated data to operate on
- Can get it from Activity::onCreate()

```
override fun onCreate(savedInstanceState: Bundle?) {
  val i = intent // short for getIntent()
  Log.d(LOG_TAG, "${i.action} for ${i.data}")
}
```

Intent Uses

- Intent can be used with __________ to ___________

1. `startActivity(intent)` to launch an activity

2. `broadcastIntent(intent)` to inform BroadcastReceivers

3. `startService(intent)` to start a background Service

Types of Intents

- Explicit Intent
  1. Start a specific activity
  3. Start a specific service

- Implicit Intent
  1. Request an action to be completed, the OS tells us eligible apps to complete that action
  2. Broadcast information to receivers

Intent Uses with Types

- Intent can be used with ________ to __________

1. **`startActivity(intent)`** to launch an activity
   - Explicit or Implicit

2. **`broadcastIntent(intent)`** to inform BroadcastReceivers
   - Implicit

3. **`startService(intent)`** to start a background Service
   - Explicit

On Tap For Today

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Starting an Activity

- We create an Intent object that specifies the activity class to start

```
Intent(packageContext: Context, cls: Class<T>)
```

- Example

```
val i = Intent(context, TargetActivity::class.java)
startActivity(i)
```

Pass Intent to Android OS

- Call **`startActivity()`** to pass the intent to the OS
- The **`ActivityManager`** then creates the activity

Passing Data Between Activities

- **`CallingActivity`** should can pass data to **`TargetActivity`**
- Add an **`extra`** to the **`intent`** that is passed to **`startActivity()`**
- An **`extra`** is a mapped key-value pair

Passing Data in Intent

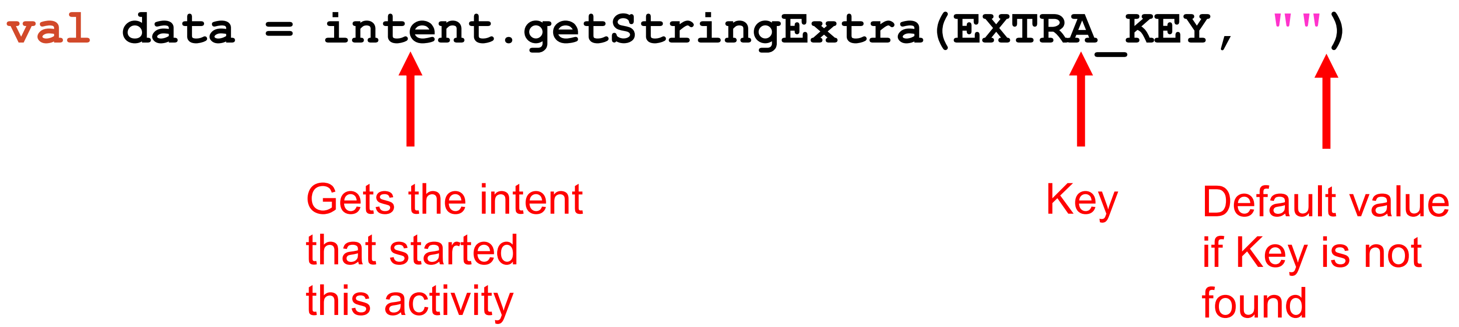
```
val i = Intent(context, TargetActivity::class.java)

i.putExtra(EXTRA_KEY, extraValue)

startActivity(i)
```

Retrieving Data from Intent

- When **`TargetActivity`** starts, its **`onCreate()`** method is called
- We can retrieve the data from the intent using the key



```
val data = intent.getStringExtra(EXTRA_KEY, "")
```

Gets the intent that started this activity

Key

Default value if Key is not found

Concerns...

CallingActivity.kt

```
val i = Intent(context, TargetActivity::class.java)
i.putExtra(EXTRA_KEY, extraValue)
startActivity( i )
```

TargetActivity.kt

```
val data = intent.getStringExtra(EXTRA_KEY, "")
```

Phew

CallingActivity.kt

```
val i = TargetActivity.newIntent(context, extraValue)

startActivity( i )
```

TargetActivity.kt

```
companion object {
  private const val EXTRA_KEY = "key"
  fun newIntent(pkgCtxt: Context, value: String): Intent {
    val i = Intent( pkgCtxt, TargetActivity::class.java )
    i.putExtra( EXTRA_KEY, value )
    return i
  }
}

override fun onCreate(savedInstanceState: Bundle?) {
  val data = intent.getStringExtra(EXTRA_KEY, "")
}
```

On Tap For Today

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  - Explicit Intents
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Implicit Intents

- Explicit intents now less common to start a specific activity

```
val i = TargetActivity.newIntent()
startActivity(i)
```

- In an Implicit Intent, you just describe the job that you need done, and the OS will start an activity in an appropriate application for you

Parts of an Implicit Intent

- Action
  - The action you are trying to perform, such as **`ACTION_VIEW`** (to view a webpage)
- Data
  - Formatted as a Uniform Resource Identifier (URI); e.g., the URL address of the webpage
- Type
  - MIME type for the data, such as **`text/html`**
- Category
  - Optional additional info about components that can handle the intent (e.g., **`CATEGORY_BROWSABLE`**)

Example Actions - Implicit Intent

- `ACTION_DIAL`
  - Dial a number
- `ACTION_EDIT`
  - Display data to edit
- `ACTION_PICK`
  - Pick an item from the data, returning what was selected
- `ACTION_SEND`
  - Deliver some data to someone else

See: http://developer.android.com/reference/android/content/Intent.html

Motivation for Implicit Intents

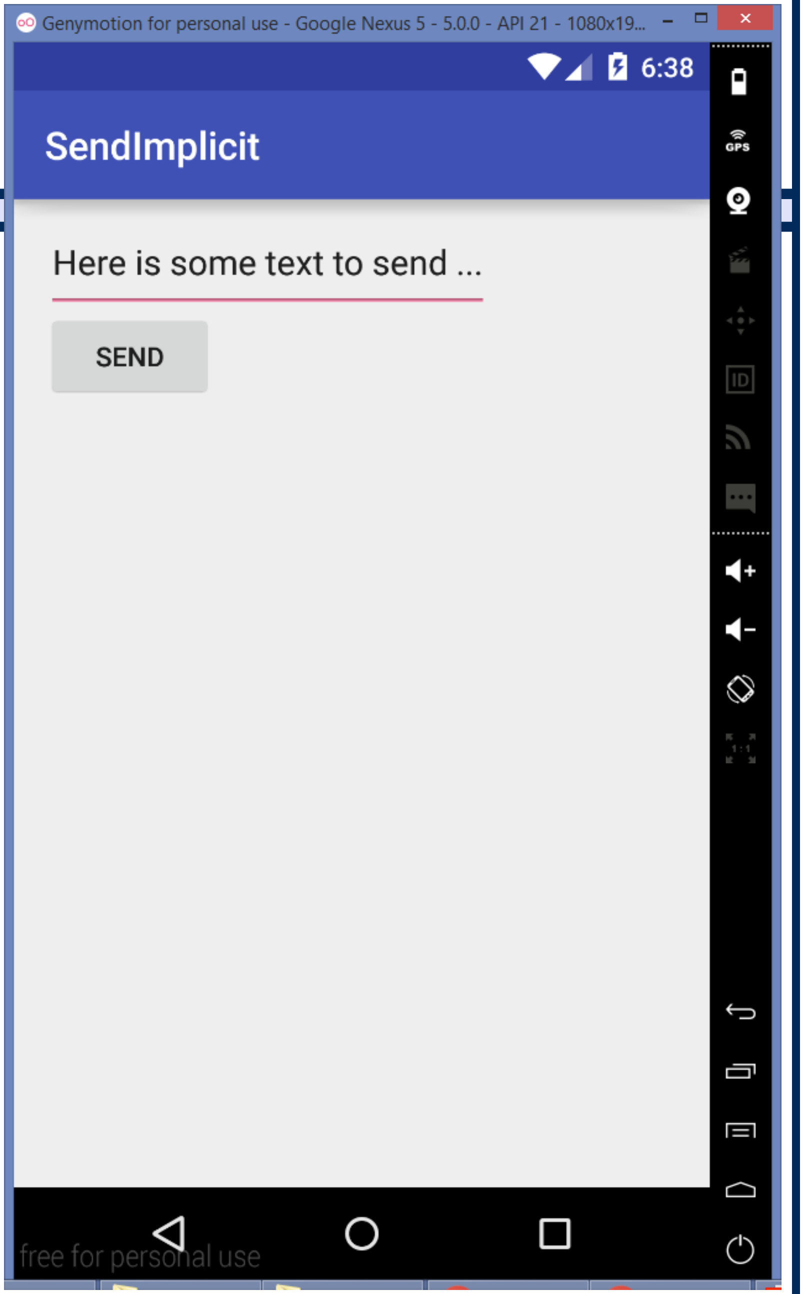
- There may be multiple existing apps that do the task that you want.
- Users appreciate being able to use apps they already know and like, in conjunction with your app.
- Using implicit intents to harness other applications is far easier than writing your own implementations for common tasks.

Simple Example Apps

- SendImplicit
  - Sends an implicit intent for **`ACTION_SEND`**
- ShowText
  - Receives an implicit intent for **`ACTION_SEND`**

SendImplicit

- When you click the button, this app sends an implicit intent
- It puts the text string as an "extra" on the intent



Genymotion for personal use - Google Nexus 5 - 5.0.0 - API 21 - 1080x19...

SendImplicit

Here is some text to send ...

Starting an Implicit Intent

```
onClickListener = {
        val str = "string value"

        val i = Intent(Intent.ACTION_SEND).apply {
          type = "text/plain"
          putExtra(Intent.EXTRA_TEXT, str)
        }
        startActivity(i)
}
```

ShowText

- This app advertises itself as capable of handling actions of type **`ACTION_SEND`**

```xml
<?xml version="1.0" encoding="utf-8"?>
<manifest package="edu.mines.csci448.showtext"
          xmlns:android="http://schemas.android.com/apk/res/android">

    <application
        android:allowBackup="true"
        android:icon="@mipmap/ic_launcher"
        android:label="@string/app_name"
        android:supportsRtl="true"
        android:theme="@style/AppTheme">
        <activity android:name=".MainActivity">
            <intent-filter>
                <action android:name="android.intent.action.MAIN"/>
                <category android:name="android.intent.category.LAUNCHER"/>
            </intent-filter>

            <intent-filter>
                <action android:name="android.intent.action.SEND"/>
                <category android:name="android.intent.category.DEFAULT" />
                <data android:mimeType="text/plain"/>
            </intent-filter>
        </activity>
    </application>

</manifest>
```

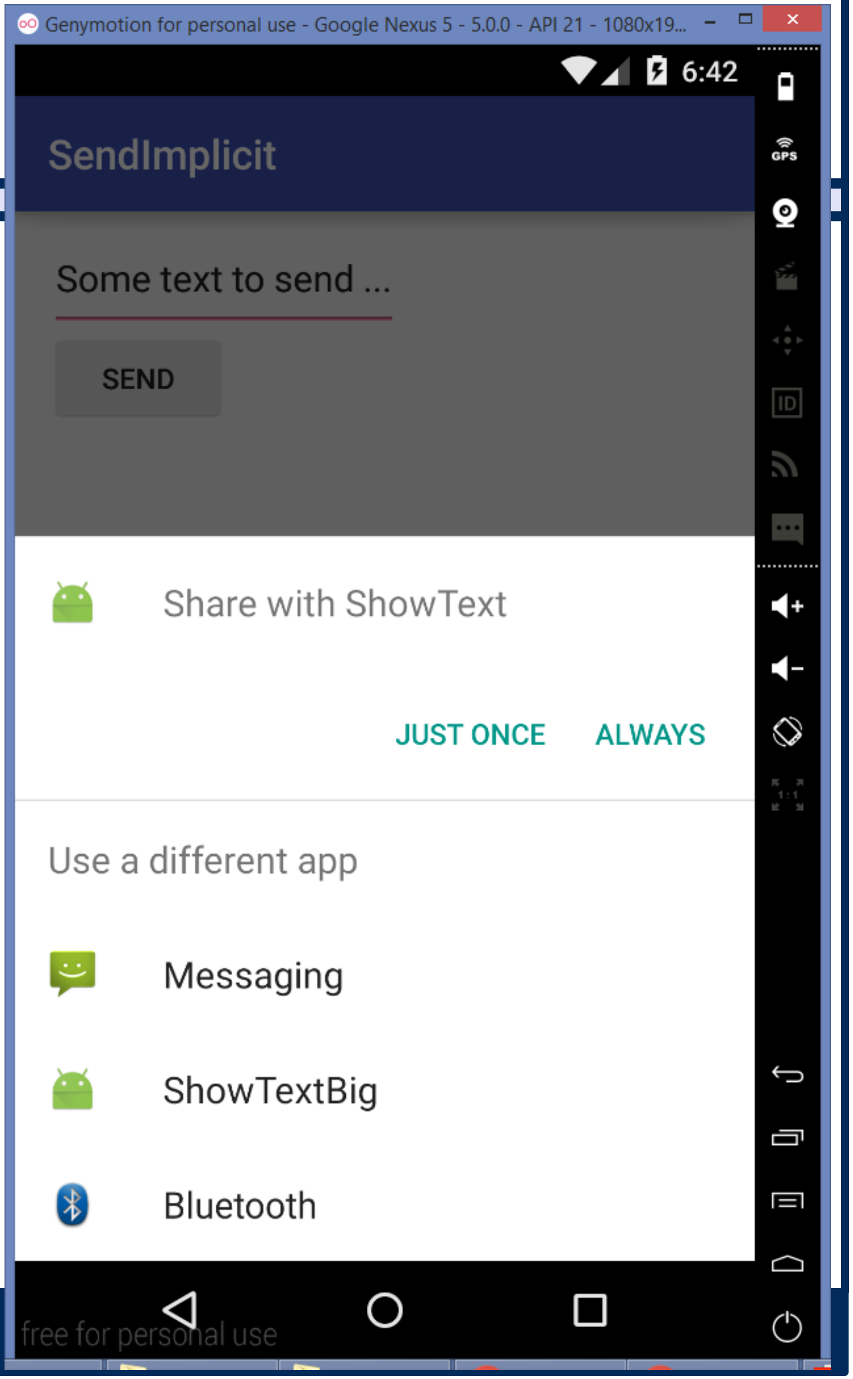
AndroidManifest.xml

Get Intent Extra

```
override fun onCreate(savedInstanceState: Bundle?) {
  val str = intent.getStringExtra(Intent.EXTRA_TEXT)
  ...
}
```

User’s Choice

- If more than one app is capable of handling the implicit intent, the OS allows the user to pick one



Genymotion for personal use - Google Nexus 5 - 5.0.0 - API 21 - 1080x19...

6:42

SendImplicit

Some text to send ...

SEND

Share with ShowText

JUST ONCE

ALWAYS

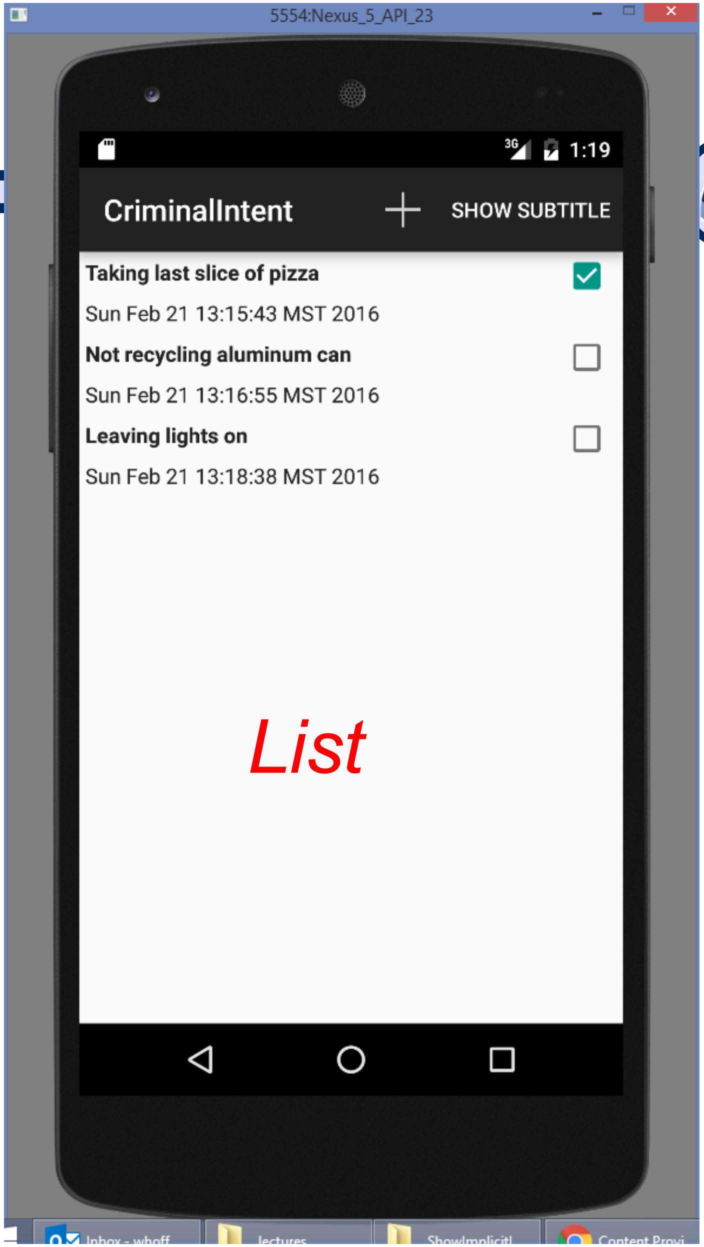
Use a different app

Messaging

ShowTextBig

Bluetooth

free for personal use

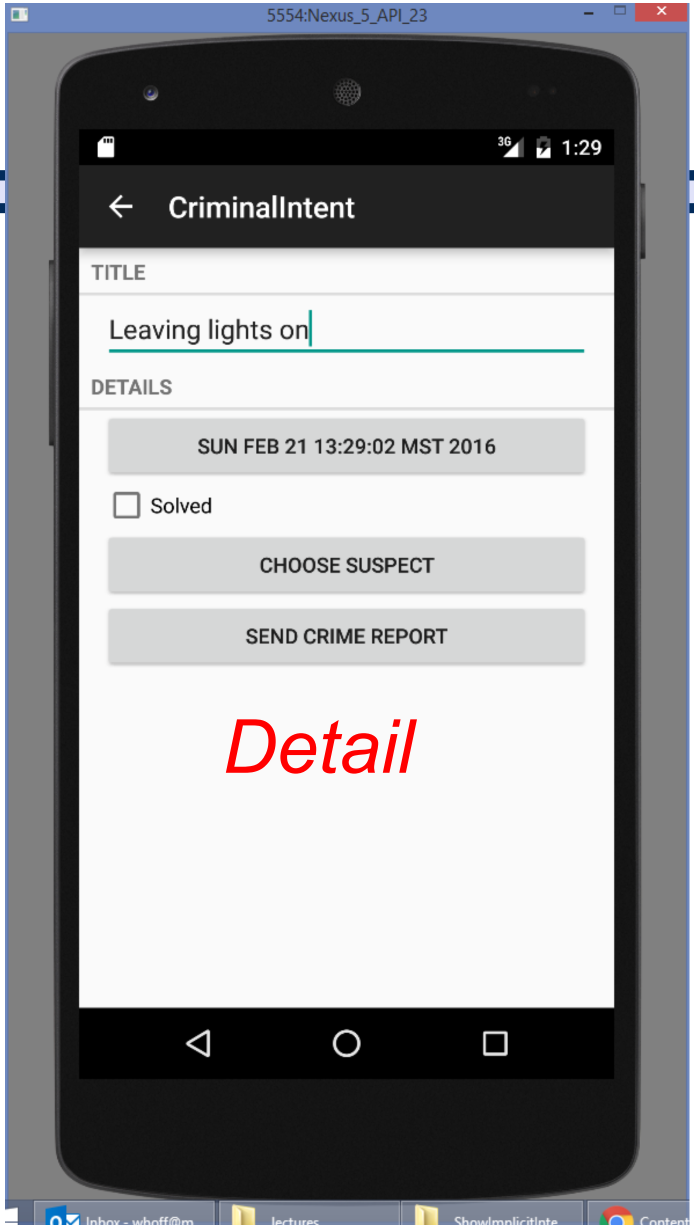


Taking last slice of pizza ☑
Sun Feb 21 13:15:43 MST 2016

Not recycling aluminum can ☐
Sun Feb 21 13:16:55 MST 2016

Leaving lights on ☐
Sun Feb 21 13:18:38 MST 2016

List



TITLE

Leaving lights on

DETAILS

SUN FEB 21 13:29:02 MST 2016

☐ Solved

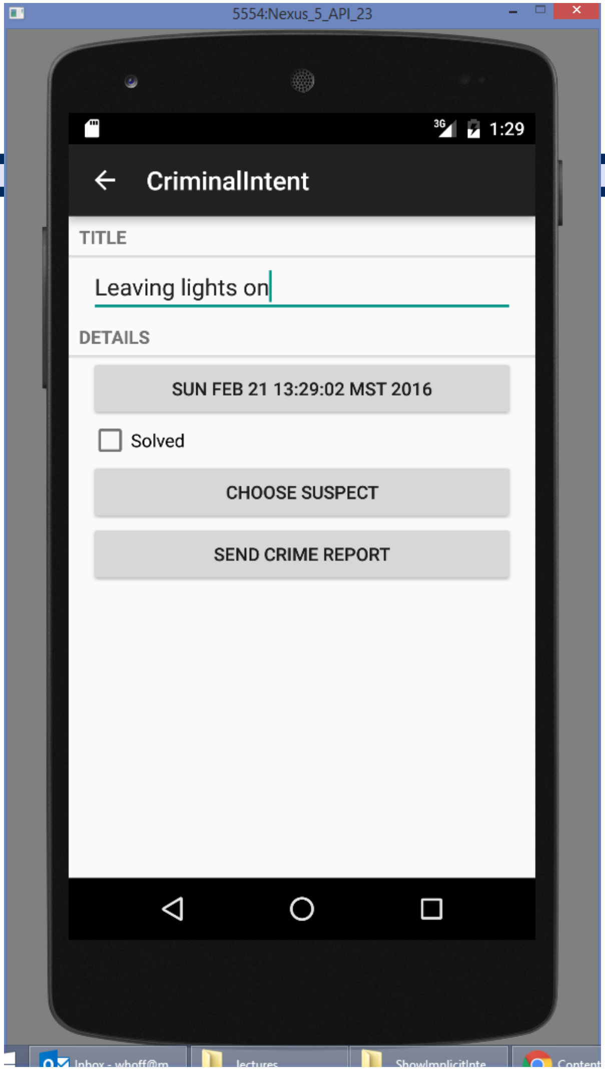
CHOOSE SUSPECT

SEND CRIME REPORT

Detail

CriminalIntent

- “Send Crime Report” sends an implicit intent of type **`ACTION_SEND`**
  - The data is a text string, containing all the info about the crime



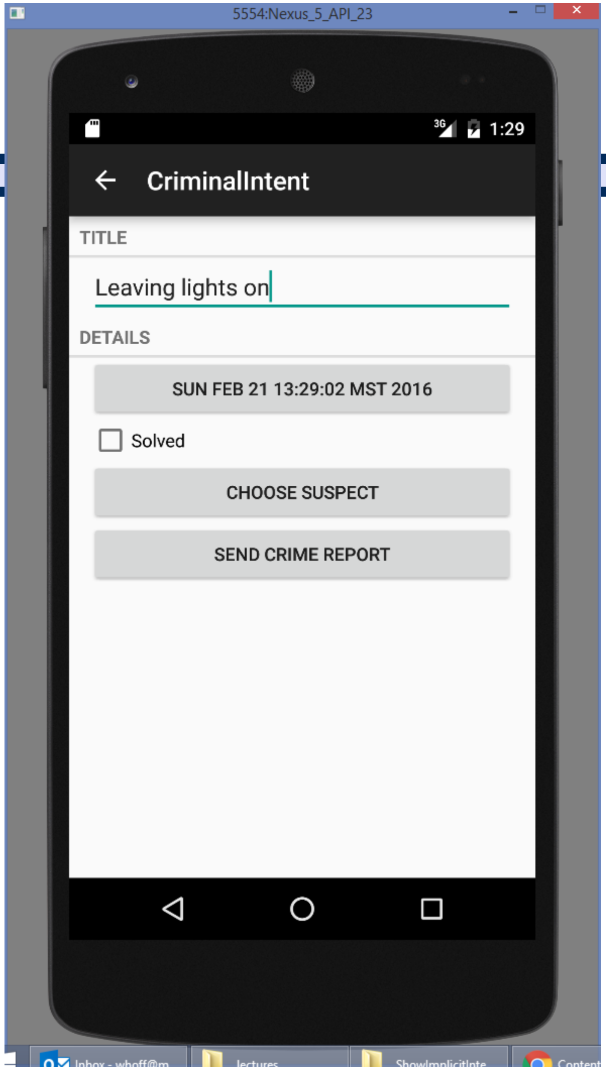
Leaving lights on

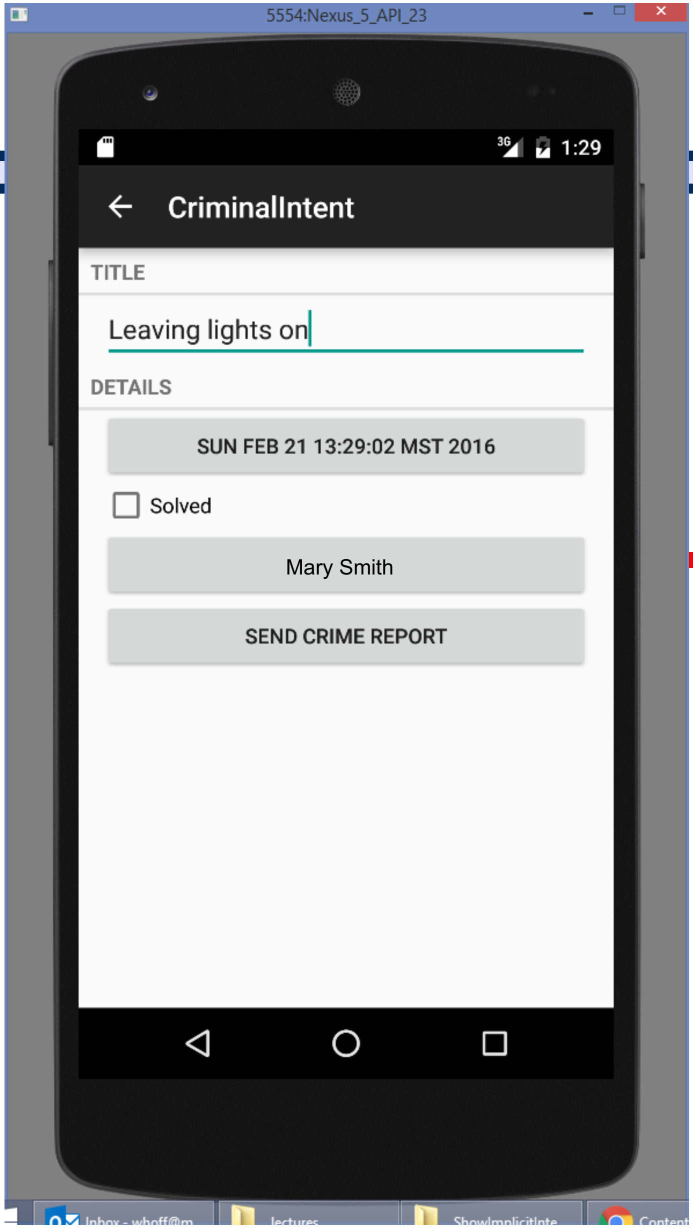
☐ Solved

```
val i = Intent(Intent.ACTION_SEND).apply {
  type = "text/plain”
  putExtra(Intent.EXTRA_TEXT, getCrimeReport())
  putExtra(Intent.EXTRA_SUBJECT,
       getString(R.string.crime_report_subject))
}
i = Intent.createChooser(i, getString(R.string.send_report))
```

CriminalIntent

- “Choose Suspect” sends an implicit intent of type **`ACTION_PICK`**





5554:Nexus_5_API_23

1:29

CriminalIntent

TITLE

Leaving lights on

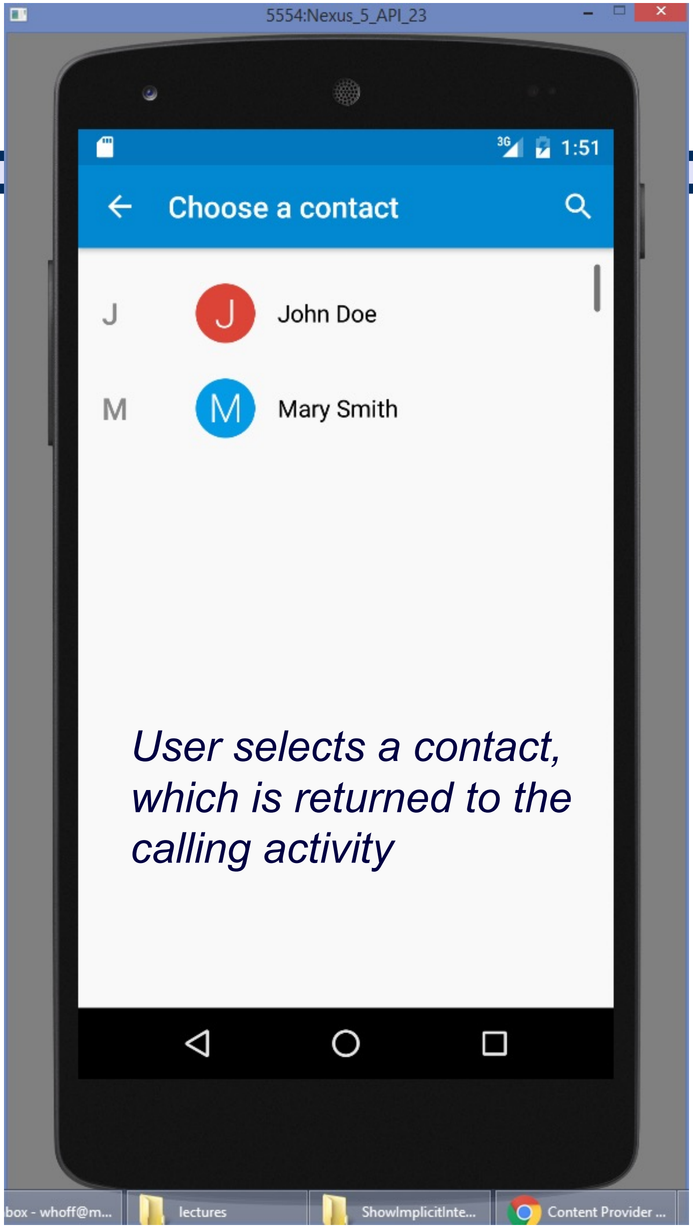
DETAILS

SUN FEB 21 13:29:02 MST 2016

□ Solved

Mary Smith

SEND CRIME REPORT



5554:Nexus_5_API_23

1:51

Choose a contact

J	John Doe
M	Mary Smith

User selects a contact, which is returned to the calling activity

Activity Launchers

- Launching new Activities
  - When no response needed:
    `startActivity(intent)`
  - When response is needed:
    `startActivityForResult(intent)`
    - Response received in **`onActivityResult()`**

Activity Launchers

- Launching new Activities
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  - When response is needed:
    ~~**`startActivityForResult(intent)`**~~
    - Response received in ~~**`onActivityResult()`**~~

Activity Launchers

- Launching new Activities
  - When no response needed:
    `startActivity(intent)`
  - When response is needed:
    ~~**`startActivityForResult(intent)`**~~
    - Response received in ~~**`onActivityResult()`**~~
- **`CallingActivity`** may have been killed when **`TargetActivity`** was running!

On Tap For Today

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  - Implicit Intents
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To Do For Next Time

- Lab07 due Fri Mar 10
- Alpha Release due Mon Mar 13 – have NavGraph in place
- A2 due Tue Mar 14
- Lab08 due Fri Mar 17
- Alpha Feedback due Fri Mar 17
- !!! Spring Break !!!
- Lab09 due Tue Mar 28