CS194A

Android Programming Workshop

Lecture 2: April 15, 2020

Rahul Pandey

Outline

- Logistics
- Bigger Number Game
- Layouts

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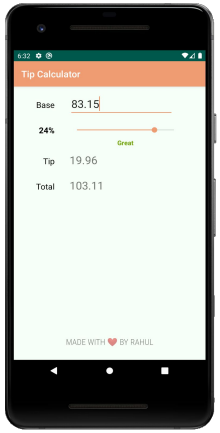
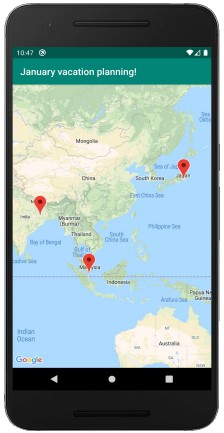
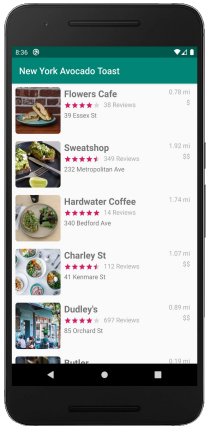
- **Logistics**
- Bigger Number Game
- Layouts







Assn 1: Tip Calculator

Assn 2: Google Maps

Assn 3: Yelp Clone

Industry panel discussion

1 2 3 4 5 6 7 8 9

Week #

Tip Calculator

- Canvas > Assignment
  - Follow the README template to use markdown
  - I'll assign partners by next week
  - Due April 26

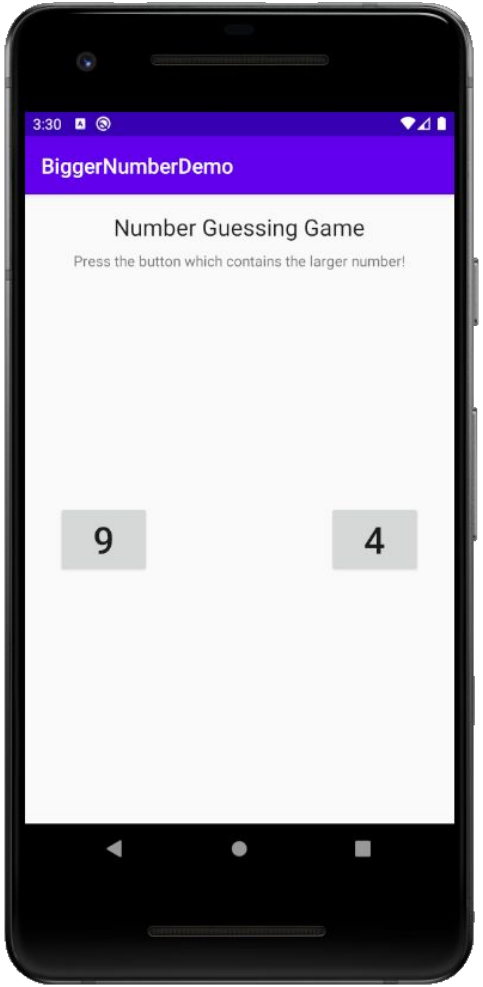
Git and Github session

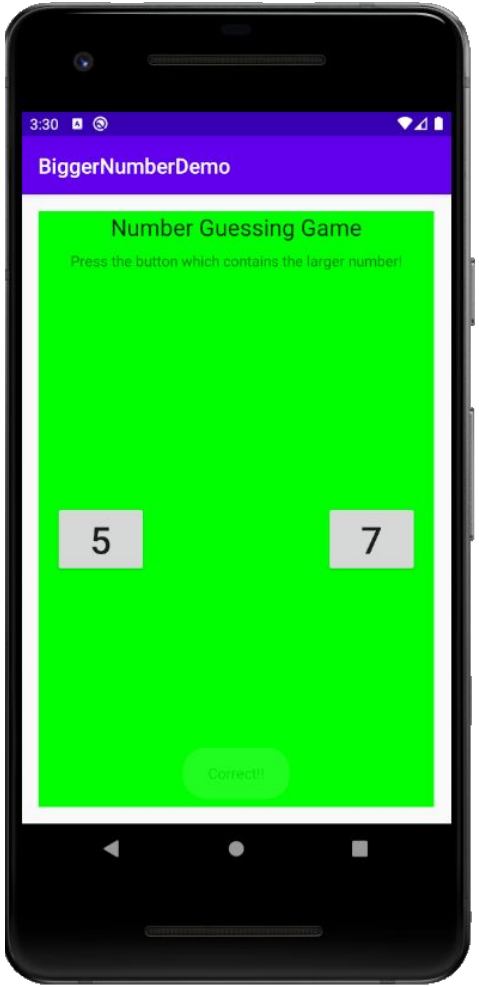
- Monday, April 20 6-7pm

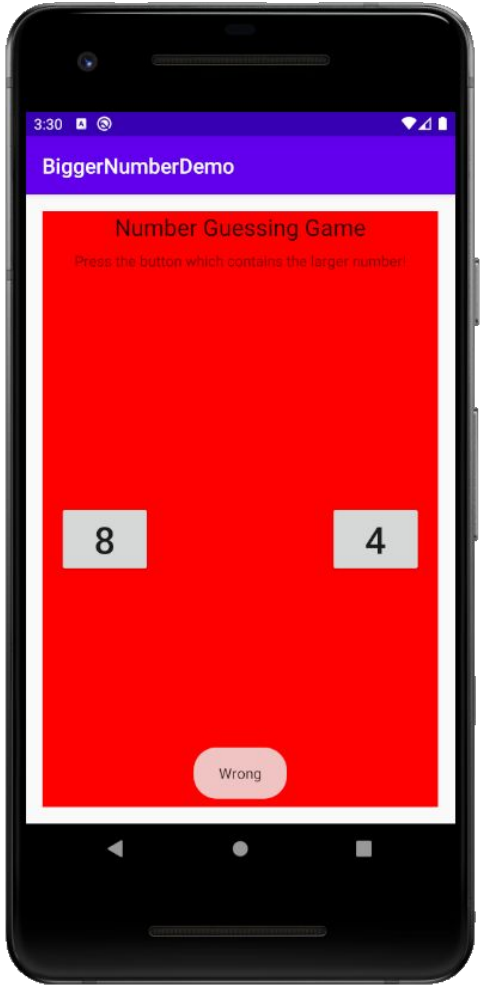
- Cover the basics to submit your project

Outline

- Logistics
- **Bigger Number Game**
- Layouts

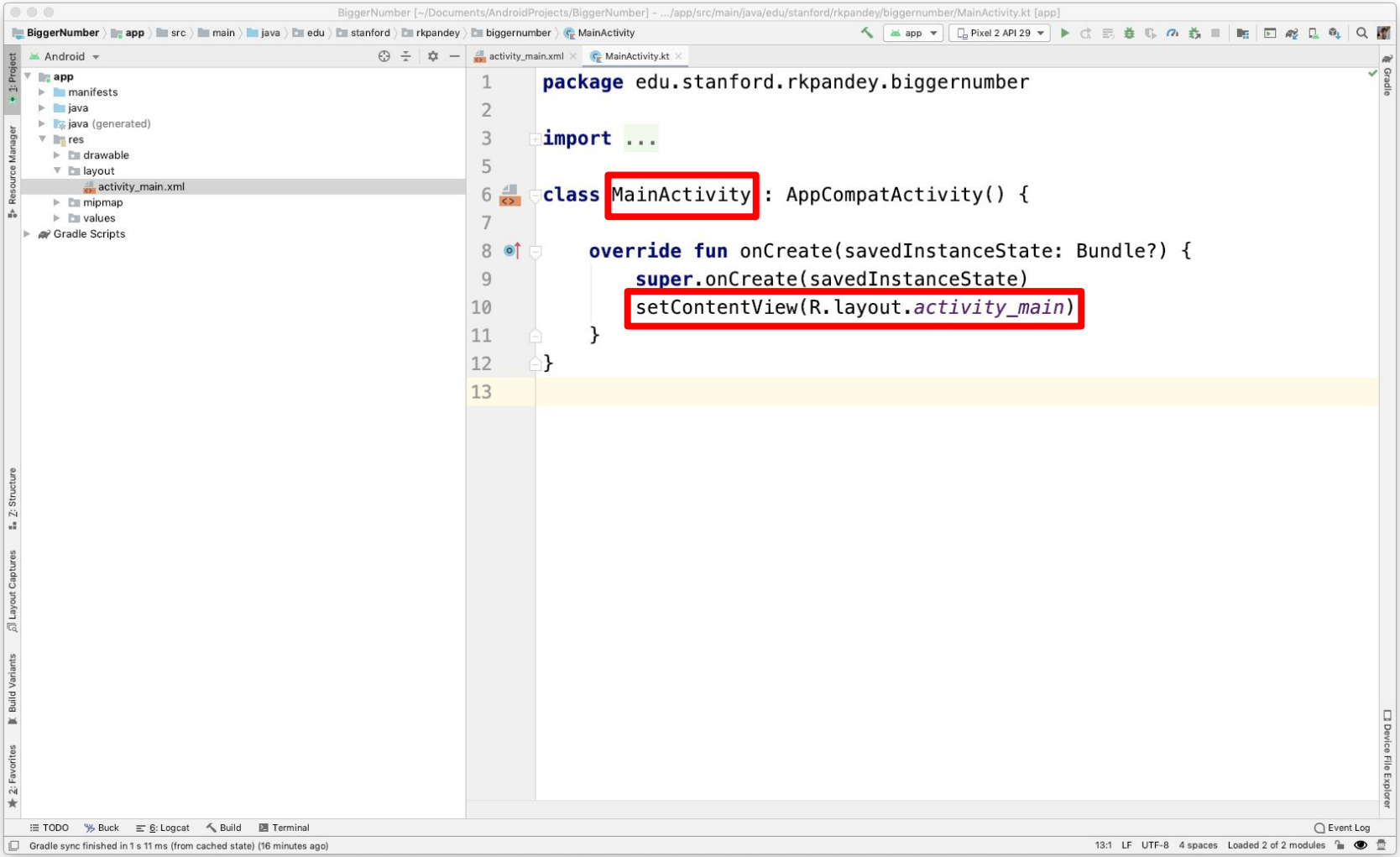

3:30
BiggerNumberDemo
Number Guessing Game
Press the button which contains the larger number!
9
4


3:30
BiggerNumberDemo
Number Guessing Game
Press the button which contains the larger number!
5
7
Correct!!


3:30
BiggerNumberDemo
Number Guessing Game
Press the button which contains the larger number!
8
4
Wrong

Android Activity

- A “screen” in Android is called an Activity
- Activities are where we write our application logic:
  - handle user interaction
  - change what’s on the screen
  - tell views to update


BiggerNumber [~/Documents/AndroidProjects/BiggerNumber] - .../app/src/main/java/edu/stanford/rkpandey/biggernumber/MainActivity.kt [app]
BiggerNumber app src main java edu stanford rkpandey biggernumber MainActivity
app
Pixel 2 API 29
Android
app
manifests
java
java (generated)
res
drawable
layout
activity_main.xml
mipmap
values
Gradle Scripts
activity_main.xml
MainActivity.kt
1 package edu.stanford.rkpandey.biggernumber
2
3 import ...
5
6 class MainActivity : AppCompatActivity() {
7
8 override fun onCreate(savedInstanceState: Bundle?) {
9 super.onCreate(savedInstanceState)
10 setContentView(R.layout.activity_main)
11 }
12 }
13
1: Project
Resource Manager
Z: Structure
Layout Captures
Build Variants
2: Favorites
Gradle
Device File Explorer
TODO
Buck
6: Logcat
Build
Terminal
Event Log
Gradle sync finished in 1 s 11 ms (from cached state) (16 minutes ago)
13:1 LF UTF-8 4 spaces Loaded 2 of 2 modules

Bigger Number Game

- Building a layout
- Responding to user input
- Comparison logic
- Code cleanliness

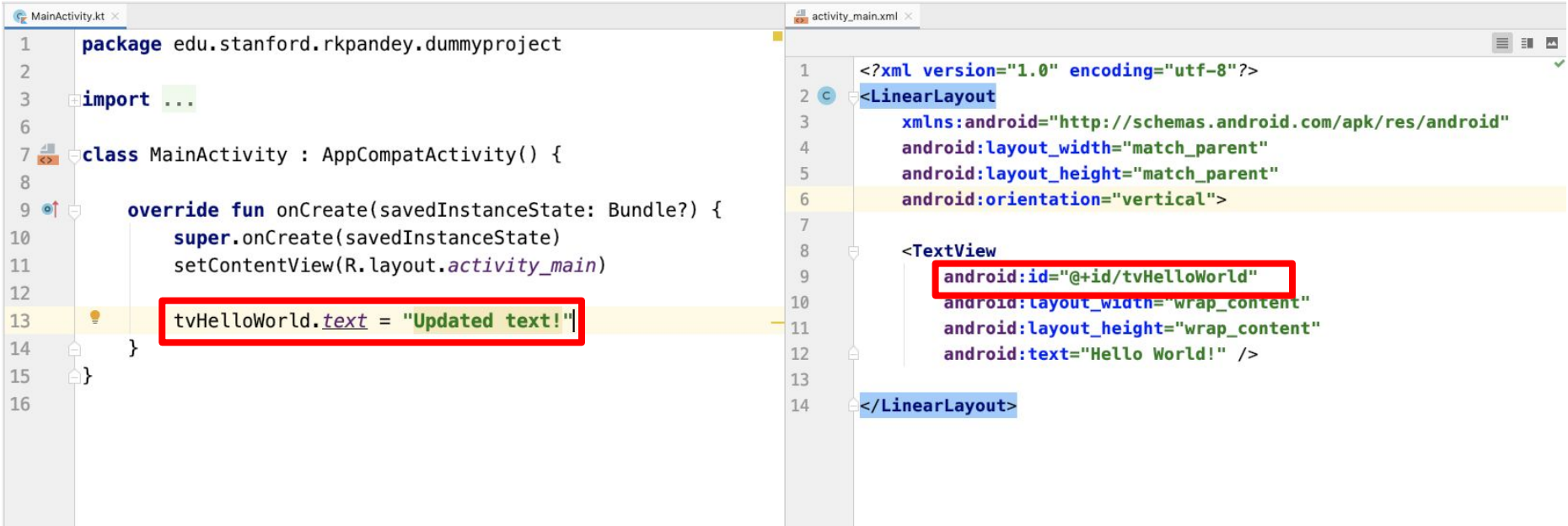
Outline

- Logistics
- Bigger Number Game
- **Layouts**

Layouts

- Layouts are defined in XML
- Consist of various “views”
  - `TextView`
  - `ImageView`
  - `Button`
  - `EditText`
  - `...`

Activity ←→ Layout Communication

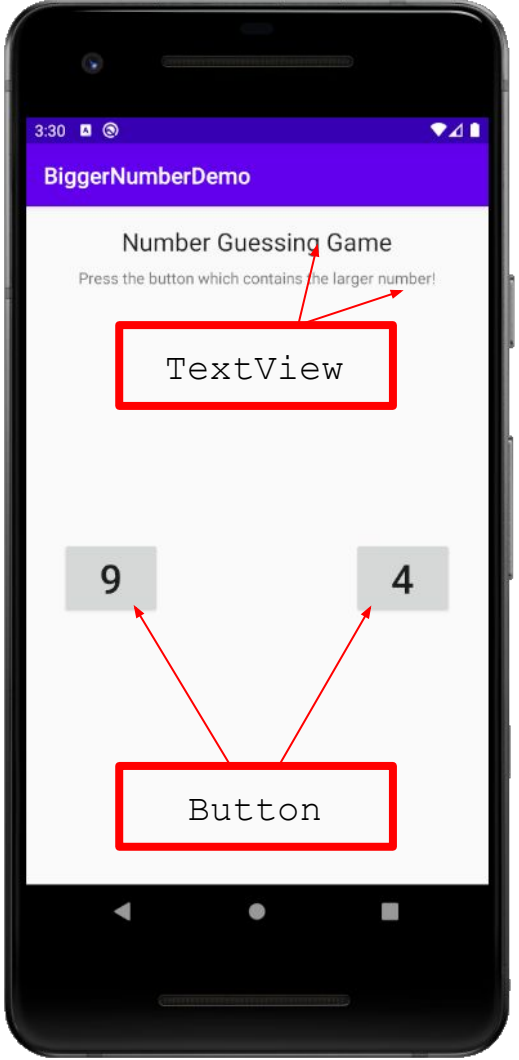


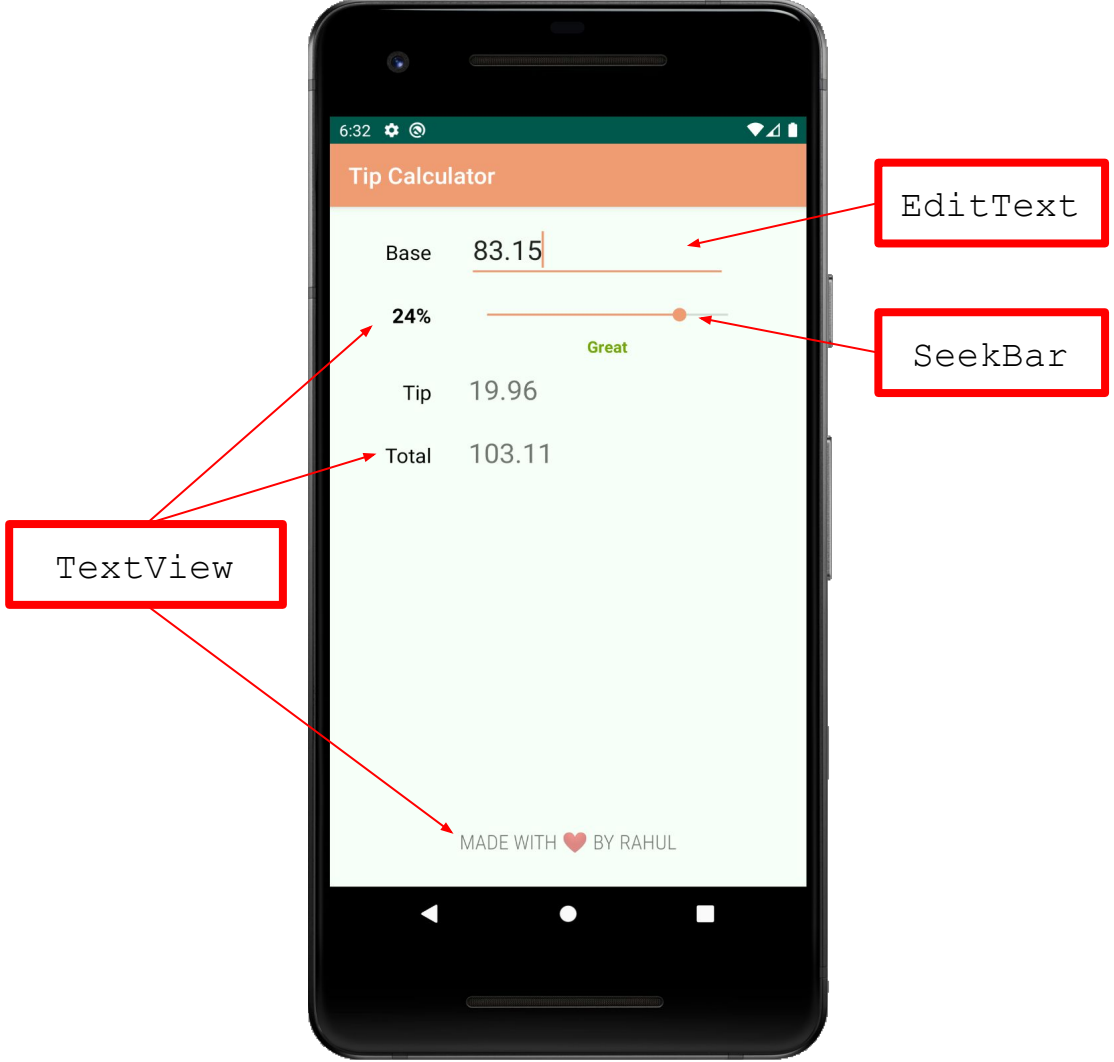
MainActivity.kt

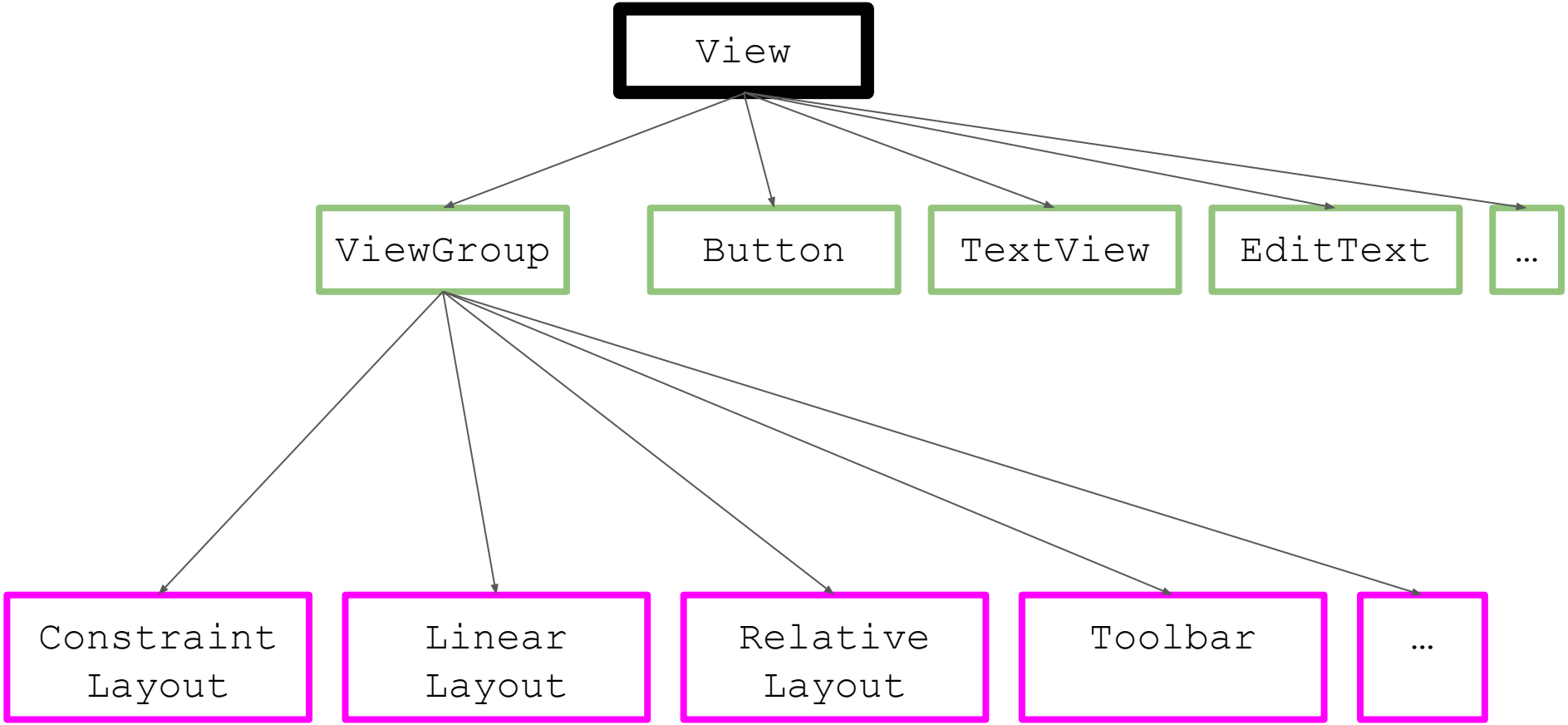
```
1  package edu.stanford.rkpandey.dummyproject
2
3  import ...
6
7  class MainActivity : AppCompatActivity() {
8
9      override fun onCreate(savedInstanceState: Bundle?) {
10         super.onCreate(savedInstanceState)
11         setContentView(R.layout.activity_main)
12
13         tvHelloWorld.text = "Updated text!"
14     }
15 }
16
```

activity_main.xml

```
1  <?xml version="1.0" encoding="utf-8"?>
2  <LinearLayout
3      xmlns:android="http://schemas.android.com/apk/res/android"
4      android:layout_width="match_parent"
5      android:layout_height="match_parent"
6      android:orientation="vertical">
7
8      <TextView
9          android:id="@+id/tvHelloWorld"
10         android:layout_width="wrap_content"
11         android:layout_height="wrap_content"
12         android:text="Hello World!" />
13
14 </LinearLayout>
```


3:30
BiggerNumberDemo
Number Guessing Game
Press the button which contains the larger number!
TextView
9
4
Button


6:32
Tip Calculator
Base
83.15
24%
Great
Tip
19.96
Total
103.11
MADE WITH BY RAHUL
EditText
SeekBar
TextView


View
ViewGroup
Button
TextView
EditText
…
Constraint Layout
Linear Layout
Relative Layout
Toolbar
…

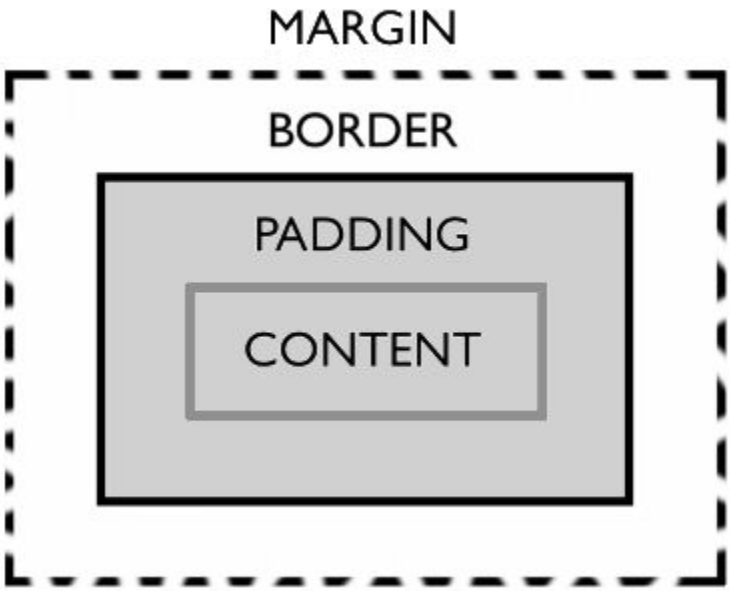
Layouts (ViewGroups)

- ViewGroup: a special view that can contain other views (called **children**)
- Subclasses:
  - ConstraintLayout
  - LinearLayout
  - FrameLayout
  - RelativeLayout

XML

- Language used to describe hierarchical data (e.g. views inside a viewgroup)
  - `<element attr1="value" attr2="value"> ... </element>`
  - `<element attr1="value" attr3="value" />` (self-closing)
- Case sensitive!
- Let autocomplete help you

Padding inside, margin outside



Prefer design tab, but understand XML

Most professional devs will edit the XML directly

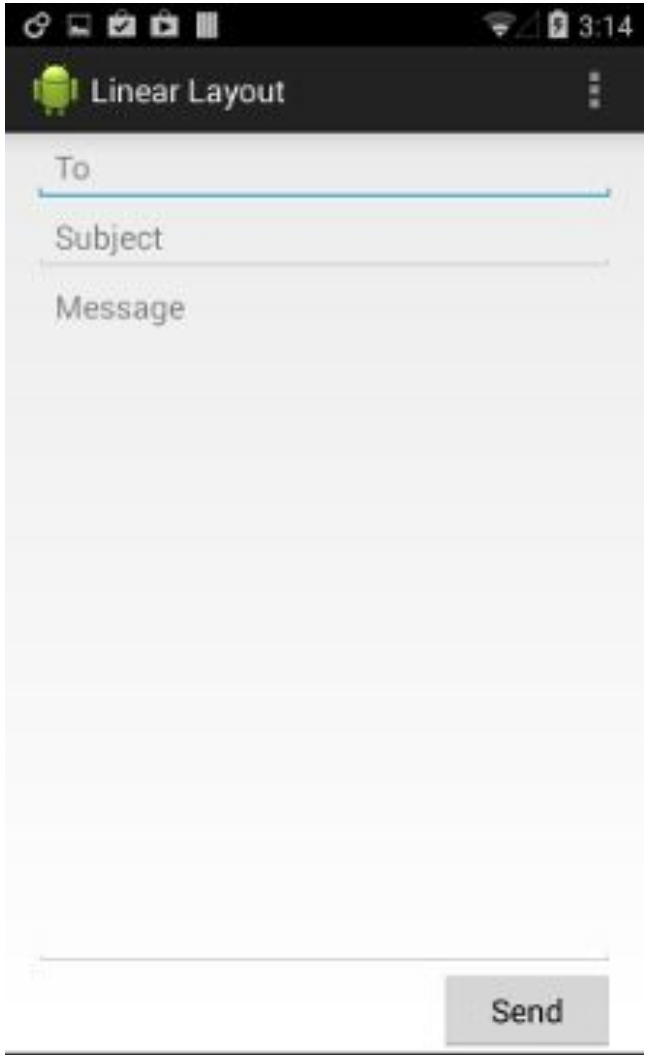
- Faster to specify attribute names instead of searching
- Company-specific abstractions = less value from design preview

ConstraintLayout

- The new default layout system, intended to create powerful and flat view hierarchies
- Views are laid out according to relationships (or **constraints**) between sibling views and the parent layout.

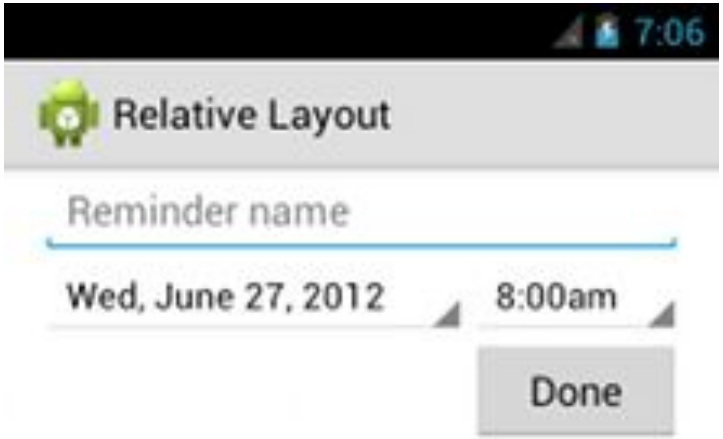
LinearLayout

Aligns all children in a single direction, vertically or horizontally

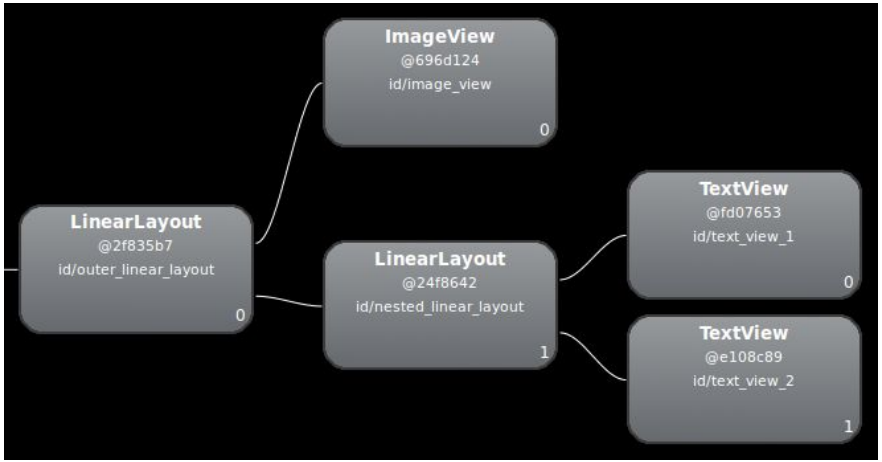


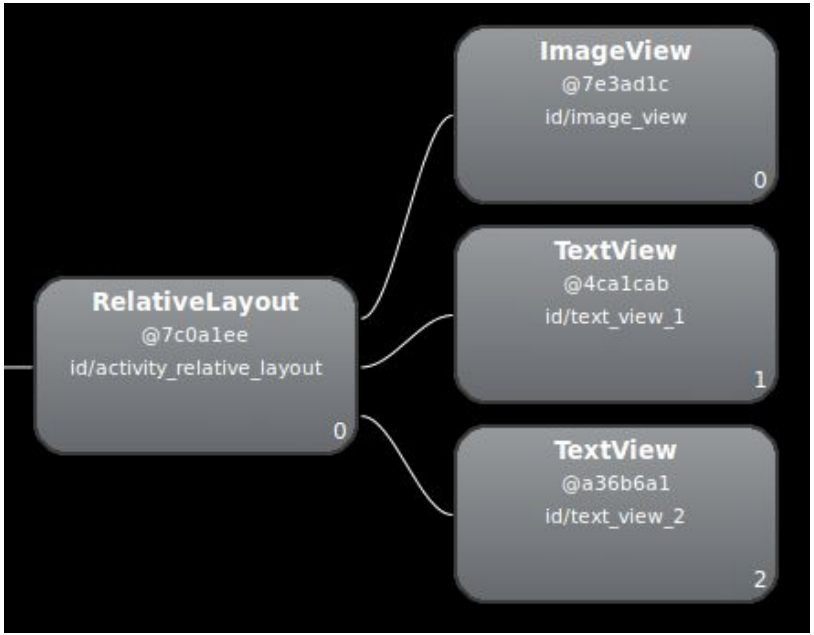
RelativeLayout

Displays child views in relative positions



Flat hierarchies





Prep for next week

- Build the Tip Calculator
- If you’re stuck for more than 30 minutes, post on Piazza or come to office hours