# CS194A

## Android Programming Workshop

Lecture 3: Oct 6, 2021
Rahul Pandey

# Outline

- Logistics
- Submission guidelines (Git/Github)
- Layouts

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- **Logistics**
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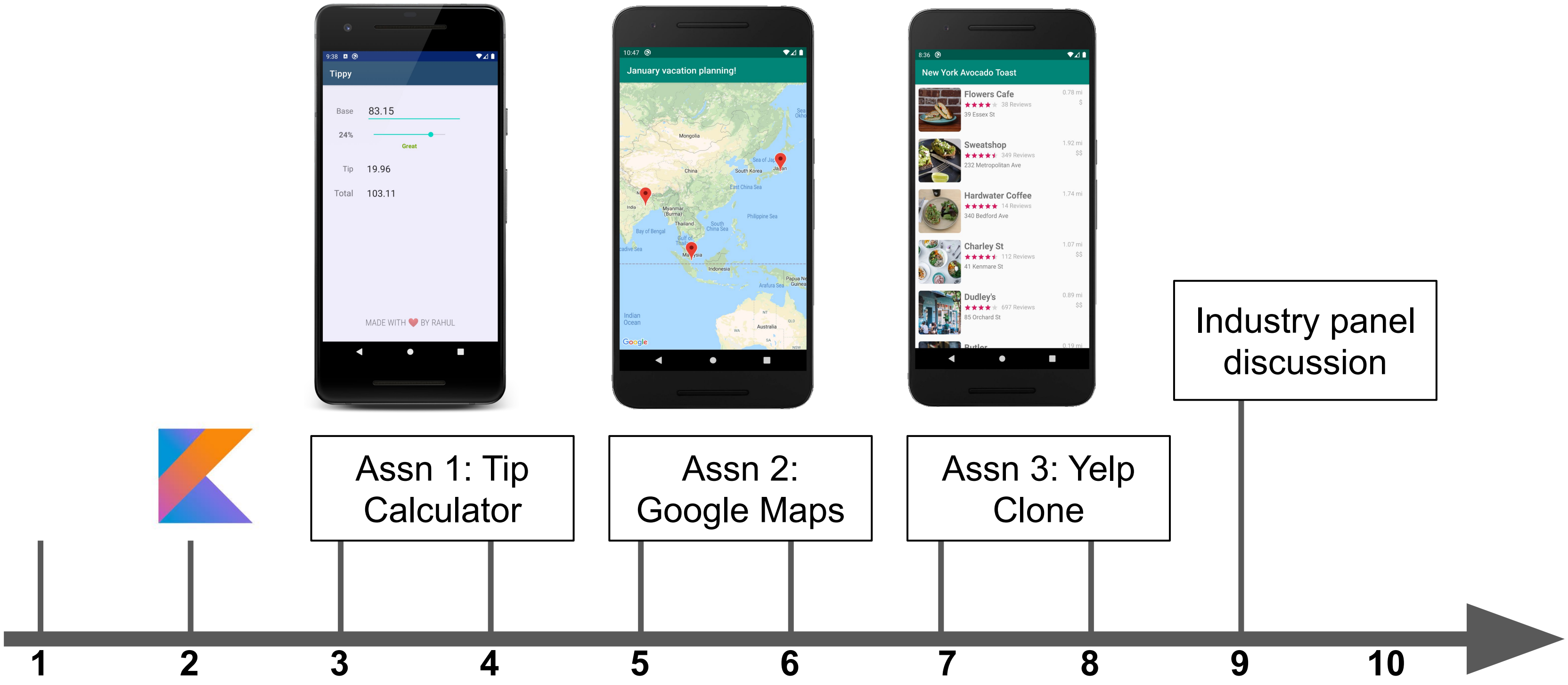
- Layouts



9:38

Tippy

Base 83.15

24%

Great

Tip 19.96

Total 103.11

MADE WITH ❤ BY RAHUL

10:47

January vacation planning!

8:36

New York Avocado Toast

Flowers Cafe ★★★★☆ 38 Reviews 39 Essex St 0.78 mi $

Sweatshop ★★★★½ 349 Reviews 232 Metropolitan Ave 1.92 mi $$

Hardwater Coffee ★★★★★ 14 Reviews 340 Bedford Ave 1.74 mi

Charley St ★★★★½ 112 Reviews 41 Kenmare St 1.07 mi $$

Dudley's ★★★★☆ 697 Reviews 85 Orchard St 0.89 mi $$

Butler 0.19 mi

Assn 1: Tip Calculator

Assn 2: Google Maps

Assn 3: Yelp Clone

Industry panel discussion

Week #

# Tip Calculator

- Canvas > Assignment
  - Follow the README template to use markdown
  - Due October 17
  - Partners are assigned randomly after submission

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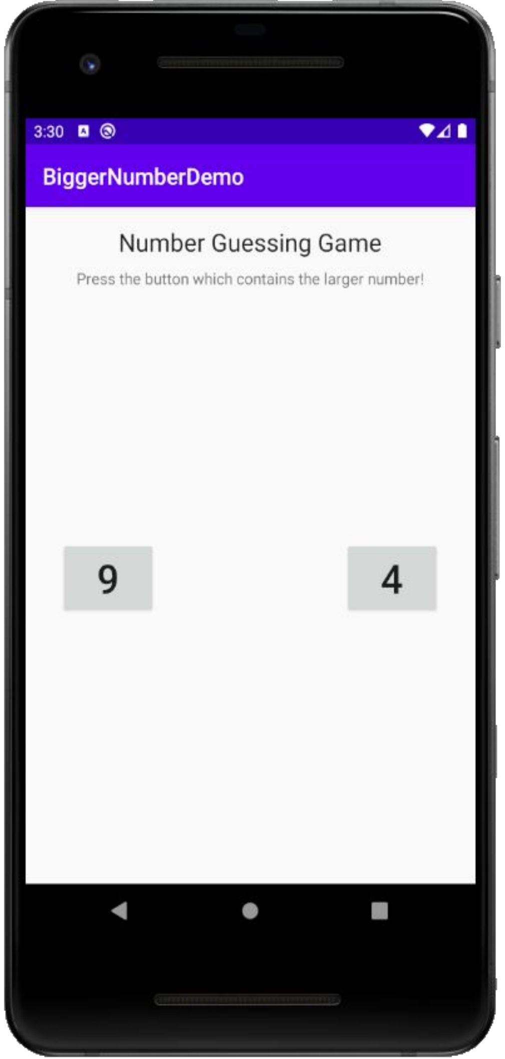
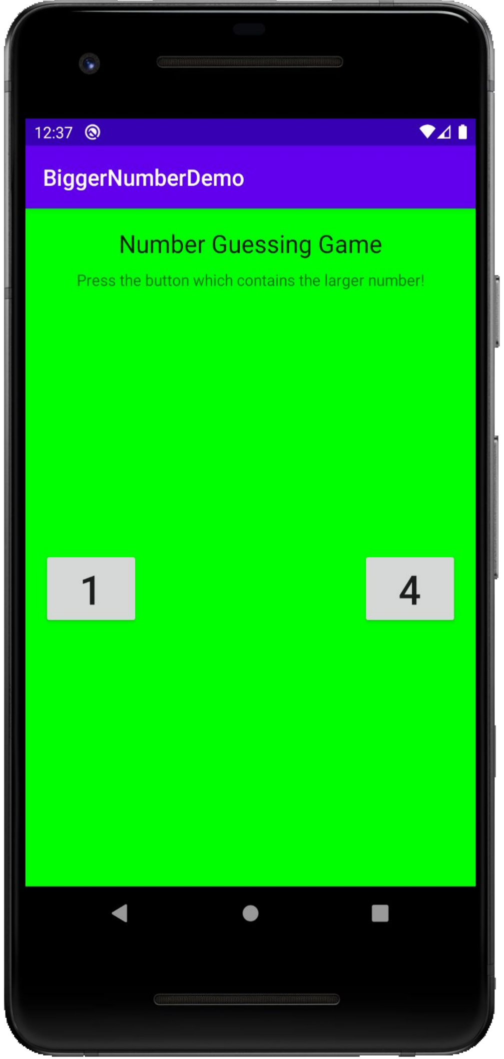


BiggerNumberDemo

Number Guessing Game

Press the button which contains the larger number!



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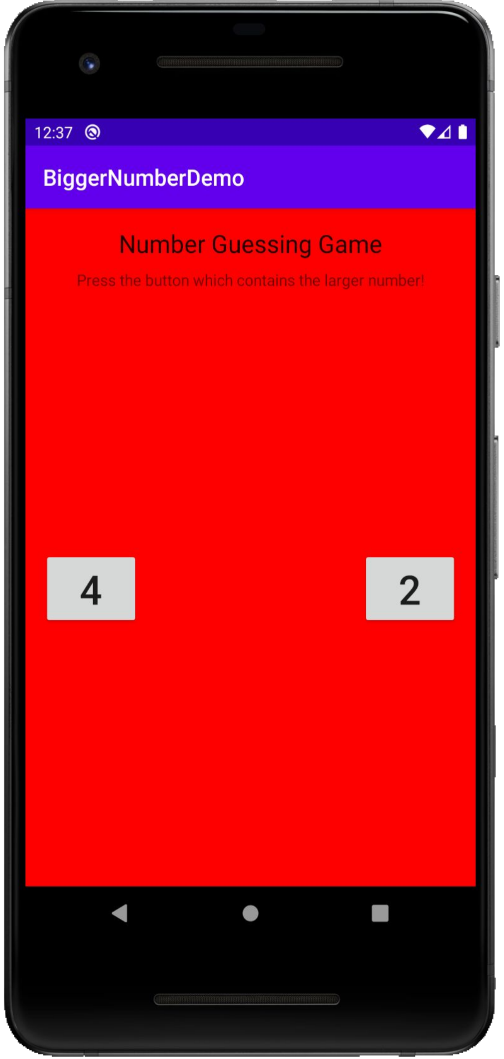


BiggerNumberDemo

Number Guessing Game

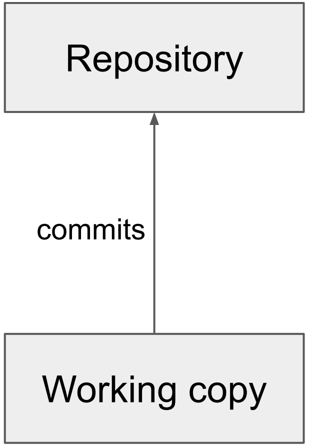
Press the button which contains the larger number!

# Source Control

- Records all your code changes
- Single source of truth for all developers
- Key functionality
  - Revert files back to previous state
  - Compare changes over time
  - Easily collaborate on features
  - “Blame” a code change :) for bug triage or learning

# Git: a distributed version control system

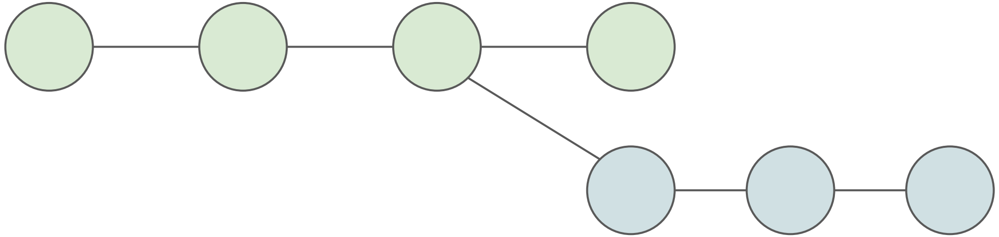
- One of many version control systems
  - Git (git)
  - Mercurial (hg)
  - Subversion (svn)
- Understand the fundamentals of git: https://git-scm.com/book/en/v2



Repository

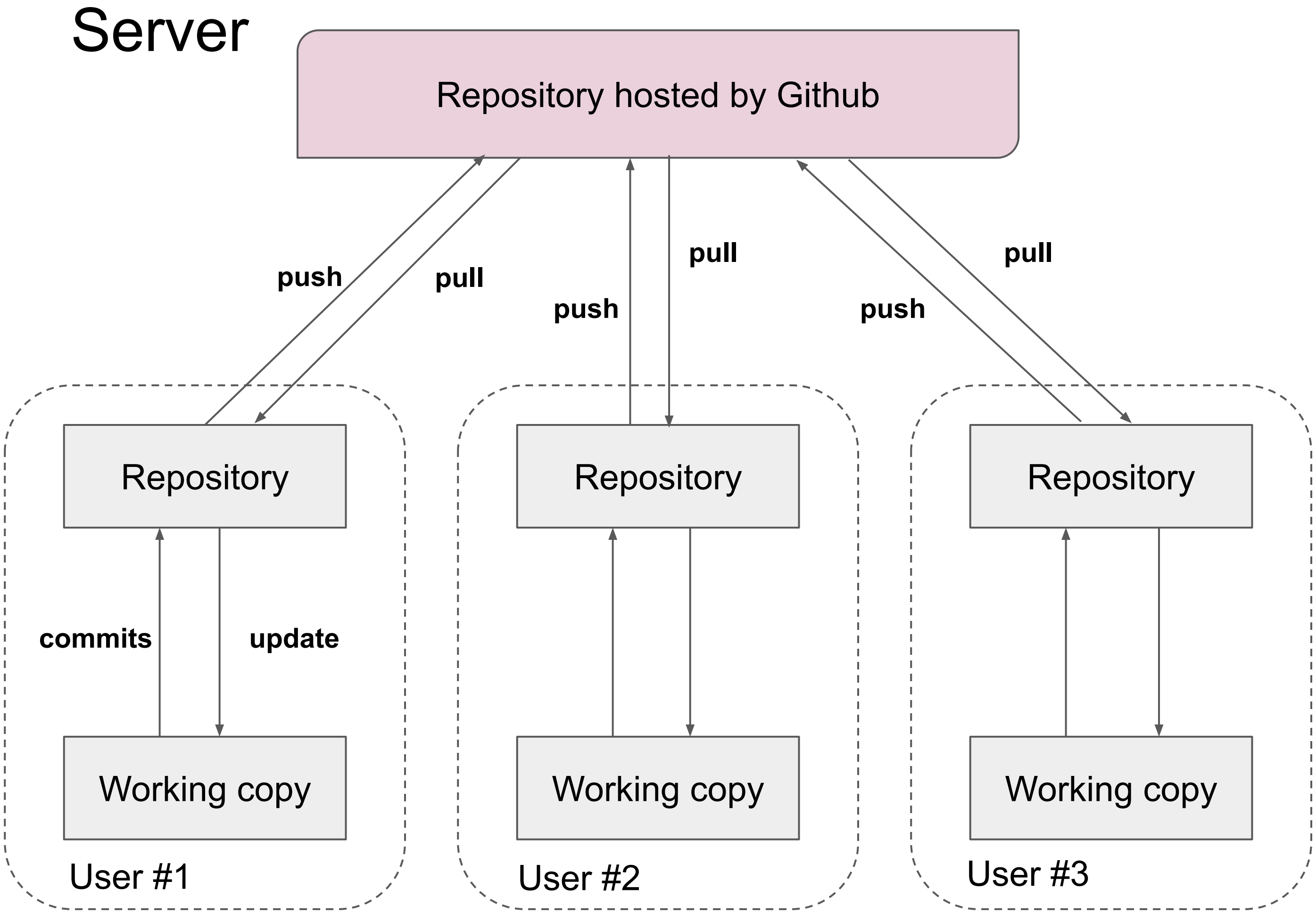
commits

Working copy



# Github

- A website/community that provides hosting for Git repositories
- Allows you to easily view files in the browser and comment on changes
- Register for an account at github.com



Server

Repository hosted by Github

push

pull

push

pull

push

pull

Repository

commits

update

Working copy

User #1

Repository

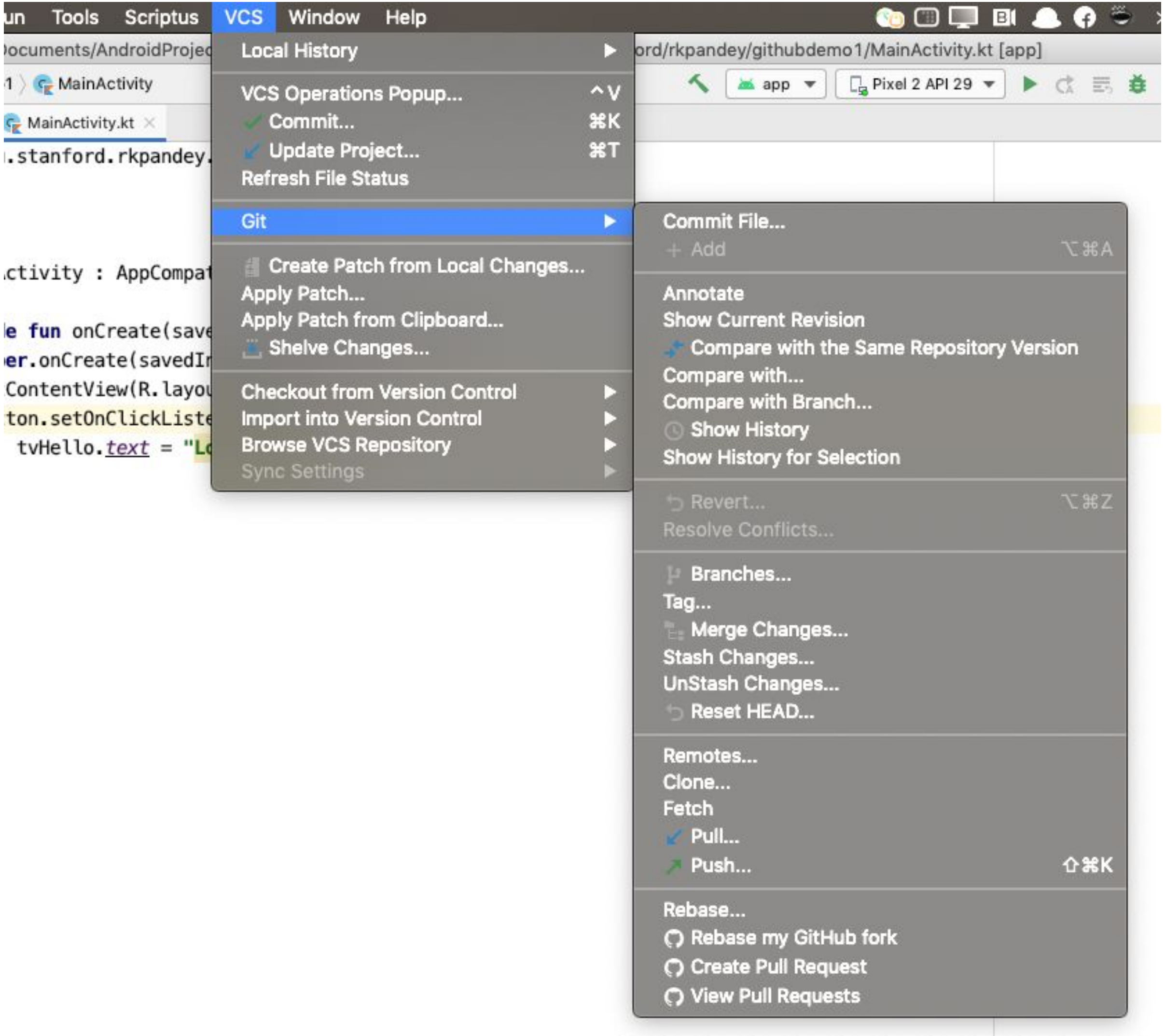
Working copy

User #2

Repository

Working copy

User #3



```
.stanford.rkpandey.

ctivity : AppCompat

e fun onCreate(save
er.onCreate(savedIr
ContentView(R.layou
ton.setOnClickListe
 tvHello.text = "Lo
```

# Public vs private repos

- Prefer public repositories:
  - Better for building a portfolio
  - Easier for sharing
- Be careful with what you put in Github
  - Secret API keys or access tokens
  - Use .gitignore file

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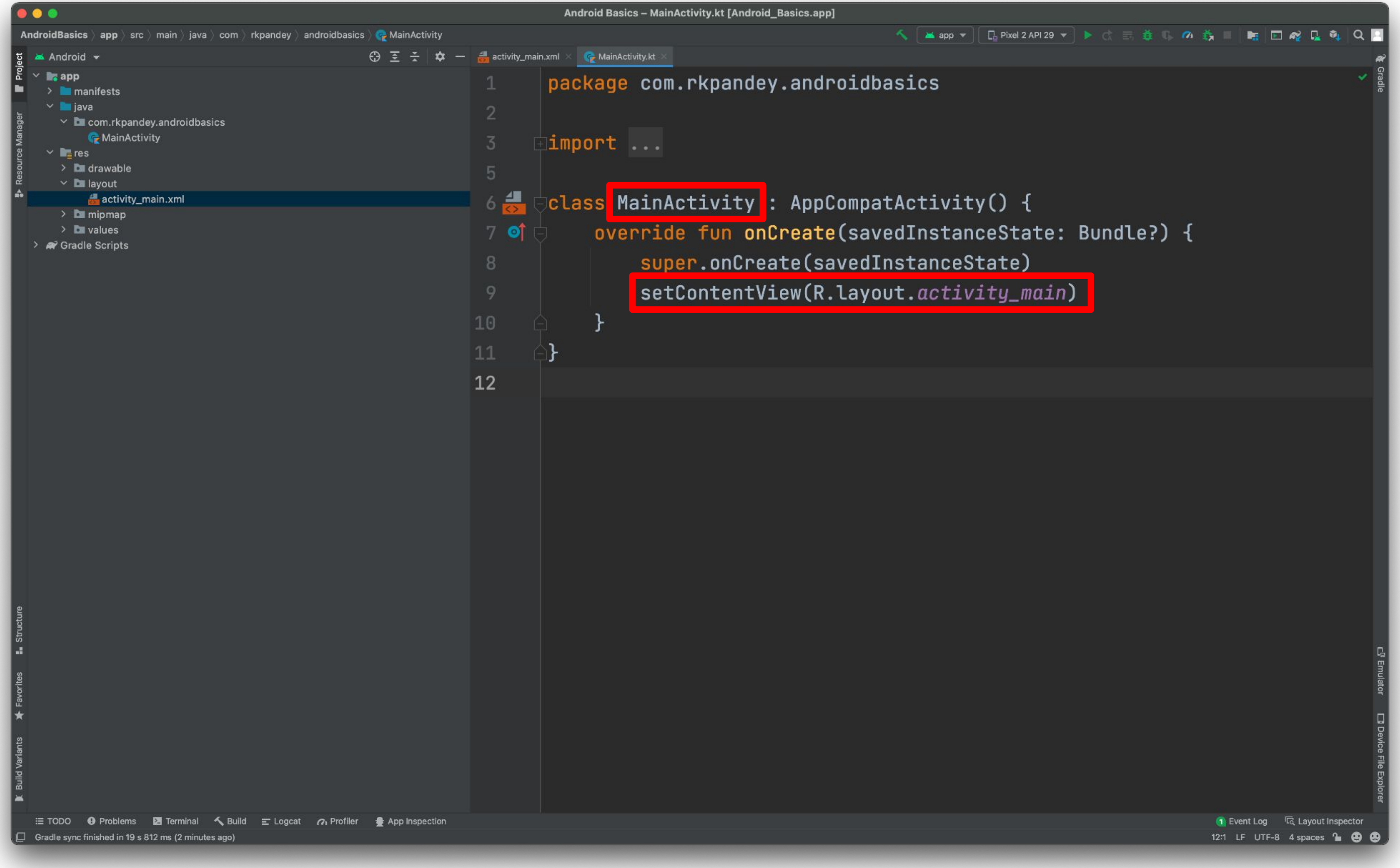
# Android Activity

- 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



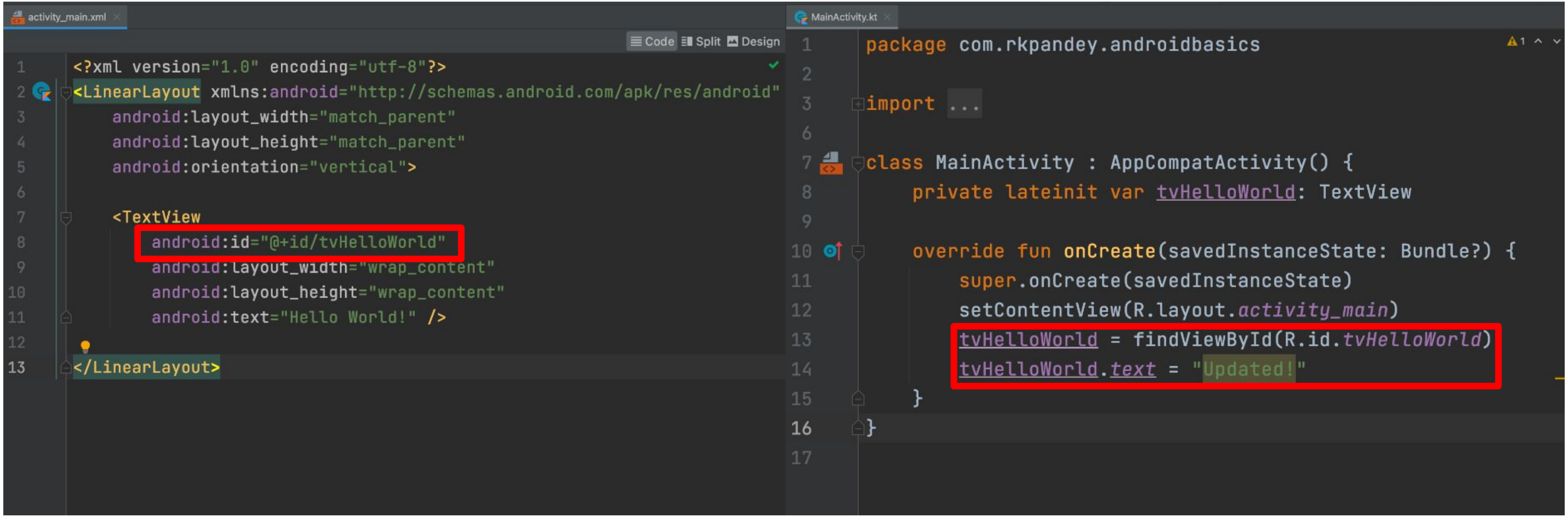
```
package com.rkpandey.androidbasics

import ...

class MainActivity : AppCompatActivity() {
    override fun onCreate(savedInstanceState: Bundle?) {
        super.onCreate(savedInstanceState)
        setContentView(R.layout.activity_main)
    }
}
```

Gradle sync finished in 19 s 812 ms (2 minutes ago)

# Layouts

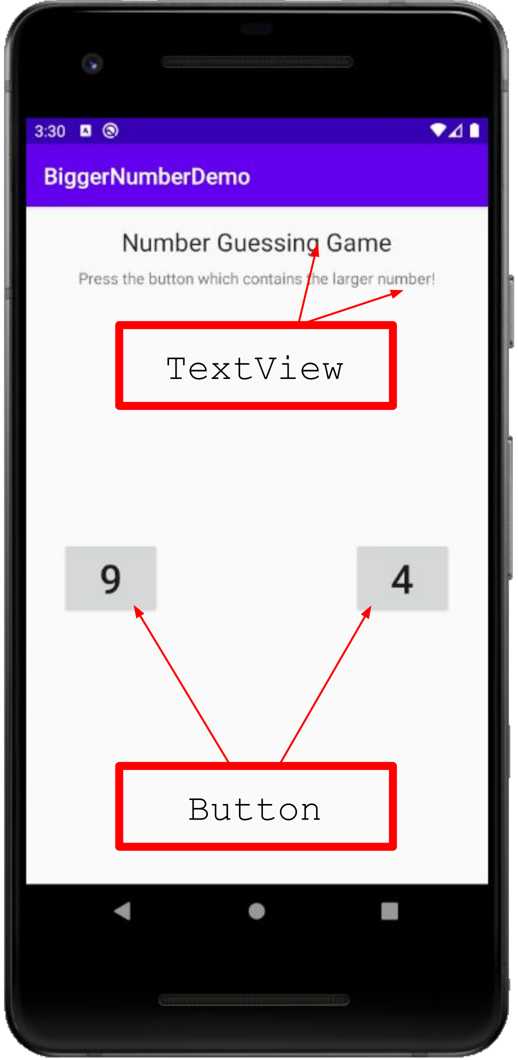
- Layouts are defined in XML
- Consist of various “views”
  - `TextView`
  - `ImageView`
  - `Button`
  - `EditText`
  - `...`

# Activity ←→ Layout Communication



```xml
<?xml version="1.0" encoding="utf-8"?>
<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical">

    <TextView
        android:id="@+id/tvHelloWorld"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Hello World!" />

</LinearLayout>
```

```kotlin
package com.rkpandey.androidbasics

import ...

class MainActivity : AppCompatActivity() {
    private lateinit var tvHelloWorld: TextView

    override fun onCreate(savedInstanceState: Bundle?) {
        super.onCreate(savedInstanceState)
        setContentView(R.layout.activity_main)
        tvHelloWorld = findViewById(R.id.tvHelloWorld)
        tvHelloWorld.text = "Updated!"
    }
}
```



3:30

BiggerNumberDemo

Number Guessing Game

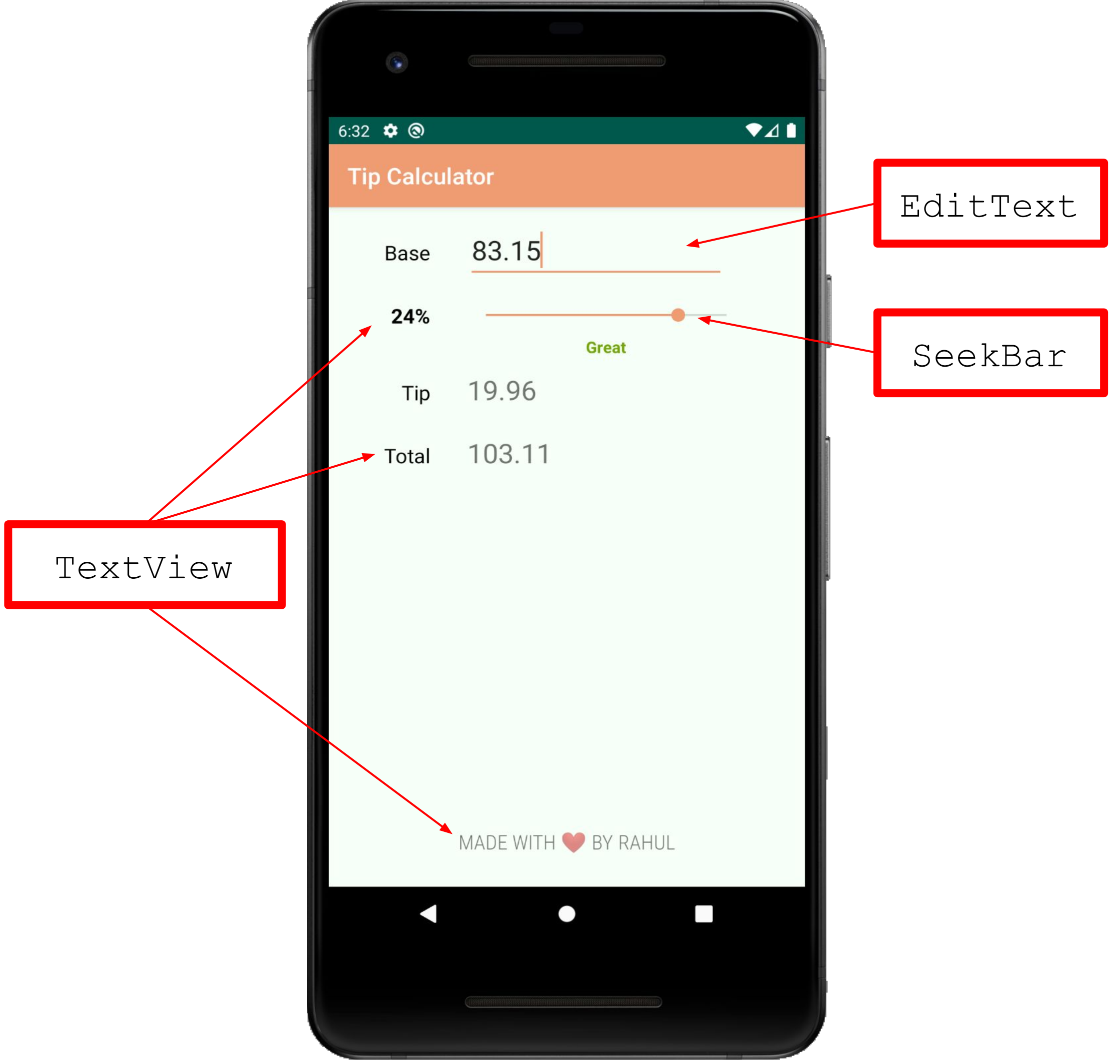
Press the button which contains the larger number!

9

4

TextView

Button



6:32

Tip Calculator

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24%

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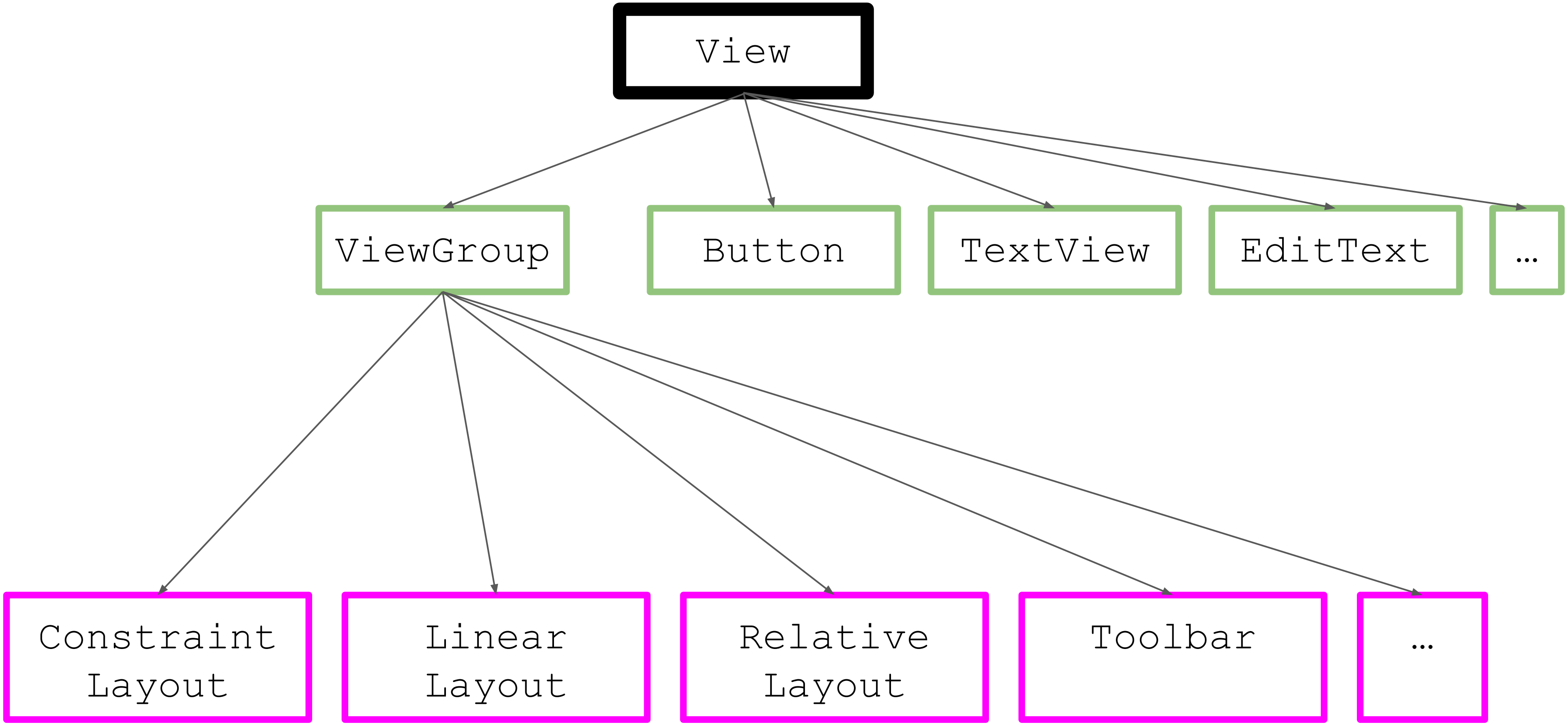
EditText

SeekBar

TextView


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

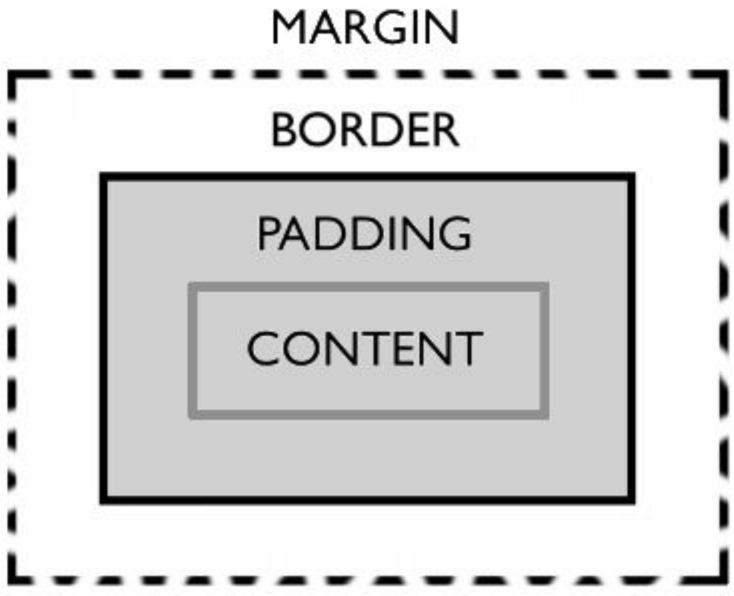
# Layouts (ViewGroups)

- 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

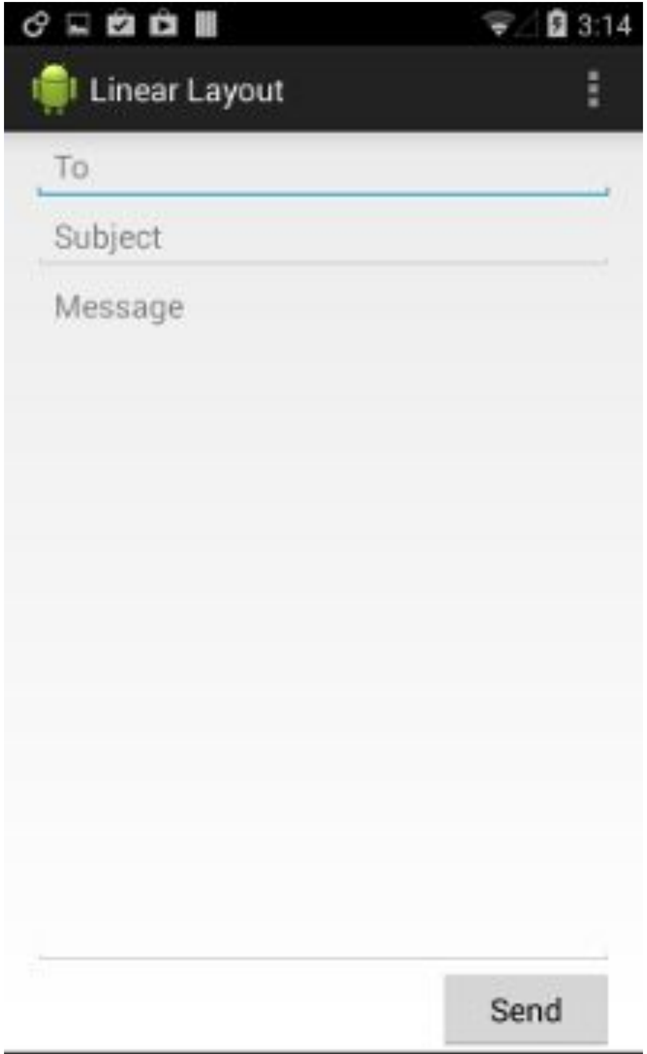
- Faster to specify attribute names instead of searching
- Company-specific abstractions = less value from design preview

# ConstraintLayout

- Modern 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.

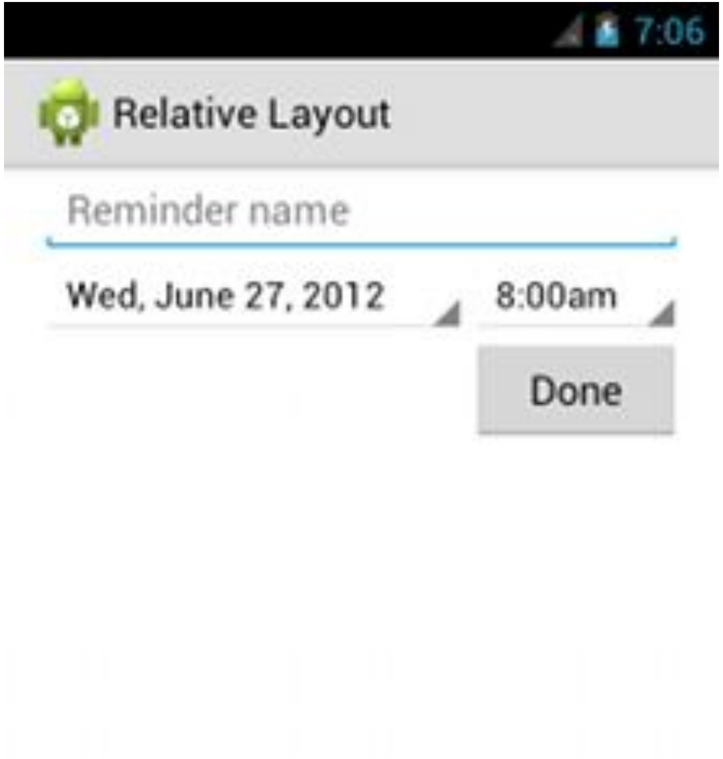
# LinearLayout

Aligns all children in a single direction, vertically or horizontally

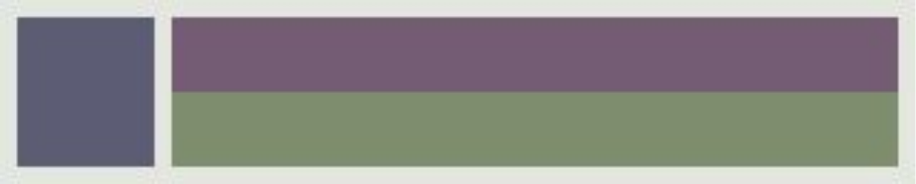


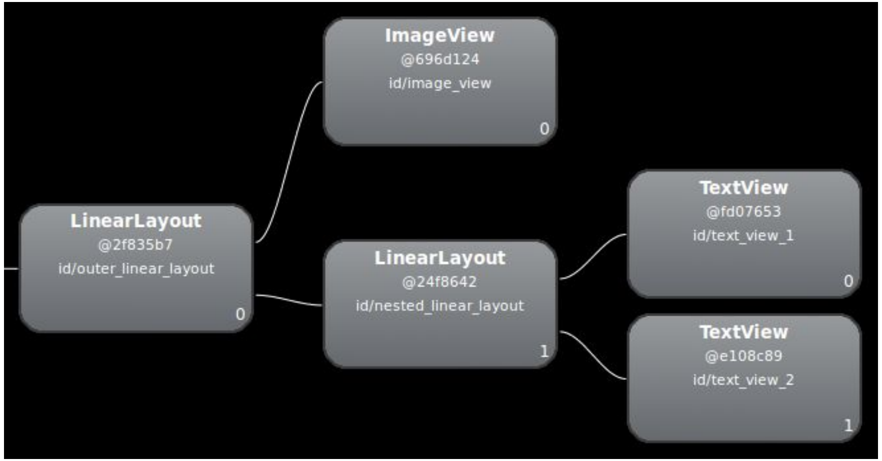
# RelativeLayout

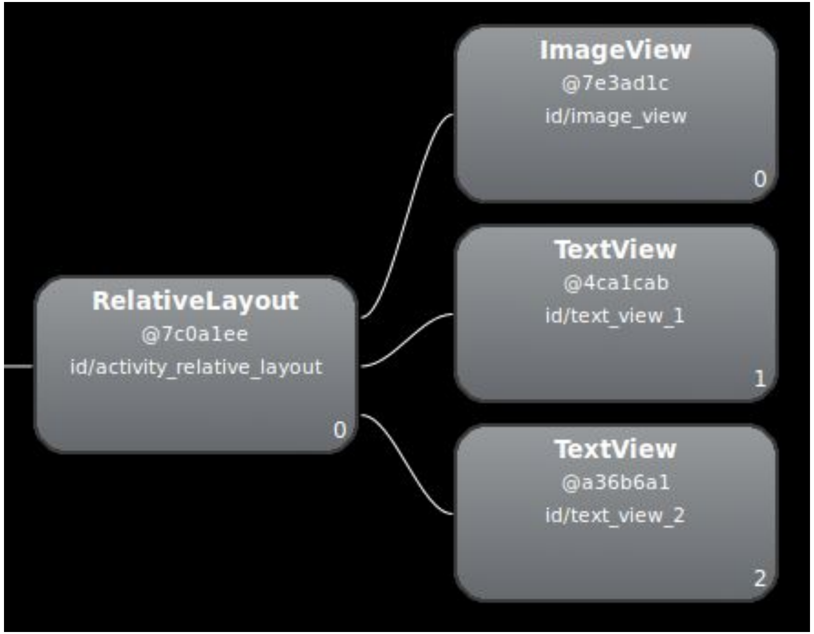
Displays child views in relative positions



# Flat hierarchies







# Prep for next week

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