Mobile Development

(Lab 1 – Android Studio)

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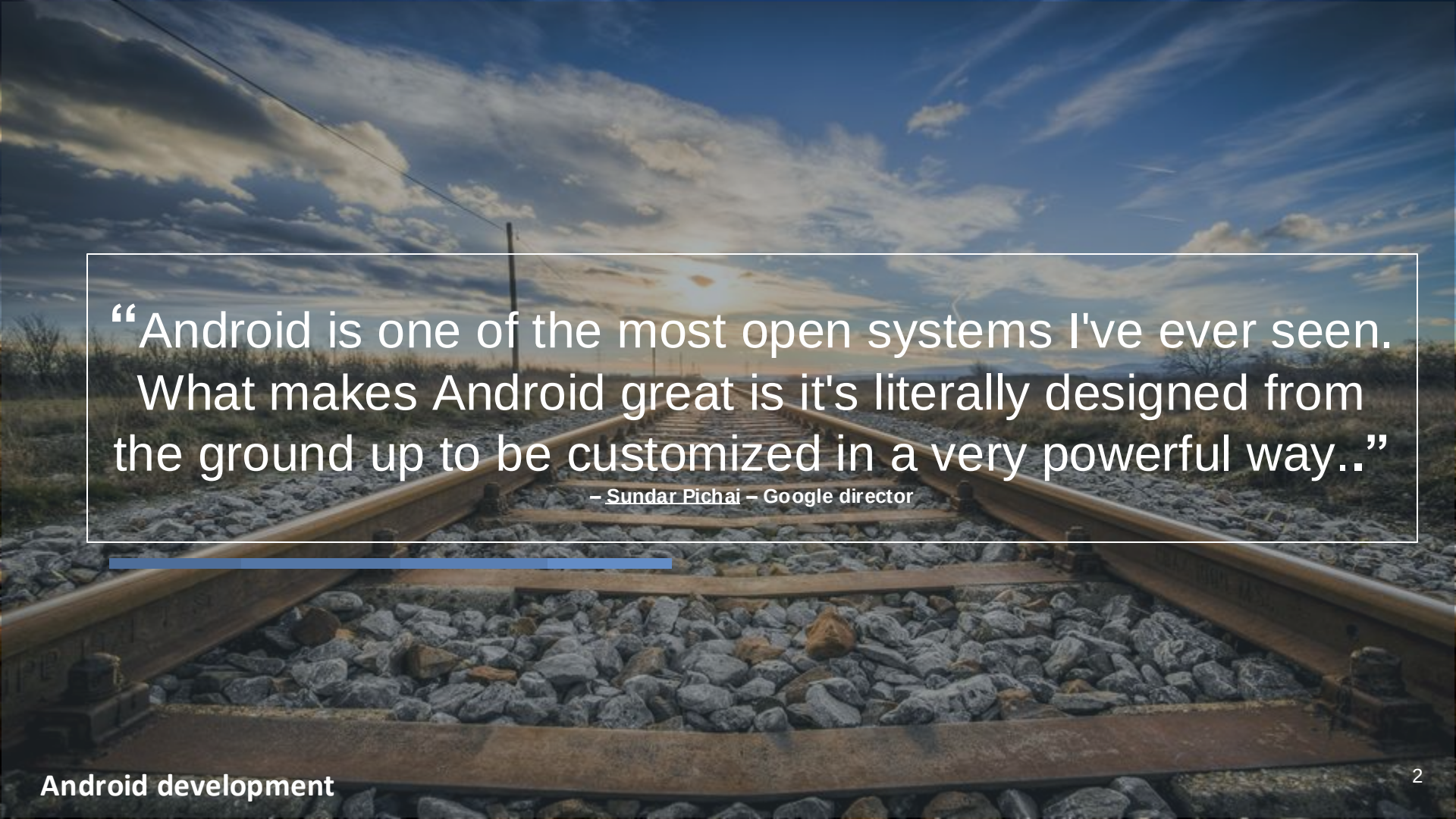
March 1st, 2025

S3T
Smart Software System Team


“Android is one of the most open systems I've ever seen. What makes Android great is it's literally designed from the ground up to be customized in a very powerful way..”
– Sundar Pichai – Google director

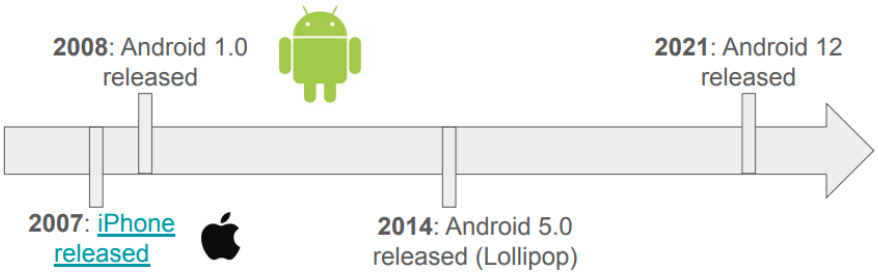
Learning Objectives

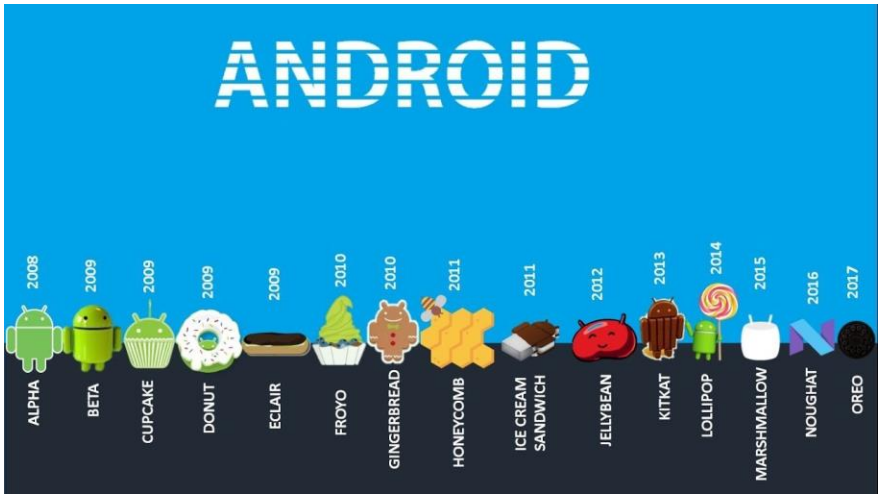
- Provide you with realistic, hands-on experience developing Android applications.
- Create a portfolio of apps that you can show your friends, discuss in interviews, and borrow for other applications.

What is Android

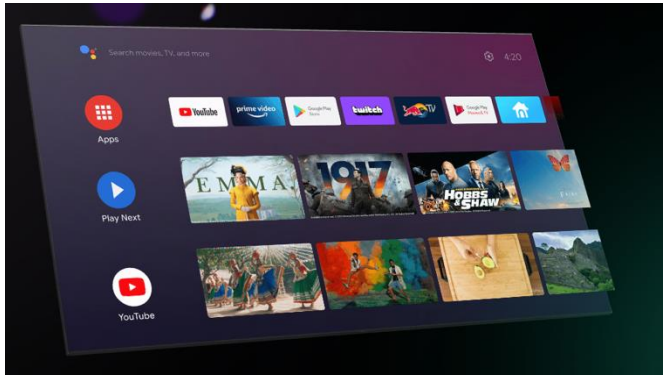
- Mobile operating system maintained by Google
- Based on Java (dev language) and Linux (kernel)

Android version





Android ecosystem



Why Android ?

- Free/cheap development tools make it simpler to ship. (Apple is not)
- Numerous work prospects exist, with further chances projected in the future.
- Native Android + iOS will stay relevant and in demand for at least the next 5-10 years.

Android development language

Java

```
String first = ”Nguyen";

String last = ” Nhat";

last += ”Anh";

String text = "Mr. " + last;
```

Kotlin

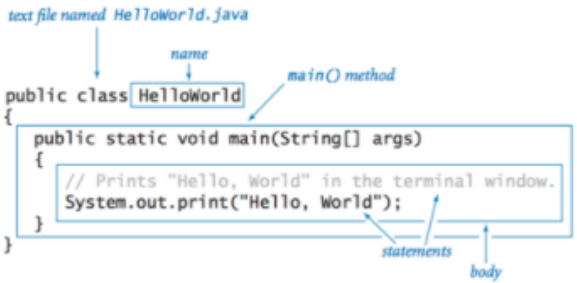
```
val first = ”Nguyen";

val last = ” Nhat";

last += ”Anh";

val text = "Mr. " + last;
```

Java cheat sheet

JAVA PROGRAMMING CHEATSHEET

We summarize the most commonly used Java language features and APIs in the textbook.

Hello, World.

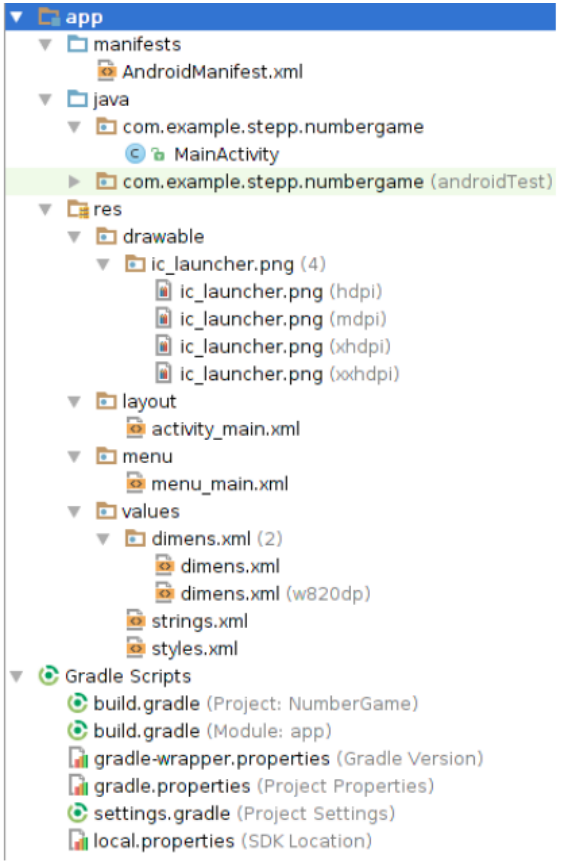


Java to Kotlin

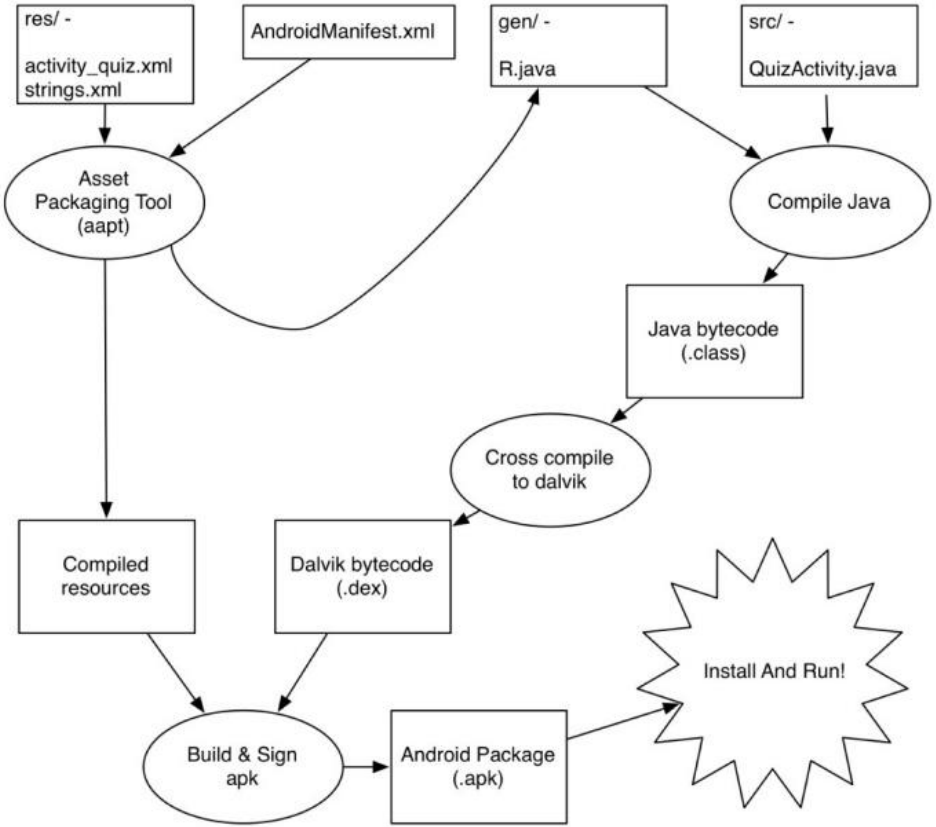
https://fabiomsr.github.io/from-java-to-kotlin/

Project structure

- **AndroidManifest.xml**
  - overall project config and settings
- **src/java/…**
  - source code for your Java classes
- **res/…** = resource files *(many are **XML**)*
  - drawable/ = images
  - layout/ = descriptions of GUI layout
  - menu/ = overall app menu options
  - values/ = constant values and arrays
  - strings = localization data
  - styles = general appearance styling
- **Gradle**
  - a build/compile management system
  - **build.gradle** = main build config file



App build process



Android terms

- activity: a single UI screen that occurs in your application
- view: items that appear onscreen in an activity
- event: action that occurs when user interacts with widgets
- action bar: a menu of frequently used actions located at the top of the app
- Notification area: the system's primary menu and icons

Android widgets

9:26:00 pm

Analog/DigitalClock

Button 1
Button 2
Button 3

Button

Plain
Serif
Bold
Italic

Checkbox

12:15 PM

Date/TimePicker

EditText 1
(206)555-1212
••••••••••••

EditText

Gallery

ImageView/Button

ProgressBar

Plain
Serif
Bold
Bold & Italic

RadioButton

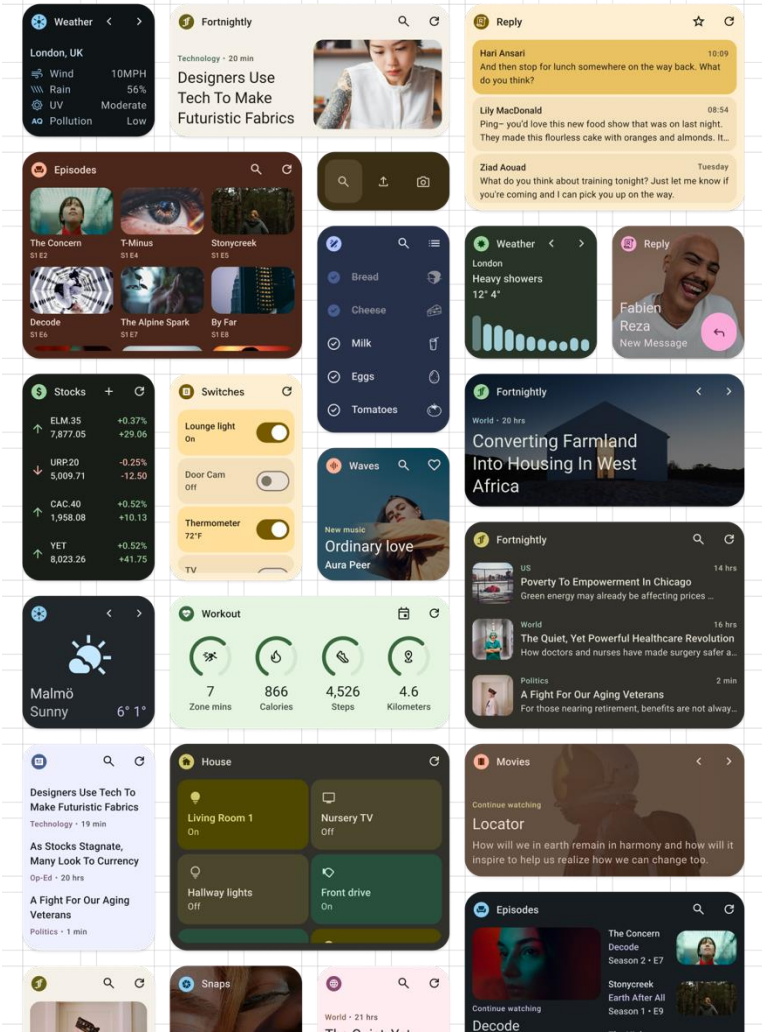
Spinner

Spinner

Plain
Serif
Bold
Italic

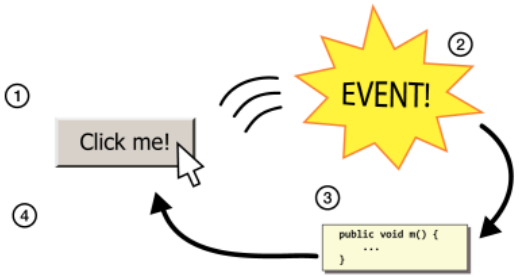
TextView

MapView, WebView



Android event

- **event**: An external stimulus your program can respond to.
- Common kinds of events include:
  - Mouse motion / tapping, Keys pressed,
  - Timers expiring, Network data available

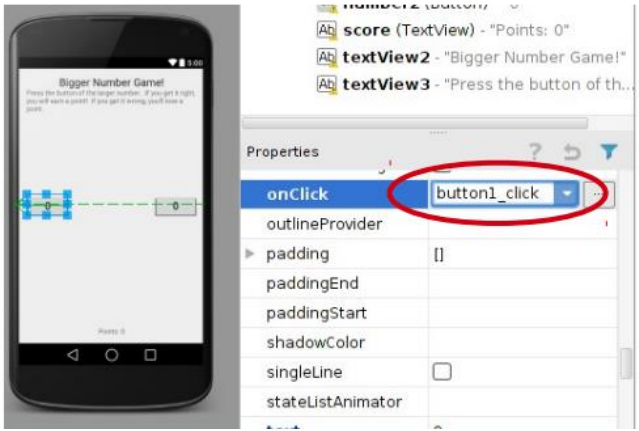


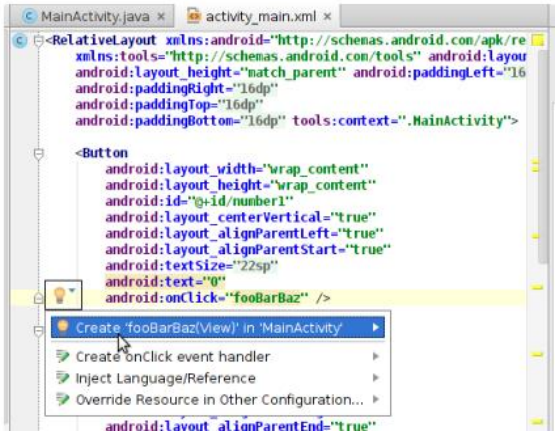
- **event-driven programming**: Overall execution of your program is largely dictated by user events.
  - Commonly used in graphical programs.

- To respond to events in a program, you must:
  - Write methods to handle each kind of event ("listener" methods).
  - Attach those methods to particular GUI widgets.

Android event

- select the widget in the **Design** view
- scroll down its **Properties** until you find `onClick`
- type the name of a method you'll write to handle the click
- switch to the **Text view** and find the XML for that button
- click the "Light Bulb" and choose to "**Create**" the method



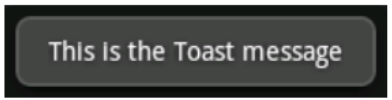


Android event

```
Toast.makeText(this,
               "message",
               duration).show();
```

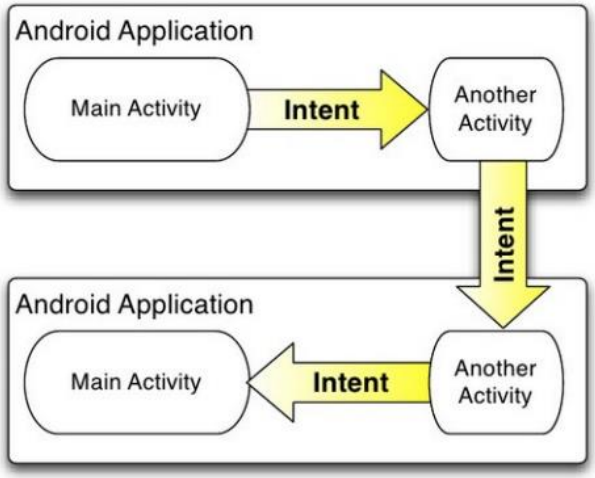
- where ***duration*** is `Toast.LENGTH_SHORT` or `LENGTH_LONG`

- A "Toast" is a pop-up message that appears for a short time.
- Useful for displaying short updates in response to events.
- Should not be relied upon extensively for important info.



Intent

- **intent**: a bridge between activities;
  a way for one activity to invoke another
  - the activity can be in the same app or in a different app
  - can store **extra data** to pass as "parameters" to that activity
  - second activity can "**return**" information back to the caller if needed



Intent

- To launch another activity (usually in response to an event), create an Intent object and call `startActivity` with it:

```
Intent intent = new Intent(this, ActivityName.class);
startActivity(intent);
```

- If you need to pass any parameters or data to the second activity, call `putExtra` on the intent.
  - It stores "extra" data as key/value pairs, not unlike a Map.

```
Intent intent = new Intent(this, ActivityName.class);
intent.putExtra("name", value);
intent.putExtra("name", value);
startActivity(intent);
```

Implicit Intent

- **implicit intent**: One that launches another app, without naming that specific app, to handle a given type of request or action.
  - examples: invoke default browser; load music player to play a song

```
// make a phone call
Uri number = Uri.parse("tel:5551234");
Intent callIntent = new Intent(Intent.ACTION_DIAL, number);

// go to a web page in the default browser
Uri webpage = Uri.parse("http://www.stanford.edu/");
Intent webIntent = new Intent(Intent.ACTION_VIEW, webpage);

// open a map pointing at a given latitude/longitude (z=zoom)
Uri location = Uri.parse("geo:37.422219,-122.08364?z=14");
Intent mapIntent = new Intent(Intent.ACTION_VIEW, location);
```

Button

A clickable widget with a text label

- key attributes:

`android:clickable="`***`bool`***`"`	set to false to disable the button
`android:id="@+id/`***`theID`***`"`	unique ID for use in Java code
`android:onClick="`***`function`***`"`	function to call in activity when clicked (must be public, void, and take a View arg)
`android:text="`***`text`***`"`	text to put in the button

- represented by `Button` class in Java code

```
Button b = (Button) findViewById(R.id.theID);
...
```

Edit text

An editable text input box

- key attributes:

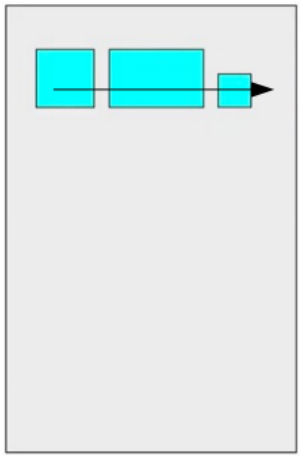
`android:hint="`***`text`***`"`	gray text to show before user starts to type
`android:id="@+id/`***`theID`***`"`	unique ID for use in Java code
`android:inputType="`***`type`***`"`	what kind of input is being typed; `number`,`phone`,`date`,`time`,...
`android:lines="`***`int`***`"`	number of visible lines (rows) of input
`android:maxLines="`***`int`***`"`	max lines to allow user to type in the box
`android:text="`***`text`***`"`	initial text to put in box (default empty)
`android:textSize="`***`size`***`"`	size of font to use (e.g. "20dp")

  - others: `capitalize`, `digits`, `fontFamily`, `letterSpacing`, `lineSpacingExtra`, `minLines`, `numeric`, `password`, `phoneNumber`, `singleLine`, `textAllCaps`, `textColor`, `typeface`

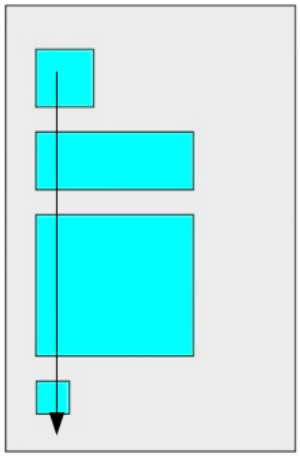
Linear layout

- lays out widgets/views in a single line
- **orientation** of horizontal (default) or vertical
- items do *not* wrap if they reach edge of screen!

horizontal



vertical

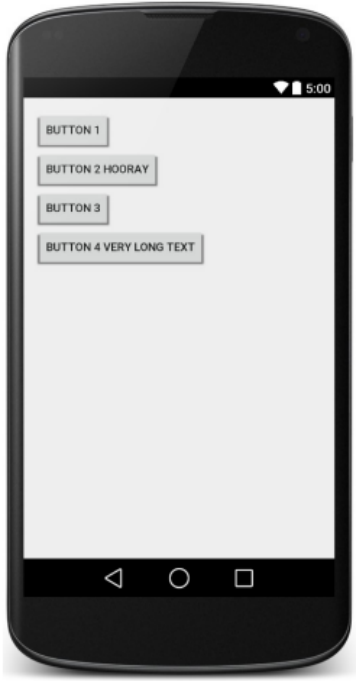


Linear layout

```
<LinearLayout ...
        android:orientation="horizontal"
        tools:context=".MainActivity">
    <Button ... android:text="Button 1" />
    <Button ... android:text="Button 2 Hooray" />
    <Button ... android:text="Button 3" />
    <Button ... android:text="Button 4
                        Very Long Text" />
</LinearLayout>
```

Linear layout

```
<LinearLayout ...
        android:orientation="vertical"
        tools:context=".MainActivity">
    <Button ... android:text="Button 1" />
    <Button ... android:text="Button 2
                                Hooray" />
    <Button ... android:text="Button 3" />
    <Button ... android:text="Button 4
                          Very Long Text" />
</LinearLayout>
```



Homework

- Do you remember this homework? So find a way to transform web version to mobile version.

Profile

I'm a student

About me

I am a lovely cat. I have passion in IT and I want to become data analyst.

Details

Name:
Tran Van Boss
Age:
5 years
Location:
UIT, VNU-HCM

Experiences

Educations

UIT, VNU-HCM
Apr 2019 - June 2024

Information System
The education was mainly System design-basec course, but I also learned about Web, Data analysis and more. During my time in college, I specialized in OOP, data science. Now, I'm learning web development

Working Experiences

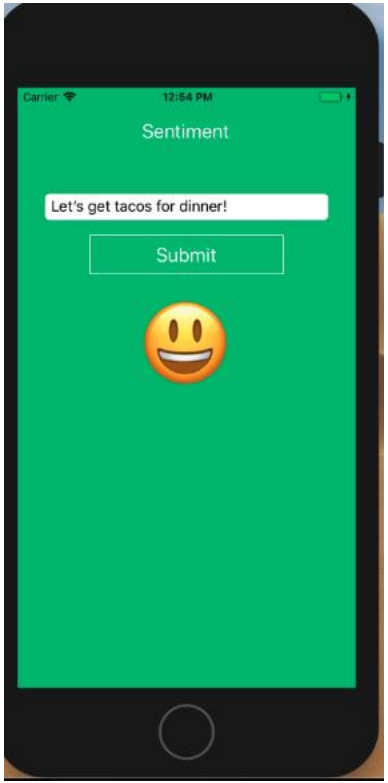
Facebook | Fresher Engineer
Sep 2021 - current

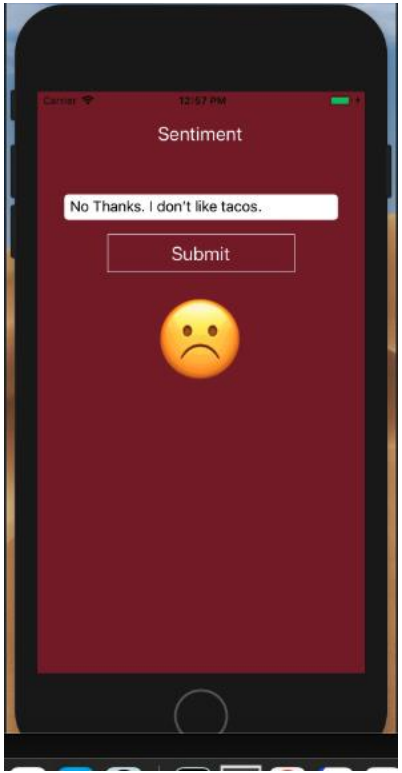
Partime - Fresher Web Developer
Working as a Fresher Devloper on a dating function on Facebook page. Dating function is an app as Tinder

Homework 2 – Android Sentiment Analysis

- Use this API and create the app to classify your input sentence
- https://ai.google.dev/prompts/sentiment-analysis?hl=vi
- Sample is in the next page

Homework 2 – Android Sentiment Analysis





References

- https://web.stanford.edu/
- https://developer.android.com/
- https://introcs.cs.princeton.edu/
- https://www.cs.utexas.edu/

Q & A

Thank you for listening

“Coming together is a beginning;
Keeping together is progress;
Working together is success.”
- HENRY FORD