

Основы мобильной разработки. Android

Введение



iPhone
June 29th 2007



Особенности мобильной разработки

Причина

- Тачскрин
- Личное устройство
- Автономная работа от аккумулятора

Следствие

- UI (широкие элементы, одно действие - один экран)
- Безопасность и конфиденциальность
- Ограничения работы в фоновом режиме, архитектура процессора

Плюсы Android

- Разработка на любой ОС
- Android Studio - бесплатная JetBrains-IDE от Google
- Опенсорсная (AOSP)
- Vast community
- Постоянно развивается Гуглом
- Просто публиковать в Google Play

Минусы Android

- Фрагментация парка устройств
 - по версиям ОС
 - по производителю
 - по характеристикам (размер экрана, поддержка фич и пр.)
- Растущие ограничения API

Язык программирования Java

- **Объектно-ориентированный**
- **Платформо-независимый**
- **Простой**
- **Надёжный**
- **Многопоточный**
- **Интерпретируемый**

JVM - Java Virtual Machine

Java

- JVM (.class)
 - Oracle
 - x86

Android

- Dalvik (.dex)
- ART (Android Runtime)
 - Google
 - ARM

Система сборки Gradle

- Написана на Java
- Поддерживает скрипты на Groovy и Kotlin

<https://developer.android.com/studio/build>

Язык программирования Kotlin

- Поддержка от производителя Android
- Null-безопасный
- Краткий
- Функциональный
- Совместим с Java
- Удобная runtime-библиотека



Android Studio

Version 3.5.3

- + Start a new Android Studio project
- 📁 Open an existing Android Studio project
- 🔗 Check out project from Version Control ▼
- 📱 Profile or debug APK
- 📄 Import project (Gradle, Eclipse ADT, etc.)
- 📄 Import an Android code sample

⚙️ Configure ▼ Get Help ▼

Choose your project

Phone and Tablet

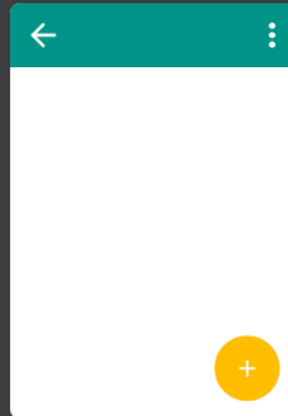
Wear OS

TV

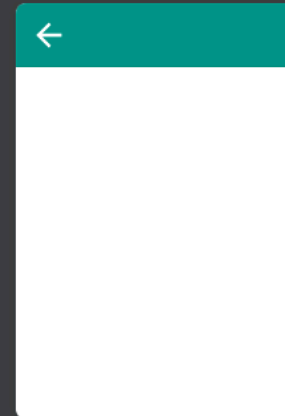
Android Auto

Android Things

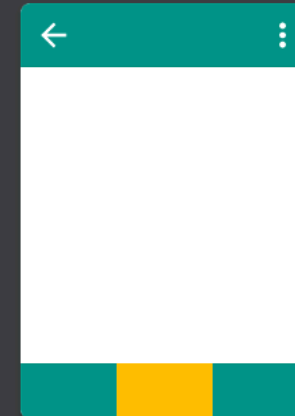
Add No Activity



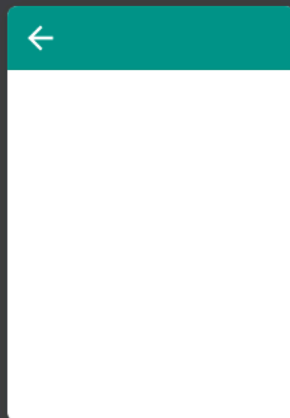
Basic Activity



Empty Activity



Bottom Navigation Activity



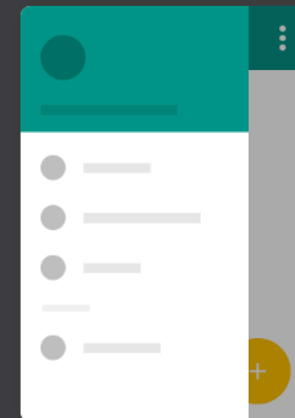
Fragment + ViewModel



Fullscreen Activity



Master/Detail Flow



Navigation Drawer Activity

Empty Activity

Creates a new empty activity

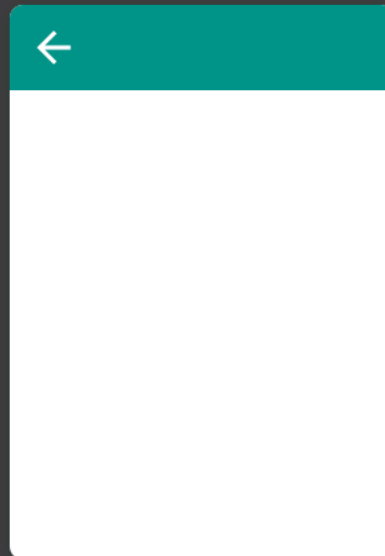
Cancel

Previous

Next

Finish

Configure your project



Empty Activity

Creates a new empty activity

Name

Hello World

Package name

com.learning.helloworld

Save location

/Users/ernesta/Projects/android-learning/HelloWorld



Language

Kotlin



Minimum API level

API 22: Android 5.1 (Lollipop)



i Your app will run on approximately **80.2%** of devices.

[Help me choose](#)

☐ This project will support instant apps

☒ Use androidx.* artifacts

Cancel

Previous

Next

Finish

1: Project

Android

app

manifests

java

com.learning.helloworld

MainActivity

com.learning.helloworld (androidTest)

com.learning.helloworld (test)

java (generated)

res

Gradle Scripts

Resource Manager

2: Favorites

Build Variants

Layout Captures

activity_main.xml

MainActivity.kt

```
1 package com.learning.helloworld
2
3 import ...
4
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
```

Gradle

Build:

Build Output

Sync

Build: completed successfully at 2020-02-17 21:17

Run build /Users/ernesta/Projects/android-learning/HelloWorld

Load build

Configure build

Calculate task graph

Run tasks

1 s 170 ms

935 ms

2 ms

354 ms

249 ms

323 ms

Device File Explorer

TODO

Terminal

Build

Logcat

Event Log

Gradle build finished in 1 s 183 ms (3 minutes ago)

1:1

LF

UTF-8

4 spaces

Структура проекта

Код

Система сборки

Android

+

-

⚙

—

1: Project

▼ app

▼ manifests

AndroidManifest.xml

▼ java

▼ com.learning.helloworld

MainActivity

▶ com.learning.helloworld (androidTest)

▶ com.learning.helloworld (test)

▶ java (generated)

▼ res

▼ drawable

ic_launcher_background.xml

ic_launcher_foreground.xml (v24)

▼ layout

activity_main.xml

▼ mipmap

▶ ic_launcher (6)

▶ ic_launcher_round (6)

▼ values

colors.xml

strings.xml

styles.xml

▼ 2: Favorites

▼ Gradle Scripts

build.gradle (Project: Hello World)

build.gradle (Module: app)

gradle-wrapper.properties (Gradle Version)

proguard-rules.pro (ProGuard Rules for app)

gradle.properties (Project Properties)

settings.gradle (Project Settings)

local.properties (SDK Location)

Resource Manager

Z: Structure

Build Variants

Layout Captures

```

1  apply plugin: 'com.android.application'
2
3  apply plugin: 'kotlin-android'
4
5  apply plugin: 'kotlin-android-extensions'
6
7  android {
8      compileSdkVersion 29
9      buildToolsVersion "29.0.2"
10     defaultConfig {
11         applicationId "com.learning.helloworld"
12         minSdkVersion 22
13         targetSdkVersion 29
14         versionCode 1
15         versionName "1.0"
16         testInstrumentationRunner "androidx.test.runner.AndroidJUnitRunner"
17     }
18     buildTypes {
19         release {
20             minifyEnabled false
21             proguardFiles getDefaultProguardFile('proguard-android-optimize.txt'), 'proguard-rules.pro'
22         }
23     }
24 }
25
26 dependencies {
27     implementation fileTree(dir: 'libs', include: ['*.jar'])
28     implementation "org.jetbrains.kotlin:kotlin-stdlib-jdk7:$kotlin_version"
29     implementation 'androidx.appcompat:appcompat:1.1.0'
30     implementation 'androidx.core:core-ktx:1.2.0'
31     implementation 'androidx.constraintlayout:constraintlayout:1.1.3'
32     testImplementation 'junit:junit:4.12'
33     androidTestImplementation 'androidx.test.ext:junit:1.1.1'
34     androidTestImplementation 'androidx.test.espresso:espresso-core:3.2.0'
35 }
36

```

Конфигурация
приложения

Зависимости
(библиотеки)

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

    <application
        android:allowBackup="true"
        android:icon="@mipmap/ic_launcher"
        android:label="Hello World"
        android:roundIcon="@mipmap/ic_launcher_round"
        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>
```


Разметка UI в XML

```
<?xml version="1.0" encoding="utf-8"?>
<androidx.constraintlayout.widget.ConstraintLayout xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context=".MainActivity">

    <TextView
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Hello World!"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintLeft_toLeftOf="parent"
        app:layout_constraintRight_toRightOf="parent"
        app:layout_constraintTop_toTopOf="parent" />

</androidx.constraintlayout.widget.ConstraintLayout>
```

activity_main.xml

MainActivity.kt

AndroidManifest.xml

Component Tree

ConstraintLayout

Ab TextView- "Hello World!"

0dp

Hello World!

Attributes

activity_main.xml

MainActivity.kt

AndroidManifest.xml

Component Tree

ConstraintLayout

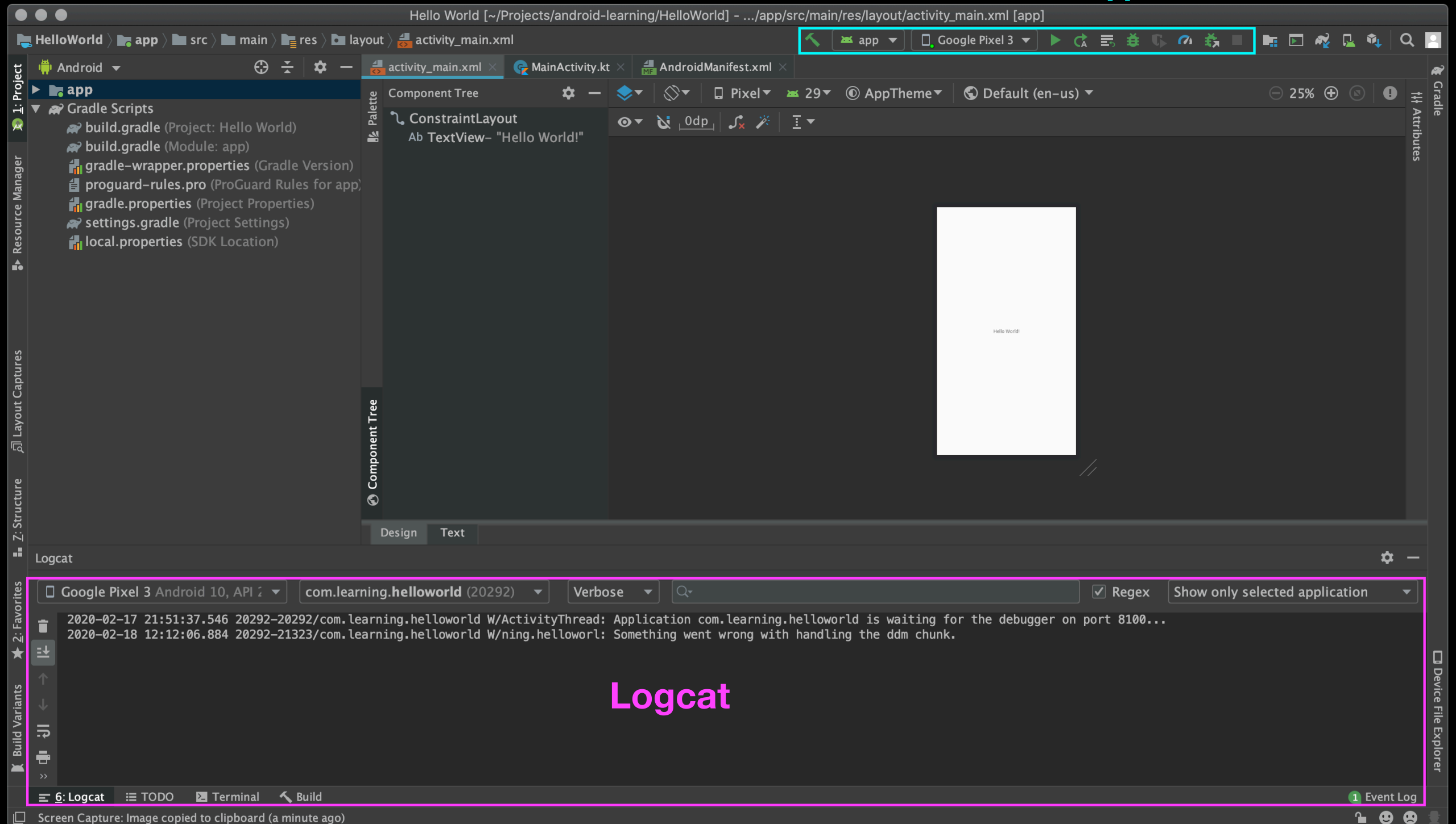
Ab TextView- "Hello World!"

0dp

Hello World!

Attributes

Панель отладки





Developer options



On



DEBUGGING

USB debugging

Debug mode when USB is connected



Revoke USB debugging authorizations

Bug report shortcut

Show a button in the power menu for taking a bug report



Select mock location app

No mock location app set

Force full GNSS measurements

Track all GNSS constellations and frequencies with no duty cycling



Enable view attribute inspection



Select debug app

No debug application set

Wait for debugger

Debugged application waits for debugger to attach before executing



Hello World

Hello World!

Домашнее задание

- Установить Android Studio
- Создать проект
- Запустить Hello World на устройстве или эмуляторе
- Добавить кнопку на главный экран