

OpenLab session 8. 4. 2016



Android development

Matúš Nemeč

Faculty of Informatics, Masaryk University

CRCS

Centre for Research on
Cryptography and Security

Outline

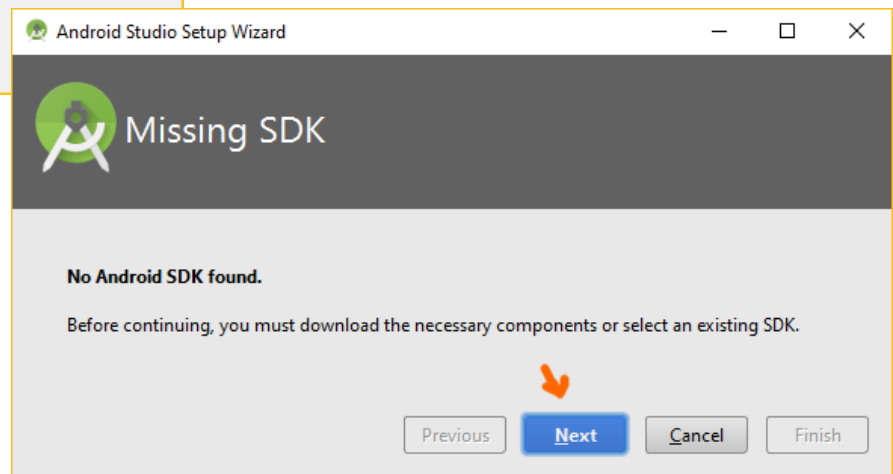
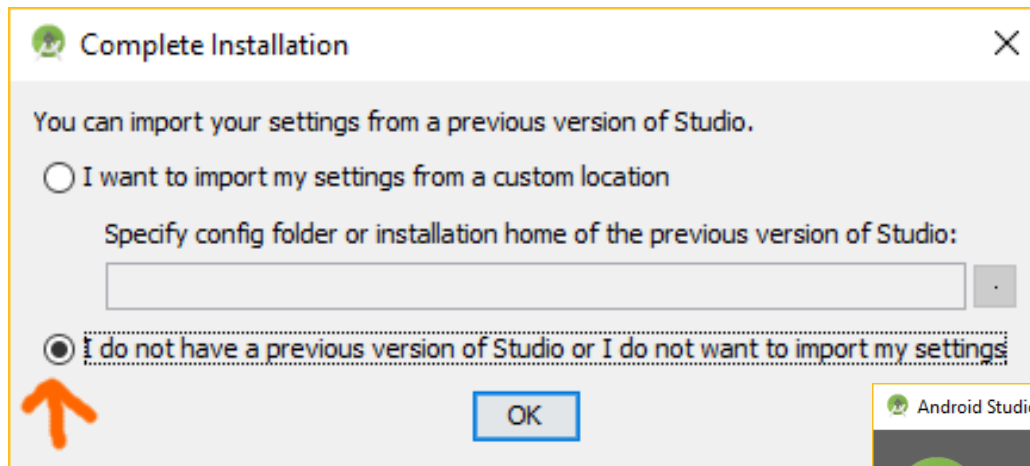
- Android Studio installation
- Android fundamentals
- Creating an Android project
- Running your application
- Building a simple user interface
- Starting another activity

Android Studio installation

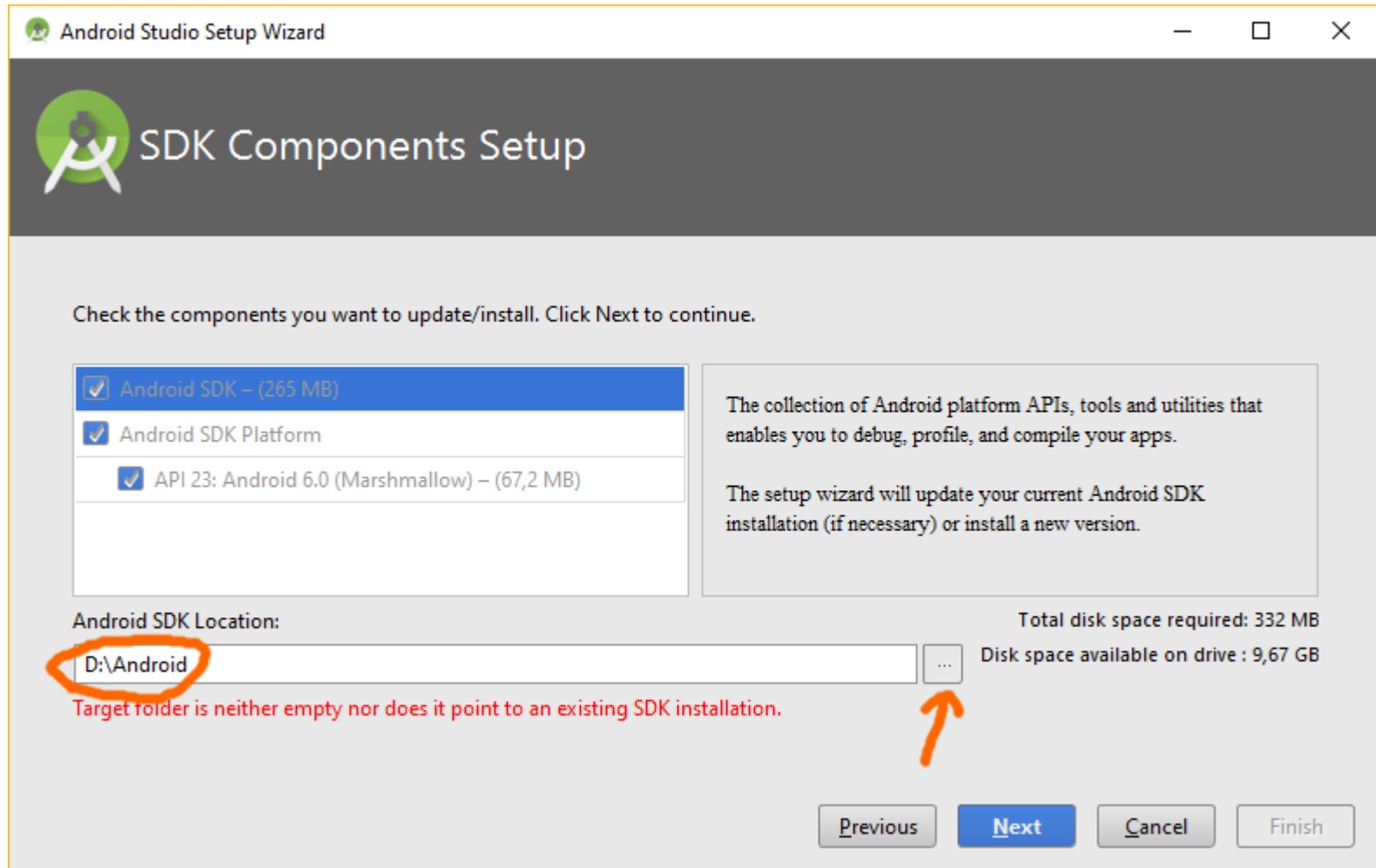
- Download & install
- <https://developer.android.com/sdk/index.html>
- On lab computer
- <https://dl.google.com/dl/android/studio/ide-zips/2.0.0.20/android-studio-ide-143.2739321-windows.zip>
- Use 7-Zip to extract to e.g. D:\Android

Installation

- Run `D:\Android\android-studio\bin\studio64.exe`



- Install the SDK to same path as your Android Studio for easier cleanup



App components

- **Activity** - single screen with a user interface
- **Service** - runs in the background to perform long-running operations; no user interface
- **Content provider** - manages a shared set of app data (file system, SQLite DB, web)
- **Broadcast receiver** - responds to system-wide broadcast announcements (intents)

The Manifest file

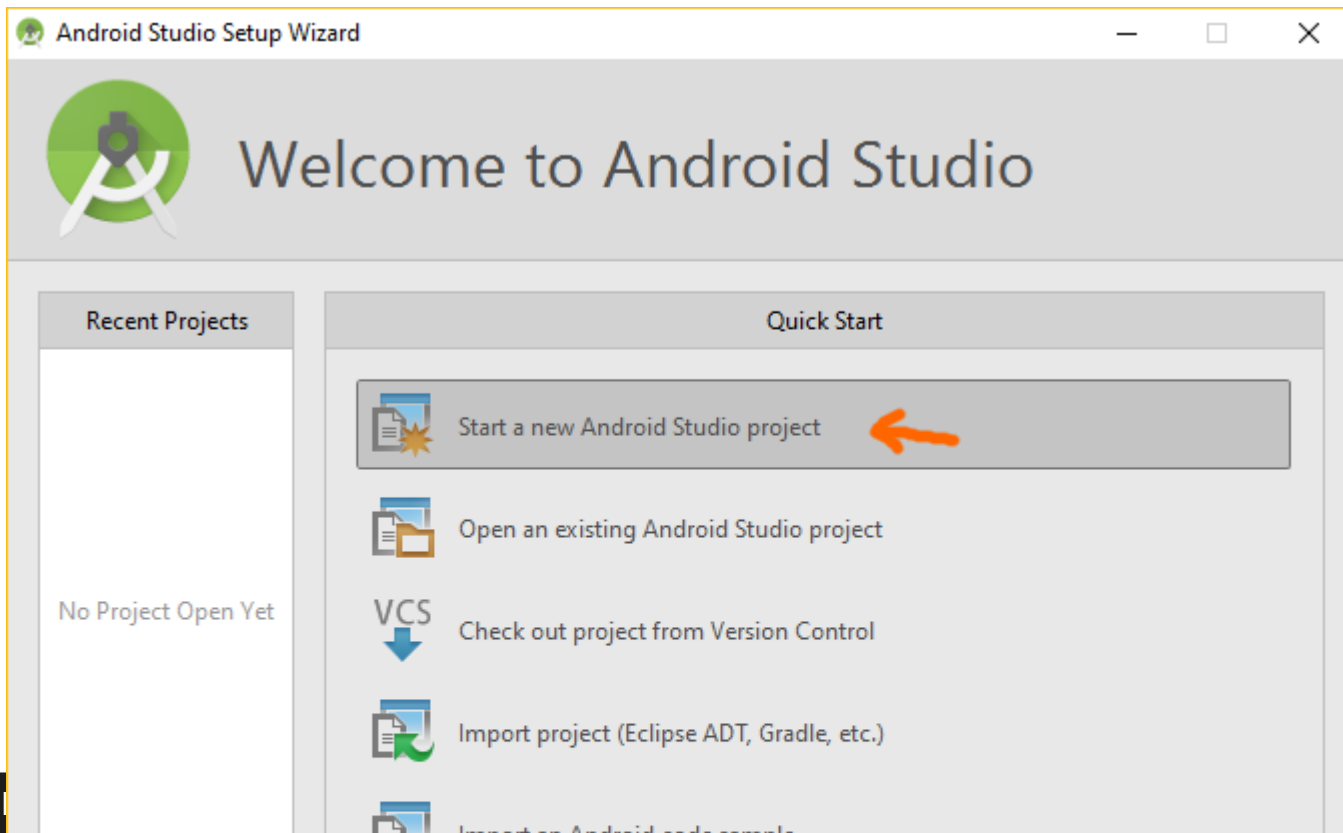
- Declaring components
 - `<activity>` `<service>` `<receiver>` `<provider>`
- Declaring component capabilities
 - `<intent-filter>`
- Declaring app requirements
 - `<uses-sdk android:minSdkVersion="7" android:targetSdkVersion="19" />`
 - `<uses-feature android:name="android.hardware.camera.any" android:required="true" />`

App resources

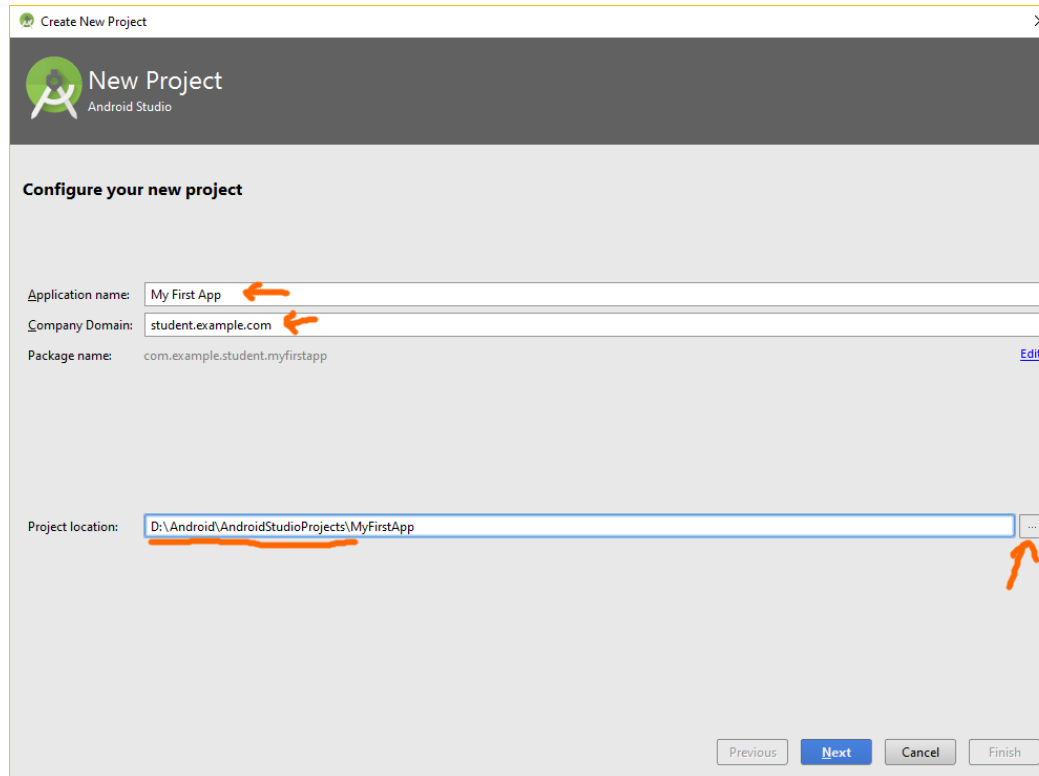
- Images
- Layouts
 - For different screen sizes and orientations
- Strings
 - For localization
- Colors
- ...

Building your first app

- Tutorial based on developer.android.com/training/basics/firstapp/



New project (My First App)



- **Create the project at the same location as IDE**

Minimum SDK & Target SDK

Create New Project

Target Android Devices

Select the form factors your app will run on

Different platforms may require separate SDKs

Phone and Tablet

Minimum SDK: API 14: Android 4.0 (IceCreamSandwich)

Lower API levels target more devices, but have fewer features available.
By targeting API 14 and later, your app will run on approximately 97.3% of the devices that are active on the Google Play Store.
[Help me choose](#)

Wear

Minimum SDK: API 21: Android 5.0 (Lollipop)

TV

Minimum SDK: API 21: Android 5.0 (Lollipop)

Android Auto

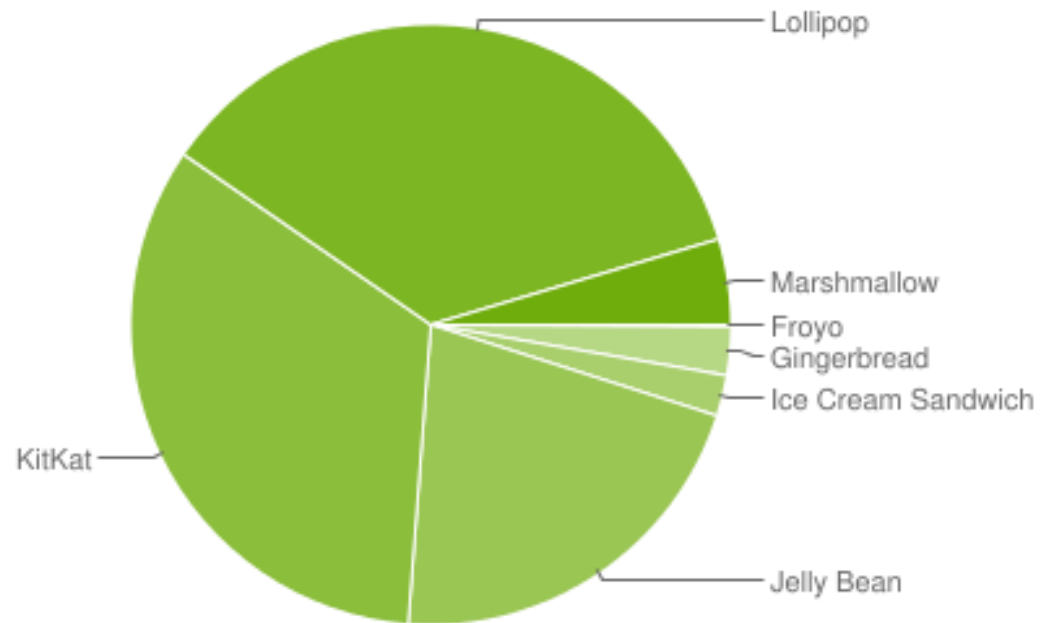
Glass

Minimum SDK: Glass Development Kit Preview

Previous Next Cancel Finish

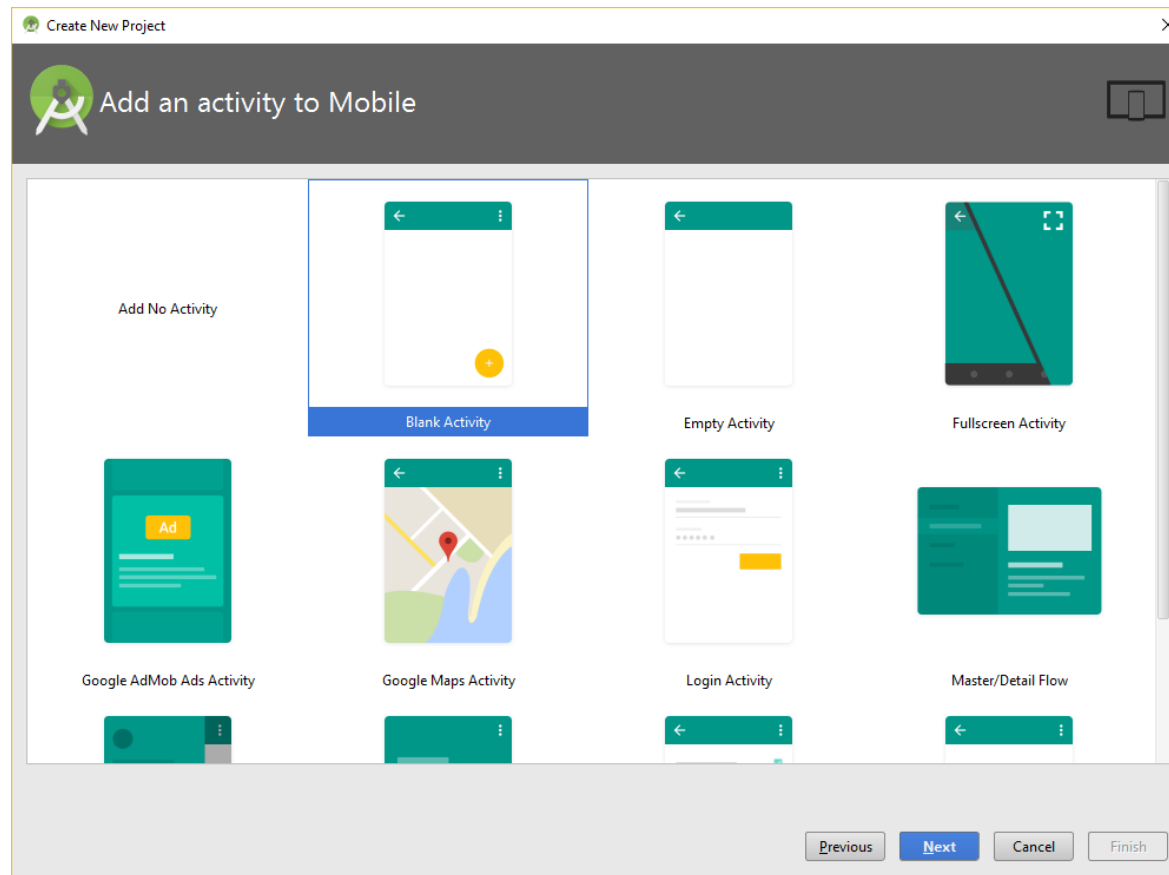
- <https://developer.android.com/about/dashboards/>

Version	Codename	API	Distribution
2.2	Froyo	8	0.1%
2.3.3 - 2.3.7	Gingerbread	10	2.6%
4.0.3 - 4.0.4	Ice Cream Sandwich	15	2.2%
4.1.x	Jelly Bean	16	7.8%
4.2.x		17	10.5%
4.3		18	3.0%
4.4	KitKat	19	33.4%
5.0	Lollipop	21	16.4%
5.1		22	19.4%
6.0	Marshmallow	23	4.6%

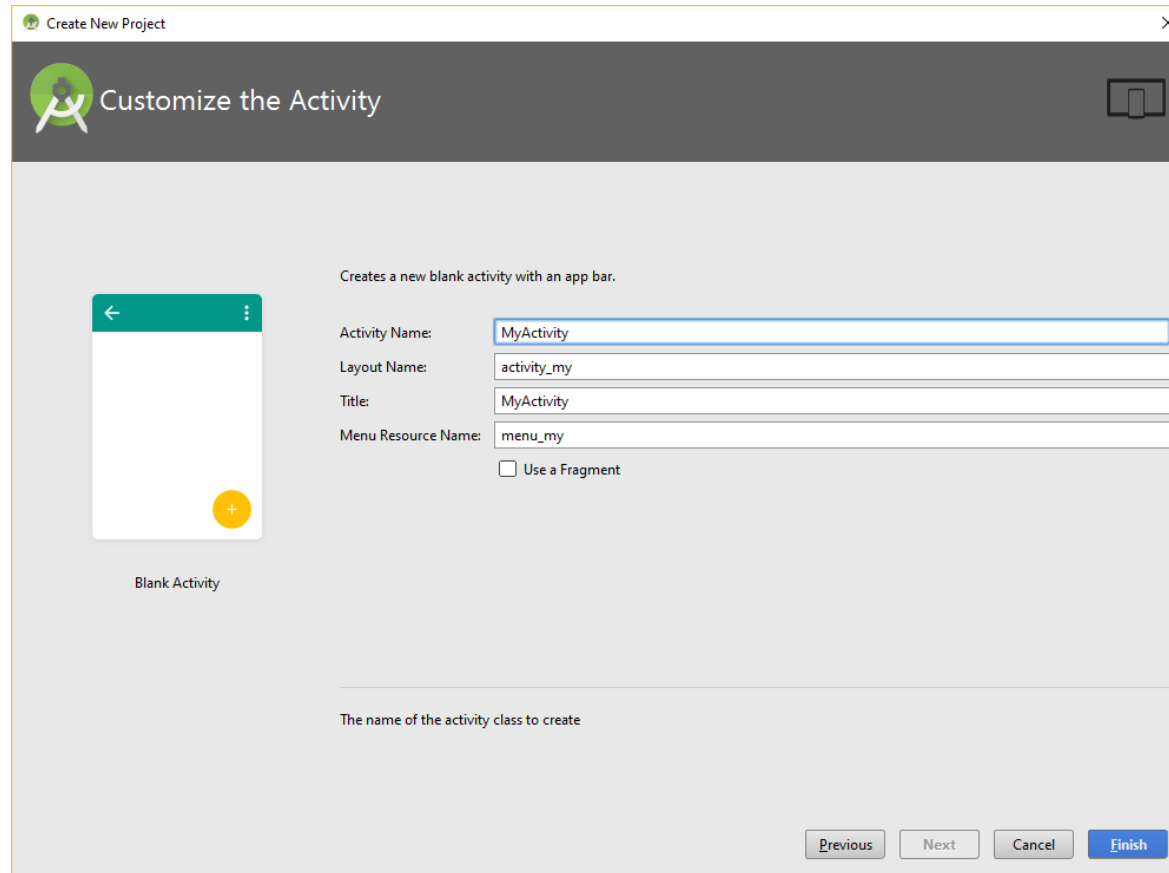


Data collected during a 7-day period ending on April 4, 2016.

Add an activity



Customize the Activity (MyActivity)



Create New Project

Customize the Activity

Creates a new blank activity with an app bar.

Blank Activity

Activity Name: MyActivity

Layout Name: activity_my

Title: MyActivity

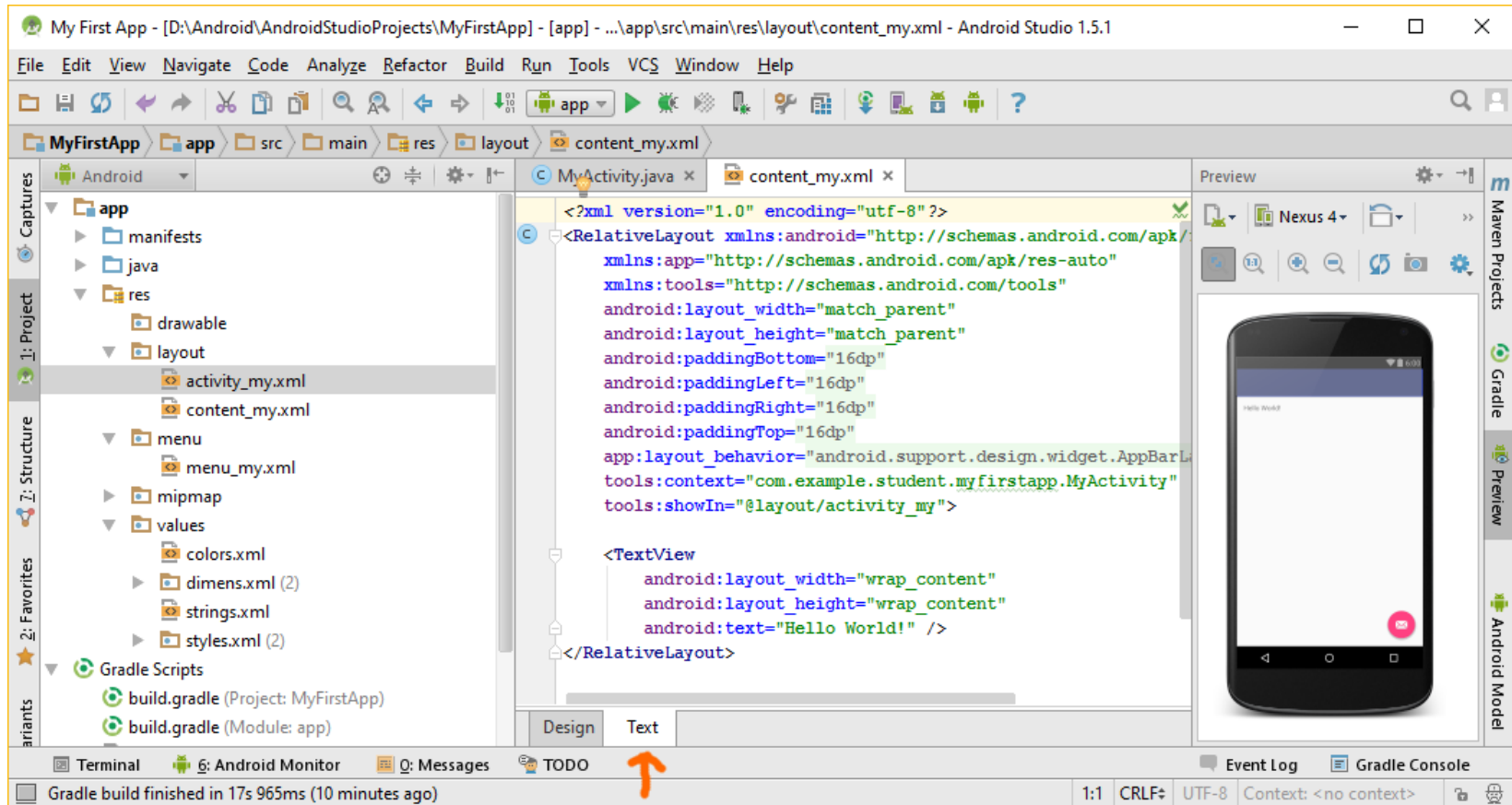
Menu Resource Name: menu_my

Use a Fragment

The name of the activity class to create

Previous Next Cancel Finish

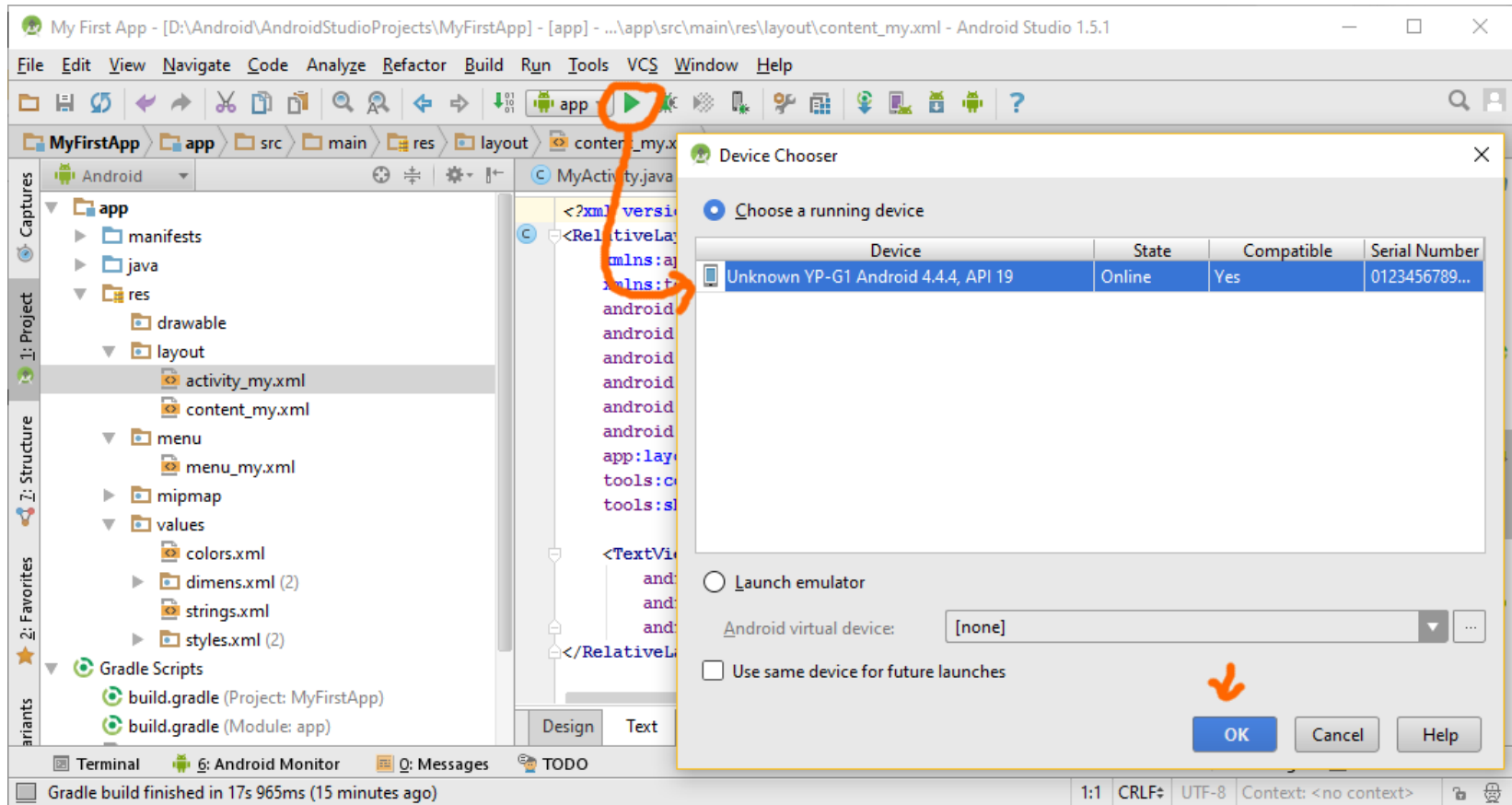
Project files



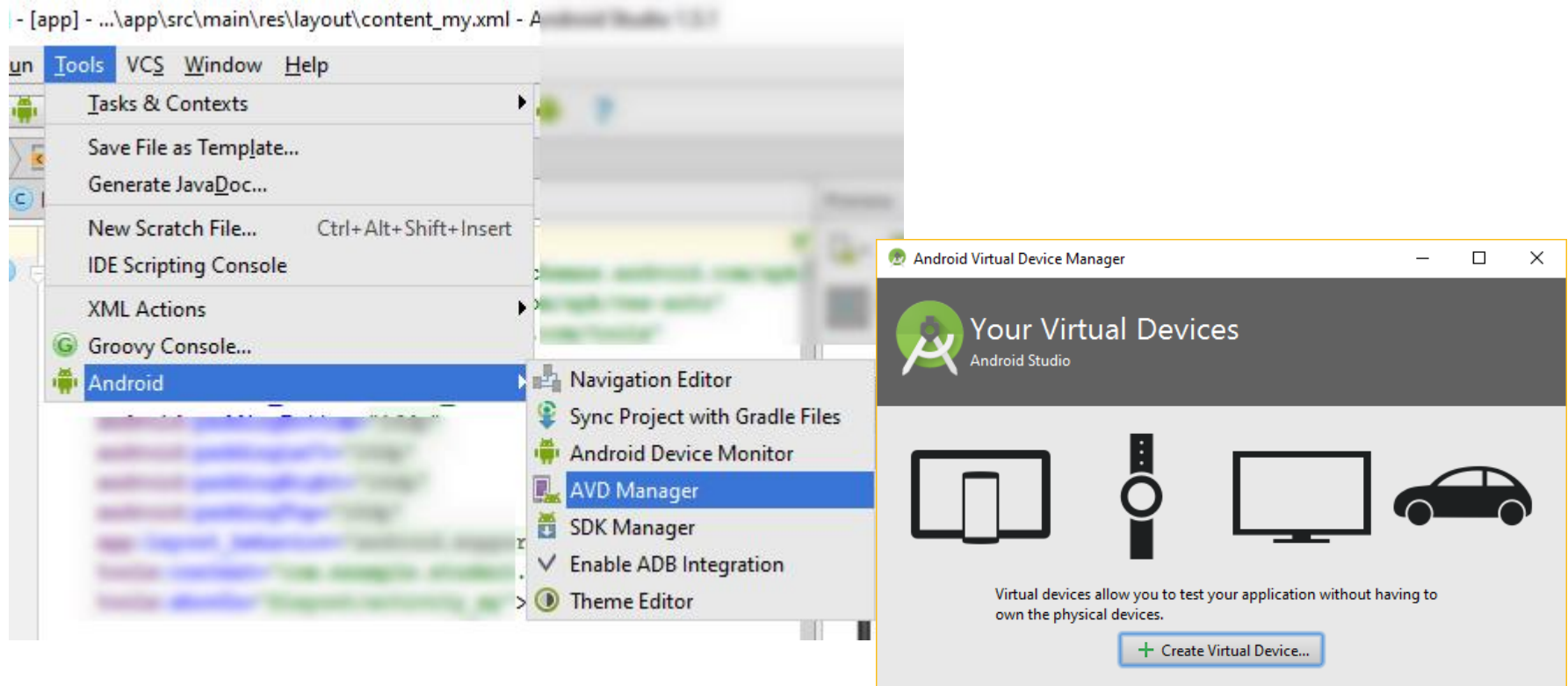
Run the app – real device

- Android 3.2 or older
 - **Settings > Applications > Development.**
- Android 4.0 and newer
 - **Settings > Developer options**
- **Note:** On Android 4.2 and newer, **Developer options** is hidden by default. To make it available, go to **Settings > About phone** and tap **Build number** seven times. Return to the previous screen to find **Developer options**.

Run the app – real device



Run on the Emulator



- **Select any device**
- **Install SDK 23 ARM (no Google APIs)**

Continue the tutorial

- Building a Simple User Interface
 - <https://developer.android.com/training/basics/firstapp/building-ui.html>
- Starting Another Activity
 - <https://developer.android.com/training/basics/firstapp/starting-activity.html>

More guides

- Practical guides
 - <https://developer.android.com/training/>
- Fundamentals
 - <https://developer.android.com/guide/>
- API reference
 - <https://developer.android.com/reference/packages.html>

Cleanup

- If you are working on a lab computer, please delete Android Studio, Android SDK and your project