Mobile Application Development

Lesson 2

Dr. Syed Asim Jalal Department of Computer Science University of Peshawar

Prerequisites

- Java Programming Language
- Object-oriented programming
- XML properties / attributes
- Using an IDE for development and debugging

Your first Android app



Android Studio

Google Developers Training Android Developer Fundamentals V2

Your first Android app



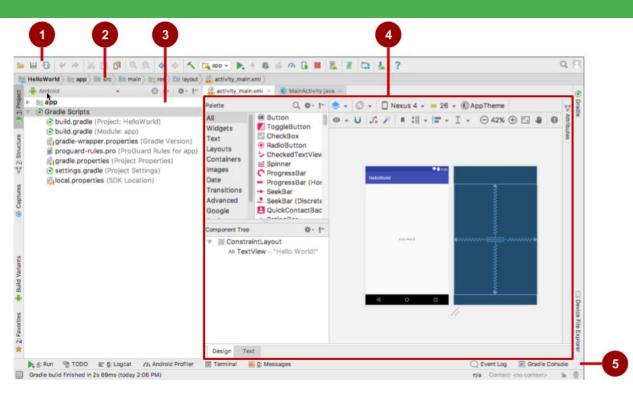
What is Android Studio?

- Android integrated development environment (IDE)
- Project and Activity templates
- Layout editor
- Testing tools
- Gradle-based build
- Log console and debugger
- Emulators

Your first Android app



Android Studio interface



- 1. Toolbar
- 2. Navigation bar
- 3. Project pane
- 4. Editor
- 5. Tabs for other

panes

Your first Android app



Installation Overview

- Mac, Windows, or Linux
- Download and install Android Studio from

https://developer.android.com/studio/

Google Developers Training Android Developer Fundamentals V2

Your first Android app



Creating your first Android app

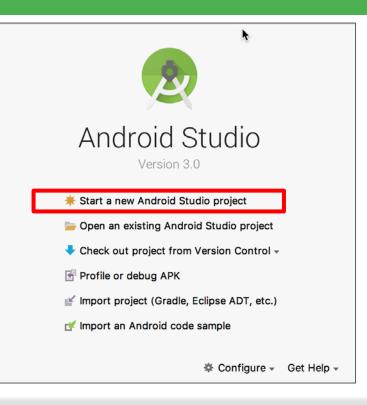
Google Developers Training Android Developer Fundamentals V2

Your first Android app



Start Android Studio





Google Developers Training **Android** Developer Fundamentals V2

Your first Android app



Create a project inside Android Studio

Android S	tudio	File	Edit	View	Navigate	Co	de /	Analyze	Refact	or Bui	ld Run	Tools
	Ор	W Open en Rece ose Proj	ent		•	New Project Import Project Project from Version Control						
			Project her Sett		ure	೫; ▶	Im	port Mo	dule nple	La app		Wrotelt2
Ca Who		Settings Repository						⊕ ≑ I ty_main.xml × © MainActivity.				
<u>1</u> : Project		Ø	Save A Synchr alidate	onize		жs жү				build	script	
و ا	v (0)	•	Print							r	eposit jce	enter()
3 Z: Structure		ling ■ p	rogua	wrapp rd-rul	e er.proper es.pro (Proj	oGu	ard I	dle Ver Rules fo		} d	epende cla	encies isspath

Your first Android app



Name your app

Google Developers Training

	Create New Project
	Create Android Project
	Application name Hello World
	Company domain android.example.com
	Project location //Users/tbove/AndroidStudioProjects/HelloWorld
	Package name com.example.android.helloworld Edit
	Include C++ support Include Kotlin support
	Cancel Previous Next Finish
	Android Developer Fundamentals V2 Android app Creative Commons Attribution 4.0

Android app

International License.

(÷ ΒY





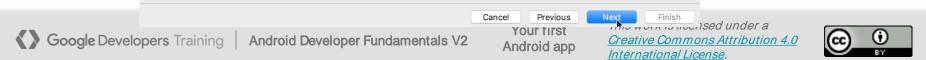
Target Android Devices

Select the form factors and minimum SDK

Some devices require additional SDKs. Low API levels target more devices, but offer fewer API features.

Phone and Tablet

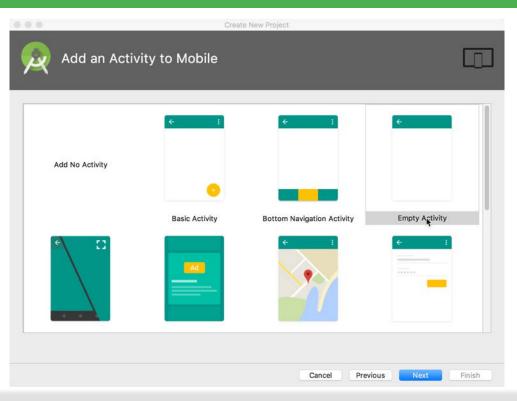
API 15: Android 4.0.3 (IceCreamSandwich)	\$
By targeting API 15 and later, your app will run on approximately 100% of devices. Help me choose	
Include Android Instant App support	
Wear	
API 21: Android 5.0 (Lollipop)	\$
τv	
API 21: Android 5.0 (Lollipop)	\$
Android Auto	
Android Things	
API 24: Android 7.0 (Nougat)	\$



Pick activity template

Choose templates for common activities, such as maps or navigation drawers.

Pick Empty Activity or Basic Activity for simple and custom activities.



Your first Android app



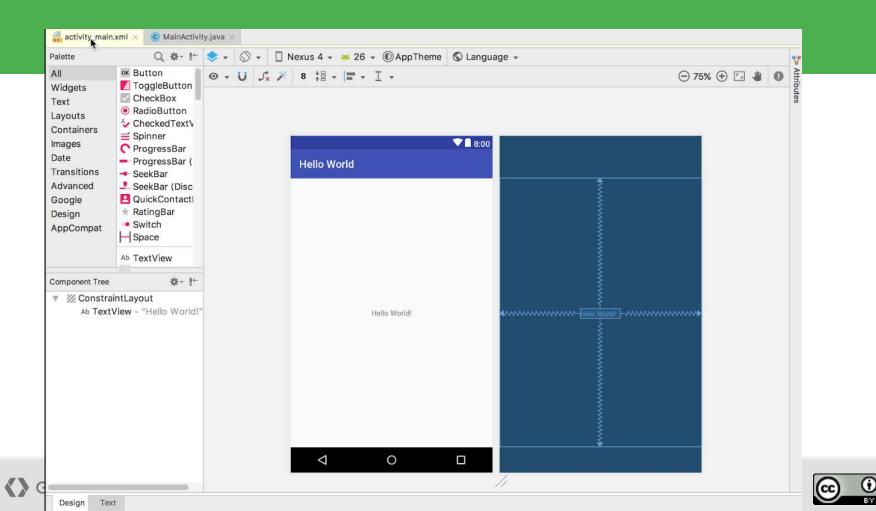
Name your activity

- Good practice:
 - Name main activity
 <u>MainActivity</u>
 - Name layout
 <u>activity main</u>
- Use AppCompat
- Generating layout file is convenient

0.0	_	Create New Project	
R	Configure Activity		
		Creates a new empty activity	
	÷	Activity Name	
		MainActivity	
		Generate Layout File	
		Layout Name activity_main	
		Backwards Compatibility (AppCompat)	
		Cancel Previous Next	Finish

Your first Android app





Project folders

- manifests—Android Manifest file description of app read by the Android runtime
- examples
- 2. java—Java source code packages
- **3. res**—Resources (XML) layout, strings, images, dimensions, colors...

4. build.gradle—Gradle build files

Google Developers Training Android Developer Fundamentals V2

Your first Android app *This work is licensed under a* <u>Creative Commons Attribution 4.0</u> International License.



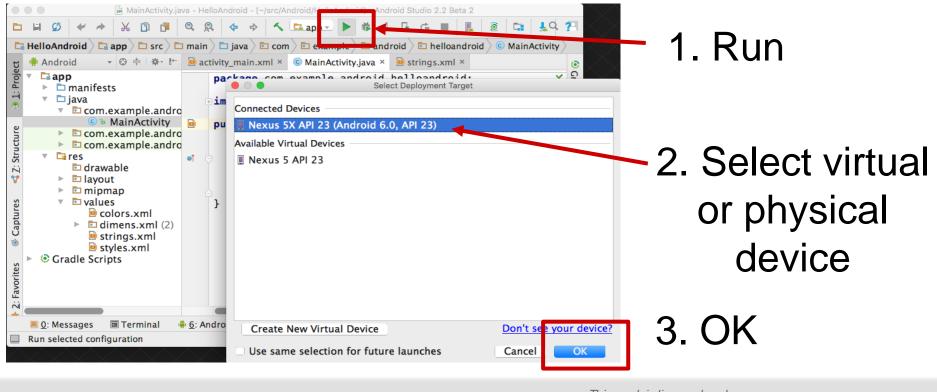
🖬 💋 🛹 🤌 🖞 🖺 📬 🍳 🗶 🔄 android-RuntimePermissions-master C Appl Android Application manifests AndroidManifest.xml 2 com.example.android common.activities drawable layout menu 🛅 mipmap values Gradle Scripts build.gradle (Project: android-Runtim build.gradle (Module: Application) 4 gradle-wrapper.properties (Gradle V settings.gradle (Project Settings) local.properties (SDK Location)

Gradle build system

- Modern build subsystem in Android Studio
- Three build.gradle:
 - Project: information about the gradle itself.
 - Module: information about each module. Phone, Wear, TV, Car
 - Settings: information about which module to compile, Phone+TV
- Typically not necessary to know low-level Gradle details



Run your app



Google Developers Training Android Developer Fundamentals V2

Your first Android app *This work is licensed under a* <u>*Creative Commons Attribution 4.0*</u> <u>*International License.*</u>



Create a virtual device

Use emulators to test app on different versions of Android and form factors.

Tools > Android > AVD Manager or:									Select Deployment Target Connected Devices Nexus 5X API 23 (Android 6.0, API 23) Available Virtual Devices	
2	Your Virtual E	Devices		ndroid Vir	tual Device Manager				I Nexus 5 API 23	
Type	Name	Play Store	Resolution	API	Target	CPU/ABI	Size on Disk	Actions		
C0	Nexus 4 API 19		768 × 1280: xhdpi	19	Android 4.4 (Google	x86	1 GB	• • •		
Co	Nexus 5 API 23		1080 × 1920: xxhdpi	23	Android 6.0 (Google	x86	2 GB	► / -		
Co	Nexus 5 API 25 Nou		1080 × 1920: xxhdpi	25	Android 7.1.1 (Googl	x86	2 GB	▶ / ▼		
Cp	Nexus 5X O API 26	⊳	1080 × 1920: 420dpi	26	Android 8.0 (Google	x86	2 GB	► / ×		
Co	Nexus 7 2012 API 16		800 × 1280: tvdpi	16	Android 4.1	x86	4 GB	> / •		
Co	Nexus 7 API 23		1200 × 1920: xhdpi	23	Android 6.0 (Google	x86	4 GB	► / ×	Create New Virtual Device Don't see your devi	ce?
Cp	Nexus 9 API 23		2048 × 1536: xhdpi	23	Android 6.0 (Google	x86	2 GB	► / ×	Use same selection for future launches Cancel OK	
Co	Nexus One API 16		480 × 800: hdpi	16	Android 4.1	x86	4 GB	► / ×		
C	+ Create Virtual Devic	e						Ø		

Your first Android app



Configure virtual device

- 1. Choose hardware
- 2. Select Android version
- 3. Finalize



Select Hardware

Choose a device definition

Category	Name 👻	Play Store	Size	Resolution	Density	C Nexus 5X
۲V	Pixel XL		5.5"	1440x2	560dpi	
Vear	Pixel		5.0"	1080x1	xxhdpi	1080px Size: large
hone	Nexus S		4.0"	480x800	hdpi	Ratio: long Density: 420dpi
Tablet	Nexus One	3.7"	480x800	hdpi		
	Nexus 6P		5.7"	1440x2	560dpi	5.2" 1920px
	Nexus 6		5.96"	1440x2	560dpi	
	Nexus 5X	⊳	5.2"	1080x1	420dpi	
	Nexus 5	⊳	4.95"	1080x1	xxhdpi	
	Nexus 4		4.7"	768x12	xhdpi	
	Colour Name			700.40		
New Hardwar	e Profile Import Har	rdware Profiles			Ø	Clone Device

Google Developers Training Android Developer Fundamentals V2

Your first Android app



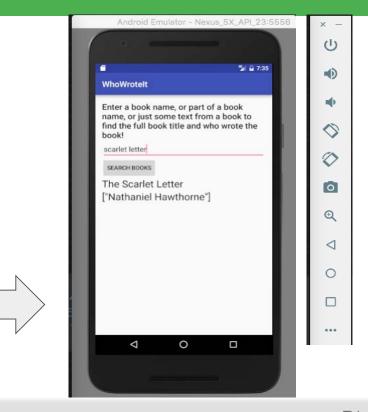


Select a system image

Release Name	API Level 🔻	ABI	Target		
API 27	27	x86	Android API 27 (Google Play)		
Oreo	26	x86	Android 8.0 (Google Play)		API Level
Nougat	25	x86	Android 7.1.1 (Google Play)	6	26
Nougat Download	24	x86	Android 7.0 (Google Play)		Android
					8.0
					Google Inc.
					System Image
					x86
					hese Google Play images because
				this device is com	patible with Google Play.
				Questions on API	
			Ø	See the API level of	distribution chart
?				Cancel Prev	ious Next Finish
		velopel i uli	Android	1 200	
				<u>Interna</u>	<u>tional License</u> .

	Android fundamentals 01.1: Android Studio and Hello Wo	rld	Troubleshoot	
	Connected Devices <none> Available Virtual Devices</none>			
	 Nexus 5X API 26 Nexus 5X API 25 Nexus 9 API 25 Tab 			
	Create New Virtual Device		Don't see your device? Cancel OK	
Google Developers	Training Android Developer Fundamentals V2	Your first Android app	This work is licensed under a <u>Creative Commons Attribution 4</u> International License.	

Run on a virtual device



Google Developers Training Android Developer Fundamentals V2

Your first Android app

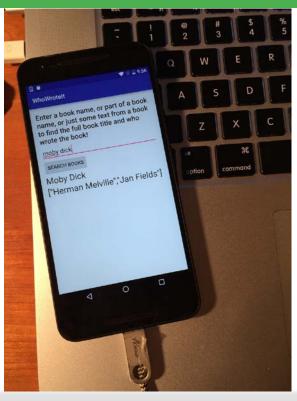


Run on a physical device

- 1. Turn on Developer Options:
 - a. Settings > About phone
 - b. Tap Build number seven times
- 2. Turn on USB Debugging
 - a. Settings > Developer Options > USB Debugging
- 3. Connect phone to computer with cable
- Windows/Linux additional setup:
 - Using Hardware Devices
- Windows drivers:
 - OEM USB Drivers

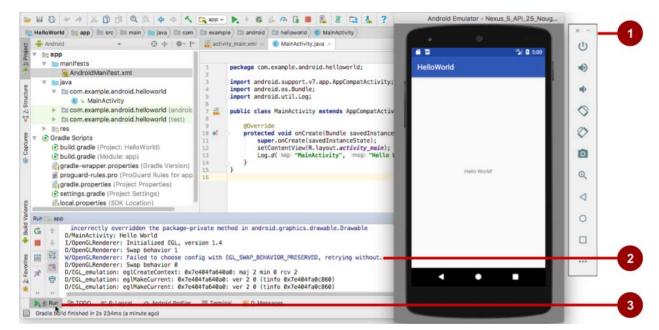
Your first Android app





Get feedback as your app runs

- Emulator running the app
- 2. Run pane
- **3. Run** tab to open or close the Run pane



Google Developers Training Android Developer Fundamentals V2

Your first Android app



Adding logging to your app

- As the app runs, the Logcat pane shows information
- Add logging statements to your app that will show up in the Logcat pane
- Set filters in Logcat pane to see what's important to you
- This will be covered in later lectures.

Google Developers Training Android Developer Fundamentals V2

Your first Android app

