IT 4785. Phát triển ứng dụng cho thiết bị di động

Chapter 2. Android Studio

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Tài liệu tham khảo

Mobile Application Development – Android OS, Victor Matos, Cleveland State University

Android Applications

- Android applications are usually created using the Java programming language
- Apps must import various Android Libraries (such as android.jar, maps.jar, etc) to gain the functionality needed to work inside the Android OS.
- Android apps are made of multiple elements such as: user-defined classes, android jars, third-party libraries, XML files defining the UIs or views, multimedia resources, data assets such as disk files, external arrays and strings, databases, and finally a Manifest summarizing the ‘anatomy’ and permissions requested by the app.
- The various app components are given to the compiler to obtain a single signed and deployable Android Package (an .apk file).
- Like “.class” files in Java, “.apk” files are the byte-code version of the app that finally will be ‘executed’ by interpretation inside either a Dalvik Virtual Machine (DVM) or an Android-Runtime Engine (ART).

Distribution dashboard

Platform versions

https://developer.android.com/about/dashboards

developers | Platform | Android Studio | Google Play | Jetpack | Kotlin | Docs | News

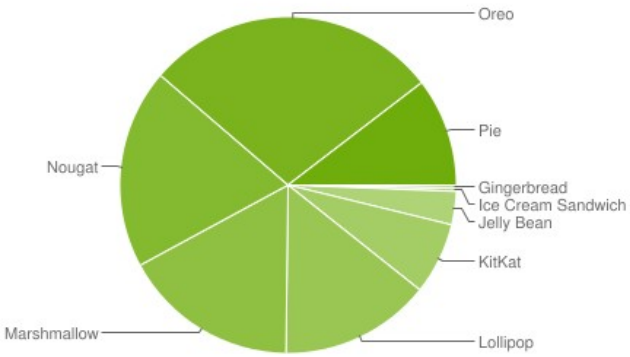
OVERVIEW | RELEASES | TECHNOLOGY | LIBRARIES | GAMES | MACHINE LEARNING | PRIVACY

Versions
- Android 11 Developer Preview
- Android 10
- Pie
- Oreo
- Nougat
- Marshmallow
- Lollipop
- KitKat

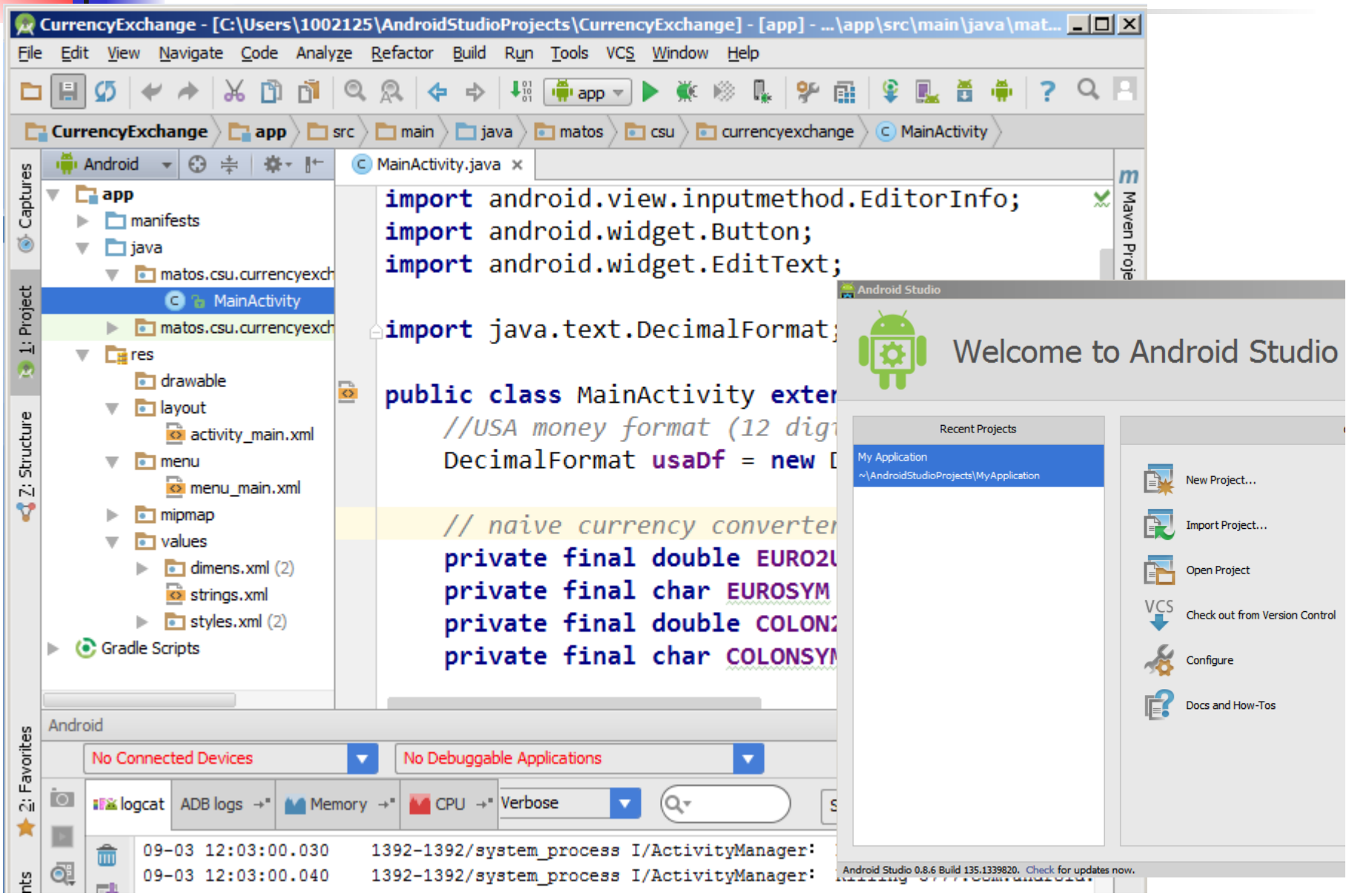
Dashboards

Devices
- Wear OS
- Android TV
- Android for Cars
- Android Things
- Chrome OS devices

4.2.x		17	1.5%
4.3		18	0.5%
4.4	KitKat	19	6.9%
5.0	Lollipop	21	3.0%
5.1		22	11.5%
6.0	Marshmallow	23	16.9%
7.0	Nougat	24	11.4%
7.1		25	7.8%
8.0	Oreo	26	12.9%
8.1		27	15.4%
9	Pie	28	10.4%

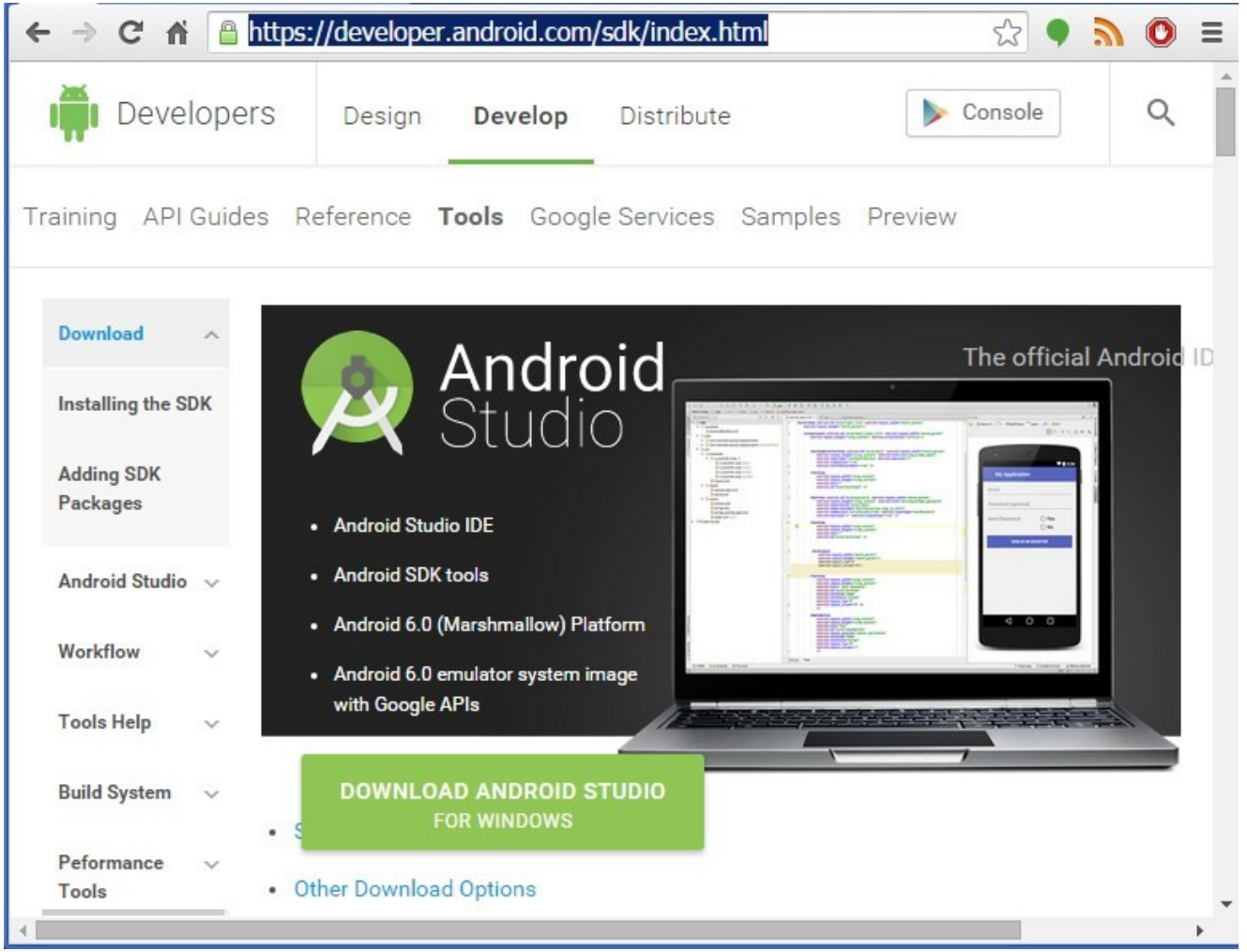


Android Studio

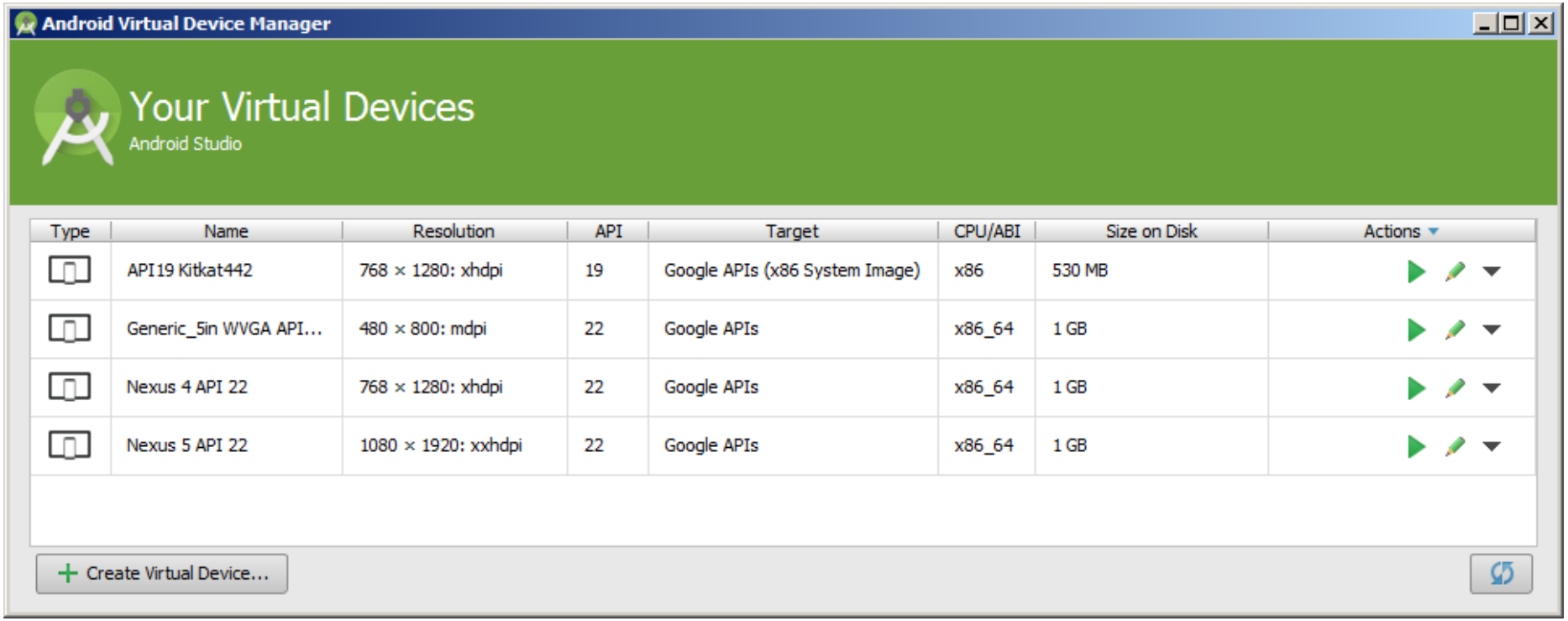


Downloading Android Studio IDE

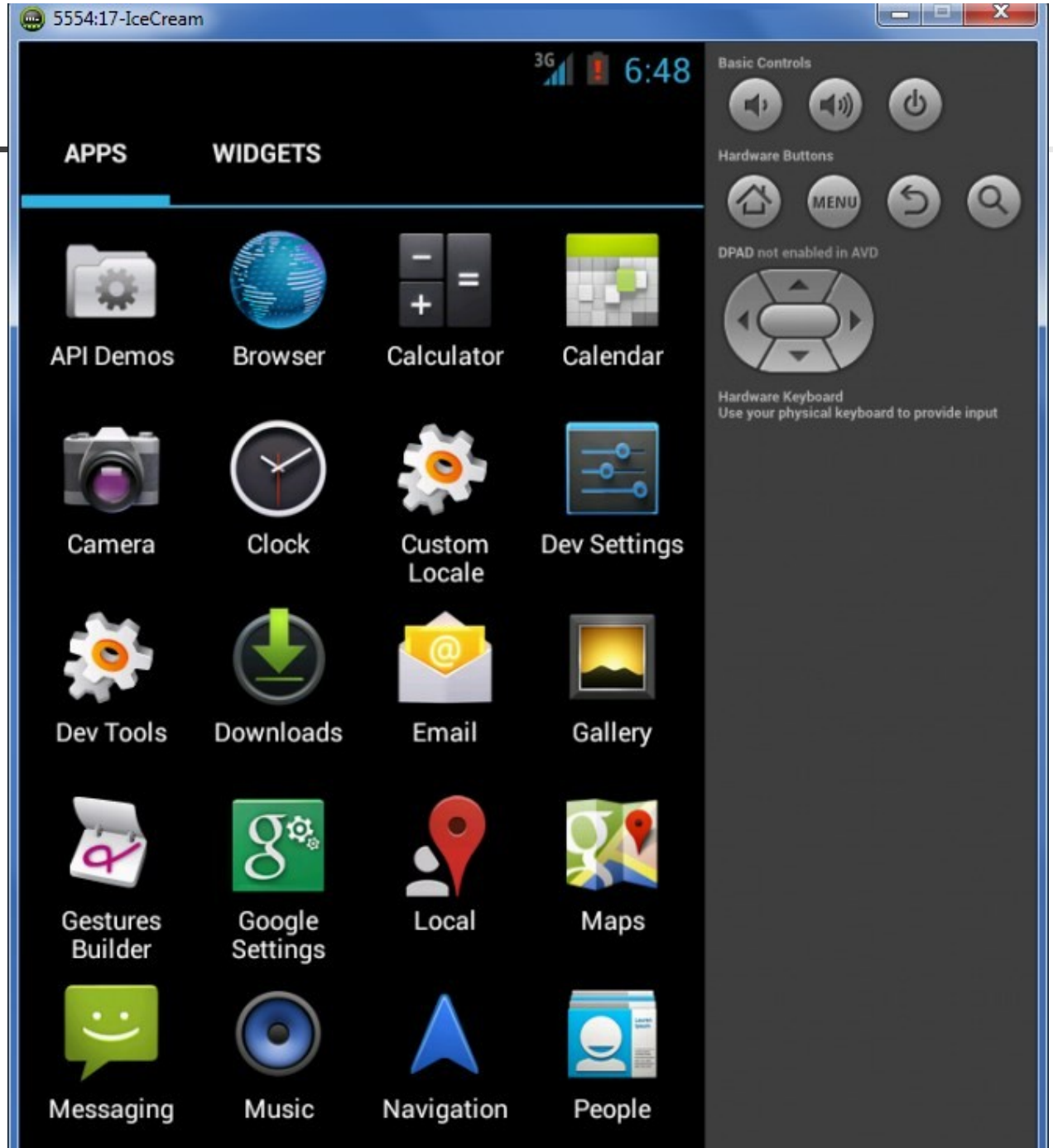
https://developer.android.com/sdk/index.html



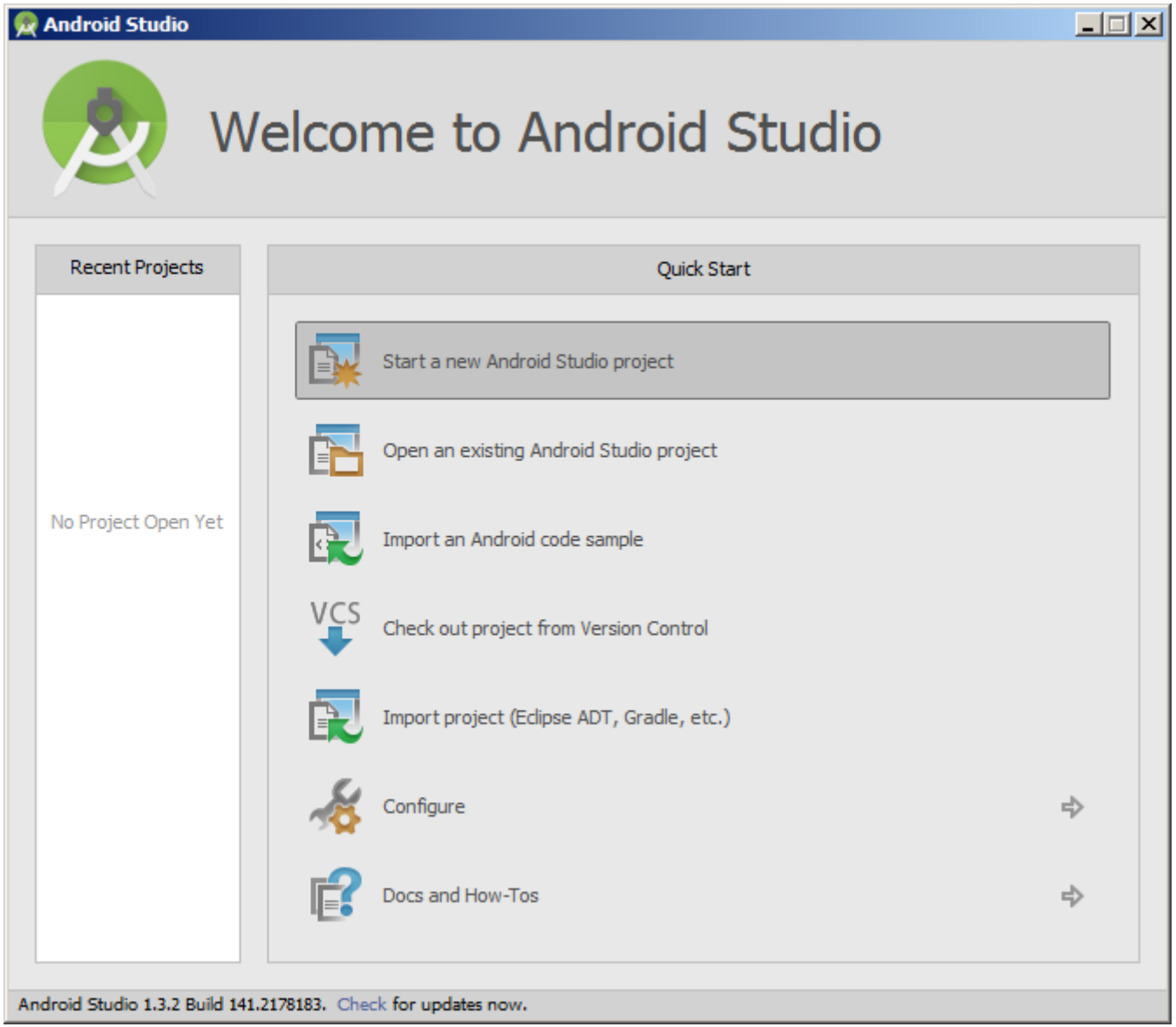
Working with Virtual Devices (AVDs)

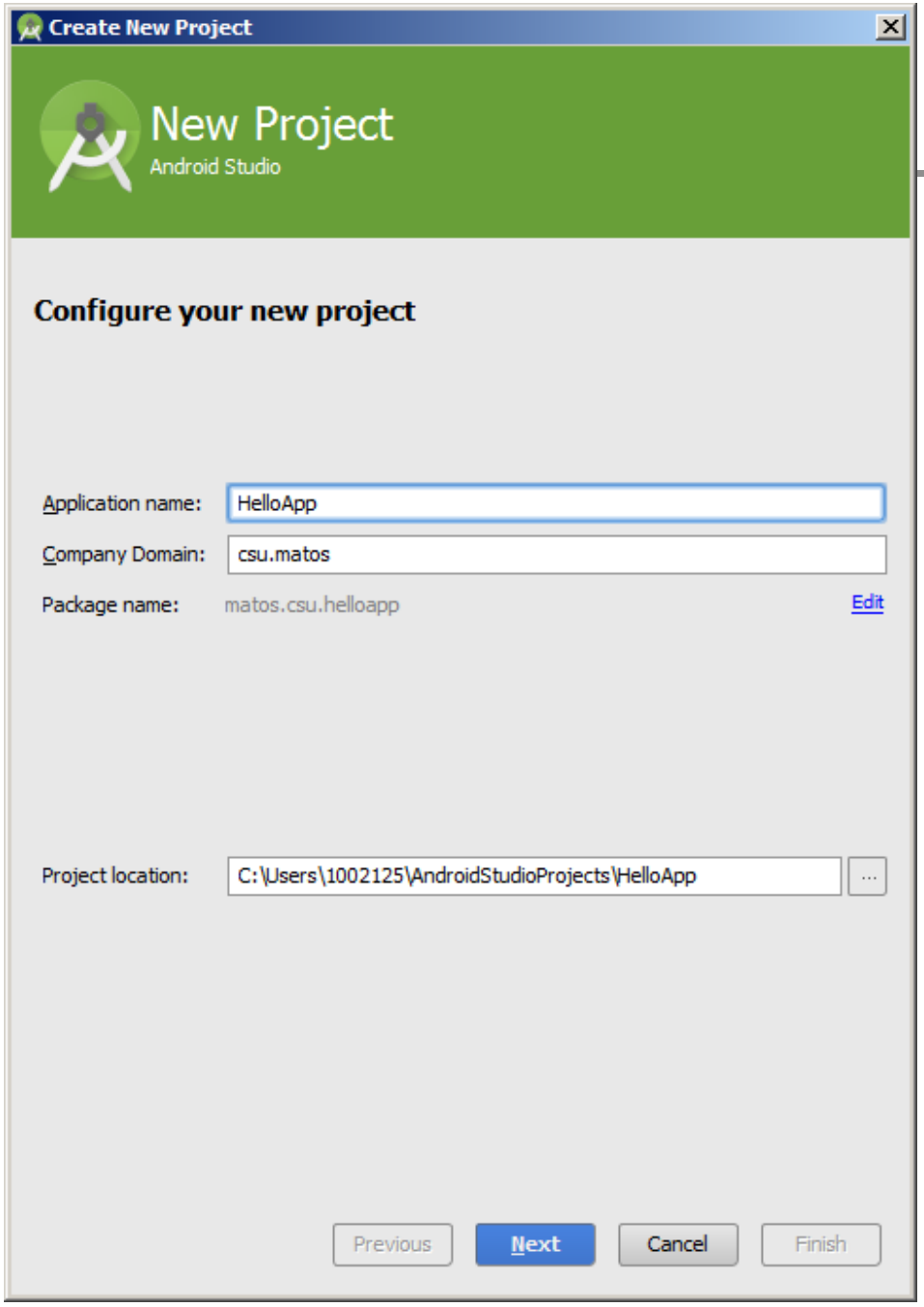


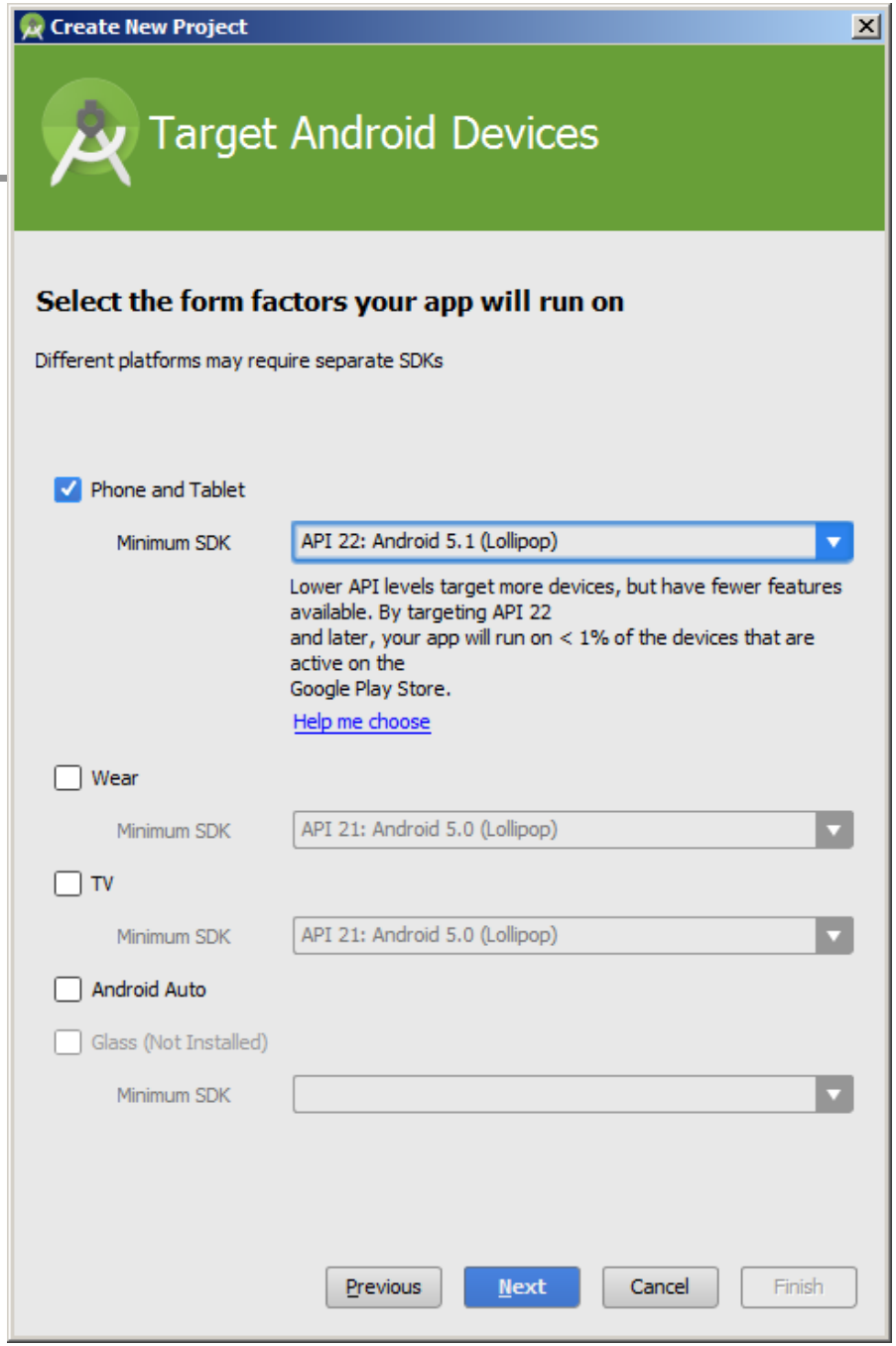
Android Virtual Devices

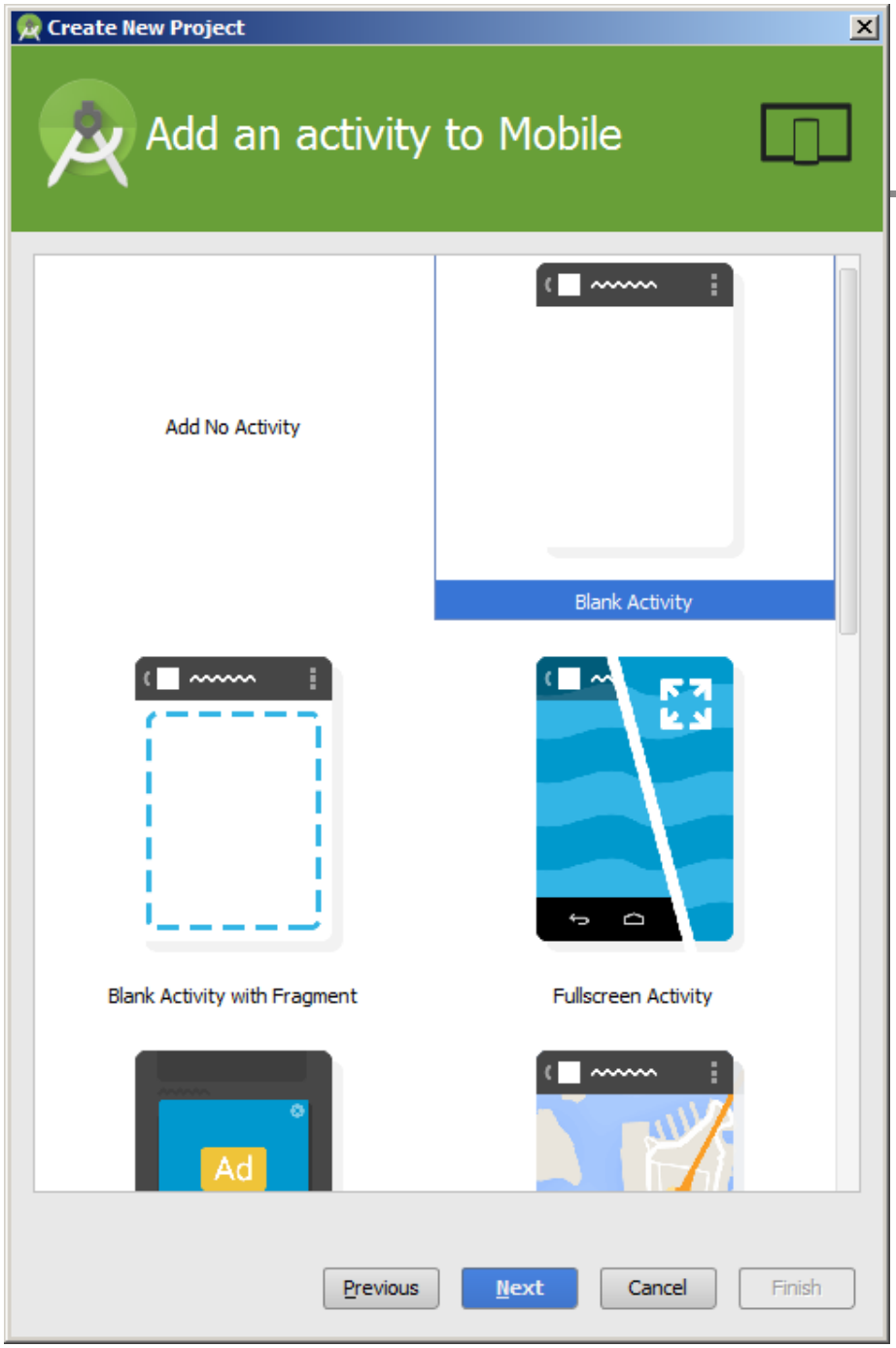

5554:17-IceCream
6:48
APPS
WIDGETS
API Demos
Browser
Calculator
Calendar
Camera
Clock
Custom Locale
Dev Settings
Dev Tools
Downloads
Email
Gallery
Gestures Builder
Google Settings
Local
Maps
Messaging
Music
Navigation
People
Basic Controls
Hardware Buttons
MENU
DPAD not enabled in AVD
Hardware Keyboard
Use your physical keyboard to provide input

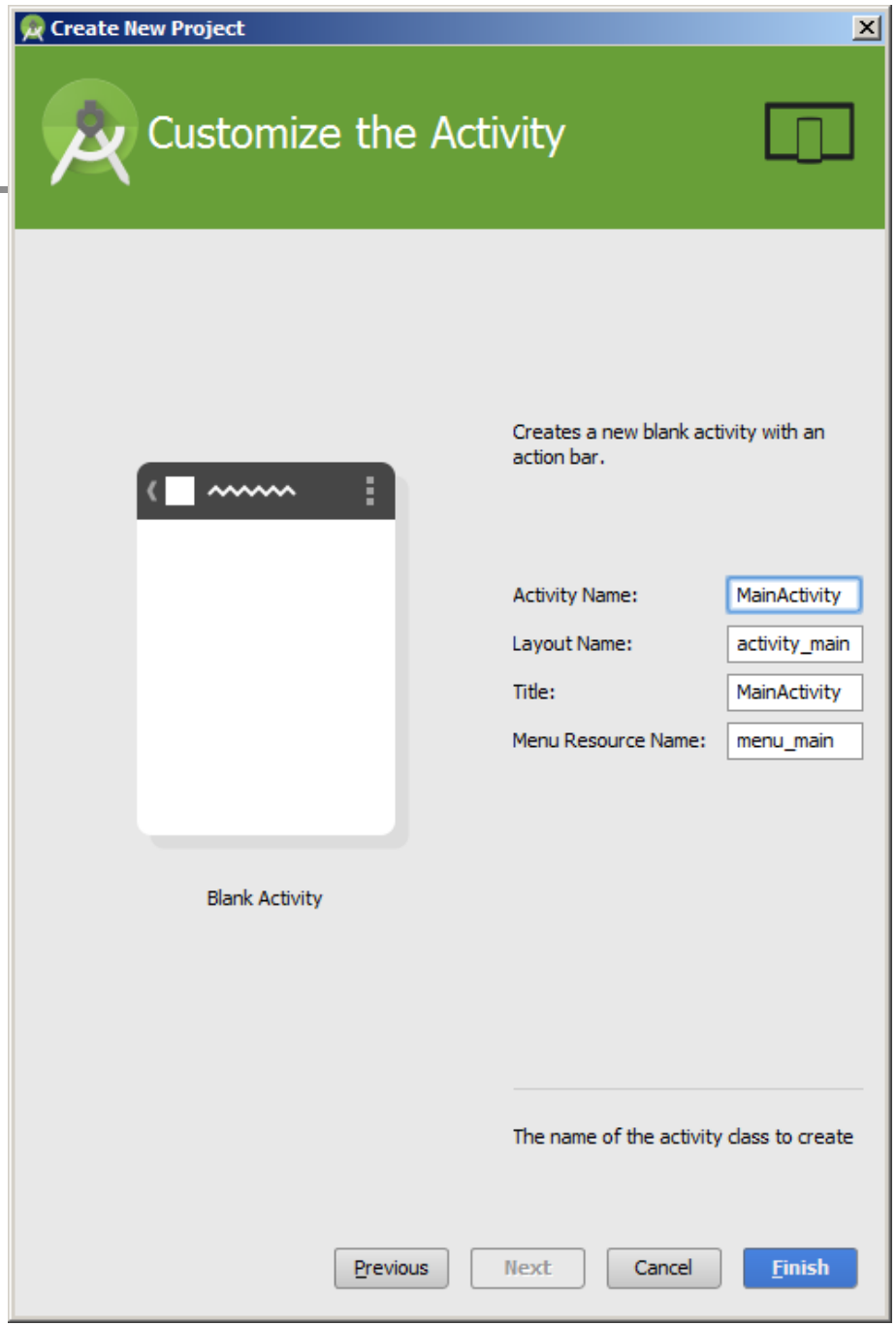
Example 2.1 : HelloWorld App

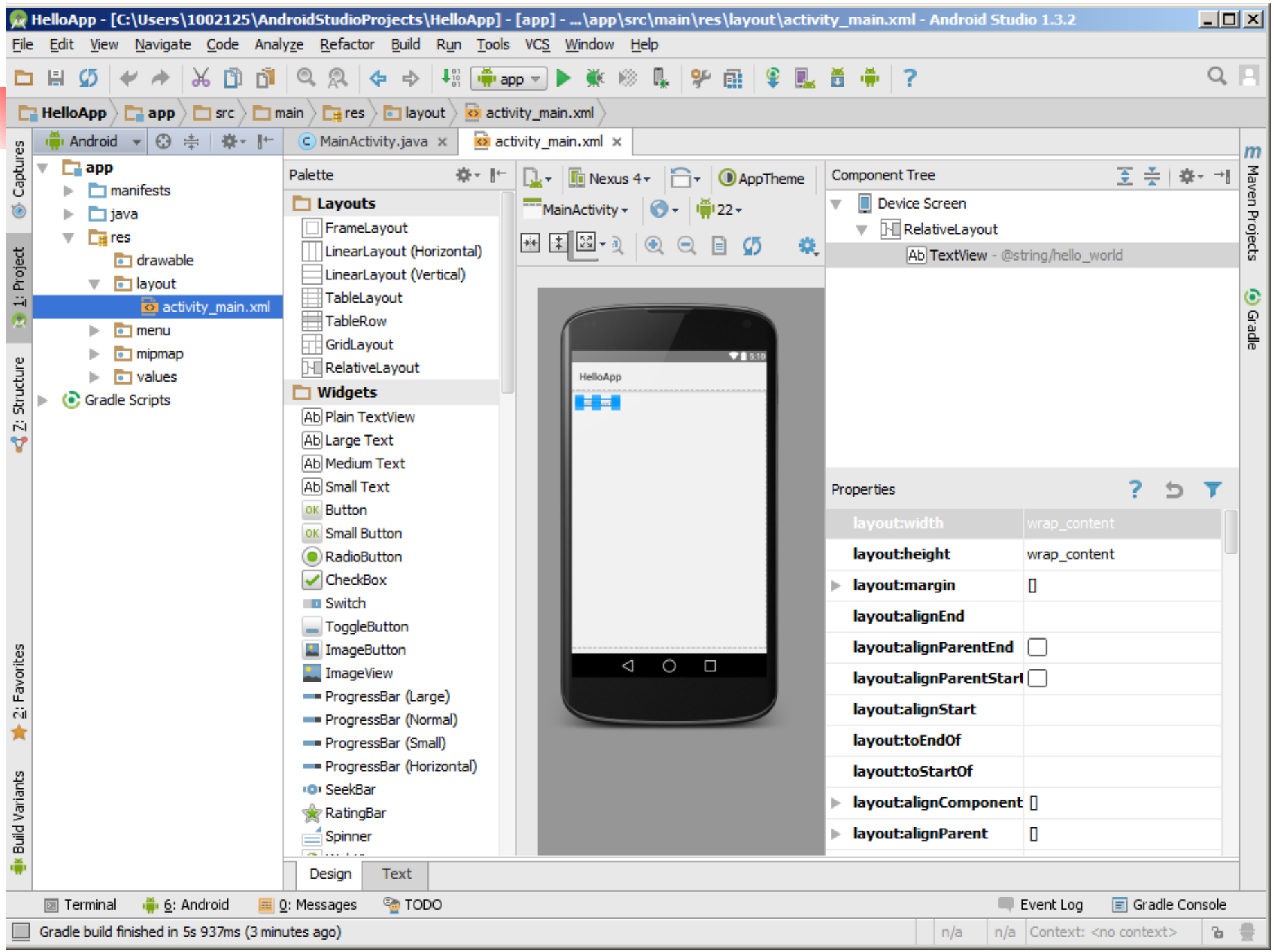



Create New Project
New Project
Android Studio
Configure your new project
Application name:
HelloApp
Company Domain:
csu.matos
Package name:
matos.csu.helloapp
Edit
Project location:
C:\Users\1002125\AndroidStudioProjects\HelloApp
...
Previous
Next
Cancel
Finish


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 22: Android 5.1 (Lollipop)
Lower API levels target more devices, but have fewer features available. By targeting API 22
and later, your app will run on < 1% 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 (Not Installed)
Minimum SDK
Previous
Next
Cancel
Finish

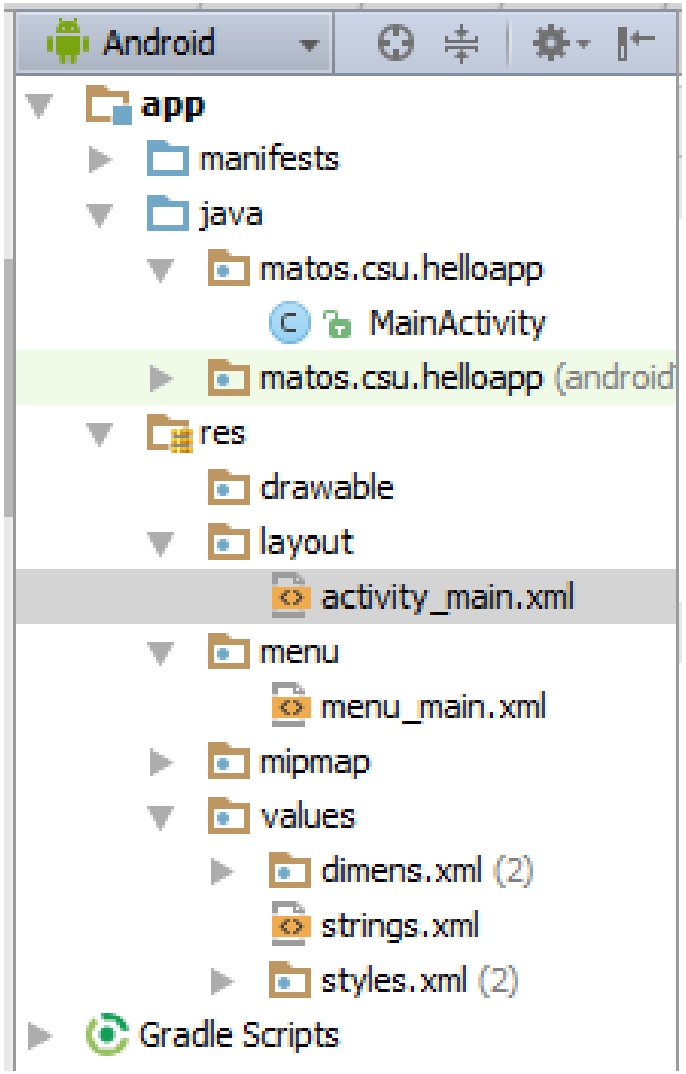

Create New Project
Add an activity to Mobile
Add No Activity
Blank Activity
Blank Activity with Fragment
Fullscreen Activity
Ad
Previous
Next
Cancel
Finish


Create New Project
Customize the Activity
Creates a new blank activity with an action bar.
Activity Name:
MainActivity
Layout Name:
activity_main
Title:
MainActivity
Menu Resource Name:
menu_main
Blank Activity
The name of the activity class to create
Previous
Next
Cancel
Finish


HelloApp - [C:\Users\1002125\AndroidStudioProjects\HelloApp] - [app] - ...\app\src\main\res\layout\activity_main.xml - Android Studio 1.3.2
File Edit View Navigate Code Analyze Refactor Build Run Tools VCS Window Help
HelloApp app src main res layout activity_main.xml
Android
app
manifests
java
res
drawable
layout
activity_main.xml
menu
mipmap
values
Gradle Scripts
MainActivity.java
activity_main.xml
Palette
Layouts
FrameLayout
LinearLayout (Horizontal)
LinearLayout (Vertical)
TableLayout
TableRow
GridLayout
RelativeLayout
Widgets
Plain TextView
Large Text
Medium Text
Small Text
Button
Small Button
RadioButton
CheckBox
Switch
ToggleButton
ImageButton
ImageView
ProgressBar (Large)
ProgressBar (Normal)
ProgressBar (Small)
ProgressBar (Horizontal)
SeekBar
RatingBar
Spinner
Nexus 4
AppTheme
MainActivity
22
HelloApp
Component Tree
Device Screen
RelativeLayout
TextView - @string/hello_world
Properties
layout:width wrap_content
layout:height wrap_content
layout:margin
layout:alignEnd
layout:alignParentEnd
layout:alignParentStart
layout:alignStart
layout:toEndOf
layout:toStartOf
layout:alignComponent
layout:alignParent
Design
Text
Captures
1: Project
7: Structure
2: Favorites
Build Variants
Maven Projects
Gradle
Terminal
6: Android
0: Messages
TODO
Event Log
Gradle Console
Gradle build finished in 5s 937ms (3 minutes ago)
n/a
n/a
Context: <no context>

Example 2.1 : HelloWorld App

- Thư mục java/ : Holds your Main-Activity Java code. All other Java files for your application go here.
- Thư mục res/ This folder stores application resources such as drawable files, UI layout files, string values, menus, multimedia, etc.
- File AndroidManifests.xml The Android Manifest for your project.



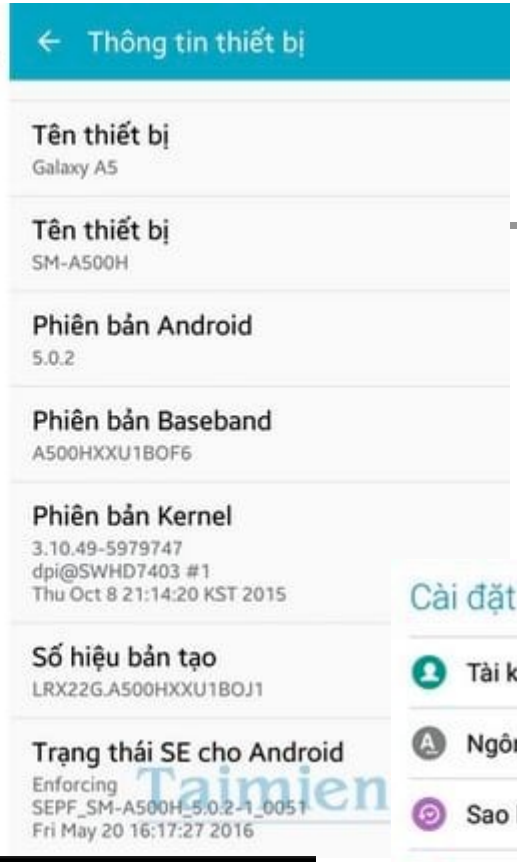
Chạy ứng dụng Android trên thiết bị Android

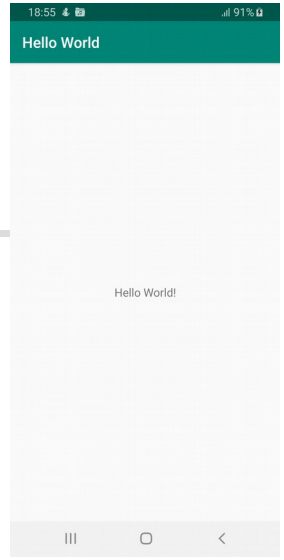
Cấu hình trên điện thoại / máy tính bảng Android:

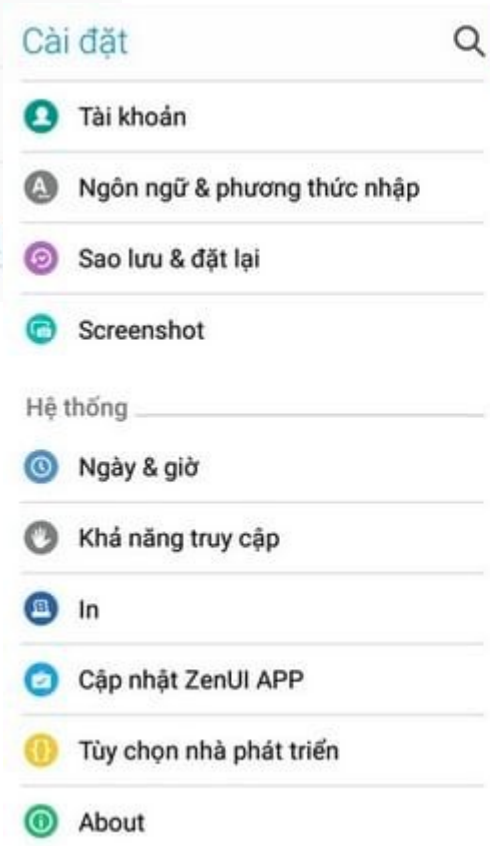
Settings (Cài đặt) > About device (Thông tin thiết bị) > Build Number (Số hiệu bản tạo)

Sau khi đã xác định được Build Number, nhấn vào mục này 7 lần liên tiếp. Sau 2 lần chạm, một khung thông báo nhỏ hiện lên với dòng chữ “You are now X steps away from being a developer” với X là con số đếm ngược mỗi lần chạm tiếp theo.

Sau 7 lần chạm, tùy chọn dành cho nhà phát triển (Developer options) sẽ được mở khóa và có thể sử dụng (trong phần Settings - Cài đặt). Truy cập phần Developer Mode trên Android, chọn kích hoạt gỡ lỗi USB.







MainActivity.java

```
package matos.csu.helloapp;
import ...
  public class MainActivity extends Activity {
  @Override
  protected void onCreate(Bundle savedInstanceState) {
    super.onCreate(savedInstanceState);
    setContentView(R.layout.activity_main);
  }
  @Override
  public boolean onCreateOptionsMenu(Menu menu) {
    // Inflate the menu; this adds items to the action bar if it is present.
    getMenuInflater().inflate(R.menu.menu_main, menu);
    return true;
}
```

MainActivity.java

```
@Override
public boolean onOptionsItemSelected(MenuItem item) {
  // Handle action bar item clicks here. The action bar will
  // automatically handle clicks on the Home/Up button, so long
  // as you specify a parent activity in AndroidManifest.xml.
  int id = item.getItemId();
  // noinspection SimplifiableIfStatement
  if (id == R.id.action_settings) {
    return true;
  }
  return super.onOptionsItemSelected(item);
}
```

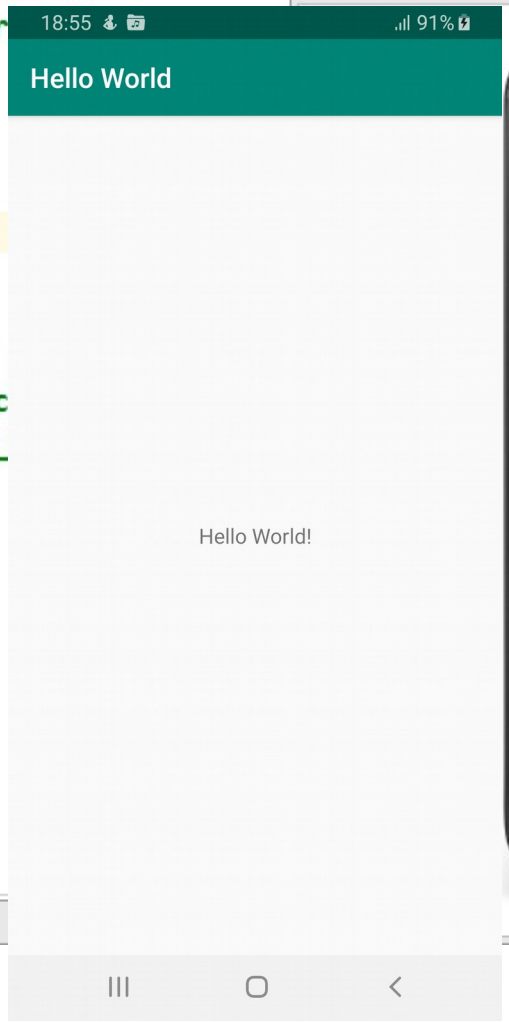
activity_main.xml

MainActivity.java | activity_main.xml

```
<RelativeLayout xmlns:android="http://schemas.andro
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_par
    android:paddingLeft="16dp"
    android:paddingRight="16dp"
    android:paddingTop="16dp"
    android:paddingBottom="16dp"
    tools:context=".MainActivity">

    <TextView
        android:text="Hello world!"
        android:layout_width="wrap_c
        android:layout_height="wrap_

</RelativeLayout>
```

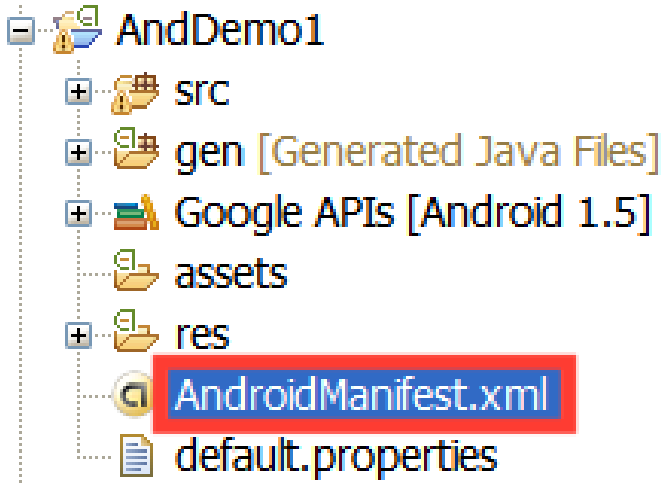
Design | Text

Preview: Nexus 4 | AppTheme | MainActivity | 22



Android Manifest XML File

- Every application must have an AndroidManifest.xml file in its root directory.
- The manifest presents essential information about the application to the Android system, for instance it has an entry for each activity, library request, and special permissions needed to assemble the app.



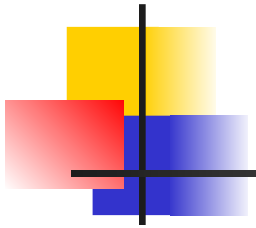
AndroidManifest.xml

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

    <application
        android:allowBackup="true"
        android:icon="@mipmap/ic_launcher"
        android:label="@string/app_name"
        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>
```

Android Manifest XML File

This is a list of the <XML-elements> allowed in the Manifest file.

<action>
<activity>
<activity-alias>
<application>
<category>
<data>
<grant-uri-permission>
<instrumentation>
<intent-filter>
<manifest>
<meta-data>
<permission>
<permission-group>
<permission-tree>
<provider>
<receiver>
<service>
<uses-configuration>
<uses-library>
<uses-permission>
<uses-sdk>



Next: Android-Lesson03-Life-Cycle