



Mobile App Development

Phát triển ứng dụng di động

4 Advanced Training Program

Mai Cường Thọ - Khoa Công nghệ thông tin – Trường Đại học Nha Trang

Tho C. Mai, FIT, NTU

Lecture 1

Introduction

Course: Mobile App Development (SOT397)

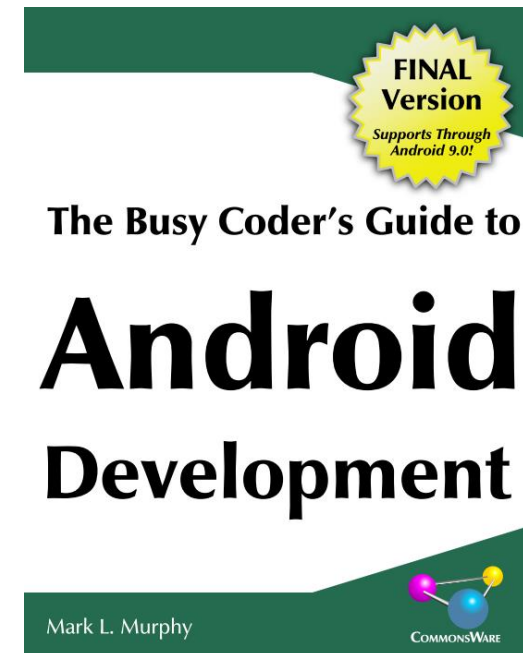
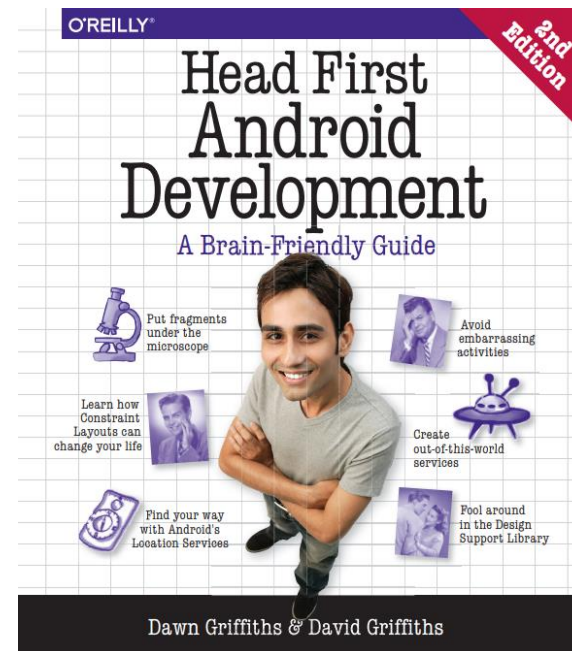
By: Tho C. Mai
Nha Trang University

Introduction



- Instructors
 - Tho C. Mai
- Office Hours
 - MW 2-5pm
- Other contact infos
 - Email: thomc@ntu.edu.vn
 - FB Messenger : maicuongtho
 - Mobile: 0915311008
- Course Web site
 - Elearning NTU

Textbooks



Required Hardware & Software



- Hardware
 - PC or laptop (Mac, Windows, Linux)
 - Android Phone (optional)
- Software
 - Android Studio IDE

Assignments and Grading



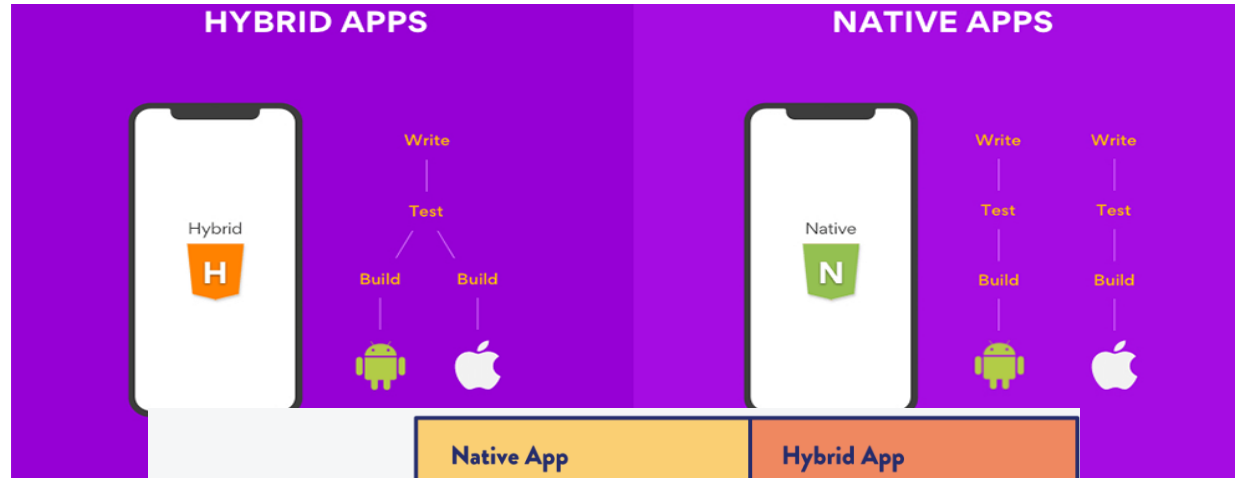
- Assignments
 - Homework assignments (basic tasks, simple extension, challenge tasks)
 - Team project
 - Design and develop an interesting Android app
 - Project presentations and demonstration
 - Project report with source code
- Grading policy
 - Class participation: 30%
 - Mid term exams: 20%
 - Final exam: via team Project: 50%

What is Android?





- Based on Linux
- Originally developed by a startup company named “Android”
- 2005 Google purchased the startup
- Most of the Android code is open-source
- Android offers a unified approach to application development

Android vs ...







	Native App	Hybrid App
Languages	Platform-specific: Objective C or Swift for iOS, Java or Kotlin for Android	General: HTML, CSS, Javascript
Codebase	Distinct repositories for each platform	Single cross-platform codebase
Financial Investment	High	Low
Pace of Development	Slow	Fast
Performance	Fast	Medium

Native Android App Development Programming Languages

Logo	Name	Current Version	Developed Year	Famous Mobile Apps	Active Developers
	Java	JDK 16	1995	Minecraft Spotify	9 million
	Kotlin	1.5.31	2016	Evernote Coursera	4 million

4 Best Hybrid Mobile App Development Frameworks

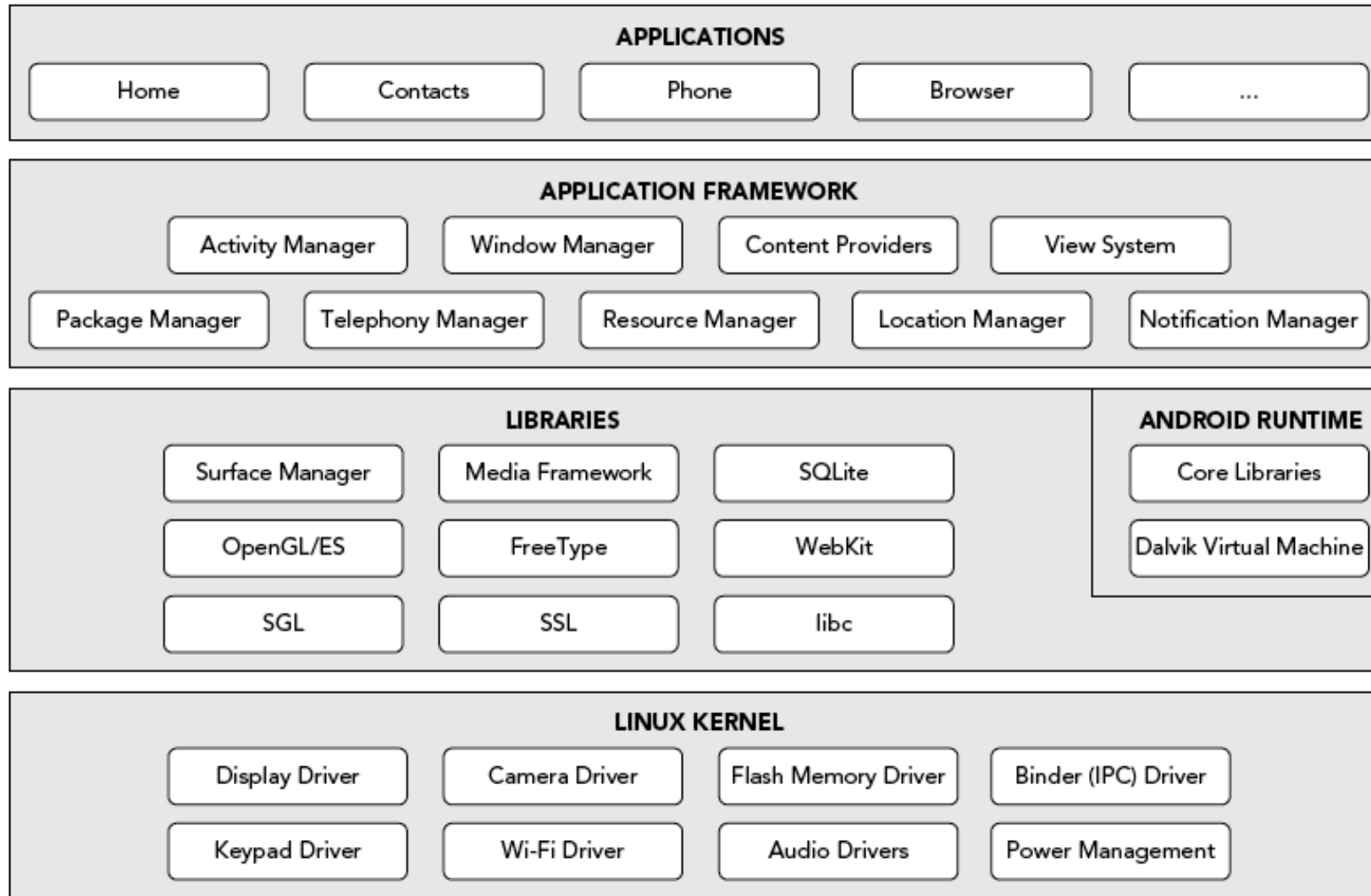
Logo	Name	Core Language	Famous Mobile Apps	Used by Developers (Statista)
	Xamarin	C#	Olo Azure app FreshDirect	11%
	Flutter	Dart	Groupon CapitalOne eBay	42%
	React Native	JavaScript	Instagram Coinbase NerdWallet	42%
	Ionic	JavaScript	CNBC Swokit InstantPot	16%

Android Versions



- 1.1: Feb 9, 2009; 1.5: April 30, 2009, Cupcake
- 1.6: Sep 15, 2009, Donut; 2.0/2.1: Oct 26, 2009, Eclair
- 2.2: May 20, 2010, Froyo; 2.3: Dec 6, 2010, Gingerbread
- 3.0/3.1/3.2: Feb 22, 2011, Honeycomb
- 4.0: Oct 8, 2011, Ice Cream Sandwich
- 4.1: July 9, 2012, Jelly Bean
- 4.4: Oct 31, 2013, KitKat
- 5.0: Nov 12, 2014, Lollipop
- 6.0: Oct 5, 2015, Marshmallow
- 7.0: Aug 22, 2016, Nougat
- 8.0: Aug 21, 2017, Oreo
- 9.0: Aug 6, 2018, Pie
- 10: September 3, 2019, Quince Tart
- 11: September 8, 2020, Red Velvet Cake
- 12: October 4, 2021, Snow Cone
- 13 : August 15, 2022, Tiramisu
- 14 : Q3 2023, Upside Down Cake
- 15 :

Android Architecture



Android Development Tools



- Android Studio: <http://developer.android.com/sdk/index.html>
- Android SDK (Software Development Kit)

Each Android SDK Platform package includes the Android platform and sources pertaining to an API level by default. Once installed, the IDE will automatically check for updates. Check "show package details" to display individual SDK components.

	Name	API Level	Revision	Status
<input type="checkbox"/>	Android API 34	34	1	Not installed
<input type="checkbox"/>	Android UpsideDownCakePrivacySandbox Preview	UpsideDownCakePrivacySandbox	1	Not installed
<input type="checkbox"/>	Android TiramisuPrivacySandbox Preview	TiramisuPrivacySandbox	9	Not installed
<input type="checkbox"/>	Android 13.0 (Tiramisu)	33	2	Partially installed
<input type="checkbox"/>	Android 12L (Sv2)	32	1	Not installed
<input type="checkbox"/>	Android 12.0 (S)	31	1	Not installed
<input type="checkbox"/>	Android 11.0 (R)	30	3	Not installed
<input type="checkbox"/>	Android 10.0 (Q)	29	5	Not installed
<input type="checkbox"/>	Android 9.0 (Pie)	28	6	Not installed
<input type="checkbox"/>	Android 8.1 (Oreo)	27	3	Not installed
<input type="checkbox"/>	Android 8.0 (Oreo)	26	2	Not installed
<input type="checkbox"/>	Android 7.1.1 (Nougat)	25	3	Not installed
<input checked="" type="checkbox"/>	Android 7.0 (Nougat)	24	2	Installed
<input type="checkbox"/>	Android 6.0 (Marshmallow)	23	3	Not installed

Creating Android Virtual Devices

- Android Studio offers an emulator for testing of Android apps

The screenshot shows the Android Studio interface. The top toolbar has a red arrow pointing to the 'Run' button (a green play icon). Below the toolbar is the 'Device Manager' tab, which has 'Virtual' and 'Physical' sub-tabs. A red arrow points to the 'Create device' button in the 'Virtual' sub-tab. Below the 'Device Manager' is a table of virtual devices. The 'Nexus 5' device is selected, showing an API level of 24 and a size of 9.2 GB. To the left of the 'Device Manager' is a 'Choose a device definition' dialog. This dialog has a table with columns: Category, Name, Play Store, Size, Resolution, and Density. The 'Phone' category is selected, and the 'Nexus 5' device is highlighted in blue. To the right of the table is a diagram of the Nexus 5 phone with dimensions: 1080px width, 1920px height, and 4.95 inch diagonal.

Choose a device definition

Category	Name	Play Store	Size	Resolution	Density
Phone	Nexus 6		5.96"	1440x2560	560dpi
Tablet	Nexus 5X	▶	5.2"	1080x1920	420dpi
Wear OS	Nexus 5	▶	4.95"	1080x1920	xxhdpi
Desktop	Nexus 4		4.7"	768x1280	xhdpi

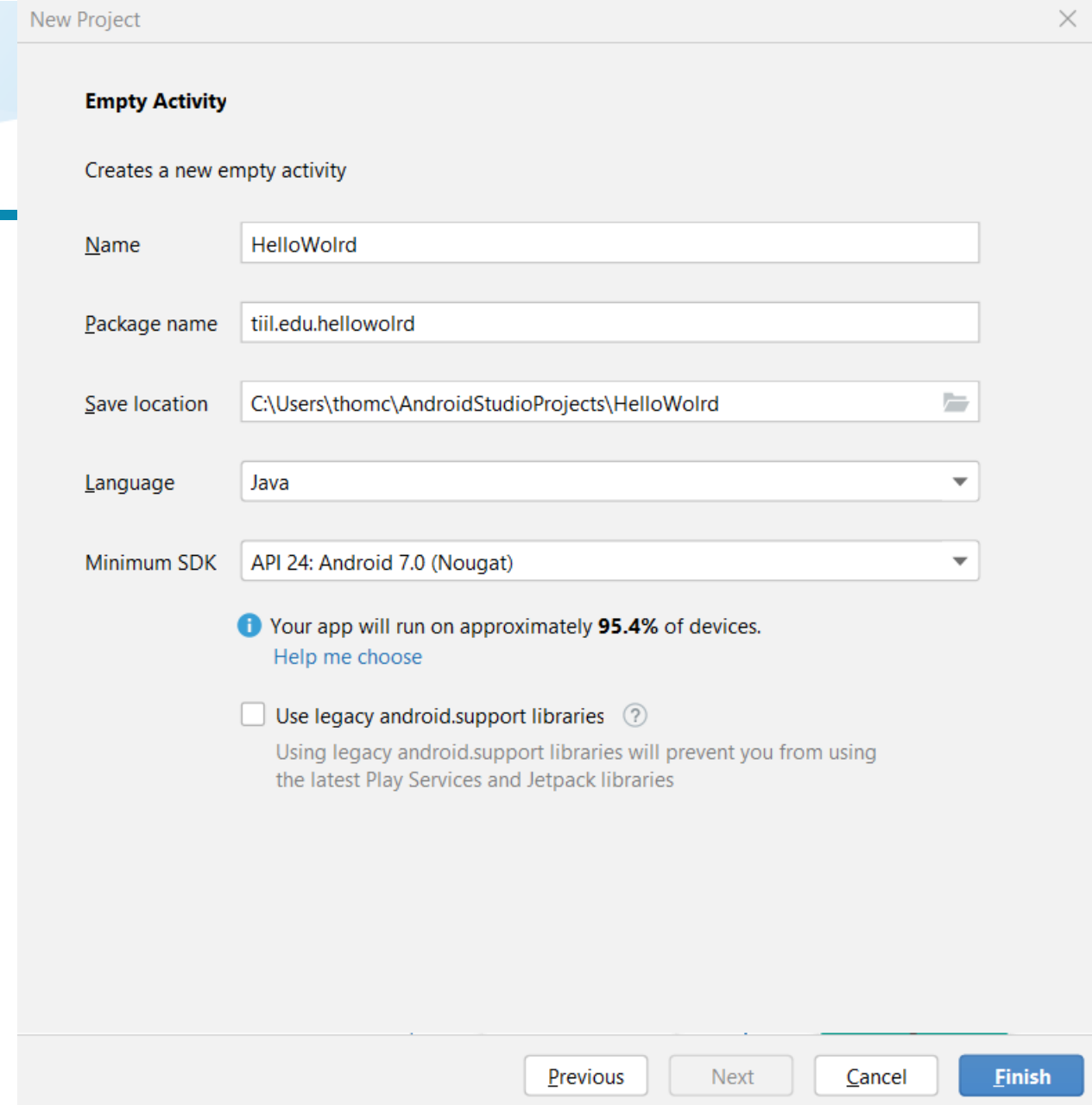
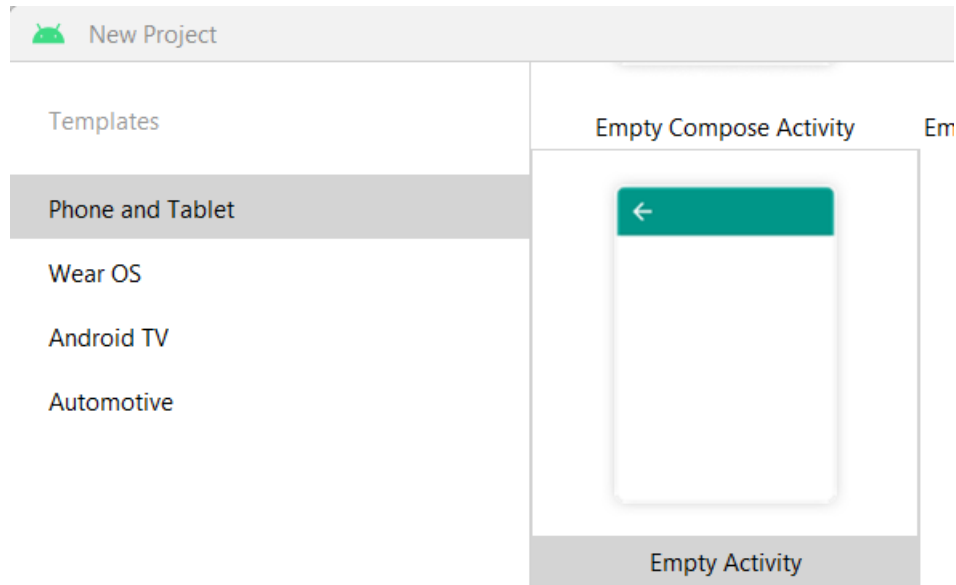
Nexus 5

1080px
4.95"
1920px



Creating your first Android App

- File -> New->New Project
- Name the app: HelloWorld
- Then select default option for all remaining steps



Creating your first Android App

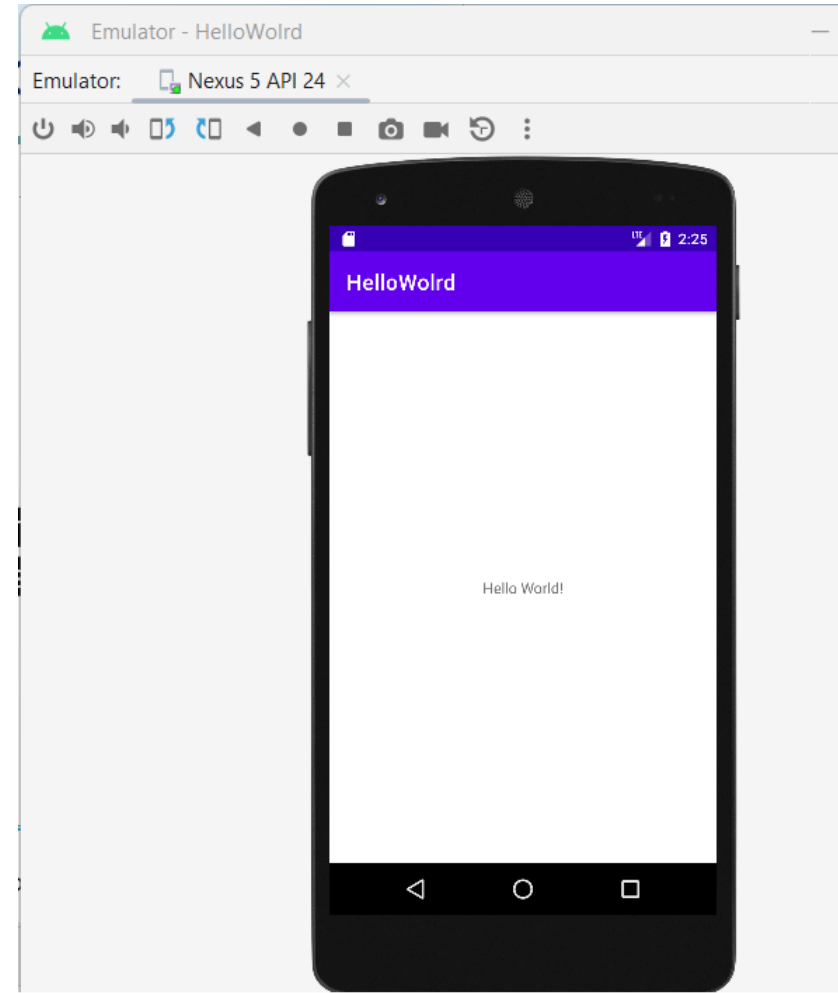
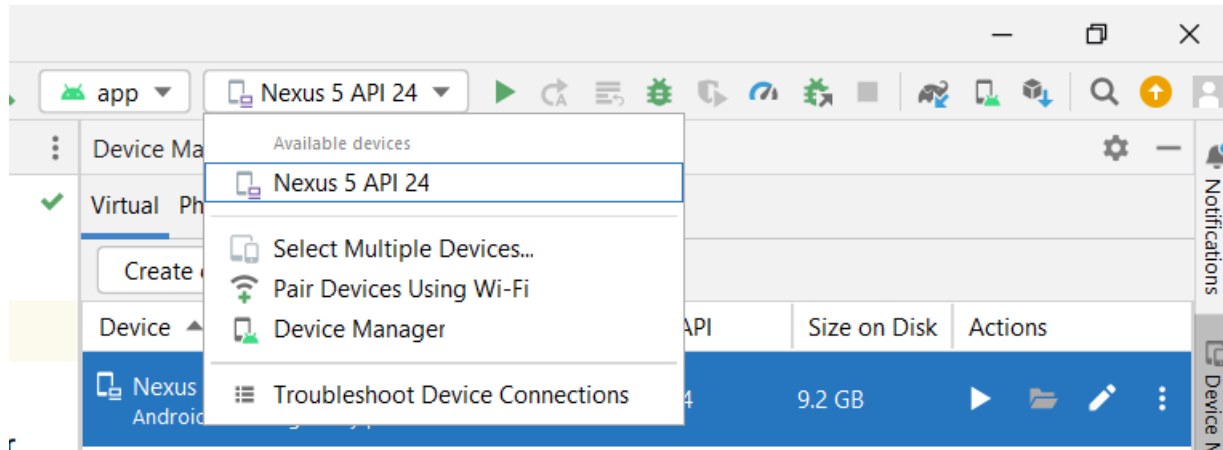


The screenshot shows an IDE window titled "HelloWolrd - MainActivity.java [HelloWolrd.app.main]". The top menu bar includes File, Edit, View, Navigate, Code, Refactor, Build, Run, Tools, VCS, Window, and Help. The toolbar shows various icons for running, debugging, and navigating. The left sidebar displays the Project, Resource Manager, Structure, and Bookmarks views. The Project view shows the hierarchy: app > manifests > java > tiil.edu.helloworld > MainActivity. The Resource Manager view shows the layout directory containing activity_main.xml. The Structure view shows the package structure. The Bookmarks view shows the build.gradle files. The main editor area displays the MainActivity.java code, which is highlighted in yellow. The code is as follows:

```
1 package tiil.edu.helloworld;
2 import androidx.appcompat.app.AppCompatActivity;
3 import android.os.Bundle;
4
5 public class MainActivity extends AppCompatActivity {
6     @Override
7     protected void onCreate(Bundle savedInstanceState) {
8         super.onCreate(savedInstanceState);
9         setContentView(R.layout.activity_main);
10    }
```

The bottom status bar shows "Gradle sync finished in 21 s 625 ms (3 minutes ago)" and "5:1 LF UTF-8 4 spaces".

Launching your first Android App



Your turn

I fear not the man who has practiced 10,000 kicks once,
but I fear the man who has practiced one kick 10,000 times.
Bruce Lee



- The first thing you HAVE TO DO
 - Create your Github repository to store and manage your code, as well as track and control changes.
 - Create your local repository as a workspace to store your projects
- Practice 1/ Exercice 1
 - 1) Repeat the example by yourself
 - 2) Push it to your github repository
 - ✓ With a report with screenshots of the final app in action, data structures used/class design, and the implementation logic.