



Introduction to Platform-Based Programming

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Learning Objectives

After completing this session, students will be able to:

- Explain the definition of a platform.
- Explain why it is important to learn programming frameworks.
- Differentiate between web platforms and mobile platforms.

Agenda

- Basic Concepts of Platforms
- Programming Frameworks
- Web Platforms vs. Mobile Platforms

What is platform?

Definition of Platform

<https://www.merriam-webster.com/dictionary/platform>



Definition of *platform*

1 a : a flat horizontal surface that is usually higher than the adjoining area: such as

(1) : a raised flooring (such as a stage or dais)

// ... a great stack of chairs piled up on and about the musicians' platform ...

— Joseph Conrad

// From this official table on a raised platform ... , Robert Thomas, the show's chairman, directs operations ...

— Liz Horwitt

(2) : an elevated area next to railroad tracks for the boarding of trains

// The platform was crowded with waiting passengers.

b : a device or structure incorporating or providing a platform

// a viewing platform

specifically : such a structure on legs used for offshore drilling (as for oil)

<https://kbbi.kemdikbud.go.id/entri/platform>



i Informasi: Temukan bantuan menggunakan KBBI Daring [di sini](#).

platform



plat.form

→ Tesaurus

1. *n* rencana kerja; program
2. *n* pernyataan sekelompok orang atau partai tentang prinsip atau kebijakan
3. *n* tempat yang tinggi; panggung; pentas; mimbar: *masalah penciptaan adalah masalah yang dibahas dalam -- ilmu sastra*
4. *n* beranda stasiun; peron: *saya lihat beliau keluar dari -- Stasiun Tugu langsung menuju kendaraannya*

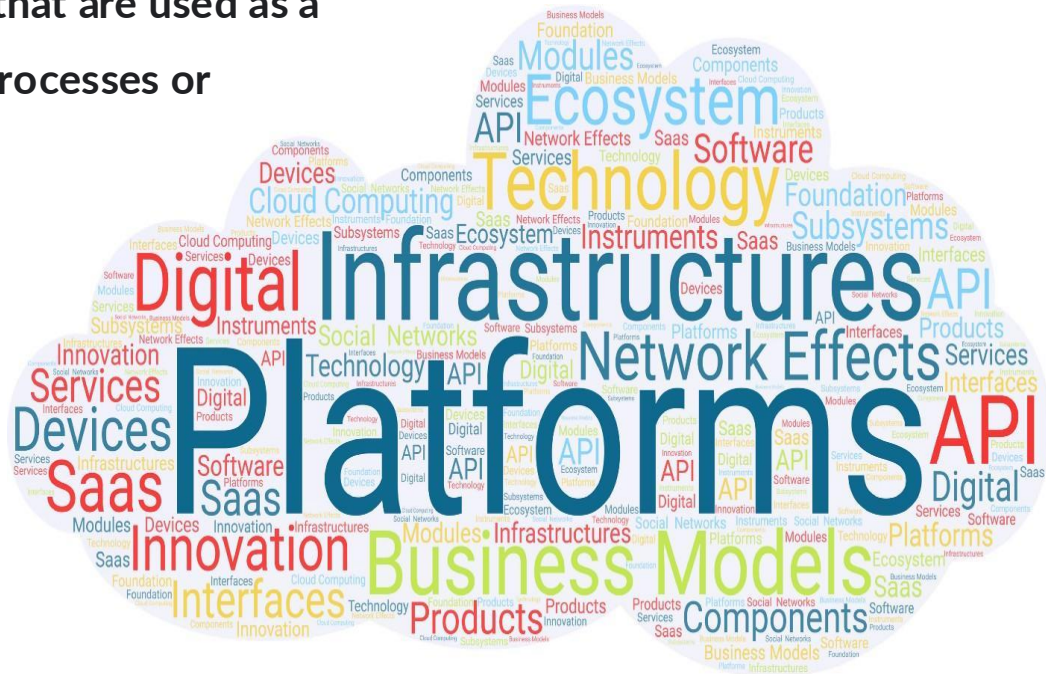
Example: Platform

- Platform at train station (in bahasa Indonesia: *peron*)
- Stage at art performance
- Structure



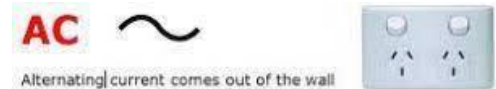
Definition of Platform (Technology)

A platform is a group of technologies that are used as a base upon which other applications, processes or technologies are developed



Example: Technology Platform

- Telecommunication: 3G / 4G / 5G
- Electricity (Current): AC (Alternating Current) / DC (Direct Current)
 - DC to AC => Converter (Inverter)
 - AC to DC => Converter (Adaptor)
- Machine/Automotive: Diesel vs Gasoline vs Electric



Definition of Platform (Computing)

- ❑ A platform serves as the basic foundation for the development and support of [hardware](#) and [software](#).
- ❑ Everything created on top of a foundation operates together within the same framework. As such, **each platform has its own set of rules, standards, and restrictions that dictate what hardware/software can be built and how each should work.**
- ❑ computer, computing device, computing machine, data processor, electronic computer, information processing system - a machine for performing calculations automatically
- ❑ ADP system, ADPS, automatic data processing system, computer system, computing system - a system of one or more computers and associated software with common storage
- ❑ operating system, OS - software that controls the execution of computer programs and may provide various services

Example: Computing Platform

Hardware:

X86 (Intel / AMD) 32bit / 64bit

ARM (Snapdragon)

ATMEL

Bluetooth

USB



Software:

Sistem Operasi (Linux, Android, Windows, iOS, dll)



Definition of Platform & Framework

- ❑ A platform is a set of hardware and software components that provide a space for developers to build and run applications.
- ❑ Platforms are designed to be environments for apps. Not only will developers build the app on a particular platform, but the finished product will also run on that platform.
- ❑ A framework is a software-only app skeleton that includes preset tools, libraries, software development kits, and other components.
- ❑ Frameworks are intended to be more like app templates. Their ready-made components provide some guidance to developers throughout the development process. However, the app will still need external support to run once it's complete.

<https://themanifest.com/app-development/blog/platform-vs-framework>

<https://www.brainspire.com/blog/mobile-development-platform-vs-framework-how-they-differ>

Definition of Programming Platform & Framework

- ❑ A programming platform is a software platform that encompasses all the necessary components, application programming interfaces and libraries required by programmers and developers to author, compile, debug and execute language-specific applications. Programming platforms are typically accompanied with development tools that enable effortless application development.
- ❑ A programming framework is a **prepackaged set of solutions** that solves common development problems.

Example: Programming Platform & Framework

Web:

- Server Based: **Django**, Laravel, Springbot, .NET
- Client Side: ReactJS, AngularJS, Flutter for Web

Mobile:

- Wearable Device
- Smart Phone: Native Android, Native iOS, Native Tizen, Native HarmonyOS, **Flutter**, ReactNative,

Home Appliance:

- Smart TV
- Smart Refrigerator

Desktop:

- QT, .NET Framework

Game:

- Streaming: Steam, Google Stadia
- Console: Nintendo, XBox, Playstation, etc
- Mobile: Unity
- Desktop: Unity, Unreal engine, etc

Artificial Intelligence:

- Nvidia CUDA, Tensorflow

Embedded:

- IoT (Smart Lamp, etc)
- Education (Micro:bit, Raspberry Pi)

Digital Industrial Platform

Digital industrial platforms are essential for the **integration of key digital technologies, large-scale piloting and experimentation** is needed to gradually develop and mature such platforms. Equipped with appropriate business models, digital industrial platforms could be instrumental in the **creation of ecosystems** of market actors in a multi-sided marketplace. These ecosystems enable the creation of new innovative products and services and accelerate the development of worldwide standards.

Example: Digital Industrial Platform

Closed:



HUAWEI



Open: (Industrial Revolution 4.0)

- Cloud




- Open Protocol
 - Blockchain (Ethereum, Bitcoin, etc)
 - Open API (Open Banking, Digital Signature, etc)



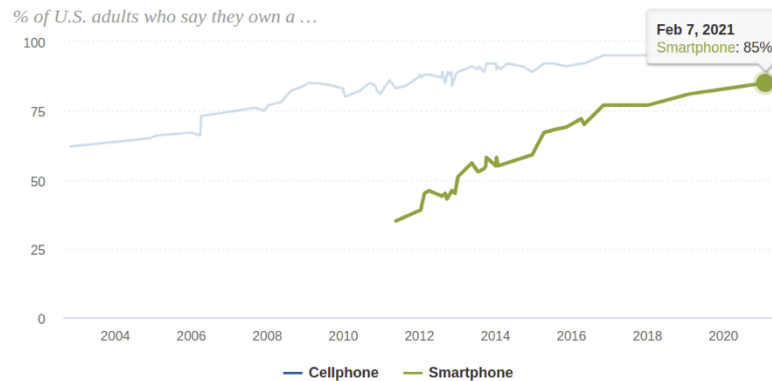
Why we need programming framework?

- ❑ The principles of rapid development, which means developers can do more than one iteration at a time without starting the whole schedule from scratch;
- ❑ DRY philosophy – Don't Repeat Yourself – which means developers can reuse existing code and focus on the unique one.
- ❑ As a result, it takes a lot less time to get the project to market

Why we need to understand web & mobile platform?

- ❑ Internet as primary needs
 - ❑ Application delivery on Internet as a Web Application
- ❑ Website as landing page for services, mobile applications for personalized interactions

- ❑ Mobile phone users: 85% (US Survey)
- ❑ Services deliver over mobile Apps



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INDONESIA

OVERVIEW OF THE ADOPTION AND USE OF CONNECTED DEVICES AND SERVICES

NOTE: SIGNIFICANT REVISIONS TO SOURCE DATA MEAN THAT FIGURES SHOWN HERE ARE **NOT COMPARABLE** WITH PREVIOUS REPORTS. SEE THE IMPORTANT NOTES AT THE START OF THIS REPORT FOR DETAILS.



INDONESIA

TOTAL
POPULATION



we
are
social

285
MILLION

YEAR-ON-YEAR CHANGE

+0.8%
+2.3 MILLION

URBANISATION

59.5%

CELLULAR MOBILE
CONNECTIONS



Meltwater

356
MILLION

YEAR-ON-YEAR CHANGE

+1.6%
+5.7 MILLION

TOTAL vs. POPULATION

125%

INDIVIDUALS USING
THE INTERNET



212
MILLION

YEAR-ON-YEAR CHANGE

+8.7%
+17 MILLION

TOTAL vs. POPULATION

74.6%

SOCIAL MEDIA
USER IDENTITIES



143
MILLION

YEAR-ON-YEAR CHANGE

+2.9%
+4.0 MILLION

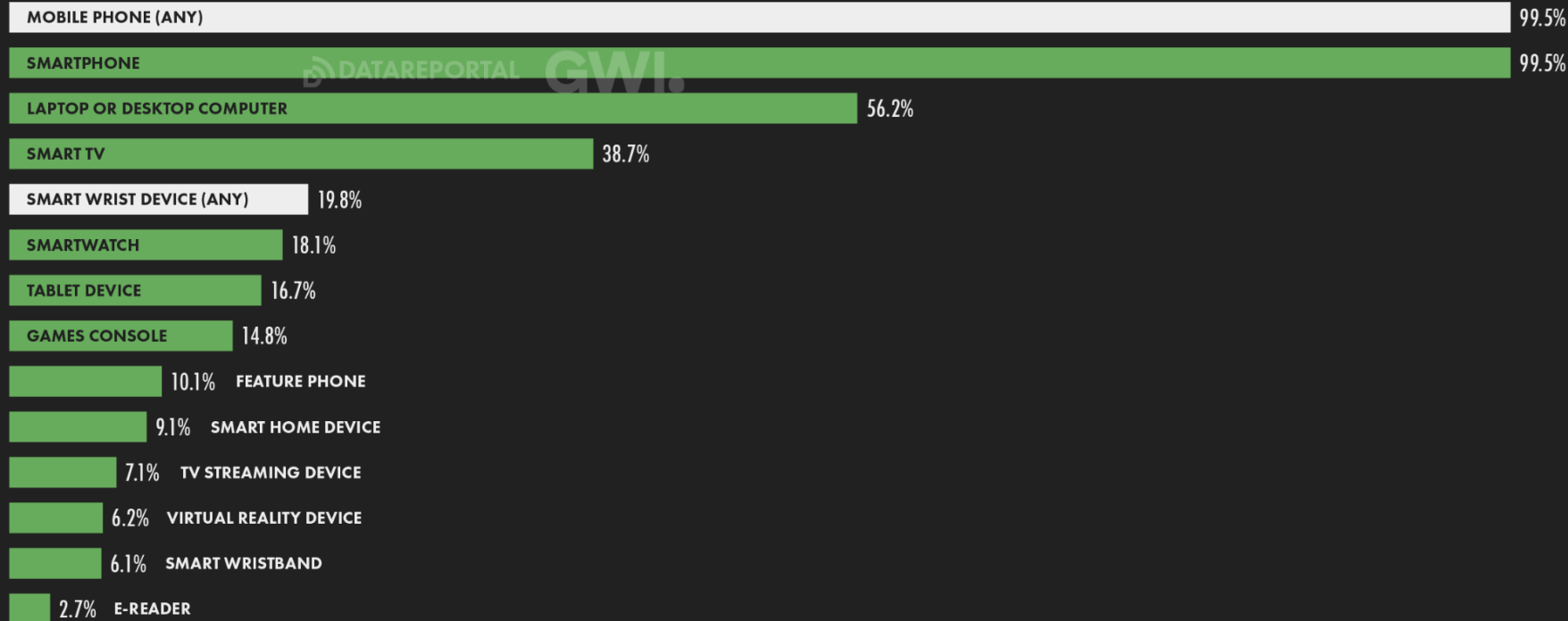
TOTAL vs. POPULATION

50.2%

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DEVICE OWNERSHIP

PERCENTAGE OF INTERNET USERS AGED 16+ WHO OWN EACH KIND OF DEVICE



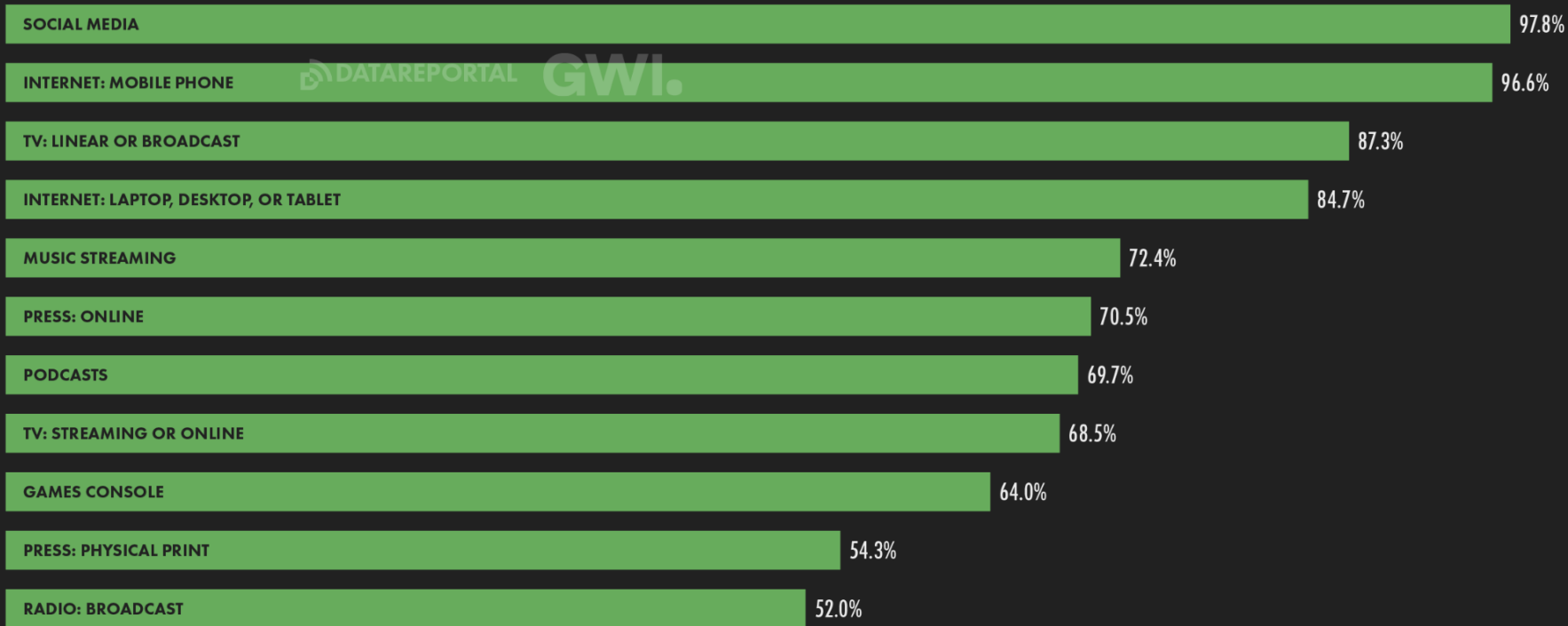
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MEDIA USE

THE PERCENTAGE OF INTERNET USERS AGED 16+ WHO CONSUME EACH MEDIA TYPE



INDONESIA



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MOBILE CONNECTIVITY

USE OF MOBILE PHONES AND DEVICES THAT CONNECT TO CELLULAR NETWORKS



INDONESIA

NUMBER OF CELLULAR
MOBILE CONNECTIONS
(EXCLUDING IOT)



356
MILLION

NUMBER OF CELLULAR MOBILE
CONNECTIONS COMPARED
WITH TOTAL POPULATION



125%

YEAR-ON-YEAR CHANGE
IN THE NUMBER OF CELLULAR
MOBILE CONNECTIONS



+1.6%
+5.7 MILLION

SHARE OF CELLULAR MOBILE
CONNECTIONS THAT ARE
BROADBAND (3G, 4G, 5G)



96.4%

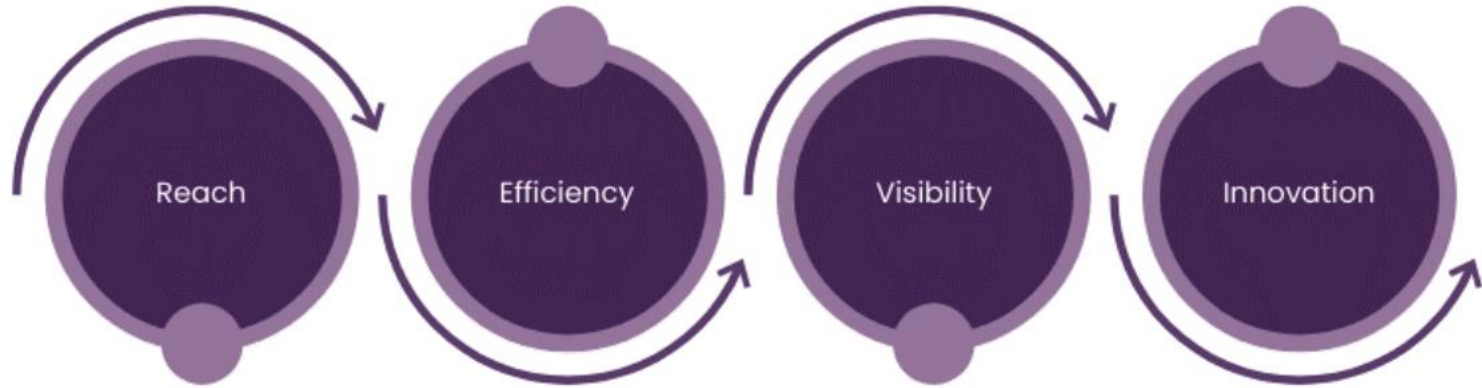
Web Platform

Web Platform

A web platform is a browser-based computing environment that allows applications to run over the internet without requiring installation on the user's device.

- Accessed through a browser (Chrome, Firefox, Safari, Edge, etc.).
- Built using HTML, CSS, JavaScript, and modern frameworks (React, Angular, Vue, etc.).
- Cross-device accessibility (PC, laptop, tablet, smartphone) as long as an internet connection is available.
- Examples: Gmail (web version), SIAK-NG, SCeLE Fasilkom

Benefit of Web Platform



Disadvantages of a Web Platform

- **User Interaction:**
Web apps generally have fewer interactions compared to mobile apps. Push notifications are less common and less effective, making instant engagement harder.
- **Browser Compatibility:**
Since web apps are cross-platform, some features may not work properly on older browsers, though this is relatively rare.

Web Platform (using Django Framework)

- ❑ Server Based: Django
- ❑ Client Based: Javascript jQuery



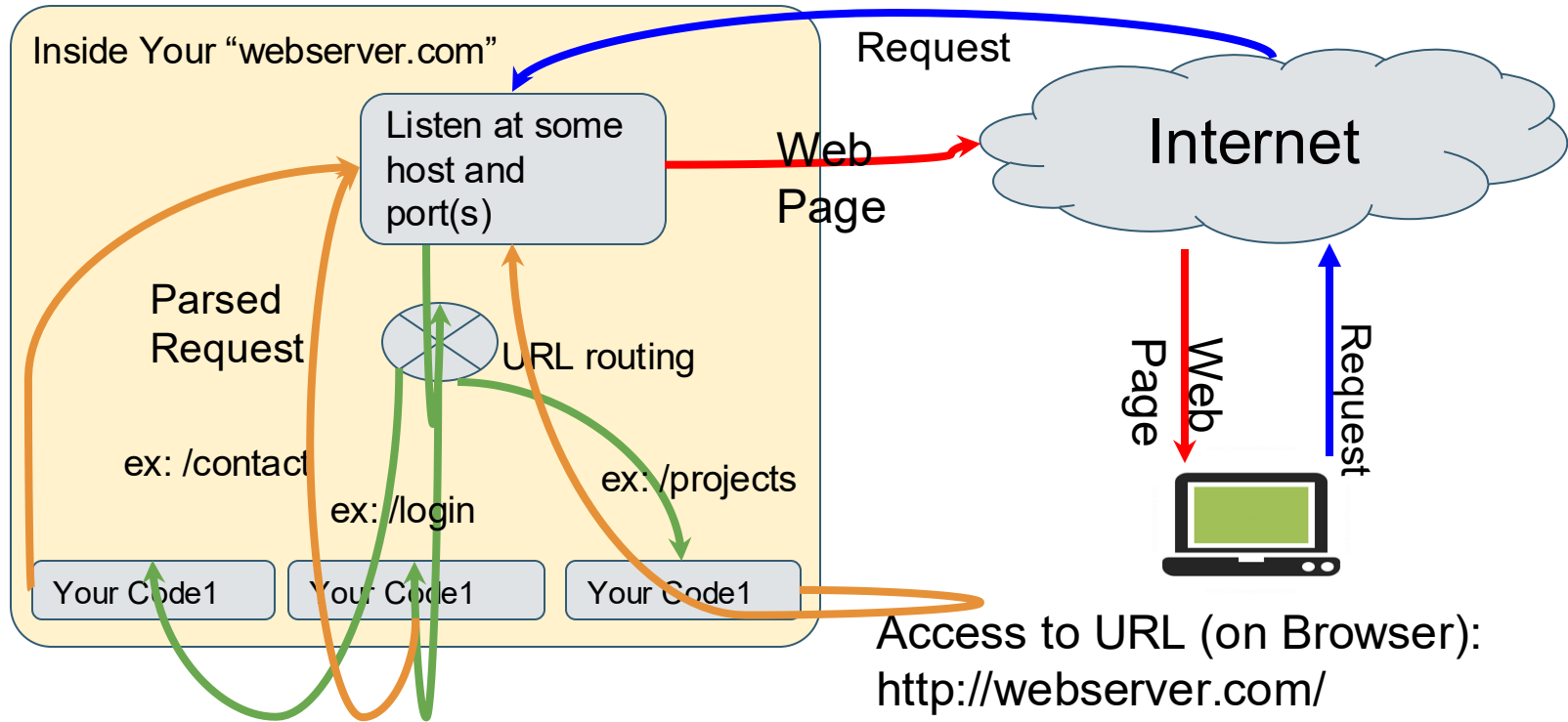
Code execution in Server
execution result HTML, CSS, JS
Deliver HTML, CSS, JS



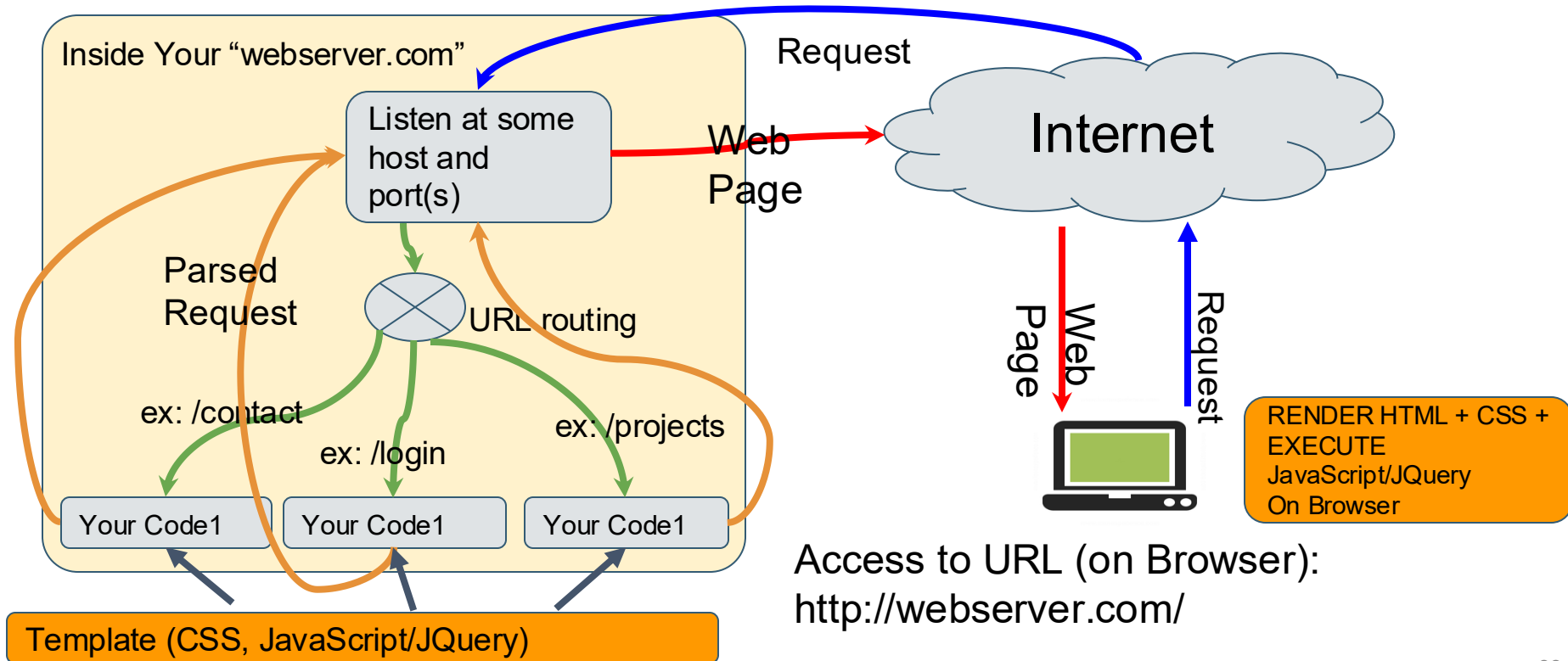
JavaScript

Browser receive JS Code from Server
Code execution on Browser

Web Platform: Server Based Application



Web Platform: Client Based Application



Mobile Platform

Mobile Platform

A mobile platform is an operating system-based environment designed for mobile devices (such as Android or iOS), enabling applications to run natively or in hybrid mode on smartphones and tablets.

- Accessed through apps installed from the App Store (iOS) or Google Play Store (Android).
- Developed using platform-specific languages/frameworks (Java/Kotlin for Android, Swift/Objective-C for iOS, or cross-platform frameworks like Flutter and React Native).
- Supports direct interaction with device hardware (camera, GPS, accelerometer, biometrics).
- Examples: Instagram, Gojek, and Moodle App (UI mobile version).

Benefit of Mobile Platform



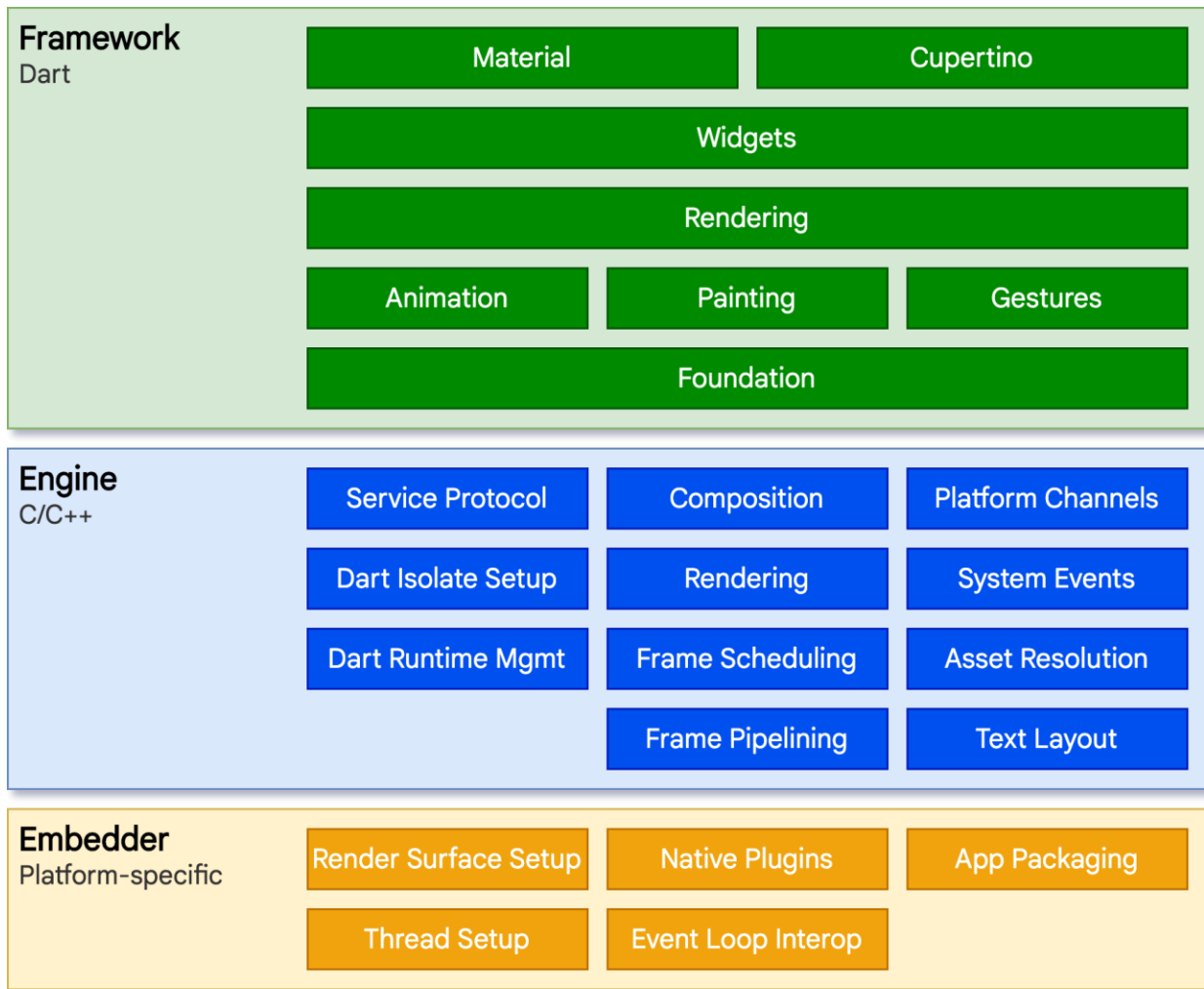
Disadvantages of a Mobile Platform

- **Development Cost & Time:** Mobile apps take longer to build and are more expensive.
- **User Adoption:** Harder to convince users to download apps; usually happens later in the user journey after trying the web version.
- **Backward Compatibility:** Teams must maintain support for old features or older OS versions if users skip updates.

Mobile Platform (using Flutter Framework)

- Back in the days of Objective C/Swift and Java/Kotlin as primary languages for mobile development, building apps was expensive. You had to build two separate apps, which obviously meant doing the work twice.
- Flutter is a cross-platform framework that uses just one code to create apps for different devices.
- Applications that are programmed in **Dart** language act almost identically on each mobile operating platform (Android & iOS) and they have similar efficiency to their native solutions. Moreover, apps made with Flutter are indeed native.

Flutter Architecture



Flutter in Course Platform-Based Programming

- Emphasized on UI of mobile/smartphone application
- Multi-Computing Platform (Android - iOS)
- Communication with Backend (served by Django Web service)



Key factors to consider when choosing between Web or Mobile platforms

- **Target audience**

- Mobile Apps → Reach users who prefer smartphones/tablets.
- Web Apps → Reach users across different devices without requiring downloads/updates.

- **Functionality**

- Mobile Apps → More powerful, faster, and can use device features (camera, GPS, notifications).
- Web Apps → Functional but less smooth, reliant on internet and browser compatibility.

Key factors to consider when choosing between Web or Mobile platforms (Cont)

- **Development cost and time**

- Mobile Apps → Higher cost and longer development (different platforms, app store approval, frequent updates).
- Web Apps → Lower cost, faster to develop, no app store approval, automatic updates.

- **Maintenance and support**

- Mobile Apps → Require more maintenance, updates, and compliance with app store policies.
- Web Apps → Easier maintenance, quick modifications, no app store restrictions.

Summary

In this session, students have learned about:

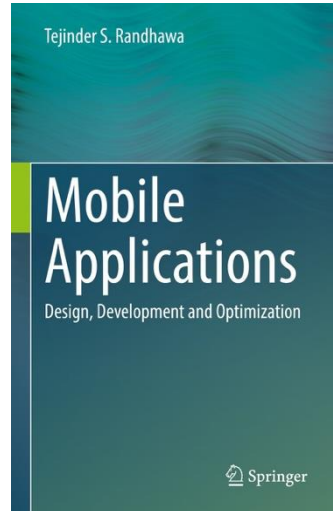
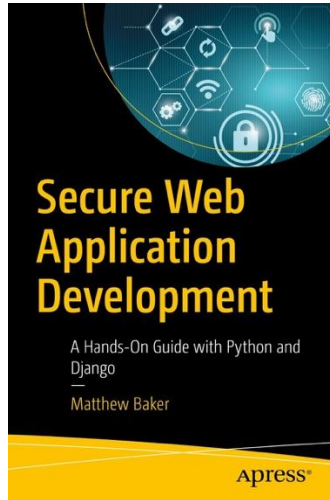
- The basic concepts of platforms
- Why it is important to learn programming frameworks
- The differences between web platforms and mobile platforms

Next Session Topics

- Git: A Version Control System for Codebases
- GitHub: A Collaboration Platform Using Git
- The Benefits of Understanding Git and GitHub

Recommended Learning Resources

- <https://www.w3schools.com/whatis/>
- <https://www.geeksforgeeks.org/mobile-computing/what-is-mobile-app-development-process/>



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