



# 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://kbki.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*

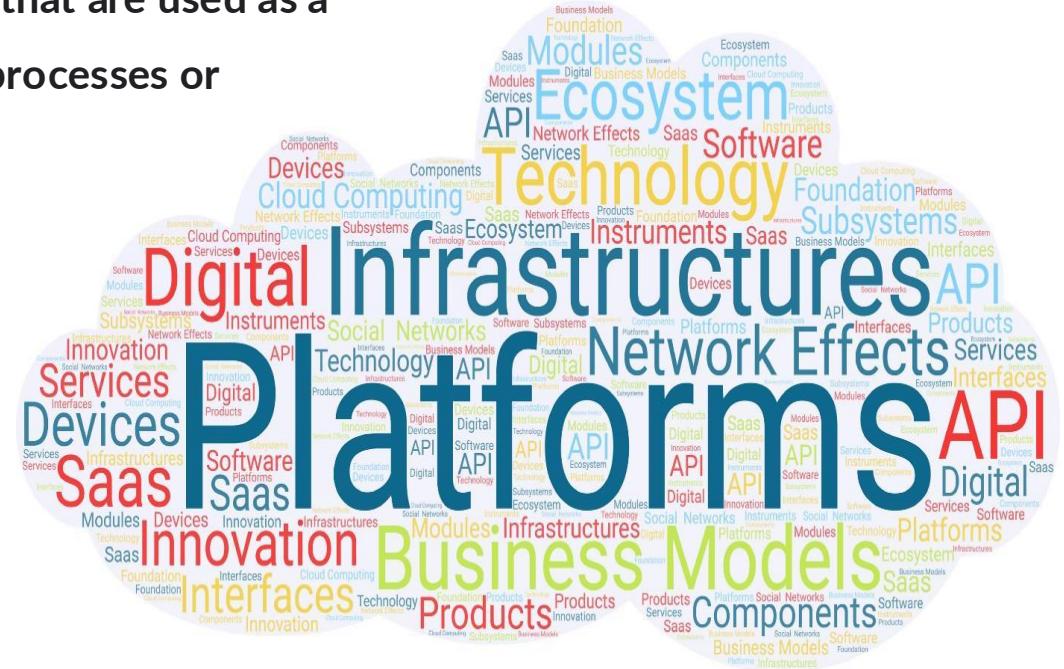
# Example: Platform

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



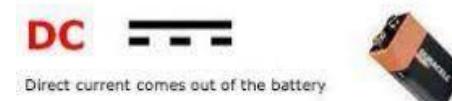
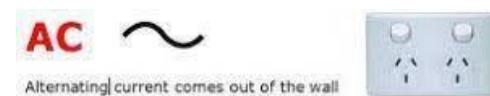
# Definition of Platform (Technology)

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.braininspire.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.

<https://www.igi-global.com/dictionary/mobile-applications-programming-platforms-development/23789>  
<https://makemeaprogrammer.com/what-is-a-programming-framework/>

# 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  
The Amazon logo, showing the word "amazon" in lowercase with a curved orange arrow underneath.



Google Cloud



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

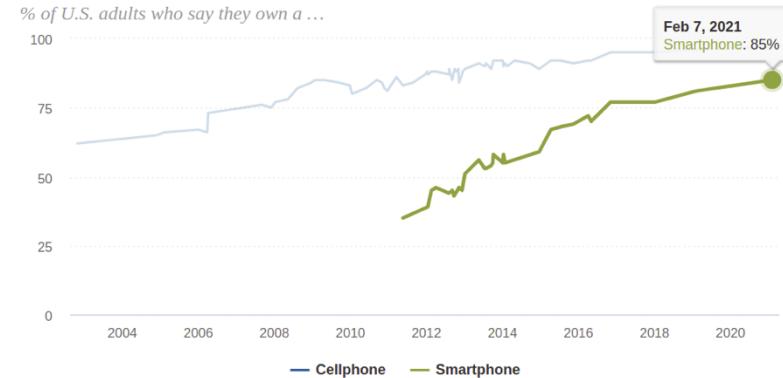


# Why we need programming framework?

- 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.



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

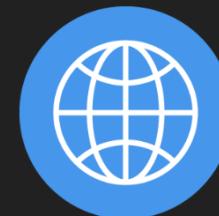
YEAR-ON-YEAR CHANGE

**+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

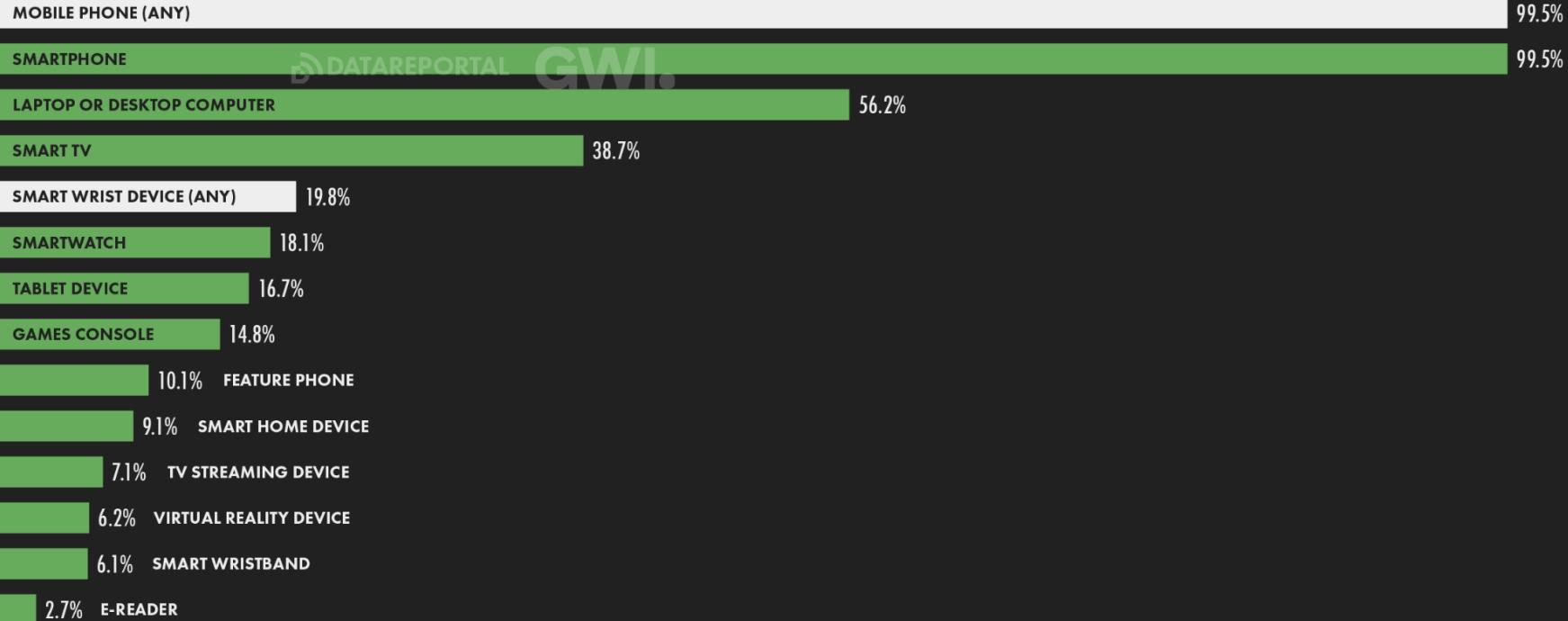
TOTAL vs. POPULATION

**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

SOCIAL MEDIA

97.8%

INTERNET: MOBILE PHONE

DATAREPORTAL

GWI.

96.6%

TV: LINEAR OR BROADCAST

87.3%

INTERNET: LAPTOP, DESKTOP, OR TABLET

84.7%

MUSIC STREAMING

72.4%

PRESS: ONLINE

70.5%

PODCASTS

69.7%

TV: STREAMING OR ONLINE

68.5%

GAMES CONSOLE

64.0%

PRESS: PHYSICAL PRINT

54.3%

RADIO: BROADCAST

52.0%

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# MOBILE CONNECTIVITY

USE OF MOBILE PHONES AND DEVICES THAT CONNECT TO CELLULAR NETWORKS



NUMBER OF CELLULAR  
MOBILE CONNECTIONS  
(EXCLUDING IOT)



NUMBER OF CELLULAR MOBILE  
CONNECTIONS COMPARED  
WITH TOTAL POPULATION



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



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



**356**  
**MILLION**

**125%**

**+1.6%**  
**+5.7 MILLION**

**96.4%**

GSMA

GSMA

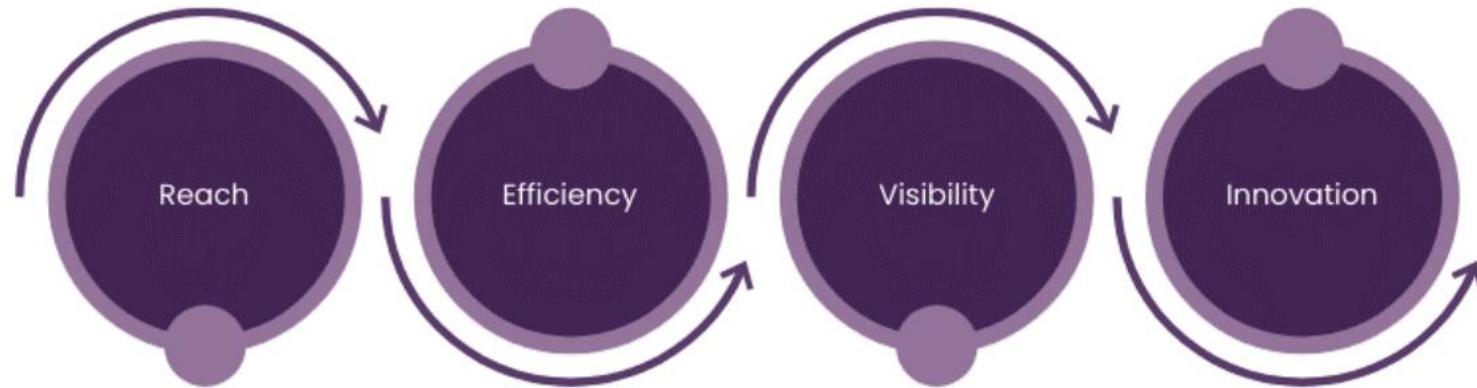
# Web Platform

# 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



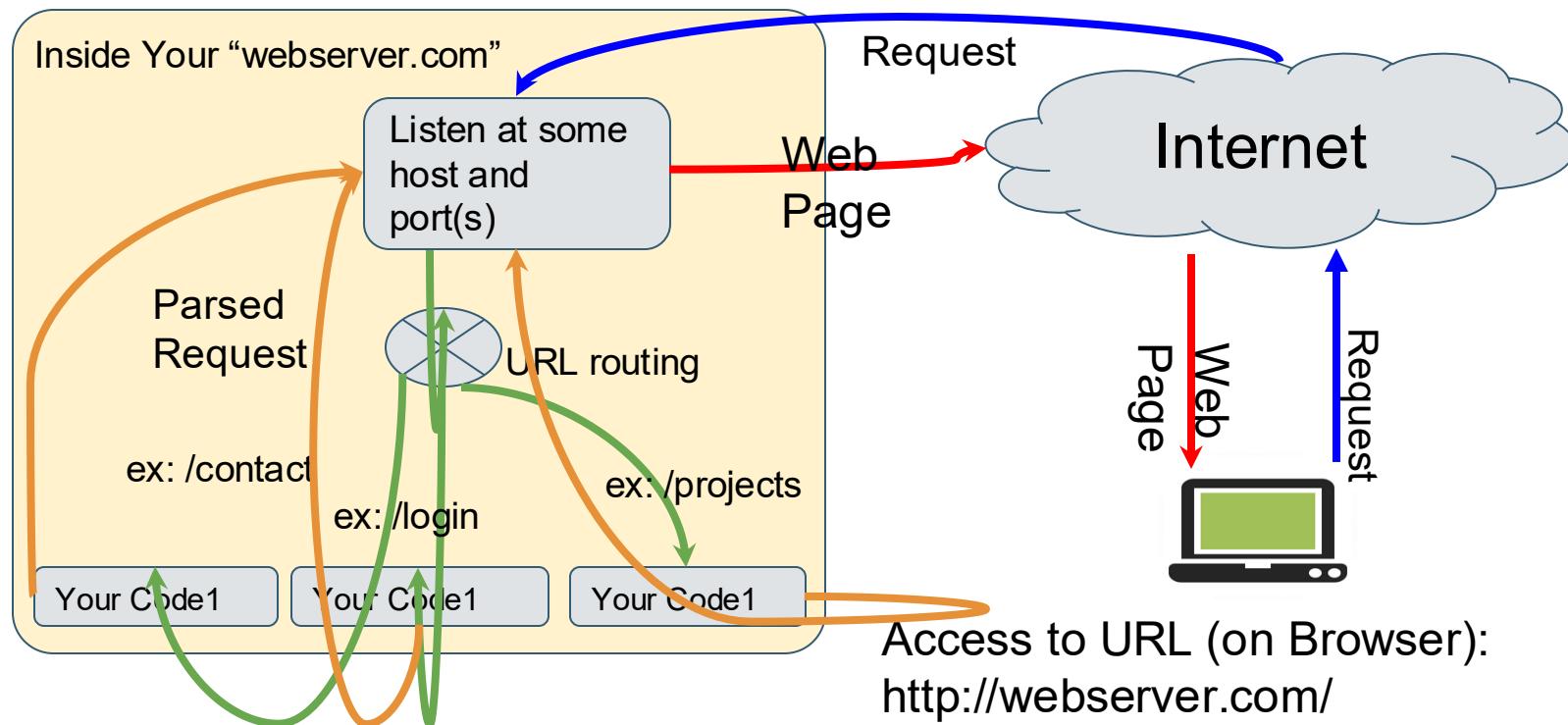
Code execution in Server  
execution result HTML, CSS, JS  
Deliver HTML, CSS, JS



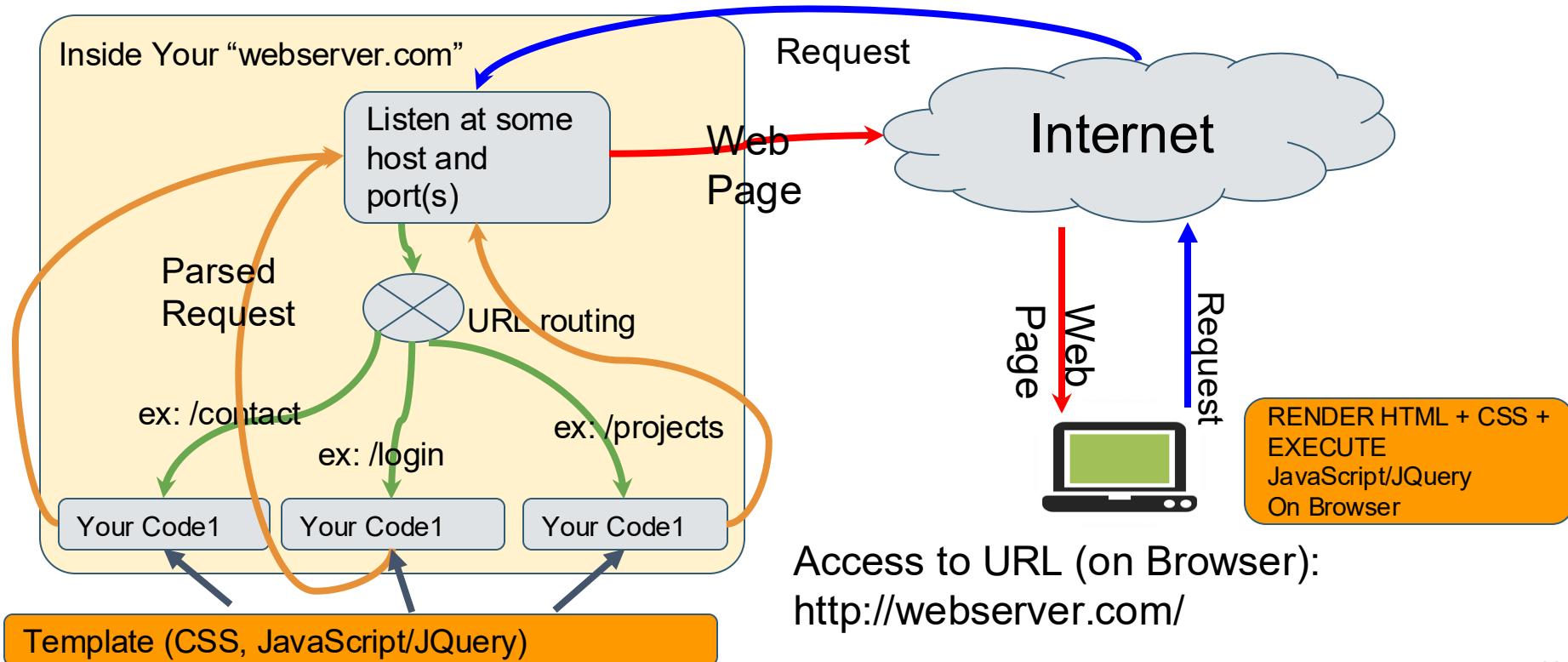
JavaScript

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



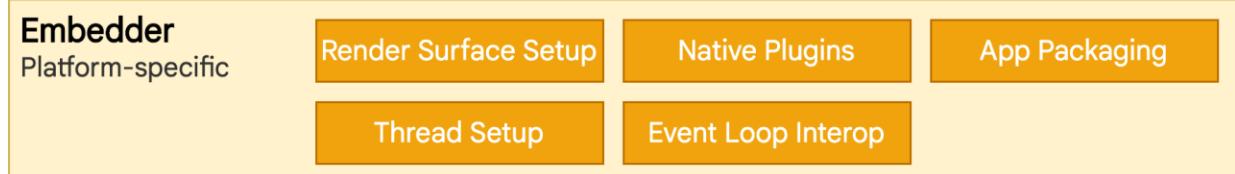
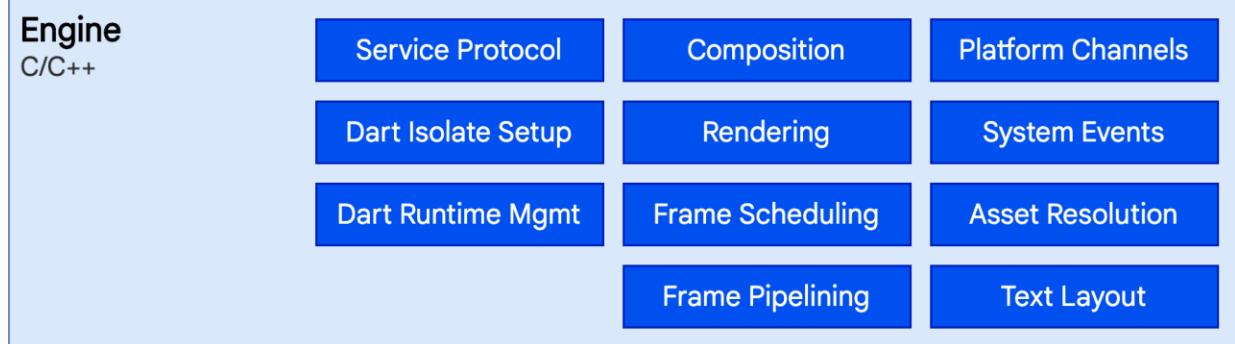
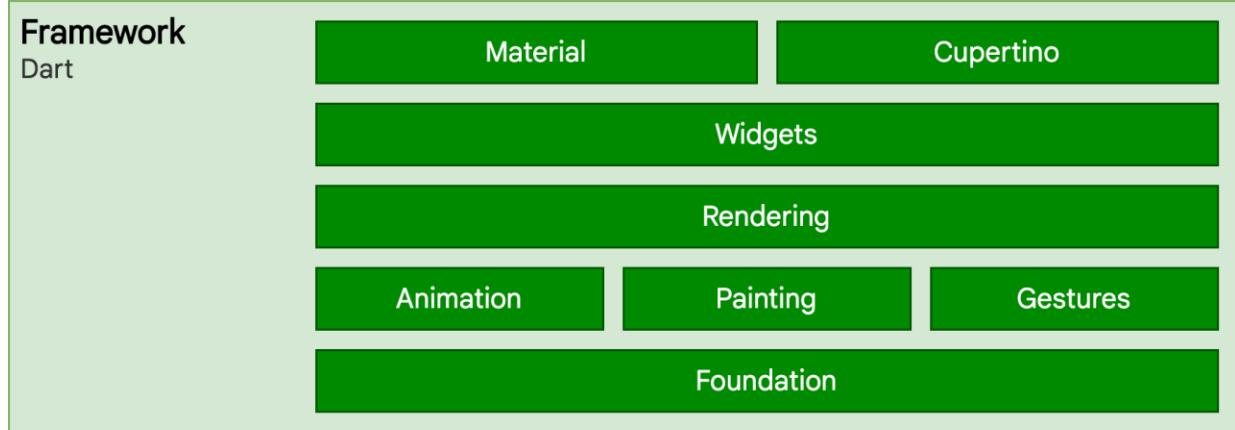
# Disadvantages of a Mobile Platform

- **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:

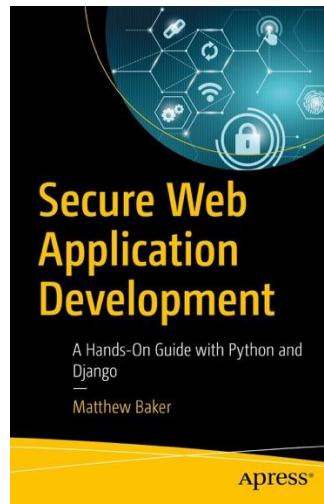
- The basic concepts of platforms
- Why it is important to learn programming frameworks
- The differences between web platforms and mobile platforms

# 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/>



# References

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