Lecture—01

Introduction to Mobile Application Design

Course Code: CSE413

Course Title: Mobile Application Development

Learning Outcomes

Understand the fundamentals of mobile application design and development.

Identify major mobile platforms and their characteristics.

Trace the evolution and emerging trends in mobile applications.

Differentiate between mobile app design and development roles.
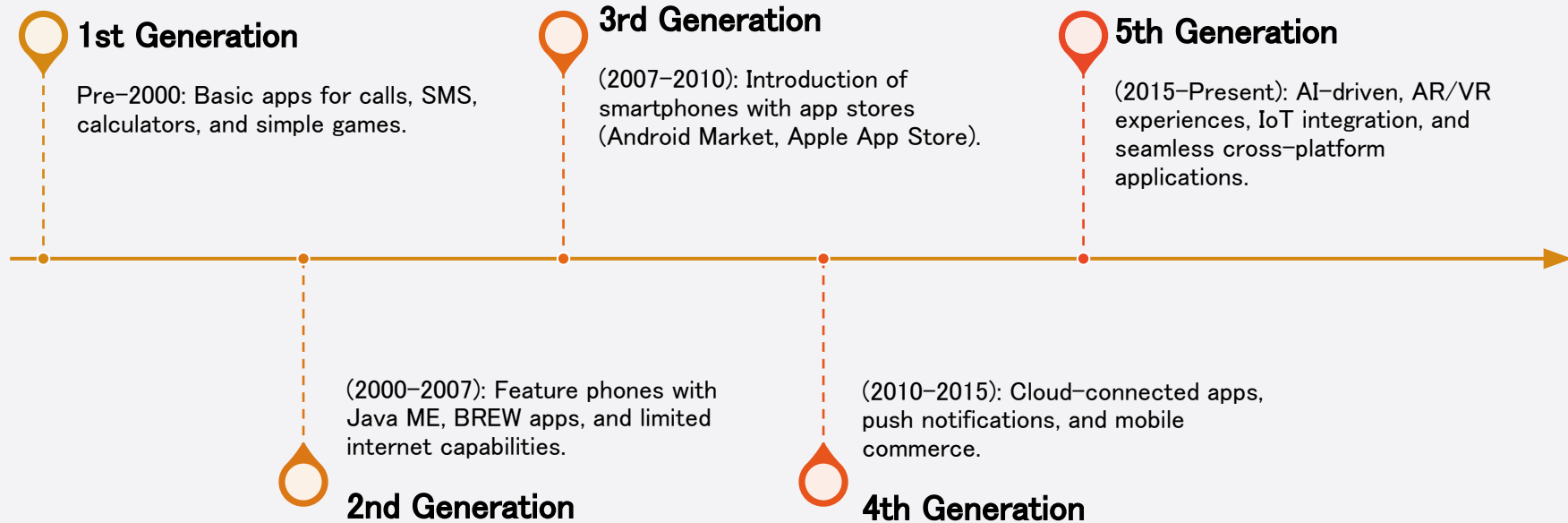
What is a mobile?

A mobile device is a handheld computer or smartphone designed for portability, making it compact and lightweight. These devices typically feature a flat LCD or OLED screen, a touchscreen interface, and digital or physical buttons. Examples of mobile devices include smartphones, tablets, e-readers, portable music players, smartwatches, and fitness trackers with smart capabilities.
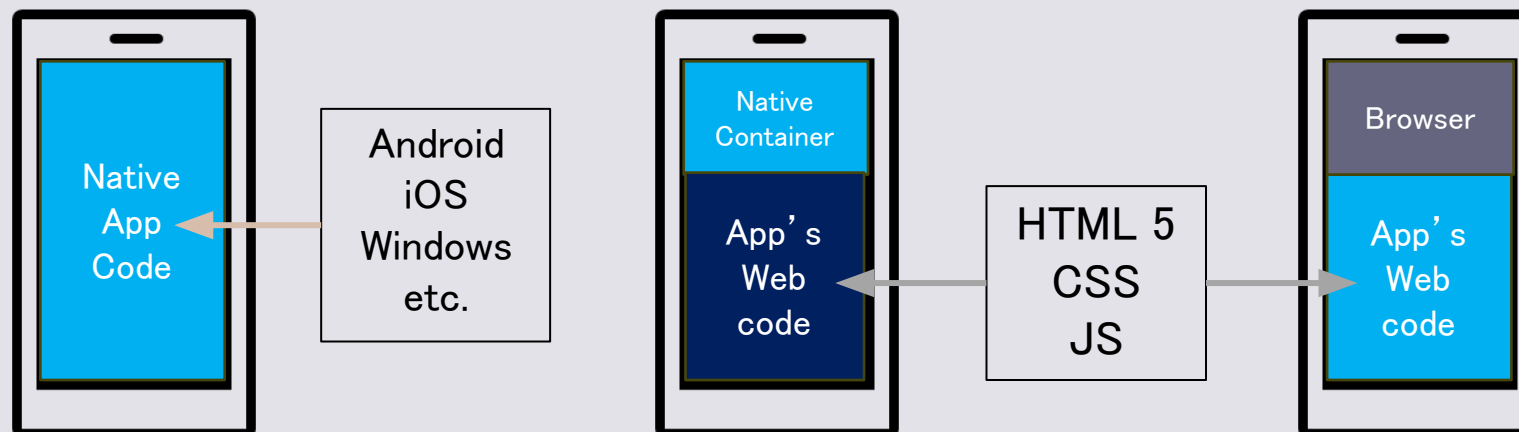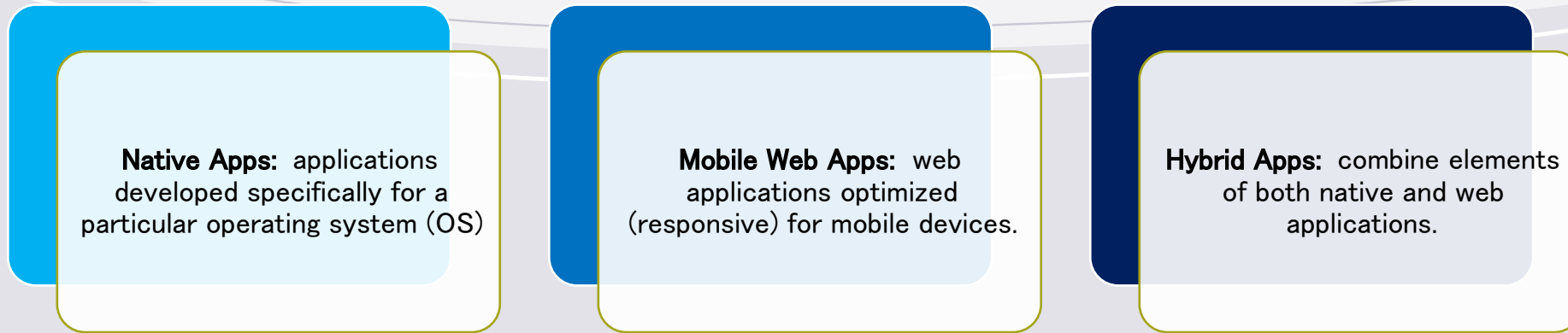
Mobile Application

✔ A mobile application (or mobile app) is a software application designed to run on smartphones, tablet computers and other mobile devices.

✔ Mobile application development is the set of processes and procedures involved in writing software for small, wireless computing devices, such as smartphones and other hand-held devices.

✔ Like web application development, mobile application development has its roots in more traditional software development. One critical difference, however, is that mobile apps are often written specifically to take advantage of the unique features of a particular mobile device.

✔ a gaming app might be written to take advantage of the Phone's accelerometer or a mobile health app might be written to take advantage of a smartwatch's temperature

✔ A mobile application, most commonly referred to as an app, is a type of application software designed to run on a mobile device, such as a smartphone or tablet computer.

✔ Mobile applications frequently serve to provide users with similar services to those accessed on PCs.

✔ Apps are generally small, individual software units with limited function.

Evolution of Mobile Applications

1st Generation

Pre-2000: Basic apps for calls, SMS, calculators, and simple games.

3rd Generation

(2007-2010): Introduction of smartphones with app stores (Android Market, Apple App Store).

5th Generation

(2015-Present): AI-driven, AR/VR experiences, IoT integration, and seamless cross-platform applications.

(2000-2007): Feature phones with Java ME, BREW apps, and limited internet capabilities.

2nd Generation

(2010-2015): Cloud-connected apps, push notifications, and mobile commerce.

4th Generation

Types of Mobile Apps

Native Apps: applications developed specifically for a particular operating system (OS)

Mobile Web Apps: web applications optimized (responsive) for mobile devices.

Hybrid Apps: combine elements of both native and web applications.

Native App Code

Android iOS Windows etc.

Native Container

App's Web code

HTML 5 CSS JS

Browser

App's Web code

Mobile Platforms – iOS

iOS

✔ Developed exclusively by Apple for its devices (iPhone, iPad, iPod Touch).

✔ Closed ecosystem ensures high security and quality control.

✔ Known for its clean and intuitive user interface. It uses a consistent design language called Human Interface Guidelines, which ensures a seamless user experience across all Apple devices.

✔ Apps for iOS are developed using **Swift** or **Objective-C** programming languages. Developers use **Xcode**, Apple's integrated development environment (IDE), to create and test their apps.

✔ iOS is optimized for performance, providing smooth and responsive interactions. Apple designs its own processors (A-series chips) to work seamlessly with iOS, ensuring efficient power management and high performance.

✔ Distributed solely through the Apple App Store.

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Mobile Platforms – Android

Android

- Developed by Android Inc. and Bought by Google in 2005, Android is the most widely used mobile OS globally.
- Open-source platform built on Linux, allowing extensive customization.
- Version numbers (before version 10) are associated alphabetically with desserts
- Developers program using an API level associated with a specific version.
- Primarily uses Java and Kotlin for app development.
- Distributed through the Google Play Store and third-party stores.

Mobile Platforms – Android (Cont.)

Android

- It's a powerful development framework that includes everything you need to build great apps using a mix of Java/Kotlin and XML.
- Android does not use a Java Virtual Machine. Android does not use Abstract Window Toolkit or Swing library.
- Android used Dalvik Virtual Machine (DVM), specialized VM and now is using ART –Android Runtime

Role of Design in Development

User Interface (UI):   Visual elements like colors, typography, icons, and layouts.

User Experience (UX):   Focus on intuitive navigation, functionality, and user satisfaction.

Accessibility: Designing apps usable by people with disabilities (e.g., voice controls, high-contrast modes).

Prototyping & Wireframing: Visual blueprints for app structure and user flow, created using tools like Figma and Adobe XD.

Consistency: Maintaining design standards across devices and screen sizes.

Trends in Mobile Application Development

Cross-Platform Development: Technologies like Flutter and React Native allow single codebases for Android and iOS.

5G Integration: Faster internet speeds enable richer multimedia apps and real-time data processing.

Artificial Intelligence & Machine Learning: Chatbots, recommendation systems, and predictive analytics.

Augmented Reality (AR) & Virtual Reality (VR):   Interactive gaming, virtual tours, and retail experiences.

Internet of Things (IoT): Smart home devices, wearable tech, and interconnected ecosystems.

Progressive Web Apps (PWA): Blurring the line between web and native apps.

What are the primary advantages and disadvantages of Android and iOS?

How do modern design trends influence user engagement?

Which mobile development trend do you think will be most impactful in the next five years and why?
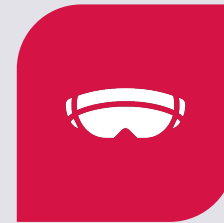
Discussion & Questions

Thank you

KEY TAKEAWAYS

ANDROID AND IOS ARE THE LEADING MOBILE PLATFORMS.

TRENDS: CROSS-PLATFORM DEVELOPMENT, AI, AR/VR, IOT, AND 5G.

UX/UI DESIGN ENHANCES USABILITY; DEVELOPMENT ENSURES FUNCTIONALITY.