Introduction to Mobile Applications

Mobile Operating Systems

- A mobile operating system, also called a **mobile OS**, is an operating system that is specifically designed to run on devices such as:
  - Mobile phones
  - Smartphones
  - PDAs
  - Tablet computers
  - Other handheld devices.

Popular Mobile OS

- Popular Mobile OSs along are as follows:
  - ✔ Android: **75.27%**
  - ✔ iOS: **22.74%**
  - ✔ KaiOS: **0.75%**
  - ✔ Windows: **0.24%**
  - ✔ Samsung: **0.22%**

Types of Mobile Applications

1. Native Applications
2. Hybrid Applications
3. Progressive Web Applications (PWAs)

Native Applications

- These are applications developed to be used on a particular platform or operating system such as Android, iOS etc. Native apps are usually written in languages that the platform accepts.

- The principal advantage of native apps is that they optimize the user experience. By being designed and developed specifically for that platform, they look and perform better.

Native Application Languages

- Some languages used to develop native applications:
  - Swift or Objective C for **iOS** applications
  - Java, Kotlin for **Android** applications
  - C# or VB.NET for **Windows** applications

Native Application Pros vs Cons

- **Pros:**
  - Fast and responsive because they are built for that specific platform
  - Best performance
  - Interactive, intuitive and run much smoother in terms of user input and output
- **Cons:**
  - Much more expensive to develop compared to cross platform and web applications
  - Require more time to develop as one application has to be written in different languages for different platforms
  - Higher cost of maintenance and pushing out updates, due to multiple source code bases.

Hybrid Applications

- These are applications developed to be used across **multiple platforms.** This type of applications are developed in one language and later deployed to multiple platforms (iOS, Android,… etc.).
- Hybrid mobile applications possess elements both from **native apps** and **web apps**. Web apps are websites that act like apps but are not installed on a device and are accessed on the internet via a browser.
- Both use a combination of technologies like HTML, CSS, and JavaScript.
- Hybrid apps are deployed in a **native container** that uses a mobile **WebView object**.
- This native container enables them to do things like access hardware capabilities (camera, contacts, accelerometer) of the mobile device.

Hybrid Application Pros vs Cons

- **Pros:**
  - Adaptable to multiple platforms, as the same code can be re-used for Android, iOS, and Windows.
  - Unified and less expensive development, as the app only has to be developed once using one code base.
  - Faster development time when compared to native apps as only one development process is involved.
- **Cons:**
  - Slower app performance when compared to Native Apps, because the hybrid framework acts as a bridge to communicate with the phone's native features.
  - Apps with heavy animations and sound effects aren't as seamless as their native counterparts.

Progressive Web Applications (PWAs)

- A Progressive Web App (PWA) is a web app that uses modern web capabilities to deliver an app-like experience to users without requiring them to install an app from the AppStore/PlayStore.
- However, unlike web apps, PWAs are installable on device (mobile or desktop) by a web URL which can always be pinned or saved on your phone's home screen (in the form of an icon).
- PWAs are usually built using HTML, CSS, JavaScript too but unlike web apps it is not browser-dependent. It provides seamless user experience similar to a native application and can use most native device features like push notifications.
- A PWA has the following characteristics:
  - ✔ **Reliable**: Loads instantly. Never show the downasaur. 
  - ✔ **Fast**: Responds quickly to user interactions
  - ✔ **Engaging**: Feels like a natural app.
  - ✔ **Ease of access**: Via links
  - ✔ **Automatic update**: Unlike native apps, the updates happen in real
- A PWA essentially gives the big reach of the web , as well as the engaging features of the native apps.

PWAs Pros vs Cons

- **Pros:**
  - Contains features of both web and native app
  - No installation required and no app updates.
  - Works offline and performs well on low-quality networks.
  - Build one app for all platforms — iOS, Android, etc. as long as it can run on a browser
- **Cons:**
  - Initially, users have to visit the website before they can add the app on their phone screen.
  - Fewer functionalities, not all the features of the device can be accessed like the native apps.
  - Despite having good performance, the native apps still outperforms PWAs.

THANK YOU