

(1) What is cross platform application development?

→ Cross-platform development is the creation of software application that are compatible with multiple mobile operating system. Originally, the complexity of developing mobile apps was compounded by the difficulty of building out a backend that worked across multiple platform. Although it was time-consuming and expensive, it wasn't often easier to build native application for each mobile operating system (OS). The problem was that the code built for one operating system could not be repurposed for another OS.

Today, it is easier for programmers to develop cross-platform apps. Newer approaches to cross-platform development include:

- Hybrid mobile app development - developers write the core of the application as an HTML5 or JavaScript mobile app and then place a native device wrapper around it.
- Rapid mobile app development - developers

use code-free programming tools. RMAO offers business users the ability to quickly build and manage "good-enough" internal apps to address specific business issues.

- Windows universal apps - one codebase for all windows devices. The goal is to enable the same app to run on a Windows PC, tablet, smartphone, smartwatch or Xbox.

- Progressive web apps - websites that look and behave as if they are mobile apps. PWAs are built to take advantages of native mobile device features, without requiring the end user to visit an appstore, make a purchase and download software locally.

(2) Enlist any four benefit of cross platform application development?

→ Benefit of cross platform application development are as follow:-

- (1) Codes can be reused
- (2) Control Cost
- (3) Quicker development time
- (4) Easier Implementation

(4) What is use of npm?

→ npm is the package manager for the Node JavaScript platform. It puts modules in place so that node can find them, and manages dependency conflict intelligently. It is extremely configurable to support a wide variety of use cases. Most commonly, it is used to publish, discover, install, and develop node programs.

(5) How to install npm in system?

→ for installing npm in system, following steps need to be followed:

Step 1: Download Node.js Installer

Step 2: Install Node.js and NPM from Browser. Once the installer finishes downloading, launch it....

Step 3: Verify installation.

(7) List and discuss ~~features~~ various steps which are used to create an ionic project.

→ Step 1: Open a new terminal window (Mac) or a command window (windows), and navigate (cd) to the ionic-tutorial directory.

Step 2: Using the ionic CLI, create an application named conference based on the sidemenu starter app:

ionic start conference sidemenu

Step 3: Navigate to the conference folder
cd conference

Step 4: Start the application in a browser using ionic serve

ionic serve

Note - Because of cross domain policy issues, you have to load the application from a server. Ionic server is a lightweight local web server with live reload.

Step 5: In the application, open the side menu ("hamburger" icon in the upper left corner) and select playlist in the list to see the details.

In the next modules, you will replace the playlists with a list of conference sessions retrieved from the server using the REST services you experimented with in the previous module.

Step 6: Open the side menu again and select login. Click the login button to close the window.

In the last module of this tutorial you will implement login using facebook.

(9) Enlist four popular framework which used to develop cross platform application.

(1) FLUTTER

→ Flutter is a popular cross-platform mobile app development framework in 2020. It is written in dart language and launched by google. flutter is an open-source mobile app development SDK.

The option of the 2D rendering engine has made this framework very popular. It is the best cross-platform mobile app development process in case there is an error. This means the error can be resolved in real-time.

Advantages :-

- (1) Fast app development
- (2) Responsive
- (3) Easy-to-use UI

Disadvantages:-

- (1) Limited libraries
- (2) No flexibility

(2) REACT NATIVE

React Native is an open-source cross-platform mobile app development framework built by facebook. This framework supports Javascript codebase and utilizes the same codebase for developing both android and ios application. The framework helps to build high-performance mobile application within a short span, making this framework powerful as well as reliable. The framework design enables the developer to reuse components for integrating the rich mobile UI.

Advantages:

- (1) Fast programming due to Javascript



- (2) Enables codebases sharing
- (3) High performance

Disadvantages:

- (1) Cannot be used for cross-platform development completely
- (2) Compatibility issues
- (3) Native modules require expertise.

(3) IONIC

Ionic is among the most popular cross-platform app framework, built using Angular and Cordova. It can be used to develop apps for three different platforms, namely Android, iOS, and Windows. This framework helps developers to build a user-friendly app interface and user-friendly features. It is an open-source front-end framework that allows developers to alter the development process according to their unique ideas.

Advantages:

- (1) Easy to learn
- (2) Fast prototyping
- (3) Concise documentation

Disadvantages

- (1) Plugin-dependent
- (2) Security issues
- (3) Overall performance lacking
- (4) XAMARIN

Xamarin is an open-source cross-platform mobile app development framework acquired by Microsoft. It utilizes the same address for Android and iOS application. This framework utilizes C# programming language that eliminates the need to learn Swift or Java for developing Android or iPhone apps. Xamarin is more advantageous than React Native as it provides a native-like aesthetic experience to your app.

Advantages:-

- (1) Performance is almost equal to Native
- (2) Easy to maintain
- (3) Requirement of only one stack of technologies for various platform.

Disadvantages:-

- (1) High Cost