Mobile Development

مهندسی نرم افزار

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گردآوردنده: ملیحه هاشمی

آزمایشگاه سیستم های هوشمند

سال تحصیلی ۹۶-۹۷

انواع سیستم عامل های موبایل

- Current:
  - Google Android OS
  - Apple iOS
  - Windows Mobile

- Discontinued:
  - Symbian OS
  - Firefox OS
  - Bada

روش های پیاده سازی

- Mobile Web
- Hybrid Web
- Hybrid Native
- 100% Native

Mobile Web

Common Frameworks

Responsive Design

HTML5

DESKTOP   TABLET   PHONE

Hybrid Web

Apache Cordova / Phone Gap

Titanium

Ionic Framework

Sencha Touch

jQuery Mobile

Apache Cordova Phone Gap

Developed by Adobe Systems

Free and opensource

Apps written in HTML5, CSS3 and Javascript

Support for Android, iOS, Blackberry, WebOS, Windows Phone, Symbian and Bada.

Apache Cordova is the heart of the backend.

Performance limited because of hybrid nature of the app.

Source code organization

No built in support for Bluetooth and NFC.

No Web services support built in.

How does Cordova work?

Create Cordova Project →

Cordova Project
- HTML, CSS, JS
- Assets
- Platform code
- Plugin code
- Configuration

Build Cordova Project →

Visual Studio Project
- HTML, CSS, JS, assets
- Windows-specific runtime
- Windows-specific plugin

→ **Native Windows App**

XCode Project
- HTML, CSS, JS, assets
- iOS-specific runtime
- iOS-specific plugin code

→ **Native iOS App**

Android Project
- HTML, CSS, JS, assets
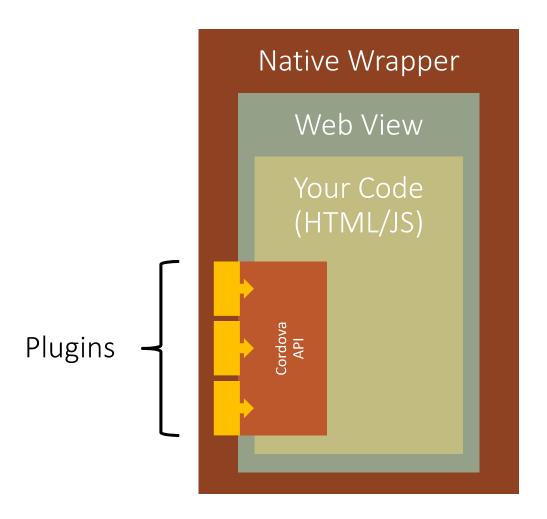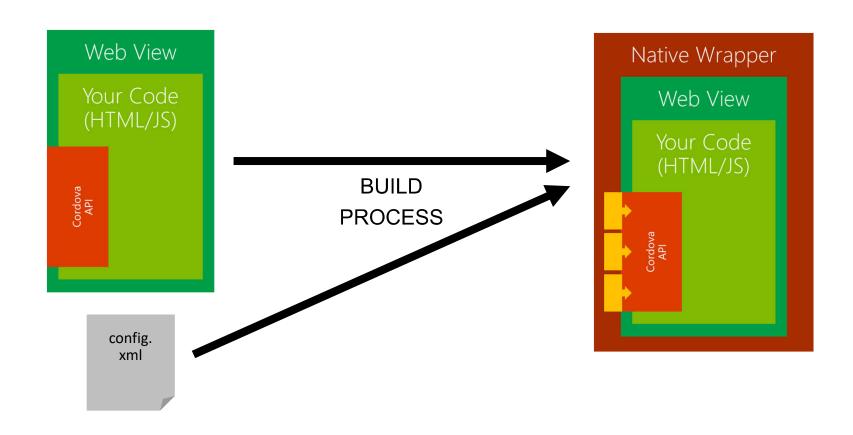- Android-specific runtime
- Android-specific plugin

→ **Native Android App**

PhoneGap / Cordova

Start with HTML5/CSS3/JavaScript → Use PhoneGap → Deploy to platforms

http://phonegap.com

Native Wrapper

Web View

Your Code
(HTML/JS)

Cordova API

Plugins

BUILD
PROCESS

Web View

Your Code
(HTML/JS)

Cordova
API

config.
xml

Native Wrapper

Web View

Your Code
(HTML/JS)

Cordova
API

Titanium

Developed by Appcelerator Inc.

Titanium is free and opensource

Apps written in javascript

Support to build Android, iOS and Blackberry Apps, trying to extend support for Windows.

Interpreter for Android and BlackBerry is MozillaRhino, for iOS JavascriptCore

Source code organization

Device Specific Functionality – No built in support for Bluetooth and NFC.

Web services – SOAP, XML, JSON

Code maintenance

MBaaS support

Apache License
FREE

- Appcelerator Titanium SDK
- Titanium Module SDK

- Appcelerator Titanium SDK
- Titanium Module SDK

Paid Modules
- Commerce Modules
- Communication Modules
- Analytics Module
- Media Modules

Titanium Mobile

Native iPhone and Android Applications Rock

You've got the ideas, now you've got the power. Titanium translates your hard won web skills into native applications that perform and look just like they were written in Objective-C [iPhone and iPad] or Java [Android]. With over 300 APIs, a thriving developer community, and the support you need, you can build applications that are more social, local, media rich, interactive, and extensible.

Titanium Mobile

Titanium JavaScript

Interpreted By
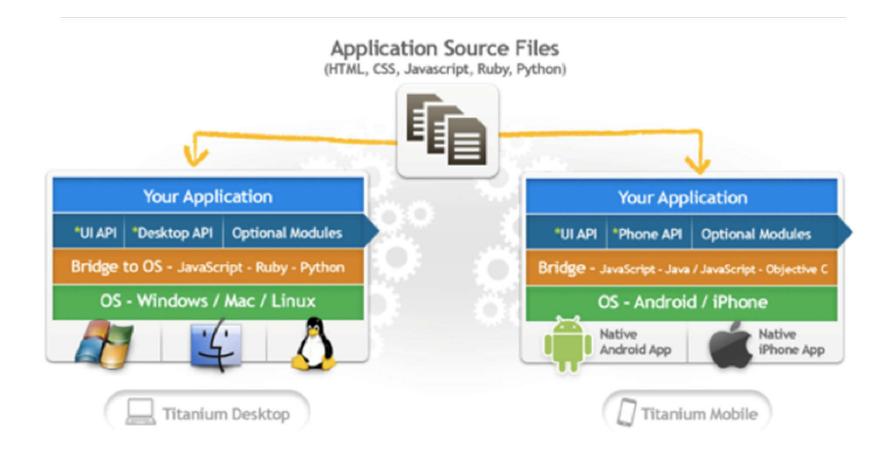
Webkit JavaScriptCore

Mozilla Rhino

IPhone

Android

آزمایشگاه سیستم های هوشمند

Titanium Architecture

Application Source Files
(HTML, CSS, Javascript, Ruby, Python)

Your Application
*UI API | *Desktop API | Optional Modules
Bridge to OS - JavaScript - Ruby - Python
OS - Windows / Mac / Linux

Titanium Desktop

Your Application
*UI API | *Phone API | Optional Modules
Bridge - JavaScript - Java / JavaScript - Objective C
OS - Android / iPhone

Native Android App
Native iPhone App

Titanium Mobile

آزمایشگاه سیستم های هوشمند

Ionic

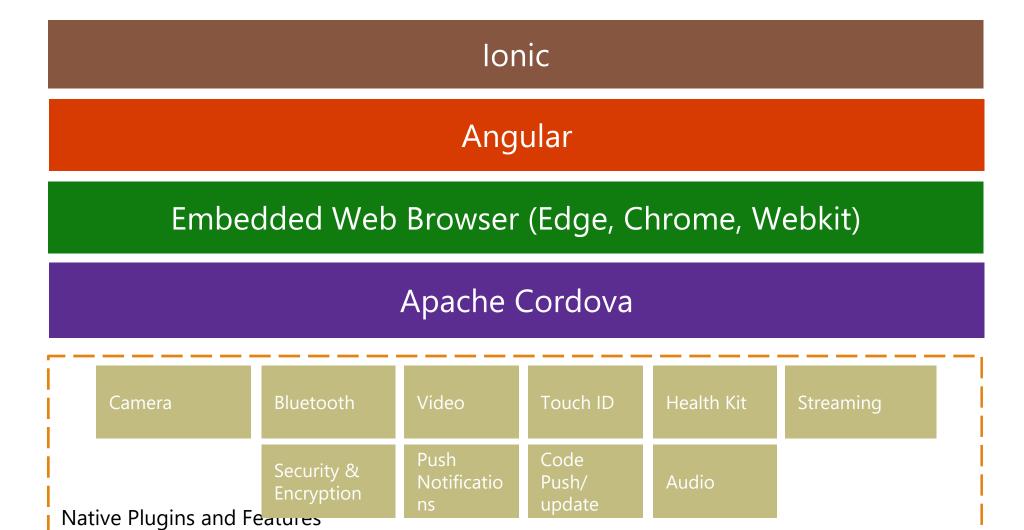On top of AngularJS and Apache Cordova

Free & Open Source Using HTML5 SDK

Focused mainly on the look and feel, and UI interaction of app

Premier Native Plugins :

◦ over 120 native device features like Bluetooth, HealthKit, Finger Print Auth, and more with Cordova/PhoneGap plugins and TypeScript extensions.

Ionic Framework

Ionic

Angular

Embedded Web Browser (Edge, Chrome, Webkit)

Apache Cordova

Camera	Bluetooth	Video	Touch ID	Health Kit	Streaming
	Security & Encryption	Push Notifications	Code Push/ update	Audio	

Native Plugins and Features

Sencha Touch

Over 50 built-in components.

Built-in MVC system

Apps written in HML5 and CSS3.

Sencha Touch 2.2 is the latest version

Faster, Cheaper and highly customizable

PC developers can now create iOS applications without needing a Mac.

More than 500,000 developers

Rich set of documentation

jQuery Mobile

Built on the rock-solid jQuery and jQuery UI foundation

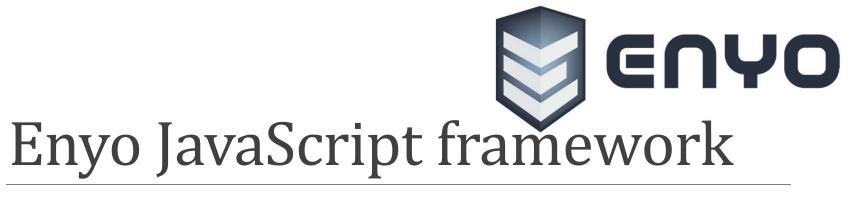Its lightweight size makes it a speed freak

JQuery Mobile 1.3.1 recently launched

AJAX-powered navigation system

Extensions are easy to make

No established architecture

Easy to debug

Markup-based

Enyo JavaScript framework

http://enyojs.com/

cross-platform mobile, desktop, TV and web applications

object-oriented encapsulation and modularity

◦ Layout: Fittables, scrollers, lists, drawers, panels.

◦ Onyx: Based on the original styled of webOS/Touchpad design but available for use on any platform.

◦ Moonstone: Used by LG SmartTV apps but available for use on any platform.

◦ Spotlight: To support key-based interactions and "point and click" events on remote controls and keyboards.

◦ enyo-cordova: Enyo-compatible library to automatically include platform-specific Cordova library (WIP).

Hybrid Native

MonoCross

Xamarin for Visual Studio

Unity

Cross Platform Mobile Apps

WHEN TO

Performance is not the main criteria

More or less Replicates Web Apps with few device feature

Standard Restful

Widget based apps

Many Platforms

WHEN NOT TO

High Performance Apps

Heavy on OS and Device Features

Complex N/W comm.

Canvas based Apps

Only Few Platforms

Cross Platform Mobile Apps

WHEN TO

Time to market is critical

Saving Cost is critical

WHEN NOT TO

آزمایشگاه سیستم های هوشمند

MonoCross

DOWNLOAD
The Monocross Mobile Framework

Part of the Mono Project

Built on the .NET framework.

C# is used to build apps.

Support to build Android and iOS.

Specific platform tools – Xamarin Mono and Xamarin MonoTouch.

Interpreter for Android and BlackBerry is MozillaRhino, for iOS JavascriptCore
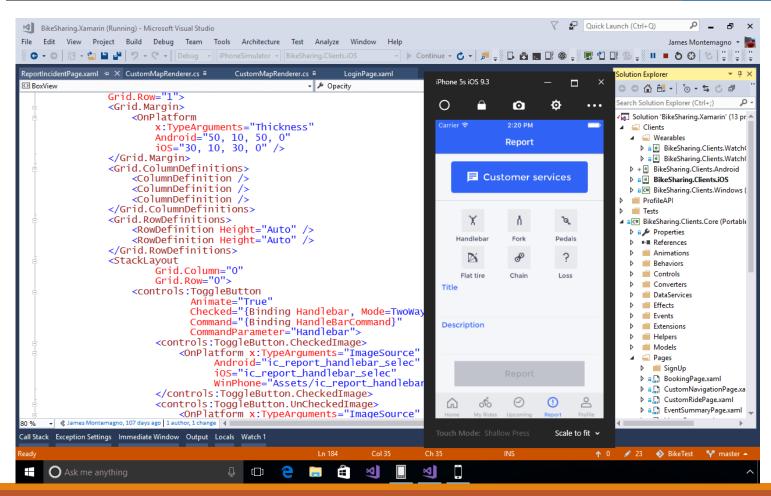
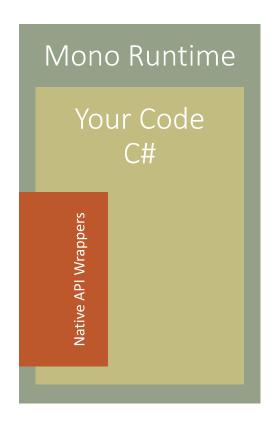Native experience – 'not quite there'

Source code organization

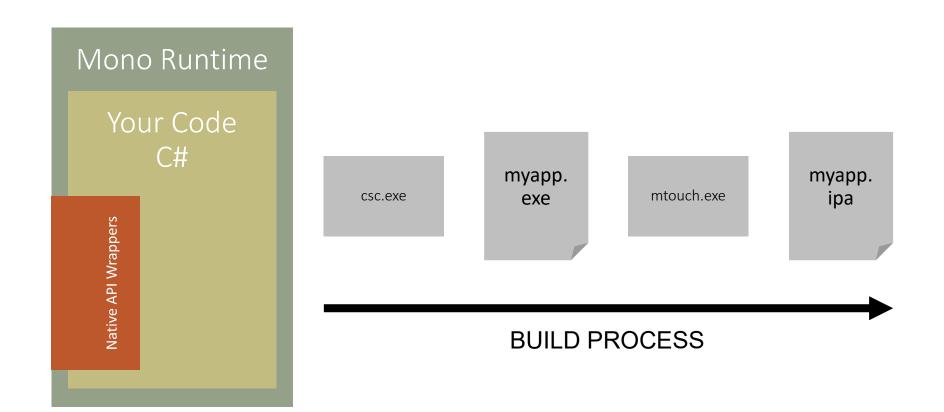Device Specific Functionality – No built in support for Bluetooth and NFC.
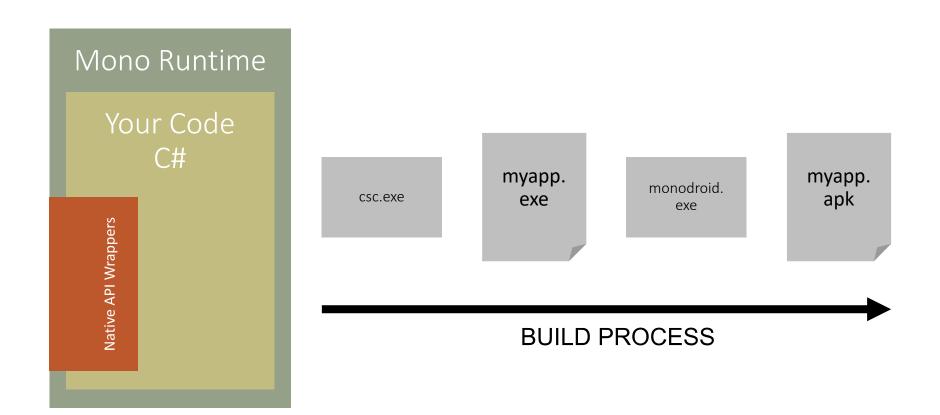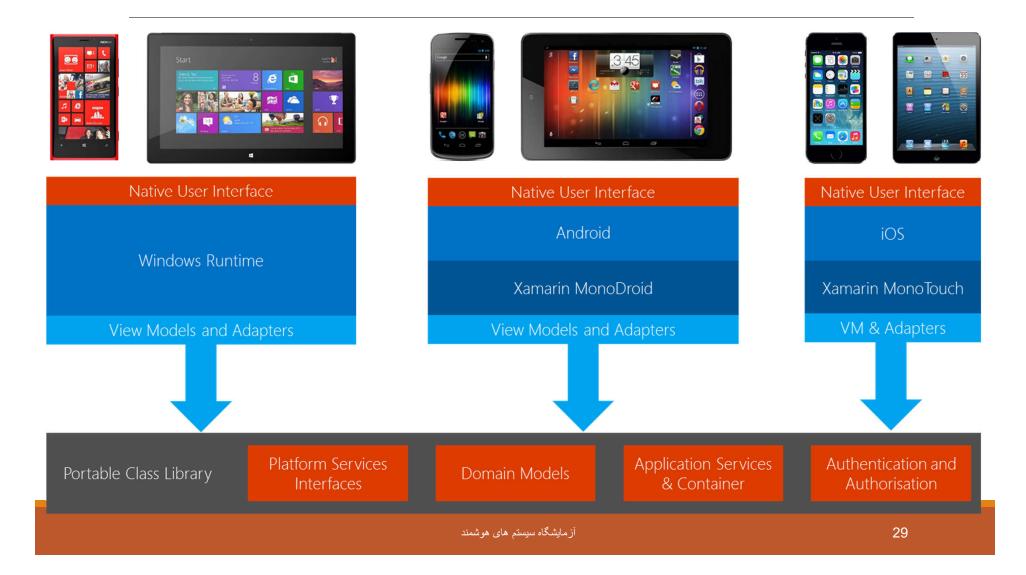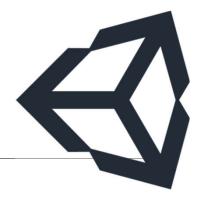
Windows Communication Foundation– Bing Maps API

Xamarin for Visual Studio

Mono Runtime

Your Code
C#

Native API Wrappers

BUILD PROCESS

Mono Runtime

Your Code
C#

Native API Wrappers

csc.exe

myapp.
exe

monodroid.
exe

myapp.
apk

BUILD PROCESS

structure of a cross platform application built with Xamarin

Native User Interface	Native User Interface	Native User Interface
Windows Runtime	Android	iOS
	Xamarin MonoDroid	Xamarin MonoTouch
View Models and Adapters	View Models and Adapters	VM & Adapters

Portable Class Library	Platform Services Interfaces	Domain Models	Application Services & Container	Authentication and Authorisation

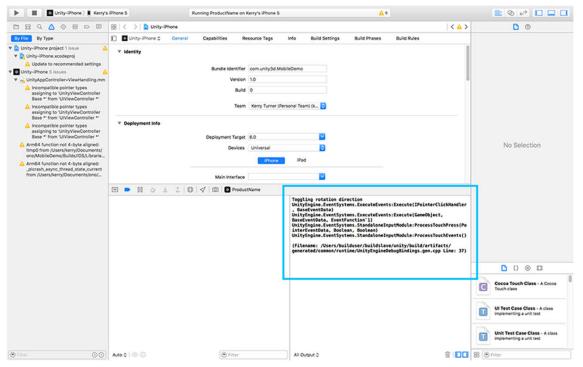# Unity

high-quality 2D/3D applications (mostly games)

Windows, iOS, Android and Xbox

Native Mobile Apps

WHEN TO	WHEN NOT TO
High Performance Apps	Performance is not the main criteria
Heavy on OS and Device Features	More or less Replicates Web Apps with few device feature
Complex N/W comm.	Standard Restful
Canvas based Apps	Widget based apps
Only Few Platforms	Many Platforms

آزمایشگاه سیستم های هوشمند
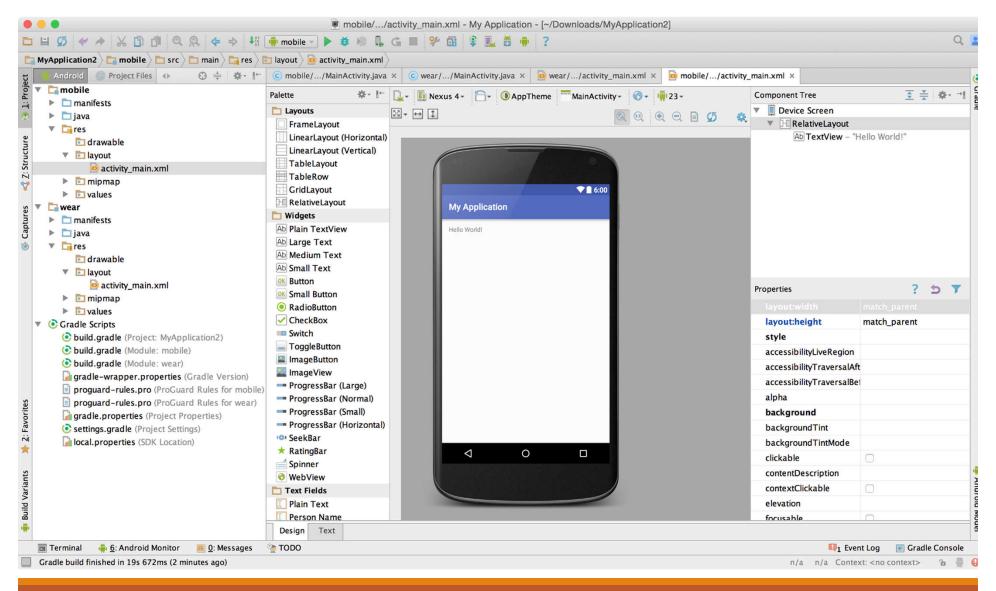
Android Studio

integrated development environment (IDE) for the Android platform.

under the Apache License

Based on JetBrains' IntelliJ IDEA software

http://developer.android.com/tools/studio/index.html

Android Studio

Android Emulator

The Android SDK includes a mobile device emulator

A virtual mobile device that runs on your computer.

The emulator lets you develop and test Android applications without using a physical device.

The emulator lets you prototype, develop and test Android applications without using a physical device.
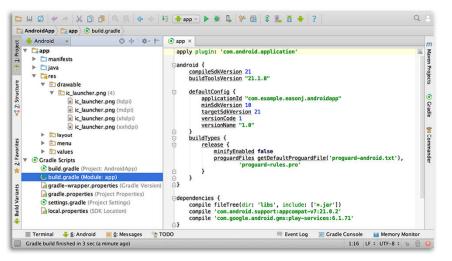
Install tools for Android Development
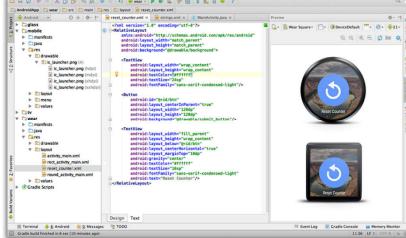
https://developer.android.com/sdk/index.html

Install the SDK
- https://developer.android.com/sdk/installing/index.html

Recommended Installation
- http://developer.android.com/sdk/installing/studio.html

iOS

- developed and distributed by Apple Inc.

- Originally unveiled in 2007 for the iPhone.

- It has been extended to support other Apple devices such as the iPod Touch (September 2007), iPad (January 2010), iPad Mini (November 2012) and second-generation Apple TV (September 2010).

- Unlike Microsoft's Windows Phone and Google's Android, Apple does not license iOS for installation on non-Apple hardware.

- The user interface of iOS is based on the concept of direct manipulation, using multi-touch gestures.
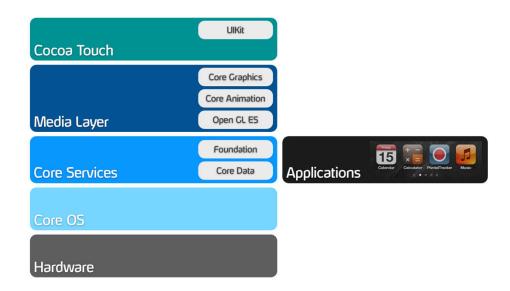
IOS Architecture

Kernel is based on Hybrid XNU

Higher layers are for object-oriented abstractions for lower layer constructs

Lower layers written in C

Applications layers are written in Objective-C and Swift

Cocoa-Touch :API for running applications on iOS devices.

Installing Tools for iOS Development

Xcode

Development Tutorials and Help

◦ http://developer.apple.com/devcenter/ios/index.action

Install Xcode

◦ http://developer.apple.com/xcode/index.php
◦ Download from Mac App Store

What is Xcode?

Apple IDE for developing MacOSX and iOS Apps

https://developer.apple.com/xcode/ide/

Components of Xcode

Xcode IDE
- ◦ Integrated development environment (IDE) that enables you to manage, edit, debug your projects.

iOS Simulator
- ◦ Provides a software simulator to simulate an iPhone or an iPad on your Mac.

Interface Builder
- ◦ Visual editor for designing user interfaces for your iPhone and iPad applications.

Windows 10 Mobile

- From Microsoft.

- Closed source

- successor to Windows Phone 8.1

- harmonizing user experiences and functionality between different classes of devices

- Windows Runtime apps for Windows 10 on PC can be ported to other platforms in the Windows 10 family

- Notifications can be synced between devices

Windows Phone Architecture

Applications	Your App UI and logic		
	Frameworks		
	Silverlight	XNA	HTML/JavaScript
	CLR		

App Model	UI Model	Cloud Integration
App management Licensing Chamber isolation Software updates	Shell frame Session manager Direct3D Compositor	Xbox LIVE Bing Location Push notifications Windows Live ID

Kernel

Security
Networking
Storage

Hardware BSP

A-GPS Accelerometer Compass Light   Proximity
Media   Wi-Fi   Radio   Graphics

Hardware Foundation