Commercial Mobile OS

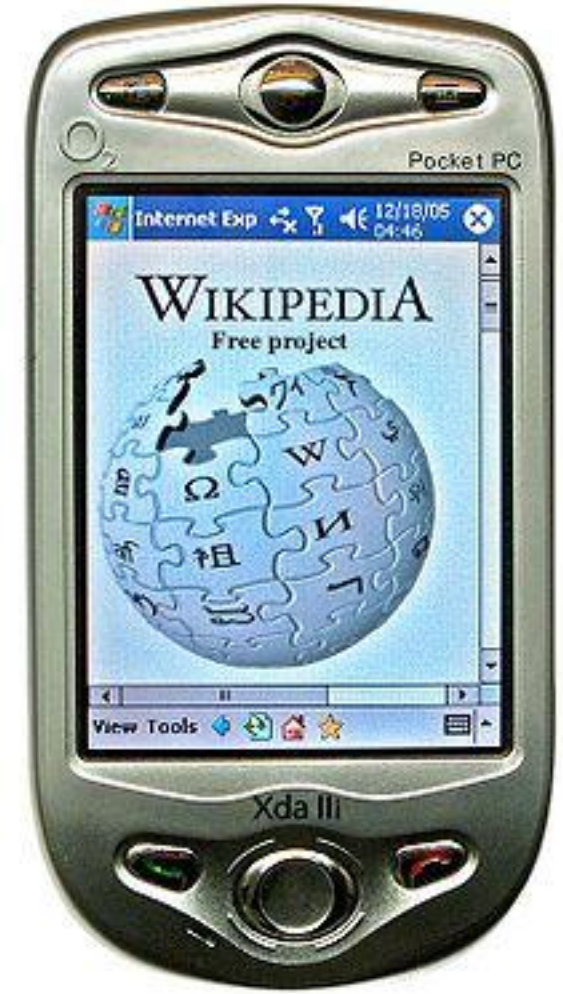
Beulah A.
AP/CSE

Popular Mobile OS

- Windows Mobile
- Palm OS
- Symbian OS
- iOS
- Android
- Blackberry OS

Windows Mobile

- Windows CE (Compact Edtion) - designed specifically for handheld devices, based on Win32 API
- For devices without mobile phone capabilities, and those that included mobile phone capabilities



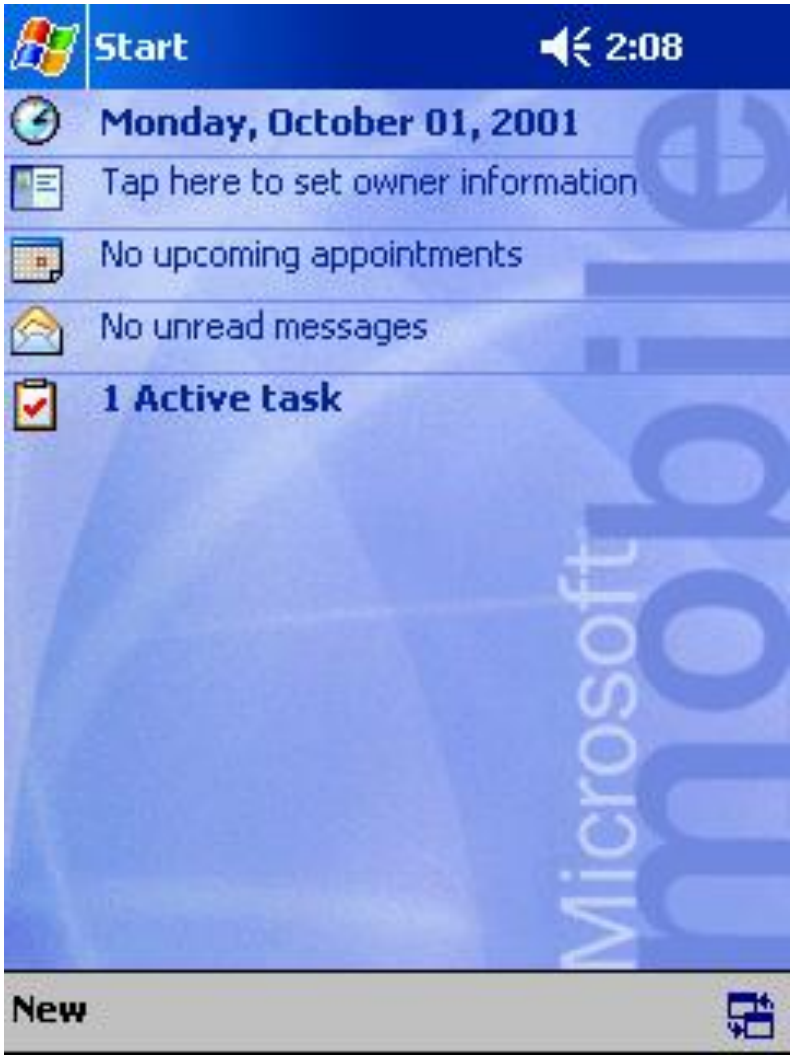
Windows Mobile

- 1996 – Windows CE 1.0
- 1997 – Windows CE 2.0 (ATM, games consoles, Handheld PC's, kitchen utensils)
- 2000 - Windows CE 3.0 - Pocket PC 2000 - (became the OS of choice on many Pocket PCs, looked and worked like Windows 98, no phone feature)

PocketPC 2000

Windows Mobile

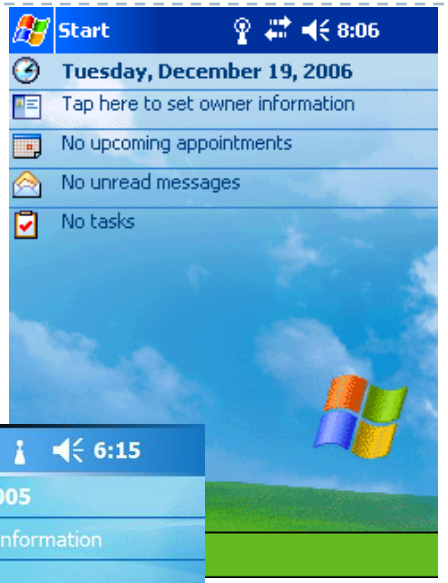
- 2001 - CE 3.0 - Smartphone 2002– used for Pocket PC phones and Smartphones, UI reflect the new Windows XP

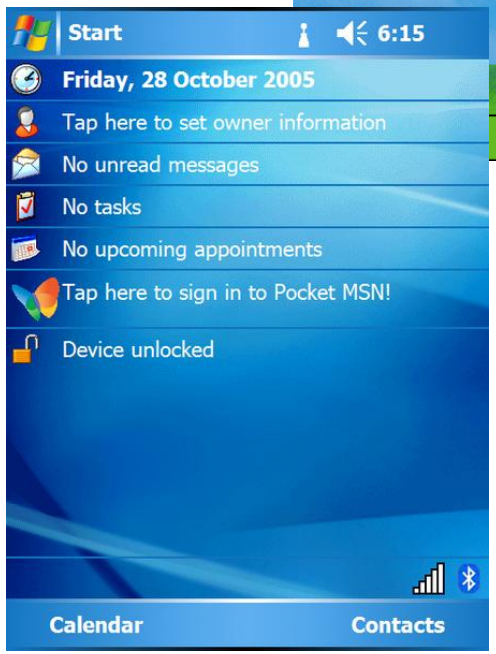


Windows Mobile

- 2003 – Windws Mobile 2003 (Windows CE 4.2) - first release under the Windows Mobile banner - name changed form PocketPC to Windows Mobile
- 2005 - WM5 (CE5.0) - new standard API created for a simplified programming of 3D apps and games with Direct3Dmobile. It use .Net Compact Framework environment

PocketPC WM 2003





Windows Moblie 5

Windows Mobile

- 2007 – WM6 (CE 5.2) – (also year of introducing iPhone) similar in design to the Vista, works much like WM5, but with much better stability
- 2008 – WM 6.1 – (year of releasing Android)
- 2009 – WM6.5, vertically scrollable labels, Windows Marketplace announced
- Feb 2010 – WM6.5.3, was officially announced as first Windows Phone 6.5.3 smartphone

WM 6

WM 6.5

Windows Mobile

- 2010- windows phone 7
- 10 devices operating Windows Phone 7, made by HTC, Dell, Samsung, and LG
- 2012- windows phone 8
- 2015- windows phone 10

Windows Mobile

- Important features of Windows Mobile OS
  - Graphics/Window/Event Manager component handles all input and output
  - Provides a virtual memory management
  - Security through cryptographic library.
  - Win-32 based applications
  - Not true multitasking. Application in background goes into hibernation and gets active only when it comes to foreground.

Palm OS

- Palm OS/ Garnet OS was developed by Palm Computing.
- Designed for the ease of use with the provision of a touch screen based graphical user interface.
- Deployed in smartphones, wrist watches, hand held gaming consoles, bar code readers and GPS devices.
- Nokia n810, Aceeca

Palm OS

- Features of Palm OS
  - Single tasking OS
  - Palm supplies Palm emulator (develop apps)
  - Handwriting recognition
  - Data synchronization
  - Playback and recording capabilities
  - Simple Security – lock device with password
  - Supports Interfaces - USB, Infrared, Bluetooth, Wifi
  - Proprietary format to store calendar, address task and note entries and yet are accessible by third party applications

Symbian OS

- Symbian OS was developed through a collaboration among a few prominent mobile manufactures including Ericsson, Nokia, Panasonic, Samsung, Siemens, Sony Ericsson, Psion.
- Symbian OS is a standard operating system for data-enabled mobile devices
- Symbian OS is 32 bit, little-endian operating system, running on different flavors of ARM architecture.
- It is a multitasking operating system and very less dependence on peripherals.

Symbian OS

- User libraries include networking, communication, I/O interfaces and etc.
- Access to these services and resources is coordinated through a client-server framework.
- The inherent design of Symbian OS is microkernel based.
- 2 types of Symbion OS
  - Series 60
  - UIQ Interface

Symbian OS

- Series 60
  - Large sized colour screen, easy to use interface, rich content downloading, MMS.
  - Mainly used in Nokia and Samsung
- UIQ Interface
  - User Interface Quartz technology
  - GUI with third party application developers to develop new applications.

Symbian OS

- Features of Symbian OS
  - Supports networking protocols such as TCP, UDP, PPP, DNS, FTP, WAP etc.
  - For PDA it supports Bluetooth, Infrared, USB etc.
  - Pre-emptive multitasking scheduling
  - CPU switched to low power mode when app is not responding.
  - Object oriented paradigm
  - IDE toolkit for C++ application on Symbian OS.

iOS

- Apples mobile operating system considered the foundation of the iPhone
- Originally designed for the iPhone but now supports iPod touch, iPad, and Apple TV
- iPhone OS was first unveiled in Jan 2007 at the Macworld Conference and Expo
- Released June 2007
- In June 2010 licensed the trademark iOS (From Cisco IOS)
- Now goes all the way up to iOS 9.3 Beta 6
- Originally did not allow third party applications but after Feb 2008 this changed
  - With either 30% profit to apple, or free with membership fee

iOS

- It is a closed and proprietary operating system fully owned and controlled by Apple and not designed to be used by various mobile phone vendors on their system.
- Several innovations
  - Swipe, tap, pinch, reverse pinch
  - Shake the device to undo (accelerometer sensor)
  - Rotate the device to switch from portrait to landscape

Android

- Google's income is based on searches performed (no. of hits)
- Computer/ Laptop – preferred search engine – Google.
- Mobile phone - preferred search engine – ?
- Ex: Verizon mobile phone uses their own search engine (as Verizon don't want to miss the extra revenue)
- Now Google took a serious decision, as mobile searches out pace the conventional searches.
- So in 2005 Google acquired a small startup 'Android' - which develops OS for mobile phones on Linux.

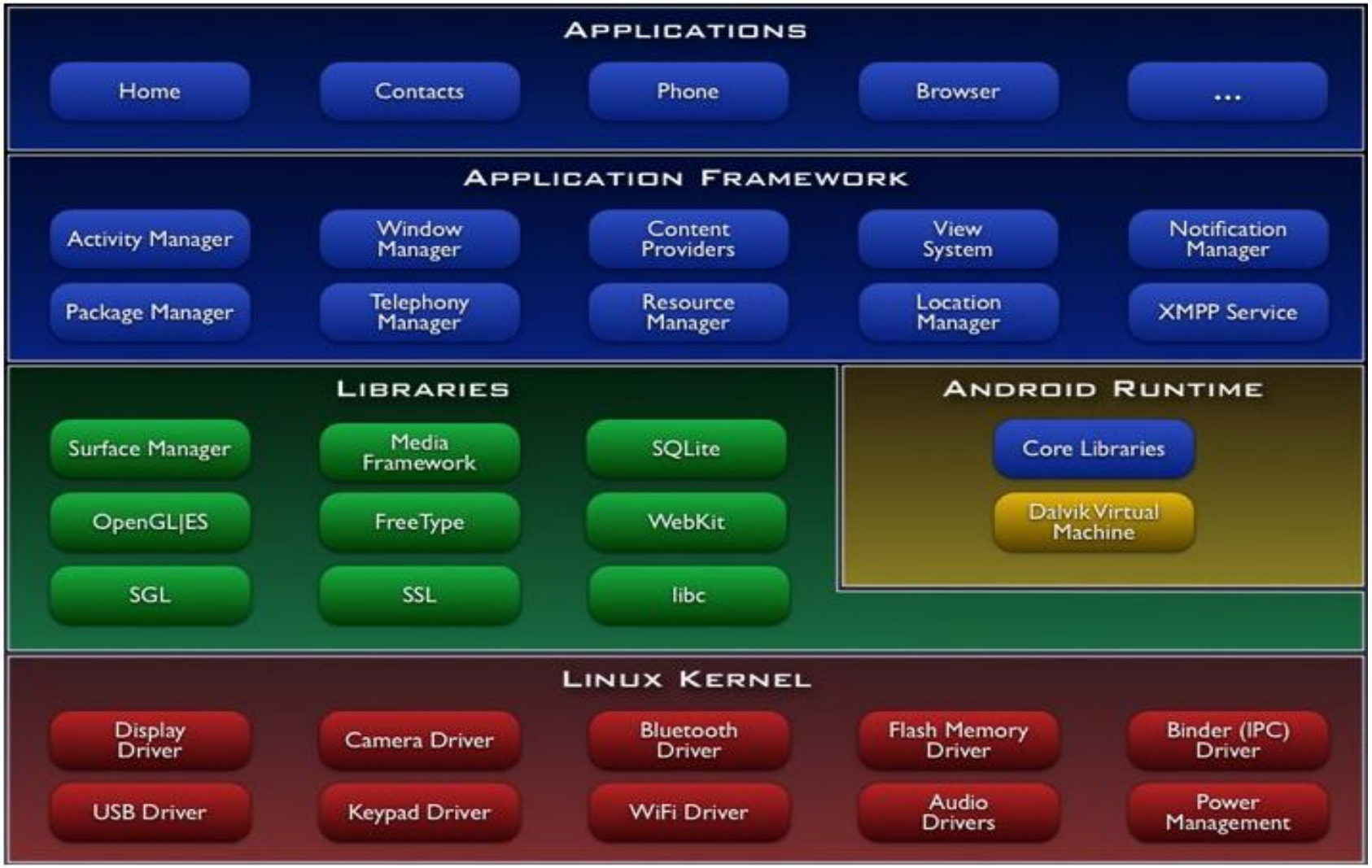
Android

- 2007 Google setup 'Open Handset Alliance' with 82 technology and mobile companies to develop Android OS.
- This facilitates third party developers to develop applications to android.
- Now Google could embed its search engine into Android to get extra revenue.
- Starting form 0% market in 2008 (MP with Android announced) it has shown a remarkable rate of growth in market share and user acceptance.

Android

- To understand the success of Android, it is important to understand the difficulties that users were experiencing with other OS:
  - Different user interfaces and interaction styles.
    - Ability to use either phone based keyboard or a touch screen
  - To browse real web pages and not the simplified version.
    - Ability to provide a built-in full web browser capable of rendering full web pages and not just mobile versions.
  - No third party applications
    - Provides 3rd party applications.
  - Android SDK works in eclipse
  - RDBMS SQLite
  - Preinstalled applications – Gmail, Maps, Voice search, Translate etc.

Android Software Stack



Android Software Stack

- Kernel
  - It is the heart of android architecture that exists at the root of android architecture.
  - Linux kernel is responsible for device drivers, power management, memory management, device management and resource access.
- Libraries
  - On the top of linux kernel, their are Native libraries such as WebKit, OpenGL, FreeType, SQLite, Media, C runtime library (libc) etc.
  - The WebKit library is responsible for browser support, SQLite is for database, FreeType for font support, Media for playing and recording audio and video formats.

Android Software Stack

- Runtime
  - In android runtime, there are core libraries and DVM (Dalvik Virtual Machine) which is responsible to run android application.
  - DVM is like JVM but it is optimized for mobile devices.
  - It consumes less memory and provides fast performance.
- Application Framework
  - On the top of Native libraries and android runtime, there is android framework.
  - Application framework includes Android API's such as UI (User Interface), telephony, resources, locations, Content Providers (data) and package managers.
  - It provides a lot of classes and interfaces for android application development.

Android Software Stack

- Applications
  - On the top of android framework, there are applications.
  - All applications such as home, contact, settings, games, browsers are using android framework that uses android runtime and libraries.
  - Android runtime and native libraries are using linux kernal.

Blackberry OS

- This is a Proprietary OS designed for Blackberry smartphones.
- Features of Blackberry Os
  - Ability to send and receive internet e- mail using the "push" method of delivery
  - Phone and texting functionality
  - Supports Internet faxing and Web browsing
  - Supports the viewing of Office applications
  - Ability to support numerous other wireless information services

Comparison of Mobile OS

https://en.wikipedia.org/wiki/Comparison_of_mobile_operating_systems

OS for Sensor Networks

- NO Kernel - Direct hardware manipulation
- NO Process management - Only one process on the fly.
- NO Virtual memory - Single linear physical address space
- NO Dynamic memory allocation -Assigned at compile time
- NO Software signal or exception - Function Call instead
- Tiny Os, Contiki OS, Lite OS, MANTIS