

Mobile Devices

COMPUTER LITERACY



Multimedia
Computer

NOKIA
Connecting People



Reinvented
Phone





RIM

Motorola

Samsung

Kyocera

Palm

Nokia

BenQ

Fujitsu

Mobile device manufacturers

Sanyo

Sharp

LG

SonyEricsson

Apple

Mobile Device Characteristics



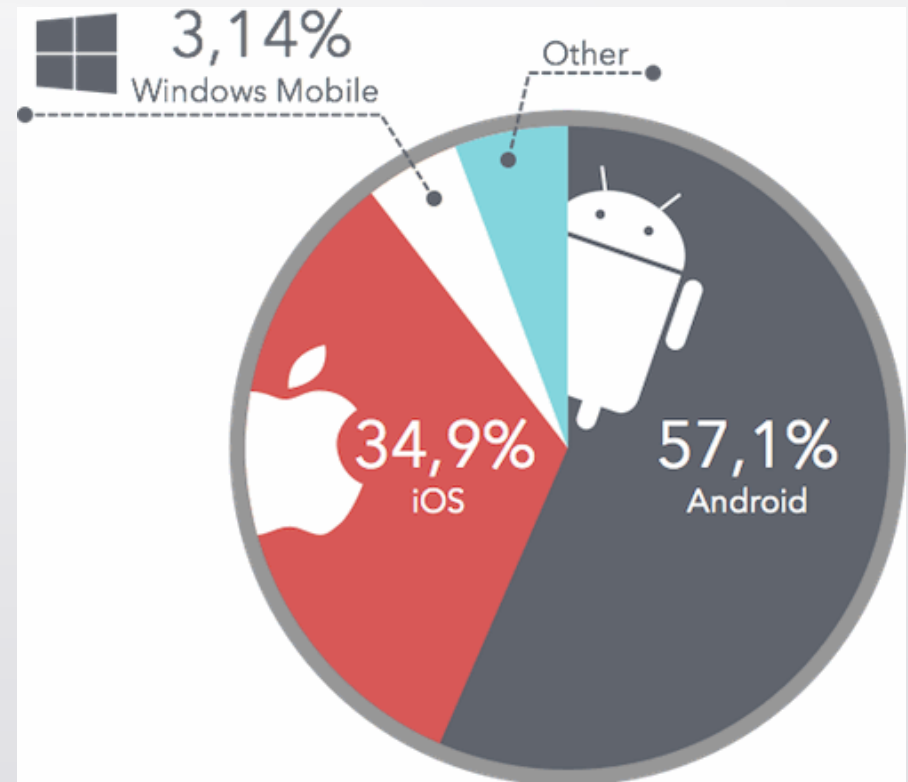
- Cell phones designed for one handed use
- Limited processing power and battery life
- Rich in sensors
- Truly ubiquitous

Mobile Operating System



Embedded operating systems

- Android OS
- iOS
- Windows OS
- Blackberry OS
- Symbian OS



Android



- Released in 2007
- Based on Linux kernel - Open source
- Bought by Google
- OS Names come in tasty flavors...
 - Cupcake, Donut, Éclair, Froyo,, Nougat, Oreo
- Update Ecosystem
 - Google releases an update to the OS
 - Manufacturers must write device drivers to support
 - Manufacturers, and carriers, can add custom software (if unwanted, this is called **bloatware**)
- Also supports Android Shield, Tablet, etc.

iOS



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- Released in 2007
 - Programmed in C, C++, Objective C, and Swift
 - Closed source
 - the foundation of the iPhone
 - Update Ecosystem
 - Apple releases an update to the OS
 - Apple is the manufacturer; OS created for those devices
 - Carriers can release software through the App Store
 - Also supports iPod touch, iPad, Apple Watch, and Apple TV

G - 1/2/3/4 G



- G refers to the different generations of mobile technology
- First generation (1G)
- Second generation (2G)
- Third generation (3G)
- Fourth generation (4G)

0G

1946-1980's

Early mobile phones

- Expensive
- In cars/trucks
- Voice only



1G

1980's -
2000's

First generation cellular networks

- Radio signals are analog
- Voice only
- Bell Labs developed modern commercial cell technology
 - Centrally controlled **base station**
 - Each base station provides service to a small area known as a **cell**
- Technologies
 - AMPS (Advanced Mobile Phone System)
 - FDMA (Frequency Division Multiple Access)
- First Blackberry (850)



2G

1990's-now

Second generation cellular networks

- Radio signals are digital
- Digital Voice
- SMS (short message service)
- Technologies
 - GSM (Global System for Mobile Communications) standard
 - TDMA (Time Division Multiple Access)
- 2.5G
 - An advancement for 2G
 - Introduction of packet switching



3G

2004-now

Third generation cellular networks

- Radio signals are digital
- Digital Voice
- SMS (short message service)
- Broadband data
- Streaming video
- Technologies
 - UMTS (Global System for Mobile Communications) standard
 - CDMA (Code Division Multiple Access)



4G

2012 -
now

Fourth generation cellular networks



- All internet protocol
- Can transmit data while traveling at 100Mb/s
- Can transmit data while stationary at 1GB/s
- Even faster data rates
- Technologies
 - LTE (long term evolution) standard
 - More advanced multiplexing schemes

5G

2020 ??

Fifth generation cellular networks



2020 (expected): Coming to a cell tower near you...