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CMSC436: Programming Handheld Systems

Handheld Systems & Their Applications

Some Statistics

More people own handheld devices than own toothbrushes

10x+ more phones than PCs sold each year

More people access Internet via phone than via PC

Are Handheld Devices Different? – Viewpoint #1

- Handheld Device == Small Computer

- Computers keep getting faster, lighter, cheaper & more powerful

- Handheld devices are just another stage in this evolution

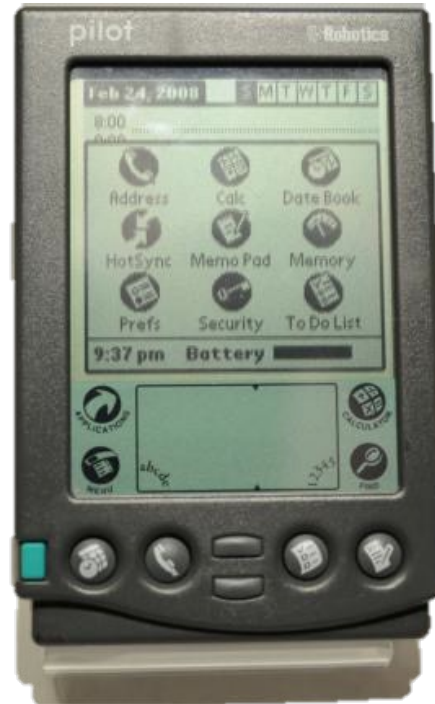# 1960's : Mainframes
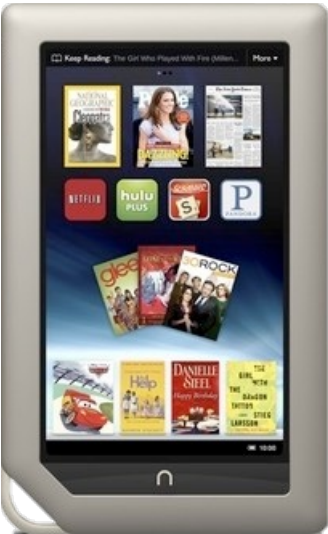
1970's : Minicomputers

1980's : PCs

Early-1990's : Laptops

Mid-1990's : PDA's

Today: Smartphones & Tablets

Tomorrow?

Mainframe

Power

Size

Mini-computer

Personal Computer

Notebook Computer

PDA

phone/ Tablet

Are Handheld Devices Different? – Viewpoint #2

But...

Handheld Device Characteristics

Small, portable, battery-powered

Accept touch, audio, light & radio input

Sensor-enabled

> Location, direction, motion, light & proximity

Characteristics

Networked

    WiFi, cellular telephony & Bluetooth

Truly personal

    Rarely shared (even among family members)

    One study reported that 7/10 people sleep with their phone within arm's reach

Challenges

Limited resources

   CPU, memory, battery, I/O bandwidth

Limited screen space & varied form factors

Diverse context of use

Different activities & usage patterns

Limited user attention

Limited Screen Space

Traditional webpages are designed for large screens

- On mobile device displays operations are more difficult

- Hard to select small objects

- Typing is slow & difficult

May need to spread content over multiple screens

Summary Thumbnails
[Lam et al., 2005]

Varying Form Factors

Diverse Usage Context

Specialized vs. general

Indoor vs. outdoor settings

Light & climate

Private vs. public settings

Different Usage Patterns

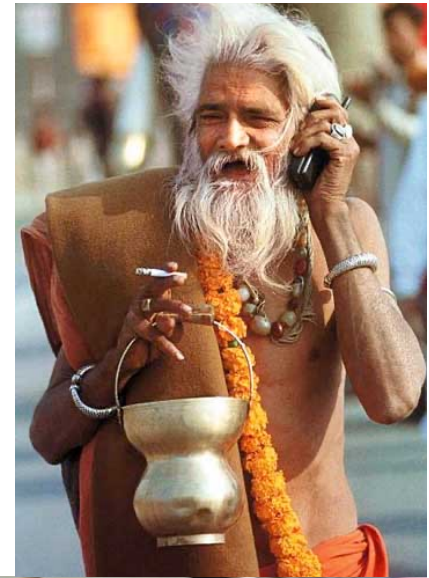Handhelds do different things in different ways

Highly context-dependent

Sustained vs. bursty usage patterns – seconds to minutes

Limited Attention

Mobile usage implies multi-tasking

Apps compete for limited mental & physical resources

Summary

Handheld devices are small computers, but...

They are resource-challenged, portable, networked, sensor-enabled, & truly personal

Their apps must be designed for:

Limited resources, unreliable networks, less than ideal usage environments, privacy & security concerns

Next Time

Introduction to the Android Platform