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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?
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