Programming Handheld Systems

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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
Handheld Device = Small Computer

Computers keep getting faster, lighter, cheaper & more powerful

Handheld devices are just another point in this evolution
1960’s: Mainframes
1970’s : Minicomputers
1980's : PC's
Early-1990’s : Laptops
Mid-1990's : PDA's
Today: Smartphones/Tablets
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 & Bluetooth

Truly personal

Rarely shared (even among family members)

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 have assumed a large screen 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 Devices

Indoor vs. outdoor
Light & climate
Private vs. public settings
Different Usage Patterns

Handheld devices do different things in different ways

Highly context-dependent

Bursty usage patterns - from seconds to minutes
Limited Attention

Mobile usage implies multi-tasking
Apps compete for limited mental & physical resources
**Summary**

Handheld devices are just 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