Mobile Computing: Is It Right for You?

Advantages

• Convenience
• Boost productivity
• Communicate with others anywhere
• Access to electronic information

Limitations

• Expensive
• Short battery life
• Small screen display
• Slow Internet speed
Mobile Computing Devices

- Cell phones
- Portable media players
- PDAs/smartphones
- Subnotebooks
- Notebooks and tablet PCs
## Comparing Mobile Devices

<table>
<thead>
<tr>
<th>Device</th>
<th>Relative Price</th>
<th>Approximate Size</th>
<th>Approximate Weight</th>
<th>Standard Capabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cell Phone</td>
<td>$$ (Includes cost for the phone, a monthly plan, and Internet access)</td>
<td>$5” × 2” × 0.5”</td>
<td>0.25 lbs.</td>
<td>Provides voice, e-mail, limited access to application software, and Internet connectivity</td>
</tr>
<tr>
<td>PMP</td>
<td>$$–$$$$</td>
<td>$3” × 2” × 0.5”</td>
<td>0.25 lbs. or more</td>
<td>Provides storage of digital music, video, and other digital files</td>
</tr>
<tr>
<td>PDA/smartphone</td>
<td>$$–$$$$</td>
<td>$4.5” × 2” × .75”</td>
<td>0.25 lbs</td>
<td>Provides PIM capabilities, access to application software, and access to the Internet</td>
</tr>
<tr>
<td>Subnotebook</td>
<td>$$$$$</td>
<td>$7” × 5”</td>
<td>1–2 lbs.</td>
<td>Have 7” or smaller screens and run fully functioning operating system and applications</td>
</tr>
<tr>
<td>Tablet PC</td>
<td>$$$$$$</td>
<td>$10” × 8” × 1”</td>
<td>3 lbs.</td>
<td>Provides PIM capabilities, access to application software, access to the Internet, and special handwriting- and speech-recognition capabilities</td>
</tr>
<tr>
<td>Notebook</td>
<td>$$$$–$$$$$$$</td>
<td>$10” × 13” × 2”</td>
<td>5 to 8 lbs.</td>
<td>Provides all the capabilities of a desktop computer while also being portable</td>
</tr>
</tbody>
</table>
Cellular Phones

• Full-featured communication and information storage devices

• Features include
  – Auto-redial
  – Call timers
  – Voice mail
  – Voice-activated dialing
  – Internet access
  – Text messaging
  – Personal information management (PIM)
Cell Phone Hardware

• Microprocessor (CPU)
  – Coordinates sending data between components
  – Runs the operating system
• Memory
  – ROM stores the operating system
  – Internal memory chips
  – SIM card (Subscriber Information Module)
Cell Phone Hardware

- Input devices
  - Microphone
  - Keypad
  - Graffiti pad
  - Touch screen
  - Digital camera

- Output devices
  - Speaker
  - LCD display
Cell Phone Operating Systems

• Translate the user’s commands into instructions for the processor
  – Symbian (owned by Nokia)
  – Windows Mobile
  – OS X (Apple)
How Cell Phones Work

- Analog-to-digital converter chip converts voice sound waves into digital signals.
- Digital signal processor compresses the signal so it can be sent to another phone.
- Digital data is transmitted as radio waves.
- Digital signal processor decompresses incoming calls.
Cell Phone Text Messaging

• Text messaging
  – Short Message Service (SMS)
    • Sends messages of up to 160 characters
    • Free SMS information
  – Multimedia Message Service (MMS)
    • Sends text, sound, images, and video clips
Cell Phone Internet Connectivity

- Wireless Internet service provider
- Internet connectivity plans, usually known as data plans
- Speeds of 200–300 Kbps
- 2G, 3G, 4G (2012?)
- Microbrowser software
- Difficult to display Web pages on the small screen without horizontal scrolling
Cell Phone Internet Connectivity

- Checking e-mail is a popular feature.
- Special “push” technology delivers e-mail to a cell phone.
- **Viruses can target cell phones.**
- Antivirus software for mobile devices is available. (Symantec, McAfee, F-Secure)
Portable Media Players

• MP3
  – Format for storing music

• Portable media player (PMP)
  – Small device that stores and plays music
# Popular PMPs

<table>
<thead>
<tr>
<th>Popular PMPs</th>
<th>Media Capacity</th>
<th>Built-In Flash Memory</th>
<th>Hard Drive Capacity</th>
<th>Connection to Computer</th>
<th>Other Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creative Labs Digital MP3 Zen Nano Plus</td>
<td>As many as 500 songs</td>
<td>512 MB to 1 GB</td>
<td>None</td>
<td>USB 2.0 port</td>
<td>Built-in FM radio, voice recorder, and four-band equalizer</td>
</tr>
<tr>
<td>Oregon Scientific MP121</td>
<td>As many as 32 hours of music</td>
<td>1 GB</td>
<td>None</td>
<td>USB 2.0 port</td>
<td>Waterproof to 3 feet deep, built-in pedometer, built-in FM radio, and equalizer</td>
</tr>
<tr>
<td>Apple iPod Nano</td>
<td>As many as 2,000 songs or 7 hours of video</td>
<td>4 GB to 8 GB</td>
<td>None</td>
<td>USB 2.0 port</td>
<td>Weighs only 1.5 ounces; flash memory provides for skip-free playback.</td>
</tr>
<tr>
<td>Apple iPod</td>
<td>As many as 40,000 songs, 50,000 images, or 200 hours of video</td>
<td>None</td>
<td>80 GB to 1,600 GB</td>
<td>USB 2.0 port</td>
<td>Has calendar feature that syncs with Outlook; can serve as a small, portable hard drive.</td>
</tr>
<tr>
<td>Zen Vision W</td>
<td>As many as 15,000 songs or 240 hours of movies</td>
<td>None</td>
<td>30 GB to 60 GB</td>
<td>USB 2.0 port</td>
<td>Includes 4.3”-wide screen display, integrated FM radio and a voice recorder; syncs with Outlook.</td>
</tr>
</tbody>
</table>
PMP Flash Memory

- Used to add additional memory to portable media players
- Nonvolatile
- Noiseless
- Uses very little power
- Software enables transfer of audio and video files
PMP Ethical Issues

• Is it illegal to download MP3 files?
  – MP3.com
    • Song files are on a public server.
    • Permission is given by the artist or recording company to place the files on the server.
    • A fee is paid to download a file.
  – The original Napster
    • A file exchange site
    • Song files were borrowed from users’ computers (peer-to-peer [P2P] sharing).
    • Sued for copyright infringement
DRM Music -- Digital Rights Management

- Music without any digital rights
- Can be moved freely from system to system
- May be part of a subscription service
- See notes
Podcasting

• Distributing non-music MP3 files over the Internet
• Podcasts can be information, books on tape, audio plays, Radio Shows, Church Services, etc.
• People can listen when they wish.
• iPod synchronization transfers new content:
• Software (itunes) automatically downloads when available
PDAs/Smartphones

• Small devices that store digital information
• PDA/smartphone hardware includes
  – CPU
  – Operating system
  – Storage capabilities
  – Input/output devices
  – Ports
PDA/Smartphone Input and Output Devices

• Input devices
  – Touch screen with stylus
  – Keyboards
    • Graffiti text system (draw on screen)

• Output devices
  – LCD displays
PDA/Smartphone Processors

• Popular processors
  – Samsung SC
  – Texas Instruments OMAP
  – Intel XScale

• Comparing processors
  – Speed
  – Performance
    • Benchmarking
  – Power consumption (Battery life)
PDA/Smartphone Operating Systems

• Main OS competitors
  – Palm OS
  – Windows Mobile
  – Blackberry OS
  – OS X versions
  – Symbian OS

• OS features include
  – Calendar
  – To-do list
  – Contact information
  – Viewing videos
  – Playing MP3 files
PDA/Smartphone Memory and Storage

• ROM stores the operating system and the basic programs.
• RAM stores additional applications and data.
• Flash memory is used for additional storage.
PDA/Smartphone File Transfer and Synchronization

- PDA/smartphone files can be transferred to a desktop using
  - Flash card readers
  - Cradles
- Synchronizing updates files on both the PDA/smartphone and desktop
  - Sync cables
  - Windows Vista Sync Center
- Wireless transfers
  - IrDA
  - Bluetooth
PDA/Smartphone Software and Accessories

• Standard software
  – To-do list
  – Contacts manager
  – Calendar

• Additional software
  – Microsoft Word, Excel, Outlook, and PowerPoint
  – Games
  – Tools (currency converters)
  – References (dictionaries)
PDA/Smartphone or Cell Phone

- Cell phones with PDA/smartphone capability
- PDAs with cell phone capability
- Smartphones
- Apple iphone
- Blackberry
Convergent Technologies

Cell phones that use:

• Cell technology
• WiFi + Voip
• Landlines
• Done seamlessly
Other Devices to Consider

- Kindle
- Sony Portable Reader System
  - Holds 160 e-books
  - Nokia n800 Internet Tablet
  - Uses Skype for voice communication
- Subnotebooks
  - Lightweight, powerful computing abilities
Notebooks

• Also called laptops
• Computing power of a desktop (except for workstations)
• Weigh more than tablet PCs
Notebook Hardware

• Dual-core CPUs
• Blu-ray/DVD/CD-RW drives
• Hard drives
• RAM
• Keyboard
• Built-in mouse (touch pad)
• LCD displays
CPUs for Notebooks

• Slightly slower than desktop CPUs (lower power consumption)
• Dual-core CPUs
  – Difference in speed is less noticeable
• Windows Vista
  – Allows for RAM to be used more efficiently
Notebook Operating Systems

• Same operating systems as those found on desktops

• Power management
  – Shuts down the hard drive
  – Turns off the monitor
  – Puts the computer into standby mode or hibernation
Tablet PCs

• Lightweight, portable computers
  – Can be used clipboard style
  – Integrated keyboard
  – Most weigh just over 3 pounds
• Digital ink technology
  – Pressure-sensitive screen
  – Digital pen
Tablet Software

- Windows Vista is now the operating system.
  - Digital ink
  - Handwriting recognition
- Application programs compatible with Windows Vista are available.
Netbooks

• Reduced capability PCs (less speed, memory, hard drive)
• Reduced connectivity
• WiFi enabled
• Applications Software included
• Low price <$400
Windows Mobility Center
from Control Panel

• Gives details on
  – Display brightness
  – Battery status
  – Power management plant
  – Wireless network connections
  – External displays
  – Presentation systems (projectors) connected
Notebook Ports

• A full set of ports:
  – Monitor
  – USB
  – Modem
  – Ethernet
  – Audio
  – FireWire
  – PCI type I/II card slots
  – DVI video
  – IrDA
Wireless Network Connections for Notebooks

• Most notebooks have integrated support for wireless connectivity.
• The 802.11g WiFi wireless standard is most common.
• 802.11n is gaining in popularity.
• Bluetooth chips
Notebook Batteries and Accessories

• Batteries lighter than previous generations
• No “memory effect”
• Battery rated at 5 A-hrs can provide 5 amps of current for an hour
• AC/DC or DC/DC converter (car 12V)
Notebook or Desktop?

• Desktop—pros
  – Better value in terms of computing power for your money
  – More expansion possibilities
  – More reliable (less abuse)
  – Lasts longer
  – More secure

• Notebook—pro
  – Portable