Chapter 2
Exploring the Human-Computer Interface

Learning Objectives
- Give names to computing features that you know intuitively
- Explain placeholders and the placeholder technique
- Explain how "metaphor" is used in computing
- Describe the desktop metaphor, giving examples of appropriate icons
- Describe the touch metaphor, giving sample motions
- Explain how the desktop and touch metaphores differ

Feedback
- A computer assists us, doing whatever we ask it to do
- We want our "assistant" to report on the progress of the task it is doing
- We need to know that the task was done and when to give another one
- Computer systems always give the user feedback about "what's happenin'"

Feedback
- Feedback is an indication that either the computer is still working or is done
- Feedback takes many forms:
  - The revision is visible
  - Areas on the screen become highlighted, shaded, grey, underlined, color change, or you might hear a click

Feedback
- Most common form of feedback is that the computer is performing a time-consuming operation
  - Cursor is replaced by a different icon
  - Some apps give custom feedback
  - Or use a progress bar to give an estimate of time remaining
  - Always expect feedback

Consistent Interface
- Regardless of who makes the software, icons and menus tend to be similar
  - Especially so within a specific company (Microsoft for example)
  - Look for similar menu names, like File and Edit
  - Look for similar functions within the menus, like Cut, Copy, Paste in the Edit menu
Consistent Interface

- Why?
  - Companies reuse the same code in each of their applications
  - Aids you in learning and using additional applications
  - Certain operations are so fundamental to processing that all apps just use those operations

New Instance

- Under File you usually find a command, New
  - New creates a “blank” instance of the kind of files the application creates
  - What is “blank information”?
    - An empty structure to hold (record) all of the properties of that file and store its content
    - Example: A new empty address book entry is ready to hold names, images, and phone numbers about the new individual

New Instance for the Address Book

Clicking and Blazing

- Consistency provides a strong sense of familiarity with a new application
- With a new app, two important activities are immediately performed:
  - “Clicking Around” to explore the application to see what features are available
  - “Blazing Away” is trying the application in a way you haven’t done so before

Perfect Reproduction

- Computers encode information as a sequence of binary digits, 0’s and 1’s
- Because of the use of two digits, we call it digital information
- Using only 0’s and 1’s means that digital information can be perfectly reproduced or replicated

10010111 10101000 11001010

Exact Duplicate

- A second copy is made simply by duplicating the sequence of 0’s and 1’s
- This is one way digital improves on analog information
  - Analog Information comes from or is stored on a continuously variable medium
  - A copy of an image, for example, could come out too dark or too light when compared to the original
The Perfect Reproduction Property of Digital Information

- It also doesn't matter where the copy came from:
  - Both the original and the copy are the same sequence of 1's and 0's
  - Every copy can be made from the last copy, and still be identical to the original!

Copying

- Copy/Paste/EDIT
  - Copy and Paste operations are available in many applications
  - When editing a file, you can either create content from "scratch" or use Copy/Paste (C/P) to reproduce it from another location
  - Copy/Paste is generally faster and less error prone

Find/Replace, Placeholder

- Find and ReplaceAll
  - In Find/Replace editing operations, the source content to Find is identified in the document
  - The target content to Replace it with is also identified
  - Find/ReplaceAll (F/R/A) is an all-at-once version of Copy/Paste
  - Use an abbreviation of a long name or title as a placeholder, then use F/R/A to put in the correct name all at once!

How We Learn Technology

- When many the purpose or operation of a new technology may seem obvious
- Some technologies require instruction (driving a car or using a chain saw!)
- Much of the technology we use we figure out on our own
  - We know intuitively what to do
  - The technology developers did that on purpose!

Metaphors

- In computing, a metaphor is an icon or image used as representative or symbolic of a computation
- When designers create a technology, they use metaphors to help users know how to operate their devices without reading a manual
- Metaphors are a terrific solution!

The Desktop

- In the '70s the first personal computer (the Alto) was developed
- It was the first computer with a Graphic User Interface when the computer booted
- Since the computer was designed for business use, the metaphor that was used for the screen was desktop
  - Other business metaphors: files, folder, documents
The Desktop

- Steve Jobs and Steve Wozniak founded Apple and built computers without GUIs
- Jobs saw the Alto and liked the GUI concept
- Apple redesigned an unsuccessful personal machine (Lisa), then launched the Mac in 1984
- Soon after, Microsoft began developing Windows to replace its DOS system

More Computer Metaphors

- The Mac first introduced the mouse to the public...another component in desktop metaphor
  - Apple did not invent it
  - Stanford Research Institute invented the mouse in December 1968
  - When introduced, it was stated that they called it a mouse and didn't know why they didn't change the name!

Changing Metaphors

- A new idea, the touch metaphor
  - Users touch the content, smart phones, tablets, and other mobile devices
  - Example: the Cover Flow mechanism for scanning through a list, using a sweeping motion of the pointer

Touch Metaphor Gestures

<table>
<thead>
<tr>
<th>Gesture</th>
<th>Description</th>
<th>Simulation</th>
<th>Duration</th>
</tr>
</thead>
</table>
| Tap     | Single finger pressing a button | Simulate tap action | Short
| Swipe   | Flicking the screen horizontally to move through items | Simulate swipe to move through list | Long
| Pinch   | Pinching the screen to zoom in or out | Simulate pinch gesture | Medium

Metaphor Relationships

- The touch metaphor is intended to simplify the use of smart phone and tablets
- This technology is not new (use of stylus and touch screen interaction at kiosks)
- Touch has no mouse
- It's possible to use the touch metaphor with a trackpad or mouse so it is not limited to mobile devices
Why is Touch a Metaphor?
- It's a way to eliminate the mouse, but...
- It changes how humans interact with the computer
  - Scrollbars using the desktop metaphor for moving through a display
  - Small screens don't have room for scrollbars
  - Direction of motion is opposite between touch and desktop metaphors

Why is Touch a Metaphor?
- It changes how humans interact with the computer
  - With the touch metaphor, your hands are "on" the content
  - You move the content to where you want it to be
  - With the desktop metaphor you "slide a window over the content"

Summary of Metaphors
- We use technical metaphors daily
  - They are 100 percent synthetic, created by imagination of the developers
  - They are meant to simplify the use of the devices.
- The touch metaphor will not replace the desktop metaphor
- Both have extensively determined how we think and behave with technology

Summary
- We can figure out software because designers use consistent interfaces, suggestive metaphors, and standard functionality.
- We should explore a new application by "clicking around" and "blazing away."
- Making exact copies is a fundamental property of digital information that we use daily.

Summary
- Find and ReplaceAll are standard operations that simplify our computer use.
- Metaphors are essential to computer usage because the guide us in learning and using software.
- The desktop metaphor is classic; the touch metaphor is newer, they will co-exist.