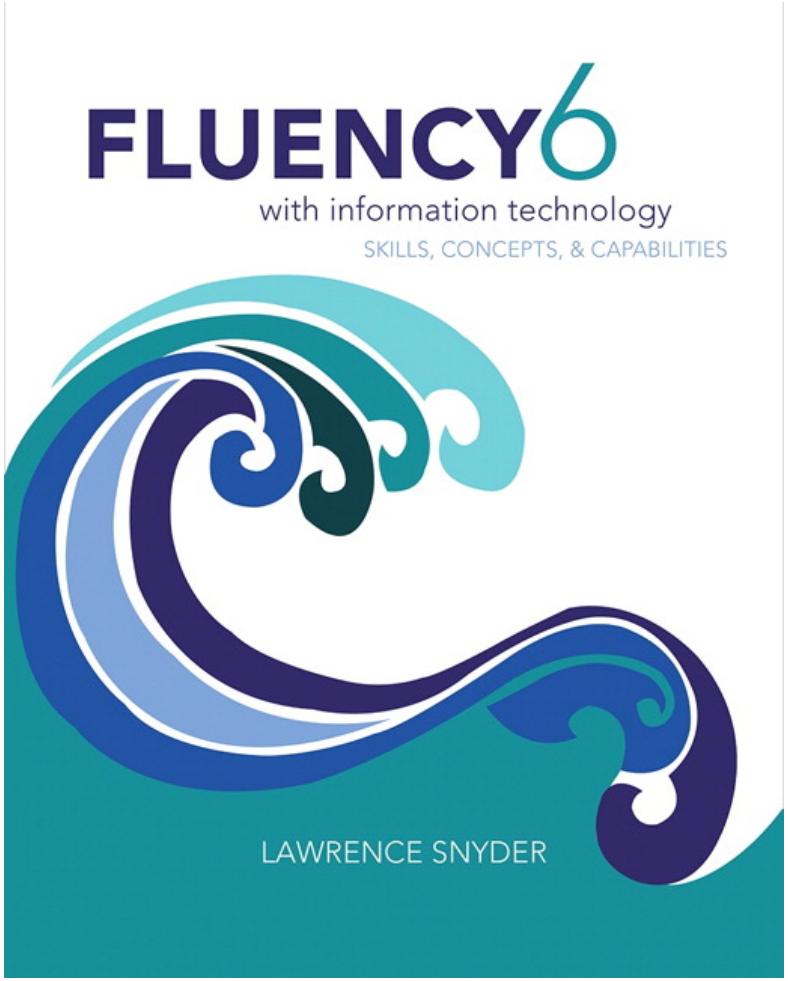


Chapter 2

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 metaphors 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
- Always expect feedback about what is happening

Feedback

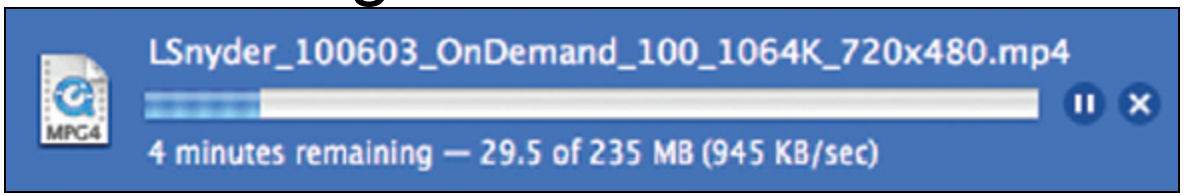
- **Feedback** is an indication that either the computer is still working or it is done
- Feedback takes many forms:
  - The revision is visible
  - Areas on the screen become highlighted, shaded, gray, underlined, color change, or you might hear a click

Feedback

- Most obvious 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 on time remaining



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

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

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

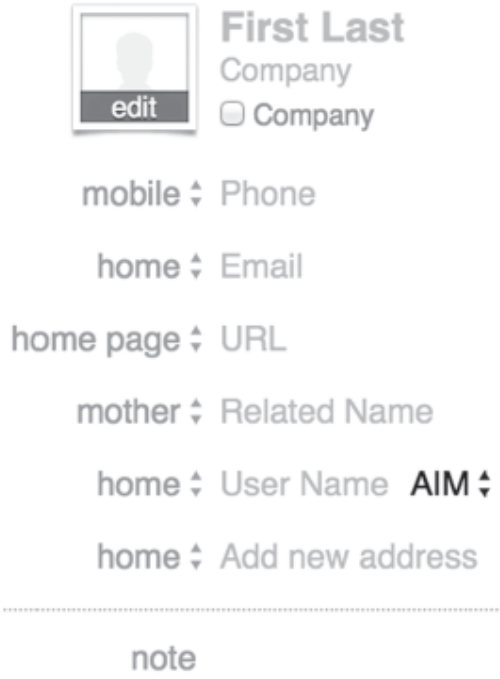


Figure 2.1 A visual form of a blank instance of contact information from an electronic address book; the instance has structure inside the computer with empty fields, as shown.

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 10101100 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

How We Learn Technology

- 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/RA**) is an all-at-once version of *Copy*/*Paste*
    - Use an abbreviation of a long name or title as a placeholder, then use F/RA to put in the correct name all at once!

Placeholder Technique

- Sometimes, the way to use a new technology is not obvious.
- 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!
  - Just needs some thought!

Placeholder Technique

- You want to replace every use of etc with etc. to fix the periods you left out.
- But that doubles periods when etc falls at the end of a sentence.
- Replacing .. will break your ellipses.
- So first replace etc. with some unused marker to hide it.
- Replace etc, then replace the marker.

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 by Xerox
- It introduced a graphical user interface instead of the (usual) text user interface
- Since the Alto was designed for office use, the metaphor that was used for the screen was *desktop*
  - Other office metaphors: *files, folder, documents*

The Desktop

- Steve Jobs and Steve Wozniak founded Apple and built computers TUIs at first
- Apple Macintosh was first successful GUI PC.
- Extended ideas from Alto with new icons
- Showcased painting and drawing
- Microsoft introduced Windows a year and a half later

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!

Engelbart's Mouse

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 2.1 Gestures supporting the touch metaphor

Gesture	Description	Typical Use	Typical Result
Sweep or Swipe	Move finger across surface	Scan through a list	Items sweep by, with one selected
Tap	Light one-finger tap on surface	Select or choose	Item identified
Double Tap	Light two-finger tap on surface	Launch	Selected item starts
Drag	Move selected item by pulling	Move item	Item in new position
Pinch Fingers/Pull Fingers Apart	Contract/expand separation between fingers	Shrink/zoom	Image is resized
Two-Finger Scroll	Move fingers across surface	Navigation	Move around a clipped image
Flick	Quick sweep, finger leaves surface	Express acceleration	Sustained sweep

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