Usability of Human Interfaces

Devclub.eu

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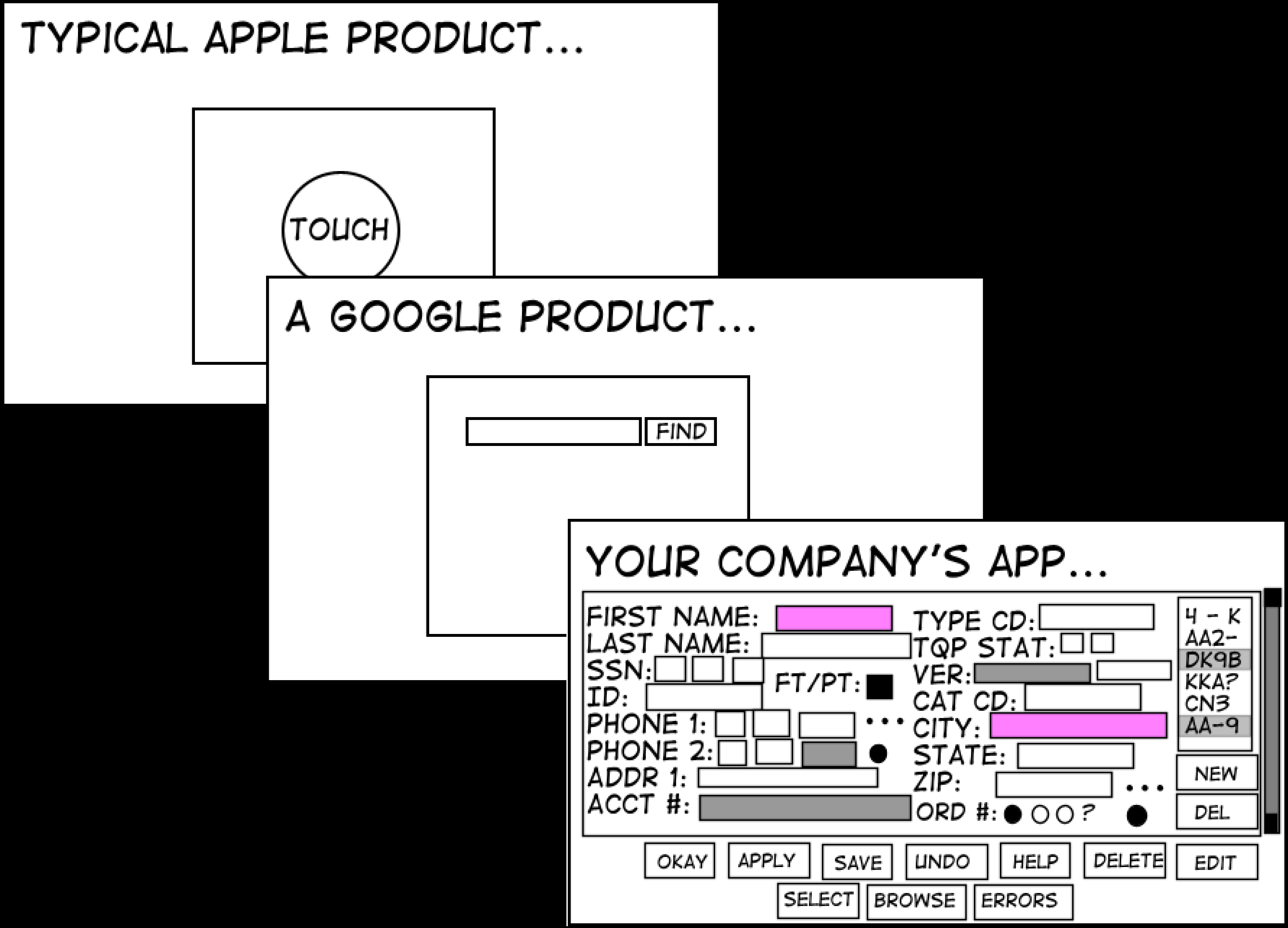
Anton Keks

Why talk about it?

- Computer is a tool
- How much stuff that you do nowadays doesn't involve a computer?
  - and TVs, phones, airplanes, cars...
  - we are already entering the pervasive computing age
- HCI (Human-Computer Interaction) studies interaction between people and computers

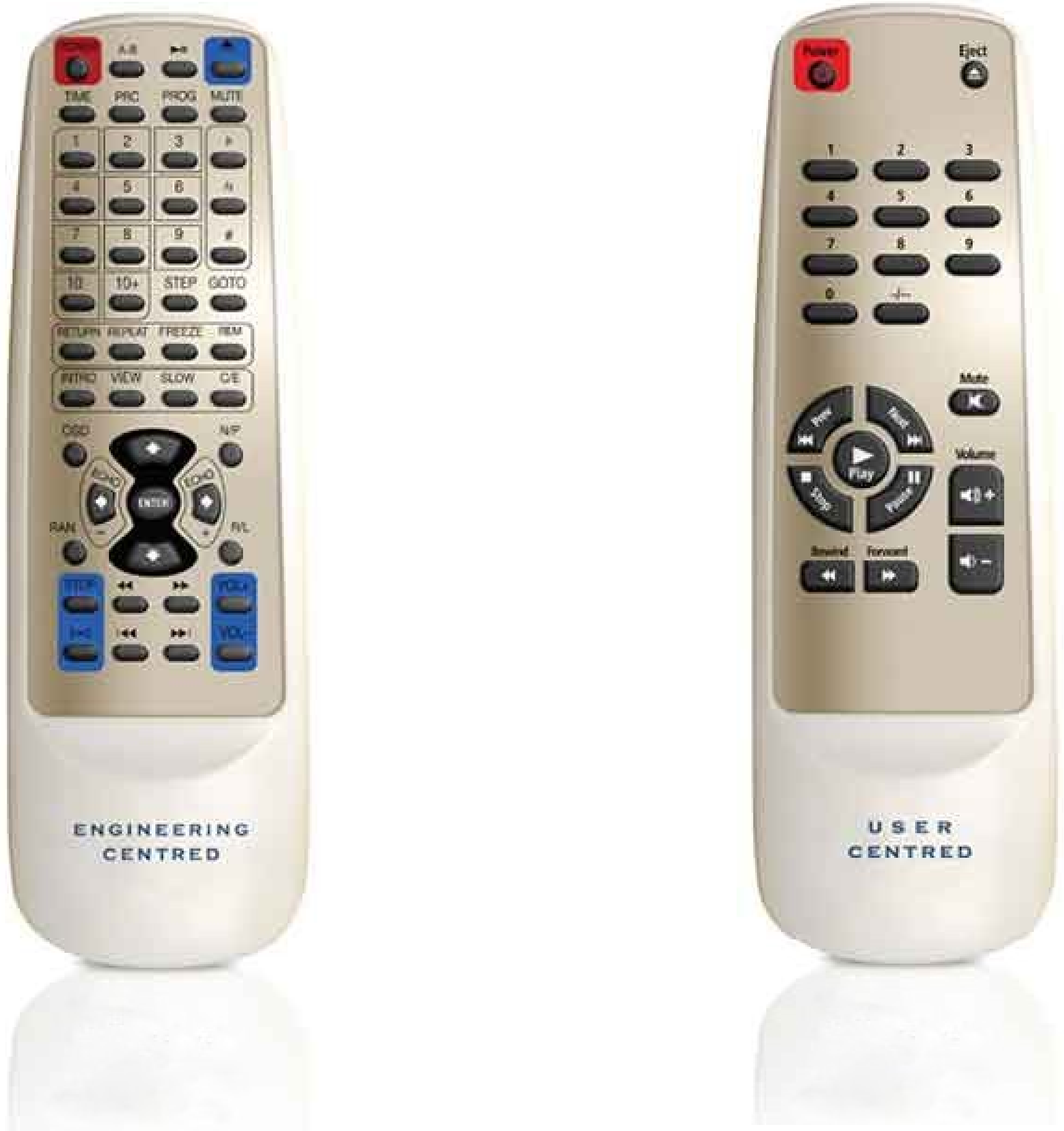


FROM STUFFTHATHAPPENS.COM BY ERIC BURKE

Why talk about it?

- The are too many bad and ugly UIs out there
- Good UI can be the deciding factor of choosing the software
- “Once you put usability at the forefront of your project planning, you'll be surprised how quickly your users become convinced that you're one of the best developers out there”
- User interface skills are critical for all developers

Engineering vs User centered design

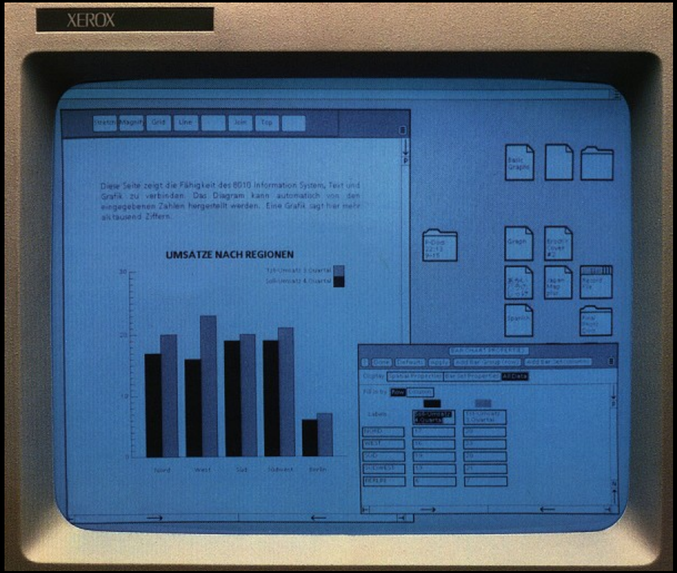


Timeline of dominant computer UIs

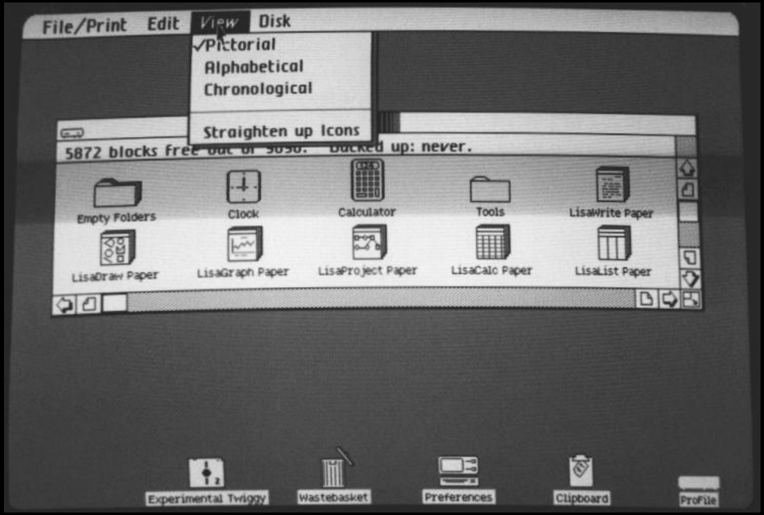
- Batch interface, 1945-1968
- Command-line user interface, 1969-1980
- Graphical user interface, 1981-present
  - Web user interface, 1991-present
  - Touch user interface, e.g. point of sale devices, iPhone
- Tangible interfaces / Pervasive computing, now, near future?

First GUIs

Xerox Alto, 1973
Never sold commercially



Xerox Star, 1981, a commercial failure



Apple Lisa, 1983, commercially successful

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Starting MS-DOS...

C:\>_
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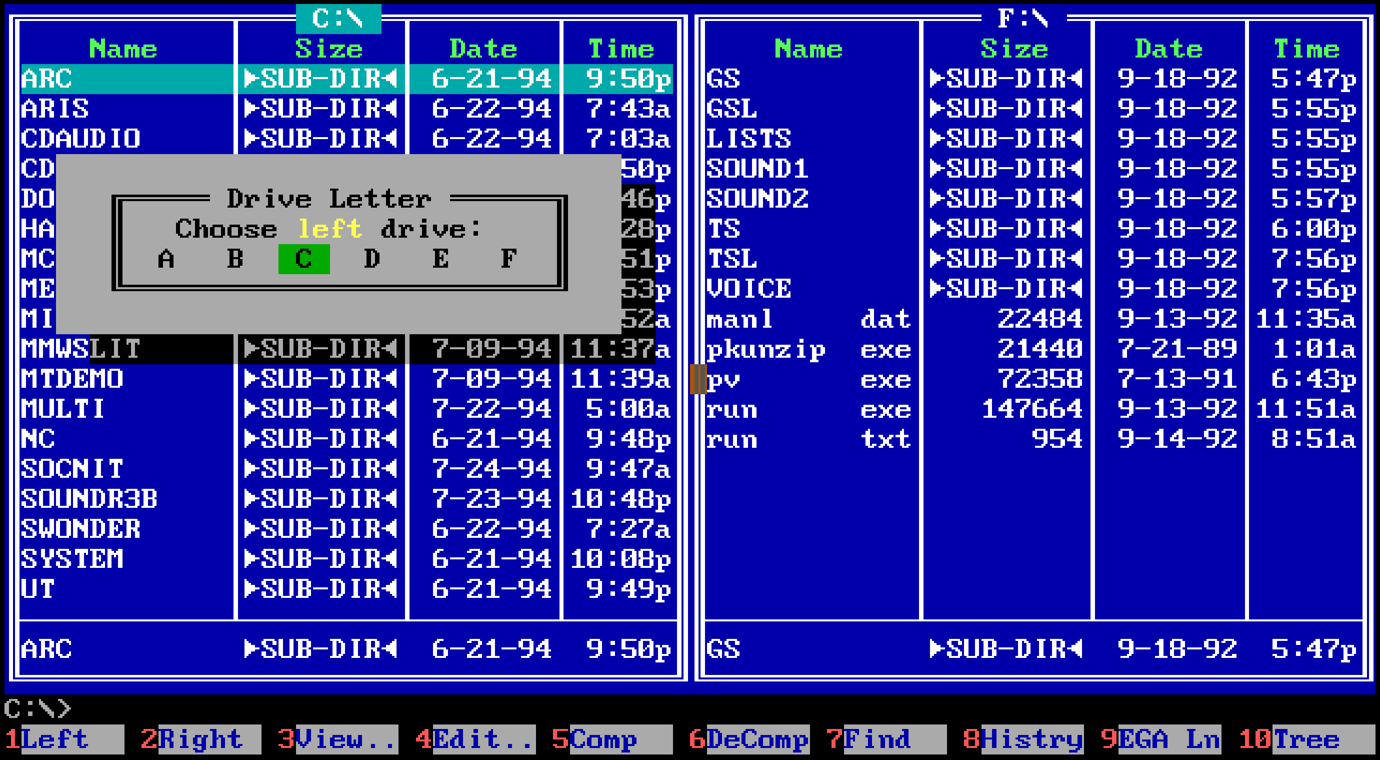
MS-DOS experience, 1981-2000



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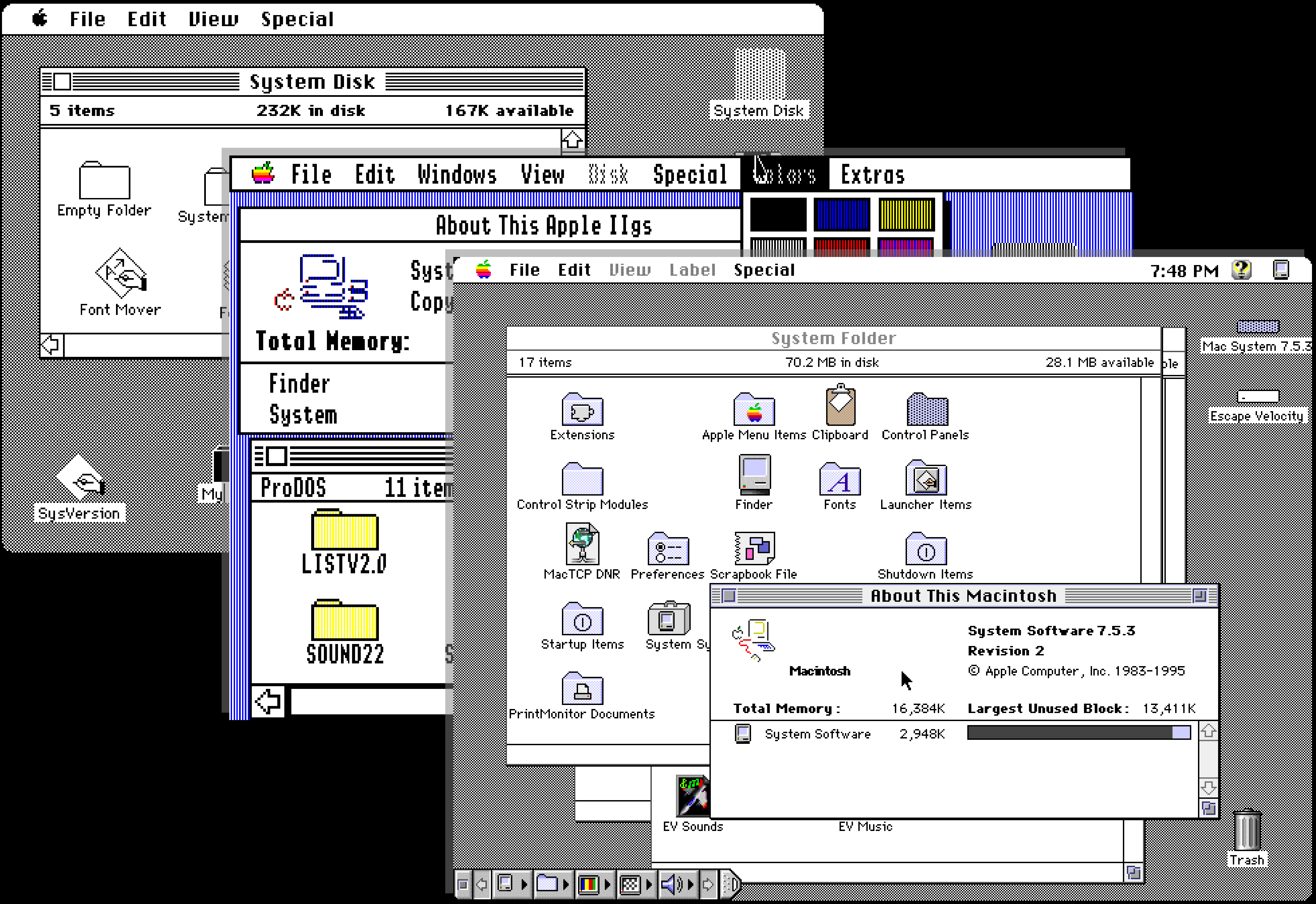
                      C:\                                               F:\
   Name        Size        Date      Time   |   Name         Size        Date      Time
ARC          ►SUB-DIR◄   6-21-94   9:50p    | GS           ►SUB-DIR◄   9-18-92   5:47p
ARIS         ►SUB-DIR◄   6-22-94   7:43a    | GSL          ►SUB-DIR◄   9-18-92   5:55p
CDAUDIO      ►SUB-DIR◄   6-22-94   7:03a    | LISTS        ►SUB-DIR◄   9-18-92   5:55p
CD                                   50p    | SOUND1       ►SUB-DIR◄   9-18-92   5:55p
DO            Drive Letter           46p    | SOUND2       ►SUB-DIR◄   9-18-92   5:57p
HA         Choose left drive:        28p    | TS           ►SUB-DIR◄   9-18-92   6:00p
MC        A   B   C   D   E   F      51p    | TSL          ►SUB-DIR◄   9-18-92   7:56p
ME                                   53p    | VOICE        ►SUB-DIR◄   9-18-92   7:56p
MI                                   52a    | manl     dat     22484   9-13-92  11:35a
MMWSLIT      ►SUB-DIR◄   7-09-94  11:37a    | pkunzip  exe     21440   7-21-89   1:01a
MTDEMO       ►SUB-DIR◄   7-09-94  11:39a    | pv       exe     72358   7-13-91   6:43p
MULTI        ►SUB-DIR◄   7-22-94   5:00a    | run      exe    147664   9-13-92  11:51a
NC           ►SUB-DIR◄   6-21-94   9:48p    | run      txt       954   9-14-92   8:51a
SOCNIT       ►SUB-DIR◄   7-24-94   9:47a    |
SOUNDR3B     ►SUB-DIR◄   7-23-94  10:48p    |
SWONDER      ►SUB-DIR◄   6-22-94   7:27a    |
SYSTEM       ►SUB-DIR◄   6-21-94  10:08p    |
UT           ►SUB-DIR◄   6-21-94   9:49p    |

ARC          ►SUB-DIR◄   6-21-94   9:50p    | GS           ►SUB-DIR◄   9-18-92   5:47p
C:\>
1Left  2Right  3View..  4Edit..  5Comp  6DeComp  7Find  8Histry  9EGA Ln  10Tree
```

Norton Commander, 1986



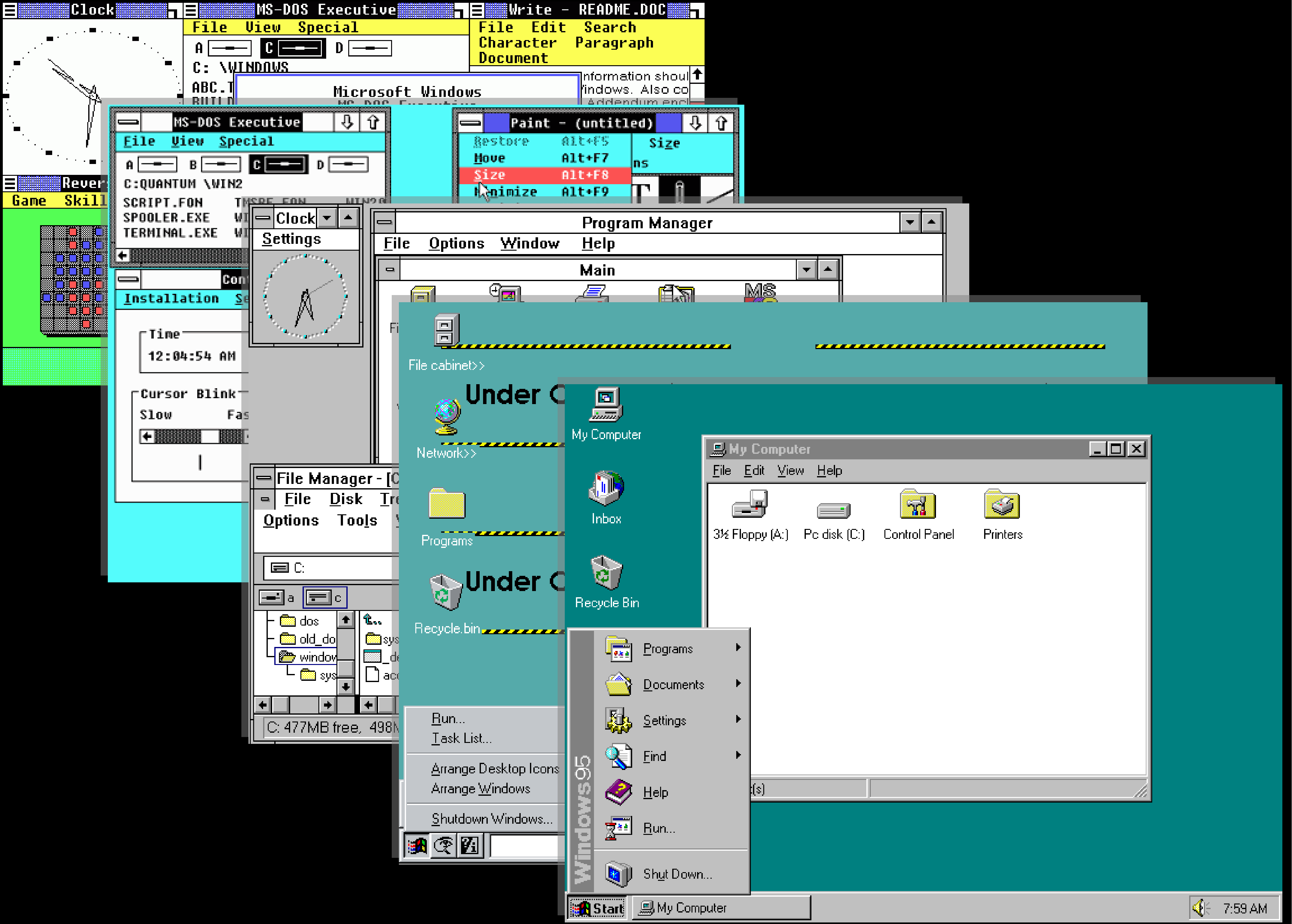
System Disk: 5 items, 232K in disk, 167K available

System Folder: 17 items, 70.2 MB in disk, 28.1 MB available

System Software 7.5.3
Revision 2
© Apple Computer, Inc. 1983-1995

Total Memory: 16,384K   Largest Unused Block: 13,411K
System Software 2,948K

Macintosh System 7, 1997


Clock
MS-DOS Executive
File View Special
C: \WINDOWS
Microsoft Windows
Write - README.DOC
File Edit Search
Character Paragraph
Document
Reversi
Game Skill
MS-DOS Executive
File View Special
C:QUANTUM \WIN2
SCRIPT.FON
SPOOLER.EXE
TERMINAL.EXE
Paint - (untitled)
Restore Alt+F5
Move Alt+F7
Size Alt+F8
Minimize Alt+F9
Clock
Settings
Installation
Time
12:04:54 AM
Cursor Blink
Slow
Program Manager
File Options Window Help
Main
File Manager - [C
File Disk Tree
Options Tools
C:
dos
old_dos
windows
sys
C: 477MB free, 498M
File cabinet>>
Under C
Network>>
Programs
Recycle.bin
Run...
Task List...
Arrange Desktop Icons
Arrange Windows
Shutdown Windows...
My Computer
Inbox
Recycle Bin
My Computer
File Edit View Help
3½ Floppy (A:)
Pc disk (C:)
Control Panel
Printers
Programs
Documents
Settings
Find
Help
Run...
Shut Down...
Windows 95
Start
My Computer
7:59 AM

What we primarily use now…

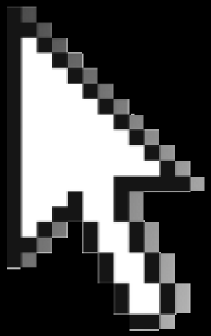
is often referred to as

WIMP

(Window-Icon-Menu-Pointer)

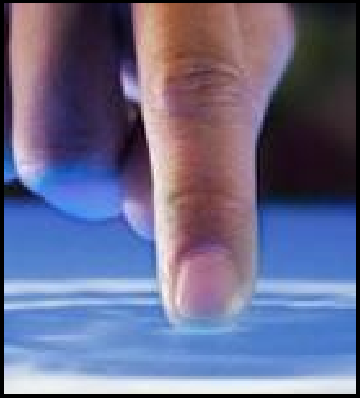
WIMP GUI

- Good enough at abstracting workspaces, documents, and their actions
- Easy to understand by novice users
- Suitable for multitasking environments
- Rectangular regions on a flat screen are easy to program
- 30 years old, but still dominant

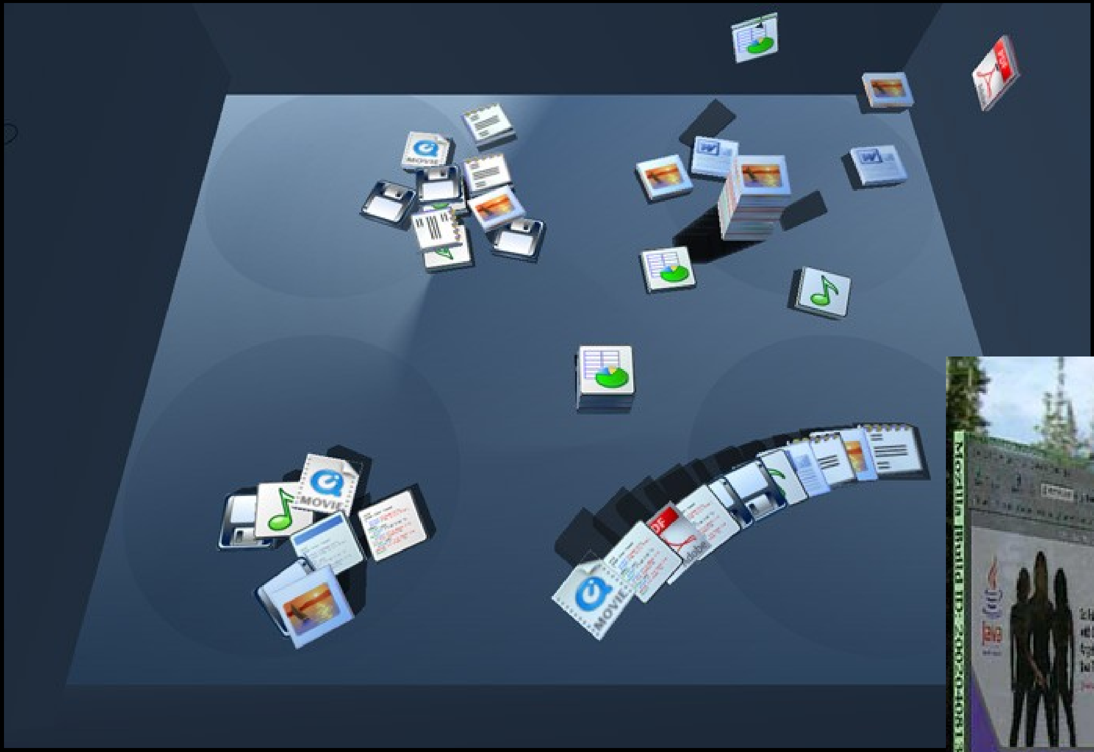


Post-WIMP

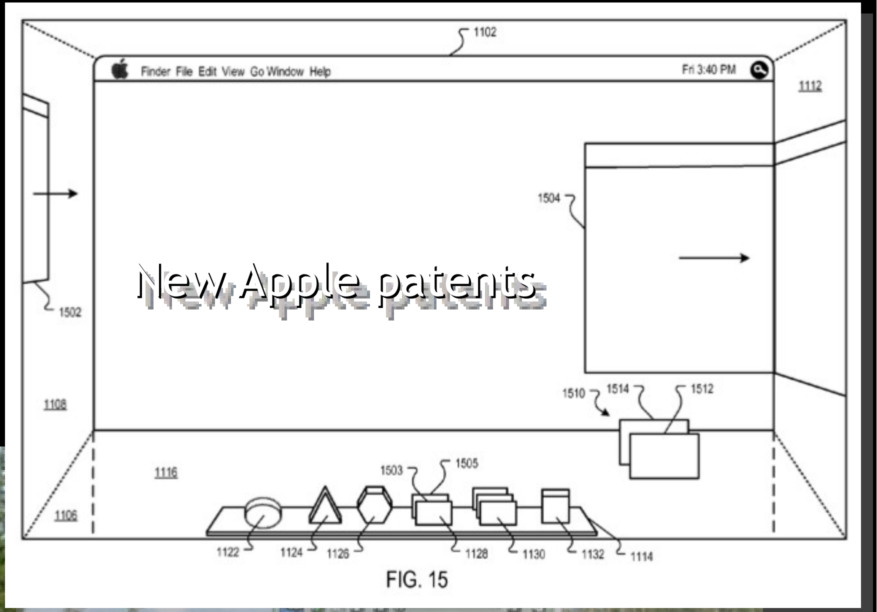
- iPod, mobile phones (most notably iPhone)
- Computer games
- 3D desktops, e.g Compiz, Vista
- NUI – Natural User Interface
- New input methods
- More dynamic
- More eye-candy



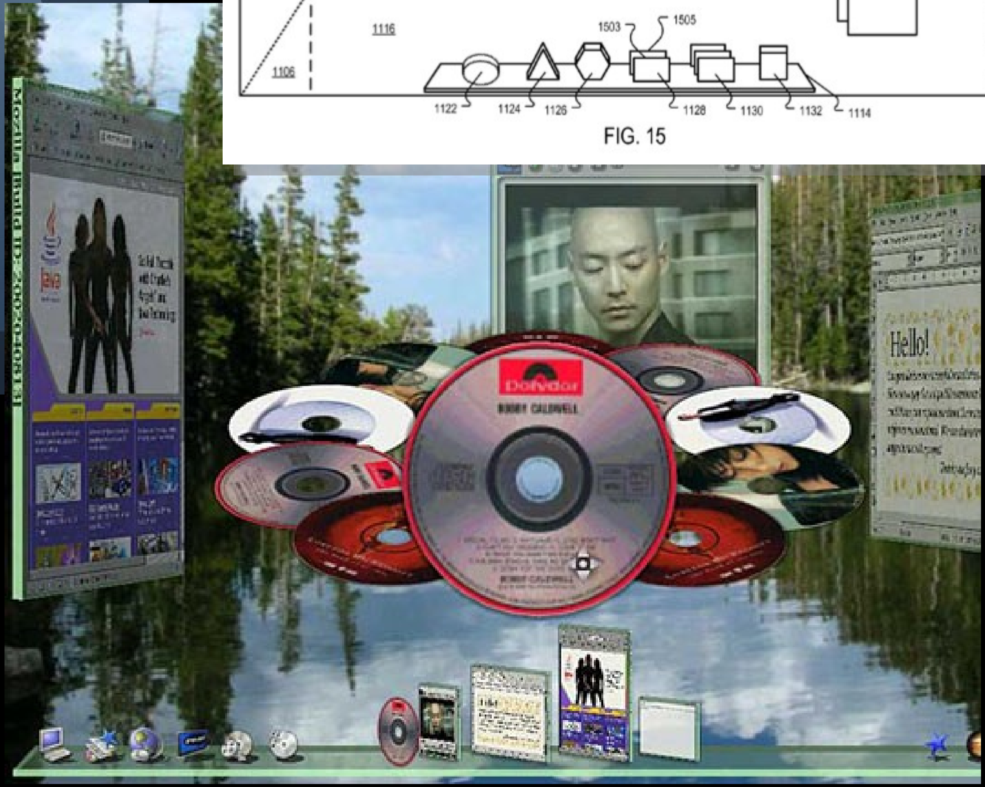
Post-WIMP



BumpTop, Watch Video



New Apple patents

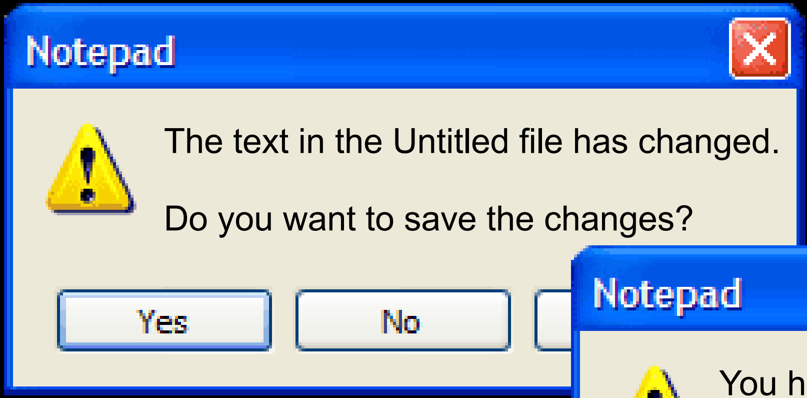


Looking Glass project by Sun

Usability

- Usable = Capable of being used
- User-centered design
- But only if the code underneath actually works

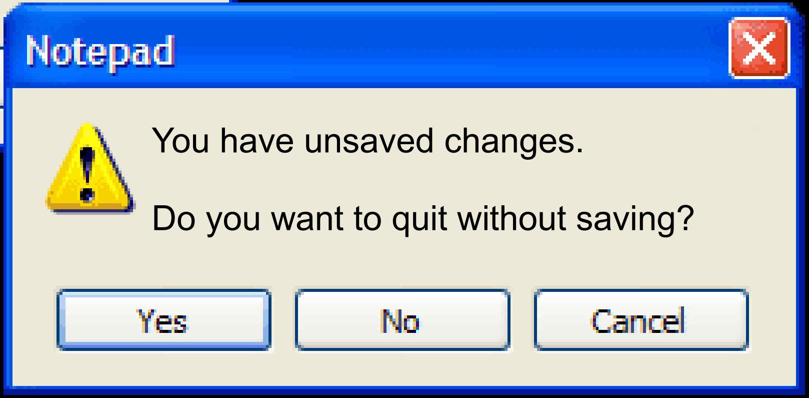
Usability



The text in the Untitled file has changed.

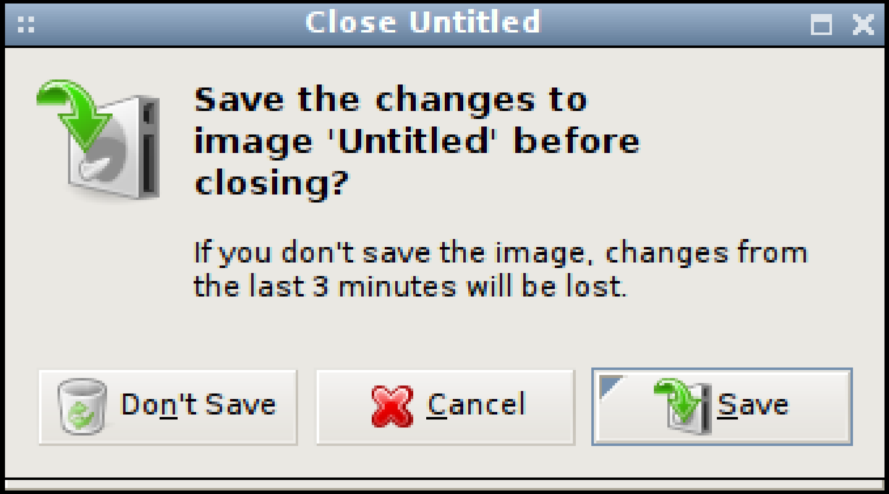
Do you want to save the changes?

vs



You have unsaved changes.

Do you want to quit without saving?



Save the changes to image 'Untitled' before closing?

If you don't save the image, changes from the last 3 minutes will be lost.

See the difference?

The most common User Interface Design Principles

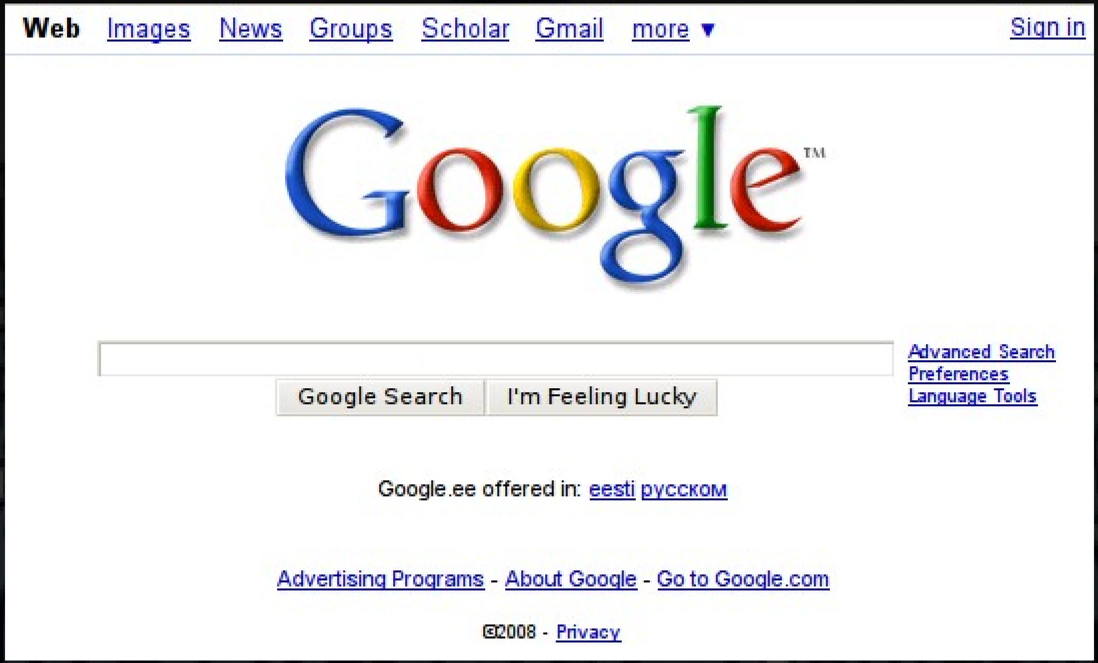
Clarity

If you can remember only one…

Consistency, Consistency, Consistency

- With itself and with other apps/environment!
- Important through all aspects of the UI
- Standard behaviors and intuitive interfaces require less explanation
- Inconsistency forces users to stop and deal with it - or make quick mistakes
- Creates sense of comfort and trust
- Includes colors, fonts, themes

Simplicity



People come here for searching!

I'm Feeling Lucky: “not useful, but gives personality”

Video: The Science and Art of User Experience at Google

Simplicity

- Enables concentration on the task
  - Show only useful and relevant stuff
  - Every UI element competes for attention
- Familiar things feel simpler (consistency)
- Every feature must benefit the users
- Try to make the UI obvious
- Provide reasonable defaults for the settings
  - most users won't bother changing them

“Don't Make Me Think”

- A program should let users accomplish their intended tasks as easily and directly as possible
- Is a much cited book by Steve Krug
- BTW, applies to **code** equally well!
  - “Any fool can write code that a computer can understand. Good programmers write code that humans can understand.”
    - Martin Fowler

Direct manipulation

- Allow users to act on objects directly
  - rather than dialogs or explicit commands
  - eg Drag and Drop
  - the effect must be obvious
- This is more intuitive and convenient
  - closer to the real world

Feedback

- Visual, audible, other (depends on hardware)
  - appropriate type of feedback for the task
  - redundancy is good
- Users must understand what they are doing
- Responsiveness = immediate feedback

Feedback types

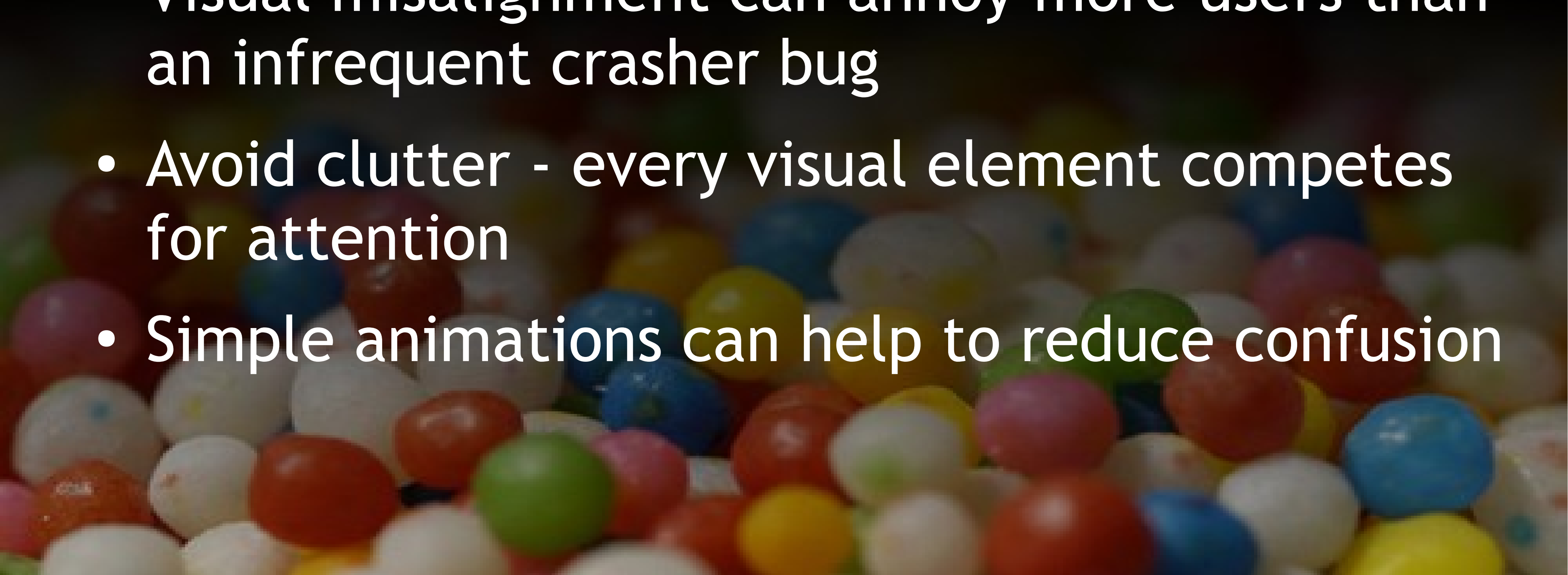
- Mouse pointer
- Visual changes of objects during manipulation
- Clear error messages
- Animations
- Progress bars, checklists
- Modeless popups (notifications)

Responsiveness

- Users don't tolerate slow software
  - it must feel fast (timely feedback)
- Early showing of windows/results
  - fooling users that the app is faster/more responsive than it actually is
- Delay what can be delayed
  - use background processing
- Avoid overuse of system resources

Aesthetics

- Users react better to the visually appealing UI
- For most people, visual channel of information is the primary one - provide them with eye candy!
- Visual misalignment can annoy more users than an infrequent crasher bug
- Avoid clutter - every visual element competes for attention
- Simple animations can help to reduce confusion



Language

- Short, clear messages
- Consistent and precise terminology
- Avoid abbreviations, numeric codes
  - This is why we use DNS!
- Localization, locales, encodings
- Technology-based vs Goal-based language

User in Control

- Computers exist to serve humans
  - user initiates actions
- Feel in control rather than be controlled
  - avoid modes - users should be able to switch between tasks at any time
- Honor system/global settings!
- User should be allowed to tune and personalize the software
  - but not too much - only really useful things

WYSIWIG

- What You See Is What You Get
  - provide early insight on the final result
- Very old principle, still important
  - especially for non-technical people
  - technical users may want to avoid it

Keyboard

Keyboard

- Every computer has one!
- WIMPK?
- It must be usable even in GUI applications
  - 100+ keys
  - faster to use compared to mouse
  - Examples
    - PhotoShop, AutoCAD
    - even web apps, eg Gmail and MediaWiki

Accessibility

- Don't limit your user base!
- People with disabilities
  - Contrast
  - Font size
  - Color blindness
  - etc
- Redundancy
- Keyboard
- Internationalization

Annoyance

- What about now?
- Now?
- Now?
- Now?
- Just wanted to know if I should restart now?
- What about now?
- Are you ready to restart?
- Shall I restart now?
- Should I not restart later?
- I think I should restart now.
- Wouldn't it be good if I restarted now?
- Updates complete. Restart now?

Annoyances

- The infamous Clippy in MS Office
- Notification abuse (system tray in Windows)
- Paranoid confirmations in Vista
- Wizards
- Start menu bloat
- “Hanging windows” (no WM authority)
- Illogical menu structure (File->Exit)
- Non-resizable tiny dialogs
- Lack of style and consistency

Cross-platform

- Nowadays is a must
  - Don't limit your user base
  - Ensure your success doesn't depend on the success of some particular platform
- Web always is!
- Be consistent with the platform
- Testing

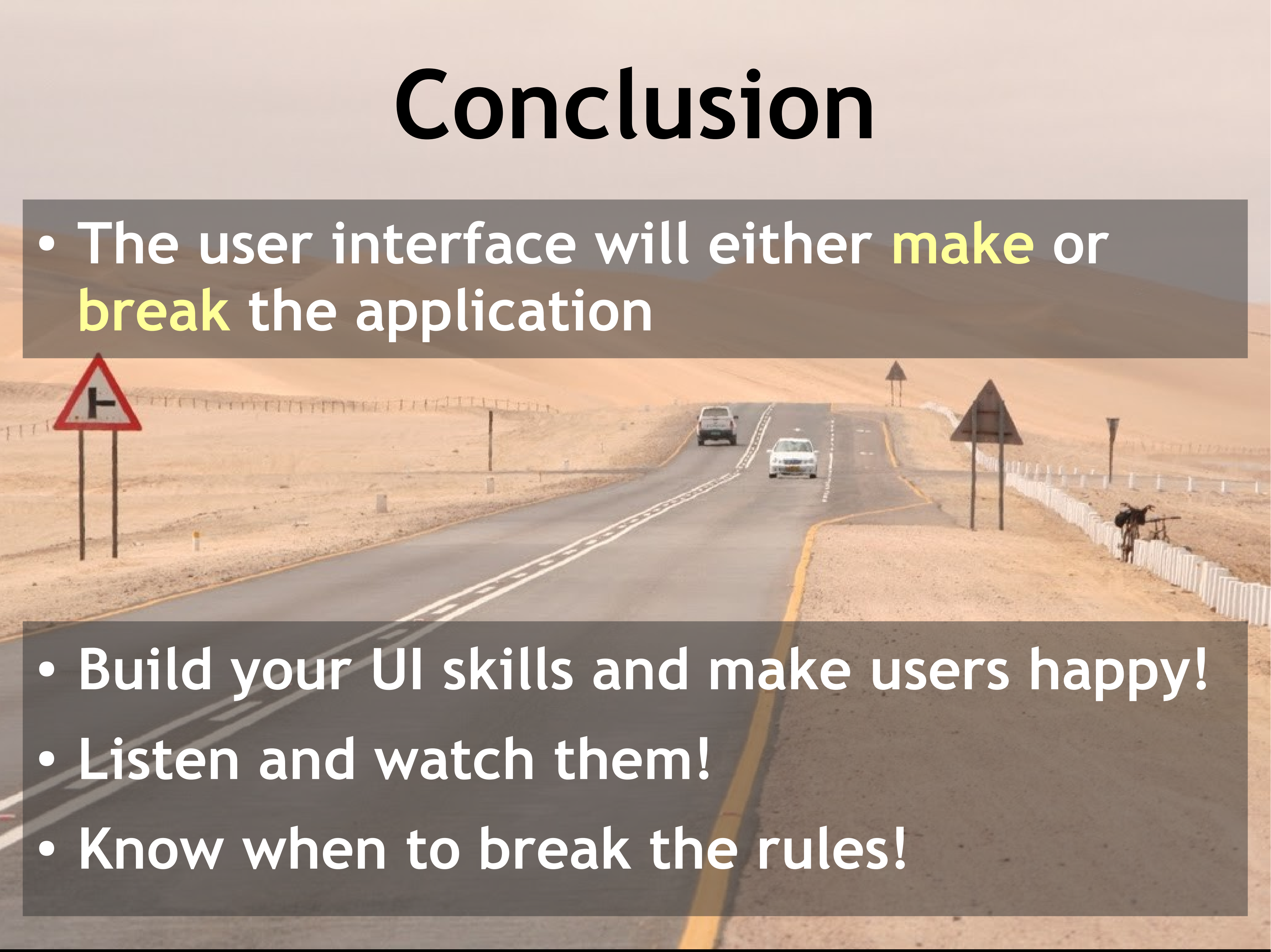
Usability Testing

- "Corridor testing"
  - very easy to do, invaluable feedback
  - take any 3-4 persons, give them tasks, observe them having trouble
- More formal testing may involve measuring of
  - Performance
  - Accuracy
  - Recall
  - Emotional response

“Am I the only one who doesn't want a "user experience"? If I'm getting an "experience", the damned user interface is getting in my way. I just want to get the job done, not have an "experience".”

- someone on Slashdot

Conclusion



- The user interface will either make or break the application

- Build your UI skills and make users happy!
- Listen and watch them!
- Know when to break the rules!