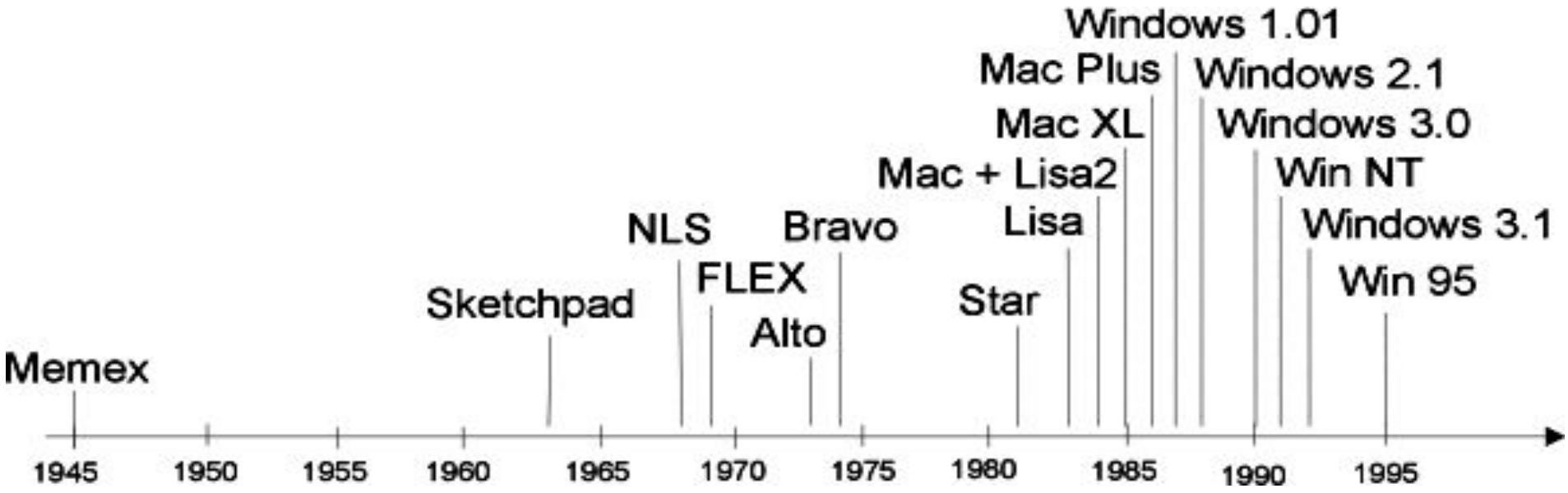
SENG 310
Lecture 2 - May 8th, 2023

Slide credits: Prof. Sowmya Somanath and Prof. Charles Perin

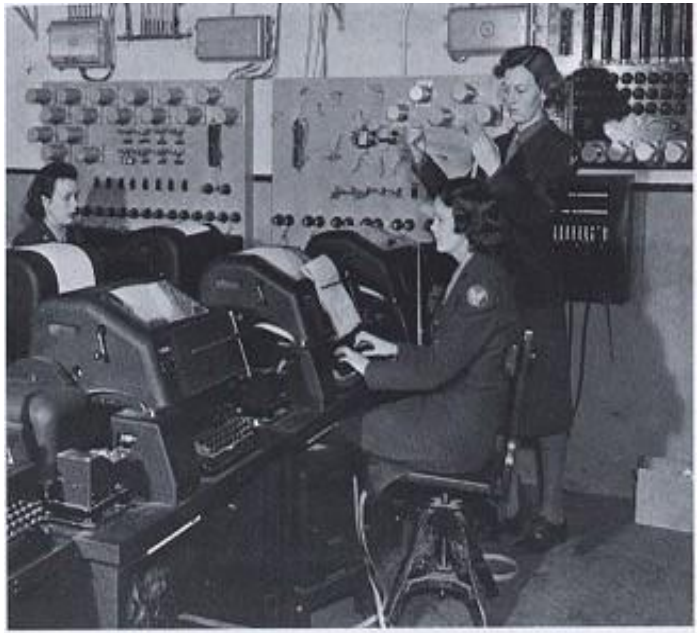
Brief History of HCI

Approximate Timeline

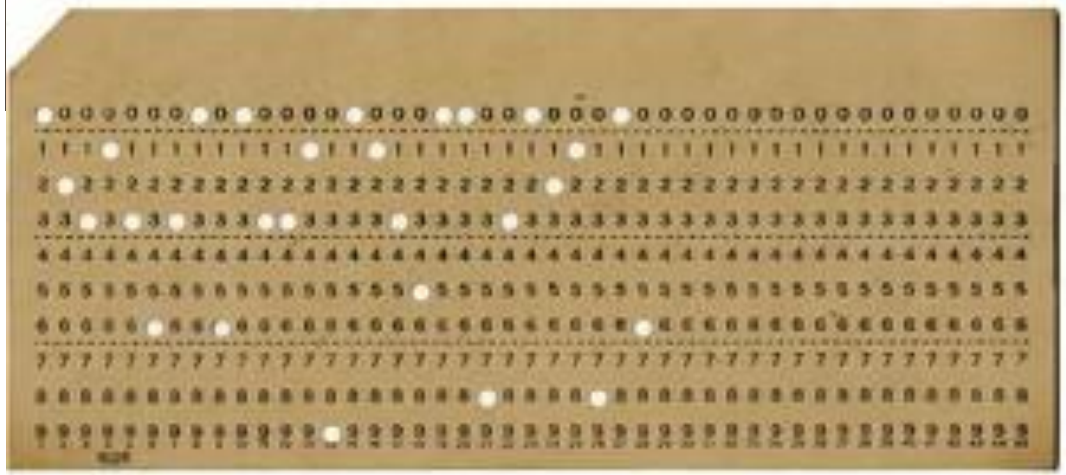


Approximate Timeline

I. **Operate the machine**
II. Use the software
III. Perform a task
IV. Experience (live, learn, work, play)



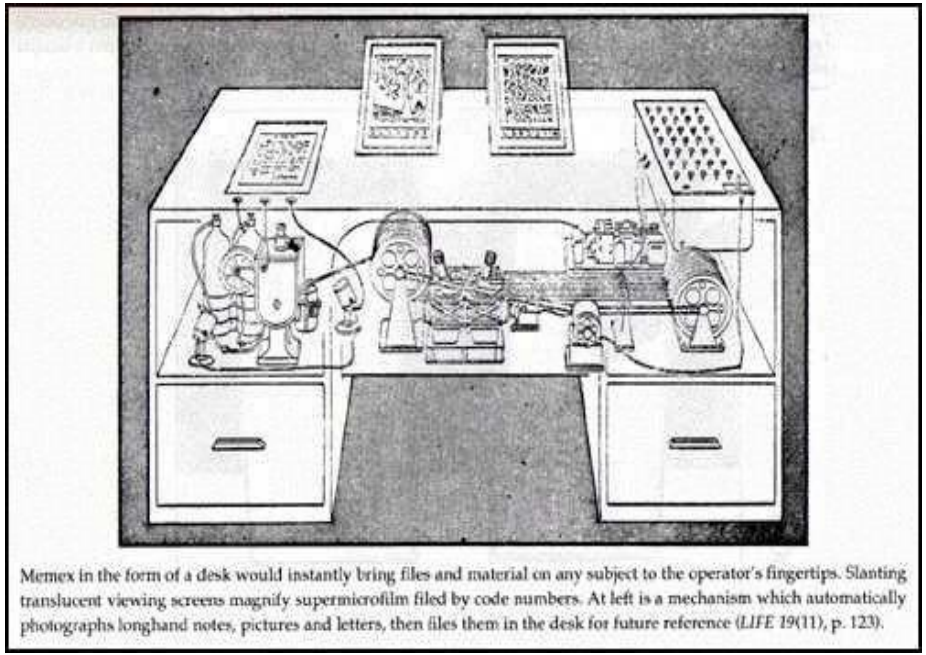
WACs assigned to the Eighth Air Force in England operate teletype machines. (DOD photograph)



MEMEX

Conceived Hypertext and the World Wide Web

- A device where individuals store all personal books, records, communications, etc..
- Items retrieved rapidly through indexing, keywords, cross references
- Can annotate text with margin notes, comments, etc..
- Can construct and save a trail (chain of links) through the material
- Based on microfilm, not implemented



Memex in the form of a desk would instantly bring files and material on any subject to the operator's fingertips. Slanting translucent viewing screens magnify supermicrofilm filed by code numbers. At left is a mechanism which automatically photographs longhand notes, pictures and letters, then files them in the desk for future reference (*LIFE* 19(11), p. 123).

Engelbart’s NLS Demo

Document Processing

- Modern word processing,outlines
- Hypermedia

Input / Output

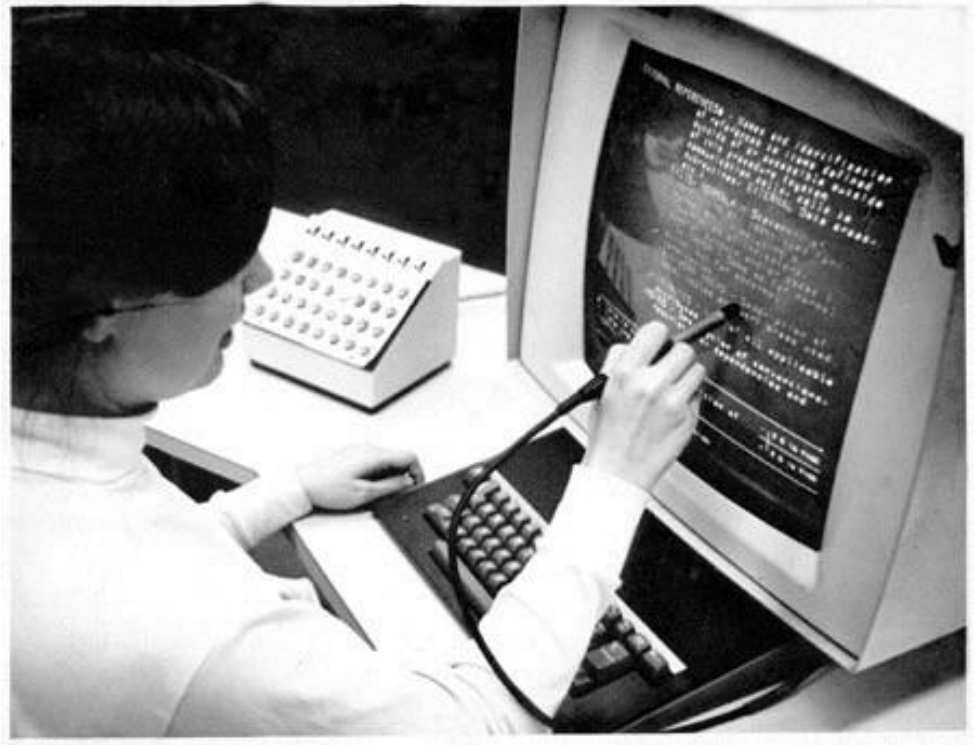
- The mouse, one-handed corded keyboard
- High-resolution displays
- Multiple windows
- Specially designed furniture

Shared Work

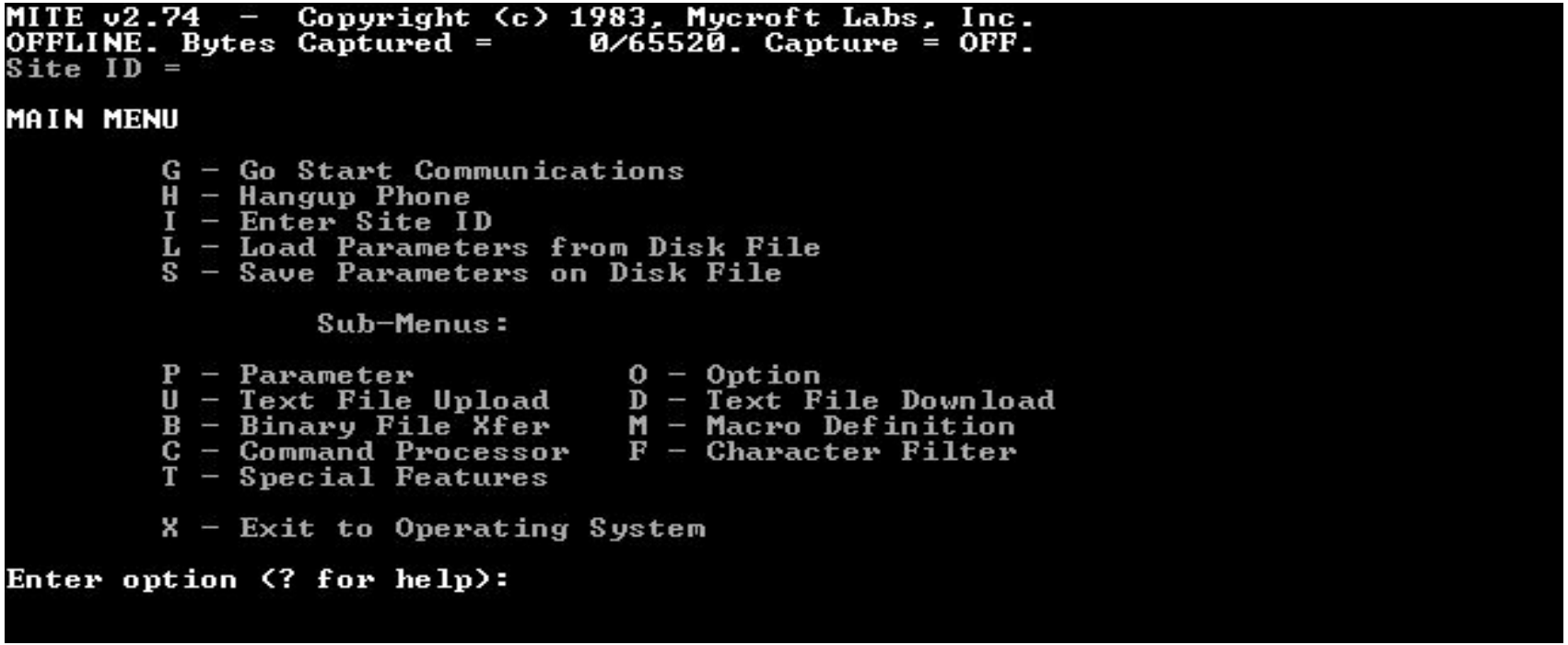
- Electronic messaging
- Shared displays with multiple pointers
- Audio/video conferencing
- Ideas of an internet

Early Hypertext Systems

Brown University, 1969



Command Line Interfaces



Approximate Timeline

I. Operate the machine
II. Use the software
III. Perform a task
IV. Experience (live, learn, work, play)

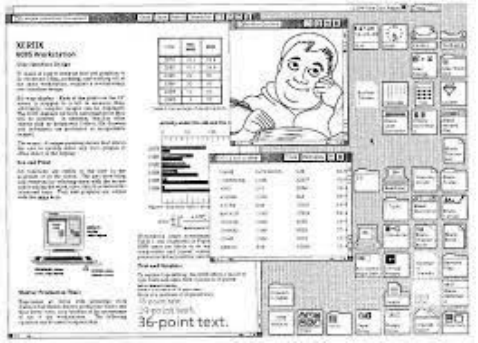
Personal Computers in the 70s and 80s

Alto Xerox PARC, mid-70's

- **Local processor** but on **local area networks** (shared resources)
- Bit-mapped **display**, **mouse GUI**, windows, menus
- **Apps:** email, text and drawing editing

Xerox STAR, 1981 (one of the first commercial PCs)

- Familiar **user's conceptual model** (the desktop)
- Promoted **recognizing/pointing** rather than remembering/typing
- What you see is what you get (**WYSIWYG**)
- Small set of **generic commands** that could be used throughout the system
- High degree of **consistency** and **simplicity**
- Limited amount of user **tailorability**



Approximate Timeline

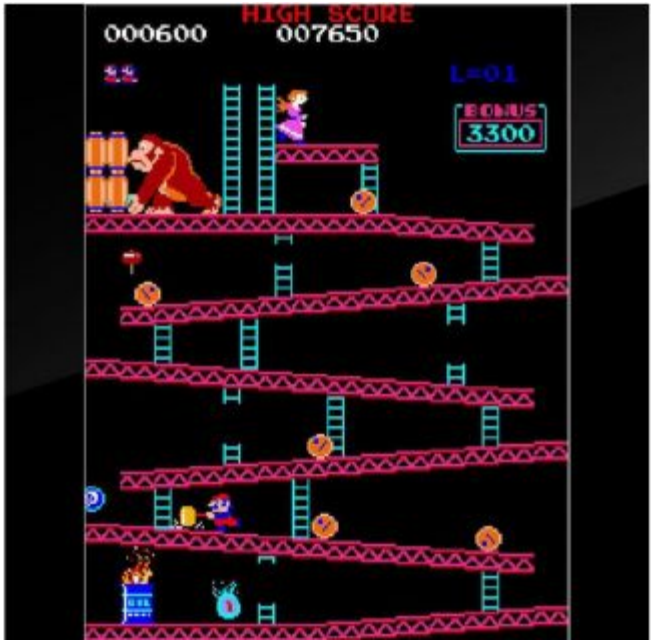
I. Operate the machine
II. Use the software
III. Perform a task
IV. Experience (live, learn, work, play)

“Direct Manipulation”, 1982

Visibility of the object of interest

Rapid reversible, incremental actions

Replacement of complex command language syntax by direct manipulation of the object of interest



Shneiderman, B., "Direct Manipulation: A Step Beyond Programming Languages." IEEE Computer, 1983. 16(8): pp. 57-69.

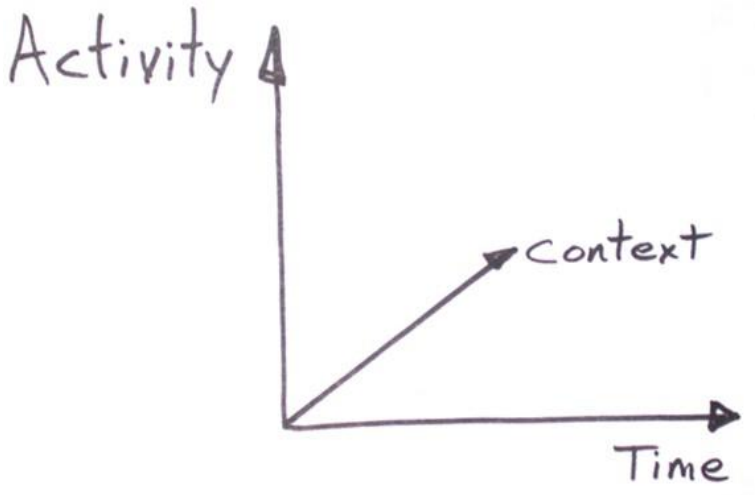
Approximate Timeline

I. Operate the machine
II. Use the software
III. Perform a task
IV. Experience (live, learn, work, play)

Need to fit context of use, latent needs

Focus on not just one individual, but many people

Focus not just on one point in time, but over time



Key Takeaways

The goal in many of these projects is developing new technology mediums, motivated by human needs and abilities such as:

- Ergonomics
- Ability to be precise
- Ability to remember things
- Need for being faster
- Need for being creative
- And much more

Key to your project work in this course as well.

Key Takeaways

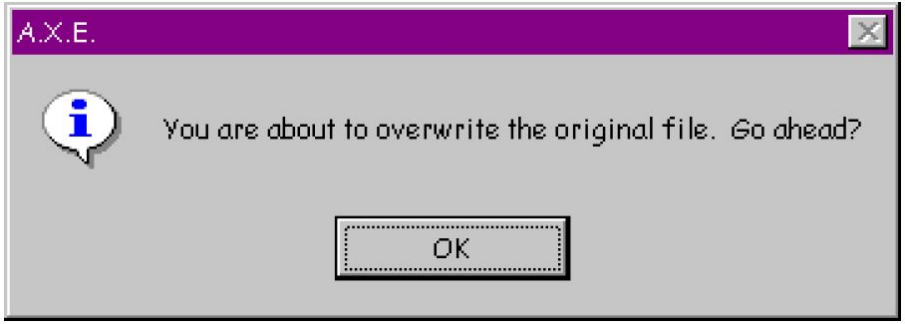
“Despite the enormous outward success of personal computers, the daily experience of using computers far too often is still fraught with difficulty, pain, and barriers for most people.”

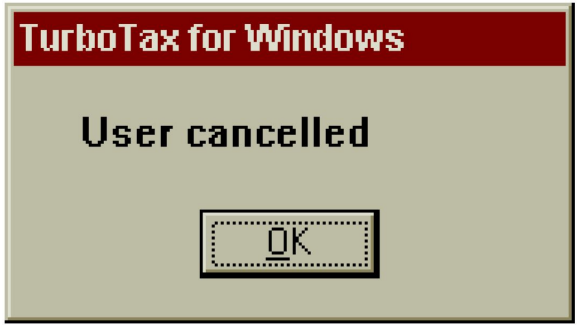
“The lack of usability of software and the poor design of programs are the secret shame of the industry.”

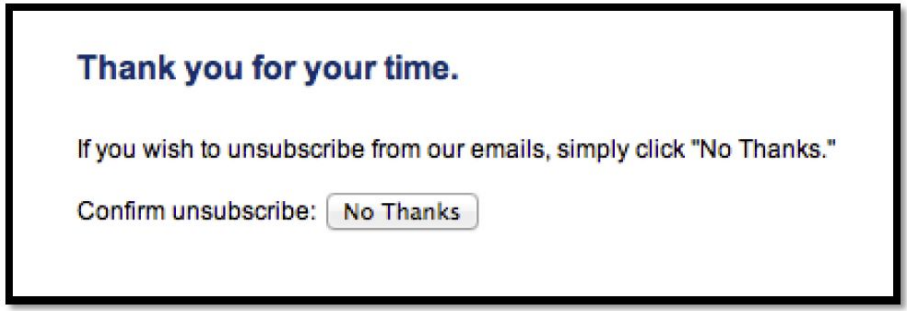
Kapor, Software Design Manifesto (1990)

Good and Bad Design

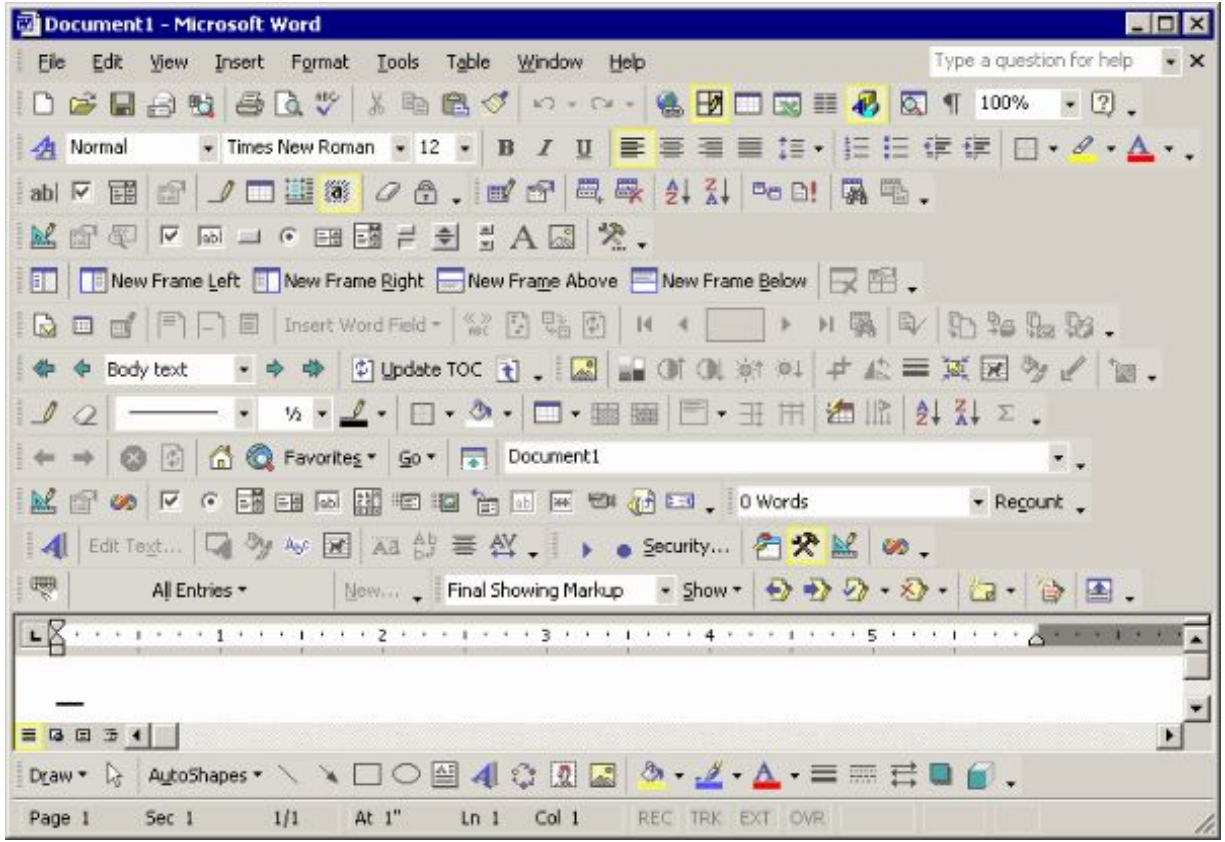

Error Deleting File
Cannot delete 016: There is not enough free disk space.
Delete one or more files to free disk space, and then try again.
OK


A.X.E.
You are about to overwrite the original file. Go ahead?
OK


TurboTax for Windows
User cancelled
OK


Thank you for your time.
If you wish to unsubscribe from our emails, simply click "No Thanks."
Confirm unsubscribe:
No Thanks

What make a good experience?



Characteristics of a Good Interface

People feel **satisfied** when they use them

People can complete their tasks **error-free**

People can complete their tasks **quickly**

People can **learn** how to use the system (and it's functionality) quickly for first-time use

Seven Fundamental Principles of Interaction

Discoverability

Affordances

Signifiers

Mapping

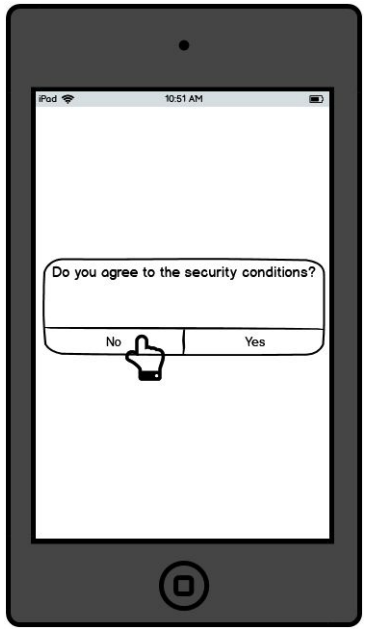
Feedback

Constraints

Conceptual Models

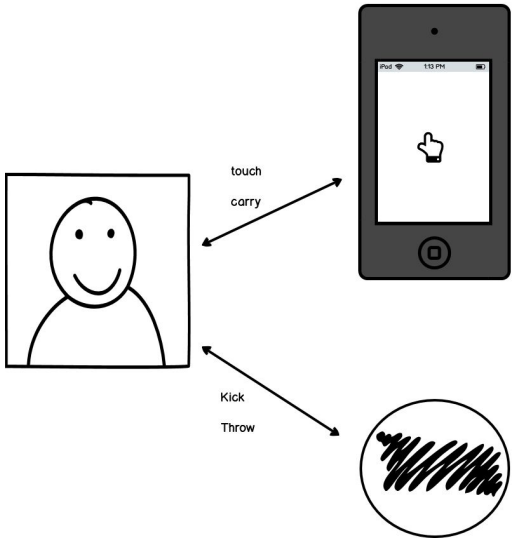
The Design of Everyday Things. Don Norman, Basic Books, (1988)

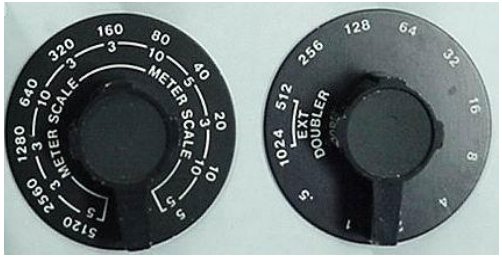
Discoverability



Is it possible to determine what actions are possible and where and how to perform them?

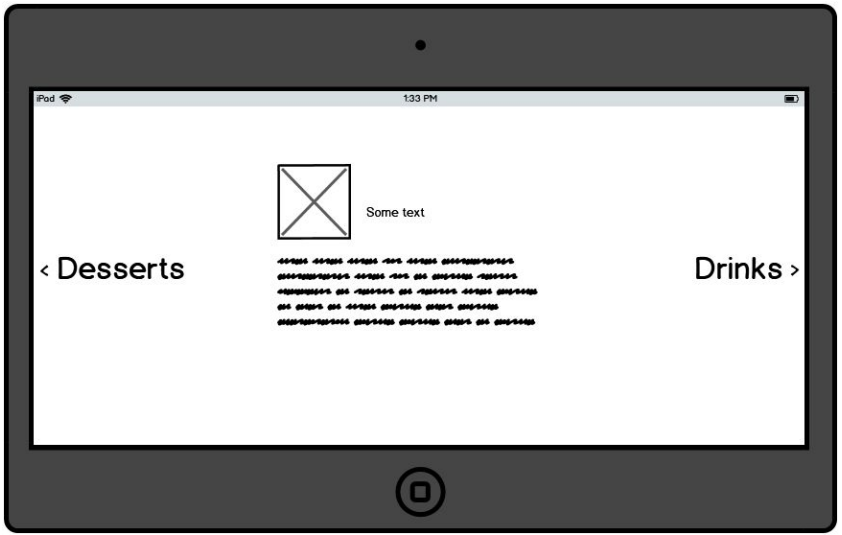
Affordances





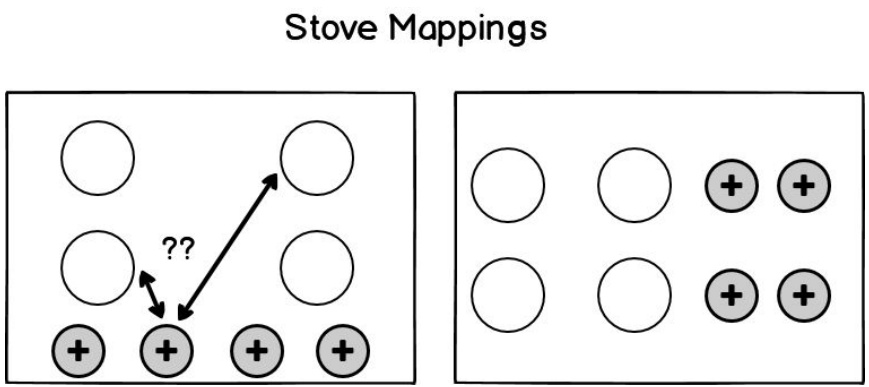
It is the relationship between the properties of the artifact **and** the capabilities of the agent that determine how the artifact could possibly be used.

Signifiers



Signifier is a communication mechanism (sound, mark or other perceivable indicator) that communicates appropriate behavior to the person.

Mapping



Mapping is the relationship between controls and their corresponding actions.

Typically spatial correspondence is helpful. Some may emerge from cultural practices

Feedback

Feedback shows full and continuous information about the results of action and the current state of the technology.

Constraints

Constraints set some limitations for how people interact with the technology.

Conceptual Models

Conceptual Model is an explanation we form, typically simplified, of how something works and in turn interact with technology.

Slips and Mistakes - Two Kinds of Error

Slip vs. Mistake

SLIP: error in carrying out an action (e.g., motor action)

MISTAKE: error in choosing an objective or action (e.g., cognitive goal)

Slips could be a lapse in attention, or due to a change in typical circumstances

Mistakes typically occur when a person **misunderstands** something in the system

The distinction matters because as designers, we want to help people avoid mistakes. With careful design, we can help avoid slips, too.

Two Kinds of Errors

Imagine you are using a mapping application wanted to find something, and clicked this icon.

Let’s pretend that in the application, the icon meant to magnify.

Is this a slip or a mistake?

Slip vs. Mistake

Mistyping an email address

Clicking on a heading that isn’t clickable

Clicking “Save” instead of “Open”

Sending an email without remembering to add the attachment

Typing both first and last name in the first name field

SENG 310 Project