

# Intro: Design and Creation

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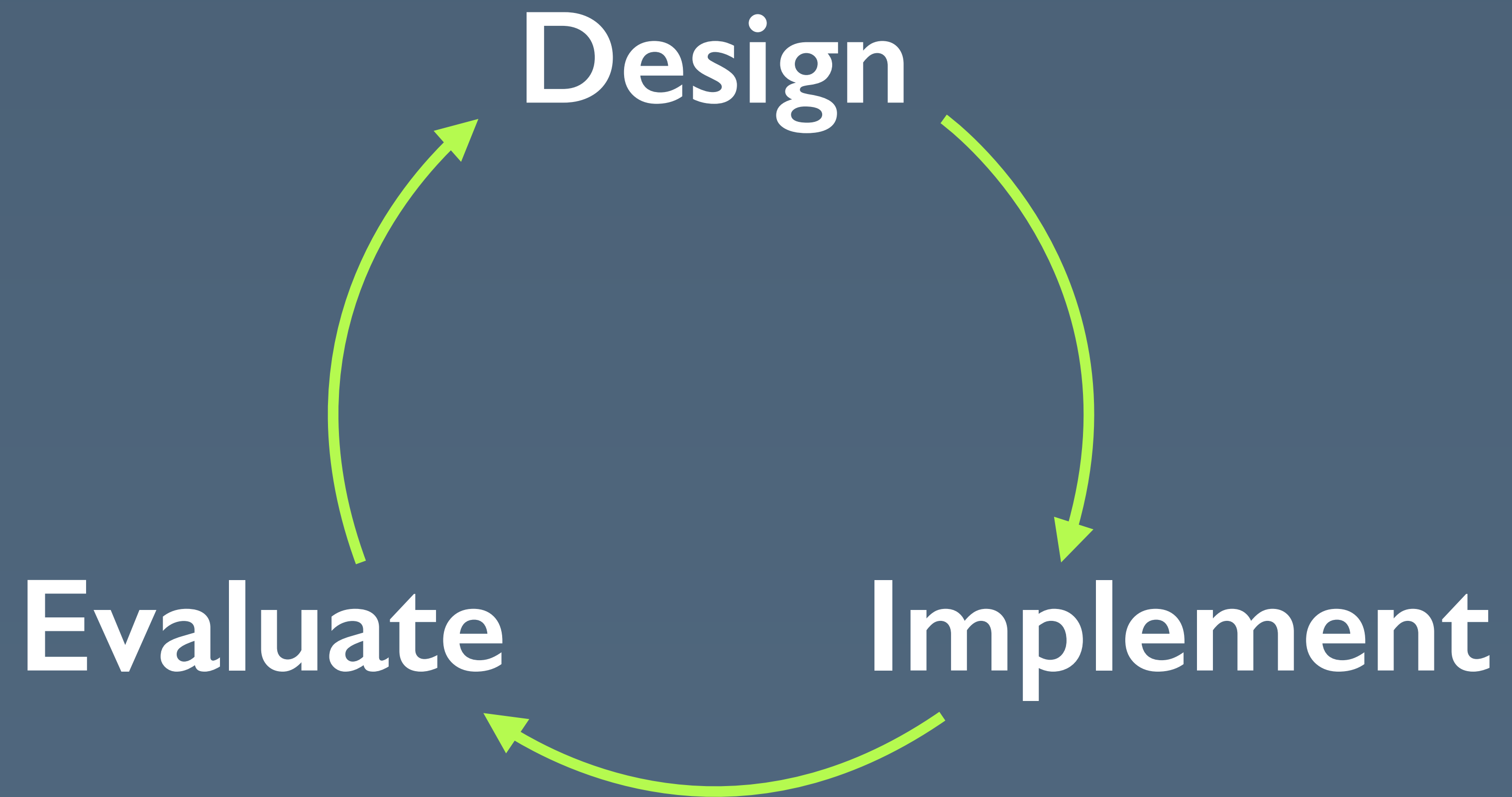
CS 376

# Announcements

- Readings: the magic of Stanford's EZProxy
- Project Brainstorm Round 2 due Friday
  - Find a team!
  - Mixer at 5pm today
- Feedback on Round 1 coming soon

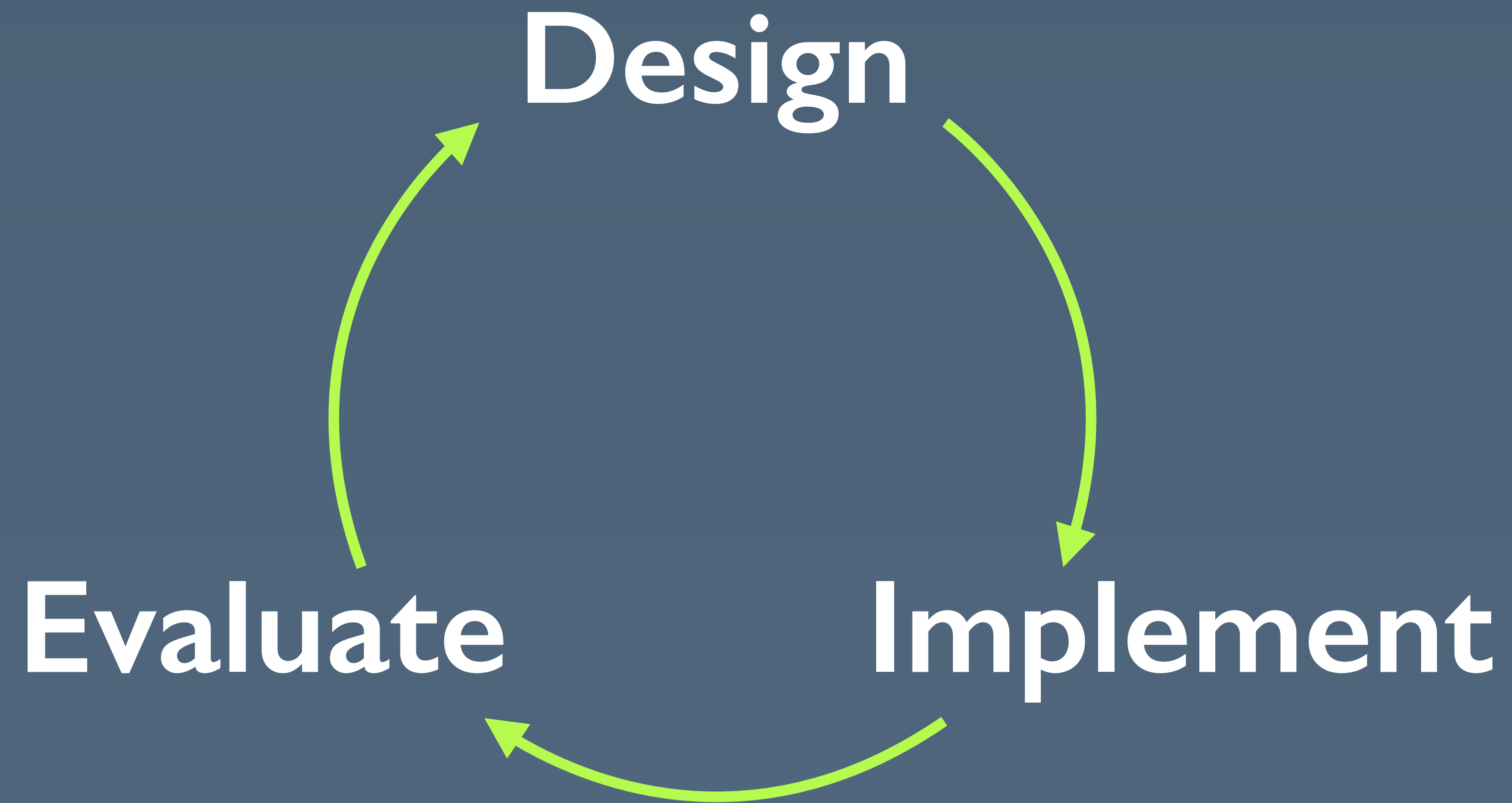
# Round 1 feedback

- Research is a different mode of thinking than typical design projects
- For this assignment, we're sharing warnings rather than grading harshly. (That's by design!) Now that you're learning this, we'll be more stringent with Round 2.
- To Rob!



**Design and creation are  
not static processes.**

**They can be studied,  
supported and improved.**



How might we facilitate and empower this process?

# Design

Brainstorming process  
Early-stage design tools

# Evaluate

Study strategies  
Cognitive modeling

# Implement

Programming tools  
WYSIWYG design tools  
Rapid prototyping tools

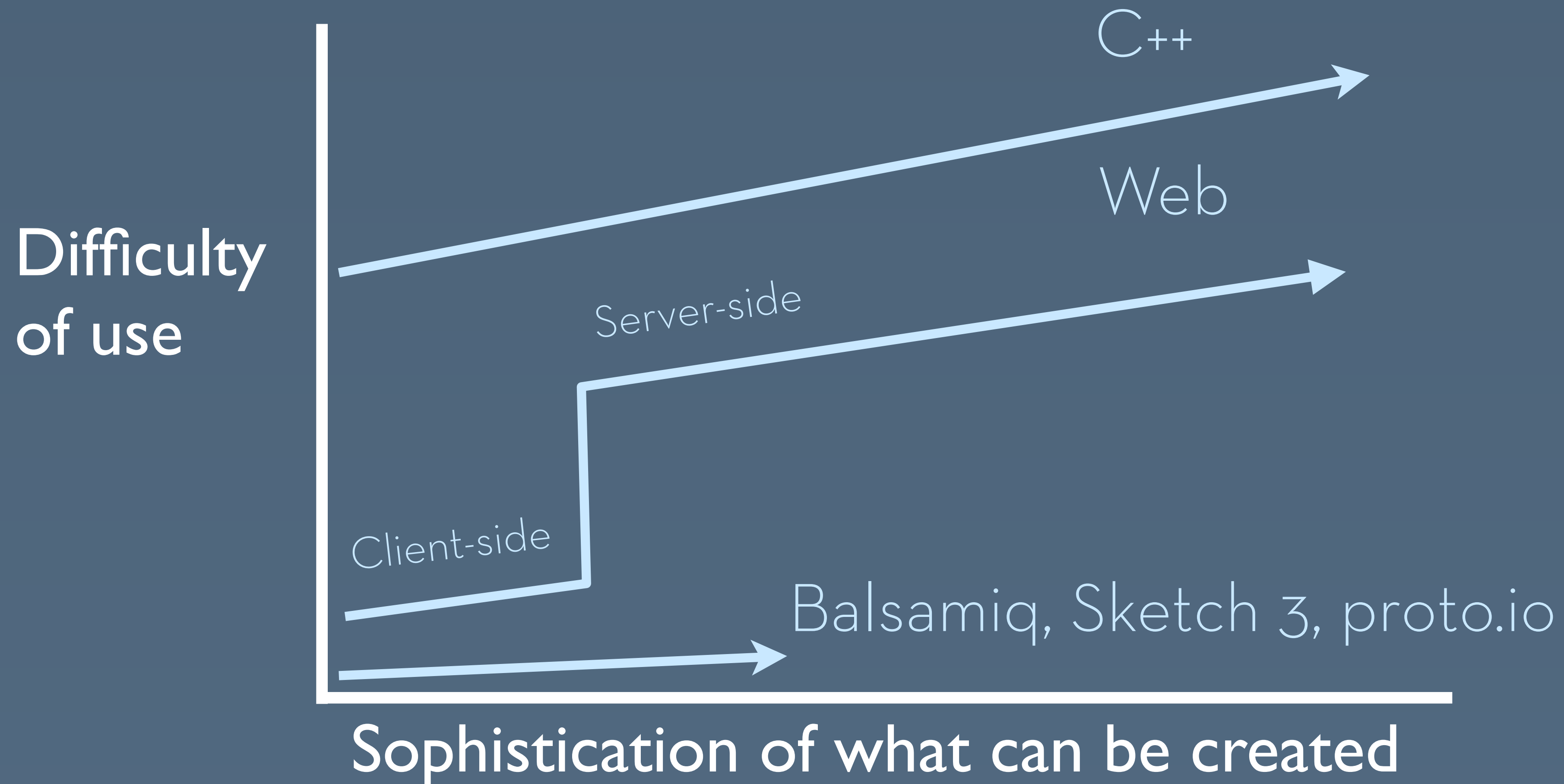
**“Enlightened trial and error  
outperforms the planning of  
flawless intellect.”**

- David Kelley



# Threshold/Ceiling Tradeoff

[Myers, Hudson and Pausch, TOCHI 2000]



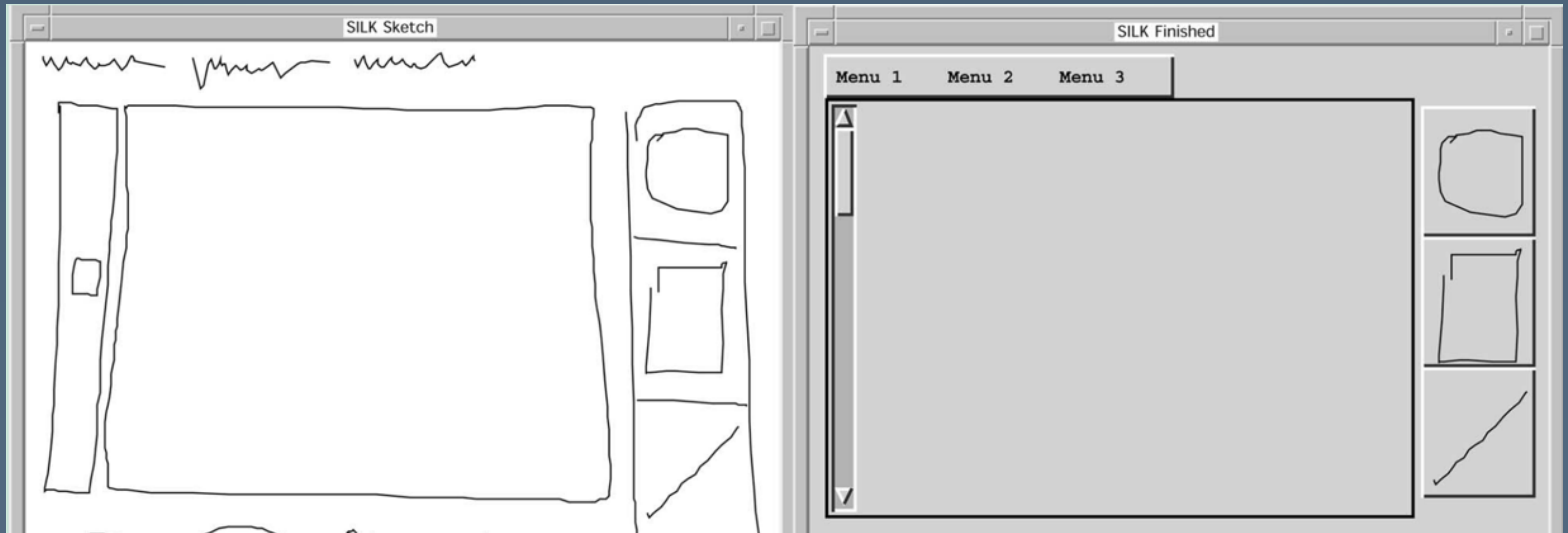
# Design tools

# Goal: facilitate rapid iteration

- Prototypes enable exploration and iteration around concrete artifacts
- The more fluid the prototyping process is, the more you can learn before you sink time into engineering

# Sketch the interaction to produce working systems

- SILK [Landay, CHI '96]



# Sketch the interaction to produce working systems

- Led to: Balsamiq



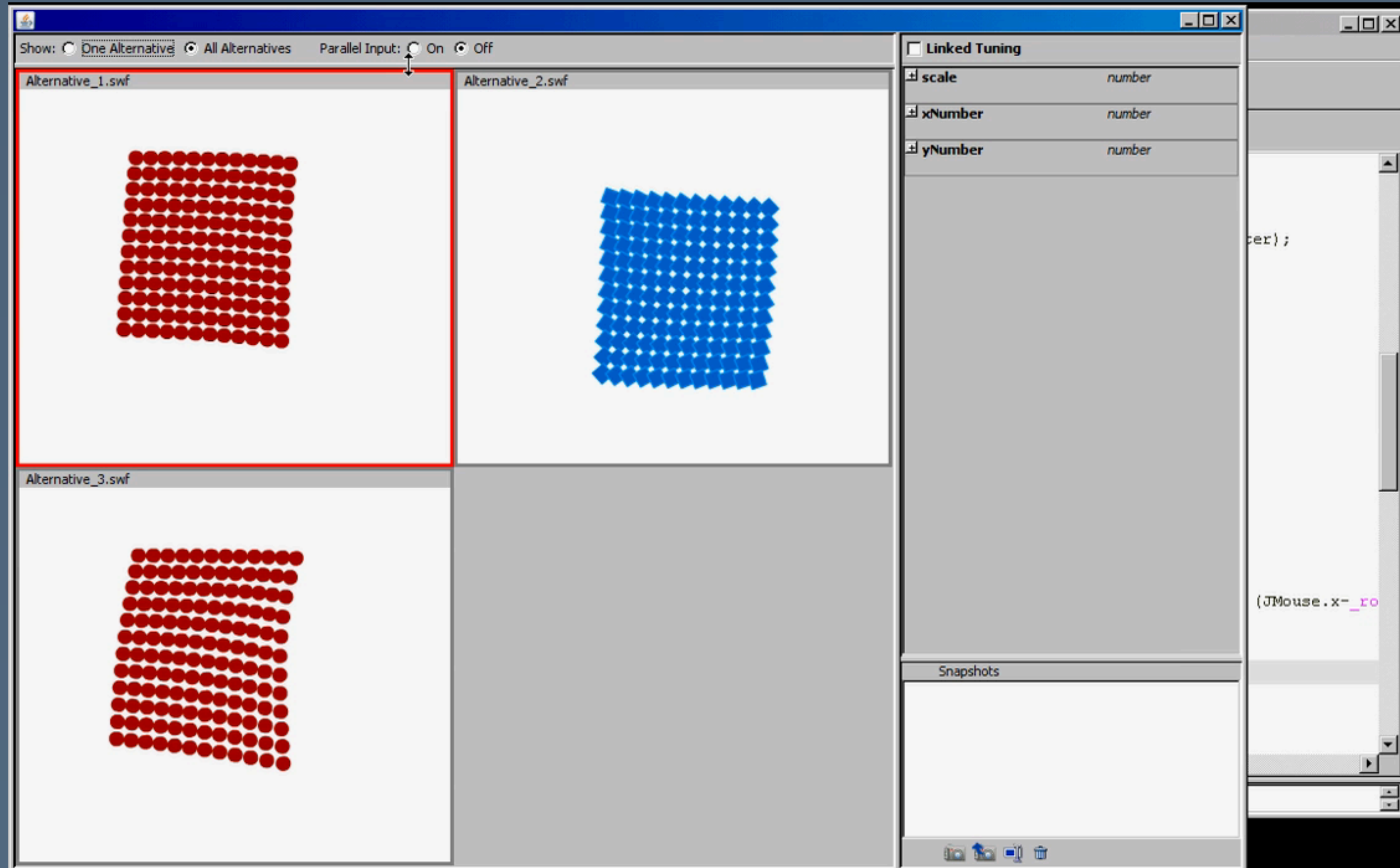
# d.tools: Prototyping Physical Computing Experiences

- How might we prototype an iPhone in thirty minutes?
  - Plug-and-play sensors
  - Statechart authoring for logic
  - Runtime visualization of user states



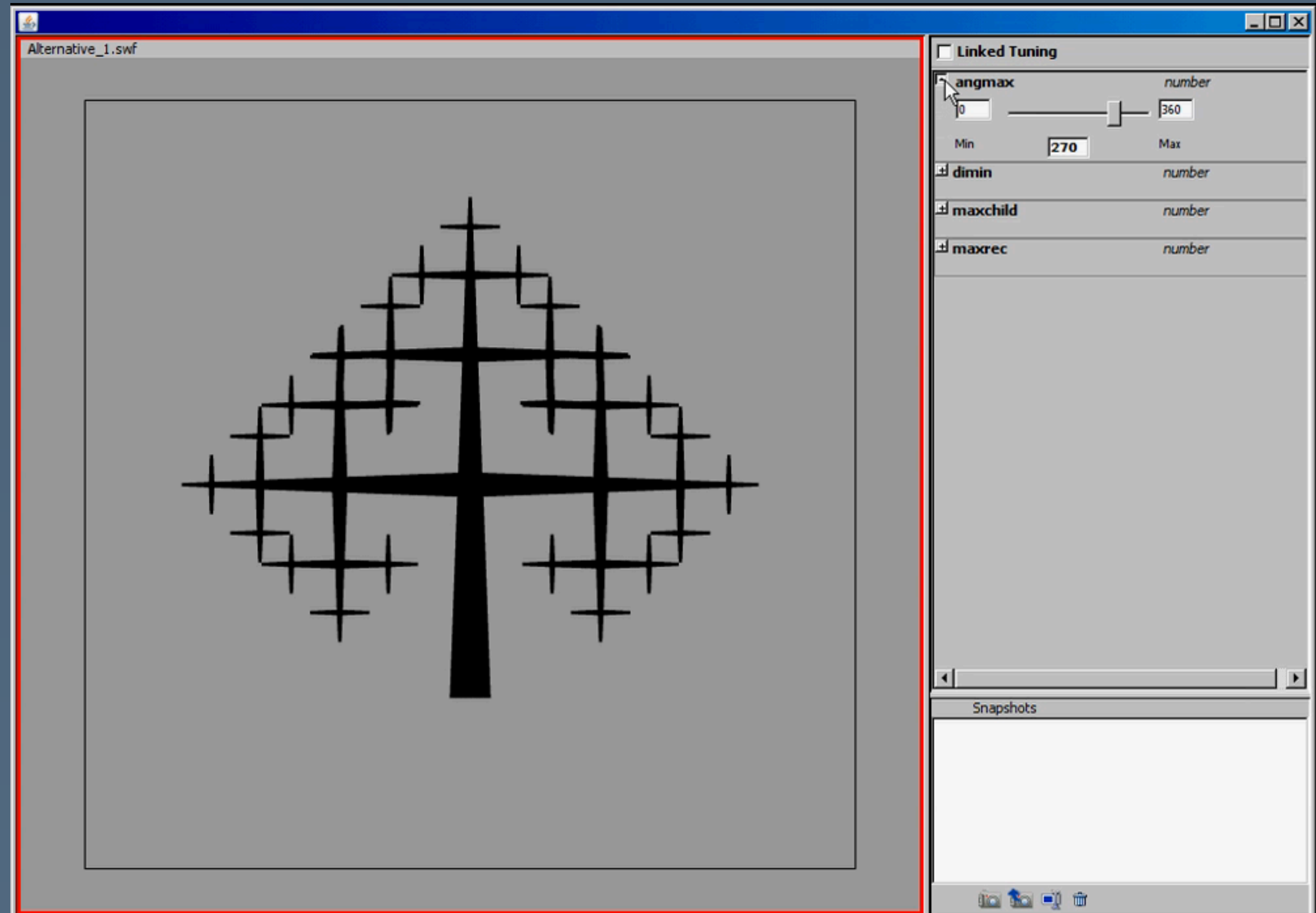
# Closed-loop parameter tuning

- Juxtapose  
[Hartmann et al.,  
UIST 2009]



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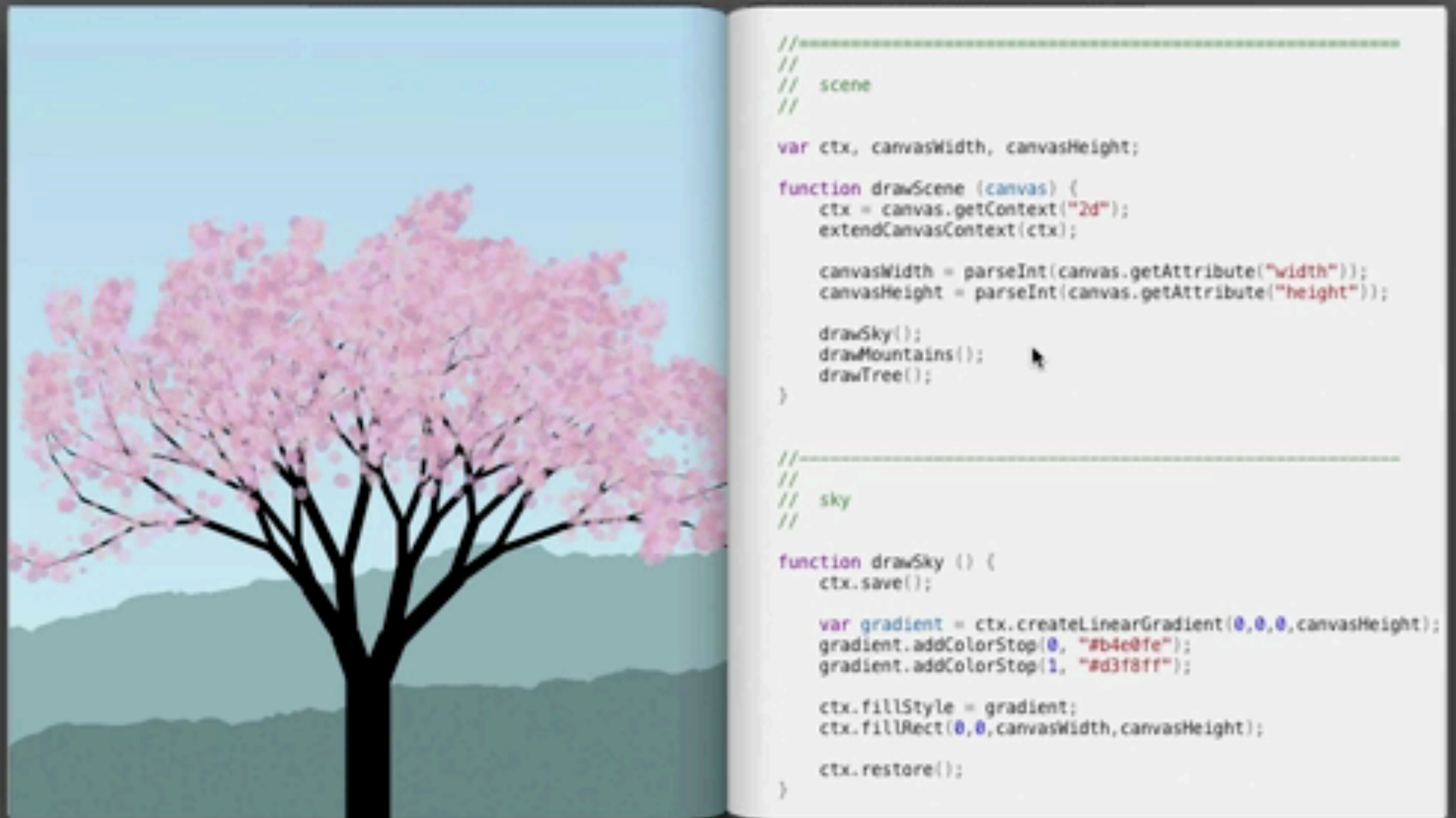


Tree matc



# Closed-loop parameter tuning

- Led to:  
Inventing on  
Principle  
[Victor 2012]



# Design process

# Improve the process, improve the output.

- The design process we teach in human-computer interaction need not be fixed!
- Many techniques we use today were once prototyped in research labs.

# Wizard-of-Oz Prototypes

- An iterative design methodology for user-friendly natural language office information applications [Kelley, TOIS '84]
- *“Central to the methodology is an experimental simulation which I call the OZ paradigm, in which experimental participants are given the impression that they are interacting with a program that understands English as well as another human would.”*

# Iterate on a design, or create parallel alternatives?

[Dow et al., TOCHI 2010]

- Feedback on five iterations or five parallel alternatives
- Quality measured via ad clickthrough
- Designs generated in parallel condition had  $\sim 1/3$  more clicks



# Participatory Design

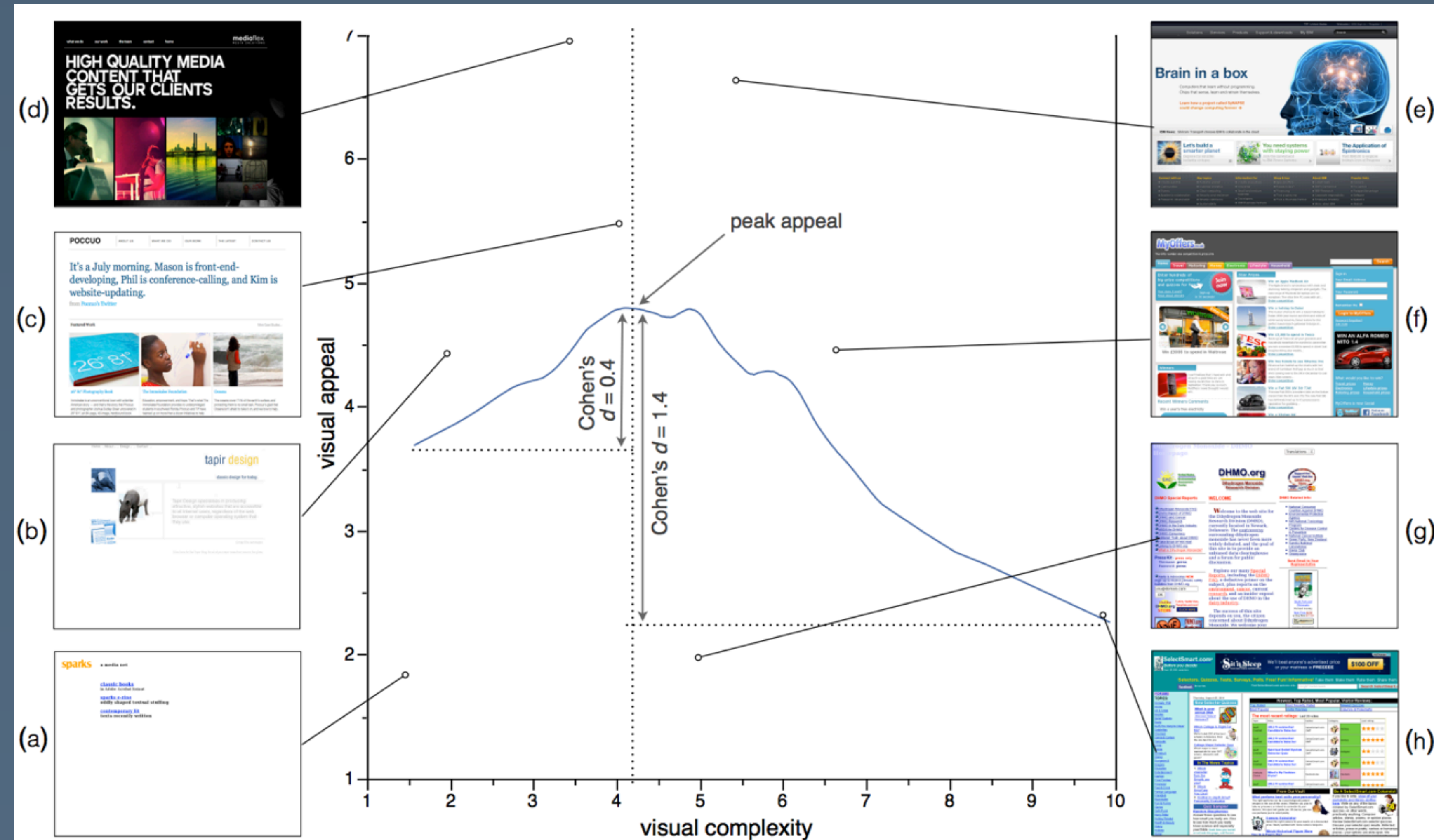
[Schuler and Namioka '93]

- Developed in Scandinavia, and later ported to the United States design tradition
- Involve the eventual users deeply in the design process
  - Initial exploration
  - Problem definition
  - Develop and focus ideas
  - Evaluation

# Quantifying Visual Preferences

[Reinecke and Gajos CHI 2014]

- LabInTheWild data via a quiz about which web sites you like



**(End-user)  
programming**

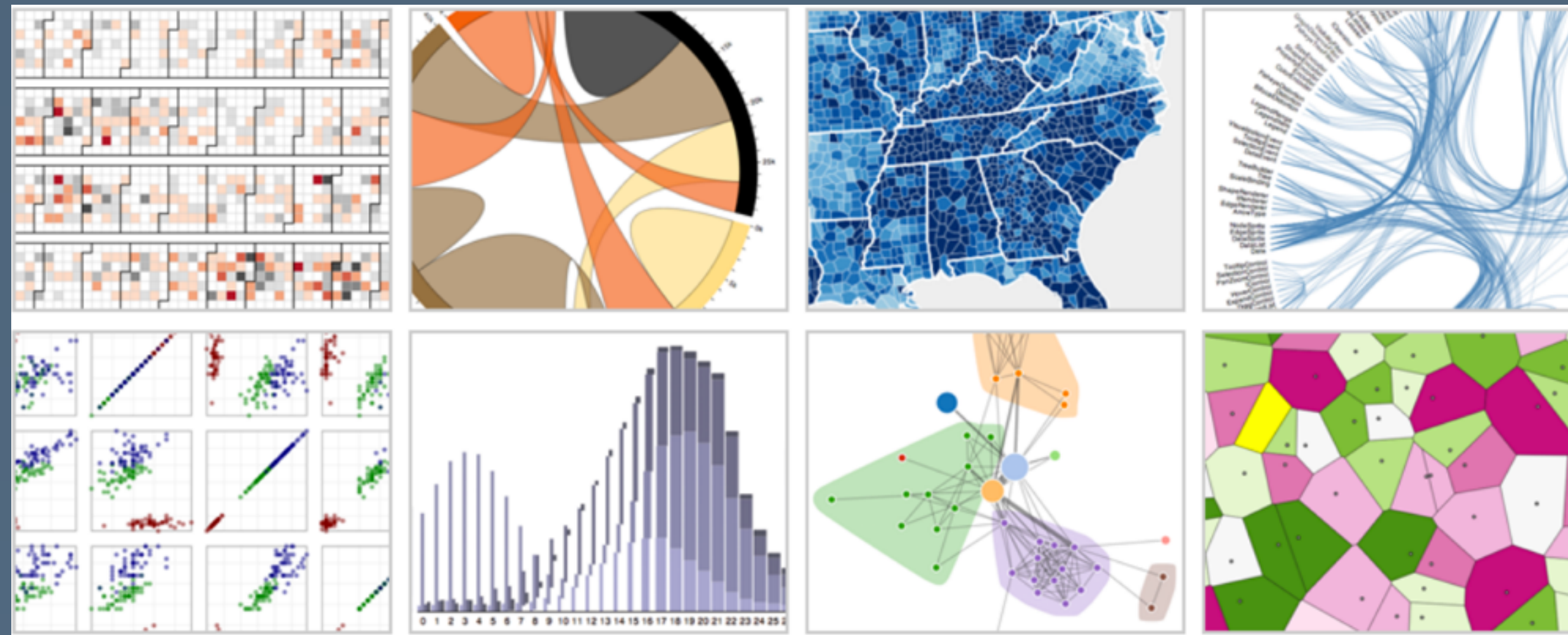


# Garbage in, garbage out

- The quality of the interactive systems we build depends on the tools we have at our disposal
- Toolkits and software engineering UIs...
  - Make programming easier to learn and debug, more powerful and more natural
- End-user programming...
  - Make programming more accessible to non-engineers

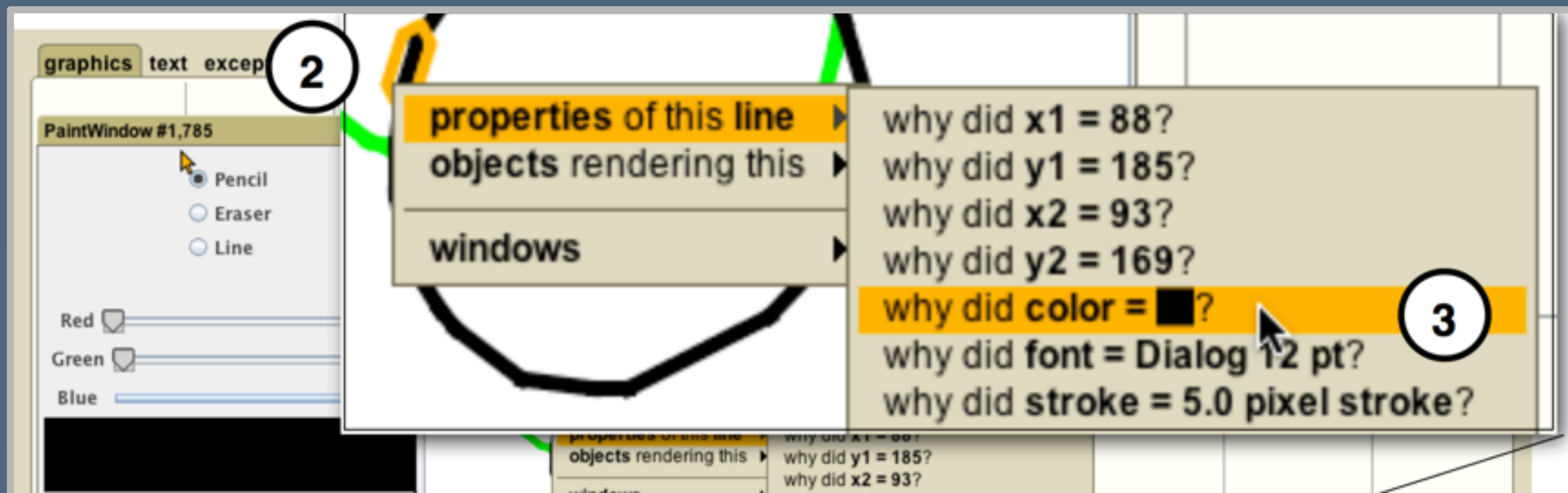
# Programming toolkits

- Seek to understand programmers' mental model and task goals
- Then, design better support!
- D3: Data-Driven Documents  
[Bostock, Ogievetsky and Heer, Visweek '11]



# Software engineering interfaces

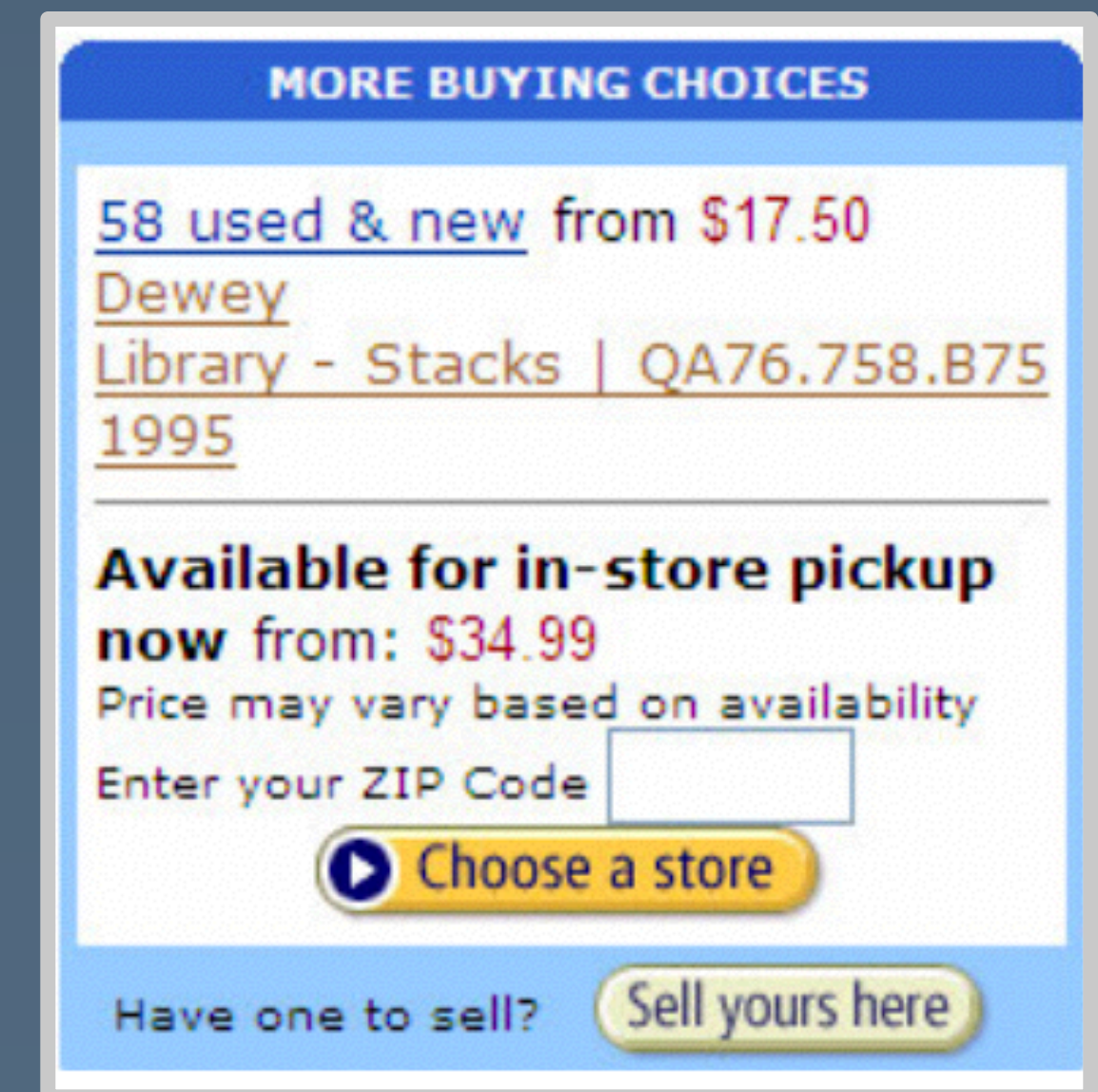
- Augment the development environment rather than the programming language
- Programmers often ask ‘why?’ questions of their programs. Could we support this directly?  
[Ko and Myers, CHI ‘08]



# End-user programming

- Lower the threshold to writing programs
- Allow users with little programming skill to author behaviors
  - e.g., Chickenfoot [Bolin et al., UIST 2008]

```
isbn = find('number just after isbn')
with (fetch('libraries.mit.edu')) {
  pick('Keywords');
  enter(isbn)
  click('Search')
  link=find('link just after Location')
}
// back to Amazon
if (link.hasMatch) {
  insert(before('first rule after "Buying"'),
  link.html)
}
```



The screenshot shows a section titled "MORE BUYING CHOICES" for a book. It displays two options: one for 58 used & new copies from \$17.50, and another for in-store pickup from \$34.99. The in-store pickup option includes a ZIP code input field and a "Choose a store" button. At the bottom, there is a "Sell yours here" button.

**MORE BUYING CHOICES**

58 used & new from **\$17.50**

Dewey  
Library - Stacks | QA76.758.B75  
1995

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**Available for in-store pickup now** from: **\$34.99**  
Price may vary based on availability

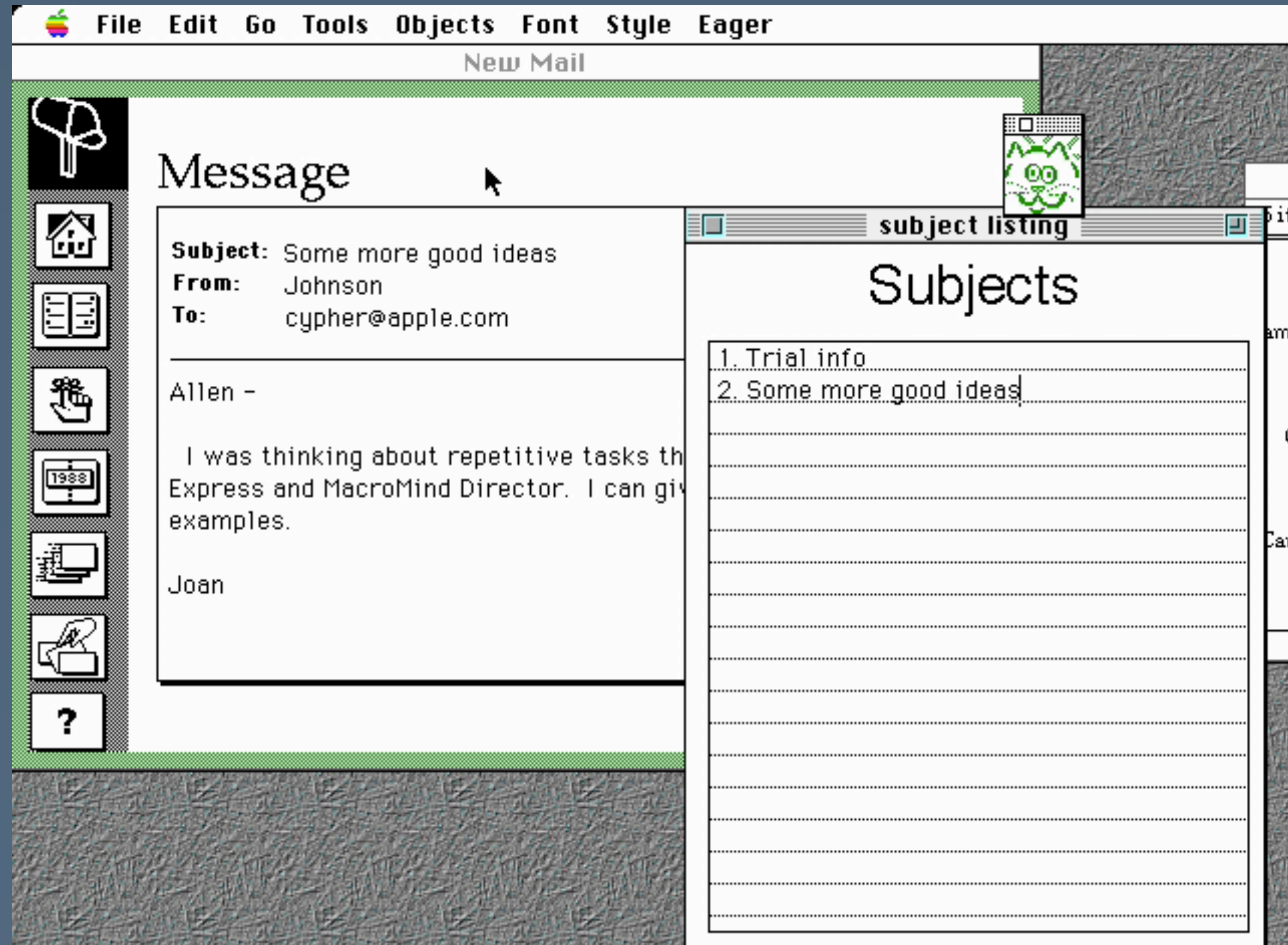
Enter your ZIP Code

**Choose a store**

Have one to sell? **Sell yours here**

# Programming by demonstration

- Induce a program behind the scenes
  - EAGER  
[Cypher, CHI '91]



# Getting the Right Design and Getting the Design Right

- What?
  - Showing users multiple versions of an interface produces more honest and more critical feedback
- Why?
  - It asks, how might we adapt the design thinking process to be more effective?

# Webzeitgeist

- What?
  - Mine not the function but the form of designs around the web, and give the analytics and insight back to designers
- Why?
  - A vision of a future for data-driven design

Why read these  
papers?



# What's difficult about design and creation research?

- Design and programming tools:
  - Slight accelerations are easy; larger-scale improvements are not
- Design process:
  - Multidimensional and difficult to measure

# What's exciting about design and creation research?

- Existing creation tools are getting better every day
- The design process is now an accepted practice in industry, but still malleable
- Your contributions are generative: they lead to new designs and programs that others will create tomorrow

# Discussion rooms

Rotation	Littlefield 107	Littlefield 103
a	12	34
b	24	13
c	14	23
d	34	12
e	13	24
f	23	14