HW3

hw3server, hw3draw.app
HW 3 Ingredients

Network Communication
Drawing Command Language
UI Widgets
History
Communication

Applications A and B have to exchange messages in both directions.

Should not interfere with application responsiveness (can’t block): asynchronous model.
OPTION 1:

1. START THIS
   ...
   APP A
   ...
   SERVER

   3. ...
   ...
   CLIENT

2. THEN THIS
   ...
   APP B

OPTION 2:

2. THEN THIS OR...
   ...
   APP A
   ...
   CLIENT

   4. ...
   ...
   SERVER

   5. ...
   ...
   CLIENT
Command Language

Need to communicate at least the following events:

ID: which application generated the event
Cursor moved to (x,y)
Draw dot at (x,y) or line segment from (x1,y1) to (x2,y2)
Change brush color to (r,g,b); change brush size to (x)
Draw image (imagedata) at position (x,y)
Clear screen
How to choose commands

Any scheme will do since you are controlling both the generation of messages as well as the parsing of messages.

Ex 1: encode as string “d:0,0,100,100” (draw line from x:0 y:0 to x:100 y:100)
How to choose commands

Encoding different data types can be a hassle. Choose a library that does this for you. E.g.: OpenSoundControl (oscP5)

```
"/draw/line" ,iiii 0 0 100 100
```

- address (string)
- number + types of args
- args
History

Intuition: Save all $n$ commands you have seen since the application/session started.

To access time $t$ in the history, find index $m$ of last event before that point in time.

Clear screen; replay all events from $0$ to $m$. 
Optional HW

Post project ideas on the Wiki by this Friday.
Design: “devising courses of action aimed at changing current situations into preferred ones.”

Herb Simon
Core Characteristics

1. Design is a structured process
2. The output of design are plans or models (and sometimes software)
3. Design has clients and users
Design as a unique “way of knowing”

Four central abilities, distilled from observational studies:

1) resolving ill-defined problems
2) adopting solution-focused cognitive strategies
3) employing abductive thinking
4) using non-verbal modeling media

Nigel Cross, Designerly Ways of Knowing
Ill-defined or “wicked” problems

- The problem statement itself is unclear or open to revision
- Impossible to enumerate all possible solutions
- Can make relative judgments between solutions, but cannot find an optimum
“Enlightened trial and error outperforms the planning of flawless intellect.”

- David Kelley
How do designers work?
The distance between drawing board and assembly line is not one inspired leap for the industrial designer but rather a series of careful and patient steps. Our development of Singer’s Model 600 sewing machine is typical. Although there is an infinity of steps in between, the eight shown here are fundamental to our approach to a client’s problem.

1. We start by studying the competition. We analyze models and illustrations of other companies’ merchandise, both here and from abroad.

2. We familiarize ourselves with the client’s manufacturing facilities. We like to know the limitations as well as the potentials of his plants.

3. We learn how the product will be used. In developing Model 600, our designers took a Singer sewing course, Singer zig-zag stitching and all.

4. After consultations with top management, sales executives and engineers, we develop a variety of idea sketches.

5. Now we’re ready to study the design in three dimensions. We start this phase of the work with a rough clay model.

6. Using the anthropometric techniques we originated, we turn to human engineering. We see how a mother and daughter will use the machine.

7. Through each step there is close collaboration with our client’s engineers. Working drawings are made and checked against their pilot model.

8. A prototype model—identical to the production-line product in every detail—completes the project. Exit designer. Enter sales team.
d.school design process

UNDERSTAND → OBSERVE → IMPLEMENT

VISUALIZE

EVALUATE ← PROTOTYPE
Constraints

Evaluation
Prototyping
Visualization
Selection

Synthesis
Framing
Ideation
Envisioning

Uncertainty
ANALYZE

EVALUATE

PROTOTYPE
Iterative Design Cycle

- Design
- Prototype
- Evaluate

Getting it right the first time is hard
Need better support for quick turns around loop
Understanding Prototypes
Prototype:
the means by which designers organically
and evolutionarily learn, discover, generate, and refine designs.
(Lim & Stolterman)
Prototype:
a representation of a design, made before the final solution exists.
(Moggridge, Designing Interactions)
Prototype: producing early working versions of the future application system and experimenting with them. (Lichter)
Prototypes for the Microsoft mouse
From Moggridge, Designing Interactions, Ch2
Paper Prototyping
Software Prototypes
Apple Knowledge Navigator:
http://youtu.be/HGYFEI6uLy0
The Cognitive Value of Prototyping

1. We know more than we can tell (*Polanyi*)
2. Actions in the world outperform mental operations (*Kirsh*)
3. Backtalk: The value of surprise (*Schoen*)
Tacit Knowledge
The Purpose of Prototyping

What questions do prototypes answer?
When and how should they be constructed?
Figure 1. A model of what prototypes prototype.
Experience Prototype:
“[A]n Experience Prototype is any kind of representation, in any medium, that is designed to understand, explore or communicate what it might be like to engage with the product, space or system we are designing”.

(Buchenau & Suri)
Figure 2: Experiencing a train journey.
Three Stages of Prototyping (IDEO)

# of ideas vs project time

- **INSPIRE**
  - Prototype-driven specifications

- **EVOLVE**
  - Specification-driven prototypes

- **VALIDATE**
How Should One Prototype?

Dow et. al, Creativity&Cognition, 2009
How Should One Prototype?

Dow et. al, Creativity&Cognition, 2009
How Should One Prototype?

Dow et. al, TOCHI 17(4), 2010
How Should One Prototype?

Dow et. al, TOCHI 17(4), 2010
Prototyping in HCI Research

Part of design process for research systems
  • Developing novel interfaces & techniques

An object of study in its own right
  • How might we better characterize and improve the prototyping process?

An activity that may benefit from new tools
  • We’ll visit Design Tools research next time…