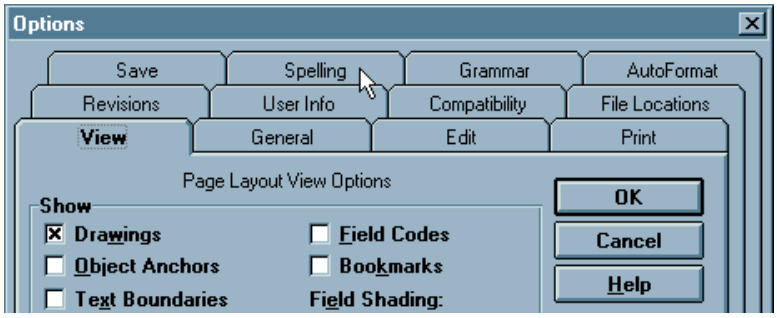
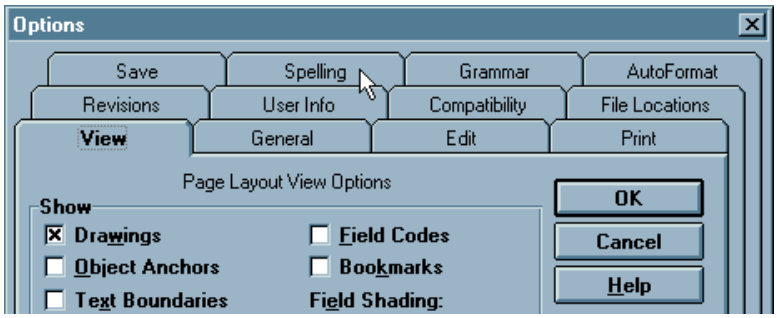
# Sketching and Storyboarding

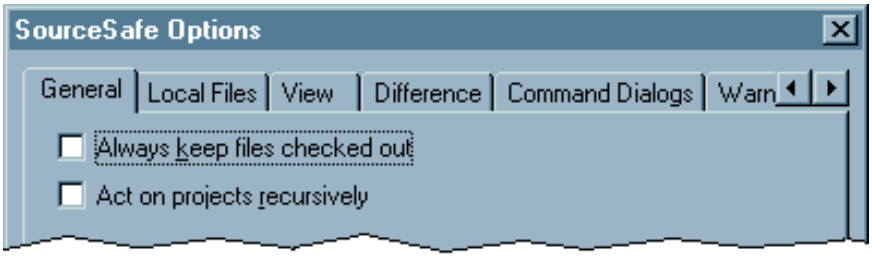
CS160: User Interfaces

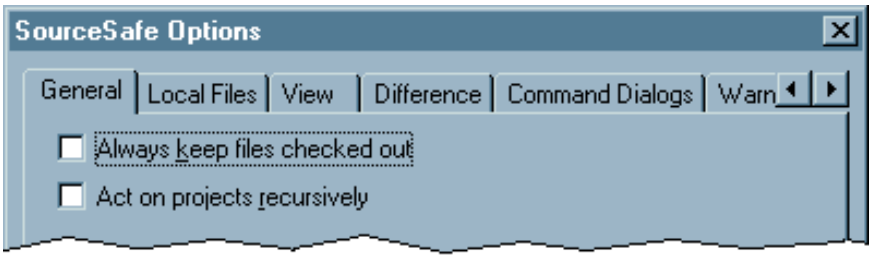
Maneesh Agrawala and Jeffrey Nichols



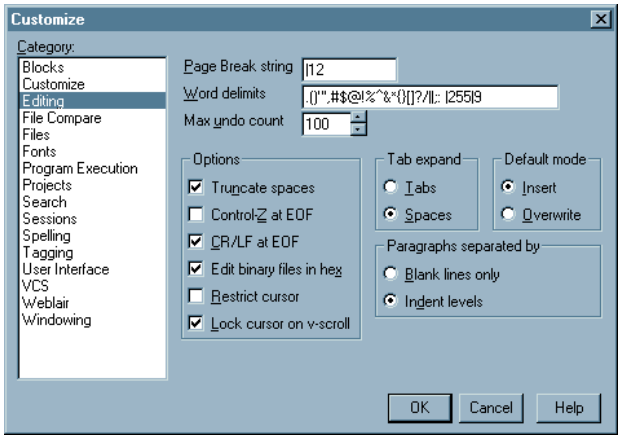


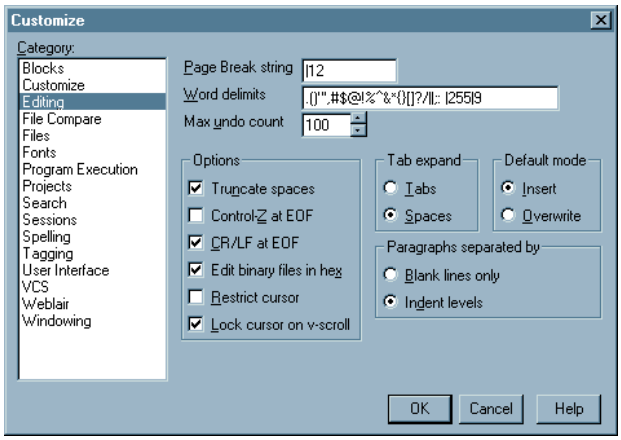

- Too many tabs – take up lots of screen space
- Tab layout reorganized every time user clicks on one
- Unclear if OK corresponds to single tab or to whole dialog






- Many tabs are hidden
- Have to scroll through to see all tabs






- Can fit in many more options vertically
- Layout never changes (selecting one does not affect others)

# Review: Structure & Design

Formal Elements

- Players
- Objectives
- Procedures
- Rules
- Resources
- Conflict
- Boundaries
- Outcome

Engaging Elements

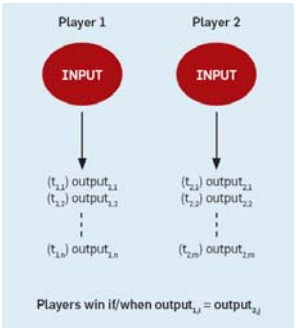
- Challenge
- Play
- Premise
- Character
- Story

What is the difference between procedures and rules?

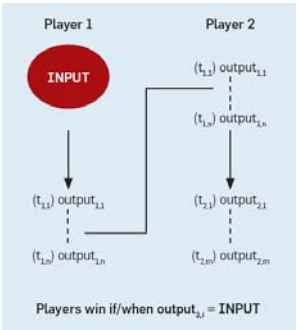
# Review: Games Benefiting Players


How else could games benefit players?

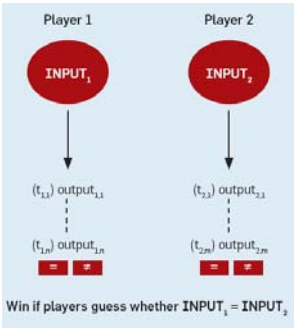
# Review: Games Solving Problems




output agreement




inversion problem




input agreement

What are examples in each category?
Think of a new game design in each category

## Due Today (before class)

Individual Project Proposal

## Project Groups (email by EOD)

Groups of 4

- You can choose your group
- Need to decide today
- Send email by end of day - today

Send email to cs160@imail.eecs.berkeley.edu

- One email per group
- List other group members
- If your group is 1, 2 or 3 people we will build groups for you

**Each person must appear in some email by the end of the day or we will assign you ourselves**

# Project Assignment (due Feb 9)

Group Brainstorm

- Goal: Brainstorm and refine project ideas with small group
- Will have time in class (next time)
  You may also need to meet outside class to finish the assignment

Next class (meet in Wozniak Lounge)

- Bring printouts of your Individual Project Proposal
- Brainstorm together

# Design Assignment (due Feb 9)

Design Photocopier Touchscreen: 10 pts

- 5"x3" window
- Functions
  - Start/Stop Copying
  - Quantity of copies to make (0-100)
  - Light/Dark setting (7 levels)
  - Multiple paper sizes for input and output (Letter, Legal, Tabloid)
  - Automatic scaling when copying between different page sizes (on/off)
  - Manual scaling (25%-400%)
  - 2-sided copying (1->1, 1->2, 2->1, 2->2)
  - Image repeat
- Produce at least 3 sketches showing alternate designs
  - Describe advantages/disadvantages of each
  - Should be hand-drawn - Scale them to be easy to read in wiki
- Due before class on Mon online, bring printout to Section

## Sections

How can we reduce to 2 sections?

W 1-2pm

W 2-3pm

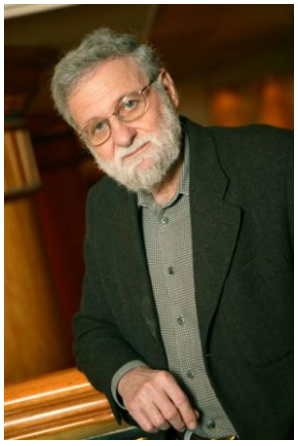
Th 1-2pm

## Topics

- Affordances
- Depicting Processes
- Storyboarding
- Sketching (Lora Oehlberg)

# Affordances

"… the term **affordance** refers to the *perceived* and *actual* properties of the thing, primarily those fundamental properties that determine just how the thing could possibly be used.



Some affordances obvious

- Knobs afford turning
- Buttons afford pushing
- Glass can be seen through

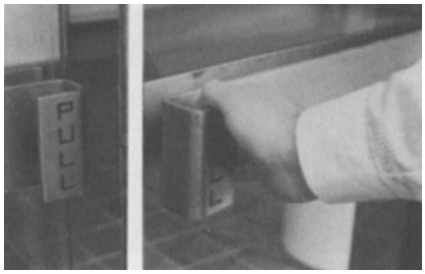
Some affordances learned

- Glass breaks easily
- Floppy disk
  - Rectangular – can't insert sideways
  - Tabs prevent backwards insertion

The Design of Everyday Things. 1988. Don Norman

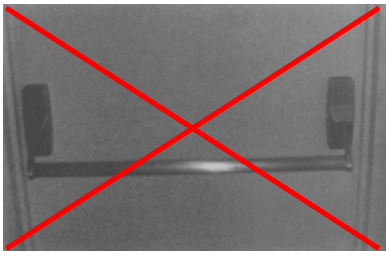
# Door Handles

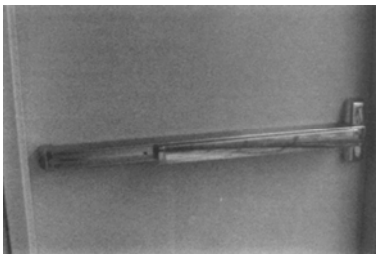
Affordances suggest how to use the object




# Door Handles

Affordances suggest how to use the object





# Dependencies

Affordances suggest how to use the object

Can be dependent on the
- Experience
- Knowledge
- Culture

# Cultural Dependencies

Affordances suggest how to use the object

Can be dependent on the
- Experience
- Knowledge
- Culture
  - Switches (US down=off, UK down=on)
  - red = danger, green = go

Can make an action easy/difficult

# Perceived Affordances

Affordances suggest how to use the object

Can be dependent on the
- Experience
- Knowledge
- Culture of the actor

Can make an action easy/difficult

Affordances may be *perceived* without actually existing

# Screen-Based Interfaces

Physical affordances
- Screen, pointing device, physical buttons, keyboard
- These afford touching, pointing, clicking on every pixel

# Screen-Based Interfaces

Physical affordances

- Screen, pointing device, physical buttons, keyboard
- These afford touching, pointing, clicking on every pixel

Physical affordances of screens often unused

- Screen affords touching, but most screens are *not* touch sensitive

# Game Controller Affordances

# Game Controller Affordances

Wii remote, roughly flashlight sized, easy to grip the right way.

Roughly the diameter of a tennis racket/ baseball bat/golf club

"Trigger" button underneath falls under the index finger.

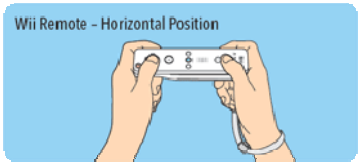
Most-used buttons are thumb- or index-finger operated.


# Game Controller Affordances

But the Wii remote also supports two-handed use.

In this position, the main select "A" button falls under the left hand. The right hand button replaces it.

Main select doesn't work in older Nintendo games. This takes some getting used to…



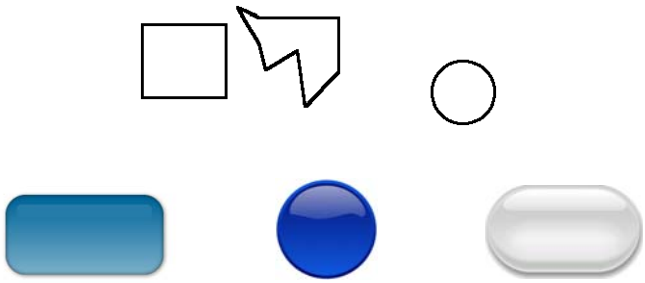
## Designer Controls Perceived Affordances

What are the affordances of these graphical objects?

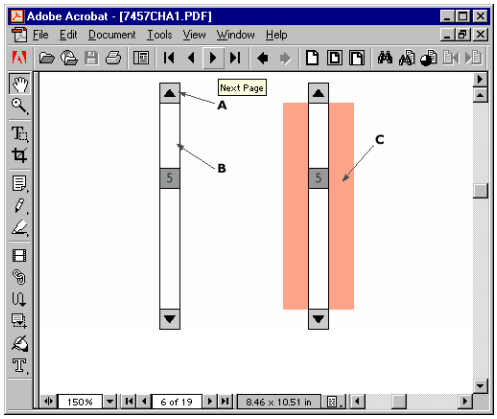
## Do Graphical Objects Afford Clicking?

What are the affordances of these objects?

# Do Graphical Objects Afford Clicking?



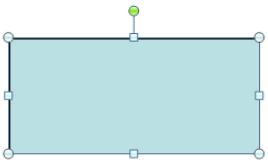
- Graphic design emphasizes affordances
- Does user recognize object as a button to be clicked?



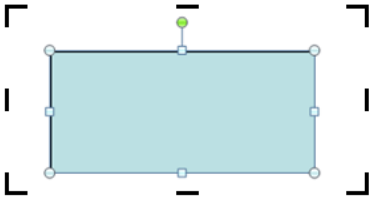
# Widget Affordances

Well-designed widgets have clear affordances

e.g. resize handles:



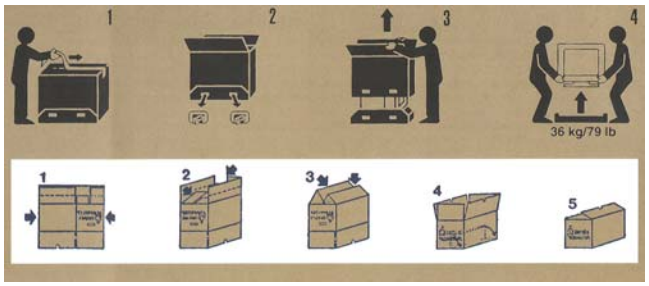
crop handles:



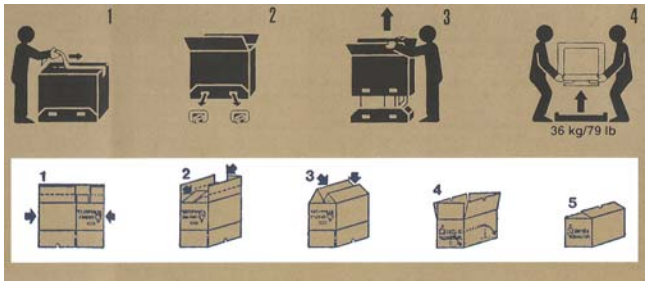
motion arrows

# Depicting Processes

# What is a Process?




# What is a Process?

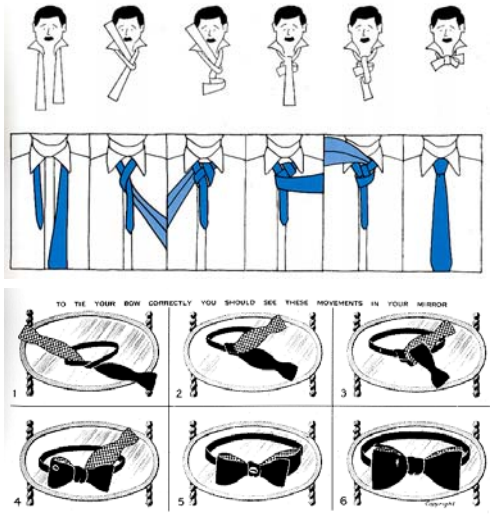


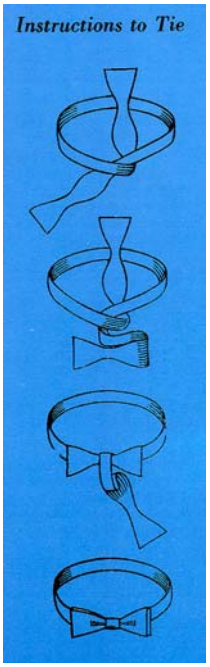

Process: A *series* of actions or operations conducing to an *end*

- Series ➔ Time
- End ➔ Goal

# Lego Assembly Instructions


# Putting on a tie



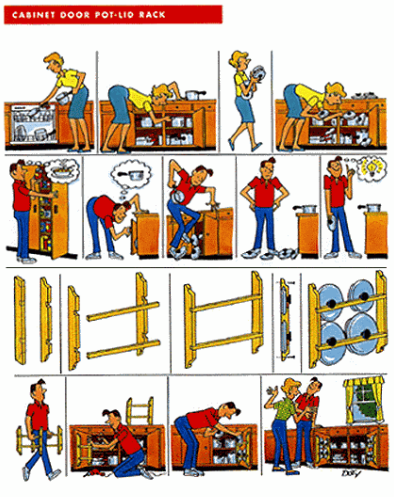
# Creating the Narrative

Process: A *series* of actions or operations conducing to an *end*

1. Choose the goal
2. Plan ordered set of actions to achieve goal
3. Depict each action

# Breaking Goal Into Tasks/Actions

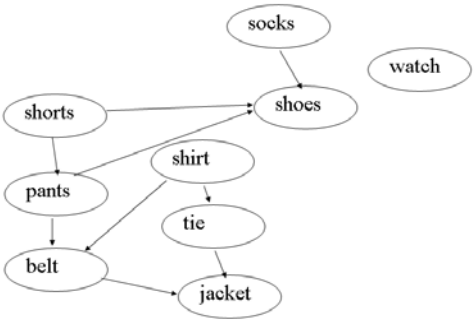
- What is unit of action?
- Sub-steps within steps




Wordless Workshop [Doty 96]

# Planning

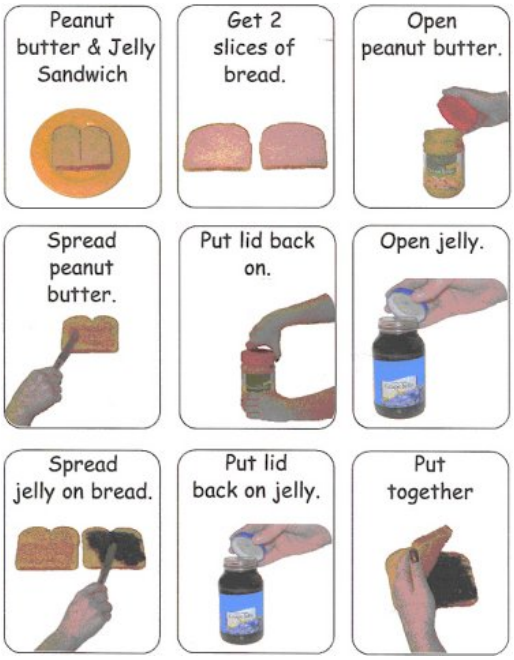
- Which actions?
- What order?




**Operations required to dress**
**[based on Cormen et al. 90]**

# Depiction

Visual instructions for learning disabled



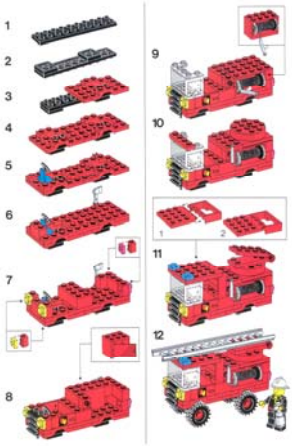

**[Orth 01]**

# Depiction

- Words ⟷ Images

**Building a Lego Fire Truck**

1. **Start with 2 x 20 black piece**
2. **Turn over and attach 2 x 2 black piece flush with left side. Attach another 2 x2 black piece 2 studs in from the right side.**
3. **Turn right side up and attach 1 x 4 red piece …**



**[from Mijksenaar 99]**

# Words and Images

## Words

- Labeling / Annotation
- Verbs (actions)
- Adverbs, Some adjectives
- Abstract concepts

## Images (Very important for interface design)

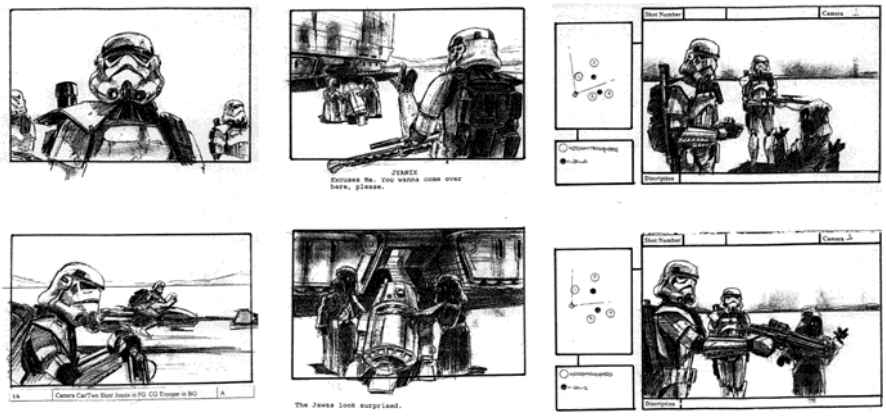
- Visual / physical properties
- Spatial relationships
- Actions indicated by diagrammatic conventions

- Images allow for graphic conversations (QC514A.mov)
- Loose diagrams are especially useful early on (QC515A.mov)

# Storyboarding

In Interface Design

# Troops



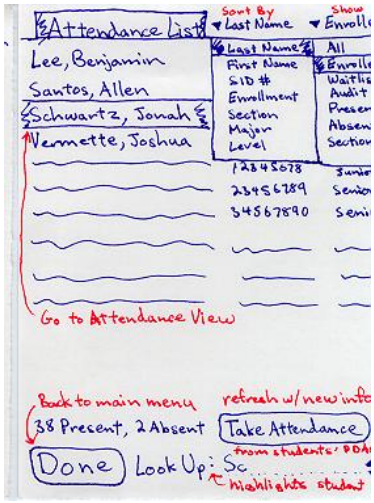

See http://www.theforce.net/theater/shortfilms/troops/

# Storyboarding for Interfaces

Technique

- Series of frames depicting key steps in reaching a goal
  - Can use a pin board for easy rearrangement/editing
- **Describe the interaction in context**
  - Often useful to **show user** in at least 1st frame (establishing shot)
  - Relationship between the user and its environment
  - Relationship between the user and the system

# Sketch: Single Display



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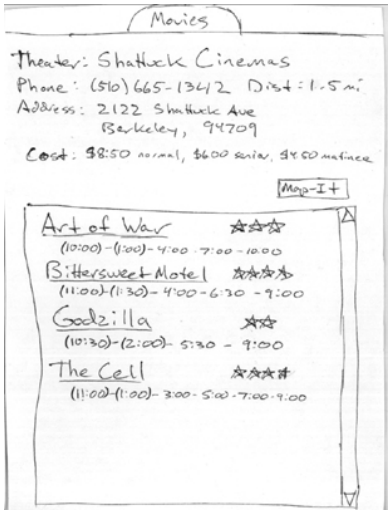


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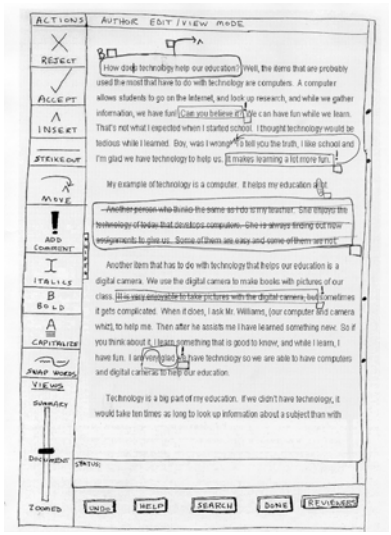

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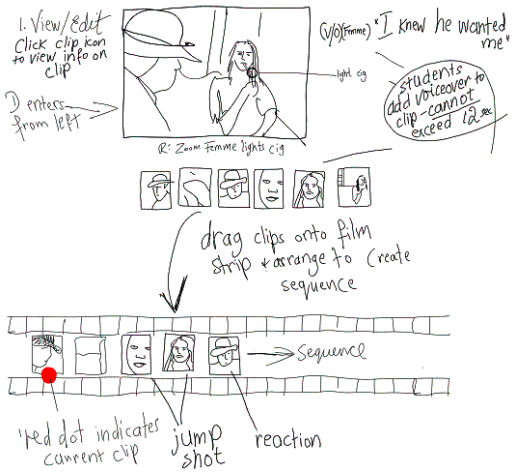
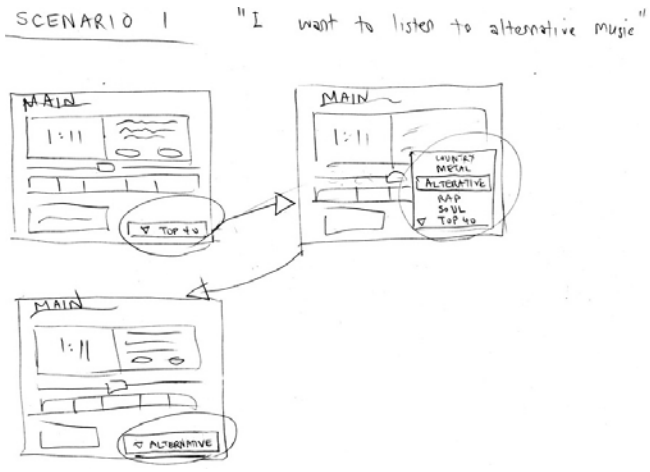



Film Editing Interface

# Storyboards: Multiple Frames



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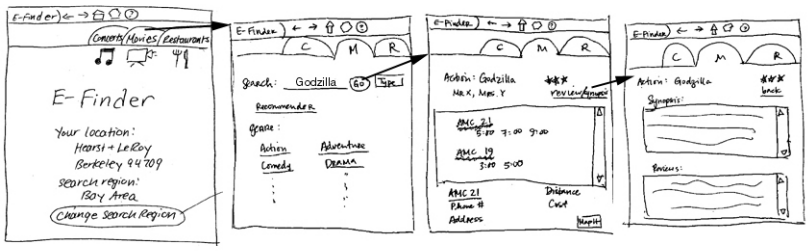


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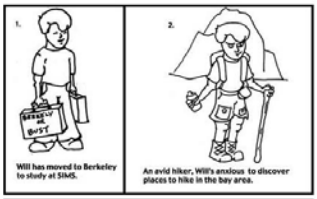


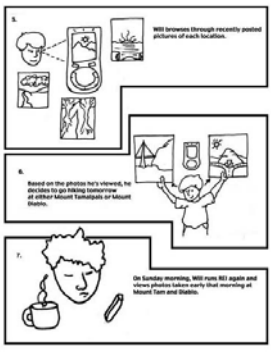


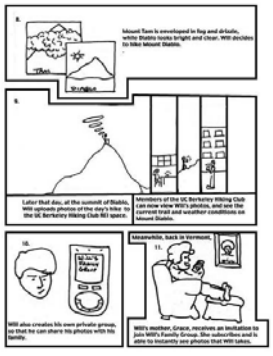


From SIMS 202

# Test Storyboards with Users

Can be "played" in front of users (or other designers)

Check understanding of process users go through
- Observe user reaction
- Debrief users

Good reference point during the design process

# Next Time

In Class Group Brainstorm

Bring another printout of your Individual Project Proposal

Reading

Direct Manipulation Interfaces. *User Centered System Design.* Chap 5. Hutchins, Hollan & Norman.

This is a classic HCI paper, but quite dense. Focus on understanding Fig 6.