CSE 428
Human Computer Interaction

Yasin Sazid
Lecturer
Department of CSE
East West University

Prototyping

Fidelity in Prototyping

- **High Fidelity**
  - Prototypes look and feel more like the final product

- **Low Fidelity**
  - Designer sketches with many details missing

Why Prototype?

- Get feedback earlier, cheaper
- Experiment with alternatives
- Easier to change or throw away

Sketches (low fidelity)

Paper Prototypes (low fidelity)

Sketching

STORE FOR THE STYLE-CHALLENGED

(pre-selected to match so you don't have to choose.)

Add plants list
Search via name
need info
Beni
"Sunshine is great!"
Lily
Show Schedule page
Show plants list
Show settings
icon
Reminder
Levels of schedual
plants stats

Profile Setup
Edit
Name : Sushi
Age : 2 year old
Breed : Labrador
Bio :
Submit
Playdates
Mon Feb 4
Presley's Home Party
Create
Create a Playdate
Name Dog Park Meetup
Time 04:30 AM
Date
Location
Members
Find Friends
Little (♀)
Add Friend
Adopt
Suggestions
Marrie
City Shelter
Messages
Presley
Missy
Little

Why Sketch?

- Sketching is the fastest instance of design iteration (an entire design-implement-evaluate cycle in as little as a few minutes!)
- We are still in the tightest part of the spiral in the **spiral model**
- Because it's so cheap, we can also **parallel prototype** (which you've learned is good to do)
- All these things help us **boost creativity**!
- As our ideas get more in-depth (moving towards higher fidelity prototypes), we narrow and switch to **serial prototyping**

Sketching is…

A **process** that enables you to think through ideas and convey design ideas to others very early in the design phase

12 Important Properties of Sketches

Quick

A sketch is quick to make,
or at least gives that impression

Timely

A sketch can be provided when needed

Inexpensive

Cost must not inhibit the ability to explore a concept, especially early in design

Disposable

If you cannot afford to throw it away,
then it is not a sketch

But they are not "worthless"

Plentiful

Sketches do not exist in isolation

Sketches are made to be compared

Meaning and relevance
is in the context of a
collection or series

Clear Vocabulary

The way it is rendered makes it distinctive that it is a sketch (e.g., style, form)

Distinct Gesture

Fluidity of sketches gives them a sense of openness and freedom

Opposite of engineering drawing, which is tight and precise

Minimal Detail

Include only what is required to render the intended purpose or concept

Minimal Detail

Appropriate Degree of Refinement

Make the sketch as refined as the idea

If you have a solid idea,
make the sketch look
more defined

If you have a hazy idea,
make the sketch look
rougher and less defined

Suggest and Explore Rather than Confirm

Sketches should act as a catalyst
of the desired and appropriate behaviors,
conversations, and interactions with others
(such as the people giving you feedback on
your sketch).

Ambiguity

Intentionally ambiguous

Value comes from being
able to be interpreted
in different ways, even by the
person who created them

Sketches have holes

Rapid Prototyping

Moving from Sketches to Prototypes

Sketch	Prototype
Invite	Attend
Suggest	Describe
Explore	Refine
Question	Answer
Propose	Test
Provoke	Resolve
Tentative, non committal	Specific Depiction

Example: Rapid prototyping the mouse

Paper Prototyping

Rapid Physical Prototyping

Rapid Physical Prototyping

Example: Rapid Prototyping Google Glass

Storyboarding

Why do we need stories in design?

Stories help explain the experience of something to someone who hasn’t experienced it before.

Three ways of telling stories in design:

- **Scenarios**
  - A short story about a specific user with a specific goal
  - Written accounts and narratives of the experience
  - Analogy: Books
- **Storyboards**
  - A series of drawn panels showing how a user might progress through a task in a system
  - Visual storytelling with rough sketches/cartoons
  - Analogy: Comics, Picture books
- **Video Storyboards**
  - Richer visual storytelling
  - Analogy: Movies/TV

https://www.commoncraft.com/video/twitter

Storytelling

- Stories have an **audience**
  - Other designers, clients, stakeholders, managers, funding agencies, potential end-users
- Stories have a **purpose**
  - Gather and share information about people, tasks, goals
  - Put a human face on analytic data
  - Spark new design concepts and encourage innovation
  - Share ideas and create a sense of history and purpose
  - Giving insight into people who are not like us
  - Persuade others of the value of contribution

Stories Provide Context

- Characters
  - Who is involved
- Setting
  - Environment
- Sequence
  - What task is being accomplished
  - What leads a person to use your technology
  - What steps are involved
- Satisfaction
  - What is the motivation for the user?
  - What is the end result?
  - What need are you satisfying?

Sketch ——————————————> Storyboard

Sketches

Movies
Theater: Shattuck Cinemas
Phone: (510) 665-1342 Dist: 1.5 mi
Address: 2122 Shattuck Ave
Berkeley, 94709
Cost: $8.50 normal, $6.00 senior, $4.50 matinee
Map-It
Art of War
(10:00)-(1:00)-4:00-7:00-10:00
Bittersweet Motel
(11:00)-(1:30)-4:00-6:30-9:00
Godzilla
(10:30)-(2:00)-5:30-9:00
The Cell
(11:00)-(1:00)-3:00-5:00-7:00-9:00

STORE FOR THE STYLE-CHALLENGED
As is...
As it should be...
outfit#1
outfit#2
outfit#3
(pre-selected to match so you don't have to choose.)

Sketches

SCENARIO 1
"I want to listen to alternative music"
MAIN
TOP 40
MAIN
COUNTRY
METAL
ALTERATIVE
RAP
SOUL
TOP 40
MAIN
ALTERNATIVE

Add plants list
Add a plant
Type
Search via name
load info
Monty Tree
Nickname
Beni
Location
Living Room
Sensor Scanning
scan button
Beni
"Sunshine is great!"
Lily
Lily's Tulip
Show schedule page.
show plants list
show settings
open app
schedule
icon
Beni need more water!
Reminder
Beni need to be watered today!
Lily need to be moved to a warmer place.
Lily need to be watered today.
levels of schedule
main
schedule
plants
settings

Sketches

And finally… a storyboard!

Storyboards

Storyboards

Storyboards

seattle critical mass images from flickr user timm/corker/

/ield trial participants not onl/ reported changing their behavior - reducing single occupant trips b/ around 10% - but the/ also told us about encouraging their peers and colleagues to do to same during and after the field trial.

Why Storyboards if you have Scenarios?

- They help you think more deeply about…
  - Specific details about the environments where the system is used
  - Physical constraints (size of system, space where it’s used)
  - Relationship among multiple people
  - Feelings and concerns of people

Illustrating Time

- Storyboards come from film and animation
- Give a “script” of important events
  - leave out the details
  - concentrate on the important interactions

Allowing Exploration

- Still relatively fast and inexpensive to produce
  - Can explore more potential approaches
- Notes help fill in missing pieces of the proposal

Effective to communicate

- Effective storyboards can quickly convey information that would be difficult to understand in text
- Imagine explaining the storyboard on the right in text, for various audiences

5 considerations in a storyboard

5 Considerations in a Storyboard

1. Level of detail
2. Inclusion of text
3. Inclusion of people and emotions
4. Number of frames
5. Portrayal of time

Truong, Khai N., Gillian R. Hayes, and Gregory D. Abowd. "Storyboarding: an empirical determination of best practices and effective guidelines." *Proceedings of the 6th conference on Designing Interactive systems*. 2006.

1. Level of detail

- Guideline: too much detail can lose universality
- How to draw people?

1. Level of detail

- How to easily indicate pointing or pressing

1. Level of detail

1. Level of detail

2. Inclusion of Text

2. Inclusion of Text

- Guideline: text is often necessary—but keep it short!

1. At home, Mary checks her blood pressure.
2. After a few simple key presses, her blood pressure readings get sent to a clinic.
3. The information is made available to her doctor.

3. Inclusion of People and Emotions

- Guideline: Include people experiencing the design and their reactions to it (good or bad)
- Remember, the point of storyboards is to convey the experience of using the system.

4. How Many Frames?

- Guideline: 4-6 frames per scenario is ideal for end-users
  - Less work to illustrate
  - Must be able to succinctly tell story
  - Potentially longer for design clients
- More is not always better
  - May lose focus of story
  - May lose attention

4. How Many Frames?

- Guideline: Remove unnecessary frames

4. How Many Frames?

5. Passage of Time

- Guideline: Don’t need explicit indicators since assumption is that time is going by, unless you need to show how much time has gone by.

Storyboards for Comparing Ideas

Authoritative

Cell phone is used to keep track of one's fitness goal.

Supportive

Cell phone is used to keep track of one's fitness goal.

Storyboards for Comparing Ideas

Cooperative

Competitive

Tips and Tricks for Storyboarding

You can use photos (only if really necessary)

IT IS SO DARK JANE CAN HARDLY READ HER BOOK

SHE GESTURES IN FRONT OF HER SPECIAL PENDANT TO TURN ON THE LIGHTS

THE LIGHTS TURN ON!

FINALLY, SHE CAN READ HAPPILY.

Blur Out Unnecessary Detail

Using image
editing software
to simplify photos
into sketches

Use existing images from other sources

http://designcomics.org
http://www.pdclipart.org
https://thenounproject.com

Selective use of color

Paper Prototyping

Paper Prototypes are interactive!
So you can test them with users!

Paper Prototypes

- Different sketches of screen appearance on paper
- Interactive
  - Different pieces of paper show different views, dialog boxes, menus, etc.
  - User interacts by writing and pointing
- A person simulates the computer's operation
  - Putting down & picking up pieces
  - Writing responses on the "screen"
  - Describing effects that are hard to show on paper

Why Paper Prototype?

- You can still make it quickly
- Easier to change
  - Easy to make changes between user tests, or even during a user test
  - No code investment - everything will be thrown away (except the design)
- Focuses attention on the big picture
  - Designer doesn't waste time on details
  - User makes more creative suggestions, not nitpicking
- Only kindergarten-level crafting skills are required!

How to make paper prototypes

Basic Materials

- Poster board, butcher paper, and/or printer paper
  - for background, window frame
- Index cards, post-its
  - for different views to swap in and out, menus, dialog boxes
- Tape, stick glue
  - for keeping pieces fixed
- White correction tape
  - For text fields, checkboxes, short messages
- Overhead transparencies
  - for highlighting, user “typing”
- Pens and markers in different colors and sizes, scissors, stickers, rulers
- Sometimes cardboard to make thicker or 3d objects

Compose interface from different pieces of paper

Compose interface from different pieces of paper

Post-it glue helps lots of little pieces stay put

Write on transparencies to “type” or dynamically change the UI

Write on transparencies to “type” or dynamically change the UI

Tips for good paper prototypes

Make it larger than life

- Remember - fingers are bigger than a mouse pointer
- People usually write bigger than 12 point font
- Easier to see from a distance, like across a table
- Lots of tiny pieces of paper are a hassle

too many tiny pieces to wrangle

...while remembering your target form constraints

- If you are dealing with an unusually small display, you may want to keep that in mind when thinking about how many things would fit in the view

Write/sketch using darker and thicker marker, not pencil

- People are going to be looking at your paper prototype from farther away (or remotely). Pencil sketches are going to be hard to see.
- Sticking with monochrome is okay, unless color is important for conveying some part of your UI

Sometimes including printouts can be useful/faster than sketching

- Don’t want to make the whole thing digital (becomes easier to nitpick)
- Can do a hybrid approach instead

too detailed and hard to read

better!

Time-saving tips

- If you have lots of little pieces, organize them
  - envelopes, plastic ziplocks, paper clips

- You can use a photocopier to save time
  - many similar sketches with slight variations

- If something is hard to convey, you can speak descriptions
  - Example: a drag & drop interface can be hard to convey
  - Animations, sliders, progress bars
  - No need to prototype these in detail unless you want to test them

You can paper prototype different form factors

Paper prototypes for video demos

Testing your paper prototype

Before even creating your paper prototype

- Start by thinking of and planning out your **tasks** you want users to try before sketching
- What kind of **research questions** do you want to answer with this prototype?
- What kind of **observations** will you look for to answer those questions?
- Remember, you can change your paper prototype between user sessions (and sometimes even during them!) as you notice obvious issues or have new questions come up.

Preparing for a Test

- Prepare tasks for the users and paper prototype
  - Write down a “script” of what you’re going to say out loud to keep it constant between tests
  - Giver your testers a context for what they’re doing (like the scenarios)
- Practice to avoid “bugs” in your prototype
- Select your user participants
  - Friends and family are okay at first (and acceptable for this class) but typically you want people in your target audience

Give different people on the team roles

- "**Computer**"
  - Simulates the prototype
  - Doesn't give any feedback that the computer wouldn't give
- **Facilitator**
  - Presents interface and task to the user
  - Encourages user to think aloud by asking questions
  - Keeps user test on track
- **Observer**
  - Doesn't talk
  - Takes copious notes

Introducing the test to a user

- **Address potential feelings of judgment**
  - Thank the user for being there, make them comfortable.
  - *“Today we are interested in learning about X. That’s where you come in!”*
  - *“It is X being tested here, not you.”*
- **Set expectations for the process**
  - *“It is essential you think out loud while working with X. Tell me constantly what you are thinking, looking for, wondering, confused about, surprised, and so on. If you stop talking, I will prompt you to talk.”*
  - *“I will not be able to answer your questions when you start using X. Do you have any questions now?”*
  - *“This should take about 15 minutes in total.”*

What can you learn from a test of a paper prototype?

- Conceptual model
  - Do users understand it?
- Functionality
  - Does it do what's needed? Missing features?
- Navigation and task flow
  - Can users find their way around?
  - Are information preconditions met?
- Terminology
  - Do users understand labels?
- Screen contents
  - What needs to go on the screen?

What can't **you learn from a test of a paper prototype?**

- Look: color, font, whitespace, etc.
- Feel: efficiency issues
- Response time
- Are small changes noticeable?
  - Even minor UI changes are really noticeable in a paper prototype
- Exploration vs deliberation
  - Users are more deliberate in a paper prototyping session. They're not going to quickly click around and explore as much

Digital Prototyping

Figma

Wireframe in Figma

Mockup in Figma

Prototype in Figma

Figma Components

Figma Styles

Style Guide

Typography
Heading 1
Heading 2
Body text - Bold
Body text - Medium
Body text - Small
Link
Colors

THANK YOU