

# Today's Agenda

- Prototyping

# Announcement: Quiz #3

## Quiz # 3

- Thursday, Sep. 19 in class
- Via Blackboard – **Bring your laptop to class!**
- Open book and open notes

# Reminder

Exam 1 is scheduled on **Tuesday, Sep. 24, 1:15pm -2:30 pm in class** through Blackboard

Cover materials until Sep. 19

Most of materials from class lecture notes

Open-book and open-notes

Make-up exams are not allowed except excusable absences with appropriate documentation and advanced notice.

# Exam 1

Questions in Exam 1 including

- True/false
- Single-choice or Multiple-choice
- Short answer
- Case study

Graduate students will have a different exam.

# Reminder: First Group Project Deliverable due Today

Each group should submit a written report of “Topic definition and understanding of the problem” including

- An introduction of the topic
- A discussion about the system/interface's purpose and requirements
  - Who are the users
  - What are the system's major functions
  - What are the environmental conditions and constraints
- A project management plan with a Gantt Chart

**Each team only needs to submit a single report**

**Due in Blackboard 11:59 pm EST, Tuesday, Sep. 17**

# Prototyping

Rapid prototyping, sketches, storyboards, mock-ups, etc  
(adopted partially from Dr. Bruce Walker)

# Six Design Principles

1. Visibility – Can I see it? – visible capabilities
  - Can see states of devices and possible actions
  - Buttons/knobs are organized to be found and used easily
2. Feedback – What is it doing now?
  - Respond to the user's operations
3. Affordance – How do I use it?
  - Properties of an object give clues to its operation
4. Mapping – What is the relationship between things?
  - Relationships between controls and effect/function
5. Constraint – Why can't I do that?
  - Restricting the kind of interactions to reduce errors or focus attention
6. Consistency – I think I have seen this before?
  - Similar operations/elements to achieve similar tasks

# Important Resource

## **Glossary**

<http://www.usabilityfirst.com/glossary/>

## **NN/g Nielsen Norman Group**

- <https://www.nngroup.com/>



# Getting Started

- How do we express early design ideas?
  - ❖ No software coding at this stage
- Key notions
  - ❖ Make it fast!!!
  - ❖ Allow lots of flexibility for radically different designs
  - ❖ Make it cheap
  - ❖ Promote valuable feedback

**\*\*\* Facilitate iterative design and evaluation \*\*\***

# The Dilemma

- You can't evaluate design until it's built
  - ❖ But...
- After building, changes to the design are difficult and expensive!
- Simulate the design, in low-cost manner



# Prototyping Dimensions

- Representation
- Scope
- Executability
- Maturation

# Prototyping Dimensions

## ➤ 1. Representation

- ❖ How is the design depicted or represented?
- ❖ Can be just textual description or can be visuals and diagrams

## ➤ 2. Scope

- ❖ Is it just the interface (mock-up) or does it include some computational component?

# Prototyping Dimensions (con't)

## ➤ 3. Executability

- ❖ Can the prototype be “run”?
- ❖ If coding, there will be periods when it can't

## ➤ 4. Maturation

- ❖ What are the stages of the product as it comes along?

Revolutionary - Throw out old one

Evolutionary - Keep changing previous design

# More terminology

- Early prototyping

- ❖ Used to evaluate function and interface

- Late prototyping

- ❖ Used to evaluate performance

# More terminology

➤ Low-fidelity prototype

➤ High-fidelity prototype

How is the prototype close to the final product in terms of

- Interactivity
- Visuals
- Content and commands

by Kara Pernice

# More terminology

- Low-fidelity prototype
  - Paper-based sketches without user interactions
    - Focus on functionality
    - Less focus on aesthetics
  - Early visualization of design alternatives
  - Quick to create and easy to change
- High-fidelity prototype
  - Computer-based with user interactions
  - Close to true representation
  - More effective to collect performance data



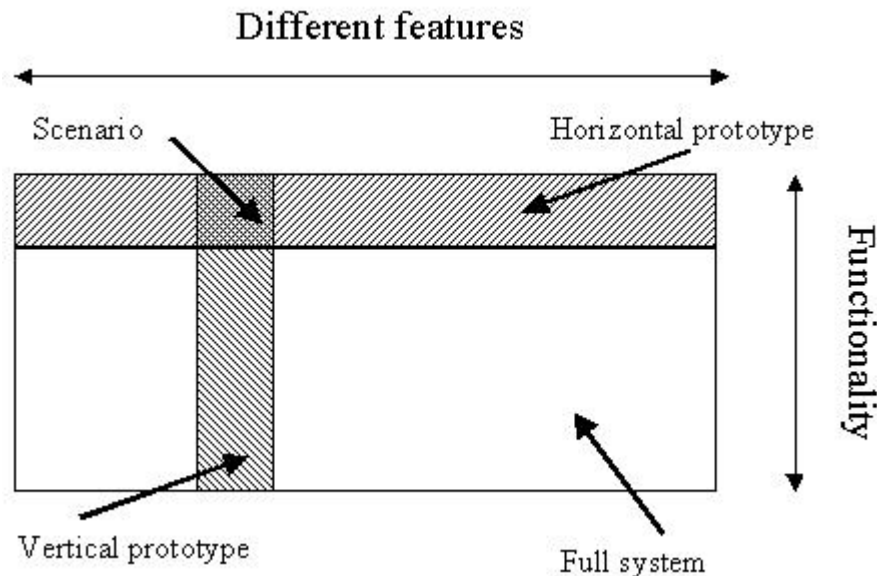
# More terminology

## ➤ Horizontal prototype

Very broad, does or shows much of the interface, but does this in a shallow manner

## ➤ Vertical prototype

Fewer features or aspects of the interface simulated but done in great detail



# PROTOTYPE EXAMPLES/TYPES

# I am about to show you many examples....

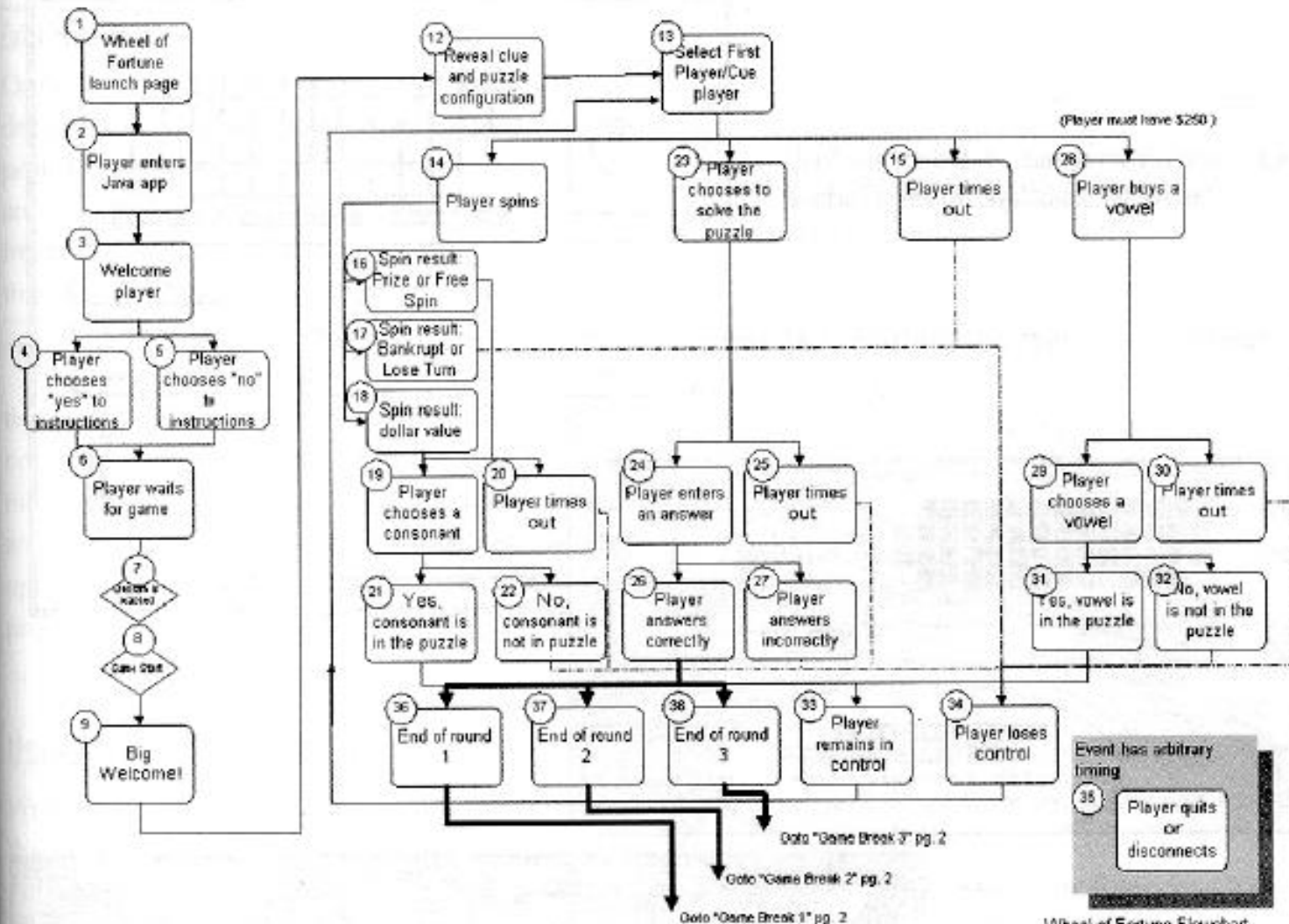
I expect your group to go through multiple rounds of prototype development

1. Start with drawings / sketches
2. Revise, revise, revise
3. Work up to functional website/app prototypes
4. Test
5. Revise
6. etc

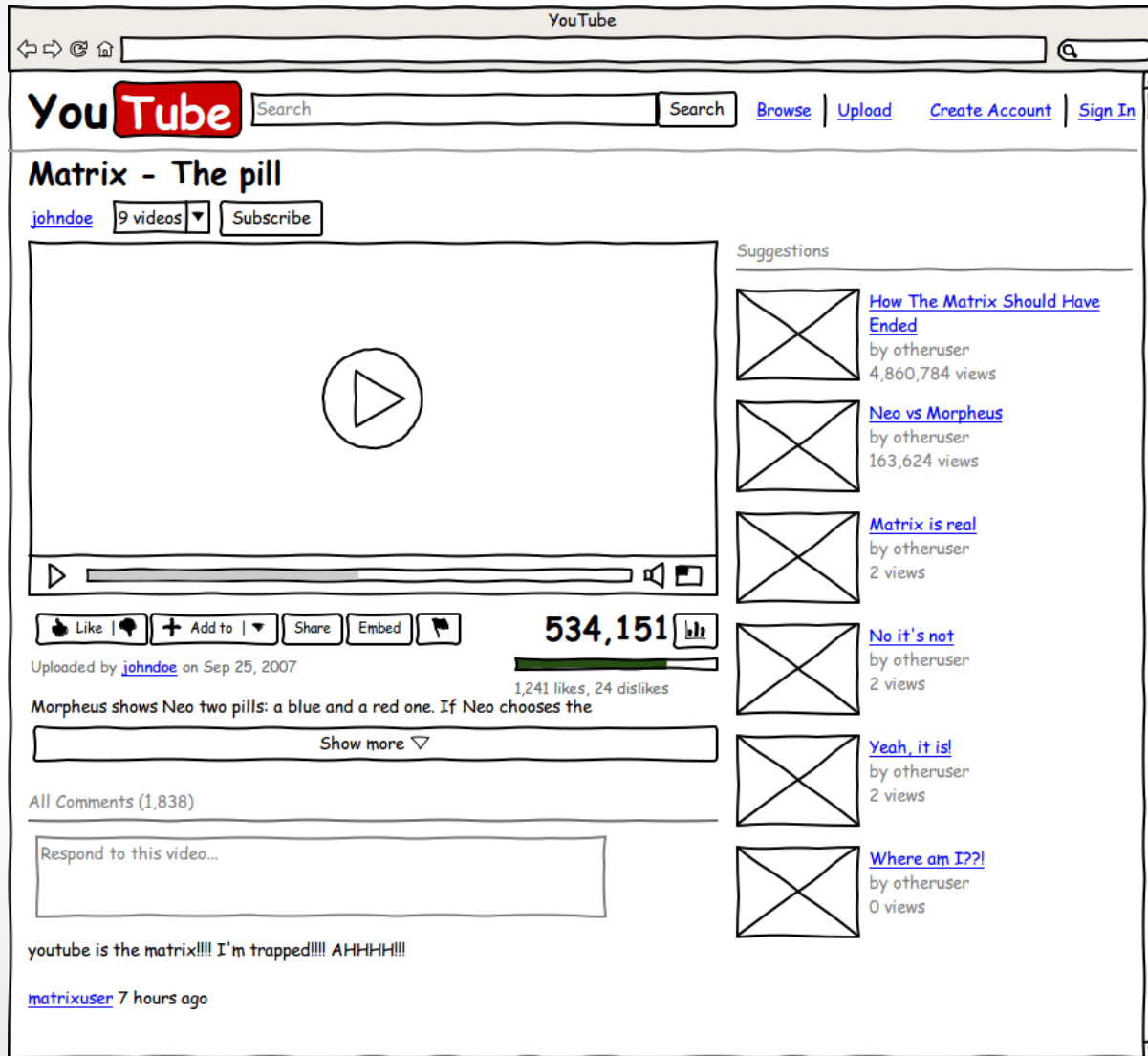
# 1. Flow Chart Prototype

- Functional specification of how the system operates, in a step-by-step flow
- IF-THENS, branches, loops
- No visual layout/interface specified
- More detailed, useful for quick evaluation, but requires more commitment of resources to produce
- Also more advanced (sometimes means more rigid) than simpler mockups

# Example of Flow Chart Prototype



## 2. Wireframes: Screen



“a wireframe is a visual illustration of a web page... to show you where each item should be placed on a page.”

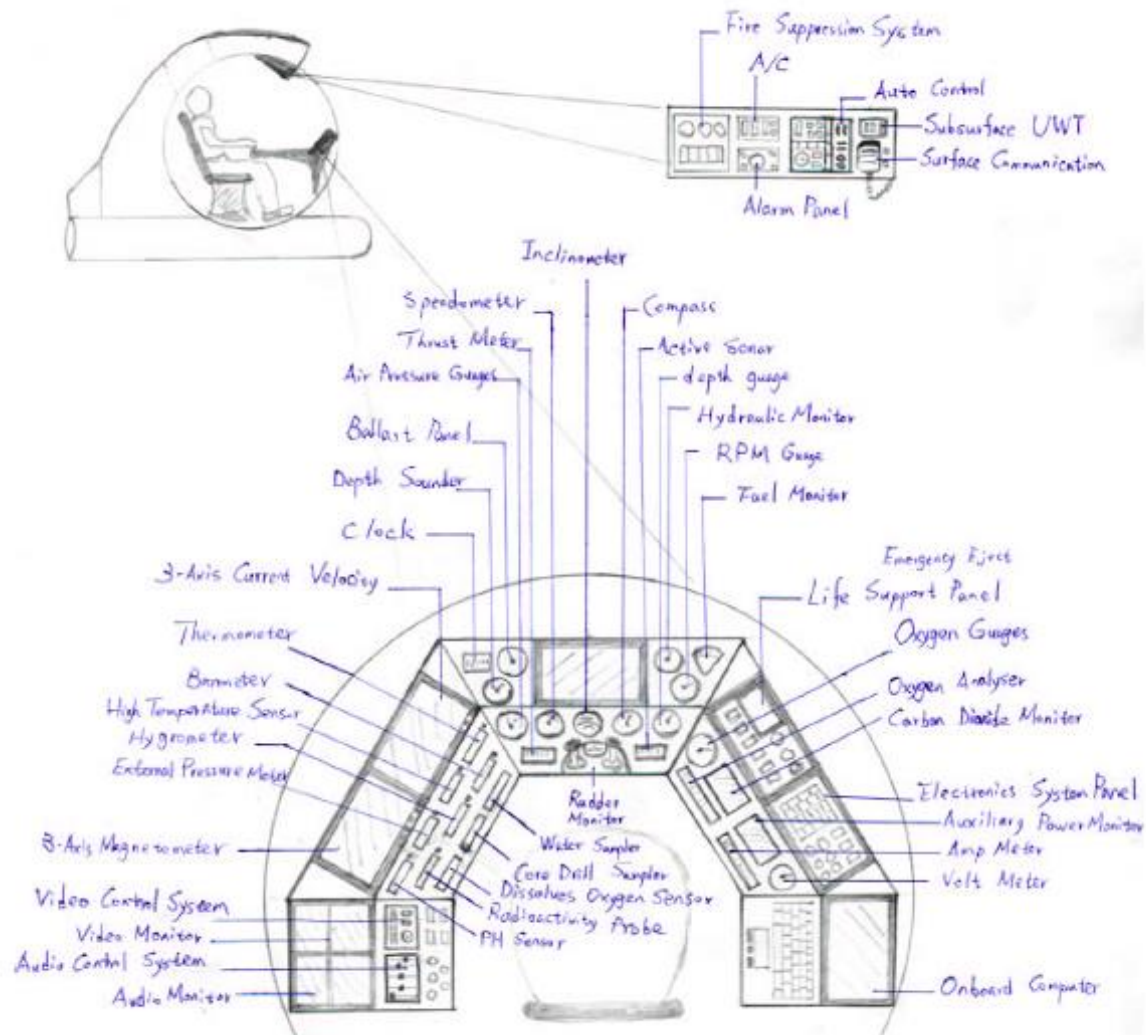
[Usability.gov](http://Usability.gov)

# 3. Sketches and Mock-Ups

- Paper-based “drawings” of interfaces
- Good for brainstorming
- Focuses people on high-level design notions
- Not so good for illustrating flow and the details
- Quick and cheap -> helpful feedback

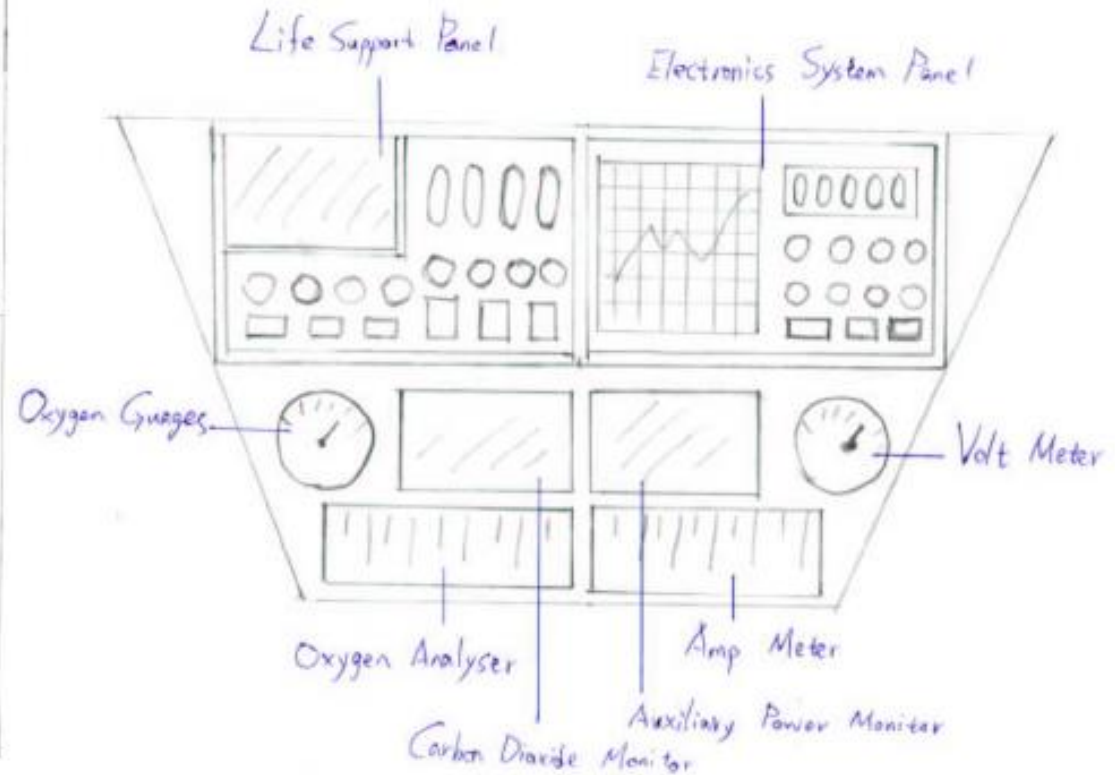
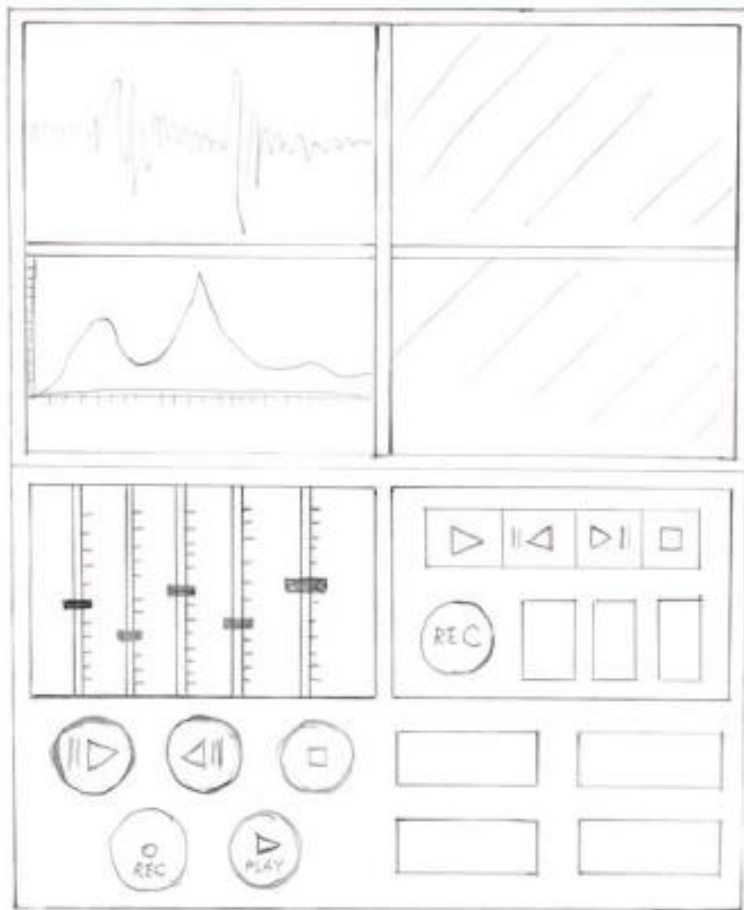


# Sketches and Mock-Ups





# Sketches and Mock-Ups: Displays



Audio Monitor  
Audio Control System

Video Monitor  
Video Control System

# Physical Mock-Up



# Showing users sketches & mock-ups...

- What is benefit of using a not-so-pretty sketch with users?
- Danger in using professional art or design tools?
  - Users may over focus on aesthetics, which you don't care about just yet
  - If it is obvious it is a prototype, then user will focus on functionality or “imagine” what final product will do

# 4. Storyboarding

- Pencil and paper simulation or walkthrough of system look and functionality
  - ❖ Use sequence of diagrams/drawings
  - ❖ Show key snap shots
  - ❖ Quick & easy



# Storyboard



## Contoso ice cream

### Flavors:

- ☐ Shortbread
- ☐ Oatmeal
- ☒ Toothpaste

Buy

Customer chooses flavor

## How do you want to pay?

Login

Card

Customer pays



Dispatcher

## Orders

Jo	Oatmeal	2
Dipak	Cherry	1
Liz	Grout	1

Dispatcher fulfills orders



Ice cream is  
delivered

# Paper Prototypes

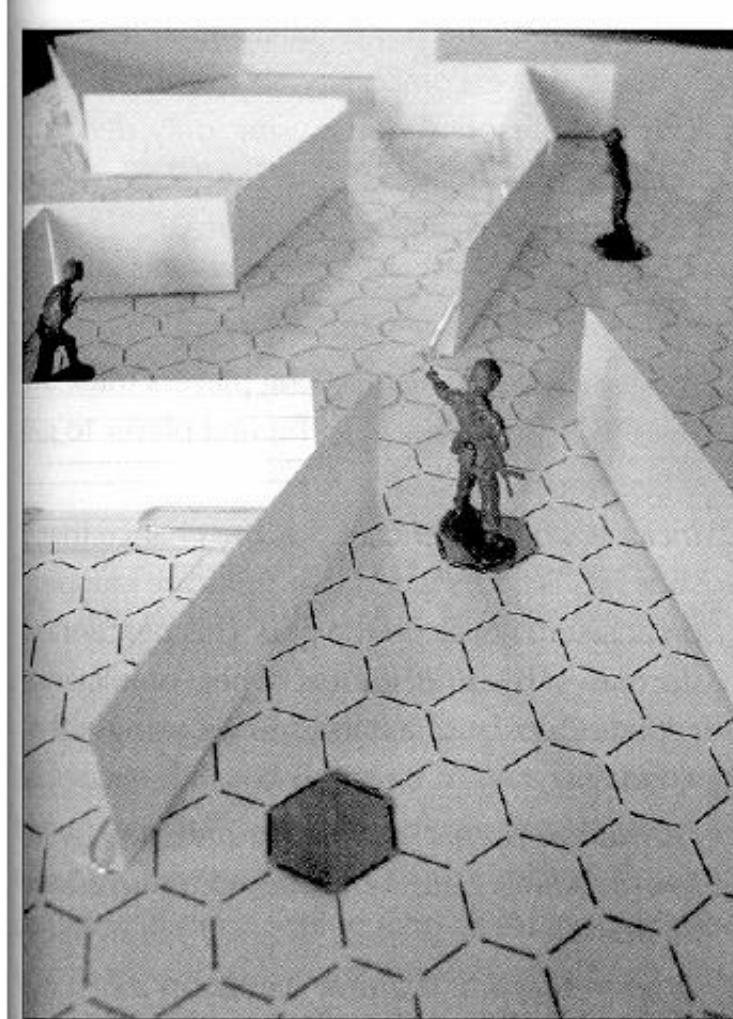




# Paper Prototypes (game design)



# Paper Prototypes (game design)



7.5 FPS Prototype example



# Time to work in your groups!

So far, you have defined your topic for the project

It is time to work on designs

Before you start...

Figure out who is taking notes.

1. Discuss on design options
2. Take notes during discussion