

Week 3, Part 1:

# Design process & prototyping



# In this lecture:

- The interface design process
- Concepts in participatory design
  - Characteristics
  - Principles and activities
  - Prototyping

# What is interface design?

**Design (as a verb) is a process:**

- A goal-directed problem solving activity informed by intended use, target domain, materials, cost, and feasibility
- A creative activity
- A decision-making activity to balance trade-offs

**Design (as a noun) is a representation:**

- A plan for development
- A set of alternatives, or elaborations

# How do we design an interface?

How do we:

- Optimise the **experience** of the person using an interface system?
- Ensure that the thing we're designing is so that it is **useful, efficient, and usable**?
- Tailor an interface to the needs of a person using it?
- Involve the people who will use it in the design process?
- Evaluate it, so we know whether we've succeeded?

**Participatory design as  
both an approach and  
a process**

# About participatory design

- ★ Participatory design was developed in Scandinavia where it was associated with trade unions (hence its democratic history)
- ★ Its goal is to keep the entire design process centred on the people who will use the system
- ★ It includes those people on the design team, rather as outsiders to the design process
- ★ It assumes that the people who are using a system are already experts about what they need it to do

The  
participatory  
design approach  
has 3  
characteristics:

It is **work focussed**

It is **collaborative**

It is **iterative**

# **Work focussed:**

---

The design focusses on what the workers need (improving the workers' environment and the tasks they perform) rather than what the system needs (the requirements of the workplace).

# **Collaborative:**

---

The designers and the people who will use the system collaborate at every stage, and the people who will use the system contribute directly

# **Iterative:**

---

Design does not happen once, but instead there are many design and evaluation stages through which we approach a final design

# The participatory design process employs various techniques:

Brainstorming

Concept development

Prototyping

Storyboarding

Workshops

# **Stages of the participatory design process:**

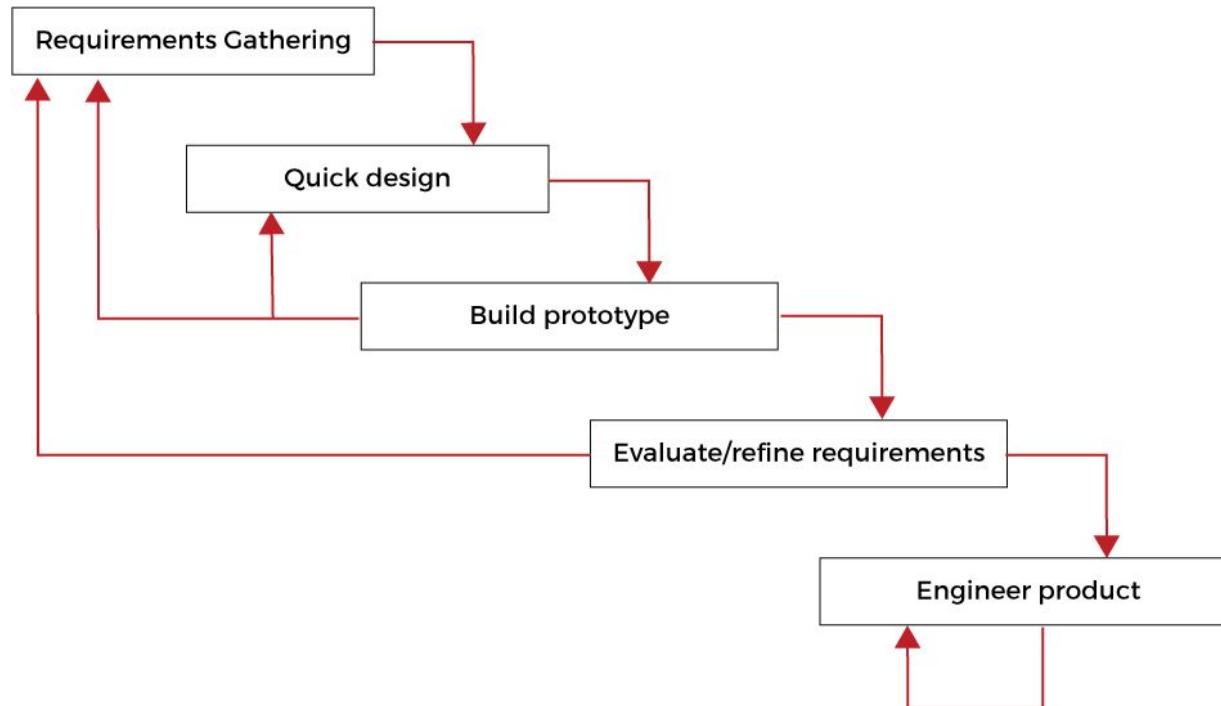
**Identify requirements**

**Develop a range of design ideas** to meet those requirements

**Build interactive versions** of the designs

**Evaluate the outcomes**

# (This should sound familiar.)



**Stage 2:  
Develop a  
range of design  
ideas.**



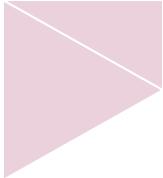


# **Design a range of ideas.**

Suggest ideas for meeting the identified requirements through:

**Conceptual design** - captures and describes what the system will do and how it will behave

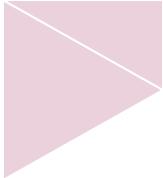
**Physical design** - describes the physical or visual features that are needed for this concept



# Conceptual design

**Abstractly describes an interface's behaviour.**

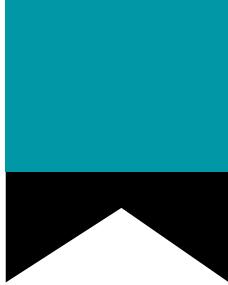
“It’s a machine in a wall that knows who the person is because they give it a card and a code. The person asks for an amount of money. Then the machine talks to the bank while the person waits, and if the bank says yes, the machine gives that person the amount of money they requested.”



# Physical design

**Addresses the concrete physical, layout and design features needed to carry out the conceptual task.**

A cashpoint needs to be outside, needs to have a card slot and numbered buttons, a connection to the bank, it needs to be secure, it needs rollers to dispense money, it needs electricity, it needs to open with a key to be refilled ...



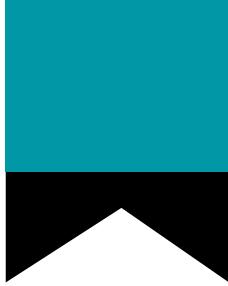
# Technique: Brainstorming

Come up with lots and lots (and lots) of ideas.

Especially effective in a group, but there needs to be no judgement and trust among members

Find the germ of each idea - is it relevant? Can it be developed?

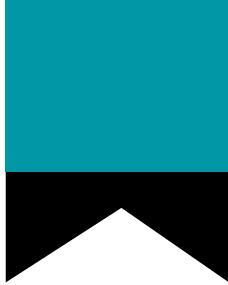
Don't ever throw ideas away forever!



# Technique: **Concept development**

You need a **strong, cohesive** metaphor for a design.

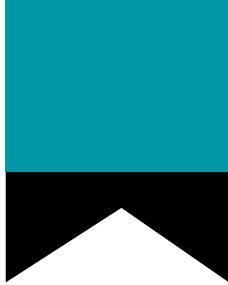
This metaphor has to be understood on a deep level by the people who will use your product



# Technique: **Concept development**

**Verbal ideas: Great for developing abstract concepts**

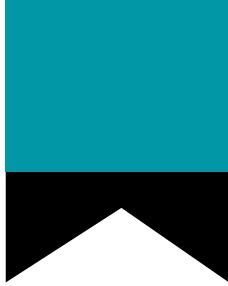
- Describe what this interface does
- Describe how it should feel
- Describe the message it should communicate



# Technique: **Concept development**

**Concrete ideas: Great for bringing things into reality**

- How will the message be conveyed?
- What will it look like?
- Draw it!
- Colour scheme is vital - it makes things real



# Technique: Prototyping

You need a **strong, cohesive** metaphor for a design.

This metaphor has to be understood on a deep level by the people who will use your product

# Stage 3: Prototyping



# What exactly is a prototype?

A prototype is an incomplete version of a project.

It can be as simple as a drawing on paper, or as complex as a working web application (or anywhere in between!)

# **The best prototypes are interactive**

You can learn lots by having people interact with lots of versions of what you're making.

This is part of the iterative process - lots of opportunities for re-assessment

# Prototyping makes a thing real.

Don't sit on ideas, or just think about them - make a version. Try it out. Talk about it.

Don't just stand  
there - make  
something!

# What can we explore through prototyping?

---

Pretty much everything!

- Interaction
- Form
- Technology
- Concepts
- Content
- Design

# Who can I demo a product for?

---

Pretty much anybody!

- Stakeholders
- Clients
- Funders
- Team members
- Yourself

---

# Why make a prototype?

## Design development:

- Test concepts, assumptions, ideas, requirements
- Thinking through making
- Identify and prioritize most important features
- Choose between alternatives

---

# Why make a prototype?

## User testing:

- Different than interviews
- Get more focused feedback when they can choose between alternatives and say why
- Offers insight into how your product is perceived
- Identifies problems
- Assess how well it meets needs

# I'm convinced!

## What should I prototype?

You might focus on some or all of the following:

- Technical aspects
- Workflow
- Screen layouts and information display, taxonomy
- Graphic design, look and feel
- Content (is the language appropriate?)
- Controversial/critical areas (does this important part make sense? Are we saying things in the right way?)

---

# Kinds of prototypes

## Lo-fi

Made really quickly (as in, minutes or hours)

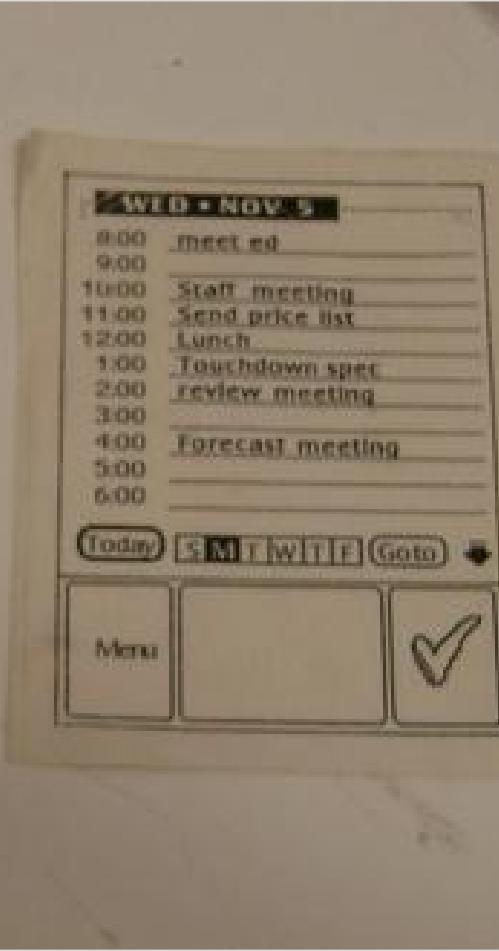
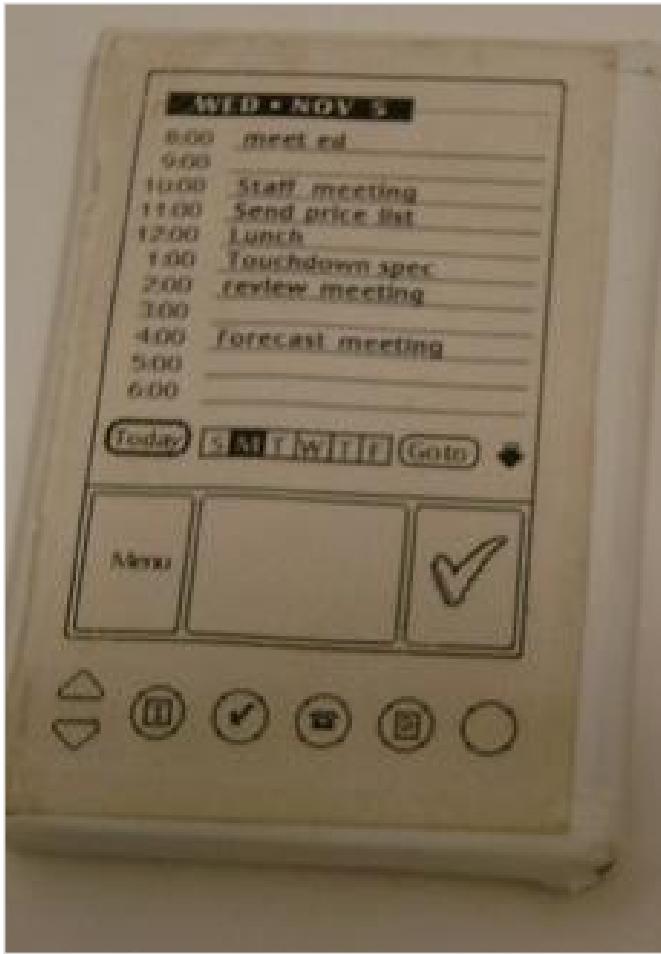
Made from cheap materials that are readily available (hooray for paper)

# **Form model prototype**

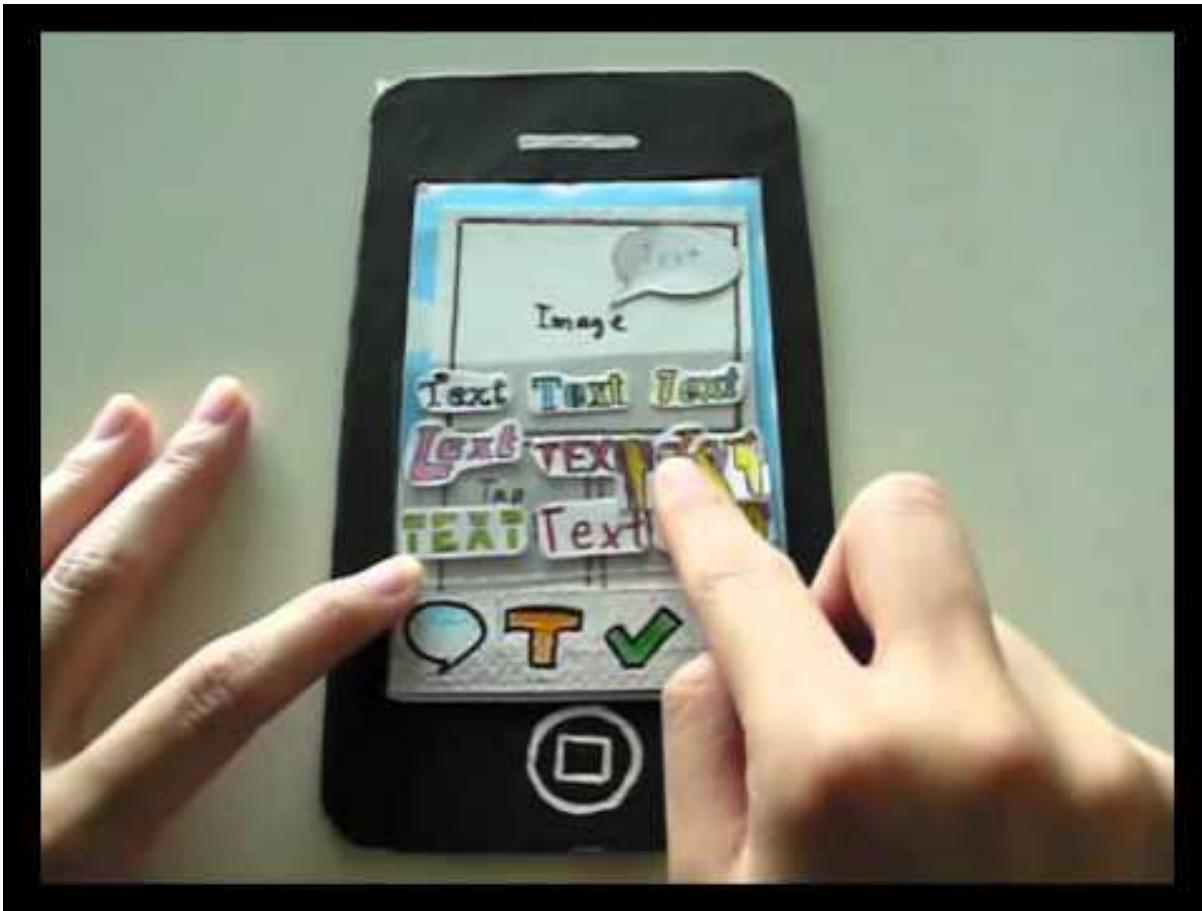


# **Palm Pilot**

# Paper prototype



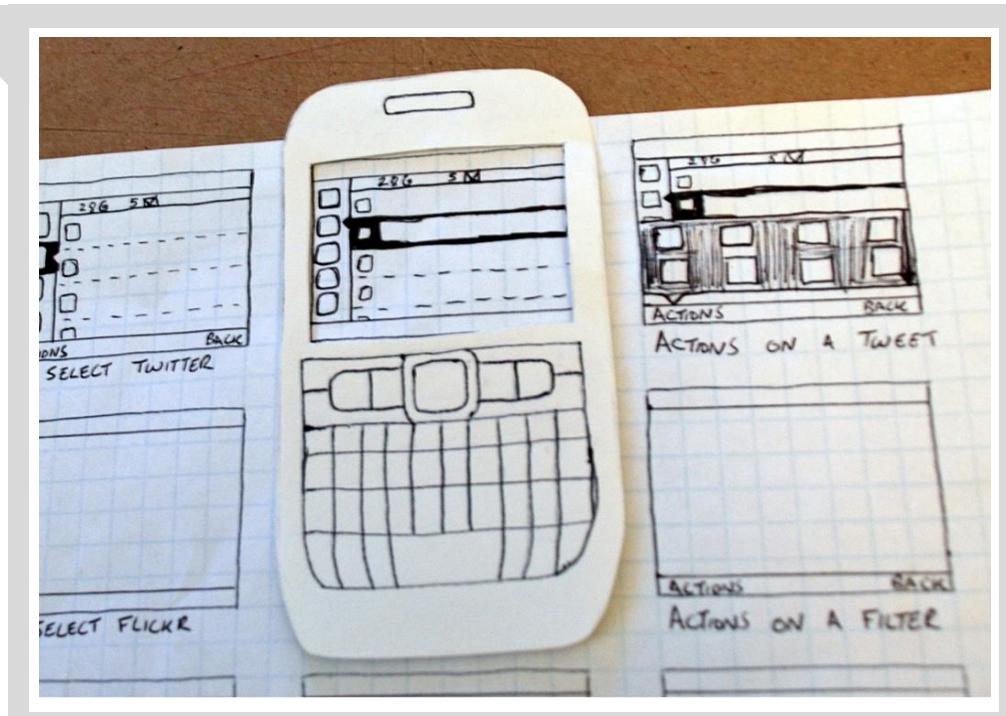




**Video  
prototype**

# Wireframe prototype

- Schematic of information architecture
- Shows relationships of content/navigation
- Non-visual design
- Defines scope





### Image Scroller

Selection of product images with a title and brief info, swipe to scroll through.

### Navigation

Logo sitting above the main navigation.

### Product Gallery

Main products images with a title and brief product information.

---

# Kinds of prototypes

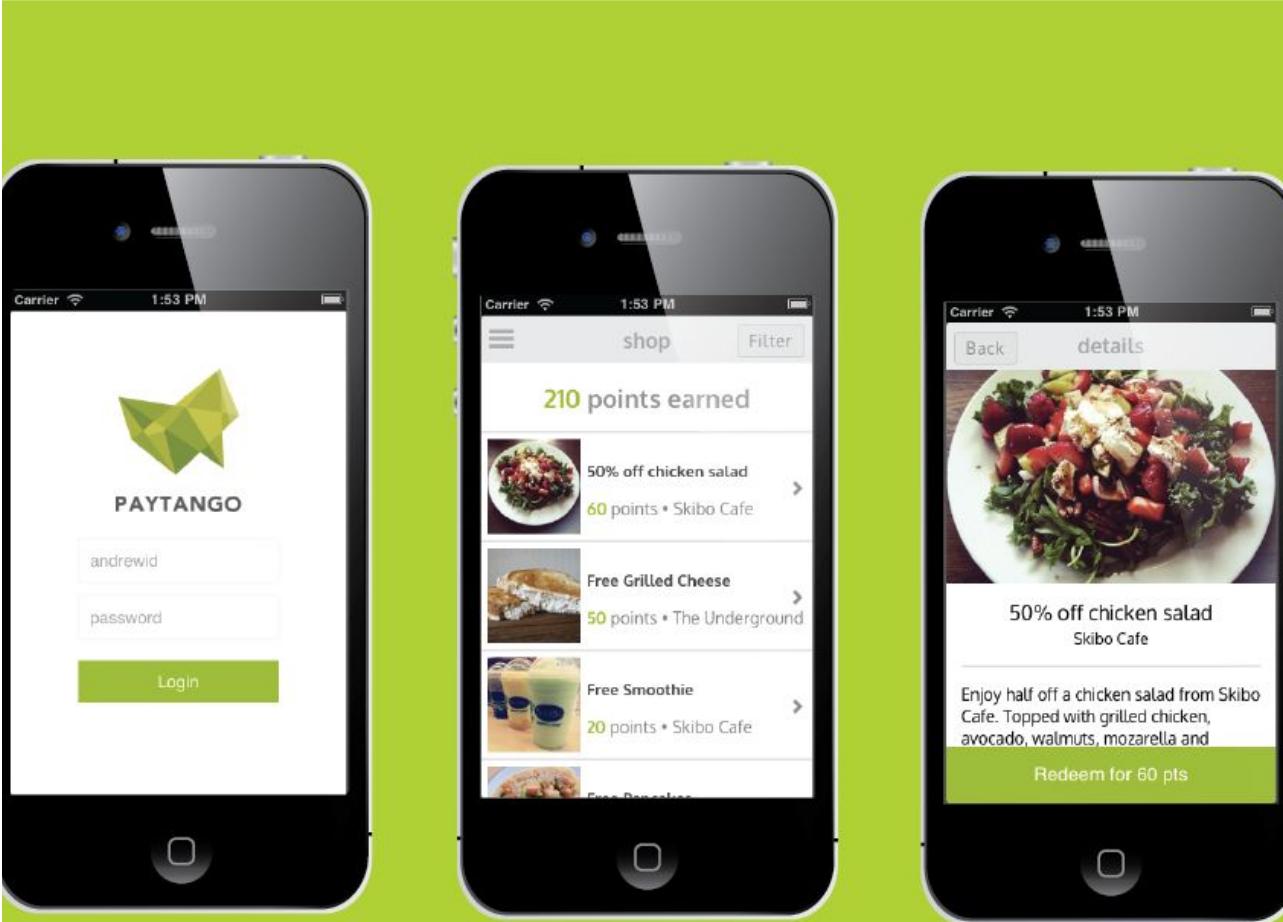
## Hi-fi

Much longer to make (usually quite far along in the design process)

It is a representation of the final product in a close resemblance to the final design in terms of **detail and interaction**.

# Digital layouts

A very good representation of the final product (not interactive)



# Working prototype

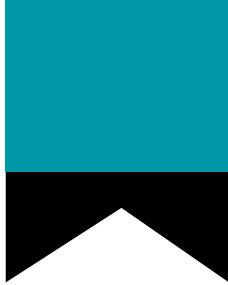
A proof of concept that functions



# Wizard of Oz prototype

The system isn't  
fully finished yet,  
and it's run by  
someone

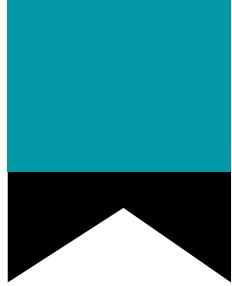




# Lo fi vs hi fi: Which is better?

**Hi fi can be problematic:**

- Users often focus on small unimportant details
- Developers get very attached
- Everybody is used to it and reluctant to change



# **Lo fi vs hi fi: Which is better?**

**Lo fi prototypes avoid these issues:**

- They're easy to change
- No design or interactivity to distract the participant
- Disposable and cheap, low risk

If the lo fi isn't  
right, the hi fi  
won't be either.

# Stage 4: Storyboarding.



# **What's a storyboard?**

A series of views of the app as the person who is using it moves through a task.

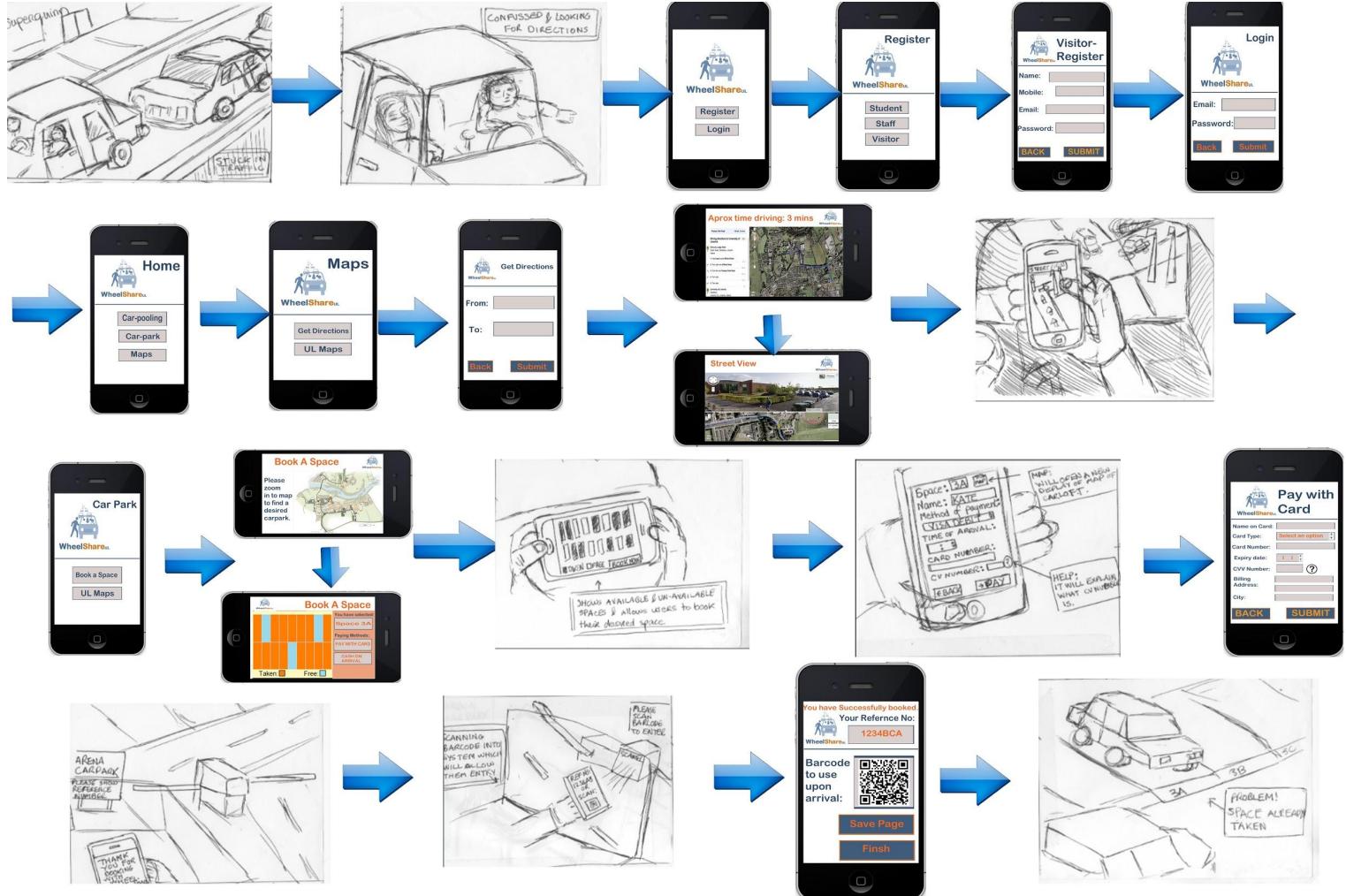
# How do we use storyboards?

A rough sketch of the activities involved in an interaction are presented as a series of frames or drawings

Storyboards are sequential, showing how a person might progress through a task

We can add detail: Requirements, personas, scenarios, what we know about stakeholders, roleplay

Showing this to stakeholders helps designers get valuable feedback on **what stakeholders do and how they do it**





# Stage 5: Workshops.



---

# What are workshops?

A gathering together of stakeholders and designers to:

- talk
- discuss requirements
- look at prototypes
- get feedback ...

---

# **What workshops are good for**

- Establish understandings of the design issues
- Focus the designers' understanding of what the product should do
- Fill in gaps: enquire about work environment, talk about technical possibilities

# Reflecting on participatory design



---

# Summing up participatory design:

It involves the people who will use a product at every stage of design.

It is **collaborative** and **iterative**.

It involves:

- **Brainstorming**
- **Concept development**
- **Prototyping**
- **Storyboarding**
- **Workshops**

---

# Good things about participatory design:

**It works.**

It's widely accepted (started in Scandinavia but is becoming more and more worldwide)

It places the people who use something at the centre of design

---

# Possible drawbacks of participatory design:

It takes a lot of time and effort  
(but most good design does)

It requires less hierarchical  
structure - designers,  
developers and the people  
who will use the product must  
be equals

# NUMMI

Joint venture  
between Toyota and  
General Motors

Radically changed  
the American  
automotive industry  
in 1985

Entirely based on  
participatory design!





Week 3, Part 2:  
**Interactive  
devices**



44

45

ED46

90

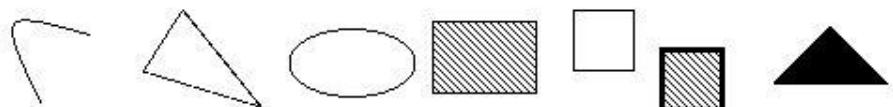
**In the beginning,  
there was the  
mainframe.**

# Xerox Star (1981)



# WIMP

Star provides integrated text and graphics. A variety of type sizes and styles may be used.



Description	Price
Peas	\$0,39
Beans	\$0,50

12    Icon    Icons

Thesis

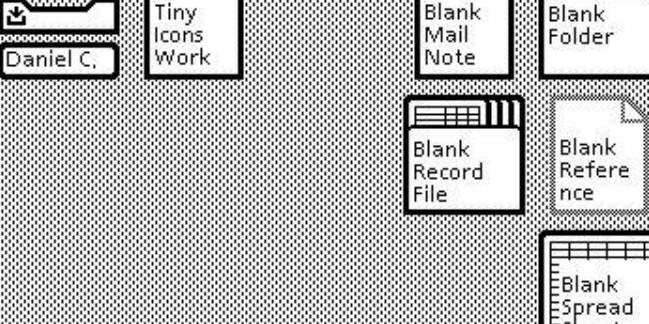
?

Close

# Window

NAM

- |   | SIZE     | VERSION OF     |
|---|----------|----------------|
| <input type="checkbox"/> 0 Temporary title page   | 1 Page   | 10/30/84 13:29 |
| <input type="checkbox"/> A Copyright and abstract | 2 Pages  | 11/06/84 16:12 |
| <input type="checkbox"/> B Front matter           | 4 Pages  | 10/31/84 22:05 |
| <input type="checkbox"/> Chapter 1                | 11 Pages | 10/30/84 13:56 |
| <input type="checkbox"/> Chapter 2                | 15 Pages | 10/31/84 22:49 |
| <input type="checkbox"/> Chapter 3                | 21 Pages | 11/02/84 15:41 |
| <input type="checkbox"/> Chapter 4                | 36 Pages | 10/31/84 21:47 |
| <input type="checkbox"/> Chapter 5                | 15 Pages | 11/02/84 15:45 |



June  
Expens  
Report



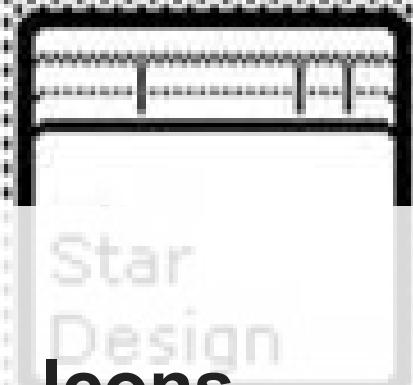
Office



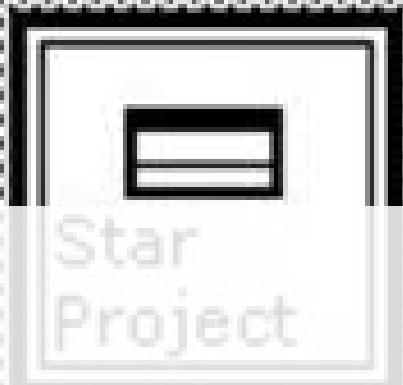
Starmen



Norm Cox



Star  
Design  
Icons



Star  
Project



Gutenberg



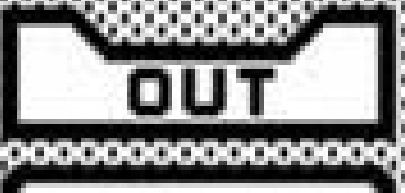
Backup



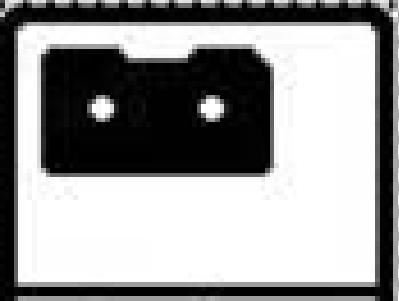
Design



IN



OUT





Menu Button

- Copy from Floppy
- Copy to Floppy
- Date and Time
- End Session
- Show Size
- Exit
- Invert Screen
- Load System File
- Upgrade to OS 2.2
- Logout
- Good Help
- Get Info from floppy



## Menu

menu button demo

©1991 by Xerox Corporation. All rights reserved.

1-1269-1268 1244 1245-1246

# Pointer



# Bitmapped Display

WYSIWYG editing

Display of  
proportionally-spaced fonts

Integrated text and graphics

Graphical user interfaces



(It was a total  
commercial  
failure.)

**... but it inspired a  
famous commercial  
success.**



# **Direct manipulation**

README.TXT

USING M

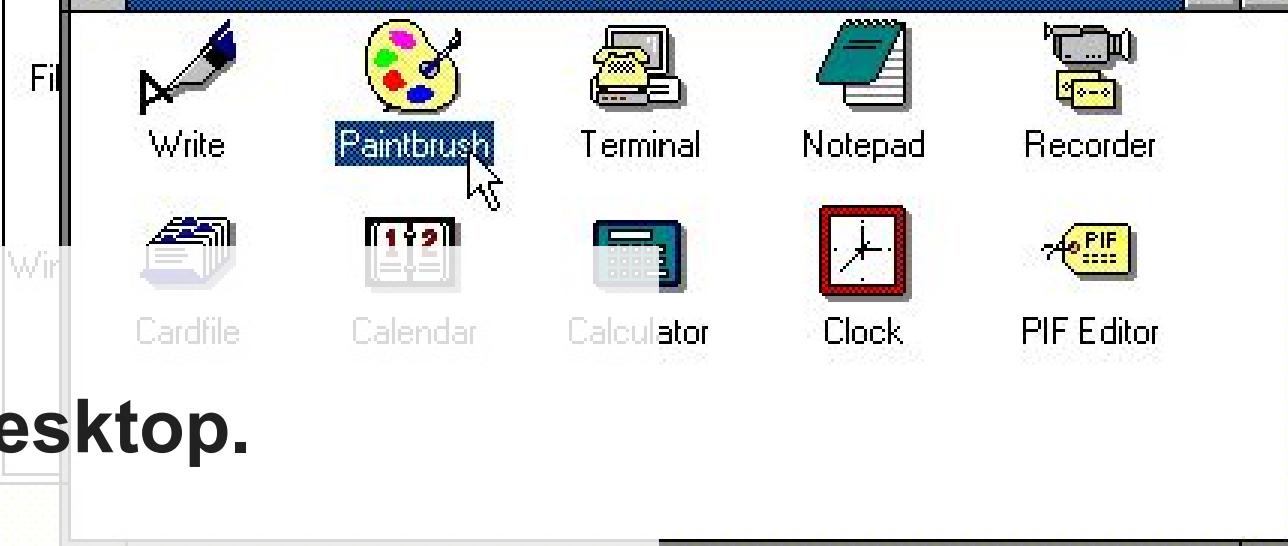
=====

## Program Manager

File Options Window Help

### Main

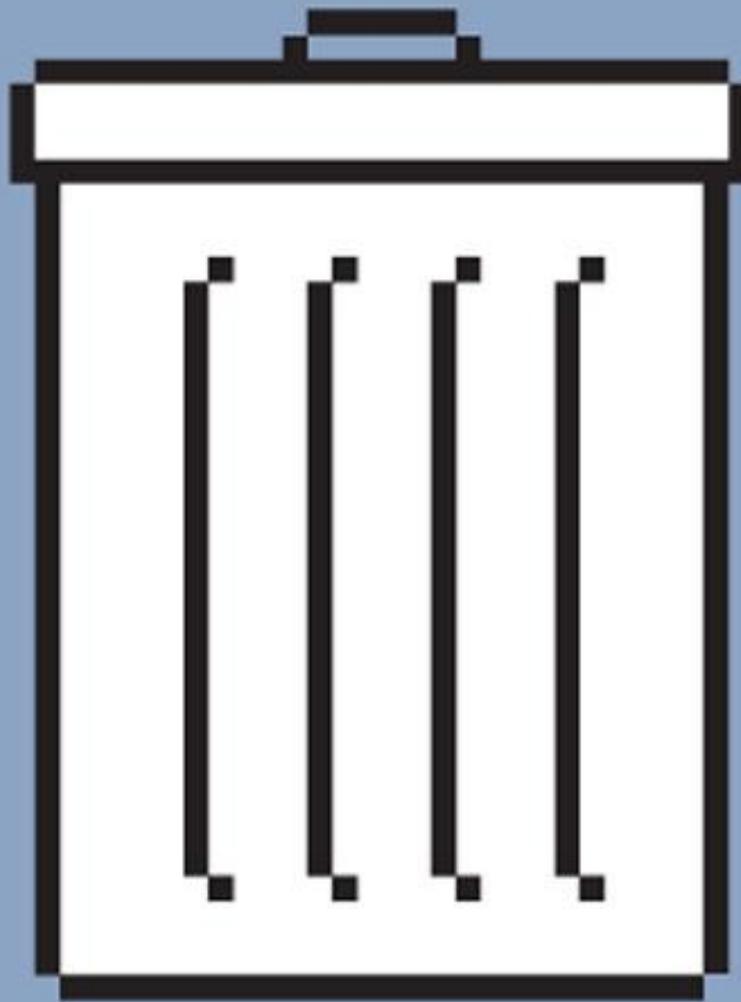
#### Accessories



# The desktop.

---

Direct  
manipulation  
relies on  
**metaphors of  
interaction**  
that are specific  
to that object.

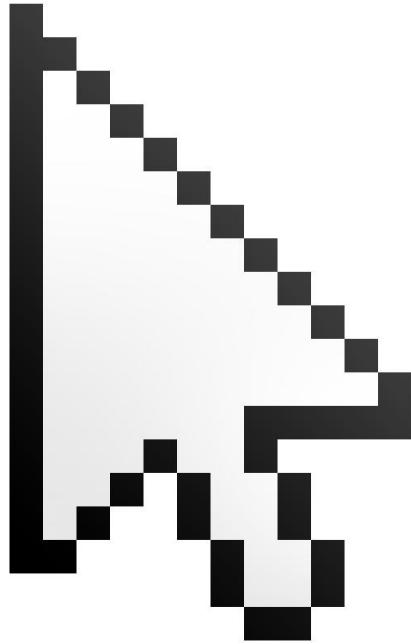


(This was very  
much in  
contrast to  
existing  
methods of  
interaction at  
the time.)

```
FORMAT?  
dir  
ASM86    CMD : TOD      CMD : COPYDISK CMD : BDT86  
ASSIGN   CMD : NEWDISK   CMD : FUNCTION CMD : PROTOCOL  
ED        CMD : SPEED     CMD : PIP       CMD : SUBMIT  
HELP      CMD : HELP      HLP : STAT     CMD : GENCMD  
newdisk b: $n  
NEWDISK vn. 1.0 01/25/82  
Disk B will be formatted.  
ALL DATA WILL BE ERASED FROM THE DISK.  
Is this what you want (y/n)? y  
Disk format in progress.  
Formatting Track 39  
Verifying Track 00  
Format complete.  
Press Control-C to exit, or  
ENTER to format another disk.  
|U=00|02/10/82|00:03:57|
```

WIMP also added a  
vital element:  
**abstraction.**



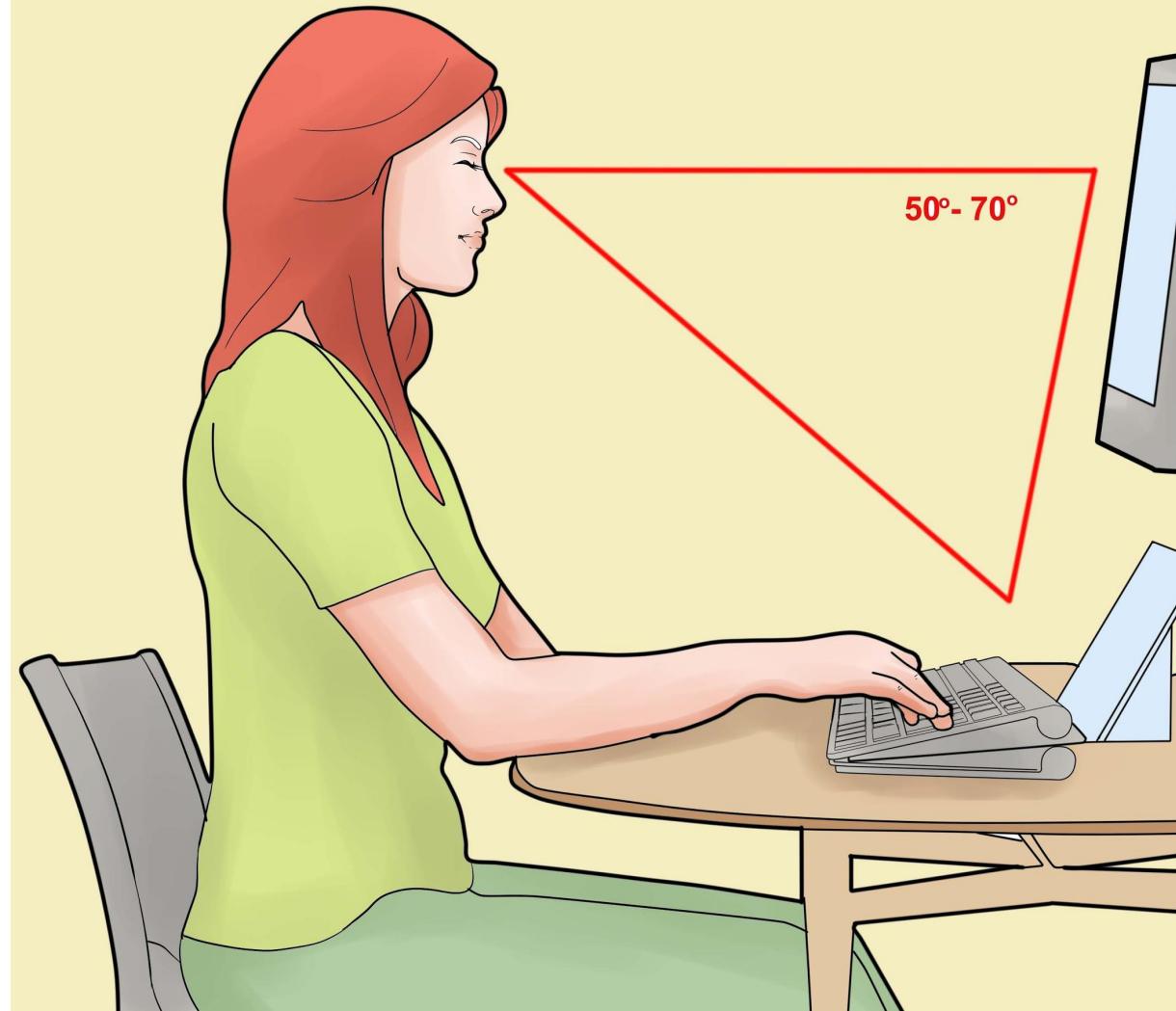


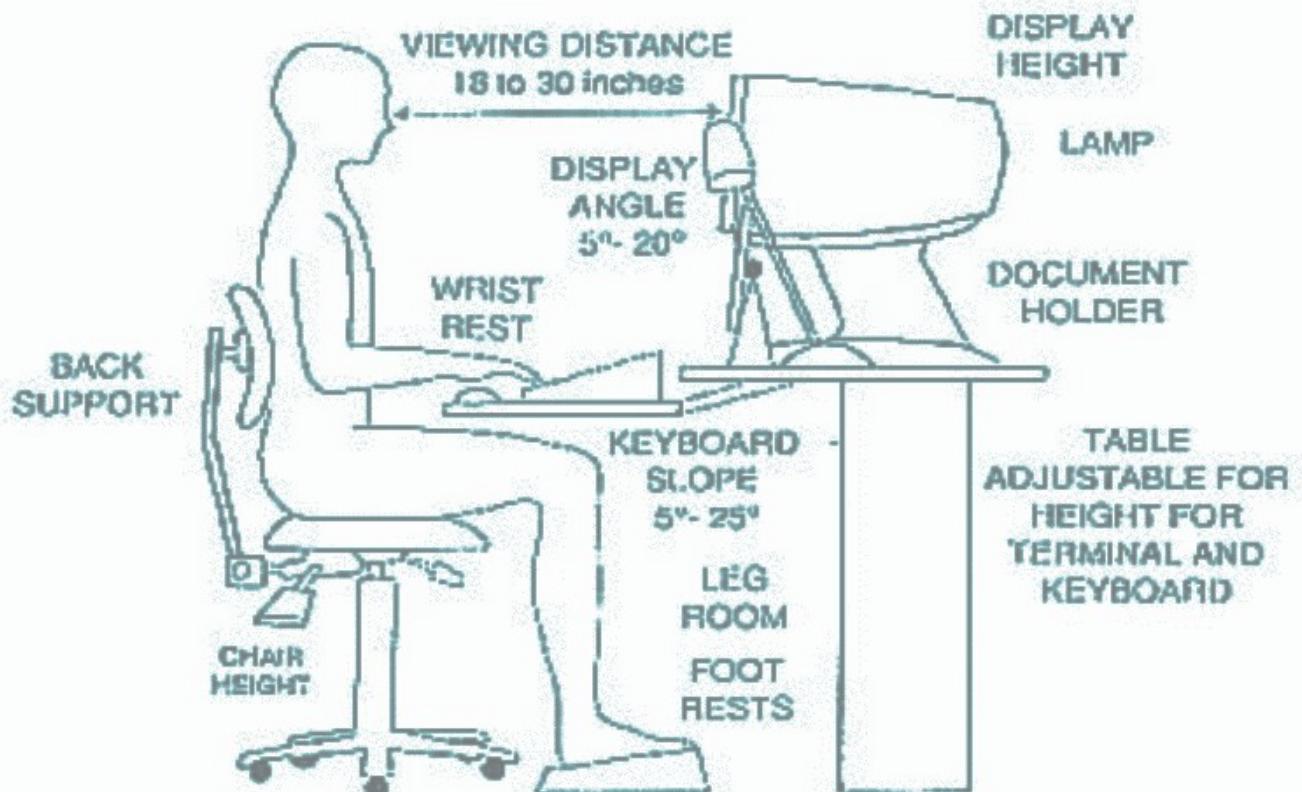
**Both these things are pointers.**

---

WIMP assumes  
the person using  
the system is:

- Sitting at a desk
- Using a keyboard
- Oriented toward a screen





This is the beginning of

## Human Computer Interaction.

(More on that in week 6.)

# Input/Output Devices

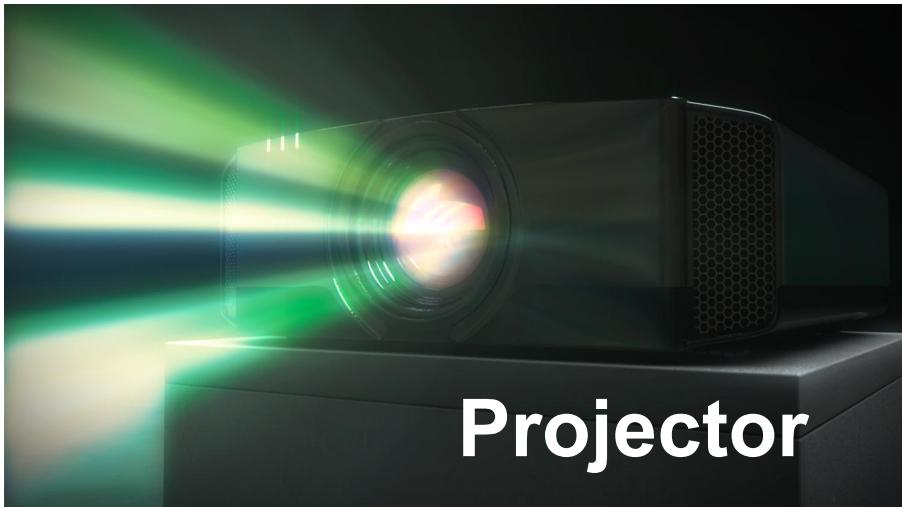


Voice

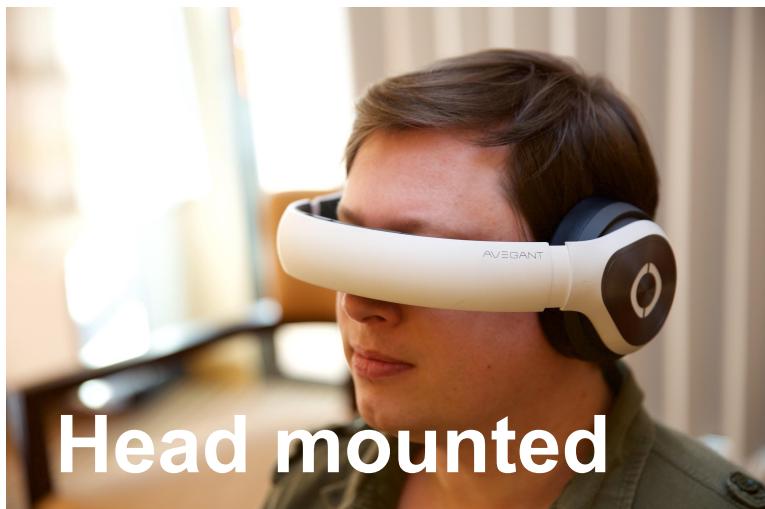




Monitor



Projector



Head mounted



Audio

Some are  
unusual ...







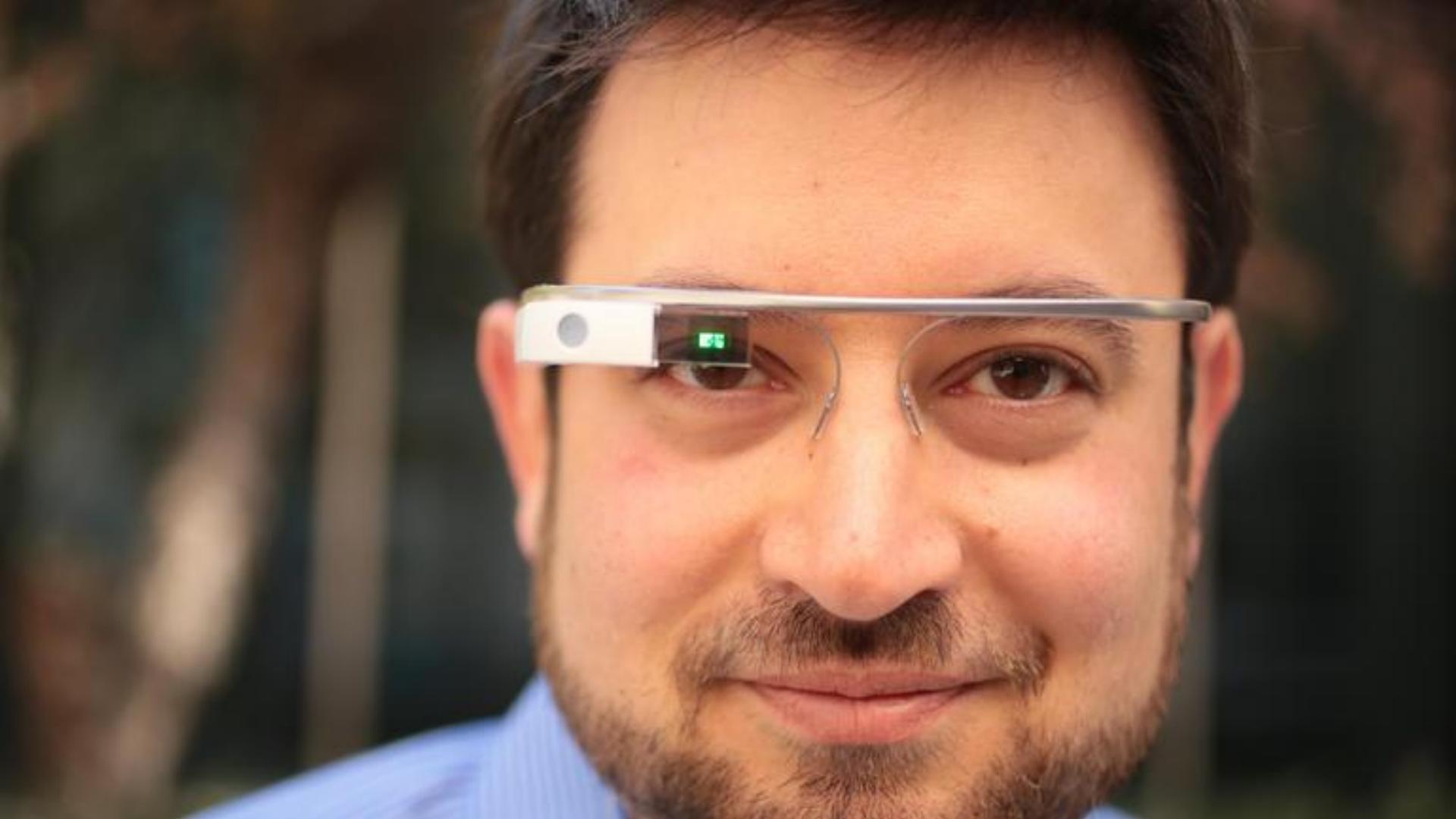




And there's  
some really  
weird stuff.













Some  
considerations

We have to  
choose the right  
input and output  
for any given  
interaction.

# The ultimate device: The iPhone

Needs only a finger for input thanks to capacitive touch!

Completely changed media and society in a decade!



**... but posture is  
a consideration.**



---

New interaction:

## Oculus Rift

Completely  
immersive!

Amazingly  
realistic!!



... but is it  
really what  
we're being  
promised?



---

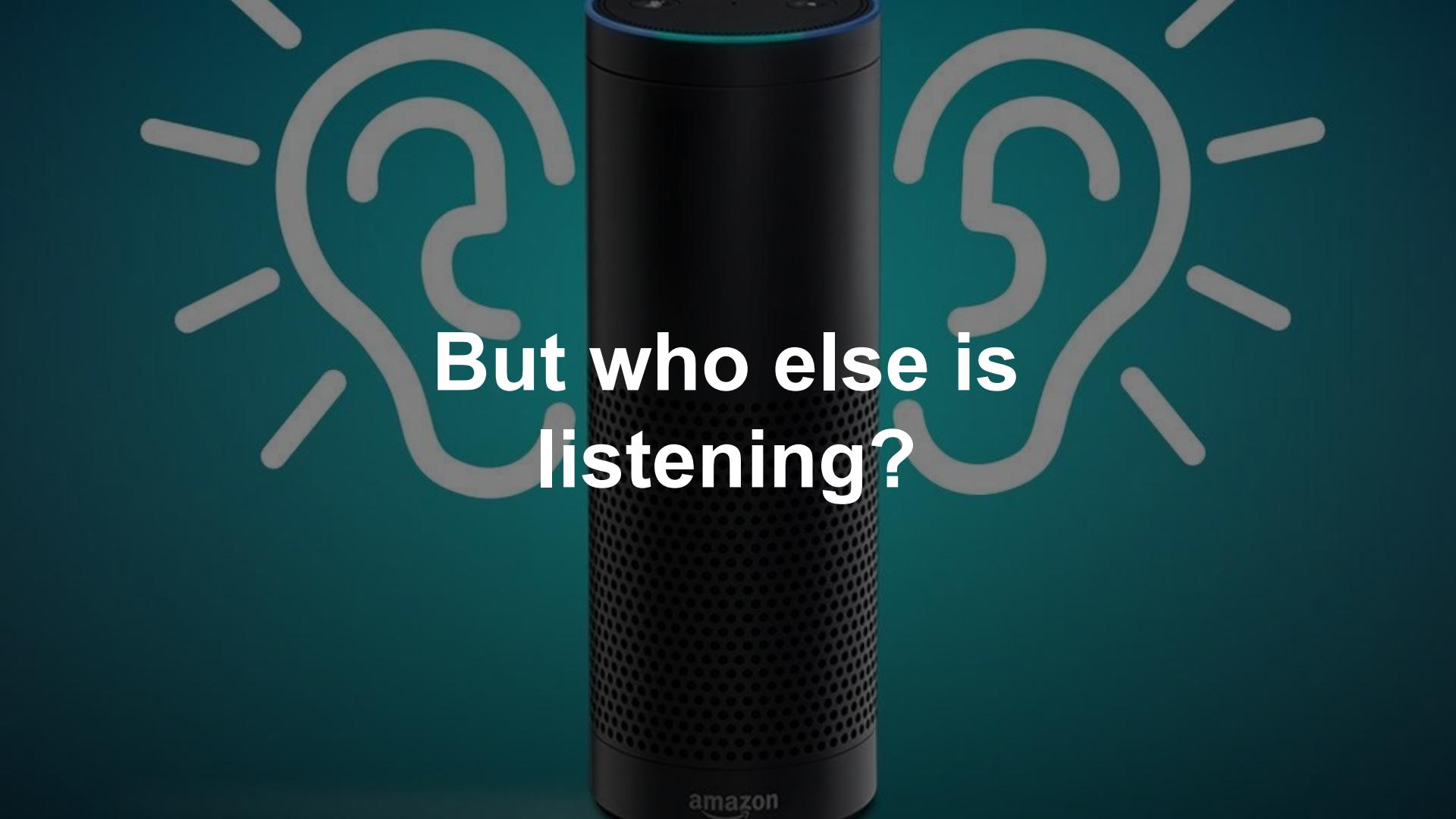
**The current big  
thing:**

## **Amazon echo**

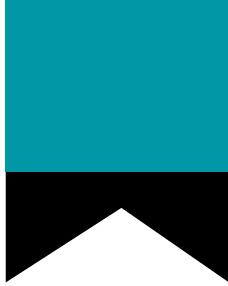
**Ultra convenient!**

**Instantly order  
anything just by  
saying it!**





**But who else is  
listening?**



## In summary ...

There are some truly miraculous options for interaction.

However, the right method must be used for the right interaction.

We also need to consider factors like physicality, context, and ethics.