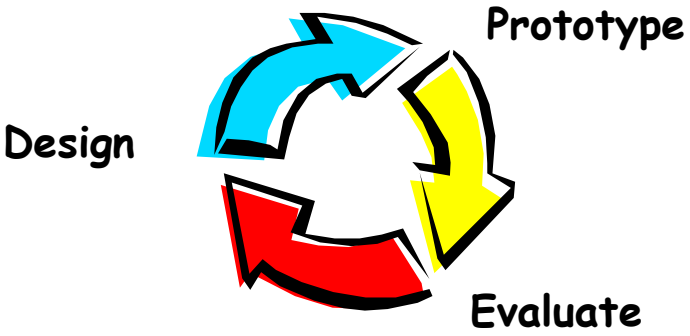
The Design Cycle and Brainstorming

CS160: User Interfaces

John Canny

Review

Course overview



Project theme

Model 160 - 500 Gb

Course mechanics

Assignments

Due today

- Creation of wiki account
- Course petition
- 1 comment per lecture

Due next Wednesday

- Individual project proposal

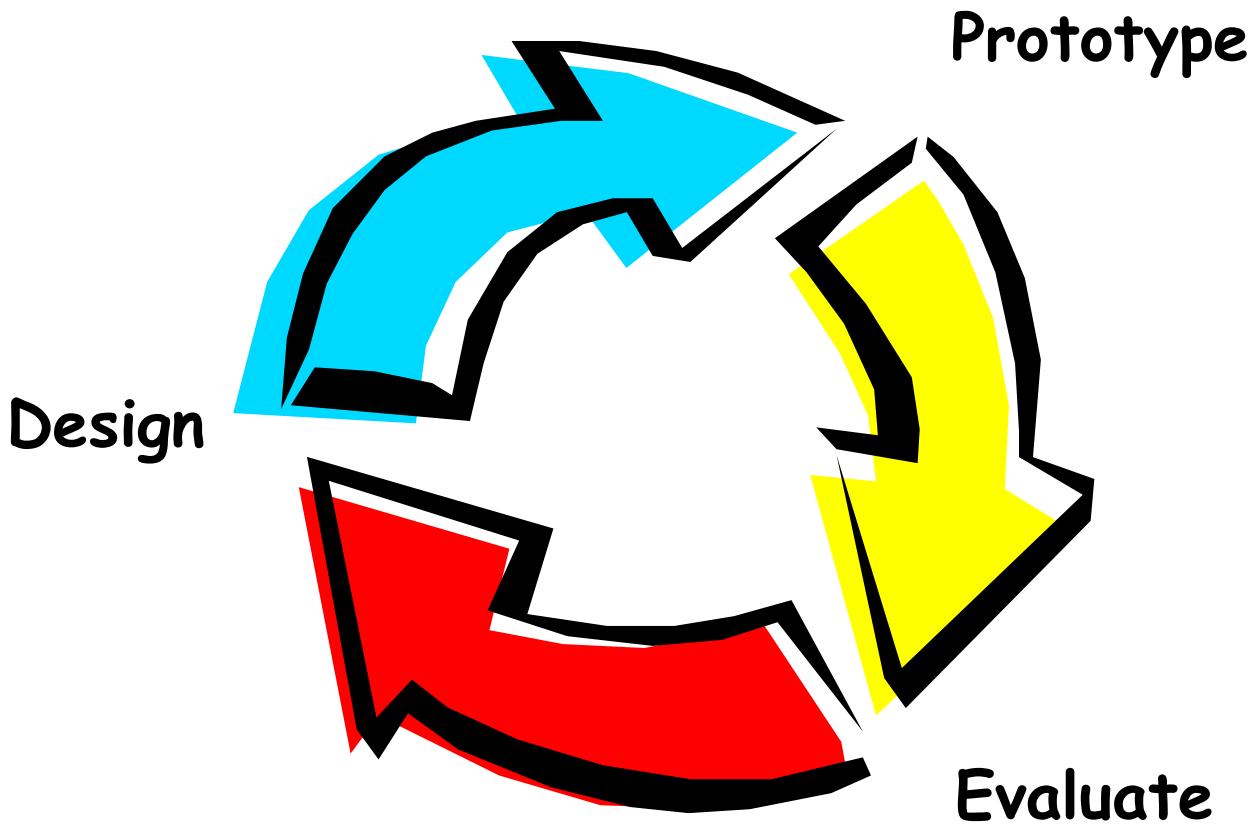
Due on Sept 13

- Individual programming assignment 1

Topics Today

- The Design Cycle
- Brainstorming

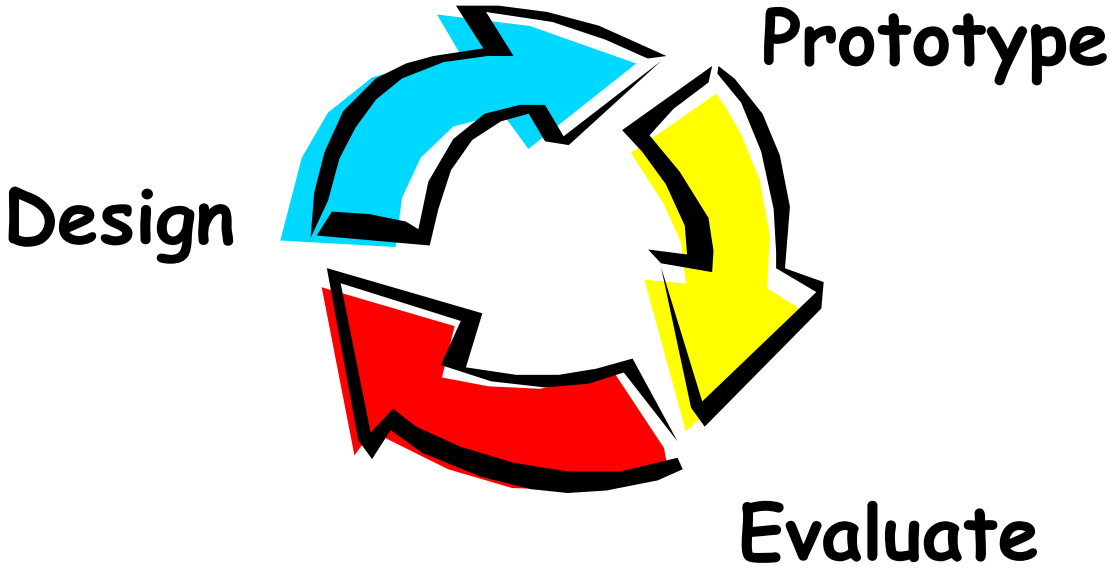
The Design Cycle


Prototype
Design
Evaluate

The Art of UI Design

But, there's more to it …

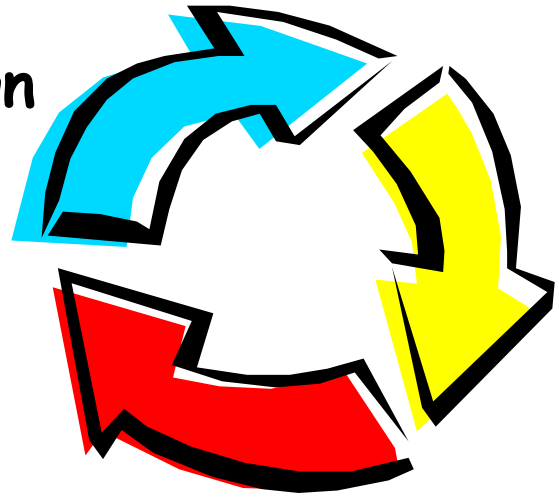
A soufflé is eggs, butter, milk & flour, but the difference between soaring and sinking is in the execution.


Prototype
Design
Evaluate

Lewis and Rieman's cycle

1. Choose Users
2. Select tasks
3. Plagiarize
4. Rough out a design

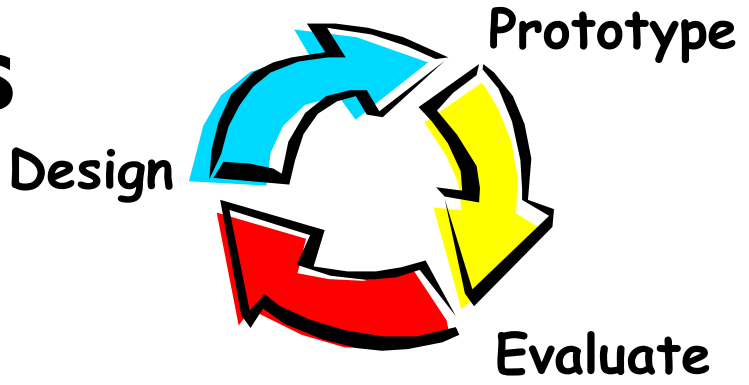
5. Think about it



6. Prototype

7. Evaluate
8. Iterate
9. Build the design
10. Track the design
11. Change the design

Understand Users



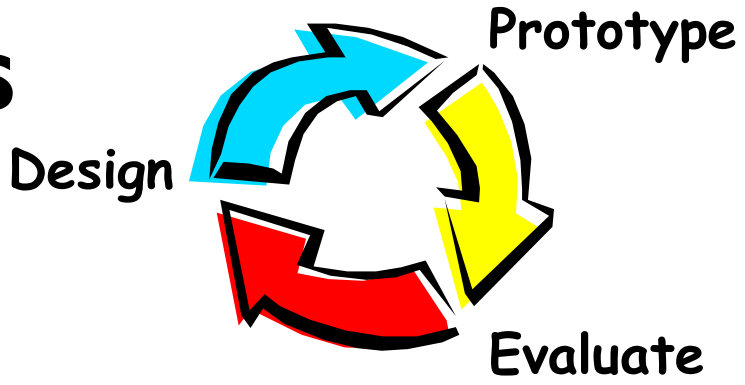
User-centered design starts
and ends with real users.

Observation, surveys, interviews

Two ways to summarize traits:

- Abstraction
- Archetypes

Understand Users



User-centered design starts and ends with real users.

Observation, surveys, interviews

Two ways to summarize traits:

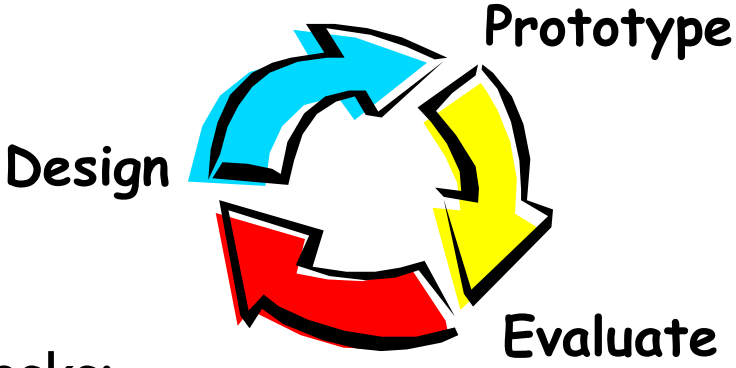
- Abstraction
- **Archetypes**

Personae

Tasks

What are the tasks?

Observe and test, don't guess



Tasks:

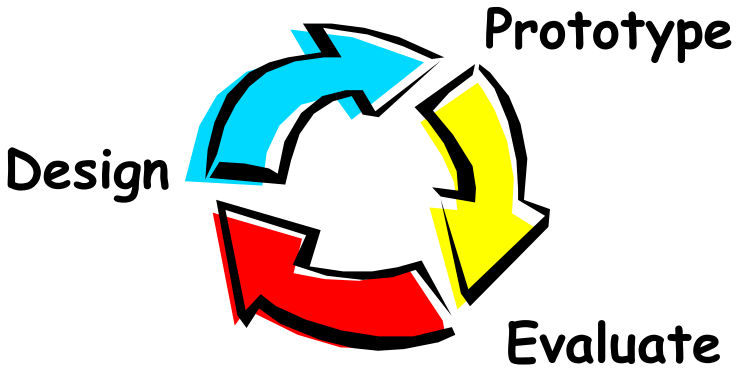
- Finding a point-of-interest
- Sending a message
- Taking/sharing a photo

Mixture of easy/hard

- Browse for a contact
- : : :
- Create a location-based reminder

Support strange paths..

Definition



Focus on the problem

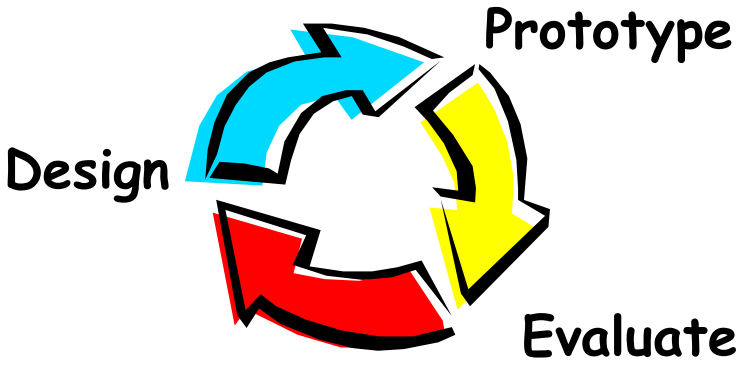
- Choose appropriate framing

Not “bicycle cup-holders” but “helping cyclists to drink coffee without accidents”

Or, helping users work out more regularly

Or, helping users learn during their commute

Ideation



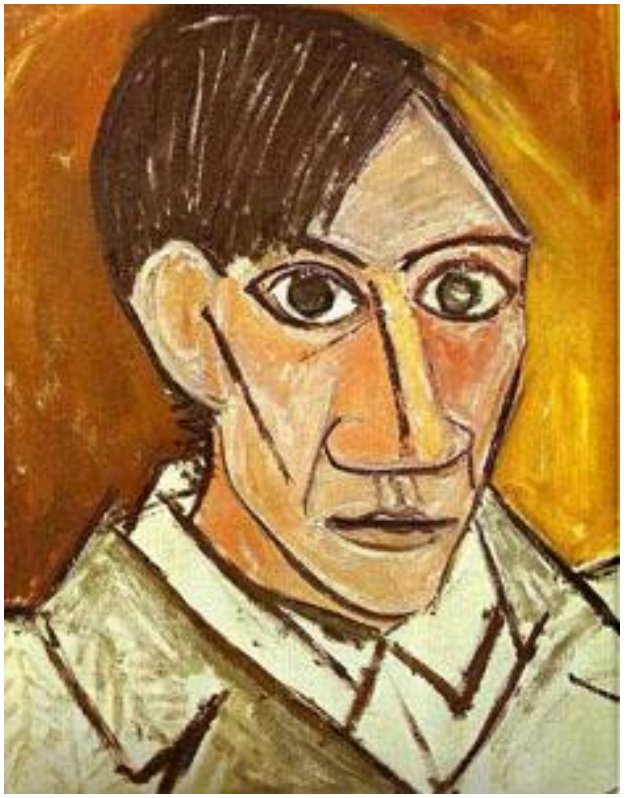
Brainstorming

- Stretch mental muscles
  - Loosen up with simple games
  - Do homework
  - Seed with related ideas/objects
- Get physical
  - Sketch
  - Make models
  - Act out
- IDEO rules
  - One conversation at a time
  - Stay focused
  - Encourage wild ideas
  - Defer judgment
  - Build upon ideas from others

Aim for quantity

Plagiarize

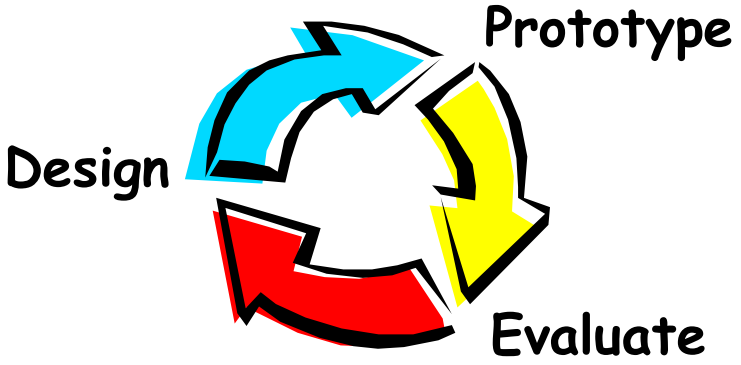
"Good artists borrow (from other artists),
but great artists steal !"
- Pablo Picasso



Compelling design takes practice
and experience –
a natural part of which is study
and critique of other's work

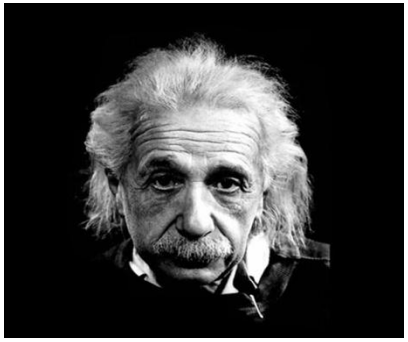
Csikszentmihalyi "Creativity" – most
creative people were also experts
in the history of their field.

Idea Selection



Define importance of each idea

- Does it address problem
- Will target users like it
- Is hardware available
- Is software available
- What is the cost
- Market window
- …

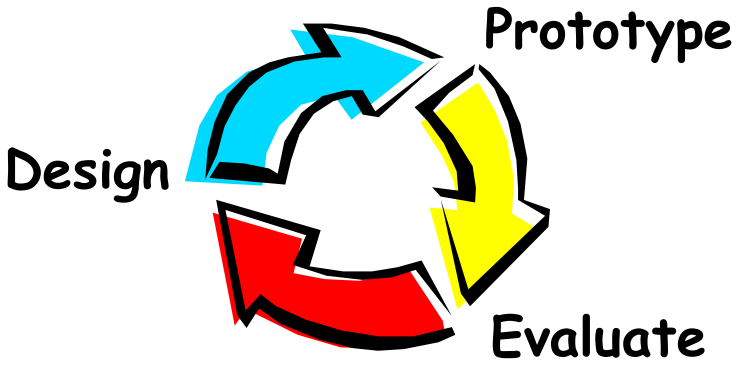


Rank ideas according the your criteria – don't kill ideas with "fatal flaws" too early.

Pick top N

- Choices depend on resources and stage of the project

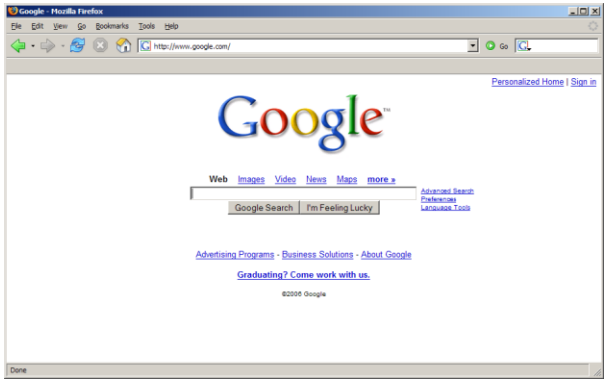
Design Discipline



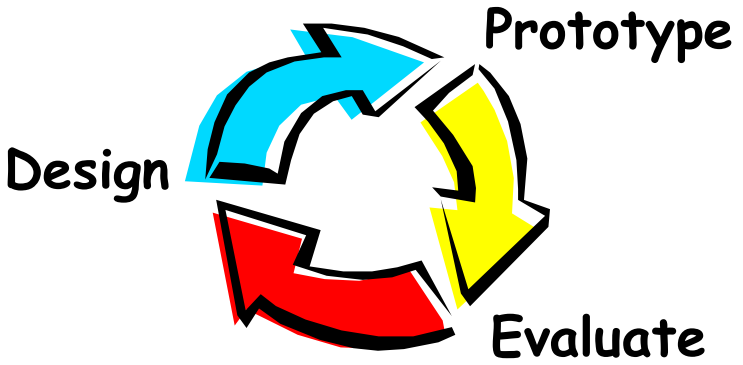
Great design is about choosing what to leave out.

Takes a clear understanding of users' needs.

SIMPLIFY whenever possible.



Rough it out

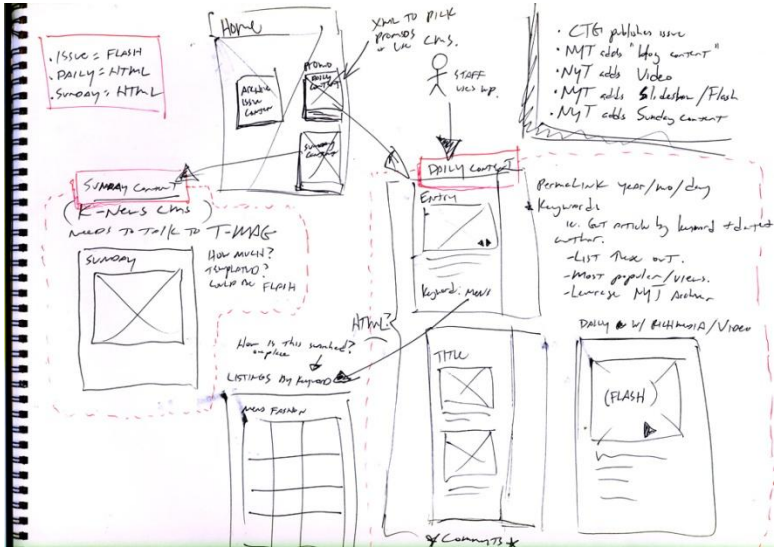


Sketch

Argue

Get criticism from others

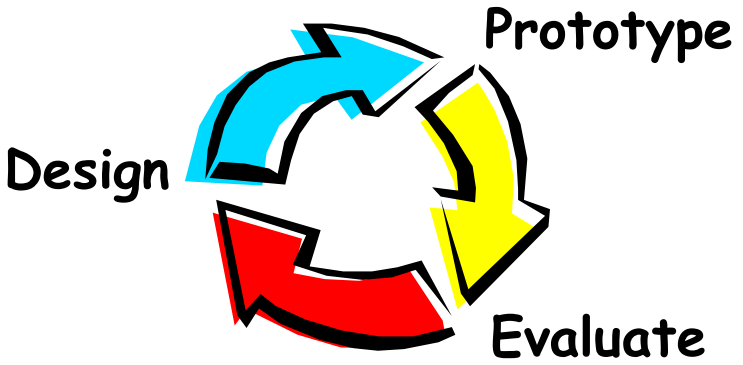
- Seeing through many eyes



Studio model

- The space is a cognitive extension

Think

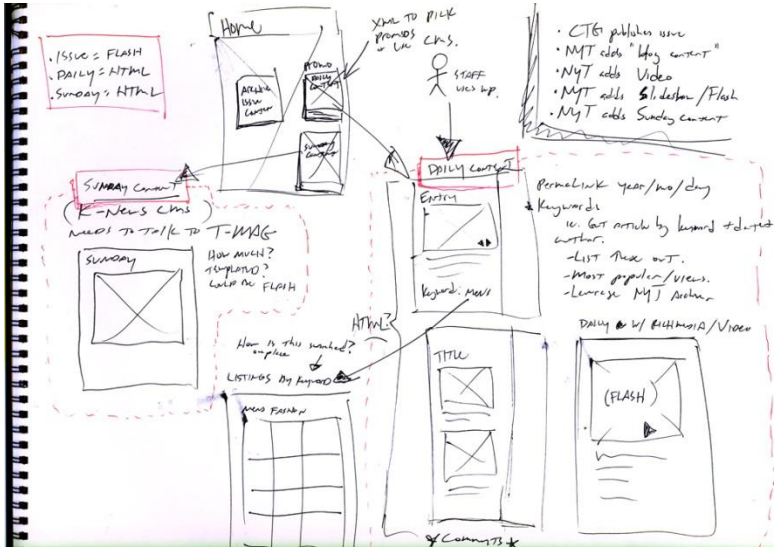


Step back…

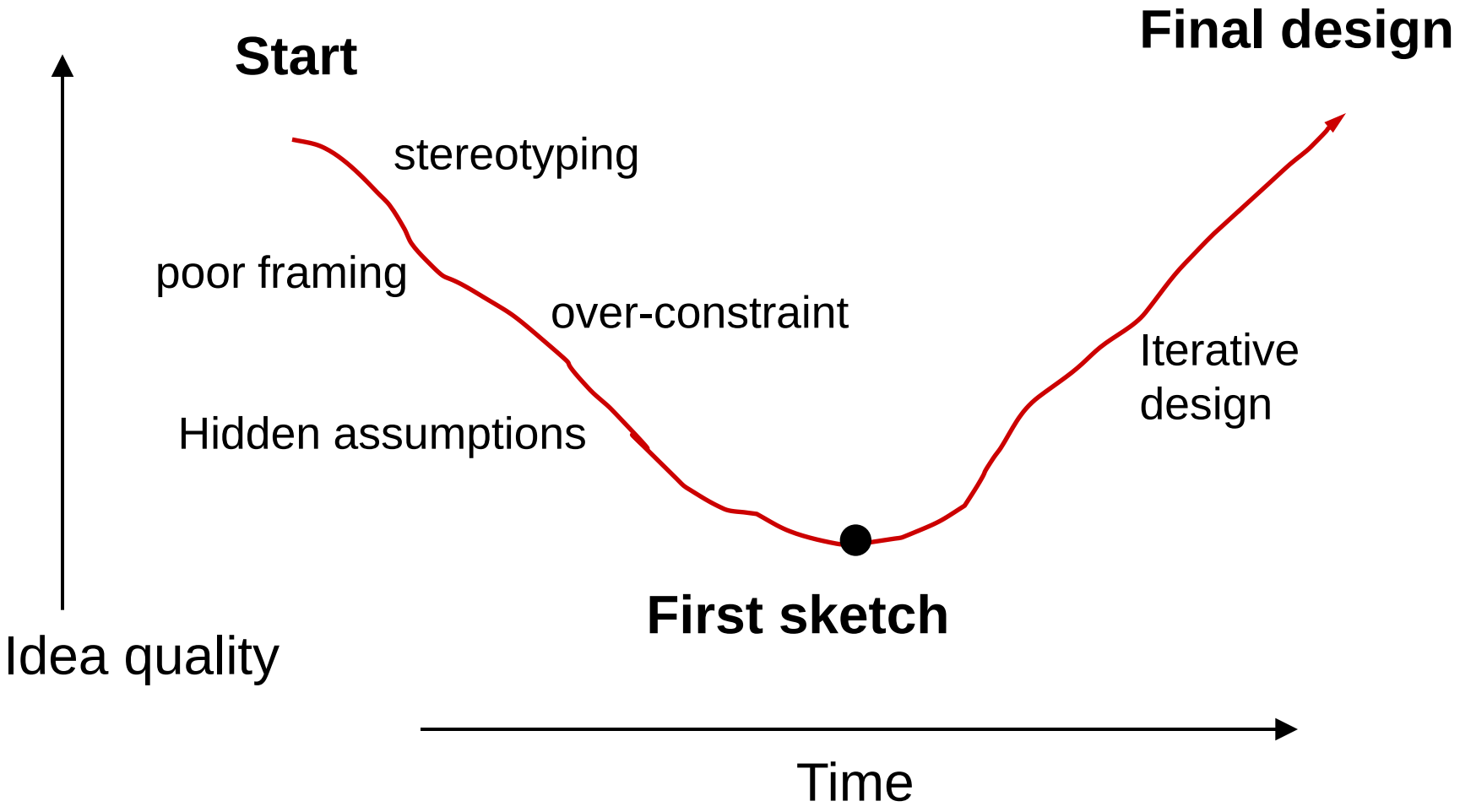
Critique your own design

Why did you make the choices you did?

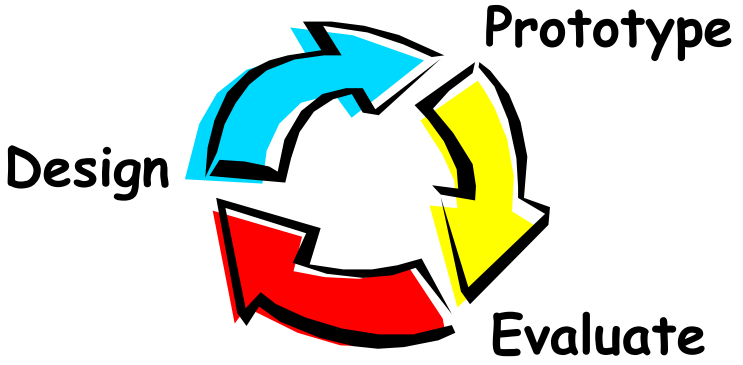
What is the real design space you are working in?



Try to avoid “overthinking” before your first sketch

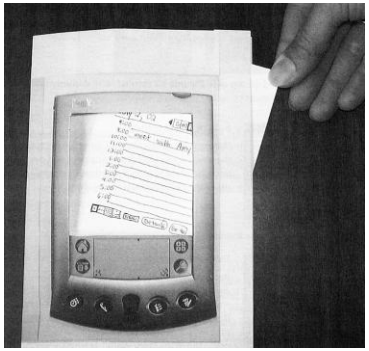


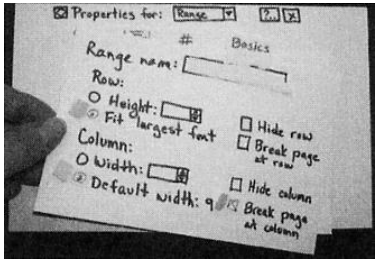
Implementation

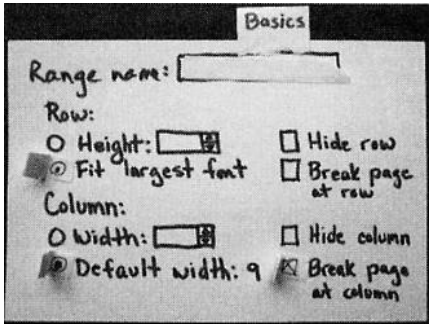


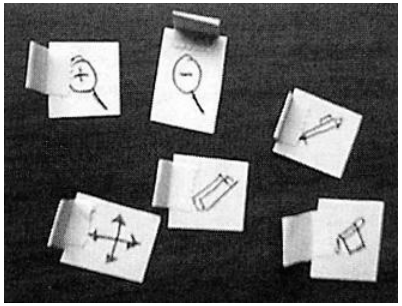
Scale up low → high fidelity

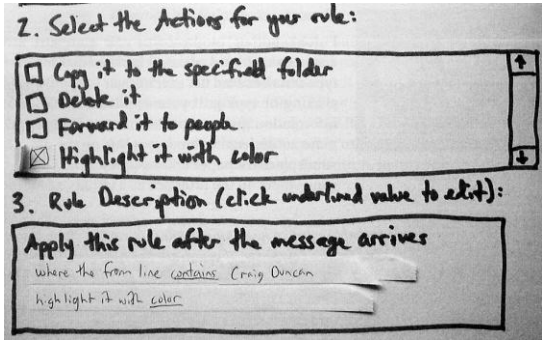
- Low-fidelity (quick, cheap, dirty)
  sketches, paper models, foam core, …

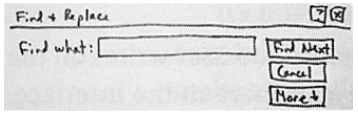


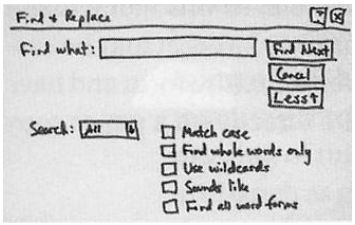












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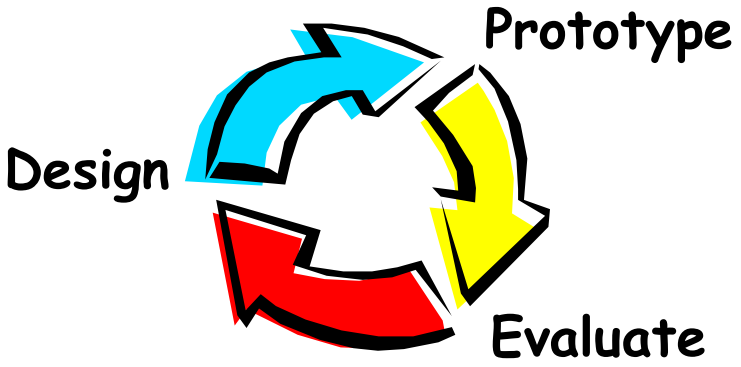
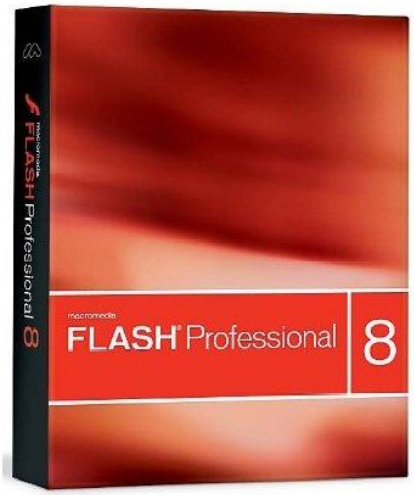
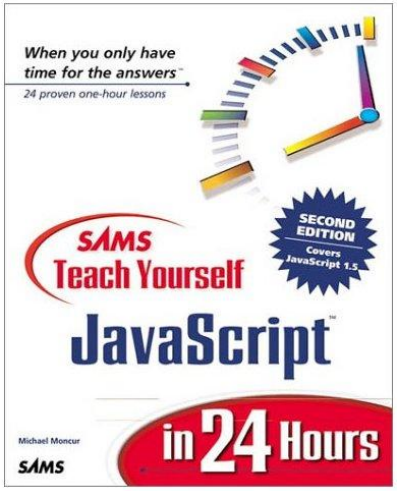
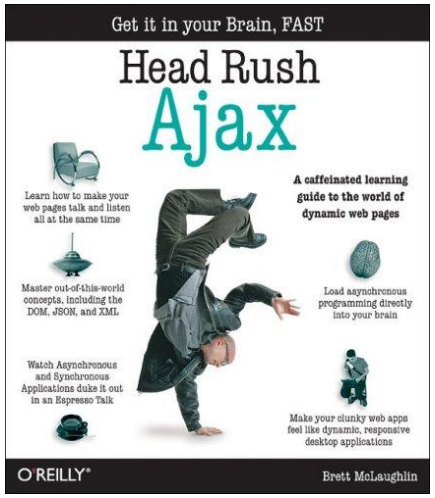


Scale up low → high fidelity

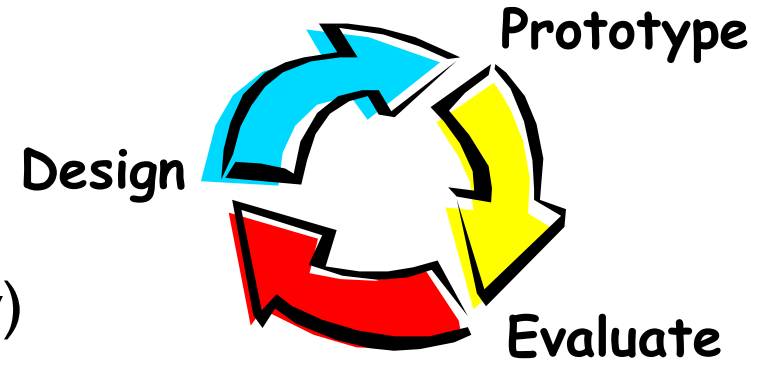
- Low-fidelity (quick, cheap, dirty)
  sketches, paper models, foam core, …
- Medium fidelity (slower, more expensive)
  Flash, JavaScript, AJAX, …
- Refactor/rethink





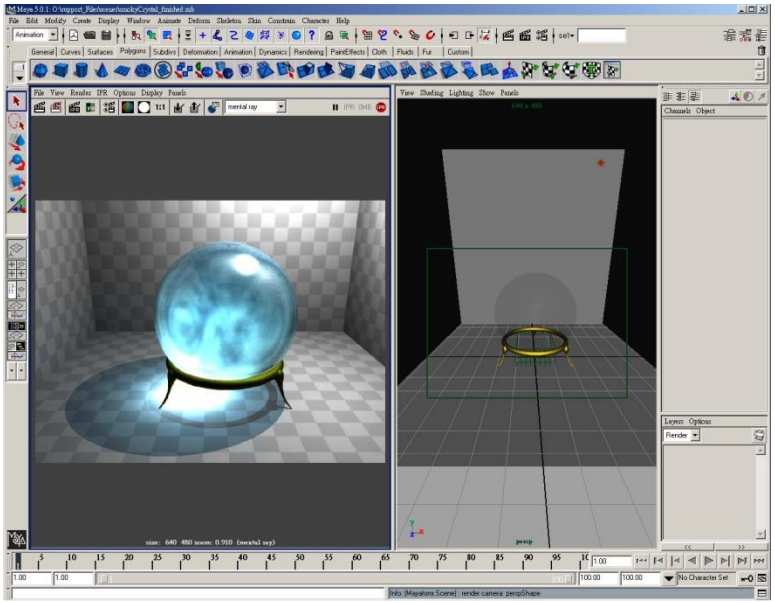


Implementation



Scale up low → high fidelity

- Low-fidelity (quick, cheap, dirty)
  sketches, paper models, foam core, …
- Medium fidelity (slower, more expensive)
  Flash, JavaScript, AJAX, …
- High fidelity (slowest, most expensive)
  The full interface



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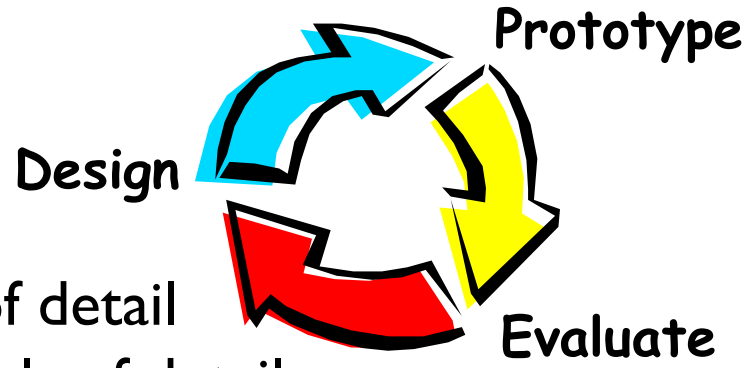
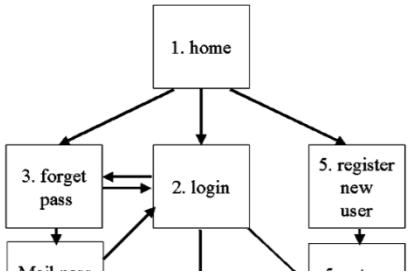
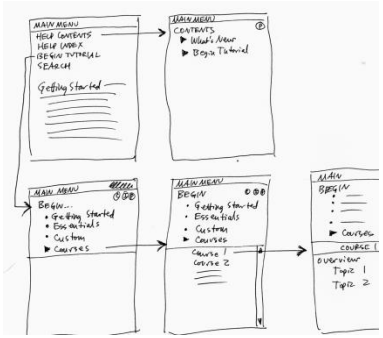


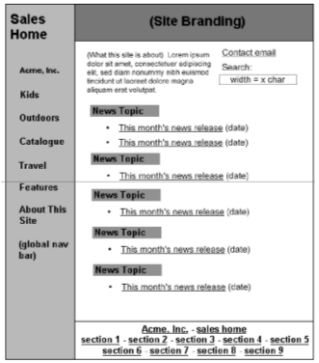
Web design

- Sites *created* at multiple levels of detail
- Sites iteratively *refined* at all levels of detail
- Iterate quickly to see what works

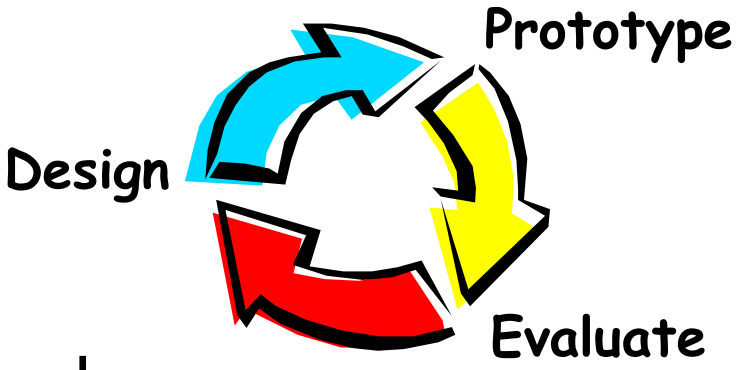
Site Maps → Storyboards → Schematics → Mock-ups





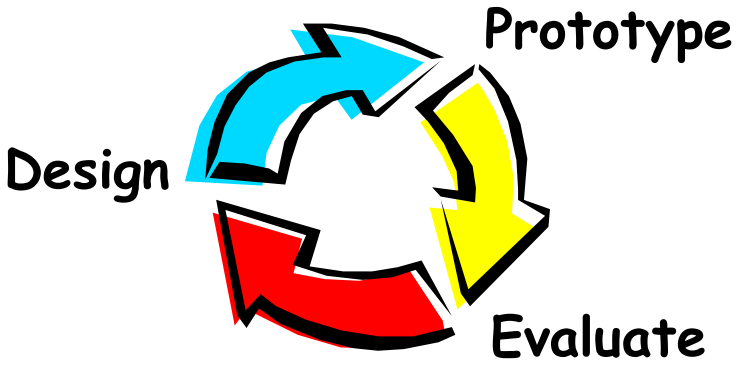


Evaluation

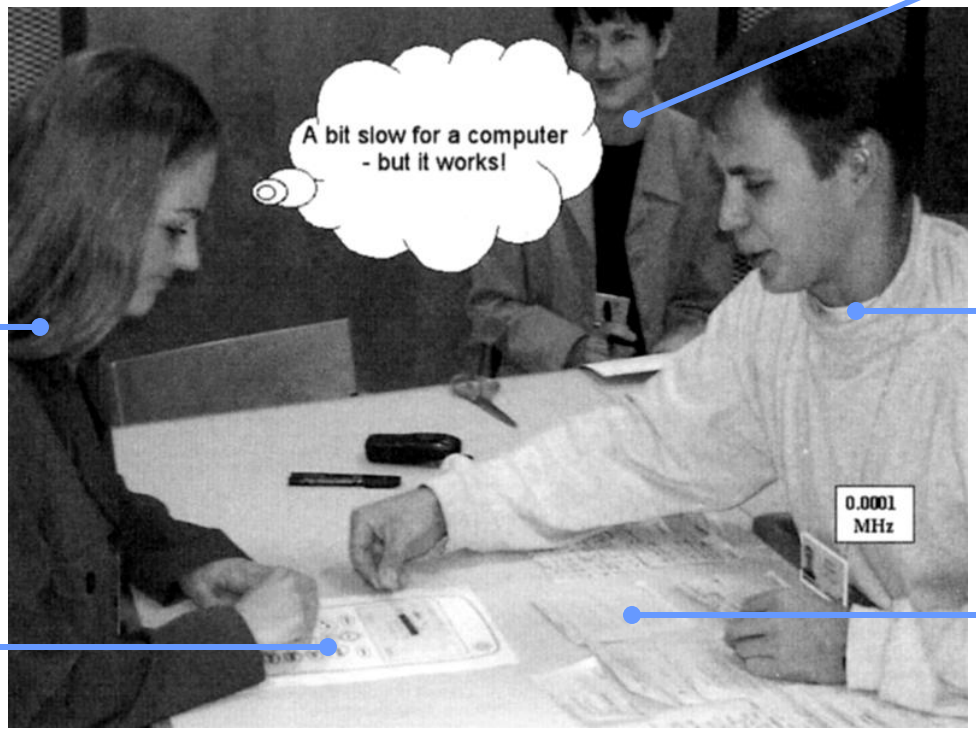


Early tests - Wizard of Oz approach

Evaluation



Walk-through prototype design



Observer
(or video camera)

User

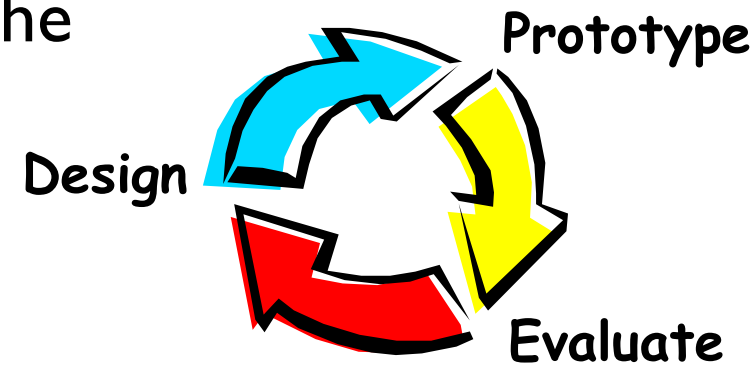
"Computer"

Interface

Interface elements

Build, Track, Change

Design continues after the product ships.



Quality – bug fixes.

Track usage, seek user feedback (support!).

Do something about the problems you find.

A bit of history

Q: What was the Zoomer?

A: The Palm Pilot's parent.

It failed in the marketplace.

Palm Pilot

- Intensive studies of Zoomer users began in 1994.
- Decided the PDA should be a paper replacement, not a PC replacement.
- Switched to graffiti.
- Shrunk to pocket size.
- Unveiled the Palm Pilot in 1994.

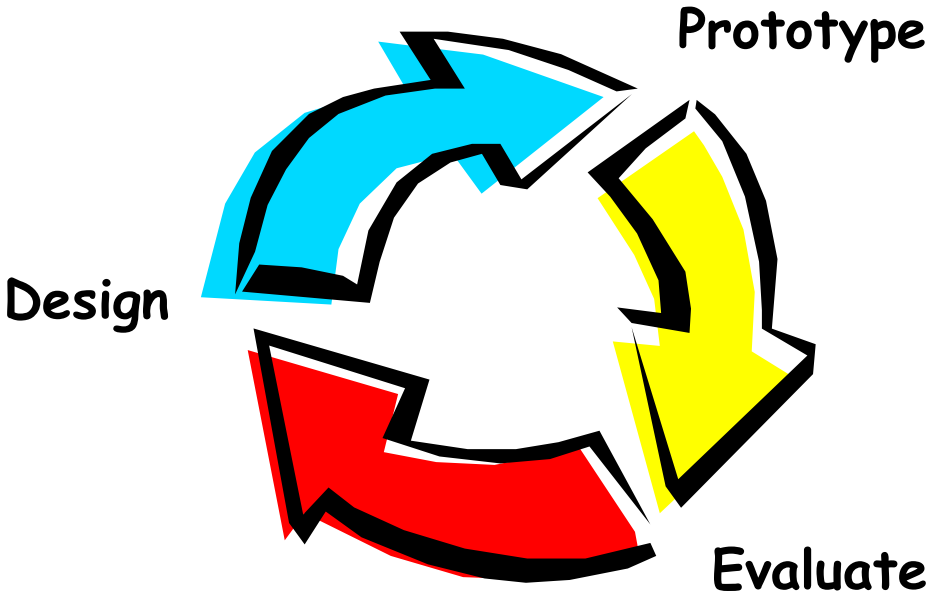
What are?

- Apple Lisa
- Windows 1.0 and 2.0
- IBM's Simon?

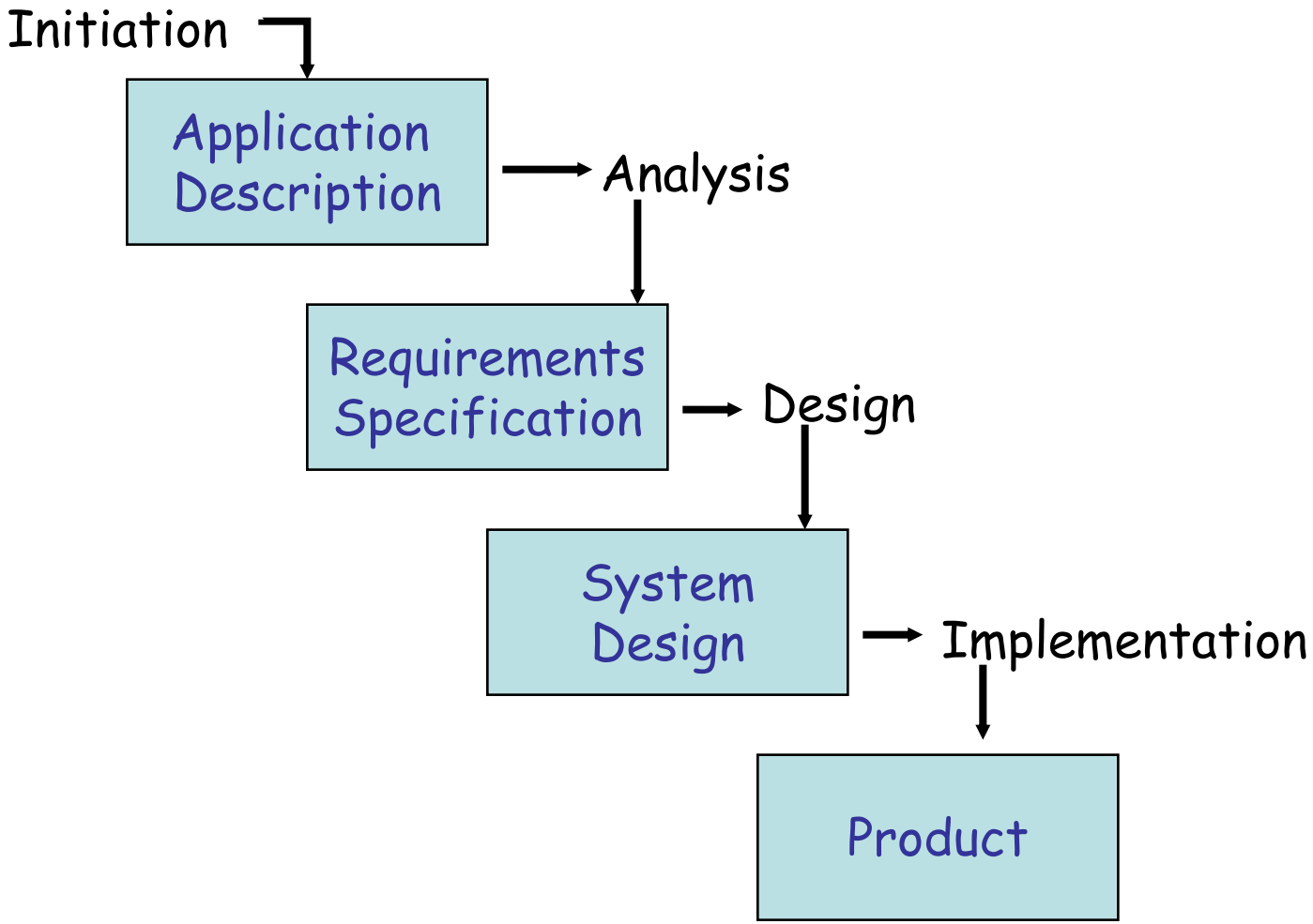
What are?

- Apple Lisa

- Windows 1.0 and 2.0
- IBM's Simon? Touchscreen phone in 1994


Prototype
Design
Evaluate

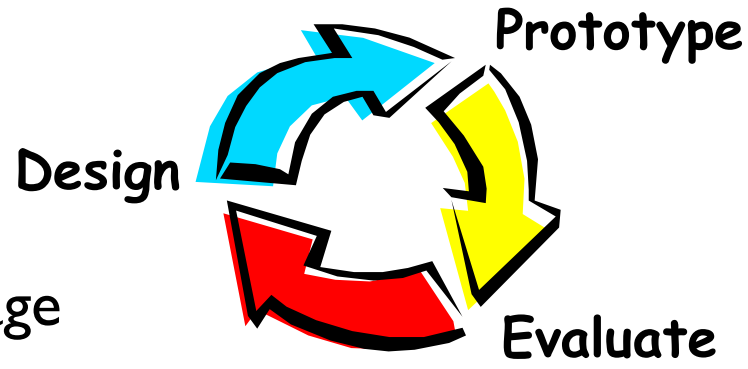
Waterfall Model (Soft. Eng.)

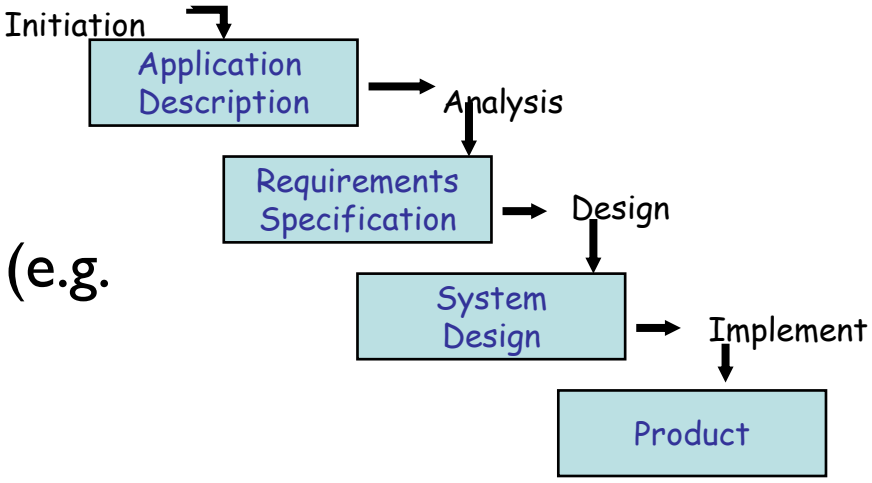


Comparison

Focus differs

- Waterfall has no feedback
  - High cost of fixing errors
  - Increases by 10x at each stage
  - Iterative design finds problems earlier



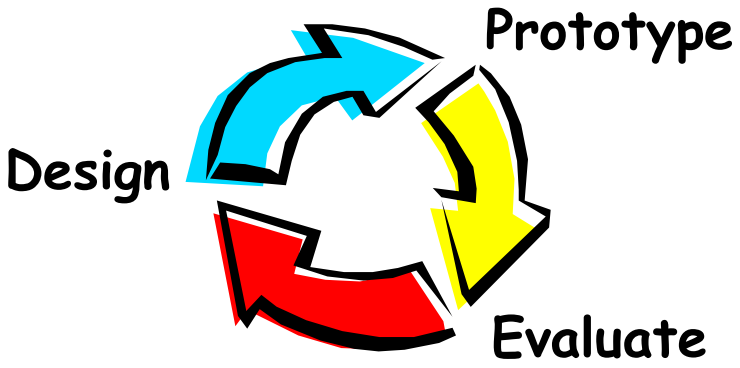


However, ***agile*** SWE processes (e.g. extreme programming, SCRUM) adopt a similar iterative model.

Comparison

Extreme programming:

- Very short, test-driven cycles
- Reprioritization of features
- Customer always on hand



SCRUM:

- Small team (< 10 people)
- Weekly “sprints” followed by meetings with all stakeholders
- Increments in customer-facing features
- Any design spec can change

Brainstorming

The Psychology of Creativity

Conformity: the enemy of creativity

Groups and organizations encourage conformity

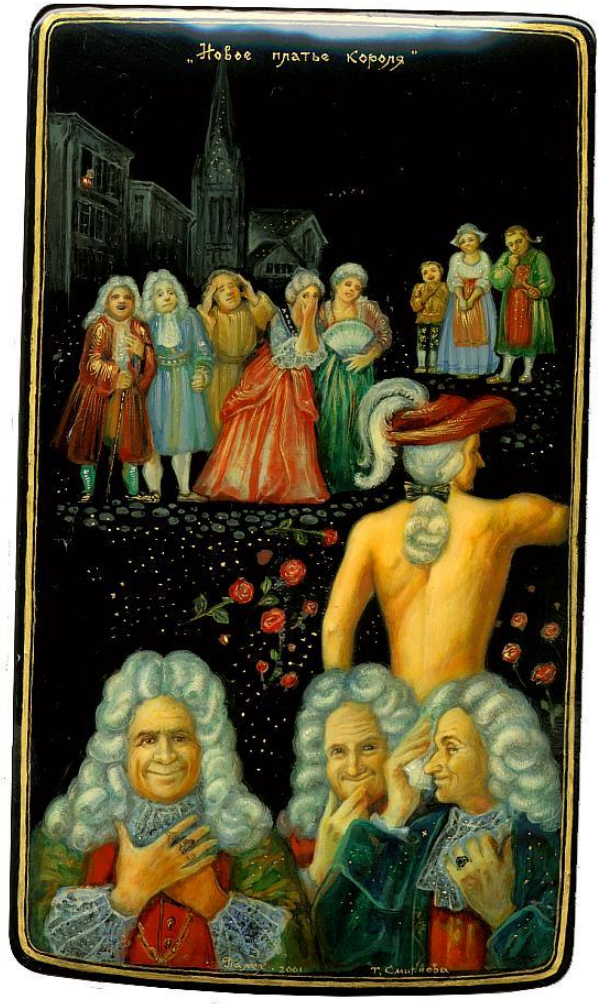
Part of "brand" or "corporate identity"

The Psychology of Creativity

Pressure to conform affects judgment and perception:

- The emperor's new clothes
- McCarthyism: if you're not one of us, you're one of them…

People in minority will adopt majority opinion and even manufacture their own explanation of it.

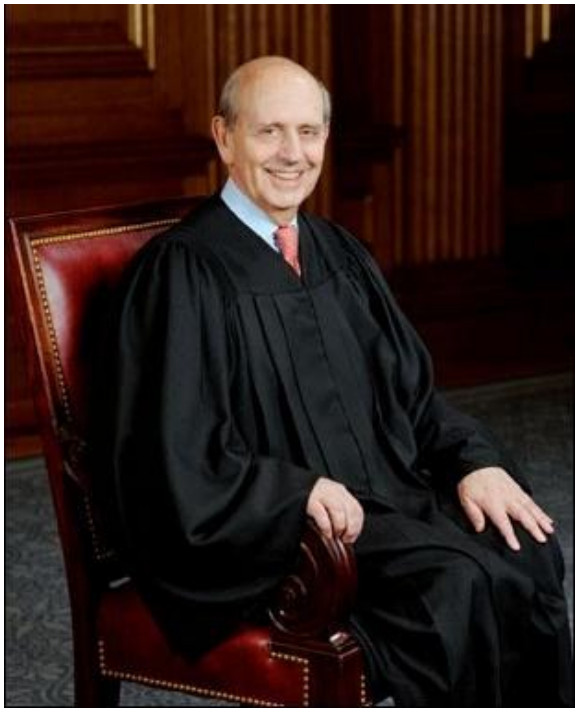


Creativity and Dissent

Authentic dissenters – people who really disagree with group – can enhance group creativity

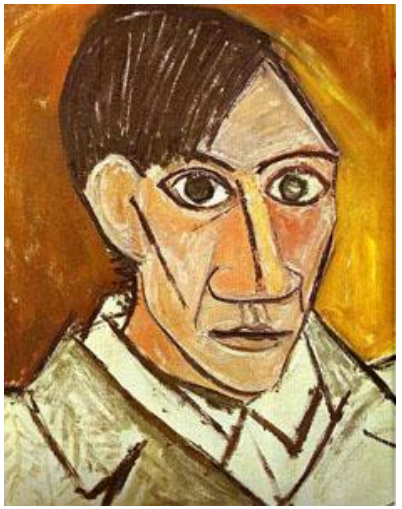
Their opinion needn't be right – but they can free the group from stagnant thinking.

The originality of the minority stimulates the majority



Creativity and Scholarship

"Good artists borrow (from other artists), but great artists steal !"
- Pablo Picasso

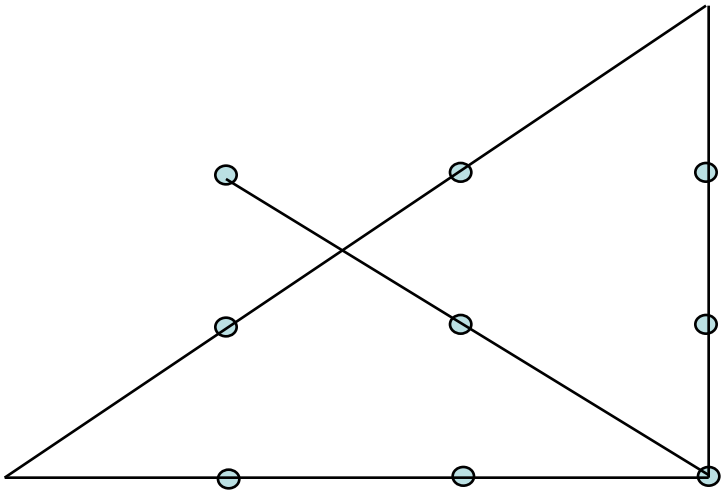


Mihaly Csikszentmihalyi studied creative individuals from many disciplines and found they had tremendous knowledge of the history and prior work in their discipline.

Enhancing Creativity

Thinking outside the box:

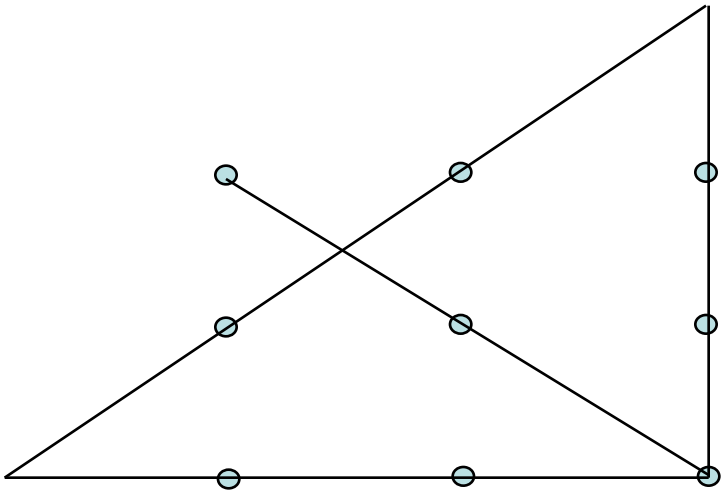
Draw a series of 4 straight lines through all the points below, without lifting pen from paper:



Why Is This Hard?

We adopt expectations about the solution

- Based on conventions
- Based on what we believe the questioner expects



IDEO's Brainstorming Rules

1. Sharpen the Focus
2. Playful Rules
3. Number your Ideas
4. Build and Jump
5. The Space Remembers
6. Stretch Your Mental Muscles
7. Get Physical

Aim for quantity

Hope for quality

Sharpen the Focus

Posing the right problem is critical – neither too narrow, nor too fuzzy

Not “bicycle cup-holders” but “helping cyclists to drink coffee without accidents”

Number Your Ideas

Obvious but very useful

Helps keep track of them when the brainstormer is successful (and 100 or more ideas are in play)

Allows ideas to take on an identity of their own

Build and Jump

Build to keep momentum on an idea:

- "shock absorbers are a great idea; what are other ways to reduce coffee spillage on bumps?"

Jump to regain momentum when a theme tapers out:

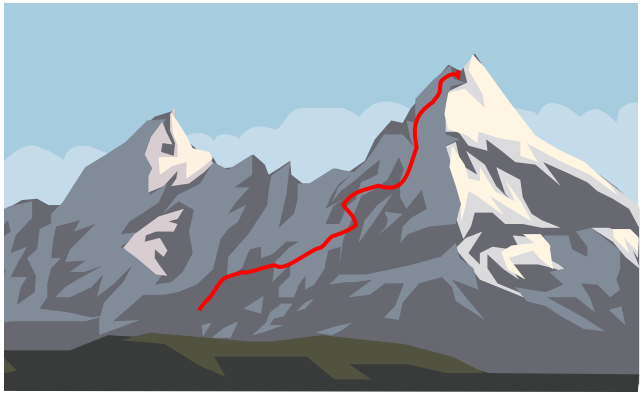
- "OK, but what about hands-free solutions?"

Build and Jump

Premature idea rejection is a serious barrier to good design.

One of the biggest differentiators between good designers and great ones is the latter's ability to successfully develop unusual ideas.

This requires a strong instinct to be able to distinguish fatal vs. minor flaws in an idea.



Concept Refinement

Premature idea rejection is a serious barrier to good design.

One big differentiator between good designers and great ones is the latter's ability to successfully develop unusual ideas

This requires a strong instinct to be able to distinguish fatal vs. minor flaws in an idea

The Space Remembers

Covering whiteboards or papering walls with text is extremely useful in group work.

It's a very effective form of external (RAM) memory for group

Even better, its shared RAM. Helps group share understanding

Stretch your Mental Muscles

Warmups: word games, puzzles

Get immersed in the domain: go visit the toy shop, or the bicycle shop, phone shop etc…

Bring some examples of the technology to the brainstomer

Get Physical

Sketch

Make models

Act out

Next Time

Sections will meet this Friday

Readings: Sketching

Don't forget – read, then write a comment on the wiki

Project proposal (individual) due on Weds.

Assignment: Individual Project Proposal

Propose idea for course project

- Based on mobile app. theme
- Exciting to you
- Be creative!
- Consider needs of a well-defined target user group
- Include sketches as appropriate

Description must be posted to wiki before class 9/8/10.

Assignment: Individual Programming I

Make sure you can get Android code compiled and running in emulator

Lots of resources on web and wiki for Android development.

Assignment must be posted to wiki by 5pm 9/13/10.