

The Design Cycle and Brainstorming

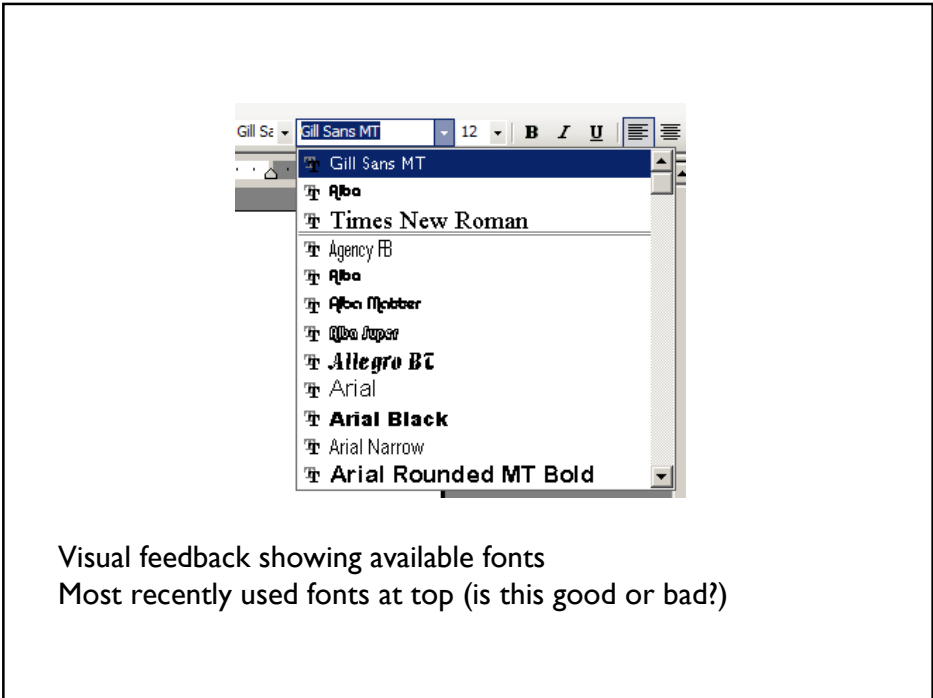
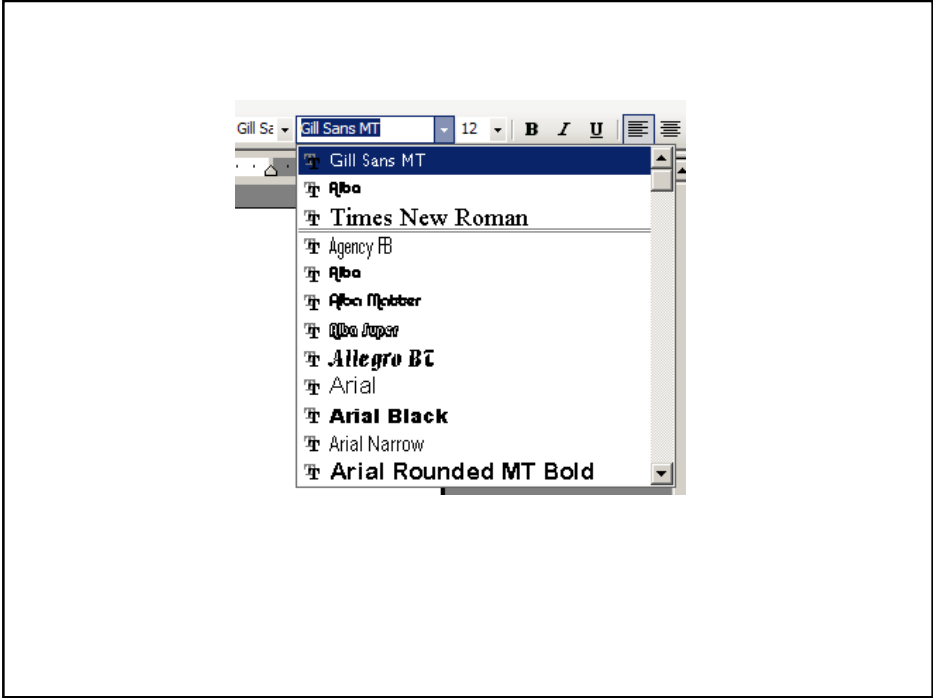
CSI 60: User Interfaces
Maneesh Agrawala and Jeffrey Nichols

Instructor: Jeffrey Nichols

Researcher at IBM Almaden
San Jose, CA
Joined IBM December 2006

Work in HCI, Mobile, Web
Automatic interface generation
for handheld devices
Multi-device communication
infrastructures
Programming-by-demonstration
and
end-user programming
for the web

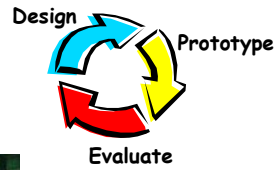




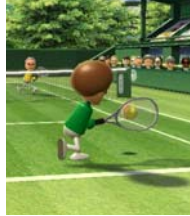
Visual feedback showing available fonts
Most recently used fonts at top (is this good or bad?)

Review

Course overview



Project theme



Course mechanics



Due Today (before class)

- Creation of wiki account
- Course petition
- Design assignment: Play and Analyze a Game
- 1 comment per lecture (cs160/cs160Readings)

Design Assignment Examples

Game Description

Carassonne

TURN-BASED GAME

- At each turn, each player:
 - Draws a tile and plays it down adjacent to one of the existing tiles according to the rules on the right.
 - Decides whether or not to place a "stronghold" if any remain, and the tile just laid down.
 - Shows cards when all tiles have been laid down. The final score is calculated and the player with the highest score wins.

Legend:

- Each "stronghold" scores 1 point when the territory is completed.
- ... with exception for the "stronghold" which scores 2 points when the territory is completed.

Tile Rules:

- A road is completed when it has a path in a row or a column.
- A wall is completed when it has a path in a row or a column.
- A stronghold is completed when it has a path in a row or a column.
- Strongholds score by the number of completed roads they are adjacent to.

Positive Aspect

Positive Aspect #3 of Board!

The game is easy for new players to pick up because of the intuitive symbols on each card, but the game mechanics can be pushed to the limits to make the game very quickly very complicated.

- Draw 3 cards from the deck.
- Draw 1 card from a player within 1 range.
- Discard a card from any player.
- Bomb! all other players.

Design Assignment Examples

Positive Aspect

Positive UI Aspect #2: Very simple interaction for playing and creating levels

Playing - level

Editing - level

Only added some elements when editing - level is - Main menu adds the level of complexity in the level.

Right-click edit play - level

Right-click edit edit - level

- The main difference between playing and editing - level is it's more focused on the more than on the balls that - when you add elements to your level and more and mostly there elements.
- Keeps these interface so simple makes it very easy for users who has played the game to try their hand at making - level. You can still with control your character just as if you were playing the level.
- When it very easy to see how - level will play because you can easily start playing it.

Negative Aspect

Negative: Difficult to negotiate among many goo balls

You will often get into situations where there are many goo balls in one area, but you want to select one specific goo ball among the many. This can be difficult for 2 reasons:

- Your cursor is the size of a goo ball, so if it goes over multiple goo balls, it automatically selects one then to be the selected one.
- If you miss, the goo ball you accidentally went over gets bigger and hides the one you wanted to select.

Thus when there are lots of goo balls, selecting goo balls can become clumsy and frustrating.

Assigned Today

No Design Assignment this week

Individual Project Proposal: Due Feb 2

Propose idea for course project

- Based on “games with a purpose” theme
- Exciting to you
- Be creative!
- Consider needs of a well-defined target user group
- Include sketches as appropriate

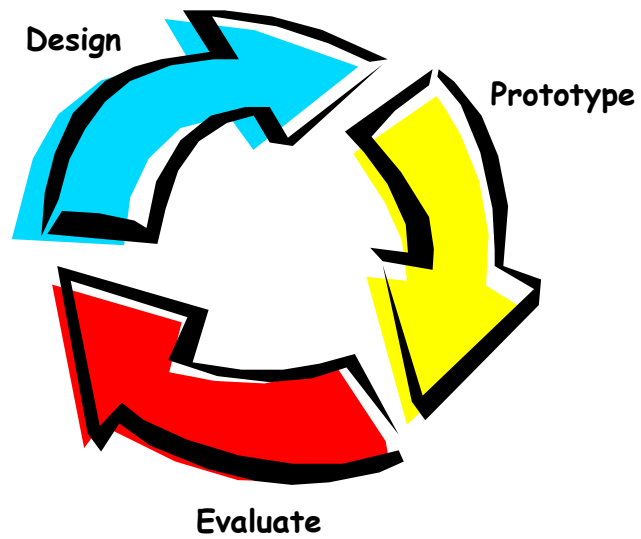
Grading details on the web (20 points total)

Description must be posted to wiki before class Feb 2.

Topics

- The Design Cycle
- Brainstorming

The Design Cycle



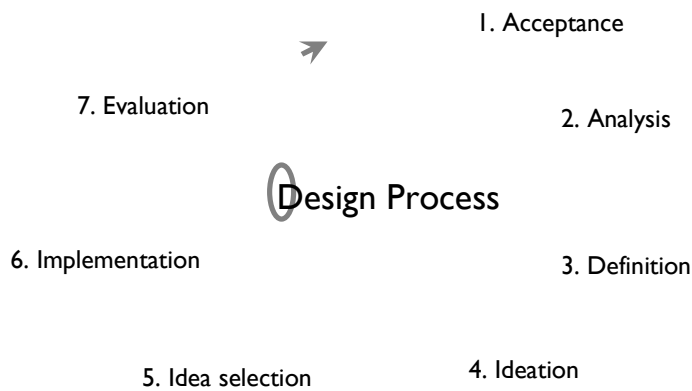
The Art of UI Design

But, there's more to it ...

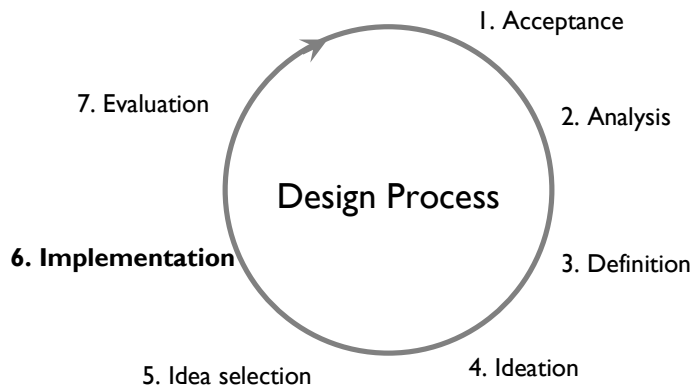


A soufflé is eggs, butter, milk & flour, but the difference between soaring and sinking is in the execution.

The Design Process [Koberg & Bagnall]



The Design Process [Koberg & Bagnall]



Acceptance

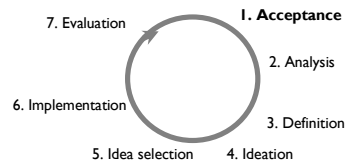
Getting started

- Because of a deadline
- Because of possible reward
- Because you are forced to

Commitment

- Time
- Resources
- Responsibility

Key is to set motivation

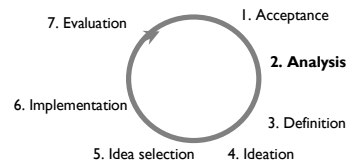


Analysis

Understand users and tasks



Who are the users?
What are their tasks?
Observe and test, don't guess

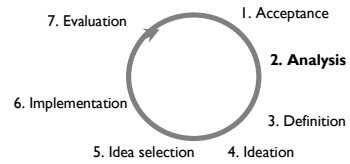


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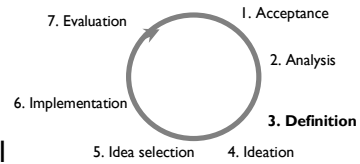
Tools

- Notebook
- Tape recorder
- Camera
- Video camera

Definition

Focus on the problem

- Choose appropriate level of detail

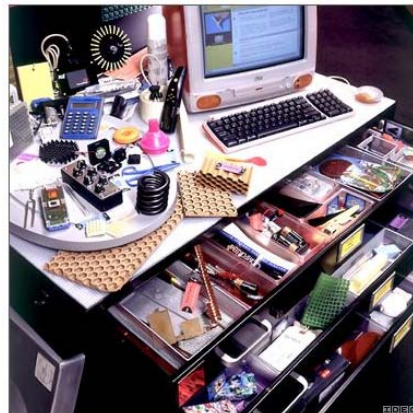
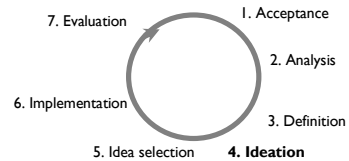


Not “bicycle cup-holders” but “helping cyclists to drink coffee without accidents”

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 idea from others



Aim for quantity

Idea Selection

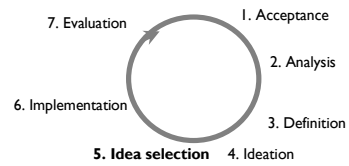
Define importance of each idea

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

Rank ideas according to your criteria

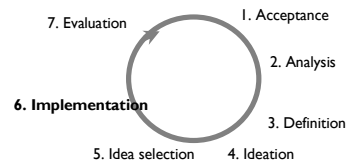
Pick top N

- Choices depend on resources and stage of the project



Implementation

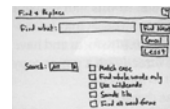
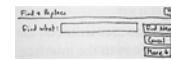
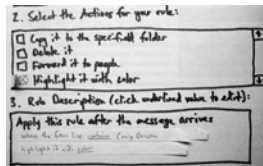
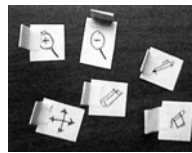
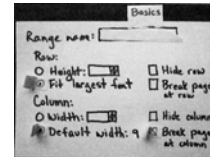
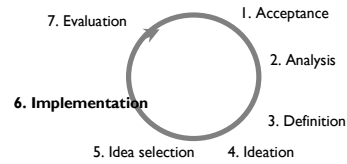
Scale up low → high fidelity



Implementation

Scale up low → high fidelity

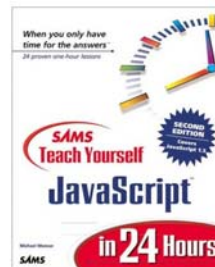
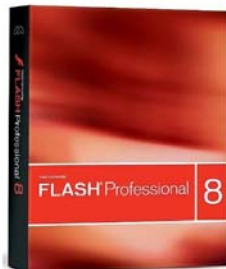
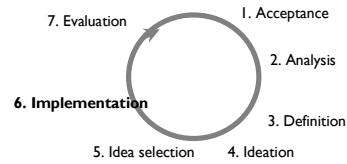
- Low-fidelity (quick, cheap, dirty)
sketches, paper models, foam core, video, ...



Implementation

Scale up low → high fidelity

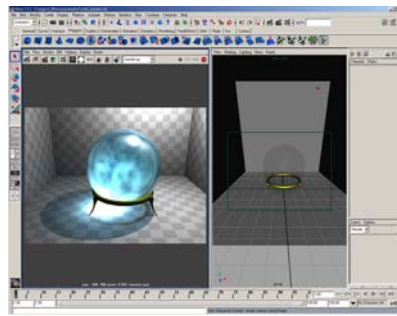
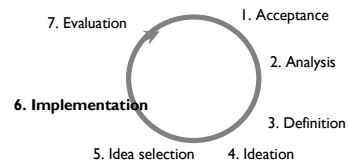
- Low-fidelity (quick, cheap, dirty)
sketches, paper models, foam core, ...
- Medium fidelity (slower, more expensive)
Flash, JavaScript, AJAX, ...



Implementation

Scale up low → high fidelity

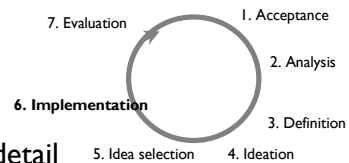
- Low-fidelity (quick, cheap, dirty)
sketches, paper models, foam core, ...
- Medium fidelity (slower, more expensive)
Flash, JavaScript, AJAX, ...
- High fidelity (slowest, most expensive)
The full interface



Implementation

Web design

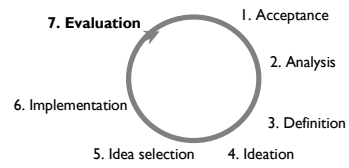
- Sites *created* at multiple levels of detail
- Sites iteratively *refined* at all levels of detail
- Iterate quickly to see what works



Site Maps → Storyboards → Schematics → Mock-ups



Evaluation

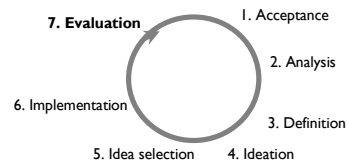


Many types of evaluation:

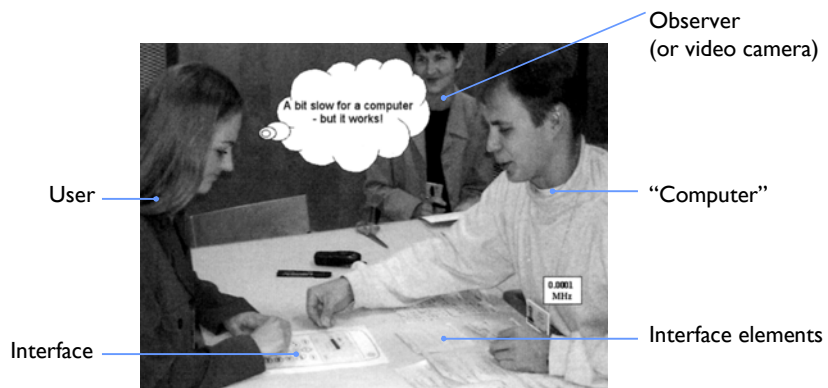
- Prototype walkthroughs
- Think-aloud studies
- Wizard-of-Oz
- Performance comparisons

Type of evaluation chosen depends on the level of implementation, etc.

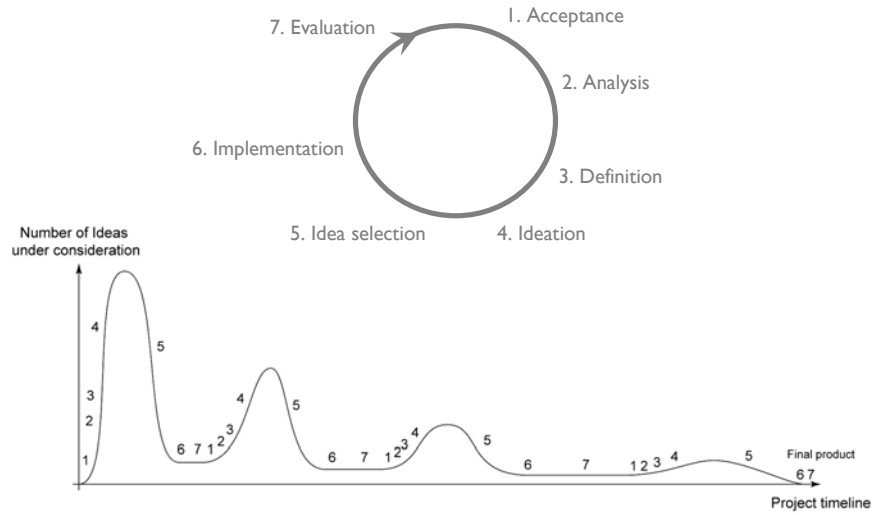
Evaluation



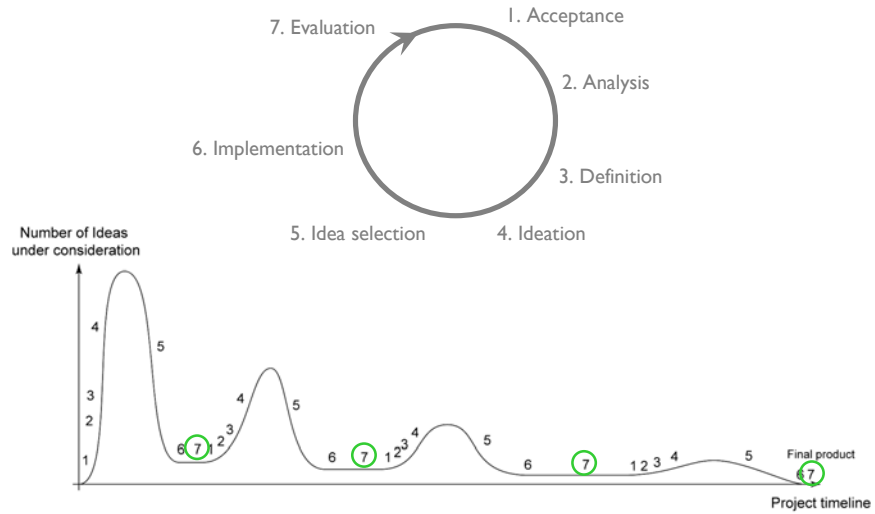
Walk-through prototype design



Design Cycle Over Project Lifespan

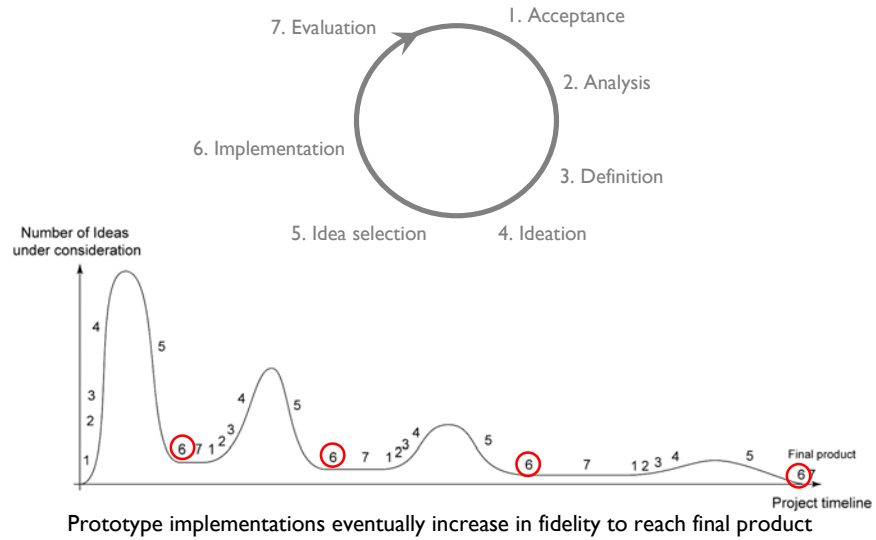


Design Cycle Over Project Lifespan



Evaluation reveals problems with design. Re-design requires cycling the process.

Design Cycle Over Project Lifespan

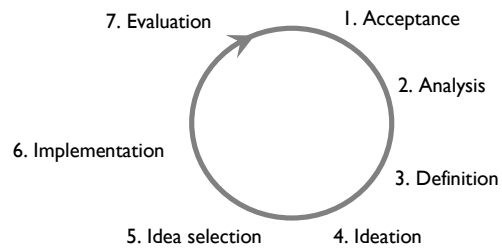


Comparison

[Lewis & Rieman]

- Who will use?
- What are their tasks?
- Plagiarize
- Rough out a design
- Think about design
- Create a prototype
- Test it with users
- Iterate
- Build a production version
- Track use
- Evolve the design

[Koberg & Bagnall]

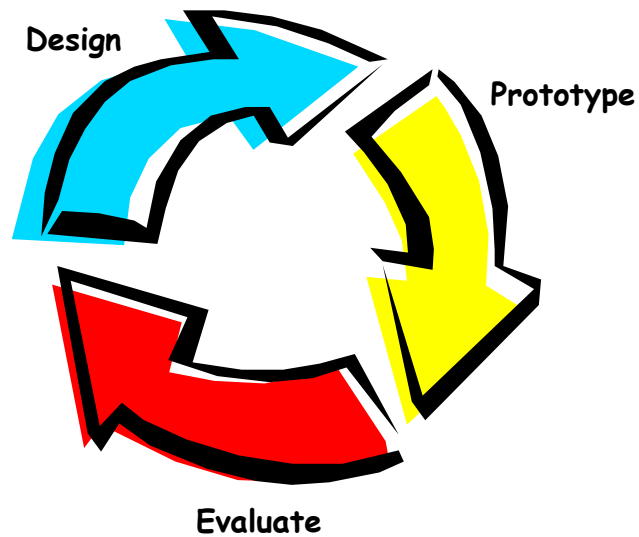
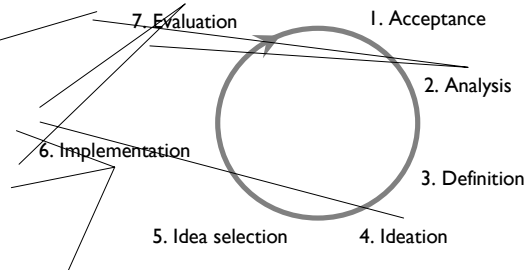


Comparison

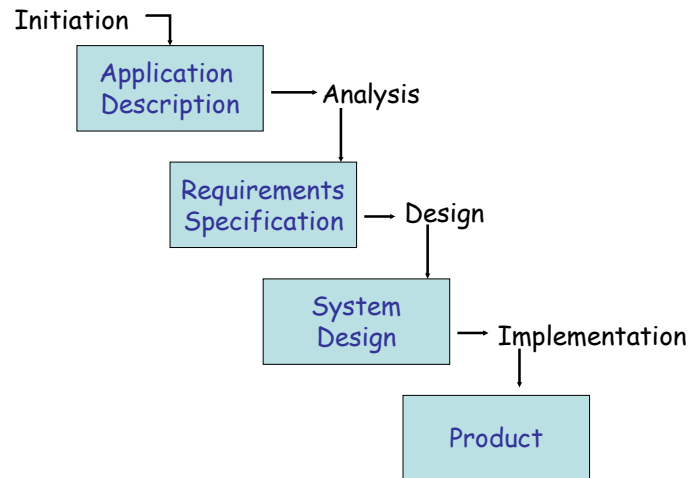
[Lewis & Rieman]

[Koberg & Bagnall]

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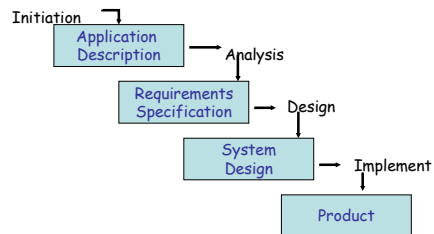
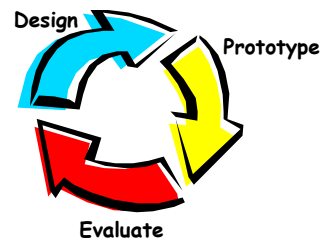
Waterfall Model (Soft. Eng.)



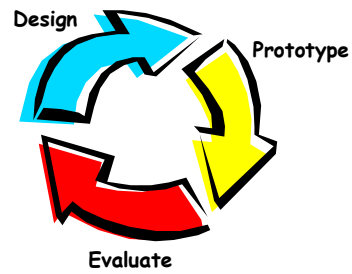
Comparison

Focus differs

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



Video: The Deep Dive



How well do they follow the cycle?
What do they do for each step of the cycle?
How many cycles do you think they went through?

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...

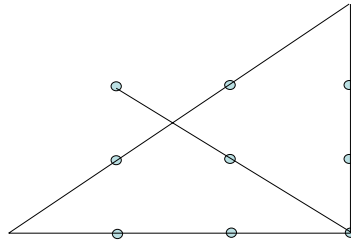
People in minority will adopt majority opinion and even manufacture their own explanation of it.



Enhancing Creativity

Thinking outside the box:

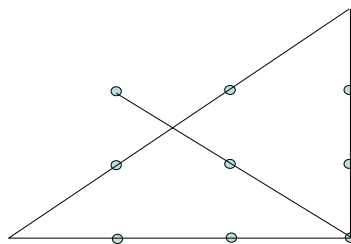
Draw a series of 4 straight lines through all the points below, without lifting pen from paper:



Why Is This Hard?

We adopt expectations about the solution

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



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

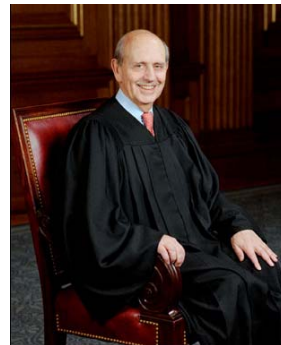


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Dissent and Authenticity

The benefits of dissent are weakened if

Dissent is not real: A deliberate “devil’s advocate” in the group can actually stifle dissent, because the majority know the opinion is manufactured.

Dissent is not encouraged: Polite or pro-forma acceptance is not enough.



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?”

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

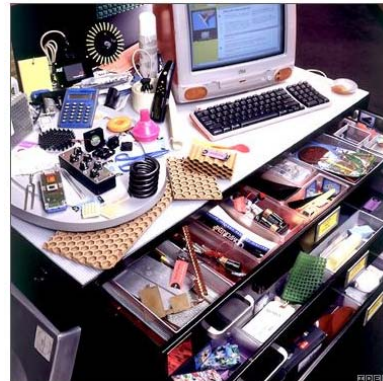


Stretch your Mental Muscles

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 brainstormer



Get Physical

Sketch

Make models

Act out



Next Time

Be prepared to present game analysis in section

Lecture Topic: Games Overview & Structure

- [The Structure of Games](#). *Game Design Workshop* Chap 2. Fullerton will need username/password for this one
- [Designing Games With A Purpose](#) Luis Von Ahn and Laura Dabbish, *Communications of the ACM*, August 2008, Volume 51, Number 8, pp. 58-67

Don't forget!

- Read, then write a comment on the wiki
- Individual Project Proposal, Due Feb 2