Turn on your video if possible.

Get Paper and Drawing Implements ready – you might use them in today.

CS1320 Creating Modern Web and Mobile Applications

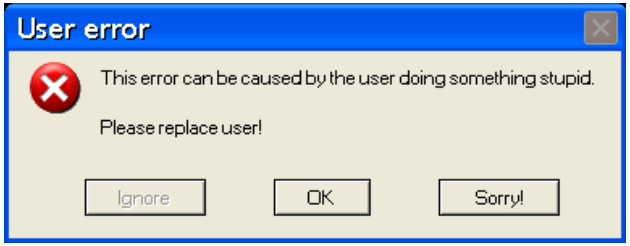
Lecture 27

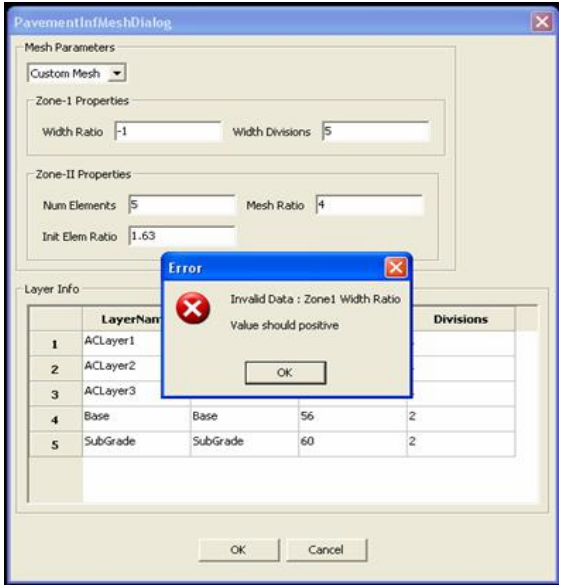
Human-Computer Interaction III

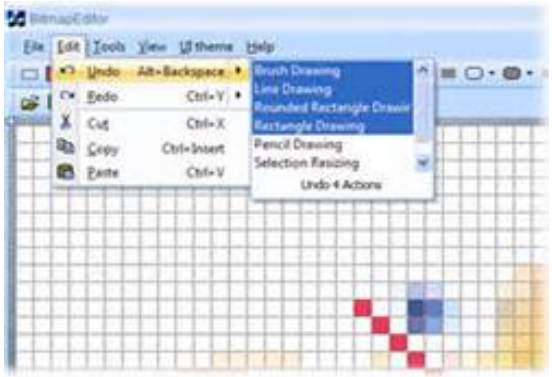
Steve's Golden Rules of Design

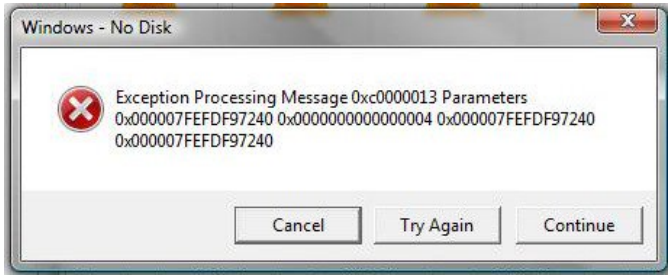
- ~~Common Sense~~
- Simplicity
- Consistency
- Feedback
- Handle Errors
- Accommodate all levels of users
- Make it look good (aesthetics)

Handle Errors



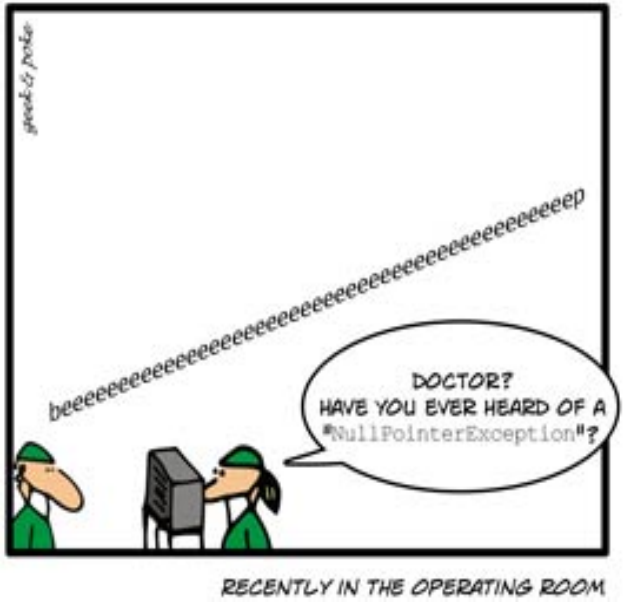






Handling User Errors

- Users will make mistakes
  - Minimize error possibilities
  - Many UI problems involve errors
- Don't let users clobber themselves
  - Don't display meaningless buttons
  - Make dangerous actions difficult
- Avoid unexpected side effects
  - Adding to shopping cart
  - Printing a document
- Provide meaningful error messages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Handling User Errors

- Design to minimize errors
  - Make it difficult to click in the wrong place
  - Make sure buttons have meaningful names
  - Require acknowledgement where appropriate
  - Simpler is better
- Provide for error recovery
  - UNDO : very difficult in a web/mobile app
  - Make options obvious (e.g. remove from cart)
- Remember old values for forms
  - Don't force the user to do extra work on errors
  - Highlight bad values as early as possible
- Allow multi-step commands to be aborted

Handling System Errors

- Your code won't be perfect
  - Nor are the libraries you are using
  - Nor is the OS or network or hardware
- Determine how to recover from errors
  - Do you need to restart, can you ignore them, can you undo, repeat?
  - Assume errors will happen and write your code accordingly
  - Need to consider the state at each point in the program
  - Identify any crucial points in the program; use transactions; ensure safety
- What do you tell the user
  - Can you do nothing
  - User needs to know what state their work is in
  - User prefers not to lose any work

Problems with Error Handling

- Error handling is application specific
  - What is essential, what is not
  - What needs to be saved, what doesn't
  - What are critical regions
  - What state is the system in after an error
  - What state is the user in after an error
- Error handling is difficult
  - Can be as much or more code as the original system
  - Often best thought about from the start, not added on
  - Philosophy: don't lose the user's work

Handle All Levels of Users

- Novice users
  - Prompting, help facilities, meaningful error messages
- Intermediate users
  - Simplified input screens, short cuts
  - Auto-completion of input fields
  - Perpetual intermediate users
- Experienced users
  - Efficiency of use is important
  - Customization of the interface
- Need to work at all levels simultaneously
  - Novice users aren't novices forever
  - Experienced users are novices too

Novice *vs.* Expert Users

Web usability has focused on ease of learning for the new visitor. While learnability remains important, it is time to also consider expert performance.

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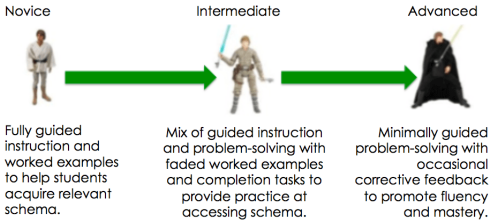
Learnability

- One way of handling users is to ensure
  - The interface is intuitive to use
  - There is adequate and ready documentation available
  - There is help if the user needs it
  - In other words, the interface is easy to learn
- Techniques
  - Make actions obvious (but this depends on user model)
  - FAQs which answer real questions
  - User manuals (to read or to search)
  - Tool tips providing cues
- Don’t depend on StackOverflow or similar sites
  - This is an admission of failure

Problems With Handling All Levels of Users

- Anticipating questions and problems is difficult
  - You are an expert at your system, not a novice
- User and system vocabularies differ
  - Make search and questions more difficult
  - User and system models differ as well
- Writing prose and code are different skill sets
  - Programmers aren't always the best at writing manuals
- Hard to balance simplicity with ease of use
  - How to document a customizable interface



Aesthetics

Louisville
37°
WEDNESDAY 39° 32°
THURSDAY 41° 27°
FRIDAY 39° 19°
SATURDAY 46° 37°
SUNDAY 60° 45°
MONDAY 63° 39°

08:04
08:08

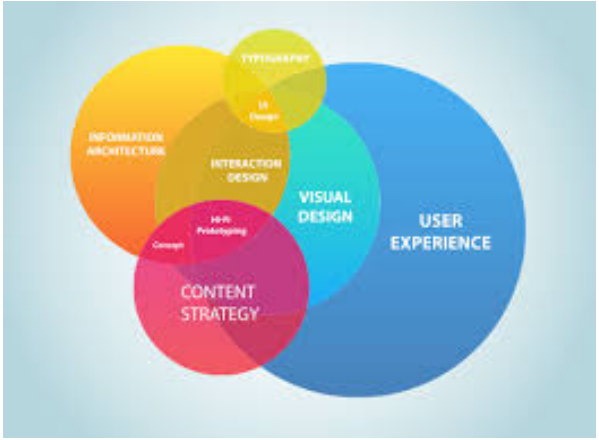
Cupertino, USA
Prague, Czech Republic
CLEAR INTERFACE
COLD WEATHER

Karachi
19°C
Monday
Tuesday
Wednesday

reddit, meet beautiful.
Today
New York, NY
Tue, 10 Jan 2012
09 46
Partly Cloudy 76°
GO Weather

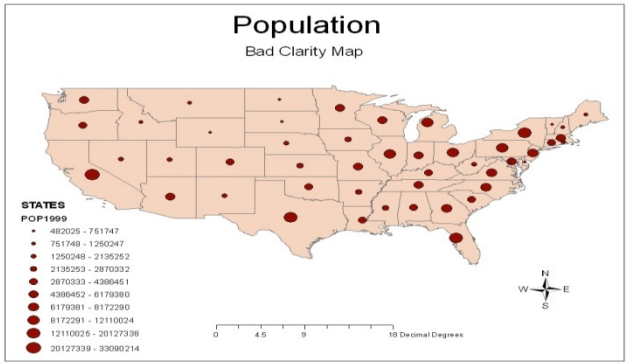
WEDNESDAY
29°
THURSDAY
18°

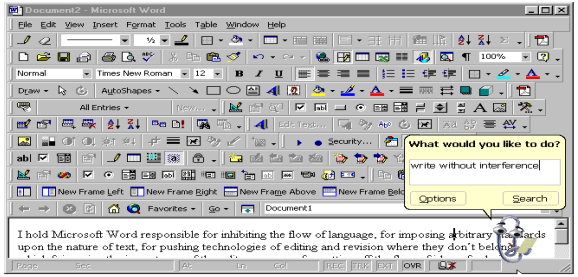
Aesthetics



- Good user interfaces LOOK GOOD
  - Must be comfortable to look at as well as to use
  - This is not purely subjective
- Several aspects to this
  - Visual clarity/coding; attention getting; layout; color; …

Visual Clarity and Coding

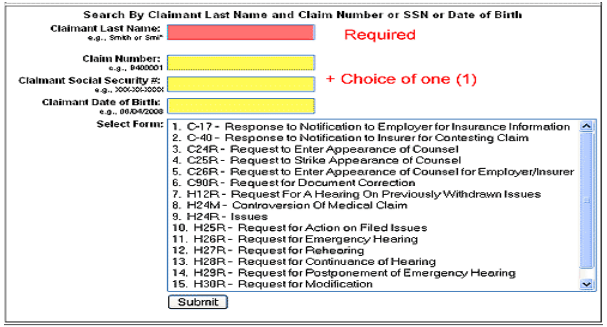


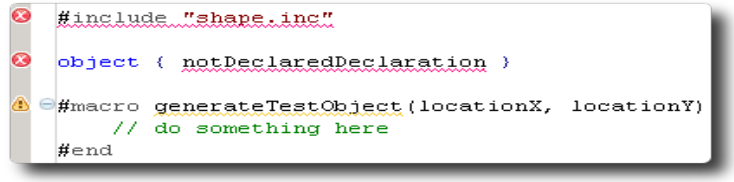


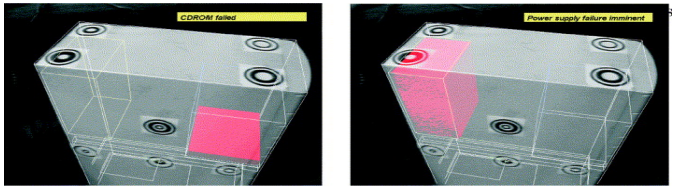
Visual Clarity and Coding

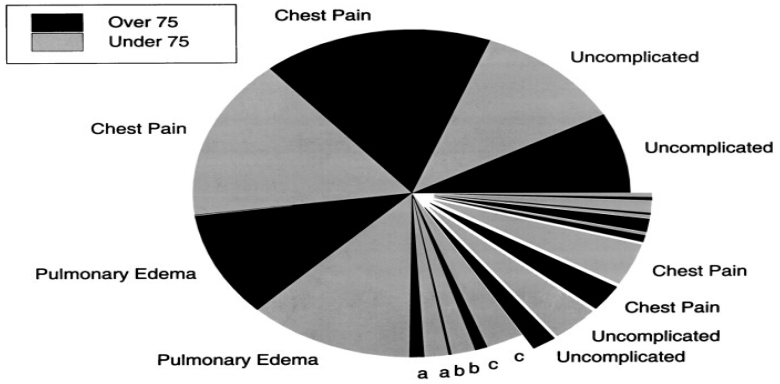
- Meaning should be apparent
  - For icons, images, buttons, the overall screen
    - Harder to do as icons get smaller
  - User shouldn't need to wonder "what is this"
    - Use tool tips to help the user
- Many different coding techniques (Tufte)
  - Color, shape, size, font, line styles, fill styles, …
  - Can be assigned different meanings
  - Should be done consistently and logically
- Don't overdo it

Attention Getting









Attention Getting

- One of the principle uses of encoding
- Alternatives
  - Intensity: 2 levels
  - Sizes: up to 4 sizes
  - Fonts: up to 3 fonts
  - Inverse video
  - Blinking (2-4 hz)
  - Color: up to 4 colors
  - Animation
  - Audio (but some users will have it turned off)
- Do not overuse

Layout

- Balance
  - Left-right and top-bottom
- Gridding
  - Put things on a well-defined grid
  - Line up columns
- Proportion
  - Know the pleasing proportions

Use of Color

- Color is easy to misuse
- Color can do a lot of things for you
  - Be soothing or striking to the eye (warm versus cold)
  - Add accents to an uninteresting display
  - Provide subtle discriminations in complex displays
  - Draw attention to errors/problems
  - Evoke emotional reactions
- Don’t rely solely on color
  - 6-8% of males are color blind
- Color should be used conservatively

Problems With Aesthetics

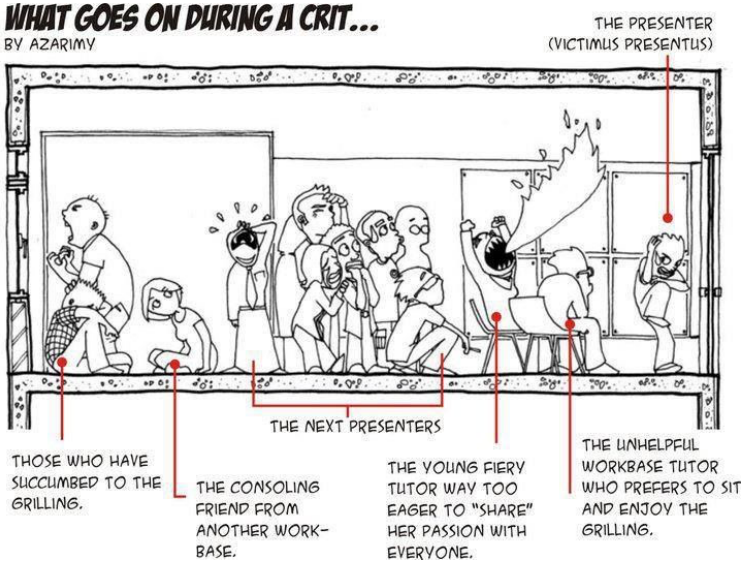
- You need a good artistic sense / background
  - If you don't have one, find someone who does; trust them
- Balancing aesthetics and functionality
  - Looking good, but operations not fitting on screen
  - You need the basic functionality present
- Balancing aesthetics and usability
  - Looking good, but harder to learn
  - Looking good, but harder to use

Steve's Golden Rules of Design

- Common Sense
- Simplicity
- Consistency
- Feedback
- Handle Errors
- Accommodate all levels of users
- Make it look good (aesthetics)

In-Class Exercise

- Lets do CRITS on the second design
  - Based on understanding of what HCI means
  - http://bdognom-v2.cs.brown.edu:5002
  - Do lesson 4 (Crits 2)
  - Take 10 minutes
  - If you finish early, do a second one



Redesign (if there is time – else offline)

- Now, with the additional crits, we can do a final design
  - Based on understanding of what HCI means
  - http://bdognom-v2.cs.brown.edu:5002
  - Do lesson 5 (Design 3)
  - Take 10 minutes

Next Time

- Security I
- If you are off-line, do the crits exercise
  - Before the next class
- Office hours Thursday 1-3
  - 795-241-247