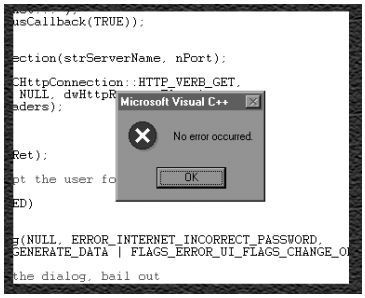
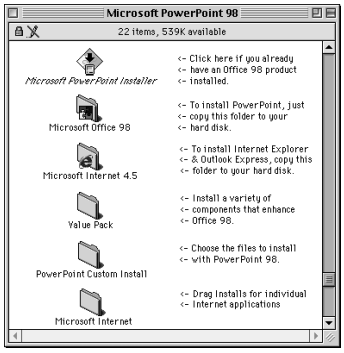
ICS 105: Project in HCI

Visual Design and Screen Design

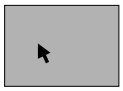
user interface hall of shame



user interface hall of shame



two questions



- consider this situation
  - the user's mouse is roughly mid-left
  - need to pop up a target for user to hit
  - *what are five points the user can most easily reach?*
- now try this
  - Mac menu bars are at the top of the screen
  - Windows menu bars are at the top of the window
  - Mac menu bars are five times (or more) faster
  - *why?*

visual design

- two principal elements to UI design
  - visual performance
  - temporal performance
- so far, emphasised temporal performance
  - ie interface behaviour across time
    - can you get from one state to another?
    - are options clear?
    - is behaviour consistent?
- today's focus is visual performance

visual design

- what is visual design for?

visual design

- what is visual design for?
  - not just about aesthetics…
  - communicating function
- we live in a visually rich world
  - we're used to processing visual information
  - it's a very high bandwidth channel
  - visual design can convey a great deal
    - how system is structured
    - how system should be used

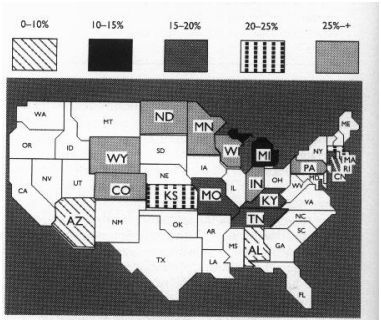
recognition versus recall

- two paradigms for interaction
  - the recognition paradigm (e.g. GUI)
    - opportunities for action are visibly present
  - the recall paradigm (e.g. UNIX commands)
    - you need to remember how to take action
- this is not an all-or-nothing thing
  - you need to be able to design for recognition
    - depends on the kinds of tasks
    - visual and perceptual features help make actions clear

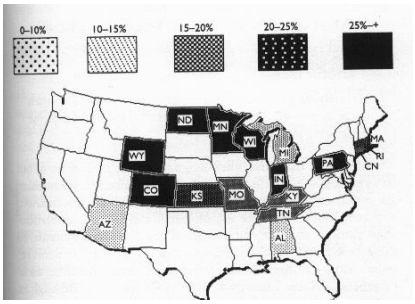
visual representation

- human beings are very good at…
  - understanding information
  - interpreting the world
  - seeing patterns
- or are they?
  - you can only see a pattern if it's been made visible for you

visual representation



visual representation



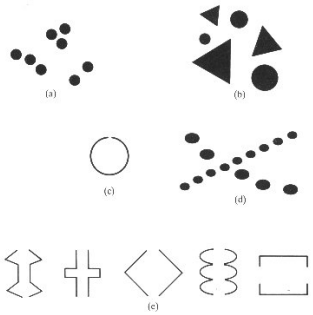
visual representation

- think of representations as *cognitive artifacts*
  - ways we structure the world to make it easier to process
- example: roman and arabic numerals
  - both represent numbers
  - arabic numerals make computation easier
    - positional structure
    - zero
- need to design representations accordingly
  - understand how they'll be processed

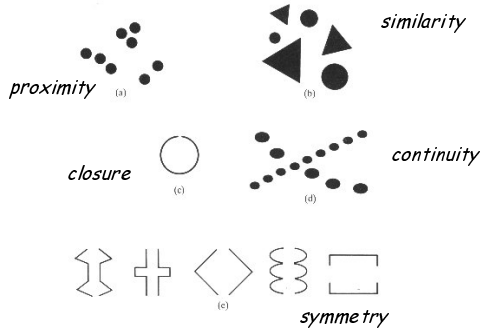
gestalt perception

- gestalt – "the whole"
  - perception of objects
  - the *holistic* perception of scenes
  - underlying principles
    - regular patterns on which perception is based
    - determine how the visual scene is parsed

gestalt perception

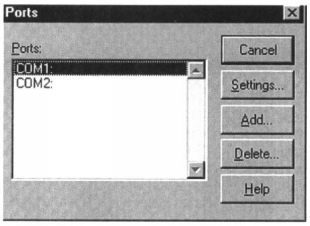


gestalt perception



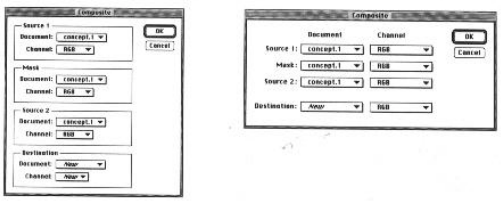
gestalt in GUI design

- grouping
  - items that appear grouped appear to be related



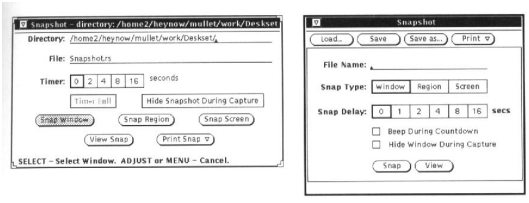
gestalt in GUI design

- grouping
  - use proximity to indicate relatedness



gestalt in GUI design

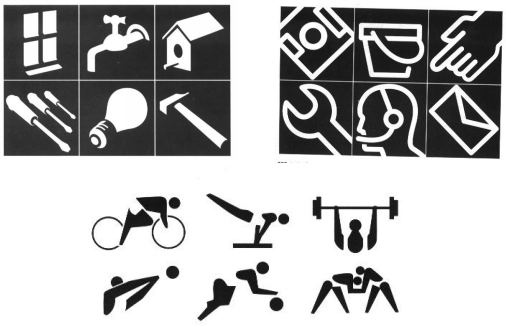
- alignment is an important cue



gestalt in GUI design

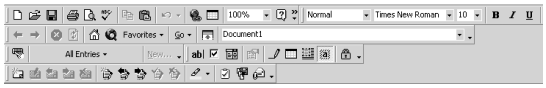
- exploiting consistency and structure
  - design interfaces as "visual languages"
    - a set of visual conventions that can be combined and extended across a range of specific uses
    - using visual characteristics to express features of the objects
  - consistency across representations
    - visual structure
    - information density
    - abstraction

visual languages



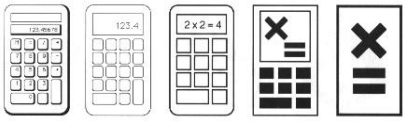
visual languages

- sometimes these features are more notable by their absence…
  - how do these items relate?



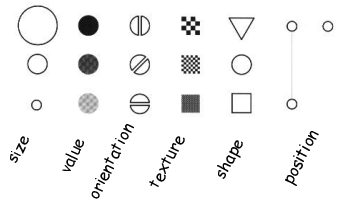
visual languages

- levels of abstraction
  - abstracting simplifies the design…
  - … but only so far before it becomes meaningless



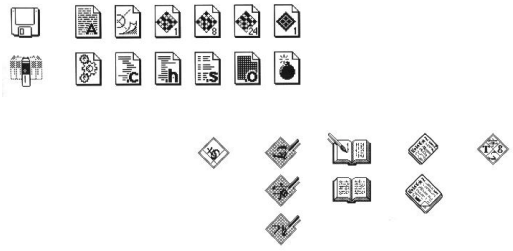
visual languages

- looking for common patterns and scales
  - the key is to build a *system* of representations
  - based on systematic variability
- bertin's "retinal variables"



visual languages

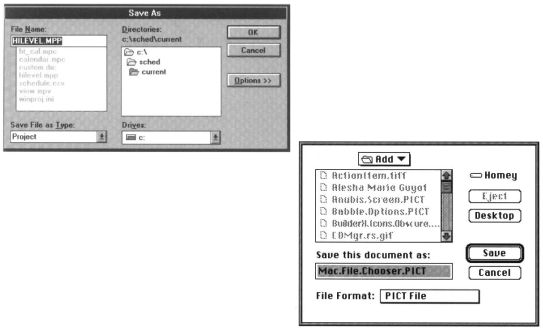
- consistency and structure



spatial logic

- aligning structure
  - the structure of the visual display
  - the structure of the task
- left-to-right, top-to-bottom
  - we're used to "reading" texts and images
  - look for the "flow" of the task
  - make sure it's reflected in the interface

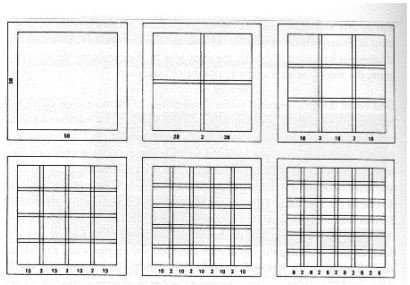
spatial logic



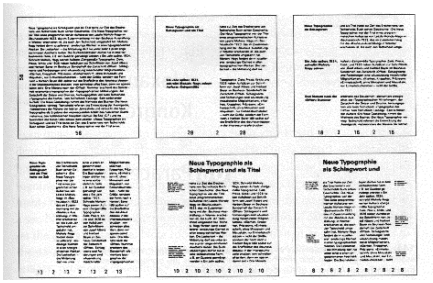
grid-based design

- grid-based design creates a framework
  - exploiting techniques from graphic design
  - an underlying logic to the problems of layout
  - you can use the grid many ways
    - to tie objects together visually
    - to separate them

grid-based design

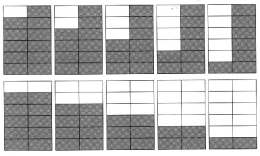


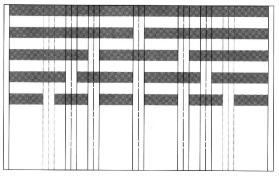
grid-based design



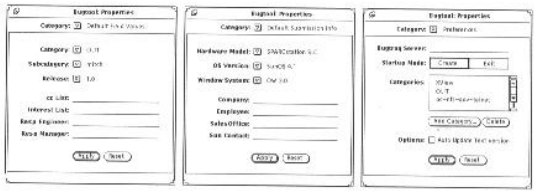
grid-based design

- a single grid can provide multiple uses



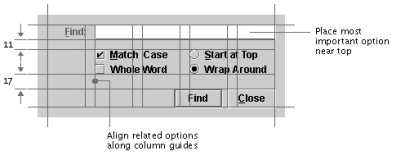


grid-based design



grid-based design

- a consistent layout structure
  - operates across different interfaces and dialogs
  - makes it easier to parse the visual scene
  - exploits proximity, grouping, symmetry, alignment



fitt's law

- also need to consider performance
  - user interfaces aren't just visual
  - they're also sites of action
  - what rules govern patterns of action?
- fitt's law
  - the time to hit a target is a function of the distance to and size of the target
    - MT = a + (b log 2D/W)

fitt's law

- the questions earlier
  - what are the five points that are easiest to hit?
  - why?

fitt's law

- the questions earlier
  - what are the five points that are easiest to hit?
  - why?
- the answer
  - where you are right now
    - distance is zero
  - the four corners
    - area is effectively infinite

fitt's law

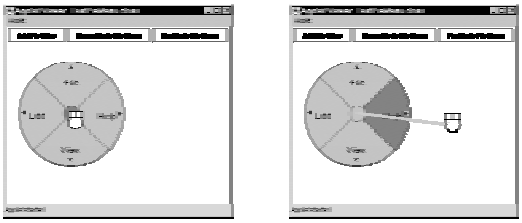
- the questions earlier
  - why is the Mac menubar faster than Windows?

fitt's law

- the questions earlier
  - why is the Mac menubar faster than Windows?
- the answer
  - Mac menubar is at the top of the screen
  - effectively, menu targets are infinitely tall
- the lesson
  - edges are precious real estate!

pie menus

- an application of fitt's law
  - all items are equidistant from mouse pointer
  - larger area to hit



summary: design principles

- reduce design to its essence
- combine elements for maximum leverage
- use alignment to establish relationships
- use symmetry to ensure balance
- reinforce structure through repetition
- use grid-based layouts
- coordinate to ensure visual consistency
- pay attention to performance

want to know more?

- we've only scratched the surface
  - this isn't something with hard-and-fast rules
  - need to develop an "eye" for good design
- these books can tell you more:
  - "Designing Visual Interfaces", Mullet & Sano
  - "Things that Make Us Smart", Norman

next time

- we'll look at some current "hot topics"
  - new (and future?) styles of interaction
  - ubiquitous computing
  - tangible interaction
- after that…
  - no lectures following two weeks
  - week 9: evaluation sessions
  - week 10: presentations