Models of Design

Why discuss?

Overall...
- Interface *Design*

Projects...
- *Design* an Experiment.
- *Design* Software.
- *Design* an Interface.

Knowing something about design processes will help!
DESIGN FACTORS

What factors influence a design?

☐ General properties of the human user.
  ➔ Memory, Perception, Motor skills.
  ➔ Natural abilities and limitations.

☐ The characteristics of the user.
  ➔ e.g., personality, education, etc.

☐ The user's task.
  ➔ e.g., stressful, repetitive, etc.

☐ The interaction hardware.
  ➔ e.g., screen, mouse, etc.

☐ The interaction and display methods used.
  ➔ menus, layout, colors, icons, etc.
  ➔ strengths and weaknesses of methods.

☐ The implementation of the methods.
  e.g., speed, tool selection and use, etc.

☐ Graphical design.
Ingredients

- Needs
  - want

- Requirements
  - must
  - testable

- Constraints
  - must not

- Preferences
  - should

- Evaluation
  - quality
Four Basic Design Activities

- Identifying Needs and Establishing Requirements
  - User Analysis
  - Task Analysis

- Developing Alternative Designs
  - Conceptual Design
  - Physical Design

- Build Interactive Versions of Designs
  - Different levels of prototyping
  - Paper, web, VB,...

- Evaluating Designs
  - Metrics, Questionnaires, Interviews, Heuristic Evaluation,...

- AND Iterate!
SEARCH ~ Multidimensional

"Parametric"
SEARCH

~ Space

starting point

one decision

DESIGN SPACE

Goal satisfying Regs.

a design or partial design
Key Idea

- Stay conceptual at the start.
  - That is, don't commit too soon.
  - Commitment adds constraints.
  - Constraints prune the search space.
  - Constraints remove possibilities.
  - Maybe including good designs.

"Late binding".
"Least commitment".
Key Idea

- Generate many alternative conceptual designs!

- Especially if being rewarded for creativity.

- Especially if likely to fixate.
Key Idea

- Make evaluation criteria explicit
  
e.g., cost -- low is good  
  mass -- low is good  
  attractiveness -- high is good  

- Criteria should be measurable.  
  Or at least consistently estimable.
Key Idea

- Understand the importance of each evaluation criterion ($C_i$).
  
  e.g., low cost $>\: high$ strength

  where "$>\: means "is more important than""

- Then you can weight each evaluation by its importance:
  
  e.g. $Eval = w_1C_1 + \ldots + w_nC_n$
Evaluate & Select Designs

Concept scoring matrix

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<th>Attribute</th>
<th>Weight</th>
<th>Design1</th>
<th></th>
<th>Design2</th>
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Key idea:

- Understand uncertainty of evaluation

Confidence

how much a person believes design alternative satisfies evaluation criterion

Knowledge

amount of knowledge to back up evaluation

For one person evalutate criterion