Elements of Design Space Analysis

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What is Design Space Analysis?

• An approach to representing design rationale
  – uses a semiformal notation called QOC
• The goal is to try and create the design space around an artifact
QOC

• Questions
  – define the space for the alternatives
• Options
  – create possible solutions to the questions posed
• Criteria
  – help qualify the options

Procedure

• Formulate questions pertinent to the design
• Generate a set of options for each question
  – should be worded to give a qualitative answer
    • Ex: small or large not 1 yard or 2 mm
  – If done correctly, the options will lead to a conclusive decision that can be quantitative
Procedure (cont.)

• Create criteria that will help link options with rationale
  – Including the rationale in the notation, allows easy comparisons between tradeoffs and helps in communication
  – Must have correct level of abstraction relative to the options to be effective

Ex: choosing the right scroll bar

Positive Assessment

--- Negative Assessment

Q: How wide?

O: Narrow
C: Screen Compactness
C: Ease of hitting with a mouse
C: Low user effort
C: Screen Compactness
C: Continuous feedback to user

O: Wide

O: Permanent

O: Appearing

Q: How to display?
Argument Based Analysis

• Can link arguments to defend criterion assessment
  – Both supportive and challenging arguments can be made
• Arguments are mostly key points brought up in discussion
  – aids in communication

Strengths

• Expandability to different levels of detail
• Communication
  – Able to deal with different individuals, each with varying skills and objectives
    • Life cycle of a software project
      – creation, maintenance, upgrades
Strengths (cont.)
The Big Three

- Creation
  - produces a structured environment for creating ideas which enhances the creative process
- Reflection
  - A check of all past decisions
- Management
  - handling a complex system is easier with a “road map” of the design

Weaknesses

- Knowing when to use the process
- How to use the Design space analysis
  - Detail
  - Phrasing of questions
- Price of creating this analysis
- Scalability

Solutions

- Training
  - but who?
- Experience
- More research needed
Internal Consistency

- Options must be justifiable
  - Isolated view
  - Global view

- Ex: pull-down menus

Cross-Question Constraints

- Selected options can generate new questions or determine what options must be selected at later phases
- Export
  - affects another phase
- Import
  - part of the design space that is affected
Summary

• Good overall idea
• Not used in the real world
• Needs further research to define the process in more detail and answer pertinent questions
  – How will implementation occur?
  – Will the time spent pay off?