A Rational Design Process: How and Why to Fake It

- all this is straight top-down development
- "reality does not work this way!"
- but it pays to pretend that it does
- text: [PaCl86]

A Rational Person

- one who always has a good reason for what he does
- each step is provably the best way to get to the goal

- are you a rational professional?

- top-down approaches: desire for rational software design
  - ∘ the search for the philosopher's stone

Why a Rational Design Process Does Not Work

- customer does not know exactly what he wants, customer cannot tell us all he knows
- even if we knew the requirements: we don't know all details necessary for the best design decisions
  - ∘ need to backtrack in design
  - ∘ minimize lost work

- even if we knew all relevant facts: a human cannot handle this huge amount of details
  - ∘ separation of concerns helps
  - ∘ but before concerns are separated, we are bound to make errors
- even if we could master all detail: all projects change due to external reasons
  - ∘ minimize lost work
- human errors are inevitable
  - ∘ even after separation of concerns
- we have preconceived design ideas
  - ∘ own invention, from related projects, learned in class
  - ∘ try out favorite idea in project

- re-use of software
  - ∘ from previous project
  - ∘ shared with parallel project
  - ∘ off-the-shelf software
  - ∘ software not ideal for project, but will save effort

- are small textbook examples rational?
  - ∘ no, polished until they show the point nicely

Why a Rational Design Process is Useful Nevertheless

- keeping as close to the process *as possible* helps
  - ∘ guideline
- the *documentation* that would have resulted from this process is useful
- this is "faking a rational design process"

Why Use an Ideal Process as a Guideline

- designers need guidance: what to do first?
- even if we cannot know all facts at the beginning: trying to find them reduces backtracking and thereby improves the design
- measure progress of project
  - ∘ relative to ideal process
- an organization needs a standard process for projects
  - ∘ to transfer people, ideas, software
  - ∘ external review of projects (measure progress)
  - ∘ a rational process is a good base
    - ▷ more refined processes (V-model, . . .): → *SCS 2 (SoSe 03)*

What should the Process Description Tell?

- what product to work on next
- what criteria the product must satisfy
- what kind of persons should do the work
- what information they should use

most useful: description in terms of work products
- allows reviews and progress measurement
  - ∘ see also course: "Integrierte Softwareentwicklung und Qualitätssicherung mit Together" (WiSe 02/03, Buth)

The Rational Design Process

1. Establish and Document Requirements
2. Design and Document the Module Structure
3. Design and Document the Module Interfaces
4. Design and Document the Uses Hierarchy
5. Design and Document the Module Internal Structures
6. Write Programs
7. Maintain