CPE/CSC 484: User-Centered Design and Development

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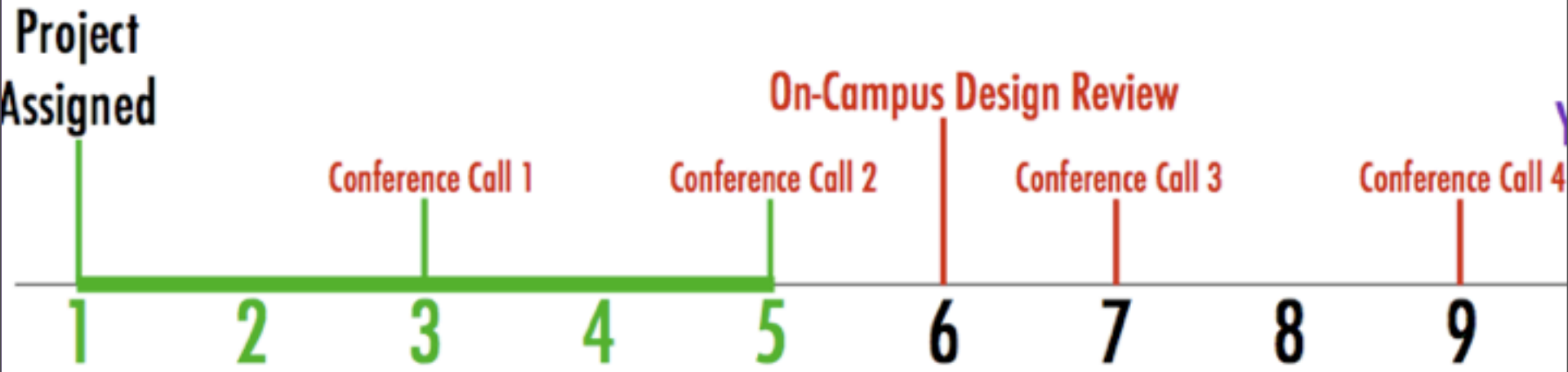
Chapter 9
The process of interaction design

Logistics

- **Thu, April 26,**
  - 9:10 am: Class Visit AJ Brush, Microsoft Research
    - informal discussion about user experience with consumer-oriented devices
    - advice on practical aspects of conducting usability experiments
  - 9:30 am: Opening Data Studio in the Library
    - interesting part starts at 10:30
  - 11:00 am: Talk about Parallelization
  - 3:10 pm: Talk by AJ Brush
- **Assignments**
  - presentations for A2 · UCD Tools
    - see http://kurfess.wikia.com/wiki/UCD_Tools_Page
    - feedback via Web form at https://docs.google.com/spreadsheet/viewform?formkey=dE94M1pLRHVTNTk3N0d5ajQ5ZnM3Q2c6MA
  - A3 · Storyboards deadline coming up on May 3
- **Term Project**
  - user feedback on initial designs collected and evaluated
  - low-fidelity prototypes completed
  - mid-quarter project displays Thu, May 3

Rough Timeline



GOALS/DELIVERABLES

- enumeration and description of personas
- user stories/use cases fleshed out
- concept maps
- paper prototyping

Chapter Overview

- Interaction Design Activities
- Key Characteristics of the Interaction Design Process
- Users and User Needs
- Alternative Designs
- Life Cyle Models

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Motivation

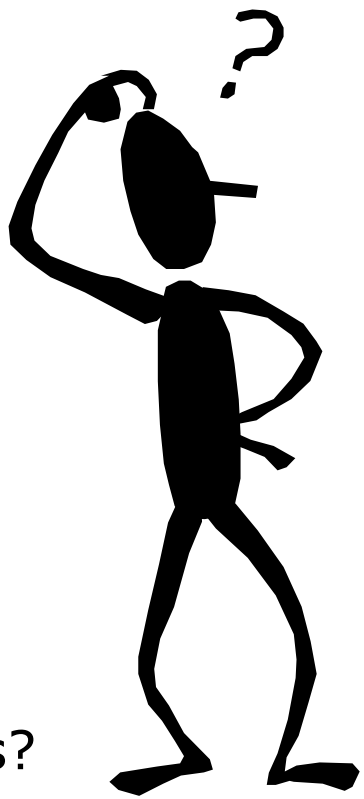
- it is helpful to know about common basic activities in interaction design, and key characteristics of the design process
- interaction design should be driven by the needs of the users
- alternative designs can provide options for users, designers, and developers
- lifecycle models for interaction design have been derived from similar ones used in software engineering and HCI

Objectives

- know about the basic activities and key characteristics of the interaction design process
- be aware of different types of users and shareholders, and their potential influence on the design
- be familiar with some strategies to generate alternative designs
- know the main differences between SE/HCI life cycle models and one for interaction design

Overview

- What is involved in Interaction Design?
  - Importance of involving users
  - Degrees of user involvement
  - What is a user-centered approach?
  - Four basic activities
- Some practical issues
  - Who are the users?
  - What are 'needs'?
  - Where do alternatives come from?
  - How do you choose among alternatives?



What is involved in Interaction Design?

- It is a process:
  - a goal-directed problem solving activity informed by intended use, target domain, materials, cost, and feasibility
  - a creative activity
  - a decision-making activity to balance trade-offs

- Four approaches: user-centered design, activity-centered design, systems design, and genius design

Importance of involving users

- Expectation management
  - Realistic expectations
  - No surprises, no disappointments
  - Timely training
  - Communication, but no hype
- Ownership
  - Make the users active stakeholders
  - More likely to forgive or accept problems
  - Can make a big difference to acceptance and success of product

Degrees of user involvement

- Member of the design team
  - Full time: constant input, but lose touch with users
  - Part time: patchy input, and very stressful
  - Short term: inconsistent across project life
  - Long term: consistent, but lose touch with users
- Newsletters and other dissemination devices
  - Reach wider selection of users
  - Need communication both ways
- User involvement after product is released
- Combination of these approaches

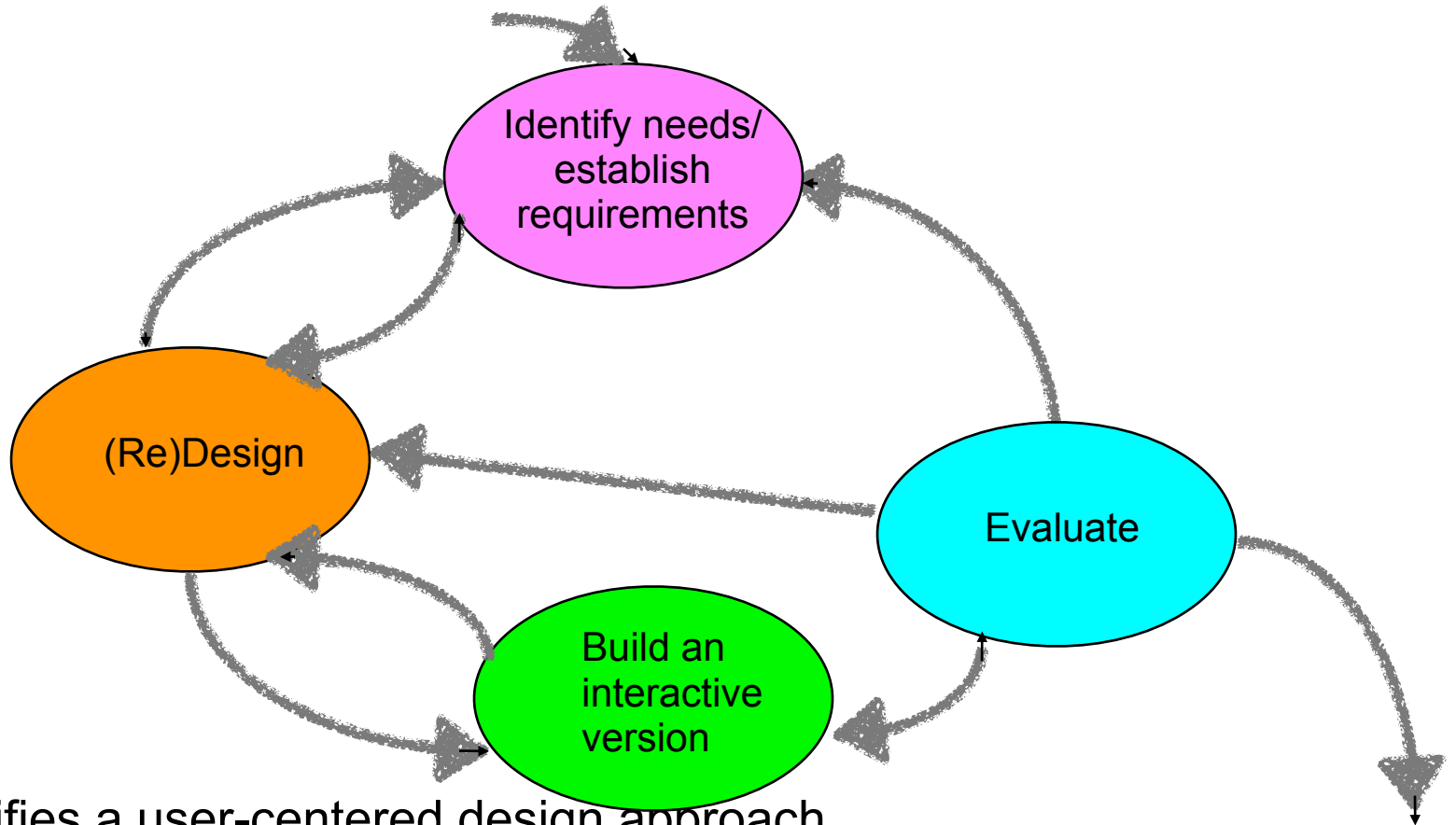
What is a user-centered approach?

- User-centered approach is based on:
  - Early focus on users and tasks:
    - directly studying cognitive, behavioral, anthropomorphic & attitudinal characteristics
  - Empirical measurement:
    - users' reactions and performance to scenarios, manuals, simulations & prototypes are observed, recorded and analysed
  - Iterative design:
    - when problems are found in user testing, fix them and carry out more tests

Four basic activities in Interaction Design

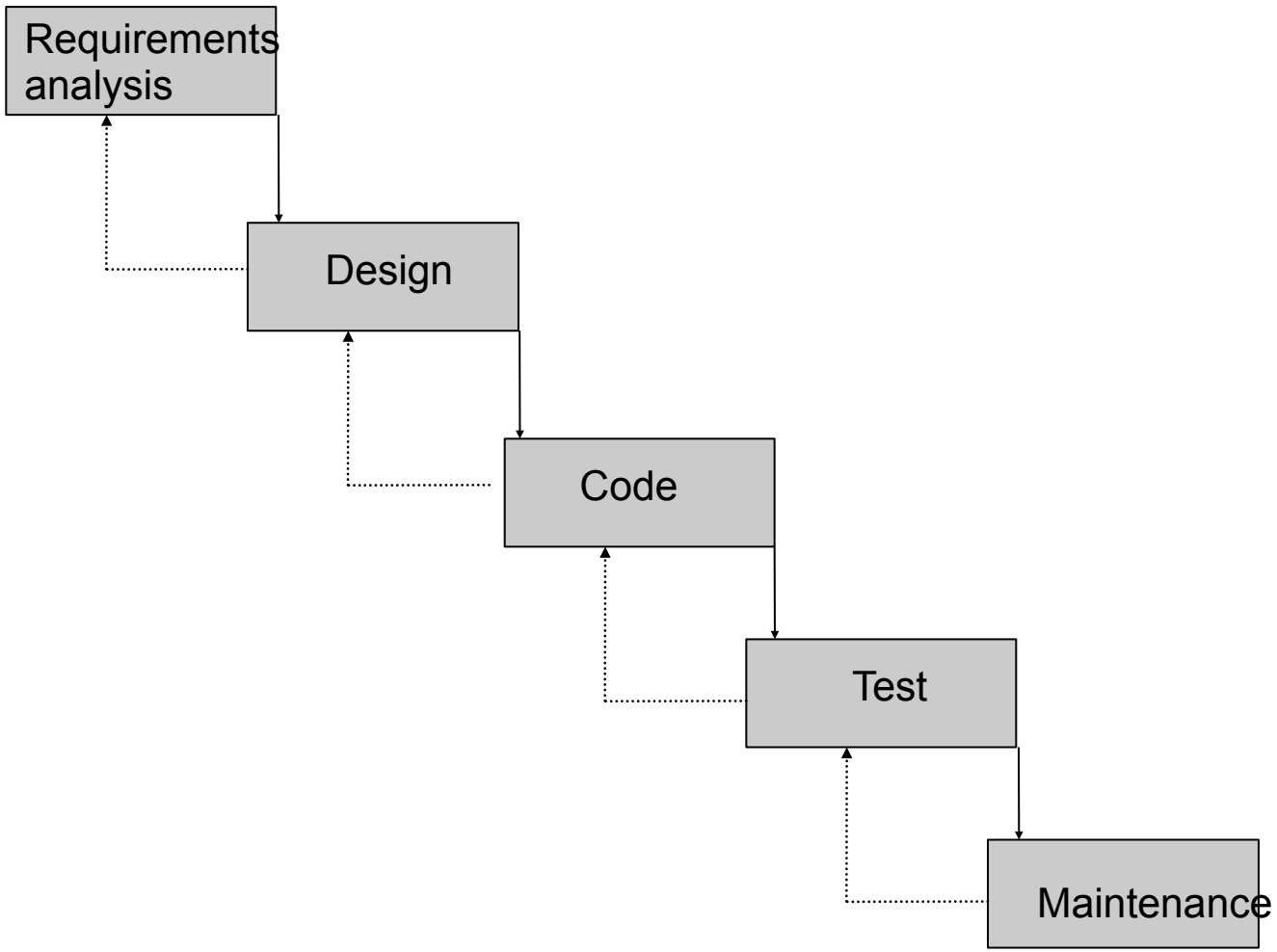
- Establishing requirements
- Designing alternatives
- Prototyping
- Evaluating

A simple interaction design lifecycle model



Exemplifies a user-centered design approach

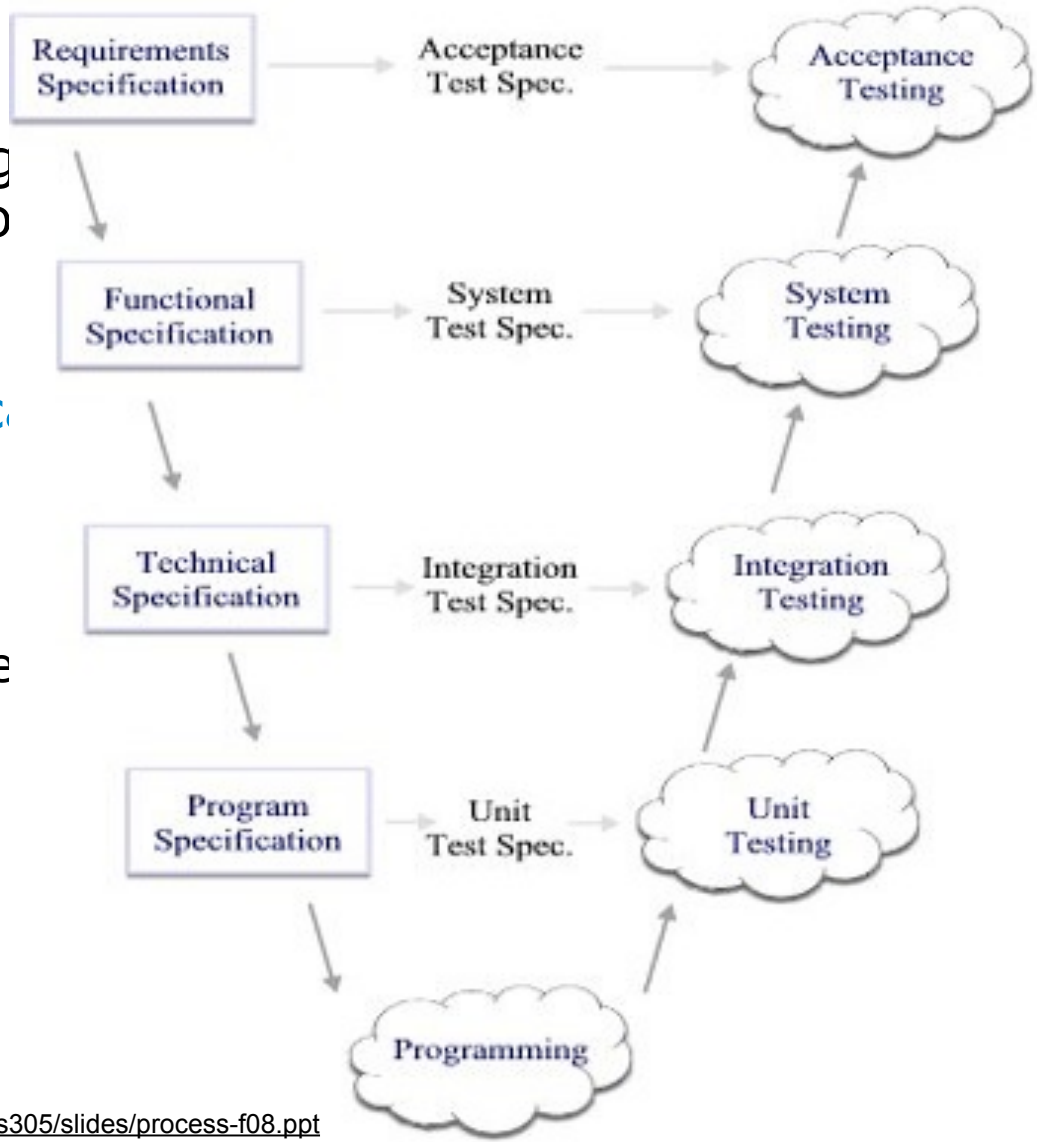
Traditional 'waterfall' lifecycle



http://www.cs.virginia.edu/~horton/cs305/slides/process-f08.ppt

A Quality-based View

- rearranged waterfall
  - to emphasize testing activities that are no explicit in the last diagram
- not intended for practic use
  - big-picture view for *understanding*
  - A company might have detailed standard plan (their process)



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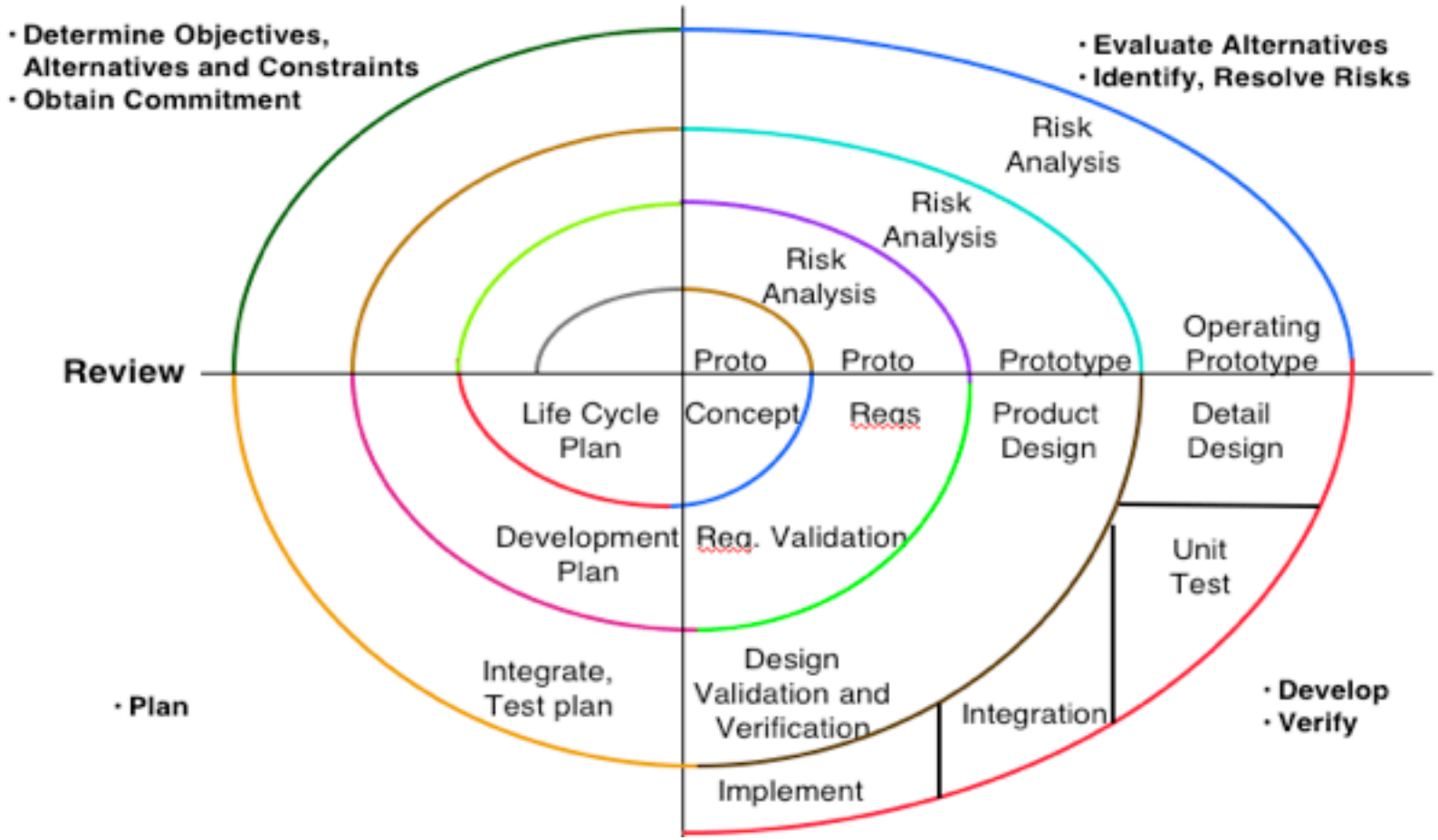
Spiral Model (Barry Boehm)

- Important features:
  - Risk analysis
  - Prototyping
  - Iterative framework allowing ideas to be checked and evaluated
  - Explicitly encourages alternatives to be considered
- Good for large and complex projects but not simple ones
  - significant overhead

The Spiral Model



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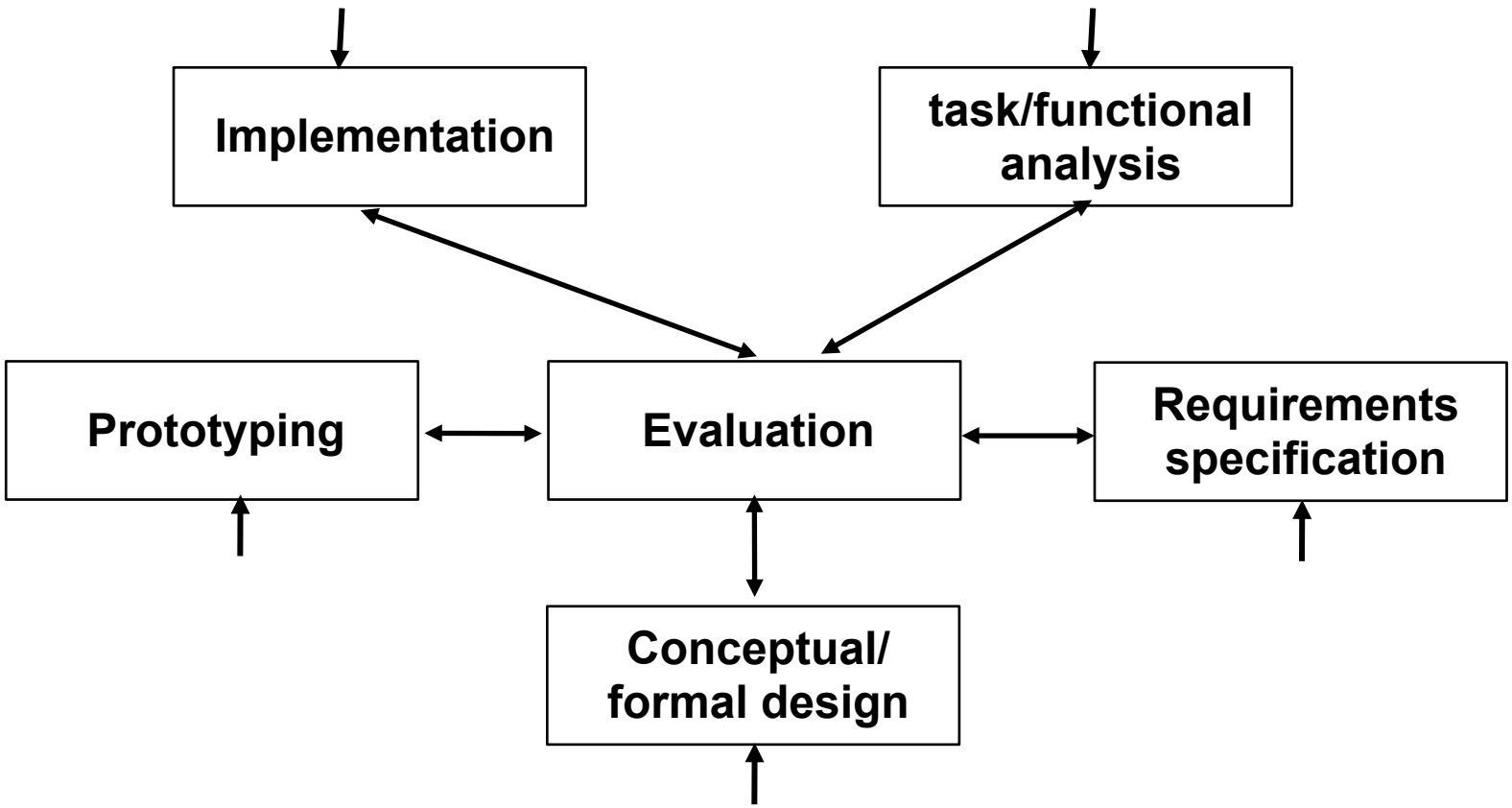
The Star Lifecycle Model

- Important features:
  - Evaluation at the center of activities
  - No particular ordering of activities. Development may start in any one
  - Derived from empirical studies of interface designers
- Suggested by Hartson and Hix (1989)

The Star Model
(Hartson and Hix, 1989)



Some practical issues

- Who are the users?
- What do we mean by 'needs'?
- How to generate alternatives
- How to choose among alternatives
- How to integrate interaction design activities with other models?

Who are the users/stakeholders?

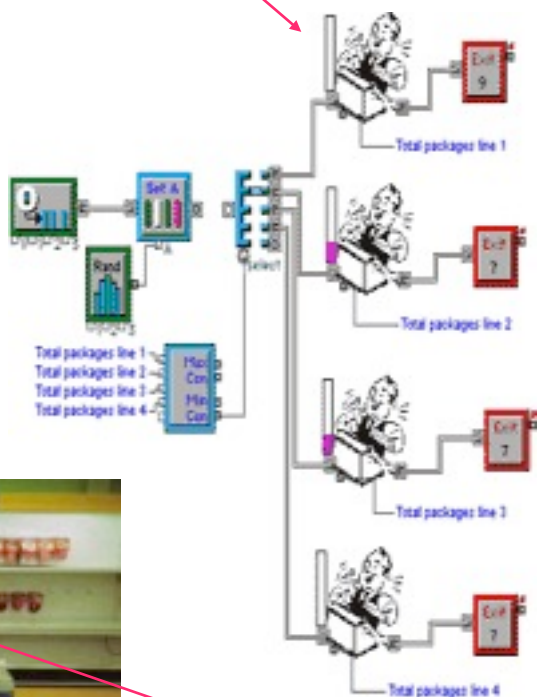
- Not as obvious as you think:
  - those who interact directly with the product
  - those who manage direct users
  - those who receive output from the product
  - those who make the purchasing decision
  - those who use competitor's products

- Three categories of user (Eason, 1987):
  - primary: frequent hands-on
  - secondary: occasional or via someone else
  - tertiary: affected by its introduction, or will influence its purchase

Who are the stakeholders?

- Suppliers
- Local shop owners

Check-out operators



Managers and owners

Customers

What do we mean by 'needs'?

- Users rarely know what is possible
- Users can't tell you what they 'need' to help them achieve their goals
- Instead, look at existing tasks:
  - their context
  - what information do they require?
  - who collaborates to achieve the task?
  - why is the task achieved the way it is?
- Envisioned tasks:
  - can be rooted in existing behaviour
  - can be described as future scenarios

How to generate alternatives

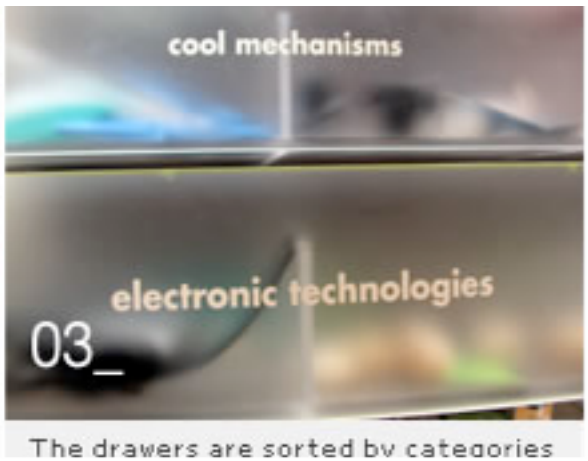
- Humans stick to what they know works
- But considering alternatives is important to 'break out of the box'
- Designers are trained to consider alternatives, software people generally are not
- How do you generate alternatives?
  - —'Flair and creativity': research and synthesis
  - —Seek inspiration: look at similar products or look at very different products

IDEO TechBox

- Library, database, website - all-in-one
- Contains physical gizmos for inspiration

The Tech Box is centrally located

An item on the intranet website



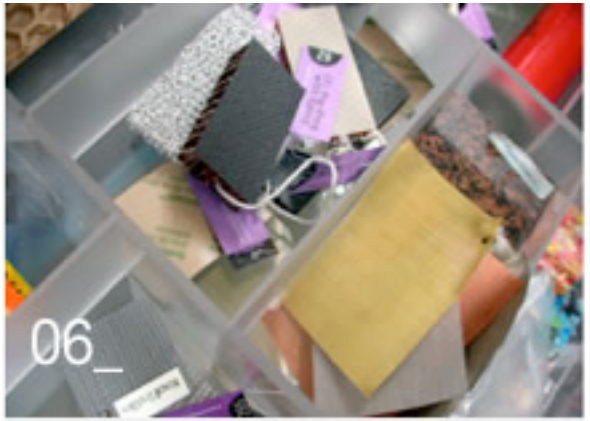
The drawers are sorted by categories

From: www.ideo.com/

The TechBox

Each drawer resembles a bento box

The curator keeps order



All the entries are tagged

It really is used daily

Two demonstrations units on top

How to choose among alternatives

- Evaluation with users or with peers, e.g. prototypes
- Technical feasibility: some not possible
- Quality thresholds: Usability goals lead to usability criteria set early on and check regularly
  - —safety: how safe?
  - —utility: which functions are superfluous?
  - —effectiveness: appropriate support? task coverage, information available
  - —efficiency: performance measurements

Testing prototypes to choose among alternatives

How to integrate interaction design in other models

- Lifecycle models from other disciplines
- Agile software development promising
  - have development and design running in separate tracks
  - maintain a coherent vision of the interface architecture

Summary

Four basic activities in the design process

1. Establishing requirements
2. Designing alternatives
3. Prototyping
4. Evaluating

User-centered design rests on three principles

1. Early focus on users and tasks
2. Empirical measurement using quantifiable & measurable usability criteria
3. Iterative design