The process of interaction design

Overview

- What is interaction design ?
  - Four basic activities
  - Three key characteristics
- Some practical issues
  - Who are the users ?
  - What are the needs ?
  - Where do alternatives come from ?
  - How do you choose among alternatives ?
- Lifecycle models from Software Engineering
- Lifecycle models from HCI

What is Interaction Design ?

- It is a process
  - Goal-directed problem-solving activity informed by intended use, target domain, materials, cost, and feasability
  - A creative activity
  - A decision-making activity to balance tradeoffs
- It is a representation
  - Plan for development
  - Set of alternatives and succesive elaborations

Four basic activities

- Identifying needs and establishing requirements
- Developing alternative designs
- Building interactive versions of the designs
- Evaluating designs

Three key characteristics

- Three key characteristics permeate these four activities
  - Focus on users early in the design and evaluation of the artefact
  - Identify, document and agree specific usability and user experience goals
  - Iteration is inevitable. Designers never get it right the first time

Some practical issues

- Who are the users ?
- What are needs ?
- Where do alternatives come from ?
- How do you choose among alternatives ?

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 users (Eason, 1987)
  - Primary: frequent, hands-on
  - Secondary: occasional or via someone else
  - Tetriary: affected by it's introduction, or will affect it's purchase

Who are the stakeholders ?

Suppliers, local store owners
Customers
Checkout-operators
Managers and owners
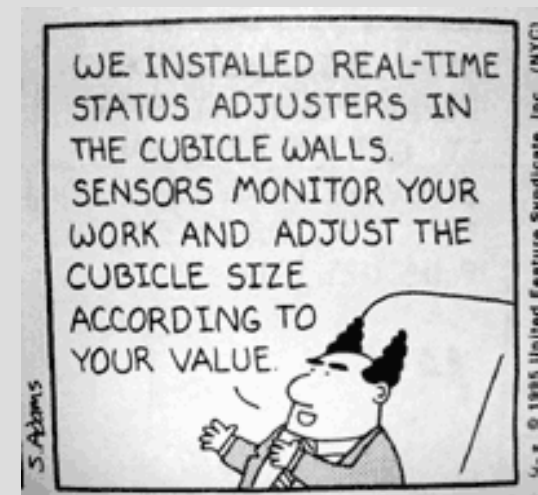
What are the users capabilities ?

- Humans vary in many dimensions
  - Size of hands may affect the size and positioning of input buttons
  - Motor abilities may affect the suitability of certain input and output devices
  - Height if designing a physical kiosk
  - Strength – a child's toy requires little strength to operate, but greater strength to change batteries
  - Disabilities (e.g sight, hearing, dexterity)

UVATT

- University of Victoria Assistive Technologies team (http://web.uvic.ca/uvatt/)
  - Students, faculty, staff design and develop technologies that can be used by people with disabilities special needs
  - Great opportunity if you are interested in fascinating ID research, volunteering, co-op
- Projects
  - Brain-wave communication
  - Tricycles for visually-impaired children
  - Automatic laptop opening device

What are needs ?

- Users rarely know what is possible
- Users can't tell you what they 'need' to help them achieve their goal – but they can describe their goals
- Instead look at existing tasks
  - Context
  - Information they require
  - Who collaborates to achieve the task ?
  - Why is the task achieved the way it is ?
- Envisioned tasks
  - Rooted in existing behavior
  - Described as future scenarios

Based on the slides available at www.id-book.com
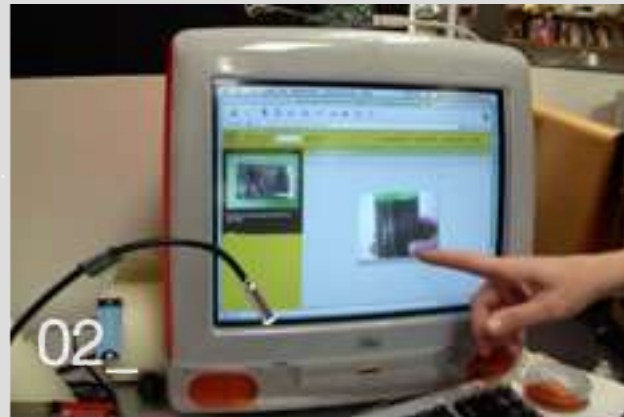
Where do alternatives come from ?

- 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
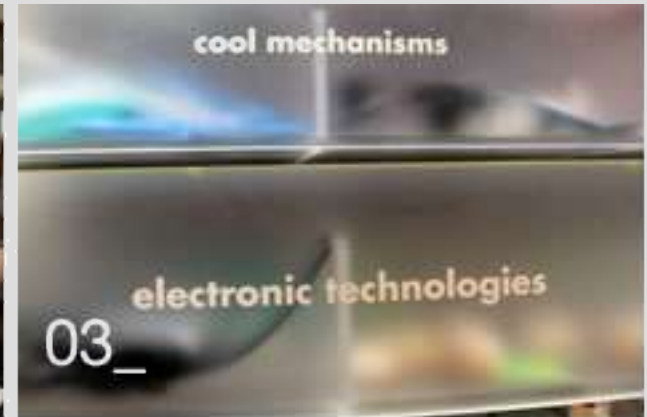
IDEO Tech Box

- Library, database, website - all in one
- www.ideo.com
- Contain physical gizmos for inpiration

The Tech Box is centrally located | An item on the intranet website | The drawers are sorted by categories
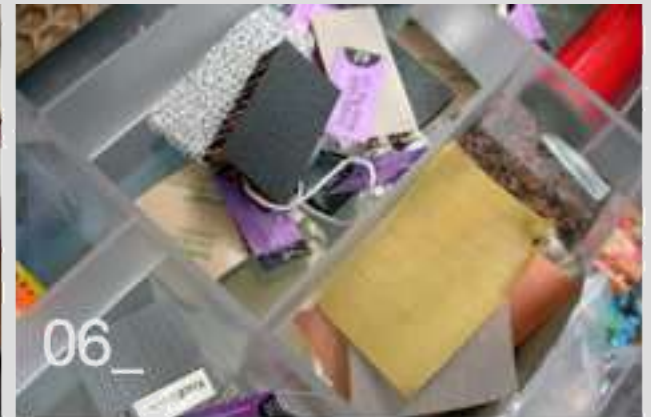
The TechBox

04_ Each drawer resembles a bento box

05_ The curator keeps order

06_ All the entries are tagged

07_ It really is used daily
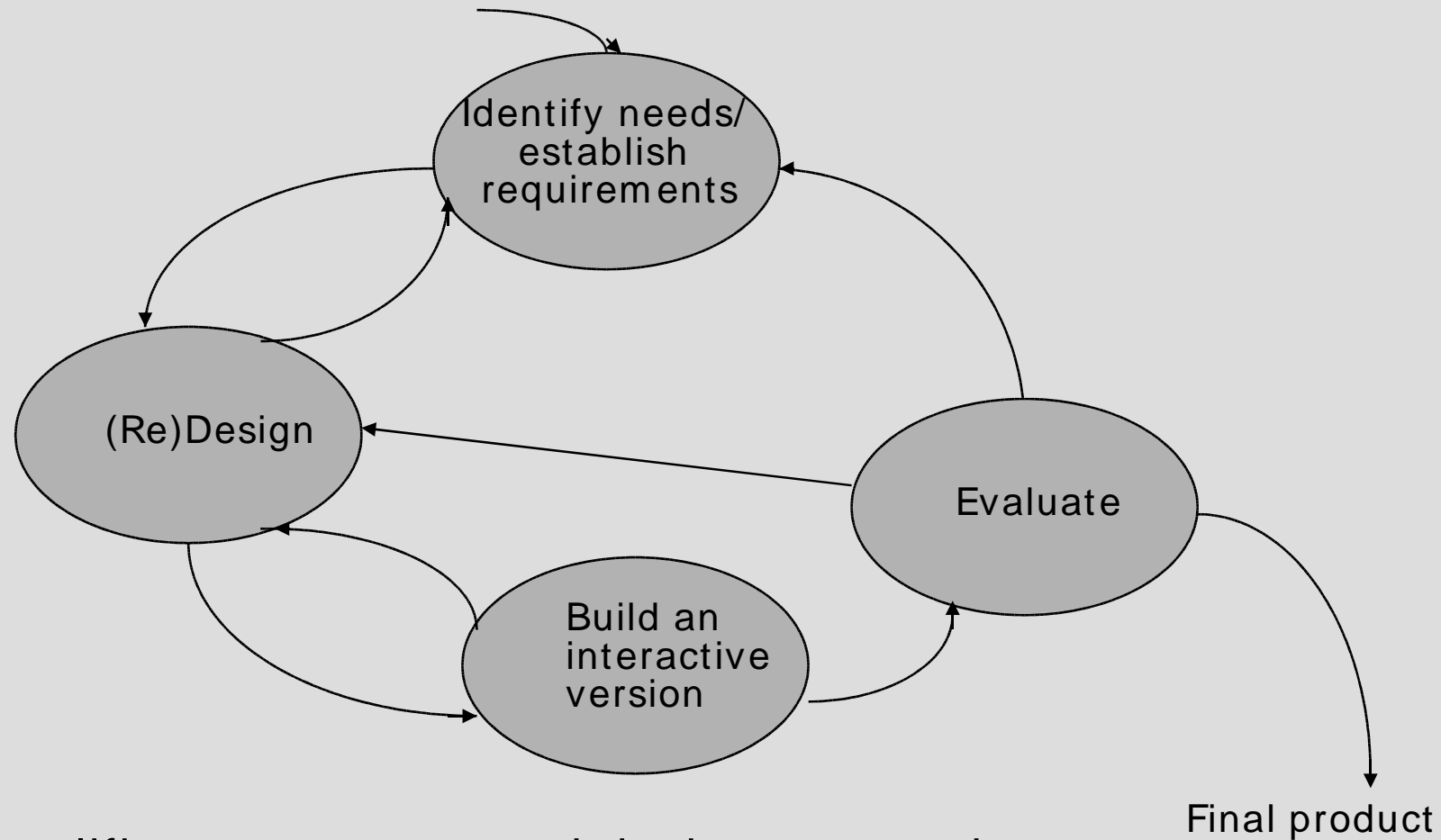
08_ Two demonstrations units on top

How do you choose among alternatives ?

- Evaluation with users or with peers e.g. Prototypes
- Technical feasibility – some not possible
- Quality thresholds: Usability goals lead to criteria set early on and checked regularly
  - Safety: how safe ?
  - Utility: which functions are superfluous
  - Effectiveness: appropriate support, task coverage, information available
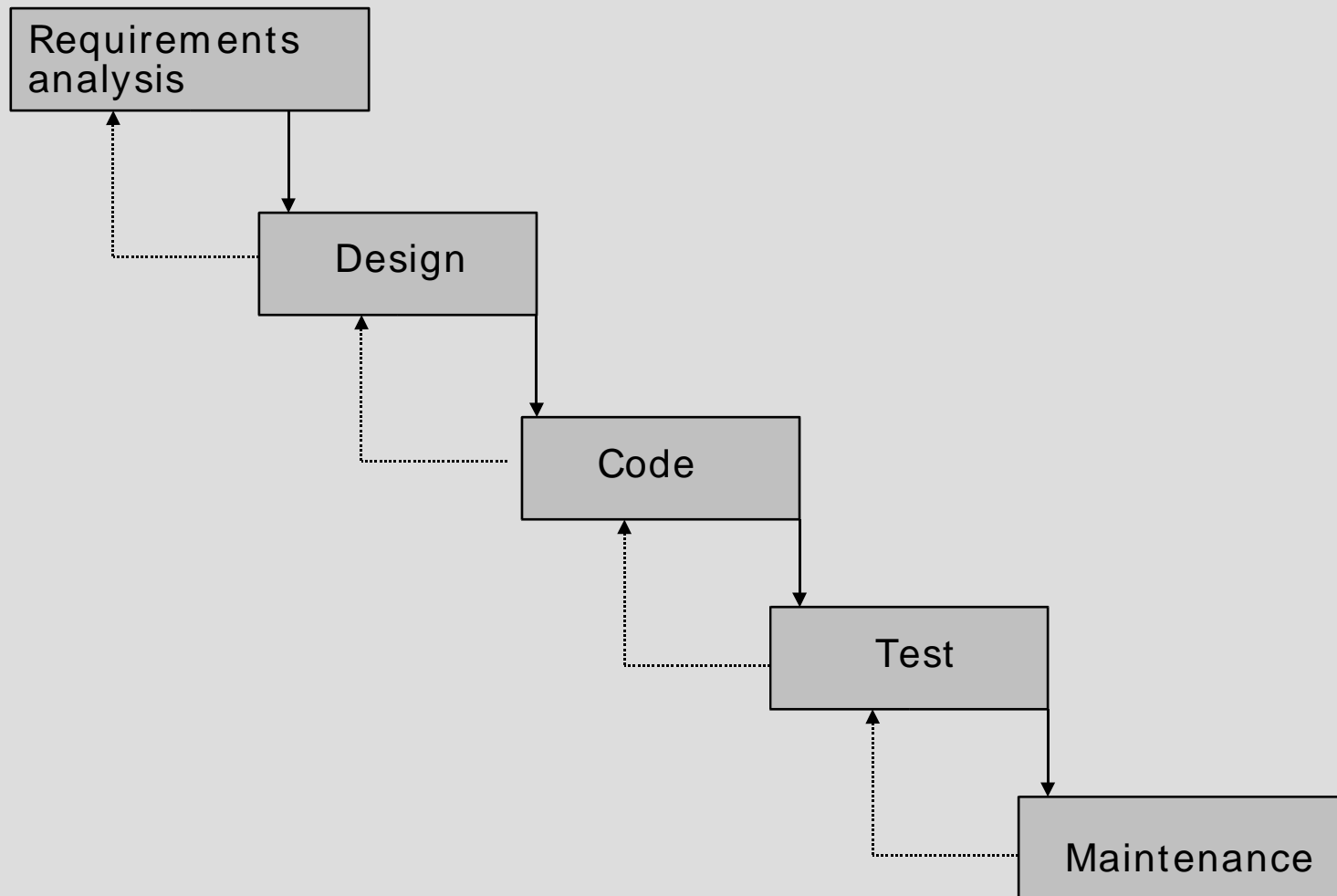 - Efficiency: performance measurements

Lifecycle models

- Show how activities are related to each other
- Lifecycle models are:
  - Management tools
  - Simplified versions of reality
- Many lifecycle models exist, for example:
  - From software engineering: waterfall, spiral, JAD/RAD, Microsoft
  - From HCI: star, usability engineering

A simple interaction design model
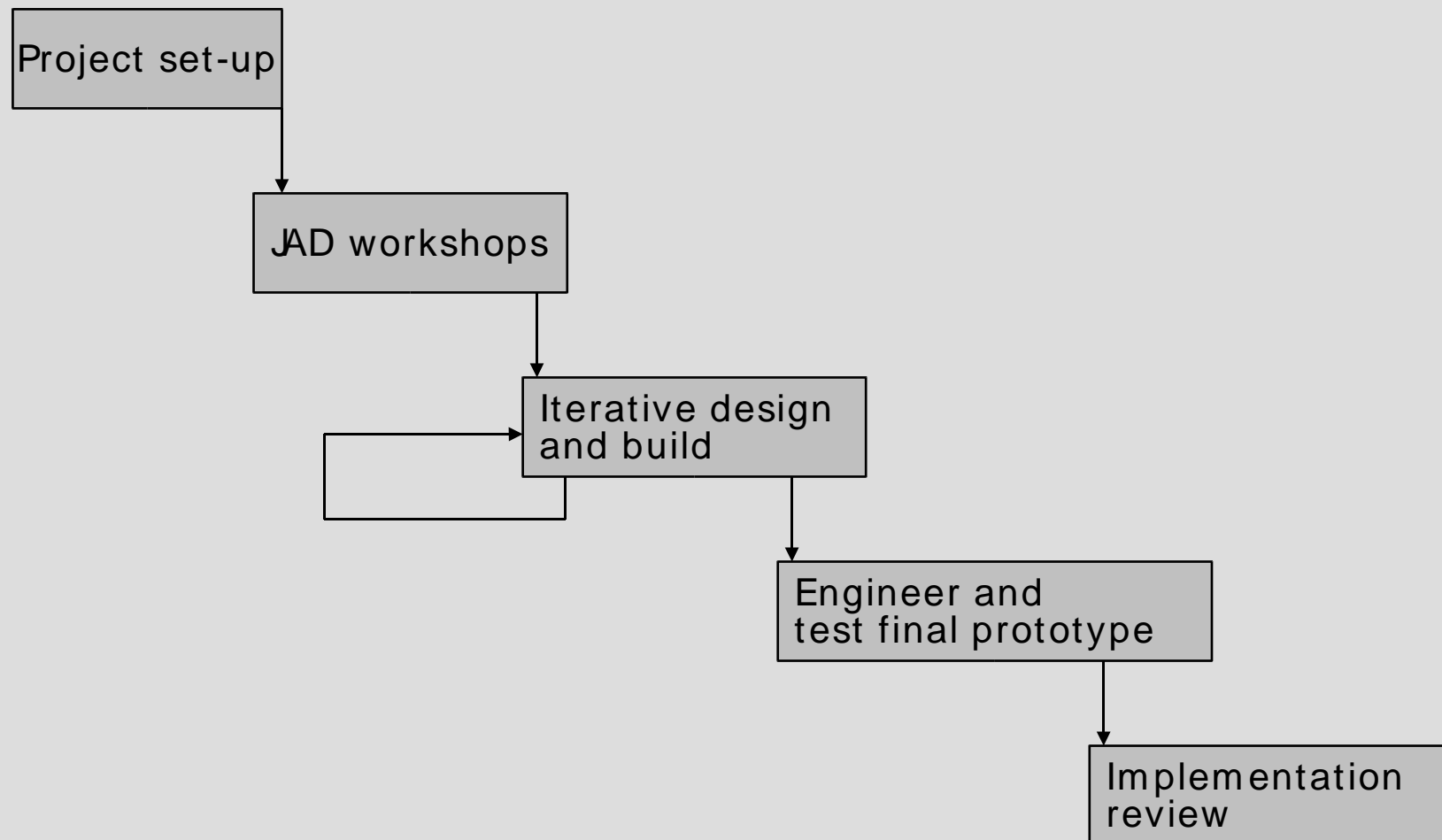

Identify needs/
establish
requirements

(Re)Design

Evaluate

Build an
interactive
version

Final product

Exemplifies a user-centered design approach

Traditional waterfall model

Requirements analysis → Design → Code → Test → Maintenance

A Lifecycle for RAD (Rapid Application Development)

```
┌─────────────────┐
│ Project set-up  │
└────────┬────────┘
         │
         ▼
   ┌──────────────┐
   │ JAD workshops│
   └──────┬───────┘
          │
          ▼
   ┌──────────────────┐
──▶│ Iterative design │
│  │ and build        │
│  └────────┬─────────┘
└───────────┘        │
                     ▼
            ┌──────────────────────┐
            │ Engineer and         │
            │ test final prototype │
            └──────────┬───────────┘
                       │
                       ▼
              ┌────────────────┐
              │ Implementation │
              │ review         │
              └────────────────┘
```

Spiral Model (Barry Boehm)

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

Spiral Lifecycle Model
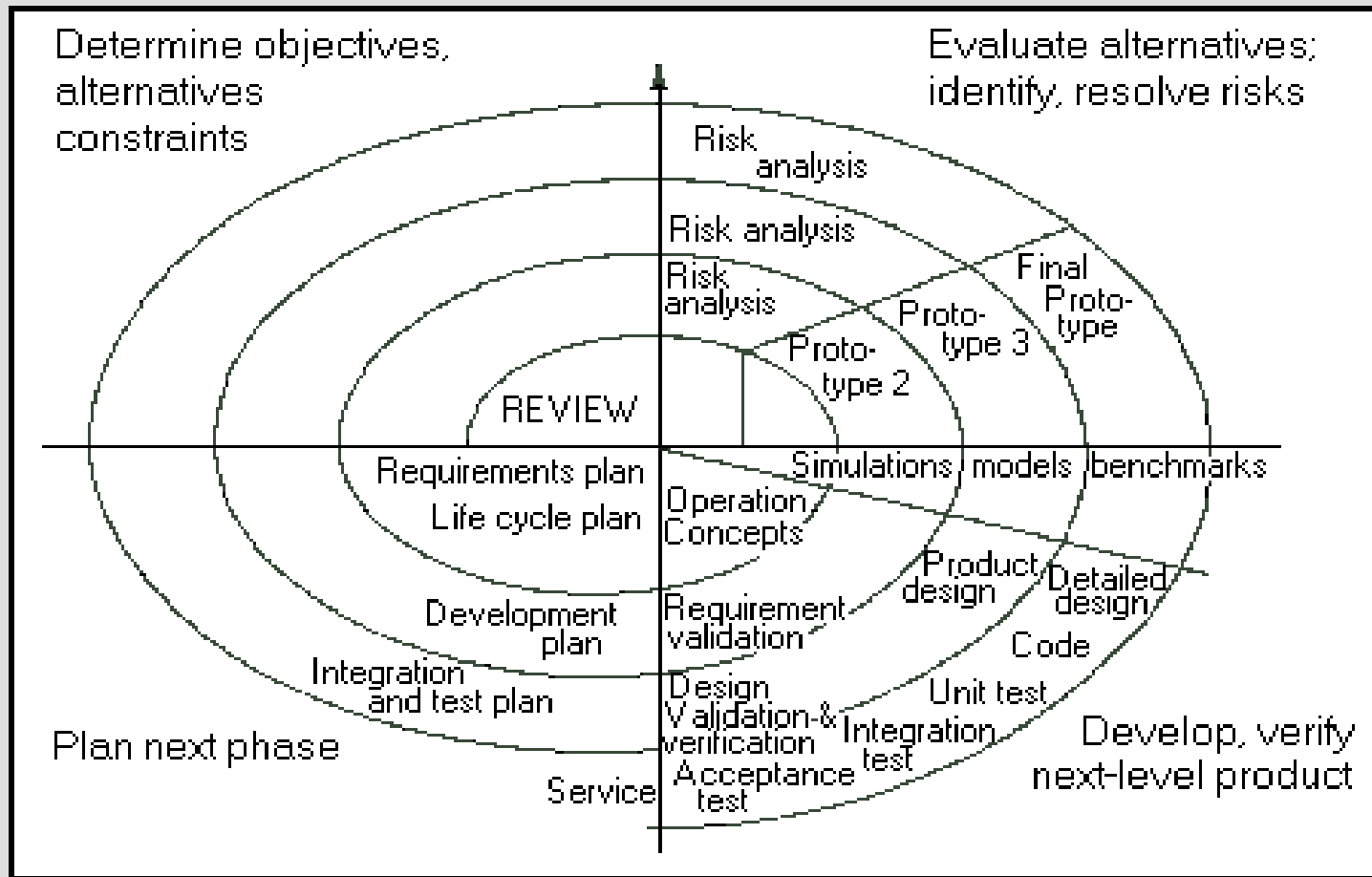
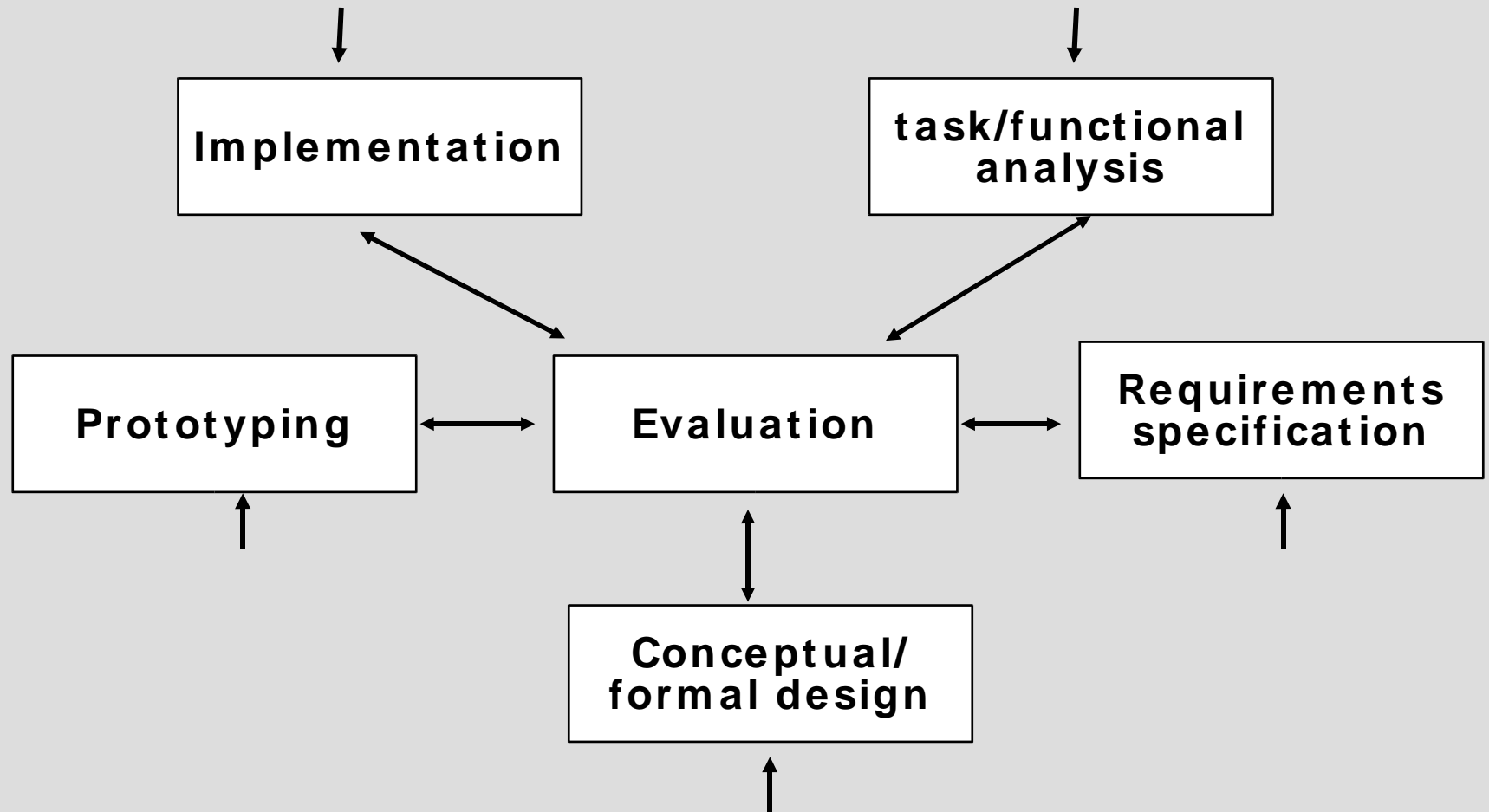From cctr.umkc.edu/~kennethjuwng/spiral.htm

The Star Lifecycle Model

- Suggested by Hartson and Fix (1989)
- Important features
  - Evaluation at the core of activities
  - No particular ordering of activities. Development may start in anyone
  - Derived from empirical studies of user interface designers

The Star Model
(Hartson and Hix, 1989)

Usability engineering lifecycle model

- Reported by Deborah Mayhew
- Important features
  - Holistic view of usability engineering
  - Provides links to software engineering approaches
  - Stages of identifying requirements, designing, evaluating, prototyping
  - Can be scaled down for small projects
  - Uses a style guide to capture a set of usability goals

Summary

- Four basic activities in the design process
  - Identify needs and establish requirements
  - Design potential solutions (re-design)
  - Choose between alternatives (evaluate)
  - Build the artefact
- These are permeated with three principles
  - Involve users early in the design and evaluation of the artefact
  - Define quantifiable & measurable usability criteria
  - Iteration is inevitable
- Lifecycle models show how these are related