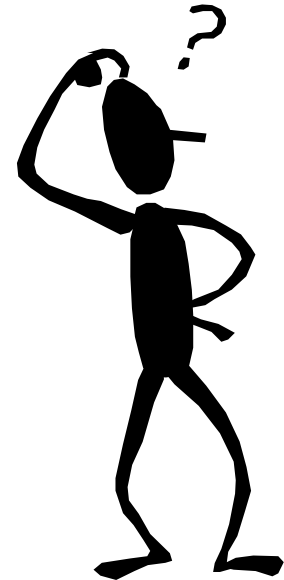# The Process of Interaction Design

Overview

- What is Interaction Design?
  - Four basic activities
  - Three key characteristics

- Some practical issues
  - Who are the users?
  - What are '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:
  - — 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

- It is a representation:
  - — a plan for development
  - — a set of alternatives and successive elaborations

Four basic activities

There are four basic activities in Interaction Design:

1. Identifying needs and establishing requirements

2. Developing alternative designs

3. Building interactive versions of the designs

4. Evaluating designs

Three key characteristics

Three key characteristics permeate these four activities:

   1. Focus on users early in the design and evaluation of the artefact

   2. Identify, document and agree specific usability and user experience goals

   3. Iteration is inevitable. Designers never get it right first time
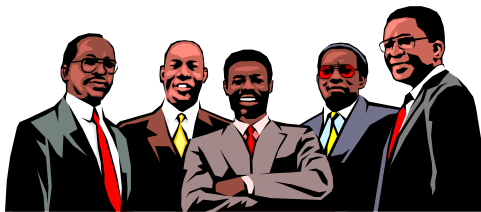
Some practical issues

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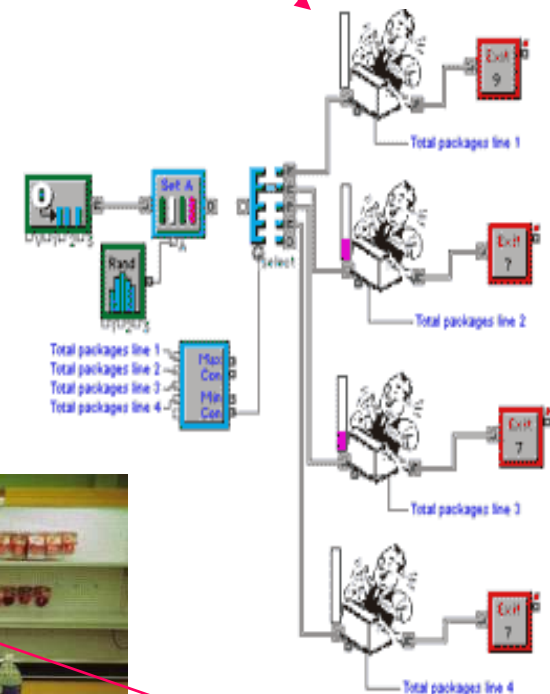 - tertiary: affected by its introduction, or will influence its purchase

Who are the stakeholders?

- Suppliers
- Local shop owners

Check-out operators

Customers

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)

What are '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

Simultaneous encoding and decoding up to 30 frames / s and up to CIF resolution

▶ messaging
▶ streaming
▶ video telephony
▶ video conference

Excellent error resilience grants high picture quality

INCOMING VIDEOSTREAM

OUTGOING STREAM

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
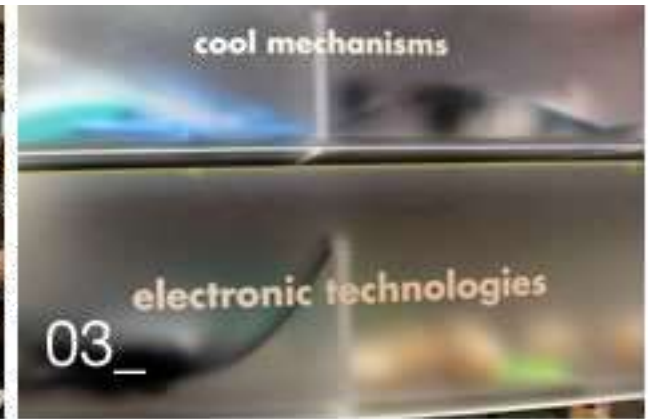
IDEO TechBox

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

01_ The Tech Box is centrally located
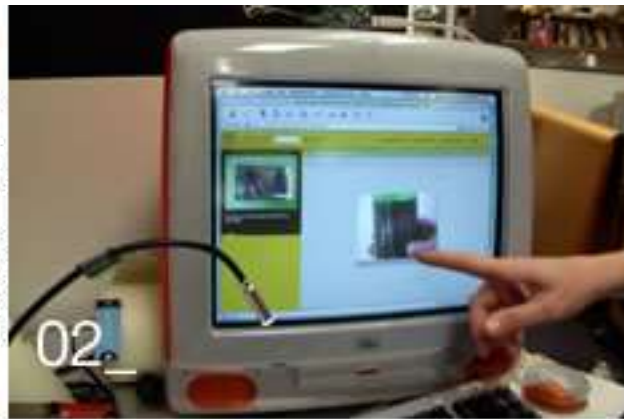
02_ An item on the intranet website

cool mechanisms

electronic technologies

03_ The drawers are sorted by categories

From: www.ideo.com/
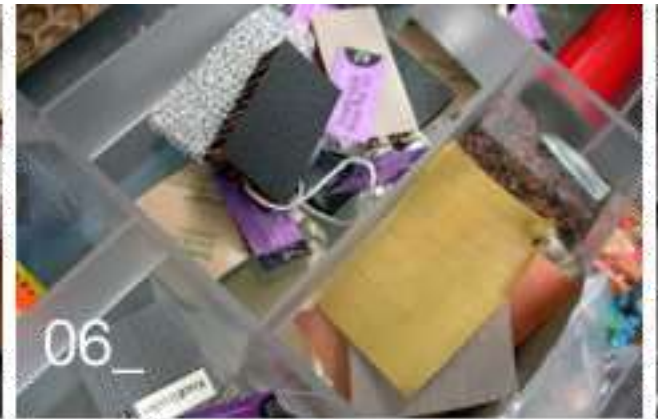
The TechBox

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 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 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

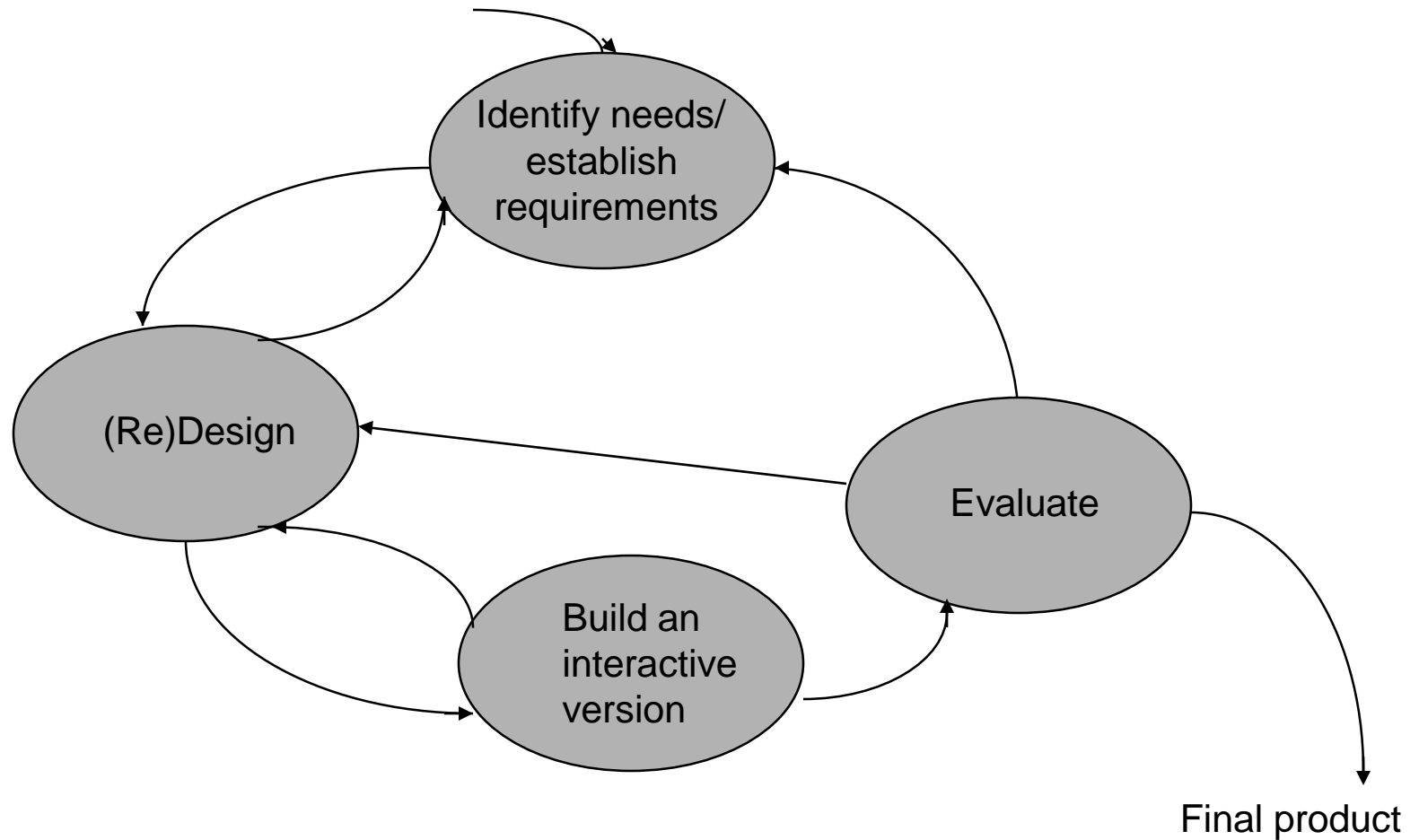# Testing prototypes to choose among alternatives

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
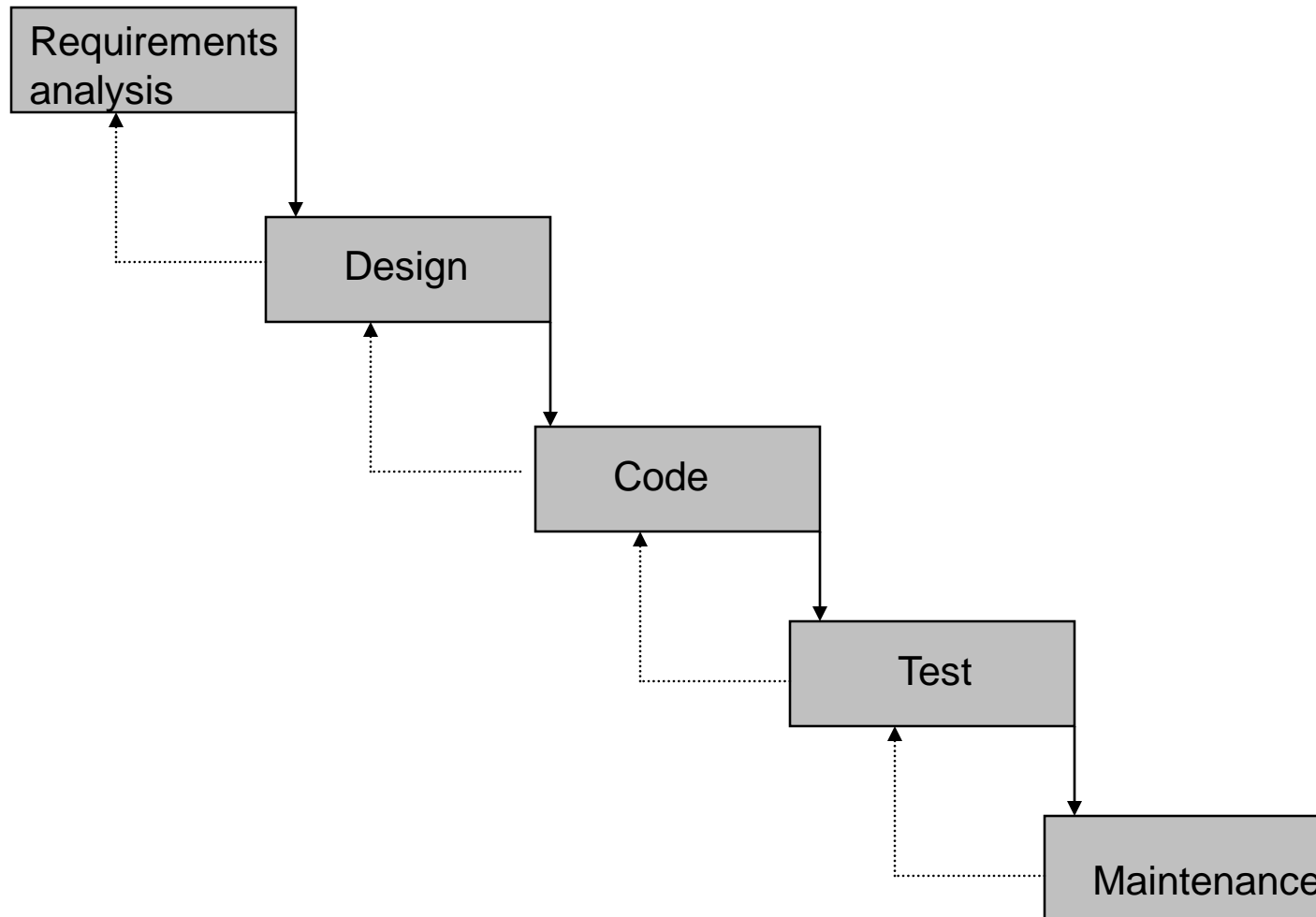 - from HCI: Star, usability engineering
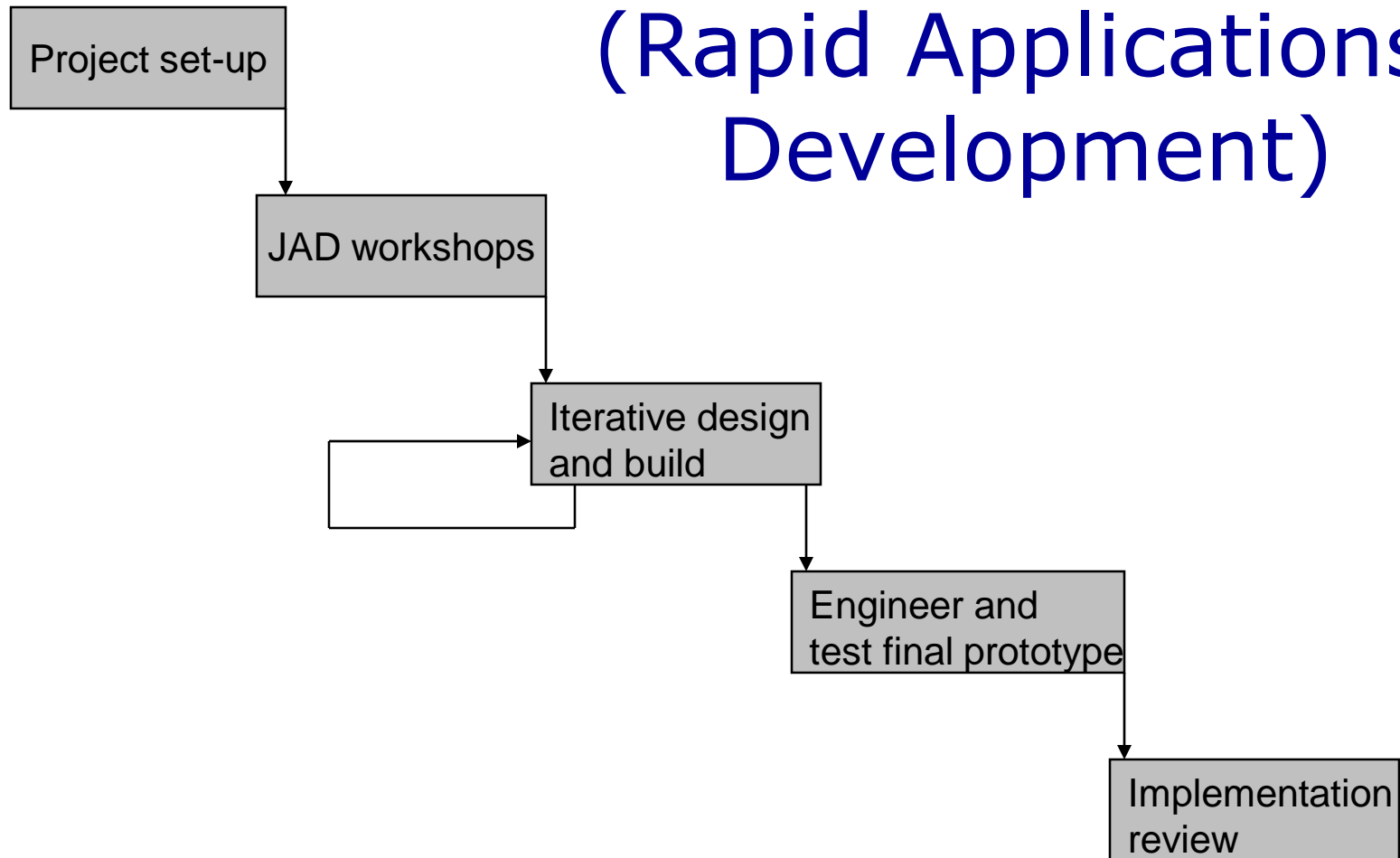
A simple interaction design model

Identify needs/
establish
requirements

(Re)Design

Build an
interactive
version

Evaluate

Final product

Exemplifies a user-centered design approach

Traditional 'waterfall' lifecycle

A Lifecycle for RAD (Rapid Applications Development)

Project set-up

JAD workshops

Iterative design and build
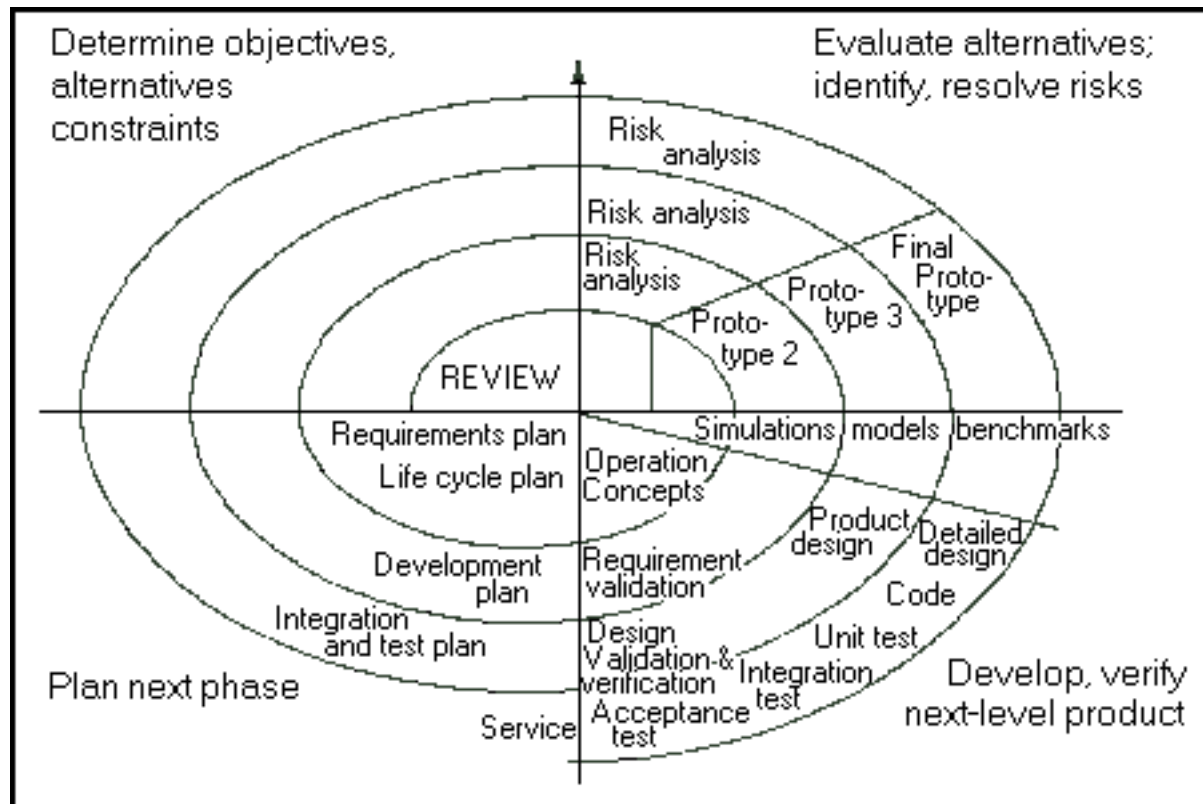
Engineer and test final prototype

Implementation review

Spiral model (Barry Boehm)

Important features:

—Risk analysis

—Prototyping

—Iterative framework allowing ideas to be checked and evaluated

—Explicitly encourages alternatives to be considered

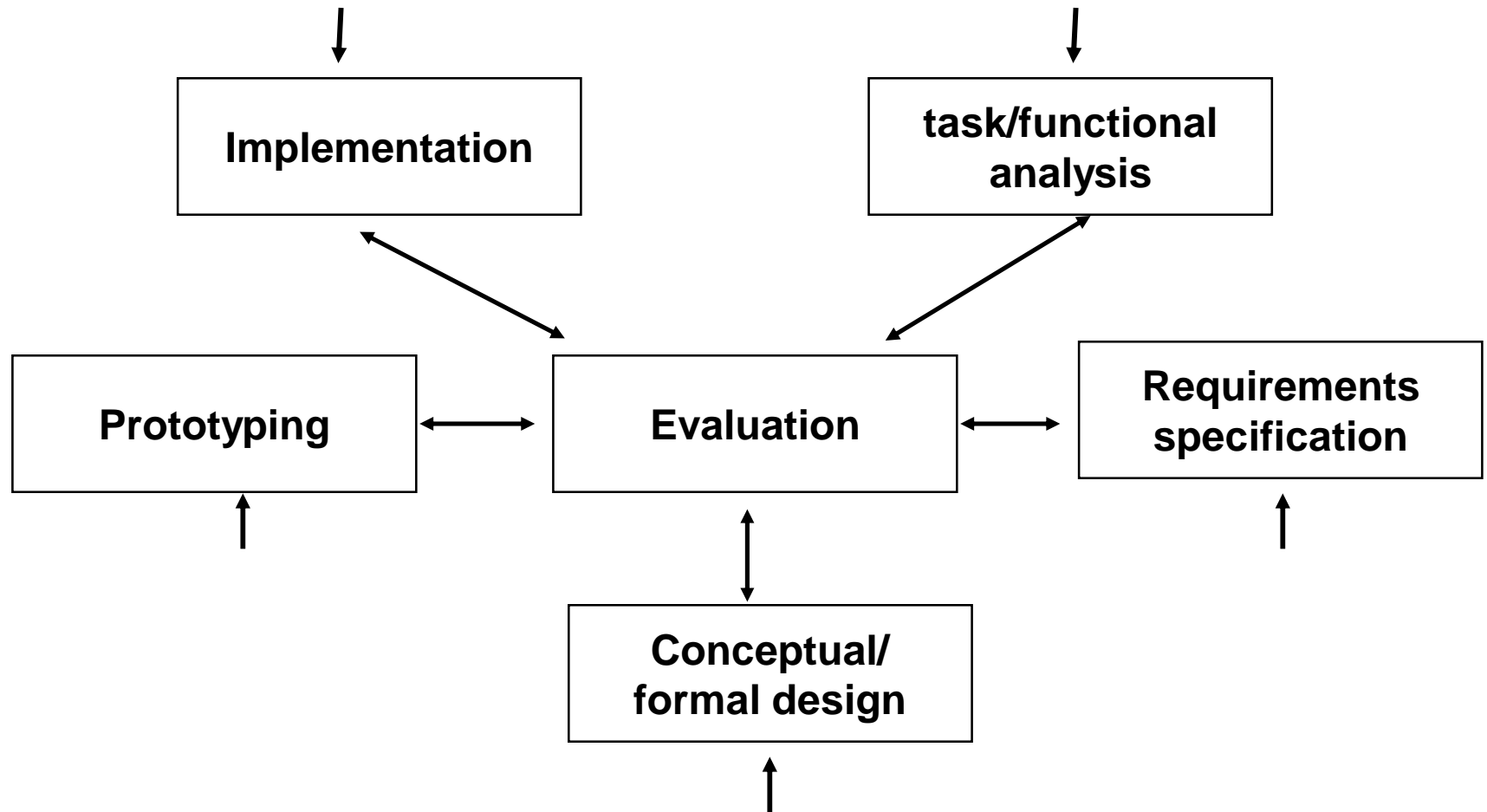Good for large and complex projects but not simple ones

Spiral Lifecycle model

From cctr.umkc.edu/~kennethjuwng/spiral.htm

The Star lifecycle model

- Suggested by Hartson and Hix (1989)

- 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

The Star Model (Hartson and Hix, 1989)

Implementation

task/functional analysis

Prototyping

Evaluation

Requirements specification

Conceptual/ formal design

Usability engineering lifecycle model

- Reported by Deborah Mayhew
- Important features:
  - Holistic view of usability engineering
  - Provides links to software engineering approaches, e.g. OOSE
  - 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
1. Identify needs and establish requirements
2. Design potential solutions ((re)-design)
3. Choose between alternatives (evaluate)
4. Build the artefact

These are permeated with three principles
1. Involve users early in the design and evaluation of the artefact
2. Define quantifiable & measurable usability criteria
3. Iteration is inevitable

Lifecycle models show how these are related