Sommerville Chapter 2 and 3

# The Process

## Part Two

Slides from Mats Heimdahl

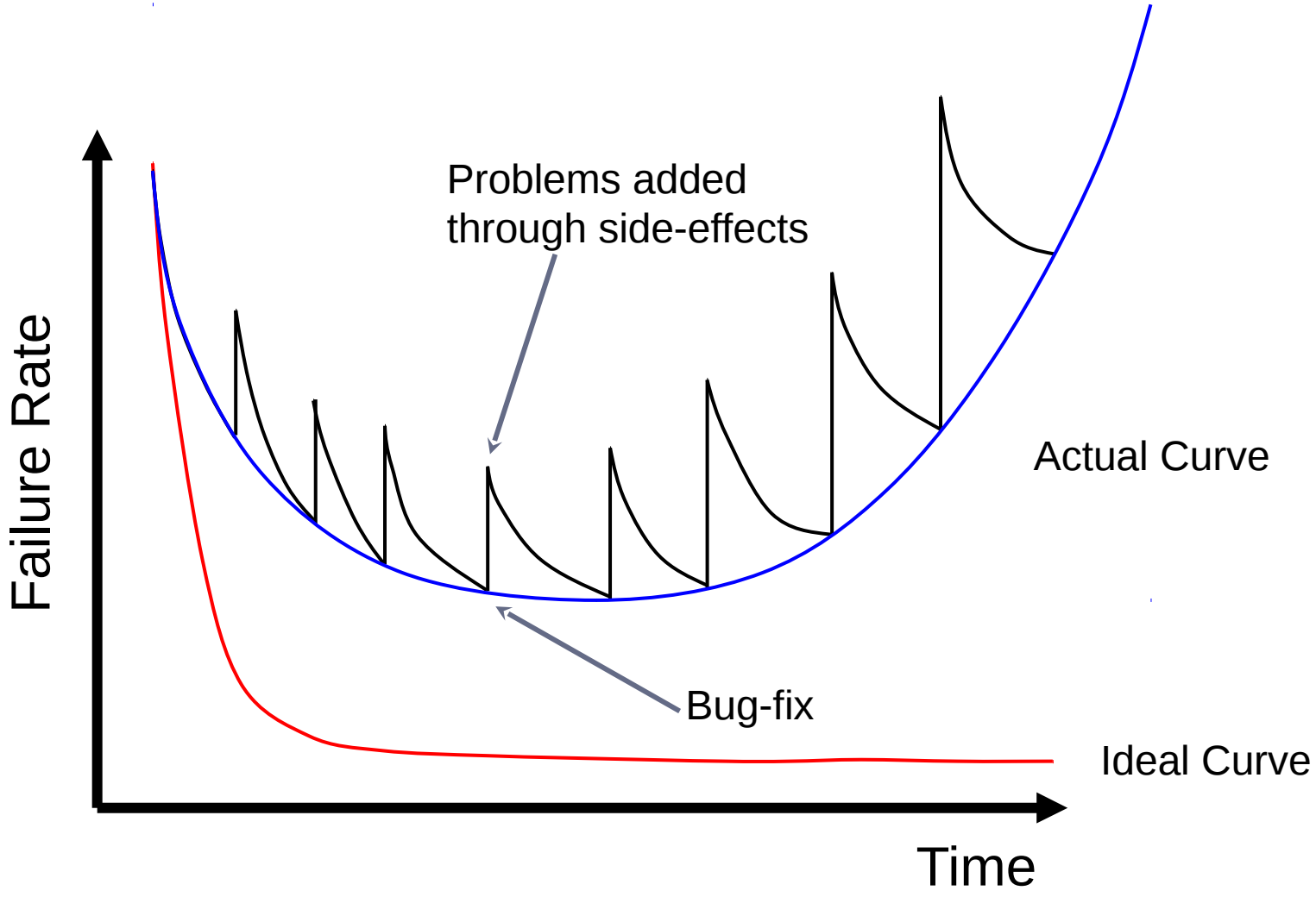
# Announcements

- HW3 due November 18th at Noon.
- Last lecture will be on November 18th and will summarize all the topics covered thus far.

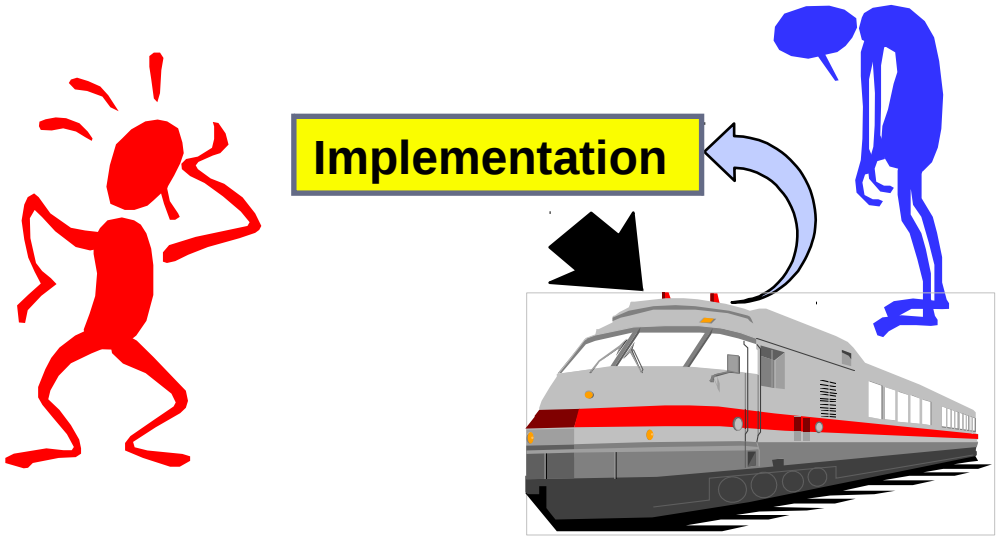
# Today's Goals

- Introduce and/or Review Software Development Processes
  - Definitions, Processes, and Process Models
  - Examples of Software Process Models

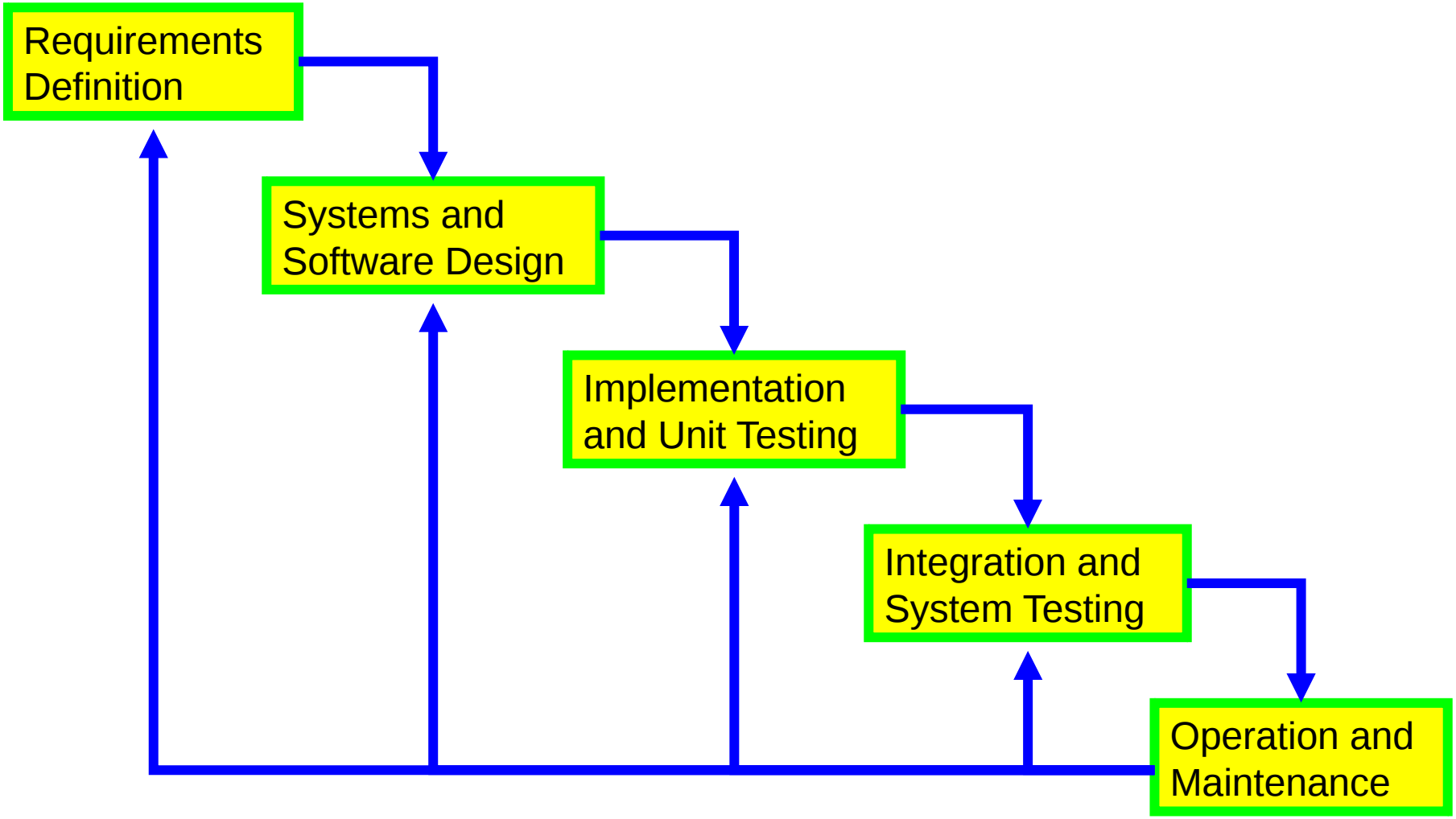
# How it Really Works (L)



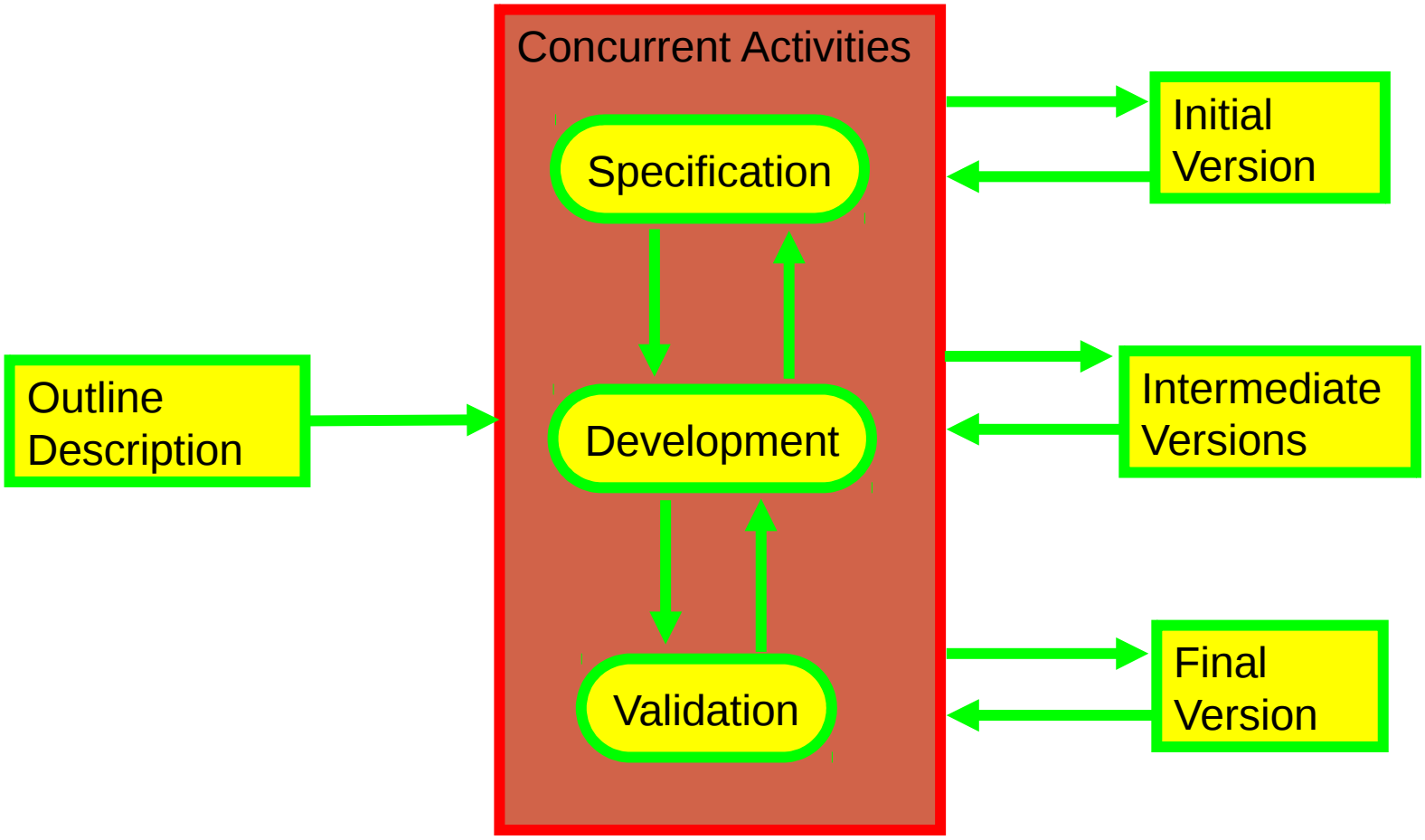
# Code and Fix



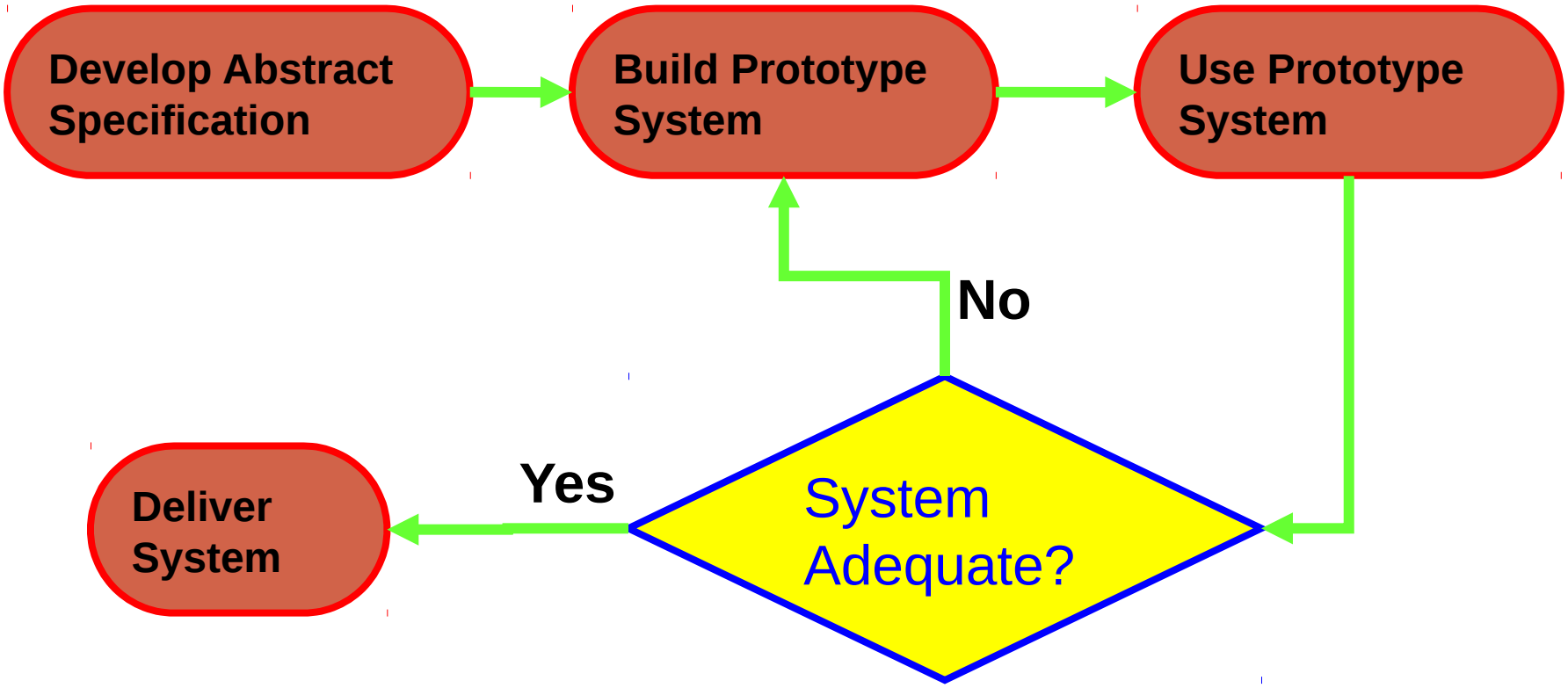
# Waterfall Model



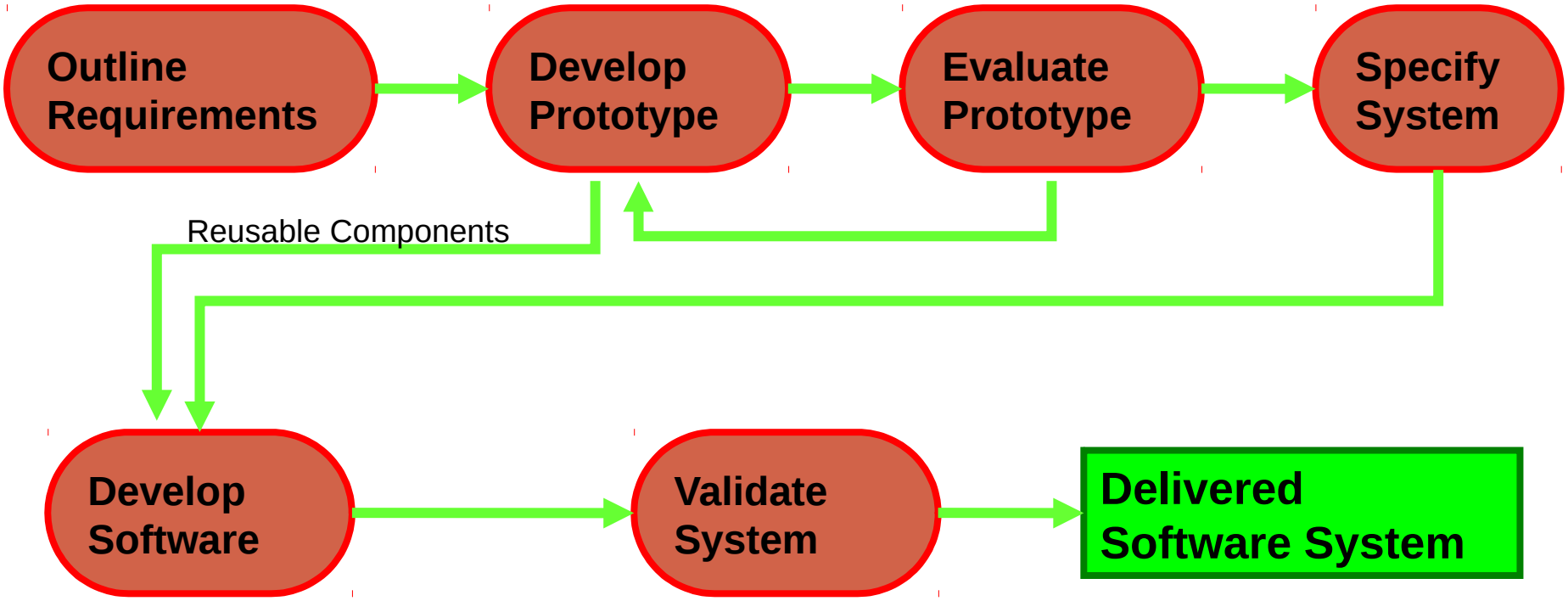
# Evolutionary Development



# Evolutionary Prototyping



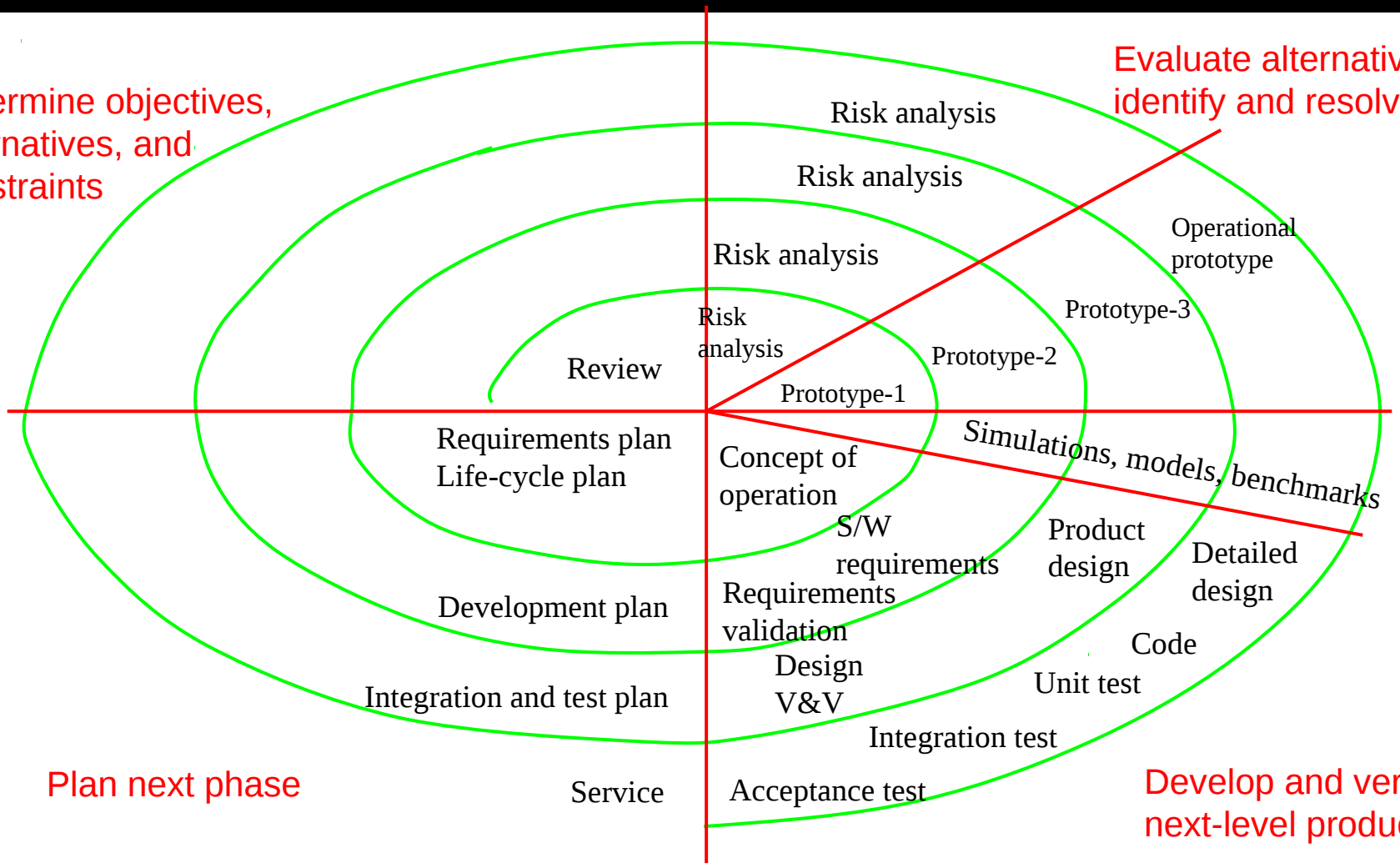
# Throw-away Prototyping



# Risk Management

- Perhaps the principal task of a manager is to minimizes risk
- The “risk” inherent in an activity is a measure of the uncertainty of the outcome of that activity
- High-risk activities cause schedule and cost overruns
- Risk is related to the amount and quality of available information
  - The less information, the higher the risk
- **A visible process provides the means to track progress and assess risk**

# Spiral Model



# Phases of the Spiral Model

- Objective setting
  - Specific objectives for the project phase are identified
- Risk assessment and reduction
  - Key risks are identified, analyzed and information is sought to reduce these risks
- Development and validation
  - An appropriate model is chosen for the next phase of development.
- Planning
  - The project is reviewed and plans drawn up for the next round of the spiral

# Quality Improvement

- Objectives
  - Significantly improve software quality
- Constraints
  - Within a three-year time-scale
  - Without large-scale capital investment
  - Without radical change to company standards
- Alternatives
  - Reuse existing certified software
  - Introduce formal specification and verification
  - Invest in testing and validation tools

# Quality Improvement (Cont.)

- Risks
  - No cost effective quality improvement possible
  - Quality improvements may increase costs excessively
  - New methods might cause existing staff to leave
- Risk resolution
  - Literature survey
  - Pilot project
  - Survey of potential reusable components
  - Assessment of available tool support
  - Staff training and motivation seminars

# Quality Improvement (Cont.)

- Results
  - Experience of formal methods is limited
    - very hard to quantify improvements
  - Limited tool support available for company standard development system
  - Reusable components available but little reuse tool support
- Plans
  - Explore reuse option in more detail
  - Develop prototype reuse support tools
  - Explore component certification scheme
- Commitment
  - Fund further 18-month study phase

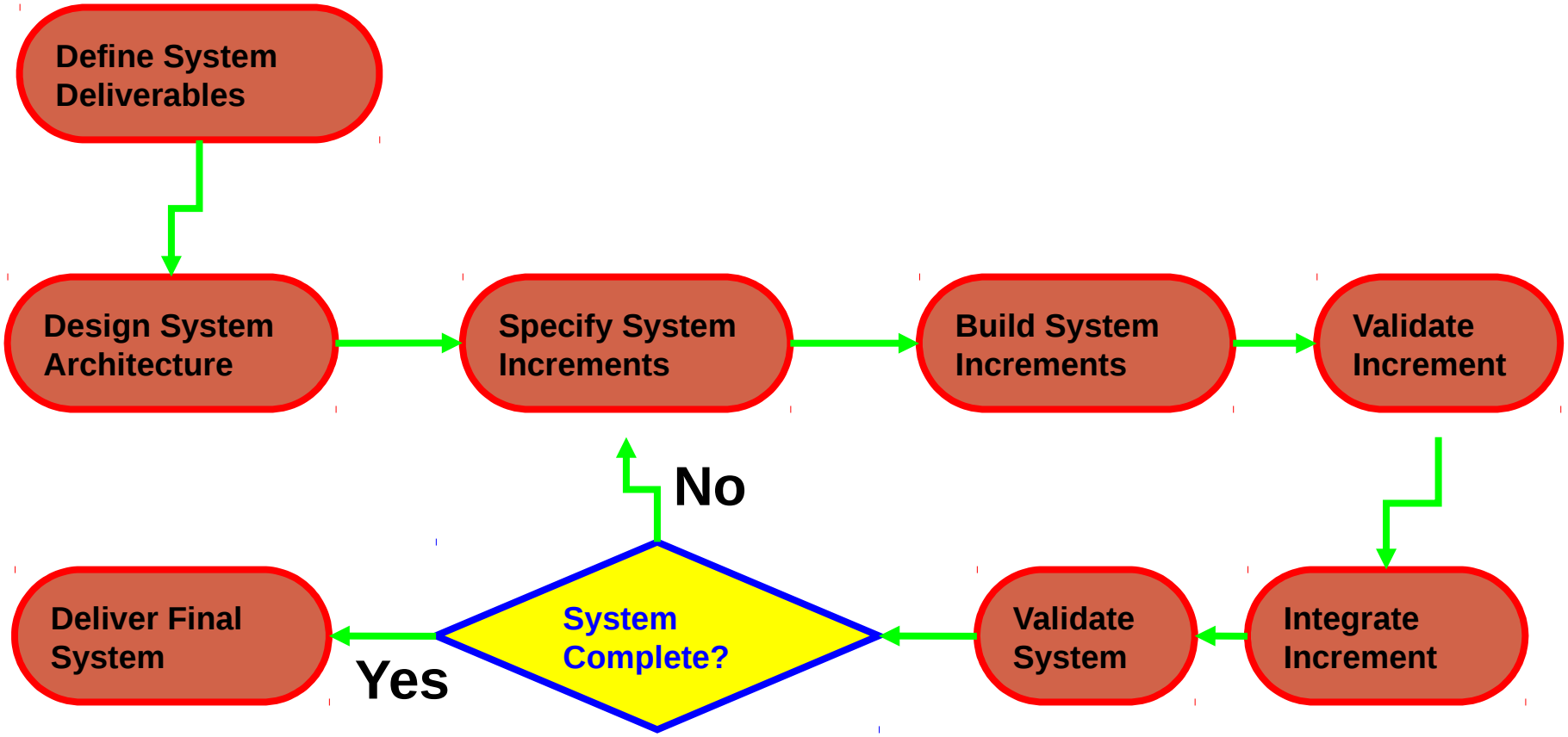
# Spiral Model (L)

- Advantages
  - Focuses attention on reuse options
  - Focuses attention on early error elimination
  - Puts quality objectives up front
  - Integrates development and maintenance
  - Provides a framework for hardware/software development
- Problems
  - Contractual development often specifies process model and deliverables in advance
  - Requires risk assessment expertise
  - Needs refinement for general use

# Incremental Development

- System is developed and delivered in increments after establishing an overall architecture
- Users may experiment with delivered increments while others are being developed
  - Therefore, these serve as a form of prototype system
- Intended to combine some of the advantages of prototyping but with a more manageable process and better system structure

# Incremental Development Process



# Process Overview

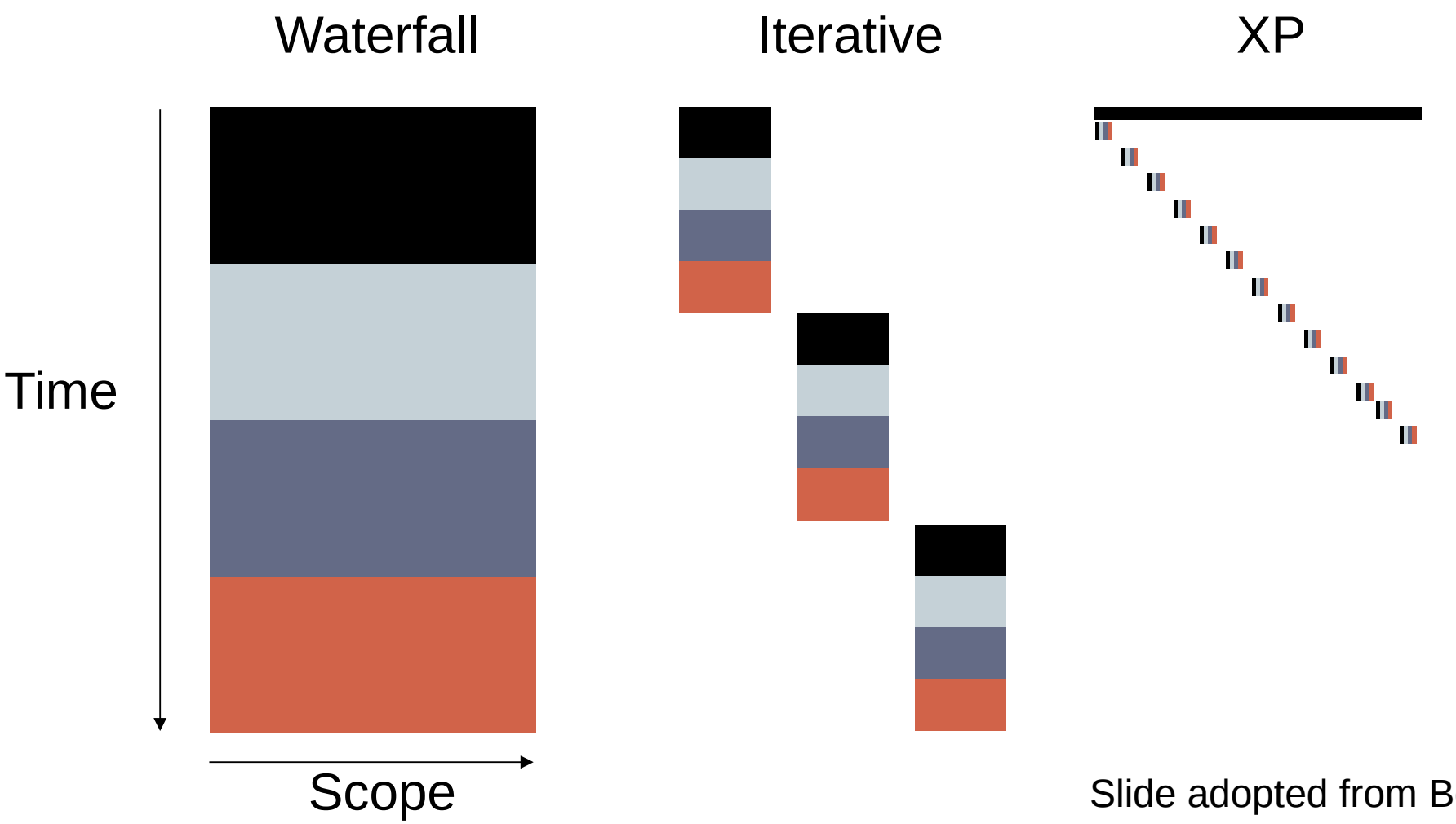
- Inception
  - Identifies project scope, requirements (functional and non-functional) and risks at a high level.
- Elaboration
  - delivers a working architecture that mitigates the top risks and fulfills the non-functional requirements.
- Construction
  - incrementally fills-in the architecture with production-ready code produced from analysis, design, implementation, and testing of the functional requirements.
- Transition
  - delivers the system into the production operating environment.

Each of the phases may be divided into 1 or more iterations

# Process Overview

- Inception
- Elaboration
- Construction
  - Many iterations
- Transition

# Three Processes




Slide adopted from Beck