

# Software Engineering Design Process



Copyright © 1998 United Feature Syndicate, Inc.  
Redistribution in whole or in part prohibited

# Today's Lecture

---

- 1. Intro to Software Engineering**
- 2. Inexact quantities**
- 3. Error propagation**
- 4. Floating-point numbers**
- 5. Design process**
- 6. Teamwork**
- 7. Project planning**
- 8. Decision making**
- 9. Professional Engineering**
- 10. Software quality**
- 11. Software safety**
- 12. Intellectual property**

# Design Models and Processes

---

An **engineering design** is a model of the product or structure to be engineered. The model is used to

- Evaluate suitability of proposed product/system
- Communicate proposed product to others

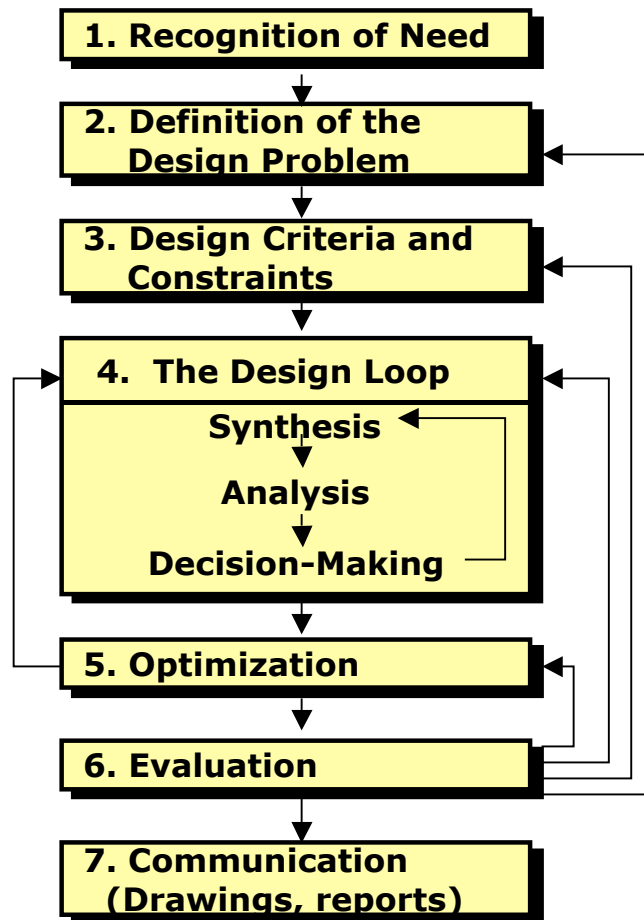
An **engineering design process** describes a set of steps for constructing an engineering design.

# Agenda

---

- SE process vs. Engineering design process
- Software Engineering processes
  - Waterfall model
  - Concurrent engineering
  - Spiral model
  - Agile methods

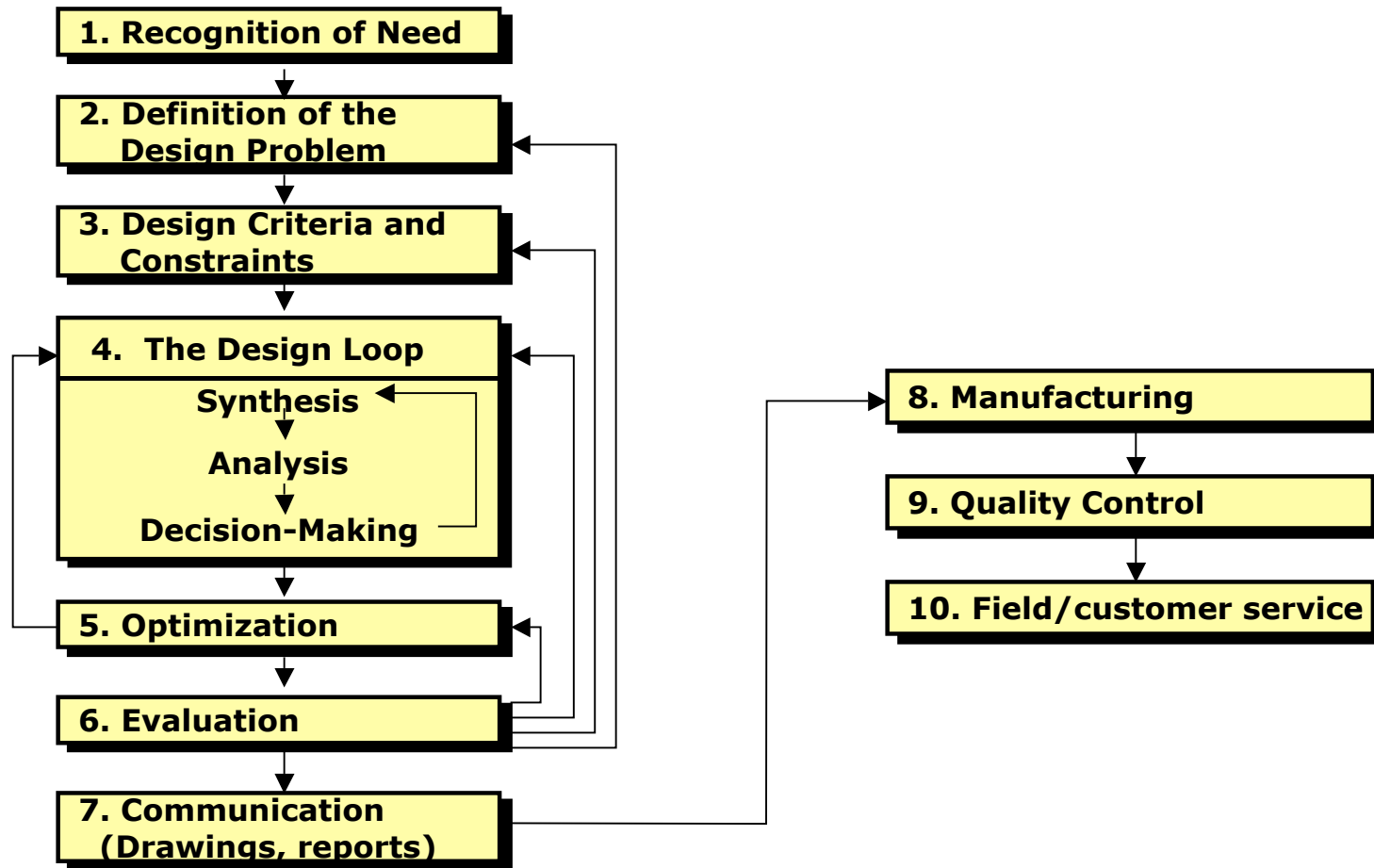
# Engineering Design Process



Andrews, Aplevich, Fraswer, Ratz, *Introduction to Professional Engineering in Canada*, Pearson, 2002.

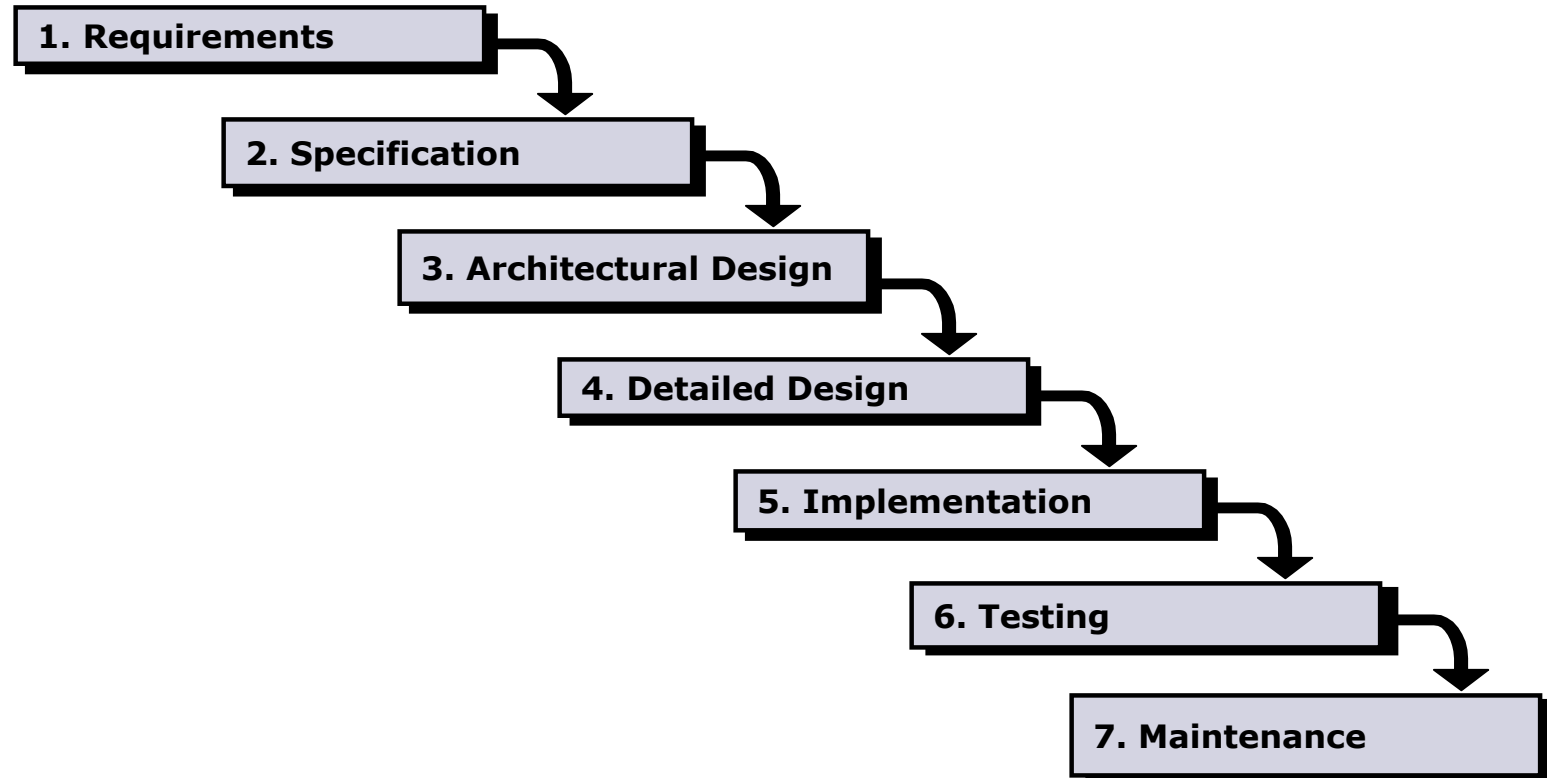
# Engineering Development Process

---



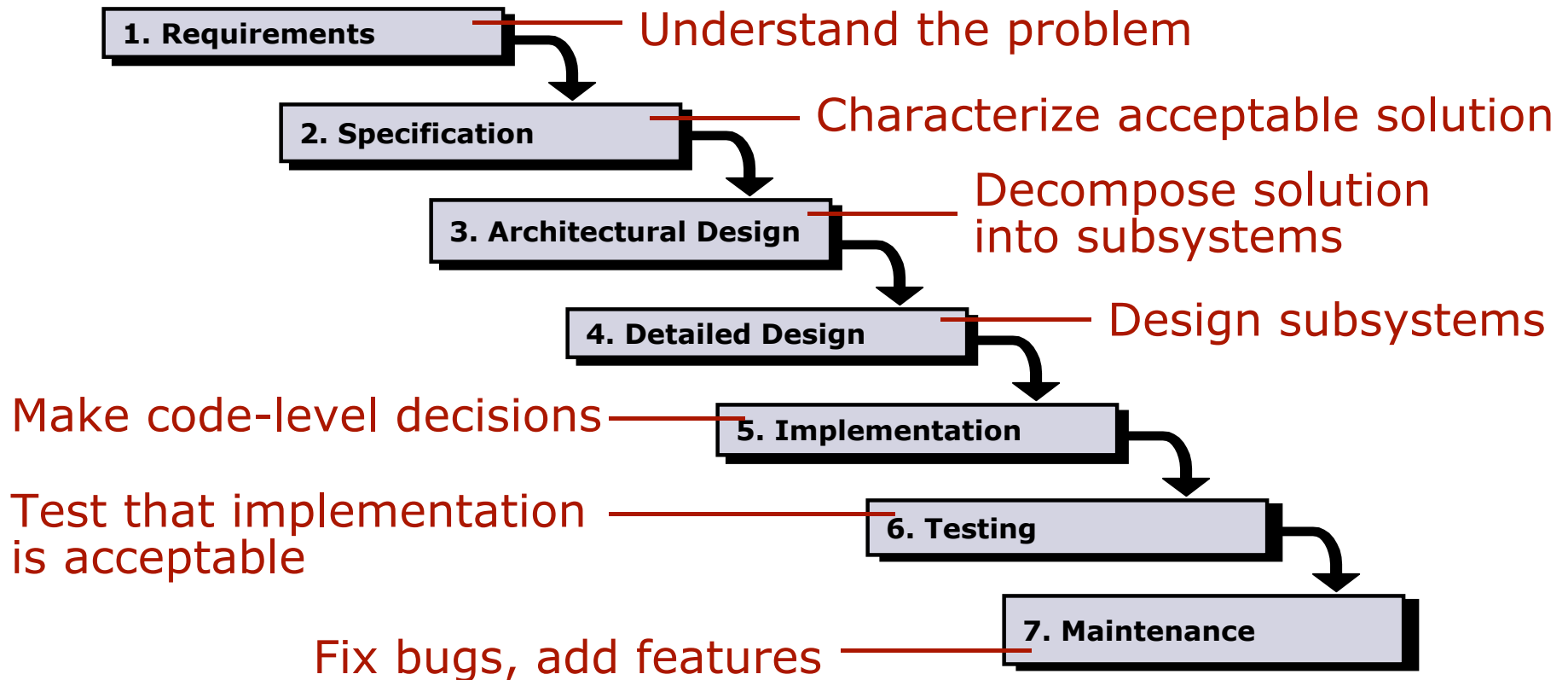
# 1. Waterfall Model

---



# Waterfall Model

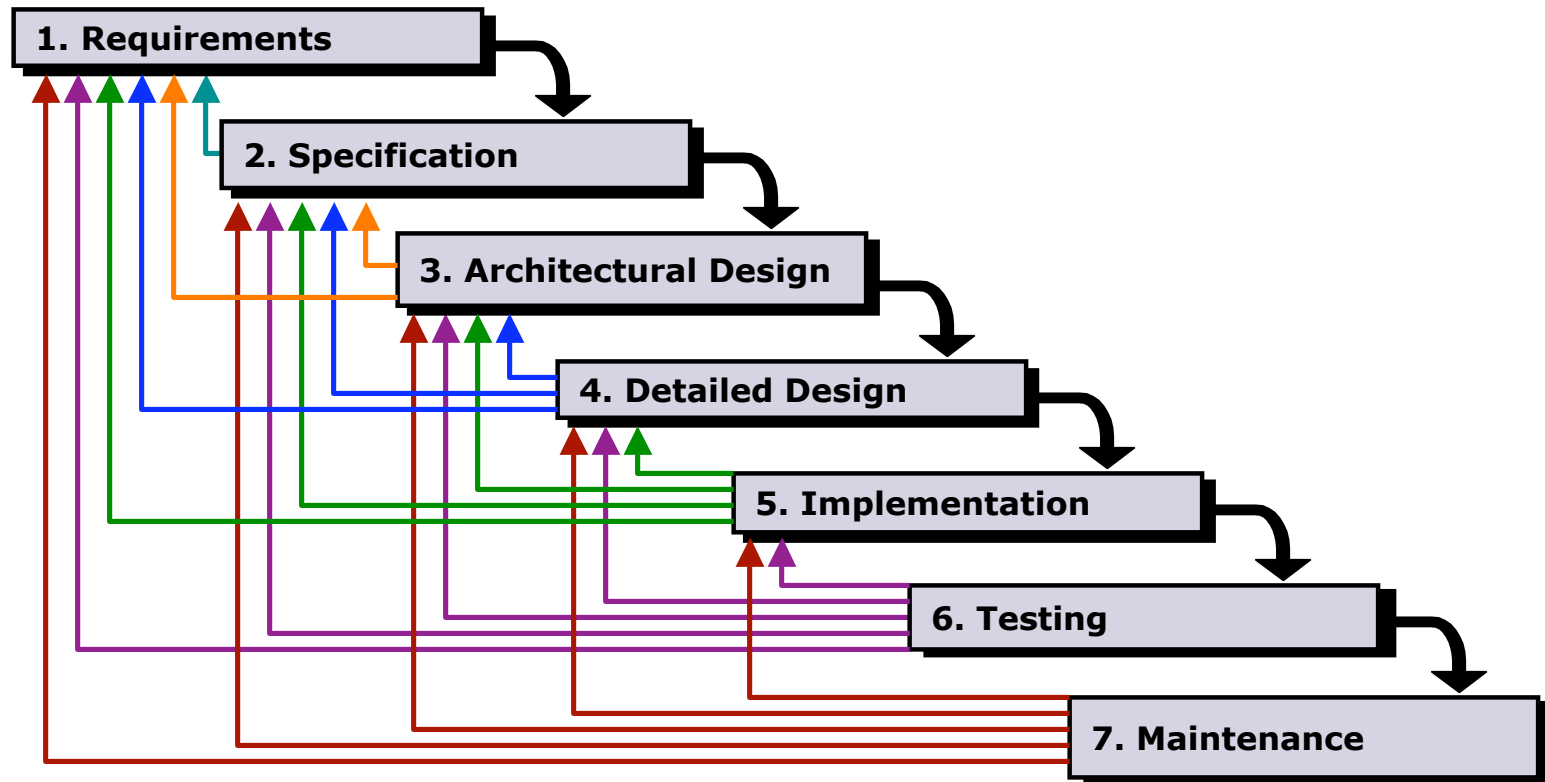
---



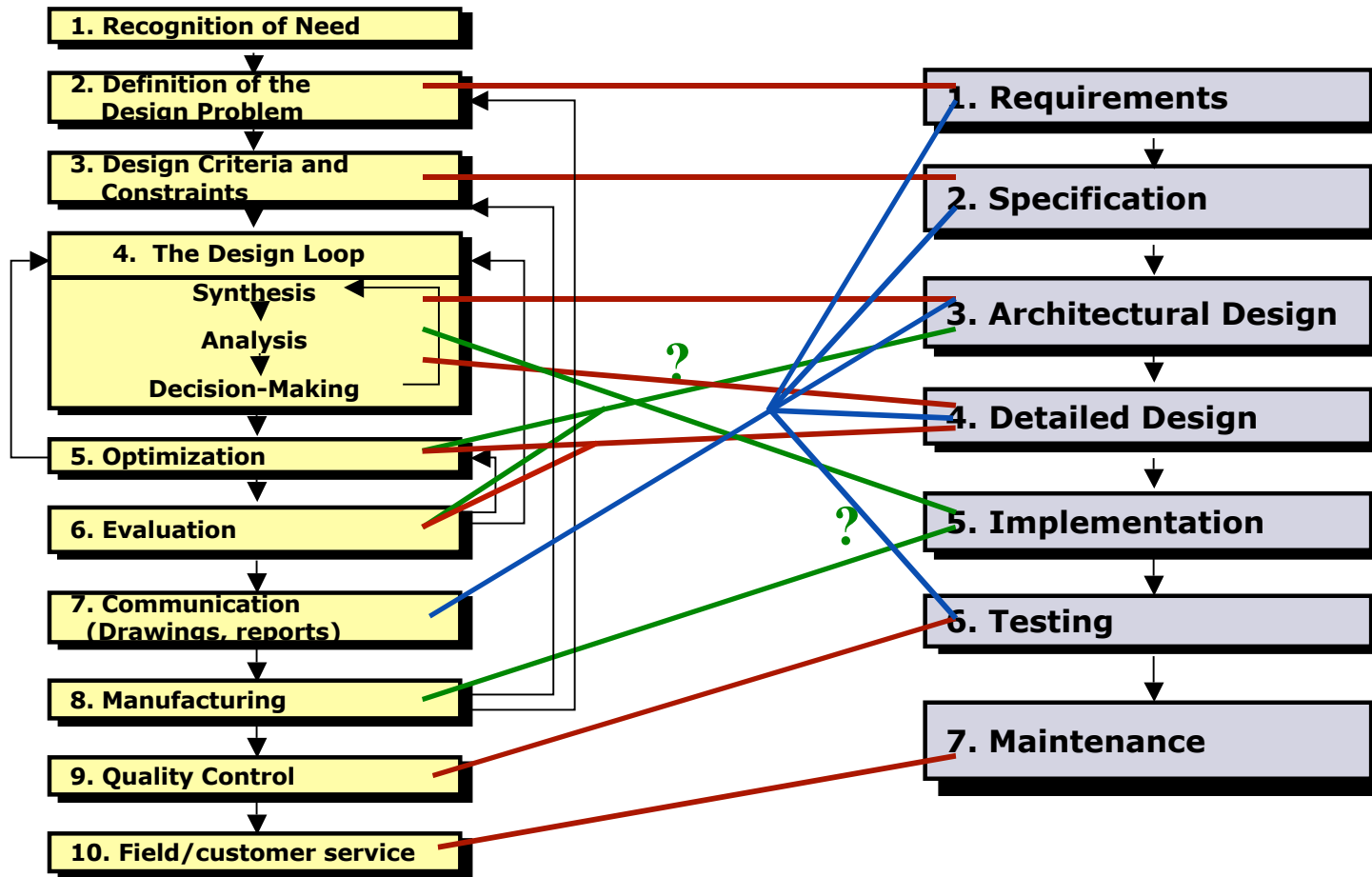


# Waterfall Model

---

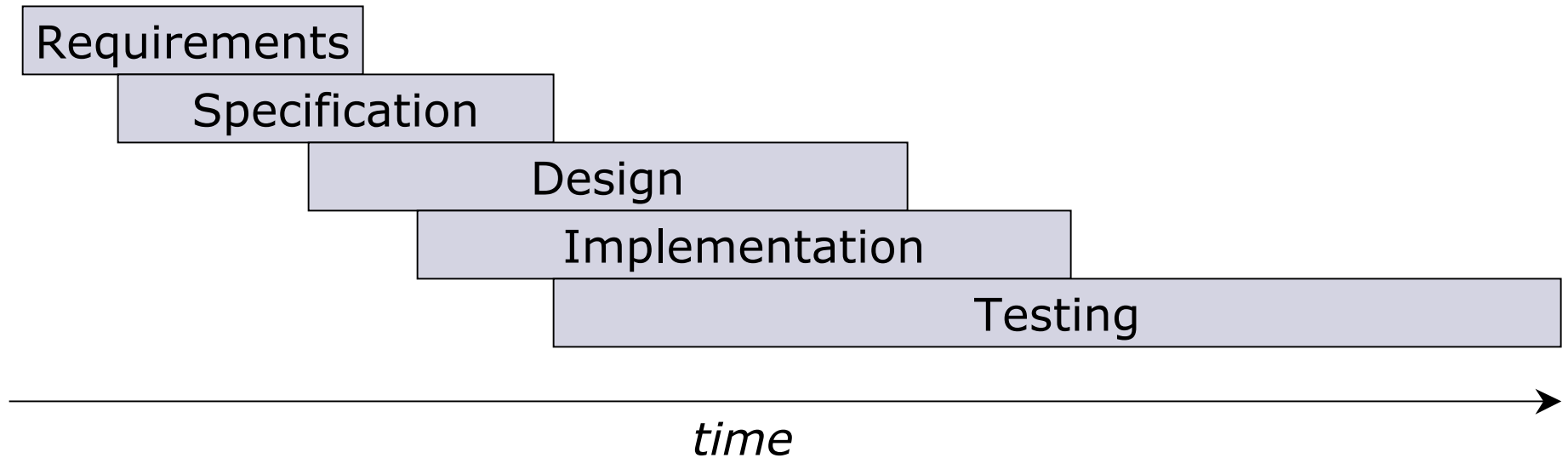


# Eng. Process vs. SE Process



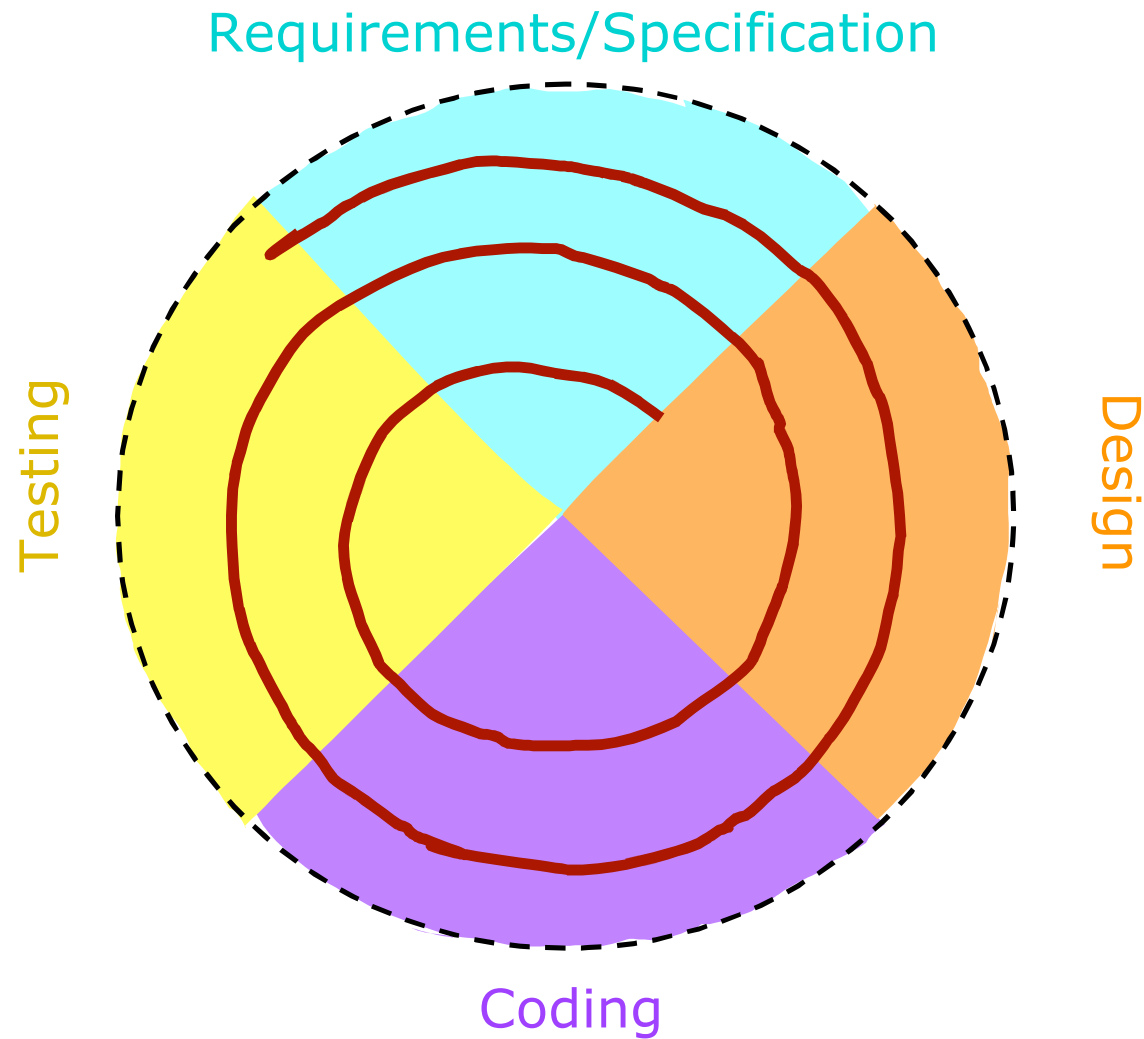
## 2. Concurrent Engineering

---



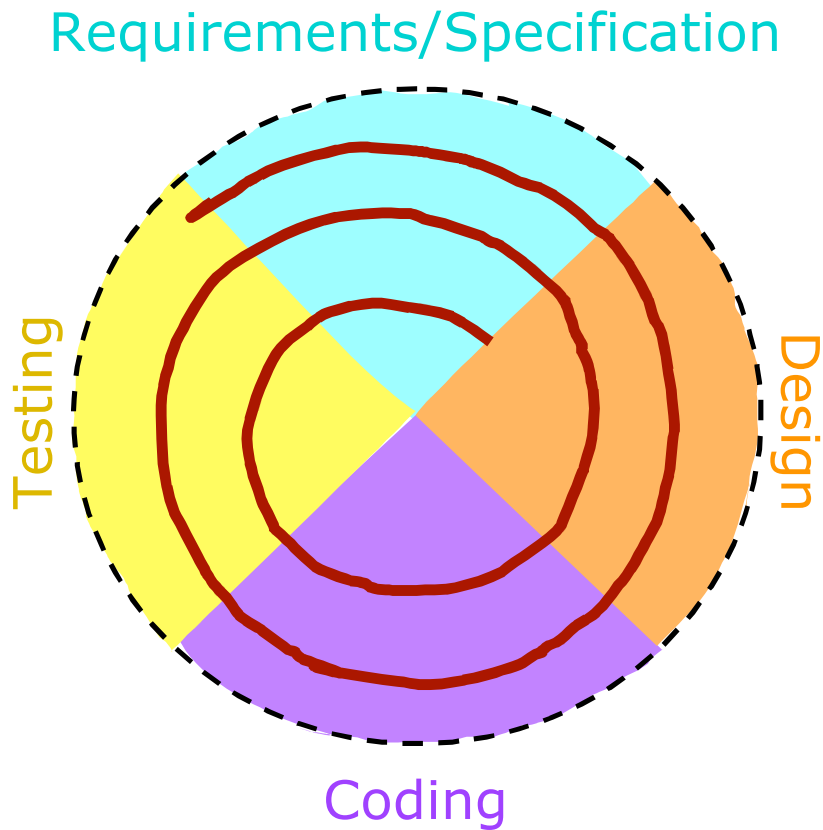
# 3. Spiral Model

---

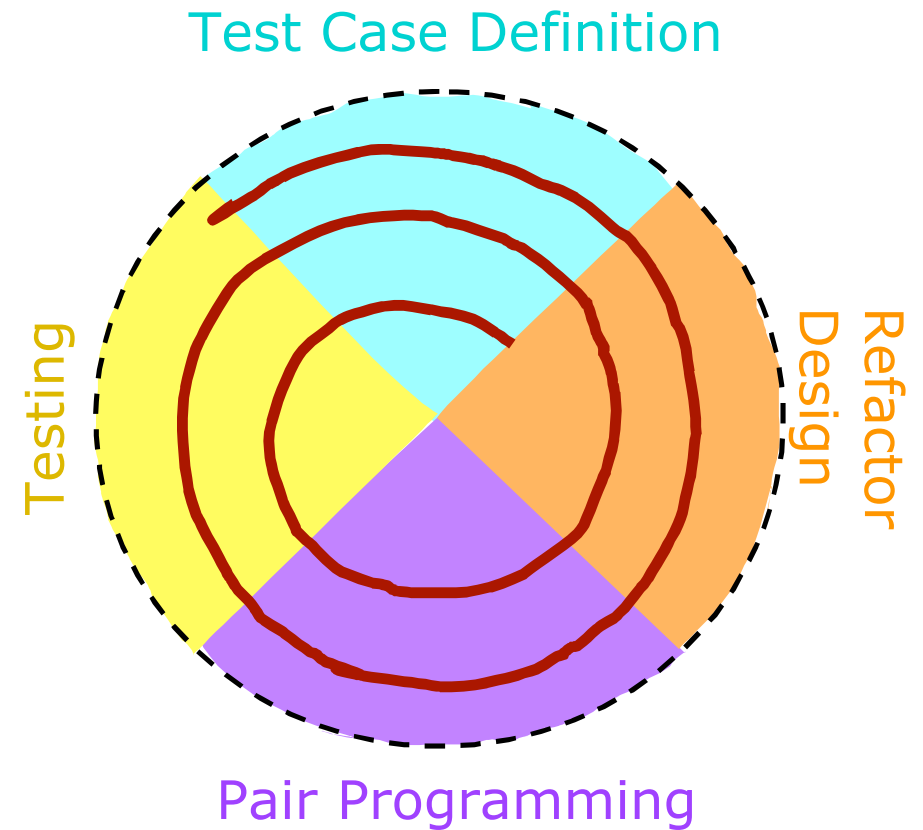


# 4. Agile Methods

## 3. Spiral Model

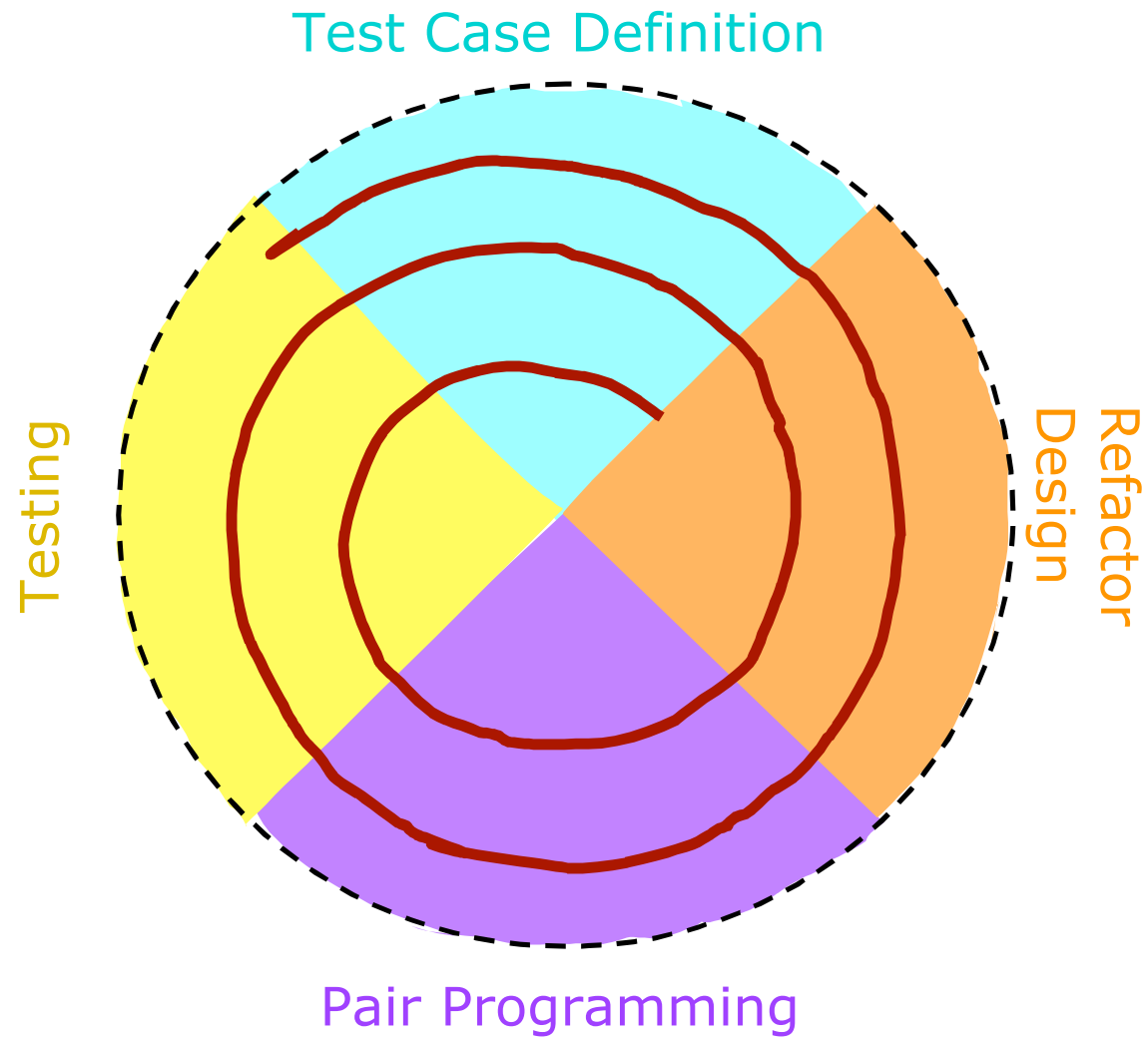


## 4. Agile methods (e.g., Extreme Programming)



# 4. Agile Methods (Extreme Programming)

---



# Brief Comparisons

Attributes	Agile Methods	Plan-driven Methods
Primary Objective		
Project Size		
Developers		
Project Requirements		
Product Architecture		

Boehm, "Get Ready for Agile Methods, with Care", IEEE Computer, January 2002.

# Brief Comparisons

Attributes	Agile Methods	Plan-driven Methods
Primary Objective	Rapid development	High quality
Project Size		
Developers		
Project Requirements		
Product Architecture		

Boehm, "Get Ready for Agile Methods, with Care", IEEE Computer, January 2002.



# Brief Comparisons

Attributes	Agile Methods	Plan-driven Methods
Primary Objective	Rapid development	High quality
Project Size	Smaller teams and products	Larger teams and products
Developers		
Project Requirements		
Product Architecture		

Boehm, "Get Ready for Agile Methods, with Care", IEEE Computer, January 2002.

# Brief Comparisons

Attributes	Agile Methods	Plan-driven Methods
Primary Objective	Rapid development	High quality
Project Size	Smaller teams and products	Larger teams and products
Developers	Agile, knowledgeable, talented, collocated, collaborative	Plan-oriented, adequately skilled, have access to external knowledge
Project Requirements		
Product Architecture		

Boehm, "Get Ready for Agile Methods, with Care", IEEE Computer, January 2002.

# Brief Comparisons

Attributes	Agile Methods	Plan-driven Methods
Primary Objective	Rapid development	High quality
Project Size	Smaller teams and products	Larger teams and products
Developers	Agile, knowledgeable, talented, collocated, collaborative	Plan-oriented, adequately skilled, have access to external knowledge
Project Requirements	Emergent, rapidly changing	Knowable early, largely stable
Product Architecture		

Boehm, "Get Ready for Agile Methods, with Care", IEEE Computer, January 2002.

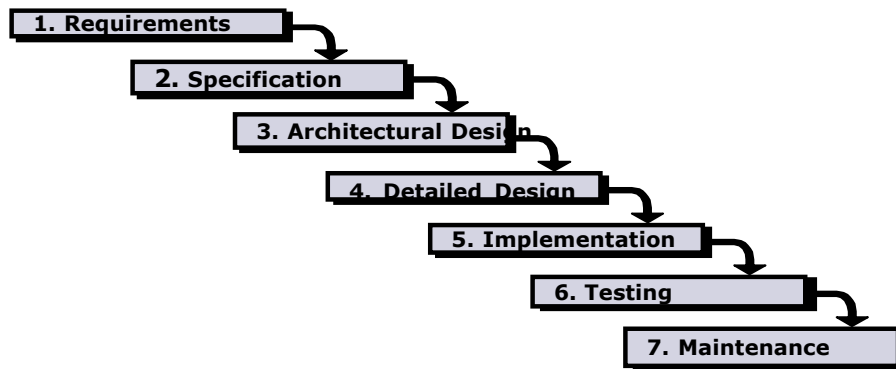
# Brief Comparisons

Attributes	Agile Methods	Plan-driven Methods
Primary Objective	Rapid development	High quality
Project Size	Smaller teams and products	Larger teams and products
Developers	Agile, knowledgeable, talented, collocated, collaborative	Plan-oriented, adequately skilled, have access to external knowledge
Project Requirements	Emergent, rapidly changing	Knowable early, largely stable
Product Architecture	Designed for current requirements	Designed for current and foreseeable requirements

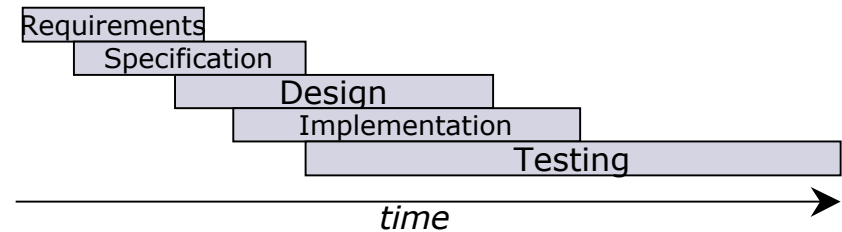
Boehm, "Get Ready for Agile Methods, with Care", IEEE Computer, January 2002.

# Summary

## 1. Waterfall Model

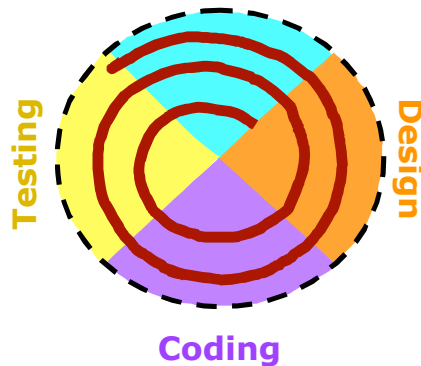


## 2: Concurrent Engineering



## 3: Spiral Model

Requirements/Specification



## 4: Agile Methods

Test Case Definition



# Announcements

---

- (Optional) draft design report due **Thursday 4:30p.m.**
- No web review next week.