Software Project Management

Chapter13 Software Process Management

Software Process Management

What is Software Process?

It refers to a set of acts, methods, technology and transformation process that is applied to develop and maintain software and related products (such as project plans, design documents, code, test cases and user manuals)

Software process can not be simply interpreted as software product development process.

Software Process Management

Best Practices

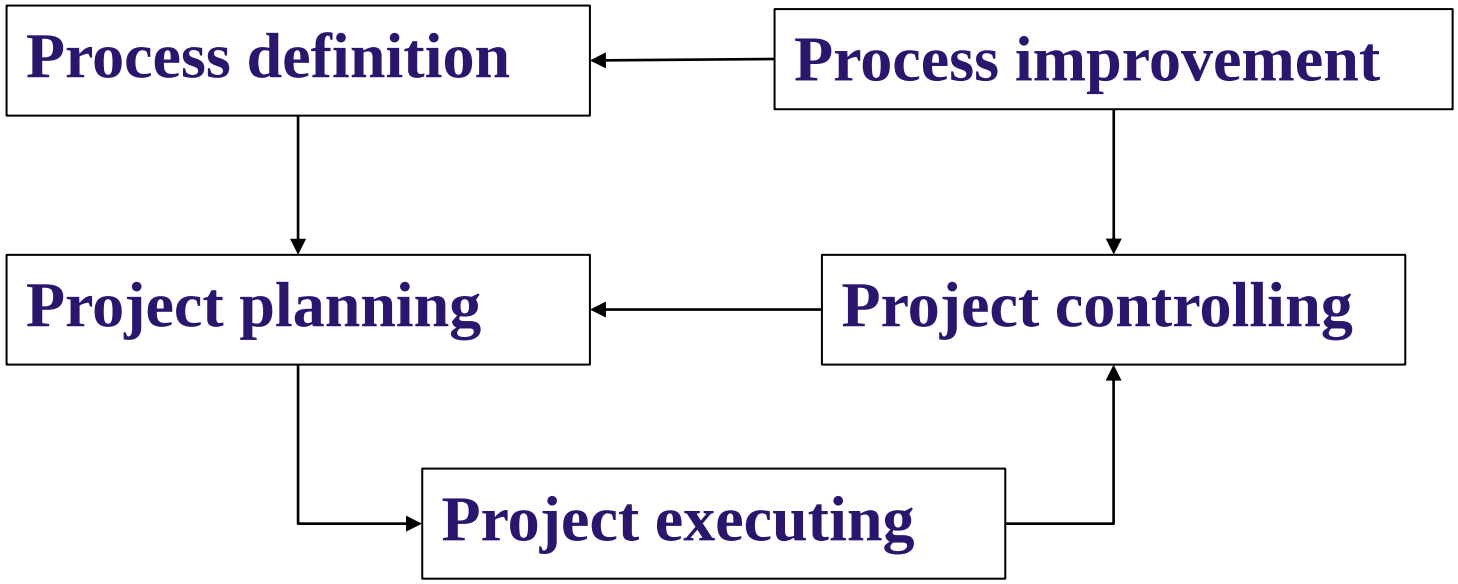
From a large number of projects in practice summed up the effective process known as the Best Practices.

Software process management is the effective accumulation of the best practices, to form the repeatable software process, so that the best practices in the organization can be shared.

Software Process Management

The relationship between software process management and software project management

Mutual dependence and mutual promotion



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- There are some fundamental activities that are common to all software processes:
  - Software specification. In this activity the functionality of the software and constraints on its operation must be defined.
  - Software design and implementation. The software that meets the specification is produced.
  - Software validation. The software must be validated to ensure that it has all the functionalities what the customer needs.
  - Software evolution. The software must evolve to meet changing customer needs.

Software Process Management

Software Process Model

An abstract representation of a software process. Each process model represents a process from a particular perspective, and thus provides only partial information about that process.

Software Development Life Cycle models

Software Process Management

- **Software Development Life Cycle models:**
  1. **Predictive Life Cycles**
     - Waterfall model
     - V model
  2. **Incremental Life Cycles**
  3. **Iterative Life Cycles**
  4. **Adaptive Life Cycles**
     - Agile model

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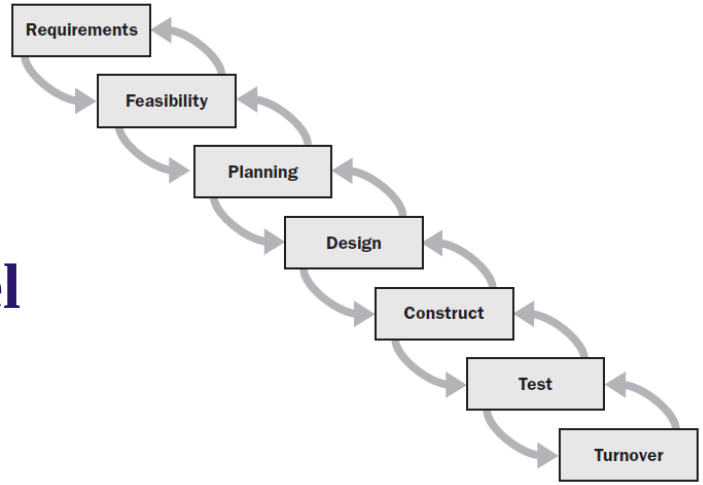
- **Predictive Life Cycles:**
  - Project proceed through a series of sequential or overlapping phases, with each phase generally focusing on a subset of project activities and project management processes.
  - The work performed in each phase is usually different in nature to that in the preceding and subsequent phases, therefore, the makeup and skills required of the project team may vary from phase to phase.



Waterfall model
V model

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Waterfall model

The first published model of the software development process (1970, Winston Royce)

What is Waterfall?

Define Requirements ⇐ Phase

Design/Develop Solution ⇐ Phase

Test/Implement Solution ⇐ Phase

⇑ Implement change control

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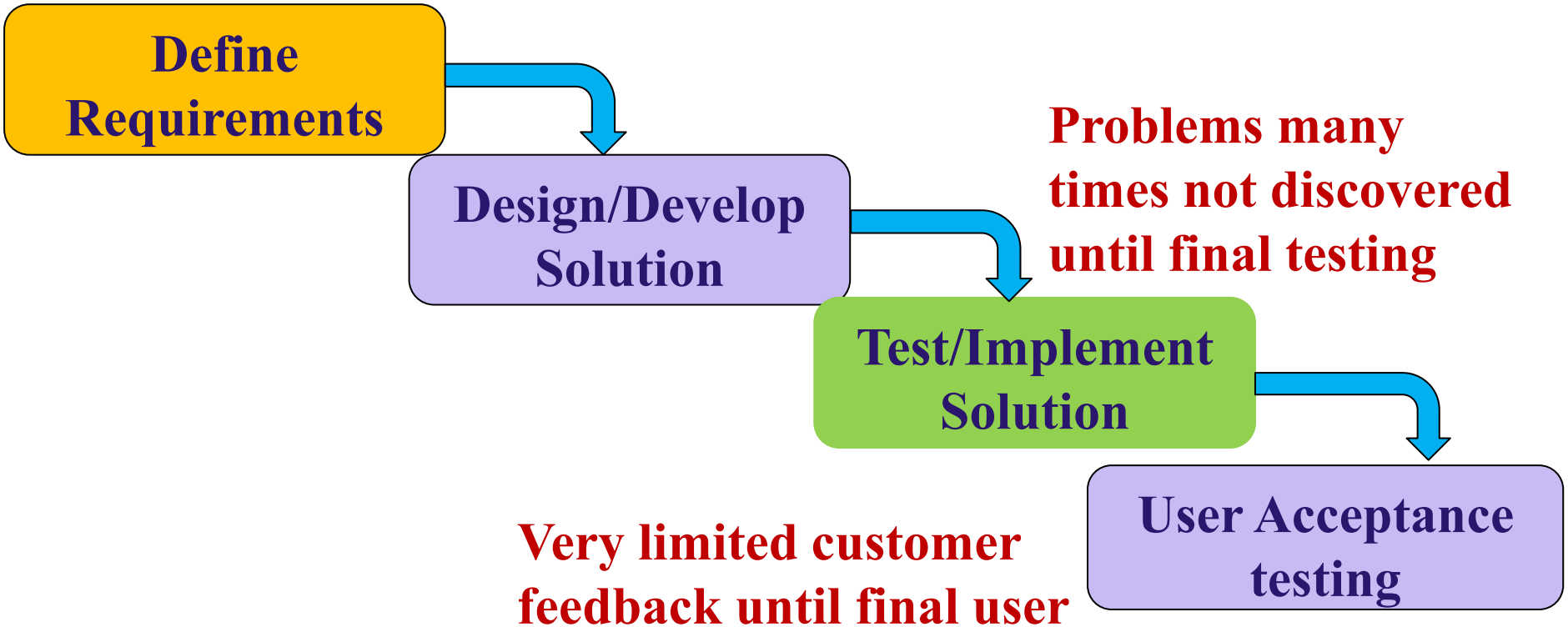
Problems of Waterfall model



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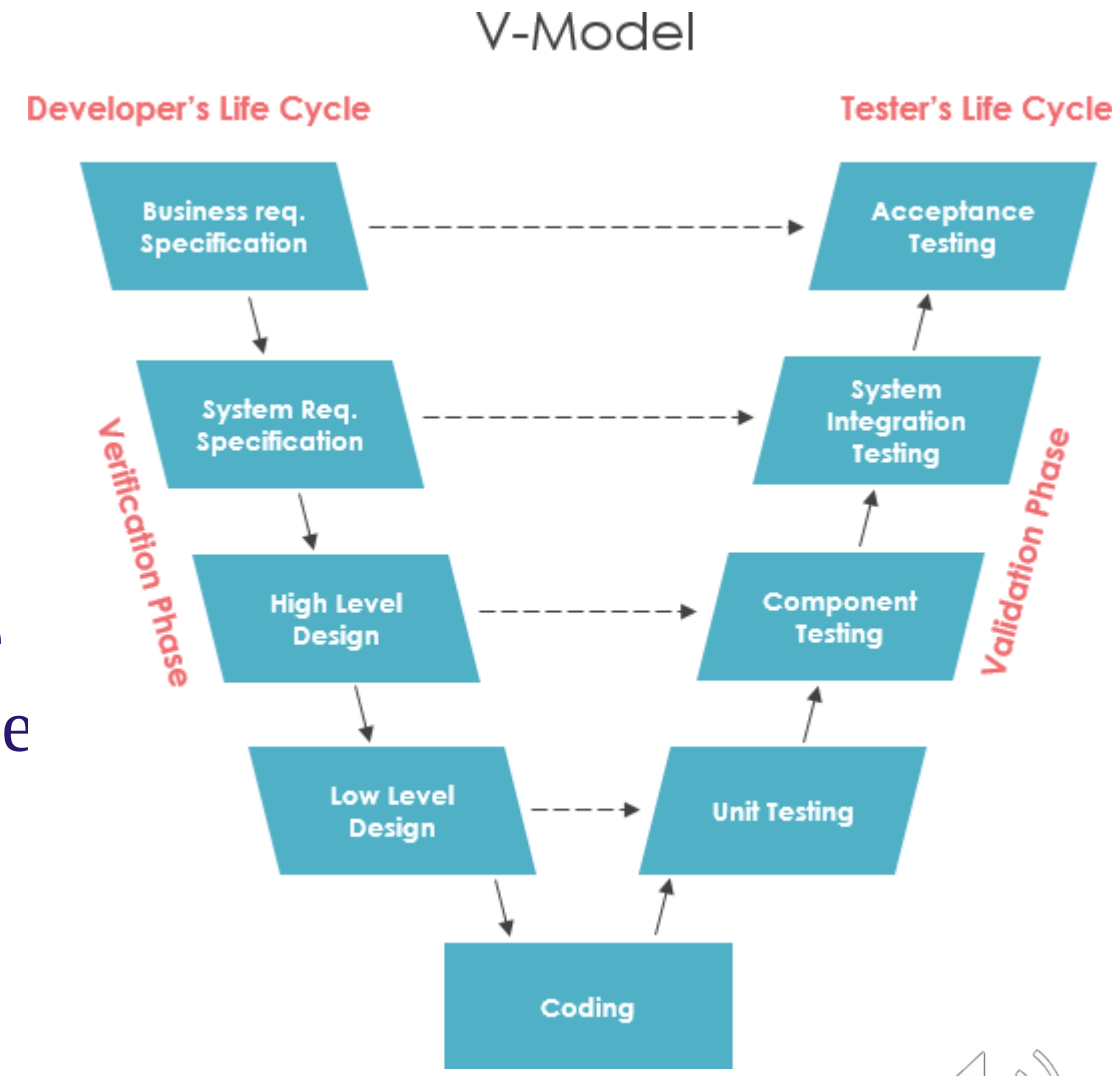
V-Model

- is an extension of the waterfall model.
- demonstrates the relationships between each phase of the development life cycle and its associated phase of testing.



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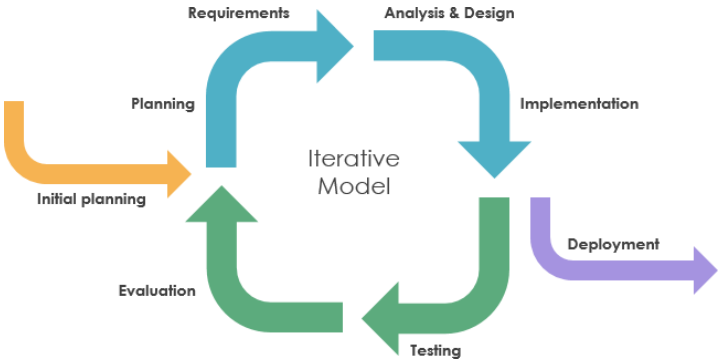
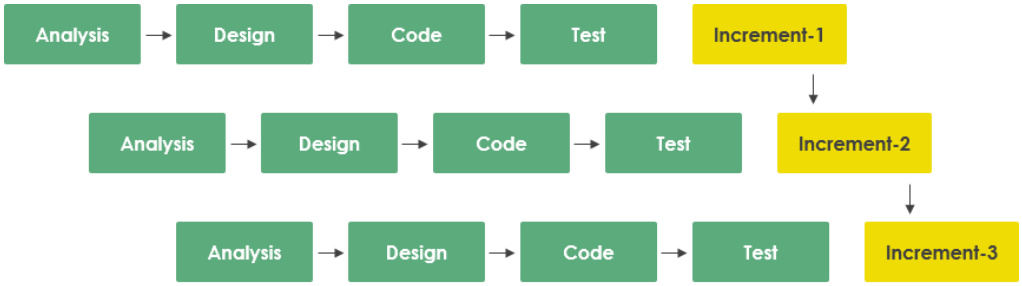
- **Iterative Life Cycles:**
- **Incremental Life Cycles:**
  - Iterations develop the product through a series of repeated cycles, while increments successively add to the functionality of the product.



It first focuses on an initial, simplified set user features, which then progressively gains more complexity and a broader set of features until the targeted system is complete.



Incremental Model

This model combines the elements of the waterfall model with the iterative philosophy of prototyping.

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- **Adaptive Life Cycles:**
  - Adaptive life cycles are intended to respond to high levels of change and ongoing stakeholder involvement.
  - Adaptive methods are also iterative and incremental, but differ in that iterations are very rapid (usually with a duration of 2 to 4 weeks) and are fixed in time and cost.
  - Adaptive methods are generally preferred when dealing with a rapidly changing environment, when requirements and scope are difficult to define in advance, and when it is possible to define small incremental improvements that will deliver value to stakeholders.

Agile model

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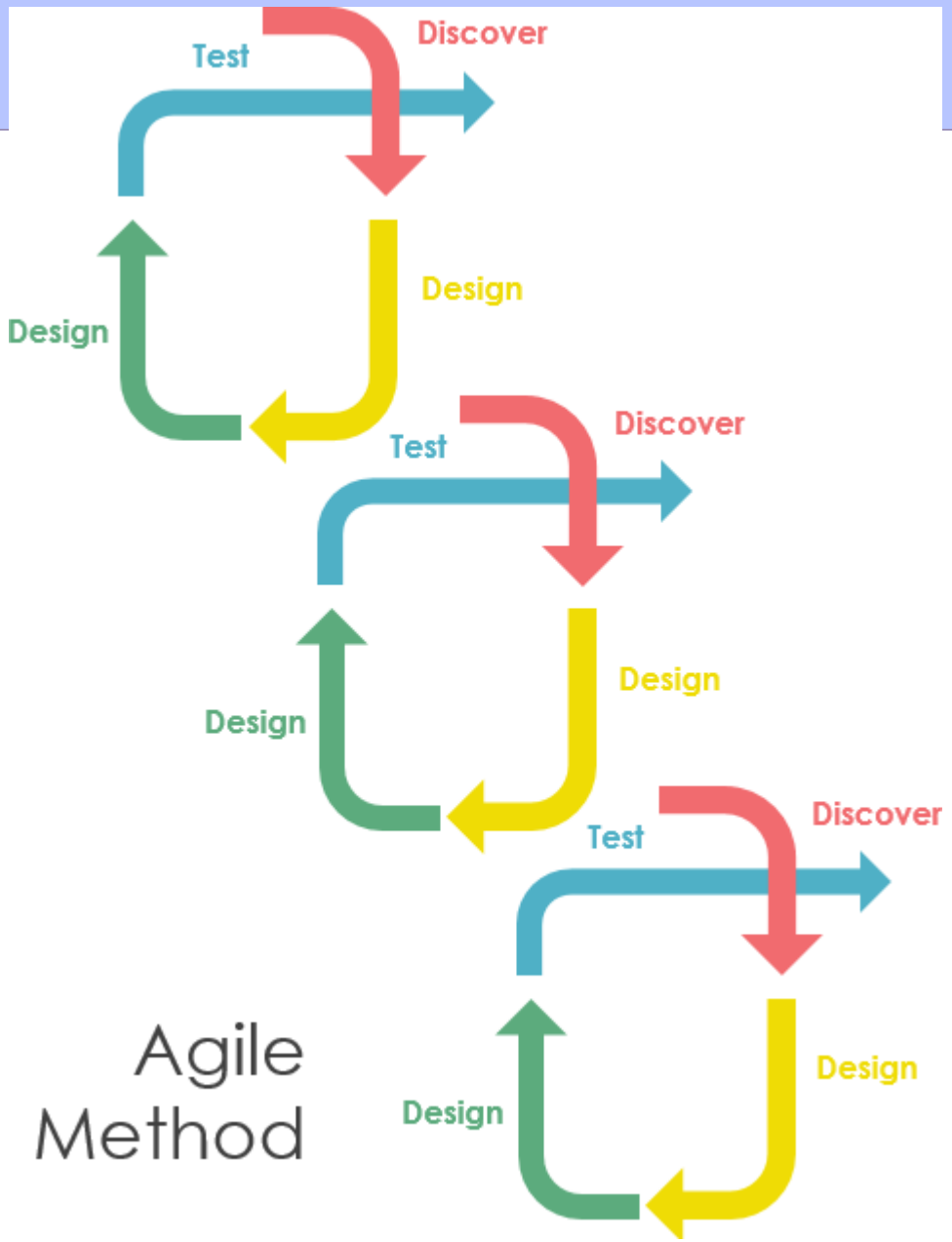
Agile model

What is Agile?

Agile is a new approach to project management.
1990's

It provides a more flexible and adaptive approach to project management



That provides an opportunity for quick and frequent feedback to keep the project on the right track and to maximize the business value that is delivered

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Agile model

Individuals and Interactions	Over	Processes and Tools
Working Software	Over	Comprehensive Documentation
Customer Collaboration	Over	Contract Negotiation
Responding to Change	Over	Following a Plan

CMMI

Capability Maturity Model Integration, CMMI

Developed by Capability Maturity Model, describing the way to improve the software process from disorder and immature to mature and orderly software process.

It was first applied to a process improvement model of the software industry.

Currently, CMMI has gradually evolved into a comprehensive process improvement model

CMMI

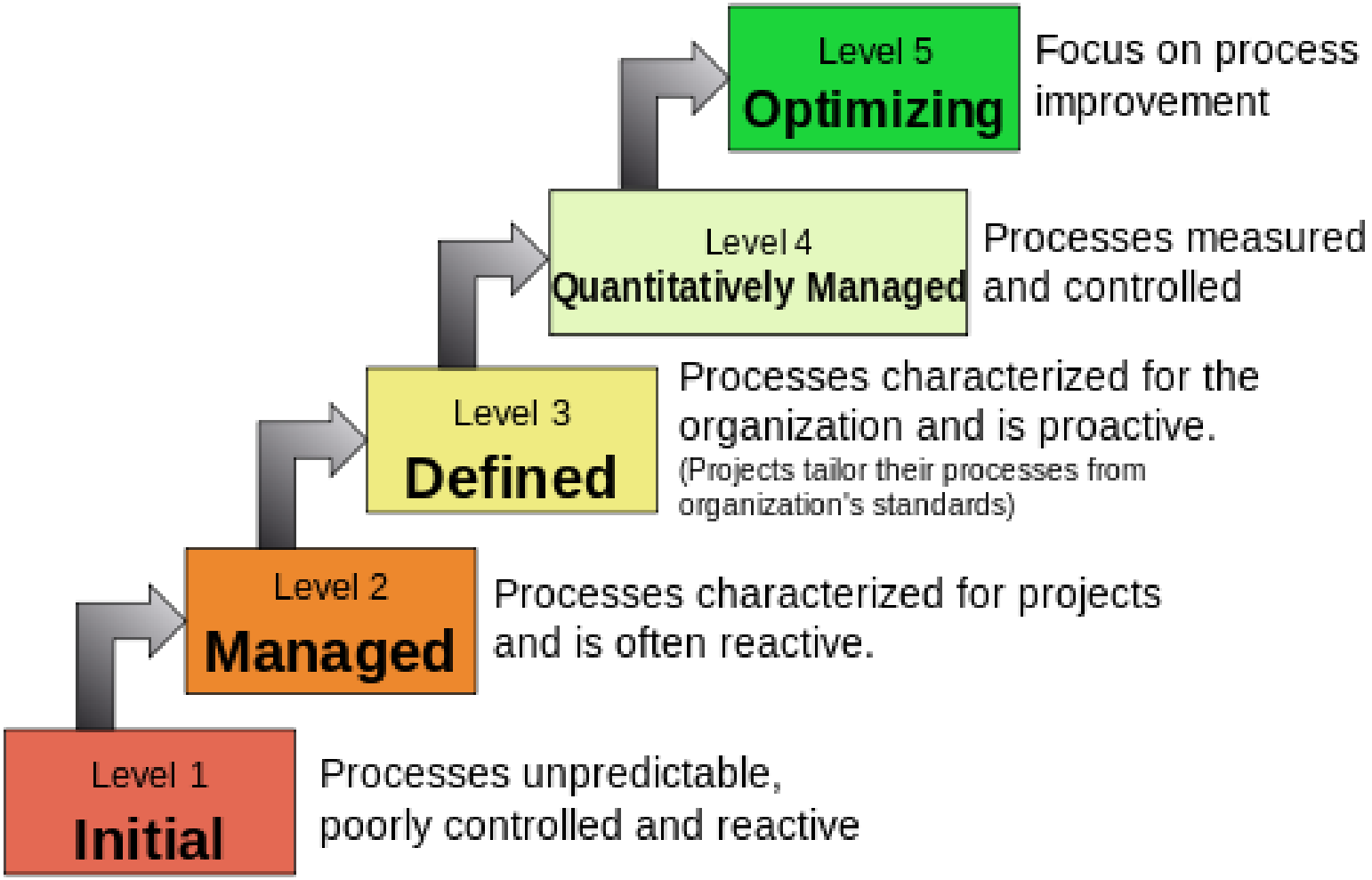
Software process maturity

Refers to the degree that a specific software process is defined, managed, measured, controlled, and implemented efficiently and effectively.

Five maturity levels

CMMI

Characteristics of the Maturity levels



Chapter 13 Summary

A Understand the concept of software process management and process models

B Understanding the Five levels of CMMI