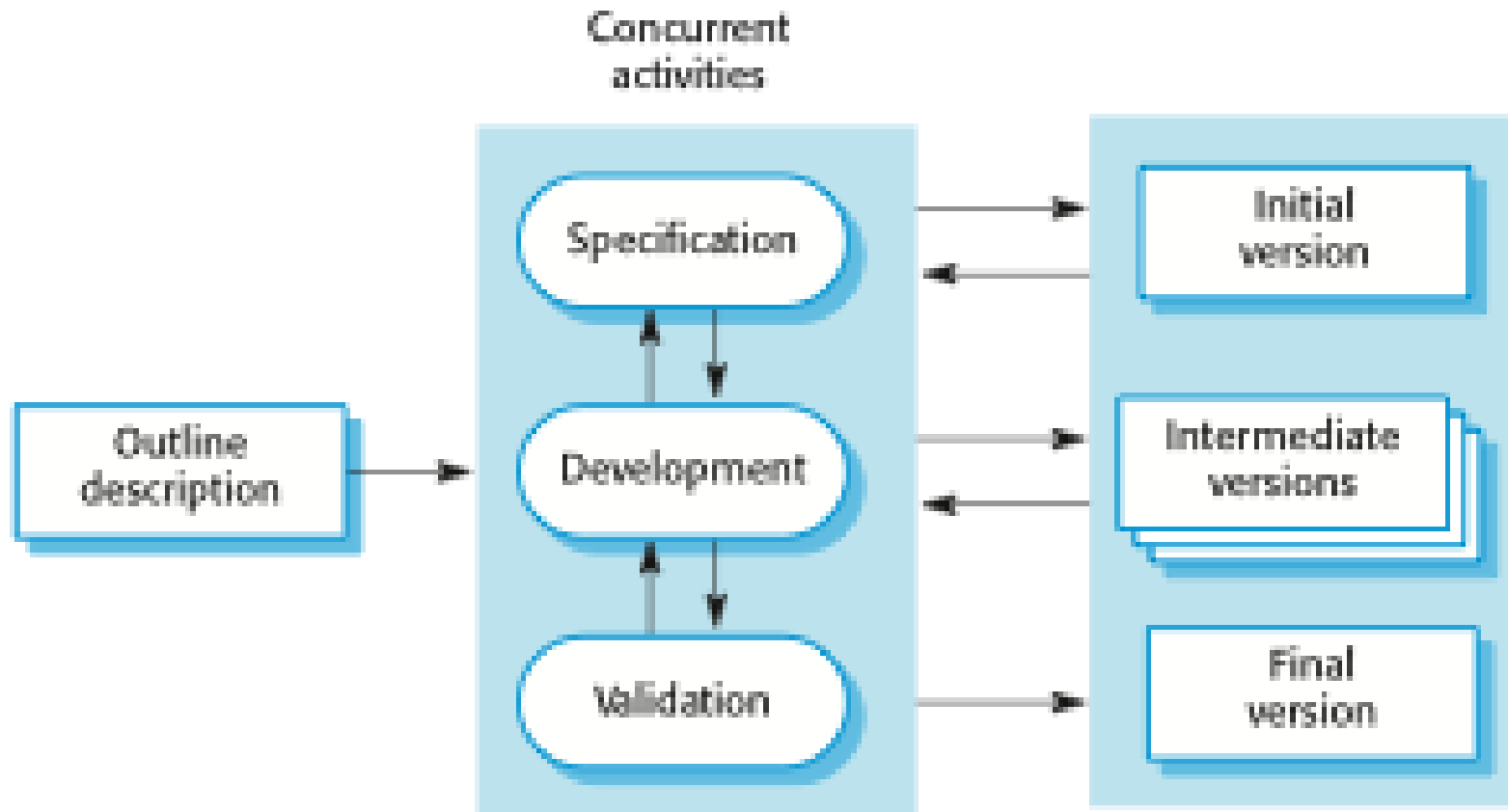


Software Engineering

Prof Ravi Prakash Gorthi

Incremental / Agile development model



Incremental / Agile development benefits

- ✧ The cost of accommodating changing customer requirements is reduced.
 - The amount of analysis and documentation that has to be redone is much less than what is required with the waterfall model.
- ✧ It is easier to get customer feedback on the development work that has been done.
 - Customers can comment on demonstrations of the software and see how much has been implemented.
- ✧ More rapid delivery and deployment of useful software to the customer is possible.
 - Customers are able to use and gain value from the software earlier than is possible with a waterfall process.

Incremental / Agile development problems

✧ The process is not visible.

- Managers need regular deliverables to measure progress. If systems are developed quickly, it is not cost-effective to produce documents that reflect every version of the system.

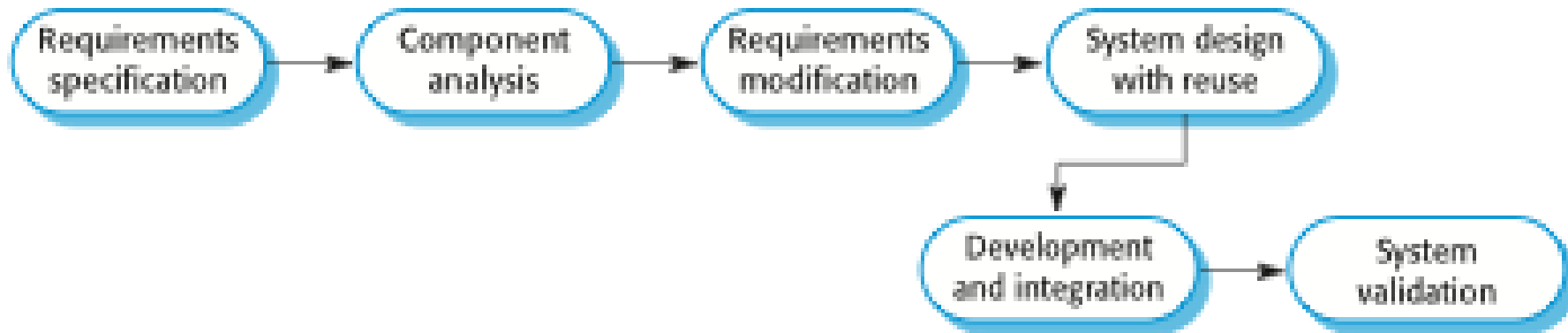
✧ System structure tends to degrade as new increments are added.

- Unless time and money is spent on refactoring to improve the software, regular change tends to corrupt its structure. Incorporating further software changes becomes increasingly difficult and costly.

Component-based development model

- ✧ Based on systematic reuse where systems are integrated from existing components or COTS (Commercial-off-the-shelf) systems.
- ✧ Process stages
 - Component analysis;
 - Requirements modification;
 - System design with reuse;
 - Development and integration.
- ✧ Reuse is now becoming the standard approach for building many types of business system

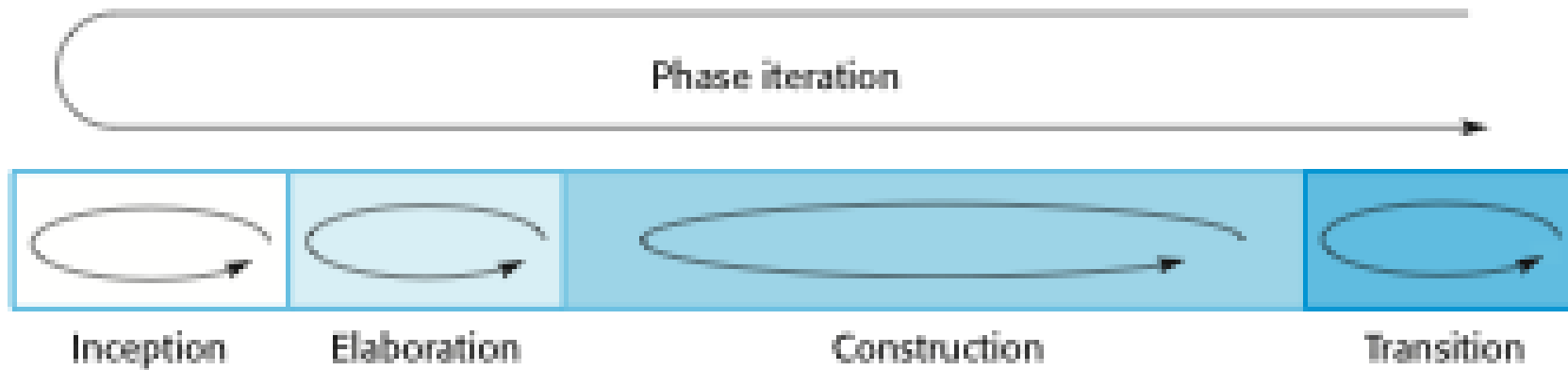
Component-based development model



The Rational Unified Process

- ❖ In 1995, [James Rumbaugh](#) joined the company, Rational Software, and then it acquired [Ivar Jacobson](#)'s firm [Objectory AB](#) from [Ericsson](#).
- ❖ With [Grady Booch](#) already aboard, this brought within one company three of the leading object-oriented software methodologists.
- ❖ These three experts attempted to unify their work. They developed [Unified Modeling Language](#) (UML), which provided a level playing field for all tool vendors. It was this collaboration effort that earned Rumbaugh, Jacobson and Booch the moniker "The Three Amigos" within the software engineering industry. At its 1.0 release, the Unified Modeling Language was contributed to the [Object Management Group](#), which has managed its subsequent development.
- ❖ Rational Software developed CASE tools under the brand 'Rational Software Engineering tools.
- ❖ In Feb, 2003, IBM acquired Rational Software and its suite of Rational tools.

Phases in the Rational Unified Process



RUP phases

✧ Inception

- Establish the business case for the system.

✧ Elaboration

- Develop an understanding of the problem domain and the system architecture.

✧ Construction

- System design, programming and testing.

✧ Transition

- Deploy the system in its operating environment.

RUP iteration

✧ In-phase iteration

- Each phase is iterative with results developed incrementally.

✧ Cross-phase iteration

- As shown by the loop in the RUP model, the whole set of phases may be enacted incrementally.

RUP good practice

✧ Develop software iteratively

- Plan increments based on customer priorities and deliver highest priority increments first.

✧ Manage requirements

- Explicitly document customer requirements and keep track of changes to these requirements.

✧ Use component-based architectures

- Organize the system architecture as a set of reusable components.

RUP good practice

✧ Visually model software

- Use graphical UML models to present static and dynamic views of the software.

✧ Verify software quality

- Ensure that the software meet's organizational quality standards.

✧ Control changes to software

- Manage software changes using a change management system and configuration management tools.