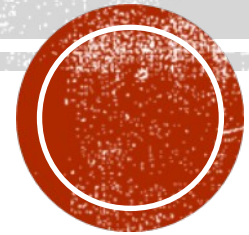# Software Quality Assurance

Content…

- ✓ *Quality, quality concepts*
- ✓ Software Quality Assurance
- ✓ Software Reviews
- ✓ Formal Technical Reviews
- ✓ SQA Group Plan
- ✓ ISO 9000, 9001
- ✓ Example
- ✓ Internal and external attributes

What is the Quality?

✓ *Quality* refers to any measurable characteristics such as correctness, maintainability, portability, testability, usability, reliability, efficiency, integrity, reusability and interoperability.

✓ Quality, simplistically, means that a product should meet its specification.

Concepts of the Quality

- ✓ Quality assurance
  - ▪ Establish organisational procedures and standards for quality
- ✓ Quality planning
  - ▪ Select applicable procedures and standards for a particular project and modify these as required
- ✓ Quality control
  - ▪ Ensure that procedures and standards (are followed by the software development team)
- ✓ Cost of Quality
  - ▪ Includes all costs incurred in the pursuit of quality or in performing quality related activities such as appraisal costs, failure costs and external failure costs.

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Relative cost of correcting errors
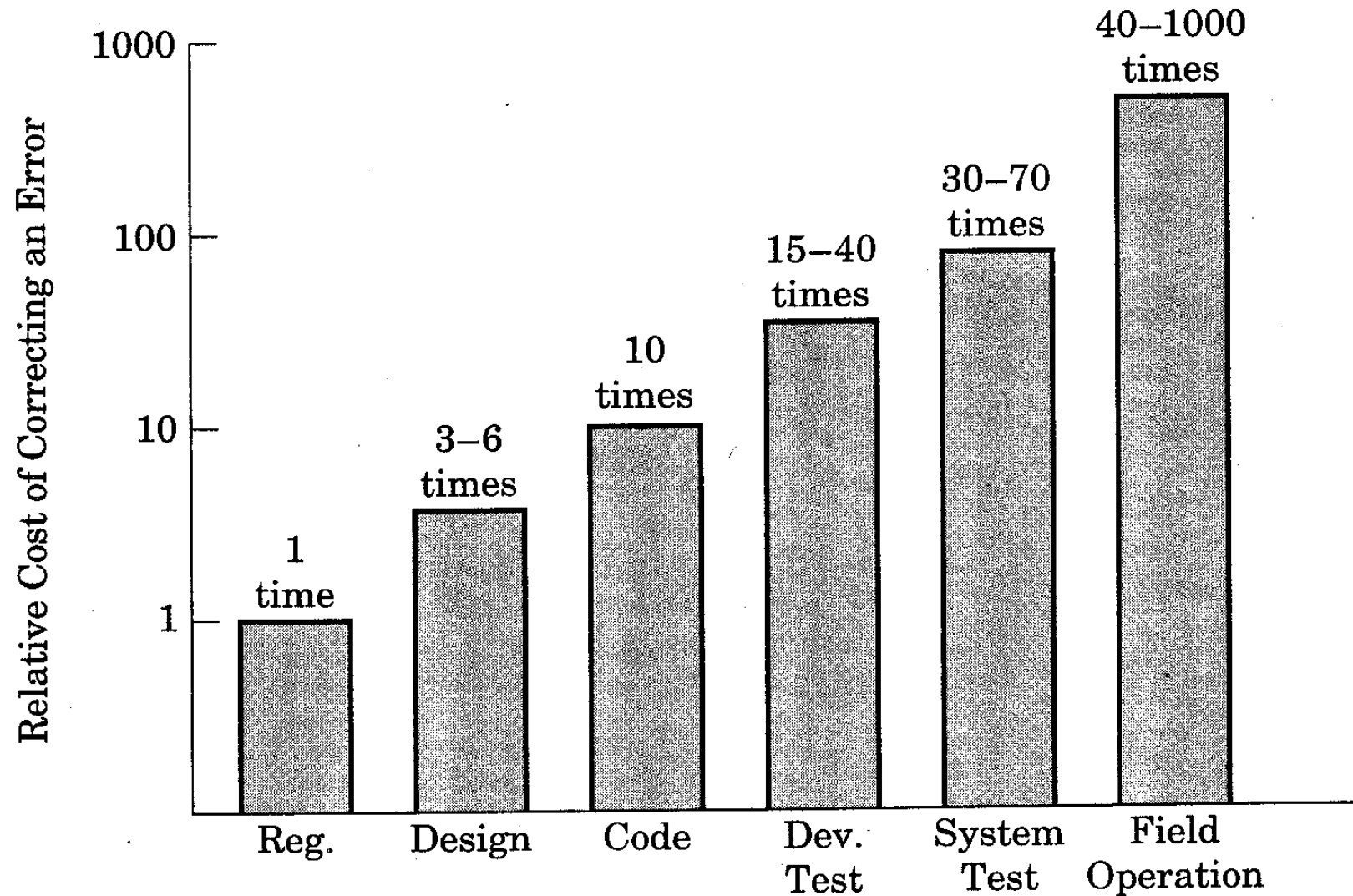
FIGURE 8.1.
Relative cost of correcting an error.

Software Quality Assurance

✓ IEEE Glossary: Degree to which a system, component,

or process meets

   (1) specified requirements

      (2) customer or user needs or expectations

✓ ISO: the totality of features and characteristics of a product

or service that bear on its ability to satisfy specified or implied needs
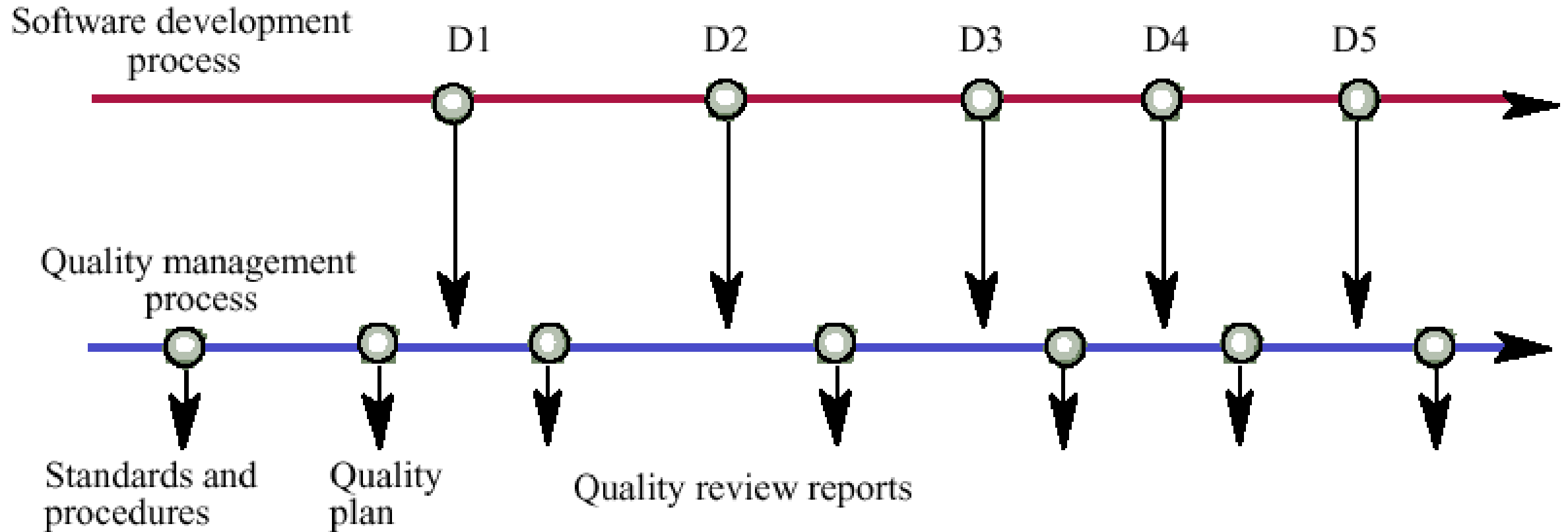
Software quality attributes

Safety	Understandability	Portability
Security	Testability	Usability
Reliability	Adaptability	Reusability
Resilience	Modularity	Efficiency
Robustness	Complexity	Learnability

Process-based quality
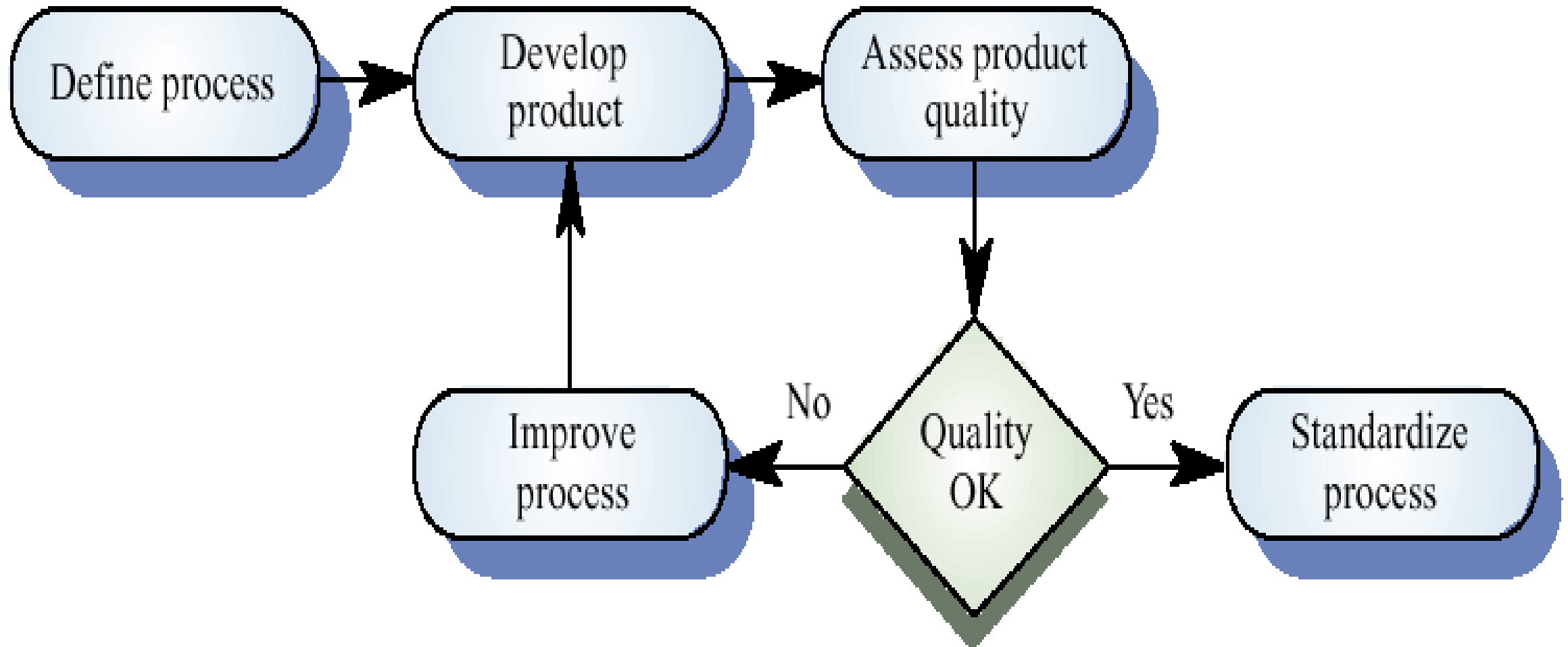
Quality management and software development

Formal Technical Reviews

✓ Purpose is to find defects before they are passed on to another software engineering activity or released to the customer.

✓ Software engineers (and others) conduct formal technical reviews (FTR) for software engineers.

✓ Using formal technical reviews (walkthroughs or inspections) is an effective means for improving software quality.
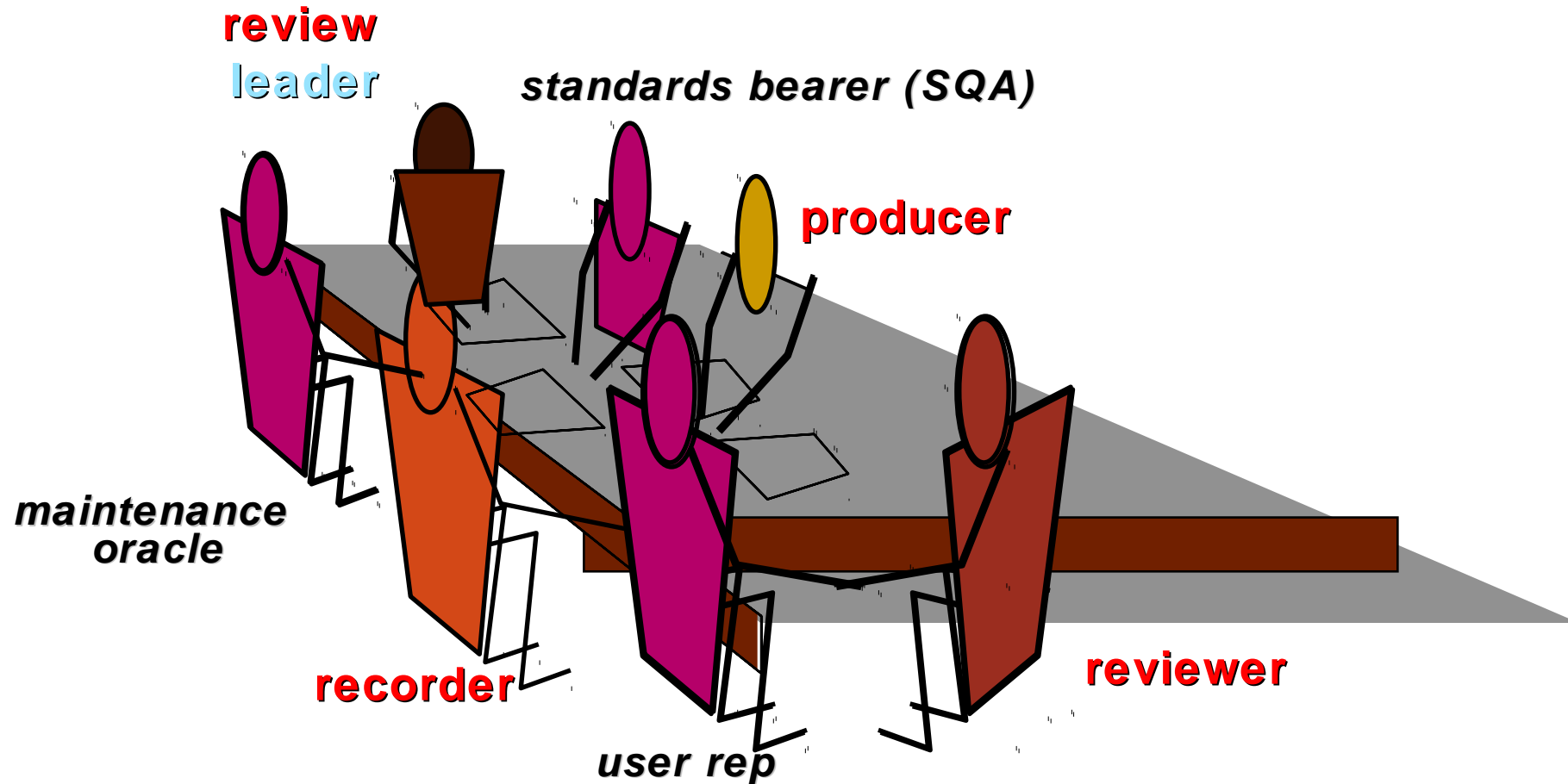
Software Reviews

- ✓ To uncover errors in function, logic or implementation for any representation of the software.
- ✓ To verify that software meets its requirements.
- ✓ To ensure that software representation meets predefined standards.
- ✓ To achieve software development in a uniform manner.
- ✓ To make projects more manageable.

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The review process
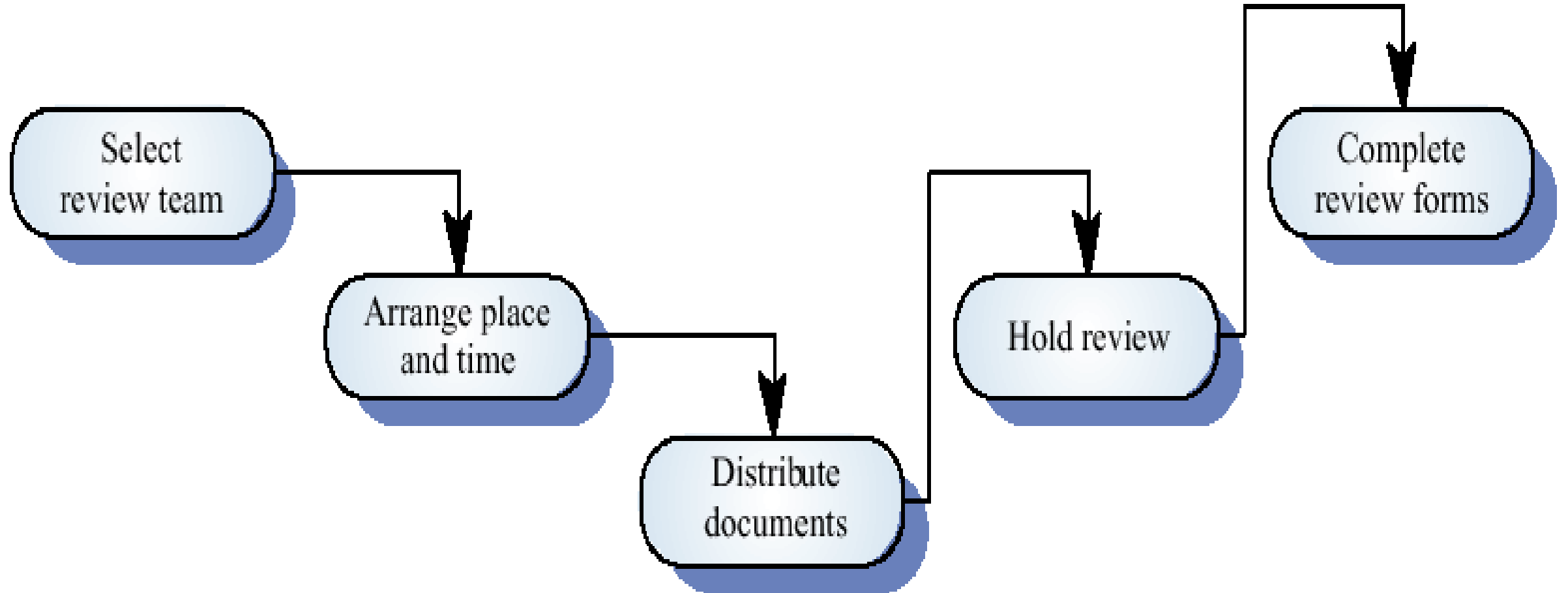
The players

SQA Group Plan

- ✓ Evaluations to be performed.
- ✓ Audits and reviews to be performed.
- ✓ Standards that are applicable to the project.
- ✓ Procedures for error reporting and tracking.
- ✓ Documents to be produced by the SQA group.
- ✓ Amount of feedback provided to software project team.

ISO 9000 certification

- ✓ International set of standards for quality management.
- ✓ Applicable to a range of organisations from manufacturing to service industries.

ISO 9000 and quality assurance

ISO 9001 certification

- ✓ ISO 9001 applicable to organisations which design, develop and maintain products.
- ✓ ISO 9001 is a generic model of the quality process Must be instantiated for each organisation.
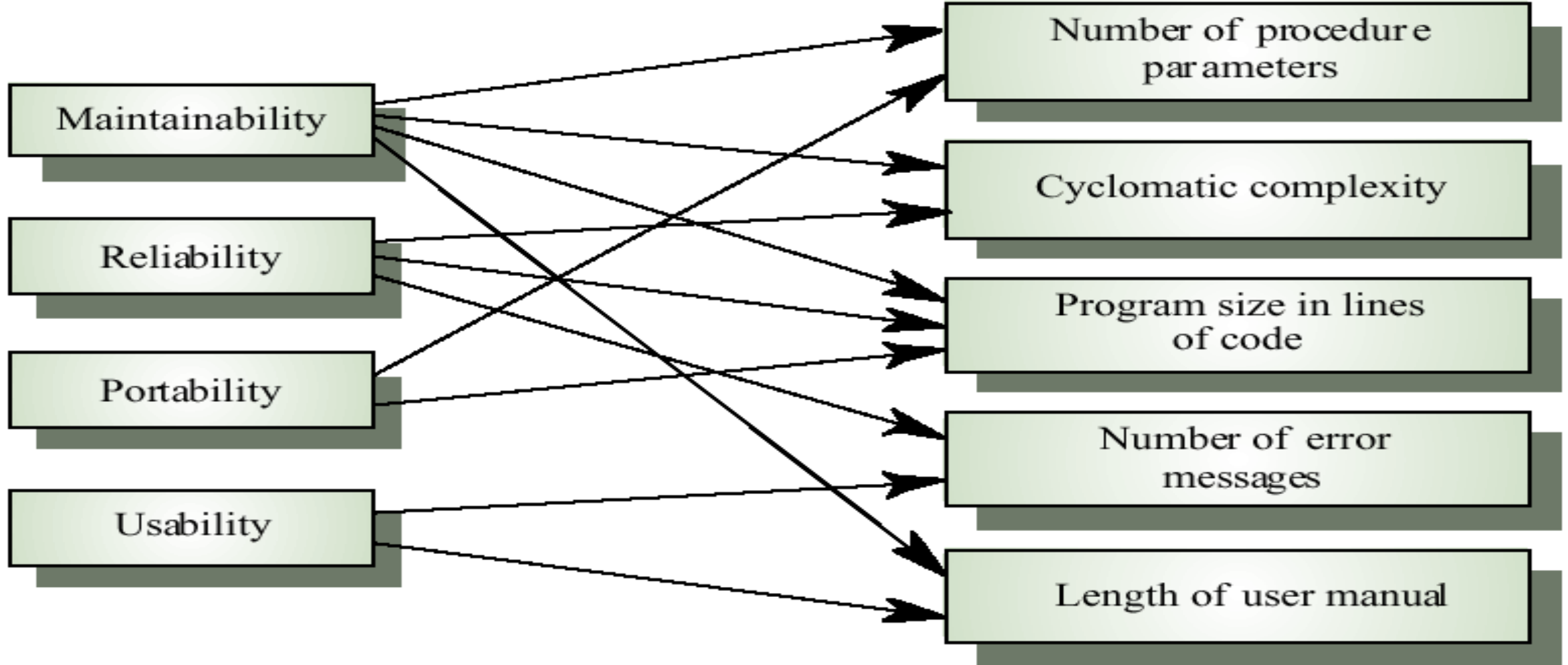
ISO 9001

Management responsibility	Quality system
Control of non-conforming products	Design control
Handling, storage, packaging and delivery	Purchasing
Purchaser-supplied products	Product identification and traceability
Process control	Inspection and testing
Inspection and test equipment	Inspection and test status
Contract review	Corrective action
Document control	Quality records
Internal quality audits	Training
Servicing	Statistical techniques

Product and process standards

Product standards	Process standards
Design review form	Design review conduct
Document naming standards	Submission of documents to CM
Procedure header format	Version release process
Ada programming style standard	Project plan approval process
Project plan format	Change control process
Change request form	Test recording process

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Internal and external attributes

Thank You.....