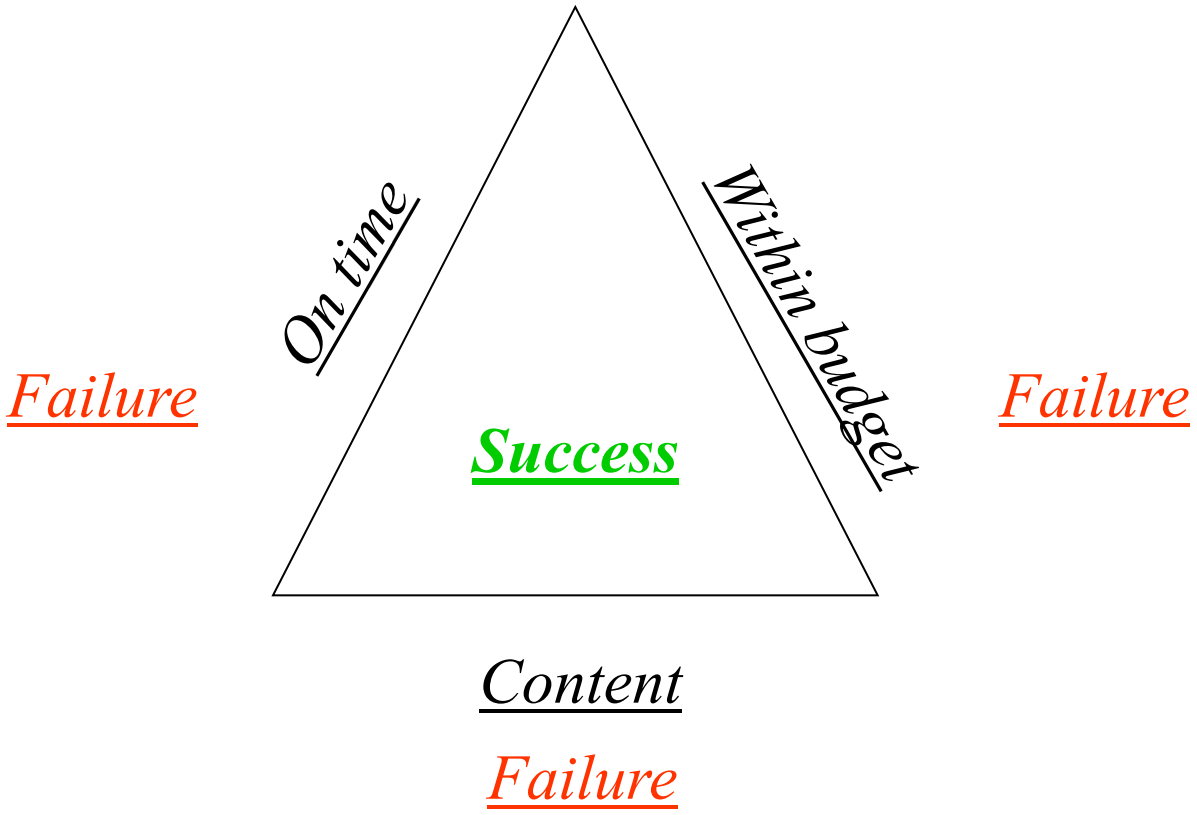
What is Quality Assurance ?

- Quality =
  - ...meeting the customer's requirements,
    - ...at the agreed cost,
      - ...within the agreed timescales.
- Quality = "Fitness for purpose"
- Quality = Customer satisfaction !

“Success” v “Failure”

Quality Assurance helps us avoid failure !



Quality Concepts

- **Quality control:** a series of inspections, reviews, tests
- **Quality assurance:** analysis, auditing and reporting activities
- **cost of quality**

Software Quality Assurance

- **Software quality is defined as :**
- **conformance to explicitly stated functional and performance requirements,**
- **explicitly document development standards**
- **and implicit characteristics that are expected of all professionally developed software.**

Software Quality Assurance

Software Quality Assurance

1. **SQA is an umbrella activity that is applied throughout the software process.**
2. **SQA encompasses :**
    1. **A quality management approach,**
    2. **Effective software engineering technology,**
    3. **Formal Technical Reviews that are applied throughout the software process,**
    4. **A multitier testing strategy,**
    5. **Control of software documentation & the change made to it,**
    6. **A procedure to ensure compliance with software development standards (when applicable) and**
    7. **Measurement & reporting mechanisms**

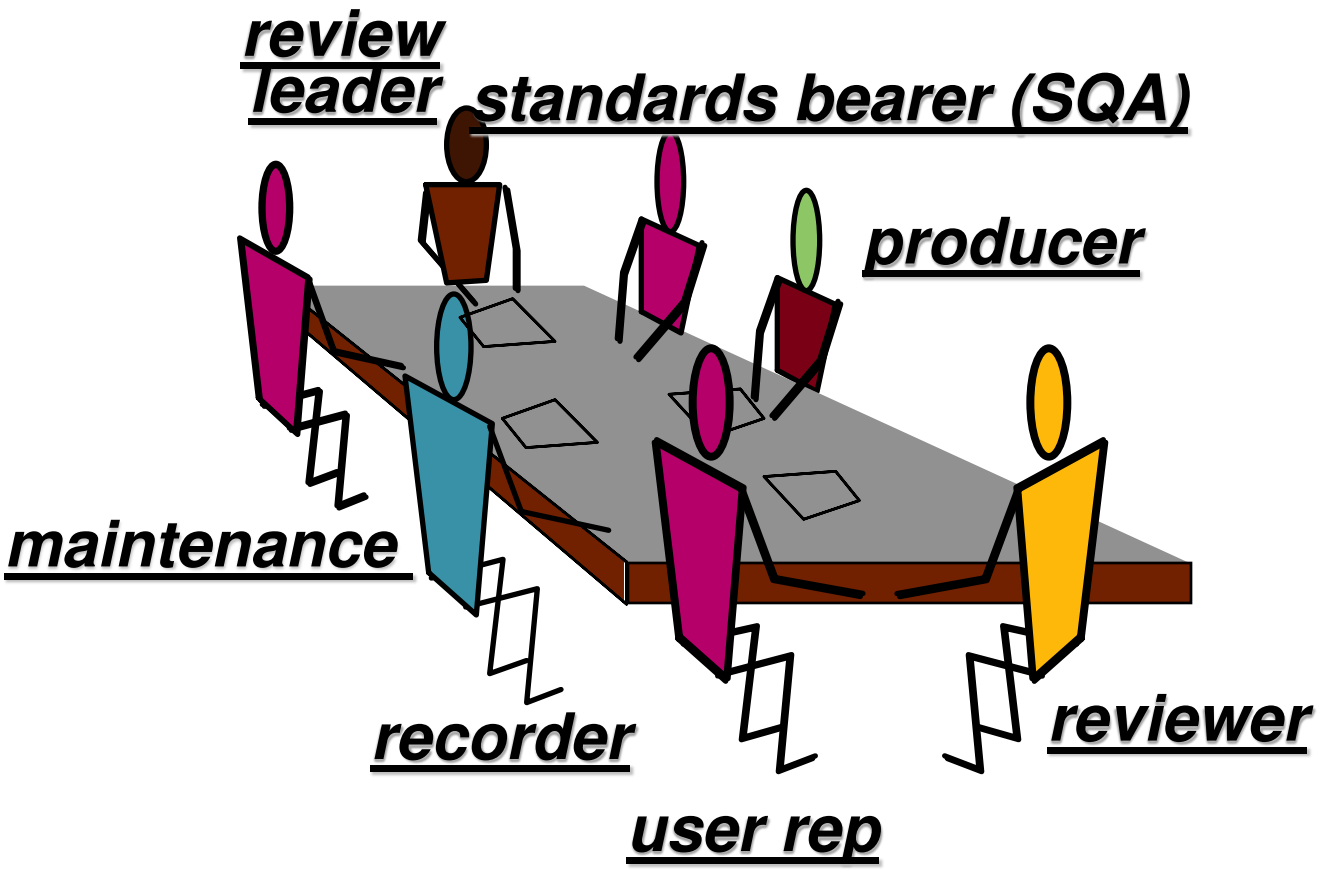
SQA ACTIVITIES

1. Prepare an SQA plan for a project
   - evaluations to be performed
   - Audits and reviews to be performed
   - Documents to be produced by the SQA group
   - procedures for error reporting and tracking
2. Participates in the development of the project's software process description.
3. Audits designated software work products to verify compliance with those defined as part of the software process.
4. Reviews software engineering activities to verify compliance with the defined software process
5. Ensures that deviations in software work and work products are documented and handled according to a documented procedure.

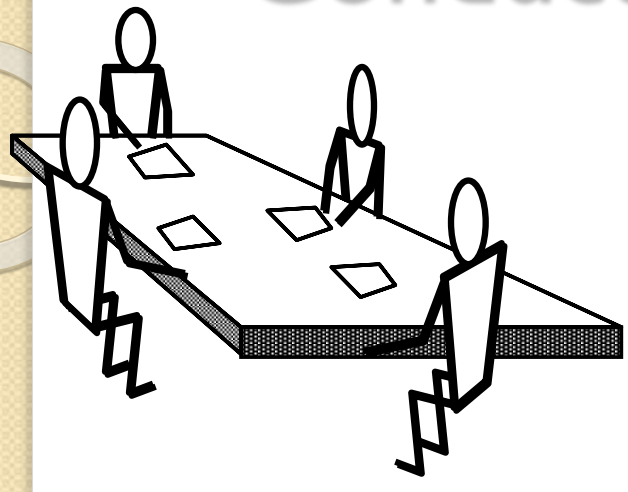
What Are Reviews?

- a meeting conducted by technical people for technical people
- a technical assessment of a work product created during the software engineering process
- a software quality assurance mechanism

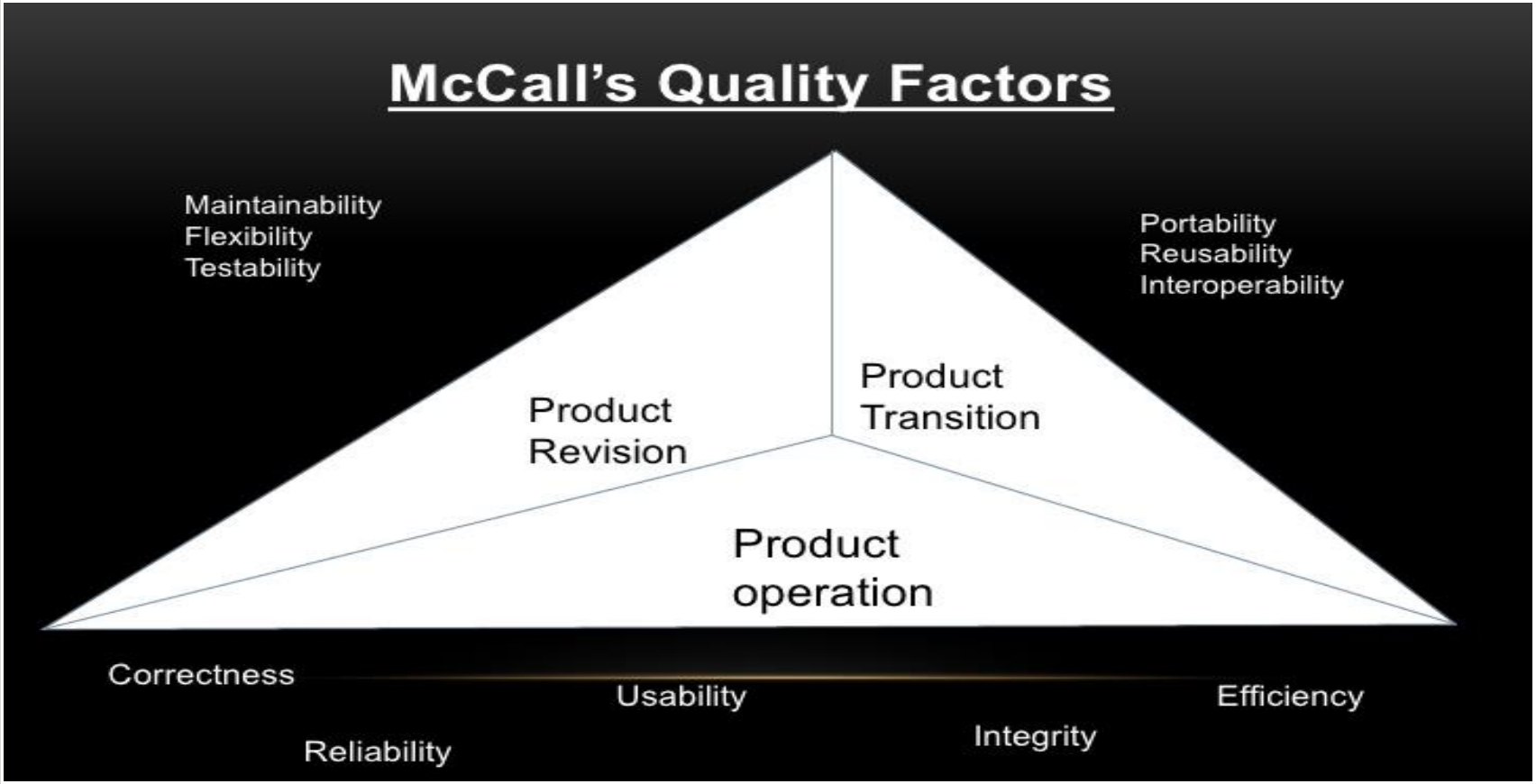
The Players


review leader
standards bearer (SQA)
producer
maintenance
recorder
reviewer
user rep

Conducting the Review



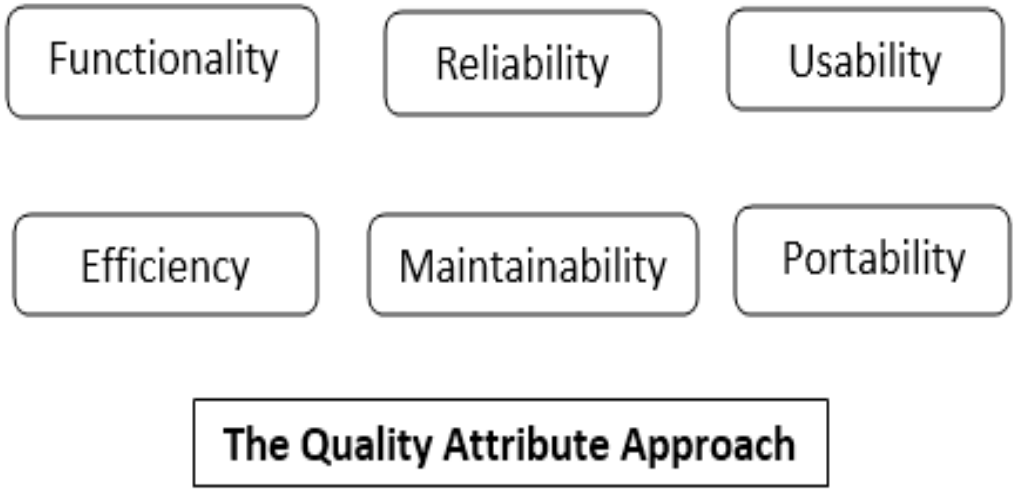
1. **be prepared—evaluate product before the review**
2. **review the product, not the producer**
3. **keep your tone mild, ask questions instead of making accusations**
4. **stick to the review agenda**
5. **raise issues, don't resolve them**
6. **avoid discussions of style—stick to technical correctness**
7. **schedule reviews as project tasks**
8. **record and report all review results**



- Product revision (ability to change).
- Product transition (adaptability to new environments).
- Product operations (basic operational characteristics)

The SQA Attribute

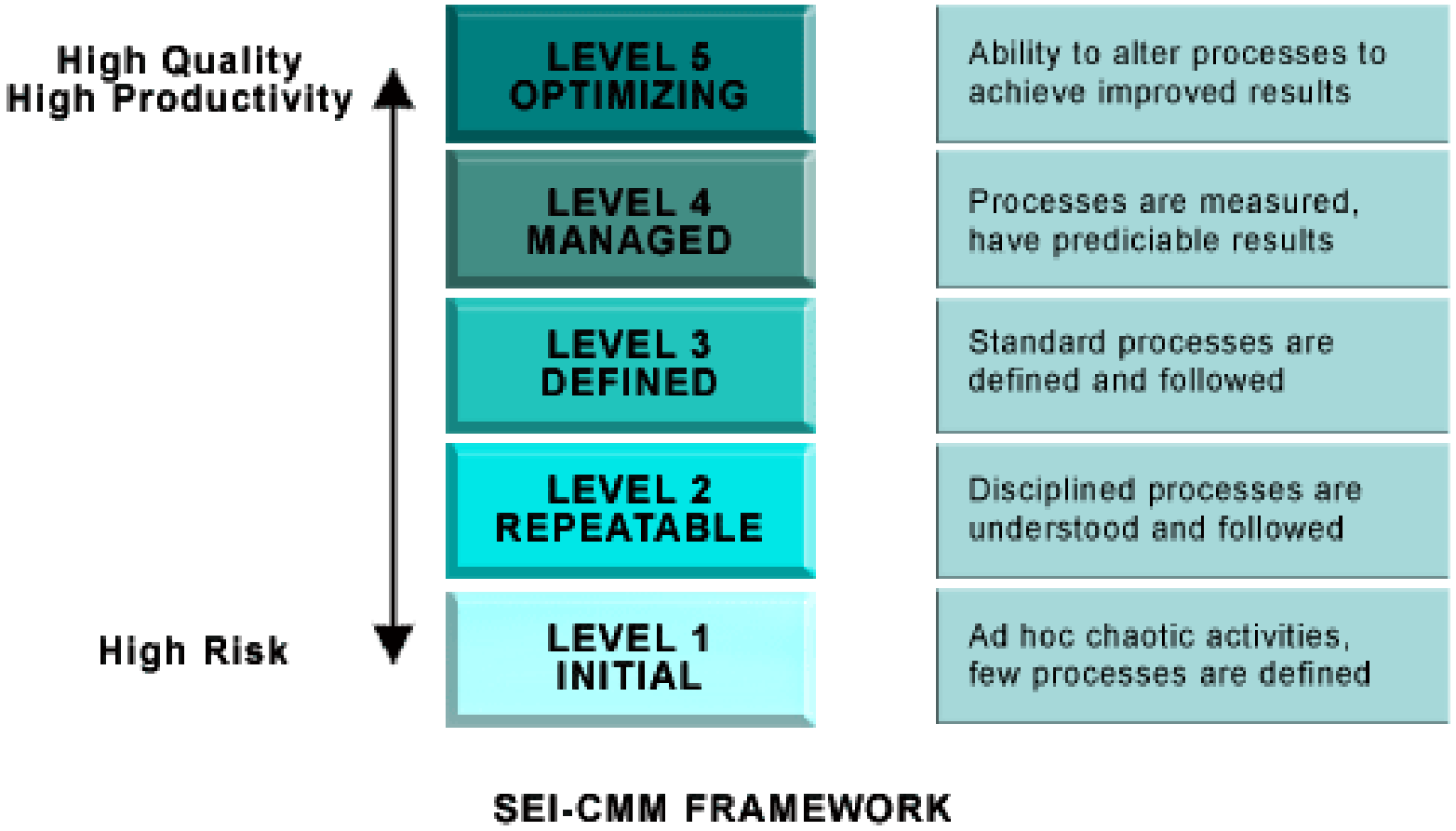
- **There is a list of attributes which describes the step by step approach to obtain Software Quality Assurance. The attributes are given as in the diagram below:**



The SQA Attribute contd..

- **Functionality: The attributes considers the set of all the functions used in the software.**
  - **Suitability:** Ensures the functions of the software are appropriate.
  - **Accuracy:** Ensures the accurate usage of the functions.
  - **Interoperability:** Ensure the effective interaction of the software with other components.
  - **Security:** Ensure the software is capable of handling any security issues

Capability Maturity Model



SEI-CMM FRAMEWORK

ISO 9000 Quality Standards

- **ISO 9000 describes quality assurance elements in generic terms that can be applied to any business regardless of product or services offered.**
- **To become registered to one of the quality assurance system models contained in ISO 9000, a company's quality system and operations are scrutinized by third party auditors for compliance to the standard and for effective operation.**

ISO 9000 Quality Standards

- **ISO 9000 describes the elements of quality assurance system in general terms.**
- **These elements include the organizational structure, procedure, processes and resources needed to implement quality planning, quality control, quality assurance and quality improvement.**
- **However, ISO 9000 does not describe how an organization should implement these quality system elements.**

The ISO 9001 Standard

- **ISO 9001 is the quality assurance standard that applies to software engineering.**
- **The standard contains 20 requirements that must be present for an effective quality assurance system. [Management responsibility, quality system, contract review, design control, document and data control, product identification and traceability, process control, Inspection and testing, corrective and preventive action, control of quality records, internal quality audits, training , servicing and statistical techniques.]**