

# Unit 10. ISO 9126, Parts 1 & 2

10-1

Soo Kim 02

## Organization

- ⇒ Part 1
  - Quality Model
- ⇒ Part 2
  - External Metrics
- ⇒ Part 3
  - Internal Metrics
- ⇒ Part 4
  - Quality In Use Metrics

10-2

Soo Kim 02

# Organization

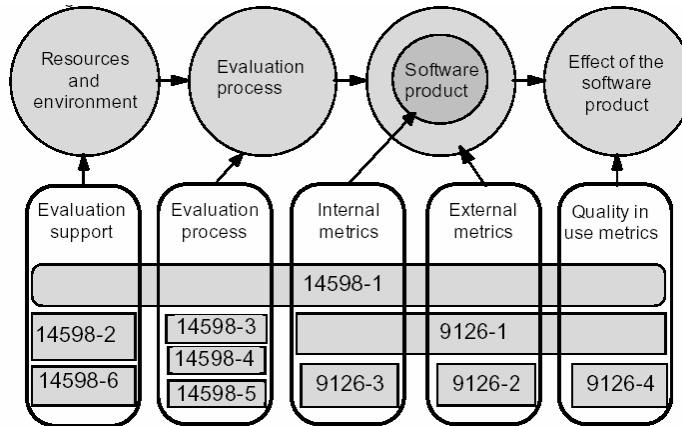


Figure 1 - Relationship between ISO/IEC 9126 and ISO/IEC 14598 standards

# Quality Model Framework

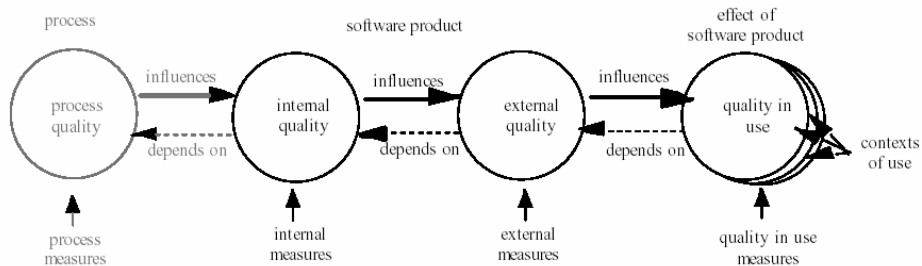
- ⇒ **Process Quality**
  - ❑ Quality of Life-cycle Process
  - ❑ Process quality contributes to improving product quality.
- ⇒ **Product Quality**
  - ❑ Can be evaluated by measuring internal attributes or measuring external attributes.
  - ❑ **Internal quality**
    - is evaluated by the static measure of intermediate products.
    - View of User/Management
  - ❑ **External quality**
    - is evaluated by measuring the behavior of the code when executed.
    - View at Technical Level
  - ❑ Product quality contributes to improving quality in use.

# Quality Model Framework

## ⇒ Quality In Use

- ❑ User's view of the quality of an environment containing software, and is measured from the results of using the software in the environment.
  - Rather than properties of the software itself.
- ❑ User's environment may be different from development environment.

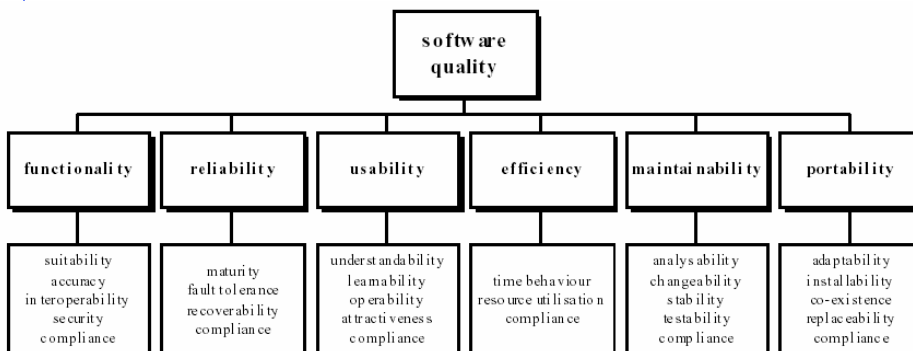
# Quality Model Framework



# Quality Model of ISO 9126

- ⇒ Level 1.
  - Characteristic
- ⇒ Level 2.
  - Sub-characteristic
- ⇒ Level 3.
  - Metrics

# Six Characteristics



## Six Characteristics

### ⇒ 1. Functionality

- Capability of software product to provide functions which meet stated and implied needs

### ⇒ 2. Reliability

- Capability of software product to maintain a specified level of performance

### ⇒ 3. Usability

- Capability of software product to be understood, learned, used and attractive to user.

## Six Characteristics

### ⇒ 4. Efficiency

- Capability of software product to provide appropriate performance, relative to the amount of resources used.

### ⇒ 5. Maintainability

- Capability of software product to be modified.

### ⇒ 6. Portability

- Capability of software product to be transferred from one environment to another.

## Sub-characteristics of Reliability

### ⇒ Maturity

- Capability of software product to avoid failure as a result of faults in the software

### ⇒ Fault Tolerance

- Capability of software product to maintain a specified level of performance in cases of software faults or infringement of its specified interface

## Sub-characteristics of Reliability

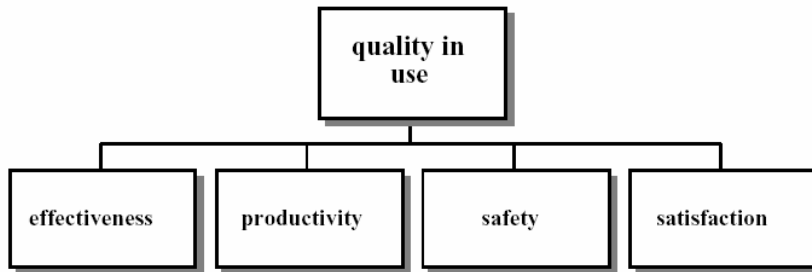
### ⇒ Recoverability

- Capability of software product to re-establish a specified level of level of performance and recover the data directly affected in the case of a failure.

### ⇒ Compliance

- Capability of software product to adhere to standards, conventions or regulations relating to reliability

# Quality In Use



# Metrics

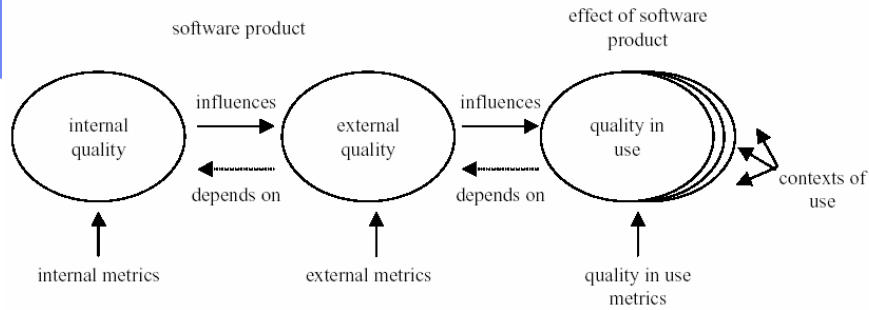
## ⇒ Internal Metrics

- ❑ Can be applied to a non-executable software product during designing and coding.

## ⇒ External Metrics

- ❑ Use measures of an executable software product.
- ❑ By testing, operating and observing the executable software or system.

## Relationships between Metrics



## Example of External Metrics

### ⇒ Sub-characteristics

- ❑ Maturity, Fault Tolerance, Recoverability, Compliance

### ⇒ External Metrics for Fault Tolerance

- ❑ Breakdown Avoidance
  - $X = 1 - (\# \text{ of Breakdowns}) / (\# \text{ of Failures})$
- ❑ Failure Avoidance
- ❑ Incorrect Operation Avoidance



## Comments on ISO 9126

- ⇒ It's only a generic quality model.
  - Should be tailored for each organization.
- ⇒ Metrics and their formulas
  - Mostly adoptable.
  - Some are not feasible/practical.
- ⇒ Nonetheless, the most comprehensive model for software quality.