

Tutorial Sheet 8: Reliability Models & Quality Measures

Assignment 1: Musa's Reliability Model

- Draw a typical curve of the failure intensity according Musa's Reliability Model. Explain the characteristics of the curve.

[Response: See lecture slides.]

- A program has a total number of 200 faults. Initially, it has a failure intensity of 15 failures per hour. What is the failure intensity after 10 hours? How many failures will have occurred after 10 hours?

[Response:

Failure intensity after 10 hours: 7.1

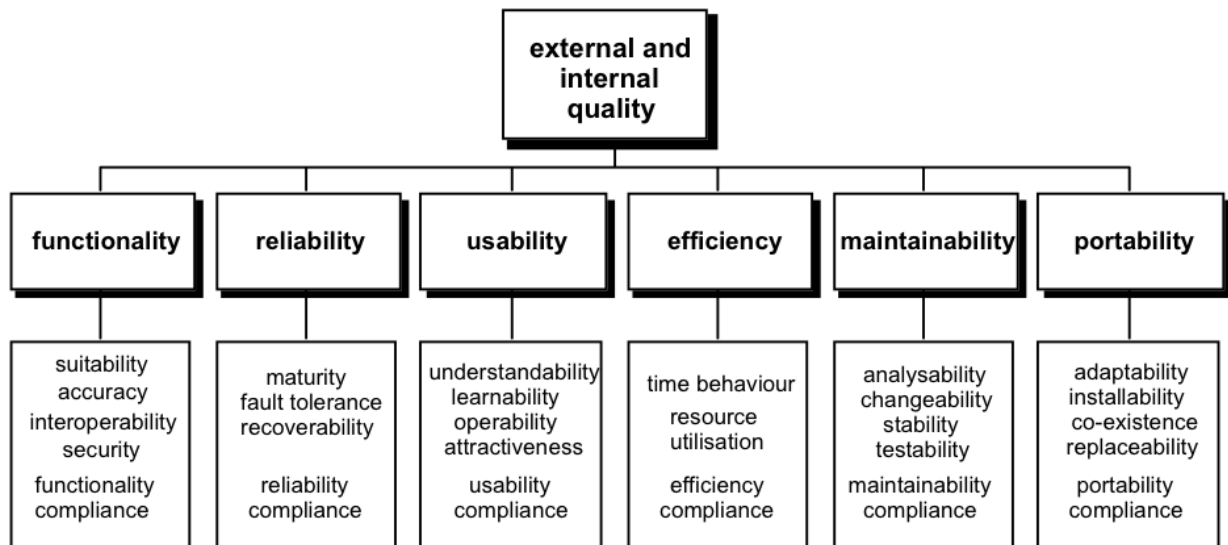
Number of failures occurred after 10 hours: 105.5]

- A program has an initial failure intensity of 20 failures per hour and a total number of 100 faults. After how many hours are only 10 of those faults left in the system, i.e. they did not occur yet?

[Response: 11.5 hours]

Assignment 2: Quality Measures

The ISO 9126 standard for product quality defines 6 quality characteristics. These are further divided into sub-characteristics.



Assign each of the following quality measures to one or more specific quality sub-characteristic for which the measure can be used as an indicator.

- Method length
- McCabe Cyclomatic Complexity
- Number of parameters per method
- Depth of inheritance tree
- Number of subclasses
- Comment ratio
- Clone coverage
- Number of unused variables
- Nesting depth
- Detected vulnerabilities per LOC
- Response time
- Number of defects delivered to users
- Data throughput
- Processor utilization
- Number of successful attacks per year
- Rating for user satisfaction with features
- Time to complete a task
- Memory consumption
- Number of platform-specific libraries used
- Time to learn

- Time spent on errors
- Number of defects per LOC

[**Response:** Possible assignments:

- Method length: analysability, changeability
- McCabe Cyclomatic Complexity: testability, analysability
- Number of parameters per method: analysability, testability
- Depth of inheritance tree: analysability, testability, changeability
- Number of subclasses: analysability, changeability
- Comment ratio: analysability
- Clone coverage: changeability, testability
- Number of unused variables: analysability, resource utilization
- Nesting depth: analysability, testability, changeability
- Detected vulnerabilities per LOC: security
- Response time: time behavior, operability
- Number of defects delivered to users: fault tolerance, operability, maturity
- Data throughput: resource utilization, operability
- Processor utilization: resource utilization, operability
- Number of successful attacks per year: security
- Rating for user satisfaction with features: suitability
- Time to complete a task: operability, learnability
- Memory consumption: resource utilization
- Number of platform-specific libraries used: adaptability
- Time to learn: learnability
- Time spent on errors: operability
- Number of defects per LOC: maturity

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