

### Introduction

<b>Quality Management</b>	ensure that the development processes are suitable
<b>Quality Assurance</b>	ensure that the development steps provided the desired results

### Terminology

#### System

- \* Technical and organizational means for the autonomous fulfillment of a task
- \* Generally, a system can consist of hardware, software, people (service and maintenance personnel) and logistic assistance

#### Technical System

- \* System where influences by people and logistics are ignored

#### Quality

- \* Degree in which the inherent (anhaltend, dazugehörend) attributes of an entity fulfill quality requirements

#### Quality Requirement

- \* Expectation or demand defined (by a customer) that is generally assumed or mandatory

#### Quality Characteristics

- \* Property of an entity on the basis of which its quality is described and estimated, but which makes no statement about the degree of fulfillment of the characteristic
- \* A quality characteristic can be refined incrementally into partial characteristics
- \* Inherent attribute of a process, product or a system that relates to a quality requirement /DIN EN ISO 9000 05/

#### Quality Measure

- \* Measure which allows to draw conclusions on the fulfillment of specific quality characteristics. For instance, MTTF (Mean Time To Failure) is a quality measure of the quality characteristic Reliability

### Terminology (cont)

#### Safety

- \* State where the danger of a personal or property damage is reduced to an acceptable value (DIN EN ISO 8402)
- \* Birolini defines safety as a measure for the ability of an item to endanger neither persons, property nor the environment
- \* A distinction is drawn between the safety of a failure-free system (accident prevention) and the technical safety of a failure afflicted system
- \* Absence of unacceptable risks /IEC 61508 98/

**Safety analysis aims at proving that the actual risk is below the acceptable risk**

#### Technical Safety

- \* Measure for the ability of a failure afflicted item to endanger neither persons, property nor the environment

#### Correctness

- \* Correctness has a binary character, i.e., an item is either correct or incorrect
- \* A fault-free realization is correct
- \* An artifact is correct if it is consistent to its specification
- \* If no specification exists for an artifact, correctness is not defined

#### Completeness

- \* A system is functional complete, if all functions required in the specification are implemented. This concerns the treatment of normal cases as well as the interception of failure situations

#### Robustness

- \* Property to deliver an acceptable behavior also in exceptional situations (e.g. ability of a software to detect hardware failures)
- \* A correct system – as measured by the specification – can have a low robustness, actually
- \* Accordingly, robustness is rather a property of the specification than of the implementation
- \* A robust program is the result of the correct implementation of a good and complete specification
- \* Robustness has a gradual character



## Terminology (cont)

### Reliability

- \* Part of the quality with regard to the behavior of an entity during or after given time periods with given working conditions (DIN 40041)
- \* Collective term for the description of the power concerning availability and its influencing factors: power concerning functionality, maintainability and maintainability support (DIN EN ISO 8402)
- \* Property of an entity regarding its qualification to fulfill the reliability requirements during or after given time periods with given application requirements (DIN ISO 9000)
- \* Measure for the ability of an item to remain functional, expressed by the probability that the required function is executed failure-free under given working conditions during a given time period (based on Birolini, ETH)

### Availability

- \* Measure for the ability of an item to be functional at a given time



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Not published yet.

Last updated 9th July, 2020.

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