

# Functional Correctness

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## Discussion

Functional Correctness is a [Quality Characteristic](#) concerning the degree to which a subject produces correct results with the required precision.

Functional Correctness can apply to:

- A [Candidate Solution](#)
- A [Distributed System](#)
- A [Node](#)
- A [Node Set](#)
- A service
- A software component
- A calculation
- A transformation
- A transaction
- A decision
- Another subject producing an observable result

Functional Correctness can concern:

- Calculated values
- Generated values
- Transformed values
- Selected values
- Stored values
- Transmitted values
- State transitions
- Transaction outcomes
- Decisions
- Messages
- Events
- Other functional outputs

Functional Correctness can identify:

- The evaluated function
- The applicable inputs
- The applicable [Test Argument Values](#)
- The applicable [Expected Results](#)
- The observed [Test Results](#)
- The required precision
- The permitted tolerance
- The comparison method

- The reference value
- The applicable DIDO [Baseline](#)
- The applicable [Validation Criteria](#)
- The applicable [Acceptance Criteria](#)
- Its [Evidence](#)
- Its [Provenance](#)
- Its [Traceability](#)

Functional Correctness can be evaluated by comparing an observed Test Result with:

- An Expected Result
- An authoritative reference value
- A result produced by an approved reference implementation
- A corresponding Test Result in a controlling DIDO Baseline
- A result calculated using an independently verified method
- Another reference established by the Acceptance Criteria

## Definition

*Quality Characteristic concerning the degree to which a subject produces correct results with the required precision*

## Source

Adapted from:

- [ISO/IEC 25010:2023, Systems and software Quality Requirements and Evaluation \(SQuaRE\) — Product quality model](#)
- [Quality Characteristic](#)
- [Expected Result](#)
- [Test Result](#)
- DIDO Reference Implementation Conceptual Model
- DIDO-TE draft Requirements Register

ISO/IEC 25010 identifies Functional Correctness as a product-quality subcharacteristic associated with producing correct results with the required precision.

This definition adapts that concept for DIDO-TE evaluation of Candidate Solutions, Distributed Systems, Nodes, services, components, calculations, transactions, and other subjects producing observable results.

## Note

Functional Correctness differs from functional completeness:

- Functional Correctness concerns whether produced results are correct
- Functional completeness concerns whether the available functions cover the specified tasks and objectives

Functional Correctness differs from functional appropriateness:

- Functional Correctness concerns the correctness of results
- Functional appropriateness concerns whether functions facilitate accomplishment of specified tasks and objectives

Functional Correctness differs from [Reliability](#):

- Functional Correctness concerns whether a produced result is correct
- Reliability concerns the degree to which a subject performs specified functions under specified conditions for a specified period

A subject can produce an incorrect result reliably.

A subject can produce correct results during successful operations while experiencing unacceptable failures.

Functional Correctness does not require exact equality when the applicable Acceptance Criteria permit:

- Numerical tolerance
- Statistical tolerance
- Rounding
- Approximation
- Nondeterministic ordering
- Equivalent representations
- Another bounded variation

The applicable Acceptance Criteria determine:

- The authoritative Expected Result or reference value
- The comparison method
- The required precision
- The permitted tolerance
- The treatment of missing values
- The treatment of invalid values
- The treatment of nondeterministic results

A passing [Verdict](#) can indicate that an observed Test Result satisfies the Functional Correctness criteria applicable to a particular Test Step or Test Run.

One passing Verdict does not necessarily establish Functional Correctness across every input, condition, Configuration, or operational context.

## Example

Three Candidate Solutions calculate the expected settlement amount for the same financial

agreement.

The applicable Acceptance Criteria establish:

- The financial agreement
- The applicable calculation rules
- The Test Argument Values
- The authoritative Expected Result
- The currency
- The required decimal precision
- The permitted rounding method
- The permitted tolerance

DIDO-TE performs the applicable Test Definition for each Candidate Solution and compares each resulting Test Result with the authoritative Expected Result.

A Candidate Solution exhibits Functional Correctness for the evaluated calculation when its Test Result satisfies the required precision and permitted tolerance.

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