Software Quality Assurance (SQA)

Software, Software Quality and Software Quality Assurance

Software, from the SQA perspective, is the combination of computer programs (the "code"), procedures, documentation, and data necessary for operating the software system. The combination of all four components is needed to assure the quality of the development process as well as the ensuing long years of maintenance.

Software quality (SQ) is the degree of conformance to specific functional requirements, specified software quality standards, and Good Software Engineering Practices (GSEP).

Software quality assurance (SQA) is the systematic, planned set of actions necessary to provide adequate confidence that a software development or maintenance process conforms to established functional technical requirements as well as the managerial requirements of keeping to schedules and operating within the budget.

Software Errors, Software Faults and Software Failures

- Software errors are sections of the code that are partially or totally incorrect as a result of a grammatical, logical or other mistake made by a systems analyst, a programmer, or another member of the software development team.

- Software faults are software errors that cause the incorrect functioning of the software during a specific application. So, a fault found only after the software has been released to end users.

- Software faults become software failures only when they are "activated", that is, when a user tries to apply the specific software section that is faulty. Thus, the root of any software failure is a software error.
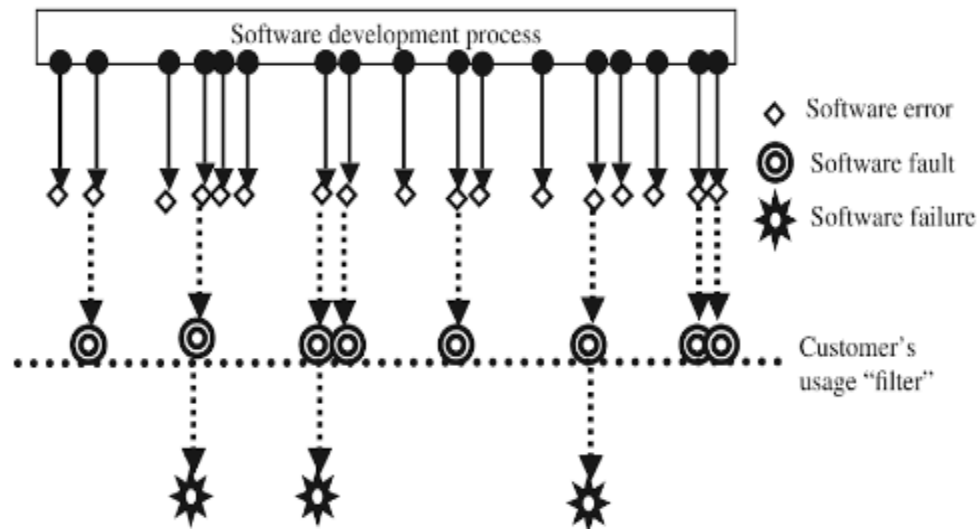

Figure   Software errors, software faults, and software failures

the various causes of software errors

There are nine causes of software errors: faulty requirements definition, client– developer communication failures, deliberate deviations from software requirements, logical design errors, coding errors, non-compliance with documentation and coding instructions, short comings of the testing process, procedure errors, and documentation errors.

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The Objectives of software quality assurance activities

The objectives of SQA activities for software development are:

(1) Assuring, with acceptable levels of confidence, conformance to functional technical requirements.

(2) Assuring, with acceptable levels of confidence, conformance to managerial requirements of scheduling and budgets.

(3) Initiating and managing activities for the improvement and greater efficiency of software development and SQA activities.

The Relationship between Software Quality Assurance and Software Engineering.

Software engineering is the application of a systematic, disciplined, quantifiable approach to the development, operation and maintenance of software. The characteristics of software engineering, especially its systematic, disciplined and quantitative approach, make software engineering a good environment for achieving SQA objectives. It is commonly accepted that cooperation between software engineers and the SQA team is the way to achieve efficient and economic development and maintenance activities that, at the same time, assure the quality of the products of these activities.