

IEEE Standard for Software Reviews and Audits

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**Software Engineering Technical Committee of the
IEEE Computer Society**

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Foreword

(This Foreword is not a part of IEEE Std 1028-1988, IEEE Standard for Software Reviews and Audits.)

This Foreword provides the user with the rationale and background of the review and audit procedures outlined in this standard, and their relation to other IEEE standards.

Purpose. This standard defines the review and audit processes applicable to critical and noncritical software, and the specific procedures required for the execution of the reviews and audits described. Also, this standard supports ANSI/IEEE Std 730-1984 by defining review and audit procedures.

This standard does not establish measures or mechanisms for judging individual contributions to product development. Conformance to this standard may be claimed where reviews and audits are performed using procedures defined by this standard.

Additional documents that should be referenced for specific application of this standard are as follows:

- (1) ANSI/IEEE Std 729-1983, IEEE Standard Glossary of Software Engineering Terminology.
- (2) ANSI/IEEE Std 730-1984, IEEE Standard for Software Quality Assurance Plans.
- (3) ANSI/IEEE Std 828-1983, IEEE Standard for Software Configuration Management Plans.
- (4) ANSI/IEEE Std 983-1986, IEEE Guide for Software Quality Assurance.
- (5) ANSI/IEEE Std 1012-1986 IEEE Standard for Software Verification and Validation Plans.

These standards address specific applications to this standard. Although only IEEE standards are referenced in this standard, this standard can be applied in concert with local standards requiring reviews and audits.

Moreover, to support the use of this standard by ensuring uniform classification and codes, use of IEEE Std 1044-1988, IEEE Standard Classification for Software Errors, Faults, and Failures, is suggested.

General Application Intent. This standard applies to all phases of typical software life cycles and provides a standard against which review and audit plans can be prepared and assessed. Maximum benefit can be derived from this standard by planning for its application early in the project life cycle.

This standard can be used with different life cycles provided its intent is followed. ANSI/IEEE Std 730-1984 identifies specific (and minimum) review and audit applications for critical software, while this standard defines the specific processes available to meet these application needs. Planning for reviews and audits, as part of an integrated verification and validation approach, can be aided by following ANSI/IEEE Std 1012-1986.

This standard for software reviews and audits was written in consideration of both the software and its system operating environment. It can be used where software is the total system entity or where it is part of a larger system. Care should be taken to integrate software review and audit activities into any total system development planning; they should exist in concert with hardware system reviews and audits to the benefits of the entire system. To broaden the application possibilities of this standard, simply replace *software element* with *system element* when reading.

This standard was written with the assumption that organizations are void of corruption. This may become an issue where, for example, during the course of an audit, theft or embezzlement is discovered. In such a case, although the audit may proceed, the applicability of this standard is removed.

Appendixes. Although not considered part of this standard, appendixes are provided to assist the reader in understanding:

- (1) Specific process applications required by ANSI/IEEE Std 730-1984.
- (2) How processes defined in this standard might be applied to meet those application needs.

Audience. This standard was written for those who are responsible for defining, planning, implementing, or supporting software reviews and audits.

Conformance. Conformance to this standard can be claimed when review and audit processes, wherever performed, are performed as defined in this standard.

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IEEE Standard for Software Reviews and Audits

1. Scope and References

1.1 Scope. The purpose of this standard is to provide definitions and uniform requirements for review and audit processes. It does not establish the need to conduct specific reviews or audits; that need is defined by local policy. Where specific reviews and audits are required, standard procedures for their execution must be defined.

This standard provides such definition for review and audit processes that are applicable to products and processes throughout the software life cycle. Each organization shall specify where and when this standard applies and any intended deviations from this standard.

1.2 References. This standard shall be used in conjunction with the following publications:

[1] ANSI/IEEE Std 729-1983, IEEE Standard Glossary of Software Engineering Terminology.¹

[2] ANSI/IEEE Std 829-1983, IEEE Standard for Software Test Documentation.

2. Definitions

audit. An independent evaluation of software products or processes to ascertain compliance to standards, guidelines, specifications, and procedures based on objective criteria that include documents that specify

- (1) The form or content of the products to be produced
- (2) The process by which the products shall be produced
- (3) How compliance to standards or guidelines shall be measured

review. An evaluation of software element(s) or project status to ascertain discrepancies from planned results and to recommend improvement. This evaluation follows a formal process (for example, management review process, technical review process, software inspection process, or walkthrough process).

software element. A deliverable or in-process document produced or acquired during software development or maintenance. Specific examples include but are not limited to

- (1) Project planning documents (for example, software development plans, and software verification and validation plans)
- (2) Software requirements and design specifications
- (3) Test effort documentation (ie, as described in ANSI/IEEE Std 829-1983 [2])²
- (4) Customer-deliverable documentation
- (5) Program source code
- (6) Representation of software solutions implemented in firmware
- (7) Reports (for example, review, audit, project status) and data (for example, defect detection, test)

For other definitions, including verification and validation, see ANSI/IEEE Std 729-1983 [1].

¹ANSI/IEEE publications are available from IEEE Service Center, 445 Hoes Lane, PO Box 1331, Piscataway, NJ 08855-1331, or from the Sales Department, American National Standards Institute, 1430 Broadway, New York, NY 10018.

²The numbers in brackets correspond to those of the references in 1.2.

3. Introduction

Reviews and audits can be used in support of objectives associated with software quality assurance, project management, and configuration management, or similar control functions, as shown in Table 1. Those quality objectives, valid throughout software development and maintenance, include the need for evaluation, verification, validation, and compliance confirmation. For the sake of completeness, Test is identified in Table 1 as the principal process of validation. Testing, however, is outside the scope of this standard. Processes defined in this standard include

- (1) Management review
- (2) Technical review
- (3) Software inspection
- (4) Walkthrough
- (5) Audit

To support compliance confirmation, auditing activities may include performing reviews and tests to determine product consistency with respect to established baselines (ie, software requirements specifications or design descriptions) or to witness the correctness of implementation.

Moreover, since quality assurance deals with products and processes, Fig 1 provides a view of how various quality assurance pro-

Table 1
Some Principal Processes for Achieving Quality Objectives

Objectives	Principal Processes Include
Evaluation	Management review, Technical review
Verification	Inspection, Walkthrough
Validation	Test
Compliance, Confirmation	Audit

cesses can be mapped to examine product and project issues.

The examination of project issues (both technical and managerial) occurs at various phases during the project life cycle. The results of such examinations are meant to permit improvement of the methods of ensuring software quality and the ability to meet time and cost constraints. The evaluation of software elements occurs during the production of the element(s) and on its completion. This ensures that the element(s) completely and correctly embodies its baseline specifications.

Any standard process has prerequisite conditions; those conditions necessary, though not in themselves sufficient for the process to reach completion. For reviews and audits, these conditions are identified in 3.1 and 3.2 respectively.

Fig 1
Relation of Some Quality Assurance Processes to Products and Projects

