Software Quality Assurance
Text and Readings

- Hall
- Macfarlane, M. “Eating the elephant one bite at a time”.
- McCall et al. (1997) Factors in software quality
National Standards Authority of Ireland
Certification Services,
Glasnevin, Dublin 9.

Telephone 8073800
Software Quality Assurance

• Quality in the life-cycle
• Quality management system
• ISO 9001  ISO 90003 & TickIT
• Quality manual
• Quality system certification
• Quality assurance manager
• Advantages of certification
Quality in the life-cycle

- Not mentioned in waterfall or spiral models.
- Desirability of adapted model.
- Considered at all phases of the life-cycle.
- Responsibility of the QA manager.
Quality Management System

• A system or policy for ensuring that the quality characteristics of a software product are built into the product from the start.
  – System is documented in a manual.
    • contains standards
    • procedures
    • quality controls
  – System is certified (in Ireland by NSAI).
  – Manual is used for the purpose of preparing individual quality plan for each project.
  – Quality is managed and audited.
ISO 9000:2000 Family
Quality management systems —
Fundamentals and vocabulary.

Others

ISO 9001:2000
Quality management systems —
Requirements.

ISO 90003:2004
Software engineering –
Guidelines for the application of ISO 9001:2000
to computer software.
ISO 9001  ISO 90003 & TickIT


• **ISO 9001** - International Standard. Quality management systems — Requirements


• **TickIT**
ISO 90003
reads

• **The purpose...** *This International Standard provides guidance for organizations in the application of ISO 9001:2000 to the acquisition, supply, development, operation and maintenance of computer software and related support services. It does not add to or otherwise change the requirements of ISO 9001:2000.*

• **Appropriate to...**
  – part of a commercial contract with another organisation,
  – a product available for a market sector,
  – used to support the processes of an organisation,
  – embedded in a hardware product, or
  – related to software services.
Quality manual

– Contents, index, mission statement, person responsible for corporate quality policy, holders of quality manuals.

– Outlines standards, procedures and quality controls as appropriate for all of the twenty sub-sections of ISO 9001 (Using guidelines ISO 90003).

– Depth of detail to suit your Quality Management System.
Quality Manual ISO 9001/ISO 90003

- Scope
- Normative reference
- Terms and definitions
- General requirements
- Management responsibility
- Resource management
- Product realisation
- Measurement, analysis and improvement
Quality manual

Examples

• **Standards** (In-house, De facto and International)
  – H-CI standards
  – Modelling standards
  – Coding practice standards

• **Procedures**
  – Contract Review procedure
  – Purchasing procedure
  – Testing procedures
  – Procedures for project review
Quality manual

Examples

• Quality controls
  – Third party software control
  – Change request control
  – Document control
  – Configuration management
Project Quality Plan

A plan is a strategy which defines who does what, when, where and how.

So, a project quality plan will identify the requirements in terms of quality attributes, what activities must be performed to ensure that these attributes are built into the product, at what stage in the life-cycle this quality assurance is performed, who performs it and what methods and techniques are use.
Project Quality Plan
ISO/DIS 9000-3 (1996)

• Should specify or reference
  – Quality requirements
  – Criteria for starting and ending project phases
  – Identify reviews, tests, validation and verification
  – Details for reviews, tests and V&V activities, including schedules, resources and approval authorities
  – Specific responsibilities for
    • Reviews and tests;
    • V&V of purchased products;
    • Verification of customer-supplied products;
    • Configuration management;
    • Control of nonconforming product and corrective action.
Quality System Certification

• Prepare and fully document, in a manual, your organisation’s quality system.
• Apply to the National Standards Authority of Ireland (NSAI) for registration and assessment.
• Await assessment being completed by NSAI and remedy any omissions notified to applicant.
• Arrange visit by NSAI assessors to observe system in operation.
• Await notification of approval. Once satisfied, the applicant is approved as a Registered Firm who may display and appropriate mark on corporate advertising material.
• Be always prepared for on-going, unannounced inspections to ensure quality standards are maintained.
Quality System Certification

• Review BCS question
  – Part II, Option 2C - Data Processing and Information Systems, Paper 1, Q1.
Quality System Certification
Cost involved (1997)

- **Introductory workshop fee** 1-3 days @£190 per day per person
- **Application fee** related to size of company - approx £450
- **Assessment fee** 1-4 days @ £435 per day plus expenses
- **Annual fee** £575
- **Surveillance fee** Three 1-day visits @ £500 each
- **Costs associated with preparing the manual, implementation and corporate display**
Quality System Certification
Cost involved (2008)

• 1. Introductory workshop. See training pages http://www.nsai.ie/EN/index.cfm/area/page/information/qualitysystems

• 2. Application fee varies depending on size of company and can be waived if the customer is already a client. It is about €440

• 3. Assessment fee varies depending on audit days (see www.iaf.nu, GD2) but is about €1100 per day

• 4. Annual account administration fee is €440

• 5. Surveillance and reassessment fee - see my answer to 3.
Quality System Certification
Timescale (1997)

• Writing and implementing the manual
  – 6 months to 2 years

• Assessment period
  – Depends on the type of organisation and availability of suitable assessors
  – 2 - 3 months

• Audit
  – On-going in-house audit to ensure quality system is honoured.
Advantages of certification

• Increased marketability
  – Requirement for European tendering

• International recognition
  – NSAI have technical committee links with other National Authorities

• Customer/client confidence

• Cost reduction/Increased profitability
  – Improved development productivity

• Staff commitment and motivation

• Management control
Deficiencies of certification

• Set your own standards, procedures and controls - not universal.
Quality Assurance Manager

- Co-ordinates activities that set standards and checks compliance with standards to improve the quality and accuracy of systems.
Quality Assurance Manager

• Implements QA policy.
• Ensures quality characteristics are outlined in specification.
• Prepares quality plans
  – Quality requirements
  – Validation & verification
  – Unit, integration, system and acceptance tests