Quality Management

Goals:

- Apply characteristic techniques for quality planning, quality assurance, monitoring and quality control.

Theory Overview:

See lecture notes (Chapter 5).

Quality represents the aggregate of an entity's characteristics that assures its ability to satisfy its imposed and implicit user's needs.

The quality system represents an organizational structure, the responsibilities, the procedures, processes and resources required for the implementation of the quality management, considering the specific business type of the organization and the conformity of these with clients imposed norms.

Project's quality management includes processes required to assure that the project satisfies the desired quality level:

1. Quality planning – identifies the reference quality standards inside the project and determines the ways of assuring them (for example: in software ISO 9000-3).

The quality standards must be accepted by the company, because they impose working procedures not exclusively limited to the project.

The desired quality level is established mainly according to the product's nature, its purpose and the company's quality policy.

The Quality Management Plan will indicate, on deliverable categories, the way to verify and validate the fact that all the requirements are fulfilled. For software products, this can include information about:

- Developing models and tools used in the product's development;
- Working procedures used to elaborate the design, the way to verify its correctness and the fact that it will solve all the imposed requirements;
- Working procedures used for implementation;
- Working procedures for unit testing, system testing and performance testing;
- Working procedures for acceptance testing.

2. Project's quality assurance – includes systematical activities, planned (to deploy regularly), that assures the project to honor its desired level of quality.

These activities are generally presented in the Tasks Management Plan and refer to training activities (concerning procedures that must be used by the project's team members), activities related to testing/checking plans, activities for verifying/checking

Quality assurance is efficient only when the procedures are specific and understood. It is recommended to eliminate the subjectivism in the verification step by using appropriate instrumentation and automation of the working mode.

3. *Project quality control* – monitors some of the important results of the project for assuring that it satisfies reference standards conditions and manages the required changes.

These results are, usually sampled at the end of some phases or other moments marked as checking points/analysis points/critical data.

One of the difficulties imposed by the quality management is related to implicit requirements. It is preferable that all the requirements concentrated in deliverable products of the project should be expressed based on performance criteria(attribute, metric, value), but unfortunately, some requirements cannot be completely described (simply) through performance indices and associated target values.

Another difficulty results from introducing in practice of quality management techniques that produce changes inside the organization with respect to the organization and structure (emerge specialized compartments in quality assurance, beside technical control, auditory control services, etc.), but also in the psychology of managers and executants, client position. Quality management cannot be realized through sporadic activities executed by few team members.
A modern quality management focuses on:

- Satisfying the client/user
  - Establishing validation tests
  - Transparency and consulting
- Prevention actions, more than correction – the cost of the error prevention actions is always smaller than the cost of correcting
  - Quality assurance using only by testing is inaccurate: conceptual models, early testing/checking, prototype approaches/ incremental/spiral
  - Caution to implicit requirements
  - Automation
- By implying the entire team in quality assurance >> organization, formalization – working procedures, cross-checking, etc.

Although there is a limit in the approach of the quality management: project's limited period assumes limiting the defect prevention and evaluation tasks.

Specific quality management forms:

1. Diagrams that illustrate the causes for not honoring the desired quality level (see lecture notes 5.2.1): flow diagrams de flux, Ishikawa diagrams.

2. Quality Management Plan – Establishes generally how to implement the desired quality inside the project (see lecture notes 5.2.1):

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3. Forms used in testing stages (see lecture notes 5.3):
   - Testing Specifications – Describes the tests required to check the deliverables;
   - Testing Reports – Records the results of the ran tests;
   - Acceptance Plan – Describes the validity tests and performance criteria imposed for validation.

Working plan:

For one of the applications presented, pass through the following steps:
- Cite three implicit requirements that must be honored by a software product (not included in the functional and non-functional requirements list previously filled);
- Organize the specifications in a V& V model (see lecture notes 5.3);
  - For each level point out: what to verify, how will be verified, who verifies, who controls the checking process;
- Build an Ishikawa diagram to explain the potential error sources in a selected use-case (consider only the technical causes in the development process);
- For unity testing: for two of the selected use cases elaborate the "Testing Specifications" document, indicating with details the test sequence to execute;
Direction: tests can be generated in the in-out manner, considering different values of the input dataset.
- For integration testing of two sub-systems contour the "Testing Specifications" document;
- Contour the "Quality Management Plan";
- Contour the "Acceptance Plan";
- Actualize project's Gantt Chart in MP by adding details to tasks related to assuring and controlling project's quality (see lecture notes 5.2 and 5.3).