Chapter XIII

Efficient Software Quality Assurance Approaches Oriented to UML Models in Real Life

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Abstract

UML is accepted as the standard notation for object-oriented (OO) development. UML models have a widespread use in today’s software practices. Any initiative to improve software quality assurance (SQA) should assume that a high percentage of deliverables to be controlled are currently based on the use of UML notation. However, real life projects are strongly influenced by the need of reaching tangible productivity and efficiency goals. SQA techniques should be customized to meet the balance between quality and budget supported by risk analysis. In this chapter, different strategies and techniques devised to follow the above philosophy of efficiency are presented, especially centred in automatic testing generation from specifications. Our proposal is mainly
Based on a recommended course of action as well as on integrated tool support for Eclipse environments.

Introduction

As defined by ISO (2000a), quality is defined as “the ability of a set of inherent characteristics of a product, system, or process to fulfil requirements of customers and other interested parties.” In the case of software development and maintenance, quality can be promoted by actions in three different axes:

1. **Selection, recruiting, training, and motivation of the best human resources for the development team:** Good developers tend to produce good software and sometimes there are “Net negative producing programmers” who do not produce but also reduce productivity of the rest of the team (Schulmeyer, 1992). Models like PSP (Humphrey, 1996) and TSP help to set individual performance apart from other considerations of degree or educational curricula for IT professionals (Fernández & García, 2003).

2. **Best practices and organization for development processes acting as frameworks for exploiting the benefits of the two other axes:** Models like ISO 9001 (ISO, 2000a), CMMi (Chrissis, Konrad, & Shrum, 2003) or ISO 15504 SPICE (series of standards starting with ISO, 2004) provide a framework for evaluating, improving, and certifying best practices related to software processes.

3. **Improvement of development methods, techniques, tools, and technology:** What it is assumed is that better resources lead to better characteristics of the produced software. This is not only applicable to development methods that prevent the insertion of defects and get better designs or code (e.g., use of new compilers, environments or even notations like UML, etc.) but also to all the activities for controlling results and detecting and fixing problems before customers begin to use the software (e.g., inspections, testing tools, etc.). Obviously, technology markets tend to use exaggerated expectations and promises to enhance capabilities of products that have been reported with interesting data in references like McConnell (1996) or Jones (1994).

In this chapter, we will explore different possibilities of improving and making more efficient the methods and techniques for preventing and detecting defects for real-life practitioners following a philosophy of SQA defined as a “planned and systematic pattern of all actions necessary to provide adequate confidence that the item or product conforms to established technical requirements” (IEEE, 1991).

One of the problems is that today’s software development market rules do not favour a real competition between providers based on offering high quality as the primary reasoning of their strategy because projects are still mainly driven by schedule and budget stringent schemes. This market is not mature enough to have a customer culture.
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