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Effective Software Maintenance and Evolution

A Reuse-Based Approach

Stanislaw Jarzabek • National University of Singapore

Provides essential information on software maintenance

The complexity of software is quickly approaching the limits of what the current programming paradigm can handle. As it exists today, this complexity remains proportional to the size of the software. This is particularly true of software maintenance, which is almost exclusively done at the level of code. Not surprisingly, it is estimated that up to 80% of software costs go to maintenance.

Effective Software Maintenance and Evolution: A Reuse-Based Approach examines various methods and the issues that can arise. The first part of the book concentrates on conventional methods for software maintenance. It discusses static program analysis and reverse engineering methods, and model-based design, a technique that can ease anticipated changes, as well as software configuration management tools.

Certain problems related to change remain inherently difficult to address with conventional methods. As a result, the second part of the book describes a novel approach called “mixed strategy.” Mixed-strategy exploits similarities in software and in patterns of evolutionary changes, simplifying software maintenance and evolution. Mixed-strategy program representation comprises code along with information about program design and changes that occurred to software over time. It is non-redundant, easy to work with, human-readable, and amenable to automation.

Focusing on the most cutting-edge methods available, **Effective Software Maintenance and Evolution: A Reuse-Based Approach** is an essential, authoritative resource for software developers and engineers, system analysts, and modelers.

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Features

- Presents a plan of strategic maintenance to transform and better align software with the business goals of a company
- Demonstrates how to use generative, metaprogramming techniques to enhance productivity and overcome certain limitations of component-based approaches
- Examines model-based tool design for static program analysis and business-process reengineering

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INTRODUCTION

CONVENTIONAL METHODS OF SOFTWARE MAINTENANCE AND EVOLUTION

- Static Program Analysis Methods • Reverse Engineering Methods • Model-Based Design for Ease of Maintenance
- Evolution of Versions and Configuration Management
 - Limits of Conventional Techniques

REUSE-BASED SOFTWARE MAINTENANCE AND EVOLUTION

- The Mixed-Strategy Approach: An Overview • Step-By-Step Introduction to XVCL • Software Similarities: Symptoms and Causes • The Mixed-Strategy Approach to Generic Design • Evolution with the Mixed-Strategy Approach • Scaling Up the Mixed-Strategy Approach
- The Mixed-Strategy Approach in Other Projects
 - Other Techniques Related To XVCL • Evaluation of the Mixed-Strategy Approach

CONCLUSIONS • APPENDICES • INDEX

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