



# ESSENTIAL SKILLS FOR THE AGILE DEVELOPER

A Guide to Better Programming and Design

Net bjectives

Lean-Agile Series

ALAN SHALLOWAY SCOTT BAIN KEN PUGH AMIR KOLSKY

#### Praise for Essential Skills for the Agile Developer

"I tell teams that the lean and agile practices should be treated like a buffet: Don't try and take everything, or it will make you ill—try the things that make sense for your project. In this book the authors have succinctly described the 'why' and the 'how' of some of the most effective practices, enabling all software engineers to write quality code for short iterations in an efficient manner."

#### —Kay Johnson

Software Development Effectiveness Consultant, IBM

"Successful agile development requires much more than simply mastering a computer language. It requires a deeper understanding of agile development methodologies and best practices. *Essential Skills for the Agile Developer* provides the perfect foundation for not only learning but truly understanding the methods and motivations behind agile development."

#### -R.L. Bogetti

www.RLBogetti.com, Lead System Designer, Baxter Healthcare

*"Essential Skills for the Agile Developer* is an excellent resource filled with practical coding examples that demonstrate key agile practices."

#### —Dave Hendricksen

Software Architect, Thomson Reuters

## Essential Skills for the Agile Developer: A Guide to Better Programming and Design

## **Table of Contents**

Contents

Series Foreword

**Preface** 

Acknowledgments

About the Authors

Part I: The Core Trim Tabs

Chapter 1 Programming by Intention

Advantages

Summary

Chapter 2 Separate Use from Construction

An Important Question to Ask

Perspectives

**Timing Your Decisions** 

Overloading and C++

Validating This for Yourself

Summary

Chapter 3 Define Tests Up Front

A Trim Tab: Testing and Testability

What Is Testing?

Testability and Code Quality

Case Study: Testability



A Reflection on Up-Front Testing

Summary

#### Chapter 4 Shalloways Law and Shalloways Principle

Types of Redundancy

Redefining Redundancy

Other Types of Redundancy

The Role of Design Patterns in Reducing Redundancy

Few Developers Spend a Lot of Time Fixing Bugs

Redundancy and Other Code Qualities

Summary

#### Chapter 5 Encapsulate That!

Unencapsulated Code: The Sabotage of the Global Variable

**Encapsulation of Member Identity** 

Self-Encapsulating Members

**Preventing Changes** 

The Difficulty of Encapsulating Reference Objects

Breaking Encapsulation with Get()

**Encapsulation of Object Type** 

Encapsulation of Design

Encapsulation on All Levels

Practical Advice: Encapsulate Your Impediments

Summary

#### Chapter 6 Interface-Oriented Design

Design to Interfaces

Definition of Interface

Interface Contracts

Separating Perspectives

Mock Implementations of Interfaces

Keep Interfaces Simple



**Avoids Premature Hierarchies** 

Interfaces and Abstract Classes

Dependency Inversion Principle

Polymorphism in General

Not for Every Class

Summary

#### Chapter 7 Acceptance TestDriven Development (ATDD)

Two Flows for Development

Acceptance Tests

An Example Test

Implementing the Acceptance Tests

An Exercise

What to Do If the Customer Wont Tell You

Summary

#### Part II: General Attitudes

#### Chapter 8 Avoid Over- and Under-Design

A Mantra for Development

The Pathologies of Code Qualities

Avoid Over- and Under-Design

Minimize Complexity and Rework

Never Make Your Code Worse/Only Degrade Your Code Intentionally

Keep Your Code Easy to Change, Robust, and Safe to Change

A Strategy for Writing Modifiable Code in a Non-Object-Oriented or Legacy System

Summary

#### Chapter 9 Continuous Integration

Branching the Source Code

The Merge-Back

Test-Driven Development and Merge Cost



Continuous Integration
Continuous Integration Servers
Summary

### Part III: Design Issues

#### Chapter 10 Commonality and Variability Analysis

Using Nouns and Verbs as a Guide: Warning, Danger Ahead!

What Is the Real Problem?

What We Need to Know

Commonality and Variability Analysis

A New Paradigm for Finding Objects

The Analysis Matrix: A Case Study

Summary

#### Chapter 11 Refactor to the Open-Closed

The Open-Closed Principle

Refactoring

Summary

## Chapter 12 Needs versus Capabilities Interfaces

The Law of Demeter

Coupling, Damned Coupling, and Dependencies

The Ideal Separation: Needs Interfaces and Capabilities Interfaces

Back to the Law of Demeter

Summary

#### Chapter 13 When and How to Use Inheritance

The Gang of Four

Initial Vectors, Eventual Results

**Favoring Delegation** 

The Use of Inheritance versus Delegation

Uses of Inheritance

Scalability



Applying the Lessons from the Gang of Four to Agile Development

**Testing Issues** 

Theres More

#### Part IV: Appendixes

Appendix A: Overview of the Unified Modeling Language (UML)

What Is the UML?

The Class Diagram

Sequence Diagram

Summary

#### Appendix B: Code Qualities

Christmas-Tree Lights: An Analogy

Cohesion

Coupling

Redundancy

Encapsulation

#### Appendix C: Encapsulating Primitives

**Encapsulating Primitives in Abstract Data Types** 

**Principles** 

Narrow the Contract

Expanding Abstract Data Types

Use Text as External Values

Enumerations Instead of Magic Values

Disadvantages

Summary

#### Index

