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Clean Code

You are reading this book for two reasons. First, you are a programmer. Second, you want to be a better programmer. Good. We need better programmers.

This is a book about good programming. It is filled with code. We are going to look at code from every different direction. We'll look down at it from the top, up at it from the bottom, and through it from the inside out. By the time we are done, we're going to know a lot about code. What's more, we'll be able to tell the difference between good code and bad code. We'll know how to write good code. And we'll know how to transform bad code into good code.

There Will Be Code

One might argue that a book about code is somehow behind the times—that code is no longer the issue; that we should be concerned about models and requirements instead. Indeed some have suggested that we are close to the end of code. That soon all code will be generated instead of written. That programmers simply won't be needed because business people will generate programs from specifications.

Nonsense! We will never be rid of code, because code represents the details of the requirements. At some level those details cannot be ignored or abstracted; they have to be specified. And specifying requirements in such detail that a machine can execute them *is programming*. Such a specification *is code*.

I expect that the level of abstraction of our languages will continue to increase. I also expect that the number of domain-specific languages will continue to grow. This will be a good thing. But it will not eliminate code. Indeed, all the specifications written in these higher level and domain-specific language will *be* code! It will still need to be rigorous, accurate, and so formal and detailed that a machine can understand and execute it.

The folks who think that code will one day disappear are like mathematicians who hope one day to discover a mathematics that does not have to be formal. They are hoping that one day we will discover a way to create machines that can do what we want rather than what we say. These machines will have to be able to understand us so well that they can translate vaguely specified needs into perfectly executing programs that precisely meet those needs.

This will never happen. Not even humans, with all their intuition and creativity, have been able to create successful systems from the vague feelings of their customers. Indeed, if the discipline of requirements specification has taught us anything, it is that well-specified requirements are as formal as code and can act as executable tests of that code!

Remember that code is really the language in which we ultimately express the requirements. We may create languages that are closer to the requirements. We may create tools that help us parse and assemble those requirements into formal structures. But we will never eliminate necessary precision—so there will always be code.