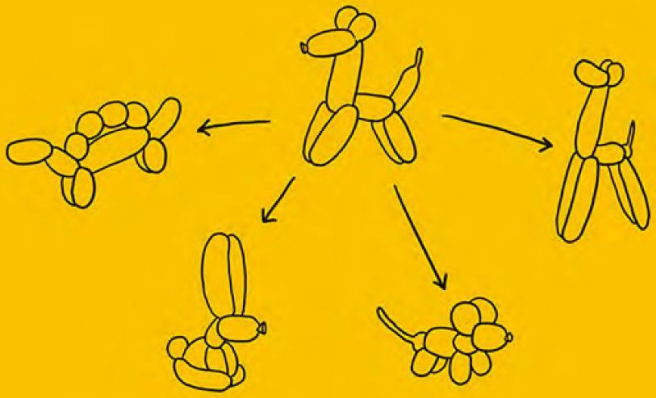

SOFTWARE DESIGN DECODED

66 Ways Experts Think

Marian Petre and André van der Hoek
illustrations by Yen Quach

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PREFACE

What makes an expert software designer? The typical answer—experience and innate ability—is less than satisfying. While it carries elements of truth, it offers little from which we can learn and generalize. Experts clearly do not just approach their work randomly. Quite the contrary, they have specific habits, learned practices, and observed principles that they employ deliberately during their design work.

This book offers a look at those habits, practices, and principles, one rooted in many years of studying professional software designers and their ways of working. It offers 66 “things that expert software

designers do," each of which can be traced back to academic literature that documents expert behavior and each of which has been confirmed to us time and again by those working in the field.

Some may be familiar, others not. Some are easily put in practice, others not. Some have immediate impact, others not. A constant, however, is that expert software designers are keenly aware of *all* of these practices and draw on them when the situation calls for it.

Today, software is no longer limited by technology, but rather by imagination. Yet the software that turns the imagined into reality can be complex, and the context

in which this transformation must happen can be even more complex. This places extraordinary demands on software designers, demands that can be met only if we collectively “step up” to achieve sustained excellence in design.

We hope this book plays its part.

ACKNOWLEDGMENTS

This book would not have been possible without the many software designers we have been able to study, observe, interview, and simply talk to over the years. We appreciate your generosity, and hope that you might still be able to find a practice or two to adopt. Our sincere gratitude.

In addition, we thank the following individuals for their contributions to the book: Alex Baker, Clive Baldwin, Gerald Bortis, Randi Cohen, Grace Petre Eastty, Max Petre Eastty, Peter Eastty, Thomas Green, Jasper Grimm, Uwe Grimm, Michael Jackson, Christopher Keller, Kimberly Keller, Crista Lopes, Consuelo Lopez, Tamara Lopez, Marie Lufkin Lee, Clara Mancini, Nick Mangano, Lee Martie, Martin Nally, Peter Petre, Edgar Weidema, Greg Wilson.

SOURCE NOTES FOR ILLUSTRATIONS

3—Experts divide and conquer

Trygve Reenskaug (1979). Models - Views - Controllers, Xerox PARC Technical Note, December 10, 1979. Based on Tryvge Reenskaug, THING-MODEL-VIEW-EDITOR—an Example from a Planning System, Xerox PARC Technical Note, May 12, 1979. Available at http://heim.ifi.uio.no/~trygver/2007/MVC_Originals.pdf [Accessed June 15 2016].

6—Experts use metaphor

J. M. Carroll and C. Carrithers (1984). Training Wheels in a User Interface. *Communications of the ACM* 27 (8):800–806.

7—Experts prefer working with others

Used by permission, drawing based on photograph from: A. van der Hoek and M. Petre, eds. (2013). *Software Designers in Action: A Human-Centric Look at Design Work*. CRC Press / Taylor & Francis Group, 452 pages. ISBN 978-1-4665-0109-6.

10—Experts involve the user

Based on dog-appropriate switches designed by Clara Mancini. http://www.open.ac.uk?blogs/ACI/.

13—Experts prefer solutions that they know work

R.T. Fielding and R.N. Taylor (2002). Principled Design of the Modern Web Architecture. *ACM Transactions on Internet Technology* 2 (2):407–416.

28—Experts invent notations

Example provided by Jasper Grimm, based on a notation developed by Jeff Walker: J. Walker (1982). Variations for Numbers Jugglers, *Juggler's World* 34 (1):11–14.

38—Experts address knowledge deficiencies

Based on *The Wizard of Oz*, 1939, Metro-Goldwyn-Mayer.

54—Experts test across representations

Used by permission, drawing based on photograph from A. van der Hoek and M. Petre, eds. (2013). *Software Designers in Action: A Human-Centric Look at Design Work*. CRC Press / Taylor & Francis Group, 452 pp. ISBN 978-1-4665-0109-6.

EXPERTS KEEP IT **SIMPLE**

I

2

EXPERTS SOLVE SIMPLER PROBLEMS FIRST

Experts do not try to think about everything at once. When faced with a complex problem, experts often solve a simpler problem first, one that addresses the same core issue in a more straightforward form. In doing so, they can generate candidate solutions that are incomplete, but provide insight for solving the more complex problem that they actually have to solve.