

Extracted from:

Mastering Ruby Closures

A Guide to Blocks, Procs, and Lambdas

This PDF file contains pages extracted from *Mastering Ruby Closures*, published by the Pragmatic Bookshelf. For more information or to purchase a paperback or PDF copy, please visit <http://www.pragprog.com>.

Note: This extract contains some colored text (particularly in code listing). This is available only in online versions of the books. The printed versions are black and white. Pagination might vary between the online and printed versions; the content is otherwise identical.

Copyright © 2017 The Pragmatic Programmers, LLC.

All rights reserved.

No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form, or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior consent of the publisher.

The Pragmatic Bookshelf

Raleigh, North Carolina

The
Pragmatic
Programmers

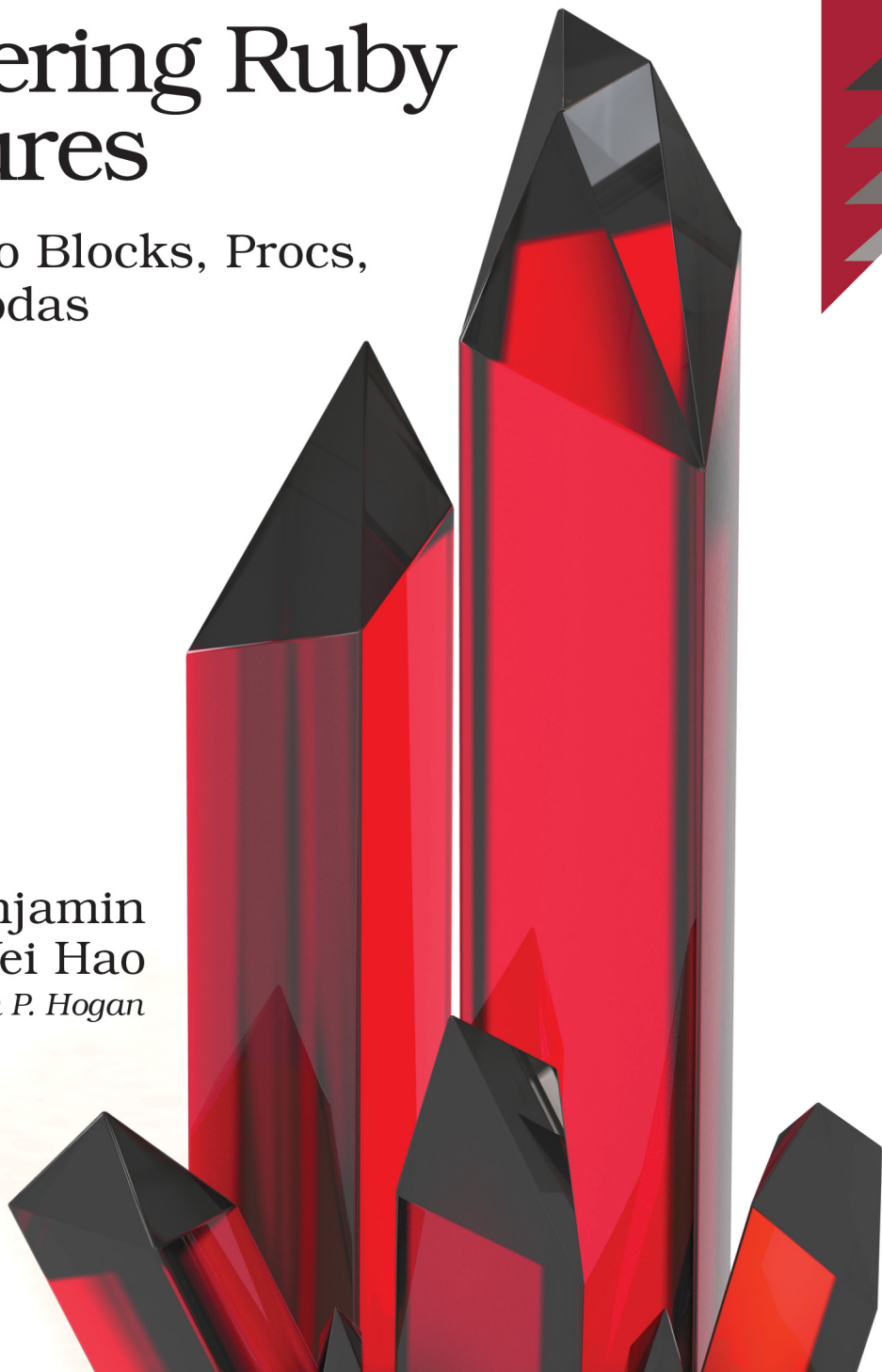
Pragmatic
exPress

Mastering Ruby Closures

A Guide to Blocks, Procs,
and Lambdas

Benjamin
Tan Wei Hao

edited by Brian P. Hogan



Mastering Ruby Closures

A Guide to Blocks, Procs, and Lambdas

Benjamin Tan Wei Hao

The Pragmatic Bookshelf

Raleigh, North Carolina



Many of the designations used by manufacturers and sellers to distinguish their products are claimed as trademarks. Where those designations appear in this book, and The Pragmatic Programmers, LLC was aware of a trademark claim, the designations have been printed in initial capital letters or in all capitals. The Pragmatic Starter Kit, The Pragmatic Programmer, Pragmatic Programming, Pragmatic Bookshelf, PragProg and the linking *g* device are trademarks of The Pragmatic Programmers, LLC.

Every precaution was taken in the preparation of this book. However, the publisher assumes no responsibility for errors or omissions, or for damages that may result from the use of information (including program listings) contained herein.

Our Pragmatic books, screencasts, and audio books can help you and your team create better software and have more fun. Visit us at <https://pragprog.com>.

The team that produced this book includes:

Publisher: Andy Hunt

VP of Operations: Janet Furlow

Executive Editor: Susannah Davidson Pfalzer

Development Editor: Brian P. Hogan

Copy Editor: Nicole Abramowitz

Layout: Gilson Graphics

For sales, volume licensing, and support, please contact support@pragprog.com.

For international rights, please contact rights@pragprog.com.

Copyright © 2017 The Pragmatic Programmers, LLC.

All rights reserved.

No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form, or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior consent of the publisher.

Printed in the United States of America.

ISBN-13: 978-1-68050-261-9

Encoded using the finest acid-free high-entropy binary digits.

Book version: P1.0—August 2017

Welcome!

Welcome to the Ruby closures book! You have taken a very important step toward becoming a better Ruby developer.

Closures are used everywhere in Ruby, from simple scripts to the most popular web frameworks. You might have even been using closures without knowing it.

However, once you become familiar with closures and their features, they will start jumping out at you, and you'll appreciate the ways in which closures enable expressive and beautiful programs. But closures do more than that, especially in Ruby. Closures allow you to *extend* the language by enabling you to write your own domain-specific languages, or DSLs.

This book will take you from being a consumer of beautiful libraries, APIs, and DSLs, to someone who understands, appreciates, and produces the same beautiful code that only comes with close study and experimentation.

Why This Book?

I have been a Ruby programmer for quite a number of years, but until recently, I had been blissfully ignorant of one of Ruby's most powerful features. One day, I saw a co-worker casually write a method that took in a block. I realized immediately that I had a major gap in my Ruby knowledge.

That incident left me unsure of my Ruby skills, so I decided to learn as much as I could about Ruby's blocks. That pursuit also led me to Procs and lambdas.

It didn't take long to discover that blocks, Procs, and lambdas are Ruby's implementation of closures, hence the title of this book. The word "closure" sounds like a scary concept, and indeed, throughout my career, I avoided learning about closures. But not this time. I got my hands on every book, conference video, screencast, and blog post that even mentioned the word "closure" and dove in. This book is the distillation of everything I have learned.

Who Is This Book For?

This book is written with the intermediate Ruby developer in mind. You're already comfortable with programming in Ruby. For example, you may have written some Rails or Sinatra applications, or even dabbled in some metaprogramming, but you're not an expert in the language.

This book will *not* cover the basics of Ruby, except when it relates to the subject matter. There are many excellent books and resources that will do a much better job of covering how to program in Ruby. If you are just starting out, or are a little rusty, you should start with [The Ruby Way \[Ful06\]](#), [Programming Ruby \(2nd edition\) \[FH04\]](#), or [The Well-Grounded Rubyist, Second Edition \[Bla14\]](#) before reading this book.

How to Use This Book

This book's goal is to make you a better Ruby developer. To do that, you have to learn how to read and write good code. This book is designed specifically to help you read and write good code that uses Ruby's closures.

I have strived to make this book as understandable as possible. You will find that I repeat concepts, although in a slightly different way each time. This is intentional, as it helps reinforce important concepts. I find that I learn much better this way, and I hope that works for you too.

Obviously, I shouldn't be doing all the hard work. You will learn better when you try out the code samples in `irb`. More importantly, you will find exercises at the back of every chapter—*DO THEM*. Simply reading about code will not magically transform you into a better developer. You'll find suggested solutions to all the exercises in the back of the book, so you will not be left in the dark if you're stuck, but be sure to give these exercises your best shot before peeking at the answers.

One thing that has helped me improve as a developer is, as Gregory Brown from Practicing Ruby¹ puts it, to build *cheap counterfeits*. Throughout this book, you will implement your own versions of built-in features, as well as scaled-down versions of popular libraries, purely for educational purposes, so you can see how you might build them.

1. <http://practicinruby.com/articles/patterns-for-building-excellent-examples>

What's in This Book

This book is broken into four parts. The first three parts get you comfortable with blocks, Procs, and lambdas, and the last part gives you some practice using those concepts.

In [Chapter 1, *Closing in on Closures*, on page ?](#), you'll explore the basics of closures. This chapter lays the groundwork for the rest of the book.

In [Chapter 2, *Beautiful Blocks*, on page ?](#), you'll dive into blocks, where you'll start with the basics and build your very own implementations of Enumerable and Enumerator in Ruby. You'll learn about the patterns that involve blocks and how they are used in real-world code.

In [Chapter 3, *The Power of Procs and Lambdas*, on page ?](#), you'll learn how to create and use *Procs* and *lambdas*, and you'll learn to appreciate the special relationship that blocks, Procs, and lambdas have with each other. Doing the exercises in this chapter will change how you write Ruby code.

Finally, in [Chapter 4, *Building Your Own Lazy Enumerables*, on page ?](#), you'll put what you have learned into practice as you build a stripped-down (but working) version of *lazy* enumerables. Along the way, you will work with fibers, generators, and yielders. If that all seems intimidating or has left you scratching your head, don't worry; by the time you get to this chapter, you'll be well-prepared.

About Ruby Versions

I used Ruby 2.2.X to develop the examples. Ruby 1.9.X and 2.X should have no problems. Earlier versions of Ruby have confusing behavior with regard to Procs that was fixed in later versions. Before you start, make sure you have an appropriate version of Ruby installed.

Where to Go for Help

The book's website² has links to a forum and the source code for this book, as well as a place for you to report any issues you may have found while reading the book.

I hope you're excited and ready to go! Warm up your brain and fire up your console, because we are diving straight into the fascinating world of closures.

2. <http://pragprog.com/titles/btrubyclo>