

AngularJS in Action

AngularJS in Action

LUKAS RUEBBELKE
with BRIAN FORD



MANNING
Shelter Island

For online information and ordering of this and other Manning books, please visit www.manning.com. The publisher offers discounts on this book when ordered in quantity. For more information, please contact

Special Sales Department
Manning Publications Co.
20 Baldwin Road
PO Box 761
Shelter Island, NY 11964
Email: orders@manning.com

©2015 by Manning Publications Co. All rights reserved.

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

Many of the designations used by manufacturers and sellers to distinguish their products are claimed as trademarks. Where those designations appear in the book, and Manning Publications was aware of a trademark claim, the designations have been printed in initial caps or all caps.

© Recognizing the importance of preserving what has been written, it is Manning's policy to have the books we publish printed on acid-free paper, and we exert our best efforts to that end. Recognizing also our responsibility to conserve the resources of our planet, Manning books are printed on paper that is at least 15 percent recycled and processed without the use of elemental chlorine.

 Manning Publications Co.
20 Baldwin Road
PO Box 761
Shelter Island, NY 11964

Development editor: Cynthia Kane
Technical development editor: Leonardo Cassarani
Copyeditor: Benjamin Berg
Proofreader: Katie Tennant
Technical proofreader: Richard Scott-Robinson
Typesetter: Gordan Salinovic
Cover designer: Marija Tudor

ISBN 9781617291333

Printed in the United States of America

1 2 3 4 5 6 7 8 9 10 – EBM – 20 19 18 17 16 15

*To my father, Daniel Ruebelke,
who is the foundation of my life*

brief contents

PART 1	GET ACQUAINTED WITH ANGULARJS	1
	1 ■ Hello AngularJS	3
	2 ■ Structuring your AngularJS application	20
PART 2	MAKE SOMETHING WITH ANGULARJS	33
	3 ■ Views and controllers	35
	4 ■ Models and services	57
	5 ■ Directives	80
	6 ■ Animations	115
	7 ■ Structuring your site with routes	130
	8 ■ Forms and validations	142
APPENIDXES	153
	A ■ Setting up Karma	153
	B ■ Setting up a Node.js server	158
	C ■ Setting up a Firebase server	160
	D ■ Running the app	162

contents

foreword xiii
preface xv
acknowledgments xvi
about this book xvii
about the authors xx
about the cover illustration xxi

PART 1 GET ACQUAINTED WITH ANGULARJS1

1 Hello AngularJS 3

- 1.1 Advantages of using AngularJS 4
- 1.2 The AngularJS big picture 6
- 1.3 Build your first AngularJS application 7
 - The module* 10 ▪ *Views and controllers* 11 ▪ *Services* 15
 - Directives* 17
- 1.4 Summary 18

2 Structuring your AngularJS application 20

- 2.1 Hello Angello 20
- 2.2 AngularJS application structure 23

- 2.3 Laying the Angello foundation 25
- 2.4 Basic routes and navigation 26
- 2.5 A few best practices 30
- 2.6 Summary 31

PART 2 MAKE SOMETHING WITH ANGULARJS.....33

3 Views and controllers 35

- 3.1 The big picture 36
- 3.2 What is an AngularJS view? 38
- 3.3 What is an AngularJS controller? 39
 - The digest cycle* 40 ▪ *Controller as syntax* 41 ▪ *AngularJS events* 42
- 3.4 Properties and expressions 43
 - Display stories with ngRepeat* 43 ▪ *Filters* 46 ▪ *Expressions* 48
- 3.5 Best practices and testing 54
- 3.6 Summary 56

4 Models and services 57

- 4.1 What are models and services? 58
 - Hello services* 59 ▪ *The service lifecycle* 59 ▪ *The different types of services* 60
- 4.2 Models with \$http 63
 - What is \$http?* 63 ▪ *Create your first model* 64
 - \$http convenience methods* 65
- 4.3 Promises 67
 - What are promises?* 68 ▪ *Promises in action* 68 ▪ *\$http.success and \$http.error* 69 ▪ *Elegant sequencing with promises* 70
- 4.4 \$http interceptors 71
 - Why intercept?* 71 ▪ *Interceptors in action* 72
- 4.5 Service decorators 73
 - Why decorate?* 73 ▪ *Enhanced logging* 73
- 4.6 Testing consideration 75
 - Testing a service* 75
 - Using \$httpBackend to mock server calls* 76 ▪ *Best practices* 78
- 4.7 Summary 78

5 Directives 80

- 5.1 Introduction to directives 80
 - What are directives?* 80 ▪ *Why we need directives* 81 ▪ *Why we want directives* 81
- 5.2 Directives 101: a quick foundation 81
 - The user story directive* 82
- 5.3 A more advanced feature 87
 - The drag-and-drop feature* 87 ▪ *Use the drag-container directive* 89 ▪ *Build the controller* 90 ▪ *Create the drop-container directive* 92 ▪ *Use the drop-container directive* 93 ▪ *Build the controller* 94 ▪ *Create the drop-target directive* 100 ▪ *Use the drop-target directive* 102 ▪ *Build the controller* 102 ▪ *Create the \$dragging service* 103 ▪ *Update the StoryboardCtrl* 104
- 5.4 Integrating with third-party libraries again! 106
 - Install Flot* 106 ▪ *Build the directive* 107 ▪ *Use the directive* 107 ▪ *Massage our data* 107 ▪ *It's time we had the "isolated scope talk"* 109 ▪ *Grand finale: breathe life into Flot* 110
- 5.5 Testing a directive 112
- 5.6 Best practices 113
- 5.7 Summary 114

6 Animations 115

- 6.1 Intro to animations 115
 - How AngularJS handles animations* 116 ▪ *The animation-naming convention* 116 ▪ *Animations enable!* 117
- 6.2 CSS transitions 118
 - Define the base transition* 118 ▪ *Define the ng-enter transitions* 118 ▪ *Define the ng-leave transitions* 119 ▪ *Making it move* 119
- 6.3 CSS animations 121
 - Define the base animation classes* 121 ▪ *Define the animation keyframes* 121 ▪ *Make it move* 124
- 6.4 JavaScript animations 124
 - Defining the JavaScript animation* 125 ▪ *The JavaScript animation events* 126 ▪ *The JavaScript animation class* 126 ▪ *TweenMax* 127 ▪ *Making it move* 127
- 6.5 Testing 128

6.6 Best practices 128

6.7 Summary 129

7 *Structuring your site with routes* 130

7.1 The components of AngularJS routes 131

7.2 How to create routes in AngularJS 132

Create your first route with `ngRoute` and `ngView` 132 ▪ *Add `ngView` 132* ▪ *Set up your route with `$routeProvider` 132*
Set up route navigation 134 ▪ *Review 134*

7.3 Using parameters with routes 135

Review 137

7.4 Using `resolve` with routes 137

Review 138

7.5 Route events 139

Review 139

7.6 Testing 139

7.7 Best practices 140

7.8 Summary 141

8 *Forms and validations* 142

8.1 The big picture: AngularJS form validation 143

Extending HTML form elements 143 ▪ *Adding validations 144*
Form validation and CSS 148 ▪ *Form validation, `$setPristine`,
and `$setUntouched` 149*

8.2 Testing 149

8.3 Best practices 152

8.4 Summary 152

appendix A Setting up Karma 153

appendix B Setting up a Node.js server 158

appendix C Setting up a Firebase server 160

appendix D Running the app 162

index 163

foreword

I realized how awesome Lukas was the day we met at ng-europe. After the conference, we started talking more and I participated in a hackathon he organized, and the other way around. The one passion we share, and what has brought us together, is helping people build awesome stuff. I know for a fact that was the reason he decided to write this book. Not for him, but for you!

AngularJS is quickly becoming one of *the* front-end frameworks to use. It's also one of the most rapidly changing frameworks out there. In this book, you'll learn how you can build an exciting application from top to bottom with AngularJS, while learning what controllers, templates, directives, services, factories, and providers are. Instead of an extensive in-depth guide to Angular's features, in this book you'll get a quick glance at what they are and then get your hands dirty so you can learn by using them! You'll learn not only how to code this application, but also how to test it.

Angello is the exciting application—it uses some of the most interesting libraries out there for AngularJS. It's a project management tool very similar to Trello. Throughout the book, you'll learn how to implement the different pieces of this application, and how to use ui-router, Auth0, and Firebase, among others.

I know you'll find this book really useful. Happy hacking!

MARTIN GONTOVNIKAS
DEVELOPER ADVOCATE, AUTH0

preface

Never in my wildest dreams did I think that I would be an author, and yet here I am. I vividly remember the panic that I felt as I clicked “Publish” on my first WordPress post on AngularJS. It felt like I was pressing the launch button for a series of missiles, and I had no idea where they would go! Little did I know that I had in fact released a series of missiles that would change my life in the most profound and unexpected ways.

The moment I decided that I cared more about being helpful than being perfect was one of the most important turning points of my life. Beginning with a series of barely passable blog posts, by accepting every opportunity to implement feedback I gradually grasped what it takes to write a solid blog post. It was also during that time that I had the opportunity to become friends with the AngularJS core team. AngularJS at the time was still relatively unknown, and so it was much easier to get on their radar than it is now. Lucky me!

I’ll never forget that afternoon when I got the email asking if I was interested in writing this book. When I was pretty sure that no one was looking, I would break out into this little happy dance for days. If only my high school English teacher could see me now!

From that moment, I have considered it a great privilege to share with you the things I’ve learned while building some large applications and writing untold lines of AngularJS code. It’s been a most excellent journey, and I thank each and every one of you for making this possible!

LUKAS RUEBBELKE

acknowledgments

This book wouldn't have been possible without the input and support from the amazing AngularJS community. I want to thank Brad Green, Igor Minar, Miško Hevery, Brian Ford, and Matias Niemela for their friendship and for setting such a great example of what it looks like to build awesome things. I would also like to thank Jeff Whelpley, Brandon Tilley, Omar Gonzalez, Martin Gontovnikas, Joe Eames, and about a hundred other people for their feedback. They helped me craft Angello and the book that's built around it. I would also like to thank Geoff Goodman for his contributions on the awesome drag-and-drop example. And I owe Jonathan Garvey a huge debt of gratitude for helping me get this book over the finish line. You are holding this book right now because of his help and tough love. Special thanks to Martin for penning the foreword to the book, and to Brian for his contributions at the beginning of the project.

I especially want to thank my saint of an editor, Cynthia Kane, for her infinite patience, for helping me to become a better writer, and for sometimes nudging me to do things I didn't want to do—like write! Thanks also to everyone else on the Manning team who worked with me during the development and production of the book.

Many people read early drafts of the manuscript and sent in corrections and comments as it was being written, including numerous MEAP (Manning Early Access Program) readers, as well as the following reviewers: Ahmed Khattab, Brian Cooksey, Chad Davis, Daniel Bretoi, Fernando Monteiro Kobayashi, Gregor Zurowski, Jeelani Shaik, Jeff Condal, Jeff Cunningham, Richard Scott-Robinson, Robert Casto, Roberto Rojas, and William E. Wheeler. Thanks to all, with a special acknowledgment to technical proofreader Richard Scott-Robinson, who checked the code and read the manuscript one last time, shortly before it went into production.

about this book

The goal of this book is to equip you, the reader, with an arsenal of practical techniques that you can use in the real world—to help you build a non-trivial web application from the ground up, and offer commentary on the most pertinent pieces. The sample application presented in the book, Angello, comes with a fully functional back end in either Firebase or Node.js with a few extra bonuses such as social logins with Auth0.

We had to make some hard decisions about what we were going to cover in the book and, more importantly, what we would not cover. It would have been easy to go down a rabbit trail as we tried to explain AngularJS on a molecular level, but the actual application of this knowledge is relegated to edge cases at best. We'll be the first to admit that we don't cover everything about AngularJS—that would make for a book three times the size of what is currently in your possession.

We make some assumptions about the readers of this book so they'll get the most out of the material. We assume a fundamental knowledge of HTML, CSS, and JavaScript. We don't call out the CSS or HTML in the application unless it pertains specifically to what we're doing in AngularJS.

Roadmap

We've divided the book into two main sections: a gentle introduction to AngularJS and then an in-depth commentary on the pieces of AngularJS, as we start to build out Angello.

Part 1, “Get acquainted with AngularJS,” introduces the high-level pieces of AngularJS and talks about what each piece does and how they fit together (chapter 1). To reiterate these concepts, we build out our first AngularJS application, a simplified version of the main sample application, in chapter 2.

Part 2, “Make something with AngularJS,” gets into more advanced and specific topics, such as server-side communication, directives, animations, routing, and forms and validations. In each chapter, we look at the underpinnings of the topic and then see how it appears in the context of a real application. We end each chapter with a discussion on testing and best practices. Chapter 3 discusses how views and controllers work together in AngularJS to control what the user sees, as well as capture user interactions and convey those events for processing. Chapter 4 expands on controllers by introducing services and then showing how to communicate with a remote server using the `$http` service. Chapter 5 introduces directives and shows how directives turn layouts into components while providing complex functionality. We’ll kick our layouts up a notch in chapter 6 by adding in animations using `ngAnimate`. Chapter 7 digs into using routes in AngularJS to deep-link to specific states in the application, preloading specific data using `resolve`, and passing variables from route to route using `$routeParams`. Chapter 8 finishes off with a discussion on how to use form validation to enhance the user experience while providing safeguards around the data being entered.

There are also four appendixes about setting up Karma, setting up a Node.js server, setting up a Firebase server, and running the sample app.

Source code conventions and downloads

The source code in the book, whether in code listings or snippets, is in a fixed-width font like this, which sets it off from the surrounding text. In some listings, the code is annotated to point out key concepts, and numbered bullets are sometimes used in the text to provide additional information about the code. The code is formatted so that it fits within the available page space in the book by adding line breaks and using indentation carefully.

All of the source code for the examples in the book can be found at this Github link: <https://github.com/angularjs-in-action>. The sample application for the book is at this repository: <https://github.com/angularjs-in-action/angelo>. The simplified version of the application is at this repository: <https://github.com/angularjs-in-action/angelo-lite>.

You can also find detailed instructions on how to get the applications up and running in the readme file. Visit the repo often for updates and bug fixes to the project as well as bonus repositories.

The source code is also available for download from the publisher’s website at www.manning.com/AngularJSinAction.

NOTE At the time of this writing, Angular 2 is in an alpha release and not yet ready for writing non-trivial applications. With that said, we’ll be publishing an Angular 2 version of Angello as soon as it makes sense.

Software requirements

To run the sample applications, you'll need to have Node.js installed. You can find the installation instructions for Node.js at this link: <https://nodejs.org/>. To run the tests, it's also necessary to have Karma installed to execute the unit tests. You can find instructions on how to install Karma at their website: <http://karma-runner.github.io/0.12/index.html>.

We also recommend installing the `serve` npm module, a lightweight web server to display your web applications in the browser: <https://www.npmjs.com/package/serve>.

Resources

- The most valuable resources for the book are the repositories you will find at the link <https://github.com/angularjs-in-action>.
- You can also see a live version of Angello at the companion site for the book at this link: <http://www.angelloinaction.com/>.
- And you'll find a ton of helpful material at the blog "One Hungry Mind" here: <http://onehungrymind.com/>. Additional content relating to Angello, based on reader feedback, will be posted.

Author Online

Purchase of *AngularJS in Action* includes free access to a private web forum run by Manning Publications where you can make comments about the book, ask technical questions, and receive help from the authors and other users. To access the forum and subscribe to it, point your web browser to www.manning.com/AngularJSinAction. This Author Online (AO) page provides information on how to get on the forum once you're registered, what kind of help is available, and the rules of conduct on the forum.

Manning's commitment to our readers is to provide a venue where a meaningful dialog among individual readers and between readers and authors can take place. It's not a commitment to any specific amount of participation on the part of the authors, whose contribution to the forum remains voluntary (and unpaid). We suggest you try asking the authors some challenging questions, lest their interest stray!

The AO forum and the archives of previous discussions will be accessible from the publisher's website as long as the book is in print.

about the authors



LUKAS RUEBBELKE started programming in 2001 when he discovered Flash. He learned to program in ActionScript 1.0, which is a prototypical language. Almost fifteen years later, he has come full circle as he spends almost all of his time writing JavaScript.

Lukas lives in Phoenix, Arizona, where he is passionately dedicated to the community and cohosts one of the largest meetups in the valley. He's also an avid blogger at <http://onehungrymind.com/> and has spoken at many conferences, including ng-conf, ng-europe, and ng-vegas. He is completely sold on the belief that programming changes lives, and this book is one of the artifacts of his deeply held conviction.

BRIAN FORD is a developer working on the Angular core team at Google. Self-described as often “the most millennial person in the room,” Brian started committing to Angular core while studying Computer Science Engineering at the University of Michigan.

about the cover illustration

The figure on the cover of *AngularJS in Action* is captioned “Man from Vukovar, Croatia.” The illustration is taken from a reproduction of an album of traditional Croatian costumes from the mid-nineteenth century by Nikola Arsenovic, published by the Ethnographic Museum in Split, Croatia, in 2003. The illustrations were obtained from a helpful librarian at the museum, itself situated in the Roman core of the medieval center of the town: the ruins of Emperor Diocletian’s retirement palace from around AD 304. The book includes finely colored illustrations of figures from different regions of Croatia, accompanied by descriptions of the costumes and of everyday life.

Vukovar is a mid-sized town in eastern Croatia. It has the country’s largest river port, located at the confluence of the Vuka River with the Danube. Vukovar has always been a thriving community due to its fortunate location, and it has served as a gateway to Austria and the west for centuries. The figure on the cover is dressed in his Sunday finery—blue woolen pants, a black woolen vest over a white linen shirt, topped by a voluminous black cloak—all richly adorned with the intricate and colorful embroidery that is typical for this region of Croatia.

Dress codes and lifestyles have changed over the last 200 years, and the diversity by region, so rich at the time, has faded away. It is now hard to tell apart the inhabitants of different continents, let alone of different hamlets or towns separated by only a few miles. Perhaps we have traded cultural diversity for a more varied personal life—certainly for a more varied and fast-paced technological life.

Manning celebrates the inventiveness and initiative of the computer business with book covers based on the rich diversity of regional life of two centuries ago, brought back to life by illustrations from old books and collections like this one.