Full-Stack React Projects Second Edition

Learn MERN stack development by building modern web apps using MongoDB, Express, React, and Node.js

Shama Hoque



Full-Stack React Projects Second Edition

Copyright © 2020 Packt Publishing

All rights reserved. No part of this book may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, without the prior written permission of the publisher, except in the case of brief quotations embedded in critical articles or reviews.

Every effort has been made in the preparation of this book to ensure the accuracy of the information presented. However, the information contained in this book is sold without warranty, either express or implied. Neither the author, nor Packt Publishing or its dealers and distributors, will be held liable for any damages caused or alleged to have been caused directly or indirectly by this book.

Packt Publishing has endeavored to provide trademark information about all of the companies and products mentioned in this book by the appropriate use of capitals. However, Packt Publishing cannot guarantee the accuracy of this information.

Acquisition Editor: Clint Rodricks

Content Development Editor: Aamir Ahmed

Senior Editor: Hayden Edwards Technical Editor: Deepesh Patel Copy Editor: Safis Editing Project Coordinator: Kinjal Bari Proofreader: Safis Editing Indexer: Manju Arasan

Production Designer: Joshua Misquitta

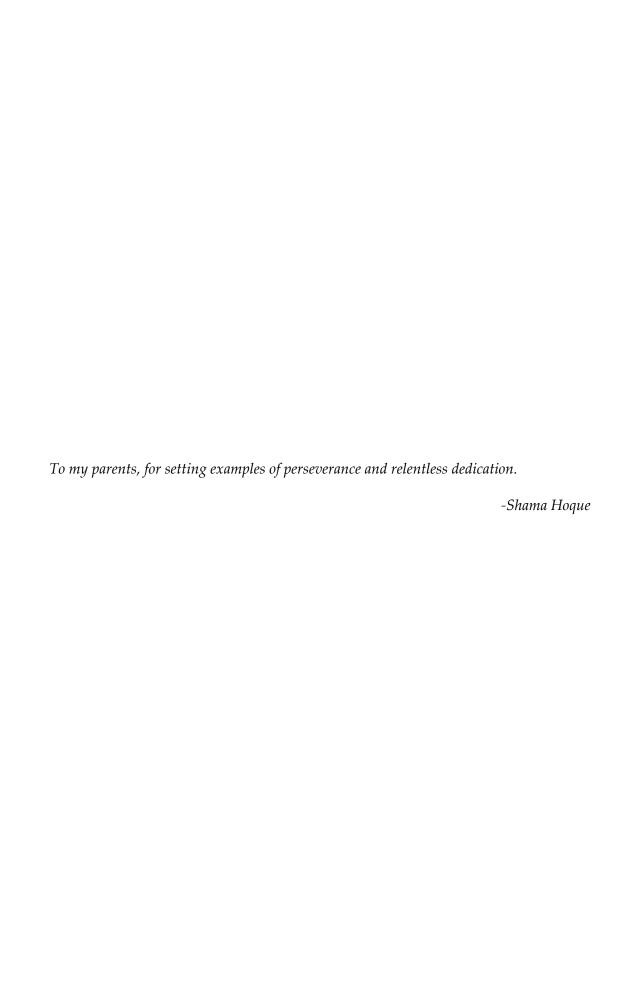
First published: May 2018 Second edition: April 2020

Production reference: 1160420

Published by Packt Publishing Ltd. Livery Place 35 Livery Street Birmingham B3 2PB, UK.

ISBN 978-1-83921-541-4

www.packt.com





Packt.com

Subscribe to our online digital library for full access to over 7,000 books and videos, as well as industry leading tools to help you plan your personal development and advance your career. For more information, please visit our website.

Why subscribe?

- Spend less time learning and more time coding with practical eBooks and Videos from over 4,000 industry professionals
- Improve your learning with Skill Plans built especially for you
- Get a free eBook or video every month
- Fully searchable for easy access to vital information
- Copy and paste, print, and bookmark content

Did you know that Packt offers eBook versions of every book published, with PDF and ePub files available? You can upgrade to the eBook version at www.packt.com and as a print book customer, you are entitled to a discount on the eBook copy. Get in touch with us at customercare@packtpub.com for more details.

At www.packt.com, you can also read a collection of free technical articles, sign up for a range of free newsletters, and receive exclusive discounts and offers on Packt books and eBooks.

Contributors

About the author

Shama Hoque has more than 9 years of experience as a software developer and mentor, with a master's in software engineering from Carnegie Mellon University.

From Java programming to full-stack development with JavaScript, the applications she has worked on include national Olympiad registration websites, universally accessible widgets, video conferencing apps, and 3D medical reconstruction software.

Currently, she makes web-based prototypes for R&D start-ups in California, while training aspiring software engineers and teaching web development to CS undergrads in Bangladesh.

About the reviewers

Kirill Ezhemenskii is an experienced software engineer, frontend and mobile developer, solution architect, and the CTO of a healthcare company. He is also a functional programming advocate; an expert in the React stack, GraphQL, and TypeScript; and a React Native mentor.

Carlos Santana Roldán is a senior web developer with more than 12 years of experience. Currently, he is working as a senior React developer at MindBody Inc. He is the founder of Dev Education, one of the most popular developer communities in Latin America, training people in web technologies such as React, Node.js, GraphQL, and JavaScript in general.

Packt is searching for authors like you

If you're interested in becoming an author for Packt, please visit authors.packtpub.com and apply today. We have worked with thousands of developers and tech professionals, just like you, to help them share their insight with the global tech community. You can make a general application, apply for a specific hot topic that we are recruiting an author for, or submit your own idea.

Table of Contents

Pretace	1
Section 1: Getting Started with MERN	
Chapter 1: Unleashing React Applications with MERN	9
What is new in the second edition?	10
Book structure	10
Getting started with MERN	11
Building MERN applications from the ground up	11
Developing web applications with MERN	11
Advancing to complex MERN applications	11
Going forward with MERN	12
Getting the most out of this book	12
The MERN stack	14
Node	14
Express	15
MongoDB	16
React	17
Relevance of MERN	17
Consistency across the technology stack	18
Takes less time to learn, develop, deploy, and extend	18
Widely adopted in the industry	18
Community support and growth	18
Range of MERN applications	19
MERN applications developed in this book	19
Social media platform	20
Web-based classroom application	21 22
Online marketplace Expense tracking application	23
Media streaming application	24
VR game for the web	25
Summary	26
Chapter 2: Preparing the Development Environment	27
Selecting development tools	27
Workspace options	28
Local and cloud development	28
IDE or text editors	28
Chrome Developer Tools	29
Git	29
Installation	29

Remote Git hosting services	30
Setting up MERN stack technologies	30
MongoDB	30
Installation	31
Running the mongo shell	31
Node.js	31
Installation	32
Node version management with nvm	32
Yarn package manager	32
Modules for MERN	33
Key modules	33
devDependency modules	33
Checking your development setup	35
Initializing package json and installing Node js modules	36
Configuring Babel, Webpack, and Nodemon	37
Babel	38
Webpack	38
Client-side Webpack configuration for development	39
Server-side Webpack configuration	41
Client-side Webpack configuration for production	42
Nodemon	43
Frontend views with React	43
Server with Express and Node	45
Express app Pundling Poset and during development	45 45
Bundling React app during development Serving static files from the dist folder	45 46
Rendering templates at the root	46
Connecting the server to MongoDB	47
Run scripts	48
Developing and debugging in real time	49
Summary	
Sullillary	49
Section 2: Building MERN from the Ground Up	
hapter 3: Building a Backend with MongoDB, Express, and Node	53
Overview of the skeleton application	54
Feature breakdown	54
Defining the backend components	54 54
User model	55
API endpoints for user CRUD	55
Auth with JSON Web Tokens	56
How JWT works	56
Setting up the skeleton backend	58
Folder and file structure	58
Initializing the project	59
Adding package.json	59
Development dependencies	60
Babel	60

Webpack	61
Nodemon	61
Config variables	61
Running scripts	62
Preparing the server	62
Configuring Express	62
Starting the server	64
Setting up Mongoose and connecting to MongoDB	65
Serving an HTML template at a root URL	66
Implementing the user model	67
User schema definition	68
Name	68
Email	68
Created and updated timestamps	69
Hashed password and salt Password for auth	69
	69 70
Handling the password string as a virtual field Encryption and authentication	70 70
Password field validation	70 72
Mongoose error handling	72
Adding user CRUD APIs	74
User routes	74 75
User controller	76
Creating a new user Listing all users	77
	78
Loading a user by ID to read, update, or delete Loading	78 79
Reading	79 79
Updating	80
Deleting	81
Integrating user auth and protected routes	82
Auth routes	82
Auth controller	83
Sign-in	84
Signout	85
Protecting routes with express-jwt	86
Protecting user routes	86
Requiring sign-in	87
Authorizing signed in users	87
Auth error handling for express-jwt	88
Checking the standalone backend	88
Creating a new user	89
Fetching the user list	90
Trying to fetch a single user	90
Signing in	92
Fetching a single user successfully	93
Summary	
Julilliai y	94

Chapter 4: Adding a React Frontend to Complete MERN	95
Defining the skeleton application frontend	96
Folder and file structure	97
Setting up for React development	98
Configuring Babel and Webpack	99
Babel	99
Webpack	100
Loading Webpack middleware for development	100
Loading bundled frontend code	102
Serving static files with Express	102
Updating the template to load a bundled script	102
Adding React dependencies	103
React React Router	103 103
Material-UI	103
Rendering a home page view	104
Entry point at main.js	104
Root React component	105
Customizing the Material-UI theme	105
Wrapping the root component with ThemeProvider and BrowserRouter	107
Marking the root component as hot-exported	108
Adding a home route to MainRouter	108
The Home component	109
Imports	110
Style declarations	110
Component definition	112
Bundling image assets	113
Running and opening in the browser	113
Integrating backend APIs	114
Fetch for user CRUD	114
Creating a user	114
Listing users	115
Reading a user profile	115
Updating a user's data Deleting a user	116 117
Fetch for the auth API	118
Sign-in	118
Sign-out	119
Adding auth in the frontend	119
Managing auth state	120
Saving credentials	120
Retrieving credentials	121
Deleting credentials	121
The PrivateRoute component	122
Completing the User frontend	123
The Users component	124
The Signup component	127