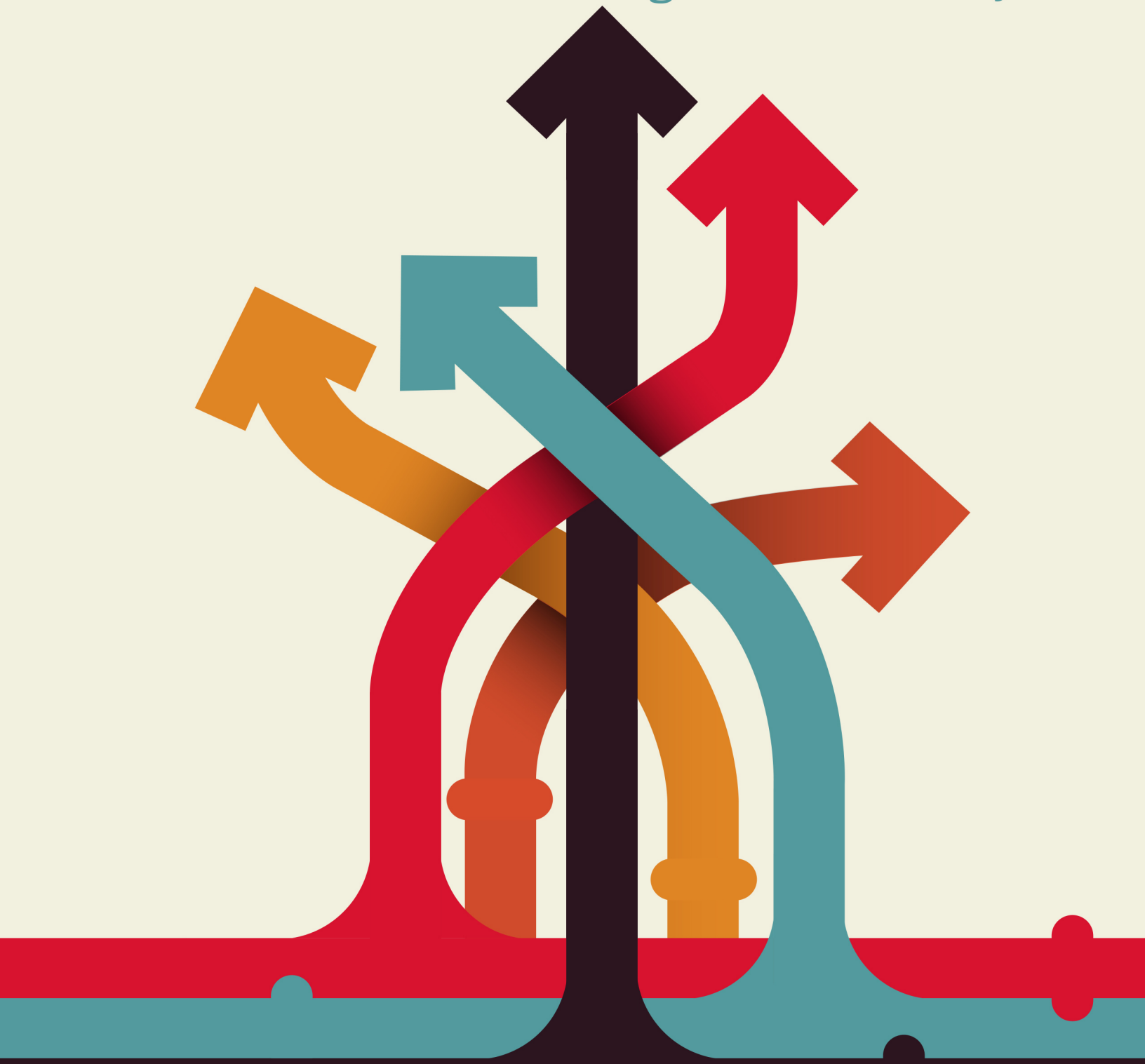
EASY LARAVEL 5

A Hands On Introduction Using a Real-World Project



W. JASON GILMORE

easylaravelbook.com

Easy Laravel 5

A Hands On Introduction Using a Real-World Project

W. Jason Gilmore

This book is for sale at http://leanpub.com/easylaravel

This version was published on 2016-04-27

This is a Leanpub book. Leanpub empowers authors and publishers with the Lean Publishing process. Lean Publishing is the act of publishing an in-progress ebook using lightweight tools and many iterations to get reader feedback, pivot until you have the right book and build traction once you do.

© 2014 - 2016 W. Jason Gilmore

Also By W. Jason Gilmore

Easy Active Record for Rails Developers

Easy E-Commerce Using Laravel and Stripe

Easy React

Dedicated to The Champ, The Princess, and Little Winnie. Love, Daddy

Contents

Introduction

I've spent the vast majority of the past 16 years immersed in the PHP language. During this time I've written eight PHP-related books, including a bestseller that has been in print for more than eleven years. Along the way I've worked on dozens of PHP-driven applications for clients ranging from unknown startups to globally-recognized companies, penned hundreds of articles about PHP and web development for some of the world's most popular print and online publications, and personally delivered training sessions to hundreds of developers. So you might be surprised to learn a few years ago I became rather disenchanted with the very language that for so very long had consumed the better part of my professional career. It felt like there were more exciting developments taking place within other programming communities, and wanting to be part of that buzz, I wandered off. In recent years, I spent the majority of my time working on a variety of projects including among others several ambitious Ruby on Rails applications and even a pretty amazing Linux-powered robotic device.

Of course, old habits are hard to break and so during this time I kept tabs on the PHP community, watching with great interest as several talented developers worked tirelessly to inject that missing enthusiasm back into the language. During my time in the wilderness Nils Adermann and Jordi Boggiano released the Composer[1] dependency manager. The Framework Interoperability Group[2] was formed. And in 2012 the incredibly talented Taylor Otwell[3] created the Laravel framework[4] which quickly soared in popularity to become the most followed PHP project on GitHub, quickly surpassing projects and frameworks that had been under active development for years.

At some point I spent some time with Laravel and after a scant 30 minutes knew it was the real deal. Despite being a relative newcomer to the PHP framework landscape, Laravel is incredibly polished, offering a shallow learning curve, easy test integration, a great object-relational mapping solution called Eloquent, and a wide variety of other great features. In the pages to follow I promise to add you to the ranks of fervent Laravel users by providing a wide-ranging and practical introduction to its many features.

What's New in Laravel 5?

Laravel 5 is an ambitious step forward for the popular framework, offering quite a few new features. In addition to providing newcomers with a comprehensive overview of Laravel's fundamental capabilities, I'll devote special coverage to several of these new features, including:

[1] https://getcomposer.org/
[2] http://www.php-fig.org/
[3] http://taylorotwell.com/
[4] http://laravel.com/

- **New project structure**: Laravel 5 projects boast a revamped project structure. In chapter 1 I'll review every file and directory comprising the new structure so you know exactly where to find and place project files and other assets.
- **Improved environment configuration**: Laravel 5 adopts the PHP dotenv[5] package for environment configuration management. I think Laravel 4 users will really find the new approach to be quite convenient and refreshing. I'll introduce you to this new approach in chapter 1.
- **Elixir**: Elixir[6] offers Laravel users a convenient way to automate various development tasks using Gulp[7], among them CSS and JavaScript compilation, JavaScript linting, image compression, and test execution. I'll introduce you to Elixir in chapter 2.
- **Flysystem**: Laravel 5 integrates Flysystem[8], which allows you to easily integrate your application with remote file systems such as Dropbox, S3 and Rackspace.
- **Form requests**: Laravel 5's new form requests feature greatly reduces the amount of code you'd otherwise have to include in your controller actions when validating form data. In chapter 5 I'll introduce you to this great new feature.
- **Middleware**: Middleware is useful when you want to interact with your application's request and response process in a way that doesn't pollute your application-specific logic. Chapter 7 is devoted entirely to this topic.
- **Easy user authentication**: User account integration is the norm these days, however integrating user registration, login, logout, and password recovery into an application is often tedious and time-consuming. Laravel 5 all but removes this hassle by offering these features as a turnkey solution. You'll learn all about Laravel authentication in chapter 6.
- **Event handling**: Laravel 5 event handlers allow you to reduce redundant logic otherwise found in your controllers by packaging bits of logic separately and then executing that logic in conjunction following certain events, such as sending an e-mail following the registration of a new user. In chapter 11 you'll learn how to create an event handler and then integrate a corresponding event listener into your code.
- **The Lumen Microframework**: Although not part of the Laravel framework per se, Lumen is an optimized version of Laravel useful for creating incredibly fast micro-services and REST APIs. I'll introduce you to this great framework in chapter 10.

But we're not going to stop with a mere introduction to these new features. I want you to learn how to build *real-world* Laravel applications, and so I additionally devote extensive coverage to about topics such as effective CSS and JavaScript integration, automated testing, and more!

About this Book

This book is broken into twelve chapters and an appendix, each of which is briefly described below.

[5] https://github.com/vlucas/phpdotenv
[6] https://github.com/laravel/elixir
[7] http://gulpjs.com/
[8] https://github.com/thephpleague/flysystem

Chapter 1. Introducing Laravel

In this opening chapter you'll learn how to create and configure your Laravel project both using your existing PHP development environment and Laravel Homestead. I'll also show you how to properly configure your environment for effective Laravel debugging, and how to expand Laravel's capabilities by installing several third-party Laravel packages that promise to supercharge your development productivity. We'll conclude the chapter with an introduction to PHPUnit, showing you how to create and execute your first Laravel unit test!

Chapter 2. Managing Your Project Controllers, Layout, Views, and Other Assets

In this chapter you'll learn how to create controllers and actions, and define the routes used to access your application endpoints using Laravel 5's new route annotations feature. You'll also learn how to create the pages (views), work with variable data and logic using the Blade templating engine, and reduce redundancy using layouts and view helpers. I'll also introduce Laravel Elixir, a new feature for managing Gulp[9] tasks, and show you how to integrate the popular Bootstrap front-end framework and jQuery JavaScript library. We'll conclude the chapter with several examples demonstrating how to test your controllers and views using PHPUnit.

Chapter 3. Talking to the Database

In this chapter we'll turn our attention to the project's data. You'll learn how to integrate and configure the database, create and manage models, and interact with the database through your project models. You'll also learn how to deftly configure and traverse model relations, allowing you to greatly reduce the amount of SQL you'd otherwise have to write to integrate a normalized database into your application.

Chapter 4. Model Relations, Scopes, and Other Advanced Features

Building and navigating table relations is an standard part of the development process even when working on the most unambitious of projects, yet this task is often painful when working with many web frameworks. Fortunately, using Laravel it's easy to define and traverse these relations. In this chapter I'll show you how to define, manage, and interact with one-to-one, one-to-many, many-to-many, has many through, and polymorphic relations. You'll also learn about a great feature known as scopes which encapsulate the logic used for more advanced queries, thereby hiding it from your controllers.

[9] http://gulpjs.com/

Chapter 5. Integrating Web Forms

Your application will almost certainly contain at least a few web forms, which will likely interact with the models, meaning you'll require a solid grasp on Laravel's form generation and processing capabilities. While creating simple forms is fairly straightforward, things can complicated fast when implementing more ambitious solutions such as forms involving multiple models. In this chapter I'll go into extensive detail regarding how you can integrate forms into your Laravel applications, introducing Laravel 5's new form requests feature, covering both Laravel's native form generation solutions as well as several approaches offered by popular packages. You'll also learn how to upload files using a web form and Laravel's fantastic file upload capabilities.

Chapter 6. Integrating Middleware

Laravel 5 introduces middleware integration. In this chapter I'll introduce you to the concept of middleware and the various middleware solutions bundled into Laravel 5. You'll also learn how to create your own middleware solution!

Chapter 7. Authenticating and Managing Your Users

Most modern applications offer user registration and preference management features in order to provide customized, persisted content and settings. In this chapter you'll learn how to integrate user registration, login, and account management capabilities into your Laravel application.

Chapter 8. Creating a Restricted Administration Console

This chapter shows you how to identify certain users as administrators and then grant them access to a restricted web-based administrative console using a prefixed route grouping and custom middleware.

Chapter 9. Deploying, Optimizing and Maintaining Your Application

"Deploy early and deploy often" is an oft-quoted mantra of successful software teams. To do so you'll need to integrate a painless and repeatable deployment process, and formally define and schedule various maintenance-related processes in order to ensure your application is running in top form. In this chapter I'll introduce the Laravel 5 Command Scheduler, which you can use to easily schedule rigorously repeating tasks. I'll also talk about optimization, demonstrating how to create a faster class router and how to cache your application routes. Finally, I'll demonstrate just how easy it can be to deploy your Laravel application to the popular hosting service Heroku, and introduce Laravel Forge.

Chapter 10. Introducing the Lumen Microframework

This chapter introduces the new Laravel Lumen microframework. You'll learn all about Lumen fundamentals while building a companion microservice for the TODOParrot companion application!

Chapter 11. Introducing Events

This chapter introduces Laravel Events, showing you how to create event handlers, event listeners, and integrate events into your application logic. You'll also learn all about Laravel's fascinating event broadcasting capabilities, accompanied by a real-world example.

Chapter 12. Introducing Vue.js

Vue.js[10] has become the Laravel community's de facto JavaScript library, and for good reason; it shares many of the practical, productive attributes Laravel developers have come to love. Chapter 12 introduces Vue.js' fundamental features, and shows you how to integrate highly interactive and eye-appealing interfaces into your Laravel application.

Appendix B. Feature Implementation Cheat Sheets

The book provides occasionally exhaustive explanations pertaining to the implementation of key Laravel features such as controllers, migrations, models and views. However, once you understand the fundamentals it isn't really practical to repeatedly reread parts of the book just to for instance recall how to create a model with a corresponding migration or seed the database. So I thought it might be useful to provide an appendix which offered a succinct overview of the steps necessary to carry out key tasks. This is a work in progress, but already contains several pages of succinct explanations.

Introducing the TODOParrot Project

Learning about a new technology is much more fun and practical when introduced in conjunction with real-world examples. Throughout this book I'll introduce Laravel concepts and syntax using code found in TODOParrot[11], a web-based task list application built atop Laravel.

The TODOParrot code is available on GitHub at https://github.com/wjgilmore/todoparrot[12]. It's released under the MIT license, so feel free to download the project and use it as an additional learning reference or in any other manner adherent to the licensing terms.

[10] http://vuejs.org/

[11] http://todoparrot.com

[12] https://github.com/wjgilmore/todoparrot

About the Author

W. Jason Gilmore[13] is a software developer, consultant, and bestselling author. He has spent much of the past 15 years helping companies of all sizes build amazing solutions. Recent projects include a SaaS for the interior design and architecture industries, an e-commerce analytics application for a globally recognized publisher, an intranet application for a major South American avocado farm, and a 10,000+ product online store.

Jason is the author of eight books, including the bestselling *Beginning PHP and MySQL, Fourth Edition*, *Easy E-Commerce Using Laravel and Stripe* (with co-author Eric L. Barnes), and *Easy Active Record for Rails Developers*.

Over the years Jason has published more than 300 articles within popular publications such as Developer.com, JSMag, and Linux Magazine, and instructed hundreds of students in the United States and Europe. Jason is cofounder of the wildly popular CodeMash Conference[14], the largest multi-day developer event in the Midwest.

Away from the keyboard, you'll often find Jason playing with his kids, hunched over a chess board, and having fun with DIY electronics.

Jason loves talking to readers and invites you to e-mail him at wj@wjgilmore.com.

Errata and Suggestions

Nobody is perfect, particularly when it comes to writing about technology. I've surely made some mistakes in both code and grammar, and probably completely botched more than a few examples and explanations. If you would like to report an error, ask a question or offer a suggestion, please e-mail me at wj@wjgilmore.com.

[13] http://www.wjgilmore.com
[14] http://www.codemash.org

Chapter 1. Introducing Laravel

Laravel is a web application framework that borrows from the very best features of other popular framework solutions, among them Ruby on Rails and ASP.NET MVC. For this reason, if you have any experience working with other frameworks then I'd imagine you'll make a pretty graceful transition to Laravel. Newcomers to framework-driven development will have a slightly steeper learning curve due to the introduction of new concepts, however Laravel's practical and user-friendly features will make your journey an enjoyable one.

In this chapter you'll learn how to install Laravel and create your first Laravel project. We'll use this project as the basis for introducing new concepts throughout the remainder of the book, and to keep things interesting many of the examples will echo what is found in the TODOParrot companion application. I'll also introduce you to several powerful debugging and development tools crucial to efficient Laravel development. Finally, I'll show you how to write automated tests to ensure your Laravel application is operating precisely as expected.

Installing Laravel

Laravel is a PHP-based framework that you'll typically use in conjunction with a database such as MySQL or PostgreSQL. Therefore, before you can begin building a Laravel-driven web application you'll need to first install PHP 5.5.9 or newer and one of Laravel's supported databases (MySQL, PostgreSQL, SQLite, and Microsoft SQL Server). While those of you who are seasoned PHP developers likely already have local versions of this software installed on your development laptop, I'd like to recommend a *far more efficient* approach which completely eliminates the need to manage this software on your own. Fortunately for you newcomers this approach will be equally welcome since it allows you to avoid the often time-consuming and error-prone process of installing and configuring PHP, MySQL, and a web server. This approach involves using the *Homestead* virtual machine, and I'll tell you all about it next.

Introducing Homestead

PHP is only one of several technologies you'll need to have access to in order to begin building Laravel-driven web sites. Additionally you'll need to install a web server such as Apache[15] or nginx[16], a database server such as MySQL[17] or PostgreSQL[18], and often a variety of supplemental technologies such as Redis[19] and Grunt[20]. As you might imagine, it can be quite a challenge to install and configure

[15] http://httpd.apache.org/
[16] http://nginx.org/
[17] http://www.mysql.com/
[18] http://www.postgresql.org/
[19] http://redis.io/
[20] http://gruntjs.com/

all of these components, particularly when you'd prefer to be writing code instead of grappling with configuration issues.

In recent years the bar was dramatically lowered with the advent of the *virtual machine*. A virtual machine is a software-based implementation of a computer that can be run inside the confines of another computer (such as your laptop), or even inside another virtual machine. This is an incredibly useful bit of technology, because you can use a virtual machine to for instance run Ubuntu Linux on your Windows 10 laptop, or vice versa. Further, it's possible to create a customized virtual machine image preloaded with a select set of software. This image can then be distributed to fellow developers, who can run the virtual machine and take advantage of the custom software configuration. This is precisely what the Laravel developers have done with Homestead[21], a virtual machine which bundles everything you need to get started building Laravel-driven websites.

Homestead is currently based on Ubuntu 14.04, and includes everything you need to get started building Laravel applications, including PHP 7.0, Nginx, MySQL, PostgreSQL and a variety of other useful utilities such as Redis and Memcached. It runs flawlessly on OS X, Linux and Windows, and the installation process is very straightforward, meaning in most cases you'll be able to begin building Laravel applications in less than 30 minutes.

Installing Homestead

Homestead requires Vagrant[22] and VirtualBox[23]. User-friendly installers are available for all of the common operating systems, including OS X, Linux and Windows. Take a moment now to install Vagrant and VirtualBox. Once complete, open a terminal window and execute the following command:

```
$ vagrant box add laravel/homestead
==> box: Loading metadata for box 'laravel/homestead'
    box: URL: https://atlas.hashicorp.com/laravel/homestead
This box can work with multiple providers! The providers that it
can work with are listed below. Please review the list and choose
the provider you will be working with.

1) virtualbox
2) vmware_desktop

Enter your choice: 1
==> box: Adding box 'laravel/homestead' (v0.4.2) for provider: virtualbox
    box: Downloading: https://atlas.hashicorp.com/laravel/boxes/homestead/versio\
ns/0.4.2/providers/virtualbox.box
==> box: Successfully added box 'laravel/homestead' (v0.4.2) for 'virtualbox'!
```

[21] http://laravel.com/docs/homestead

[22] http://www.vagrantup.com/

[23] https://www.virtualbox.org/wiki/Downloads

Throughout the book I'll use the $ symbol to represent the terminal prompt.

This command installs the Homestead *box*. A box is just a term used to refer to a Vagrant package. Packages are the virtual machine images that contain the operating system and various programs. The Vagrant community maintains hundreds of different boxes useful for building applications using a wide variety of technology stacks, so check out this list of popular boxes[24] for an idea of what else is available.

Once the box has been added, you'll next want to install Homestead. To do so, you'll ideally using Git to clone the repository. If you don't already have Git installed you can easily do so by heading over to the Git website[25] or using your operating system's package manager.

Next, open a terminal and enter your home directory:

```
$ cd ~
```

Then use Git's `clone` command to clone the Homestead repository:

```
$ git clone https://github.com/laravel/homestead.git Homestead
Cloning into 'Homestead'...
remote: Counting objects: 1497, done.
remote: Compressing objects: 100% (5/5), done.
remote: Total 1497 (delta 0), reused 0 (delta 0), pack-reused 1492
Receiving objects: 100% (1497/1497), 241.74 KiB | 95.00 KiB/s, done.
Resolving deltas: 100% (879/879), done.
Checking connectivity... done.
```

You'll see this has resulted in the creation of a directory named `Homestead` in your home directory which contains the repository files. Next, you'll want to enter this directory and execute the following command:

```
$ bash init.sh
```

If you're on Windows you'll instead want to run the following command:

```
$ init.bat
```

[24] https://vagrantcloud.com/discover/popular
[25] https://git-scm.com/downloads

This will create a directory called `.homestead`, which will also be placed in your home directory. You'll modify the files found in this directory to configure Homestead in a variety of ways, including most notably how to find and serve the web applications which will be hosted on the virtual machine.

Next you'll want to configure the project directory that you'll share with the virtual machine. Doing so requires you to identify the location of your public SSH key, because key-based encryption is used to securely share this directory. If you don't already have an SSH key and are running Windows, this SiteGround tutorial[26] offers a succinct set of steps. If you're running Linux or OS X, nixCraft[27] offers a solid tutorial.

You'll need to identify the location of your public SSH key in the `.homestead` directory's `Homestead.yaml` file. Open this file and locate the following line:

```
1 authorize: ~/.ssh/id_rsa.pub
```

If you're running Linux or OS X, then you probably don't have to make any changes to this line because SSH keys are conventionally stored in a directory named `.ssh` found in your home directory. If you're running Windows then you'll need to update this line to conform to Windows' path syntax which looks like this:

```
1 authorize: c:/Users/wjgilmore/.ssh/id_rsa.pub
```

If you're running Linux or OS X and aren't using the conventional SSH key location, or are running Windows you'll also need to modify the `keys` property. For instance Windows users would have to update this section to look something like this:

```
1 keys:
2     - c:/Users/wjgilmore/.ssh/id_rsa
```

Next you'll need to modify the `Homestead.yaml` file's `folders` list to identify the location of your Laravel project (which we'll create a bit later in this chapter). The two relevant `Homestead.yaml` settings are `folders` and `sites`, which by default look like this:

[26] http://kb.siteground.com/how_to_generate_an_ssh_key_on_windows_using_putty/
[27] http://www.cyberciti.biz/faq/how-to-set-up-ssh-keys-on-linux-unix/

```
folders:
    - map: ~/Code
      to: /home/vagrant/Code

sites:
    - map: homestead.app
      to: /home/vagrant/Code/Laravel/public
```

This particular step tends to be the source of great confusion Homestead beginners, so pay close attention to the following description. The `folders` structure's `map` attribute identifies the location in which your Laravel project will be located. The default value is `~/Code`, meaning Homestead expects your project to reside in a directory named `Code` found in your home directory. You're free to change this to any location you please, keeping in mind for the purposes of this introduction the directory *must* identify your Laravel project's root directory (I realize we haven't created the project or directory just yet, so just keep in mind this value must identify that soon-to-be-created directory). The `folders` structure's `to` attribute identifies the location *on the virtual machine* that will mirror the contents of the directory defined by the `map` key, thereby making the contents of your local directory available to the virtual machine. You almost certainly do not have to change the `to` attribute's default value, so don't worry about it for now.

Windows users should keep in mind the tilde (~) home directory shortcut is not supported on Windows and so you'll need to specify the absolute path to your chosen directory.

The `sites` structure's `map` attribute defines the domain name you'll use to access the Laravel application via the browser. For instance, you might change this to `dev.todoparrot.com`. Keep in mind this domain name is used purely for internal developmental purposes, so you don't actually have to own the domain name.

Finally, the `sites` structure's `to` attribute defines the Laravel project's root *web directory*, which is `/public` by default. This isn't just some contrived setting; a file named `index.php` resides in your Laravel application's `/public` directory, and it "listens" for incoming requests to your application and kicks off the process which ultimately results in the client's desired resource (web page, JSON data, etc.) being returned.

Despite my best efforts this explanation is likely clear as mud, so let's clarify with an example. Begin by setting the `folders` structure's `map` attribute to somewhere within the directory where you tend to manage your various software projects. For instance, mine is set like this:

```
folders:
    - map: ~/Code/dev.todoparrot.com
    - to: /home/vagrant/Code
```

Next, modify the `sites` structure to look like this:

```
sites:
    - map: dev.todoparrot.com
      to: /home/vagrant/Code/dev.todoparrot.com/public
```

Save the changes and we'll next create a quick test to confirm you can indeed talk to the Homestead webserver. Create the directory identified by the `map` attribute, and inside it create a directory named `public`. Create a file named `index.php` inside the `public` directory, adding the following contents to it:

```
<?php echo "Hello from Homestead!"; ?>
```

Save these changes, and then run the following command from within your `Homestead` directory:

```
$ vagrant up
Bringing machine 'default' up with 'virtualbox' provider...
==> default: Importing base box 'laravel/homestead'...
==> default: Matching MAC address for NAT networking...
==> default: Checking if box 'laravel/homestead' is up to date...
==> default: Setting the name of the VM: homestead-7
==> default: Clearing any previously set network interfaces...
==> default: Preparing network interfaces based on configuration...
...
==> default: Forwarding ports...
    default: 80 => 8000 (adapter 1)
    default: 443 => 44300 (adapter 1)
    default: 3306 => 33060 (adapter 1)
    default: 5432 => 54320 (adapter 1)
    default: 22 => 2222 (adapter 1)
==> default: Running 'pre-boot' VM customizations...
==> default: Booting VM...
$
```

Your Homestead virtual machine is up and running! With that done, we have one remaining step. We'll need to configure your laptop to recognize what it should do when the `dev.todoparrot` URL defined in `Homestead.yaml` is requested in the browser. To do so, you'll need to update your development machine's `hosts` file so you can easily access the server via a hostname rather than the IP address found in the `Homestead.yaml` file. If you're running OSX or Linux, this file is found at `/etc/hosts`. If you're running Windows, you'll find the file at `C:\Windows\System32\drivers\etc\hosts`. Open up this file and add the following line:

```
192.168.10.10  dev.todoparrot.com
```

After saving these changes, we'll want to create the Laravel project that will be served via this URL. However, there still remains plenty to talk about regarding Homestead and virtual machine management so in the sections that follow I discuss several important matters pertaining to this topic. For the moment though I suggest jumping ahead to the section "Creating the TODOParrot Application" and returning to the below sections later.

Managing Your Virtual Machine

There are a few administrative tasks you'll occasionally need to carry out regarding management of your virtual machine. For example, if you'd like to shut down the virtual machine you can do so using the following command:

```
$ vagrant halt
==> default: Attempting graceful shutdown of VM...
$
```

To later boot the machine back up, you can execute `vagrant up` as we did previously:

```
$ vagrant up
```

If you'd like to delete the virtual machine (including all data within it), you can use the `destroy` command:

```
$ vagrant destroy
```

I stress executing the `destroy` command this *will delete* the virtual machine and all of its data! Executing this command is very different from shutting down the machine using `halt`.

If you happen to have installed more than one box (it can be addictive), use the `box list` command to display them:

```
$ vagrant box list
laravel/homestead (virtualbox, 0.4.2)
```

These are just a few of the many commands available to you. Run `vagrant --help` for a complete listing of what's available:

```
$ vagrant --help
```

SSH'ing Into Your Virtual Machine

Because Homestead is a virtual machine running Ubuntu, you can SSH into it just as you would any other server. For instance you might wish to configure nginx or MySQL, install additional software, or make other adjustments to the virtual machine environment. If you're running Linux or OS X, you can SSH into the virtual machine using the `ssh` command:

```
$ ssh vagrant@127.0.0.1 -p 2222
Welcome to Ubuntu 14.04.4 LTS (GNU/Linux 3.19.0-25-generic x86_64)

 * Documentation:  https://help.ubuntu.com/
Last login: Thu Mar 10 17:11:55 2016 from 10.0.2.2
```

Windows users will need to first install an SSH client. A popular Windows SSH client is PuTTY[28].

In either case, you'll be logged in as the user `vagrant`, and if you list this user's home directory contents you'll see the `Code` directory defined in the `Homestead.yaml` file:

```
vagrant@homestead:~$ ls
Code
```

If you're new to Linux be sure to spend some time nosing around Ubuntu! This is a perfect opportunity to get familiar with the Linux operating system without any fear of doing serious damage to a server because if something happens to break you can always reinstall the virtual machine.

Transferring Files Between Homestead and Your Laptop

If you create a file on a Homestead and would like to transfer it to your laptop, you have two options. The easiest involves SSH'ing into Homestead and moving the file into one of your shared directories, because the file will instantly be made available for retrieval via your laptop's file system. For instance if you're following along with the `dev.todoparrot.com` directory configuration, you can SSH into Homestead, move the file into `/home/vagrant/dev.todoparrot.com`, and then logout of SSH. Then using your local terminal, navigate to `~/Code/dev.todoparrot.com` and you'll find the desired file sitting in your local `dev.todoparrot.com` root directory.

Alternatively, you can use `sftp` to login to Homestead, navigate to the desired directory, and transfer the file directly:

[28] http://www.putty.org/

```
$ sftp -P 2222 vagrant@127.0.0.1
Connected to 127.0.0.1.
sftp> cd dev.farm.com
sftp> get hello.txt
Fetching /home/vagrant/dev.todoparrot.com/db.sql.gz to db.sql.gz
/home/vagrant/dev.farm.com/db.sql.gz 0%    0     0.0KB/s   --:-- ETA
sftp>
```

Connecting to Your Database

Although this topic won't really be relevant until we discuss databases in chapter 3, this nonetheless seems a logical place to show you how to connect to your project's Homestead database. If you return to `Homestead.yaml`, you'll find the following section:

```
databases:
    - homestead
```

This section is used to define any databases you'd like to be automatically created when the virtual machine is first booted (or re-provisioned; more about this in the next section). As you can see, a default database named `homestead` has already been defined. You can sign into this database now by SSH'ing into the machine and using the `mysql` client:

```
$ ssh vagrant@127.0.0.1 -p 2222
Welcome to Ubuntu 14.04.4 LTS (GNU/Linux 3.19.0-25-generic x86_64)

 * Documentation:  https://help.ubuntu.com/
Last login: Wed Mar 23 00:56:23 2016 from 10.0.2.2
```

After signing in, enter the database using the `mysql` client, supplying the default username of `homestead` and the desired database (also `homestead`). When prompted for the password, enter `secret`:

```
vagrant@homestead:~$ mysql -u homestead homestead -p
Enter password:
Reading table information for completion of table and column names
You can turn off this feature to get a quicker startup with -A

Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 2330
Server version: 5.7.11 MySQL Community Server (GPL)

```

```
Copyright (c) 2000, 2016, Oracle and/or its affiliates. All rights reserved.

Oracle is a registered trademark of Oracle Corporation and/or its
affiliates. Other names may be trademarks of their respective
owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql>
```

There are of course no tables in the database (we'll do this in chapter 3), but feel free to have a look anyway:

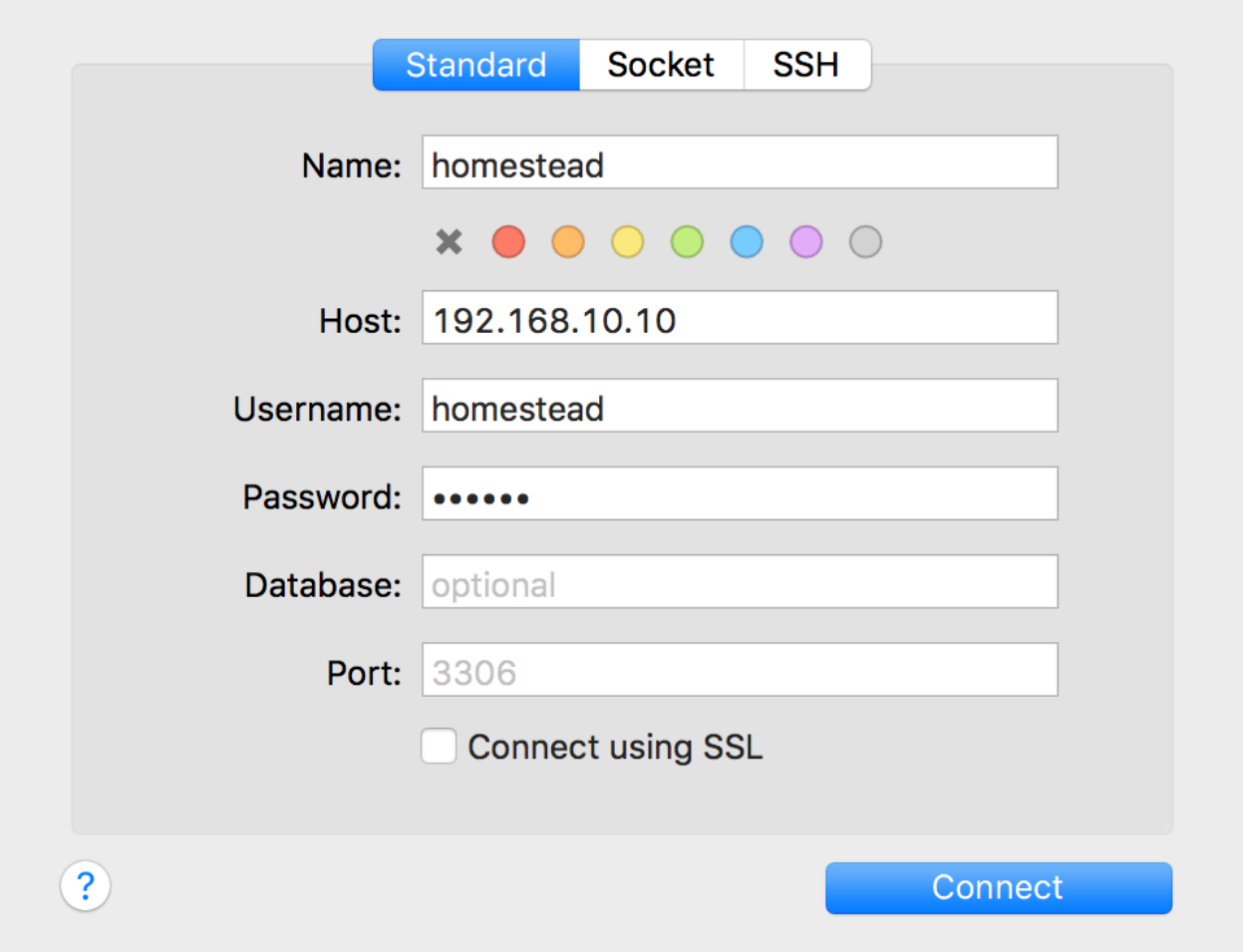
```
mysql> show tables;
Empty set (0.00 sec)
```

To exit the `mysql` client, just execute `exit`:

```
mysql> exit;
Bye
$
```

Chances are you prefer to interact with your database using a GUI-based application such as Sequel Pro[29] or phpMyAdmin[30]. You'll connect to the `homestead` database like you would any other, by supplying the username (`homestead`), password (`secret`), and the host, which is `192.168.10.10`. For instance, the following screenshot depicts my Sequel Pro connection window:

[29] http://www.sequelpro.com/
[30] https://www.phpmyadmin.net/



The Sequel Pro connection window

Of course, you may want to change the name of this default database, or define additional databases as the number of projects you manage via Homestead grows in size. I'll show you how to do this next.

Defining Multiple Homestead Sites and Databases

My guess is you'll quickly become so enamored with Homestead that it will be the default solution for managing all of your Laravel projects. This means you'll need to define multiple projects within the `Homestead.yaml` file. Fortunately, doing so is easier than you think. Check out the following slimmed down version of my own `Homestead.yaml` file, which defines two projects (`dev.nannycrate.com` and `dev.todoparrot.com`):

```
folders:
    - map: ~/Code/dev.nannycrate.com
      to: /home/vagrant/dev.nannycrate.com
    - map: ~/Code/dev.todoparrot.com
      to: /home/vagrant/dev.todoparrot.com

sites:
    - map: dev.nannycrate.com
      to: /home/vagrant/dev.nannycrate.com/public
    - map: dev.todoparrot.com
      to: /home/vagrant/dev.todoparrot.com/public

databases:
    - dev_nannycrate_com
    - dev_todoparrot_com
```

Notice how I've also defined two different databases, since each application will logically want its own location to store data.

After saving these changes, you'll want your virtual server to be reconfigured accordingly. If you have *never* started your virtual server, running `vagrant up` will be suffice because the `Homestead.yaml` file had never previously been read. However, if you've been following along then you'll need to force Homestead to *re-provision* the virtual machine. This involves reloading the configuration. To do so, you'll first want to find the identifier used to present the currently running machine, done using the `global-status` command:

```
$ vagrant global-status
id       name    provider   state   directory
-------------------------------------------------------------------
6f13a59  default virtualbox running /Users/wjgilmore/Homestead
```

Copy and paste that `id` value (`6f13a59` in my case), supplying it as an argument to the following command:

```
$ vagrant reload --provision 6f13a59
==> default: Attempting graceful shutdown of VM...
==> default: Checking if box 'laravel/homestead' is up to date...
==> default: Clearing any previously set forwarded ports...
==> default: Clearing any previously set network interfaces...
==> default: Preparing network interfaces based on configuration...
...
```

Once this command completes running, your latest `Homestead.yaml` changes will be in place!

Creating the TODOParrot Application

With Laravel (and presumably Homestead) installed and configured, it's time to get our hands dirty! We're going to start by creating the TODOParrot application, as it will serve as the basis for much of the instructional material presented throughout this book. There are a couple of different ways in which you can do this, but one of the easiest involves installing the Laravel installer using Composer[31]:

```
$ composer global require "laravel/installer"
Changed current directory to /Users/wjgilmore/.composer
Using version ^1.3 for laravel/installer
./composer.json has been updated
Loading composer repositories with package information
Updating dependencies (including require-dev)
  - Removing laravel/installer (v1.2.1)
  - Installing laravel/installer (v1.3.1)
    Downloading: 100%

Writing lock file
Generating autoload files
```

Obviously you'll need to install Composer to use Laravel in this fashion, however you'll need it anyway to perform other tasks such as package installation. See the Composer[32] website for more information regarding installation.

After installing the Laravel installer, you'll want to add the directory `~/.composer/vendor/bin` to your system path so you can execute the `laravel` command anywhere within the operating system. After doing so you'll be able to create new Laravel project skeletons using the `laravel` utility's `new` command. Before just executing this anywhere though, remember that Homestead is expecting the application to reside in the directory you specified within the `folders` structure's `map` property. As a reminder here is what mine looks like:

```
folders:
    - map: ~/Code/dev.todoparrot.com
    - to: /home/vagrant/Code
```

Therefore I'll first enter the `~/Code` directory and then execute the `laravel new` command:

[31] https://getcomposer.org
[32] https://getcomposer.org

```
$ cd ~/Code
$ laravel new dev.todoparrot.com
Crafting application...
Loading composer repositories with package information
Installing dependencies (including require-dev)
  - Installing vlucas/phpdotenv (v2.2.0)
    Downloading: 100%
...
> php -r "copy('.env.example', '.env');"
> php artisan clear-compiled
> php artisan optimize
Generating optimized class loader
> php artisan key:generate
Application key [AVf9837AICSJWnsXCcR1fKvK85KV52i2m] set successfully.
```

This command created a new Laravel skeleton project in the directory `dev.todoparrot.com`. These contents are a combination of files and directories, each of which plays an important role in the functionality of your application so it's important for you to understand their purpose. Let's quickly review the role of each:

- `.env`: Laravel 5 uses the PHP dotenv[33] library to conveniently manage your application's configuration variables. You'll use `.env` file as the basis for configuring these settings. A file named `.env.example` is also included in the project root directory, which should be used as a template from which fellow developers will copy over to `.env` and modify to suit their own needs. I'll talk more about these files and practical approaches for managing your environment settings in the later section, "Configuring Your Laravel Application".
- `.gitattributes`: This file is used by Git[34] to ensure consistent settings across machines, which is useful when multiple developers using a variety of operating systems are working on the same project. You'll find a few default settings in the file, however these are pretty standard and you in all likelihood won't have to modify them. Plenty of other attributes are however available; Scott Chacon's online book, "Pro Git"[35] includes a section ("Customizing Git - Git Attributes"[36]) with further coverage on this topic.
- `.gitignore`: This file tells Git what files and folders should not be included in the repository. You'll see a few default settings in here, including the `vendor` directory which houses the Laravel source code and other third-party packages, and the `.env` file, which should never be managed in version control since it presumably contains sensitive settings such as database passwords.

[33] https://github.com/vlucas/phpdotenv
[34] http://git-scm.com/
[35] http://git-scm.com/book
[36] http://git-scm.com/book/en/Customizing-Git-Git-Attributes

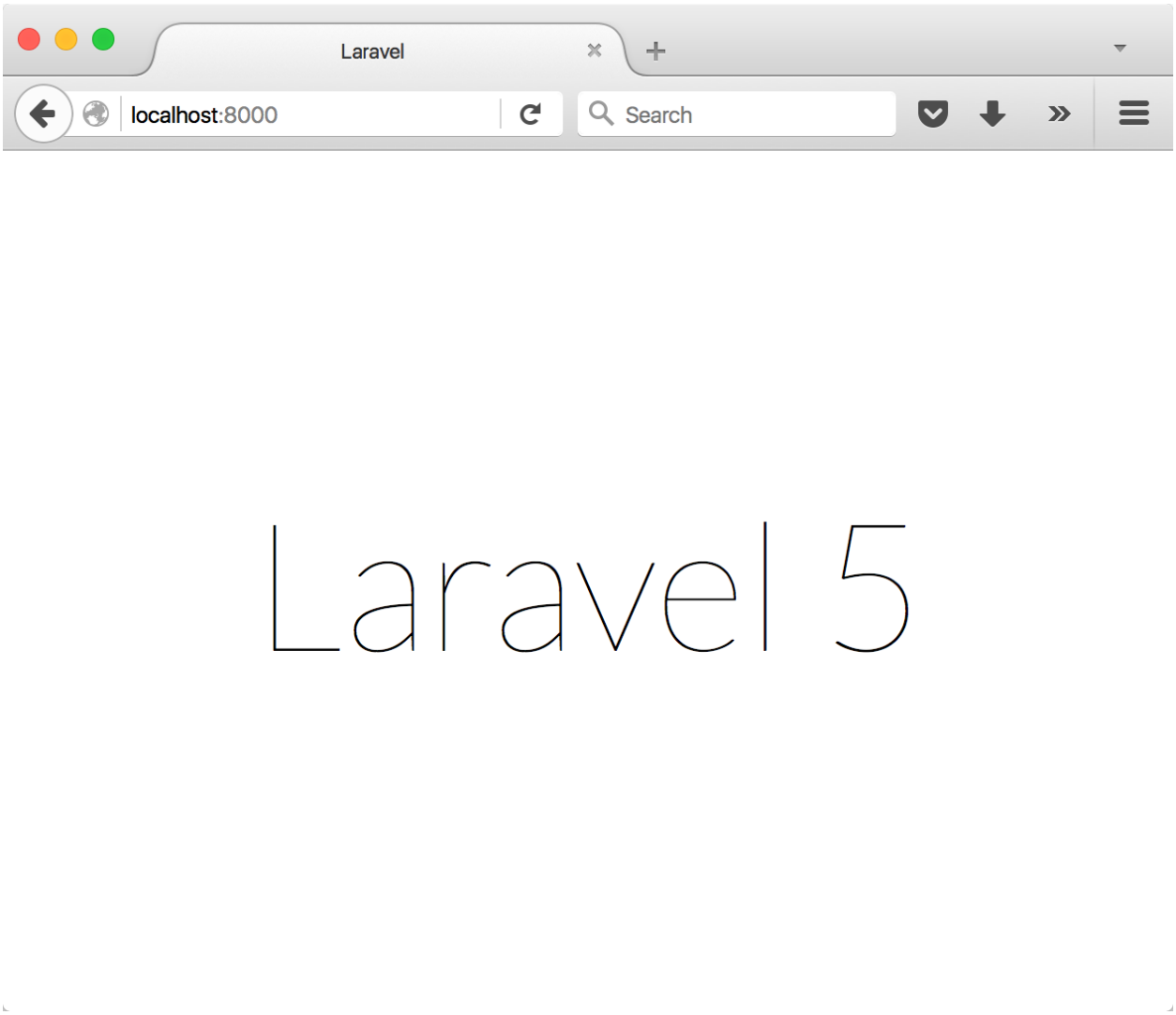
- `app`: This directory contains much of the custom code used to power your application, including the models, controllers, and middleware. We'll spend quite a bit of time inside this directory as the book progresses.
- `artisan`: `artisan` is a command-line tool we'll use to rapidly create new parts of your applications such as controllers and models, manage your database's evolution through a great feature known as *migrations*, and interactively debug your application. We'll return to `artisan` repeatedly throughout the book as it is such an integral part of Laravel development.
- `bootstrap`: This directory contains the various files used to initialize a Laravel application, loading the configuration files, various application models and other classes, and define the locations of key directories such as `app` and `public`. Normally you won't have to modify any of the files found in this directory.
- `composer.json`: Composer[37] is PHP's popular package manager, used by thousands of developers around the globe to quickly integrate popular third-party solutions such as Swift Mailer[38] and Doctrine[39] into a PHP application. Laravel heavily depends upon Composer, and you'll use the `composer.json` file to identify the packages you'll like to integrate into your Laravel application. If you're not familiar with Composer by the time you're done reading this book you'll wonder how you ever lived without it. In fact in this introductory chapter alone we'll use it several times to install several useful packages.
- `composer.lock`: This file contains information about the state of the installed Composer packages at the time these packages were last installed and/or updated. Like the `bootstrap` directory, you will rarely if ever directly interact with this file.
- `config`: This directory contains more than a dozen files used to configure various aspects of your Laravel application, such as the database credentials, the cache, e-mail delivery, and session settings.
- `database`: This directory contains the directories used to house your project's database migrations and seed data (migrations and database seeding are both introduced in Chapter 3).
- `gulpfile.js`: Laravel 5 introduces a new feature called *Laravel Elixir*. Elixir relies upon the `Gulpfile.js` file to define various Gulp.js[40] tasks useful for automating various build-related processes associated with your project's CSS, JavaScript, tests, and other assets. I'll introduce Elixir in Chapter 2.
- `package.json`: This file is used by the aforementioned Elixir to install Elixir and its various dependencies. I'll talk about this file in Chapter 2.
- `phpunit.xml`: Even trivial web applications should be accompanied by an automated test suite. Laravel leaves little room for excuse to avoid this best practice by automatically configuring your application to use the popular PHPUnit[41] test framework. The `phpunit.xml` is PHPUnit's application configuration file, defining characteristics such as the location of the application tests. We'll return to the topic of testing repeatedly throughout the book.

[37] https://getcomposer.org
[38] http://swiftmailer.org/
[39] http://www.doctrine-project.org/
[40] http://gulpjs.com/
[41] http://phpunit.de/

- `public`: The `public` directory serves as your application's root directory, housing the `.htaccess`, `robots.txt`, and `favicon.ico` files, in addition to a file named `index.php` that is the *first* file to execute when a user accesses your application. This file is known as the *front controller*, and it is responsible for loading and executing the application. It's because the `index.php` file serves as the front controller that you needed to identify the `public` directory as your application's root directory when configuring `Homestead.yaml`.
- `readme.md`: The `readme.md` file contains some boilerplate information about Laravel of the sort that you'll typically find in an open source project. Feel free to replace this text with information about your specific project. See the TODOParrot[42] README file for an example.
- `resources`: The `resources` directory contains your project's views and localized language files. You'll also store your project's raw assets such as CoffeeScript and Saas files.
- `server.php`: The `server.php` file can be used to bootstrap your application for the purposes of serving it via PHP's built-in web server. While a nice feature, Homestead offers a far superior development experience and so you can safely ignore this file and feature.
- `storage`: The `storage` directory contains your project's cache, session, and log data.
- `tests`: The `tests` directory contains your project's PHPUnit tests. Testing is a recurring theme throughout this book, complete with numerous examples.
- `vendor`: The `vendor` directory is where the Laravel framework code itself is stored, in addition to any other third-party code. You won't typically directly interact with anything found in this directory, instead doing so through the `artisan` utility and Composer interface.

Now that you have a rudimentary understanding of the various directories and files comprising a Laravel skeleton application let's see what happens when we load the default application into a browser. Presuming you've configured Homestead and generated the Laravel project in the appropriate directory, you should be able to navigate to `http://dev.todoparrot.com` and see the page presented in the below screenshot:

[42] http://github.com/wjgilmore/todoparrot



The Laravel splash page

As you can see, the Laravel logo is presented in the default page. So where is this page and logo located? It's found in a *view*, and in the next chapter I'll introduce Laravel views in great detail.

Setting the Application Namespace

Laravel 5 uses the PSR-4 autoloading standard[43], meaning your project controllers, models, and other key resources are namespaced. The default namespace is set to `App`, which is pretty generic, however if you don't plan on distributing your application to third-parties then the default is going to be just fine. If you did want to update your project's namespace to something unique, such as `Todoparrot`. You can do so using the `artisan` CLI's `app:name` command:

[43] http://www.php-fig.org/psr/psr-4/

```
$ php artisan app:name Todoparrot
Application namespace set!
```

This command will not only update the default namespace setting (by modifying `composer.json`'s `autoload/psr-4` setting), but will additionally updating any namespace declarations found in your controllers, models, and other relevant files.

Configuring Your Laravel Application

Most web frameworks, Laravel included, offer environment-specific configuration, meaning you can define certain behaviors applicable only when you are developing the application, and other behaviors when the application is running in production. For instance you'll certainly want to output errors to the browser during development but ensure errors are only output to the log in production.

Your application's default configuration settings are found in the `config` directory, and are managed in a series of files including:

- `app.php`: The `app.php` file contains settings that have application-wide impact, including whether debug mode is enabled (more on this in a moment), the application URL, timezone, locale, and autoloaded service providers.
- `auth.php`: The `auth.php` file contains settings specific to user authentication, including what model manages your application users, the database table containing the user information, and how password reminders are managed. I'll talk about Laravel's user authentication features in Chapter 7.
- `broadcasting.php`: The `broadcasting.php` is used to configure Laravel 5.1's new event broadcasting feature. I discuss event broadcasting in Chapter 11.
- `cache.php`: Laravel supports several caching drivers, including filesystem, database, memcached, redis, and others. You'll use the `cache.php` configuration file to manage various settings specific to these drivers.
- `compile.php`: Laravel can improve application performance by generating a series of files that allow for faster package autoloading. The `compile.php` configuration file allows you to define additional class files that should be included in the optimization step.
- `database.php`: The `database.php` configuration file defines a variety of database settings, including which of the supported databases the project will use, and the database authorization credentials.
- `filesystems.php`: The `filesystems.php` configuration file defines the file system your project will use to manage assets such as file uploads. Currently the local disk, Amazon S3, and Rackspace are supported.
- `mail.php`: As you'll learn in Chapter 5 it's pretty easy to send an e-mail from your Laravel application. The `mail.php` configuration file defines various settings used to send those e-mails, including the desired driver (SMTP, Sendmail, PHP's `mail()` function, Mailgun, and the Mandrill API are supported). You can also direct mails to the log file, a technique that is useful for development purposes.

- `queue.php`: Queues can improve application performance by allowing Laravel to offload time- and resource-intensive tasks to a queueing solution such as Beanstalk[44] or Amazon Simple Queue Service[45]. The `queue.php` configuration file defines the desired queue driver and other relevant settings.
- `services.php`: If your application uses a third-party service such as Stripe for payment processing or Mandrill for e-mail delivery you'll use the `services.php` configuration file to define any third-party service-specific settings.
- `session.php`: It's entirely likely your application will use sessions to aid in the management of user preferences and other customized content. Laravel supports a number of different session drivers used to facilitate the management of session data, including the file system, cookies, a database, the Alternative PHP Cache[46], Memcached, and Redis. You'll use the `session.php` configuration file to identify the desired driver, and manage other aspects of Laravel's session management capabilities.
- `view.php`: The `view.php` configuration file defines the default location of your project's view files and the renderer used for pagination.

I suggest spending a few minutes nosing around these files to get a better idea of what configuration options are available to you. There's no need to make any changes at this point, but it's always nice to know what's possible.

Configuring Your Environment

Your application will presumably rely upon database credentials and other sensitive information such as authentication usernames and keys for third party services. This confidential information should never be shared with others, and therefore you'll want to take care it isn't embedded directly into the code. Instead, you'll want to manage this data within *environment variables*, and then refer to these variables within the application.

Laravel supports a very convenient solution for managing and retrieving these variables thanks to integration with the popular PHP dotenv[47] package. When developing your application you'll define environment variables within the `.env` file found in your project's root directory. The default `.env` file looks like this:

[44] http://kr.github.io/beanstalkd/
[45] http://aws.amazon.com/sqs/
[46] http://php.net/manual/en/book.apc.php
[47] https://github.com/vlucas/phpdotenv

```
APP_ENV=local
APP_DEBUG=true
APP_KEY=AjUNzUS9JKqFXmndq7166viVc6XnbGpW
APP_URL=http://localhost

DB_HOST=127.0.0.1
DB_PORT=3306
DB_DATABASE=homestead
DB_USERNAME=homestead
DB_PASSWORD=secret

CACHE_DRIVER=file
SESSION_DRIVER=file
QUEUE_DRIVER=sync

REDIS_HOST=127.0.0.1
REDIS_PASSWORD=null
REDIS_PORT=6379

MAIL_DRIVER=smtp
MAIL_HOST=mailtrap.io
MAIL_PORT=2525
MAIL_USERNAME=null
MAIL_PASSWORD=null
MAIL_ENCRYPTION=null
```

These variables can be retrieved anywhere within your application using the `env()` function, as demonstrated within the `config/database.php` file. This file is used to define your project's database connection settings (we'll talk more about this in chapter 3), retrieving the `DB_HOST`, `DB_DATABASE`, `DB_USERNAME`, and `DB_PASSWORD` variables defined within `.env`:

```
'mysql' => [
    'driver'    => 'mysql',
    'host'      => env('DB_HOST', 'localhost'),
    'database'  => env('DB_DATABASE', 'forge'),
    'username'  => env('DB_USERNAME', 'forge'),
    'password'  => env('DB_PASSWORD', ''),
    'charset'   => 'utf8',
    'collation' => 'utf8_unicode_ci',
    'prefix'    => '',
    'strict'    => false,
],
```

If you have a look at the `.gitignore` file, you'll see that `.env` is listed by default. This is because you should *never* manage `.env` in your version control repository! Instead, when it comes time to deploy your application to production, you'll define the variables found in `.env` as *server environment variables* which can also be retrieved using PHP's `env()` function.

We'll return to the configuration file throughout the book as new concepts and features are introduced.

Useful Development and Debugging Tools

There are several native Laravel features and third-party tools that can dramatically boost productivity by reducing the amount of time and effort spent identifying and resolving bugs. In this section I'll introduce you to a few of my favorite solutions, and additionally show you how to install and configure the third-party tools.

The debugging and development utilities discussed in this section are specific to Laravel, and do not take into account the many other tools available to PHP in general. Be sure to check out Xdebug[48], FirePHP[49], and the many tools integrated into PHP IDEs such as Zend Studio[50] and PHPStorm[51].

The dd() Function

Ensuring the `.env` file's `APP_DEBUG` variable is set to `true` is the easiest way to proactively view information about any application errors, because Laravel will dump error- and exception-related information directly to the browser. However, , sometimes you'll want to peer into the contents of an object or array even if the data structure isn't causing any particular problem or error. You can do this using Laravel's `dd()`[52] helper function, which will dump a variable's contents to the browser and halt further script execution. If you'd like to see the `dd()` function in action we'll need to create a proper controller/action/view configuration for the home page as Laravel 5.1 includes some unfortunate changes to the default home page behavior.

If you're unfamiliar concepts such as controllers, routes, actions and views I suggest just skipping this section and returning to it after you've read chapter 2.

Begin by creating a file named `WelcomeController.php`, and save it to `app/Http/Controllers`. Add the following contents to it:

[48] http://xdebug.org/
[49] http://www.firephp.org/
[50] http://www.zend.com/en/products/studio
[51] http://www.jetbrains.com/phpstorm/
[52] http://laravel.com/docs/helpers#miscellaneous

```
<?php

namespace App\Http\Controllers;

use Illuminate\Http\Request;

use App\Http\Requests;

class WelcomeController extends Controller
{
    public function index()
    {

        $items = [
            'items' => [
              'Pack luggage',
              'Go to airport',
              'Arrive in San Juan'
            ]
        ];

        dd($items);

        return view('welcome');

    }
}
```

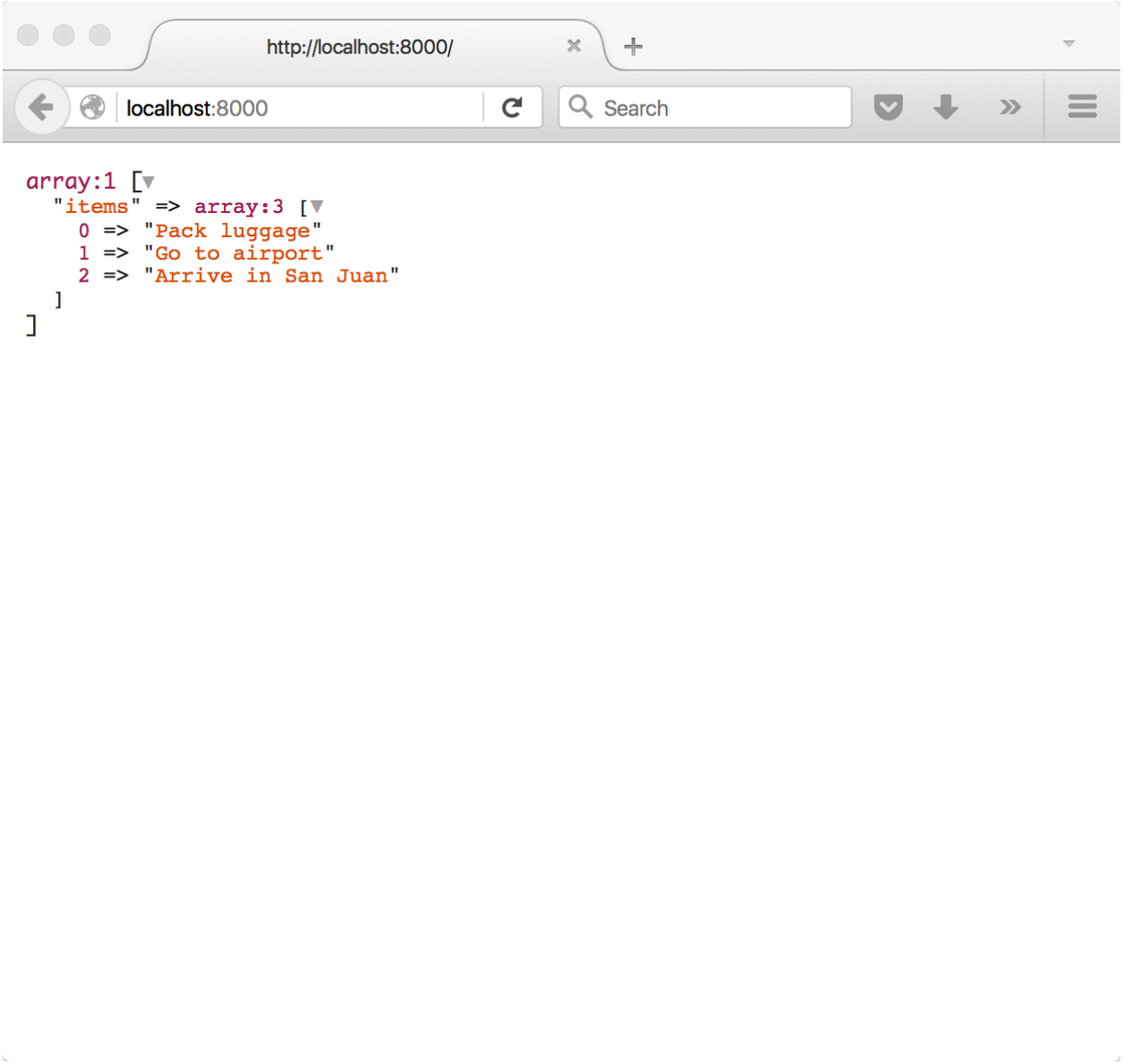
Don't get too caught up on what's going on here if you're yet familiar with the concept of a controller, since controllers will be formally introduced in Chapter 2. Just pay attention to the code found in the `index` method, since it is there where an array named `$items` is defined, and subsequently dumped to the browser using the `dd()` function. Next, open up `app/Http/routes.php`, and look for the following block of code:

```
Route::get('/', function () {
    return view('welcome');
});
```

Replace this code with the following:

```
Route::get('/', ['as' => 'home',
  'uses' => 'WelcomeController@index']);
```

After saving the changes, reload the home page in your browser and you should see the `$items` array contents dumped to the browser window as depicted in the below screenshot.



dd() function output

The Laravel Logger

While the `dd()` helper function is useful for quick evaluation of a variable's contents, taking advantage of Laravel's logging facilities is a more effective approach if you plan on repeat-

edly monitoring one or several data structures or events without necessarily interrupting script execution. Laravel will by default log error-related messages to the application log, located at `storage/logs/laravel.log`. Because Laravel's logging features are managed by Monolog[53], you have a wide array of additional logging options at your disposal, including the ability to write log messages to this log file, set logging levels, send log output to the Firebug console[54] via FirePHP[55], to the Chrome console[56] using Chrome Logger[57], or even trigger alerts via e-mail, HipChat[58] or Slack[59]. Further, if you're using the Laravel Debugbar (introduced later in this chapter) you can easily peruse these messages from the Debugbar's `Messages` tab.

Generating a custom log message is easy, done by embedding one of several available logging methods into the application, passing along the string or variable you'd like to log. Open the `app/Http/Controllers/WelcomeController.php` file created in the earlier section introducing `dd()` and modify the `index` method to look like this:

```
1  public function index()
2  {
3
4      $items = [
5        'Pack luggage',
6        'Go to airport',
7        'Arrive in San Juan'
8      ];
9
10     \Log::debug($items);
11
12     return view('welcome');
13
14 }
```

Save the changes, reload the page within your browser, and a log message similar to the following will be appended to `storage/logs/laravel.log`:

[53] https://github.com/Seldaek/monolog
[54] https://getfirebug.com/
[55] http://www.firephp.org/
[56] https://developer.chrome.com/devtools/docs/console
[57] http://craig.is/writing/chrome-logger
[58] http://hipchat.com/
[59] https://www.slack.com/

```
[2016-03-24 01:20:36] local.DEBUG: array (
  'items' =>
  array (
    0 => 'Pack luggage',
    1 => 'Go to airport',
    2 => 'Arrive in San Juan',
  ),
)
```

The debug-level message is just one of several at your disposal. Among other levels are info, warning, error and critical, meaning you can use similarly named methods accordingly:

```
\Log::info('Just an informational message.');
\Log::warning('Something may be going wrong.');
\Log::error('Something is definitely going wrong.');
\Log::critical('Danger, Will Robinson! Danger!');
```

Integrating the Logger and FirePHP

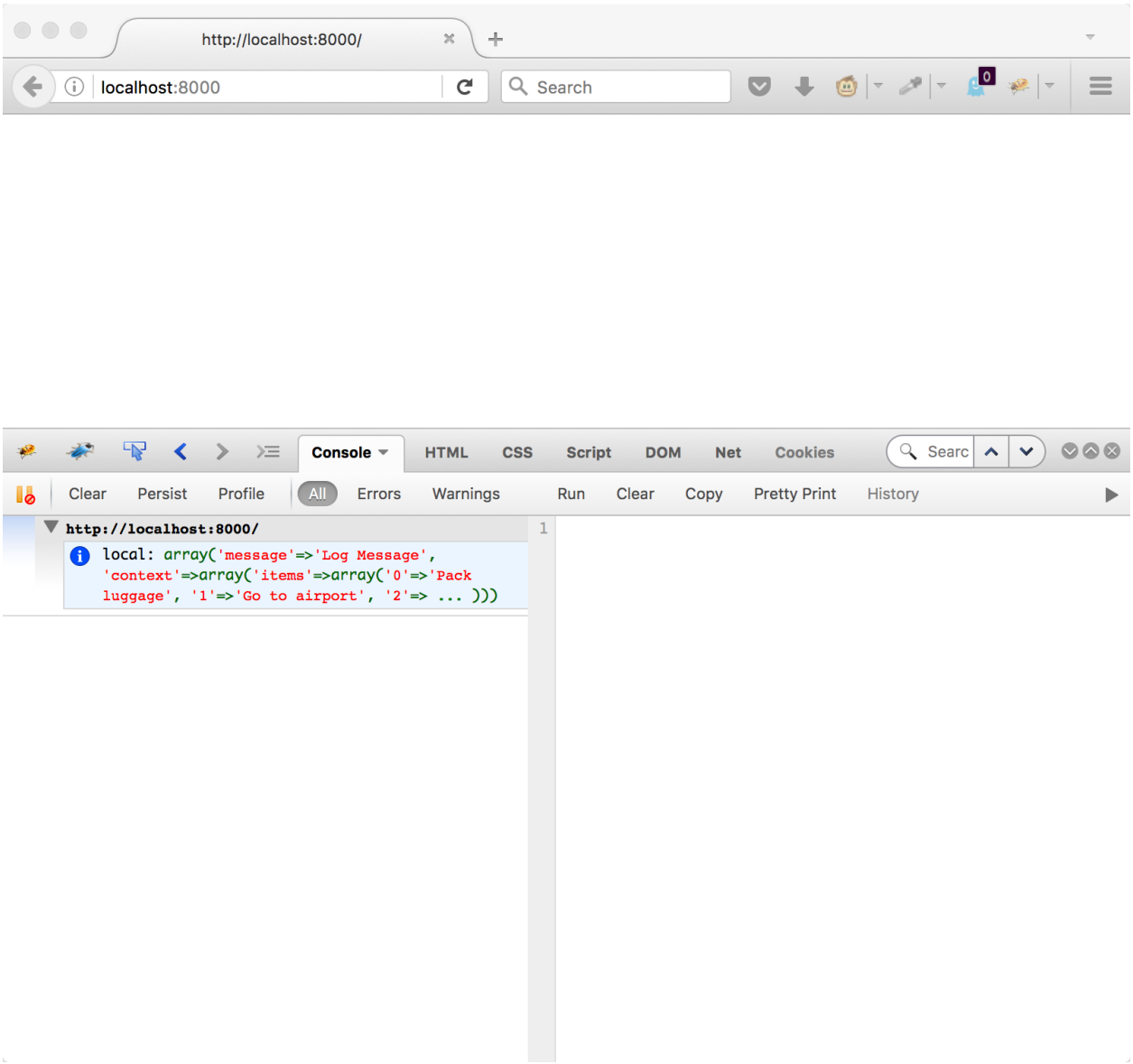
When monitoring the log file it's common practice to use the `tail -f` command (available on Linux and OS X) to view any log file changes in real time. You can however avoid the additional step of maintaining an additional terminal window for such purposes by instead sending the log messages to the Firebug[60] console, allowing you to see the log messages alongside your application's browser output. You'll do this by integrating FirePHP[61].

You'll first need to install the Firebug and FirePHP[62] extensions, both of which are available via Mozilla's official add-ons site. After restarting your browser, you can begin sending log messages directly to the Firebug console like so:

```
$monolog = \Log::getMonolog();

$items = ['Pack luggage', 'Go to airport', 'Arrive in San Juan'];

$monolog->pushHandler(new \Monolog\Handler\FirePHPHandler());

$monolog->addInfo('Log Message', array('items' => $items));
```

Once executed, the `$items` array will appear in your Firebug console as depicted in the below screenshot.

[60] https://getfirebug.com/
[61] http://www.firephp.org/
[62] https://addons.mozilla.org/en-US/firefox/addon/firephp/



Logging to Firebug via FirePHP

Using the Tinker Console

You'll often want to test a small PHP snippet or experiment with manipulating a particular data structure, but creating and executing a PHP script for such purposes is kind of tedious. You can eliminate the additional overhead by instead using the tinker console, a command line-based window into your Laravel application. Open tinker by executing the following command from your application's root directory:

```
$ php artisan tinker
Psy Shell v0.7.2 (PHP 5.6.18 â€” cli) by Justin Hileman
>>>
```

Notice tinker uses PsySH[63], a great interactive PHP console and debugger. PsySH is new to Laravel 5, and is a huge improvement over the previous console. Be sure to take some time perusing the feature list on the PsySH website[64] to learn more about what this great utility can do. In the meantime, let's get used to the interface:

```
>>> $items = ['Pack luggage', 'Go to airport', 'Arrive in San Juan'];
=> [
       "Pack luggage",
       "Go to airport",
       "Arrive in San Juan"
   ]
```

From here you could for instance learn more about how to sort an array using PHP's `sort()` function:

```
>>> sort($items);
=> true
>>> $items;
=> [
       "Arrive in San Juan",
       "Go to airport",
       "Pack luggage"
   ]
>>>
```

After you're done, type `exit` to exit the PsySH console:

```
>>> exit
Exit:  Goodbye.
$
```

The Tinker console can be incredibly useful for quickly experimenting with PHP snippets, and I'd imagine you'll find yourself repeatedly returning to this indispensable tool. We'll take advantage of Tinker throughout the book to get acquainted with various Laravel features.

[63] http://psysh.org/
[64] http://psysh.org/

Introducing the Laravel Debugbar

It can quickly become difficult to keep tabs on the many different events that are collectively responsible for assembling the application response. You'll regularly want to monitor the status of database requests, routing definitions, view rendering, e-mail transmission and other activities. Fortunately, there exists a great utility called Laravel Debugbar[65] that provides easy access to the status of these events and much more by straddling the bottom of your browser window (see below screenshot).

The Laravel Debugbar

The Debugbar is visually similar to Firebug[66], consisting of multiple tabs that when clicked result in context-related information in a panel situated below the menu. These tabs include:

- **Messages**: Use this tab to view log messages directed to the Debugbar. I'll show you how to

[65] https://github.com/barryvdh/laravel-debugbar
[66] http://getfirebug.com

do this in a moment.

- **Timeline**: This tab presents a summary of the time required to load the page.
- **Exceptions**: This tab displays any exceptions thrown while processing the current request.
- **Views**: This tab provides information about the various views used to render the page, including the layout.
- **Route**: This tab presents information about the requested route, including the corresponding controller and action.
- **Queries**: This tab lists the SQL queries executed in the process of serving the request.
- **Mails**: This tab presents information about any e-mails delivered while processing the request.
- **Session**: This table presents any session-related information made available while processing the request.
- **Request**: This tab lists information pertinent to the request, including the status code, request headers, response headers, and session attributes.

To install the Laravel Debugbar, execute the following command:

```
$ composer require barryvdh/laravel-debugbar --dev
Using version ^2.2 for barryvdh/laravel-debugbar
./composer.json has been updated
Loading composer repositories with package information
...
$
```

Next, add the following lines to the `providers` and `aliases` arrays to your `config/app.php` file, respectively:

```
'providers' => [
    ...
    Barryvdh\Debugbar\ServiceProvider::class,
],

...

'aliases' => [
    ...
    'Debugbar' => Barryvdh\Debugbar\Facade::class,
]
```

Save the changes and finally, install the package configuration to your `config` directory:

```
$ php artisan vendor:publish
```

While you don't have to make any changes to this configuration file (found in `config/debugbar.php`), I suggest having a look at it to see what changes are available.

Reload the browser and you should see the Debugbar at the bottom of the page! Keep in mind the Debugbar will only render when used in conjunction with an endpoint that actually renders a view to the browser.

The Laravel Debugbar is tremendously useful as it provides easily accessible insight into several key aspects of your application. Additionally, you can use the Messages panel as a convenient location for viewing log messages. Logging to the Debugbar is incredibly easy, done using the Debugbar facade. Add the following line to the `Welcome` controller's `index` action (`app/Http/Controllers/WelcomeController.php`):

```
\Debugbar::error('Something is definitely going wrong.');
```

Save the changes and reload the home page within the browser. Check the Debugbar's `Messages` panel and you'll see the logged message! Like the Laravel logger, the Laravel Debugbar supports the log levels defined in PSR-3[67], meaning methods for debug, info, notice, warning, error, critical, alert and emergency are available.

Testing Your Laravel Application with PHPUnit

Automated testing is a critical part of today's web development workflow, and should not be ignored even for the most trivial of projects. Fortunately, the Laravel developers agree with this mindset and automatically include PHPUnit support with every new Laravel project. PHPUnit is a very popular *unit testing framework* which allows you to create and execute well-organized tests used to confirm all parts of your application are working as expected.

Each new Laravel application even includes an example test which you can use as a reference for beginning to write your own tests! You'll find this test inside the `tests` directory. It's named `ExampleTest.php`, and it demonstrates how to write a test that accesses the project home page, and determines whether the text `Laravel 5` is visible:

[67] http://www.php-fig.org/psr/psr-3/

```
<?php

use Illuminate\Foundation\Testing\WithoutMiddleware;
use Illuminate\Foundation\Testing\DatabaseMigrations;
use Illuminate\Foundation\Testing\DatabaseTransactions;

class ExampleTest extends TestCase
{
    /**
     * A basic functional test example.
     *
     * @return void
     */
    public function testBasicExample()
    {
        $this->visit('/')
             ->see('Laravel 5');
    }
}
```

To run the test, execute the `phpunit` command from within your project's root directory:

```
$ phpunit
PHPUnit 4.8.24 by Sebastian Bergmann and contributors.

.

Time: 346 ms, Memory: 14.25Mb

OK (1 test, 2 assertions)
```

See that single period residing on the line by itself? That represents a passed test, in this case the test defined by the `testBasicExample` method. If the test failed, you would instead see an `F` for error. To see what a failed test looks like, open up `resources/views/welcome.blade.php` and locate the following line:

```
<div class="title">Laravel 5</div>
```

Replace the string `Laravel 5` with anything you please, such as `I Love PHP`. If you reload the browser after saving the changes you'll see the updated text. Now run execute `phpunit` anew:

```
$ vendor/bin/phpunit
PHPUnit 4.8.24 by Sebastian Bergmann and contributors.

F

Time: 348 ms, Memory: 14.25Mb

There was 1 failure:

1) ExampleTest::testBasicExample
<head>
<title>Laravel</title>
...
</head>
<body>
        <div class="container">
            <div class="content">
                <div class="title">I love PHP</div>
            </div>
        </div>
    </body>


Failed asserting that the page contains the HTML [Laravel 5]: Something.
Please check the content above.

...

FAILURES!
Tests: 1, Assertions: 2, Failures: 1.
~/Code/dev.test.com >
```

This time the `F` is displayed, because the assertion defined in `testBasicExample` failed. Additionally, information pertaining to why the test failed is displayed. In the chapters to come we will explore other facets of PHPUnit and write plenty of additional tests.

Consider spending some time exploring the Laravel[68] documentation to learn more about the syntax available to you. In any case, be sure to uncomment that route definition before moving on!

[68] http://laravel.com/docs/master/testing

Conclusion

It's only the end of the first chapter and we've already covered a tremendous amount of ground! With your project generated and development environment configured, it's time to begin building the TODOParrot application. Onwards!