PhoneGap and AngularJS for Cross-platform Development

Build exciting cross-platform applications using PhoneGap and AngularJS

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I am grateful for this opportunity and I want to thank the following people at Packt Publishing: Priyanka Shah, Kartik Vedam, Sageer Parkar, Meeta Rajani, and Anand Singh.

Special thanks to Professor Daphne Yuan, Professor Tsai-Yen Li, and Professor Pailin Chen of the National Cheng Chi University, Taipei, Taiwan, for providing me with timely and practical advice on how to carry out great research and how to deal with life.

To the good people of Service Science Research Center, Intelligent Media Lab, and the research team of the Flood and Fire research project, thank you for helping me out when I needed it the most.

I also want to thank XJL for helping me out and staying put when I most needed support.

Last but not least, I want to thank my family members and friends for their continued support.
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Preface

Welcome to AngularJS with PhoneGap! In this book, you will receive practical knowledge about AngularJS and PhoneGap. In particular, you will learn how to build a complete, workable web app using AngularJS, after which you will convert various versions of this web app to a PhoneGap app. You should also pick up something new regarding PhoneGap in particular: how to use the command-line interface to generate PhoneGap apps.

What this book covers

Chapter 1, Introduction to AngularJS, will teach you the absolute basics of building an AngularJS app.

Chapter 2, Getting Ready for PhoneGap, will cover the PhoneGap command-line interface. By end of this chapter, you will have learned that the command-line interface is one of the best things about PhoneGap 3.x. The example you coded in Chapter 1, Introduction to AngularJS, will be put to use in this chapter.

Chapter 3, From a Simple To-do List to an Advanced To-do List, will cover some of the slightly more advanced concepts of AngularJS, such as code organization, making RESTful calls, and more. This advanced app will then be converted to a PhoneGap app.

Chapter 4, Adding Authentication Capabilities Using PhoneGap Plugins, will add Facebook authentication capabilities via PhoneGap plugins. Once again, you will see how we can add the Facebook plugin using the command-line interface.

Chapter 5, Sprucing Up the App Using Animations and Mobile Design, will cover a slightly more advanced AngularJS topic: animations.

Chapter 6, Getting Ready to Launch, will teach you how to launch the app, both in Android and iOS devices.

Appendix, References, has a list of references that you should find useful.
What you need for this book
This book assumes that you have a basic code editor. You will need a Mac if you intend to develop iOS versions of the PhoneGap app. You will most definitely require an Internet connection and the Google Chrome browser.

Who this book is for
This book is intended for people who are not familiar with AngularJS but have beginner experience in PhoneGap, and who might want to improve their PhoneGap skills by learning the command-line interface for PhoneGap 3.x, and develop PhoneGap apps using AngularJS.

Conventions
In this book, you will find a number of styles of text that distinguish between different kinds of information. Here are some examples of these styles, and an explanation of their meaning.

Code words in text, database table names, folder names, filenames, file extensions, pathnames, dummy URLs, user input, and Twitter handles are shown as follows: "Feel free to copy the code and save it as concepts.html."

A block of code is set as follows:

```javascript
project/
css/
js/
    controllers/
    todo.js
services/
    todo.js
app.js
partials/
detail.html
    list.html
index.html
```
When we wish to draw your attention to a particular part of a code block, the relevant lines or items are set in bold:

```html
<li ng-repeat="todo in todos">
    <input type="checkbox" ng-model="todo.done">
    <span class="done-{{todo.done}}">{{todo.text}}</span>
    <button ng-click="showDetail(todo.text)" >Detail</button>
</li>
```

Any command-line input or output is written as follows:

cordova emulate android

**New terms** and **important words** are shown in bold. Words that you see on the screen, in menus or dialog boxes for example, appear in the text like this: "Click on **Edit/Details** for the Android item and start editing."

![Warnings](image.png)

![Tips](image.png)

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Preface

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Introduction to AngularJS

Welcome to the world of AngularJS with PhoneGap! In this book, you will learn how to merge two very exciting technologies, namely AngularJS and PhoneGap. By the end of this book, you will have a working mobile app that works across iOS and Android, based on AngularJS and PhoneGap. As mentioned previously, this book is targeted at programmers who have knowledge of PhoneGap, but may or may not have knowledge regarding AngularJS. You should have some idea about JavaScript though, for you to get maximum benefit out of this book. That said, let us begin with AngularJS.

A brief overview of AngularJS

AngularJS (https://angularjs.org/) is a super heroic JavaScript MVC framework, which is maintained by Google. It is open source and its main goal is to assist with creating single page applications. These are typically one-page web applications that only require HTML, CSS, and JavaScript on the client side.

While one may argue that there are already many frameworks out there in the market that help with this issue, I would like to say that AngularJS is different in a few ways. And in quite a few of these instances, it makes your life much easier as a frontend programmer.

Core concepts

There are many concepts related to AngularJS, but I will cover the most commonly used ones for the sake of progressing through this chapter. As we go along in this book, I'll touch on other concepts, such as the use of self-defined directives and performing RESTful requests via AngularJS. The main concepts that you should understand in this section are directives, controllers, and data binding.
Controllers
If you have already used JavaScript frameworks, such as BackBone.js, Can.js, Ember.js, or KnockOut.js, you should be familiar with this concept. Controllers are the behavior behind the DOM elements. AngularJS lets you express the behavior in a clean readable form without the usual boilerplate of updating the DOM, registering callbacks, or watching model changes.

Data-binding
Data-binding is an automatic way to update the view whenever the model changes, as well as updating the model whenever the view changes. The coolest aspect of this concept is that it is a two way data-binding process. Used in tandem with controllers, this can save you a lot of code, as there is no need for you to write the usual updating of the DOM elements.

Directives
Directives are another awesome concept in AngularJS. What they do is teach your application new HTML syntax and new things specific to your application. Directives can be self-defined and predefined. Some of the more notable predefined directives include:

- **ng-app**: This declares an element as a root element of the application, allowing its behavior to be modified through custom HTML tags.
- **ng-bind**: This automatically changes the text of an HTML element to the value of a given expression.
- **ng-model**: This is similar to ng-bind, but allows two-way binding between the view and scope.
- **ng-controller**: This specifies a JavaScript controller class, which evaluates HTML expressions. In layman's terms, what ng-controller does is that it applies a JavaScript function to this block of HTML so that this particular JavaScript function (including its accompanying logic, expressions, and more) can only operate in this block of HTML.
- **ng-repeat**: You can see this as a loop through a collection.
A conceptual example
Now, let's take a look at how some of the previous concepts play together. Consider the following piece of code:

```html
<!doctype html>
<html ng-app>
<head>
    <script src="https://ajax.googleapis.com/ajax/libs/angularjs/1.2.12/angular.min.js"></script>
</head>
<body>
    <div>
        <label>Say Hello World</label>
        <input type="text" ng-model="yourHelloWorld" placeholder="Type anything here.">
        <hr>
        <h1>Hello {{yourHelloWorld}}!</h1>
    </div>
</body>
</html>
```

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Let's go through the code.

- We defined an HTML5 HTML document in this case, as seen in the first line.
- Next, notice `ng-app` in the second line of the code; this is an AngularJS directive, which tells AngularJS that this is the root of the AngularJS application.
- In order to use AngularJS, we obviously have to install the script on this web page, as shown in the `<script>` tag.
- Within the body tag, we see a `label`, an `input`, and an `h1` tag.
- Take note of the `input` tag, there is a `ng-model` directive, which is mapped to `h1` tag's `{{yourHelloWorld}}`.
- The version of the code we are using in this chapter, version 1.2.12; should you be using newer versions of AngularJS, there is no guarantee that the code will work.
Now that we have briefly walked through the code, let us copy the code and run it on our web browser. Feel free to copy the code and save it as concepts.html. The source code for this chapter can be found in the concepts.html file in the Chapter 1 folder.

Copied the code? If so, open the file in your favorite web browser. You should see the following screenshot in your browser:

![A sample concept web page](image)

Got the previous code? Ok great! So now you can try typing into the input box and see new text being appended to **Hello** and before ! in the screen.

For instance, when we type **world**, we will see the new characters being appended to the screen as I continue to type. By the end of typing the word "World", we should see the following screenshot:

![After typing World](image)

Now that we have a brief idea as to how a simple AngularJS app works, let us move to a more complicated app.

**A simple to-do list using AngularJS**

In this example, we will cover in detail as to how to write code for a slightly more complicated AngularJS app. This app is modified from the official example found at angularjs.org. This example will be used as a base when we convert it from a web application to a PhoneGap application.
Preparing your code structure

For starters, create the index.html and todo.js files. Just for your information, the code found in this section can be found in the todo folder in Chapter 1.

HTML for our to-do list

We need to prepare our HTML file so that we can make use of AngularJS. Similar to the previous concepts.html file, you will see that we have included the use of AngularJS via script. Open up your index.html file in your favorite editor and you can start by adding the following code:

```html
<!doctype html>
<html ng-app>
<head>
    <script src="https://ajax.googleapis.com/ajax/libs/angularjs/1.2.12/angular.min.js"></script>
    <script src="todo.js"></script>
    <link rel="stylesheet" href="http://netdna.bootstrapcdn.com/bootstrap/3.0.3/css/bootstrap.min.css">
    <style>
        body {
            padding:40px;
        }
        #todoDetails {
            visibility: hidden;
        }
    </style>
</head>
<body>
    <div class="row" ng-controller="todoCtrl">
        <div class="col-md-6">
            <h2>Todo</h2>
            <div>
                <span>{{getRemaining()}} of {{todos.length}} remaining</span>
                [ <button ng-click="archive()">archive</button> ]
                <ul class="unstyled">
                    <li ng-repeat="todo in todos">
                        <input type="checkbox" ng-model="todo.done">
                        <span class="done-{{todo.done}}">{{todo.text}}</span>
                        <button ng-click="showDetail(todo.text)">Detail</button>
                    </li>
                </ul>
                <form ng-submit="addTodo()">
                </form>
            </div>
        </div>
    </div>
</body>
</html>
```
Now, to make sure that you are on the same page as I am, I want you to open this file in your favorite browser. You should see something like the following screenshot:

Our HTML template

---

[10]
Got the previous code? It looks weird now due to the fact that we have not added the main JavaScript functionalities. We will be working on it in the next section.

Now, let me explain the code; notice that I have highlighted a few lines of it. These are the most important lines of the code that you should take note of in this example. The remaining lines are just the usual HTML code.

- The first two lines of the highlighted code simply install AngularJS and include BootStrap 3’s CSS for styling purposes. Without both, the project will not work and may not look good.
- The `ng-controller` directive is what we covered briefly earlier on in this chapter. We are applying `todoCtrl` to this block of HTML.
- The `ng-click` directive is another directive that we did not touch on in the previous section. What `ng-click` does is that it executes whatever function is defined for this directive. In our example, `ng-click="archive()"` means that on clicking it, `archive()` will be executed. The JavaScript function `archive()` is written in our `todo.js` file, which we will cover later.
- The `ng-repeat` directive is a directive that loops through a collection. Notice how we implemented `ng-repeat` in our HTML code:
  ```html
  <li ng-repeat="todo in todos">
    <input type="checkbox" ng-model="todo.done">
    <span class="done-{{todo.done}}">{{todo.text}}</span>
    <button ng-click="showDetail(todo.text)">Detail</button>
  </li>
  ```
  Anything that is within `<li>` is dependent on the `todo` object, which is part of the `todos` collection.
- The `ng-submit` directive is generally used in forms. This is a directive which controls what is being done on the submit form. In this case, on the submit form, we will execute the JavaScript function `addToDo()`.
- The `[]` option encapsulates `button ng-click="archive()">archive</button>`, which simply adds a square bracket around the button.

## Adding in JavaScript with AngularJS

Now we will open our `todo.js` file, which we created in the previous section. Open `todo.js` in your favorite text editor. Let us begin by coding the following:

```javascript
function todoCtrl($scope) {
}
```
We are first going to define a controller, which we will be using for our app. Notice that we have named it todoCtrl, which is mapped onto ng-controller in the HTML file (index.html), where ng-controller="todoCtrl" means that todoCtrl will be controlling this portion of the web page.

Also, notice the use of $scope, which is an object that refers to the application model; it is the execution context for related expressions, such as ng-click, ng-model, and so on. Any such expressions of a predefined directive outside this scope will not be executed.

Let's start by initializing our to-do list. Within todoCtrl, add the following code:

```javascript
$scope.todos = [
    {text:'here is my first to do', done:true, details:''},
    {text:'continue writing chapter 1 for this book', done:false, details:''},
    {text:'work on chapter 2 examples', done:false, details:''}
];

$scope.currentText = ''; // make the text empty
$scope.currentDetails = ''; // make the text empty
```

What $scope.todos does is that it simply creates a list of objects, which contains the text, details, and whether this to-do is executed or not (true or false). Notice that todos here is mapped to the collection todos as seen in index.html, where ng-repeat is being used.

Let's move on by adding more functionalities. After $scope.currentDetails, add the following three JavaScript functions:

```javascript
$scope.addTodo = function() {
    $scope.todos.push({text:$scope.todoText, done:false, details:''});
    $scope.todoText = '';
};

$scope.remaining = function() {
    var count = 0;
    angular.forEach($scope.todos, function(todo) {
        count += todo.done ? 0 : 1;
    });
    return count;
};

$scope.archive = function() {
    var oldTodos = $scope.todos;
    $scope.todos = [];
};
```
angular.forEach(oldTodos, function(todo) {
  if (!todo.done) $scope.todos.push(todo);
});

The $scope.todoText function resets todoText after it has been pushed into the array. The $scope.addTodo function does what it is suppose to do, simply adding a new to-do to the list of todos as defined earlier. The beauty of AngularJS is that it uses standard JavaScript data structures that make manipulation so much easier.

The $scope.getRemaining function simply calculates the number of items that are not done yet. Here, we can see two-way data-binding in action as this function executes whenever there is a change in the length of todos.

The $scope.archive function marks a to-do as done:true in standard JavaScript manner.

By now, you should have noticed that all the JavaScript functions defined here are being used in index.html under ng-controller="todoCtrl".

Let's now add three more JavaScript functions to complete the finishing touch for this sample application.

After the $scope.archive function, add the following functions:

```javascript
$scope.showDetail = function(text) {
  var result = $scope.todos.filter(function (obj) {
    return obj.text == text;
  });
  $scope.currentText = result[0].text;
  $scope.currentDetails = result[0].details;
  document.getElementById('todoDetails').style.visibility = 'visible';
}

$scope.closeThis = function() {
  $scope.currentText = '';
  $scope.currentDetails = '';
  document.getElementById('todoDetails').style.visibility = 'hidden';
}

$scope.addDetails = function(text) {
  var result = $scope.todos.filter(function (obj) {
    return obj.text == text;
  });
```
The $scope.showDetail function simply retrieves the current to-do being clicked on and shows it on the div with ID #todoDetails. The visibility of the #todoDetails function is then set to visible.

The $scope.close function simply changes the visibility of #todoDetails to hidden.

Finally, $scope.addDetails adds the details of the todo item, and changes the visibility of #todoDetails to hidden once done.

Okay, so to see if we are on the same page, we now need to check our code. Save this file as todo.js. Refresh your browser and you should still see the same user interface as per the previous screenshot.

Now, try clicking on the Detail button in front of work on chapter 2 examples, and you should see the following screenshot:

![Image of the user interface showing the details of a to-do item](image)

Details of the ToDo item shows on clicking on the corresponding detail button

You will see the details of a particular to-do item. You can try to add some details for this item and click on Add Details. You can then click on other items and come back to this item later (without refreshing the browser), and you should still see the details in the text area.
You can also check off any of the items and you will see that the number of remaining to-do item decreases:

![Todo interface](image1)

Number of items changes dynamically as you check off items

And of course, you can add new items by simply typing in the input box and clicking on the add button. You should notice that the number of items now increases:

![Todo interface](image2)

Adding new to-dos changes the number of items dynamically and also shows on the screen immediately
Summary

To summarize what we have done in this chapter; we have walked through the basics of building an AngularJS app and familiarized ourselves with the basic concepts used in AngularJS. We have made use of ng-app, ng-controller, ng-click, ng-repeat, and ng-submit in general. These expressions, such as ng-click and ng-submit are typically mapped onto JavaScript functions defined in AngularJS controllers, as seen in todo.js in our example. Notice how little code we have written in order to achieve such speedy UX through the concept of two-way data-binding and its controllers.

In the next chapter, we will start to port this app in a more organized manner to PhoneGap.
Getting Ready for PhoneGap

As you might already know, PhoneGap (http://phonegap.com/) is a really cool open source project (now owned by Adobe), that allows you to create cross platform mobile apps using JavaScript/CSS/HTML.

This means that you can readily use your web development skills to developing mobile apps. Since this book assumes basic familiarity with PhoneGap, I will advance to how to install PhoneGap. You will primarily see examples related to Android and iOS since we are going to create mobiles apps that only support Android and iOS.

Note that we are focusing on using PhoneGap Version 3.3.0 and, as much as possible, we will be building the apps via the latest command-line interface provided by PhoneGap.

Just for your information, all source code found in this chapter—whether automatically generated by PhoneGap or coded by us—can be found in the source code folder, chapter2.

Preparing for PhoneGap development

We will now go quickly through the installation process for Android and iOS platforms. The basic instructions for this section can be found at http://docs.phonegap.com/en/3.3.0/guide_platforms_index.md.html#Platform%20Guides.
Getting Ready for PhoneGap

Installing Android
The instructions to install Android SDK can be found at http://docs.phonegap.com/en/3.3.0/guide_platforms_android_index.md.html#Android%20Platform%20Guide.

In order to benefit from this chapter, you need to follow the instructions till the point where you can run the Hello World example in your Android emulator. This will include things like installing the Android SDK, Eclipse Tools, and so on.

Installing iOS
If you are using Mac and want to develop an app for iOS, then you will need to install the SDK for iOS as well. In general, you will need to install Xcode from the App Store and you will need to register as an Apple Developer in order to deploy the app in the App Store.

You can follow the instructions given at http://docs.phonegap.com/en/3.3.0/guide_platforms_ios_index.md.html#iOS%20Platform%20Guide.

Please make sure that you can at least run the PhoneGap Hello World example in your iOS simulator in order to benefit from this chapter.

Command-line interface for both Android and iOS
Once you have finished installing the individual platforms, it's time to move on to the command-line interface. This section contains the most important commands for the command-line interface. To start off, you need to install Node.js (www.nodejs.org).

Once you have installed node.js, perform the following steps:

1. Run the npm -g install cordova command. This installs the command-line interface on your computer.
2. Change the directory to the place where you will be saving your project files for this chapter.
3. Once in the directory, issue the cordova create todo com.project.todo ToDo command. This will create a folder containing your basic files for PhoneGap.
4. Now, change directory to /todo.
5. Once in the directory, we need to install the various platforms we will be supporting:
   ° For iOS, use the `cordova platform add ios` command
   ° For Android, use the `cordova platform add android` command

6. Now, let’s try to run the Hello World example in Android using the `cordova emulate android` command. If you see an area where you have not defined an AVD, run the `android create avd –name todo –target 1` command.

7. Then, run the `cordova emulate android` again command. If everything works correctly, you should see the following screenshot:

![Hello World working in android](image-url)
Cool, so now let’s try to run the Hello World example in an iOS simulator. For a start, issue the `node -g install ios-sim` command. Now, run the `cordova emulate ios` command. If everything runs correctly, you should see the following screenshot:

![iOS Simulator Screenshot](image)

**Running on real devices**

So far, we have learned how to run the Hello World app on emulators. However, what if we want to run our code on our devices? It’s easy; for Android, run the following commands:

```bash
cordova build android
cordova run android
```

For iOS, run the following commands:

```bash
cordova build ios
cordova run ios
```
Got the previous example running? If so, great! Let's now move on to the next section where we implement AngularJS on PhoneGap.

**AngularJS on PhoneGap**

Before we begin this section, let's take a look at how much magic the PhoneGap command-line interface has. Navigate to the directory where you saved your code; you should see something like the following screenshot:
The previous screenshot is how my code directory looks after issuing the PhoneGap commands of the previous section. Notice that I've created the folder phonegap/, and the PhoneGap command line helped us create the todo/ project folder with other folders such as hooks/, merges/, platforms/, plugins/, and so on. Our platform-specific commands created the folders android/ and ios/ and they are found under merges/ and platforms/ respectively.

The automatically created folders are meant to hold important files that belong to different platforms. For example, you will find Android-related files in android, while you will find iOS related files in ios/. In the plugins/ folder, you will find the various plugins that you have installed. Later in this book, you will see and experience the Facebook connect plugin.

In my opinion, the command-line interface saves us a lot of work. Most importantly, we are not tied down to any particular code editor; we can just use the terminal and any code editor that we prefer (I use Sublime Text).

Now, going back to your source code, navigate to the www/ folder under todo/. As you might already know, www/ contains our source code for the JavaScript, CSS, and HTML files.

Look for the index.html file and rename it index_backup.html. Now, create a new index.html file under the www/ directory.

Next, copy and paste the contents from concepts.html, but make a few changes to it. For your convenience, the code that we will use is as follows:

```html
<!doctype html>
<html ng-app>
<head>
    <script type="text/javascript" src="cordova.js"></script>
    <script src="https://ajax.googleapis.com/ajax/libs/angularjs/1.2.12/angular.min.js"></script>
    <style>
        body {
            padding:40px;
        }
        #holder {
            border: 2px solid red;
        }
    </style>
</head>
<body>
    <div id="holder">
        <label>Say Hello World</label>
    </div>
</body>
</html>
```
<input type="text" ng-model="yourHelloWorld" placeholder="Type anything here.">
<hr>
<h1>Hello {{yourHelloWorld}}!</h1>

The code is generally the same as the concepts.html file as seen in the chapter1 folder, but with a few changes as shown in the highlighted lines of code:

- In the <header> tag, we installed PhoneGap by using <script type="text/javascript" src="cordova.js">
- Next, we added simple styles so that we can see what we are concerned with bounded in a red box

Now, save your code as index.html. Make sure it is saved under the www/ folder. After you have saved it, we need to test the code and make sure that the code is working as per what we have seen in the chapter1 folder. We should expect to see that as we type any text into the input box, it should be appended after the Hello! text.

So now, let's start testing our code. Let's start with iOS. Go to your terminal and make sure you change the directory to todo/. Once in the directory, issue the command cordova emulate ios. Once your emulator has started, you should see the following screenshot:

AngularJS Hello World example on PhoneGap iOS Simulator
All is good. Now let's test by typing into the text input and see if it works as intended. In my case, I typed, `hey`, and I got the following screenshot:

![Typing hey to make sure that the code works](image)

Understood the example? Make sure that the characters get printed out as you type along! If iOS is working out fine, we should not have any problem with Android. However, for safety's sake, let's fire up Android's emulator to make sure things are going as intended.

Quit your iOS simulator if you want to. Now, return to your terminal and issue the command `cordova emulate android`. Once Android's emulator has started, you should see the following screenshot:
If you got the output, that's good. Let's test by typing into the text input box. This time, I typed `world` and I got the following screenshot:

![AngularJS Hello World on iOS simulator](image-url)

AngularJS Hello World on iOS simulator
What just happened?
By now, you should have noticed that enabling AngularJS on PhoneGap apps are pretty straightforward, just code as if you are writing an AngularJS app. To port it over to PhoneGap, just make sure you run the commands shown in the previous sections and install the cordova.js script in your AngularJS app.

Now that we have made sure that AngularJS works in PhoneGap, it's time to move on to the main topic of this chapter: building a Todo app.

Creating a to-do list app using AngularJS on PhoneGap
For this section, we'll start off by transferring the to-do list app from the chapter1 folder to PhoneGap. As you may have already guessed, shifting the to-do list app to a PhoneGap version simply requires the installation of cordova.js. Let's see how this is done in the next section.

A basic version of a to-do list using AngularJS on PhoneGap
Let's quickly get started by shifting the to-do list app from chapter1 to PhoneGap. Perform the following steps:

1. Change the directory to chapter2 and navigate to www/ where your PhoneGap files are located.
2. Change index.html to index_concepts.html.
3. Now, copy the contents from index.html from chapter1 (where the basic HTML structure for todo app resides) to our new index.html file.
4. Copy todo.js from todo/ in chapter1 to js/ in www/ in the chapter2 folder.
Your directory should look like this for todo app of chapter2:

The code directory

5. So, as of now, your index.html file for this chapter should look like the following code:

```html
<!doctype html>
<html ng-app>
<head>
  <script src="https://ajax.googleapis.com/ajax/libs/angularjs/1.2.12/angular.min.js"></script>
  <script src="todo.js"></script>
  <link rel="stylesheet" href="http://netdna.bootstrapcdn.com/bootstrap/3.0.3/css/bootstrap.min.css">
  <style>
    body { padding:40px; }
    #todoDetails { visibility: hidden; }
  </style>
</head>
```

Getting Ready for PhoneGap

```html
<html>
    <head>
        <style>
            [108x688]ns-controller="todoCtrl">
            <div class="row" ng-controller="todoCtrl">
                <div class="col-md-6">
                    <h2>Todo</h2>
                    <div>
                        <span>{{remaining()}} of {{todos.length}} remaining</span>
                    </div>
                    <ul class="unstyled">
                        <li ng-repeat="todo in todos">
                            <input type="checkbox" ng-model="todo.done">
                            <span class="done-{{todo.done}}">{{todo.text}}</span>
                            <button ng-click="showDetail(todo.text)">Detail</button>
                        </li>
                    </ul>
                    <form ng-submit="addTodo()">
                        <input type="text" ng-model="todoText" size="30" placeholder="add new todo here">
                        <input class="btn-primary" type="submit" value="add">
                    </form>
                </div>
                <div id="todoDetails" class="col-md-6">
                    <h2>Details</h2>
                    Title: <span id="title">{{currentText}}</span>
                    Add Details:
                    <form ng-submit="addDetails(currentText)">
                        <textarea id="details" ng-model="currentDetails">{{currentDetails}}</textarea>
                        <p>
                            <input class="btn-primary" type="submit" value="Add Details">
                            <input class="btn-primary" type="submit" value="Cancel" ng-click="closeThis()">
                        </p>
                    </form>
                </div>
            </div>
        </style>
    </head>
    <body>
        <div class="row" ng-controller="todoCtrl">
            <div class="col-md-6">
                <h2>Todo</h2>
                <div>
                    <span>{{remaining()}} of {{todos.length}} remaining</span>
                </div>
                <ul class="unstyled">
                    <li ng-repeat="todo in todos">
                        <input type="checkbox" ng-model="todo.done">
                        <span class="done-{{todo.done}}">{{todo.text}}</span>
                        <button ng-click="showDetail(todo.text)">Detail</button>
                    </li>
                </ul>
                <form ng-submit="addTodo()">
                    <input type="text" ng-model="todoText" size="30" placeholder="add new todo here">
                    <input class="btn-primary" type="submit" value="add">
                </form>
            </div>
            <div id="todoDetails" class="col-md-6">
                <h2>Details</h2>
                Title: <span id="title">{{currentText}}</span>
                Add Details:
                <form ng-submit="addDetails(currentText)">
                    <textarea id="details" ng-model="currentDetails">{{currentDetails}}</textarea>
                    <p>
                        <input class="btn-primary" type="submit" value="Add Details">
                        <input class="btn-primary" type="submit" value="Cancel" ng-click="closeThis()">
                    </p>
                </form>
            </div>
        </div>
    </body>
</html>
```
Let's make some CSS changes to the code that you are going to use for index.html; we need to change the highlighted line of code to `padding:40px 20px 0 20px;`.

6. Now, we need to fire up our code to make sure that it is working as intended. We'll test it out on iOS first. Go to your terminal, change the directory to todo/ and issue the command `cordova emulate ios`. Once the iOS simulator is fired up, you should see the following screenshot:

![Todo App on iOS](image)

7. Now test the following to make sure that it is working as per what we see in chapter1:
   
   - Tick off the check boxes to see if the number of tasks remaining and total tasks are correct
   - Try adding a new todo item and see if it adds to the list of todos
° Click on **Detail** and see if the item will show up below the input box. For instance, you should see something like the following screenshot:

![Todo app on Android](image)

If you are getting the preceding tests right, then congratulations; all is working well and good. Now we need to test the code on Android. Going back to your terminal, issue the command `cordova emulate android`. After the emulator is fired up, you should see the following:
Now, as usual, carry out the test that you have done for iOS. Similarly, when you click on the **Detail** button, you should see the following screenshot:

![Todo details for each todo on Android](image)

**Summary**

Let's quickly discuss what we have done in this chapter. We have prepared ourselves for PhoneGap development by installing SDKs for both Android and iOS. Next, we touched on how we can make use of PhoneGap command-line interface to set up our app, install, and prepare for different platforms and run our apps on iOS and Android emulators. We've also learned the commands to run our apps on real devices.

However, we are still far away from a decent mobile app. What we have now is just a basic version of the todo app on PhoneGap; we need to improve on it. Specifically, we need to make it look more like a mobile app. For instance, can we design the look and feel of the to-do list so that it when we tap on it, we are shown the individual todo item on a single page, instead of just appending it to the bottom of the page? We'll do this and more in the next chapter.
Now that we have our basics in place, let's move on to something more advanced. In *Chapter 1, Introduction to AngularJS*, and *Chapter 2, Getting Ready for PhoneGap*, we built a simple to-do list, which works well, but the code organization is amateurish at best. The code arrangement in the previous chapters prevents us from writing large apps should we want to. Hence, in this chapter, we will start off by reorganizing the code first, before wiring up with a backend server.

We will be building on the topics covered in *Chapter 1, Introduction to AngularJS*, and *Chapter 2, Getting Ready for PhoneGap*. Specifically, we are going to cover three main areas:

- Reorganizing the code
- Writing our server using the Tornado web server
- Wiring our app with the backend server

### Rewriting the simple to-do list app

In *Chapter 2, Getting Ready for PhoneGap*, we wrote a rather simplistic version of the to-do list app. As you may have already noticed, many things were missing; there was no backend server to save your to-do lists, and there was no code organization, as everything was just written within a folder and with minimal breakup of the code.

In this section, we are going to do just that; rewrite the code so that there are some levels of code organization.
Let's review the code organization first. The app we built in Chapter 1, Introduction to AngularJS, looks like the following:

```
from a Simple To-do List to an Advanced To-do List

Let's review the code organization first. The app we built in Chapter 1, Introduction to AngularJS, looks like the following:

todo/
todo.js
index.html

We are going to break up the code so that the code organization looks as follows:

project/
css/
js/
    controllers/
        todo.js
    services/
        todo.js
    app.js
partials/
    detail.html
    list.html
    index.html

So what is going to happen is that project.js from Chapter 2, Getting Ready for PhoneGap, will be broken up into todo.js, controllers/todo.js, services/todo.js, and app.js. We will also breakup index.html into multiple HTML snippets and place them under the partials/ folder.

So before you start with the next section, you might want to create the directories and empty files based on the code organization.

**Splitting index.html into multiple files**

We will start work on index.html first. To start off, this is what index.html will look like in this chapter:

```
<!doctype html>
<html ng-app="todoApp">
<head>
    <link rel="stylesheet" href="http://netdna.bootstrapcdn.com/bootstrap/3.0.3/css/bootstrap.min.css">
    <style>
        body {
            padding: 40px 20px 0 20px;
        }
    </style>
</head>
```
The preceding code structure is essentially the same as what we saw in Chapter 2, *Getting Ready for PhoneGap*. The main difference is that much of the details (such as listing the to-do lists and edit view) are now being abstracted away.

The main thing to note is the use of `ng-view` in `index.html`; you can think of `ng-view` as a container that will hold different snippets of HTML based on the current URL.

Now let’s begin coding:

1. Let’s work on `partials/detail.html`:

   ```html
   <form name="myForm">
      <div class="control-group">
         <label>Name</label>
         <input type="text" name="text" ng-model="todoText">
      </div>
      
      <div class="control-group">
         <label>Details</label>
         <textarea name="description" ng-model="todoDetails"></textarea>
      </div>
      
      <a href="#/" class="btn">Cancel</a>
      <button ng-click="save()" class="btn btn-primary">Save</button>
      <button ng-click="destroy()" ng-show="project.$remove" class="btn btn-danger">Delete</button>
   </form>
   ```
2. You will see some of the details of the detail.html file in the previous chapter; the highlighted lines of code are the new additions:

° <a href="#/" class="btn">Cancel</a> simply performs a change in the URL route when we perform a cancel action. Notice that we are using #/ instead of /.

° Instead of using ng-submit to add new to-do lists, we now use ng-click="save()" to either create or edit the current to-do item, should there be any.

3. Once you're done with the preceding step, let's move to partials/list.html:

```html
<span>{{remaining()}} of {{todos.length}} remaining</span>
<table>
  <thead>
    <tr>
      <th>Todo</th>
      <th>Done</th>
      <th>Details</th>
      <th><a href="#/new"><i class="icon-plus-sign">NEW</i></a></th>
    </tr>
  </thead>
  <tbody>
    <tr ng-repeat="todo in todos">
      <td>{{todo.text}}</td>
      <td><input type="checkbox" ng-model="todo.done"></td>
      <td>
        <a href="#/edit/{{todo.text}}"><i class="icon-pencil">Edit/Details</i></a>
      </td>
    </tr>
  </tbody>
</table>
```

4. The list.html file is similar to what we have done in Chapter 2, Getting Ready for PhoneGap; the only change was that we split the part where we loop through the list of to-dos into a separate HTML file.

Now that we are done with the HTML portion of the code, let's move on to the meat of this rewrite: rearranging the JavaScript code.
Splitting todo.js into multiple files

We will first work on app.js found under the project/js folder. Bear in mind that this is the first time we write the code for app.js. It contains the routes to different views of the app by making use of an AngularJS module called ngRoute.

Now let's see how we can make use of ngRoute:

1. To start off, here's what app.js looks like now:

```javascript
angular.module('todoApp', [  'ngRoute',  'todoApp.controllers',  'todoApp.services'])

.config(function($routeProvider) {  $routeProvider  .when('/', {    controller:'ListCtrl',    templateUrl:'partials/list.html'  })  .when('/edit/:todoText', {    controller:'EditCtrl',    templateUrl:'partials/detail.html'  })  .when('/new', {    controller:'CreateCtrl',    templateUrl:'partials/detail.html'  })  .otherwise({    redirectTo:'/'});
})
```

2. Let's go through what's happening here line by line:

   ° We first define todoApp; something we have done in Chapter 1, Introduction to AngularJS, and Chapter 2, Getting Ready for PhoneGap.

   ° Next, we included the modules and code that we want to use, namely ngRoute, todoApp.controller, and todoApp.services. Take note that we have not created todoApp.controller and todoApp.services yet.

   ° Finally, we make use of the ngRoute module to define the routes we want to use, and its associated controller and template.
From a Simple To-do List to an Advanced To-do List

° when('/') means that when the URL location is '/', we will be using ListCtrl and the partials/list.html template.
° Controllers in each of the route are defined as todoApp.controllers (which is the controller.js file we will be working on in the next section).
° templateUrl is simply the HTML snippet that we would like to show for each different URL.

3. Now let's create the controller found at controller/todo.js. The code is the same as in Chapter 2, Getting Ready for PhoneGap:

```javascript
angular.module('todoApp.controllers', [])
  .controller('ListCtrl', function($scope, $http, Todos) {
    $scope.todos = Todos;
    $scope.remaining = function() {
      var count = 0;
      angular.forEach($scope.todos, function(todo) {
        count += todo.done ? 0 : 1;
      });
      return count;
    };
  })
  .controller('CreateCtrl', function($scope, $location, $timeout, Todos) {
    $scope.todoText = "";
    $scope.todoDetails = ""
    $scope.save = function() {
      Todos.push({text:$scope.todoText, done:false,
                   details:$scope.todoDetails});
      $location.path('/');
    };
  })
  .controller('EditCtrl', function($scope, $location, $routeParams, Todos) {
    $scope.todos = Todos;
    var result = $scope.todos.$filter(function (obj) {
      return obj.text == $routeParams.todoText;
    });
    $scope.todoText = result[0].text;
    $scope.todoDetails = result[0].details;
    $scope.save = function() {
      var text = $scope.todoText;
```
var details = $scope.todoDetails;
var done = $scope.todoDone;
alert(text);
angular.forEach($scope.todos, function(todo) {
    if(todo.text == text) {
        todo.text = text;
        todo.details = details;
    }
});
$location.path('/:');
}
$scope.destroy = function() {
    $scope.project.$remove();
    $location.path('/:');
};
});
4. The only line of code you need to take note of is the first line; we have defined todoApp.controllers, which was referenced from js/app.js earlier on.

5. We can now move on to js/services/todo.js. As usual, we first declare todoApp.services, followed by Todos. We simply return a list of to-do items here. The code looks as follows:

    angular.module('todoApp.services', [])
    .factory('Todos', function() {
        var items = [
            {text:'here is my first to do', done:true, details:''},
            {text:'continue writing chapter 1 for this book', done:false, details:''},
            {text:'work on chapter 2 examples', done:false, details:''}
        ]
        return items;
    })

Now that we have more or less reorganized our code, we should check that our code is working. Save your code and open up index.html in your web browser. You should expect to see that the code is working as per Chapter 2, Getting Ready for PhoneGap. The interface will look the same with the exception that the underlying code's organization has changed.
Is it all working well? If so, great! You can proceed to create a PhoneGap version of this code by copying and pasting the contents of todos_advance/ into the www/ folder found in your PhoneGap project.

Next, you can test your code in the Android and iOS emulators by running cordova emulator android and cordova emulator ios, respectively, and making sure that the code is working fine.

Checkpoint

Now that we have rewritten the code and transferred it to PhoneGap, check if the www/ directory in your PhoneGap app looks like the following:

```
www/
css/
js/
  controllers/
  todo.js
services/
  todo.js
partials/
  detail.html
  list.html
index.html
```

Most importantly, make sure that your code in PhoneGap is working as per Chapter 2, Getting Ready for PhoneGap. Also, your app should look and work similarly to the version we have coded we have in Chapter 2, Getting Ready for PhoneGap. If the code is confirmed and working correctly, let's move on to the next section where we wire a backend server and create an advanced version of the to-do list app.

Wiring up a backend server

In this section, we will make use of the $http module of AngularJS to make RESTful calls to a simple backend server. The backend server here is based on Facebook's Tornado Framework (https://github.com/facebook/tornado/), but the fact is that you can make RESTful calls using Express.js (http://expressjs.com/) or any other framework that you like.

Before you get started with this section, you will need to have MongoDB (http://www.mongodb.org/), Python 2.7.x, and the Tornado web server installed. You will also need to install a Python library called tornado-cors (https://github.com/globocom/tornado-cors), which facilitates the use of cross-origin resources between your AngularJS app and server.
Coding our server
The main idea of the Python Tornado server is as follows:

- We have one endpoint, where this endpoint will receive a **GET** or **POST** request from our AngularJS app.
- Depending on the URL argument received, the corresponding handler will perform **GET** on all to-do items or one to-do item. If the request is a **POST** request, it will either edit or create a new to-do item.

Since the Tornado web server uses class-based views, we only need to define one class, which accepts a **GET** or **POST** request. You can refer to the source code found at `chapter3/server/server.py`. The full code for our server is as follows:

```python
import tornado.httpserver
import tornado.ioloop
import tornado.options
import tornado.web
import pymongo
from bson.objectid import ObjectId
from tornado_cors import CorsMixin
from tornado.options import define, options
import json

define("port", default=8000, help="run on the given port",
type=int)

class Application(tornado.web.Application):
    def __init__(self):
        handlers = [(r"/todos", Todos)]
        conn = pymongo.Connection("localhost")
        self.db = conn["todos"]
        settings = dict(
            xsrf_cookies=False,
            debug=True
        )
        tornado.web.Application.__init__(self, handlers,
                                        **settings)

class Todos(CorsMixin, tornado.web.RequestHandler):
    CORS_ORIGIN = "*
    CORS_METHODS = "POST, GET, OPTIONS"
    CORS_HEADERS = "Origin, X-Requested-With, Content-Type, Accept, content-type"
    CORS_MAX_AGE = 1728000
```
CORS_CREDENTIALS = False

def get(self):

    Todos = self.application.db.todos
    todo_id = self.get_argument("id", None)

    if todo_id:
        todo = Todos.find_one({"_id": ObjectId(todo_id)})
        todo['_id'] = str(todo['_id'])
        self.write(todo)
    else:
        todos = Todos.find()
        result = []
        data = {}
        for todo in todos:
            todo['_id'] = str(todo['_id'])
            result.append(todo)
        data['todos'] = result
        self.write(data)

def options(self):

    todo_id = self.get_argument("id", None)
    Todos = self.application.db.todos
    #if self.request['Access-Control-Request-Method'] == 'POST':
    self.set_header("Access-Control-Allow-Headers", "content-type")


def post(self):
    data = json.loads(self.request.body)

    Todos = self.application.db.todos
    todo_id = self.get_argument("id", None)

    if todo_id:
        # perform an edit
        todo = Todos.find_one({"_id": ObjectId(todo_id)})

        # here should perform the update...
        todo['text'] = data['text']
        todo['details'] = data['details']
        todo['done'] = data['done']
        Todos.save(todo)
# cos _id is not JSON serializable.
todo['_id'] = str(todo['_id'])
self.write(todo)
else:
data = json.loads(self.request.body)
todo = {
    'text': data['text'],
    'details': data['details'],
    'done': data['done']
}
a = Todos.insert(todo)

# cos _id is not JSON serializable.
todo['_id'] = str(a)
self.write(todo)

def main():
tornado.options.parse_command_line()
http_server = tornado.httpserver.HTTPServer(Application())
http_server.listen(options.port)
tornado.ioloop.IOLoop.instance().start()

if __name__ == '__main__':
    main()

Here's what's happening in our code:

- Right at the top of server.py, we simply import various libraries required for our sever.
- Next, we have the Application class defined, where we initialize the handlers required for our server. Handlers are simply URLs that are mapped to class-based views in the Tornado web server.
- The Todos class contains three functions:
  - get: This function supports the GET operations
  - options: This function supports the CORS OPTIONS string
  - post: This function supports the POST operations
- Finally, we define a main() function, which is supposed to run our Tornado server when called.
To make sure that the Tornado Python server is working, you must first run MongoDB on your computer, navigate to the folder where `server.py` resides, and then run the following command:

```python
python server.js
```

Once you issue the preceding command, open up your web browser and navigate to `http://localhost:8000`; you will see the following screen:

```
Traceback (most recent call last):
  File "/Library/Python/2.7/site-packages/tornado/web.py", line 1134, in _execute
    self._execute_method()
  File "/Library/Python/2.7/site-packages/tornado/web.py", line 1693, in prepare
    raise HTTPError(self._status_code)
HTTPError: HTTP 404: Not Found
```

Getting an error since we have not defined a handler for this URL

We get an error message because we did not define any handlers for the URL at `http://localhost:8000`. So let's now change our URL to `http://localhost:8000/todos`. You should technically receive an empty page, but because we already have some test data saved in MongoDB, you will see the following screen:

```
{
    "todos": [
        {"text": "go do", "id": "53b973888f0f209516af0c3", "done": true, "details": "go do"},
        {"text": "go do", "id": "53b973888f0f20951752170"}
    ]
}
```

A sample list of data returned

So when we perform a GET request at `/todos`, we simply retrieve a full list of to-dos. Similarly, when we perform a GET request with an ID, you will see that only one to-do item is being returned.
Now that our server is ready, we need to start coding our AngularJS app to make it ready for RESTful operations. We'll be making changes to the code found in js/controllers and js/services, in general. We'll start with js/services/todo.js first.

### Changing AngularJS to perform RESTful requests

Let's get back to js/services/todo.js. We are going to include four basic operations in this module, namely getting all to-do items, getting one to-do item, saving to-do lists, and finally, editing to-do item operations.

The code that will consume the RESTful APIs is as follows:

```javascript
angular.module('todoApp.services', [])
.config(function ($httpProvider) {
  $httpProvider.defaults.useXDomain = true;
  delete $httpProvider.defaults.headers.common['X-Requested-With'];
})
.factory('Todos', function($http) {
  return {
    getAll: function() {
      // return $http.get('http://10.0.2.2:8000/todos'); // if using android
      return $http.get('http://localhost:8000/todos');
    },
```
getTodo: function (id) {
    // return $http.get('http://10.0.2.2:8000/todos?id='+id); // if using android
    return $http.get('http://localhost:8000/todos?id='+id);
},
save: function (todoData) {
    // return $http.post('http://10.0.2.2:8000/todos', todoData); // if using android
    return $http.post('http://localhost:8000/todos', todoData);
},
edit: function (id, todoData) {
    // return $http.post('http://10.0.2.2:8000/todos', todoData); // if using android
    return $http.post('http://localhost:8000/todos?id='+id, todoData);
},
delete: function(id) {
    console.log("i dont think I have a delete here.")
}
}

First and foremost, notice that we have a .config file where we used $httpProvider and made some changes to the default behavior of the AngularJS $http requests. The first two highlighted lines with .config are there to ensure that cross-domain requests can be done, since our AngularJS app resides in a different location as our server.

Secondly, notice that the services module simply returns the operations we need, with the relevant RESTful endpoints. For example, getAll is a function that returns the endpoint http://localhost:8000/todos using a GET request.

**Rewriting controllers to make use of the $http module**

In the previous section, we rewrote services/todo.js so that it now performs RESTful requests. How do we consume these services in the controller? We can simply do so by including Todo under the controllers that we want to use the services provided for by Todo. Take for instance, ListCtrl:

```javascript
.controller('ListCtrl', function($scope, $rootScope, $http, Todos) {
    Todos.getAll().success(function(data) {
        $rootScope.todos = data['todos'];
    })
});
```
Chapter 3

$\text{scope.remaining} = \text{function}() \{ 
    \text{var count} = 0; 
    \text{angular.forEach($scope.todos, function(todo) \{ 
        \text{count += todo.done ? false : true; 
    \})}; 
    \text{return count}; 
\}; 
\}

\text{In the highlighted line in the preceding code, notice that we have included Todos. Next, in order to retrieve all to-do items, we simply make a .getAlI() call by doing Todos.getAlI(). If the call is successful, we return the JSON data and assign it to $rootScope.todos.}

\text{We use $rootScope instead of $scope, because I wanted all the controllers to be able to access the current state of todos without making another call to the backend server.}

\text{Next, for CreateCtrl, we simply make a .save() to the backend with our to-do data:}

\text{.controller('CreateCtrl', function($scope, $rootScope, $location, $timeout, Todos) \{ 
    $scope.todoText = ""; 
    $scope.todoDetails = ""; 
    $scope.save = \text{function}() \{ 
        \text{var todo = \{ 
            text:$scope.todoText, 
            done:false, 
            details:$scope.todoDetails 
        \}; 
        console.log($rootScope.todos); 
        $rootScope.todos.push(todo); 
        console.log($rootScope.todos); 
        
        Todos.save(todo); 
        $location.path('/'); 
        
    \}; 
\})

\text{Notice that we simply make a Todos.save() call to save our data to our backend server.}
Finally, let's take a look at `EditCtrl`. This time around, we simply get the to-do item by its ID, and perform `edit()` when we have made changes to the item. This is shown by the highlighted line in the following code:

```javascript
.controller('EditCtrl',
  function($scope, $location, $routeParams, Todos) {
    // $scope.todos = Todos;
    console.log($location.$$path.split("/");
    var id = $location.$$path.split("/")[2];
    var result = Todos.getTodo(id).success(function(data) {
      console.log(" and the returned data is ");
      console.log(data);
      $scope.todoText = data.text;
      $scope.todoDetails = data.details;
      return data;
    })
    $scope.save = function() {
      var todo = {
        id:$location.$$path.split("/")[2],
        text:$scope.todoText,
        details:$scope.todoDetails,
        done:true
      }
      Todos.edit(id, todo);
    }
  });
```

### Checking our code

Now that we have rewritten our AngularJS app, it's time to check if it works correctly. As usual, fire up your server by issuing the Python `server.py` and start your AngularJS app using a local server. When you first load your AngularJS app, you will see a GET request on your server in the backend. Here's what it looks like on my terminal:

```
[17:14:25] 17.29.53 304 GET /todos (/:1) 2.81ms
```

A GET request

Let's try creating a new to-do item by clicking on **NEW**. As usual, you should see the following screen:
Now type in the name and details. I'm going to just type `hello world` as the name and `hello world description` as the details. Once done, click on **Save**. You should see that you are now redirected to the page containing the list of todos with the new to-do item at the bottom.

If you look at your terminal, you will also see the following screen:

A series of HTTPS requests coming from our AngularJS app

The **OPTIONS** request is sent from AngularJS. You are then redirected back to the home page (that's where the **GET** request occurs), and finally, the **POST** action is completed, as shown by the last line in this terminal.

Now you can attempt to perform an edit operation. We will edit the item that we have just added:
From a Simple To-do List to an Advanced To-do List

We will now add new details to the to-do item:

![Making changes to the to-do item](image)

Now click on **Save**. We will see the following screen when we are redirected back to the home page:

![The to-do item is being edited and is reflected on the list of to-do items](image)

If everything works as expected, we can now test our code on Android and iOS.

**Preparing for PhoneGap**

As usual, we will need to transfer the code that we have written under `/www`. Make sure you transfer the code correctly to PhoneGap. If you've done it correctly, your PhoneGap folder should look as follows:
If you have performed the previous steps, let's test it out on iOS and Android.

**Testing our code on iOS**

To test our code on iOS, we simply navigate to our PhoneGap project (`phonegap/todo`) and issue the following command:

```
cordova emulate ios
```

Remember to turn on your server and MongoDB as well. You should see the following screen on your Android emulator:

![Android Emulator Screen](image)

Your to-do list app should look and work as expected.
This is simply some of the data that we created beforehand. Let's go ahead and create a new to-do item:

Your to-do list app should look and work as expected; creating a to-do item works

Now go ahead and save it. You will see the following screen:

Your to-do list app should look and work as expected; creating a to-do item works

I'm just going to go ahead and edit the latest to-do item:

Editing a to-do item should work as expected
Now click on **Save**. You should see the latest item saved as shown in the following screenshot:

![Todos screenshot](image)

After editing and saving the to-do item, the app works as expected.

**Testing our code on Android**

We need to make some changes in order to test our code on Android. We also need to make changes to the endpoint that we are calling; `http://localhost:8000` will need to be changed to `http://10.0.2.2`.

For this Android version, your `js/services/todo.js` will look as follows:

```javascript
angular.module('todoApp.services', []).config(function ($httpProvider) {
  $httpProvider.defaults.useXDomain = true;
  delete $httpProvider.defaults.headers.common
    ['X-Requested-With'];
})
.factory('Todos', function($http) {
  return {
    getAll: function () {
      return $http.get('http://10.0.2.2:8000/todos'); // if using android
      //return $http.get('http://localhost:8000/todos');
    },
    getTodo: function (id) {
      return $http.get('http://10.0.2.2:8000/todos?id=' + id); // if using android
      //return $http.get('http://localhost:8000/todos?id=' + id);
    },
```
From a Simple To-do List to an Advanced To-do List

save: function (todoData) {
  return $http.post('http://10.0.2.2:8000/todos', todoData);
  // if using android
  //return $http.post('http://localhost:8000/todos', todoData);
},
edit: function (id, todoData) {
  return $http.post('http://10.0.2.2:8000/todos', todoData);
  // if using android
  //return $http.post('http://localhost:8000/todos?id='+id, todoData);
},
delete: function(id) {
  console.log("i dont think I have a delete here.")
}
}

Notice that we are commenting out the http://localhost:8000 version and using the http://10.0.2.2 version.

Next, we simply navigate to our PhoneGap project phonegap/todo and issue the following command:

cordova emulate android

Remember to turn on your server and MongoDB as well. You should see the following screen on your Android emulator:

![Todos](image)

On the first load, the to-do app shows a list of items we have in the database
This is simply just some of the data that we have created beforehand. As you can see, the item created on iOS is present. So I’m just going to go ahead and create another new to-do item:

Let’s go ahead and save it. You should see the new item on our to-do list.
Finally, I'm going to make some edits to make sure that our code is working fine. Click on **Edit/Details** for the Android item on the emulator and start editing it:

![Editing a to-do item](image)

Once you've saved the item, you will see that the Android item is now edited.

**Summary**

That's it! We went through quite a bit of detail in this chapter. By now you should see that shifting an AngularJS app to PhoneGap is very straightforward; all you need to do is place your files in the `www/` folder. You also learned how to create RESTful apps on top of AngularJS and the Tornado web server.

In the next chapter, we will cover advanced-level topics, such as optimizing our AngularJS app for touch devices, using PhoneGap plugins such as the Facebook plugin, and how to create directives for our AngularJS app. See you there.
In this chapter, we will be adding authentication capabilities to our to-do list app. To be specific, we are going to add Facebook Login capabilities to our app. We will start working on the web-based version of our app before porting the code over to the PhoneGap version. In the PhoneGap version, we will be leveraging on the PhoneGap plugin in order to achieve what we have done for the web-based version. The porting of code will be slightly less straightforward due to the recent changes to PhoneGap's Facebook plugin. So sit tight and see how we can add login capabilities in this chapter.

**Adding Facebook Connect to the to-do list app**

Adding Facebook Connect to our web-based version of the app is straightforward. You will need to sign up for a new app (or use the current one) from https://developers.facebook.com/ and take note of the app ID and app's secret key. Then, as usual, you will need to initiate your app using some Facebook-specific JavaScript and library "namely" Facebook's JavaScript SDK.

In case you are wondering, the Facebook Connect plugin is used to perform Facebook login in PhoneGap apps.
Initializing and preparing for Facebook Connect
Let's quickly dive into the source code for index.html:

```html
<!doctype html>
<html ng-app="todoApp">
<head>
    <link rel="stylesheet" href="http://netdna.bootstrapcdn.com/bootstrap/3.0.3/css/bootstrap.min.css">
    <style>
        body {
            padding: 40px 20px 0 20px;
        }
    </style>
</head>
<body>
    <div id="fb-root"></div>
    <script src="http://connect.facebook.net/en_US/all.js"></script>
    <script>
        FB.init({
            appId : XXX',
            xfbml : true,
            version : 'v1.0'
        });
    </script>
    <h2>Todos</h2>
    <div ng-view></div>
    <script src="https://ajax.googleapis.com/ajax/libs/angularjs/1.3.0-beta.7/angular.min.js"></script>
    <script src="https://ajax.googleapis.com/ajax/libs/angularjs/1.3.0-beta.7/angular-resource.min.js"></script>
    <script src="https://ajax.googleapis.com/ajax/libs/angularjs/1.3.0-beta.7/angular-route.min.js"></script>
    <script src="js/controllers/todo.js"></script>
    <script src="js/controllers/user.js"></script>
    <script src="js/services/todo.js"></script>
</body>
</html>
```
Take note of the following highlighted lines of code:

```html
<div id="fb-root"></div>
<script src="http://connect.facebook.net/en_US/all.js"></script>
<script>
  FB.init({
    appId      : 'XXX',
    xfbml      : true,
    version    : 'v1.0'
  });
</script>
```

The preceding code is basically Facebook-specific and is required in order for you to use Facebook Login for your web application. You will need to replace XXX with your own app ID, and make sure that the site URL (found under your app settings on Facebook Developers) is set to your login location.

Next, we have `<script src="js/controllers/user.js"></script>`. This will be a small snippet of code, where we will add the login capabilities for our app.

### Writing the user controller

We'll now start with the controller aspect of the app. So let's start by creating a new file called `user.js` in `js/controllers/user.js`. As usual, we will need to define `angular.module` and we are going to name this controller `UserLoginCtrl`. We can simply make calls to Facebook using the FB object, which was initiated earlier in `index.html`. So here's what your `user.js` should look like:

```javascript
angular.module('todoApp.userControllers', [])
    .controller('UserLoginCtrl', function($scope, $rootScope, $http, $location, Todos) {

    $scope.login = function() {

        // so this is for desktop testing
        FB.login(function(response) {
            if (response.authResponse) {
                console.log('Welcome!  Fetching your information.... ');
                FB.api('/me', function(response) {
                    console.log('Good to see you, ' + response.name + '.');
                    $location.path('/');
                    if (!$scope.$$phase) $scope.$apply();
                });
            }
        });
    });
```

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Adding Authentication Capabilities Using PhoneGap Plugins

The main function here is $scope.login, which simply wraps around the FB.login call where we attempt to login the user. The AngularJS-specific stuff is found in the following code:

```javascript
$scope.login = function() {
    FB.login(function(response) {
        if (response.status === 'connected') {
            FB.api('/me', 'GET', {fields: 'name, email'}, function(response) {
                $scope.user = response; // set the user object
            });
        } else {
            console.log('User cancelled login or did not fully authorize.');
        }
    }, {scope: 'email'});
};
```

This means that we will redirect the user back to the index page after he/she has logged in successfully.

```javascript
$url.route.to('/');
if(!$scope.$$phase) $scope.$apply();
```

Now you may be wondering if there's any page where login takes place. Yes, of course, and this is exactly what we are going to do in the next section.

### Adding a login page

We are going to create a new file called login.html. This file will reside in the partials folder, where all HTML snippets are found. However, first, we need to define the route where this HTML partial will be loaded. So let's take a look at app.js:

```javascript
angular.module('todoApp', [
    'ngRoute',
    'todoApp.controllers',
    'todoApp.userControllers',
    'todoApp.services'
]).config(function($routeProvider) {
```
There are two highlighted parts in our code, todoApp.userControllers, which means that we are loading this controller so it can be used in our app.

The second instance is the following code:

```
.when('/login', {  
  controller:'UserLoginCtrl', 
  templateUrl:'partials/login.html' 
});
```

The preceding code means that when the route is /login, we will be using UserLoginCtrl and login.html. Now that we have defined the route and coded UserLoginCtrl, it's time to work on login.html. The login.html file is simple and straightforward; it contains a title and Login button:

```html
<h3>Please login</h3>
<button ng-click="login()">Login</button>
```
Adding Authentication Capabilities Using PhoneGap Plugins

Yup, that's right, simple and straightforward. So if you save your files and visit your app at /login, you will get the following screenshot:

![Login Screen](image)

So right now, we can try out by clicking on Login. If everything works correctly, you will be redirected back to your index page. This page will show you a complete list of Todos, as shown in the following screenshot:

![List of Todos](image)

Alright, pretty cool yeah? However, we are missing out some stuff. For example, what happens if the user wants to logout? Or what happens when the user goes straight to the index page without logging in first? We will deal with that in the next two sections.
Adding a logout function

Perform the following steps to add a logout function:

1. To add a logout functionality, we will first need to have a logout button. So, we can add this functionality in the index page by placing the logout button in `partials/list.html`:

   ```html
   <button ng-click="logout()" style="float:right">Logout</button>
   <span>{{remaining()}} of {{todos.length}} remaining</span>
   <table>
     <!-- table content -->
   </table>
   
   $scope.logout = function () {
     alert('logging out')
     // this is the desktop version
     FB.logout(function(response) {
       alert('logged out');
     });
   }
   
   2. The entire `partials/list.html` file is the same as before, except for the highlighted line where the logout button is added.

   3. Next, since the logout button is found in `partials/list.html`, this means that we need to add a function to log out of `todo.js`. Now, going to `controllers/todo.js`, prepend the `$scope.logout` function just before `Todos.getAll()`:

```
4. The highlighted lines of code are the lines of code that will be handling the logout. So basically, what happens is that on clicking the Logout button, you will see an alert box that says logged out, after which you will be redirected to the login page.

5. Save your files and refresh your browser. You should see the following screenshot:

![List of todos with the Logout button](image)

6. Notice that we have a Logout button to the right of the page. Now click on it and you should see the following screenshot, if everything is working correctly:
7. After clicking on **OK**, you will be redirected back to the login page.

Now, let's move on to the last requirement, which is checking for the login status.

### Checking the login status

Checking of the login status will be done in the index page, for simplicity. So we need to add a function in `controllers/todo.js`. We need to prepend the functions used in the following code, before the `$scope.logout` function that we added in the previous section:

```javascript
$scope.checkLogin = function() {
    FB.getLoginStatus(function(response) {
        if (response.status == 'connected') {
            // alert('logged in');
            console.log("logged in bro");
        } else {
            // alert('not logged in');
            $location.path('/login');
            if(!$scope.$$phase) $scope.$apply();
        }
    });
}

$scope.checkLogin();
```
Now save the file and refresh your browser. If you are still logged out, you should be redirected to the `/login` page, where you will be asked to log in. For example, as I am still logged out from the previous section, I am redirected to the login page. After clicking on the `Login` button, I am prompted to log in, as shown in the following screenshot:

![Facebook Login](image-url)

Facebook Login
After entering my credentials, I am logged in successfully. Feel free to try out other functionalities that we have coded in the previous section, just to make sure that things are working as expected.

If everything is good to go, it's time to move on and port our code to PhoneGap. It will be slightly different from what we have done in the previous sections, as there are some extra steps and precautions that we have to take. You might want to take a short break before continuing to the next section.

Facebook login for PhoneGap

PhoneGap has gone through quite a bit of changes not only for the main library, but also the plugin system. In this section, you will see that we can quickly install PhoneGap plugins using the command-line tool, without the usual multiple steps that we have to follow if we want to install it manually.

Installing the Facebook plugin

Since we have already added iOS and Android platforms, this plugin installation will add plugins for both iOS and Android. To install the Facebook plugin, you will need to navigate to your todo app project. Next, issue the following command:

```bash
cordova plugin add https://github.com/phonegap/phonegap-facebook-plugin, --variable APP_ID="XXXXX" --variable APP_NAME="AngularPhoneGapTest".
```

You will need to replace xxxx with your app ID and you can name your app_name any name you want.

The installation process is now complete. For Android, you will need three more steps:

1. Import your todo app into your Eclipse development environment as an Android project.
2. While still in your Eclipse editor, in the left-hand column where all your projects are listed, right click on **Properties**.

3. Make sure that you import **FacebookLib** and **CordovaLib** under the **Library** section (at the bottom of the next screenshot):
Once this is done, we have completed installation for both iOS and Android. Now, it's time to test the code. Most of the examples run on iOS, but bear in mind that the same piece of code will run properly and correctly on Android as well.
Testing out Facebook Login on PhoneGap

In order to test if our Facebook Login plugin is installed correctly on PhoneGap, we need to write a simple example just to see if the app is working correctly. There are many examples out there on the Internet, but I've written a simple one here that should quickly show if our app is working. At the same time, you will also see that calling the FB SDK is also slightly different. Let's jump straight into the code by writing a new index.html page for our PhoneGap app:

```html
<!DOCTYPE html>
<html>
<head>
</head>
<body>
<button onclick="login()">Login</button>

<div id="data">loading ...</div>
<div id="fb-root"></div>
<!-- cordova -->
<script src="cordova.js"></script>
<!-- cordova facebook plugin -->
<script src="cdv-plugin-fb-connect.js"></script>
<!-- facebook js sdk -->
<script src="facebook-js-sdk.js"></script>
<script>
if ((typeof cordova == 'undefined') && (typeof Cordova == 'undefined')) alert('Cordova variable does not exist. Check that you have included cordova.js correctly');
if (typeof CDV == 'undefined') alert('CDV variable does not exist. Check that you have included cdv-plugin-fb-connect.js correctly');
if (typeof FB == 'undefined') alert('FB variable does not exist. Check that you have included the Facebook JS SDK file.');

FB.Event.subscribe('auth.login', function(response) {
    alert('auth.login event');
});

FB.Event.subscribe('auth.logout', function(response) {
    alert('auth.logout event');
});
```
FB.Event.subscribe('auth.sessionChange', function(response) {
    alert('auth.sessionChange event');
});

FB.Event.subscribe('auth.statusChange', function(response) {
    alert('auth.statusChange event');
});

var fbLoginSuccess = function (userData) {
    alert("UserInfo: " + JSON.stringify(userData));
}
function login() {
    facebookConnectPlugin.login(["basic_info"],
        fbLoginSuccess,
        function (error) { alert("" + error) }
    );
}

document.addEventListener('deviceready', function() {
    try {
        alert('Device is ready! Make sure you set your app_id below this alert.');
        FB.init({ appId: "XXXX", nativeInterface: CDV.FB, useCachedDialogs: false });
        document.getElementById('data').innerHTML = "";
    } catch (e) {
        alert(e);
    }, false);
});
The preceding code is somewhat similar to the official examples, but with three subtle differences, as shown by the highlighted lines:

- `<button onclick="login()">Login</button>`
  We are only focused on `login()` here, so we will remove the remaining functionalities such as posting to the wall and so on.

- The second section of the code is as follows:
  ```html
  <!-- cordova facebook plugin -->
  <script src="cordova.js"></script>
  <script src="cordova-plugin-fb-connect.js"></script>
  <!-- facebook js sdk -->
  <script src="facebook-js-sdk.js"></script>
  ```
  We are still required to install all PhoneGap-related files, including those related to the Facebook plugins.

- The third and most important section is as follows:
  ```javascript
  var fbLoginSuccess = function (userData) {
    alert("UserInfo: " + JSON.stringify(userData));
  }
  function login() {
    facebookConnectPlugin.login("basic_info",
    fbLoginSuccess,
    function (error) { alert("" + error) }
  );
  }
  ```
  Notice that we are making a login call to Facebook using `facebookConnectPlugin.login` instead of `FB.login`. This is due to the major change in plugins by the PhoneGap team. When we are porting our code to PhoneGap from the web version, our Facebook calls will be changed to reflect this. For now, follow on with this section. Once the code is written, save the file and run the iOS emulator. Issue the following command:

  `cordova emulate ios`
You will then see your iOS emulator get fired up, and you will be greeted with the following screenshot:

![iOS emulator screen](image1)

On entering the app

After clicking on **OK**, you will see that the **loading...** message has vanished. Next, you can click on **Login** and you will be presented with Facebook's login page:

![Facebook login screen](image2)

Facebook Login Screen
Since we have already authorized the app, there's no need to log in or authorize the app again. Click on OK and you should see a new screen with an alert box showing a JSON representation of your data:

If you get the previous screenshot, this means that everything you have done till now is right and should work well for Android too. If so, time to port our web-based version of the code to the PhoneGap version.

**From web to PhoneGap**

If you remember, in the previous section, I briefly mentioned that making calls to Facebook using the JavaScript SDK is now slightly different in PhoneGap, compared to the web-based version. Instead of a simplistic `FB.login()` call in the web version, we need to make a `facebookConnectPlugin.login()` call in the PhoneGap version. In this section, we'll take careful steps to port our code from the web-based version to a PhoneGap version.
Importing Facebook and PhoneGap plugins

First, we need to import Facebook- and PhoneGap-related plugins. We also need to slightly change how we initiate the \( \text{FB} \) object. So going back to your `index.html` file, here's what you need to do:

```html
<!doctype html>
<html ng-app="todoApp">
  <head>
    <link rel="stylesheet" href="http://netdna.bootstrapcdn.com/bootstrap/3.0.3/css/bootstrap.min.css">
    <style>
      body {
        padding: 40px 20px 0 20px;
      }
    </style>
  </head>
  <body>
    <div id="fb-root"></div>
    <h2>Todos</h2>
    <div ng-view></div>
    <!-- this is for phonegap -->
    <script src="cordova.js"></script>
    <!-- cordova facebook plugin -->
    <script src="cdv-plugin-fb-connect.js"></script>
    <!-- facebook js sdk -->
    <script src="facebook-js-sdk.js"></script>
    <script>
      document.addEventListener('deviceready', function() {
        try {
          alert('Device is ready! Make sure you set your app_id below this alert.');
          FB.init({ appId: "135542699836039", nativeInterface: CDV.FB, useCachedDialogs: false });
        } catch (e) {
          alert(e);
        }, false);
      </script>
    </body>
  </html>
```

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Adding Authentication Capabilities Using PhoneGap Plugins

```html
<!--
<script src="https://ajax.googleapis.com/ajax/libs/angularjs/1.3.0-beta.7/angular-touch.min.js"></script>
-->
<script src="js/controllers/todo.js"></script>
<script src="js/controllers/user.js"></script>
<script src="js/services/todo.js"></script>
<script src="js/app.js"></script>
</body>
</html>

You will first need to import cordova.js, cdv-plugin-fb-connect.js, and facebook-js-sdk.js as shown here:

```html
<!-- this is for phonegap -->
<script src="cordova.js"></script>
<!-- cordova facebook plugin -->
<script src="cdv-plugin-fb-connect.js"></script>
<!-- facebook js sdk -->
<script src="facebook-js-sdk.js"></script>
</html>
```

Next, we initiate the FB object by waiting for the deviceready event specific to PhoneGap:

```javascript
<script>
    document.addEventListener('deviceready', function() {
        try {
            alert('Device is ready! Make sure you set your app_id below this alert.');
            FB.init({ appId: "XXXXX", nativeInterface: CDV.FB,
                useCachedDialogs: false });
        } catch (e) {
            alert(e);
        }
    }, false);
</script>
```

As usual, remember to replace the `XXXXX` with your own app ID from Facebook so that your login redirects correctly, and has the right credentials.
Changing FB to facebookConnectPlugin

The next thing that we need to do is change FB to facebookConnectPlugin. We will start with controller/user.js. The code should look like the following, after the change:

```javascript
angular.module('todoApp.userControllers', [])

.controller('UserLoginCtrl', function($scope, $rootScope, $http, $location, Todos) {

    $scope.login = function() {
        // place where the user just click and login
        var fbLoginSuccess = function(userData) {
            alert("UserInfo: " + JSON.stringify(userData));
            $location.path('/');
            if (!$scope.$$phase) $scope.$apply();
        }

        // this is used for PhoneGap ver
        facebookConnectPlugin.login(['basic_info'],
            fbLoginSuccess,
            function (error) { alert("" + error) }
        );
    }

    });
```

We have a new variable named fbLoginSuccess, which is called after the user logs in successfully. Next, we have facebookConnectPlugin.login, which makes a call to log in to Facebook via PhoneGap's plugin.
Next, we need to work on controller.js. The two functions that you need to change are $scope.checkLogin and $scope.logout. We simply replace FB with facebookConnectPlugin. So here's what the code looks like now:

```javascript
$scope.checkLogin = function() {
    facebookConnectPlugin.getLoginStatus(function(response) {
        alert(response);
        if (response.status == 'connected') {
            //alert('logged in');
            console.log("logged in bro");
            $location.path('/');
            if (!$scope.$$phase) $scope.$apply();
        }
        else {
            // alert('not logged in');
            $location.path('/login');
            if (!$scope.$$phase) $scope.$apply();
        }
    });
}

$scope.logout = function () {
    alert('logging out')

    // this is the PhoneGap version
    facebookConnectPlugin.logout(function(response) {
        alert('logged out');
        $location.path('/login');
        if (!$scope.$$phase) $scope.$apply();
    });
}
```

Now that we have made the required changes, it's time that we test the functionalities.

**The to-do list app with Facebook Login on PhoneGap**

As usual, we need to run our code using PhoneGap's command-line interface. So to change your current directory back to the to do list app, issue the following command:

```bash
cordova build ios
cordova emulate ios
```
Once you have issued the command, you should see your iOS emulator fired up. Next, you will see the following screenshot:

![Todos screenshot](image)

On Entering the App

As we are still logged in from the previous sections, we get to see our to-do list items even after clicking on OK. At this point, if you are still logged in, feel free to click on **Logout**, after which you should see the following screenshot:

![Login screenshot](image)

Login Screen
As usual, you can log in and be greeted by the previous screenshot. After clicking on OK, you can start to play around with your app.

Feel free to add new items, edit them, and log in and out just to see if the code is working correctly. If all goes well, congratulations! You now have a working PhoneGap app making RESTful calls coupled with Facebook Login capabilities.

**Summary**

To summarize, we worked our way from a very simple AngularJS app to one which can make RESTful calls coupled with Facebook Login capabilities. At each stage, we also ported the code to PhoneGap and made sure it works. The important takeaway here, is that using a command-line interface can drastically reduce the number of steps required to set up our PhoneGap project. In the next chapter, we will be working on animations; various animation techniques will be used for our PhoneGap app.
Sprucing Up the App
Using Animations and Mobile Design

Welcome to this chapter! In this chapter, we will spruce up our app using animation and styles that mimic the mobile user interface. This will be a short yet useful chapter. As usual, the code shown in this chapter can be applied across iOS and Android apps.

In this chapter, we’ll learn about:

• Performing animations using ngAnimate
• Pitfalls to avoid when performing animations in PhoneGap

Adding animations to your web app
Adding animations is surprisingly easy using AngularJS. The ngAnimate module of AngularJS will take users there with CSS animations.

We’ll start by adding animation to our web app before porting it over to PhoneGap. To do this, head back to your web-based version of the code and open index.html. There are three changes that you need to make:

1. Add a new index.css file.
2. Add class="todos" in your <div ng-view> </div>.
3. Add <script src="https://ajax.googleapis.com/ajax/libs/angularjs/1.3.0-beta.7/angular-animate.min.js"></script> to the list of imported JavaScript.
Sprucing Up the App Using Animations and Mobile Design

4. The end result of your code in `index.html` should look like this:

```html
<!doctype html>
<html ng-app="todoApp">
  <head>
    <link rel="stylesheet" href="http://netdna.bootstrapcdn.com/bootstrap/3.0.3/css/bootstrap.min.css">
    <link rel="stylesheet" href="css/index.css">
    <style>
      body {
        padding: 40px 20px 0 20px;
      }
    </style>
  </head>
  <body>
    <div id="fb-root"></div>
    <script src="http://connect.facebook.net/en_US/all.js"></script>
    <script>
      FB.init({
        appId : 'XXXXX',
        xfbml : true,
        version : 'v1.0'
      });
    </script>
    <h2>Todos</h2>
    <div ng-view class="todos"></div>
    <script src="https://ajax.googleapis.com/ajax/libs/angularjs/1.3.0-beta.7/angular.min.js"></script>
    <script src="https://ajax.googleapis.com/ajax/libs/angularjs/1.3.0-beta.7/angular-resource.min.js"></script>
    <script src="https://ajax.googleapis.com/ajax/libs/angularjs/1.3.0-beta.7/angular-route.min.js"></script>
    <script src="https://ajax.googleapis.com/ajax/libs/angularjs/1.3.0-beta.7/angular-animate.min.js"></script>
    <script src="js/controllers/todo.js"></script>
    <script src="js/controllers/user.js"></script>
    <script src="js/services/todo.js"></script>
    <script src="js/app.js"></script>
  </body>
</html>
```
The highlighted lines of code are the ones that you need to add to index.html. You may have noticed that we have not created index.css; that's what we are going to do right now:

1. Open your editor, create a new file in the css folder, and name it index.css. We are going to create the initial state of todos and define how the animation will look. Our goal is to make our app slide in from the left on initialization. Clicking on Edit/Details or New should shift it towards the right. By clicking on Cancel, the screen should shift leftwards. Our index.css file should look like the following:

```css
.todos {
    position: absolute;
    background: coral;
    display: block;
    width:90%;
    border-left:1px solid black;
}

.todos.ng-enter, .todos.ng-leave {
    transition: 500ms ease-in all;
}

.todos.ng-enter.ng-enter-active, .todos.ng-leave {
    left: 0;
}
.todos.ng-leave.ng-leave-active, .todos.ng-enter {
    left: 200%;
}
```

The .todos class simply defines the initial state of the todos class. Next, we have .todos.ng-enter and .todos.ng-leave, where we define a transition time of 500ms and an ease-in effect.

2. Next comes the fun part. .todos.ng-enter.ng-enter-active, .todos.ng-leave is defined as left:0, which means that on entering a new route, the partial in question will shift in from right to left till the distance from the left side of the parent div is 0 px.

3. Similarly, on leaving, it is defined by .todos.ng-leave.ng-leave-active, .todos.ng-enter at left:200%.

So what are we doing here? If you noticed, we first defined <div ng-view > with class="todos", and then we attached AngularJS specific animations by using ng-enter, ng-leave, ng-enter-active, and ng-leave-active. These are the four basic states that you can define for an animation.
4. Now save the file and open `index.html` on your favorite web browser. Please remember to run your server and the MongoDB server in order for this app to work. You should be greeted with the following screen:

```
Todos
```

<table>
<thead>
<tr>
<th>Todo</th>
<th>Done</th>
<th>Details</th>
<th>NEW</th>
</tr>
</thead>
<tbody>
<tr>
<td>edited - hello world</td>
<td>✔</td>
<td>Edit/Details</td>
<td></td>
</tr>
<tr>
<td>Edited - los todo</td>
<td>✔</td>
<td>Edit/Details</td>
<td></td>
</tr>
<tr>
<td>android</td>
<td></td>
<td>Edit/Details</td>
<td></td>
</tr>
<tr>
<td>edited - android</td>
<td>✔</td>
<td>Edit/Details</td>
<td></td>
</tr>
<tr>
<td>androidff</td>
<td>✔</td>
<td>Edit/Details</td>
<td></td>
</tr>
<tr>
<td>New facebook</td>
<td></td>
<td>Edit/Details</td>
<td></td>
</tr>
<tr>
<td>not really</td>
<td>✔</td>
<td>Edit/Details</td>
<td></td>
</tr>
<tr>
<td>thor</td>
<td></td>
<td>Edit/Details</td>
<td></td>
</tr>
<tr>
<td>Animation new</td>
<td></td>
<td>Edit/Details</td>
<td></td>
</tr>
</tbody>
</table>

The Todos list app

5. Click on NEW or Edit/Details and you should see animations shifting in from right or left, depending on whether you cancel the action or not. For instance, you can click on Edit/Details first and make sure that you are moving towards the right with a new screen as follows:

```
Todos
```

```
Name: edited - hello world
Details:
edited - hello world
description

Cancel  Save
```

Making changes to our items and should work as expected with animation effects

6. If you click on Cancel, you will see your screen shift leftwards, which is a direction that you would expect.

As soon as you get the preceding result, you know that all is working right. It’s time to add in CSS styles that mimic the usual mobile user interface.
Adding mobile CSS styles to your app

In order to further spruce up our app, we will be leveraging on the CSS libraries of TopCoat. You can get TopCoat CSS libraries from http://topcoat.io/. We also need to change our index.html file a bit more in order to leverage on the styles provided by TopCoat.

1. For a start, replace the stylesheet which points to Bootstrap CDN with the following code:
   
   `<link rel="stylesheet" href="//cdnjs.cloudflare.com/ajax/libs/topcoat/0.8.0/css/topcoat-mobile-light.css">

2. After this, just before `<div ng-view class="todos">`<\/div>, prepend the following code:
   
   `<div class="topcoat-navigation-bar">
   <div class="topcoat-navigation-bar__item center full">
   <h1 class="topcoat-navigation-bar__title">Todos</h1>
   </div>
   </div>

This is to give a universal header that we commonly see in mobile apps.

After these changes, your index.html file should look like this:

```html
<!doctype html>
<html ng-app="todoApp">
<head>
   <link rel="stylesheet" href="//cdnjs.cloudflare.com/ajax/libs/topcoat/0.8.0/css/topcoat-mobile-light.css">
   <link rel="stylesheet" href="css/index.css">
</head>
<body>
   <div id="fb-root"></div>
   <script src="http://connect.facebook.net/en_US/all.js"></script>
   <script>
      FB.init({
      appId      : 'XXX',
      xfbml      : true,
      version    : 'v1.0'
      });
   </script>
   <div class="topcoat-navigation-bar">
   <div class="topcoat-navigation-bar__item center full">
   <h1 class="topcoat-navigation-bar__title">Todos</h1>
   </div>
   </div>
```
3. There's still one more thing we need to change, and that is the listing of todos. So, in partials/list.html, we need to change the stylistic elements so that it appears correctly when shown on a mobile device. We are simply applying TopCoat CSS classes here:

```
<div class="topcoat-list__container scroller">
  <a style="padding-left:10px" href="#/new">
    <i class="icon-plus-sign">NEW</i></a>
  <span style="padding-left:10px">
    {{remaining()}} of {{todos.length}} remaining
  </span>
  <button ng-click="logout()"
    style="position:absolute;right:10px;">Logout</button>
  <ul class="topcoat-list list">
    <li ng-repeat="todo in todos"
      class="topcoat-list__item">
      <a style="display:block; padding-left:10px"
        href="#/edit/{{todo._id}}">{{todo.text}}</a>
    </li>
  </ul>
</div>
```

4. The next and the final step before we test our app on the browser is to remove certain parts of index.css so that our self-defined styles do not get confused with TopCoat CSS styles.
5. In your index.css file, look for .todos and remove background:coral and border-left: 1px solid black. So, your final index.css file should look like this:

```css
.todos {
  position: absolute;
  display: block;
  width:100%;
}
.todos.ng-enter, .todos.ng-leave {
  transition: 500ms ease-in all;
}
.todos.ng-enter.ng-enter-active, .todos.ng-leave {
  left: 0;
}
.todos.ng-leave.ng-leave-active, .todos.ng-enter {
  left: 200%;
}
```

6. Now, open your new index.html file in your browser. You should see something like the following screenshot:

A mobile app with universal header
Once you have this result, you might want to play around with it to see if it is working out as expected.

**Porting your web app to PhoneGap**

Now we are at the final step, which is porting our app to PhoneGap. The steps are very similar to the previous chapters: we need to include the required PhoneGap and Facebook plugins. Most importantly, we need to include the ngTouch module of AngularJS. Here’s how our index.html file should look for our PhoneGap’s version:

```html
<!doctype html>
<html ng-app="todoApp">
<head>
    <link rel="stylesheet" href="http://cdnjs.cloudflare.com/ajax/libs/topcoat/0.8.0/css/topcoat-mobile-light.css">
    <link rel="stylesheet" href="css/index.css">
</head>
<body>
    <div id="fb-root"></div>
    <div class="topcoat-navigation-bar">
        <div class="topcoat-navigation-bar__item center full">
            <h1 class="topcoat-navigation-bar__title">Todos</h1>
        </div>
    </div>
    <div ng-view class="todos"></div>
    <!-- this is for phonegap -->
    <script src="cordova.js"></script>
    <!-- cordova facebook plugin -->
    <script src="cdv-plugin-fb-connect.js"></script>
    <!-- facebook js sdk -->
    <script src="facebook-js-sdk.js"></script>

    <script>
        document.addEventListener('deviceready', function() {
            try {
                alert('Device is ready! Make sure you set your app_id below this alert.');
                FB.init({ appId: "XXXX", nativeInterface: CDV.FB,
                    useCachedDialogs: false });
            } catch (e) {
```
It's generally the final version as per the previous section; but the initialization for PhoneGap and Facebook is included in this version. As usual, remember to use your own app ID for this file.

We also need to convert our controllers to use the PhoneGap version for Facebook API calls that we previously coded for. In the source code provided with this book, you will see that there are two code blocks for each of the functions: one for the desktop/web version and the other is for the PhoneGap version.

As mentioned in *Chapter 4, Adding Authentication Capabilities Using PhoneGap Plugins*, the PhoneGap version connects to Facebook using the `facebookConnectPlugin` namespace instead of the usual `FB` namespace (compared to previous versions).
Sprucing Up the App Using Animations and Mobile Design

Testing your app on iOS
To test your app on iOS, run the following commands from the root of your app's directory:

```
cordova build ios
cordova emulate ios
```

You should see the following output in your iOS emulator:

![The to-do list app on iOS](image)

In my case, I have some items left in my database and hence that's what I got in my emulator. Feel free to click around, add new items, edit them, or log in and out. It should work as expected, with animations built in.
Testing your app on Android

Now that we have tested on iOS, it's time to get your app tested on Android as well. Note that since Android reads the `http://localhost` address differently, you will need to change `http://localhost:8000` to `http://10.0.2.2:8000` at `services/todo.js` in order for the code to work.

Also, remember to change your `facebookConnectPlugin` namespace to the usual `FB` namespace in order for the Facebook Connect plugin to work.

Once that is done, you should issue the following command:

```bash
cordova build android
cordova emulate android
```

Your app should be working as expected.

Summary

To sum up, we created animations for our app and also made use of TopCoat CSS skins to give our app a mobile look. There are many other areas that we can improve on, such as it's design or even use other frameworks such as the Ionic framework; notice that we did not make use of the popular jQuery Mobile, since we wanted to make use of AngularJS as much as possible. Most importantly, by now you should see that the code bases for both iOS and Android are almost the same, with the exception of changing the URL of our server's location. In the next and final chapter, you will learn about distributing and getting ready to launch our mobile apps.
Getting Ready to Launch

In this final chapter, we will run through some of the stuff that you should be doing before launching your app to the world, whether it's through Apple App Store or Google Android Play Store.

We will be covering the following topics:

- Testing your app on your device for real
- How to change the artwork for your app
- Deploying server.py

We will also discuss other useful tips before you launch the app in the real world, and we'll start by launching server.py.

Deploying server.py

To deploy server.py, you will need access to an actual server. It can be rented from Amazon EC2, Linode, or DigitalOcean. The operation system I am using here is Ubuntu 12.04, although older variants of Ubuntu can work too, which include 10.04 and 11.04. Since the server is essentially a Tornado app, you will need to prepend sudo to every command that follows in this section, if you are not running it as root.

1. To start off, you will need to put SSH into your server and start installing the required tools and dependencies:
   
   - `apt-get install python-setuptools`
   - `easy_install pip`
   - `pip install tornado`
Getting Ready to Launch

2. You will also need to install MongoDB:
   
   ```
   sudo apt-key adv --keyserver hkp://keyserver.ubuntu.com:80 --recv 7F0CEB10
   
   echo 'deb http://downloads-distro.mongodb.org/repo/ubuntu-upstart dist 10gen' | sudo tee /etc/apt/sources.list.d/mongodb.list
   ```

3. Reload the local package database:
   ```
   apt-get update
   ```

4. Install the MongoDB packages:
   ```
   apt-get install mongodb-org
   ```


5. Next, make a directory for you to host your app:
   ```
   mkdir /srv/www/
   mkdir /srv/www/app_name
   ```

6. Now, you can simply create a file called `server.py` under `/srv/www/app_name` and copy the contents of `server.py`, which we coded in the previous sections. However, before we run `server.py` we need to install one more package:
   ```
   pip install tornado-cors
   ```

7. Now that you have installed our required packages, you can run the server by issuing the following command:
   ```
   python server.py --host=80
   ```

8. To check if the server is working, go to [http://XXX.XX.XX/todos](http://XXX.XX.XX/todos) and see if you get an empty list. Your server should also show a **GET** response.

At this point, should you want to test your web app or PhoneGap version of the app, you have to update `js/services/todo.js` so that the URLs reflect the new IP address or domain name of the app.

There are other ways to set up `server.py`, such as using nginx and supervisor. For more details, feel free to check out the guides provided by DigitalOcean ([https://www.digitalocean.com/](https://www.digitalocean.com/)) and Linode ([https://www.linode.com/](https://www.linode.com/)) for more details.

Now that we are done with `server.py`, it's time to move on to the apps.
Using phonegap.com
The services on https://build.phonegap.com/ are a straightforward way for you to get your app compiled for various devices. While this is a paid service, there is a free plan if you only have one app that you want to work on. This would be fine in our case, for this chapter.

You will need to have an Adobe ID in order to use PhoneGap services. If not, feel free to create one. Since the process for generating compiled apps from PhoneGap may change, it's that you visit https://build.phonegap.com/ and sign up for their services and follow their instructions.
Preparing your PhoneGap app for an Android release

This section generally focuses on things that are specific for the Android platform. This is by no means a comprehensive checklist, but some of the common tasks that you should go through before releasing your app to the Android world.

Testing your app on real devices

For most of this book, we tested our app on the Android emulator. It is always good to run your app on an actual handset to see how the app is working. To run your PhoneGap app on a real device, issue the following command after you plug your handset into your computer:

```
cordova run android
```

You will see that your app now runs on your handset.

Exporting your app to install on other devices

In the previous section we talked about installing your app on your device. What if you want to export the APK so that you can test the app on other devices? Here’s what you can do:

- As usual, build your app using `cordova build android`
- Alternatively, if you can, run `cordova build release`

The previous step will create an unsigned release APK at `/path_to_your_project/platforms/android/ant-build`. This app is called `YourAppName-release-unsigned.apk`.

Now, you can simply copy `YourAppName-release-unsigned.apk` and install it on any android based device you want.
Preparing promotional artwork for release
In general, you will need to include screenshots of your app for upload to Google Play. In case your device does not allow you to take screenshots, here's what you can do:

- The first technique that you can use is to simply run your app in the emulator and take screenshots off it. The size of the screenshot may be substantially larger, so you can crop it using GIMP or some other online image resizer.
- Alternatively, use the web app version and open it in your Google Chrome Browser. Resize your browser window so that it is narrow enough to resemble the width of mobile devices.

Building your app for release
To build your app for release, you will need Eclipse IDE.

1. To start your Eclipse IDE, navigate to File | New | Project.
2. Next, navigate to Existing Code | Android | Android Project.
3. Click on Browse and select the root directory of your app. The Project to Import window should show platforms/android.
4. Now, select Copy projects into workspace if you want and then click on Finish.

Signing the app
We have previously exported the app (unsigned) so that we can test it on devices other than those plugged into our computer. However, to release your app to the Play Store, you need to sign them with keys. The steps here are the general steps that you need to follow in order to generate "signed" APK apps to upload your app to the Play Store.

1. Right-click on the project that you have imported in the previous section, and then navigate to Android Tools | Export Signed Application Package. You will see the Project Checks dialog.
2. In the Project Checks dialog, you will see if your project has any errors or not.
3. Next, you should see the **Keystore selection** dialog. You will now create the key using the app name (without space) and the extension `.keystore`. Since this app is the first version, there is no prior original name to use. Now, you can browse to the location and save the keystore, and in the same box, give the name of the keystore. In the **Keystore election** dialog, add your desired password twice and click on **Next**. You will now see the **Key Creation** dialog.

4. In the **Key Creation** dialog, use `app_name` as your alias (without any spaces) and give the password of your keystore. Feel free to enter 50 for validity (which means the password is valid for 50 years). The remaining fields such as names, organization, and so on are pretty straightforward, so you can just go ahead and fill them in.

5. Finally, select the **Destination APK** file, which is the location to which you will export your `.apk` file.

Bear in mind that the preceding steps are not a comprehensive list of instructions. For the official documentation, feel free to visit [http://developer.android.com/tools/publishing/app-signing.html](http://developer.android.com/tools/publishing/app-signing.html).

Now that we are done with Android, it's time to prepare our app for iOS.

**iOS**

As you might already know, preparing your PhoneGap app for Apple App Store requires similar levels, if not more, as compared to your usual Android deployment. In this section, I will not be covering things like making sure your app is in tandem with Apple User Interface guidelines, but rather, how to improve your app before it reaches the App Store. Before we get started, there are some basic requirements:

- Apple Developer Membership (if you ultimately want to deploy to the App Store)
- Xcode

**Running your app on an iOS device**

If you already have an iOS device, all you need to do is to plug your iOS device to your computer and issue the following command:

`cordova run ios`
You should see that your PhoneGap app will build and launch on your device. Note that before running the preceding command, you will need to install the `ios-deploy` package. You can install it using the following command:

```
sudo npm install -g ios-deploy
```

**Other techniques**

There are other ways to test and deploy your apps. These methods can be useful if you want to deploy your app to your own devices or even for external device testing.

**Using Xcode**

Now let’s get started with Xcode:

1. After starting your project using the command-line tool and after adding in iOS platform support, you may actually start developing using Xcode. You can start your Xcode and click on **Open Other**, as shown in the following screenshot:

![Welcome to Xcode](image)

2. Once you have clicked on **Open Other**, you will need to browse to your `ToDo` app folder.
3. Drill down until you see `ToDo.xcodeproj` (navigate to `platforms | ios`). Select and open this file.

4. You will see your Xcode device importing the files. After it's all done, you should see something like the following screenshot:
5. Notice that all the files are now imported to your Xcode, and you can start working from here. You can also deploy your app either to devices or simulators:

Deploy on your device or on simulators

**Summary**

In this chapter, we went through the basics of packaging your app before submission to the respective app stores. That's it for this book. We have covered quite a bit in this book in six chapters. In general, you should have a good idea of how to develop AngularJS apps and apply mobile skins on them so that it can be used on PhoneGap. You should also notice that developing for PhoneGap apps typically takes the pattern of creating a web app first, before converting it to a PhoneGap version. Of course, you may structure your project so that you can build a PhoneGap version from day one, but it may make testing more difficult. Anyway, I hope that you enjoyed this book and feel free to follow me at [http://www.liangeugene.com](http://www.liangeugene.com) and [http://growthsnippets.com](http://growthsnippets.com).
References

The following are some common resources that you can use for reference.

**AngularJS and related libraries**
- The main AngularJS is available at https://angularjs.org/; here you can learn about the basic functionalities of AngularJS
- A list of popular add-ons, modules, and plugins for AngularJS is available at http://ngmodules.org/
- CanJS, a framework that makes developing complex applications simple and fast is available at http://canjs.com/
- Ember.js, a framework that incorporates common idioms so that developers can focus on what makes your app special, is available at http://emberjs.com/
- Knockout is a framework that developers can use to build single page applications, custom bindings, and so it is available at http://knockoutjs.com/

**PhoneGap and related references**
- The PhoneGap main website is available at http://phonegap.com/
- PhoneGap Plugins are available at https://build.phonegap.com/plugins
- The Apache Cordova main website is available at http://cordova.apache.org/
- The Android Developers main website is available at http://developer.android.com/index.html
References

Others

• The iOS main website is available at https://developer.apple.com/devcenter/ios/index.action
• The Facebook login page is available at https://developers.facebook.com/docs/facebook-login/v2.0
• Facebook PhoneGap plugin is available at https://github.com/phonegap/phonegap-facebook-plugin
• The Ionic framework is available at http://ionicframework.com/

Other tutorials

In addition to the previous links, here are some useful tutorials regarding the use of AngularJS and PhoneGap. Though some of them are slightly outdated (especially for PhoneGap), it is still generally useful for you to understand how both PhoneGap and AngularJS work together by referring to the following links:

• How to use PhoneGap and AngularJS together is available at http://tech.pro/tutorial/1336/phonegap-and-angularjs-the-start
• Sample Mobile Application with AngularJS and PhoneGap is available at http://coenraets.org/blog/2013/11/sample-mobile-application-with-angularjs/
• Sample Mobile Application with Ionic Framework and PhoneGap is available at http://coenraets.org/blog/2014/02/sample-mobile-application-with-ionic-and-angularjs/
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