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The RSpec Book

Behaviour-Driven Development with RSpec, Cucumber, and Friends

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The
Pragmatic
Programmers

The RSpec Book

Behaviour-Driven Development
with RSpec, Cucumber,
and Friends

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The Facets  of Ruby Series

Describing Code with RSpec

In the previous chapter, we introduced and used Cucumber to describe the behavior of our Codebreaker game from the outside, at the application level. We wrote step definitions for our first Cucumber feature that will handle the steps in the scenario, and we left off with a failing step: we're expecting Game to send a message to our fake Output, but its array of messages is empty.

In this chapter, we're going to use RSpec to *describe* behavior at a much more granular level: the expected behavior of instances of the Game class.

5.1 Getting Started with RSpec

To get going, create a spec directory, with a subdirectory named codebreaker. Now create a file named game_spec.rb in spec/codebreaker/. As we progress, we'll maintain a parallel structure like this in which each source file (for example, lib/codebreaker/game.rb) has a parallel spec file (for example, spec/codebreaker/game_spec.rb). See the *Joe Asks...* on the next page for more on this. Add the following to game_spec.rb:

[Download](#) cb/08/spec/codebreaker/game_spec.rb

```
Line 1 require 'spec_helper'
2
3 module Codebreaker
4   describe Game do
5     describe "#start" do
6       it "sends a welcome message"
7       it "prompts for the first guess"
8     end
9   end
10 end
```



Joe Asks...

Shouldn't We Avoid a One-to-One Mapping?

Perhaps you've heard that a one-to-one mapping between objects and their specs is a BDD no-no. There is some truth to this, but the devil is in the details.

We want to avoid a strict adherence to a structure in which every object has a single example group and every method has a single code example. That sort of structure leads to long examples that take an object through many phases, setting expectations at several stopping points in each example. Examples like these are difficult to write to begin with and much more difficult to understand and debug later.

A one-to-one mapping of spec-file to application-code-file, however, is not only perfectly fine but actually beneficial. It makes it easier to understand where to find the specs for code you might be looking at. It also makes it easier for tools to automate shortcuts like the one in the RSpec TextMate bundle, which switches between spec-file and application-code-file with Ctrl+Shift+Down.

The first two statements are standard Ruby. We require a file named `spec_helper.rb` on line 1. We'll actually store that file in the `spec` directory, which RSpec adds to the global `$LOAD_PATH`. More on that in a minute.

The second statement declares a Ruby module named `Codebreaker`. This isn't necessary in order to run the specs, but it provides some conveniences. For example, we don't have to fully qualify `Game` on line 4.

The `describe()` method hooks into RSpec's API and returns a subclass of `RSpec::Core::ExampleGroup`. As its name suggests, this is a group of examples of the expected behavior of an object. If you're accustomed to xUnit tools like `Test::Unit`, you can think of an `ExampleGroup` as being akin to a `TestCase`.

The `it()` method creates an *example*. Technically, it's an instance of the `ExampleGroup` returned by `describe()`, but you really don't need to worry about that at this point. We'll get into the details of the underlying framework in Chapter 12, *Code Examples*, on page 152.

Connect the Specs to the Code

Before we can run this, we need to add the `spec_helper.rb` required on line 1. Create that now, and add the following:

[Download](#) `cb/08/spec/spec_helper.rb`

```
require 'codebreaker'
```

Similar to what we did with Cucumber's `env.rb` in the previous chapter, `spec/codebreaker/game_spec.rb` requires `spec/spec_helper.rb`, which requires `lib/codebreaker.rb`, which, in turn, requires `lib/codebreaker/game.rb`.

Open a shell and `cd` to the `codebreaker` project root directory, and run the `game_spec.rb` file with the `rspec` command,¹ like this:

```
rspec spec/codebreaker/game_spec.rb --format doc
```

You should see output similar to this:

```
Codebreaker::Game
  #start
    sends a welcome message (PENDING: Not Yet Implemented)
    prompts for the first guess (PENDING: Not Yet Implemented)
```

Pending:

```
Codebreaker::Game#start sends a welcome message
  # Not Yet Implemented
  # ./spec/codebreaker/game_spec.rb:6
Codebreaker::Game#start prompts for the first guess
  # Not Yet Implemented
  # ./spec/codebreaker/game_spec.rb:7
```

The `--format doc` option tells RSpec to format the output using the same nesting we see in the nested `describe` blocks in the file. We see `Codebreaker::Game` on the first line because we wrapped `describe Game` do inside the `Codebreaker` module.

The second line shows the string we passed to `describe()`, and the third and fourth lines show the strings we passed to `it()`.

“PENDING: Not Yet Implemented” tells us that we have to implement those examples, which we do by passing a block to the `it()` method. Without the block, the example is considered pending.

1. The `rspec` command is installed when you install the `rspec` gem.

After RSpec outputs all the strings we passed to `describe()` and `it()`, it lists all the pending examples and their locations. This is followed by a summary that tells us how many examples were run, how many failed, and how many are pending.

5.2 Red: Start with a Failing Code Example

In `game_spec.rb`, we want to do what we've done in the feature: specify that when we start the game, it sends the right messages to the output. Start by modifying `game_spec.rb` as follows:

[Download](#) `cb/09/spec/codebreaker/game_spec.rb`

```
require 'spec_helper'

module Codebreaker
  describe Game do
    describe "#start" do
      ▶ it "sends a welcome message" do
      ▶   output = double('output')
      ▶   game = Game.new(output)
      ▶
      ▶   output.should_receive(:puts).with('Welcome to Codebreaker!')
      ▶
      ▶   game.start
      ▶   end

      ▶ it "prompts for the first guess"
      ▶ end
    end
  end
end
```

Just as we did in the scenario, we want a test double to stand in for the real `STDOUT`. Instead of rolling our own as we did in the scenario, however, we're using RSpec's dynamic test double framework, `RSpec::Mocks`,² to create a dynamic test double on the first line of the example.

Next, we create a `Game` object, passing it the test double output we created on the previous line. These first two lines are the givens in this example.

The next line sets up a *message expectation*: an expectation that the output object should receive the `puts` message with the string "Welcome

2. See Chapter 14, `RSpec::Mocks`, on page 193 for more about `RSpec::Mocks`.

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