Unit and Acceptance Testing

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Unit Testing, what's the point?

- Keeps you from repeating past mistakes
- Ensures deployments will go smoothly by detecting problems before they occur
- Changing one part of the code can have unexpected effects on other parts of the code.
- Keeps you high and DRY (Don't repeat yourself) by reducing bugs.

Continuous Integration

- Continually applying quality control to source code by testing during the development procedure.
- Allows for automated build/testing/deployment to reduce bugs and increase rate of production.
- Know a rollout is going to break something before the customer does!
- http://en.wikipedia.org/wiki/Continuous_integration

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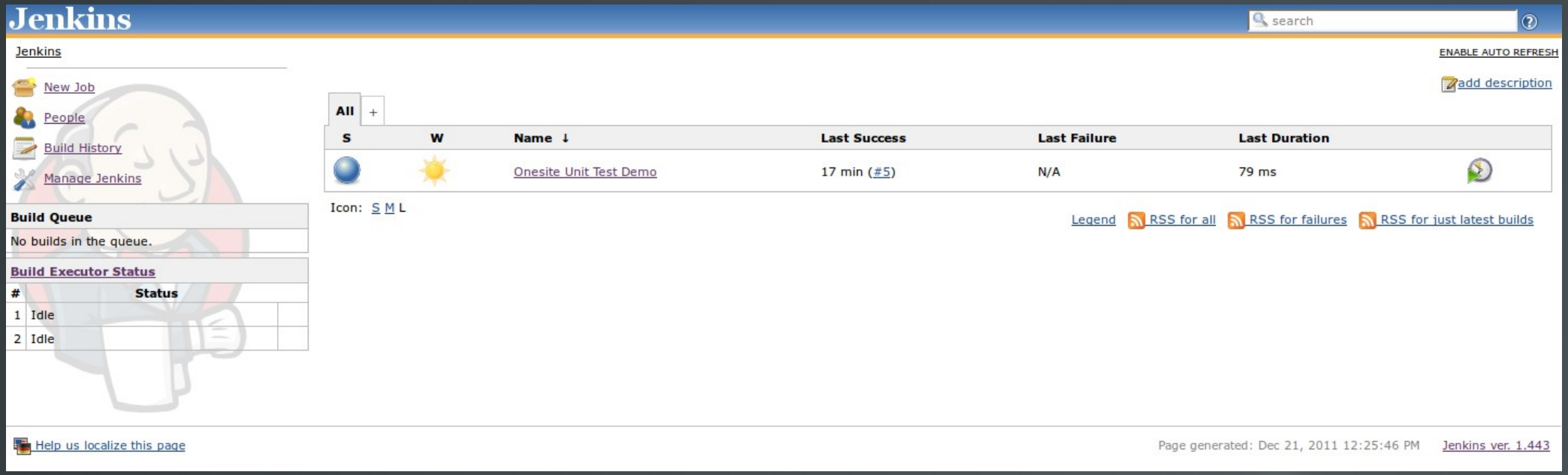
The butler, Jenkins

Developer	Source Repo	Jenkins CI	Staging
1. Checkout Code	0. Source Code		
2. Create bugs **			
3. Checkin modifications	4. New code committed	6. Test suite initiated	
	5. Git hook triggered to start test suite	7. Update to latest source	
		8. Run test cases	10. If all tests pass merge modifications to given environment, notify Dark Portal of available changes
10. Receive notification of test suites result		9. Notify users via email and post results to any included Jira tickets.	

** http://bit.ly/uZ728u

Jenkins in Action



Is it really necessary?

- You can make perfectly deployable code without ever having run a unit test against it.
- Manual testing can also help detect bugs.
- Manual testing will never catch every situation.
- Neither will unit testing.
- A combination of testing strategies is needed to ensure bug minimization.

Is it really necessary?

- By implementing Unit Testing, Selenium Testing, a good QA Strategy, and Continuous integration bugs can be minimized to acts of whichever diety you might believe in.
- This leads to greater happiness among developers who don't have to do as many bugfixes, and clients who have working products

Great, how do I do this?

- The hardest part of writing unit tests is figuring out how it could break.
  - The developer who wrote the system is likely to not to know all the places in which their application can break (due to familiarity with the code)
  - Pair programming for the test writing phase can help mitigate this problem
- Writing the tests is the easier part

Unit Testing Tools

- For PHP, phpunit is the standard testing framework
  - It is a pain to install, instead, Jake Farrell (@eatfresh) has forked phpunit and made all its dependencies git submodules. (It's awesome).
  - https://github.com/jfarrell/phpunit
  - git clone git://github.com/jfarrell/phpunit.git
- Documentation for phpunit is available online
  - http://www.phpunit.de/manual/3.5/en/writing-tests-for-phpunit.html

Test Writing Process

- Determine how your application is supposed to operate, and where it might fall apart
- Write tests to ensure that it does what it is supposed to do, and then write tests to ensure it doesn't break under various circumstances.
- Also remember to write tests to ensure it fails when it is supposed to.

Testing Examples (Demo site)

Covered in detail on the demonstration site

```php
<?php

class StringMeth
{
    /**
     * Returns only the vowels in the given string.
     *
     * @param string $string
     *
     * @return string
     */
    public static function getVowels($string)
    {
        $vowels = preg_replace("/[^aeiou]/i", '', $string);

        return preg_split('//', $vowels, -1, PREG_SPLIT_NO_EMPTY);
    }

    /**
     * Takes the string and changes spaces into hyphens, and lowercases
     * the whole thing.
     *
     * @param String $string
     *
     * @return string
     */
    public static function slugify($string)
    {
        $string = trim($string);
        $string = preg_replace('/[^a-zA-Z0-9 ]/', '', $string);
        $replaces = preg_replace("/ +/", '-', $string);

        return strtolower($replaces);
    }
}
```

Testing Examples (Demo Site)

```php
<?php

require_once dirname(__FILE__) . "/../application/libraries/stringmeth.php";

class StringMethTest extends PHPUnit_Framework_TestCase
{

    public function testStripConsonants()
    {
        $string = "Hello";
        $vowels = array(
            'e',
            'o',
        );

        $this->assertEquals(StringMeth::getVowels($string), $vowels);
    }

    public function testSlugify()
    {
        $string = "Cookies are delicious";
        $expected = 'cookies-are-delicious';

        $this->assertEquals(StringMeth::slugify($string), $expected);

        $string = "Hi Mom! I like muffins!";
        $expected = 'hi-mom-i-like-muffins';

        $this->assertEquals(StringMeth::slugify($string), $expected);

        $string = "Hey there   billy, I like cheese.  ";
        $expected = "hey-there-billy-i-like-cheese";

        $this->assertEquals(StringMeth::slugify($string), $expected);
    }
}
```

Testing Examples (Demo Site)

```
cthos@cthos-desktop ~/Documents/Code/onesite-unit-test-demo $ php ../phpunit/phpunit.php tests/
PHPUnit @package_version@ by Sebastian Bergmann.

.F

Time: 0 seconds, Memory: 5.25Mb

There was 1 failure:

1) StringMethTest::testSlugify
Failed asserting that two strings are equal.
--- Expected
+++ Actual
@@ @@
-hey-there---billy-i-like-cheese--
+hey-there-billy-i-like-cheese

/home/cthos/Documents/Code/onesite-unit-test-demo/tests/StringMethTest.php:34

FAILURES!
Tests: 2, Assertions: 4, Failures: 1.
cthos@cthos-desktop ~/Documents/Code/onesite-unit-test-demo $
```

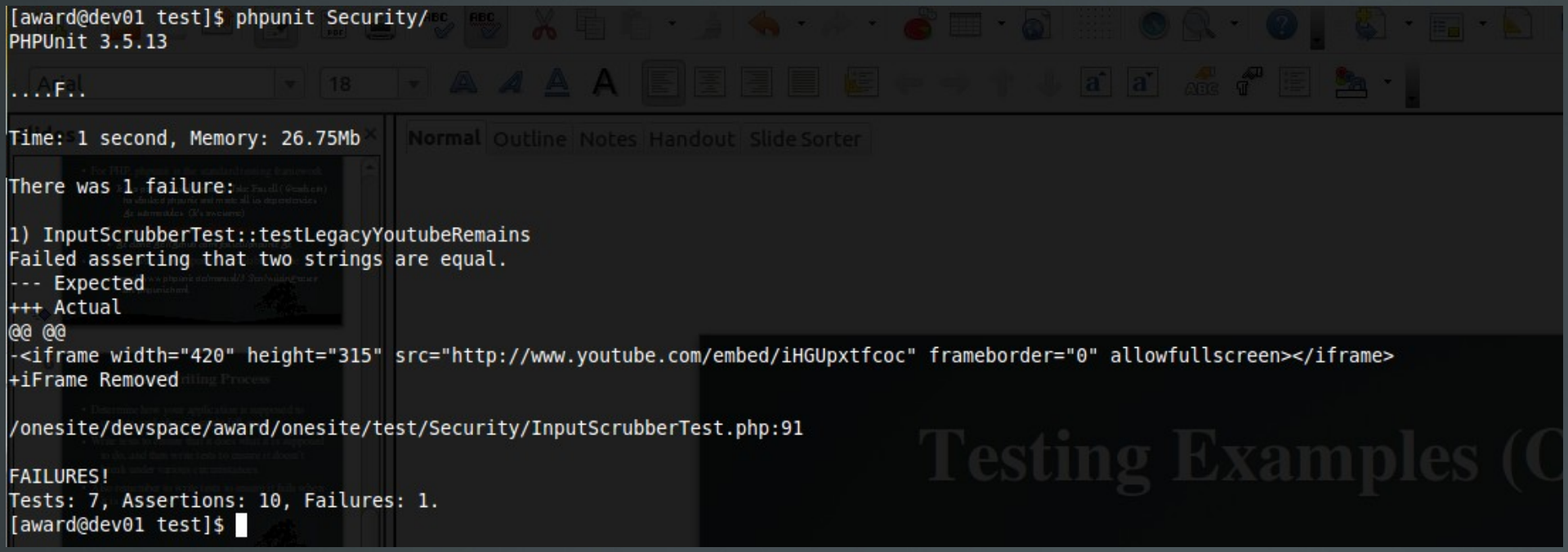
Testing Examples (ONESite)

IFrame Scrubber

```php
public function testIframeRemoved()
{
    $scrubber = new one_security_InputScrubber();

    $text = '<iframe width="420" height="315" src="http://www.boop.com/embed/iHGUpxtfcoc" frameborder="0" allowfullscreen></iframe>';

    $scrubber->strip_text($text);

    $this->assertEquals('iFrame Removed', $text);
}

/**
 * Tests that youtube videos are are not scrubbed.
 *
 * @return void
 */
public function testYoutubeRemains()
{
    $scrubber = new one_security_InputScrubber();

    $text = $old_text = '<iframe width="420" height="315" src="http://www.youtube.com/embed/iHGUpxtfcoc" frameborder="0" allowfullscreen></iframe>';

    $scrubber->strip_text($text);

    $this->assertEquals($old_text, $text);
}

/**
 * Tests that the above behavior functions when there are more than one
 * iframe in the mix.
 *
 * @return void
 */
public function testMultiIframe()
{
    $scrubber = new one_security_InputScrubber();

    $text = $old_text = '<iframe width="420" height="315" src="http://www.youtube.com/embed/iHGUpxtfcoc" frameborder="0" allowfullscreen></iframe>
        <iframe width="420" height="315" src="http://www.onesite.com/embed/iHGUpxtfcoc" frameborder="0" allowfullscreen></iframe>
        <iframe width="420" height="315" src="http://www.branmuffins.com/embed/iHGUpxtfcoc" frameborder="0" allowfullscreen></iframe>';

    $scrubber->strip_text($text);

    $this->assertNotEquals($old_text, $text);
    $this->assertEquals(strpos($text, 'branmuffins.com'), false);
    $this->assertNotEquals(strpos($text, 'youtube.com'), false);
}
```

Testing Examples (ONEsite)

Test Results



I failed at this test, because the current branch I am on does not have all the appropriate patching done from the main branch. Which makes for a good example of seeing a unit test fail.

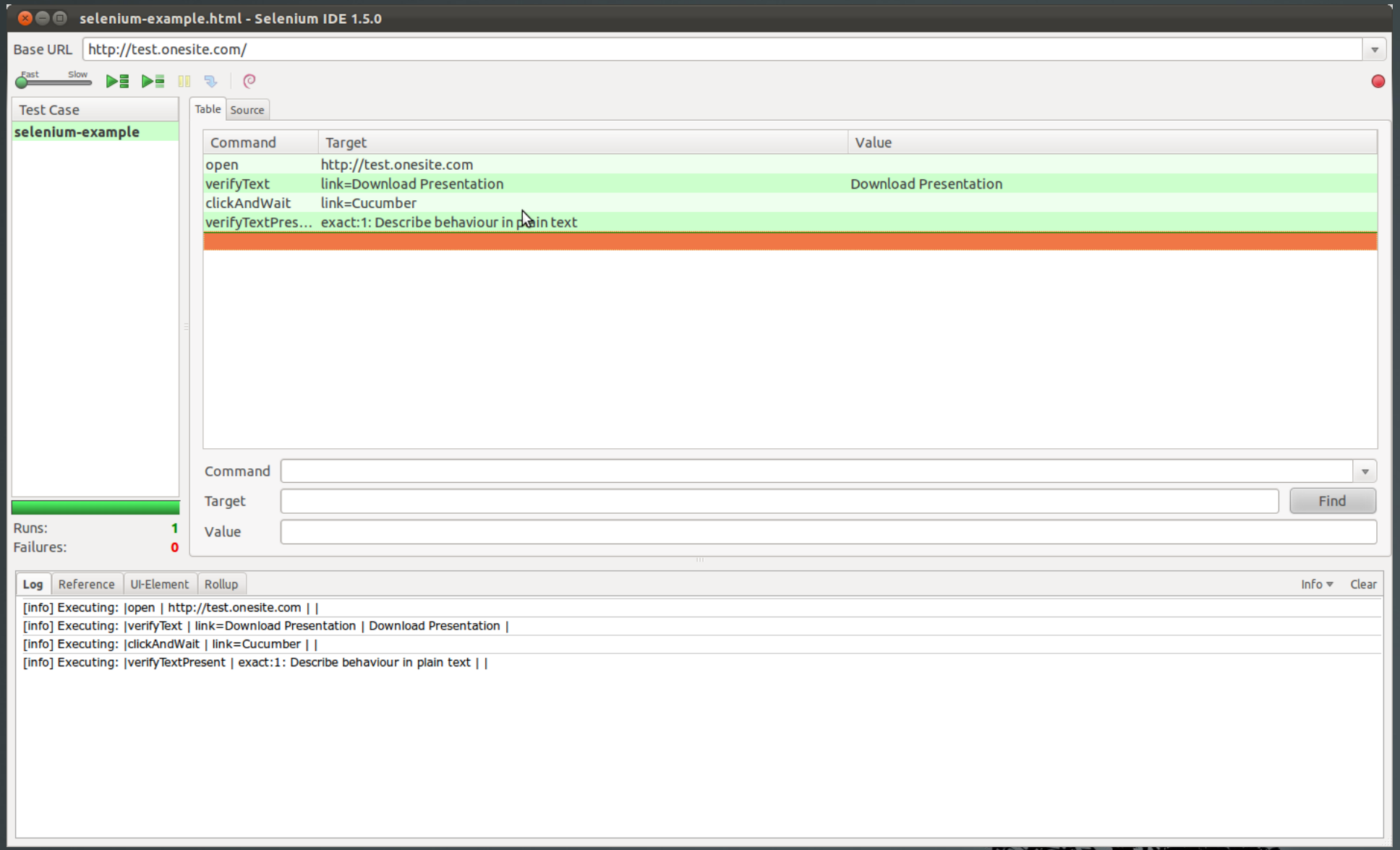
Selenium IDE Testing

- A weakness of phpunit is that it is unable to test how a user would interact with a live site.
- Selenium IDE is a Firefox plugin which allows you to write tests which will simulate user interaction and allow you to test javascript flows.
- http://seleniumhq.org/projects/ide/
- It also comes with a way to interface with a language directly, to test php server responses.

What is Selenium Good at?

- Testing any flow that relies on javascript
  - Ensuring popups display
  - Social Login flows
- Complex, multi-page flows which relies heavily on ux
  - Making sure elements on the page display and are visible

Selenium Example



TDD (Test Driven Development)

- TDD changes up the order in which you write unit tests.
- Write your tests first. They will fail. Then write your application in order to make those tests pass
  - Make sure you do this in small chunks, it is designed for continuous progress.
  - http://en.wikipedia.org/wiki/Test-driven_development

Acceptance Testing

- Acceptance testing is the corrolary to Unit Testing
- Where Unit Testing is designed to ensure you write your code correctly, Acceptance testing is designed to ensure you have written the correct code
  - As in, have met the requirements for the project.

Cucumber

- Cucumber is a BDD (Behavior Driven Development) tool designed to make acceptance testing awesome
- Write domain specific language, that looks like plain english.
- Write your application to make those tests pass
- Everyone gets exactly what they're expecting

Cucumber

```
cthos@cthos-desktop ~/Documents/Code/onesite-unit-test-demo $ cucumber
Feature: Visit the Presentation Page
  In order to share my presentation with awesome people
  I need to make sure that the page is visible with all required info

  Scenario: Download Link Present                                    # features/presentation.feature:5
    Given that I have opened "http://test.onesite.com/presentation/index" # features/presentation.feature:6
    When I click on the link "Download Presentation"                 # features/presentation.feature:7
    Then I download a file called "presentation.odp"                 # features/presentation.feature:8

1 scenario (1 undefined)
3 steps (3 undefined)
0m0.001s

You can implement step definitions for undefined steps with these snippets:

Given /^that I have opened "([^"]*)"$/ do |arg1|
  pending # express the regexp above with the code you wish you had
end

When /^I click on the link "([^"]*)"$/ do |arg1|
  pending # express the regexp above with the code you wish you had
end

Then /^I download a file called "([^"]*)"$/ do |arg1|
  pending # express the regexp above with the code you wish you had
end

If you want snippets in a different programming language,
just make sure a file with the appropriate file extension
exists where cucumber looks for step definitions.

cthos@cthos-desktop ~/Documents/Code/onesite-unit-test-demo $
```