Behaviour Driven Development with Cucumber for Java

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Goal

Introduce Cucumber for Java

Tools are useless

If you don't know how to use them

Outline

Why

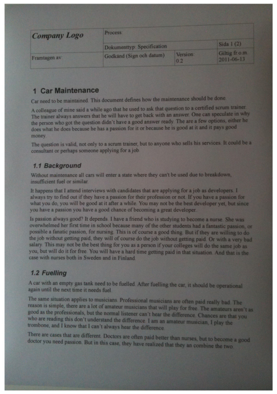
What

How

Why

Communication

Bandwidth



Company Logo	Process:		
	Dokumenttyp: Specification		Sida 1 (2)
Framtagen av:	Godkänd (Sign och datum)	Version: 0.2	Giltig fr.o.m. 2011-06-13

1 Car Maintenance

Car need to be maintained. This document defines how the maintenance should be done.

A colleague of mine said a while ago that he used to ask that question to a certified scrum trainer. The trainer always answers that he will have to get back with an answer. One can speculate in why the person who got the question didn't have a good answer ready. The are a few options, either he does what he does because he has a passion for it or because he is good at it and it pays good money.

The question is valid, not only to a scrum trainer, but to anyone who sells his services. It could be a consultant or perhaps someone applying for a job.

1.1 Background

Without maintenance all cars will enter a state where they can't be used due to breakdown, insufficient fuel or similar.

It happens that I attend interviews with candidates that are applying for a job as developers. I always try to find out if they have a passion for their profession or not. If you have a passion for what you do, you will be good at it after a while. You may not be the best developer yet, but since you have a passion you have a good chance of becoming a great developer.

Is passion always good? It depends. I have a friend who is studying to become a nurse. She was overwhelmed her first time in school because many of the other students had a fantastic passion, or possible a fanatic passion, for nursing. This is of course a good thing. But if they are willing to do the job without getting paid, they will of course do the job without getting paid. Or with a very bad salary. This may not be the best thing for you as a person if your colleges will do the same job as you, but will do it for free. You will have a hard time getting paid in that situation. And that is the case with nurses both in Sweden and in Finland.

1.2 Fuelling

A car with an empty gas tank need to be fuelled. After fuelling the car, it should be operational again until the next time it needs fuel.

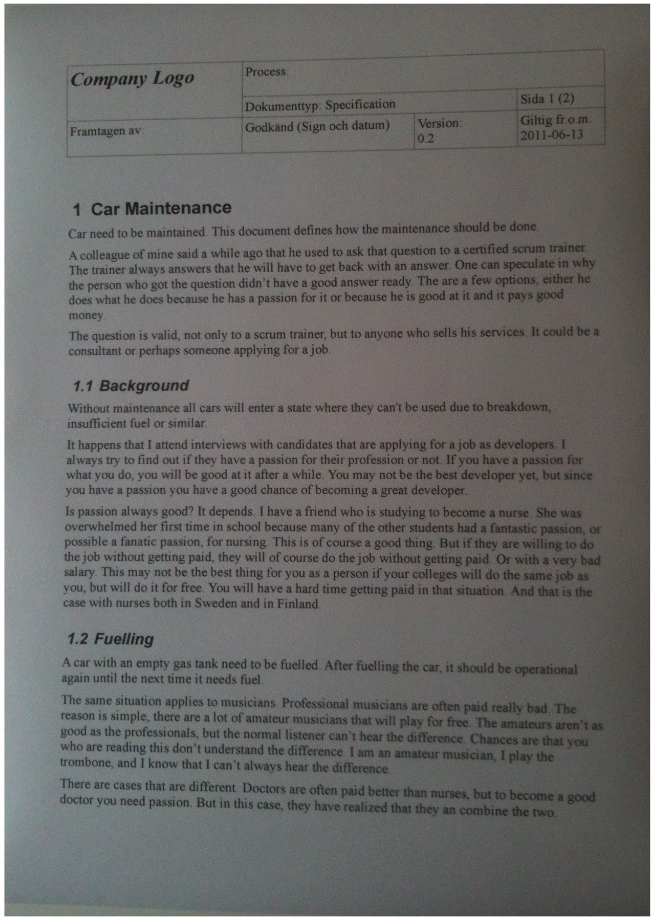
The same situation applies to musicians. Professional musicians are often paid really bad. The reason is simple, there are a lot of amateur musicians that will play for free. The amateurs aren't as good as the professionals, but the normal listener can't hear the difference. Chances are that you who are reading this don't understand the difference. I am an amateur musician, I play the trombone, and I know that I can't always hear the difference.

There are cases that are different. Doctors are often paid better than nurses, but to become a good doctor you need passion. But in this case, they have realized that they an combine the two.

Low

High

A specification



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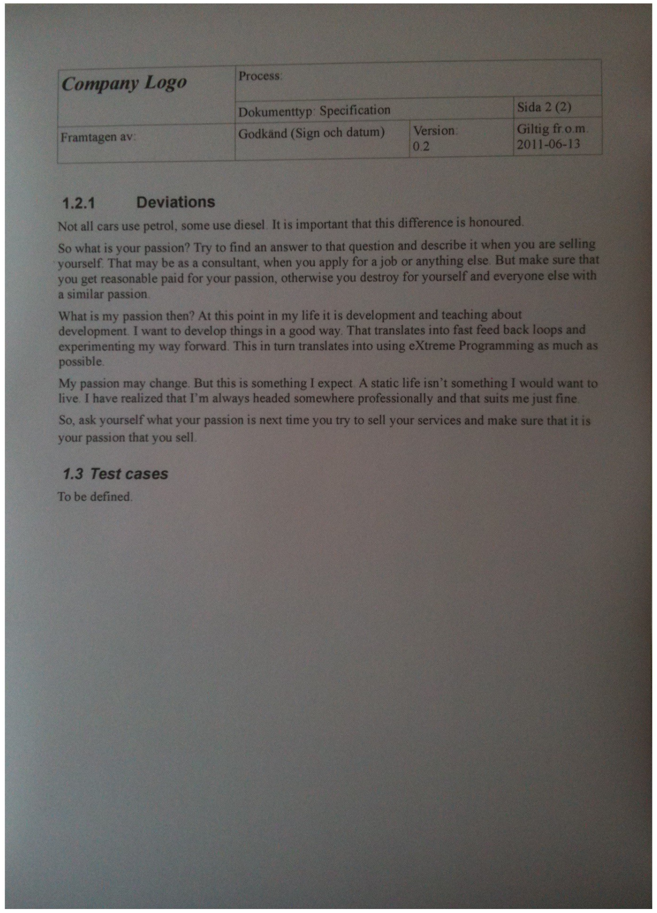

Company Logo	Process:		
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1.2.1 Deviations

Not all cars use petrol, some use diesel. It is important that this difference is honoured.

So what is your passion? Try to find an answer to that question and describe it when you are selling yourself. That may be as a consultant, when you apply for a job or anything else. But make sure that you get reasonable paid for your passion, otherwise you destroy for yourself and everyone else with a similar passion.

What is my passion then? At this point in my life it is development and teaching about development. I want to develop things in a good way. That translates into fast feed back loops and experimenting my way forward. This in turn translates into using eXtreme Programming as much as possible.

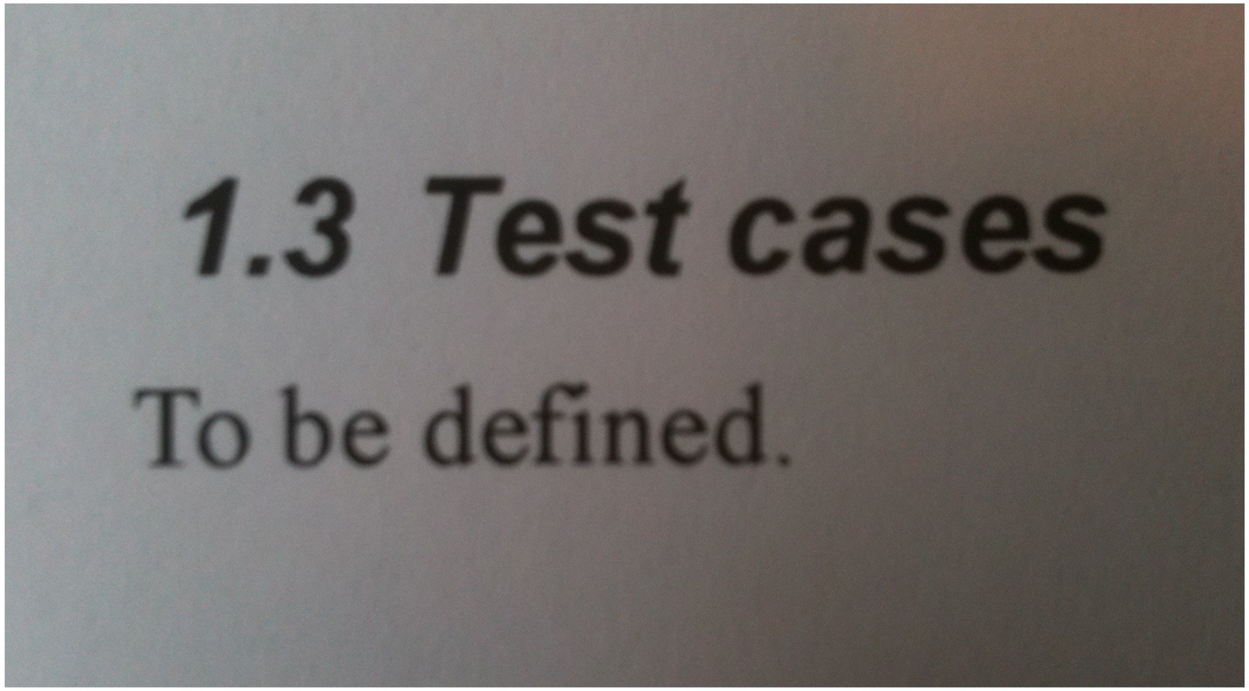
My passion may change. But this is something I expect. A static life isn't something I would want to live. I have realized that I'm always headed somewhere professionally and that suits me just fine.

So, ask yourself what your passion is next time you try to sell your services and make sure that it is your passion that you sell.

1.3 Test cases

To be defined.

A specification



1.3 Test cases

To be defined.

Examples

Create concrete examples

Mark Twain:

There is nothing so annoying as a good example

Executable

How should the examples be expressed?

Code

```
@Test
public void orderLessThenAMonthBeforeChristmasShouldGiveZeroShipping() {
    Calendar purchaseDate = GregorianCalendar.getInstance();
    purchaseDate.set(Calendar.YEAR, 2012);
    purchaseDate.set(Calendar.MONTH, Calendar.NOVEMBER);
    purchaseDate.set(Calendar.DAY_OF_MONTH, 24);

    int christmasEve = 24;
    int expectedShipping = 0;
    String expectedCurrency = "euro";

    Date purchase = purchaseDate.getTime();
    Shipping shipping = new Shipping(purchase, christmasEve);

    int actualCost = shipping.getCost();

    assertThat(actualCost, is(expectedShipping));
}
```

Scenario

```
Scenario: Free shipping a month before Christmas
  Given a customer that Christmas is celebrated 24 of December
  When a customer buys a book on 2012-12-10
  Then the shipping cost should be 0 euro
```

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    int actualCost = shipping.getCost();

    assertThat(actualCost, is(expectedShipping));
}
```

Which is easier to understand?

BALTIC
WINNER 150

Regression testing

Can we deliver?

Living documentation

These examples are actually working

What

Behaviour Driven Development

Behaviour Driven Development

Black box

High level

Not always end to end

Not always through the GUI

Common language

- Used by all involved
  - Customer
  - Developers
  - Testers

Three core principles

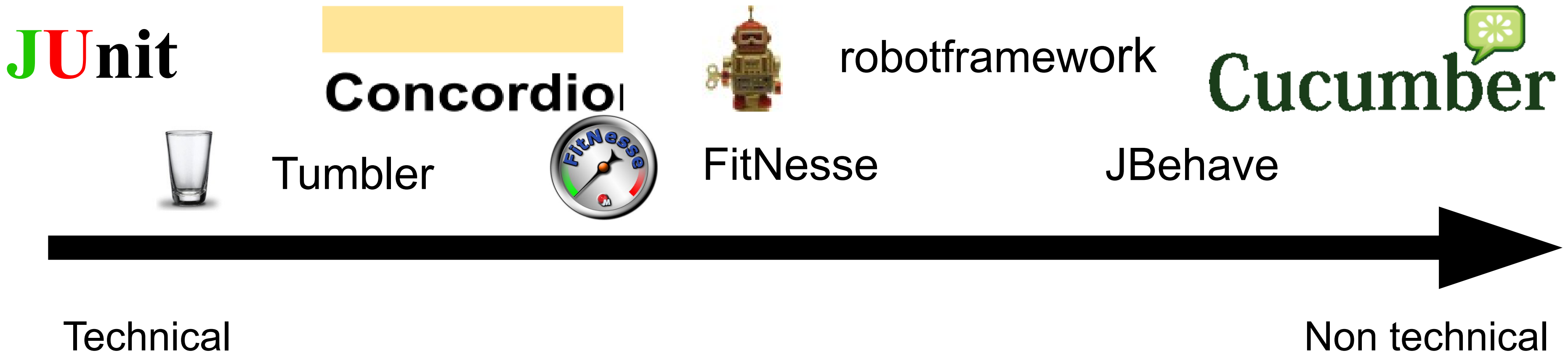
Business and Technology should refer to the same system in the same way

Any system should have an identified, verifiable value

Up-front analysis, design and planning all have a diminishing return

How

Tools


JUnit
Concordio
robotframework
Cucumber
Tumbler
FitNesse
FitNesse
JBehave
Technical
Non technical

The right tool for the job

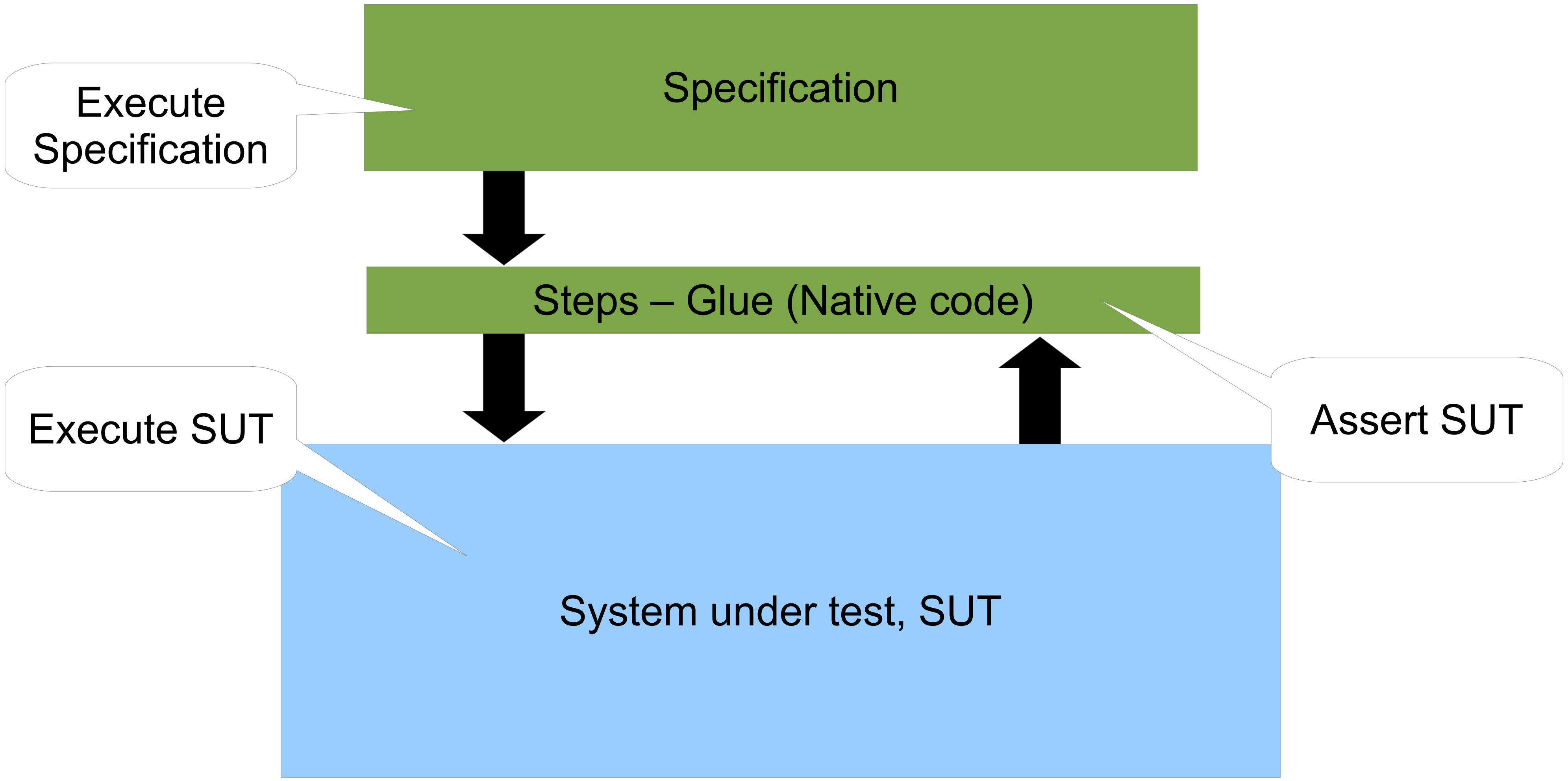
Audience

- Readers
  - Customers
  - Developers
- Maintainers
  - Product owner
  - Developers

Why Cucumber

- It is one of the least technical tools
- It descends from RSpec
- It is a very active open source project
  - Official release Mars 2012
- It supports a variety of languages

Pattern


Specification
Execute Specification
Steps – Glue (Native code)
Execute SUT
Assert SUT
System under test, SUT

Gherkin

- Small API
- Features
  - Scenarios
  - Background
  - Scenario outlines
- Translated to 47 languages

Keywords

Given – setup SUT

When – execute SUT

Then – verify SUT

And, But – flow to the language

Gherkin example

```
Feature: Hello World

  Scenario: Say hello
    Given I have a hello app with "Howdy"
    When I ask it to say hi
    Then it should answer with "Howdy World"
```

Advantages

Easy to read

Easy to understand

Easy to discuss

Easy to parse

Features

- Order not relevant
  - When
  - Given
  - Then

Backgrounds

Executed before each scenario

Powerful

Scenario outline

Substitute keywords with values from a table

Each row in the table makes up one scenario

Steps – Glue

- Java methods
- Global
  - You can't describe two different things with the same words
- Annotated with the keywords
  - Found by regular expressions

An example

```
@When("^I add (\\d+) copies the (.*) book$")
public void methodName(int copies, String title) throws Throwable {
    StepHelper stepHelper = new StepHelper();
    stepHelper.addCopies(title, copies);
}
```

Hooks

- @Before
- @After
- Executed before or after each step
  - Very often

Transformers

Transform a String to a class

```
@When("^a customer buys a book on (.*)$")

public void methodName(@Format("yyyy-MM-dd") Date purchaseDate) throws Throwable {

    this.purchaseDate = purchaseDate;

}
```

Drivers

JUnit

Command line

Continuous Integration

Maven

Ant

Example

A Maven project

Simple model

Use a Continuous Integration server

Extend to a web application

Live coding

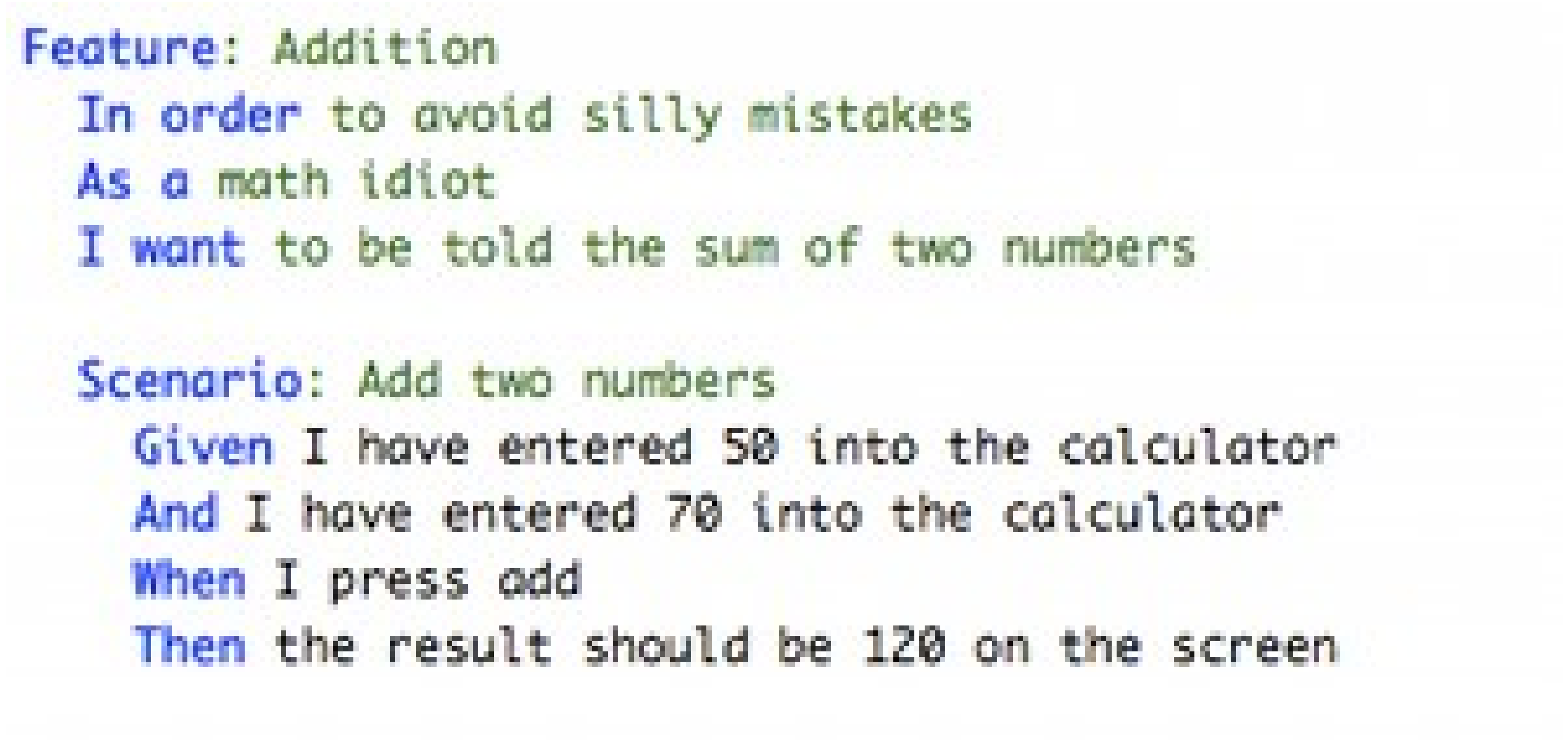
Small example

- All large systems consists of small pieces
- You can only view a small portion of a system at one time
  - ~30 – 50 loc

http://www.casualmiracles.com/2010/02/21/large-systems/

Workflow

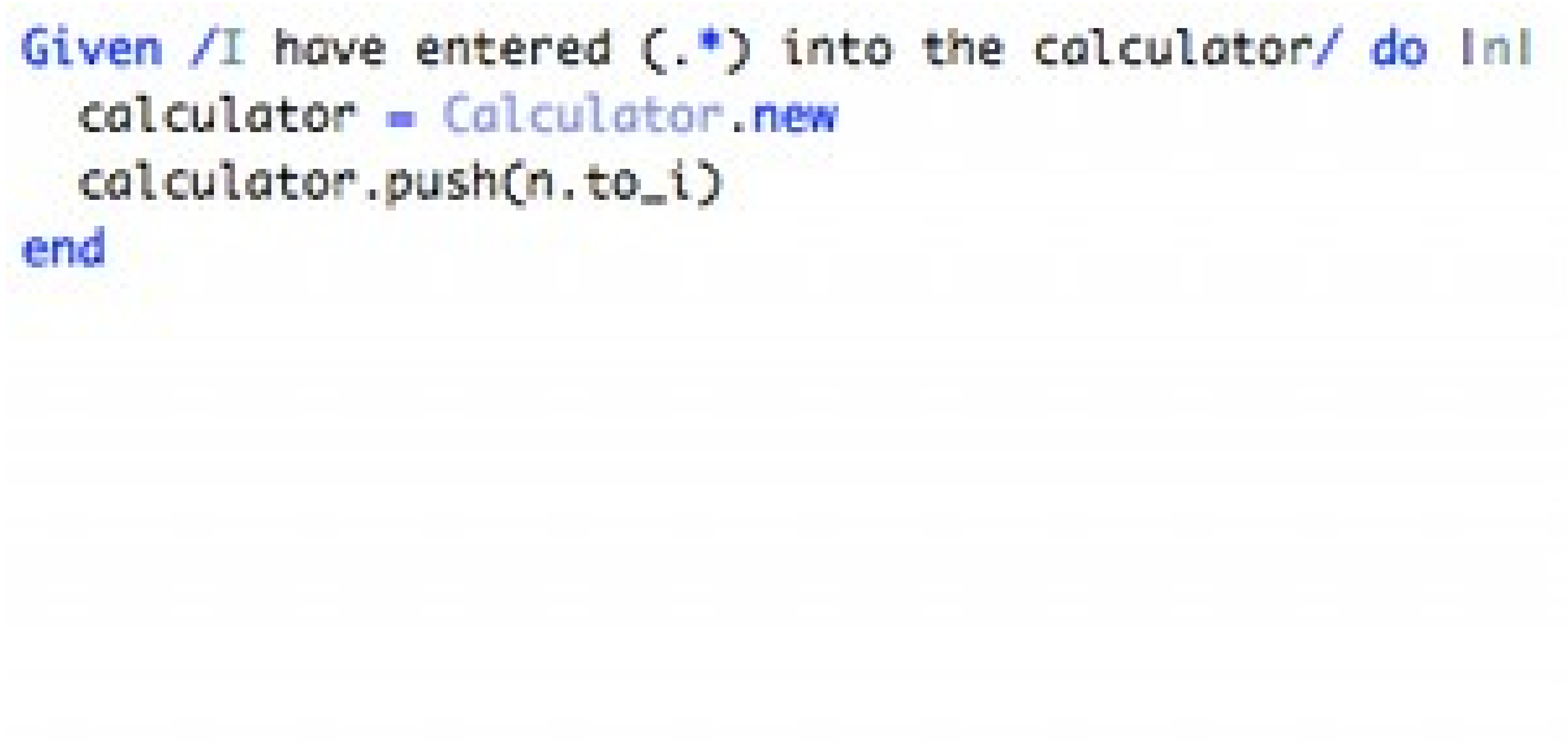
1. Describe the behaviour in plain text



```
Feature: Addition
  In order to avoid silly mistakes
  As a math idiot
  I want to be told the sum of two numbers

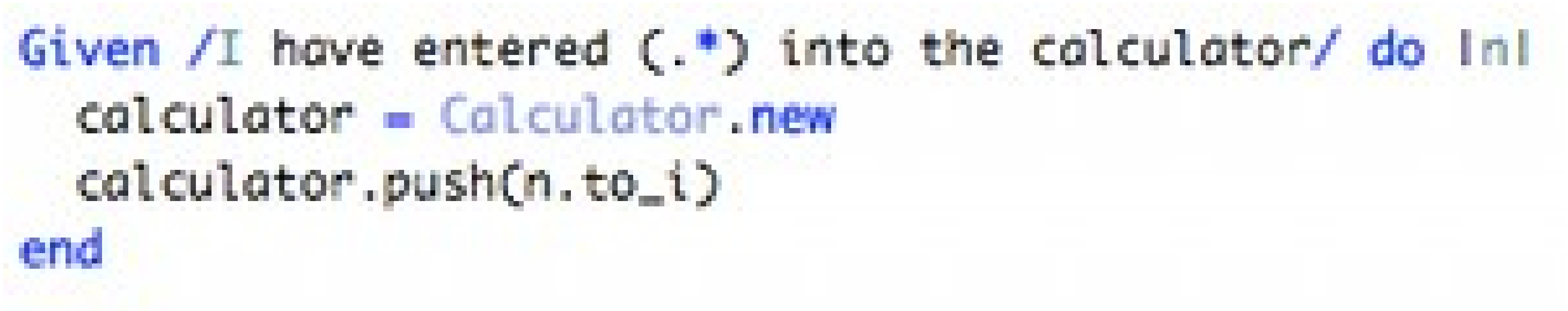
  Scenario: Add two numbers
    Given I have entered 50 into the calculator
    And I have entered 70 into the calculator
    When I press add
    Then the result should be 120 on the screen
```

2. Write a step definition in Ruby



```ruby
Given /I have entered (.*) into the calculator/ do |n|
  calculator = Calculator.new
  calculator.push(n.to_i)
end
```

2. Write a step definition in ~~Ruby~~ Java



```
Given /I have entered (.*) into the calculator/ do |n|
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end
```
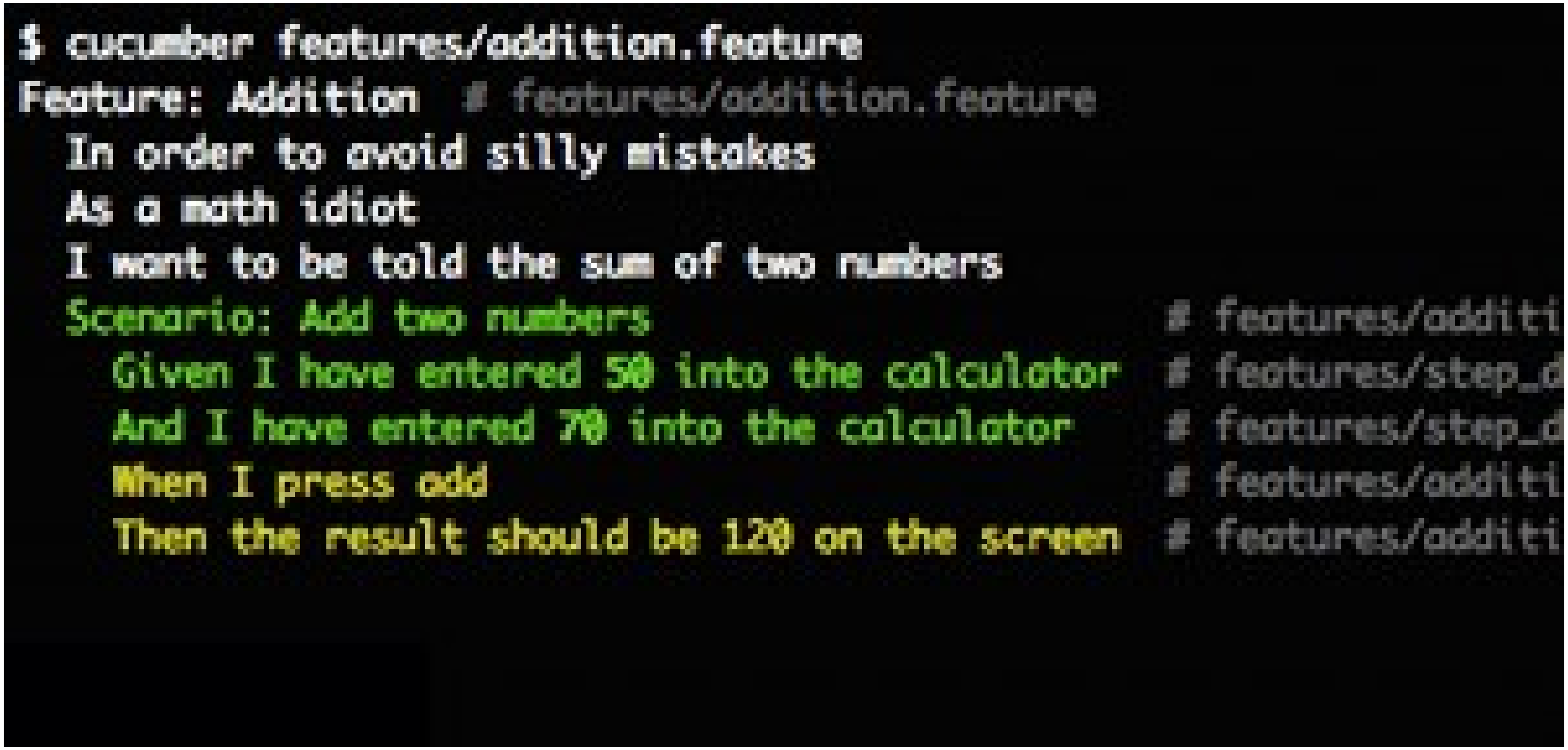
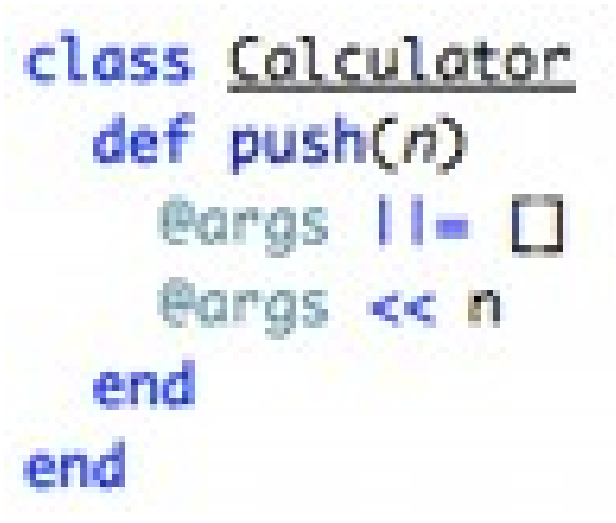

3. Run it and watch it fail



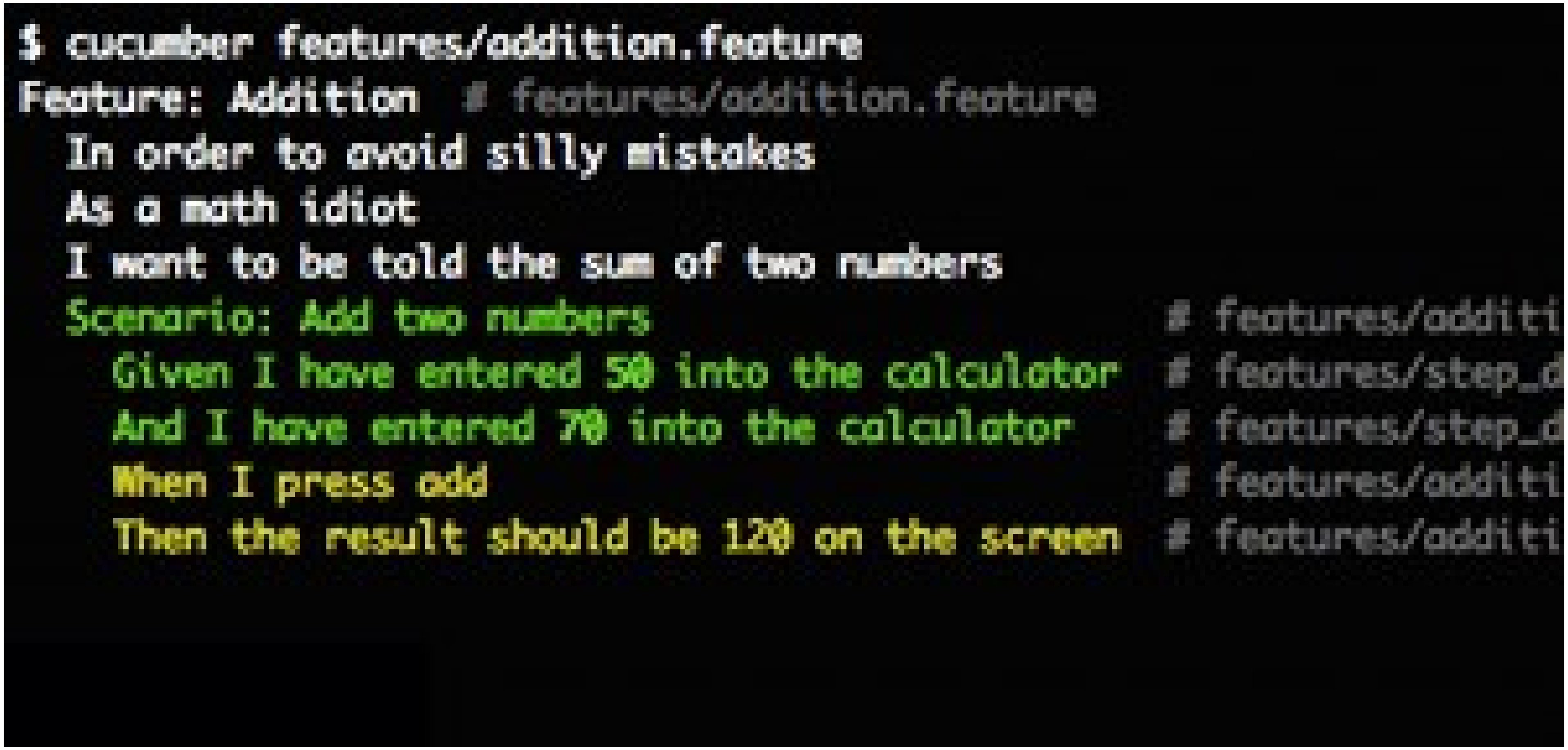
```
$ cucumber features/addition.feature
Feature: Addition  # features/addition.feature
  In order to avoid silly mistakes
  As a math idiot
  I want to be told the sum of two numbers
  Scenario: Add two numbers                       # features/additi
    Given I have entered 50 into the calculator   # features/step_d
    And I have entered 70 into the calculator     # features/step_d
    When I press add                              # features/additi
    Then the result should be 120 on the screen   # features/additi
```

4. Write code to make the step pass



```
class Calculator
  def push(n)
    @args ||= []
    @args << n
  end
end
```

5. Run it again and see the step pass



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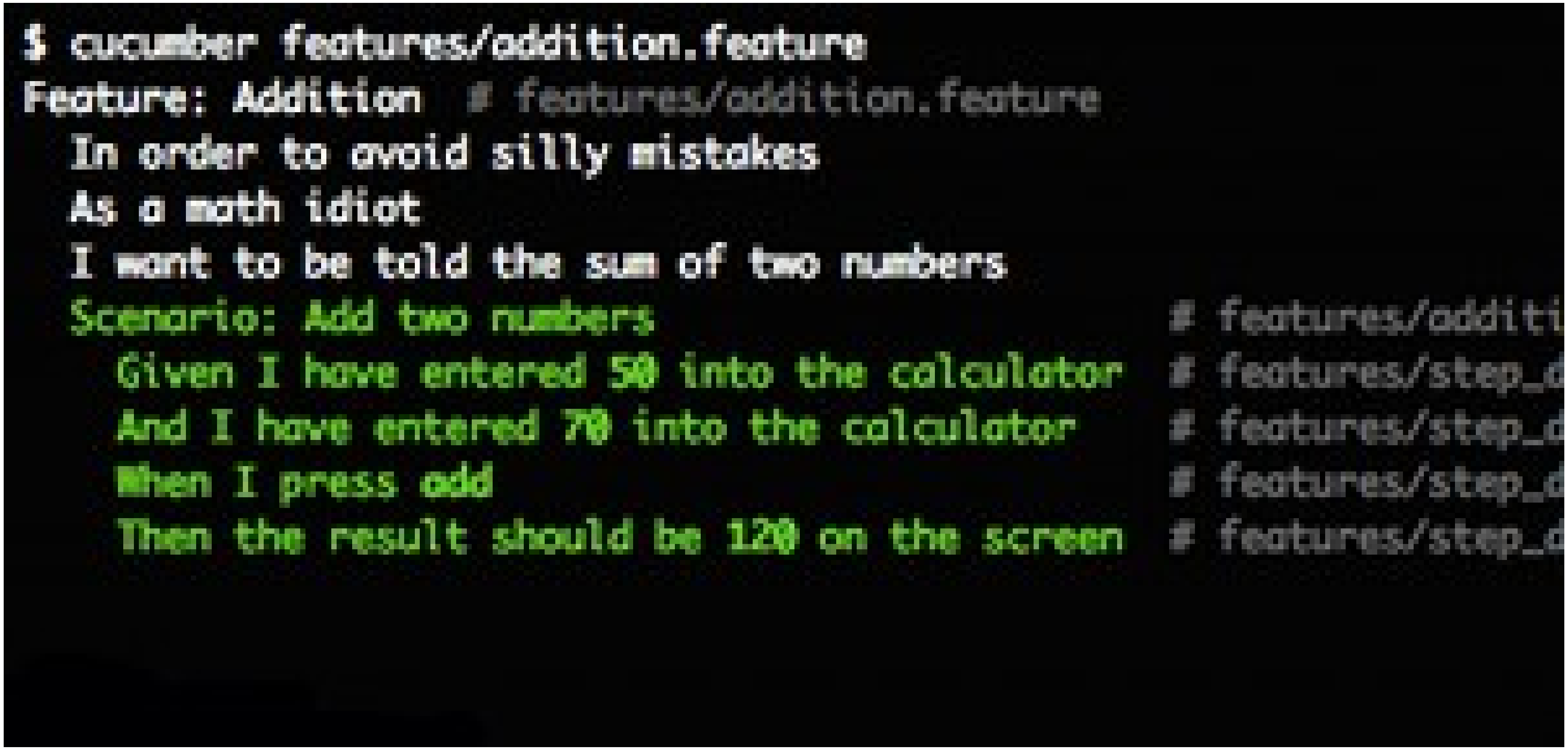
    When I press add                               # features/additi
    Then the result should be 120 on the screen    # features/additi
```

6. Repeat step 2 – 5 until green like a Cuke



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    And I have entered 70 into the calculator    # features/step_d
    When I press add                             # features/step_d
    Then the result should be 120 on the screen  # features/step_d
```

7. Repeat step 1 – 6 until the money runs out

1. Describe the behaviour in plain text
2. Write a step definition
3. Run it and watch it fail
4. Write code to make the step pass
5. Run it again and see the step pass
6. Repeat step 2 – 5 until green like a Cuke

Why

Communication

Regression testing

Living documentation

What

Behaviour

How

Features

Scenarios

Glue code

System under test

Continuous Integration

Preparation for fast deployment

It works as we have specified

Declarative

Don't write scripts

Define what should work

No implementation details

Cucumber is a good hammer

All problems are not nails

Right tool for the right problem

Do not focus on the tools

Tools will never solve the problem

A fool with a tool is still a fool

Resources

Cucumber – http://cukes.info/

Cucumber – https://github.com/cucumber/cucumber/wiki

Gherkin – https://github.com/cucumber/cucumber/wiki/Gherkin

Selenium – http://seleniumhq.org/

Maven – http://maven.apache.org/

Jenkins – http://jenkins-ci.org/

Blog – http://thomassundberg.wordpress.com/

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