Behavior-driven development and testing with Cucumber

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Story Testing

Executable Use Cases

Stories and scenarios

Story as the basic unit of functionality, and therefore of delivery.

- Captures a feature of the system
- defines the scope of the feature
- its acceptance criteria.

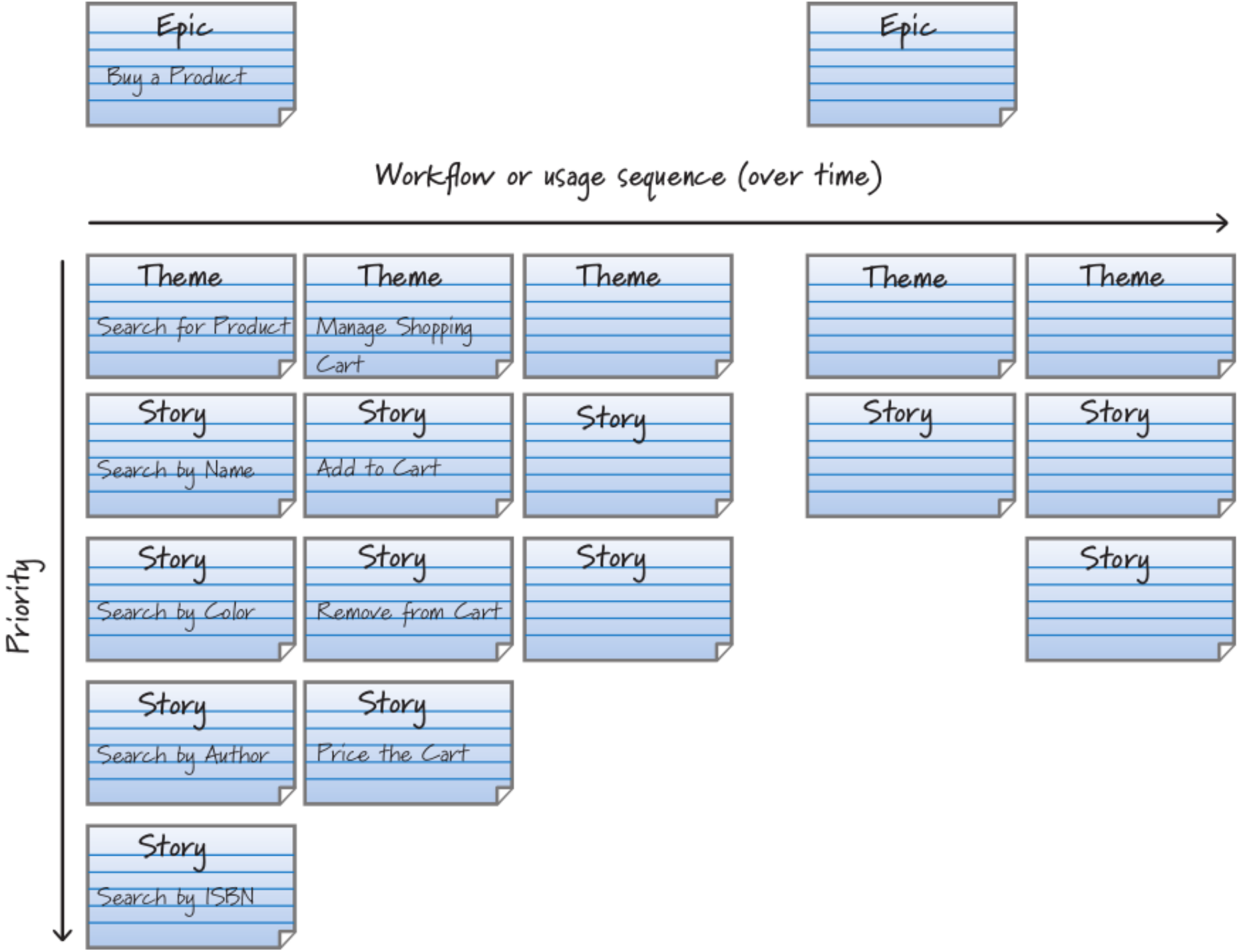
They are also used as the basis for estimation when we come to do our planning

- Can be mapped on outcomes, requirements

What's in a Story?
http://dannorth.net/whats-in-a-story/

Stories, use cases, scenarios

FIGURE 8:
THE RELATIONSHIP BETWEEN THE FLOWS AND THE STORIES


Epic
Buy a Product
Epic
Workflow or usage sequence (over time)
Priority
Theme
Search for Product
Theme
Manage Shopping Cart
Theme
Theme
Theme
Story
Search by Name
Story
Add to Cart
Story
Story
Story
Story
Search by Color
Story
Remove from Cart
Story
Story
Story
Search by Author
Story
Price the Cart
Story
Search by ISBN

A story and tests...

```
Title (one line describing the story)

Narrative:
As a [role]
I want [feature]
So that [benefit]

Acceptance Criteria: (presented as Scenarios)

Scenario 1: Title
Given [context]
  And [some more context]...
When  [event]
Then  [outcome]
  And [another outcome]...

Scenario 2: ...
```

Acceptance criteria should be executable

Story: the scope of a feature + its acceptance criteria.

```
Title (one line describing the story)

Narrative:
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Acceptance Criteria: (presented as Scenarios)

Scenario 1: Title
Given [context]
  And [some more context]...
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  And [another outcome]...

Scenario 2: ...
```

Credit: http://dannorth.net/whats-in-a-story/

```
Story: Account Holder withdraws cash

As an Account Holder
I want to withdraw cash from an ATM
So that I can get money when the bank is closed

Scenario 1: Account has sufficient funds
Given the account balance is \$100
 And the card is valid
 And the machine contains enough money
When the Account Holder requests \$20
Then the ATM should dispense \$20
 And the account balance should be \$80
 And the card should be returned

Scenario 2: Account has insufficient funds
Given the account balance is \$10
 And the card is valid
 And the machine contains enough money
When the Account Holder requests \$20
Then the ATM should not dispense any money
 And the ATM should say there are insufficient funds
 And the account balance should be \$20
 And the card should be returned
```

Features are described in the Gherkin Language

writing features - gherkin language ¶

Feature: Some terse yet descriptive text of what is desired

In order to realize a named business value

As an explicit system actor

I want to gain some beneficial outcome which furthers the goal

Scenario: Some determinable business situation

Given some precondition

And some other precondition

When some action by the actor

And some other action

And yet another action

Then some testable outcome is achieved

And something else we can check happens too

Scenario: A different situation

BDD Given, When, Then style

Structured syntax (Gherkin) to describe a feature (for testing):

- Feature: what
- Scenario: some determinable business situation
- Given: preparation/setup (e.g.: required data)
  - And…
- When: the set of actions (execute).
  - And…
- Then: specifies the expected resulting state (assert).
  - And…

Sample

brainstorm

Section	Purpose
Scenario	
Given	
Then	
When	

Cucumber tool

Goal

- common understanding of the problem ⇒ simplify the communication between all parties

Cucumber way

- express requirements using concrete examples
- create examples of behavior that are executable
- examples are found in a collaborative way (business analysts, testers and developers)
- examples can be used as acceptance tests (with additional preparation steps)

Cucumber makes your team **amazing**

At a glance, Cucumber might just look like another tool for running automated tests.
But It's more than that.

A single source of truth

Cucumber merges specification and test documentation into one cohesive whole.

Living documentation

Because they're automatically tested by Cucumber, your specifications are always bang up-to-date.

Focus on the customer

Business and IT don't always understand each other. Cucumber's *executable specifications* encourage closer collaboration, helping teams keep the business goal in mind at all times.

Less rework

When automated testing is this much fun, teams can easily protect themselves from costly regressions.

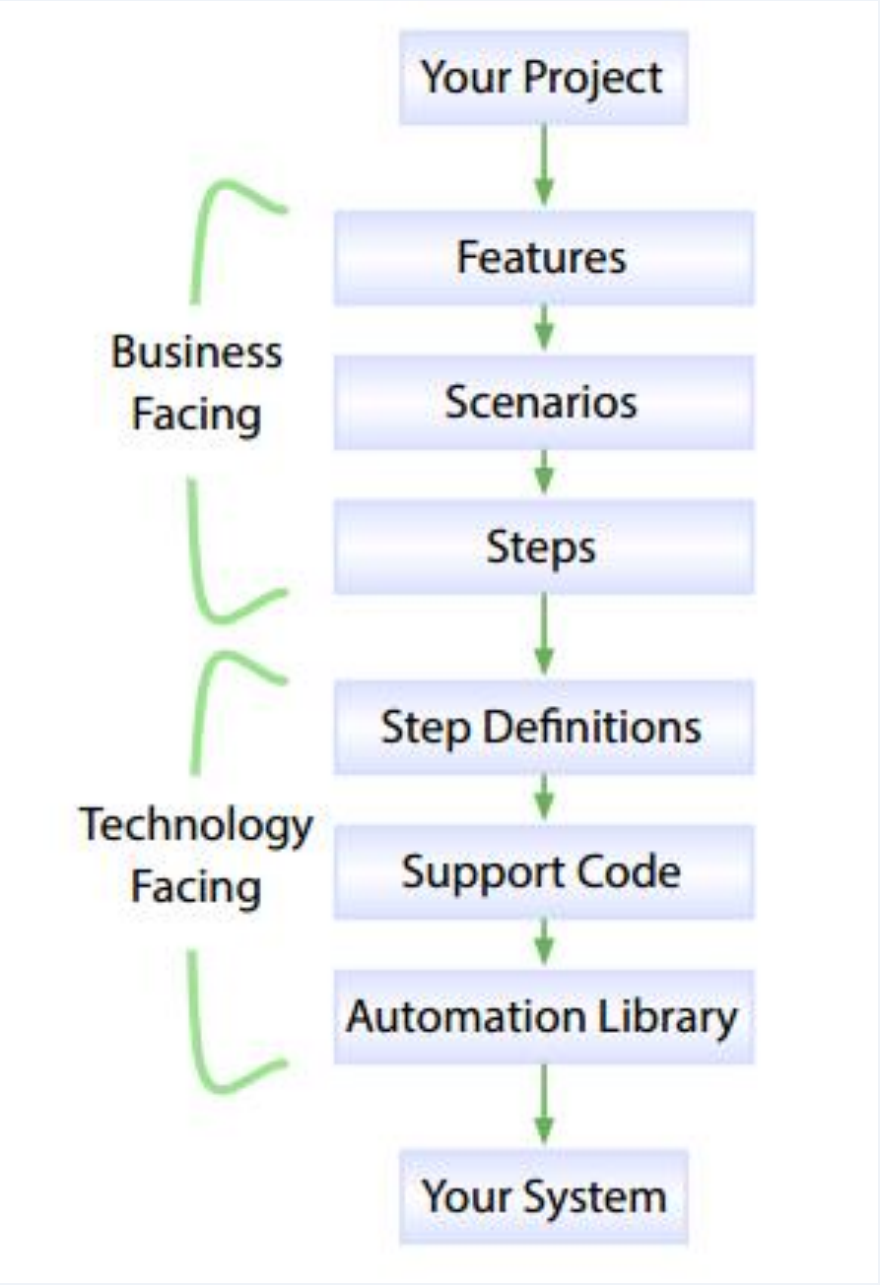
Cucumber reads specifications from plain-language text files called *features*, examines them for *scenarios* to test.

Each scenario is a list of *steps* for Cucumber to work through.

Along with the features, you give Cucumber a set of *step definitions*, which map the business-readable language of each step into code to carry out whatever action is being described by the step.

The step definition itself will probably just be one or two lines of code that delegate to a library of *support code*, specific to the domain of your application.

Sometimes that may involve using an *automation library*, like the browser automation library Selenium.



Implementing Cucumber in JVM

Cucumber is first and foremost a conversation tool.

- The most important part is the conversations that must take place before we can implement something that our users want

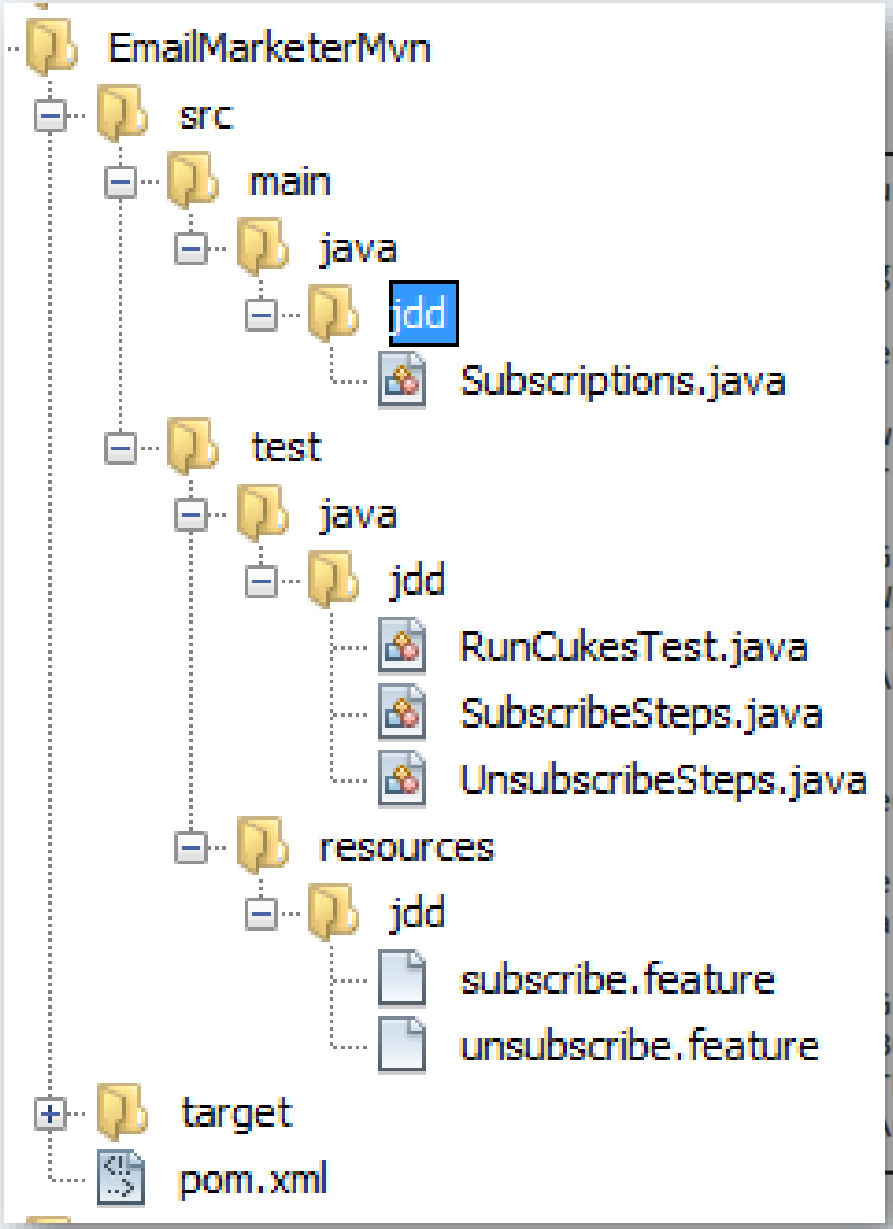
Add a few features that will define our wanted behavior

- The features must be located in the same package or a subpackage below the package where the runner is located.
- in Maven, anything found in a directory called resources at the same level as the java directory, will be a part of the classpath

Cucumber can be executed using JUnit through a specific JUnit runner.

- Feature - a short description of the feature. Try to express yourself in one sentence
- Scenario - the actual business scenario that should be working
- Given - the setup step. Define the preconditions for the wanted behavior
- When - the execution step. This is where you use the system in some way
- Then - the assertion step. This is where you observe the system and assert that the wanted change has occurred

Hands-on: cucumber jvm




```
ıre: Sign up

gn up should be quick and friendly.

enario: Successful sign up

/ users should get a confirmation email and be greeted
rsonally by the site once signed up.

iven I have chosen to sign up
hen I sign up with valid details
hen I should receive a confirmation email
nd I should see a personalised greeting message


enario: Duplicate email

re someone tries to create an account for an email ad
t already exists

iven I have chosen to sign up
ut I enter an email address that has already register
hen I should be told that the email is already regist
nd I should be offered the option to recover my passw
```

src/test/resources/se/thinkcode/geecon/belly.feature

```
# language: pl
Funkcja: Ogórkowa-JVM

  W celu zaprezentowania pakietu Ogórkowa-JVM
  Chciałbym przedstawić praktyczny przykład tak aby wszyscy mogli zobaczyć w jaki sposób możn

  Scenariusz: Burczenie w brzuchu
    Mając 42 ogórki w brzuchu
    Kiedy odczekam 1 godzinę
    Wtedy mój brzuch zacznie burczeć
```

Oops, this is in polish. If you are like me, then this is hard to understand. I don't read or speak Polish well enough to understand this. But it is valid Gherkin and it can be used by Cucumber. An English translation may look like this:

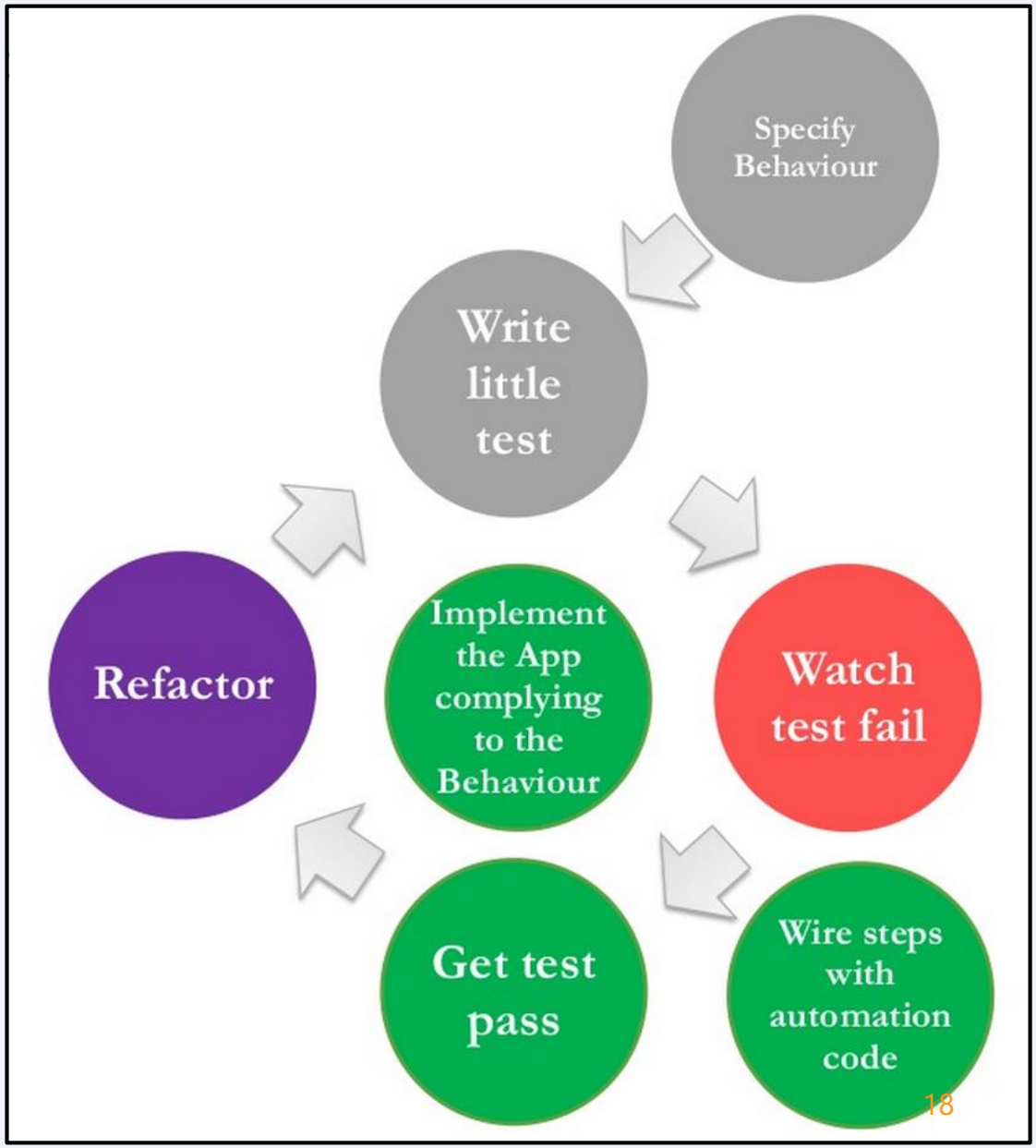
```
Feature: Cucumber-JVM should be introduced

  In order to present Cucumber-JVM
  As a speaker
  I want to develop a working example where the audience can see how it is possible to execut

  Scenario: Belly growl
    Given I have 42 cukes in my belly
    When I wait 1 hour
    Then my belly should growl
```

Views from Robert C. Martin

BDD is a variation on TDD. Whereas in TDD we drive the development of a module by “first” stating the requirements as unit tests, in BDD we drive that development by first stating the requirements as, well, *requirements*. The form of those requirements is fairly rigid, allowing them to be interpreted by a tool that can execute them in a manner that is similar to unit tests.

https://sites.google.com/site/unclebobconsultingllc/the-truth-about-bdd

BDD: Behaviour-driven development



Credit: Nalin Goonawardana

BDD frameworks

Cucumber (Ruby framework)

Cucumber-JVM

Behat (PHP framework)

Fitness

…

Resources and readings

Sundberd, T., "Where should you use Behaviour Driven Development, BDD?"

Kops, "**BDD Testing with Cucumber, Java and Junit**"