From Manual to Automating UI Testing

Module 2: Web Front-end test automation

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Brief BDD overview

- Gherkin fundamentals
- Acceptance Tests
- Best Practices
- Exercise 1: Defining Bing Search Scenario

Understanding Web UI Testing

- Anatomy of Web page / DOM elements
- Exercise 2: Finding elements with browser
- Designing Testable Web Pages
- Exercise 3: First Selenium Automated test

SpecFlow Fundamentals

- Testing Stack
- Features, scenarios,
- Binding, step definitions & hooks
- Sharing data, steps and best practices
- Hands-on Labs: Bing Search Scenarios

Next Steps

- Practice tips & References
- Feedback to next session
- Getting ready for next session

Cucumber, Gherkin and Behaviour Driven Development

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What is Automation Testing?

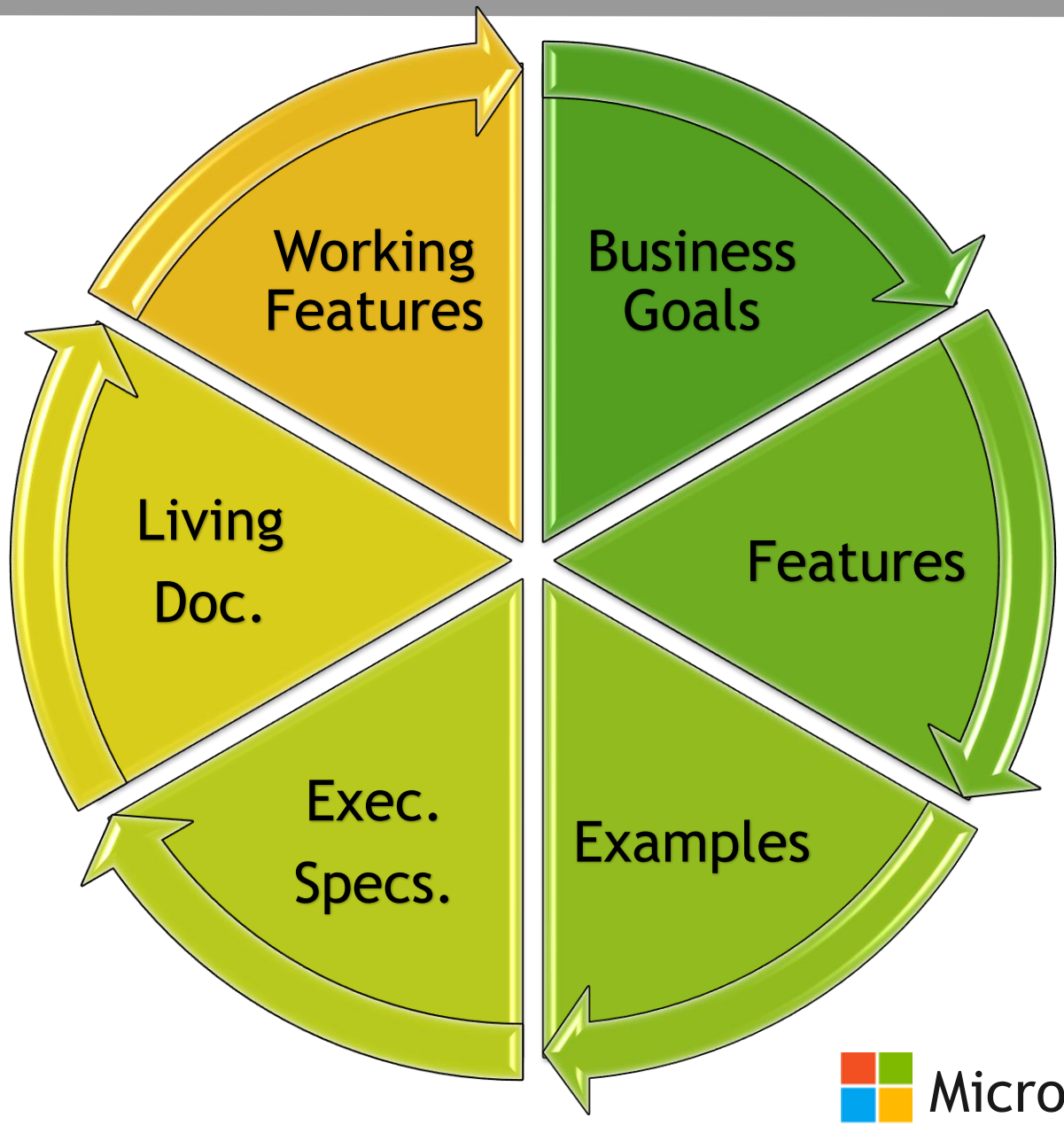
Process in which software tools execute pre-scripted tests on a software application before it is released into production.

Automated testing is code-driven and mitigates business risks

Simplify as much of the testing effort as possible with a minimum set of scripts.

The method or process being used to implement automation is called a test automation framework.

Behaviour Driven Development



https://aka.ms/BDDWorkshop

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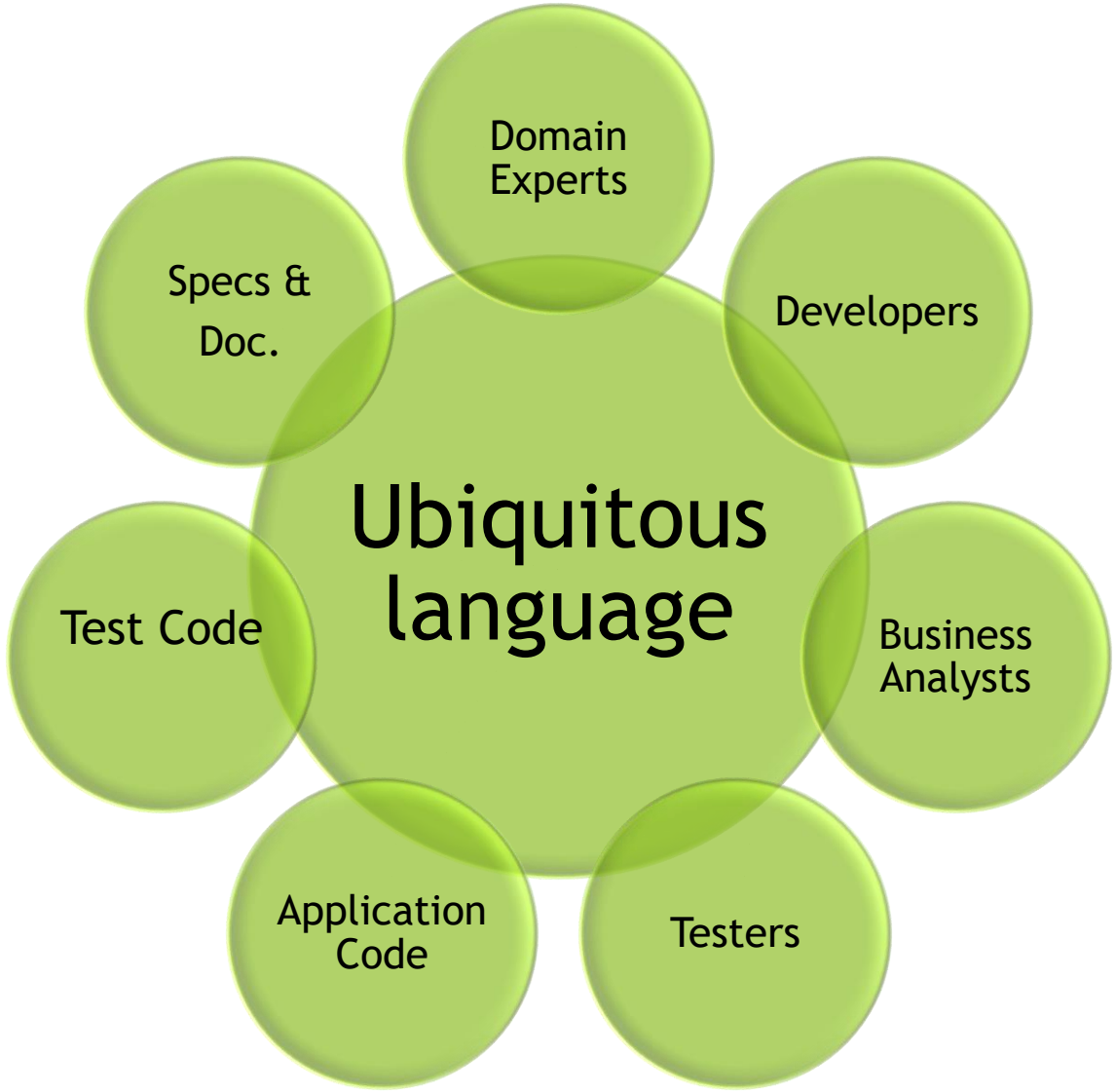
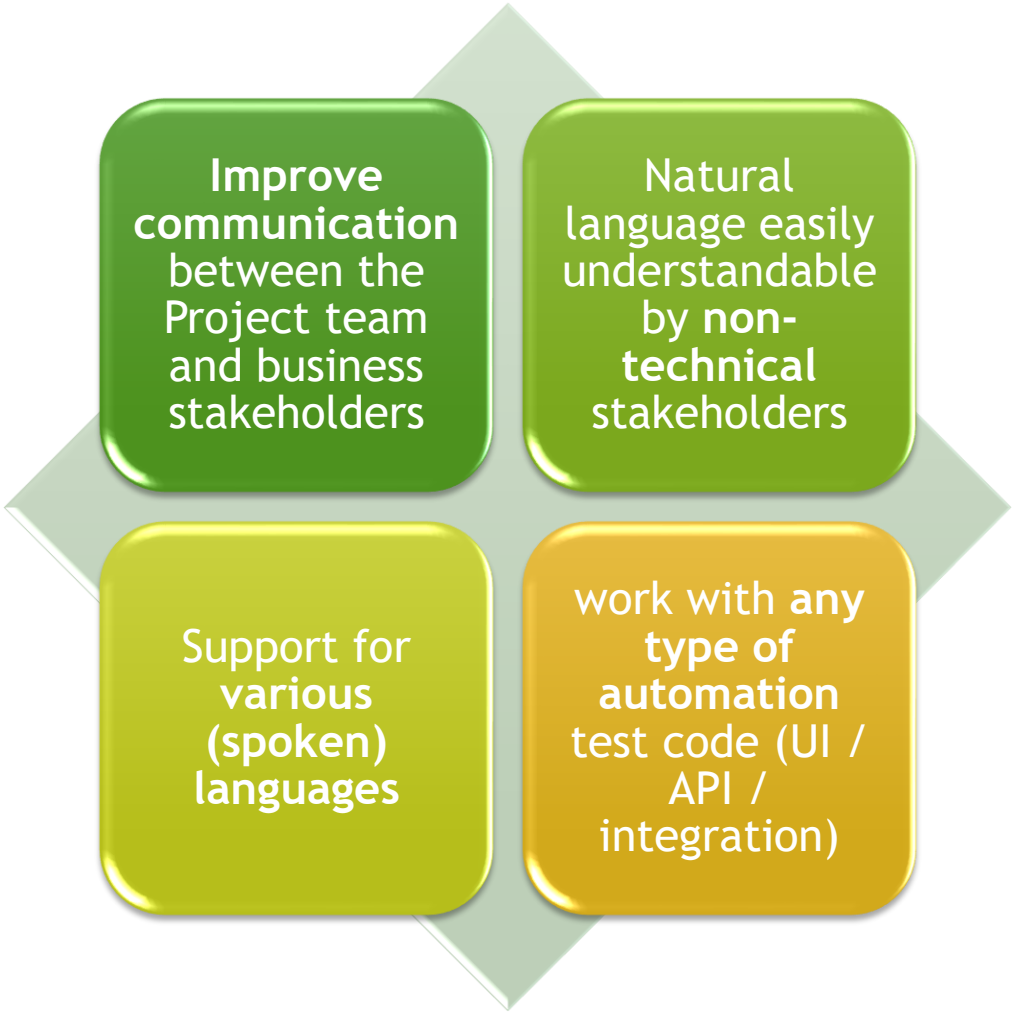
BDD – From Ideas to working software





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Gherkin, Cucumber and SpecFlow

"The hardest single part of building a software system is deciding precisely what to build"

Gherkin is plain-text English with some structure.

Cucumber understands and parses the Gherkin Language.

Specflow is Cucumber for the .NET Framework.

```
    public void IsRecurring()
    {
        var customer = new Customer { HasSubscription = true, SubscriptionType = SubscriptionType.Monthly };

        Assert.IsTrue(customer.IsRecurringSubscription);
    }

    [Test]
    public void SubscribtionRecordChargedResultToFailOnceShouldStillBeCurrent()
    {
        //Arrange
        var customer = new Customer { HasSubscription = true, SubscriptionType = SubscriptionType.Monthly };

        // Act
        customer.RecordChargedResult(false);

        // Assert
        Assert.IsTrue(customer.HasCurrentSubcription);
    }

    [Test]
    public void SubscribtionRecordChargeResultToFailMaximumTimesIsNoLongerCurrent()
    {
        // Arrange
        var customer = new Customer { HasSubscription = true, SubscriptionType = SubscriptionType.Monthly };

        // Act
        for (var i = 0; i < Customer.MAX_PAYMENT_FAILURES; i++)
            customer.RecordChargedResult(false);

        //Assert
        Assert.IsFalse(customer.HasCurrentSubcription);
    }
}
```

Exercise 1

Specifying Bing Search Scenario with Gherkin

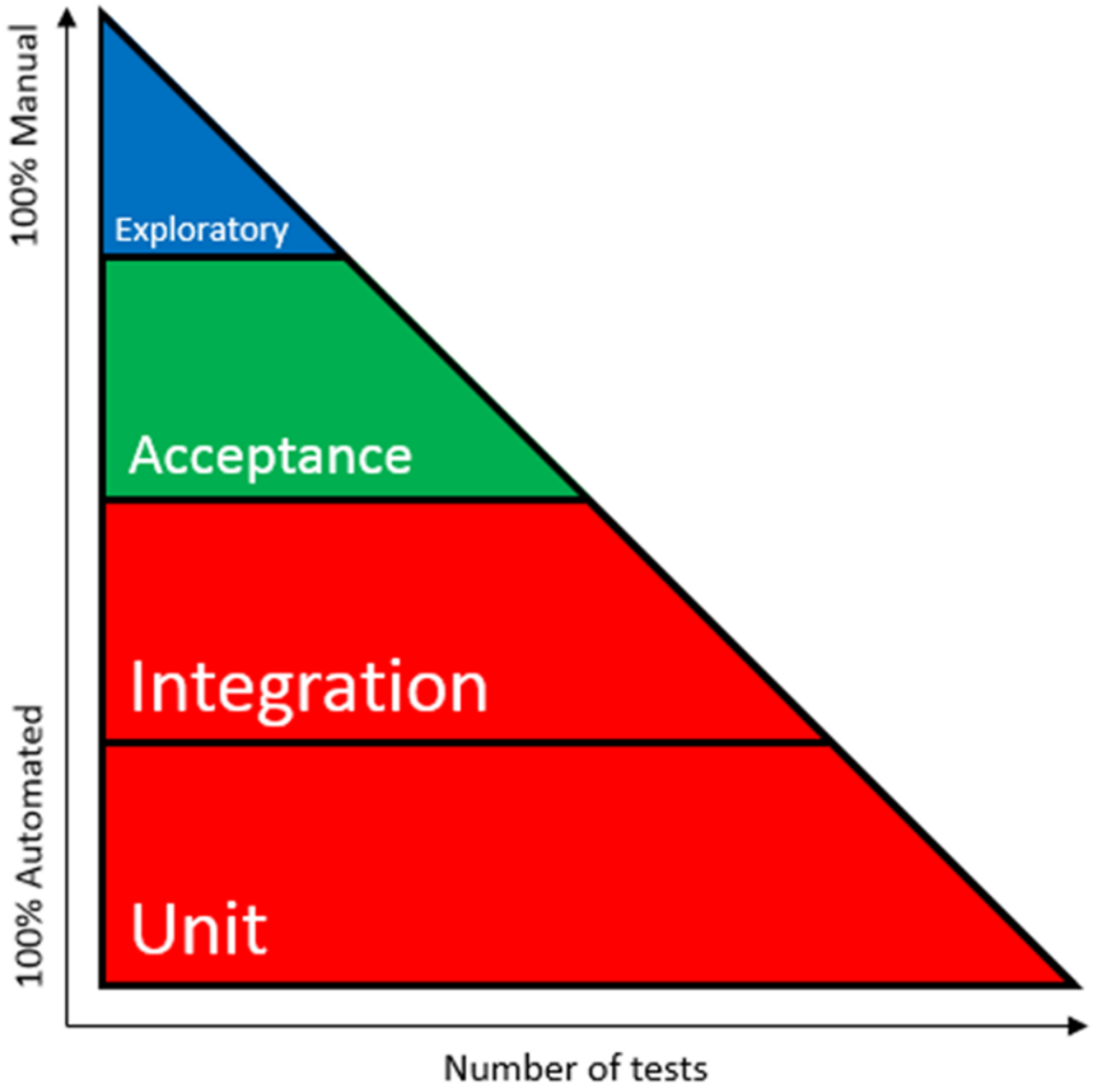
Testing Pyramid

Manual

Preferably automated. Includes functional & technical tests

Automated

Automated



Slow, Complex, Brittle, Broad

Fast, Simple, Stable, Narrow

From Acceptance Testing to Living Documentation

Business/user/customer point of view

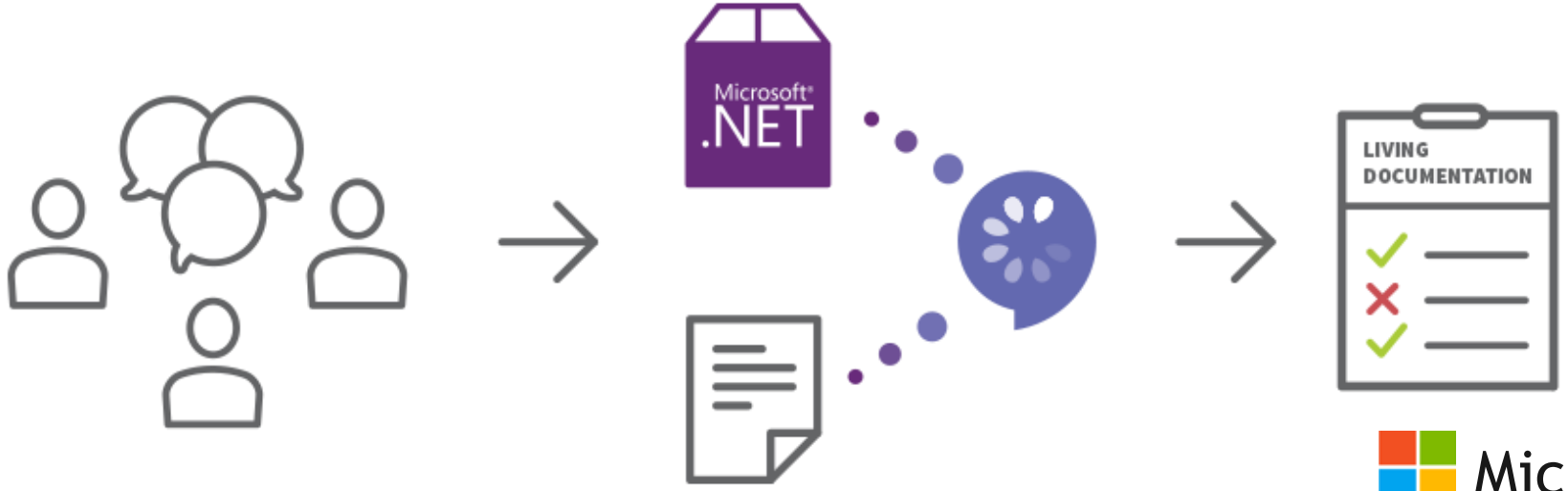
Validates that the right system is being built

Pass/fail

Shared team understanding of what is being built

Helps document what the system should do

Helps define what “done” means



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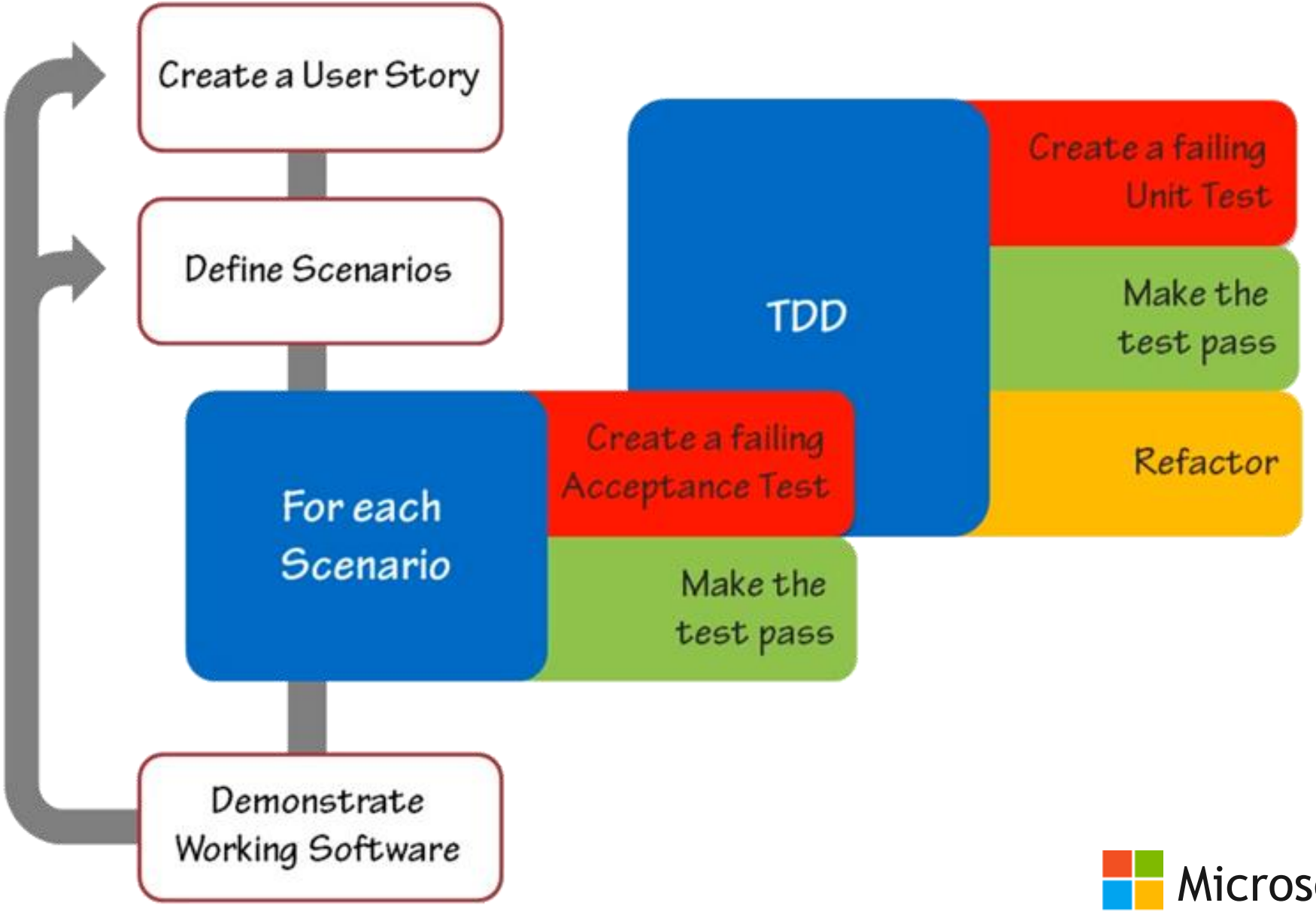
BDD – From Ideas to working software



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Cucumber /SpecFlow – It is ok to not be Behaviour/Test Driven

Business Facing and user centric

Pass/fail Regression Automated Tests

Helps document the system's expectations

Much Better than no tests

Much Better than subcutaneous tests

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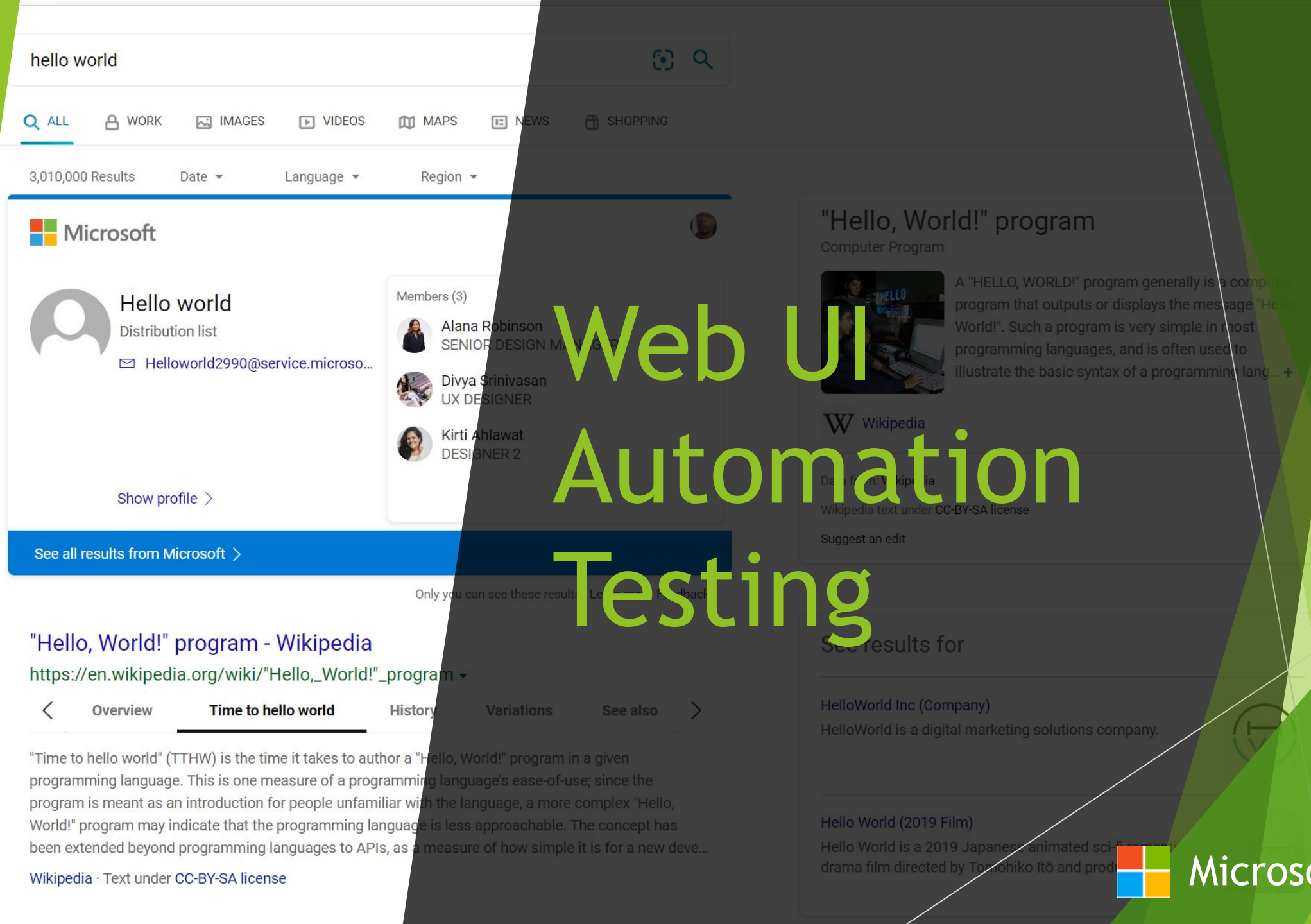
The Need for Manual Testing

There is no replacement for manual testing performed by humans.

Automated testing always going to be a subset what can be tested and cannot validate navigation, presentation, aesthetics or find hidden bugs.

However, collating and reporting on manual testing efforts is traditionally a challenging and tedious job.

Web UI Automation Testing



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Anatomy of a Web Page

hello world

ALL | WORK | IMAGES | VIDEOS | MAPS | NEWS | SHOPPING

3,010,000 Results | Date | Language | Region

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Hello world
Distribution list
Helloworld2990@service.microso...

Members (3)
Alana Robinson
SENIOR DESIGN MANAGER
Divya Srinivasan
UX DESIGNER
Kirti Ahlawat
DESIGNER 2

Show profile

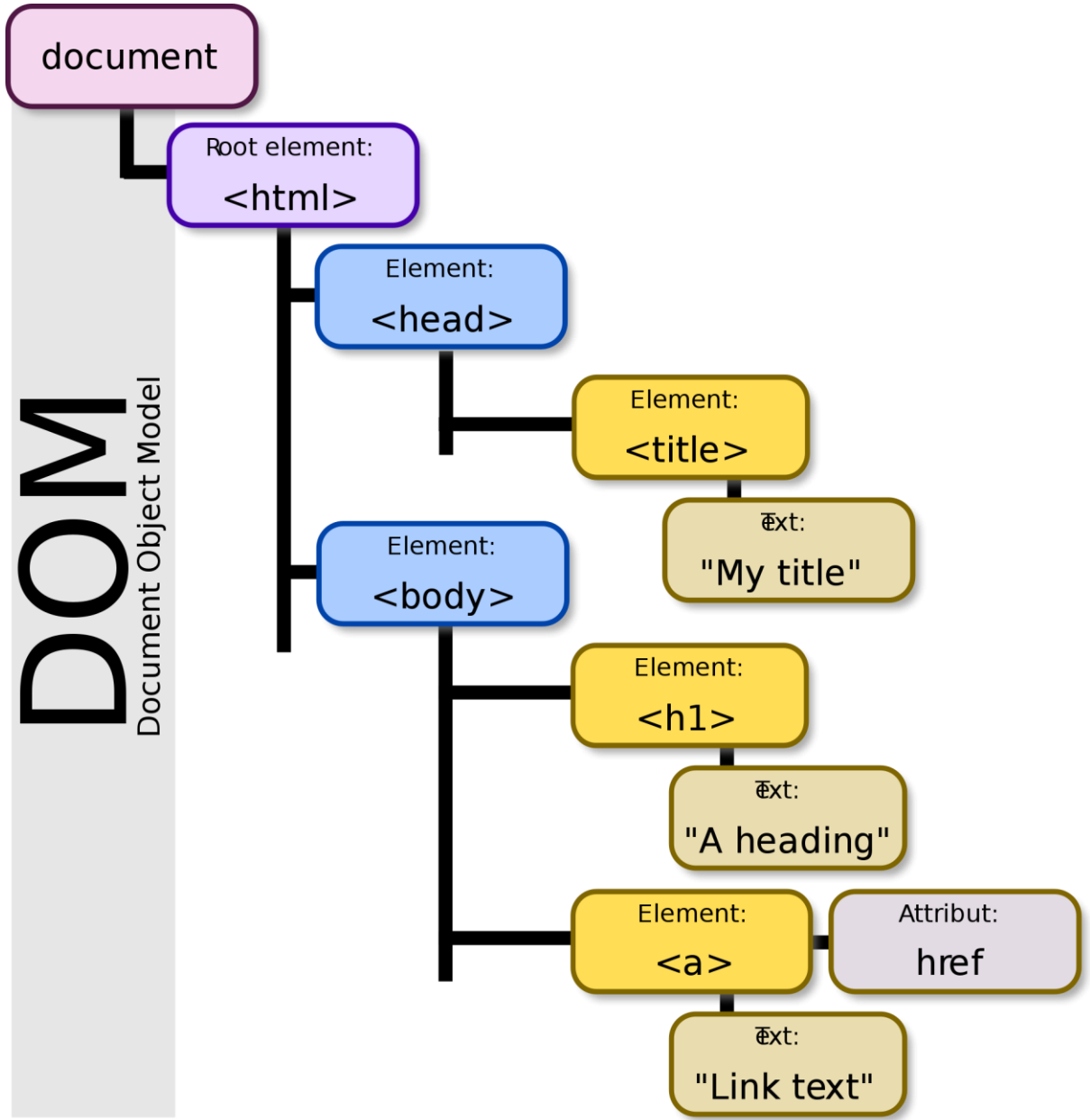
See all results from Microsoft

Only you can see these results Learn more Feedback

"Hello, World!" program - Wikipedia
https://en.wikipedia.org/wiki/"Hello,_World!"_program

Overview | Time to hello world | History | Variations | See also

"Time to hello world" (TTHW) is the time it takes to author a "Hello, World!" program in a given programming language. This is one measure of a programming language's ease-of-use; since the program is meant as an introduction for people unfamiliar with the language, a more complex "Hello,



Accessing Web Page elements

```html
<html>
    <head>
        <title>This is a Document!</title>
        <link rel="stylesheet" href="main.css">
    </head>
    <body>
        <h1>This is a header!</h1>
        <p id="excitingText">
            This is a paragraph! <em>Excitement</em>
        </p>
        <p>
            This is also a paragraph, but it's not
    nearly     as exciting as the last one.
        </p>
    </body>
</html>
```

```css
#excitingText {
    color:red
}
```

JavaScript

```
document.getElementById("excitingText");
```

XPATH

```
//*[@id="excitingText"]
```

CSS

```
#excitingText
```

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```
    public void IsRecurring()
    {
        var customer = new Customer { HasSubscription = true, SubscriptionType = SubscriptionType.Monthly };

        Assert.IsTrue(customer.IsRecurringSubscription);
    }

    [Test]
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        // Act
        for (var i = 0; i < Customer.MAX_PAYMENT_FAILURES; i++)
            customer.RecordChargedResult(false);

        //Assert
        Assert.IsFalse(customer.HasCurrentSubcription);
    }
}
```
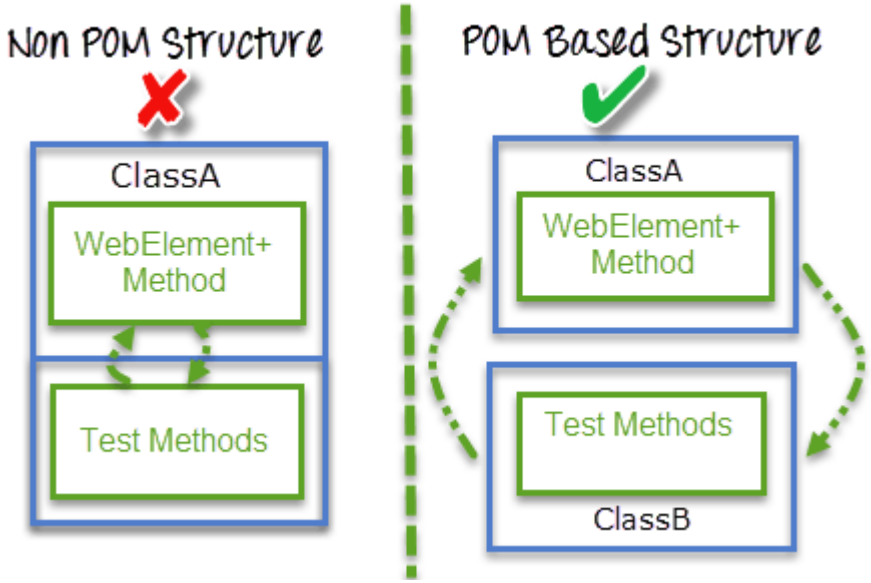
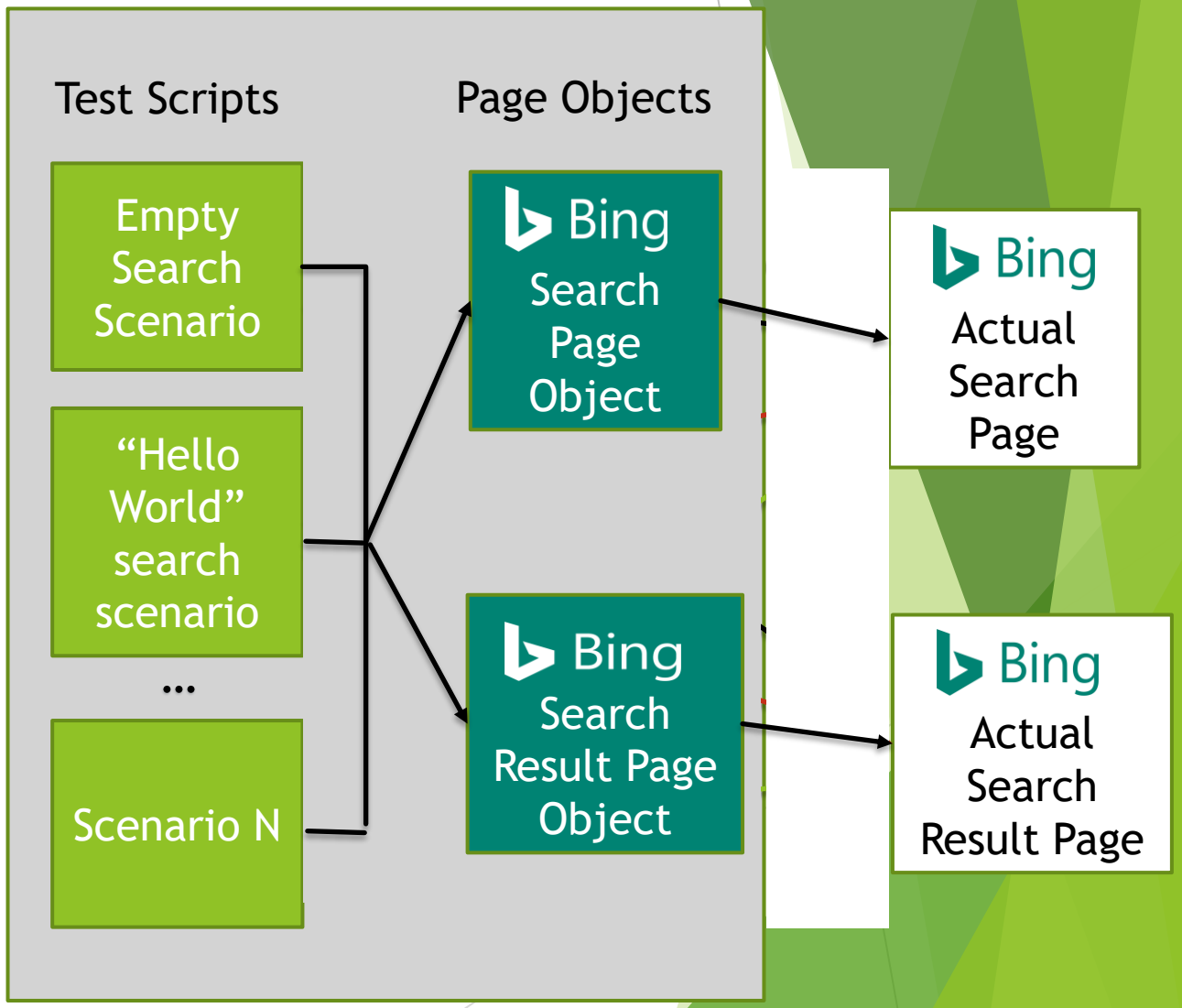

Exercise 2

Finding elements with the Web Browser

Page Object Model

- Design Pattern to create Object Repository for Web UI Elements.
- Abstract and encapsulates the responsibility into dedicated Page class to access or perform actions on its counterpart
- Page's actions either stay on the same or navigate to another page
- Makes code more readable, maintainable and reusable





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    }
}
```

Exercise 3

Writing UI Automated with Selenium and Pages Objects

SpecFlow Fundamentals

Solution 'FunctionalTests' (1 proje
FunctionalTests
- Properties
- References
- Assertions
- Configuration
- Features
  - AddingToPlanesToCart.fea
    - AddingToPlanesToCart
  - MultipleBrowserTesting.fe
- Models
- Pages
- Steps
- Transformation
- App.config
- DummyUnitTest.cs
- packages.config

Solution... Team Exp... Notificati...

```
Feature: Adding Planes To Cart
    As a scale model enthusiast
    I want to add paper or model planes to my cart
    So that I can place an order


@Failing
Scenario: Adding the model "Fourth Coffee Flyer" airplane to the cart

    Given I have selected the "Model Airplanes"
    And I have selected the 1st plane
    When I add the plane
    Then I should be redirected to the cart page's url starting with "http://tailspintoys.azurewebsites
    And there should be [illegible] in the cart
    #Next step fails because [illegible] only the first title gets picked
    And the page title's [illegible] "Fourth Coffee Flyer"
    And the 1st plane's [illegible] in the cart should be "Fourth Coffee Flyer"

@Passing
Scenario: Adding a third paper "Wingtip Toys Stunt Plane" airplane to the cart

    Given the cart has the following planes
      | Type            | Description          |
      | Model Airplanes | Trey Research Rocket |
      | Model Airplanes | Northwind Trader     |
    And I have selected the "Paper Airplanes"
    And I have selected the 2nd plane
    When I add the plane
    Then I should be redirected to the cart page's url starting with "http://tailspin[illegible]
    And there should be 3 plane(s) in the cart
    And the 3rd plane's description in the cart should be "Wingtip Toys Stunt Pl[illegible]
    And the 3rd plane's quantity in the cart should be 1
    And the 3rd plane's total price in the cart should be $50.00
```

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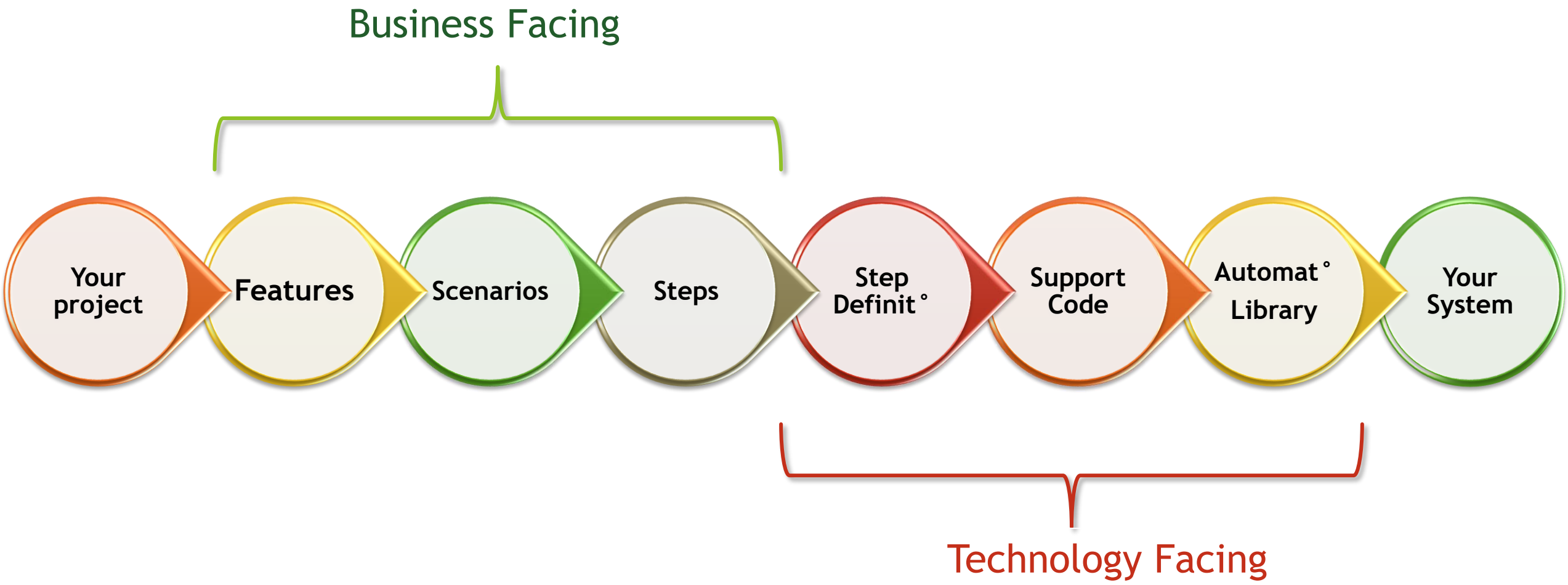
SpecFlow Testing Stack



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[Binding]

Step Definition Attributes

- Can annotate single methods with multiple step definitions
- Can parameterise methods with regular expression
- Supports different styles, parameter matching & table matching

Hooks

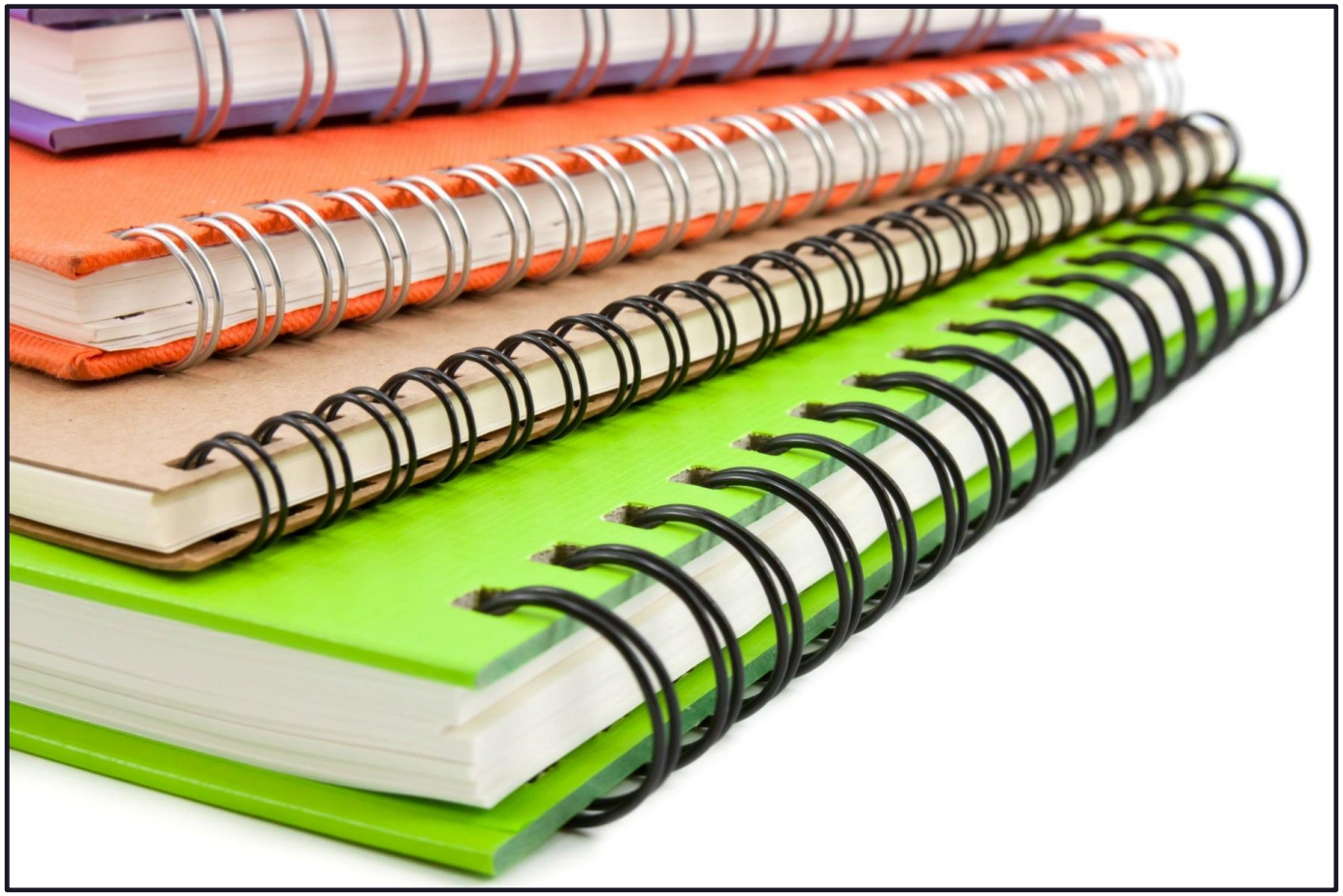
- perform additional automation logic before or after test run, feature, scenario, scenario block and step

Step Argument transformations

- Apply custom argument transformation in step definition methods from sting to a specified .NET type

Scoped bindings

- Restricts Step definition and Hooks scope at the feature, scenario titles or tags
- Allows to define different automation logic



```
[BeforeScenario("web")]
0 references | 0 changes | 0 authors, 0 changes
public static void BeforeWebScenario()
{
    if (ScenarioContext.Current.ScenarioInfo.Tags.Contains("automated"))
        StartSelenium();
}
```

Sharing Data Between Bindings

Field Instance

- Share data between different steps of the same scenario class

Context Injection

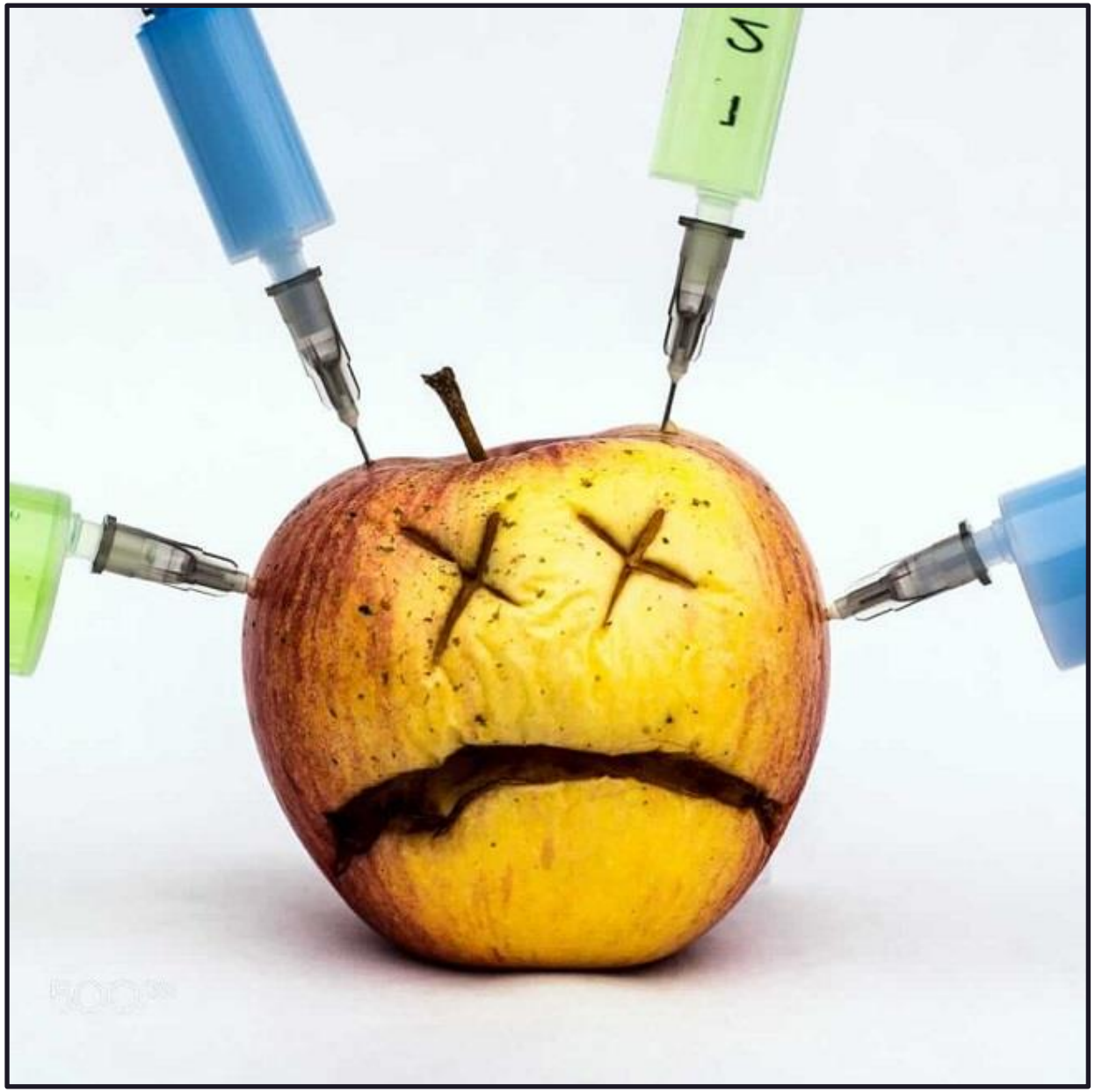
- Life span is limited to a scenario execution.
- Injected IDisposable objects are disposed after scenario execution.

Feature Context

- FeatureContext.Current stores key/values persisted for the duration of the feature
- FeatureContext.FeatureInfo provides more information on the feature (title, tags, etc.)

Scenario Context

- ScenarioContext.Pending prevents following steps from being executed
- ScenarioContext.TestError holds the last exception/error occurred
- ScenarioContext can also be injected



Specflow

Anti-patterns

SpecFlow Anti-Patterns

Beginner's mistakes

- Lots of user interface details
- Describing actions using personal pronoun
- No clear separation between Given/When/Then
- Multiple When

No living documentation

- Doesn't describe an example of business rule or scenario
- Too many details or hard to tell what is being tested
- Not using narrative section of a Feature
- Bad scenario naming

Bad collaboration

- Too high level
- Devs or testers writing scenario without talking to business (or vice-versa)
- Writing feature file after code is written

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    {
        var customer = new Customer { HasSubscription = true, SubscriptionType = SubscriptionType.Monthly };

        Assert.IsTrue(customer.IsRecurringSubscription);
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        //Assert
        Assert.IsFalse(customer.HasCurrentSubcription);
    }
}
```

Hands on Lab

SpecFlow Bing Search Scenarios

Q&A

You have Questions

We have Answers

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Thank You

ευχαριστώ Salamat Po متشكرم شكراً Grazie

благодаря ありがとうございます Kiitos Teşekkürler 谢谢

ขอบคุณครับ Obrigado شكريه Terima Kasih Dziękuję

Hvala Köszönöm Tak Dank u wel дякую Tack

Mulţumesc спасибо Danke Cám ơn Gracias

多謝晒 Ďakujem תודה நன்றி Děkuji 감사합니다