

A portrait photograph of Glenn Stephens, a man with short brown hair, wearing a dark t-shirt, standing in front of a brick wall.

Xamarin Evolve 2014

Introduction to Testing/Unit Testing

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Agenda

1. The Importance of Testing
2. Mobile Specific Issues
3. Writing Tests

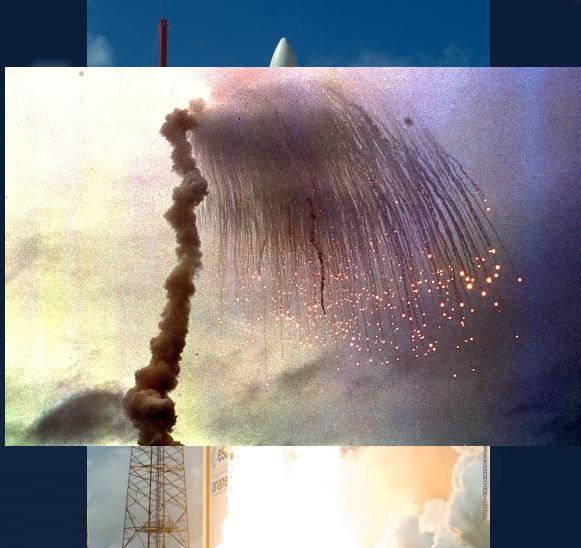


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The Importance of Testing

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If it builds, ship it!

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Importance of Testing

- We test our applications to make sure they are of high quality and fit for the purpose they were intended
- Only one chance to make a perfect first impression
- Testing documents software



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Traditional Testing

- Traditional testing had people do limited or superficial testing on the device.
- These tests could be independent and depend on the skill of the tester
- Preconditions for tests have to be setup manually



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Automated Acceptance Testing

- Many tests mean a lot of work for a human tester
- Computers are good in repeating what we tell them to do



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Mobile Specific Issues

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Agenda

1. The Importance of Testing
2. Mobile Specific Issues
3. Writing Tests



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Mobile Specific Issues

Mobile Development has different needs than desktop and web apps



Network
Connectivity



Fragmentation



Device Versions



Availability of
Services



Day-to-day use

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Agenda

1. The Importance of Testing
2. Mobile Specific Issues
3. Writing Unit Tests



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Unit Testing

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Unit Test Aspects

1. Types of Tests
2. Unit test Mechanics
3. NUnit



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Types of Tests

1. Unit Tests
2. Integration Tests
3. Regression Tests
4. Acceptance Tests



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Unit Test

- A Unit Test is a test on the smallest piece of work that can be performed to appropriately test a method or class
- It should not connect to any database or service

Person class

PersonTest class (unit test)

Course class

CourseTest class (unit test)

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Unit Testing

Unit Tests tests the smallest unit of work

```
var original = "1-855-XAMARIN";
var expected = "1-855-9262746";

var actual = PhonewordTranslator.ToNumber (original);

Assert.AreEqual (expected, actual,
    "The expected phone numbers are not equivalent");
```

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Integration Tests

- Integration tests check that classes work together as expected

Person class

Course class

EnrolmentTest class (unit test)

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Regression Tests

- Regression Tests check that older versions of a class will still remain working as new changes are made to the application

Course class

Course_v1_0_MethodsTest class
(regression test)

Course_v1_1_MethodsTest class
(regression test)

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Acceptance Tests

- Acceptance Tests ensure that the finished product conforms to original designs and/or specification and is fit for the purpose it is intended



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Unit Testing Frameworks

- Unit Testing is nearly always done with a Unit Testing Framework
- NUnit is the one used with Xamarin Studio
- Xamarin.UITest requires NUnit



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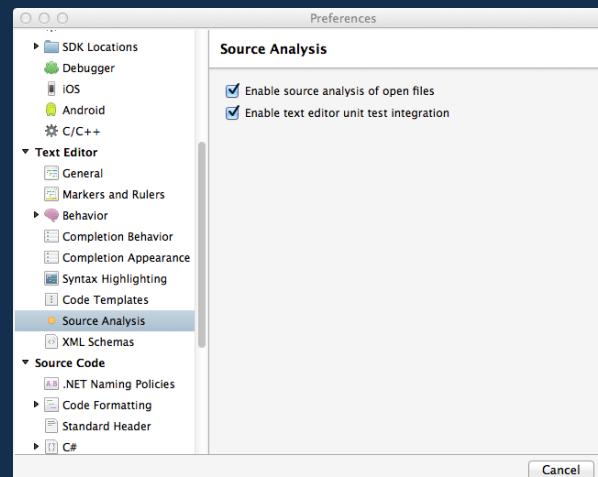
Aspects of Unit Tests

```
public void PertTest_CheckForEquality_ShouldBeTrue ()  
{  
    double likelyAmount = 20;  
    double bestCaseAmount = 12;  
    double worstCaseAmount = 40;  
  
    double estimatedResult = 22;  
  
    double actualAmount = Calculations.Estimate (likelyAmount,  
        bestCaseAmount, worstCaseAmount);  
  
    Assert.AreEqual (actualAmount, estimatedResult);  
}
```

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Xamarin Studio Integration

- There are great debugging features in Xamarin Studio that are not turned on by default
- From the Menu
- View > Unit Testing
- View > Pads > Unit Tests
- Preferences
- Projects > Debugger
- Text Editor > Source Analysis



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Demo

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Nunit Mechanics

```
[Test]
public void PertTest_CheckForEquality_ShouldBeTrue ()
{
    double likelyAmount = 20;
    double bestCaseAmount = 12;
    double worstCaseAmount = 40;

    double estimatedResult = 22;

    double actualAmount = Calculations.Estimate (likelyAmount,
        bestCaseAmount, worstCaseAmount);
    Assert.AreEqual (actualAmount, estimatedResult); <-- Success means
    no exceptions
}
```

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Using Assert (core checks)

AreEqual
AreNotEqual
IsTrue
IsFalse
IsNull
IsNotNull
Contains
IsEmpty
IsNotEmpty
Fail

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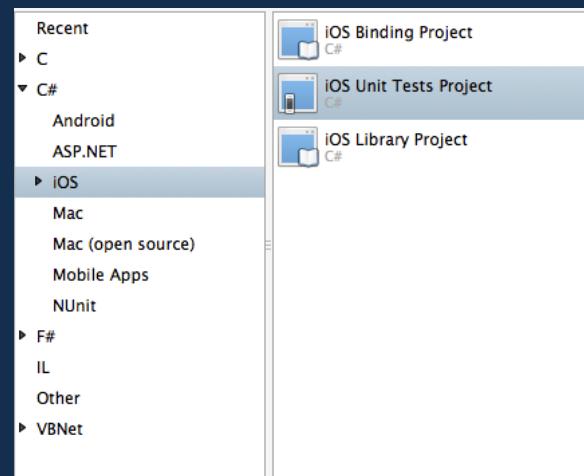
Using Assert (additional checks)

AreSame
AreNotSame
Greater
GreaterOrEqual
IsAssignableFrom
IsNotAssignableFrom
IsInstanceOfType
IsNaN
Less
LessOrEqual

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NUnitLite

- NUnitLite is a unit testing framework which allows running unit tests on mobile devices



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Summary

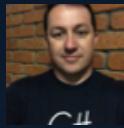
- Writing Unit Tests
- The Assert class
- Debugging IDE options

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