Asserting on Different Types of Results

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Overview

What are asserts?

The NUnit Constraint Model of assertions

How many asserts per test?

Asserting on equality

Asserting on reference equality

Adding custom failure messages

Asserting on floating point values

Asserting on collection contents

Asserting that exceptions are thrown

Other assertion examples

Asserts

Evaluate and verify the outcome of a test based on a returned result, final object state, or the occurrence of events observed during execution. An assert should either pass or fail.

If all asserts pass, the test passes.

If any assert fails the test fails.

The NUnit Constraint Model of Assertions

```
// Constraint Model of assertions (newer)
Assert.That(sut.Years, Is.EqualTo(1));
Assert.That(test result, constraint instance);


// Classic Model of assertions (older)
Assert.AreEqual(1, sut.Years);
Assert.NotNull(sut.Years);
Asert.Xyz(…)
```

The NUnit Constraint Model of Assertions

```
// Constraint Model of assertions (newer)

Assert.That(sut.Years, Is.EqualTo(1));

Assert.That(sut.Years, new EqualConstraint(1));
```

```
public abstract class Is
{
    // Additional code omitted

    public static EqualConstraint EqualTo(object expected)
    {
        return new EqualConstraint(expected);
    }

    public static FalseConstraint False
    {
        get { return new FalseConstraint(); }
    }

    public static GreaterThanConstraint GreaterThan(object expected)
    {
        return new GreaterThanConstraint(expected);
    }

    // Etc.
}
```

The NUnit Constraint Model of Assertions

```
// Constraint Model of assertions (newer)

Assert.That(sut.Years, Is.EqualTo(1));

Assert.That(sut.Years, new EqualConstraint(1));


... That<TActual>(TActual actual,
                  IResolveConstraint expression) {...}
```

The NUnit Constraint Model of Assertions

```
public class EqualConstraint : Constraint { ... }

public abstract class Constraint : IConstraint { ... }

public interface IConstraint : IResolveConstraint { ... }


... That<TActual>(TActual actual,
                 IResolveConstraint expression) {...}
```

A single test usually focuses on testing a single “behaviour”.

Multiple asserts are usually ok if all the asserts are related to testing this single behaviour.

How Many Asserts per Test?

```
[Test]
public void StoreYears()
{
   var sut = new LoanTerm(1);

   Assert.That(sut.Years, Is.EqualTo(1));
   Assert.That(sut.ToMonths(), Is.EqualTo(12));
}

[Test]
public void ReturnTermInMonths() { ... }
```

Other Assertion Examples

Asserting on Null Values

```
string name = "Sarah";


Assert.That(name, Is.Null); // fail

Assert.That(name, Is.Not.Null); // pass
```

Asserting on String Values

```
string name = "Sarah";


Assert.That(name, Is.Empty); // fail

Assert.That(name, Is.Not.Empty); // pass


Assert.That(name, Is.EqualTo("Sarah")); // pass

Assert.That(name, Is.EqualTo("SARAH")); // fail

Assert.That(name, Is.EqualTo("SARAH").IgnoreCase); // pass
```

Asserting on String Values

```
string name = "Sarah";

Assert.That(name, Does.StartWith("Sa")); // pass

Assert.That(name, Does.EndWith("ah")); // pass

Assert.That(name, Does.Contain("ara")); // pass

Assert.That(name, Does.Not.Contain("Amrit")); // pass

Assert.That(name, Does.StartWith("Sa")
                      .And.EndsWith("rah")); // pass

Assert.That(name, Does.StartWith("xyz")
                      .Or.EndsWith("rah")); // pass
```

Asserting on Boolean Values

```
bool isNew = true;

Assert.That(isNew); // pass

Assert.That(isNew, Is.True); // pass


bool areMarried = false;

Assert.That(areMarried == false); // pass

Assert.That(areMarried, Is.False); // pass

Assert.That(areMarried, Is.Not.True); // pass
```

Asserting within Ranges

```
int i = 42;


Assert.That(i, Is.GreaterThan(42)); // fail

Assert.That(i, Is.GreaterThanOrEqualTo(42)); // pass

Assert.That(i, Is.LessThan(42)); // fail

Assert.That(i, Is.LessThanOrEqualTo(42)); // pass

Assert.That(i, Is.InRange(40, 50)); // pass
```

Asserting within Ranges

```
DateTime d1 = new DateTime(2000, 2, 20);
DateTime d2 = new DateTime(2000, 2, 25);


Assert.That(d1, Is.EqualTo(d2)); // fail
Assert.That(d1, Is.EqualTo(d2).Within(4).Days); // fail
Assert.That(d1, Is.EqualTo(d2).Within(5).Days); // pass
```

http://bit.ly/nunit3asserts

Summary

What are asserts?

The NUnit Constraint Model of assertions

How many asserts per test?

Assert.That(sut.Years, Is.EqualTo(1));

Assert.That(a, Is.SameAs(b));

Adding custom failure messages

Is.EqualTo(.33).Within(0.004)

Does.Contain(expectedProduct)

Throws.TypeOf<...>()

Does.StartWith("Sa")

Up Next:

Controlling Test Execution