Improve Your Apps Through Unit Testing

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Overview

- What Is Unit Testing?
- Why Unit Testing?
- MXUnit Testing Framework
- MXUnit Eclipse Plugin
- Test Cases, Assertions, Test Driven Development (TDD)
- Debugging and Other Real World Examples
- Advanced Topics, What's Next...

What Is Unit Testing?

- Testing individual units of code
  - In CF, a unit is generally a CFC or Interface
- Test cases ensure code behaves as intended
- Test cases are run in isolation
- Unit testing is NOT integration testing

Why Unit Testing?

- Facilitate refactoring
  - Repeatable tests == freedom!
- Simplify integration testing
  - Easier when the ”parts” are already tested
- Application Design & Documentation
  - Built-in, maintained and always current!

MXUnit Unit Testing Framework

- Modeled after other xUnit frameworks (e.g., Junit)
- Conveniences for writing and running unit tests
  - Assertions, test cases, test suites
  - Test runners: HTML, Eclipse, directory runner
  - Results output: XML, HTML, JUnit reports, etc.
  - Test private methods
  - Data providers
  - Mocking and stubbing

MXUnit Framework Installation

1. Download MXUnit: http://mxunit.org/download.cfm
2. Unzip into Web root:
   `{webroot}/mxunit`
3. Test the install:
   `http://host[:port]/mxunit/index.cfm`

DEMO...

MXUnit Eclipse Plugin

Use standard Eclipse plugin install/update process.

- Eclipse Update URL: http://mxunit.org/update
- Global settings: Window > Preferences > MXUnit
- Project settings: Project > Properties > MXUnit Properties

DEMO...

Anatomy of a Test Case

- The file is a component (a .cfc file).
- The file name starts or ends with "Test."
- The component extends `mxunit.framework.TestCase`.
- All public methods will be run as tests (regardless of their names).
- `setUp()` will run prior to each and every test.
- `tearDown()` will run after to each and every test.
- `beforeTests()` will run once before any tests are run.
- `afterTests()` will run once after all tests have run.
- Private methods are not considered tests (not run by MXUnit).

EXAMPLE...

Assertions

- MXUnit base assertions
  - `assertTrue( boolean condition )`
  - `assertEquals( any expected, any actual )`
  - `assertSame( any obj1, any obj2 )`
- MXUnit assertion extensions
  - e.g., `assertIsTypeOf( component obj, string type )`
- Custom assertions
- Assertion patterns

What About Test Driven Development (TDD)?

- Write a failing test.
  - This defines desired improvement or new function.
- Write code to pass the test.
- Refactor the new code to reasonable standards.

DEMO...

Viewing Debug Output

- Use `debug()` wherever you would normally use `cfdump` or `writeDump()`.
- `cfdump/writeDump()` or `cfoutput/writeOutput()` will show up in test output, but if your test fails or errors, the output will now show up.
- You can also use `request.debug()` to see variables in your component under test.

DEMO...

Testing Private Methods

```
component extends="mxunit.framework.TestCase"
{

    function testSomePrivateDefaultBehavior()
    {
        var myObj = new Something();

        makePublic( myObj, "somePrivate" );

        var result = myObj.somePrivate( "blah" );

        assertEquals( "blah", result );
    }

}
```

Testing Expected Exceptions

```
function foo_shouldFailBecauseExpectedExceptionListNotThrown()
    mxunit:expectedException="Database,MyCustomException"
{
    new Foo().doSomethingToThrowADatabaseOrMyCustomException();
}
```

MXUnit Data Providers

- Data driven testing
- Execute tests with a wide variety of input data
- Efficient test coverage
- Provide data collection reference and MXUnit will iterate over collection and repeat test execution for each item
- Accepted data: array, query, list, CSV or Excel file

EXAMPLE...

MXUnit Test Decorators

- Change MXUnit's default behavior
- Why? E.g.,
  - Auto-rollback tests that commit to a database
  - Selectively run platform-specific tests
  - Control the sort order in tests
  - Respond to custom test attributes in decorators

EXAMPLE...

Mocking and Stubbing

- Easily create mock objects to simulate real objects
- Easily stub out data returned from a mock
- Important tools to isolate units to test from dependencies

EXAMPLE...

Creating Test Suites

```
testSuite = new mxunit.framework.TestSuite().TestSuite();

testSuite.addAll( 'mxunit.samples.MyComponentTest' );

testSuite.addAll( 'mxunit.samples.MyOtherComponentTest' );

testSuite.add( 'mxunit.samples.YetAnotherComponentTest',
      'aTestFunction,anotherTestFunction'
  );

results = testSuite.run();

writeOutput( results.getResultsOutput( 'html' ) );
```

What Else?

- Test driven development (TDD)
- Automation (ANT, CI, etc.)
- Snippets
- Keyboard shortcuts for MXUnit Eclipse plugin

Yikes! Where Do I Start?!?

1. Write one test
2. Write tests for bug fixes and new code
3. Automate testing
4. Expand test coverage

Resources

- http://wiki.mxunit.org/
- http://groups.google.com/group/mxunit
- http://blog.mxunit.org/
- Open source projects' tests

Questions?

- Thank you!
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