

pFUnit

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Contents

1	pFUnit 2 - Documentation - Version 0.0 (2013-1227-1 MLR)	1
1.1	Overview	1
1.2	Contents	1
1.3	See Also	2
1.4	Copyright	2
2	Obtaining pFUnit	3
3	Installation	5
3.1	Installing pFUnit	5
3.2	Prerequisites	5
3.3	Obtaining pFUnit	6
3.4	Manifest - What's in the directory?	6
3.5	Configuration	7
3.6	Building pFUnit	8
3.6.1	Building pFUnit for testing serial codes (Non-MPI)	8
3.6.2	Building pFUnit for testing parallel codes (MPI)	8
3.6.3	OPENMP	8
3.6.4	Cleaning	9
3.6.5	Documentation	9
3.7	Installation	9
3.7.1	Installation - Serial	10
3.7.2	Installation - MPI	10

3.7.3	Installation - OPENMP	10
3.7.4	Installation - DEFAULT DIRECTORY	10
4	Usage	13
4.1	Usage	13
4.1.1	Usage - Configuration	13
4.1.2	Usage - Hello World	13
4.1.3	Usage - Preprocessor	14
5	Development	15
6	Feedback & Support	17
6.1	Feedback	17
6.2	Support	17
7	FAQ and Tips	19
7.1	FAQ	19
7.1.1	Zero Tests Run	19
7.1.2	Some Tests Are Not Running	19
7.2	Tips	20
7.2.1	Environment Modules	20
7.2.2	Compile Time Errors	20
7.2.3	Intermediate files used by pFUnit	20
8	Platform Specific Notes	21
8.1	Mac OSX	21
8.2	Windows/CYGWIN	21
9	Acknowledgments	23
10	Known Installations & Versions	25
11	TODO	27
12	The Preprocessor - pFUnitParser	29

12.1 Using The Preprocessor	29
12.1.1 Configuration - testSuites.inc	30
12.1.2 Invocation	30
12.1.3 Preprocessor Input File (.pf)	30
12.1.4 Directives	31
12.1.4.1 @Test	31
12.1.4.2 @MPITest	31
12.1.4.3 @Assert	32
12.1.4.4 @Parameters	33
12.1.4.5 @TestCase	33
13 @Assert Preprocessor Directives	35
13.1 @Assert Preprocessor Directives	36
13.1.1 @assertEqual	36
13.1.2 @assertTrue	36
13.1.3 @assertFalse	36
13.1.4 @assertLessThan	36
13.1.5 @assertLessThanOrEqual	36
13.1.6 @assertGreaterThan	36
13.1.7 @assertGreaterThanOrEqual	36
13.1.8 @assertIsMemberOf	36
13.1.9 @assertContains	36
13.1.10 @assertAny	36
13.1.11 @assertAll	36
13.1.12 @assertNotAll	36
13.1.13 @assertNone	36
13.1.14 @assertIsPermutationOf	36
13.1.15 @assertExceptionRaised	36
13.1.16 @assertSameShape	36
13.1.17 @assertIsNaN	36
13.1.18 @assertIsFinite	36

14 Revision Notes	37
15 Data Type Index	39
15.1 Class Hierarchy	39
16 Data Type Index	43
16.1 Data Types List	43
17 Data Type Documentation	47
17.1 pFUnitParser::Action Class Reference	47
17.2 add_mod Module Reference	48
17.3 addComplex_mod Module Reference	49
17.4 CodeUtilities::ArrayDescription Class Reference	49
17.5 Assert_mod Module Reference	50
17.5.1 Detailed Description	50
17.6 AssertBasic_mod Module Reference	50
17.6.1 Detailed Description	51
17.7 AssertInteger_mod Module Reference	51
17.7.1 Detailed Description	52
17.8 GenerateRealArrayNewSignature::AssertRealArrayArgument Class - Reference	52
17.9 pFUnitParser::AtAfter Class Reference	53
17.10 pFUnitParser::AtAssert Class Reference	54
17.11 pFUnitParser::AtBefore Class Reference	54
17.12 pFUnitParser::AtBegin Class Reference	55
17.13 pFUnitParser::AtMpiAssert Class Reference	56
17.14 pFUnitParser::AtMpiTest Class Reference	56
17.15 pFUnitParser::AtParameters Class Reference	57
17.16 pFUnitParser::AtSuite Class Reference	58
17.17 pFUnitParser::AtTest Class Reference	58
17.18 pFUnitParser::AtTestCase Class Reference	59
17.19 BaseTestRunner_mod Module Reference	60
17.19.1 Detailed Description	60

17.20BeforeAfter_mod Module Reference	61
17.21BrokenSetUpCase_mod Module Reference	61
17.22BrokenTestCase_mod Module Reference	61
17.23GenerateRealArrayNewSignature::constraintASERTEQUAL Class Reference	62
17.23.1 Constructor & Destructor Documentation	62
17.23.1.1 __init__	63
17.23.2 Member Data Documentation	63
17.23.2.1 name1	63
17.23.2.2 tolerance	63
17.24mods::pre::pre2::dataString Class Reference	63
17.25DebugListener_mod Module Reference	64
17.25.1 Detailed Description	64
17.26CodeUtilities::declaration Class Reference	65
17.27DynamicTestCase_mod Module Reference	65
17.27.1 Detailed Description	66
17.28Exception_mod Module Reference	66
17.29Fixture_mod Module Reference	67
17.30FixtureTestCase_mod Module Reference	67
17.31CodeUtilities::fortranSubroutineSignature Class Reference	68
17.32Halo_mod Module Reference	68
17.33mods::pre::pre_If::IfDirective Class Reference	68
17.34CodeUtilities::implementation Class Reference	69
17.35CodeUtilities::interfaceBlock Class Reference	69
17.36mods::pre::pre_If::interval Class Reference	70
17.37GenerateRealArrayNewSignature::IsWithinTolerance Class Reference	70
17.38Test_RestrictSphericalCoordinates_mod::LatLonCase Type Reference	71
17.39LinearInterpolator_mod Module Reference	71
17.40MakeInfinity_mod Module Reference	71
17.40.1 Detailed Description	72
17.41MakeNaN_mod Module Reference	72

17.41.1 Detailed Description	72
17.42MockCall_mod Module Reference	73
17.42.1 Detailed Description	73
17.43MockListener_mod Module Reference	74
17.44testParser::MockParser Class Reference	74
17.45MockRepository_mod Module Reference	75
17.45.1 Detailed Description	75
17.46MockSUT_mod Module Reference	75
17.47testParser::MockWriter Class Reference	76
17.48CodeUtilities::module Class Reference	76
17.49MpiContext_mod Module Reference	77
17.49.1 Detailed Description	77
17.50MpiStubs_mod Module Reference	78
17.50.1 Detailed Description	78
17.51MpiTestCase_mod Module Reference	79
17.51.1 Detailed Description	79
17.52MpiTestMethod_mod Module Reference	80
17.52.1 Detailed Description	80
17.53pFUnitParser::MyError Class Reference	80
17.54ParallelContext_mod Module Reference	81
17.54.1 Detailed Description	81
17.55ParallelException_mod Module Reference	82
17.55.1 Detailed Description	82
17.56ParameterizedTestCase_mod Module Reference	82
17.56.1 Detailed Description	83
17.57Params_mod Module Reference	83
17.57.1 Detailed Description	84
17.58pFUnitParser::Parser Class Reference	84
17.59Test_Parameters_mod::peCase Type Reference	85
17.60pFUnit Module Reference	85
17.60.1 Detailed Description	86

17.61pFUnit_mod Module Reference	86
17.61.1 Detailed Description	86
17.62PrivateException_mod Module Reference	87
17.62.1 Detailed Description	87
17.63mods::pre::pre2::procDirective Class Reference	88
17.63.1 Member Function/Subroutine Documentation	89
17.63.1.1 addTokenRE	89
17.64RemoteProxyTestCase_mod Module Reference	89
17.64.1 Detailed Description	89
17.65mods::pre::pre_Repeat::RepeatDirective Class Reference	90
17.66ResultPrinter_mod Module Reference	90
17.66.1 Detailed Description	91
17.67RobustRunner_mod Module Reference	91
17.67.1 Detailed Description	92
17.68robustTestSuite_mod Module Reference	92
17.69CodeUtilities::routineUnit Class Reference	92
17.70SerialContext_mod Module Reference	93
17.70.1 Detailed Description	94
17.71SimpleTestCase_mod Module Reference	94
17.72SourceLocation_mod Module Reference	95
17.72.1 Detailed Description	95
17.73SphericalCoordinates_mod Module Reference	95
17.74TestListener_mod::startTest Interface Reference	96
17.75StringConversionUtilities_mod Module Reference	96
17.75.1 Detailed Description	96
17.76SubsetRunner_mod Module Reference	97
17.76.1 Detailed Description	97
17.77SurrogateTestCase_mod Module Reference	98
17.77.1 Detailed Description	98
17.78SUT_mod Module Reference	98
17.79Test_Assert_mod Module Reference	99

17.80	Test_AssertBasic_mod Module Reference	99
17.81	Test_AssertComplex_mod Module Reference	99
17.82	Test_AssertInteger_mod Module Reference	100
17.83	Test_AssertReal_mod Module Reference	100
17.84	Test_BasicOpenMP_mod Module Reference	101
17.85	Test_Exception_mod Module Reference	102
17.86	Test_FixtureTestCase_mod Module Reference	102
17.87	Test_LinearInterpolator_mod::Test_LinearInterpolator Type Reference	102
17.88	Test_LinearInterpolator_mod Module Reference	103
17.89	Test_MockCall_mod Module Reference	103
17.90	Test_MockRepository_mod Module Reference	104
17.91	Test_mod Module Reference	104
17.91.1	Detailed Description	104
17.92	Test_MpiContext_mod Module Reference	105
17.93	Test_MpiException_mod Module Reference	105
17.94	Test_MpiTestCase_mod Module Reference	105
17.95	Test_Parameters_mod::Test_Parameters Interface Reference	106
17.96	Test_Parameters_mod Module Reference	106
17.97	Test_RestrictSphericalCoordinates_mod::Test_RestrictSpherical- Coordinates Interface Reference	107
17.98	Test_RestrictSphericalCoordinates_mod Module Reference	108
17.99	Test_RobustRunner_mod Module Reference	108
17.100	Test_SimpleTestCase_mod Module Reference	108
17.101	Test_StringConversionUtilities_mod Module Reference	109
17.102	Test_TestMethod_mod Module Reference	109
17.103	Test_TestResult_mod Module Reference	109
17.104	Test_TestSuite_mod Module Reference	110
17.105	Test_UnixProcess_mod Module Reference	110
17.106	TestCase_mod Module Reference	110
17.106.1	Detailed Description	111
17.107	TestFailure_mod Module Reference	111

17.107. Detailed Description	112
17.108. <code>nodes::pre::pre_If::TestIfDirective</code> Class Reference	112
17.109. <code>nodes::pre::interleavedp::TestInterleaved</code> Class Reference	112
17.110. <code>TestListener_mod</code> Module Reference	113
17.110. Detailed Description	113
17.111. <code>TestMethod_mod</code> Module Reference	114
17.111. Detailed Description	114
17.112. <code>nodes::pre::parseArgs::TestParseArgs</code> Class Reference	115
17.113. <code>TestParser::TestParseLine</code> Class Reference	115
17.113. Member Function/Subroutine Documentation	116
17.113.1. <code>testAtMpiTest</code>	116
17.113.1. <code>testAtTest</code>	116
17.113.1. <code>testAtTestFail</code>	116
17.113.1. <code>testAtTestNoParens</code>	116
17.113.1. <code>testAtTestSkipComment</code>	116
17.113.1. <code>testMatchAtAfter</code>	116
17.113.1. <code>testMatchAtAssertEqual</code>	116
17.113.1. <code>testMatchAtAssertOther</code>	116
17.113.1. <code>testMatchAtBefore</code>	117
17.113.1. <code>testMatchAtMpiAssert</code>	117
17.113.1. <code>testMatchAtSuite</code>	117
17.113.1. <code>testMatchAtTestCase</code>	117
17.114. <code>nodes::pre::pre_Repeat::TestRepeatDirective</code> Class Reference	117
17.115. <code>TestResult_mod</code> Module Reference	118
17.115. Detailed Description	118
17.116. <code>TestRunner_mod</code> Module Reference	118
17.116. Detailed Description	119
17.117. <code>TestSuite_mod</code> Module Reference	119
17.117. Detailed Description	120
17.118. <code>throwFundamentalTypes_mod</code> Module Reference	120
17.118. Detailed Description	121

17.119	UnixPipeInterfaces_mod Module Reference	121
17.119.	Detailed Description	122
17.120	UnixProcess_mod Module Reference	122
17.120.	Detailed Description	122
17.120	GenerateRealArrayNewSignature::VECTOR_NORM Class Reference	123

Chapter 1

pFUnit 2 - Documentation - Version 0.0 (2013-1227-1 MLR)

[Quick link to the code!](#)

1.1 Overview

[pFUnit](#) is a unit testing framework enabling JUnit-like testing of serial and MPI-parallel software written in Fortran. Initial support for OPENMP has been implemented. [pFUnit](#) makes use of modern Fortran programming techniques, including object oriented programming, offering a convenient, lightweight mechanism for Fortran developers to create and run software tests that specify the desired behavior for a given piece of code. The framework was originally created by developers from NASA and NGC TASC. The project is hosted at [sourceforge/projects/pfunit](https://sourceforge.net/projects/pfunit).

If you are using [pFUnit](#), please leave a note/topic at [Applications of pFUnit](#), or send a note to [Tom Clune](#), Ph.D., Chief, Software Systems Support Office Code 610.3, NASA Goddard Space Flight Center.

Please refer revisions and comments about the documentation to [Mike Rilee](#), Ph.D., Rilee Systems Technologies.

1.2 Contents

- [Installation](#)
 - [Obtaining pFUnit](#)
- [Usage](#)

- [Development](#)
- [Feedback & Support](#)
- [FAQ and Tips](#)
- [Platform Specific Notes](#)
- [Acknowledgments](#)
- [Known Installations & Versions](#)
- [TODO](#)
- [The Preprocessor - pFUnitParser](#)
- [Revision Notes](#)

1.3 See Also

- [sourceforge/projects/pfunit](#)
- [NASA Modeling Guru](#)
- [JUnit.org](#)

1.4 Copyright

Copyright 2005,2013 United States Government as represented by the Administrator of the National Aeronautics and Space Administration. All Rights Reserved.

Chapter 2

Obtaining pFUnit

The best way to obtain **pFUnit** is to `clone pFUnit from the git repository` from SourceForge as follows.

```
# Read Only Access
git clone git://git.code.sf.net/p/pfunit/code pFUnit
```

This will create the directory **pFUnit** in the current working directory.

You may also visit the project page at SourceForge and download the source tarfile "pFUnit.tar.gz" there.

`http://sourceforge.net/projects/pfunit/` or `http://sourceforge.net/projects/pfunit/files/latest/download`

Extracting this tarfile via a command like

```
'$ tar xzf ./pFUnit.tar.gz'
```

will place the **pFUnit** files into the current working directory.

For other ways to acquire the code visit

`https://sourceforge.net/p/pfunit/code/ci/master/tree/`

or contact the **pFUnit** team.

Chapter 3

Installation

3.1 Installing pFUnit

Comentatry for the page.

- [Prerequisites](#)
- [Obtaining pFUnit](#)
- [Manifest - What's in the directory?](#)
- [Configuration](#)
- [Building pFUnit](#)
 - [Building pFUnit for testing serial codes \(Non-MPI\)](#)
 - [Building pFUnit for testing parallel codes \(MPI\)](#)
 - [OPENMP](#)
 - [Cleaning](#)
 - [Documentation](#)
- [Installation](#)

3.2 Prerequisites

The development work for [pFUnit](#) has mostly been carried out on a mixture of systems, including high-end computers, Apple Mac OSX, and linux-based systems. A preliminary Windows/CYGWIN port has been contributed by a user. Full use of the system depends on the following being available.

- Fortran 2003+ (Tested with Intel 13.1+, NAG 5.3, GCC 4.8.3, 4.9.0, IBM's XLF)
- The Message Passing Interface (MPI)
- GNU Make
- Python

Note: Recent changes have exposed a latent bug in GCC 4.8.2. The fix is available in the GCC 4.9 development branch and will also appear in GCC 4.8.3 when that is released. Users that require older versions of GCC should use [pFUnit 2.1.x](#).

[Doxygen](#) is used to generate documentation.

The system routinely undergoes regression testing with GNU, Intel, and NAG fortran compilers and OpenMPI.

3.3 Obtaining pFUnit

The best way to obtain [pFUnit](#) is to [clone pFUnit from the git repository](#) from SourceForge as follows.

```
# Read Only Access
git clone git://git.code.sf.net/p/pfunit/code pFUnit
```

This will create the directory [pFUnit](#) in the current working directory.

You may also visit the project page at SourceForge and download the source tarfile "pFUnit.tar.gz" there.

<http://sourceforge.net/projects/pfunit/> or <http://sourceforge.net/projects/pfunit/files/latest/download>

Extracting this tarfile via a command like

```
'$ tar xzf ./pFUnit.tar.gz'
```

will place the [pFUnit](#) files into the current working directory.

For other ways to acquire the code visit

<https://sourceforge.net/p/pfunit/code/ci/master/tree/>

or contact the [pFUnit](#) team.

3.4 Manifest - What's in the directory?

In the top level of the [pFUnit](#) distribution you will see the following files.

COPYRIGHT - Contains information pertaining to the use and distribution of [pFUnit](#).

Examples - Contains examples of how to use [pFUnit](#) once it is installed.

GNUmakefile - The top level makefile for building and installing [pFUnit](#).

bin - Executables used to construct and perform unit tests.

include - Files to be included into makefiles or source, including use code.

source - Source code and scripts of the [pFUnit](#) library and framework.

tests - Source code for unit testing [pFUnit](#) itself.

tools - Tools used to help develop, build, and install [pFUnit](#).

3.5 Configuration

Little needs to be done to configure [pFUnit](#) for the build, however there are several environment variables on which the package depends.

'F90_VENDOR' - is set to include the correct makefile in /include, i.e. GNU, Intel, NAG, or PGI. Case insensitive file systems may cause some confusion from time-to-time.

'F90' - is set to the Fortran compiler being used: e.g. ifort for Intel, gfortran for GNU.

'COMPILER' - is set according to 'F90_VENDOR' and is automatically set in the top level makefile.

For MPI-based unit testing, your setup may require the following as well.

'MPIF90'

```
$ export MPIF90=mpif90
```

As a convenience for working with multiple MPI configurations, you may also set the following.

'MPIRUN'

```
$ export MPIRUN=/some.path/mpirun
```

'DOXYGEN' - To generate documentation, set DOXYGEN to the desired executable. NOTE: Doxygen Version 1.8.5 does not respect CamelCase names from Fortran source code by currently converting all to lowercase. It does this to get HTML links correct for references in the source code that also do not respect the CamelCase convention. The Fortran standard specifies case insensitivity. Doxygen 1.7.x seems to better respect CamelCase.

```
$ export DOXYGEN=/opt/local/share/doxygen/doxygen-1.7.6/bin/doxygen
```

3.6 Building pFUnit

3.6.1 Building pFUnit for testing serial codes (Non-MPI)

1. Change to the directory into which [pFUnit](#) has been placed. 2. Set the environment variables (in bash):

```
$ export F90=gfortran-mp-4.8
$ export F90_VENDOR=GNU
```

3. To build [pFUnit](#) for unit testing of serial codes, execute make. The unit tests for [pFUnit](#) itself will run automatically.

```
$ make tests
```

3.1 Occasionally on the first run through, one will get a spurious (runtime) error, for example in the unix process component.

Re-execute "make tests" to check again.

4. At this point the [pFUnit](#) object library is in the source directory, along with a large number of Fortran module files.

3.6.2 Building pFUnit for testing parallel codes (MPI)

To build [pFUnit](#) for unit testing MPI-based codes, be sure that the environment is properly set up for the MPI implementation you are using. Depending on your local environment, you may need execute the build within a batch or other job queing system, e.g. an interactive batch job under PBS. The steps for building [pFUnit](#) start out the same as for the serial case above, but add MPI=YES to the environment to switch on MPI support. The MPI-based unit tests for [pFUnit](#) itself will run automatically. Again, occasionally a spurious (runtime) error may appear on the first execution.

3. Execute make as follows.

```
$ make tests MPI=YES
```

4. At this point an MPI-enabled [pFUnit](#) object library is in the source directory, along with a large number of Fortran module files.

Also, one may get some harmless "no symbols" warnings when the [pFUnit](#) library is constructed.

3.6.3 OPENMP

Initial (limited) support for OPENMP has been implemented. At this writing, a basic functionality is available.

The process for building [pFUnit](#) for testing OPENMP-based codes is similar to that for other paradigms.

3. To compile for OPENMP support execute make as follows.

```
$make tests OPENMP=YES
```

4. At this point the OPENMP-enabled [pFUnit](#) is ready to be installed.

3.6.4 Cleaning

To clean the [pFUnit](#) build directory for the space or to rebuild there are two options.

1. Make clean to remove object files and other intermediate products.

```
$ make clean
```

2. Make distclean to remove libraries and other more final products.

```
$ make distclean
```

3. Some directories support a 'make src_clean' to remove intermediate products in subdirectories.

3.6.5 Documentation

A start at documentation for [pFUnit](#) is in the documentation directory. [Doxygen](#) is our primary documentation tool. To make the documentation, which will be generated in the documentation directory, please invoke the following.

```
$ make documentation
```

Or to make a reference manual.

```
$ make documentation/pFUnit2-ReferenceManual.pdf
```

To select a specific version of Doxygen, please set the DOXYGEN environment variable as in [Configuration](#). You may wish to do this if your code uses CamelCase names as current versions of Doxygen (1.8.5) do not respect this convention for Fortran.

3.7 Installation

3.7.1 Installation - Serial

To install **pFUnit** for regular use, set `INSTALL_DIR` to the location in which to place **pFUnit**. This can be done on the make command line. For example, after compiling **pFUnit** for serial use (MPI absent or `MPI=NO`), please try.

```
$ # In the top of the pFUnit build directory.
$ make install INSTALL_DIR=/opt/pfunit/pfunit-serial
```

Note: you may need special privileges to install in some locations, e.g. via `sudo`.

To test the installation set `PFUNIT` to `INSTALL_DIR`, then change the working directory to `Examples` in **pFUnit** distribution and execute "buildIt," which will run a number of examples. These include some expected failures.

```
$ # In the top pFUnit build directory...
$ export PFUNIT=/opt/pfunit/pfunit-serial
$ pushd Examples
$ ./buildIt
```

3.7.2 Installation - MPI

For installing an MPI-enabled **pFUnit** library, change to the top of the distribution and execute `make` with `MPI=YES`. You may need to "make distclean" first. After compilation and **pFUnit** passes its self-tests, then installation proceeds as for the serial case above.

```
$ make install INSTALL_DIR=/opt/pfunit/pfunit-parallel
```

To test, set `PFUNIT` and go into `Examples/MPI_Halo` directory.

```
$ # In the top pFUnit build directory...
$ export PFUNIT=/opt/pfunit/pfunit-parallel
$ # The variable MPIF90 must be set to the appropriate build script.
$ export MPIF90=mpif90
$ cd Examples/MPI_Halo/Semi-Automatic
$ make
```

This will compile and run a set of parallel examples that includes intentional failures.

3.7.3 Installation - OPENMP

At this time the OPENMP version of **pFUnit** can be installed in the same way as for the serial or MPI-parallel codes. OPENMP support, tests, and examples are limited as of this writing.

3.7.4 Installation - DEFAULT DIRECTORY

If `INSTALL_DIR` is not set, "make install" will attempt to install **pFUnit** into the top build directory. This will create directories such as `lib` and `mod` in the top level of the build

directory and will overwrite the include/base.mk with include/base-install.mk. If this is not desired, then "make develop" will put back the original base.mk, which is the file to be used for development and building [pFUnit](#). In general, we recommend installing to a directory that is not also the build directory.

Chapter 4

Usage

- [Usage - Configuration](#)
- [Usage - Hello World](#)
- [Usage - Preprocessor](#)

4.1 Usage

4.1.1 Usage - Configuration

For regular use, after installation, the same compiler/MPI development configuration that was used to build [pFUnit](#) should be used. Once the environment variables and paths associated with the environment are set, to configure [pFUnit](#), please set the following.

'PFUNIT' - set to the directory into which [pFUnit](#) was installed.

'F90_VENDOR' - set to Intel, GNU, NAG, or PGI accordingly.

4.1.2 Usage - Hello World

For an example of a simple usage of [pFUnit](#), see `Examples/Simple/Semi--Automatic/tests`.

The simplest way to write a test is to write a preprocessor input file (extension ".pf"), which is a Fortran free format file with preprocessor directives added. An example from "helloWorld.pf" follows.

```
! from helloWorld.pf
@test
subroutine testHelloWorld()
```

```
use pfunit_mod
implicit none
@assertEqual("Hello World!", "Hello World!")
end subroutine testHelloWorld
```

One then instructs the preprocessor to construct a suite to execute these tests via the "testSuites.inc" file as follows.

```
! from testSuites.inc
ADD_TEST_SUITE(helloWorld_suite)
```

At this point, one can invoke the preprocessor to generate a Fortran file that when compiled and linked with [pFUnit](#) will execute the tests. For more information please see [The Preprocessor - pFUnitParser](#) or try out the examples in Example/Simple.

4.1.3 Usage - Preprocessor

Please see [The Preprocessor - pFUnitParser](#).

Chapter 5

Development

Generally [pFUnit](#) development is performed in the build directory structure. Care should be taken to make clean or distclean in between configuration changes. As stated in - [Installation](#), it is best to set INSTALL_DIR and "make install" [pFUnit](#) to another directory that can be placed in a user's paths.

Chapter 6

Feedback & Support

- [Feedback](#)
- [Support](#)

6.1 Feedback

Feedback is welcome, please use the facilities at [sourceforge/projects/pfunit](#) to share your views.

Open a [ticket](#) for bugs, features, and patch recommendations.

If you use [pFUnit](#), please let us know by leaving a note in our [Applications of pFUnit](#) forum, or email [Tom Clune](#), Ph.D., NASA Goddard Space Flight Center. - Letting us know about your application helps us seek support for [pFUnit](#)'s continued development and improvement.

6.2 Support

Please open a [ticket](#) for bugs, features, and patch recommendations. For longer term needs or considerations, please visit our [discussion forums](#) or contact - [Tom Clune](#), Ph.D., NASA Goddard Space Flight Center.

You may also find some help at [FAQ and Tips](#).

[pFUnit](#) supports the software development of several weather and climate simulations efforts. We constantly seek to improve and correct [pFUnit](#) for our users' benefit, granting priority to the needs of our major users. Please share with us information about your application on our [Applications of pFUnit](#) forum.

Chapter 7

FAQ and Tips

- [FAQ](#)
 - [Zero Tests Run](#)
 - [Some Tests Are Not Running](#)
- [Tips](#)
 - [Environment Modules](#)
 - [Compile Time Errors](#)
 - [Intermediate files used by pFUnit](#)

7.1 FAQ

7.1.1 Zero Tests Run

Symptom: The system under test compiles and runs fine, but reports zero tests run.

Solutions:

- There is no `testSuites.inc` file. Please add a `testSuites.inc` that lists the suites to add via `ADD_TEST_SUITE (the_suite_to_add)`, one to a line.
- There is no `-DUSE_MPI` passed to the compiler during the build. Please add to the compiler invocation. Please see [Some Tests Are Not Running](#).

7.1.2 Some Tests Are Not Running

Symptom: The system under test compiles and runs fine, but reports that some tests don't run.

Solutions:

- There is no `-DUSE_MPI` passed to the compiler during the build. Please add as in the following example.

```
% $PFUNIT/bin/pFUnitParser.py test_pio.pf test_pio.F90
% mpif90 -DUSE_MPI $PFUNIT/include/driver.F90 \
%      -I$PFUNIT/mod -L$PFUNIT/lib -lpfunit test_pio.F90

% mpirun -np 8 ./a.out

.
Time:          0.004 seconds

OK
```

7.2 Tips

7.2.1 Environment Modules

Though not strictly required, the Environment Modules package can be a convenient way to package, maintain, and switch between environments. This can be particularly important for [pFUnit](#), which must be built using the same tool suite being used for development, e.g. compilers, linkers, etc. [To do: A sample [pFUnit](#) modulefile is provided in the OTHER directory.]

7.2.2 Compile Time Errors

Compile time errors like "'include [...]include/.mk" not found' likely signify that you are not executing make in the top level directory during a build. Alternatively, during regular usage after installation, PFUNIT has not been set.

During building, if you wish to compile in a subdirectory within the [pFUnit](#) hierarchy, please try setting the COMPILER environment variable on the make command line. For example:

```
$ make all COMPILER=Intel
```

7.2.3 Intermediate files used by pFUnit

If you wish to see the intermediate files, use the target `.PRECIOUS` in the makefile to keep them from being deleted. For example:

```
# In GNUmakefile
.PRECIOUS: %_cpp.F90
```


Chapter 8

Platform Specific Notes

8.1 Mac OSX

The MacPorts package management system is a convenient way to install and maintain many packages, including gcc which includes gfortran.

8.2 Windows/CYGWIN

User contributed code for Windows/CYGWIN has been added, but is currently not tested and supported by the [pFUnit](#) team. At this writing, 2013-1031, serial Examples and MPI are not known to be supported. Please contact us if you wish to either contribute or otherwise discuss this port.

Chapter 9

Acknowledgments

Thanks to the following for their review and comments: B. Van Aartsen, T. Clune.

Windows/CYGWIN contributions from E. Lezar.

Other acknowledgments: S.P. Santos (NCAR), M. Hambley (UK Met).

The design of **pFUnit** is strongly influenced by **JUnit**.

Initial **pFUnit** 2 documentation by Michael Rilee (Rilee Systems Technologies).

Chapter 10

Known Installations & Versions

TBD

Chapter 11

TODO

- Make other directory.
- Make Environment Modules example in other directory.
- Other build systems, e.g. CMake.

Chapter 12

The Preprocessor - pFUnitParser

Overview of Preprocessor (pFUnitParser.py)

- Using The Preprocessor
 - Configuration - testSuites.inc
 - Invocation
 - Preprocessor Input File (.pf)
 - Directives
 - * @Test
 - * @MPITest
 - * @Assert (or Preprocessor Directives)
 - * @Parameters
 - * @TestCase

//

12.1 Using The Preprocessor

How to write tests using the ".pf" files. We expect this to be the main way people write pFUnit-based tests. Please see the Examples directory for a wide range of examples. The .pf files themselves are generally to be found in an example's semi-automatic/tests subdirectory.

12.1.1 Configuration - testSuites.inc

The include file "testSuites.inc" tells the preprocessor to generate code for TestSuites listed therein. The suite names are based on the TestCases provided in the preprocessor input file or the name of the preprocessor input file (.pf) itself. For example, if no module is defined in a .pf file, i.e. the preprocessor will define the module, one can set up a "testSuites.inc" as follows.

```
! To load "exampleTestsNoModule.pf".
ADD_TEST_SUITE(exampleTestsNoModule_suite)
```

For a .pf file that contains a module associated with a test suite the syntax is as follows.

```
! To load "exampleTests.pf" implementing the module exampleTests_mod.
ADD_TEST_SUITE(exampleTests_mod_suite)
```

12.1.2 Invocation

To run the preprocessor on a preprocessor input file "exampleTests.pf", invoke:

```
$ ${PFUNIT}/bin/pFUnitParser.py exampleTests.pf exampleTests.F90
```

A convenient GNUmakefile rule is as follows.

```
%.F90: %.pf
    ${PFUNIT}/bin/pFUnitParser.py $< $@
```

12.1.3 Preprocessor Input File (.pf)

The preprocessor input file is a Fortran free format file that contains subroutines, including those implementing the suite of tests, or a module with the tests, TestCases, and support for parameters. The preprocessor reads and parses this file producing a fortran file implementing the tests, automating some boilerplate code. Embedded "@" directives inform the preprocessor about information needed to generate the test suite. If the .pf file does not implement a module providing a test suite, the preprocessor will use the name of .pf file referred to by "testSuites.inc". Currently only one test suite per .pf file is allowed, a limitation of the current implementation of the parser.

Many example .pf files may be found in the examples' semi-automatic/tests subdirectories in the Examples directory.

Below we present the most commonly used directives first, but in a .pf file using all of these capabilities, the most common order is as follows.

- [@Parameters](#)
- [@TestCase](#)
- [@Test](#) or [@MPITest](#)
- [@Assert](#)

12.1.4 Directives

Preprocessor "@" directives, which in keeping with Fortran style are not case sensitive, instruct the preprocessor how to interpret parts of the code relevant to the generation of the test suite. The most important directives follow.

12.1.4.1 @Test

This directive is used to indicate a test routine to the preprocessor, which then includes it in the test suite. There may be multiple tests in the .pf file, each annotated by the directive. For example, from Examples/Fixture:

```
@Test
  subroutine testBracketInterior(this)
    class (Test_LinearInterpolator), intent(inout) :: this
    @assertEqual([3,4], this%interpolator%getBracket(at=4.))
  end subroutine testBracketInterior

@Test
  subroutine testInterpolateAtNode(this)
    class (Test_LinearInterpolator), intent(inout) :: this
    @assertEqual(2., this%interpolator%interpolate(at=3.))
  end subroutine testInterpolateAtNode
```

12.1.4.2 @MPItest

This directive indicates an MPI parallel test to the preprocessor, which then includes it in an MPI enabled test suite. The directive takes a single argument, the requested number of MPI processes to run. The syntax, exemplified by one of the tests from Examples/MPI_Halo:

```
@mpiTest( npes=[1,2,3])
subroutine testHaloInterior(this)
  use Halo_mod
  use pfunit_mod
  implicit none
  class (MpiTestMethod) :: this

  integer, parameter :: N = 2
  real :: a(N,0:N+1)
  integer :: p

  p = this%getProcessRank()
  a(:,1:N) = p
  a(:,0) = -1
  a(:,N+1) = -1

  call haloFill(a, this%getMpiCommunicator())

  @assertEqual(real(p), a(1,1))
```

```
@assertEqual(real(p), a(2,1))
@assertEqual(real(p), a(1,2))
@assertEqual(real(p), a(2,2))

end subroutine testHaloInterior
```

12.1.4.3 @Assert

The directives are expanded into calls to similarly named [pFUnit](#) library routines. The syntax for the directives follows the pattern for below.

```
@assertEqual(expected,found,'An identifying or explanatory message.')
```

The preprocessor will automatically add information about source location (file & line number) to the call emitted to the test suite code. It also adds the check for exceptions.

For more information about directives, please refer to the following.

- [@assertEqual](#)
- [@assertTrue](#)
- [@assertFalse](#)
- [@assertLessThan](#)
- [@assertLessThanOrEqual](#)
- [@assertGreaterThan](#)
- [@assertGreaterThanOrEqual](#)
- [@assertIsMemberOf](#)
- [@assertContains](#)
- [@assertAny](#)
- [@assertAll](#)
- [@assertNotAll](#)
- [@assertNone](#)
- [@assertIsPermutationOf](#)
- [@assertExceptionRaised](#)
- [@assertSameShape](#)
- [@assertIsNaN](#)
- [@assertIsFinite](#)

12.1.4.4 @Parameters

The directive indicates the declaration of the parameterized type used to generate the iteration over the multiple parameter values. It also identifies the names of the parameters to be iterated over. The preprocessor extracts type information from the declaration of the parameter type collection that immediately follows the directive. This directive will set up the iteration. To define the parameter values per iteration the `getParameters` method of the abstract `ParameterizedTest` must be implemented. For example:

```
@Parameters = [p1,p2]
type, extends(AbstractTestParameter) :: exampleCase
  integer :: i
  real :: x
end type exampleCase
```

12.1.4.5 @TestCase

This directive identifies to the preprocessor the `TestCase` declaration. The type declared at this point extends `TestCase` (or its extension), which includes setting methods such as the following: `setUp`, `tearDown`, `runMethod`, `userMethod`. For the extension `MPITestCase`, as with `ParameterizedTestCase`, you have the option (requirement if parameters are used) to set `getParameters` and `getParameterString`. For example:

```
@TestCase
type, extends(MPITestCase) :: Test_Parameters
  integer :: p1, p2
  procedure(runMethod), pointer :: userMethod => null()
contains
  procedure, nopass :: getParameters
  procedure :: getParameterString => getParameterString_
  procedure :: runMethod
end type Test_Parameters
```


Chapter 13

@Assert Preprocessor Directives

- @assertEqual
- @assertTrue
- @assertFalse
- @assertLessThan
- @assertLessThanOrEqual
- @assertGreaterThan
- @assertGreaterThanOrEqual
- @assertIsMemberOf
- @assertContains
- @assertAny
- @assertAll
- @assertNotAll
- @assertNone
- @assertIsPermutationOf
- @assertExceptionRaised
- @assertSameShape
- @assertIsNaN
- @assertIsFinite

13.1 @Assert Preprocessor Directives

13.1.1 @assertEqual

13.1.2 @assertTrue

13.1.3 @assertFalse

13.1.4 @assertLessThan

13.1.5 @assertLessThanOrEqual

13.1.6 @assertGreaterThan

13.1.7 @assertGreaterThanOrEqual

13.1.8 @assertIsMemberOf

13.1.9 @assertContains

13.1.10 @assertAny

13.1.11 @assertAll

13.1.12 @assertNotAll

13.1.13 @assertNone

13.1.14 @assertIsPermutationOf

13.1.15 @assertExceptionRaised

13.1.16 @assertSameShape

13.1.17 @assertIsNaN

13.1.18 @assertIsFinite

Chapter 14

Revision Notes

- 2013-1227. First note of OPENMP additions by T. Clune. MLR.
- 2013-1212. Initial draft of Doxygen version. MLR
- 2013-1107. Minor edits. MLR
- 2013-1031. Added user contributed code for Windows/CYGWIN & IBM's XLF. MLR
- 2013-0830-1359. Minor corrections and added MPIF90 to 6.2. MLR
- 2013-0806-1345. Corrected git reference. Was using old URL. MLR
- 2013-0805. Initial draft. MLR

Chapter 15

Data Type Index

15.1 Class Hierarchy

This inheritance list is sorted roughly, but not completely, alphabetically:

pUnitParser::Action	47
pUnitParser::AtAfter	53
pUnitParser::AtAssert	54
pUnitParser::AtBefore	54
pUnitParser::AtBegin	55
pUnitParser::AtMpiAssert	56
pUnitParser::AtMpiTest	56
pUnitParser::AtParameters	57
pUnitParser::AtSuite	58
pUnitParser::AtTest	58
pUnitParser::AtTestCase	59
add_mod	48
addComplex_mod	49
CodeUtilities::ArrayDescription	49
Assert_mod	50
AssertBasic_mod	50
AssertInteger_mod	51
GenerateRealArrayNewSignature::AssertRealArrayArgument	52
BaseTestRunner_mod	60
BeforeAfter_mod	61
BrokenSetUpCase_mod	61
BrokenTestCase_mod	61
mods::pre::pre2::dataString	63
DebugListener_mod	64
CodeUtilities::declaration	65

DynamicTestCase_mod	65
Exception_mod	66
Fixture_mod	67
FixtureTestCase_mod	67
CodeUtilities::fortranSubroutineSignature	68
Halo_mod	68
CodeUtilities::implementation	69
CodeUtilities::interfaceBlock	69
mods::pre::pre_If::interval	70
Test_RestrictSphericalCoordinates_mod::LatLonCase	71
LinearInterpolator_mod	71
MakeInfinity_mod	71
MakeNaN_mod	72
MockCall_mod	73
MockListener_mod	74
MockRepository_mod	75
MockSUT_mod	75
testParser::MockWriter	76
CodeUtilities::module	76
MpiContext_mod	77
MpiStubs_mod	78
MpiTestCase_mod	79
MpiTestMethod_mod	80
pFUnitParser::MyError	80
ParallelContext_mod	81
ParallelException_mod	82
ParameterizedTestCase_mod	82
Params_mod	83
pFUnitParser::Parser	84
testParser::MockParser	74
Test_Parameters_mod::peCase	85
pFUnit	85
pFUnit_mod	86
PrivateException_mod	87
mods::pre::pre2::procDirective	88
mods::pre::pre_If::IfDirective	68
mods::pre::pre_Repeat::RepeatDirective	90
RemoteProxyTestCase_mod	89
ResultPrinter_mod	90
RobustRunner_mod	91
robustTestSuite_mod	92
CodeUtilities::routineUnit	92
GenerateRealArrayNewSignature::constraintASERTEQUAL	62
GenerateRealArrayNewSignature::IsWithinTolerance	70
GenerateRealArrayNewSignature::VECTOR_NORM	123

SerialContext_mod	93
SimpleTestCase_mod	94
SourceLocation_mod	95
SphericalCoordinates_mod	95
TestListener_mod::startTest	96
StringConversionUtilities_mod	96
SubsetRunner_mod	97
SurrogateTestCase_mod	98
SUT_mod	98
Test_Assert_mod	99
Test_AssertBasic_mod	99
Test_AssertComplex_mod	99
Test_AssertInteger_mod	100
Test_AssertReal_mod	100
Test_BasicOpenMP_mod	101
Test_Exception_mod	102
Test_FixtureTestCase_mod	102
Test_LinearInterpolator_mod::Test_LinearInterpolator	102
Test_LinearInterpolator_mod	103
Test_MockCall_mod	103
Test_MockRepository_mod	104
Test_mod	104
Test_MpiContext_mod	105
Test_MpiException_mod	105
Test_MpiTestCase_mod	105
Test_Parameters_mod::Test_Parameters	106
Test_Parameters_mod	106
Test_RestrictSphericalCoordinates_mod::Test_RestrictSphericalCoordinates	107
Test_RestrictSphericalCoordinates_mod	108
Test_RobustRunner_mod	108
Test_SimpleTestCase_mod	108
Test_StringConversionUtilities_mod	109
Test_TestMethod_mod	109
Test_TestResult_mod	109
Test_TestSuite_mod	110
Test_UnixProcess_mod	110
TestCase_mod	110
TestFailure_mod	111
mods::pre::pre_If::TestIfDirective	112
mods::pre::interleavedp::TestInterleaved	112
TestListener_mod	113
TestMethod_mod	114
mods::pre::parseArgs::TestParseArgs	115
testParser::TestParseLine	115
mods::pre::pre_Repeat::TestRepeatDirective	117
TestResult_mod	118

TestRunner_mod	118
TestSuite_mod	119
ThrowFundamentalTypes_mod	120
UnixPipeInterfaces_mod	121
UnixProcess_mod	122

Chapter 16

Data Type Index

16.1 Data Types List

Here are the data types with brief descriptions:

pUnitParser::Action	47
add_mod	48
addComplex_mod	49
CodeUtilities::ArrayDescription	49
Assert_mod	
<BriefDescription>	50
AssertBasic_mod	
<BriefDescription>	50
AssertInteger_mod	
<BriefDescription>	51
GenerateRealArrayNewSignature::AssertRealArrayArgument	52
pUnitParser::AtAfter	53
pUnitParser::AtAssert	54
pUnitParser::AtBefore	54
pUnitParser::AtBegin	55
pUnitParser::AtMpiAssert	56
pUnitParser::AtMpiTest	56
pUnitParser::AtParameters	57
pUnitParser::AtSuite	58
pUnitParser::AtTest	58
pUnitParser::AtTestCase	59
BaseTestRunner_mod	
<BriefDescription>	60
BeforeAfter_mod	61
BrokenSetUpCase_mod	61

BrokenTestCase_mod	61
GenerateRealArrayNewSignature::constraintASERTEQUAL	62
mods::pre::pre2::dataString	63
DebugListener_mod	
<BriefDescription>	64
CodeUtilities::declaration	65
DynamicTestCase_mod	
<BriefDescription>	65
Exception_mod	66
Fixture_mod	67
FixtureTestCase_mod	67
CodeUtilities::fortranSubroutineSignature	68
Halo_mod	68
mods::pre::pre_If::IfDirective	68
CodeUtilities::implementation	69
CodeUtilities::interfaceBlock	69
mods::pre::pre_If::interval	70
GenerateRealArrayNewSignature::IsWithinTolerance	70
Test_RestrictSphericalCoordinates_mod::LatLonCase	71
LinearInterpolator_mod	71
MakeInfinity_mod	
<BriefDescription>	71
MakeNaN_mod	
<BriefDescription>	72
MockCall_mod	
<BriefDescription>	73
MockListener_mod	74
testParser::MockParser	74
MockRepository_mod	
<BriefDescription>	75
MockSUT_mod	75
testParser::MockWriter	76
CodeUtilities::module	76
MpiContext_mod	
<BriefDescription>	77
MpiStubs_mod	
<BriefDescription>	78
MpiTestCase_mod	
<BriefDescription>	79
MpiTestMethod_mod	
<BriefDescription>	80
pFUnitParser::MyError	80
ParallelContext_mod	
<BriefDescription>	81
ParallelException_mod	
<BriefDescription>	82

ParameterizedTestCase_mod	
<BriefDescription>	82
Params_mod	
<BriefDescription>	83
pUnitParser::Parser	84
Test_Parameters_mod::peCase	85
pUnit	
<BriefDescription>	85
pUnit_mod	
<BriefDescription>	86
PrivateException_mod	
<BriefDescription>	87
mods::pre::pre2::procDirective	88
RemoteProxyTestCase_mod	
<BriefDescription>	89
mods::pre::pre_Repeat::RepeatDirective	90
ResultPrinter_mod	
<BriefDescription>	90
RobustRunner_mod	
<BriefDescription>	91
robustTestSuite_mod	92
CodeUtilities::routineUnit	92
SerialContext_mod	
<BriefDescription>	93
SimpleTestCase_mod	94
SourceLocation_mod	
<BriefDescription>	95
SphericalCoordinates_mod	95
TestListener_mod::startTest	96
StringConversionUtilities_mod	
<BriefDescription>	96
SubsetRunner_mod	
<BriefDescription>	97
SurrogateTestCase_mod	
<BriefDescription>	98
SUT_mod	98
Test_Assert_mod	99
Test_AssertBasic_mod	99
Test_AssertComplex_mod	99
Test_AssertInteger_mod	100
Test_AssertReal_mod	100
Test_BasicOpenMP_mod	101
Test_Exception_mod	102
Test_FixtureTestCase_mod	102
Test_LinearInterpolator_mod::Test_LinearInterpolator	102
Test_LinearInterpolator_mod	103

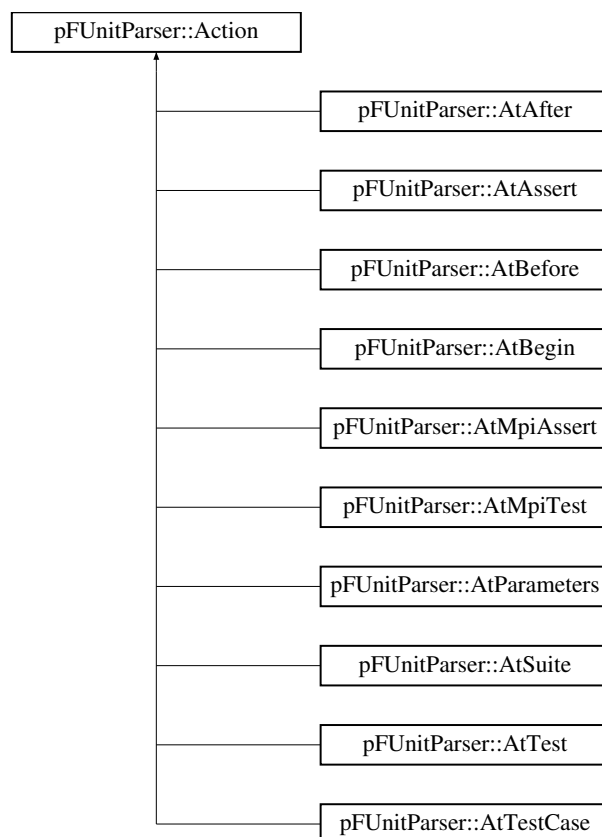
Test_MockCall_mod	103
Test_MockRepository_mod	104
Test_mod	
<BriefDescription>	104
Test_MpiContext_mod	105
Test_MpiException_mod	105
Test_MpiTestCase_mod	105
Test_Parameters_mod::Test_Parameters	106
Test_Parameters_mod	106
Test_RestrictSphericalCoordinates_mod::Test_RestrictSphericalCoordinates	107
Test_RestrictSphericalCoordinates_mod	108
Test_RobustRunner_mod	108
Test_SimpleTestCase_mod	108
Test_StringConversionUtilities_mod	109
Test_TestMethod_mod	109
Test_TestResult_mod	109
Test_TestSuite_mod	110
Test_UnixProcess_mod	110
TestCase_mod	
<BriefDescription>	110
TestFailure_mod	
<BriefDescription>	111
mods::pre::pre_If::TestIfDirective	112
mods::pre::interleavedp::TestInterleaved	112
TestListener_mod	
<BriefDescription>	113
TestMethod_mod	
<BriefDescription>	114
mods::pre::parseArgs::TestParseArgs	115
testParser::TestParseLine	115
mods::pre::pre_Repeat::TestRepeatDirective	117
TestResult_mod	
<BriefDescription> Note: A possible extension point for user-specialized TestResults	118
TestRunner_mod	
<BriefDescription>	118
TestSuite_mod	
<BriefDescription>	119
ThrowFundamentalTypes_mod	
<BriefDescription>	120
UnixPipeInterfaces_mod	
<BriefDescription>	121
UnixProcess_mod	
<BriefDescription>	122
GenerateRealArrayNewSignature::VECTOR_NORM	123

Chapter 17

Data Type Documentation

17.1 pFUnitParser::Action Class Reference

Inheritance diagram for pFUnitParser::Action:



Public Member Functions

- def **apply**

The documentation for this class was generated from the following file:

- pFUnitParser.py

17.2 add_mod Module Reference

Public Member Functions

- real function **add** (x, y)
- real function **add** (x, y)
- real function **add** (x, y)

The documentation for this module was generated from the following files:

- Robust/src/add.F90
- Simple/src/add.F90
- Simple_Windows/Semi-Automatic/src/add.F90

17.3 addComplex_mod Module Reference

Public Member Functions

- complex function, dimension(size(z0)) **add** (z0, z1)
- complex function, dimension(size(z0)) **add** (z0, z1)

The documentation for this module was generated from the following files:

- src/addComplex.F90
- Windows/Semi-Automatic/src/addComplex.F90

17.4 CodeUtilities::ArrayDescription Class Reference

Public Member Functions

- def **__init__**
- def **NAME**
- def **DECLARE**
- def **DECLARESCALAR**
- def **KIND**
- def **RANK**
- def **FTYPE**
- def **EXPANDSHAPE**
- def **FailureMessageFork**

Public Attributes

- **fType**
- **kind**
- **rank**

The documentation for this class was generated from the following file:

- CodeUtilities.py

17.5 Assert_mod Module Reference

<BriefDescription>

17.5.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

The documentation for this module was generated from the following file:

- Assert.F90

17.6 AssertBasic_mod Module Reference

<BriefDescription>

Data Types

- interface **assertEqual**
- interface **assertExceptionRaised**
- interface **assertFalse**
- interface **assertIsFinite**
- interface **assertIsNaN**
- interface **assertTrue**
- interface **fail**
- type **UnusableArgument**

Public Member Functions

- subroutine **assertExceptionRaisedMessage** (message)
- subroutine, public **assertSameShape** (shapeA, shapeB, message, location)
- logical function, public **conformable** (shapeA, shapeB)
- logical function, public **nonConformable** (shapeA, shapeB)
- subroutine, public **assertAny** (conditions, message, location)
- subroutine, public **assertAll** (conditions, message, location)
- subroutine, public **assertNone** (conditions, message, location)
- subroutine, public **assertNotAll** (conditions, message, location)
- subroutine **assertIsNaN_double** (x, message, location)
- subroutine **assertIsFinite_single** (x, message, location)
- subroutine **assertIsFinite_double** (x, message, location)

17.6.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

The documentation for this module was generated from the following file:

- AssertBasic.F90

17.7 AssertInteger_mod Module Reference

<BriefDescription>

Data Types

- interface **assertEqual**
- interface **assertGreaterThan**
- interface **assertGreaterThanOrEqual**
- interface **assertLessThan**
- interface **assertLessThanOrEqual**
- interface **locationOfFirstNonzero**

Public Member Functions

- subroutine **assertEqualInteger1D1D_** (expected, found, message, location)
- subroutine **assertEqualInteger0D1D_** (expected, found, message, location)
- subroutine **assertEqualInteger2D2D_** (expected, found, message, location)
- subroutine **assertEqualInteger0D2D_** (expected, found, message, location)
- subroutine **assertLessThan_** (a, b, message, location)

17.7.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

The documentation for this module was generated from the following file:

- AssertInteger.F90

17.8 GenerateRealArrayNewSignature::AssertRealArrayArgument Class Reference

Public Member Functions

- def **__init__**

- def **updateDescriptions**
- def **getExpectedDescription**
- def **getFoundDescription**
- def **getTolerance**

Public Attributes

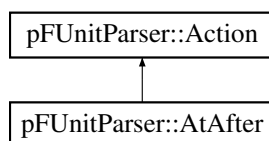
- **expectedFType**
- **expectedPrecision**
- **expectedRank**
- **foundFType**
- **foundPrecision**
- **foundRank**
- **tolerance**
- **expectedDescription**
- **foundDescription**

The documentation for this class was generated from the following file:

- GenerateRealArrayNewSignature.py

17.9 pFUnitParser::AtAfter Class Reference

Inheritance diagram for pFUnitParser::AtAfter:



Public Member Functions

- def **__init__**
- def **match**
- def **action**

Public Attributes

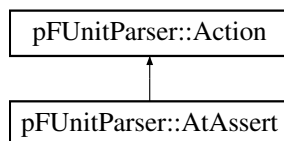
- **parser**

The documentation for this class was generated from the following file:

- pFUnitParser.py

17.10 pFUnitParser::AtAssert Class Reference

Inheritance diagram for pFUnitParser::AtAssert:



Public Member Functions

- def **__init__**
- def **match**
- def **appendSourceLocation**
- def **action**

Public Attributes

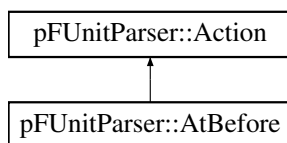
- **parser**

The documentation for this class was generated from the following file:

- pFUnitParser.py

17.11 pFUnitParser::AtBefore Class Reference

Inheritance diagram for pFUnitParser::AtBefore:



Public Member Functions

- def `__init__`
- def `match`
- def `action`

Public Attributes

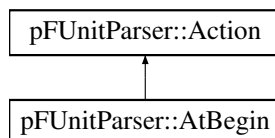
- `parser`

The documentation for this class was generated from the following file:

- `pFUnitParser.py`

17.12 pFUnitParser::AtBegin Class Reference

Inheritance diagram for `pFUnitParser::AtBegin`:



Public Member Functions

- def `__init__`
- def `match`
- def `action`

Public Attributes

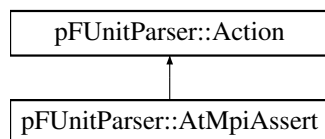
- **parser**

The documentation for this class was generated from the following file:

- pFUnitParser.py

17.13 pFUnitParser::AtMpiAssert Class Reference

Inheritance diagram for pFUnitParser::AtMpiAssert:



Public Member Functions

- def **__init__**
- def **match**
- def **appendSourceLocation**
- def **action**

Public Attributes

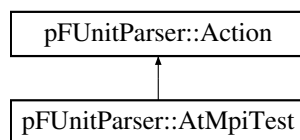
- **parser**

The documentation for this class was generated from the following file:

- pFUnitParser.py

17.14 pFUnitParser::AtMpiTest Class Reference

Inheritance diagram for pFUnitParser::AtMpiTest:



Public Member Functions

- def `__init__`
- def `match`
- def `action`

Public Attributes

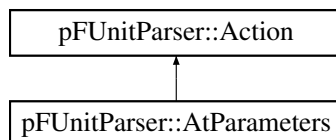
- `parser`

The documentation for this class was generated from the following file:

- `pFUnitParser.py`

17.15 pFUnitParser::AtParameters Class Reference

Inheritance diagram for pFUnitParser::AtParameters:



Public Member Functions

- def `__init__`
- def `match`
- def `action`

Public Attributes

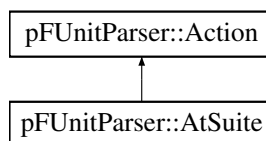
- **parser**

The documentation for this class was generated from the following file:

- pFUnitParser.py

17.16 pFUnitParser::AtSuite Class Reference

Inheritance diagram for pFUnitParser::AtSuite:



Public Member Functions

- def **__init__**
- def **match**
- def **action**

Public Attributes

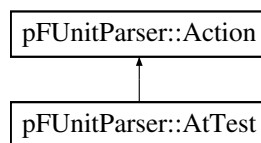
- **parser**

The documentation for this class was generated from the following file:

- pFUnitParser.py

17.17 pFUnitParser::AtTest Class Reference

Inheritance diagram for pFUnitParser::AtTest:



Public Member Functions

- def `__init__`
- def `match`
- def `action`

Public Attributes

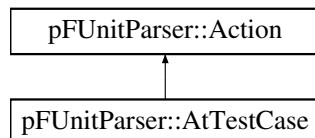
- `parser`

The documentation for this class was generated from the following file:

- pUnitParser.py

17.18 pUnitParser::AtTestCase Class Reference

Inheritance diagram for pUnitParser::AtTestCase:



Public Member Functions

- def `__init__`
- def `match`
- def `action`

Public Attributes

- **parser**

The documentation for this class was generated from the following file:

- pFUnitParser.py

17.19 BaseTestRunner_mod Module Reference

<BriefDescription>

Data Types

- type **BaseTestRunner**
- interface **run2**

Public Member Functions

- subroutine **setDebug** (this)

17.19.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

The documentation for this module was generated from the following file:

- BaseTestRunner.F90

17.20 BeforeAfter_mod Module Reference

Public Member Functions

- subroutine **first** (this)
- subroutine **last** (this)
- subroutine **succeeds** (this)
- subroutine **fails** (this)

Public Attributes

- integer **countStart** = 0
- integer **countComplete** = 0

The documentation for this module was generated from the following file:

- beforeAfter.pf

17.21 BrokenSetUpCase_mod Module Reference

Data Types

- type **BrokenSetUpCase**

Public Member Functions

- type(BrokenSetUpCase) function, pointer, public **newBrokenSetUpCase** ()

The documentation for this module was generated from the following file:

- BrokenSetUpCase.F90

17.22 BrokenTestCase_mod Module Reference

Data Types

- type **BrokenTestCase**

Public Member Functions

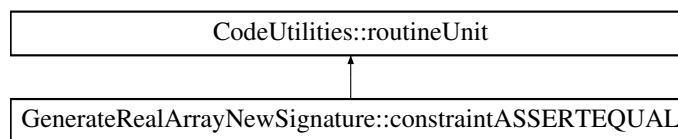
- subroutine **tearDown** (this)

The documentation for this module was generated from the following file:

- BrokenTestCase.F90

17.23 GenerateRealArrayNewSignature::constraintASERTEQUAL Class Reference

Inheritance diagram for GenerateRealArrayNewSignature::constraintASERTEQUAL:



Public Member Functions

- def [__init__](#)

This next line actually generates the text of the code.

Public Attributes

- **expectedDescr**
- **foundDescr**
- **name**
- [name1](#)

Add in the extra module procedures...

- [tolerance](#)

If you need another kind of code generator, perhaps conditioned on eDesc., fDesc., or tol, then that logic would go here...

17.23.1 Constructor & Destructor Documentation

```
17.23.1.1 def GenerateRealArrayNewSignature::constraintASSERTEQUAL::__init__( self, expectedDescr, foundDescr, tolerance )
```

This next line actually generates the text of the code.

17.23.2 Member Data Documentation

17.23.2.1 GenerateRealArrayNewSignature::constraintASSERTEQUAL::name1

Add in the extra module procedures...

If needed... Kluge. Need to make makeSubroutineNames and load the extra interface entries there.

17.23.2.2 GenerateRealArrayNewSignature::constraintASSERTEQUAL::tolerance

If you need another kind of code generator, perhaps conditioned on eDesc., fDesc., or tol, then that logic would go here...

E.g. to implement assertEquals(Logical(...))

The documentation for this class was generated from the following file:

- GenerateRealArrayNewSignature.py

17.24 mods::pre::pre2::dataString Class Reference

Public Member Functions

- def **__init__**
- def **insert**
- def **getLength**
- def **getPosition**
- def **setPosition**
- def **getItem**
- def **getDataAtPosition**
- def **getData**
- def **getSlice**
- def **getSliceForward**
- def **removeSlice**
- def **getCurrentData**
- def **insertAtCurrent**

- def **append**
- def **advanceAndGetNextData**
- def **validPosition**
- def **findToEnd**
- def **match**
- def **matchToEnd**
- def **searchToEnd**
- def **searchToPosition**
- def **finditerToEnd**
- def **finditerToPosition**

Public Attributes

- **data**
- **position**

The documentation for this class was generated from the following file:

- pre2.py

17.25 DebugListener_mod Module Reference

<BriefDescription>

Data Types

- interface **DebugListener**

Public Member Functions

- subroutine **addFailure** (this, testName, exceptions)
- subroutine **startTest** (this, testName)

17.25.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

The documentation for this module was generated from the following file:

- DebugListener.F90

17.26 CodeUtilities::declaration Class Reference

Public Member Functions

- def **__init__**
- def **generate**

Public Attributes

- **simpleDeclaration**
- **fullDeclaration**
- **name**

The documentation for this class was generated from the following file:

- CodeUtilities.py

17.27 DynamicTestCase_mod Module Reference

<BriefDescription>

Data Types

- interface **delete**
- type **DynamicTestCase**
- interface **testmethod**

Public Member Functions

- type(DynamicTestCase) function, pointer, public **newDynamicTestCase** (test-Method, name)

17.27.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

The documentation for this module was generated from the following file:

- DynamicTestCase.F90

17.28 Exception_mod Module Reference

Data Types

- interface **anyExceptions**
- interface **catch**
- interface **getNumExceptions**
- interface **throw**

Public Member Functions

- subroutine, public **initializeGlobalExceptionList** ()
- type(Exception) function, public **catchAny** (preserve)
- type(Exception) function, dimension(:), allocatable, public **getExceptions** ()
- logical function, public **noExceptions** ()
- logical function, public **anyErrors** ()

- subroutine, public **gatherExceptions** (context)
- subroutine, public **clearAll** ()

The documentation for this module was generated from the following file:

- Exception.F90

17.29 Fixture_mod Module Reference

Public Member Functions

- subroutine **mySetup** ()
- subroutine **myTearDown** ()
- subroutine **testRead** ()
- subroutine **testEOF** ()
- subroutine **mySetup** ()
- subroutine **myTearDown** ()
- subroutine **testRead** ()
- subroutine **testEOF** ()

The documentation for this module was generated from the following files:

- tests/fixtureTests.pf
- Windows/Semi-Automatic/tests/fixtureTests.pf

17.30 FixtureTestCase_mod Module Reference

Data Types

- interface **delete**
- type **FixtureTestCase**

Public Member Functions

- type(FixtureTestCase) function, public **newFixtureTestCase** ()
- subroutine, public **simpleTestMethod** (this)
- subroutine, public **methodA** (this)
- subroutine, public **methodB** (this)

The documentation for this module was generated from the following file:

- FixtureTestCase.F90

17.31 CodeUtilities::fortranSubroutineSignature Class Reference

Public Member Functions

- def `__init__`
- def `setReturnFType`
- def `addArg`
- def `generateInterfaceEntry`
- def `generateImplementationSignature`
- def `generateImplementationClose`

Public Attributes

- `name`
- `ArgumentToFType`
- `ReturnFType`
- `SubroutineType`

The documentation for this class was generated from the following file:

- CodeUtilities.py

17.32 Halo_mod Module Reference

Public Member Functions

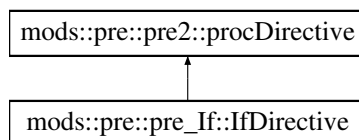
- subroutine `haloFill` (array, communicator)

The documentation for this module was generated from the following file:

- Halo.F90

17.33 mods::pre::pre_If::IfDirective Class Reference

Inheritance diagram for mods::pre::pre_If::IfDirective:



Public Member Functions

- def **evaluate**

Public Attributes

- **startPosition**
- **newPosition**

The documentation for this class was generated from the following file:

- pre_lf.py

17.34 CodeUtilities::implementation Class Reference

Public Member Functions

- def **__init__**
- def **generate**

Public Attributes

- **name**
- **source**

The documentation for this class was generated from the following file:

- CodeUtilities.py

17.35 CodeUtilities::interfaceBlock Class Reference

The documentation for this class was generated from the following file:

- CodeUtilities.py

17.36 mods::pre::pre_If::interval Class Reference

Public Member Functions

- def **__init__**
- def **getInterval**
- def **setInterval**
- def **getStart**
- def **getEnd**

Public Attributes

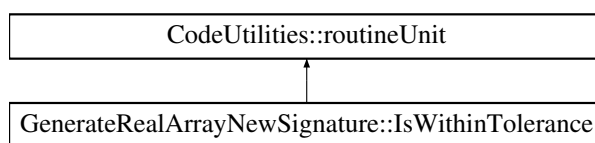
- **start**
- **end**
- **interval**

The documentation for this class was generated from the following file:

- pre_If.py

17.37 GenerateRealArrayNewSignature::IsWithinTolerance Class - Reference

Inheritance diagram for GenerateRealArrayNewSignature::IsWithinTolerance:



Public Member Functions

- def **__init__**

Public Attributes

- **rank**
- **precision**

17.38 Test_RestrictSphericalCoordinates_mod::LatLonCase Type Reference 71

- **name**
- **fType**
- **declaration**
- **declarations**

The documentation for this class was generated from the following file:

- GenerateRealArrayNewSignature.py

17.38 Test_RestrictSphericalCoordinates_mod::LatLonCase Type - Reference

Public Attributes

- real **lat**
- real **lon**
- real **restrictedLat**
- real **restrictedLon**

The documentation for this type was generated from the following file:

- Test_RestrictedSphericalCoordinates.pf

17.39 LinearInterpolator_mod Module Reference

Data Types

- interface **LinearInterpolator**
- type **Node**

The documentation for this module was generated from the following file:

- LinearInterpolator.F90

17.40 MakeInfinity_mod Module Reference

<BriefDescription>

Public Member Functions

- `real(r32)` function, public **makeInf_32** ()
- `real(r64)` function, public **makeInf_64** ()

17.40.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC SIVO

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

The documentation for this module was generated from the following file:

- `MakeInfinity.F90`

17.41 MakeNaN_mod Module Reference

<BriefDescription>

Public Member Functions

- `real(r32)` function, public **makeNaN_32** ()
- `real(r64)` function, public **makeNaN_64** ()

17.41.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

The documentation for this module was generated from the following file:

- MakeNaN.F90

17.42 MockCall_mod Module Reference

<BriefDescription>

Data Types

- type **MockCall**

Public Member Functions

- type(MockCall) function, public **newMockCall** (name)

17.42.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

The documentation for this module was generated from the following file:

- MockCall.F90

17.43 MockListener_mod Module Reference

Data Types

- type **MockListener**

Public Member Functions

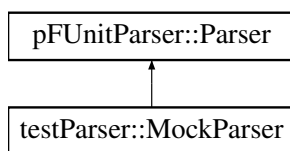
- subroutine **startTest** (this, testName)

The documentation for this module was generated from the following file:

- MockListener.F90

17.44 testParser::MockParser Class Reference

Inheritance diagram for testParser::MockParser:



Public Member Functions

- def **__init__**
- def **nextLine**
- def **reset**

Public Attributes

- **saveLines**
- **lines**
- **outputFile**
- **outLines**
- **tests**
- **mpitests**
- **currentSelfObjectName**

The documentation for this class was generated from the following file:

- testParser.py

17.45 MockRepository_mod Module Reference

<BriefDescription>

Data Types

- type **MockRepository**

Public Member Functions

- type(MockRepository) function, pointer, public **newMockRepository** ()
- subroutine **expectCall** (this, obj, method)

17.45.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

The documentation for this module was generated from the following file:

- MockRepository.F90

17.46 MockSUT_mod Module Reference

Data Types

- type **MockSUT**

Public Member Functions

- type(MockSUT) function, allocatable, public **newMockSUT** (repository)
- subroutine **method1** (this)

The documentation for this module was generated from the following file:

- Test_MockRepository.F90

17.47 testParser::MockWriter Class Reference

Public Member Functions

- def **__init__**
- def **write**

Public Attributes

- **parser**

The documentation for this class was generated from the following file:

- testParser.py

17.48 CodeUtilities::module Class Reference

Public Member Functions

- def **__init__**
- def **generate**
- def **addDeclaration**
- def **addImplementation**
- def **addRoutineUnit**
- def **addInterfaceBlock**
- def **getName**
- def **setFileName**
- def **getFileName**

Public Attributes

- **name**
- **declarations**
- **implementations**
- **generation**
- **fileName**

The documentation for this class was generated from the following file:

- `CodeUtilities.py`

17.49 `MpiContext_mod` Module Reference

<BriefDescription>

Data Types

- type **MpiContext**
- interface **newMpiContext**

Public Member Functions

- subroutine **barrier** (this)
- integer function **getMpiCommunicator** (this)

17.49.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

The documentation for this module was generated from the following file:

- `MpiContext.F90`

17.50 `MpiStubs_mod` Module Reference

<BriefDescription>

Public Member Functions

- subroutine, public **`MPI_Comm_rank`** (comm, rank, ier)
- subroutine, public **`MPI_Comm_size`** (comm, size, ier)
- subroutine, public **`MPI_Comm_dup`** (comm, newComm, ier)
- subroutine, public **`MPI_Comm_group`** (comm, group, ier)
- subroutine, public **`MPI_Group_range_incl`** (group, n, ranges, newGroups, ier)
- subroutine, public **`MPI_Comm_create`** (comm, group, newComm, ier)

Public Attributes

- integer, parameter, public **`MPI_COMM_WORLD`** = -1
- integer, parameter, public **`MPI_COMM_NULL`** = -1
- integer, parameter, public **`MPI_COMM_SUCCESS`** = 0

17.50.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

The documentation for this module was generated from the following file:

- MpiStubs.F90

17.51 **MpiTestCase_mod** Module Reference

<BriefDescription>

Data Types

- type **MpiTestCase**
- interface **runMethod**

Public Member Functions

- recursive subroutine **runBare** (this)
- subroutine **setUp** (this)

17.51.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

The documentation for this module was generated from the following file:

- MpiTestCase.F90

17.52 `MpiTestMethod_mod` Module Reference

<BriefDescription>

Data Types

- interface `mpiMethod`
- type `MpiTestMethod`
- interface `newMpiTestMethod`

17.52.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

The documentation for this module was generated from the following file:

- `MpiTestMethod.F90`

17.53 `pFUnitParser::MyError` Class Reference

Inherits `Exception`.

Public Member Functions

- `def __init__`
- `def __str__`

Public Attributes

- **value**

The documentation for this class was generated from the following file:

- pFUnitParser.py

17.54 ParallelContext_mod Module Reference

<BriefDescription>

Data Types

- interface **allReduceLogical**
- interface **gatherInteger**
- interface **gatherLogical**
- interface **gatherString**
- interface **getNumProcesses**
- type **ParallelContext**
- interface **processRank**
- interface **sum**

17.54.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

The documentation for this module was generated from the following file:

- ParallelContext.F90

17.55 ParallelException_mod Module Reference

<BriefDescription>

Data Types

- interface **anyExceptions**
- interface **getNumExceptions**

Public Member Functions

- subroutine, public **gather** (context)

17.55.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

The documentation for this module was generated from the following file:

- ParallelException.F90

17.56 ParameterizedTestCase_mod Module Reference

<BriefDescription>

Data Types

- type **AbstractTestParameter**
- interface **getParameterString**
- type **ParameterizedTestCase**

Public Attributes

- integer, parameter, public **MAX_LEN_LABEL** = 32

17.56.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

The documentation for this module was generated from the following file:

- ParameterizedTestCase.F90

17.57 Params_mod Module Reference

<BriefDescription>

Public Attributes

- integer, parameter **R32** = selected_real_kind(p=6)
- integer, parameter **R64** = selected_real_kind(p=14)
- integer, parameter **C32** = selected_real_kind(p=6)
- integer, parameter **C64** = selected_real_kind(p=14)
- integer, parameter **NEQP** = 0
- integer, parameter **EQP** = 1
- integer, parameter **GTP** = 2
- integer, parameter **GEP** = 3
- integer, parameter **LTP** = 4
- integer, parameter **LEP** = 5
- integer, parameter **RELEQP** = 6

17.57.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

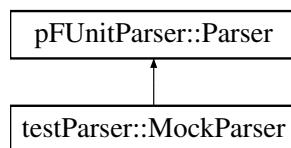
<A note here.> <Or starting here...>

The documentation for this module was generated from the following file:

- Params.F90

17.58 pFUnitParser::Parser Class Reference

Inheritance diagram for pFUnitParser::Parser:



Public Member Functions

- def **__init__**
- def **run**
- def **isComment**
- def **nextLine**
- def **makeSuite**
- def **final**

Public Attributes

- **inputFile**
- **outputFile**
- **moduleName**
- **suiteName**
- **testCase**
- **setUp**
- **tearDown**
- **defaultName**
- **fileName**
- **lineNumber**
- **parameters**
- **parameterType**
- **tests**
- **mpitests**
- **actions**

The documentation for this class was generated from the following file:

- pFUnitParser.py

17.59 Test_Parameters_mod::peCase Type Reference

Public Attributes

- integer **p1**
- integer **p2**

The documentation for this type was generated from the following file:

- parameterizedTests.pf

17.60 pFUnit Module Reference

<BriefDescription>

17.60.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

The documentation for this module was generated from the following file:

- pFUnitPackage.F90

17.61 pFUnit_mod Module Reference

<BriefDescription>

Public Member Functions

- subroutine, public **initialize** (useMpi)
- subroutine, public **finalize** (successful)

17.61.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

The documentation for this module was generated from the following file:

- pFUnit.F90

17.62 PrivateException_mod Module Reference

<BriefDescription>

Data Types

- type **Exception**
- type **ExceptionList**
- interface **newException**

Public Member Functions

- type(ExceptionList) function, public **newExceptionList** ()
- logical function **noExceptions** (this)

Public Attributes

- integer, parameter, public **MAXLEN_MESSAGE** = 80*15
- integer, parameter, public **MAXLEN_FILE_NAME** = 80
- character(len=*), parameter, public **NULL_MESSAGE** = "

17.62.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

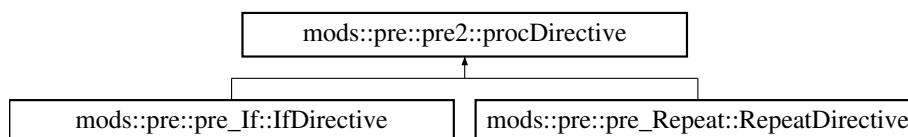
<A note here.> <Or starting here...>

The documentation for this module was generated from the following file:

- Exception.F90

17.63 mods::pre::pre2::procDirective Class Reference

Inheritance diagram for mods::pre::pre2::procDirective:



Public Member Functions

- def `__init__`
- def `getLength`
- def `match`
- def `evaluate`
- def `getNewPosition`
- def `addTokenRE`
- def `searchTokenToEnd`
- def `searchTokenToPosition`
- def `finditerTokenToPosition`
- def `makeTokenErrorMessage`

Public Attributes

- `name`
- `newPosition`
- `tokens`
- `TokenREs`

17.63.1 Member Function/Subroutine Documentation

17.63.1.1 `def mods::pre::pre2::procDirective::addTokenRE (self, args, key, defaultToken, prefix = r' ' ' (?i) [\t]* ' ' , postfix = ' ')`

Add a token/create an RE with a prefix that by default ignores preceding whitespace. Stores the RE in a dictionary for this directive.

The documentation for this class was generated from the following file:

- pre2.py

17.64 RemoteProxyTestCase_mod Module Reference

<BriefDescription>

Data Types

- interface **RemoteProxyTestCase**

17.64.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

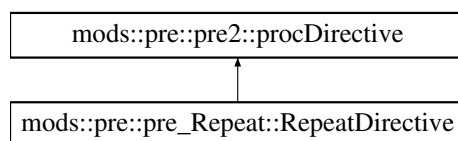
<A note here.> <Or starting here...>

The documentation for this module was generated from the following file:

- RemoteProxyTestCase.F90

17.65 mods::pre::pre_Repeat::RepeatDirective Class Reference

Inheritance diagram for mods::pre::pre_Repeat::RepeatDirective:



Public Member Functions

- def **evaluate**

Public Attributes

- **startPosition**
- **newPosition**

The documentation for this class was generated from the following file:

- pre_Repeat.py

17.66 ResultPrinter_mod Module Reference

<BriefDescription>

Data Types

- type **ResultPrinter**

Public Member Functions

- type(ResultPrinter) function, public **newResultPrinter** (unit)
- subroutine **addError** (this, testName, exceptions)
- subroutine **startTest** (this, testName)
- subroutine **printHeader** (this, runTime)

17.66.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

The documentation for this module was generated from the following file:

- ResultPrinter.F90

17.67 RobustRunner_mod Module Reference

<BriefDescription>

Data Types

- interface **RobustRunner**
- type **TestCaseMonitor**

Public Member Functions

- type(RobustRunner) function **newRobustRunner_unit** (remoteRunCommand, unit)
- subroutine **runWithResult** (this, aTest, context, result)
- subroutine **launchRemoteRunner** (this, numSkip)
- subroutine **startTest** (this, testName)
- subroutine **addError** (this, testName, exceptions)
- type(TestResult) function **createTestResult** (this)

17.67.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

The documentation for this module was generated from the following file:

- RobustRunner.F90

17.68 robustTestSuite_mod Module Reference

Public Member Functions

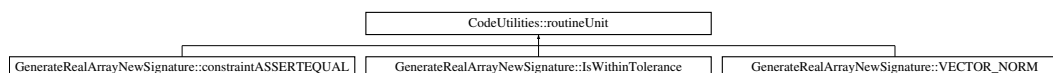
- type(TestSuite) function, public **suite** ()
- subroutine **testRunSucceeds** ()
- subroutine **testRunStops** ()

The documentation for this module was generated from the following file:

- robustTestSuite.F90

17.69 CodeUtilities::routineUnit Class Reference

Inheritance diagram for CodeUtilities::routineUnit:



Public Member Functions

- def **__init__**
- def **setName**
- def **getName**
- def **setDeclaration**
- def **addDeclaration**
- def **setImplementation**
- def **getDeclaration**
- def **getDeclarations**
- def **getImplementation**
- def **clearDeclarations**

Public Attributes

- **name**
- **declaration**
- **declarations**
- **implementation**

The documentation for this class was generated from the following file:

- CodeUtilities.py

17.70 SerialContext_mod Module Reference

<BriefDescription>

Data Types

- type **SerialContext**

Public Member Functions

- type(SerialContext) function, public **newSerialContext** ()

Public Attributes

- type(SerialContext), parameter, public **THE_SERIAL_CONTEXT** = SerialContext(1)

17.70.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

The documentation for this module was generated from the following file:

- SerialContext.F90

17.71 SimpleTestCase_mod Module Reference

Data Types

- interface **method**
- type **SimpleTestCase**

Public Member Functions

- type(TestSuite) function, public **suite** ()
- type(SimpleTestCase) function, public **newSimpleTestCase** (name, user-Method)
- subroutine, public **method1** (this)
- subroutine, public **method2** (this)
- subroutine, public **methodWith2Exceptions** (this)
- subroutine **delete_** (this)

The documentation for this module was generated from the following file:

- SimpleTestCase.F90

17.72 SourceLocation_mod Module Reference

<BriefDescription>

Data Types

- type **SourceLocation**

Public Attributes

- character(len=MAXLEN_FILE_NAME), parameter, public **UNKNOWN_FILE_NAME** = '<unknown file>'
- integer, parameter, public **UNKNOWN_LINE_NUMBER** = -1
- type(SourceLocation), parameter, public **UNKNOWN_SOURCE_LOCATION** = SourceLocation()

17.72.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

The documentation for this module was generated from the following file:

- SourceLocation.F90

17.73 SphericalCoordinates_mod Module Reference

Data Types

- interface **SphericalCoordinates**

The documentation for this module was generated from the following file:

- SphericalCoordinates.F90

17.74 TestListener_mod::startTest Interface Reference

The documentation for this interface was generated from the following file:

- TestListener.F90

17.75 StringConversionUtilities_mod Module Reference

<BriefDescription>

Data Types

- interface **toString**

Public Member Functions

- character(len=len_trim(a)+1+len_trim(b)) function, public **appendWithSpace** (a, b)
- character(len=:) function, allocatable, public **nullTerminate** (string)
- character(len=:) function, allocatable, public **unlessScalar** (vShape, string)

Public Attributes

- integer, parameter, public **MAXLEN_STRING** = 80

17.75.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

The documentation for this module was generated from the following file:

- StringConversionUtilities.F90

17.76 SubsetRunner_mod Module Reference

<BriefDescription>

Data Types

- interface **SubsetRunner**

Public Member Functions

- subroutine **addFailure** (this, testName, exceptions)
- subroutine **startTest** (this, testName)

17.76.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

The documentation for this module was generated from the following file:

- SubsetRunner.F90

17.77 SurrogateTestCase_mod Module Reference

<BriefDescription>

Data Types

- interface **getName**
- interface **runBare**
- interface **setName**
- type **SurrogateTestCase**

17.77.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

The documentation for this module was generated from the following file:

- SurrogateTestCase.F90

17.78 SUT_mod Module Reference

Data Types

- type **SUT**

The documentation for this module was generated from the following file:

- Test_MockRepository.F90

17.79 Test_Assert_mod Module Reference

Public Member Functions

- type(TestSuite) function, public **suite** ()
- subroutine **testAssertEqualStringDiffer1st** ()

The documentation for this module was generated from the following file:

- Test_Assert.F90

17.80 Test_AssertBasic_mod Module Reference

Public Member Functions

- type(TestSuite) function, public **suite** ()
- subroutine **testAssertTrueF** ()
- subroutine **testAssertIsFinite** ()

The documentation for this module was generated from the following file:

- Test_AssertBasic.F90

17.81 Test_AssertComplex_mod Module Reference

Public Member Functions

- type(TestSuite) function, public **suite** ()
- subroutine **testEquals_C_complexScalar** ()
- subroutine **testEquals_C_0D1D** ()
- subroutine **testEquals_C_1D_nonConformable1** ()
- subroutine **testEquals_C_2D_SingleElementDifferent** ()
- subroutine **testEquals_C_MultiD_SingleElementDifferent** ()
- subroutine **testEquals_C_MultiD_SingleElementDifferent1**
- subroutine **testEquals_C_MultiD_SingleElementDifferent2**
- subroutine **testEquals_C_MultiD_SingleElementDifferent3**
- subroutine **testEquals_C_MultiD_SingleElementDifferent4**
- subroutine **testEquals_C_MultiD_SingleElementDifferent5**
- subroutine **testEquals_C_MultiDMultiPrec_SingleEltDiff** ()
- subroutine **testEquals_C_MultiDMultiPrec_SingleEltDiff1** ()

- subroutine **testEquals_C_MultiDMultiPrec_SingleEltDiff2** ()
- subroutine **testEquals_C_MultiDMultiPrec_SingleEltDiff3** ()
- subroutine **testEquals_C_MultiDMultiPrec_SingleEltDiff4** ()
- subroutine **testEquals_C_MultiDMultiPrec_SingleEltDiff5** ()
- subroutine **testEquals_C_MultiDMultiPrec_SingleEltDiff6** ()
- subroutine **testEquals_C_MultiDMultiPrec_SingleEltDiff7** ()
- subroutine **testEquals_C_MultiDMultiPrec_SingleEltDiff8** ()
- subroutine **testEquals_ScalarWithTolerance** ()
- subroutine **testEquals_C_MultiDWithTolerance** ()
- subroutine **testEquals_C_MultiDWithTolerance1** ()
- subroutine **testEquals_C_MultiDWithTolerance64** ()
- subroutine **testEquals_C_MultiDWithTolerance64_1** ()
- subroutine **testEquals_C_MultiDWithTolerance64_2** ()
- subroutine **testEquals_C_MultiDSourceLocation** ()
- subroutine **testEquals_4DPComplex_DifferenceReport** ()
- subroutine **assertCatch** (string, location)

The documentation for this module was generated from the following file:

- Test_AssertComplex.F90

17.82 Test_AssertInteger_mod Module Reference

Public Member Functions

- type(TestSuite) function, public **suite** ()
- subroutine **testAssertEqual_equal** ()

The documentation for this module was generated from the following file:

- Test_AssertInteger.F90

17.83 Test_AssertReal_mod Module Reference

Public Member Functions

- type(TestSuite) function, public **suite** ()
- subroutine **testEquals_0D1D** ()
- subroutine **testEquals_1D_nonConformable1** ()
- subroutine **testEquals_2D_SingleElementDifferent** ()

- subroutine **testEquals_MultiD_SingleElementDifferent** ()
- subroutine **testEquals_MultiD_SingleElementDifferent1**
- subroutine **testEquals_MultiD_SingleElementDifferent2**
- subroutine **testEquals_MultiD_SingleElementDifferent3**
- subroutine **testEquals_MultiD_SingleElementDifferent4**
- subroutine **testEquals_MultiD_SingleElementDifferent5**
- subroutine **testEquals_MultiDMultiPrec_SingleEltDiff** ()
- subroutine **testEquals_MultiDMultiPrec_SingleEltDiff1** ()
- subroutine **testEquals_MultiDMultiPrec_SingleEltDiff2** ()
- subroutine **testEquals_MultiDMultiPrec_SingleEltDiff3** ()
- subroutine **testEquals_MultiDMultiPrec_SingleEltDiff4** ()
- subroutine **testEquals_MultiDMultiPrec_SingleEltDiff5** ()
- subroutine **testEquals_MultiDMultiPrec_SingleEltDiff6** ()
- subroutine **testEquals_MultiDMultiPrec_SingleEltDiff7** ()
- subroutine **testEquals_MultiDMultiPrec_SingleEltDiff8** ()
- subroutine **testEquals_ScalarWithTolerance** ()
- subroutine **testEquals_ScalarWithToleranceNoMsg** ()
- subroutine **testEquals_VectorWithToleranceNoMsg** ()
- subroutine **testEquals_MultiDWithTolerance** ()
- subroutine **testEquals_MultiDWithTolerance1** ()
- subroutine **testEquals_MultiDWithTolerance64** ()
- subroutine **testEquals_MultiDWithTolerance64_1** ()
- subroutine **testEquals_MultiDWithTolerance64_2** ()
- subroutine **testEquals_MultiDSourceLocation** ()
- subroutine **testEquals_ScalarAndLocation** ()
- subroutine **testEquals_ScalarInfinity_equal** ()
- subroutine **testEquals_ScalarInfinity_unequal_A** ()
- subroutine **testEquals_ScalarInfinity_unequal_B** ()
- subroutine **testEquals_ScalarInfinity_unequal_C** ()
- subroutine **assertCatch** (string, location)

The documentation for this module was generated from the following file:

- Test_AssertReal.F90

17.84 Test_BasicOpenMP_mod Module Reference

Public Member Functions

- type(TestSuite) function, public **suite** ()
- subroutine **testRunWithOpenMP** ()

- subroutine **testSerializeExceptions** ()

The documentation for this module was generated from the following file:

- Test_BasicOpenMP.F90

17.85 Test_Exception_mod Module Reference

Public Member Functions

- type(TestSuite) function, public **suite** ()
- subroutine **testGetNumExceptions** ()
- subroutine **testCatchSucceed** ()
- subroutine **testGetLineNumber** ()
- subroutine **testGetFileName** ()

The documentation for this module was generated from the following file:

- Test_Exception.F90

17.86 Test_FixtureTestCase_mod Module Reference

Public Member Functions

- type(TestSuite) function, public **suite** ()
- subroutine **testRunWithFixture** ()
- subroutine **testBrokenTestCase** ()
- subroutine **testBrokenSetUpCase** ()

The documentation for this module was generated from the following file:

- Test_FixtureTestCase.F90

17.87 Test_LinearInterpolator_mod::Test_LinearInterpolator Type - Reference

Public Member Functions

- type([Test_LinearInterpolator](#)) function **newTest_LinearInterpolator** (name, userMethod)

- procedure **setUp**
- procedure **tearDown**
- procedure **runMethod**

Public Attributes

- type(LinearInterpolator) **interpolator**
- procedure(runMethod), pointer **userMethod** = > null()

The documentation for this type was generated from the following file:

- Test_LinearInterpolator.pf

17.88 Test_LinearInterpolator_mod Module Reference

Data Types

- type [Test_LinearInterpolator](#)

Public Member Functions

- type([Test_LinearInterpolator](#)) function **newTest_LinearInterpolator** (name, userMethod)
- subroutine **setUp** (this)
- subroutine **tearDown** (this)
- subroutine **runMethod** (this)
- subroutine **testBracketAtNode** (this)
- subroutine **testBracketInterior** (this)
- subroutine **testInterpolateAtNode** (this)
- subroutine **testInterpolateConstant** (this)

The documentation for this module was generated from the following file:

- Test_LinearInterpolator.pf

17.89 Test_MockCall_mod Module Reference

Public Member Functions

- type(TestSuite) function, public **suite** ()

- subroutine **testExpectOneIntegerArgument**
- subroutine **testFailExpectOneIntegerArgument**

The documentation for this module was generated from the following file:

- Test_MockCall.F90

17.90 Test_MockRepository_mod Module Reference

Public Member Functions

- type(TestSuite) function, public **suite** ()
- subroutine **testNoAction** ()

The documentation for this module was generated from the following file:

- Test_MockRepository.F90

17.91 Test_mod Module Reference

<BriefDescription>

Data Types

- interface **countTestCases**
- interface **run**
- type **Test**

17.91.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

The documentation for this module was generated from the following file:

- Test.F90

17.92 Test_MpiContext_mod Module Reference

Public Member Functions

- type(TestSuite) function, public **suite** ()
- subroutine **testNumProcesses1** (context)

The documentation for this module was generated from the following file:

- Test_MpiContext.F90

17.93 Test_MpiException_mod Module Reference

Public Member Functions

- type(TestSuite) function, public **suite** ()
- subroutine **test_anyExceptions_none** (this)
- subroutine **test_getNumExceptions** (this)
- subroutine **test_gather** (this)

The documentation for this module was generated from the following file:

- Test_MpiException.F90

17.94 Test_MpiTestCase_mod Module Reference

Data Types

- interface **method**
- type **Test_MpiTestCase**

Public Member Functions

- type(`TestSuite`) function, public **suite** ()
- type(`Test_MpiTestCase`) function, public **newTest_MpiTestCase** (name, userMethod, numProcesses)
- subroutine **testRunOn2Processors** (this)
- subroutine **brokenProcess1** (this)
- subroutine **brokenOnProcess2** (this)
- subroutine **testFailOn1** (this)
- subroutine **testFailOn2** (this)
- subroutine **testTooFewProcs** (this)
- recursive subroutine **runMethod** (this)

The documentation for this module was generated from the following file:

- `Test_MpiTestCase.F90`

17.95 `Test_Parameters_mod::Test_Parameters` Interface Reference

Public Member Functions

- procedure, nopass **getParameters**
- procedure **getParameterString** => `getParameterString_`
- procedure **runMethod**
- type([Test_Parameters](#)) function **newTest** (name, method, npe, p1, p2)

Public Attributes

- integer **p1**
- integer **p2**
- procedure(runMethod), pointer **userMethod** = > null()

The documentation for this interface was generated from the following file:

- `parameterizedTests.pf`

17.96 `Test_Parameters_mod` Module Reference

Data Types

- type [peCase](#)
- interface [Test_Parameters](#)

17.97

Test_RestrictSphericalCoordinates_mod::Test_RestrictSphericalCoordinates

Interface Reference

107

Public Member Functions

- type([Test_Parameters](#)) function **newTest** (name, method, npe, p1, p2)
- type([peCase](#)) function, dimension(:), allocatable **getParameters** ()
- character(:) function, allocatable **getParameterString_** (this)
- subroutine **runMethod** (this)
- subroutine, public **testParamBroken** (this)

The documentation for this module was generated from the following file:

- parameterizedTests.pf

17.97 Test_RestrictSphericalCoordinates_mod::Test_Restrict-SphericalCoordinates Interface Reference

Public Member Functions

- procedure, nopass **getParameters**
- procedure **getParameterString**
- procedure **runMethod**
- type([Test_RestrictSphericalCoordinates](#)) function **newTest** (name, method, lat, lon, restrictedLat, restrictedLon)

Public Attributes

- real **lat**
- real **lon**
- real **restrictedLat**
- real **restrictedLon**
- type(SphericalCoordinates) **unrestricted**
- type(SphericalCoordinates) **restricted**
- procedure(runMethod), pointer **userMethod** = > null()

The documentation for this interface was generated from the following file:

- Test_RestrictedSphericalCoordinates.pf

17.98 Test_RestrictSphericalCoordinates_mod Module Reference

Data Types

- type [LatLonCase](#)
- interface [Test_RestrictSphericalCoordinates](#)

Public Member Functions

- type([Test_RestrictSphericalCoordinates](#)) function **newTest** (name, method, lat, lon, restrictedLat, restrictedLon)
- type([LatLonCase](#)) function, dimension(:), allocatable **getParameters** ()
- subroutine **testRestrict** (this)
- character(:) function, allocatable **getParameterString** (this)
- subroutine **runMethod** (this)

The documentation for this module was generated from the following file:

- Test_RestrictedSphericalCoordinates.pf

17.99 Test_RobustRunner_mod Module Reference

Public Member Functions

- type(TestSuite) function, public **suite** ()
- subroutine **testRunVariety** ()

The documentation for this module was generated from the following file:

- Test_RobustRunner.F90

17.100 Test_SimpleTestCase_mod Module Reference

Public Member Functions

- type(TestSuite) function, public **suite** ()
- type(TestSuite) function **internalSuite** ()
- subroutine **testWorks** ()
- subroutine **testFails** ()

- subroutine **testRunSuite** ()

The documentation for this module was generated from the following file:

- Test_SimpleTestCase.F90

17.101 Test_StringConversionUtilities_mod Module Reference

Public Member Functions

- type(TestSuite) function, public **suite** ()
- subroutine **testToStringInteger1D** ()

The documentation for this module was generated from the following file:

- Test_StringConversionUtilities.F90

17.102 Test_TestMethod_mod Module Reference

Public Member Functions

- type(TestSuite) function, public **suite** ()
- subroutine **testMethodWasRun** ()
- subroutine **testWasRun** ()

The documentation for this module was generated from the following file:

- Test_TestMethod.F90

17.103 Test_TestResult_mod Module Reference

Public Member Functions

- type(TestSuite) function, public **suite** ()
- subroutine **testGetNumRun** ()
- subroutine **testGetNumFailed** ()
- subroutine **testAddListenerEnd** ()
- subroutine **testAddListenerStart** ()
- subroutine **testAddListenerFailure** ()

The documentation for this module was generated from the following file:

- Test_TestResult.F90

17.104 Test_TestSuite_mod Module Reference

Data Types

- type **Verbose**

Public Member Functions

- type(TestSuite) function, public **suite** ()
- subroutine **testCountTestCases** ()
- subroutine **testCountTestCasesNestedA** ()
- subroutine **testCountTestCasesNestedB** ()
- subroutine **testCountTestCasesNestedC** ()
- subroutine **testGetTestCases** ()
- subroutine **myTestMethod** ()

The documentation for this module was generated from the following file:

- Test_TestSuite.F90

17.105 Test_UnixProcess_mod Module Reference

Public Member Functions

- type(TestSuite) function, public **suite** ()
- subroutine **testIsActive** ()

The documentation for this module was generated from the following file:

- Test_UnixProcess.F90

17.106 TestCase_mod Module Reference

<BriefDescription>

Data Types

- type **ConcreteSurrogate**
- interface **runMethod**
- type **TestCase**
- type **TestCaseReference**

Public Member Functions

- recursive subroutine **runBare** (this)
- recursive subroutine **runBare_surrogate** (this)

17.106.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

The documentation for this module was generated from the following file:

- TestCase.F90

17.107 TestFailure_mod Module Reference

<BriefDescription>

Data Types

- type **TestFailure**

17.107.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

The documentation for this module was generated from the following file:

- TestFailure.F90

17.108 mods::pre::pre_If::TestIfDirective Class Reference

Public Member Functions

- def **testTokenNotFound1**
- def **testNoTest**
- def **testIfTestFalse**
- def **testIfTestTrue1**
- def **testIfTestTrue2**
- def **testIfClearTokens**
- def **testIfClearTokensUntilEnd1**

The documentation for this class was generated from the following file:

- pre_If.py

17.109 mods::pre::interleavedp::TestInterleaved Class Reference

Public Member Functions

- def **test_InOrder**

- def **test_NumberMismatch**
- def **test_OrderMismatch1**
- def **test_OrderMismatch2**
- def **test_OrderMismatch3**
- def **test_ElseMid1**
- def **test_ElseMid2**
- def **test_ElseMid3**
- def **test_ElseMid4**
- def **test_ElseMid5**
- def **test_ElseMid6**
- def **test_ElseMid7**
- def **test_ElseMid8**
- def **test_ElseMid9**
- def **test_ElseMid10**

The documentation for this class was generated from the following file:

- interleavedp.py

17.110 TestListener_mod Module Reference

<BriefDescription>

Data Types

- interface **addFailure**
- interface **endTest**
- type **ListenerPointer**
- interface [startTest](#)
- type **TestListener**

17.110.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

The documentation for this module was generated from the following file:

- TestListener.F90

17.111 TestMethod_mod Module Reference

<BriefDescription>

Data Types

- interface **empty**
- interface **newTestMethod**
- type **TestMethod**

17.111.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

The documentation for this module was generated from the following file:

- TestMethod.F90

17.112 mods::pre::parseArgs::TestParseArgs Class Reference

Public Member Functions

- def **test_ParseArgs_OneArgWithBrackets1**
- def **test_ParseArgs_OneArgWithBrackets2**
- def **test_ParseArgs_OneArgWithBrackets3**
- def **test_ParseArgs_OneArgWithBrackets4**
- def **test_ParseArgs_OneArgWithBrackets5**
- def **test_ParseArgs_OneArgWithBrackets6**
- def **test_ParseArgs_OneArgWithBrackets7**
- def **test_ParseArgs_oneArg**
- def **test_ParseArgs_twoArgs1**
- def **test_ParseArgs_twoArgs2**
- def **test_ParseArgs_oneArgArray1**
- def **test_ParseArgs_TwoArgArray**
- def **test_ParseArgs_ThreeArgs**

The documentation for this class was generated from the following file:

- parseArgs.py

17.113 testParser::TestParseLine Class Reference

Public Member Functions

- def **testCppSetLineAndFile**
- def **testGetSubroutineName**
- def **testGetSelfObjectName**
- def **testGetTypeNames**
- def [testAtTest](#)
- def [testAtTestNoParens](#)
- def [testAtTestFail](#)
- def [testAtTestSkipComment](#)
- def [testAtMpiTest](#)
- def [testMatchAtTestCase](#)
- def [testMatchAtAssertEqual](#)
- def [testMatchAtAssertOther](#)
- def [testMatchAtMpiAssert](#)
- def [testMatchAtBefore](#)
- def [testMatchAtAfter](#)
- def [testMatchAtSuite](#)

17.113.1 Member Function/Subroutine Documentation

17.113.1.1 `def testParser::TestParseLine::testAtMpiTest (self)`

Check that a line starting with '@mpitest' is detected as an annotation and that optional parameters are collected.

17.113.1.2 `def testParser::TestParseLine::testAtTest (self)`

Check that a line starting with '@test' is detected as an annotation.

17.113.1.3 `def testParser::TestParseLine::testAtTestFail (self)`

Check that useful error is sent if next line is not properly formatted.

17.113.1.4 `def testParser::TestParseLine::testAtTestNoParens (self)`

Check that test procedure with no parens is accepted.

17.113.1.5 `def testParser::TestParseLine::testAtTestSkipComment (self)`

Ignore comment lines between @test and subroutine foo().

17.113.1.6 `def testParser::TestParseLine::testMatchAtAfter (self)`

Check that a line starting with '@after*' ...

17.113.1.7 `def testParser::TestParseLine::testMatchAtAssertEqual (self)`

Check that a line starting with '@assertEqual' is detected as an annotation.

17.113.1.8 `def testParser::TestParseLine::testMatchAtAssertOther (self)`

Check that a line starting with '@assert*' is detected as an annotation.

17.113.1.9 def testParser::TestParseLine::testMatchAtBefore (self)

Check that a line starting with '@before*' ...

17.113.1.10 def testParser::TestParseLine::testMatchAtMpiAssert (self)

Check that a line starting with '@mpiAssert*' is detected as an annotation.

17.113.1.11 def testParser::TestParseLine::testMatchAtSuite (self)

Check that a line starting with '@suite changes the suite name ...

17.113.1.12 def testParser::TestParseLine::testMatchAtTestCase (self)

Check that a line starting with '@testcase' is detected as an annotation.

The documentation for this class was generated from the following file:

- testParser.py

17.114 mods::pre::pre_Repeat::TestRepeatDirective Class Reference**Public Member Functions**

- def test_copyBlock1
- def test_copyBlock2
- def test_copyBlock2Vars
- def test_copyBlock2VarsMulti
- def test_copyBlock2VarsMultiWithStrings
- def test_copyNaiveRecursion
- def test_copyNaiveRecursion1
- def test_copyFunction1

The documentation for this class was generated from the following file:

- pre_Repeat.py

17.115 TestResult_mod Module Reference

<BriefDescription> Note: A possible extension point for user-specialized TestResults.

Data Types

- type **TestResult**

Public Member Functions

- type(TestResult) function, public **newTestResult** ()
- subroutine **addError** (this, aTest, exceptions)
- integer function **failureCount** (this)
- subroutine **addListener** (this, listener)

17.115.1 Detailed Description

<BriefDescription> Note: A possible extension point for user-specialized TestResults.

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

The documentation for this module was generated from the following file:

- TestResult.F90

17.116 TestRunner_mod Module Reference

<BriefDescription>

Data Types

- interface **newTestRunner**
- type **TestRunner**

Public Member Functions

- type(TestRunner) function **newTestRunner_unit** (unit)
- type(TestResult) function **run** (this, aTest, context)
- subroutine **startTest** (this, testName)

17.116.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

The documentation for this module was generated from the following file:

- TestRunner.F90

17.117 TestSuite_mod Module Reference

<BriefDescription>

Data Types

- interface **newTestSuite**
- type **TestReference**
- type **TestSuite**

Public Member Functions

- recursive subroutine **addTest** (this, aTest)

17.117.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

The documentation for this module was generated from the following file:

- TestSuite.F90

17.118 ThrowFundamentalTypes_mod Module Reference

<BriefDescription>

Data Types

- interface **throwDifferentValues**
- interface **throwDifferentValuesWithLocation**

Public Member Functions

- subroutine, public **throwNonConformable** (shapeExpected, shapeFound, location)
- character(len=MAXLEN_SHAPE) function, public **locationFormat** (iLocation)

17.118.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

The documentation for this module was generated from the following file:

- ThrowFundamentalTypes.F90

17.119 UnixPipeInterfaces_mod Module Reference

<BriefDescription>

Data Types

- interface **fgets**
- interface **free**
- interface **getdelim**
- interface **getline**
- interface **pclose**
- interface **popen**

Public Attributes

- integer(C_INT), parameter, public **CLOSE_FAILED** = -1

17.119.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

<A note here.> <Or starting here...>

The documentation for this module was generated from the following file:

- UnixPipeInterfaces.F90

17.120 UnixProcess_mod Module Reference

<BriefDescription>

Data Types

- interface **UnixProcess**

Public Member Functions

- character(len=:) function, allocatable **makeCommand** (baseCommand, runIn-Background)
- logical function **isActive** (this)
- character(len=:) function, allocatable **getDelim** (this, delimiter)
- integer function **getPid** (this)

17.120.1 Detailed Description

<BriefDescription>

Author

Tom Clune, NASA/GSFC

Date

07 Nov 2013

Note

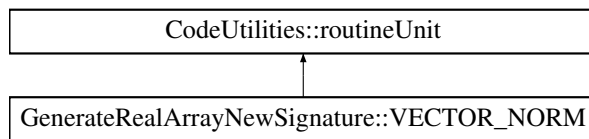
<A note here.> <Or starting here...>

The documentation for this module was generated from the following file:

- UnixProcess.F90

17.121 GenerateRealArrayNewSignature::VECTOR_NORM Class - Reference

Inheritance diagram for GenerateRealArrayNewSignature::VECTOR_NORM:



Public Member Functions

- def __init__

Public Attributes

- rank
- fType
- precision
- name
- declaration
- declarations

The documentation for this class was generated from the following file:

- GenerateRealArrayNewSignature.py