epiworld

0.0-1

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Chapter 1

Source code

Although epiworld is a header-only C++ library, we do make use of other cool projects in some of the examples and for testing. The cxxopts library provides a smooth interface for using options in your C++ program. catch2 is a great C++ unit-tests framework that we have use in other projects.

Although you are free to use epiworld/, we also have a single-header version that incorporates all its components here.

Chapter 2

Hierarchical Index

2.1 Class Hierarchy

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

Chapter 3

Class Index

3.1 Class List

Here are the classes, structs, unions and interfaces with brief descriptions:

Chapter 4

File Index

4.1 File List

Here is a list of all documented files with brief descriptions:

Chapter 5

Class Documentation

5.1 Catch::Clara::accept_many_t Struct Reference

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

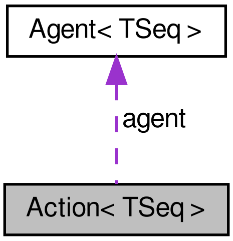
- include/catch2/catch_amalgamated.hpp

5.2 Action< TSeq > Struct Template Reference

Action data for update an agent.

`#include <config.hpp>`

Collaboration diagram for Action< TSeq >:



Public Member Functions

- Action (Agent< TSeq > ∗agent_, VirusPtr< TSeq > virus_, ToolPtr< TSeq > tool_, epiworld_fast_int new↩ _status_, epiworld_fast_int queue_, ActionFun< TSeq > call_)

  Construct a new Action object.

Public Attributes

- Agent< TSeq > * **agent**
- VirusPtr< TSeq > **virus**
- ToolPtr< TSeq > **tool**
- epiworld_fast_int **new_status**
- epiworld_fast_int **queue**
- ActionFun< TSeq > **call**

5.2.1 Detailed Description

template<typename TSeq>
struct Action< TSeq >

Action data for update an agent.

Template Parameters

TSeq	

5.2.2 Constructor & Destructor Documentation

5.2.2.1 Action()

```
template<typename TSeq >
Action< TSeq >::Action (
            Agent< TSeq > * agent_,
            VirusPtr< TSeq > virus_,
            ToolPtr< TSeq > tool_,
            epiworld_fast_int new_status_,
            epiworld_fast_int queue_,
            ActionFun< TSeq > call_ )  [inline]
```

Construct a new Action object.

All the parameters are rather optional.

Parameters

*agent_*	Agent over who the action will happen
*virus_*	Virus to add
*tool_*	Tool to add
virus_idx	Index of virus to be removed (if needed)
tool_idx	Index of tool to be removed (if needed)
*new_↩ status_*	Next status
*queue_*	Efect on the queue
*call_*	The action call (if needed)

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

- include/epiworld/agent-bones.hpp
- include/epiworld/config.hpp

5.3 AdjList Class Reference

Public Member Functions

- AdjList (const std::vector< unsigned int > &source, const std::vector< unsigned int > &target, int size, bool directed)

  Construct a new Adj List object.
- void read_edgelist (std::string fn, int size, int skip=0, bool directed=true)

  Read an edgelist.
- std::map< unsigned int, unsigned int > **operator()** (unsigned int i) const
- void **print** (unsigned int limit=20u) const
- size_t vcount () const

  Number of vertices/nodes in the network.
- size_t ecount () const

  Number of edges/arcs/ties in the network.
- std::vector< std::map< unsigned int, unsigned int > > & **get_dat** ()
- bool is_directed () const

  `true` if the network is directed.

5.3.1 Constructor & Destructor Documentation

5.3.1.1 AdjList()

```
AdjList::AdjList (
             const std::vector< unsigned int > & source,
             const std::vector< unsigned int > & target,
             int size,
             bool directed ) [inline]
```

Construct a new Adj List object.

Ids in the network are assume to range from `0` to `size - 1`.

Parameters

source	Unsigned int vector with the source
target	Unsigned int vector with the target
size	Number of vertices in the network.
directed	Bool true if the network is directed

5.3.2 Member Function Documentation

5.3.2.1 read_edgelist()

```
void AdjList::read_edgelist (
            std::string fn,
            int size,
            int skip = 0,
            bool directed = true )  [inline]
```

Read an edgelist.

Ids in the network are assume to range from `0` to `size - 1`.

Parameters

fn	Path to the file
skip	Number of lines to skip (e.g., 1 if there's a header)
directed	`true` if the network is directed
size	Number of vertices in the network.

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

- include/epiworld/adjlist-bones.hpp
- include/epiworld/adjlist-meat.hpp

5.4 Agent< TSeq > Class Template Reference

Agent (agents)

`#include <agent-bones.hpp>`

Public Member Functions

- **Agent** (const Agent< TSeq > &p)
- int get_id () const

  Id of the individual.
- std::mt19937 ∗ **get_rand_endgine** ()
- Model< TSeq > ∗ **get_model** ()
- VirusPtr< TSeq > & **get_virus** (int i)
- Viruses< TSeq > **get_viruses** ()
- const Viruses_const< TSeq > **get_viruses** () const
- size_t **get_n_viruses** () const noexcept
- ToolPtr< TSeq > & **get_tool** (int i)
- Tools< TSeq > **get_tools** ()
- const Tools_const< TSeq > **get_tools** () const

- size_t **get_n_tools** () const noexcept
- void **mutate_variant** ()
- void **add_neighbor** (Agent< TSeq > ∗p, bool check_source=true, bool check_target=true)
- std::vector< Agent< TSeq > ∗ > & **get_neighbors** ()
- void **change_status** (epiworld_fast_uint new_status, epiworld_fast_int queue=0)
- const epiworld_fast_uint & **get_status** () const
- void **reset** ()
- bool **has_tool** (unsigned int t) const
- bool **has_tool** (std::string name) const
- bool **has_virus** (unsigned int t) const
- bool **has_virus** (std::string name) const
- void **print** (bool compressed=false) const

Add/Remove Virus/Tool

Any of these is ultimately reflected at the end of the iteration.

Parameters

tool	*Tool to add*
virus	*Virus to add*
status_new	*Status after the change*
queue	

- void **add_tool** (ToolPtr< TSeq > tool, epiworld_fast_int status_new=-99, epiworld_fast_int queue=-99)
- void **add_tool** (Tool< TSeq > tool, epiworld_fast_int status_new=-99, epiworld_fast_int queue=-99)
- void **add_virus** (VirusPtr< TSeq > virus, epiworld_fast_int status_new=-99, epiworld_fast_int queue=-99)
- void **add_virus** (Virus< TSeq > virus, epiworld_fast_int status_new=-99, epiworld_fast_int queue=-99)
- void **rm_tool** (epiworld_fast_uint tool_idx, epiworld_fast_int status_new=-99, epiworld_fast_int queue=-99)
- void **rm_tool** (ToolPtr< TSeq > &tool, epiworld_fast_int status_new=-99, epiworld_fast_int queue=-99)
- void **rm_virus** (epiworld_fast_uint virus_idx, epiworld_fast_int status_new=-99, epiworld_fast_int queue=-99)
- void **rm_virus** (VirusPtr< TSeq > &virus, epiworld_fast_int status_new=-99, epiworld_fast_int queue=-99)
- void rm_agent_by_virus (epiworld_fast_uint virus_idx, epiworld_fast_int status_new=-99, epiworld_fast↩_int queue=-99)

  Agent removed by virus.
- void rm_agent_by_virus (VirusPtr< TSeq > &virus, epiworld_fast_int status_new=-99, epiworld_fast_int queue=-99)

  Agent removed by virus.

Get the rates (multipliers) for the agent

Parameters

v	*A pointer to a virus.*

Returns

epiworld_double

- epiworld_double **get_susceptibility_reduction** (VirusPtr< TSeq > v)
- epiworld_double **get_transmission_reduction** (VirusPtr< TSeq > v)
- epiworld_double **get_recovery_enhancer** (VirusPtr< TSeq > v)

- epiworld_double **get_death_reduction** (VirusPtr< TSeq > v)

Friends

- class **Model**< **TSeq** >
- class **Virus**< **TSeq** >
- class **Viruses**< **TSeq** >
- class **Viruses_const**< **TSeq** >
- class **Tool**< **TSeq** >
- class **Tools**< **TSeq** >
- class **Queue**< **TSeq** >
- void **default_add_virus** (Action< TSeq > &a, Model< TSeq > *m)
- void **default_add_tool** (Action< TSeq > &a, Model< TSeq > *m)
- void **default_rm_virus** (Action< TSeq > &a, Model< TSeq > *m)
- void **default_rm_tool** (Action< TSeq > &a, Model< TSeq > *m)

5.4.1 Detailed Description

template<typename TSeq = int>
class Agent< TSeq >

Agent (agents)

Template Parameters

TSeq	Sequence type (should match `TSeq` across the model)

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

- include/epiworld/agent-bones.hpp

5.5 AgentsSample< TSeq > Class Template Reference

Sample of agents.

```
#include <agentssample-bones.hpp>
```

Public Member Functions

- AgentsSample ()=delete

  Default constructor.
- AgentsSample (const AgentsSample< TSeq > &a)=delete

  Copy constructor.
- AgentsSample (AgentsSample< TSeq > &&a)=delete

  Move constructor.
- **AgentsSample** (Model< TSeq > &model_, size_t n)

- **AgentsSample** (Entity< TSeq > &entity_, size_t n)
- std::vector< Agent< TSeq > ∗ >::iterator **begin** ()
- std::vector< Agent< TSeq > ∗ >::iterator **end** ()
- Agent< TSeq > ∗ **operator[ ]** (size_t n)
- Agent< TSeq > ∗ **operator()** (size_t n)
- const size_t **size** () const noexcept

5.5.1 Detailed Description

template<typename TSeq>
class AgentsSample< TSeq >

Sample of agents.

This class allows sampling agents from Entity<TSeq> and Model<TSeq>.

Template Parameters

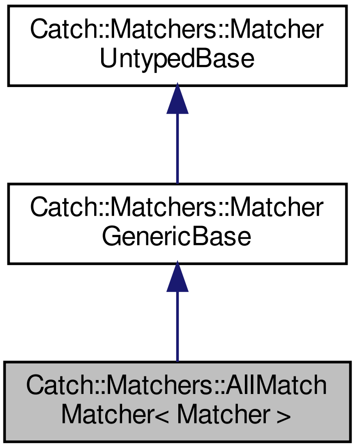
TSeq	

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

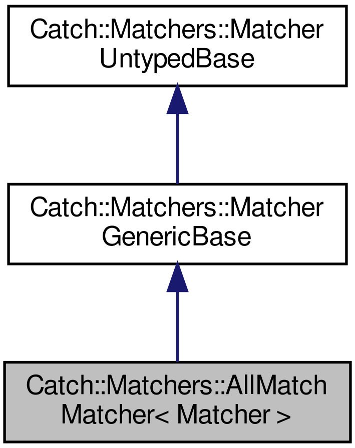
- include/epiworld/agentssample-bones.hpp

5.6 Catch::Matchers::AllMatchMatcher< Matcher > Class Template Reference

Inheritance diagram for Catch::Matchers::AllMatchMatcher< Matcher >:


Catch::Matchers::Matcher UntypedBase
Catch::Matchers::Matcher GenericBase
Catch::Matchers::AllMatch Matcher< Matcher >

Collaboration diagram for Catch::Matchers::AllMatchMatcher< Matcher >:


Catch::Matchers::Matcher UntypedBase
Catch::Matchers::Matcher GenericBase
Catch::Matchers::AllMatch Matcher< Matcher >

Public Member Functions

- **AllMatchMatcher** (Matcher matcher)
- std::string **describe** () const override
- template< typename RangeLike >
  bool **match** (RangeLike &&rng) const

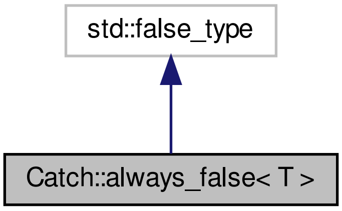
Additional Inherited Members

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

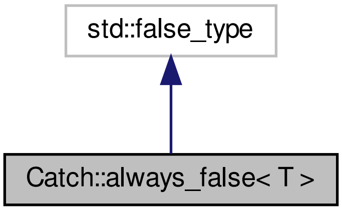
- include/catch2/catch_amalgamated.hpp

5.7 Catch::always_false< T > Struct Template Reference

Inheritance diagram for Catch::always_false< T >:



Collaboration diagram for Catch::always_false< T >:

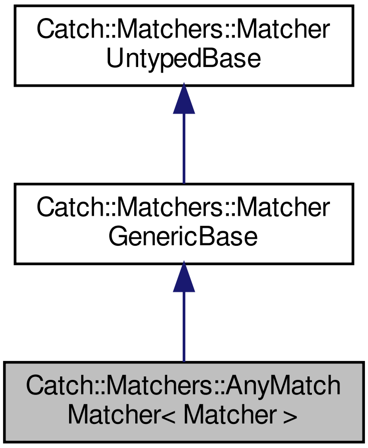


The documentation for this struct was generated from the following file:

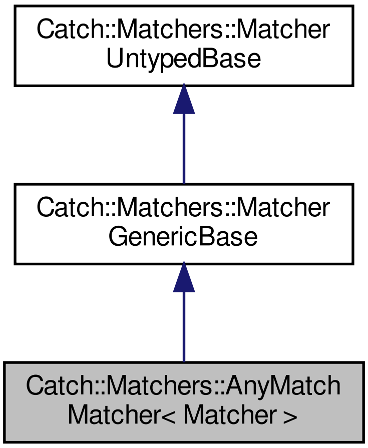
- include/catch2/catch_amalgamated.hpp

5.8 Catch::Matchers::AnyMatchMatcher< Matcher > Class Template Reference

Inheritance diagram for Catch::Matchers::AnyMatchMatcher< Matcher >:


Catch::Matchers::Matcher UntypedBase
Catch::Matchers::Matcher GenericBase
Catch::Matchers::AnyMatch Matcher< Matcher >

Collaboration diagram for Catch::Matchers::AnyMatchMatcher< Matcher >:


Catch::Matchers::Matcher UntypedBase
Catch::Matchers::Matcher GenericBase
Catch::Matchers::AnyMatch Matcher< Matcher >

Public Member Functions

- **AnyMatchMatcher** (Matcher matcher)
- std::string **describe** () const override
- template<typename RangeLike >
  bool **match** (RangeLike &&rng) const

Additional Inherited Members

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

- include/catch2/catch_amalgamated.hpp

5.9 Catch::Approx Class Reference

Public Member Functions

- **Approx** (double value)
- Approx **operator-** () const
- template<typename T , typename = std::enable_if_t<std::is_constructible<double, T>::value>>
  Approx **operator()** (T const &value) const
- template<typename T , typename = std::enable_if_t<std::is_constructible<double, T>::value>>
  Approx (T const &value)
- template<typename T , typename = std::enable_if_t<std::is_constructible<double, T>::value>>
  Approx & **epsilon** (T const &newEpsilon)
- template<typename T , typename = std::enable_if_t<std::is_constructible<double, T>::value>>
  Approx & **margin** (T const &newMargin)
- template<typename T , typename = std::enable_if_t<std::is_constructible<double, T>::value>>
  Approx & **scale** (T const &newScale)
- std::string **toString** () const

Static Public Member Functions

- static Approx **custom** ()

Friends

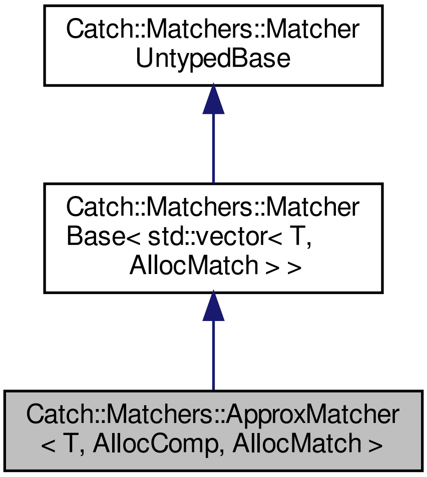
- template<typename T , typename = std::enable_if_t<std::is_constructible<double, T>::value>>
  bool **operator==** (const T &lhs, Approx const &rhs)
- template<typename T , typename = std::enable_if_t<std::is_constructible<double, T>::value>>
  bool **operator==** (Approx const &lhs, const T &rhs)
- template<typename T , typename = std::enable_if_t<std::is_constructible<double, T>::value>>
  bool **operator!=** (T const &lhs, Approx const &rhs)
- template<typename T , typename = std::enable_if_t<std::is_constructible<double, T>::value>>
  bool **operator!=** (Approx const &lhs, T const &rhs)
- template<typename T , typename = std::enable_if_t<std::is_constructible<double, T>::value>>
  bool **operator<=** (T const &lhs, Approx const &rhs)
- template<typename T , typename = std::enable_if_t<std::is_constructible<double, T>::value>>
  bool **operator<=** (Approx const &lhs, T const &rhs)
- template<typename T , typename = std::enable_if_t<std::is_constructible<double, T>::value>>
  bool **operator>=** (T const &lhs, Approx const &rhs)
- template<typename T , typename = std::enable_if_t<std::is_constructible<double, T>::value>>
  bool **operator>=** (Approx const &lhs, T const &rhs)

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

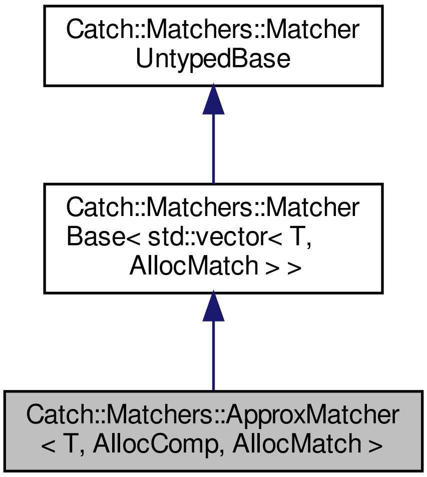
- include/catch2/catch_amalgamated.hpp

5.10 Catch::Matchers::ApproxMatcher< T, AllocComp, AllocMatch > Class Template Reference

Inheritance diagram for Catch::Matchers::ApproxMatcher< T, AllocComp, AllocMatch >:


Catch::Matchers::Matcher UntypedBase
Catch::Matchers::Matcher Base< std::vector< T, AllocMatch > >
Catch::Matchers::ApproxMatcher < T, AllocComp, AllocMatch >

Collaboration diagram for Catch::Matchers::ApproxMatcher< T, AllocComp, AllocMatch >:


Catch::Matchers::Matcher UntypedBase
Catch::Matchers::Matcher Base< std::vector< T, AllocMatch > >
Catch::Matchers::ApproxMatcher < T, AllocComp, AllocMatch >

Public Member Functions

- **ApproxMatcher** (std::vector< T, AllocComp > const &comparator)
- bool **match** (std::vector< T, AllocMatch > const &v) const override
- std::string **describe** () const override
- template<typename = std::enable_if_t<std::is_constructible<double, T>::value>>
  ApproxMatcher & **epsilon** (T const &newEpsilon)
- template<typename = std::enable_if_t<std::is_constructible<double, T>::value>>
  ApproxMatcher & **margin** (T const &newMargin)
- template<typename = std::enable_if_t<std::is_constructible<double, T>::value>>
  ApproxMatcher & **scale** (T const &newScale)

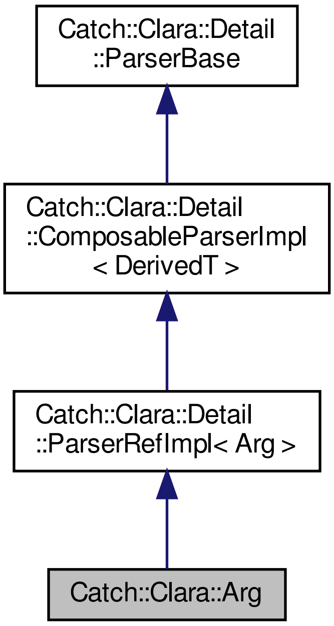
Additional Inherited Members

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

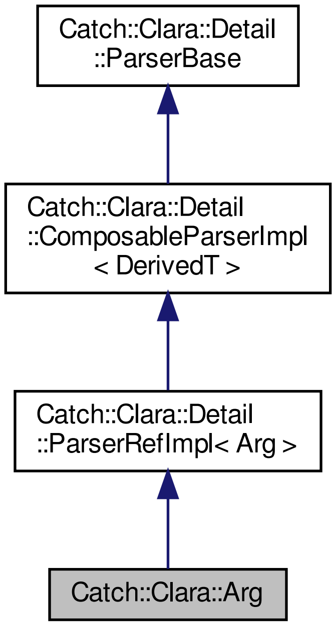
- include/catch2/catch_amalgamated.hpp

5.11 Catch::Clara::Arg Class Reference

Inheritance diagram for Catch::Clara::Arg:


Catch::Clara::Detail ::ParserBase
Catch::Clara::Detail ::ComposableParserImpl < DerivedT >
Catch::Clara::Detail ::ParserRefImpl< Arg >
Catch::Clara::Arg

Collaboration diagram for Catch::Clara::Arg:


Catch::Clara::Detail ::ParserBase
Catch::Clara::Detail ::ComposableParserImpl < DerivedT >
Catch::Clara::Detail ::ParserRefImpl< Arg >
Catch::Clara::Arg

Public Member Functions

- Detail::InternalParseResult **parse** (std::string const &, Detail::TokenStream const &tokens) const override

Additional Inherited Members

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

- include/catch2/catch_amalgamated.hpp

5.12 Catch::Clara::Args Class Reference

Public Member Functions

- **Args** (int argc, char const ∗const ∗argv)
- **Args** (std::initializer_list< std::string > args)
- std::string const & **exeName** () const

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

- include/catch2/catch_amalgamated.hpp

5.13 Catch::Generators::as< T > Struct Template Reference

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

- include/catch2/catch_amalgamated.hpp

5.14 Catch::AssertionHandler Class Reference

Public Member Functions

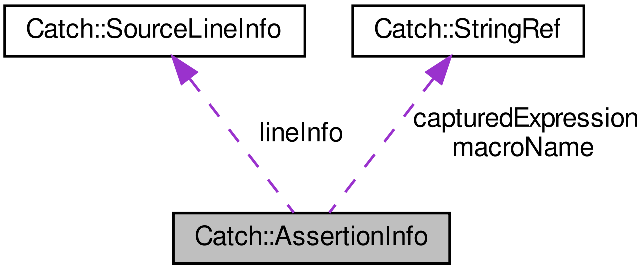
- **AssertionHandler** (StringRef macroName, SourceLineInfo const &lineInfo, StringRef capturedExpression, ResultDisposition::Flags resultDisposition)
- template< typename T >
  void **handleExpr** (ExprLhs< T > const &expr)
- void **handleExpr** (ITransientExpression const &expr)
- void **handleMessage** (ResultWas::OfType resultType, StringRef message)
- void **handleExceptionThrownAsExpected** ()
- void **handleUnexpectedExceptionNotThrown** ()
- void **handleExceptionNotThrownAsExpected** ()
- void **handleThrowingCallSkipped** ()
- void **handleUnexpectedInflightException** ()
- void **complete** ()
- void **setCompleted** ()
- auto **allowThrows** () const -> bool

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

- include/catch2/catch_amalgamated.hpp

5.15 Catch::AssertionInfo Struct Reference

Collaboration diagram for Catch::AssertionInfo:



Public Attributes

- StringRef **macroName**
- SourceLineInfo **lineInfo**
- StringRef **capturedExpression**
- ResultDisposition::Flags **resultDisposition**

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

- include/catch2/catch_amalgamated.hpp

5.16 Catch::Detail::AssertionOrBenchmarkResult Class Reference

Represents either an assertion or a benchmark result to be handled by cumulative reporter later.

```
#include <catch_amalgamated.hpp>
```

Public Member Functions

- **AssertionOrBenchmarkResult** (AssertionStats const &assertion)
- **AssertionOrBenchmarkResult** (BenchmarkStats<> const &benchmark)
- bool **isAssertion** () const
- bool **isBenchmark** () const
- AssertionStats const & **asAssertion** () const
- BenchmarkStats const & **asBenchmark** () const

5.16.1 Detailed Description

Represents either an assertion or a benchmark result to be handled by cumulative reporter later.

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

- include/catch2/catch_amalgamated.hpp

5.17 Catch::AssertionReaction Struct Reference

Public Attributes

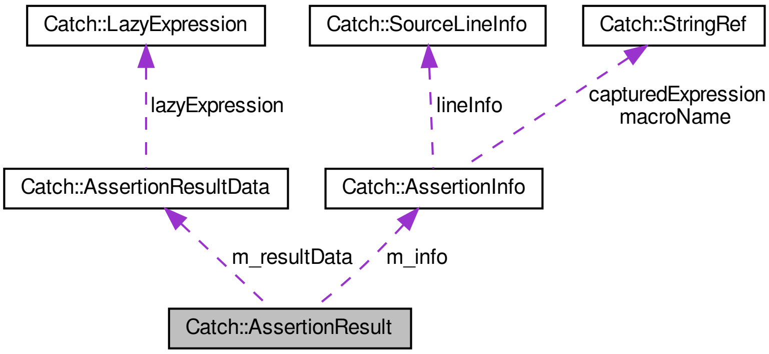
- bool **shouldDebugBreak** = false
- bool **shouldThrow** = false

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

- include/catch2/catch_amalgamated.hpp

5.18 Catch::AssertionResult Class Reference

Collaboration diagram for Catch::AssertionResult:



Public Member Functions

- **AssertionResult** (AssertionInfo const &info, AssertionResultData const &data)
- bool **isOk** () const
- bool **succeeded** () const
- ResultWas::OfType **getResultType** () const
- bool **hasExpression** () const
- bool **hasMessage** () const
- std::string **getExpression** () const
- std::string **getExpressionInMacro** () const
- bool **hasExpandedExpression** () const
- std::string **getExpandedExpression** () const
- StringRef **getMessage** () const
- SourceLineInfo **getSourceInfo** () const
- StringRef **getTestMacroName** () const

Public Attributes

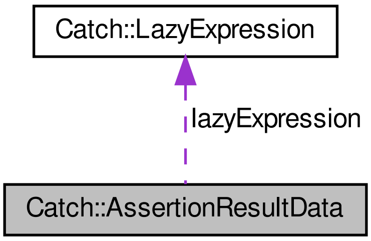
- AssertionInfo **m_info**
- AssertionResultData **m_resultData**

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

- include/catch2/catch_amalgamated.hpp

5.19 Catch::AssertionResultData Struct Reference

Collaboration diagram for Catch::AssertionResultData:



Public Member Functions

- **AssertionResultData** (ResultWas::OfType _resultType, LazyExpression const &_lazyExpression)
- std::string **reconstructExpression** () const

Public Attributes

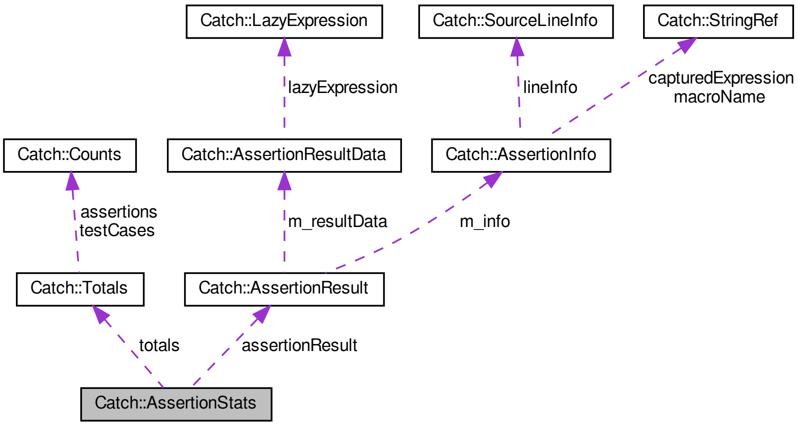
- std::string **message**
- std::string **reconstructedExpression**
- LazyExpression **lazyExpression**
- ResultWas::OfType **resultType**

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

- include/catch2/catch_amalgamated.hpp

5.20 Catch::AssertionStats Struct Reference

Collaboration diagram for Catch::AssertionStats:



Public Member Functions

- **AssertionStats** (AssertionResult const &_assertionResult, std::vector< MessageInfo > const &_info←Messages, Totals const &_totals)
- **AssertionStats** (AssertionStats const &)=default
- **AssertionStats** (AssertionStats &&)=default
- AssertionStats & **operator=** (AssertionStats const &)=delete
- AssertionStats & **operator=** (AssertionStats &&)=delete

Public Attributes

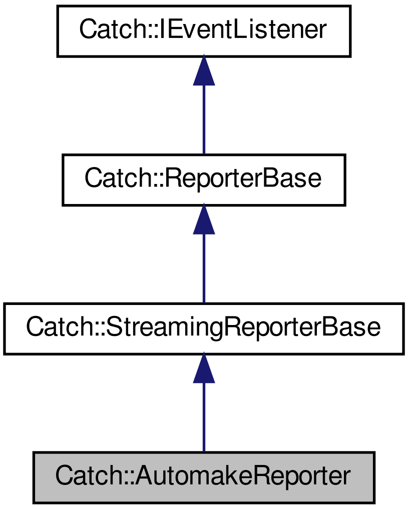
- AssertionResult **assertionResult**
- std::vector< MessageInfo > **infoMessages**
- Totals **totals**

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

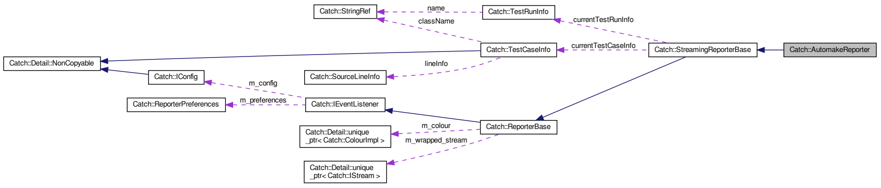
- include/catch2/catch_amalgamated.hpp

5.21 Catch::AutomakeReporter Class Reference

Inheritance diagram for Catch::AutomakeReporter:



Collaboration diagram for Catch::AutomakeReporter:



Public Member Functions

- void testCaseEnded (TestCaseStats const &_testCaseStats) override

  Called once for each TEST_CASE, no matter how many times it is entered.
- void skipTest (TestCaseInfo const &testInfo) override

  Called with test cases that are skipped due to the test run aborting.

Static Public Member Functions

- static std::string **getDescription** ()

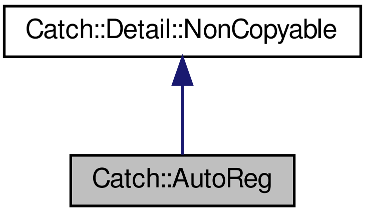
Additional Inherited Members

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

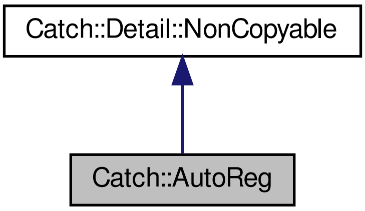
- include/catch2/catch_amalgamated.hpp

5.22 Catch::AutoReg Struct Reference

Inheritance diagram for Catch::AutoReg:



Collaboration diagram for Catch::AutoReg:



Public Member Functions

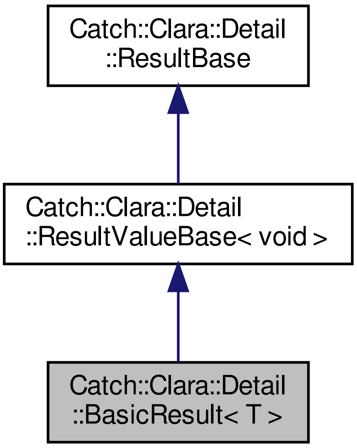
- **AutoReg** (Detail::unique_ptr< ITestInvoker > invoker, SourceLineInfo const &lineInfo, StringRef classOrMethod, NameAndTags const &nameAndTags) noexcept

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

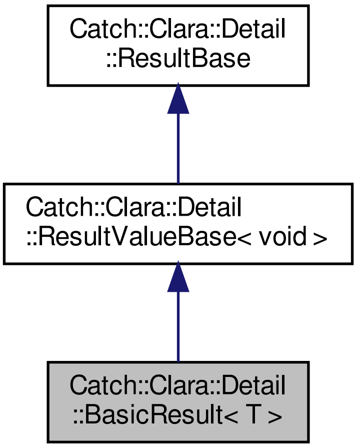
- include/catch2/catch_amalgamated.hpp

5.23 Catch::Clara::Detail::BasicResult< T > Class Template Reference

Inheritance diagram for Catch::Clara::Detail::BasicResult< T >:



Collaboration diagram for Catch::Clara::Detail::BasicResult< T >:



Public Member Functions

- template<typename U >
  BasicResult (BasicResult< U > const &other)
- **operator bool** () const
- auto **type** () const -> ResultType
- auto **errorMessage** () const -> std::string const &

Static Public Member Functions

- template<typename U >
  static auto **ok** (U const &value) -> BasicResult
- static auto **ok** () -> BasicResult
- static auto **logicError** (std::string &&message) -> BasicResult
- static auto **runtimeError** (std::string &&message) -> BasicResult

Protected Member Functions

- void **enforceOk** () const override
- **BasicResult** (ResultType type, std::string &&message)

Protected Attributes

- std::string **m_errorMessage**
- ResultType **m_type**

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

- include/catch2/catch_amalgamated.hpp

5.24 Catch::Benchmark::Benchmark Struct Reference

Public Member Functions

- **Benchmark** (std::string &&benchmarkName)
- template<class FUN >
  Benchmark (std::string &&benchmarkName, FUN &&func)
- template<typename Clock >
  ExecutionPlan< FloatDuration< Clock > > **prepare** (const IConfig &cfg, Environment< FloatDuration< Clock >> env) const
- template<typename Clock = default_clock>
  void **run** ()
- template<typename Fun , std::enable_if_t<!Detail::is_related< Fun, Benchmark >::value, int > = 0>
  Benchmark & **operator=** (Fun func)
- **operator bool** ()

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

- include/catch2/catch_amalgamated.hpp

5.25 Catch::Benchmark::Detail::BenchmarkFunction Struct Reference

```
#include <catch_amalgamated.hpp>
```

Public Member Functions

- template<typename Fun , std::enable_if_t<!is_related< Fun, BenchmarkFunction >::value, int > = 0>
  BenchmarkFunction (Fun &&fun)
- **BenchmarkFunction** (BenchmarkFunction &&that) noexcept
- **BenchmarkFunction** (BenchmarkFunction const &that)
- BenchmarkFunction & **operator=** (BenchmarkFunction &&that) noexcept
- BenchmarkFunction & **operator=** (BenchmarkFunction const &that)
- void **operator()** (Chronometer meter) const

5.25.1 Detailed Description

We need to reinvent std::function because every piece of code that might add overhead in a measurement context needs to have consistent performance characteristics so that we can account for it in the measurement. Implementations of std::function with optimizations that aren't always applicable, like small buffer optimizations, are not uncommon. This is effectively an implementation of std::function without any such optimizations; it may be slow, but it is consistently slow.

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

- include/catch2/catch_amalgamated.hpp

5.26 Catch::BenchmarkInfo Struct Reference

Public Attributes

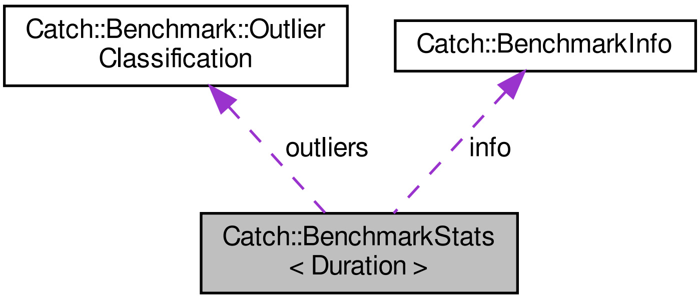
- std::string **name**
- double **estimatedDuration**
- int **iterations**
- unsigned int **samples**
- unsigned int **resamples**
- double **clockResolution**
- double **clockCost**

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

- include/catch2/catch_amalgamated.hpp

5.27 Catch::BenchmarkStats< Duration > Struct Template Reference

Collaboration diagram for Catch::BenchmarkStats< Duration >:


Catch::Benchmark::Outlier Classification
Catch::BenchmarkInfo
outliers
info
Catch::BenchmarkStats < Duration >

Public Member Functions

- template<typename Duration2 >
  operator BenchmarkStats< Duration2 > () const

Public Attributes

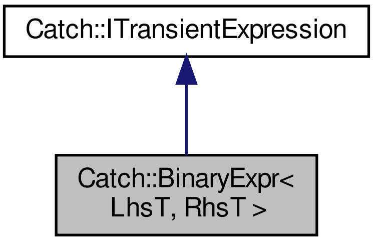
- BenchmarkInfo **info**
- std::vector< Duration > **samples**
- Benchmark::Estimate< Duration > **mean**
- Benchmark::Estimate< Duration > **standardDeviation**
- Benchmark::OutlierClassification **outliers**
- double **outlierVariance**

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

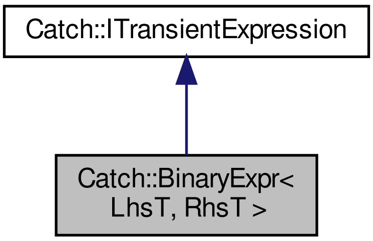
- include/catch2/catch_amalgamated.hpp

5.28 Catch::BinaryExpr< LhsT, RhsT > Class Template Reference

Inheritance diagram for Catch::BinaryExpr< LhsT, RhsT >:



Collaboration diagram for Catch::BinaryExpr< LhsT, RhsT >:



Public Member Functions

- **BinaryExpr** (bool comparisonResult, LhsT lhs, StringRef op, RhsT rhs)
- template<typename T >
  auto **operator&&** (T) const -> BinaryExpr< LhsT, RhsT const & > const
- template<typename T >
  auto **operator**|| (T) const -> BinaryExpr< LhsT, RhsT const & > const
- template<typename T >
  auto **operator==** (T) const -> BinaryExpr< LhsT, RhsT const & > const
- template<typename T >
  auto **operator!=** (T) const -> BinaryExpr< LhsT, RhsT const & > const
- template<typename T >
  auto **operator**> (T) const -> BinaryExpr< LhsT, RhsT const & > const
- template<typename T >
  auto **operator**< (T) const -> BinaryExpr< LhsT, RhsT const & > const
- template<typename T >
  auto **operator**>**=** (T) const -> BinaryExpr< LhsT, RhsT const & > const

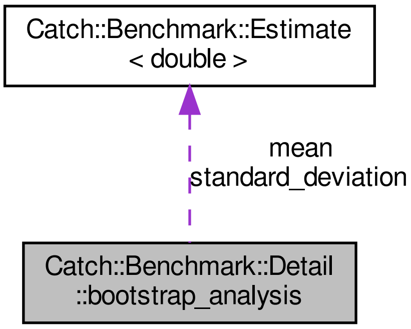
- template<typename T >
  auto **operator<=** (T) const -> BinaryExpr< LhsT, RhsT const & > const

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

- include/catch2/catch_amalgamated.hpp

5.29 Catch::Benchmark::Detail::bootstrap_analysis Struct Reference

Collaboration diagram for Catch::Benchmark::Detail::bootstrap_analysis:



Public Attributes

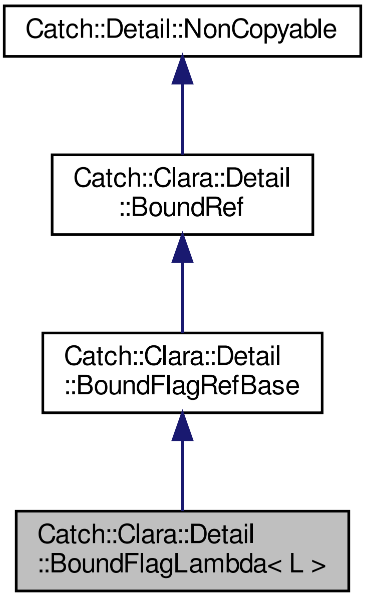
- Estimate< double > **mean**
- Estimate< double > **standard_deviation**
- double **outlier_variance**

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

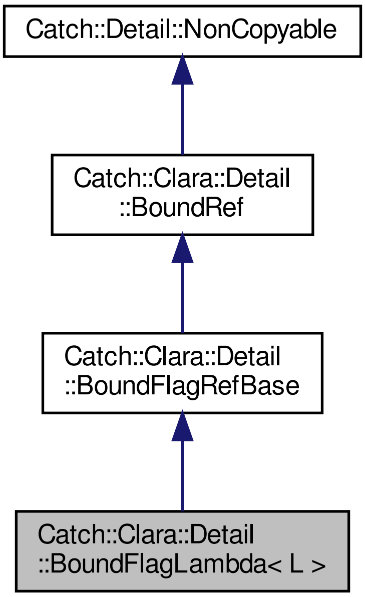
- include/catch2/catch_amalgamated.hpp

5.30 Catch::Clara::Detail::BoundFlagLambda< L > Struct Template Reference

Inheritance diagram for Catch::Clara::Detail::BoundFlagLambda< L >:


Catch::Detail::NonCopyable
Catch::Clara::Detail ::BoundRef
Catch::Clara::Detail ::BoundFlagRefBase
Catch::Clara::Detail ::BoundFlagLambda< L >

Collaboration diagram for Catch::Clara::Detail::BoundFlagLambda< L >:


Catch::Detail::NonCopyable
Catch::Clara::Detail ::BoundRef
Catch::Clara::Detail ::BoundFlagRefBase
Catch::Clara::Detail ::BoundFlagLambda< L >

Public Member Functions

- **BoundFlagLambda** (L const &lambda)
- auto **setFlag** (bool flag) -> ParserResult override

Public Attributes

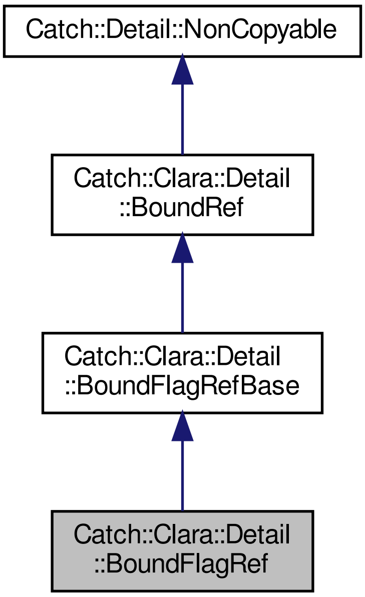
- L **m_lambda**

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

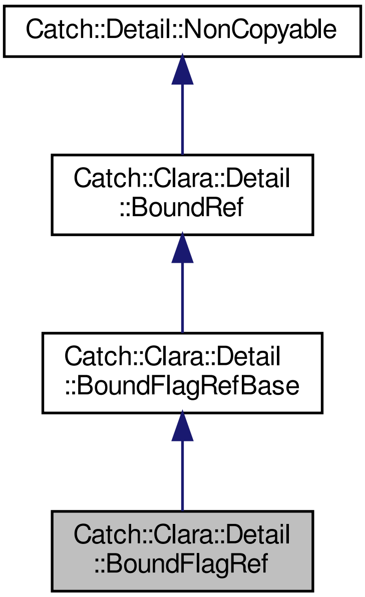
- include/catch2/catch_amalgamated.hpp

5.31 Catch::Clara::Detail::BoundFlagRef Struct Reference

Inheritance diagram for Catch::Clara::Detail::BoundFlagRef:


Catch::Detail::NonCopyable
Catch::Clara::Detail ::BoundRef
Catch::Clara::Detail ::BoundFlagRefBase
Catch::Clara::Detail ::BoundFlagRef

Collaboration diagram for Catch::Clara::Detail::BoundFlagRef:


Catch::Detail::NonCopyable
Catch::Clara::Detail ::BoundRef
Catch::Clara::Detail ::BoundFlagRefBase
Catch::Clara::Detail ::BoundFlagRef

Public Member Functions

- **BoundFlagRef** (bool &ref)
- ParserResult **setFlag** (bool flag) override

Public Attributes

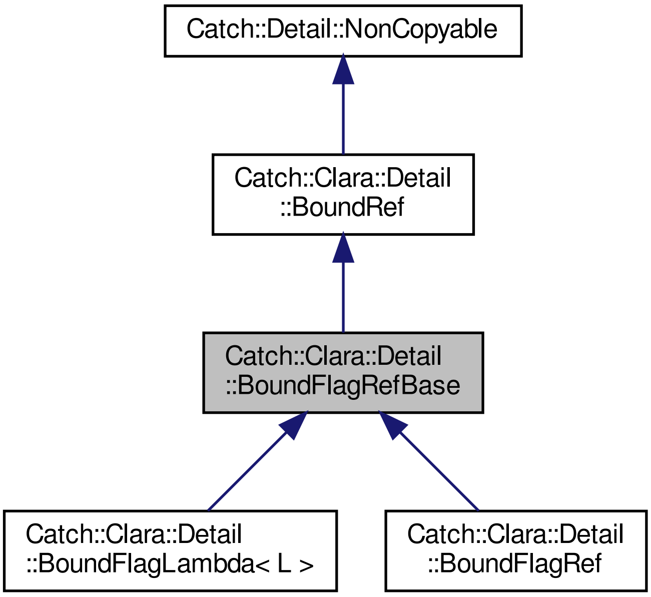
- bool & **m_ref**

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

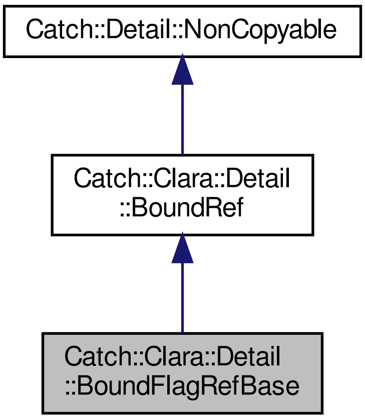
- include/catch2/catch_amalgamated.hpp

5.32 Catch::Clara::Detail::BoundFlagRefBase Struct Reference

Inheritance diagram for Catch::Clara::Detail::BoundFlagRefBase:


Catch::Detail::NonCopyable
Catch::Clara::Detail ::BoundRef
Catch::Clara::Detail ::BoundFlagRefBase
Catch::Clara::Detail ::BoundFlagLambda< L >
Catch::Clara::Detail ::BoundFlagRef

Collaboration diagram for Catch::Clara::Detail::BoundFlagRefBase:


Catch::Detail::NonCopyable
Catch::Clara::Detail ::BoundRef
Catch::Clara::Detail ::BoundFlagRefBase

Public Member Functions

- virtual auto **setFlag** (bool flag) -> ParserResult=0

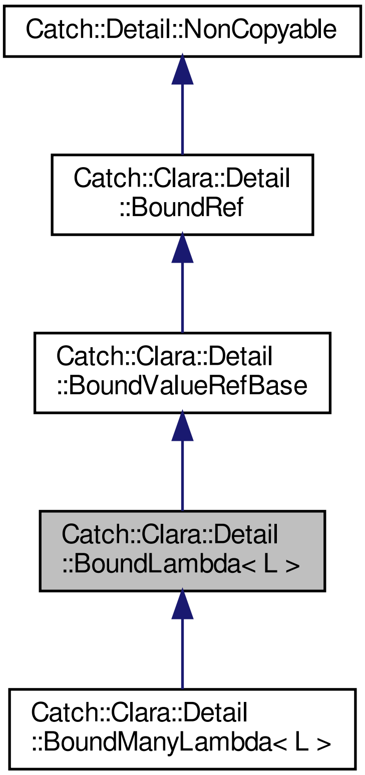
- bool **isFlag** () const override

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

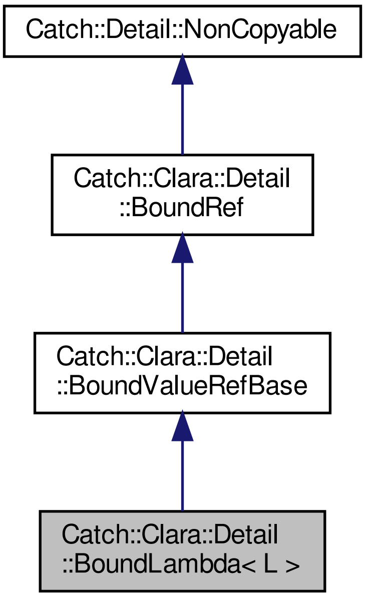
- include/catch2/catch_amalgamated.hpp

5.33 Catch::Clara::Detail::BoundLambda< L > Struct Template Reference

Inheritance diagram for Catch::Clara::Detail::BoundLambda< L >:


Catch::Detail::NonCopyable
Catch::Clara::Detail ::BoundRef
Catch::Clara::Detail ::BoundValueRefBase
Catch::Clara::Detail ::BoundLambda< L >
Catch::Clara::Detail ::BoundManyLambda< L >

Collaboration diagram for Catch::Clara::Detail::BoundLambda< L >:


Catch::Detail::NonCopyable
Catch::Clara::Detail ::BoundRef
Catch::Clara::Detail ::BoundValueRefBase
Catch::Clara::Detail ::BoundLambda< L >

Public Member Functions

- **BoundLambda** (L const &lambda)
- auto **setValue** (std::string const &arg) -> ParserResult override

Public Attributes

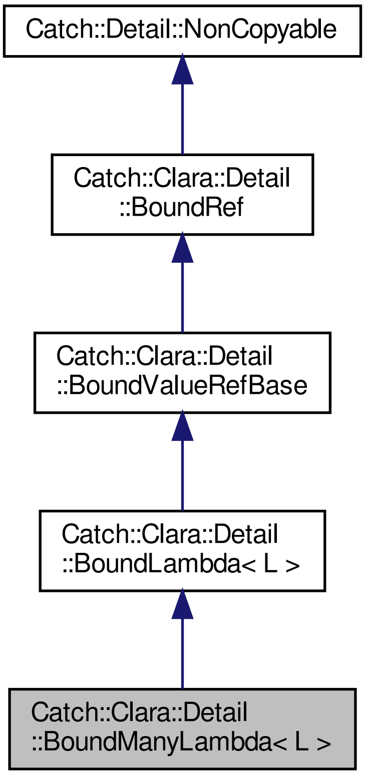
- L **m_lambda**

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

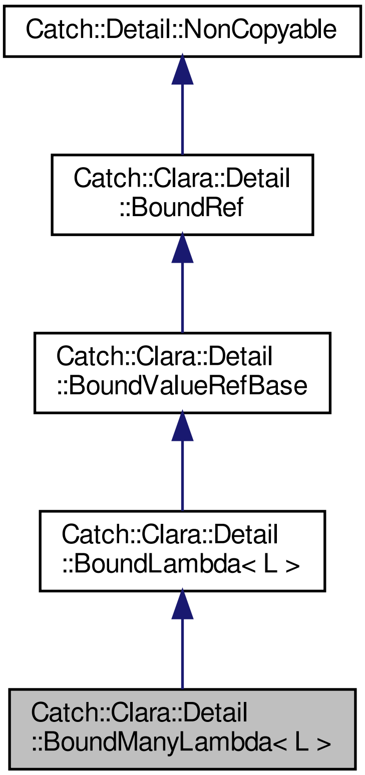
- include/catch2/catch_amalgamated.hpp

5.34 Catch::Clara::Detail::BoundManyLambda< L > Struct Template Reference

Inheritance diagram for Catch::Clara::Detail::BoundManyLambda< L >:


Catch::Detail::NonCopyable
Catch::Clara::Detail ::BoundRef
Catch::Clara::Detail ::BoundValueRefBase
Catch::Clara::Detail ::BoundLambda< L >
Catch::Clara::Detail ::BoundManyLambda< L >

Collaboration diagram for Catch::Clara::Detail::BoundManyLambda< L >:


Catch::Detail::NonCopyable
Catch::Clara::Detail ::BoundRef
Catch::Clara::Detail ::BoundValueRefBase
Catch::Clara::Detail ::BoundLambda< L >
Catch::Clara::Detail ::BoundManyLambda< L >

Public Member Functions

- **BoundManyLambda** (L const &lambda)
- bool **isContainer** () const override

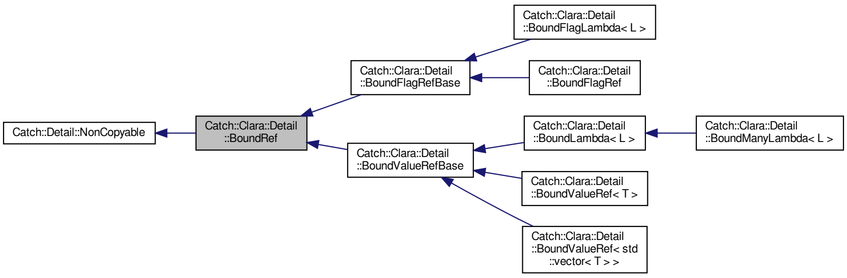
Additional Inherited Members

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

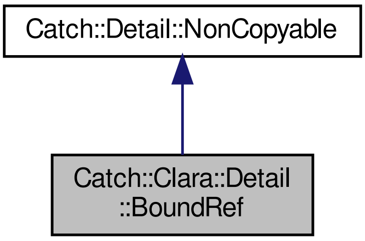
- include/catch2/catch_amalgamated.hpp

5.35 Catch::Clara::Detail::BoundRef Struct Reference

Inheritance diagram for Catch::Clara::Detail::BoundRef:


Catch::Detail::NonCopyable
Catch::Clara::Detail ::BoundRef
Catch::Clara::Detail ::BoundFlagRefBase
Catch::Clara::Detail ::BoundValueRefBase
Catch::Clara::Detail ::BoundFlagLambda< L >
Catch::Clara::Detail ::BoundFlagRef
Catch::Clara::Detail ::BoundLambda< L >
Catch::Clara::Detail ::BoundManyLambda< L >
Catch::Clara::Detail ::BoundValueRef< T >
Catch::Clara::Detail ::BoundValueRef< std ::vector< T > >

Collaboration diagram for Catch::Clara::Detail::BoundRef:



Public Member Functions

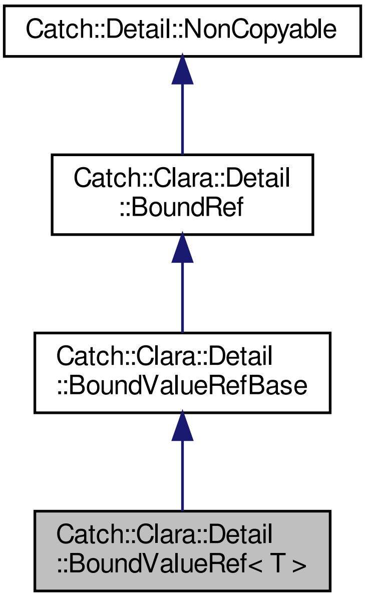
- virtual bool **isContainer** () const
- virtual bool **isFlag** () const

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

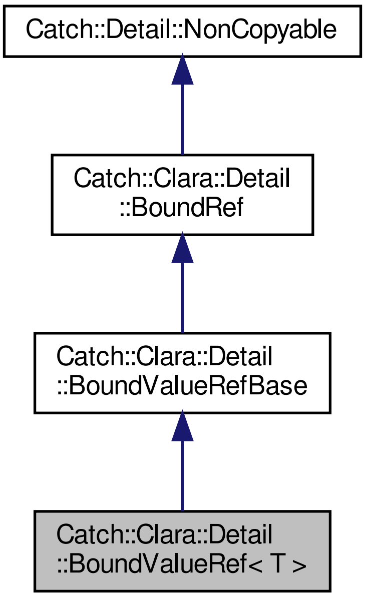
- include/catch2/catch_amalgamated.hpp

5.36 Catch::Clara::Detail::BoundValueRef< T > Struct Template Reference

Inheritance diagram for Catch::Clara::Detail::BoundValueRef< T >:


Catch::Detail::NonCopyable
Catch::Clara::Detail ::BoundRef
Catch::Clara::Detail ::BoundValueRefBase
Catch::Clara::Detail ::BoundValueRef< T >

Collaboration diagram for Catch::Clara::Detail::BoundValueRef< T >:


Catch::Detail::NonCopyable
Catch::Clara::Detail ::BoundRef
Catch::Clara::Detail ::BoundValueRefBase
Catch::Clara::Detail ::BoundValueRef< T >

Public Member Functions

- **BoundValueRef** (T &ref)
- ParserResult **setValue** (std::string const &arg) override

Public Attributes

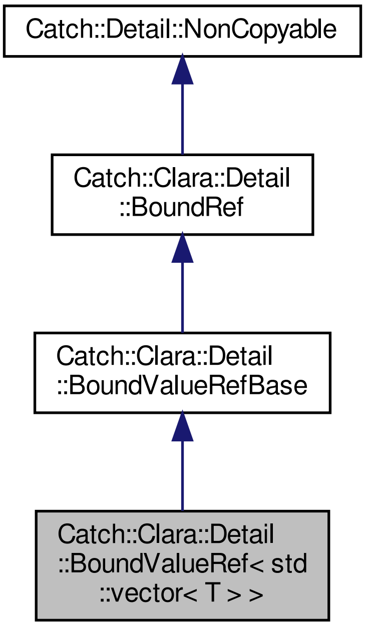
- T & **m_ref**

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

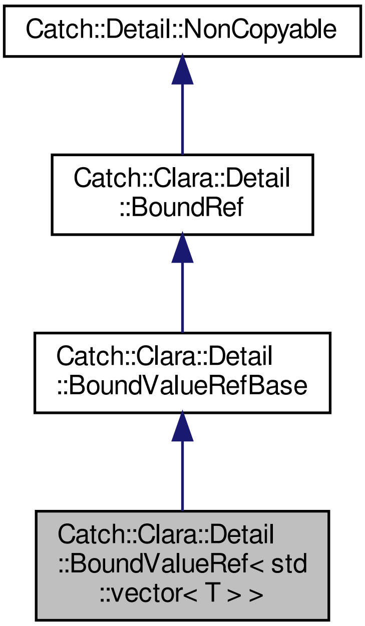
- include/catch2/catch_amalgamated.hpp

5.37 Catch::Clara::Detail::BoundValueRef< std::vector< T > > Struct Template Reference

Inheritance diagram for Catch::Clara::Detail::BoundValueRef< std::vector< T > >:


Catch::Detail::NonCopyable
Catch::Clara::Detail ::BoundRef
Catch::Clara::Detail ::BoundValueRefBase
Catch::Clara::Detail ::BoundValueRef< std ::vector< T > >

Collaboration diagram for Catch::Clara::Detail::BoundValueRef< std::vector< T > >:


Catch::Detail::NonCopyable
Catch::Clara::Detail ::BoundRef
Catch::Clara::Detail ::BoundValueRefBase
Catch::Clara::Detail ::BoundValueRef< std ::vector< T > >

Public Member Functions

- **BoundValueRef** (std::vector< T > &ref)
- auto **isContainer** () const -> bool override
- auto **setValue** (std::string const &arg) -> ParserResult override

Public Attributes

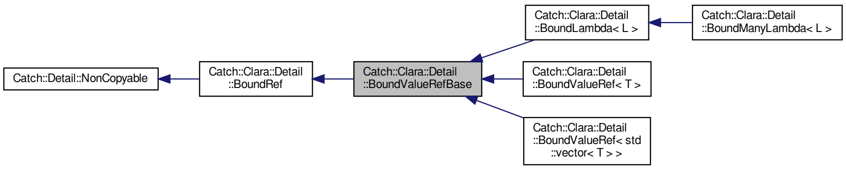
- std::vector< T > & **m_ref**

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

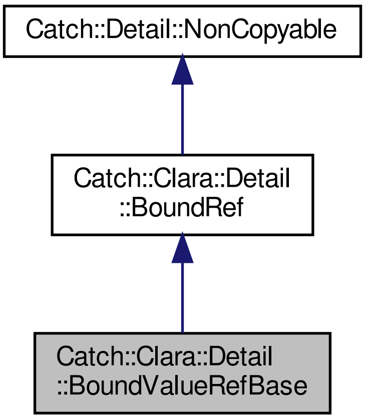
- include/catch2/catch_amalgamated.hpp

5.38 Catch::Clara::Detail::BoundValueRefBase Struct Reference

Inheritance diagram for Catch::Clara::Detail::BoundValueRefBase:


Catch::Detail::NonCopyable
Catch::Clara::Detail ::BoundRef
Catch::Clara::Detail ::BoundValueRefBase
Catch::Clara::Detail ::BoundLambda< L >
Catch::Clara::Detail ::BoundManyLambda< L >
Catch::Clara::Detail ::BoundValueRef< T >
Catch::Clara::Detail ::BoundValueRef< std ::vector< T > >

Collaboration diagram for Catch::Clara::Detail::BoundValueRefBase:


Catch::Detail::NonCopyable
Catch::Clara::Detail ::BoundRef
Catch::Clara::Detail ::BoundValueRefBase

Public Member Functions

- virtual auto **setValue** (std::string const &arg) -> ParserResult=0

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

- include/catch2/catch_amalgamated.hpp

5.39 Catch::Capturer Class Reference

Public Member Functions

- **Capturer** (StringRef macroName, SourceLineInfo const &lineInfo, ResultWas::OfType resultType, StringRef names)
- **Capturer** (Capturer const &)=delete
- Capturer & **operator=** (Capturer const &)=delete
- void **captureValue** (size_t index, std::string const &value)
- template<typename T >
  void **captureValues** (size_t index, T const &value)
- template<typename T , typename... Ts>
  void **captureValues** (size_t index, T const &value, Ts const &... values)

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

- include/catch2/catch_amalgamated.hpp

5.40 Catch::Matchers::CasedString Struct Reference

Public Member Functions

- **CasedString** (std::string const &str, CaseSensitive caseSensitivity)
- std::string **adjustString** (std::string const &str) const
- StringRef **caseSensitivitySuffix** () const

Public Attributes

- CaseSensitive **m_caseSensitivity**
- std::string **m_str**

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

- include/catch2/catch_amalgamated.hpp

5.41 Catch::Detail::CaseInsensitiveEqualTo Struct Reference

Provides case-insensitive `op==` semantics when called.

```
#include <catch_amalgamated.hpp>
```

Public Member Functions

- bool **operator()** (StringRef lhs, StringRef rhs) const

5.41.1 Detailed Description

Provides case-insensitive `op==` semantics when called.

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

- include/catch2/catch_amalgamated.hpp

5.42 Catch::Detail::CaseInsensitiveLess Struct Reference

Provides case-insensitive `op<` semantics when called.

```
#include <catch_amalgamated.hpp>
```

Public Member Functions

- bool **operator()** (StringRef lhs, StringRef rhs) const

5.42.1 Detailed Description

Provides case-insensitive `op<` semantics when called.

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

- include/catch2/catch_amalgamated.hpp

5.43 Catch_global_namespace_dummy Struct Reference

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

- include/catch2/catch_amalgamated.hpp

5.44 Catch::Benchmark::Chronometer Struct Reference

Public Member Functions

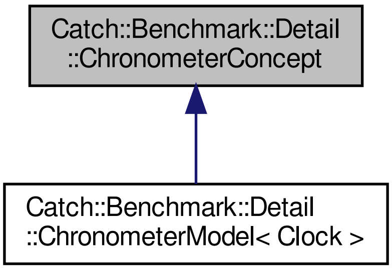
- template<typename Fun >
  void **measure** (Fun &&fun)
- int **runs** () const
- **Chronometer** (Detail::ChronometerConcept &meter, int repeats_)

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

- include/catch2/catch_amalgamated.hpp

5.45 Catch::Benchmark::Detail::ChronometerConcept Struct Reference

Inheritance diagram for Catch::Benchmark::Detail::ChronometerConcept:



Public Member Functions

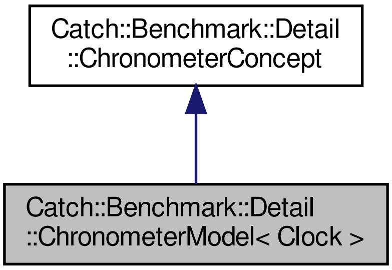
- virtual void **start** ()=0
- virtual void **finish** ()=0
- **ChronometerConcept** (ChronometerConcept const &)=default
- ChronometerConcept & **operator=** (ChronometerConcept const &)=default

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

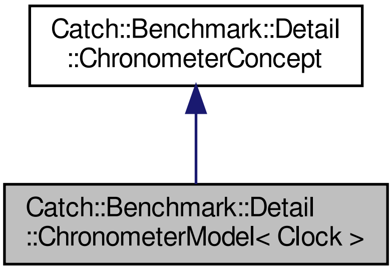
- include/catch2/catch_amalgamated.hpp

5.46 Catch::Benchmark::Detail::ChronometerModel< Clock > Struct Template Reference

Inheritance diagram for Catch::Benchmark::Detail::ChronometerModel< Clock >:



Collaboration diagram for Catch::Benchmark::Detail::ChronometerModel< Clock >:



Public Member Functions

- void **start** () override
- void **finish** () override
- ClockDuration< Clock > **elapsed** () const

Public Attributes

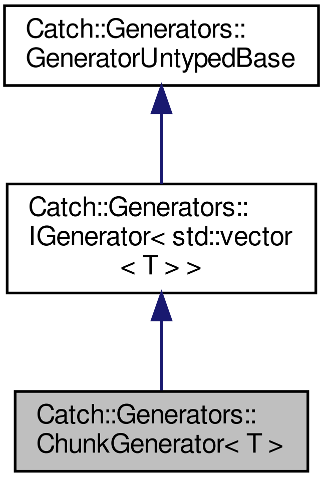
- TimePoint< Clock > **started**
- TimePoint< Clock > **finished**

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

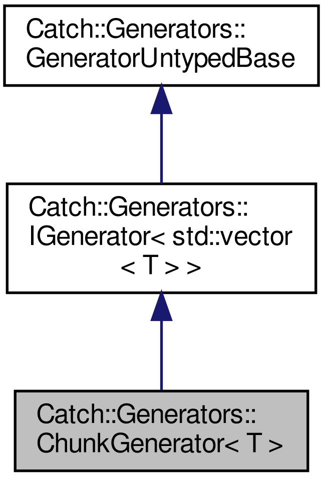
- include/catch2/catch_amalgamated.hpp

5.47 Catch::Generators::ChunkGenerator< T > Class Template Reference

Inheritance diagram for Catch::Generators::ChunkGenerator< T >:



Collaboration diagram for Catch::Generators::ChunkGenerator< T >:



Public Member Functions

- **ChunkGenerator** (size_t size, GeneratorWrapper< T > generator)
- std::vector< T > const & **get** () const override
- bool next () override

Additional Inherited Members

5.47.1 Member Function Documentation

5.47.1.1 next()

```
template<typename T >
bool Catch::Generators::ChunkGenerator< T >::next ( )  [inline], [override], [virtual]
```

Attempts to move the generator to the next element

Returns true iff the move succeeded (and a valid element can be retrieved).

Implements Catch::Generators::GeneratorUntypedBase.

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

- include/catch2/catch_amalgamated.hpp

5.48 Catch::Colour Struct Reference

Public Types

- enum **Code** {
  None = 0 , **White** , **Red** , **Green** ,
  Blue , **Cyan** , **Yellow** , **Grey** ,
  Bright = 0x10 , **BrightRed** = Bright | Red , **BrightGreen** = Bright | Green , **LightGrey** = Bright | Grey ,
  BrightWhite = Bright | White , **BrightYellow** = Bright | Yellow , **FileName** = LightGrey , **Warning** = Bright↩ Yellow ,
  ResultError = BrightRed , **ResultSuccess** = BrightGreen , **ResultExpectedFailure** = Warning , **Error** = BrightRed ,
  Success = Green , **OriginalExpression** = Cyan , **ReconstructedExpression** = BrightYellow , **Secondary**↩ **Text** = LightGrey ,
  Headers = White }

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

- include/catch2/catch_amalgamated.hpp

5.49 Catch::ColourImpl::ColourGuard Class Reference

```
#include <catch_amalgamated.hpp>
```

Public Member Functions

- ColourGuard (Colour::Code code, ColourImpl const *colour)

  *Does **not** engage the guard/start the colour.*
- **ColourGuard** (ColourGuard const &rhs)=delete
- ColourGuard & **operator=** (ColourGuard const &rhs)=delete
- **ColourGuard** (ColourGuard &&rhs) noexcept
- ColourGuard & **operator=** (ColourGuard &&rhs) noexcept
- ∼ColourGuard ()

  Removes colour if the guard was engaged.
- ColourGuard & engage (std::ostream &stream) &
- ColourGuard && engage (std::ostream &stream) &&

Friends

- std::ostream & operator<< (std::ostream &lhs, ColourGuard &guard)

  Engages the guard and starts using colour.
- std::ostream & operator<< (std::ostream &lhs, ColourGuard &&guard)

  Engages the guard and starts using colour.

5.49.1 Detailed Description

RAII wrapper around writing specific colour of text using specific colour impl into a stream.

5.49.2 Member Function Documentation

5.49.2.1 engage() [1/2]

```
ColourGuard& Catch::ColourImpl::ColourGuard::engage (
             std::ostream & stream ) &
```

Explicitly engages colour for given stream.

The API based on operator<< should be preferred.

5.49.2.2 engage() [2/2]

```
ColourGuard&& Catch::ColourImpl::ColourGuard::engage (
             std::ostream & stream ) &&
```

Explicitly engages colour for given stream.

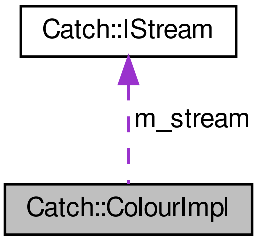
The API based on operator<< should be preferred.

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

- include/catch2/catch_amalgamated.hpp

5.50 Catch::ColourImpl Class Reference

Collaboration diagram for Catch::ColourImpl:



Classes

- class ColourGuard

Public Member Functions

- **ColourImpl** (IStream ∗stream)
- ColourGuard guardColour (Colour::Code colourCode)

Protected Attributes

- IStream ∗ m_stream

  The associated stream of this ColourImpl instance.

5.50.1 Member Function Documentation

5.50.1.1 guardColour()

```
ColourGuard Catch::ColourImpl::guardColour (
              Colour::Code colourCode )
```

Creates a guard object for given colour and this colour impl

Important: the guard starts disengaged, and has to be engaged explicitly.

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

- include/catch2/catch_amalgamated.hpp

5.51 Catch::TextFlow::Column Class Reference

```
#include <catch_amalgamated.hpp>
```

Classes

- class const_iterator

Public Types

- using **iterator** = const_iterator

Public Member Functions

- **Column** (std::string const &text)
- Column & **width** (size_t newWidth)
- Column & **indent** (size_t newIndent)
- Column & **initialIndent** (size_t newIndent)
- size_t **width** () const
- const_iterator **begin** () const
- const_iterator **end** () const
- Columns **operator+** (Column const &other)

Friends

- std::ostream & **operator**<< (std::ostream &os, Column const &col)

5.51.1 Detailed Description

Represents a column of text with specific width and indentation

When written out to a stream, it will perform linebreaking of the provided text so that the written lines fit within target width.

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

- include/catch2/catch_amalgamated.hpp

5.52 Catch::TextFlow::Columns Class Reference

Classes

- class iterator

Public Types

- using **const_iterator** = iterator

Public Member Functions

- iterator **begin** () const
- iterator **end** () const
- Columns & **operator+=** (Column const &col)
- Columns **operator+** (Column const &col)

Friends

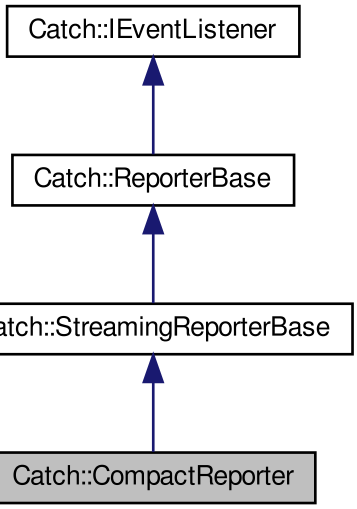
- std::ostream & **operator**<< (std::ostream &os, Columns const &cols)

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

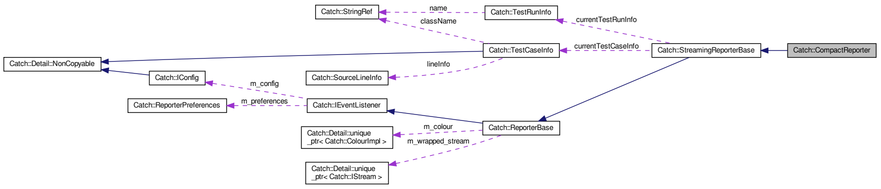
- include/catch2/catch_amalgamated.hpp

5.53 Catch::CompactReporter Class Reference

Inheritance diagram for Catch::CompactReporter:



Collaboration diagram for Catch::CompactReporter:



Public Member Functions

- void noMatchingTestCases (StringRef unmatchedSpec) override

  Called when no test cases match provided test spec.
- void testRunStarting (TestRunInfo const &_testInfo) override
- void assertionEnded (AssertionStats const &_assertionStats) override

  Called after assertion was fully evaluated.
- void sectionEnded (SectionStats const &_sectionStats) override

  Called after a `SECTION` has finished running.
- void testRunEnded (TestRunStats const &_testRunStats) override

Static Public Member Functions

- static std::string **getDescription** ()

Additional Inherited Members

5.53.1 Member Function Documentation

5.53.1.1 testRunEnded()

```
void Catch::CompactReporter::testRunEnded (
            TestRunStats const & testRunStats )  [override], [virtual]
```

Called once after all tests in a testing run are finished

Not called if tests weren't run (e.g. only listings happened)

Reimplemented from Catch::StreamingReporterBase.

5.53.1.2 testRunStarting()

```
void Catch::CompactReporter::testRunStarting (
            TestRunInfo const & testRunInfo )  [override], [virtual]
```

Called once in a testing run before tests are started

Not called if tests won't be run (e.g. only listing will happen)

Reimplemented from Catch::StreamingReporterBase.

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

- include/catch2/catch_amalgamated.hpp

5.54 Catch::Benchmark::Detail::CompleteInvoker< Result > Struct Template Reference

Static Public Member Functions

- template<typename Fun , typename... Args>
  static Result **invoke** (Fun &&fun, Args &&... args)

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

- include/catch2/catch_amalgamated.hpp

5.55 Catch::Benchmark::Detail::CompleteInvoker< void > Struct Reference

Static Public Member Functions

- template<typename Fun , typename... Args>
  static CompleteType_t< void > **invoke** (Fun &&fun, Args &&... args)

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

- include/catch2/catch_amalgamated.hpp

5.56 Catch::Benchmark::Detail::CompleteType< T > Struct Template Reference

Public Types

- using **type** = T

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

- include/catch2/catch_amalgamated.hpp

5.57 Catch::Benchmark::Detail::CompleteType< void > Struct Reference

Classes

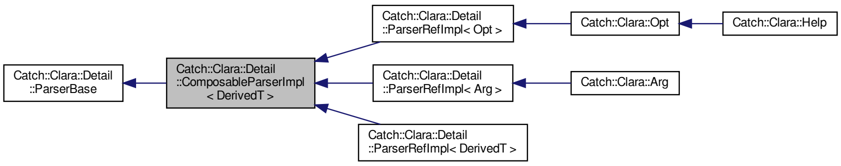
- struct type

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

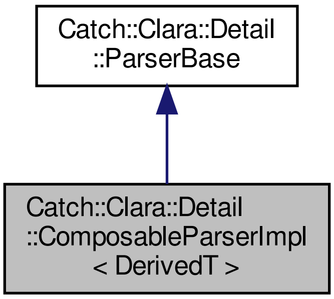
- include/catch2/catch_amalgamated.hpp

5.58 Catch::Clara::Detail::ComposableParserImpl< DerivedT > Class Template Reference

Inheritance diagram for Catch::Clara::Detail::ComposableParserImpl< DerivedT >:



Collaboration diagram for Catch::Clara::Detail::ComposableParserImpl< DerivedT >:



Public Member Functions

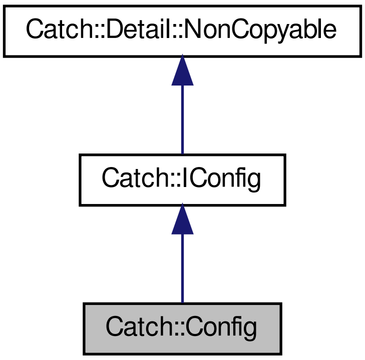
- template<typename T >
  auto **operator|** (T const &other) const -> Parser
- template<typename T >
  Parser **operator|** (T const &other) const

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

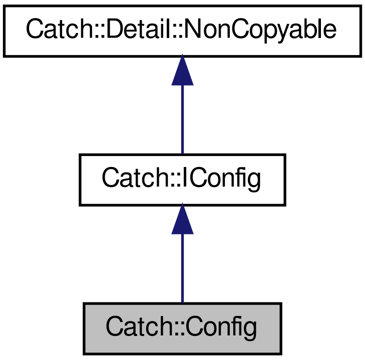
- include/catch2/catch_amalgamated.hpp

5.59 Catch::Config Class Reference

Inheritance diagram for Catch::Config:



Collaboration diagram for Catch::Config:



Public Member Functions

- **Config** (ConfigData const &data)
- bool **listTests** () const
- bool **listTags** () const
- bool **listReporters** () const
- bool **listListeners** () const
- std::vector< ReporterSpec > const & **getReporterSpecs** () const
- std::vector< ProcessedReporterSpec > const & **getProcessedReporterSpecs** () const

- std::vector< std::string > const & **getTestsOrTags** () const override
- std::vector< std::string > const & **getSectionsToRun** () const override
- TestSpec const & **testSpec** () const override
- bool **hasTestFilters** () const override
- bool **showHelp** () const
- bool **allowThrows** () const override
- StringRef **name** () const override
- bool **includeSuccessfulResults** () const override
- bool **warnAboutMissingAssertions** () const override
- bool **warnAboutUnmatchedTestSpecs** () const override
- bool **zeroTestsCountAsSuccess** () const override
- ShowDurations **showDurations** () const override
- double **minDuration** () const override
- TestRunOrder **runOrder** () const override
- uint32_t **rngSeed** () const override
- unsigned int **shardCount** () const override
- unsigned int **shardIndex** () const override
- ColourMode **defaultColourMode** () const override
- bool **shouldDebugBreak** () const override
- int **abortAfter** () const override
- bool **showInvisibles** () const override
- Verbosity **verbosity** () const override
- bool **skipBenchmarks** () const override
- bool **benchmarkNoAnalysis** () const override
- unsigned int **benchmarkSamples** () const override
- double **benchmarkConfidenceInterval** () const override
- unsigned int **benchmarkResamples** () const override
- std::chrono::milliseconds **benchmarkWarmupTime** () const override

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

- include/catch2/catch_amalgamated.hpp

5.60 Catch::ConfigData Struct Reference

Public Attributes

- bool **listTests** = false
- bool **listTags** = false
- bool **listReporters** = false
- bool **listListeners** = false
- bool **showSuccessfulTests** = false
- bool **shouldDebugBreak** = false
- bool **noThrow** = false
- bool **showHelp** = false
- bool **showInvisibles** = false
- bool **filenamesAsTags** = false
- bool **libIdentify** = false
- bool **allowZeroTests** = false
- int **abortAfter** = -1
- uint32_t **rngSeed** = generateRandomSeed(GenerateFrom::Default)

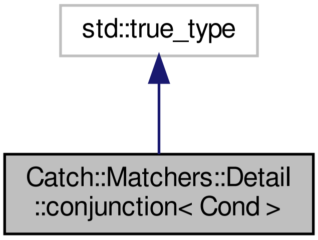
- unsigned int **shardCount** = 1
- unsigned int **shardIndex** = 0
- bool **skipBenchmarks** = false
- bool **benchmarkNoAnalysis** = false
- unsigned int **benchmarkSamples** = 100
- double **benchmarkConfidenceInterval** = 0.95
- unsigned int **benchmarkResamples** = 100000
- std::chrono::milliseconds::rep **benchmarkWarmupTime** = 100
- Verbosity **verbosity** = Verbosity::Normal
- WarnAbout::What **warnings** = WarnAbout::Nothing
- ShowDurations **showDurations** = ShowDurations::DefaultForReporter
- double **minDuration** = -1
- TestRunOrder **runOrder** = TestRunOrder::Declared
- ColourMode **defaultColourMode** = ColourMode::PlatformDefault
- WaitForKeypress::When **waitForKeypress** = WaitForKeypress::Never
- std::string **defaultOutputFilename**
- std::string **name**
- std::string **processName**
- std::vector< ReporterSpec > **reporterSpecifications**
- std::vector< std::string > **testsOrTags**
- std::vector< std::string > **sectionsToRun**

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

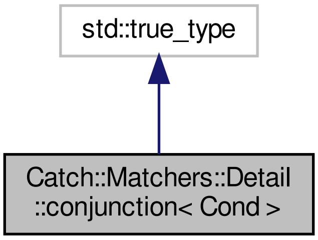
- include/catch2/catch_amalgamated.hpp

5.61 Catch::Matchers::Detail::conjunction< Cond > Struct Template Reference

Inheritance diagram for Catch::Matchers::Detail::conjunction< Cond >:



Collaboration diagram for Catch::Matchers::Detail::conjunction< Cond >:

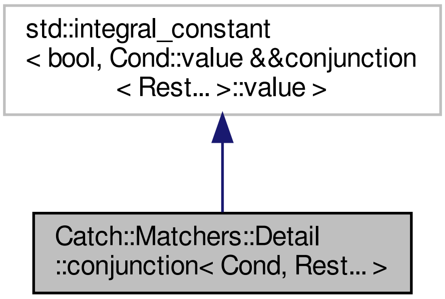


The documentation for this struct was generated from the following file:

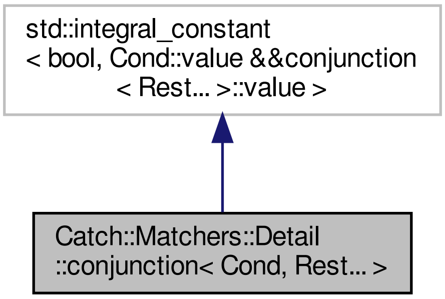
- include/catch2/catch_amalgamated.hpp

5.62 Catch::Matchers::Detail::conjunction< Cond, Rest... > Struct Template Reference

Inheritance diagram for Catch::Matchers::Detail::conjunction< Cond, Rest... >:


std::integral_constant < bool, Cond::value &&conjunction < Rest... >::value >
Catch::Matchers::Detail ::conjunction< Cond, Rest... >

Collaboration diagram for Catch::Matchers::Detail::conjunction< Cond, Rest... >:

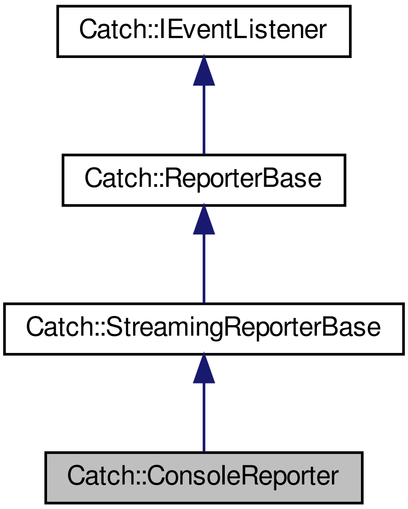


The documentation for this struct was generated from the following file:

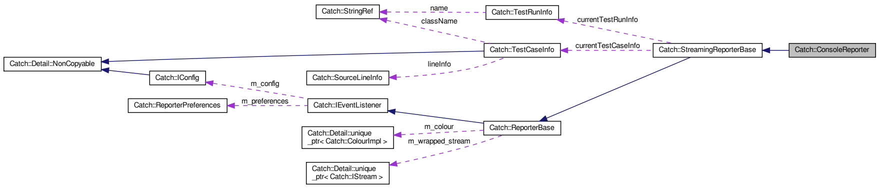
- include/catch2/catch_amalgamated.hpp

5.63 Catch::ConsoleReporter Class Reference

Inheritance diagram for Catch::ConsoleReporter:



Collaboration diagram for Catch::ConsoleReporter:



Public Member Functions

- **ConsoleReporter** (ReporterConfig &&config)
- void noMatchingTestCases (StringRef unmatchedSpec) override

  Called when no test cases match provided test spec.
- void reportInvalidTestSpec (StringRef arg) override

  Called for all invalid test specs from the cli.
- void assertionStarting (AssertionInfo const &) override

  Called before assertion success/failure is evaluated.
- void assertionEnded (AssertionStats const &_assertionStats) override

  Called after assertion was fully evaluated.
- void sectionStarting (SectionInfo const &_sectionInfo) override

  Called when a `SECTION` is being entered. Not called for skipped sections.
- void sectionEnded (SectionStats const &_sectionStats) override

  Called after a `SECTION` has finished running.
- void benchmarkPreparing (StringRef name) override

  Called when user-code is being probed before the actual benchmark runs.
- void benchmarkStarting (BenchmarkInfo const &info) override

  Called after probe but before the user-code is being benchmarked.
- void benchmarkEnded (BenchmarkStats<> const &stats) override

  Called with the benchmark results if benchmark successfully finishes.
- void benchmarkFailed (StringRef error) override

  Called if running the benchmarks fails for any reason.
- void testCaseEnded (TestCaseStats const &_testCaseStats) override

  Called once for each TEST_CASE, no matter how many times it is entered.
- void testRunEnded (TestRunStats const &_testRunStats) override
- void testRunStarting (TestRunInfo const &_testRunInfo) override

Static Public Member Functions

- static std::string **getDescription** ()

Additional Inherited Members

5.63.1 Member Function Documentation

5.63.1.1 testRunEnded()

```
void Catch::ConsoleReporter::testRunEnded (
            TestRunStats const & testRunStats )  [override], [virtual]
```

Called once after all tests in a testing run are finished

Not called if tests weren't run (e.g. only listings happened)

Reimplemented from Catch::StreamingReporterBase.

5.63.1.2 testRunStarting()

```
void Catch::ConsoleReporter::testRunStarting (
            TestRunInfo const & testRunInfo )  [override], [virtual]
```

Called once in a testing run before tests are started

Not called if tests won't be run (e.g. only listing will happen)

Reimplemented from Catch::StreamingReporterBase.

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

- include/catch2/catch_amalgamated.hpp

5.64 Catch::TextFlow::Column::const_iterator Class Reference

```
#include <catch_amalgamated.hpp>
```

Public Types

- using **difference_type** = std::ptrdiff_t
- using **value_type** = std::string
- using **pointer** = value_type ∗
- using **reference** = value_type &
- using **iterator_category** = std::forward_iterator_tag

Public Member Functions

- **const_iterator** (Column const &column)
- std::string **operator∗** () const
- const_iterator & **operator++** ()
- const_iterator **operator++** (int)
- bool **operator==** (const_iterator const &other) const
- bool **operator!=** (const_iterator const &other) const

5.64.1 Detailed Description

Iterates "lines" in `Column` and return sthem

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

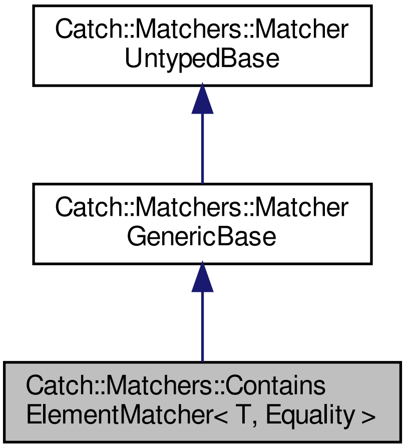
- include/catch2/catch_amalgamated.hpp

5.65 Catch::Matchers::ContainsElementMatcher< T, Equality > Class Template Reference

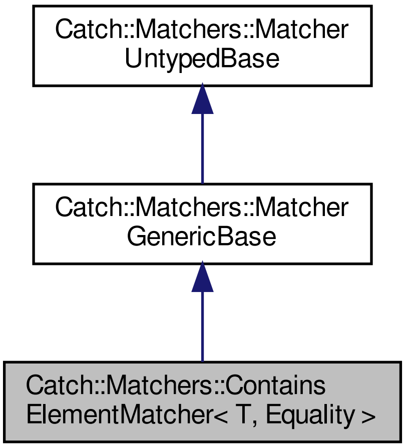
Matcher for checking that an element in range is equal to specific element.

`#include <catch_amalgamated.hpp>`

Inheritance diagram for Catch::Matchers::ContainsElementMatcher< T, Equality >:


Catch::Matchers::Matcher UntypedBase
Catch::Matchers::Matcher GenericBase
Catch::Matchers::Contains ElementMatcher< T, Equality >

Collaboration diagram for Catch::Matchers::ContainsElementMatcher< T, Equality >:


Catch::Matchers::Matcher UntypedBase
Catch::Matchers::Matcher GenericBase
Catch::Matchers::Contains ElementMatcher< T, Equality >

Public Member Functions

- template< typename T2 , typename Equality2 >
  ContainsElementMatcher (T2 &&target, Equality2 &&predicate)
- std::string **describe** () const override
- template< typename RangeLike >
  bool **match** (RangeLike &&rng) const

Additional Inherited Members

5.65.1 Detailed Description

template< typename T, typename Equality>
class Catch::Matchers::ContainsElementMatcher< T, Equality >

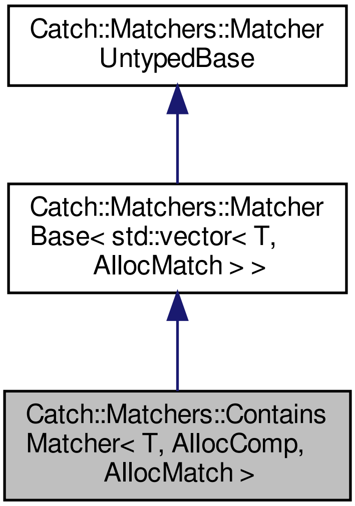
Matcher for checking that an element in range is equal to specific element.

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

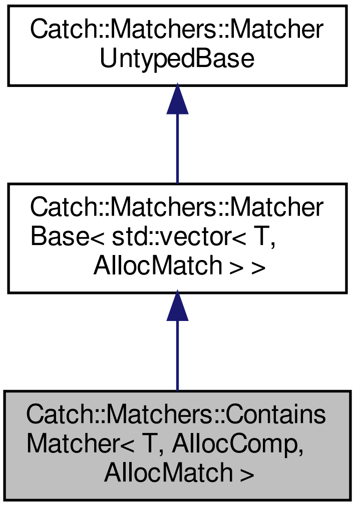
- include/catch2/catch_amalgamated.hpp

5.66 Catch::Matchers::ContainsMatcher< T, AllocComp, AllocMatch > Class Template Reference

Inheritance diagram for Catch::Matchers::ContainsMatcher< T, AllocComp, AllocMatch >:


Catch::Matchers::Matcher UntypedBase
Catch::Matchers::Matcher Base< std::vector< T, AllocMatch > >
Catch::Matchers::Contains Matcher< T, AllocComp, AllocMatch >

Collaboration diagram for Catch::Matchers::ContainsMatcher< T, AllocComp, AllocMatch >:


Catch::Matchers::Matcher UntypedBase
Catch::Matchers::Matcher Base< std::vector< T, AllocMatch > >
Catch::Matchers::Contains Matcher< T, AllocComp, AllocMatch >

Public Member Functions

- **ContainsMatcher** (std::vector< T, AllocComp > const &comparator)
- bool **match** (std::vector< T, AllocMatch > const &v) const override
- std::string **describe** () const override

Additional Inherited Members

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

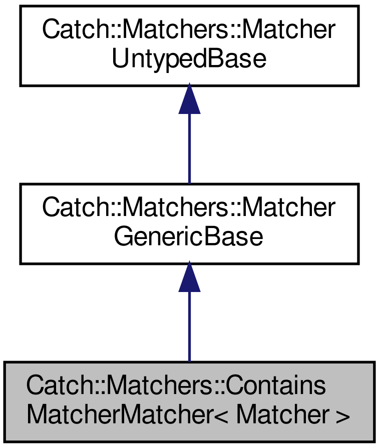
- include/catch2/catch_amalgamated.hpp

5.67 Catch::Matchers::ContainsMatcherMatcher< Matcher > Class Template Reference

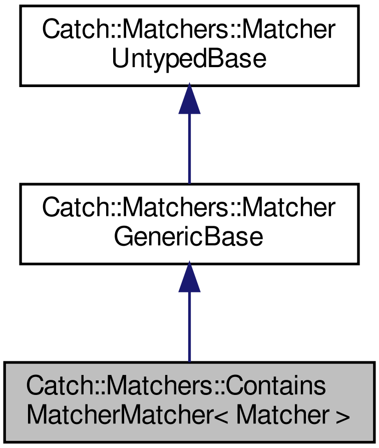
Meta-matcher for checking that an element in a range matches a specific matcher.

```
#include <catch_amalgamated.hpp>
```

Inheritance diagram for Catch::Matchers::ContainsMatcherMatcher< Matcher >:


Catch::Matchers::Matcher UntypedBase
Catch::Matchers::Matcher GenericBase
Catch::Matchers::Contains MatcherMatcher< Matcher >

Collaboration diagram for Catch::Matchers::ContainsMatcherMatcher< Matcher >:


Catch::Matchers::Matcher UntypedBase
Catch::Matchers::Matcher GenericBase
Catch::Matchers::Contains MatcherMatcher< Matcher >

Public Member Functions

- **ContainsMatcherMatcher** (Matcher matcher)
- template< typename RangeLike >
  bool **match** (RangeLike &&rng) const
- std::string **describe** () const override

Additional Inherited Members

5.67.1 Detailed Description

template<typename Matcher>
class Catch::Matchers::ContainsMatcherMatcher< Matcher >

Meta-matcher for checking that an element in a range matches a specific matcher.

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

- include/catch2/catch_amalgamated.hpp

5.68 Catch::Counts Struct Reference

Public Member Functions

- Counts **operator-** (Counts const &other) const
- Counts & **operator+=** (Counts const &other)
- std::uint64_t **total** () const
- bool **allPassed** () const
- bool **allOk** () const

Public Attributes

- std::uint64_t **passed** = 0
- std::uint64_t **failed** = 0
- std::uint64_t **failedButOk** = 0

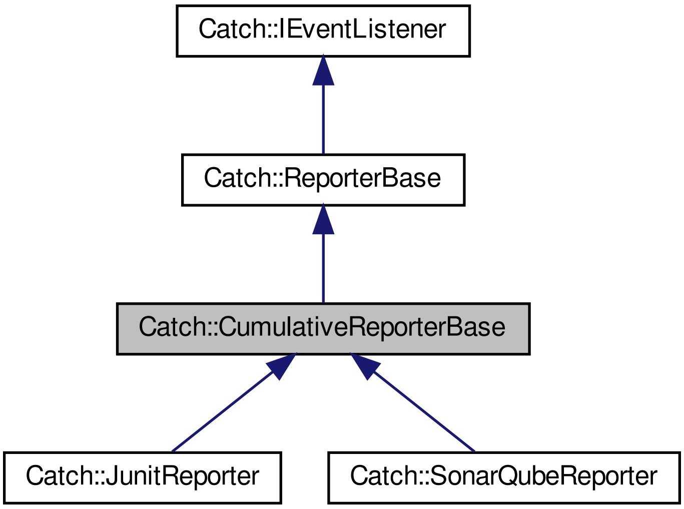
The documentation for this struct was generated from the following file:

- include/catch2/catch_amalgamated.hpp

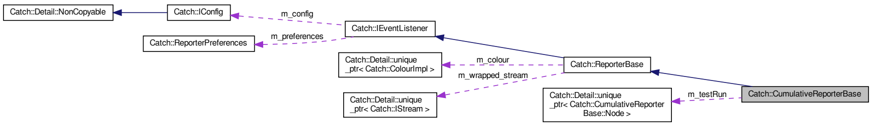
5.69 Catch::CumulativeReporterBase Class Reference

```
#include <catch_amalgamated.hpp>
```

Inheritance diagram for Catch::CumulativeReporterBase:



Collaboration diagram for Catch::CumulativeReporterBase:


Catch::Detail::NonCopyable
Catch::IConfig
m_config
Catch::IEventListener
Catch::ReporterPreferences
m_preferences
Catch::Detail::unique _ptr< Catch::ColourImpl >
m_colour
Catch::ReporterBase
m_wrapped_stream
Catch::Detail::unique _ptr< Catch::IStream >
Catch::Detail::unique _ptr< Catch::CumulativeReporter Base::Node >
m_testRun
Catch::CumulativeReporterBase

Classes

- struct Node
- struct SectionNode

Public Types

- using **TestCaseNode** = Node< TestCaseStats, SectionNode >
- using **TestRunNode** = Node< TestRunStats, TestCaseNode >

Public Member Functions

- void benchmarkPreparing (StringRef) override

  Called when user-code is being probed before the actual benchmark runs.
- void benchmarkStarting (BenchmarkInfo const &) override

  Called after probe but before the user-code is being benchmarked.
- void benchmarkEnded (BenchmarkStats<> const &benchmarkStats) override

  Called with the benchmark results if benchmark successfully finishes.
- void benchmarkFailed (StringRef) override

  Called if running the benchmarks fails for any reason.
- void noMatchingTestCases (StringRef) override

  Called when no test cases match provided test spec.
- void reportInvalidTestSpec (StringRef) override

  Called for all invalid test specs from the cli.
- void fatalErrorEncountered (StringRef) override

  Called if a fatal error (signal/structured exception) occured.
- void testRunStarting (TestRunInfo const &) override
- void testCaseStarting (TestCaseInfo const &) override

  Called once for each TEST_CASE, no matter how many times it is entered.
- void testCasePartialStarting (TestCaseInfo const &, uint64_t) override

  Called every time a TEST_CASE is entered, including repeats (due to sections)
- void sectionStarting (SectionInfo const &sectionInfo) override

  Called when a `SECTION` is being entered. Not called for skipped sections.
- void assertionStarting (AssertionInfo const &) override

  Called before assertion success/failure is evaluated.
- void assertionEnded (AssertionStats const &assertionStats) override

  Called after assertion was fully evaluated.
- void sectionEnded (SectionStats const &sectionStats) override

  Called after a `SECTION` has finished running.
- void testCasePartialEnded (TestCaseStats const &, uint64_t) override

  Called every time a TEST_CASE is entered, including repeats (due to sections)
- void testCaseEnded (TestCaseStats const &testCaseStats) override

  Called once for each TEST_CASE, no matter how many times it is entered.
- void testRunEnded (TestRunStats const &testRunStats) override
- virtual void testRunEndedCumulative ()=0

  Customization point: called after last test finishes (testRunEnded has been handled)
- void skipTest (TestCaseInfo const &) override

  Called with test cases that are skipped due to the test run aborting.
- **ReporterBase** (ReporterConfig &&config)

Protected Attributes

- bool m_shouldStoreSuccesfulAssertions = true

  Should the cumulative base store the assertion expansion for succesful assertions?
- bool m_shouldStoreFailedAssertions = true

  Should the cumulative base store the assertion expansion for failed assertions?
- Detail::unique_ptr< TestRunNode > m_testRun

  The root node of the test run tree.

5.69.1 Detailed Description

Utility base for reporters that need to handle all results at once

It stores tree of all test cases, sections and assertions, and after the test run is finished, calls into `testRunEndedCumulative` to pass the control to the deriving class.

If you are deriving from this class and override any testing related member functions, you should first call into the base's implementation to avoid breaking the tree construction.

Due to the way this base functions, it has to expand assertions up-front, even if they are later unused (e.g. because the deriving reporter does not report successful assertions, or because the deriving reporter does not use assertion expansion at all). Derived classes can use two customization points, `m_shouldStoreSuccesfulAssertions` and `m_shouldStoreFailedAssertions`, to disable the expansion and gain extra performance. **Accessing the assertion expansions if it wasn't stored is UB.**

5.69.2 Member Function Documentation

5.69.2.1 testRunEnded()

```
void Catch::CumulativeReporterBase::testRunEnded (
            TestRunStats const & testRunStats )  [override], [virtual]
```

Called once after all tests in a testing run are finished

Not called if tests weren't run (e.g. only listings happened)

Implements Catch::IEventListener.

5.69.2.2 testRunStarting()

```
void Catch::CumulativeReporterBase::testRunStarting (
            TestRunInfo const & testRunInfo )  [inline], [override], [virtual]
```

Called once in a testing run before tests are started

Not called if tests won't be run (e.g. only listing will happen)

Implements Catch::IEventListener.

Reimplemented in Catch::SonarQubeReporter, and Catch::JunitReporter.

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

- include/catch2/catch_amalgamated.hpp

5.70 DataBase< TSeq > Class Template Reference

Statistical data about the process.

```
#include <database-bones.hpp>
```

Public Member Functions

- **DataBase** (Model< TSeq > &m)
- void record_variant (Virus< TSeq > &v)

  Registering a new variant.
- void **record_tool** (Tool< TSeq > &t)
- void **set_seq_hasher** (std::function< std::vector< int >(TSeq)> fun)
- void **set_model** (Model< TSeq > &m)
- Model< TSeq > ∗ **get_model** ()
- void **record** ()
- const std::vector< TSeq > & **get_sequence** () const
- const std::vector< int > & **get_nexposed** () const
- size_t **size** () const
- void **write_data** (std::string fn_variant_info, std::string fn_variant_hist, std::string fn_tool_info, std::string fn_tool_hist, std::string fn_total_hist, std::string fn_transmission, std::string fn_transition) const
- void **record_transmission** (int i, int j, int variant, int i_expo_date)
- size_t **get_n_variants** () const
- size_t **get_n_tools** () const
- void **reset** ()
- void **set_user_data** (std::vector< std::string > names)
- void **add_user_data** (std::vector< epiworld_double > x)
- void **add_user_data** (unsigned int j, epiworld_double x)
- UserData< TSeq > & **get_user_data** ()
- std::vector< epiworld_double > transition_probability (bool print=true) const

  Calculates the transition probabilities.

Get recorded information from the model

Parameters

what	*std::string, The status, e.g., 0, 1, 2, ...*

Returns

In `get_today_total`, the current counts of `what`.

In `get_today_variant`, the current counts of `what` for each variant.

In `get_hist_total`, the time series of `what`

In `get_hist_variant`, the time series of what for each variant.

In `get_hist_total_date` and `get_hist_variant_date` the corresponding dates

- int **get_today_total** (std::string what) const
- int **get_today_total** (epiworld_fast_uint what) const
- void **get_today_total** (std::vector< std::string > ∗status=nullptr, std::vector< int > ∗counts=nullptr) const
- void **get_today_variant** (std::vector< std::string > &status, std::vector< int > &id, std::vector< int > &counts) const
- void **get_hist_total** (std::vector< int > ∗date, std::vector< std::string > ∗status, std::vector< int > ∗counts) const

- void **get_hist_variant** (std::vector< int > &date, std::vector< int > &id, std::vector< std::string > &status, std::vector< int > &counts) const

- MapVec_type< int, int > reproductive_number () const

    Computes the reproductive number of each case.
- void **reproductive_number** (std::string fn) const

Friends

- class **Model**< **TSeq** >
- void **default_add_virus** (Action< TSeq > &a, Model< TSeq > ∗m)
- void **default_add_tool** (Action< TSeq > &a, Model< TSeq > ∗m)
- void **default_rm_virus** (Action< TSeq > &a, Model< TSeq > ∗m)
- void **default_rm_tool** (Action< TSeq > &a, Model< TSeq > ∗m)

5.70.1 Detailed Description

template<typename TSeq>
class DataBase< TSeq >

Statistical data about the process.

Template Parameters

TSeq	

5.70.2 Member Function Documentation

5.70.2.1 record_variant()

```
template<typename TSeq >
void DataBase< TSeq >::record_variant (
             Virus< TSeq > & v )  [inline]
```

Registering a new variant.

Parameters

v	Pointer to the new variant. Since variants are originated in the agent, the numbers simply move around. From the parent variant to the new variant. And the total number of infected does not change.

5.70.2.2 reproductive_number()

```
template<typename TSeq >
MapVec_type< int, int > DataBase< TSeq >::reproductive_number  [inline]
```

Computes the reproductive number of each case.

Parameters

fn	File where to write out the reproductive number.

5.70.2.3 transition_probability()

```
template<typename TSeq >
std::vector< epiworld_double > DataBase< TSeq >::transition_probability (
             bool print = true ) const  [inline]
```

Calculates the transition probabilities.

Returns

std::vector< epiworld_double >

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

- include/epiworld/database-bones.hpp
- include/epiworld/database-meat.hpp

5.71 Catch::Decomposer Struct Reference

Friends

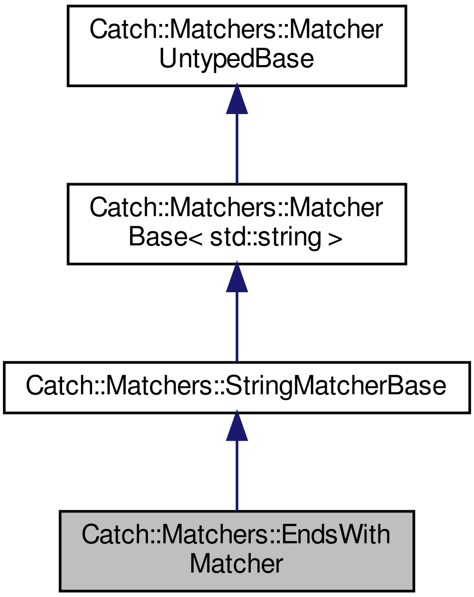
- template<typename T , std::enable_if_t<!std::is_arithmetic< std::remove_reference_t< T >>::value, int > = 0>
  auto **operator<=** (Decomposer &&, T &&lhs) -> ExprLhs< T const & >
- template<typename T , std::enable_if_t< std::is_arithmetic< T >::value, int > = 0>
  auto **operator<=** (Decomposer &&, T value) -> ExprLhs< T >

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

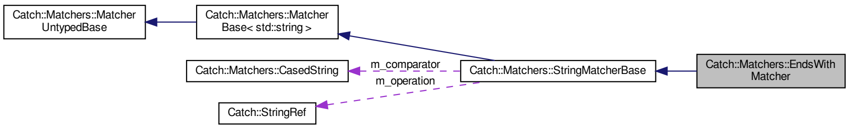
- include/catch2/catch_amalgamated.hpp

5.72 Catch::Matchers::EndsWithMatcher Class Reference

Inheritance diagram for Catch::Matchers::EndsWithMatcher:


Catch::Matchers::Matcher UntypedBase
Catch::Matchers::Matcher Base< std::string >
Catch::Matchers::StringMatcherBase
Catch::Matchers::EndsWith Matcher

Collaboration diagram for Catch::Matchers::EndsWithMatcher:


Catch::Matchers::Matcher UntypedBase
Catch::Matchers::Matcher Base< std::string >
Catch::Matchers::CasedString
m_comparator
m_operation
Catch::Matchers::StringMatcherBase
Catch::Matchers::EndsWith Matcher
Catch::StringRef

Public Member Functions

- **EndsWithMatcher** (CasedString const &comparator)
- bool **match** (std::string const &source) const override

Additional Inherited Members

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

- include/catch2/catch_amalgamated.hpp

5.73 Entity< TSeq > Class Template Reference

Public Member Functions

- void **add_agent** (Agent< TSeq > &p)
- void **add_agent** (Agent< TSeq > ∗p)
- void **rm_agent** (size_t idx)
- size_t **size** () const noexcept
- void **set_location** (std::vector< epiworld_double > loc)
- std::vector< epiworld_double > & **get_location** ()
- std::vector< Agent< TSeq > ∗ >::iterator **begin** ()
- std::vector< Agent< TSeq > ∗ >::iterator **end** ()
- std::vector< Agent< TSeq > ∗ >::const_iterator **begin** () const
- std::vector< Agent< TSeq > ∗ >::const_iterator **end** () const

Friends

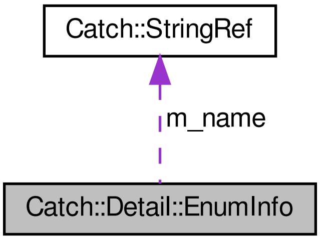
- class **Agent**< **TSeq** >
- class **AgentsSample**< **TSeq** >
- class **Model**< **TSeq** >

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

- include/epiworld/agentssample-bones.hpp
- include/epiworld/entity-bones.hpp

5.74 Catch::Detail::EnumInfo Struct Reference

Collaboration diagram for Catch::Detail::EnumInfo:



Public Member Functions

- StringRef **lookup** (int value) const

Public Attributes

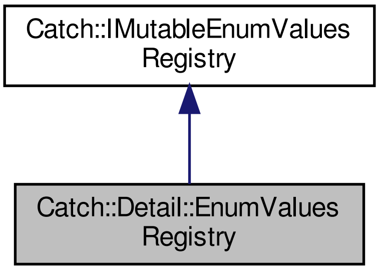
- StringRef **m_name**
- std::vector< std::pair< int, StringRef > > **m_values**

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

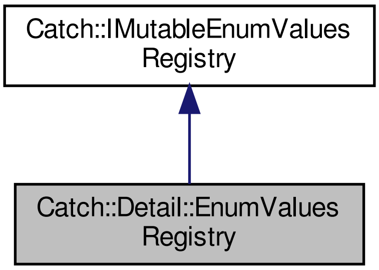
- include/catch2/catch_amalgamated.hpp

5.75 Catch::Detail::EnumValuesRegistry Class Reference

Inheritance diagram for Catch::Detail::EnumValuesRegistry:


Catch::IMutableEnumValues Registry
Catch::Detail::EnumValues Registry

Collaboration diagram for Catch::Detail::EnumValuesRegistry:


Catch::IMutableEnumValues Registry
Catch::Detail::EnumValues Registry

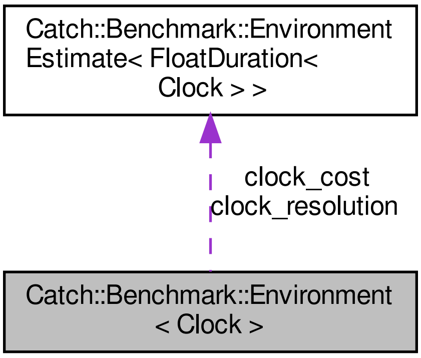
Additional Inherited Members

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

- include/catch2/catch_amalgamated.hpp

5.76 Catch::Benchmark::Environment< Clock > Struct Template Reference

Collaboration diagram for Catch::Benchmark::Environment< Clock >:



Public Types

- using **clock_type** = Clock

Public Attributes

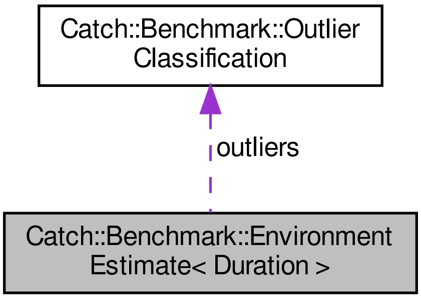
- EnvironmentEstimate< FloatDuration< Clock > > **clock_resolution**
- EnvironmentEstimate< FloatDuration< Clock > > **clock_cost**

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

- include/catch2/catch_amalgamated.hpp

5.77 Catch::Benchmark::EnvironmentEstimate< Duration > Struct Template Reference

Collaboration diagram for Catch::Benchmark::EnvironmentEstimate< Duration >:


Catch::Benchmark::Outlier Classification
outliers
Catch::Benchmark::Environment Estimate< Duration >

Public Member Functions

- template<typename Duration2 >
  operator EnvironmentEstimate< Duration2 > () const

Public Attributes

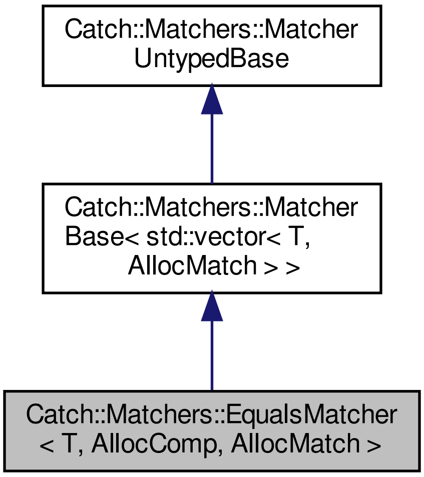
- Duration **mean**
- OutlierClassification **outliers**

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

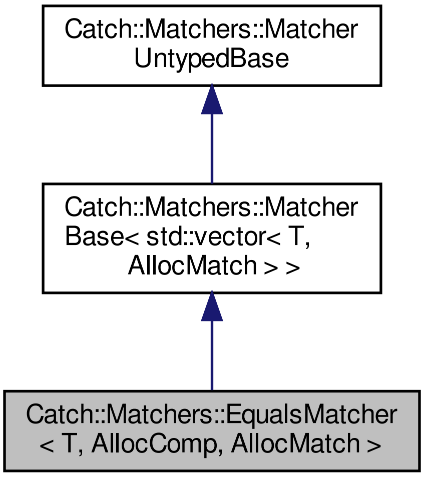
- include/catch2/catch_amalgamated.hpp

5.78 Catch::Matchers::EqualsMatcher< T, AllocComp, AllocMatch > Class Template Reference

Inheritance diagram for Catch::Matchers::EqualsMatcher< T, AllocComp, AllocMatch >:



Collaboration diagram for Catch::Matchers::EqualsMatcher< T, AllocComp, AllocMatch >:



Public Member Functions

- **EqualsMatcher** (std::vector< T, AllocComp > const &comparator)

- bool **match** (std::vector< T, AllocMatch > const &v) const override
- std::string **describe** () const override

Additional Inherited Members

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

- include/catch2/catch_amalgamated.hpp

5.79 Catch::ErrnoGuard Class Reference

```
#include <catch_amalgamated.hpp>
```

5.79.1 Detailed Description

Simple RAII class that stores the value of `errno` at construction and restores it at destruction.

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

- include/catch2/catch_amalgamated.hpp

5.80 Catch::Benchmark::Estimate< Duration > Struct Template Reference

Public Member Functions

- template<typename Duration2 >
  operator Estimate< Duration2 > () const

Public Attributes

- Duration **point**
- Duration **lower_bound**
- Duration **upper_bound**
- double **confidence_interval**

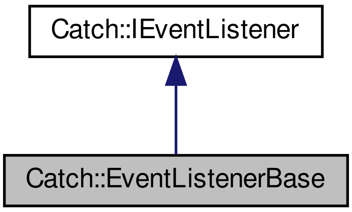
The documentation for this struct was generated from the following file:

- include/catch2/catch_amalgamated.hpp

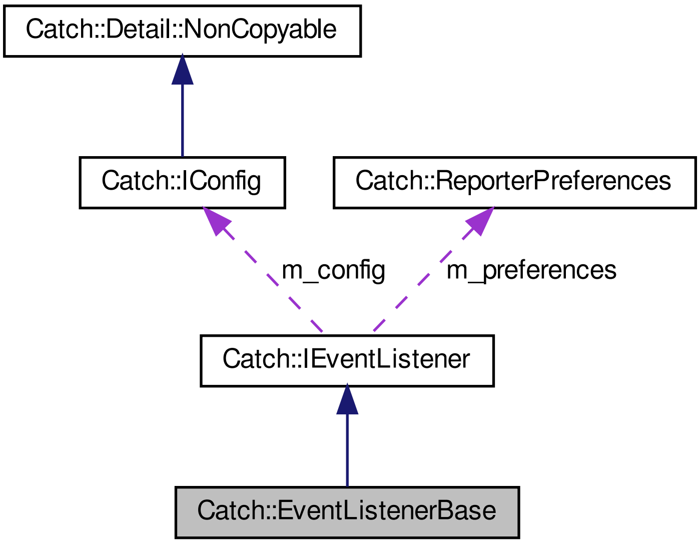
5.81 Catch::EventListenerBase Class Reference

```
#include <catch_amalgamated.hpp>
```

Inheritance diagram for Catch::EventListenerBase:



Collaboration diagram for Catch::EventListenerBase:



Public Member Functions

- void reportInvalidTestSpec (StringRef unmatchedSpec) override

  Called for all invalid test specs from the cli.
- void fatalErrorEncountered (StringRef error) override

  Called if a fatal error (signal/structured exception) occured.

- void benchmarkPreparing (StringRef name) override

  Called when user-code is being probed before the actual benchmark runs.
- void benchmarkStarting (BenchmarkInfo const &benchmarkInfo) override

  Called after probe but before the user-code is being benchmarked.
- void benchmarkEnded (BenchmarkStats<> const &benchmarkStats) override

  Called with the benchmark results if benchmark successfully finishes.
- void benchmarkFailed (StringRef error) override

  Called if running the benchmarks fails for any reason.
- void assertionStarting (AssertionInfo const &assertionInfo) override

  Called before assertion success/failure is evaluated.
- void assertionEnded (AssertionStats const &assertionStats) override

  Called after assertion was fully evaluated.
- void listReporters (std::vector< ReporterDescription > const &descriptions) override

  Writes out information about provided reporters using reporter-specific format.
- void listListeners (std::vector< ListenerDescription > const &descriptions) override

  Writes out the provided listeners descriptions using reporter-specific format.
- void listTests (std::vector< TestCaseHandle > const &tests) override

  Writes out information about provided tests using reporter-specific format.
- void listTags (std::vector< TagInfo > const &tagInfos) override

  Writes out information about the provided tags using reporter-specific format.
- void noMatchingTestCases (StringRef unmatchedSpec) override

  Called when no test cases match provided test spec.
- void testRunStarting (TestRunInfo const &testRunInfo) override
- void testCaseStarting (TestCaseInfo const &testInfo) override

  Called once for each TEST_CASE, no matter how many times it is entered.
- void testCasePartialStarting (TestCaseInfo const &testInfo, uint64_t partNumber) override

  Called every time a TEST_CASE is entered, including repeats (due to sections)
- void sectionStarting (SectionInfo const &sectionInfo) override

  Called when a `SECTION` is being entered. Not called for skipped sections.
- void sectionEnded (SectionStats const &sectionStats) override

  Called after a `SECTION` has finished running.
- void testCasePartialEnded (TestCaseStats const &testCaseStats, uint64_t partNumber) override

  Called every time a TEST_CASE is entered, including repeats (due to sections)
- void testCaseEnded (TestCaseStats const &testCaseStats) override

  Called once for each TEST_CASE, no matter how many times it is entered.
- void testRunEnded (TestRunStats const &testRunStats) override
- void skipTest (TestCaseInfo const &testInfo) override

  Called with test cases that are skipped due to the test run aborting.
- **IEventListener** (IConfig const ∗config)

Additional Inherited Members

5.81.1 Detailed Description

Base class to simplify implementing listeners.

Provides empty default implementation for all IEventListener member functions, so that a listener implementation can pick which member functions it actually cares about.

5.81.2 Member Function Documentation

5.81.2.1 testRunEnded()

```
void Catch::EventListenerBase::testRunEnded (
            TestRunStats const & testRunStats )  [override], [virtual]
```

Called once after all tests in a testing run are finished

Not called if tests weren't run (e.g. only listings happened)

Implements Catch::IEventListener.

5.81.2.2 testRunStarting()

```
void Catch::EventListenerBase::testRunStarting (
            TestRunInfo const & testRunInfo )  [override], [virtual]
```

Called once in a testing run before tests are started

Not called if tests won't be run (e.g. only listing will happen)

Implements Catch::IEventListener.

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

- include/catch2/catch_amalgamated.hpp

5.82 Catch::EventListenerFactory Class Reference

Public Member Functions

- virtual IEventListenerPtr **create** (IConfig const ∗config) const =0
- virtual StringRef getName () const =0

  Return a meaningful name for the listener, e.g. its type name.
- virtual std::string getDescription () const =0

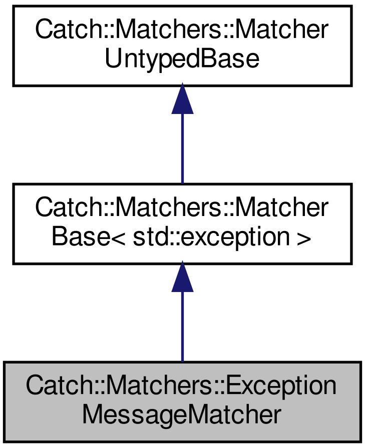
  Return listener's description if available.

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

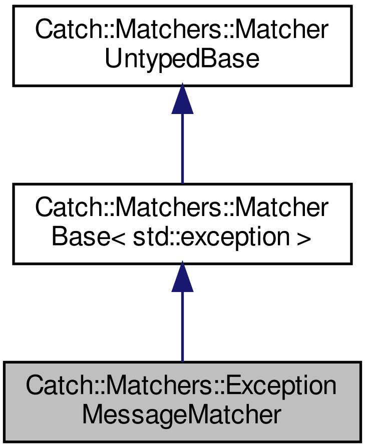
- include/catch2/catch_amalgamated.hpp

5.83 Catch::Matchers::ExceptionMessageMatcher Class Reference

Inheritance diagram for Catch::Matchers::ExceptionMessageMatcher:


Catch::Matchers::Matcher UntypedBase
Catch::Matchers::Matcher Base< std::exception >
Catch::Matchers::Exception MessageMatcher

Collaboration diagram for Catch::Matchers::ExceptionMessageMatcher:


Catch::Matchers::Matcher UntypedBase
Catch::Matchers::Matcher Base< std::exception >
Catch::Matchers::Exception MessageMatcher

Public Member Functions

- **ExceptionMessageMatcher** (std::string const &message)
- bool **match** (std::exception const &ex) const override
- std::string **describe** () const override

Additional Inherited Members

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

- include/catch2/catch_amalgamated.hpp

5.84 Catch::ExceptionTranslatorRegistrar Class Reference

Public Member Functions

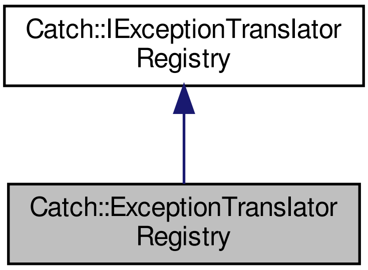
- template<typename T >
  ExceptionTranslatorRegistrar (std::string(∗translateFunction)(T const &))

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

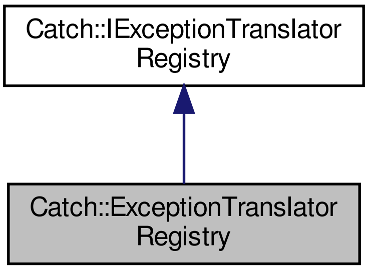
- include/catch2/catch_amalgamated.hpp

5.85 Catch::ExceptionTranslatorRegistry Class Reference

Inheritance diagram for Catch::ExceptionTranslatorRegistry:



Collaboration diagram for Catch::ExceptionTranslatorRegistry:



Public Member Functions

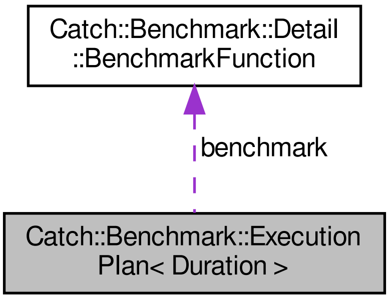
- void **registerTranslator** (Detail::unique_ptr< IExceptionTranslator > &&translator)
- std::string **translateActiveException** () const override
- std::string **tryTranslators** () const

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

- include/catch2/catch_amalgamated.hpp

5.86 Catch::Benchmark::ExecutionPlan< Duration > Struct Template Reference

Collaboration diagram for Catch::Benchmark::ExecutionPlan< Duration >:


Catch::Benchmark::Detail ::BenchmarkFunction
benchmark
Catch::Benchmark::Execution Plan< Duration >

Public Member Functions

- template<typename Duration2 >
  operator ExecutionPlan< Duration2 > () const
- template<typename Clock >
  std::vector< FloatDuration< Clock > > **run** (const IConfig &cfg, Environment< FloatDuration< Clock >> env) const

Public Attributes

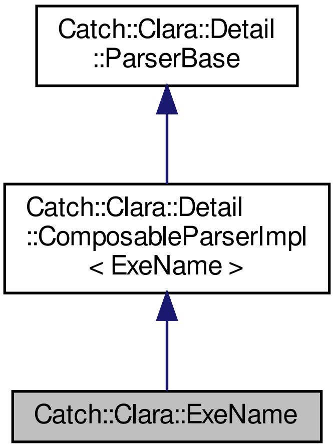
- int **iterations_per_sample**
- Duration **estimated_duration**
- Detail::BenchmarkFunction **benchmark**
- Duration **warmup_time**
- int **warmup_iterations**

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

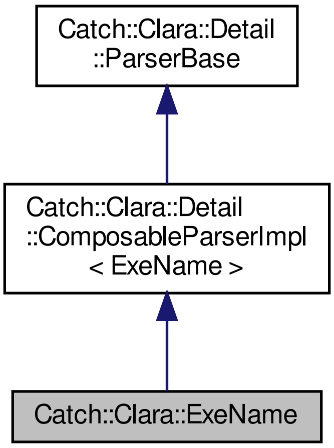
- include/catch2/catch_amalgamated.hpp

5.87 Catch::Clara::ExeName Class Reference

Inheritance diagram for Catch::Clara::ExeName:



Collaboration diagram for Catch::Clara::ExeName:



Public Member Functions

- **ExeName** (std::string &ref)
- template< typename LambdaT >
  ExeName (LambdaT const &lambda)

- Detail::InternalParseResult **parse** (std::string const &, Detail::TokenStream const &tokens) const override
- std::string const & **name** () const
- Detail::ParserResult **set** (std::string const &newName)

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

- include/catch2/catch_amalgamated.hpp

5.88 Catch::ExprLhs< LhsT > Class Template Reference

Public Member Functions

- **ExprLhs** (LhsT lhs)
- auto **makeUnaryExpr** () const -> UnaryExpr< LhsT >

Friends

- template<typename RhsT , std::enable_if_t<!std::is_arithmetic< std::remove_reference_t< RhsT >>::value, int > = 0>
  auto **operator==** (ExprLhs &&lhs, RhsT &&rhs) -> BinaryExpr< LhsT, RhsT const & >
- template<typename RhsT , std::enable_if_t< std::is_arithmetic< RhsT >::value, int > = 0>
  auto **operator==** (ExprLhs &&lhs, RhsT rhs) -> BinaryExpr< LhsT, RhsT >
- template<typename RhsT , std::enable_if_t<!std::is_arithmetic< std::remove_reference_t< RhsT >>::value, int > = 0>
  auto **operator!=** (ExprLhs &&lhs, RhsT &&rhs) -> BinaryExpr< LhsT, RhsT const & >
- template<typename RhsT , std::enable_if_t< std::is_arithmetic< RhsT >::value, int > = 0>
  auto **operator!=** (ExprLhs &&lhs, RhsT rhs) -> BinaryExpr< LhsT, RhsT >
- template<typename RhsT >
  auto **operator&&** (ExprLhs &&, RhsT &&) -> BinaryExpr< LhsT, RhsT const & >
- template<typename RhsT >
  auto **operator**|| (ExprLhs &&, RhsT &&) -> BinaryExpr< LhsT, RhsT const & >

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

- include/catch2/catch_amalgamated.hpp

5.89 Catch::Clara::Detail::fake_arg Struct Reference

Public Member Functions

- template<typename T >
  operator T ()

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

- include/catch2/catch_amalgamated.hpp

5.90 Catch::FatalConditionHandler Class Reference

```
#include <catch_amalgamated.hpp>
```

Public Member Functions

- void **engage** ()
- void **disengage** () noexcept

5.90.1 Detailed Description

Wrapper for platform-specific fatal error (signals/SEH) handlers

Tries to be cooperative with other handlers, and not step over other handlers. This means that unknown structured exceptions are passed on, previous signal handlers are called, and so on.

Can only be instantiated once, and assumes that once a signal is caught, the binary will end up terminating. Thus, there

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

- include/catch2/catch_amalgamated.hpp

5.91 Catch::FatalConditionHandlerGuard Class Reference

Simple RAII guard for (dis)engaging the FatalConditionHandler.

```
#include <catch_amalgamated.hpp>
```

Public Member Functions

- **FatalConditionHandlerGuard** (FatalConditionHandler *handler)

5.91.1 Detailed Description

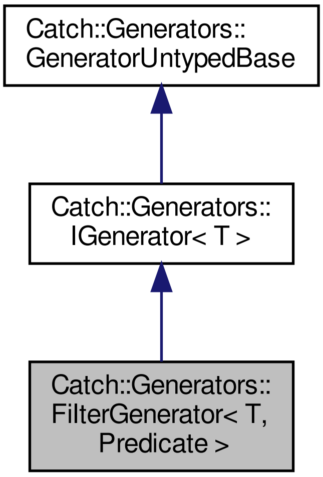
Simple RAII guard for (dis)engaging the FatalConditionHandler.

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

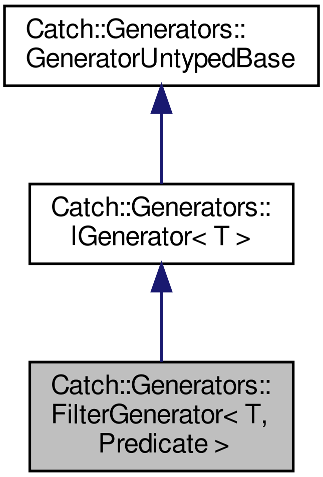
- include/catch2/catch_amalgamated.hpp

5.92 Catch::Generators::FilterGenerator< T, Predicate > Class Template Reference

Inheritance diagram for Catch::Generators::FilterGenerator< T, Predicate >:



Collaboration diagram for Catch::Generators::FilterGenerator< T, Predicate >:



Public Member Functions

- template<typename P = Predicate>
  FilterGenerator (P &&pred, GeneratorWrapper< T > &&generator)

- T const & **get** () const override
- bool next () override

Additional Inherited Members

5.92.1 Member Function Documentation

5.92.1.1 next()

```
template<typename T , typename Predicate >
bool Catch::Generators::FilterGenerator< T, Predicate >::next ( )  [inline], [override], [virtual]
```

Attempts to move the generator to the next element

Returns true iff the move succeeded (and a valid element can be retrieved).

Implements Catch::Generators::GeneratorUntypedBase.

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

- include/catch2/catch_amalgamated.hpp

5.93 Catch::TestSpec::FilterMatch Struct Reference

Public Attributes

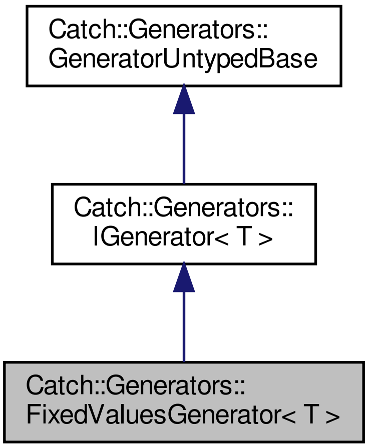
- std::string **name**
- std::vector< TestCaseHandle const * > **tests**

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

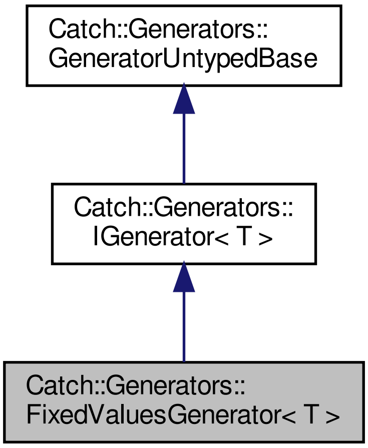
- include/catch2/catch_amalgamated.hpp

5.94 Catch::Generators::FixedValuesGenerator< T > Class Template Reference

Inheritance diagram for Catch::Generators::FixedValuesGenerator< T >:



Collaboration diagram for Catch::Generators::FixedValuesGenerator< T >:



Public Member Functions

- **FixedValuesGenerator** (std::initializer_list< T > values)
- T const & **get** () const override
- bool next () override

Additional Inherited Members

5.94.1 Member Function Documentation

5.94.1.1 next()

```
template<typename T >
bool Catch::Generators::FixedValuesGenerator< T >::next ( ) [inline], [override], [virtual]
```

Attempts to move the generator to the next element

Returns true iff the move succeeded (and a valid element can be retrieved).

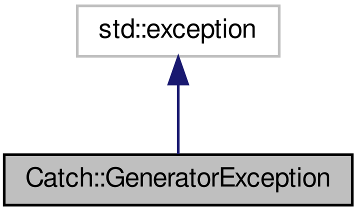
Implements Catch::Generators::GeneratorUntypedBase.

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

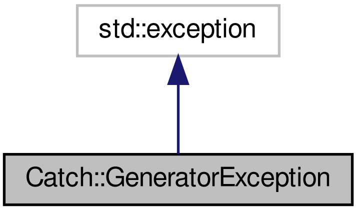
- include/catch2/catch_amalgamated.hpp

5.95 Catch::GeneratorException Class Reference

Inheritance diagram for Catch::GeneratorException:



Collaboration diagram for Catch::GeneratorException:



Public Member Functions

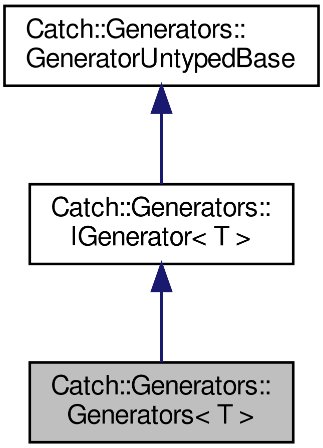
- **GeneratorException** (const char ∗msg)
- const char ∗ **what** () const noexcept override final

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

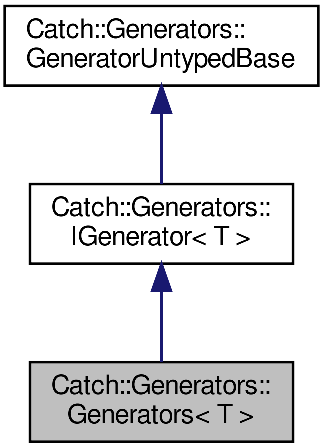
- include/catch2/catch_amalgamated.hpp

5.96 Catch::Generators::Generators< T > Class Template Reference

Inheritance diagram for Catch::Generators::Generators< T >:



Collaboration diagram for Catch::Generators::Generators< T >:



Public Member Functions

- template<typename... Gs>
  Generators (Gs &&... moreGenerators)
- T const & **get** () const override
- bool next () override

Additional Inherited Members

5.96.1 Member Function Documentation

5.96.1.1 next()

```
template<typename T >
bool Catch::Generators::Generators< T >::next ( )  [inline], [override], [virtual]
```

Attempts to move the generator to the next element

Returns true iff the move succeeded (and a valid element can be retrieved).

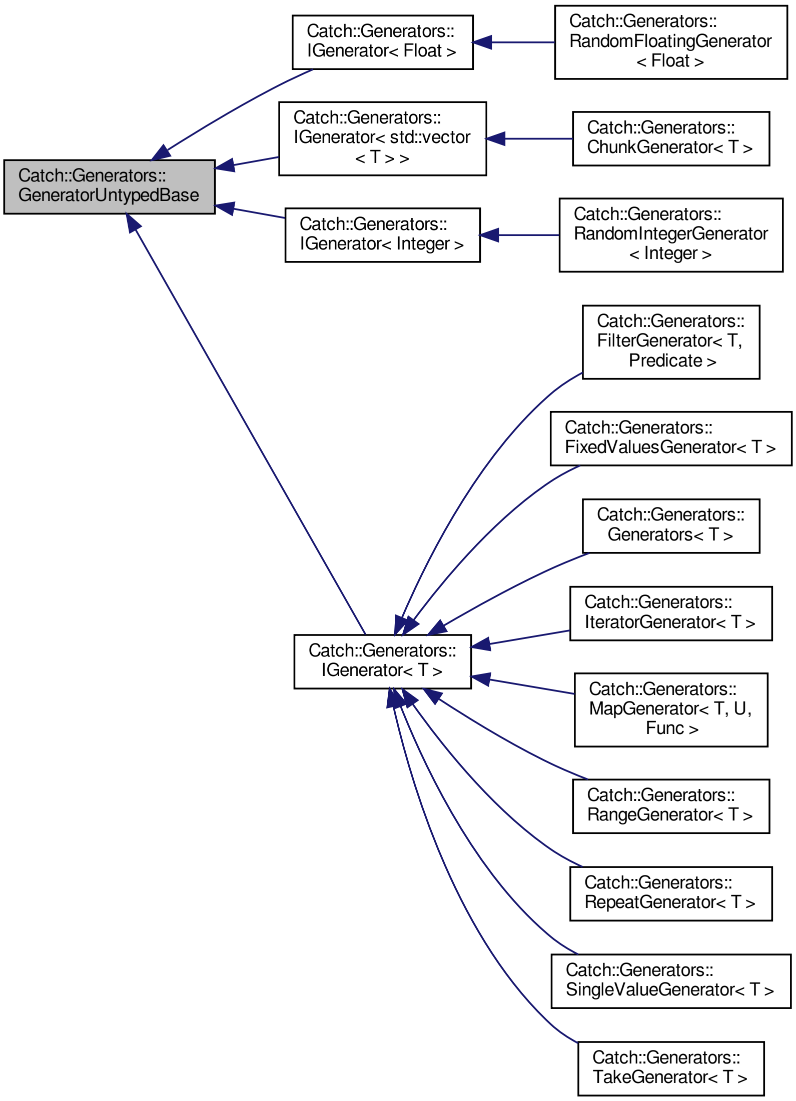
Implements Catch::Generators::GeneratorUntypedBase.

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

- include/catch2/catch_amalgamated.hpp

5.97 Catch::Generators::GeneratorUntypedBase Class Reference

Inheritance diagram for Catch::Generators::GeneratorUntypedBase:



Public Member Functions

- **GeneratorUntypedBase** (GeneratorUntypedBase const &)=default
- GeneratorUntypedBase & **operator=** (GeneratorUntypedBase const &)=default
- bool countedNext ()
- std::size_t **currentElementIndex** () const
- StringRef currentElementAsString () const

5.97.1 Member Function Documentation

5.97.1.1 countedNext()

```
bool Catch::Generators::GeneratorUntypedBase::countedNext ( )
```

Attempts to move the generator to the next element

Serves as a non-virtual interface to `next`, so that the top level interface can provide sanity checking and shared features.

As with `next`, returns true iff the move succeeded and the generator has new valid element to provide.

5.97.1.2 currentElementAsString()

```
StringRef Catch::Generators::GeneratorUntypedBase::currentElementAsString ( ) const
```

Returns generator's current element as user-friendly string.

By default returns string equivalent to calling `Catch::Detail::stringify` on the current element, but generators can customize their implementation as needed.

Not thread-safe due to internal caching.

The returned ref is valid only until the generator instance is destructed, or it moves onto the next element, whichever comes first.

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

- include/catch2/catch_amalgamated.hpp

5.98 Catch::Generators::GeneratorWrapper< T > Class Template Reference

Public Member Functions

- GeneratorWrapper (IGenerator< T > ∗generator)

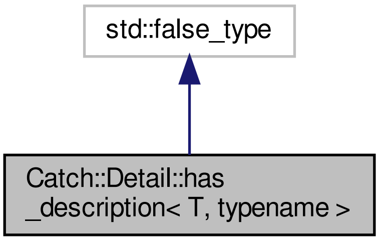
  Takes ownership of the passed pointer.
- **GeneratorWrapper** (GeneratorPtr< T > generator)
- T const & **get** () const
- bool **next** ()

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

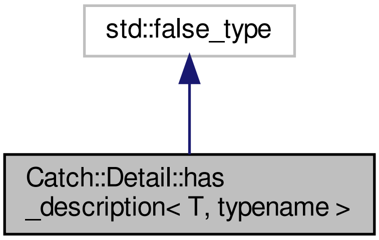
- include/catch2/catch_amalgamated.hpp

5.99 Catch::Detail::has_description< T, typename > Struct Template Reference

Inheritance diagram for Catch::Detail::has_description< T, typename >:



Collaboration diagram for Catch::Detail::has_description< T, typename >:

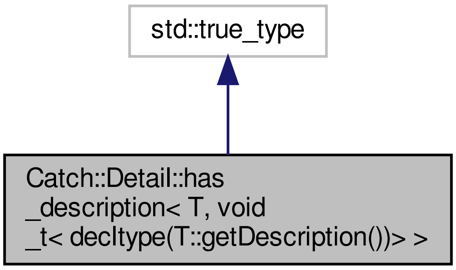


The documentation for this struct was generated from the following file:

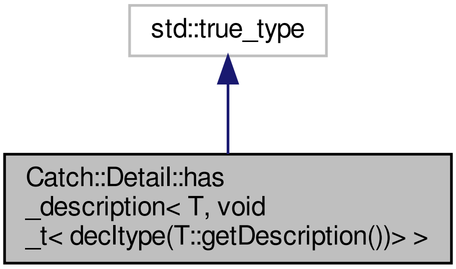
- include/catch2/catch_amalgamated.hpp

5.100 Catch::Detail::has_description< T, void_t< decltype(T::getDescription())> > Struct Template Reference

Inheritance diagram for Catch::Detail::has_description< T, void_t< decltype(T::getDescription())> >:


std::true_type
Catch::Detail::has_description< T, void_t< decltype(T::getDescription())> >

Collaboration diagram for Catch::Detail::has_description< T, void_t< decltype(T::getDescription())> >:

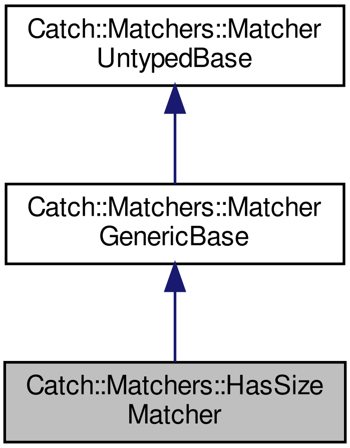

std::true_type
Catch::Detail::has_description< T, void_t< decltype(T::getDescription())> >

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

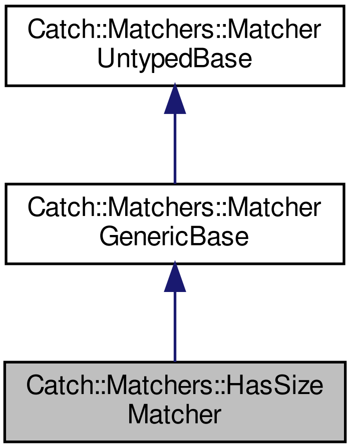
- include/catch2/catch_amalgamated.hpp

5.101 Catch::Matchers::HasSizeMatcher Class Reference

Inheritance diagram for Catch::Matchers::HasSizeMatcher:


Catch::Matchers::Matcher UntypedBase
Catch::Matchers::Matcher GenericBase
Catch::Matchers::HasSize Matcher

Collaboration diagram for Catch::Matchers::HasSizeMatcher:


Catch::Matchers::Matcher UntypedBase
Catch::Matchers::Matcher GenericBase
Catch::Matchers::HasSize Matcher

Public Member Functions

- **HasSizeMatcher** (std::size_t target_size)
- template<typename RangeLike >
  bool **match** (RangeLike &&rng) const
- std::string **describe** () const override

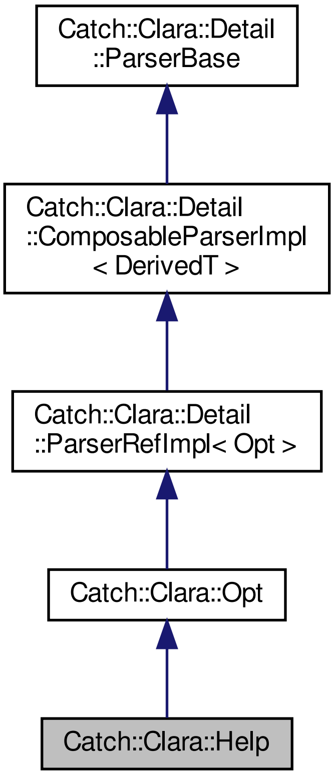
Additional Inherited Members

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

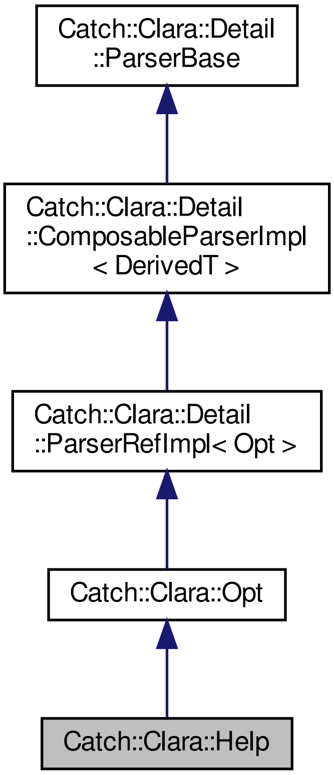
- include/catch2/catch_amalgamated.hpp

5.102 Catch::Clara::Help Struct Reference

Inheritance diagram for Catch::Clara::Help:


Catch::Clara::Detail ::ParserBase
Catch::Clara::Detail ::ComposableParserImpl < DerivedT >
Catch::Clara::Detail ::ParserRefImpl< Opt >
Catch::Clara::Opt
Catch::Clara::Help

Collaboration diagram for Catch::Clara::Help:



Public Member Functions

- **Help** (bool &showHelpFlag)

Additional Inherited Members

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

- include/catch2/catch_amalgamated.hpp

5.103 Catch::Clara::Detail::HelpColumns Struct Reference

Public Attributes

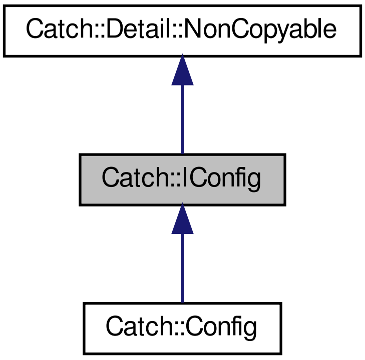
- std::string **left**
- std::string **right**

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

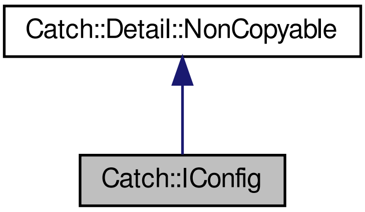
- include/catch2/catch_amalgamated.hpp

5.104 Catch::IConfig Class Reference

Inheritance diagram for Catch::IConfig:



Collaboration diagram for Catch::IConfig:



Public Member Functions

- virtual bool **allowThrows** () const =0
- virtual StringRef **name** () const =0
- virtual bool **includeSuccessfulResults** () const =0
- virtual bool **shouldDebugBreak** () const =0
- virtual bool **warnAboutMissingAssertions** () const =0
- virtual bool **warnAboutUnmatchedTestSpecs** () const =0
- virtual bool **zeroTestsCountAsSuccess** () const =0
- virtual int **abortAfter** () const =0
- virtual bool **showInvisibles** () const =0
- virtual ShowDurations **showDurations** () const =0
- virtual double **minDuration** () const =0
- virtual TestSpec const & **testSpec** () const =0

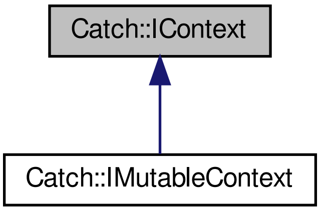
- virtual bool **hasTestFilters** () const =0
- virtual std::vector< std::string > const & **getTestsOrTags** () const =0
- virtual TestRunOrder **runOrder** () const =0
- virtual uint32_t **rngSeed** () const =0
- virtual unsigned int **shardCount** () const =0
- virtual unsigned int **shardIndex** () const =0
- virtual ColourMode **defaultColourMode** () const =0
- virtual std::vector< std::string > const & **getSectionsToRun** () const =0
- virtual Verbosity **verbosity** () const =0
- virtual bool **skipBenchmarks** () const =0
- virtual bool **benchmarkNoAnalysis** () const =0
- virtual unsigned int **benchmarkSamples** () const =0
- virtual double **benchmarkConfidenceInterval** () const =0
- virtual unsigned int **benchmarkResamples** () const =0
- virtual std::chrono::milliseconds **benchmarkWarmupTime** () const =0

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

- include/catch2/catch_amalgamated.hpp

5.105 Catch::IContext Class Reference

Inheritance diagram for Catch::IContext:



Public Member Functions

- virtual IResultCapture ∗ **getResultCapture** ()=0
- virtual IConfig const ∗ **getConfig** () const =0

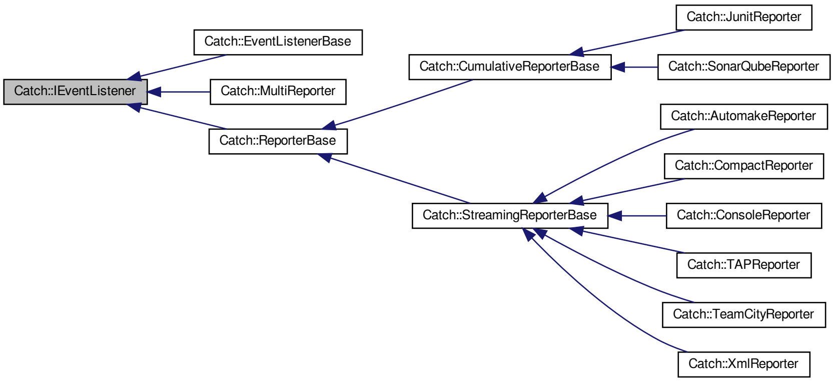
The documentation for this class was generated from the following file:

- include/catch2/catch_amalgamated.hpp

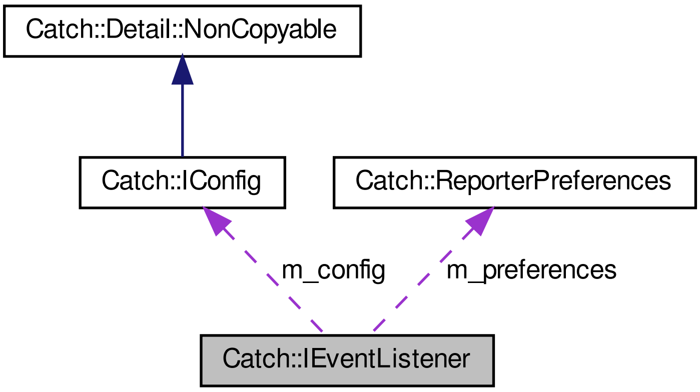
5.106 Catch::IEventListener Class Reference

```
#include <catch_amalgamated.hpp>
```

Inheritance diagram for Catch::IEventListener:



Collaboration diagram for Catch::IEventListener:



Public Member Functions

- **IEventListener** (IConfig const ∗config)
- ReporterPreferences const & **getPreferences** () const
- virtual void noMatchingTestCases (StringRef unmatchedSpec)=0

    Called when no test cases match provided test spec.
- virtual void reportInvalidTestSpec (StringRef invalidArgument)=0

    Called for all invalid test specs from the cli.
- virtual void testRunStarting (TestRunInfo const &testRunInfo)=0

- virtual void testCaseStarting (TestCaseInfo const &testInfo)=0

  Called once for each TEST_CASE, no matter how many times it is entered.
- virtual void testCasePartialStarting (TestCaseInfo const &testInfo, uint64_t partNumber)=0

  Called every time a TEST_CASE is entered, including repeats (due to sections)
- virtual void sectionStarting (SectionInfo const &sectionInfo)=0

  Called when a `SECTION` is being entered. Not called for skipped sections.
- virtual void benchmarkPreparing (StringRef benchmarkName)=0

  Called when user-code is being probed before the actual benchmark runs.
- virtual void benchmarkStarting (BenchmarkInfo const &benchmarkInfo)=0

  Called after probe but before the user-code is being benchmarked.
- virtual void benchmarkEnded (BenchmarkStats<> const &benchmarkStats)=0

  Called with the benchmark results if benchmark successfully finishes.
- virtual void benchmarkFailed (StringRef benchmarkName)=0

  Called if running the benchmarks fails for any reason.
- virtual void assertionStarting (AssertionInfo const &assertionInfo)=0

  Called before assertion success/failure is evaluated.
- virtual void assertionEnded (AssertionStats const &assertionStats)=0

  Called after assertion was fully evaluated.
- virtual void sectionEnded (SectionStats const &sectionStats)=0

  Called after a `SECTION` has finished running.
- virtual void testCasePartialEnded (TestCaseStats const &testCaseStats, uint64_t partNumber)=0

  Called every time a TEST_CASE is entered, including repeats (due to sections)
- virtual void testCaseEnded (TestCaseStats const &testCaseStats)=0

  Called once for each TEST_CASE, no matter how many times it is entered.
- virtual void testRunEnded (TestRunStats const &testRunStats)=0
- virtual void skipTest (TestCaseInfo const &testInfo)=0

  Called with test cases that are skipped due to the test run aborting.
- virtual void fatalErrorEncountered (StringRef error)=0

  Called if a fatal error (signal/structured exception) occured.
- virtual void listReporters (std::vector< ReporterDescription > const &descriptions)=0

  Writes out information about provided reporters using reporter-specific format.
- virtual void listListeners (std::vector< ListenerDescription > const &descriptions)=0

  Writes out the provided listeners descriptions using reporter-specific format.
- virtual void listTests (std::vector< TestCaseHandle > const &tests)=0

  Writes out information about provided tests using reporter-specific format.
- virtual void listTags (std::vector< TagInfo > const &tags)=0

  Writes out information about the provided tags using reporter-specific format.

Protected Attributes

- ReporterPreferences m_preferences

  Derived classes can set up their preferences here.
- IConfig const * m_config

  The test run's config as filled in from CLI and defaults.

5.106.1 Detailed Description

The common base for all reporters and event listeners

Implementing classes must also implement:

```
//! User-friendly description of the reporter/listener type
static std::string getDescription()
```

Generally shouldn't be derived from by users of Catch2 directly, instead they should derive from one of the utility bases that derive from this class.

5.106.2 Member Function Documentation

5.106.2.1 testRunEnded()

```
virtual void Catch::IEventListener::testRunEnded (
            TestRunStats const & testRunStats )  [pure virtual]
```

Called once after all tests in a testing run are finished

Not called if tests weren't run (e.g. only listings happened)

Implemented in Catch::XmlReporter, Catch::MultiReporter, Catch::EventListenerBase, Catch::CumulativeReporterBase, Catch::TeamCityReporter, Catch::TAPReporter, Catch::ConsoleReporter, Catch::CompactReporter, and Catch::StreamingReporterBase.

5.106.2.2 testRunStarting()

```
virtual void Catch::IEventListener::testRunStarting (
            TestRunInfo const & testRunInfo )  [pure virtual]
```

Called once in a testing run before tests are started

Not called if tests won't be run (e.g. only listing will happen)

Implemented in Catch::SonarQubeReporter, Catch::MultiReporter, Catch::EventListenerBase, Catch::XmlReporter, Catch::TAPReporter, Catch::JunitReporter, Catch::TeamCityReporter, Catch::ConsoleReporter, Catch::StreamingReporterBase, Catch::CompactReporter, and Catch::CumulativeReporterBase.

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

- include/catch2/catch_amalgamated.hpp

5.107 Catch::IExceptionTranslator Class Reference

Public Member Functions

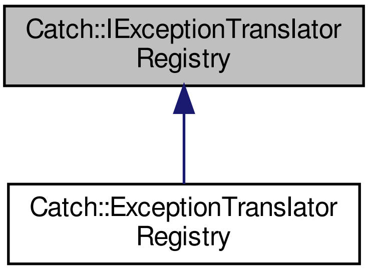
- virtual std::string **translate** (ExceptionTranslators::const_iterator it, ExceptionTranslators::const_iterator itEnd) const =0

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

- include/catch2/catch_amalgamated.hpp

5.108 Catch::IExceptionTranslatorRegistry Class Reference

Inheritance diagram for Catch::IExceptionTranslatorRegistry:


Catch::IExceptionTranslator Registry
Catch::ExceptionTranslator Registry

Public Member Functions

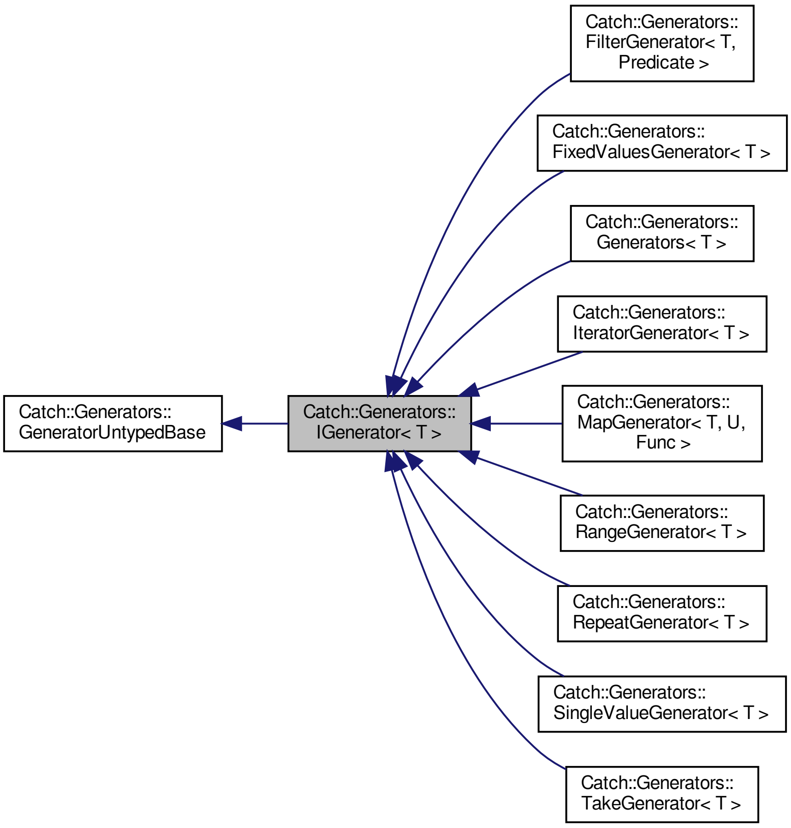
- virtual std::string **translateActiveException** () const =0

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

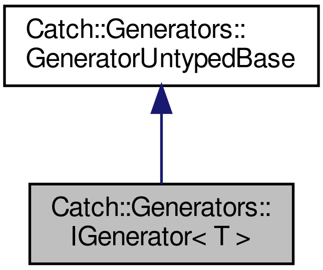
- include/catch2/catch_amalgamated.hpp

5.109 Catch::Generators::IGenerator< T > Class Template Reference

Inheritance diagram for Catch::Generators::IGenerator< T >:


Catch::Generators::GeneratorUntypedBase
Catch::Generators::IGenerator< T >
Catch::Generators::FilterGenerator< T, Predicate >
Catch::Generators::FixedValuesGenerator< T >
Catch::Generators::Generators< T >
Catch::Generators::IteratorGenerator< T >
Catch::Generators::MapGenerator< T, U, Func >
Catch::Generators::RangeGenerator< T >
Catch::Generators::RepeatGenerator< T >
Catch::Generators::SingleValueGenerator< T >
Catch::Generators::TakeGenerator< T >

Collaboration diagram for Catch::Generators::IGenerator< T >:


Catch::Generators::GeneratorUntypedBase
Catch::Generators::IGenerator< T >

Public Types

- using **type** = T

Public Member Functions

- **IGenerator** (IGenerator const &)=default
- IGenerator & **operator=** (IGenerator const &)=default
- virtual T const & **get** () const =0

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

- include/catch2/catch_amalgamated.hpp

5.110 Catch::IGeneratorTracker Class Reference

Public Member Functions

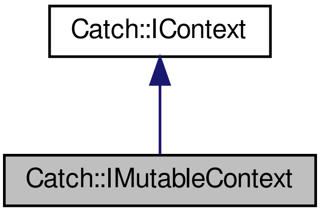
- virtual auto **hasGenerator** () const -> bool=0
- virtual auto **getGenerator** () const -> Generators::GeneratorBasePtr const &=0
- virtual void **setGenerator** (Generators::GeneratorBasePtr &&generator)=0

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

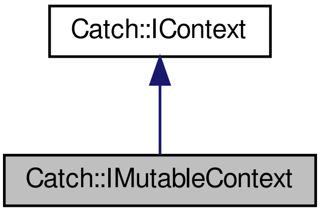
- include/catch2/catch_amalgamated.hpp

5.111 Catch::IMutableContext Class Reference

Inheritance diagram for Catch::IMutableContext:



Collaboration diagram for Catch::IMutableContext:



Public Member Functions

- virtual void **setResultCapture** (IResultCapture ∗resultCapture)=0
- virtual void **setConfig** (IConfig const ∗config)=0

Friends

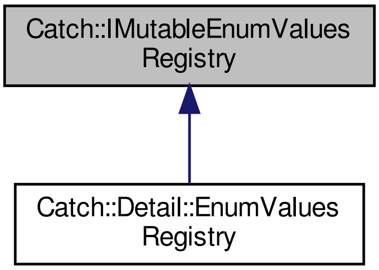
- IMutableContext & **getCurrentMutableContext** ()
- void **cleanUpContext** ()

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

- include/catch2/catch_amalgamated.hpp

5.112 Catch::IMutableEnumValuesRegistry Class Reference

Inheritance diagram for Catch::IMutableEnumValuesRegistry:


Catch::IMutableEnumValues Registry
Catch::Detail::EnumValues Registry

Public Member Functions

- virtual Detail::EnumInfo const & **registerEnum** (StringRef enumName, StringRef allEnums, std::vector< int > const &values)=0
- template<typename E >
  Detail::EnumInfo const & **registerEnum** (StringRef enumName, StringRef allEnums, std::initializer_list< E > values)

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

- include/catch2/catch_amalgamated.hpp

5.113 Catch::IMutableRegistryHub Class Reference

Public Member Functions

- virtual void **registerReporter** (std::string const &name, IReporterFactoryPtr factory)=0
- virtual void **registerListener** (Detail::unique_ptr< EventListenerFactory > factory)=0
- virtual void **registerTest** (Detail::unique_ptr< TestCaseInfo > &&testInfo, Detail::unique_ptr< ITestInvoker > &&invoker)=0
- virtual void **registerTranslator** (Detail::unique_ptr< IExceptionTranslator > &&translator)=0
- virtual void **registerTagAlias** (std::string const &alias, std::string const &tag, SourceLineInfo const &lineInfo)=0
- virtual void **registerStartupException** () noexcept=0
- virtual IMutableEnumValuesRegistry & **getMutableEnumValuesRegistry** ()=0

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

- include/catch2/catch_amalgamated.hpp

5.114 Catch::IRegistryHub Class Reference

Public Member Functions

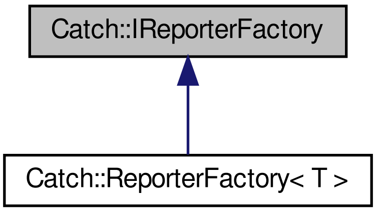
- virtual IReporterRegistry const & **getReporterRegistry** () const =0
- virtual ITestCaseRegistry const & **getTestCaseRegistry** () const =0
- virtual ITagAliasRegistry const & **getTagAliasRegistry** () const =0
- virtual IExceptionTranslatorRegistry const & **getExceptionTranslatorRegistry** () const =0
- virtual StartupExceptionRegistry const & **getStartupExceptionRegistry** () const =0

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

- include/catch2/catch_amalgamated.hpp

5.115 Catch::IReporterFactory Class Reference

Inheritance diagram for Catch::IReporterFactory:



Public Member Functions

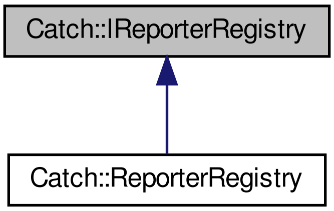
- virtual IEventListenerPtr **create** (ReporterConfig &&config) const =0
- virtual std::string **getDescription** () const =0

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

- include/catch2/catch_amalgamated.hpp

5.116 Catch::IReporterRegistry Class Reference

Inheritance diagram for Catch::IReporterRegistry:



Public Types

- using **FactoryMap** = std::map< std::string, IReporterFactoryPtr, Detail::CaseInsensitiveLess >
- using **Listeners** = std::vector< Detail::unique_ptr< EventListenerFactory > >

Public Member Functions

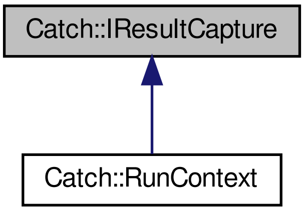
- virtual IEventListenerPtr **create** (std::string const &name, ReporterConfig &&config) const =0
- virtual FactoryMap const & **getFactories** () const =0
- virtual Listeners const & **getListeners** () const =0

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

- include/catch2/catch_amalgamated.hpp

5.117 Catch::IResultCapture Class Reference

Inheritance diagram for Catch::IResultCapture:



Public Member Functions

- virtual bool **sectionStarted** (SectionInfo const &sectionInfo, Counts &assertions)=0
- virtual void **sectionEnded** (SectionEndInfo const &endInfo)=0
- virtual void **sectionEndedEarly** (SectionEndInfo const &endInfo)=0
- virtual auto **acquireGeneratorTracker** (StringRef generatorName, SourceLineInfo const &lineInfo) -> IGeneratorTracker &=0
- virtual void **benchmarkPreparing** (StringRef name)=0
- virtual void **benchmarkStarting** (BenchmarkInfo const &info)=0
- virtual void **benchmarkEnded** (BenchmarkStats<> const &stats)=0
- virtual void **benchmarkFailed** (StringRef error)=0
- virtual void **pushScopedMessage** (MessageInfo const &message)=0
- virtual void **popScopedMessage** (MessageInfo const &message)=0
- virtual void **emplaceUnscopedMessage** (MessageBuilder const &builder)=0
- virtual void **handleFatalErrorCondition** (StringRef message)=0
- virtual void **handleExpr** (AssertionInfo const &info, ITransientExpression const &expr, AssertionReaction &reaction)=0
- virtual void **handleMessage** (AssertionInfo const &info, ResultWas::OfType resultType, StringRef message, AssertionReaction &reaction)=0
- virtual void **handleUnexpectedExceptionNotThrown** (AssertionInfo const &info, AssertionReaction &reaction)=0
- virtual void **handleUnexpectedInflightException** (AssertionInfo const &info, std::string const &message, AssertionReaction &reaction)=0
- virtual void **handleIncomplete** (AssertionInfo const &info)=0
- virtual void **handleNonExpr** (AssertionInfo const &info, ResultWas::OfType resultType, AssertionReaction &reaction)=0
- virtual bool **lastAssertionPassed** ()=0
- virtual void **assertionPassed** ()=0
- virtual std::string **getCurrentTestName** () const =0
- virtual const AssertionResult ∗ **getLastResult** () const =0
- virtual void **exceptionEarlyReported** ()=0

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

- include/catch2/catch_amalgamated.hpp

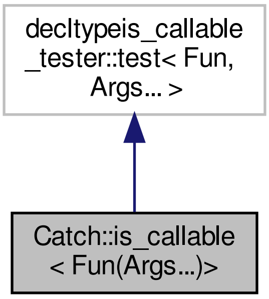
5.118 Catch::is_callable< T > Struct Template Reference

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

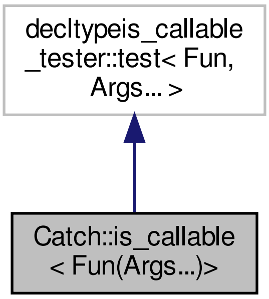
- include/catch2/catch_amalgamated.hpp

5.119 Catch::is_callable< Fun(Args...)> Struct Template Reference

Inheritance diagram for Catch::is_callable< Fun(Args...)>:



Collaboration diagram for Catch::is_callable< Fun(Args...)>:



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

- include/catch2/catch_amalgamated.hpp

5.120 Catch::is_callable_tester Struct Reference

Static Public Member Functions

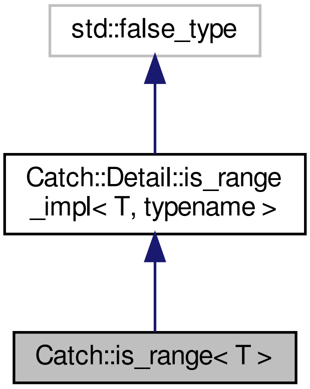
- template<typename Fun , typename... Args>
  static true_given< decltype(std::declval< Fun >)(std::declval< Args >)...))> **test** (int)
- template<typename... >
  static std::false_type **test** (...)

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

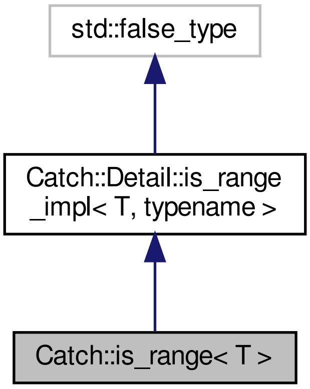
- include/catch2/catch_amalgamated.hpp

5.121 Catch::is_range< T > Struct Template Reference

Inheritance diagram for Catch::is_range< T >:



Collaboration diagram for Catch::is_range< T >:

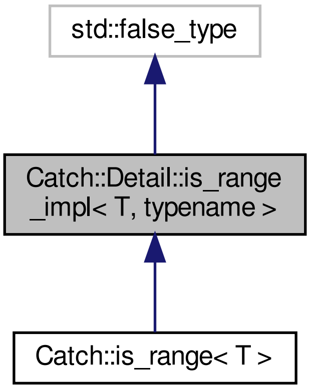


The documentation for this struct was generated from the following file:

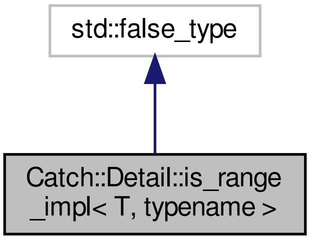
- include/catch2/catch_amalgamated.hpp

5.122 Catch::Detail::is_range_impl< T, typename > Struct Template Reference

Inheritance diagram for Catch::Detail::is_range_impl< T, typename >:



Collaboration diagram for Catch::Detail::is_range_impl< T, typename >:

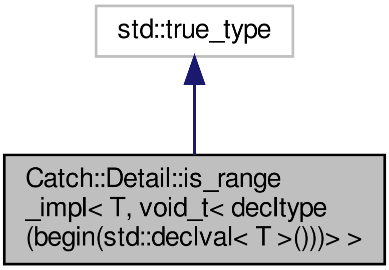


The documentation for this struct was generated from the following file:

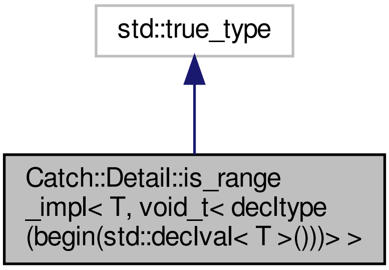
- include/catch2/catch_amalgamated.hpp

5.123 Catch::Detail::is_range_impl< T, void_t< decltype(begin(std::declval< T >()))> > Struct Template Reference

Inheritance diagram for Catch::Detail::is_range_impl< T, void_t< decltype(begin(std::declval< T >()))> >:


std::true_type
Catch::Detail::is_range _impl< T, void_t< decltype (begin(std::declval< T >()))> >

Collaboration diagram for Catch::Detail::is_range_impl< T, void_t< decltype(begin(std::declval< T >()))> >:

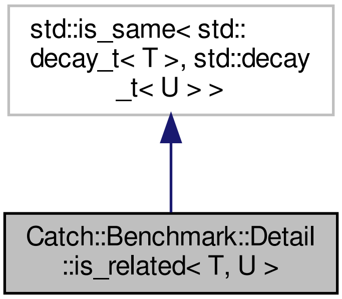

std::true_type
Catch::Detail::is_range _impl< T, void_t< decltype (begin(std::declval< T >()))> >

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

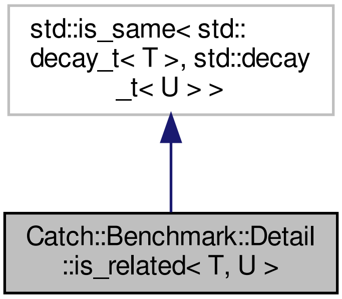
- include/catch2/catch_amalgamated.hpp

5.124 Catch::Benchmark::Detail::is_related< T, U > Struct Template Reference

Inheritance diagram for Catch::Benchmark::Detail::is_related< T, U >:


std::is_same< std:: decay_t< T >, std::decay _t< U > >
Catch::Benchmark::Detail ::is_related< T, U >

Collaboration diagram for Catch::Benchmark::Detail::is_related< T, U >:

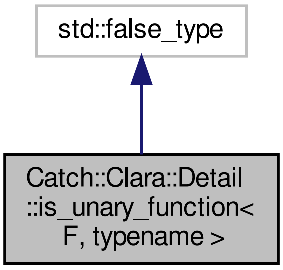


The documentation for this struct was generated from the following file:

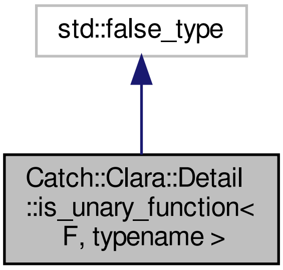
- include/catch2/catch_amalgamated.hpp

5.125 Catch::Clara::Detail::is_unary_function< F, typename > Struct Template Reference

Inheritance diagram for Catch::Clara::Detail::is_unary_function< F, typename >:



Collaboration diagram for Catch::Clara::Detail::is_unary_function< F, typename >:

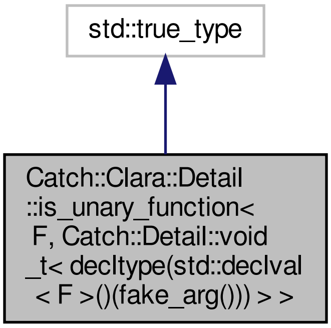


The documentation for this struct was generated from the following file:

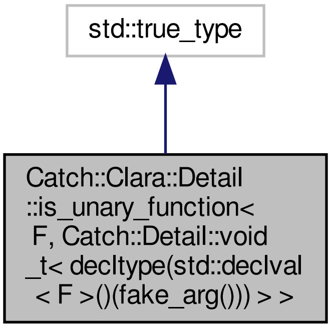
- include/catch2/catch_amalgamated.hpp

5.126 Catch::Clara::Detail::is_unary_function< F, Catch::Detail::void_t< decltype(std::declval< F >()(fake_arg())) > > Struct Template Reference

Inheritance diagram for Catch::Clara::Detail::is_unary_function< F, Catch::Detail::void_t< decltype(std::declval< F >()(fake_arg())) > >:


std::true_type
Catch::Clara::Detail ::is_unary_function< F, Catch::Detail::void _t< decltype(std::declval < F >()(fake_arg())) > >

Collaboration diagram for Catch::Clara::Detail::is_unary_function< F, Catch::Detail::void_t< decltype(std::declval< F >()(fake_arg())) > >:

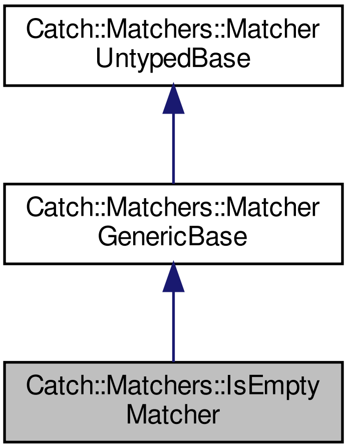

std::true_type
Catch::Clara::Detail ::is_unary_function< F, Catch::Detail::void _t< decltype(std::declval < F >()(fake_arg())) > >

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

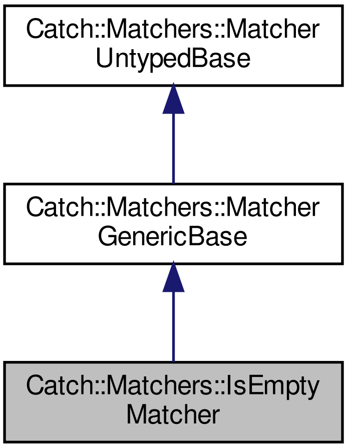
- include/catch2/catch_amalgamated.hpp

5.127 Catch::Matchers::IsEmptyMatcher Class Reference

Inheritance diagram for Catch::Matchers::IsEmptyMatcher:


Catch::Matchers::Matcher UntypedBase
Catch::Matchers::Matcher GenericBase
Catch::Matchers::IsEmpty Matcher

Collaboration diagram for Catch::Matchers::IsEmptyMatcher:


Catch::Matchers::Matcher UntypedBase
Catch::Matchers::Matcher GenericBase
Catch::Matchers::IsEmpty Matcher

Public Member Functions

- template<typename RangeLike >
  bool **match** (RangeLike &&rng) const
- std::string **describe** () const override

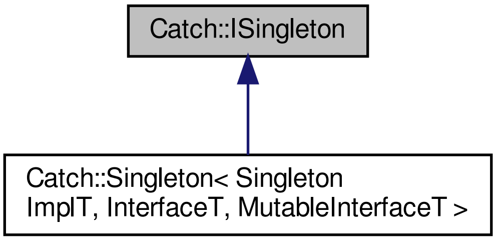
Additional Inherited Members

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

- include/catch2/catch_amalgamated.hpp

5.128 Catch::ISingleton Struct Reference

Inheritance diagram for Catch::ISingleton:


Catch::ISingleton
Catch::Singleton< Singleton ImplT, InterfaceT, MutableInterfaceT >

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

- include/catch2/catch_amalgamated.hpp

5.129 Catch::Detail::IsStreamInsertable< T > Class Template Reference

Static Public Attributes

- static const bool **value** = decltype(test<std::ostream, const T&>(0))::value

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

- include/catch2/catch_amalgamated.hpp

5.130 Catch::IStream Class Reference

Public Member Functions

- virtual std::ostream & **stream** ()=0
- virtual bool isConsole () const

5.130.1 Member Function Documentation

5.130.1.1 isConsole()

```
virtual bool Catch::IStream::isConsole ( ) const  [inline], [virtual]
```

Best guess on whether the instance is writing to a console (e.g. via stdout/stderr)

This is useful for e.g. Win32 colour support, because the Win32 API manipulates console directly, unlike POSIX escape codes, that can be written anywhere.

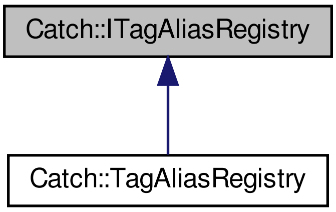
Due to variety of ways to change where the stdout/stderr is *actually* being written, users should always assume that the answer might be wrong.

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

- include/catch2/catch_amalgamated.hpp

5.131 Catch::ITagAliasRegistry Class Reference

Inheritance diagram for Catch::ITagAliasRegistry:



Public Member Functions

- virtual TagAlias const ∗ **find** (std::string const &alias) const =0
- virtual std::string **expandAliases** (std::string const &unexpandedTestSpec) const =0

Static Public Member Functions

- static ITagAliasRegistry const & **get** ()

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

- include/catch2/catch_amalgamated.hpp

5.132 Catch::TextFlow::Columns::iterator Class Reference

Public Types

- using **difference_type** = std::ptrdiff_t
- using **value_type** = std::string
- using **pointer** = value_type ∗
- using **reference** = value_type &
- using **iterator_category** = std::forward_iterator_tag

Public Member Functions

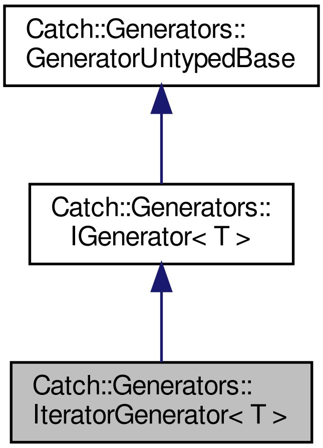
- **iterator** (Columns const &columns)
- auto **operator==** (iterator const &other) const -> bool
- auto **operator!=** (iterator const &other) const -> bool
- std::string **operator∗** () const
- iterator & **operator++** ()
- iterator **operator++** (int)

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

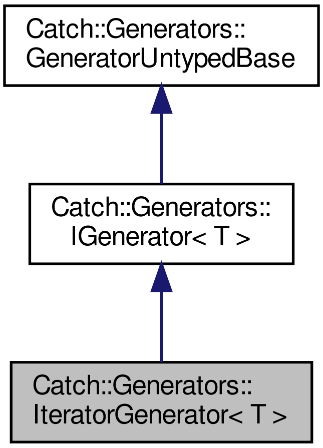
- include/catch2/catch_amalgamated.hpp

5.133 Catch::Generators::IteratorGenerator< T > Class Template Reference

Inheritance diagram for Catch::Generators::IteratorGenerator< T >:



Collaboration diagram for Catch::Generators::IteratorGenerator< T >:



Public Member Functions

- template<typename InputIterator , typename InputSentinel >
  IteratorGenerator (InputIterator first, InputSentinel last)
- T const & **get** () const override
- bool next () override

Additional Inherited Members

5.133.1 Member Function Documentation

5.133.1.1 next()

```
template<typename T >
bool Catch::Generators::IteratorGenerator< T >::next ( )  [inline], [override], [virtual]
```

Attempts to move the generator to the next element

Returns true iff the move succeeded (and a valid element can be retrieved).

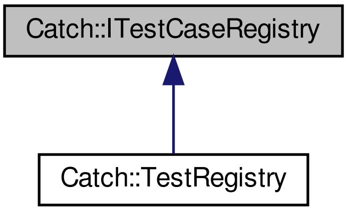
Implements Catch::Generators::GeneratorUntypedBase.

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

- include/catch2/catch_amalgamated.hpp

5.134 Catch::ITestCaseRegistry Class Reference

Inheritance diagram for Catch::ITestCaseRegistry:



Public Member Functions

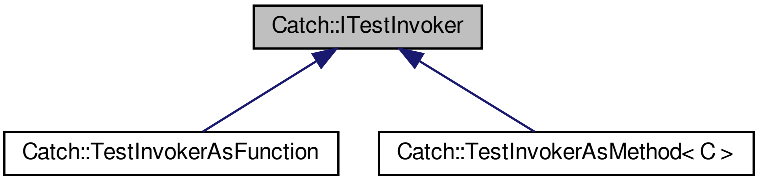
- virtual std::vector< TestCaseInfo ∗ > const & **getAllInfos** () const =0
- virtual std::vector< TestCaseHandle > const & **getAllTests** () const =0
- virtual std::vector< TestCaseHandle > const & **getAllTestsSorted** (IConfig const &config) const =0

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

- include/catch2/catch_amalgamated.hpp

5.135 Catch::ITestInvoker Class Reference

Inheritance diagram for Catch::ITestInvoker:



Public Member Functions

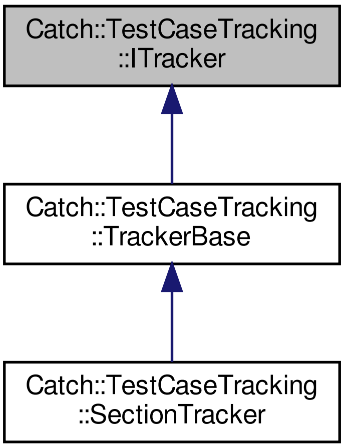
- virtual void **invoke** () const =0

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

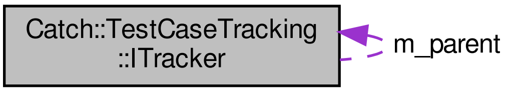
- include/catch2/catch_amalgamated.hpp

5.136 Catch::TestCaseTracking::ITracker Class Reference

Inheritance diagram for Catch::TestCaseTracking::ITracker:


Catch::TestCaseTracking ::ITracker
Catch::TestCaseTracking ::TrackerBase
Catch::TestCaseTracking ::SectionTracker

Collaboration diagram for Catch::TestCaseTracking::ITracker:



Public Member Functions

- **ITracker** (NameAndLocation const &nameAndLoc, ITracker ∗parent)
- NameAndLocation const & **nameAndLocation** () const
- ITracker ∗ **parent** () const
- virtual bool isComplete () const =0

  Returns true if tracker run to completion (successfully or not)
- bool isSuccessfullyCompleted () const

  Returns true if tracker run to completion succesfully.
- bool isOpen () const

  Returns true if tracker has started but hasn't been completed.
- bool hasStarted () const

  Returns true iff tracker has started.
- virtual void **close** ()=0
- virtual void **fail** ()=0
- void **markAsNeedingAnotherRun** ()
- void addChild (ITrackerPtr &&child)

  Register a nested ITracker.
- ITracker ∗ findChild (NameAndLocation const &nameAndLocation)
- bool hasChildren () const

  Have any children been added?
- void openChild ()

  Marks tracker as executing a child, doing se recursively up the tree.
- virtual bool isSectionTracker () const
- virtual bool isGeneratorTracker () const

Protected Types

- enum **CycleState** {
  NotStarted , **Executing** , **ExecutingChildren** , **NeedsAnotherRun** ,
  CompletedSuccessfully , **Failed** }

Protected Attributes

- ITracker ∗ **m_parent** = nullptr
- Children **m_children**
- CycleState **m_runState** = NotStarted

5.136.1 Member Function Documentation

5.136.1.1 findChild()

```
ITracker* Catch::TestCaseTracking::ITracker::findChild (
             NameAndLocation const & nameAndLocation )
```

Returns ptr to specific child if register with this tracker.

Returns nullptr if not found.

5.136.1.2 isGeneratorTracker()

```
virtual bool Catch::TestCaseTracking::ITracker::isGeneratorTracker ( ) const  [virtual]
```

Returns true if the instance is a generator tracker

Subclasses should override to true if they are, replaces RTTI for internal debug checks.

5.136.1.3 isSectionTracker()

```
virtual bool Catch::TestCaseTracking::ITracker::isSectionTracker ( ) const  [virtual]
```

Returns true if the instance is a section tracker

Subclasses should override to true if they are, replaces RTTI for internal debug checks.

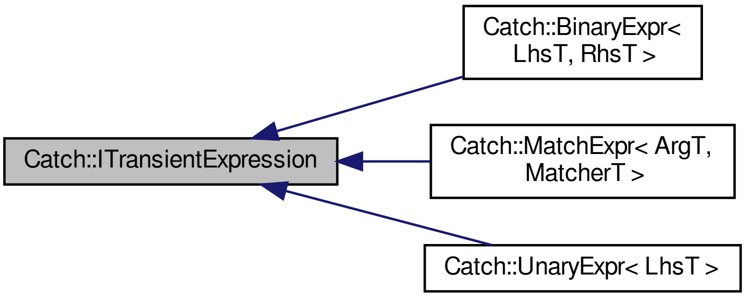
Reimplemented in Catch::TestCaseTracking::SectionTracker.

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

- include/catch2/catch_amalgamated.hpp

5.137 Catch::ITransientExpression Class Reference

Inheritance diagram for Catch::ITransientExpression:


Catch::BinaryExpr< LhsT, RhsT >
Catch::ITransientExpression
Catch::MatchExpr< ArgT, MatcherT >
Catch::UnaryExpr< LhsT >

Public Member Functions

- auto **isBinaryExpression** () const -> bool
- auto **getResult** () const -> bool
- virtual void **streamReconstructedExpression** (std::ostream &os) const =0
- **ITransientExpression** (bool isBinaryExpression, bool result)
- **ITransientExpression** (ITransientExpression const &)=default
- ITransientExpression & **operator=** (ITransientExpression const &)=default

Friends

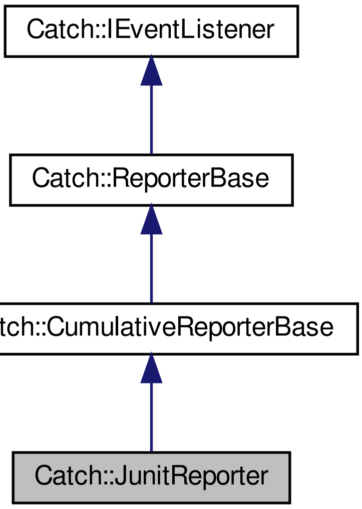
- std::ostream & **operator**<< (std::ostream &out, ITransientExpression const &expr)

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

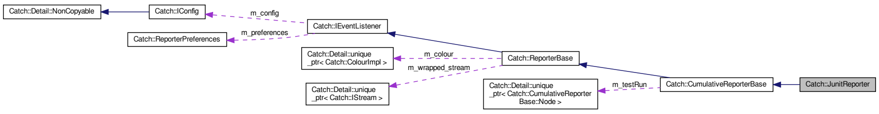
- include/catch2/catch_amalgamated.hpp

5.138 Catch::JunitReporter Class Reference

Inheritance diagram for Catch::JunitReporter:



Collaboration diagram for Catch::JunitReporter:


Catch::Detail::NonCopyable
Catch::IConfig
m_config
Catch::IEventListener
m_preferences
Catch::ReporterPreferences
Catch::Detail::unique _ptr< Catch::ColourImpl >
m_colour
Catch::ReporterBase
m_wrapped_stream
Catch::Detail::unique _ptr< Catch::IStream >
Catch::Detail::unique _ptr< Catch::CumulativeReporter Base::Node >
m_testRun
Catch::CumulativeReporterBase
Catch::JunitReporter

Public Member Functions

- **JunitReporter** (ReporterConfig &&_config)
- void testRunStarting (TestRunInfo const &runInfo) override
- void testCaseStarting (TestCaseInfo const &testCaseInfo) override

  Called once for each TEST_CASE, no matter how many times it is entered.
- void assertionEnded (AssertionStats const &assertionStats) override

  Called after assertion was fully evaluated.
- void testCaseEnded (TestCaseStats const &testCaseStats) override

  Called once for each TEST_CASE, no matter how many times it is entered.
- void testRunEndedCumulative () override

  Customization point: called after last test finishes (testRunEnded has been handled)

Static Public Member Functions

- static std::string **getDescription** ()

Additional Inherited Members

5.138.1 Member Function Documentation

5.138.1.1 testRunStarting()

```
void Catch::JunitReporter::testRunStarting (
            TestRunInfo const & testRunInfo )  [override], [virtual]
```

Called once in a testing run before tests are started

Not called if tests won't be run (e.g. only listing will happen)

Reimplemented from Catch::CumulativeReporterBase.

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

- include/catch2/catch_amalgamated.hpp

5.139 Catch::Clara::Detail::LambdaInvoker< ReturnType > Struct Template Reference

Static Public Member Functions

- template<typename L , typename ArgType >
  static auto **invoke** (L const &lambda, ArgType const &arg) -> ParserResult

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

- include/catch2/catch_amalgamated.hpp

5.140 Catch::Clara::Detail::LambdaInvoker< void > Struct Reference

Static Public Member Functions

- template<typename L , typename ArgType >
  static auto **invoke** (L const &lambda, ArgType const &arg) -> ParserResult

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

- include/catch2/catch_amalgamated.hpp

5.141 Catch::LazyExpression Class Reference

Public Member Functions

- **LazyExpression** (bool isNegated)
- **LazyExpression** (LazyExpression const &other)=default
- LazyExpression & **operator=** (LazyExpression const &)=delete
- **operator bool** () const

Friends

- class **AssertionHandler**
- struct **AssertionStats**
- class **RunContext**
- auto **operator<<** (std::ostream &os, LazyExpression const &lazyExpr) -> std::ostream &

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

- include/catch2/catch_amalgamated.hpp

5.142 Catch::LeakDetector Struct Reference

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

- include/catch2/catch_amalgamated.hpp

5.143 LFMCMC< TData > Class Template Reference

Likelihood-Free Markov Chain Monte Carlo.

```
#include <lfmcmc-bones.hpp>
```

Public Member Functions

- void **run** (std::vector< epiworld_double > param_init, size_t n_samples_, epiworld_double epsilon_)
- **LFMCMC** (TData &observed_data_)
- void **set_observed_data** (TData &observed_data_)
- void **set_proposal_fun** (LFMCMCProposalFun< TData > fun)
- void **set_simulation_fun** (LFMCMCSimFun< TData > fun)
- void **set_summary_fun** (LFMCMCSummaryFun< TData > fun)
- void **set_kernel_fun** (LFMCMCKernelFun< TData > fun)
- const size_t **get_n_samples** ()
- const size_t **get_n_statistics** ()
- const size_t **get_n_parameters** ()
- const epiworld_double **get_epsilon** ()
- const std::vector< epiworld_double > & **get_params_now** ()
- const std::vector< epiworld_double > & **get_params_prev** ()
- const std::vector< epiworld_double > & **get_params_init** ()
- const std::vector< epiworld_double > & **get_statistics_obs** ()
- const std::vector< epiworld_double > & **get_statistics_hist** ()
- const std::vector< bool > & **get_statistics_accepted** ()
- const std::vector< epiworld_double > & **get_posterior_lf_prob** ()
- const std::vector< epiworld_double > & **get_drawn_prob** ()
- std::vector< TData > * **get_sampled_data** ()
- void **set_par_names** (std::vector< std::string > names)
- void **set_stats_names** (std::vector< std::string > names)
- void **print** ()

Random number generation

Parameters

eng	

- void **set_rand_engine** (std::mt19937 &eng)
- std::mt19937 * **get_rand_endgine** ()
- void **seed** (unsigned int s)
- void **set_rand_gamma** (epiworld_double alpha, epiworld_double beta)
- epiworld_double **runif** ()
- epiworld_double **rnorm** ()
- epiworld_double **rgamma** ()
- epiworld_double **runif** (epiworld_double lb, epiworld_double ub)
- epiworld_double **rnorm** (epiworld_double mean, epiworld_double sd)
- epiworld_double **rgamma** (epiworld_double alpha, epiworld_double beta)

5.143.1 Detailed Description

template<typename TData>
class LFMCMC< TData >

Likelihood-Free Markov Chain Monte Carlo.

Template Parameters

TData	Type of data that is generated

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

- include/epiworld/math/lfmcmc/lfmcmc-bones.hpp
- include/epiworld/math/lfmcmc/lfmcmc-meat-print.hpp
- include/epiworld/math/lfmcmc/lfmcmc-meat.hpp

5.144 Catch::lineOfChars Struct Reference

Public Member Functions

- constexpr **lineOfChars** (char c_)

Public Attributes

- char **c**

Friends

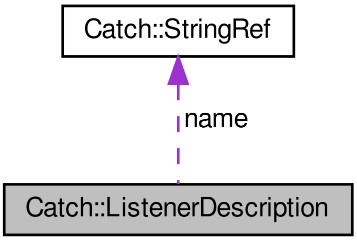
- std::ostream & **operator**<< (std::ostream &out, lineOfChars value)

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

- include/catch2/catch_amalgamated.hpp

5.145 Catch::ListenerDescription Struct Reference

Collaboration diagram for Catch::ListenerDescription:



Public Attributes

- StringRef **name**
- std::string **description**

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

- include/catch2/catch_amalgamated.hpp

5.146 Catch::ListenerRegistrar< T > Class Template Reference

Public Member Functions

- **ListenerRegistrar** (StringRef listenerName)

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

- include/catch2/catch_amalgamated.hpp

5.147 Catch::Detail::make_void<... > Struct Template Reference

Public Types

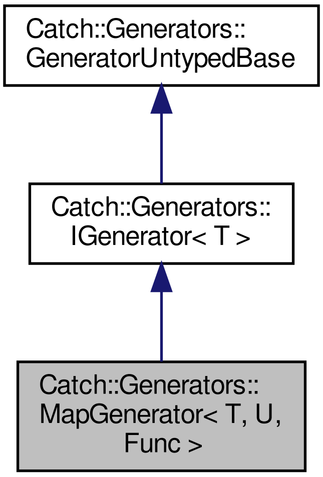
- using **type** = void

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

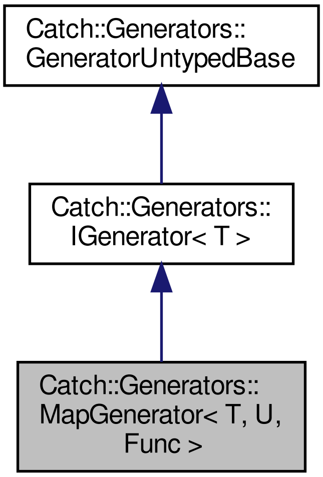
- include/catch2/catch_amalgamated.hpp

5.148 Catch::Generators::MapGenerator< T, U, Func > Class Template Reference

Inheritance diagram for Catch::Generators::MapGenerator< T, U, Func >:



Collaboration diagram for Catch::Generators::MapGenerator< T, U, Func >:



Public Member Functions

- template<typename F2 = Func>
  MapGenerator (F2 &&function, GeneratorWrapper< U > &&generator)
- T const & **get** () const override
- bool next () override

Additional Inherited Members

5.148.1 Member Function Documentation

5.148.1.1 next()

```
template<typename T , typename U , typename Func >
bool Catch::Generators::MapGenerator< T, U, Func >::next ( )  [inline], [override], [virtual]
```

Attempts to move the generator to the next element

Returns true iff the move succeeded (and a valid element can be retrieved).

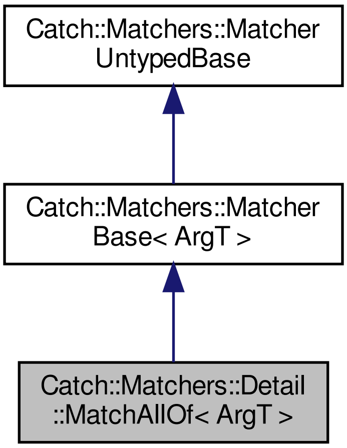
Implements Catch::Generators::GeneratorUntypedBase.

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

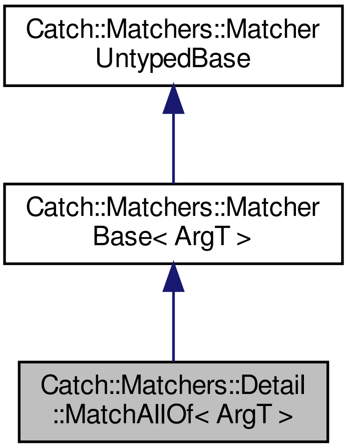
- include/catch2/catch_amalgamated.hpp

5.149 Catch::Matchers::Detail::MatchAllOf< ArgT > Class Template Reference

Inheritance diagram for Catch::Matchers::Detail::MatchAllOf< ArgT >:


Catch::Matchers::Matcher UntypedBase
Catch::Matchers::Matcher Base< ArgT >
Catch::Matchers::Detail ::MatchAllOf< ArgT >

Collaboration diagram for Catch::Matchers::Detail::MatchAllOf< ArgT >:


Catch::Matchers::Matcher UntypedBase
Catch::Matchers::Matcher Base< ArgT >
Catch::Matchers::Detail ::MatchAllOf< ArgT >

Public Member Functions

- **MatchAllOf** (MatchAllOf const &)=delete

- MatchAllOf & **operator=** (MatchAllOf const &)=delete
- **MatchAllOf** (MatchAllOf &&)=default
- MatchAllOf & **operator=** (MatchAllOf &&)=default
- bool **match** (ArgT const &arg) const override
- std::string **describe** () const override

Friends

- MatchAllOf **operator&&** (MatchAllOf &&lhs, MatcherBase< ArgT > const &rhs)
- MatchAllOf **operator&&** (MatcherBase< ArgT > const &lhs, MatchAllOf &&rhs)

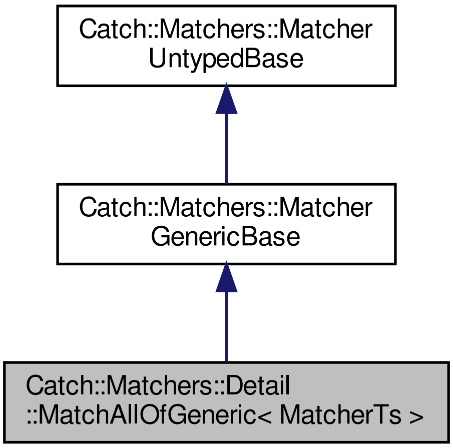
Additional Inherited Members

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

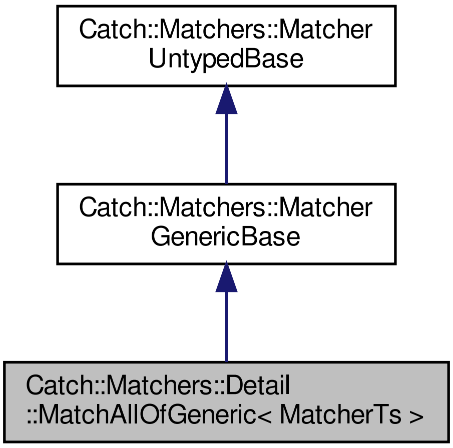
- include/catch2/catch_amalgamated.hpp

5.150 Catch::Matchers::Detail::MatchAllOfGeneric< MatcherTs > Class Template Reference

Inheritance diagram for Catch::Matchers::Detail::MatchAllOfGeneric< MatcherTs >:



Collaboration diagram for Catch::Matchers::Detail::MatchAllOfGeneric< MatcherTs >:


Catch::Matchers::Matcher UntypedBase
Catch::Matchers::Matcher GenericBase
Catch::Matchers::Detail ::MatchAllOfGeneric< MatcherTs >

Public Member Functions

- **MatchAllOfGeneric** (MatchAllOfGeneric const &)=delete
- MatchAllOfGeneric & **operator=** (MatchAllOfGeneric const &)=delete
- **MatchAllOfGeneric** (MatchAllOfGeneric &&)=default
- MatchAllOfGeneric & **operator=** (MatchAllOfGeneric &&)=default
- **MatchAllOfGeneric** (MatcherTs const &... matchers)
- **MatchAllOfGeneric** (std::array< void const ∗, sizeof...(MatcherTs)> matchers)
- template<typename Arg >
  bool **match** (Arg &&arg) const
- std::string **describe** () const override

Public Attributes

- std::array< void const ∗, sizeof...(MatcherTs)> **m_matchers**

Friends

- template<typename... MatchersRHS>
  MatchAllOfGeneric< MatcherTs..., MatchersRHS... > operator&& (MatchAllOfGeneric< MatcherTs... > &&lhs, MatchAllOfGeneric< MatchersRHS... > &&rhs)

  Avoids type nesting for `GenericAllOf && GenericAllOf` case.
- template<typename MatcherRHS >
  std::enable_if_t< is_matcher< MatcherRHS >::value, MatchAllOfGeneric< MatcherTs..., MatcherRHS > > operator&& (MatchAllOfGeneric< MatcherTs... > &&lhs, MatcherRHS const &rhs)

  Avoids type nesting for `GenericAllOf && some matcher` case.
- template<typename MatcherLHS >
  std::enable_if_t< is_matcher< MatcherLHS >::value, MatchAllOfGeneric< MatcherLHS, MatcherTs... > > operator&& (MatcherLHS const &lhs, MatchAllOfGeneric< MatcherTs... > &&rhs)

  Avoids type nesting for `some matcher && GenericAllOf` case.

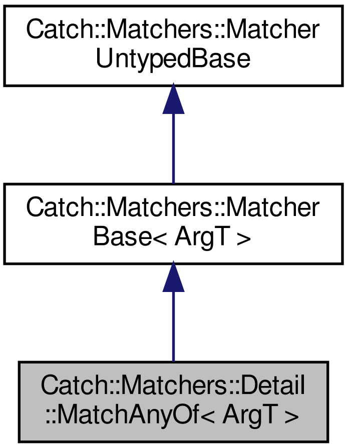
Additional Inherited Members

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

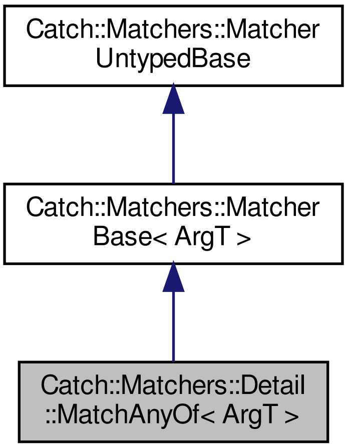
- include/catch2/catch_amalgamated.hpp

5.151 Catch::Matchers::Detail::MatchAnyOf< ArgT > Class Template Reference

Inheritance diagram for Catch::Matchers::Detail::MatchAnyOf< ArgT >:


Catch::Matchers::Matcher UntypedBase
Catch::Matchers::Matcher Base< ArgT >
Catch::Matchers::Detail ::MatchAnyOf< ArgT >

Collaboration diagram for Catch::Matchers::Detail::MatchAnyOf< ArgT >:


Catch::Matchers::Matcher UntypedBase
Catch::Matchers::Matcher Base< ArgT >
Catch::Matchers::Detail ::MatchAnyOf< ArgT >

Public Member Functions

- **MatchAnyOf** (MatchAnyOf const &)=delete
- MatchAnyOf & **operator=** (MatchAnyOf const &)=delete
- **MatchAnyOf** (MatchAnyOf &&)=default
- MatchAnyOf & **operator=** (MatchAnyOf &&)=default
- bool **match** (ArgT const &arg) const override
- std::string **describe** () const override

Friends

- MatchAnyOf **operator**|| (MatchAnyOf &&lhs, MatcherBase< ArgT > const &rhs)
- MatchAnyOf **operator**|| (MatcherBase< ArgT > const &lhs, MatchAnyOf &&rhs)

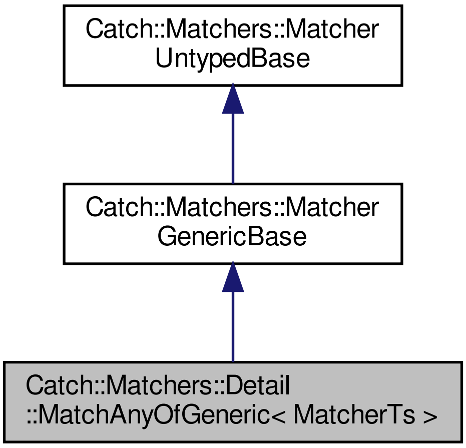
Additional Inherited Members

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

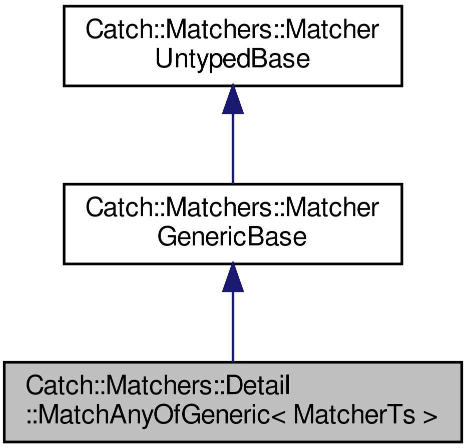
- include/catch2/catch_amalgamated.hpp

5.152 Catch::Matchers::Detail::MatchAnyOfGeneric< MatcherTs > Class Template Reference

Inheritance diagram for Catch::Matchers::Detail::MatchAnyOfGeneric< MatcherTs >:


Catch::Matchers::Matcher UntypedBase
Catch::Matchers::Matcher GenericBase
Catch::Matchers::Detail ::MatchAnyOfGeneric< MatcherTs >

Collaboration diagram for Catch::Matchers::Detail::MatchAnyOfGeneric< MatcherTs >:


Catch::Matchers::Matcher UntypedBase
Catch::Matchers::Matcher GenericBase
Catch::Matchers::Detail ::MatchAnyOfGeneric< MatcherTs >

Public Member Functions

- **MatchAnyOfGeneric** (MatchAnyOfGeneric const &)=delete
- MatchAnyOfGeneric & **operator=** (MatchAnyOfGeneric const &)=delete
- **MatchAnyOfGeneric** (MatchAnyOfGeneric &&)=default
- MatchAnyOfGeneric & **operator=** (MatchAnyOfGeneric &&)=default
- **MatchAnyOfGeneric** (MatcherTs const &... matchers)
- **MatchAnyOfGeneric** (std::array< void const ∗, sizeof...(MatcherTs)> matchers)
- template<typename Arg >
  bool **match** (Arg &&arg) const
- std::string **describe** () const override

Public Attributes

- std::array< void const ∗, sizeof...(MatcherTs)> **m_matchers**

Friends

- template<typename... MatchersRHS>
  MatchAnyOfGeneric< MatcherTs..., MatchersRHS... > operator|| (MatchAnyOfGeneric< MatcherTs... > &&lhs, MatchAnyOfGeneric< MatchersRHS... > &&rhs)

  Avoids type nesting for `GenericAnyOf || GenericAnyOf` case.
- template<typename MatcherRHS >
  std::enable_if_t< is_matcher< MatcherRHS >::value, MatchAnyOfGeneric< MatcherTs..., MatcherRHS > > operator|| (MatchAnyOfGeneric< MatcherTs... > &&lhs, MatcherRHS const &rhs)

  Avoids type nesting for `GenericAnyOf || some matcher` case.
- template<typename MatcherLHS >
  std::enable_if_t< is_matcher< MatcherLHS >::value, MatchAnyOfGeneric< MatcherLHS, MatcherTs... > > operator|| (MatcherLHS const &lhs, MatchAnyOfGeneric< MatcherTs... > &&rhs)

  Avoids type nesting for `some matcher || GenericAnyOf` case.

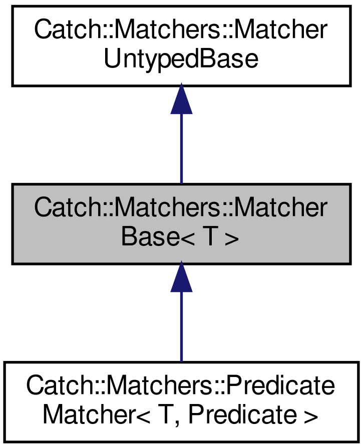
Additional Inherited Members

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

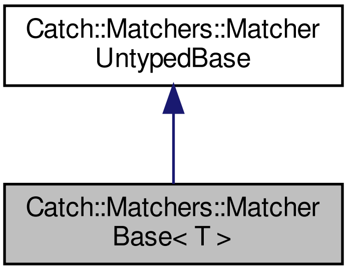
- include/catch2/catch_amalgamated.hpp

5.153 Catch::Matchers::MatcherBase< T > Class Template Reference

Inheritance diagram for Catch::Matchers::MatcherBase< T >:


Catch::Matchers::Matcher UntypedBase
Catch::Matchers::Matcher Base< T >
Catch::Matchers::Predicate Matcher< T, Predicate >

Collaboration diagram for Catch::Matchers::MatcherBase< T >:


Catch::Matchers::Matcher UntypedBase
Catch::Matchers::Matcher Base< T >

Public Member Functions

- virtual bool **match** (T const &arg) const =0

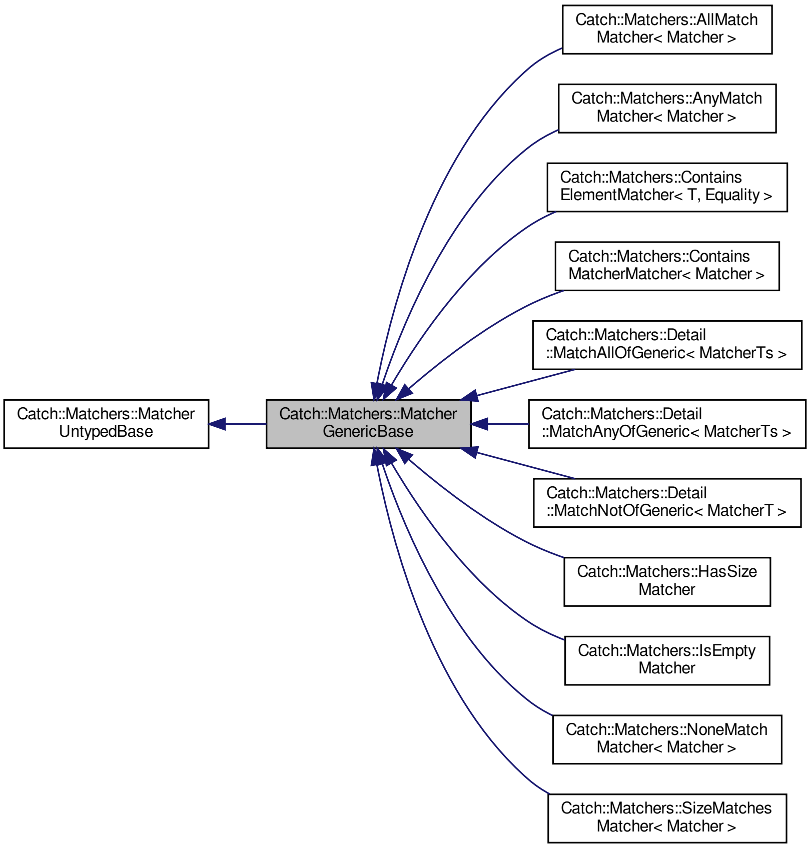
Additional Inherited Members

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

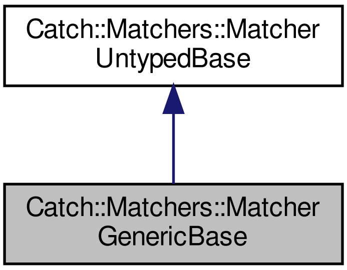
- include/catch2/catch_amalgamated.hpp

5.154 Catch::Matchers::MatcherGenericBase Class Reference

Inheritance diagram for Catch::Matchers::MatcherGenericBase:


Catch::Matchers::AllMatch Matcher< Matcher >
Catch::Matchers::AnyMatch Matcher< Matcher >
Catch::Matchers::Contains ElementMatcher< T, Equality >
Catch::Matchers::Contains MatcherMatcher< Matcher >
Catch::Matchers::Detail ::MatchAllOfGeneric< MatcherTs >
Catch::Matchers::Matcher UntypedBase
Catch::Matchers::Matcher GenericBase
Catch::Matchers::Detail ::MatchAnyOfGeneric< MatcherTs >
Catch::Matchers::Detail ::MatchNotOfGeneric< MatcherT >
Catch::Matchers::HasSize Matcher
Catch::Matchers::IsEmpty Matcher
Catch::Matchers::NoneMatch Matcher< Matcher >
Catch::Matchers::SizeMatches Matcher< Matcher >

Collaboration diagram for Catch::Matchers::MatcherGenericBase:



Public Member Functions

- **MatcherGenericBase** (MatcherGenericBase &)=default
- **MatcherGenericBase** (MatcherGenericBase &&)=default
- MatcherGenericBase & **operator=** (MatcherGenericBase const &)=delete
- MatcherGenericBase & **operator=** (MatcherGenericBase &&)=delete

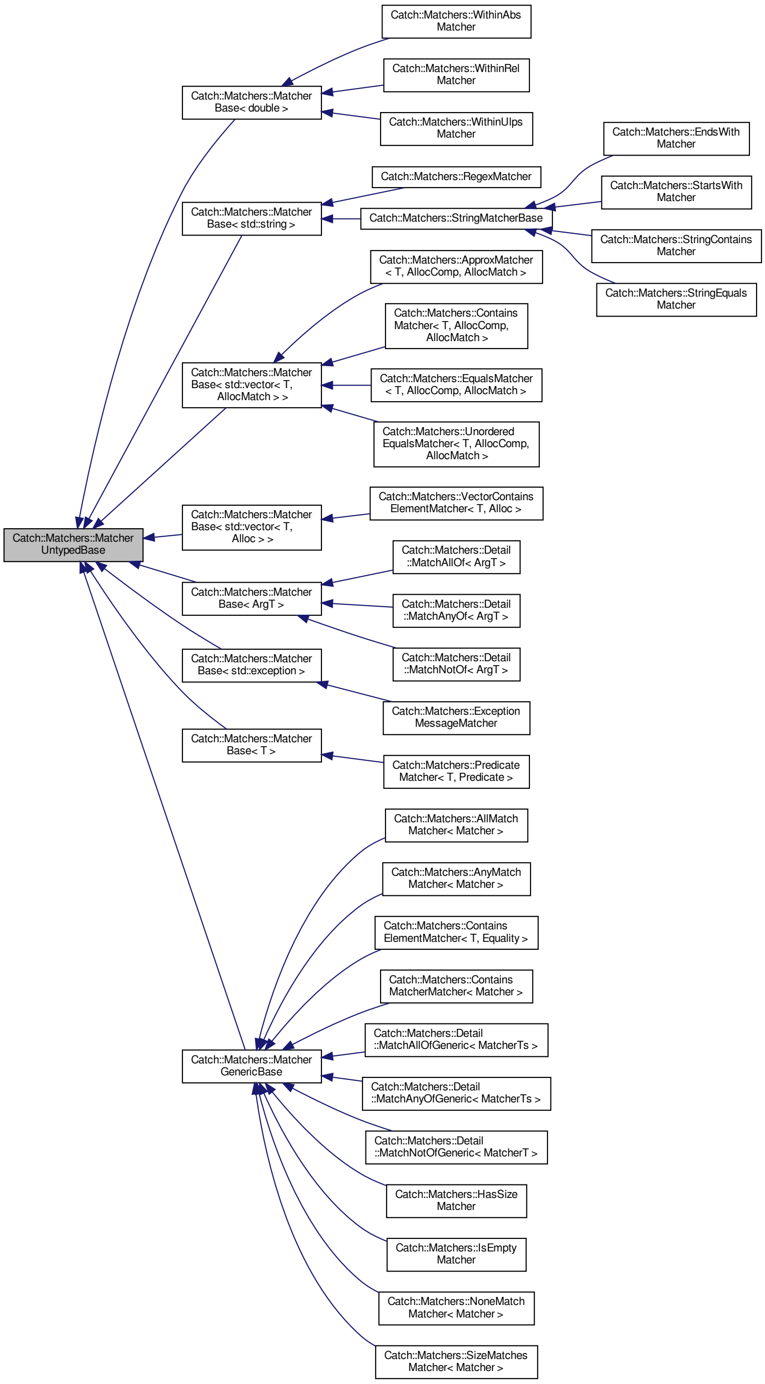
Additional Inherited Members

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

- include/catch2/catch_amalgamated.hpp

5.155 Catch::Matchers::MatcherUntypedBase Class Reference

Inheritance diagram for Catch::Matchers::MatcherUntypedBase:


Catch::Matchers::WithinAbs Matcher
Catch::Matchers::WithinRel Matcher
Catch::Matchers::Matcher Base< double >
Catch::Matchers::WithinUlps Matcher
Catch::Matchers::EndsWith Matcher
Catch::Matchers::RegexMatcher
Catch::Matchers::StartsWith Matcher
Catch::Matchers::Matcher Base< std::string >
Catch::Matchers::StringMatcherBase
Catch::Matchers::StringContains Matcher
Catch::Matchers::ApproxMatcher < T, AllocComp, AllocMatch >
Catch::Matchers::StringEquals Matcher
Catch::Matchers::Contains Matcher< T, AllocComp, AllocMatch >
Catch::Matchers::Matcher Base< std::vector< T, AllocMatch > >
Catch::Matchers::EqualsMatcher < T, AllocComp, AllocMatch >
Catch::Matchers::Unordered EqualsMatcher< T, AllocComp, AllocMatch >
Catch::Matchers::VectorContains ElementMatcher< T, Alloc >
Catch::Matchers::Matcher Base< std::vector< T, Alloc > >
Catch::Matchers::Matcher UntypedBase
Catch::Matchers::Detail ::MatchAllOf< ArgT >
Catch::Matchers::Matcher Base< ArgT >
Catch::Matchers::Detail ::MatchAnyOf< ArgT >
Catch::Matchers::Detail ::MatchNotOf< ArgT >
Catch::Matchers::Matcher Base< std::exception >
Catch::Matchers::Exception MessageMatcher
Catch::Matchers::Matcher Base< T >
Catch::Matchers::Predicate Matcher< T, Predicate >
Catch::Matchers::AllMatch Matcher< Matcher >
Catch::Matchers::AnyMatch Matcher< Matcher >
Catch::Matchers::Contains ElementMatcher< T, Equality >
Catch::Matchers::Contains MatcherMatcher< Matcher >
Catch::Matchers::Detail ::MatchAllOfGeneric< MatcherTs >
Catch::Matchers::Matcher GenericBase
Catch::Matchers::Detail ::MatchAnyOfGeneric< MatcherTs >
Catch::Matchers::Detail ::MatchNotOfGeneric< MatcherT >
Catch::Matchers::HasSize Matcher
Catch::Matchers::IsEmpty Matcher
Catch::Matchers::NoneMatch Matcher< Matcher >
Catch::Matchers::SizeMatches Matcher< Matcher >

Public Member Functions

- **MatcherUntypedBase** (MatcherUntypedBase const &)=default
- **MatcherUntypedBase** (MatcherUntypedBase &&)=default

- MatcherUntypedBase & **operator=** (MatcherUntypedBase const &)=delete
- MatcherUntypedBase & **operator=** (MatcherUntypedBase &&)=delete
- std::string **toString** () const

Protected Member Functions

- virtual std::string **describe** () const =0

Protected Attributes

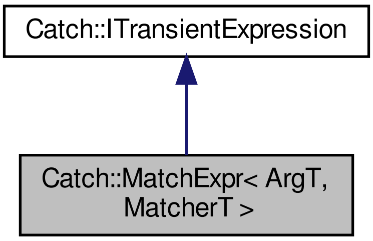
- std::string **m_cachedToString**

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

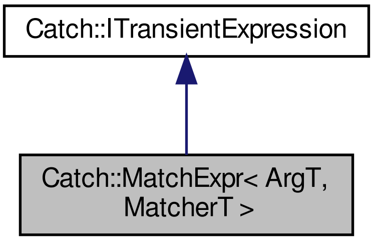
- include/catch2/catch_amalgamated.hpp

5.156 Catch::MatchExpr< ArgT, MatcherT > Class Template Reference

Inheritance diagram for Catch::MatchExpr< ArgT, MatcherT >:


Catch::ITransientExpression
Catch::MatchExpr< ArgT, MatcherT >

Collaboration diagram for Catch::MatchExpr< ArgT, MatcherT >:


Catch::ITransientExpression
Catch::MatchExpr< ArgT, MatcherT >

Public Member Functions

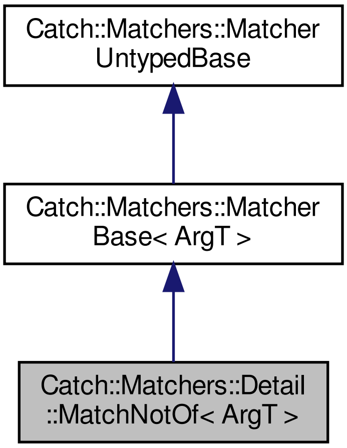
- **MatchExpr** (ArgT &&arg, MatcherT const &matcher, StringRef matcherString)
- void **streamReconstructedExpression** (std::ostream &os) const override

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

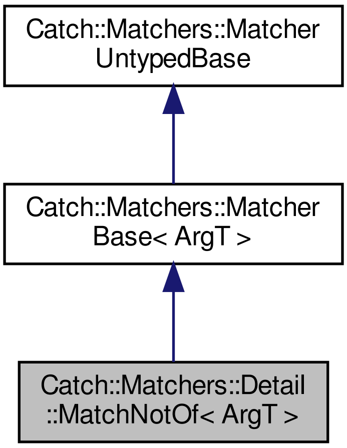
- include/catch2/catch_amalgamated.hpp

5.157 Catch::Matchers::Detail::MatchNotOf< ArgT > Class Template Reference

Inheritance diagram for Catch::Matchers::Detail::MatchNotOf< ArgT >:


Catch::Matchers::Matcher UntypedBase
Catch::Matchers::Matcher Base< ArgT >
Catch::Matchers::Detail ::MatchNotOf< ArgT >

Collaboration diagram for Catch::Matchers::Detail::MatchNotOf< ArgT >:


Catch::Matchers::Matcher UntypedBase
Catch::Matchers::Matcher Base< ArgT >
Catch::Matchers::Detail ::MatchNotOf< ArgT >

Public Member Functions

- **MatchNotOf** (MatcherBase< ArgT > const &underlyingMatcher)
- bool **match** (ArgT const &arg) const override
- std::string **describe** () const override

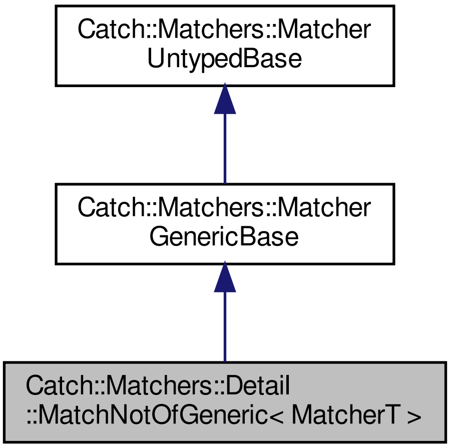
Additional Inherited Members

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

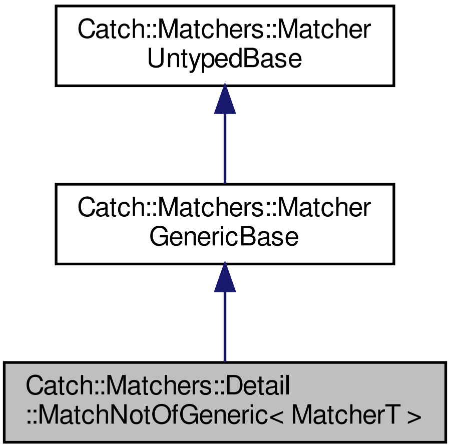
- include/catch2/catch_amalgamated.hpp

5.158 Catch::Matchers::Detail::MatchNotOfGeneric< MatcherT > Class Template Reference

Inheritance diagram for Catch::Matchers::Detail::MatchNotOfGeneric< MatcherT >:



Collaboration diagram for Catch::Matchers::Detail::MatchNotOfGeneric< MatcherT >:



Public Member Functions

- **MatchNotOfGeneric** (MatchNotOfGeneric const &)=delete

- MatchNotOfGeneric & **operator=** (MatchNotOfGeneric const &)=delete
- **MatchNotOfGeneric** (MatchNotOfGeneric &&)=default
- MatchNotOfGeneric & **operator=** (MatchNotOfGeneric &&)=default
- **MatchNotOfGeneric** (MatcherT const &matcher)
- template<typename Arg >
  bool **match** (Arg &&arg) const
- std::string **describe** () const override

Friends

- MatcherT const & operator! (MatchNotOfGeneric< MatcherT > const &matcher)

  Negating negation can just unwrap and return underlying matcher.

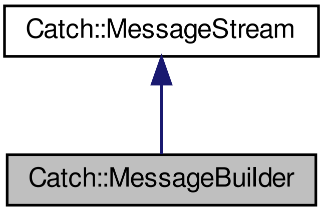
Additional Inherited Members

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

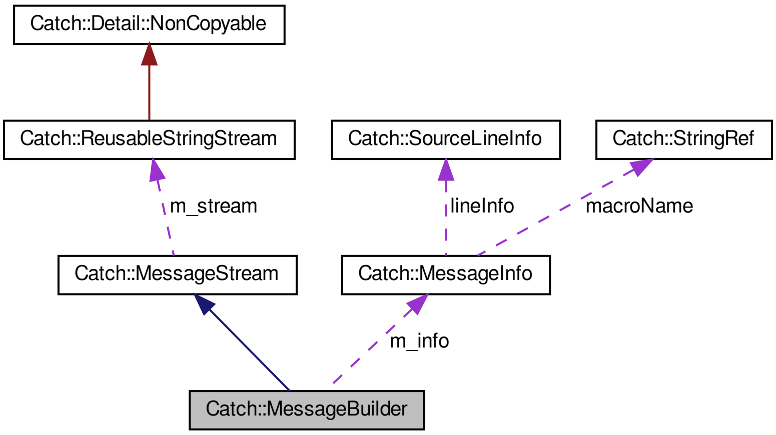
- include/catch2/catch_amalgamated.hpp

5.159 Catch::MessageBuilder Struct Reference

Inheritance diagram for Catch::MessageBuilder:



Collaboration diagram for Catch::MessageBuilder:



Public Member Functions

- **MessageBuilder** (StringRef macroName, SourceLineInfo const &lineInfo, ResultWas::OfType type)
- template<typename T >
  MessageBuilder & **operator**<< (T const &value)

Public Attributes

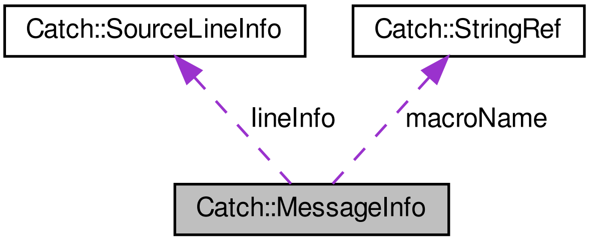
- MessageInfo **m_info**

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

- include/catch2/catch_amalgamated.hpp

5.160 Catch::MessageInfo Struct Reference

Collaboration diagram for Catch::MessageInfo:



Public Member Functions

- **MessageInfo** (StringRef _macroName, SourceLineInfo const &_lineInfo, ResultWas::OfType _type)
- bool **operator==** (MessageInfo const &other) const
- bool **operator<** (MessageInfo const &other) const

Public Attributes

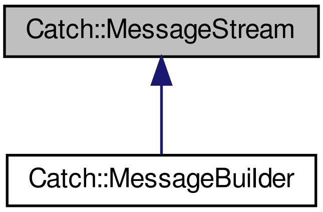
- StringRef **macroName**
- std::string **message**
- SourceLineInfo **lineInfo**
- ResultWas::OfType **type**
- unsigned int **sequence**

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

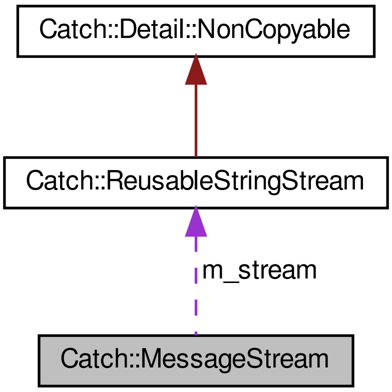
- include/catch2/catch_amalgamated.hpp

5.161 Catch::MessageStream Struct Reference

Inheritance diagram for Catch::MessageStream:



Collaboration diagram for Catch::MessageStream:



Public Member Functions

- template<typename T >
  MessageStream & **operator**<< (T const &value)

Public Attributes

- ReusableStringStream **m_stream**

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

- include/catch2/catch_amalgamated.hpp

5.162 Model< TSeq > Class Template Reference

Core class of epiworld.

```
#include <model-bones.hpp>
```

Public Member Functions

- DataBase< TSeq > & **get_db** ()
- epiworld_double & **operator()** (std::string pname)
- size_t **size** () const
- size_t **get_n_variants** () const
- size_t **get_n_tools** () const
- unsigned int **get_ndays** () const
- unsigned int **get_n_replicates** () const
- void **set_ndays** (unsigned int ndays)
- bool **get_verbose** () const
- void **verbose_off** ()
- void **verbose_on** ()
- int today () const

  The current time of the model.
- void write_data (std::string fn_variant_info, std::string fn_variant_hist, std::string fn_tool_info, std::string fn←_tool_hist, std::string fn_total_hist, std::string fn_transmission, std::string fn_transition) const

  Wrapper of `DataBase::write_data`
- std::map< std::string, epiworld_double > & **params** ()
- void reset ()

  Reset the model.
- void **print** () const
- Model< TSeq > && **clone** () const
- void **get_elapsed** (std::string unit="auto", epiworld_double *last_elapsed=nullptr, epiworld_double *total_←elapsed=nullptr, std::string *unit_abbr=nullptr, bool print=true) const
- void add_global_action (std::function< void(Model< TSeq > *)> fun, int date=-99)

  Set a global action.
- void **run_global_actions** ()
- void **clear_status_set** ()
- const std::vector< VirusPtr< TSeq > > & **get_viruses** () const
- const std::vector< ToolPtr< TSeq > > & **get_tools** () const

Set the backup object

`backup` can be used to restore the entire object after a run. This can be useful if the user wishes to have individuals start with the same network from the beginning.

- void **set_backup** ()
- void **restore_backup** ()

Random number generation

Parameters

eng	*Random number generator*
s	*Seed*

- void **set_rand_engine** (std::mt19937 &eng)
- std::mt19937 * **get_rand_endgine** ()
- void **seed** (unsigned int s)
- void **set_rand_gamma** (epiworld_double alpha, epiworld_double beta)
- epiworld_double **runif** ()
- epiworld_double **rnorm** ()
- epiworld_double **rnorm** (epiworld_double mean, epiworld_double sd)

- epiworld_double **rgamma** ()
- epiworld_double **rgamma** (epiworld_double alpha, epiworld_double beta)

Add Virus/Tool to the model

This is done before the model has been initialized.

Parameters

v	*Virus to be added*
t	*Tool to be added*
preval	*Initial prevalence (initial state.) It can be specified as a proportion (between zero and one,) or an integer indicating number of individuals.*

- void **add_virus** (Virus< TSeq > v, epiworld_double preval)
- void **add_virus_n** (Virus< TSeq > v, unsigned int preval)
- void **add_tool** (Tool< TSeq > t, epiworld_double preval)
- void **add_tool_n** (Tool< TSeq > t, unsigned int preval)

Accessing population of the model

Parameters

fn	*std::string Filename of the edgelist file.*
skip	*int Number of lines to skip in `fn`.*
directed	*bool Whether the graph is directed or not.*
size	*Size of the network.*
al	*AdjList to read into the model.*

- void **agents_from_adjlist** (std::string fn, int size, int skip=0, bool directed=false)
- void **agents_from_adjlist** (AdjList al)
- bool **is_directed** () const
- std::vector< Agent< TSeq > > ∗ **get_agents** ()
- void **agents_smallworld** (unsigned int n=1000, unsigned int k=5, bool d=false, epiworld_double p=.01)

Functions to run the model

Parameters

seed	*Seed to be used for Pseudo-RNG.*
ndays	*Number of days (steps) of the simulation.*
fun	*In the case of `run_multiple`, a function that is called after each experiment.*

- void **init** (unsigned int ndays, unsigned int seed)
- void **update_status** ()
- void **mutate_variant** ()
- void **next** ()
- void run ()

  Runs the simulation (after initialization)
- void run_multiple (unsigned int nexperiments, std::function< void(size_t, Model< TSeq > ∗)> fun=save_run< TSeq >(), bool reset=true, bool verbose=true)

Rewire the network preserving the degree sequence.

This implementation assumes an undirected network, thus if {(i,j), (k,l)} -> {(i,l), (k,j)}, the reciprocal is also true, i.e., {(j,i), (l,k)} -> {(j,k), (l,i)}.

Parameters

proportion	*Proportion of ties to be rewired.*

Returns

A rewired version of the network.

- void **set_rewire_fun** (std::function< void(std::vector< Agent< TSeq >> ∗, Model< TSeq > ∗, epiworld_double)> fun)
- void **set_rewire_prop** (epiworld_double prop)
- epiworld_double **get_rewire_prop** () const
- void **rewire** ()

Export the network data in edgelist form

Parameters

fn	*std::string. File name.*
source	*Integer vector*
target	*Integer vector*

When passing the source and target, the function will write the edgelist on those.

- void **write_edgelist** (std::string fn) const
- void **write_edgelist** (std::vector< unsigned int > &source, std::vector< unsigned int > &target) const

Manage status (states) in the model

The functions `get_status` return the current values for the statuses included in the model.

Parameters

lab	`std::string` *Name of the status.*

Returns

`add_status*` *returns nothing.*

`get_status_*` *returns a vector of pairs with the statuses and their labels.*

- void **add_status** (std::string lab, UpdateFun< TSeq > fun=nullptr)
- const std::vector< std::string > & **get_status** () const
- const std::vector< UpdateFun< TSeq > > & **get_status_fun** () const
- void **print_status_codes** () const

Set the user data object

Parameters

names	*string vector with the names of the variables.*

- void set_user_data (std::vector< std::string > names)

[@

- void **add_user_data** (unsigned int j, epiworld_double x)
- void **add_user_data** (std::vector< epiworld_double > x)
- UserData< TSeq > & **get_user_data** ()

Queuing system

When queueing is on, the model will keep track of which agents are either in risk of exposure or exposed. This then is used at each step to act only on the aforementioned agents.

- void queuing_on ()

  Activates the queuing system (default.)
- void queuing_off ()

  Deactivates the queuing system.
- bool is_queuing_on () const

  Query if the queuing system is on.
- Queue< TSeq > & get_queue ()

  Retrieve the `Queue` object.

Get the susceptibility reduction object

Parameters

v	

Returns

epiworld_double

- void **set_susceptibility_reduction_mixer** (MixerFun< TSeq > fun)
- void **set_transmission_reduction_mixer** (MixerFun< TSeq > fun)
- void **set_recovery_enhancer_mixer** (MixerFun< TSeq > fun)
- void **set_death_reduction_mixer** (MixerFun< TSeq > fun)

Friends

- class **Agent< TSeq >**
- class **AgentsSample< TSeq >**
- class **DataBase< TSeq >**
- class **Queue< TSeq >**

Tool Mixers

These functions combine the effects tools have to deliver a single effect. For example, wearing a mask, been vaccinated, and the immune system combine together to jointly reduce the susceptibility for a given virus.

- std::vector< epiworld_double > **array_double_tmp**
- std::vector< Virus< TSeq > * > **array_virus_tmp**
- **Model** ()
- **Model** (const Model< TSeq > &m)
- **Model** (Model< TSeq > &&m)
- Model< TSeq > & **operator=** (const Model< TSeq > &m)
- void **clone_population** (std::vector< Agent< TSeq > > &p, bool &d, Model< TSeq > *m=nullptr) const
- void **clone_population** (const Model< TSeq > &m)

Setting and accessing parameters from the model

Tools can incorporate parameters included in the model. Internally, parameters in the tool are stored as pointers to an std::map<> of parameters in the model. Using the `unsigned int` method directly fetches the parameters in the order these were added to the tool. Accessing parameters via the `std::string` method involves searching the parameter directly in the std::map<> member of the model (so it is not recommended.)

The `par()` function members are aliases for `get_param()`.

Parameters

initial_val	
pname	Name of the parameter to add or to fetch

Returns

The current value of the parameter in the model.

- epiworld_double * **p0**
- epiworld_double * **p1**
- epiworld_double * **p2**
- epiworld_double * **p3**
- epiworld_double * **p4**
- epiworld_double * **p5**
- epiworld_double * **p6**
- epiworld_double * **p7**
- epiworld_double * **p8**
- epiworld_double * **p9**
- epiworld_double * **p10**
- epiworld_double * **p11**
- epiworld_double * **p12**
- epiworld_double * **p13**
- epiworld_double * **p14**
- epiworld_double * **p15**
- epiworld_double * **p16**
- epiworld_double * **p17**
- epiworld_double * **p18**
- epiworld_double * **p19**
- epiworld_double * **p20**
- epiworld_double * **p21**
- epiworld_double * **p22**
- epiworld_double * **p23**
- epiworld_double * **p24**
- epiworld_double * **p25**
- epiworld_double * **p26**
- epiworld_double * **p27**
- epiworld_double * **p28**
- epiworld_double * **p29**
- epiworld_double * **p30**
- epiworld_double * **p31**
- epiworld_double * **p32**
- epiworld_double * **p33**
- epiworld_double * **p34**

- epiworld_double ∗ **p35**
- epiworld_double ∗ **p36**
- epiworld_double ∗ **p37**
- epiworld_double ∗ **p38**
- epiworld_double ∗ **p39**
- unsigned int **npar_used** = 0u
- epiworld_double **add_param** (epiworld_double initial_val, std::string pname)
- epiworld_double **get_param** (unsigned int k)
- epiworld_double **get_param** (std::string pname)
- epiworld_double **par** (unsigned int k)
- epiworld_double **par** (std::string pname)

5.162.1 Detailed Description

template<typename TSeq = int>
class Model< TSeq >

Core class of epiworld.

The model class provides the wrapper that puts together `Agent`, `Virus`, and `Tools`.

Template Parameters

TSeq	Type of sequence. In principle, users can build models in which virus and human sequence is represented as numeric vectors (if needed.)

5.162.2 Member Function Documentation

5.162.2.1 add_global_action()

```
template<typename TSeq = int>
void Model< TSeq >::add_global_action (
            std::function< void(Model< TSeq > *)> fun,
            int date = -99 )
```

Set a global action.

Parameters

fun	A function to be called on the prescribed dates
date	Integer indicating when the function is called (see details)

When date is less than zero, then the function is called at the end of every day. Otherwise, the function will be called only at the end of the indicated date.

5.162.2.2 reset()

```
template<typename TSeq = int>
void Model< TSeq >::reset ( )
```

Reset the model.

Resetting the model will:

- clear the database
- restore the population (if `set_backup()` was called before)
- re-distribute tools
- re-distribute viruses
- set the date to 0

5.162.2.3 run_multiple()

```
template<typename TSeq = int>
void Model< TSeq >::run_multiple (
            unsigned int nexperiments,
            std::function< void(size_t, Model< TSeq > *)> fun = save_run< TSeq >(),
            bool reset = true,
            bool verbose = true )
```

Parameters

nexperiments	Multiple runs of the simulation

5.162.2.4 write_data()

```
template<typename TSeq = int>
void Model< TSeq >::write_data (
            std::string fn_variant_info,
            std::string fn_variant_hist,
            std::string fn_tool_info,
            std::string fn_tool_hist,
            std::string fn_total_hist,
            std::string fn_transmission,
            std::string fn_transition ) const
```

Wrapper of `DataBase::write_data`

Parameters

fn_variant_info	Filename. Information about the variant.

Parameters

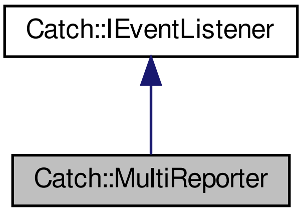
fn_variant_hist	Filename. History of the variant.
fn_tool_info	Filename. Information about the tool.
fn_tool_hist	Filename. History of the tool.
fn_total_hist	Filename. Aggregated history (status)
fn_transmission	Filename. Transmission history.
fn_transition	Filename. Markov transition history.

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

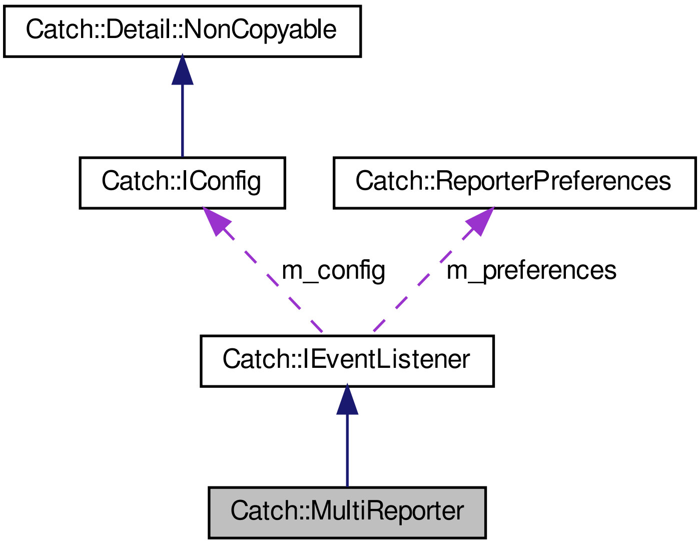
- include/epiworld/agent-meat-status.hpp
- include/epiworld/model-bones.hpp

5.163 Catch::MultiReporter Class Reference

Inheritance diagram for Catch::MultiReporter:



Collaboration diagram for Catch::MultiReporter:



Public Member Functions

- void **addListener** (IEventListenerPtr &&listener)
- void **addReporter** (IEventListenerPtr &&reporter)
- void noMatchingTestCases (StringRef unmatchedSpec) override

    Called when no test cases match provided test spec.
- void fatalErrorEncountered (StringRef error) override

    Called if a fatal error (signal/structured exception) occured.
- void reportInvalidTestSpec (StringRef arg) override

    Called for all invalid test specs from the cli.
- void benchmarkPreparing (StringRef name) override

    Called when user-code is being probed before the actual benchmark runs.
- void benchmarkStarting (BenchmarkInfo const &benchmarkInfo) override

    Called after probe but before the user-code is being benchmarked.
- void benchmarkEnded (BenchmarkStats<> const &benchmarkStats) override

    Called with the benchmark results if benchmark successfully finishes.
- void benchmarkFailed (StringRef error) override

    Called if running the benchmarks fails for any reason.
- void testRunStarting (TestRunInfo const &testRunInfo) override
- void testCaseStarting (TestCaseInfo const &testInfo) override

    Called once for each TEST_CASE, no matter how many times it is entered.
- void testCasePartialStarting (TestCaseInfo const &testInfo, uint64_t partNumber) override

    Called every time a TEST_CASE is entered, including repeats (due to sections)
- void sectionStarting (SectionInfo const &sectionInfo) override

    Called when a `SECTION` is being entered. Not called for skipped sections.
- void assertionStarting (AssertionInfo const &assertionInfo) override

Called before assertion success/failure is evaluated.
- void assertionEnded (AssertionStats const &assertionStats) override

  Called after assertion was fully evaluated.
- void sectionEnded (SectionStats const &sectionStats) override

  Called after a `SECTION` has finished running.
- void testCasePartialEnded (TestCaseStats const &testInfo, uint64_t partNumber) override

  Called every time a TEST_CASE is entered, including repeats (due to sections)
- void testCaseEnded (TestCaseStats const &testCaseStats) override

  Called once for each TEST_CASE, no matter how many times it is entered.
- void testRunEnded (TestRunStats const &testRunStats) override
- void skipTest (TestCaseInfo const &testInfo) override

  Called with test cases that are skipped due to the test run aborting.
- void listReporters (std::vector< ReporterDescription > const &descriptions) override

  Writes out information about provided reporters using reporter-specific format.
- void listListeners (std::vector< ListenerDescription > const &descriptions) override

  Writes out the provided listeners descriptions using reporter-specific format.
- void listTests (std::vector< TestCaseHandle > const &tests) override

  Writes out information about provided tests using reporter-specific format.
- void listTags (std::vector< TagInfo > const &tags) override

  Writes out information about the provided tags using reporter-specific format.
- **IEventListener** (IConfig const ∗config)

Additional Inherited Members

5.163.1 Member Function Documentation

5.163.1.1 testRunEnded()

```
void Catch::MultiReporter::testRunEnded (
            TestRunStats const & testRunStats )  [override], [virtual]
```

Called once after all tests in a testing run are finished

Not called if tests weren't run (e.g. only listings happened)

Implements Catch::IEventListener.

5.163.1.2 testRunStarting()

```
void Catch::MultiReporter::testRunStarting (
            TestRunInfo const & testRunInfo )  [override], [virtual]
```

Called once in a testing run before tests are started

Not called if tests won't be run (e.g. only listing will happen)

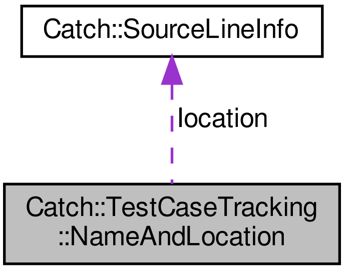
Implements Catch::IEventListener.

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

- include/catch2/catch_amalgamated.hpp

5.164 Catch::TestCaseTracking::NameAndLocation Struct Reference

Collaboration diagram for Catch::TestCaseTracking::NameAndLocation:



Public Member Functions

- **NameAndLocation** (std::string const &_name, SourceLineInfo const &_location)

Public Attributes

- std::string **name**
- SourceLineInfo **location**

Friends

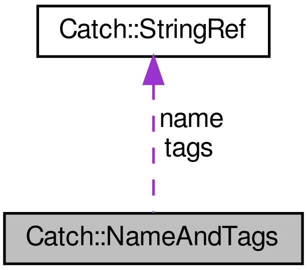
- bool **operator==** (NameAndLocation const &lhs, NameAndLocation const &rhs)

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

- include/catch2/catch_amalgamated.hpp

5.165 Catch::NameAndTags Struct Reference

Collaboration diagram for Catch::NameAndTags:



Public Member Functions

- constexpr **NameAndTags** (StringRef name_=StringRef(), StringRef tags_=StringRef()) noexcept

Public Attributes

- StringRef **name**
- StringRef **tags**

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

- include/catch2/catch_amalgamated.hpp

5.166 Catch::CumulativeReporterBase::Node< T, ChildNodeT > Struct Template Reference

Public Types

- using **ChildNodes** = std::vector< Detail::unique_ptr< ChildNodeT > >

Public Member Functions

- **Node** (T const &_value)

Public Attributes

- T **value**
- ChildNodes **children**

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

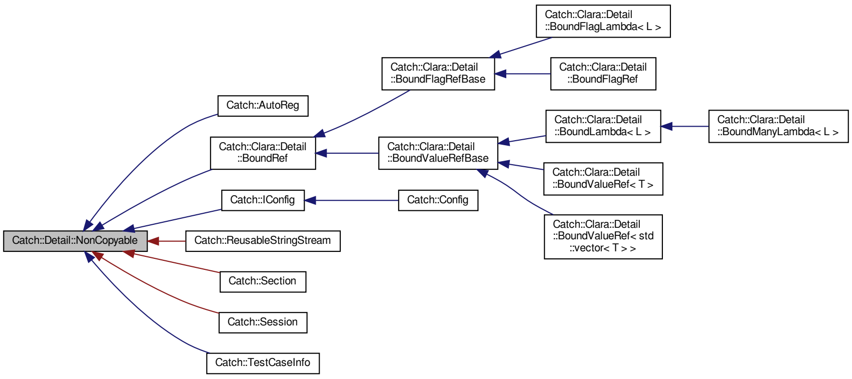
- include/catch2/catch_amalgamated.hpp

5.167 Catch::Detail::NonCopyable Class Reference

Deriving classes become noncopyable and nonmovable.

```
#include <catch_amalgamated.hpp>
```

Inheritance diagram for Catch::Detail::NonCopyable:


Catch::Clara::Detail ::BoundFlagLambda< L >
Catch::Clara::Detail ::BoundFlagRefBase
Catch::Clara::Detail ::BoundFlagRef
Catch::AutoReg
Catch::Clara::Detail ::BoundLambda< L >
Catch::Clara::Detail ::BoundManyLambda< L >
Catch::Clara::Detail ::BoundRef
Catch::Clara::Detail ::BoundValueRefBase
Catch::Clara::Detail ::BoundValueRef< T >
Catch::IConfig
Catch::Config
Catch::Clara::Detail ::BoundValueRef< std ::vector< T > >
Catch::Detail::NonCopyable
Catch::ReusableStringStream
Catch::Section
Catch::Session
Catch::TestCaseInfo

5.167.1 Detailed Description

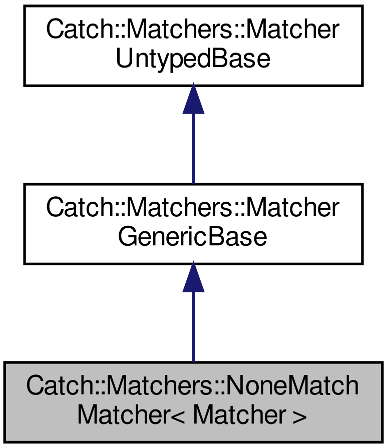
Deriving classes become noncopyable and nonmovable.

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

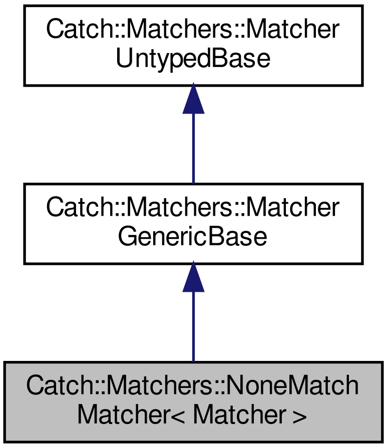
- include/catch2/catch_amalgamated.hpp

5.168 Catch::Matchers::NoneMatchMatcher< Matcher > Class Template Reference

Inheritance diagram for Catch::Matchers::NoneMatchMatcher< Matcher >:


Catch::Matchers::Matcher UntypedBase
Catch::Matchers::Matcher GenericBase
Catch::Matchers::NoneMatch Matcher< Matcher >

Collaboration diagram for Catch::Matchers::NoneMatchMatcher< Matcher >:


Catch::Matchers::Matcher UntypedBase
Catch::Matchers::Matcher GenericBase
Catch::Matchers::NoneMatch Matcher< Matcher >

Public Member Functions

- **NoneMatchMatcher** (Matcher matcher)
- std::string **describe** () const override
- template<typename RangeLike >
  bool **match** (RangeLike &&rng) const

Additional Inherited Members

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

- include/catch2/catch_amalgamated.hpp

5.169 Catch::Benchmark::now< Clock > Struct Template Reference

Public Member Functions

- TimePoint< Clock > **operator()** () const

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

- include/catch2/catch_amalgamated.hpp

5.170 Catch::Benchmark::Detail::ObjectStorage< T, Destruct > Struct Template Reference

Public Member Functions

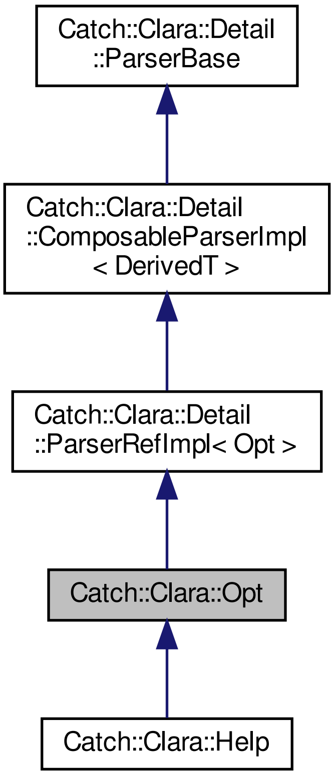
- **ObjectStorage** (const ObjectStorage &other)
- **ObjectStorage** (ObjectStorage &&other)
- template<typename... Args>
  void **construct** (Args &&... args)
- template<bool AllowManualDestruction = !Destruct>
  std::enable_if_t< AllowManualDestruction > **destruct** ()

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

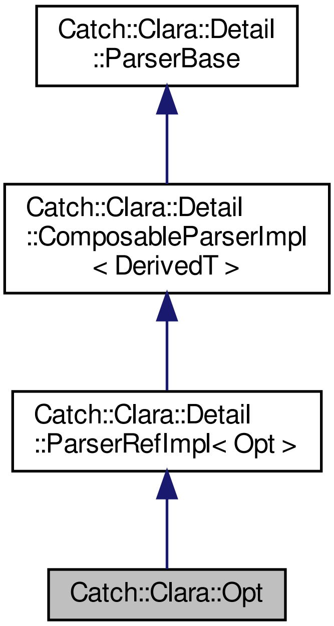
- include/catch2/catch_amalgamated.hpp

5.171 Catch::Clara::Opt Class Reference

Inheritance diagram for Catch::Clara::Opt:


Catch::Clara::Detail ::ParserBase
Catch::Clara::Detail ::ComposableParserImpl < DerivedT >
Catch::Clara::Detail ::ParserRefImpl< Opt >
Catch::Clara::Opt
Catch::Clara::Help

Collaboration diagram for Catch::Clara::Opt:


Catch::Clara::Detail ::ParserBase
Catch::Clara::Detail ::ComposableParserImpl < DerivedT >
Catch::Clara::Detail ::ParserRefImpl< Opt >
Catch::Clara::Opt

Public Member Functions

- template<typename LambdaT >
  Opt (LambdaT const &ref)
- **Opt** (bool &ref)
- template<typename LambdaT , typename = typename std::enable_if_t< Detail::is_unary_function<LambdaT>::value>>
  Opt (LambdaT const &ref, std::string const &hint)
- template<typename LambdaT >
  Opt (accept_many_t, LambdaT const &ref, std::string const &hint)
- template<typename T , typename = typename std::enable_if_t< !Detail::is_unary_function<T>::value>>
  Opt (T &ref, std::string const &hint)
- auto **operator[ ]** (std::string const &optName) -> Opt &
- std::vector< Detail::HelpColumns > **getHelpColumns** () const
- bool **isMatch** (std::string const &optToken) const
- Detail::InternalParseResult **parse** (std::string const &, Detail::TokenStream const &tokens) const override
- Detail::Result **validate** () const override

Protected Attributes

- std::vector< std::string > **m_optNames**

Additional Inherited Members

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

- include/catch2/catch_amalgamated.hpp

5.172 Catch::Optional< T > Class Template Reference

Public Member Functions

- **Optional** (T const &_value)
- **Optional** (Optional const &_other)
- Optional & **operator=** (Optional const &_other)
- Optional & **operator=** (T const &_value)
- void **reset** ()
- T & **operator*** ()
- T const & **operator*** () const
- T * **operator->** ()
- const T * **operator->** () const
- T **valueOr** (T const &defaultValue) const
- bool **some** () const
- bool **none** () const
- bool **operator!** () const
- **operator bool** () const

Friends

- bool **operator==** (Optional const &a, Optional const &b)
- bool **operator!=** (Optional const &a, Optional const &b)

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

- include/catch2/catch_amalgamated.hpp

5.173 Catch::Benchmark::OutlierClassification Struct Reference

Public Member Functions

- int **total** () const

Public Attributes

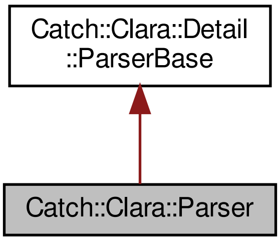
- int **samples_seen** = 0
- int **low_severe** = 0
- int **low_mild** = 0
- int **high_mild** = 0
- int **high_severe** = 0

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

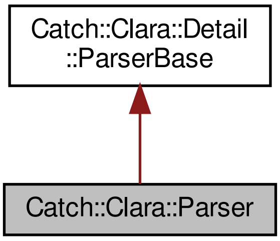
- include/catch2/catch_amalgamated.hpp

5.174 Catch::Clara::Parser Class Reference

Inheritance diagram for Catch::Clara::Parser:



Collaboration diagram for Catch::Clara::Parser:



Public Member Functions

- auto **operator|=** (ExeName const &exeName) -> Parser &
- auto **operator|=** (Arg const &arg) -> Parser &
- auto **operator|=** (Opt const &opt) -> Parser &
- Parser & **operator|=** (Parser const &other)
- template<typename T >
  auto **operator|** (T const &other) const -> Parser
- std::vector< Detail::HelpColumns > **getHelpColumns** () const
- void **writeToStream** (std::ostream &os) const
- Detail::Result **validate** () const override
- Detail::InternalParseResult **parse** (std::string const &exeName, Detail::TokenStream const &tokens) const override

Friends

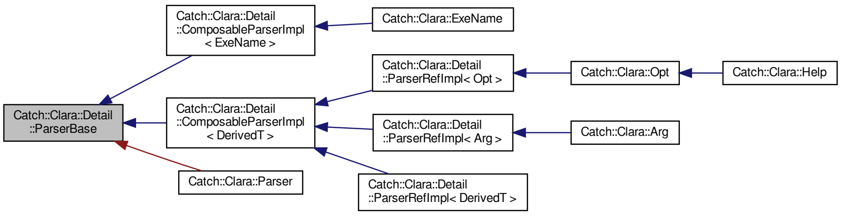
- auto **operator**<< (std::ostream &os, Parser const &parser) -> std::ostream &

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

- include/catch2/catch_amalgamated.hpp

5.175 Catch::Clara::Detail::ParserBase Class Reference

Inheritance diagram for Catch::Clara::Detail::ParserBase:


Catch::Clara::Detail ::ParserBase
Catch::Clara::Detail ::ComposableParserImpl < ExeName >
Catch::Clara::ExeName
Catch::Clara::Detail ::ParserRefImpl< Opt >
Catch::Clara::Opt
Catch::Clara::Help
Catch::Clara::Detail ::ComposableParserImpl < DerivedT >
Catch::Clara::Detail ::ParserRefImpl< Arg >
Catch::Clara::Arg
Catch::Clara::Parser
Catch::Clara::Detail ::ParserRefImpl< DerivedT >

Public Member Functions

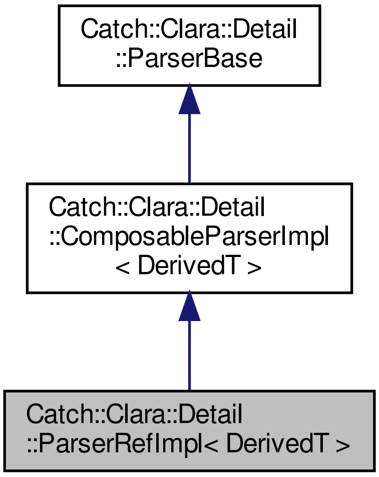
- virtual auto **validate** () const -> Result
- virtual auto **parse** (std::string const &exeName, TokenStream const &tokens) const -> InternalParseResult=0
- virtual size_t **cardinality** () const
- InternalParseResult **parse** (Args const &args) const

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

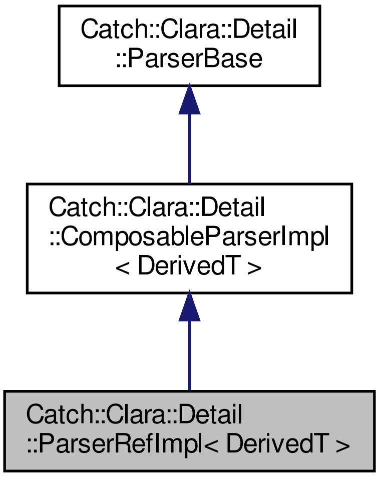
- include/catch2/catch_amalgamated.hpp

5.176 Catch::Clara::Detail::ParserRefImpl< DerivedT > Class Template Reference

Inheritance diagram for Catch::Clara::Detail::ParserRefImpl< DerivedT >:


Catch::Clara::Detail ::ParserBase
Catch::Clara::Detail ::ComposableParserImpl < DerivedT >
Catch::Clara::Detail ::ParserRefImpl< DerivedT >

Collaboration diagram for Catch::Clara::Detail::ParserRefImpl< DerivedT >:


Catch::Clara::Detail ::ParserBase
Catch::Clara::Detail ::ComposableParserImpl < DerivedT >
Catch::Clara::Detail ::ParserRefImpl< DerivedT >

Public Member Functions

- template<typename LambdaT >
  ParserRefImpl (accept_many_t, LambdaT const &ref, std::string const &hint)

- template<typename T , typename = typename std::enable_if_t< !Detail::is_unary_function<T>::value>>
  ParserRefImpl (T &ref, std::string const &hint)
- template<typename LambdaT , typename = typename std::enable_if_t< Detail::is_unary_function<LambdaT>::value>>
  ParserRefImpl (LambdaT const &ref, std::string const &hint)
- auto **operator()** (std::string const &description) -> DerivedT &
- auto **optional** () -> DerivedT &
- auto **required** () -> DerivedT &
- auto **isOptional** () const -> bool
- auto **cardinality** () const -> size_t override
- std::string const & **hint** () const

Protected Member Functions

- **ParserRefImpl** (std::shared_ptr< BoundRef > const &ref)

Protected Attributes

- Optionality **m_optionality** = Optionality::Optional
- std::shared_ptr< BoundRef > **m_ref**
- std::string **m_hint**
- std::string **m_description**

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

- include/catch2/catch_amalgamated.hpp

5.177 Catch::Clara::Detail::ParseState Class Reference

Public Member Functions

- **ParseState** (ParseResultType type, TokenStream const &remainingTokens)
- ParseResultType **type** () const
- TokenStream const & **remainingTokens** () const

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

- include/catch2/catch_amalgamated.hpp

5.178 PersonTools< TSeq > Class Template Reference

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

- include/epiworld/config.hpp

5.179 Catch::pluralise Class Reference

```
#include <catch_amalgamated.hpp>
```

Public Member Functions

- constexpr **pluralise** (std::uint64_t count, StringRef label)

Friends

- std::ostream & **operator**<< (std::ostream &os, pluralise const &pluraliser)

5.179.1 Detailed Description

Helper for streaming a "count [maybe-plural-of-label]" human-friendly string

Usage example:

```
std::cout « "Found " « pluralise(count, "error") « '\n';
```

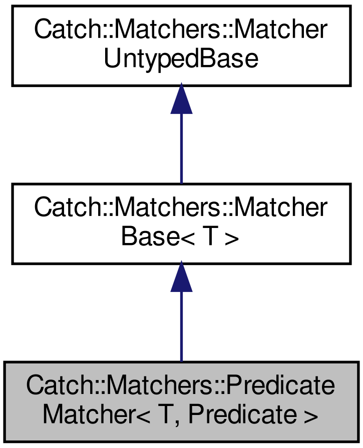
Important: The provided string must outlive the instance

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

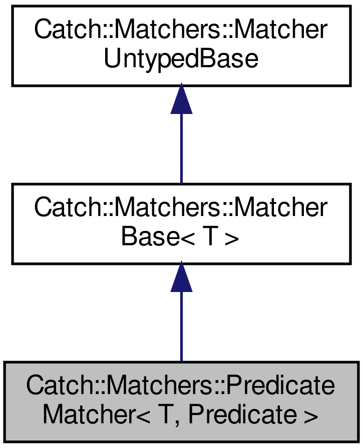
- include/catch2/catch_amalgamated.hpp

5.180 Catch::Matchers::PredicateMatcher< T, Predicate > Class Template Reference

Inheritance diagram for Catch::Matchers::PredicateMatcher< T, Predicate >:


Catch::Matchers::Matcher UntypedBase
Catch::Matchers::Matcher Base< T >
Catch::Matchers::Predicate Matcher< T, Predicate >

Collaboration diagram for Catch::Matchers::PredicateMatcher< T, Predicate >:


Catch::Matchers::Matcher UntypedBase
Catch::Matchers::Matcher Base< T >
Catch::Matchers::Predicate Matcher< T, Predicate >

Public Member Functions

- **PredicateMatcher** (Predicate &&elem, std::string const &descr)
- bool **match** (T const &item) const override
- std::string **describe** () const override

Additional Inherited Members

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

- include/catch2/catch_amalgamated.hpp

5.181 Catch::ProcessedReporterSpec Struct Reference

```
#include <catch_amalgamated.hpp>
```

Public Attributes

- std::string **name**
- std::string **outputFilename**
- ColourMode **colourMode**
- std::map< std::string, std::string > **customOptions**

Friends

- bool **operator==** (ProcessedReporterSpec const &lhs, ProcessedReporterSpec const &rhs)
- bool **operator!=** (ProcessedReporterSpec const &lhs, ProcessedReporterSpec const &rhs)

5.181.1 Detailed Description

`ReporterSpec` but with the defaults filled in.

Like `ReporterSpec`, the semantics are unchecked.

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

- include/catch2/catch_amalgamated.hpp

5.182 Progress Class Reference

A simple progress bar.

```
#include <progress.hpp>
```

Public Member Functions

- **Progress** (int n_, int width_)
- void **start** ()
- void **next** ()
- void **end** ()

5.182.1 Detailed Description

A simple progress bar.

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

- include/epiworld/progress.hpp

5.183 Queue< TSeq > Class Template Reference

Controls which agents are verified at each step.

```
#include <queue-bones.hpp>
```

Public Member Functions

- void **operator+=** (Agent< TSeq > *p)
- void **operator-=** (Agent< TSeq > *p)
- epiworld_fast_int **operator[ ]** (unsigned int i) const
- void **set_model** (Model< TSeq > *m)

5.183.1 Detailed Description

template<typename TSeq = int>
class Queue< TSeq >

Controls which agents are verified at each step.

The idea is that only agents who are either in an infected state or have an infected neighbor should be checked. Otherwise it makes no sense (no chance to recover or capture the disease).

Template Parameters

TSeq	

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

- include/epiworld/agent-bones.hpp
- include/epiworld/queue-bones.hpp

5.184 RandGraph Class Reference

Public Member Functions

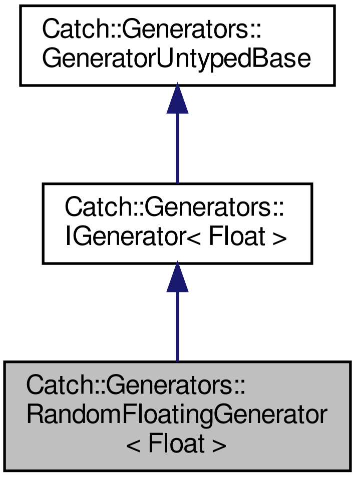
- **RandGraph** (int N_)
- void **init** (int s)
- void **set_rand_engine** (std::mt19937 &e)
- epiworld_double **runif** ()

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

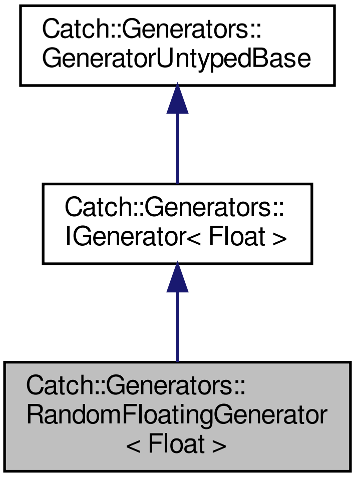
- include/epiworld/random_graph.hpp

5.185 Catch::Generators::RandomFloatingGenerator< Float > Class Template Reference

Inheritance diagram for Catch::Generators::RandomFloatingGenerator< Float >:



Collaboration diagram for Catch::Generators::RandomFloatingGenerator< Float >:



Public Member Functions

- **RandomFloatingGenerator** (Float a, Float b, std::uint32_t seed)
- Float const & **get** () const override
- bool next () override

Additional Inherited Members

5.185.1 Member Function Documentation

5.185.1.1 next()

```
template<typename Float >
bool Catch::Generators::RandomFloatingGenerator< Float >::next ( )  [inline], [override],
[virtual]
```

Attempts to move the generator to the next element

Returns true iff the move succeeded (and a valid element can be retrieved).

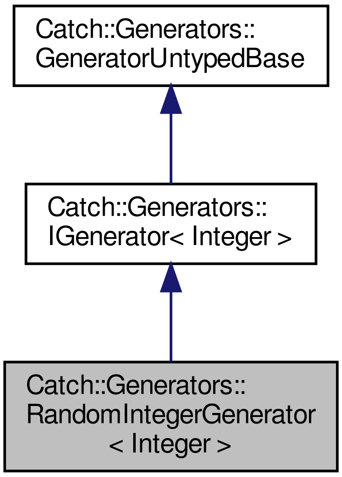
Implements Catch::Generators::GeneratorUntypedBase.

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

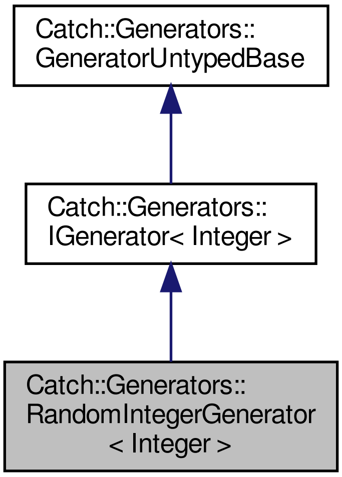
- include/catch2/catch_amalgamated.hpp

5.186 Catch::Generators::RandomIntegerGenerator< Integer > Class Template Reference

Inheritance diagram for Catch::Generators::RandomIntegerGenerator< Integer >:



Collaboration diagram for Catch::Generators::RandomIntegerGenerator< Integer >:



Public Member Functions

- **RandomIntegerGenerator** (Integer a, Integer b, std::uint32_t seed)

- Integer const & **get** () const override
- bool next () override

Additional Inherited Members

5.186.1 Member Function Documentation

5.186.1.1 next()

```
template<typename Integer >
bool Catch::Generators::RandomIntegerGenerator< Integer >::next ( )  [inline], [override],
[virtual]
```

Attempts to move the generator to the next element

Returns true iff the move succeeded (and a valid element can be retrieved).

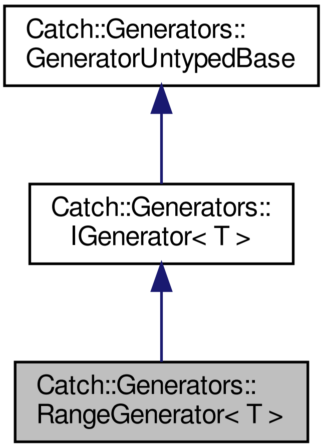
Implements Catch::Generators::GeneratorUntypedBase.

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

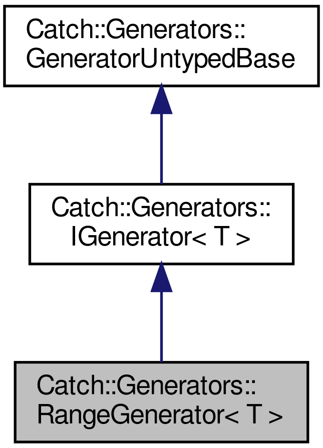
- include/catch2/catch_amalgamated.hpp

5.187 Catch::Generators::RangeGenerator< T > Class Template Reference

Inheritance diagram for Catch::Generators::RangeGenerator< T >:



Collaboration diagram for Catch::Generators::RangeGenerator< T >:



Public Member Functions

- **RangeGenerator** (T const &start, T const &end, T const &step)
- **RangeGenerator** (T const &start, T const &end)
- T const & **get** () const override
- bool next () override

Additional Inherited Members

5.187.1 Member Function Documentation

5.187.1.1 next()

```
template<typename T >
bool Catch::Generators::RangeGenerator< T >::next ( )  [inline], [override], [virtual]
```

Attempts to move the generator to the next element

Returns true iff the move succeeded (and a valid element can be retrieved).

Implements Catch::Generators::GeneratorUntypedBase.

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

- include/catch2/catch_amalgamated.hpp

5.188 Catch::ratio_string< Ratio > Struct Template Reference

Static Public Member Functions

- static std::string **symbol** ()

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

- include/catch2/catch_amalgamated.hpp

5.189 Catch::ratio_string< std::atto > Struct Reference

Static Public Member Functions

- static char **symbol** ()

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

- include/catch2/catch_amalgamated.hpp

5.190 Catch::ratio_string< std::femto > Struct Reference

Static Public Member Functions

- static char **symbol** ()

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

- include/catch2/catch_amalgamated.hpp

5.191 Catch::ratio_string< std::micro > Struct Reference

Static Public Member Functions

- static char **symbol** ()

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

- include/catch2/catch_amalgamated.hpp

5.192 Catch::ratio_string< std::milli > Struct Reference

Static Public Member Functions

- static char **symbol** ()

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

- include/catch2/catch_amalgamated.hpp

5.193 Catch::ratio_string< std::nano > Struct Reference

Static Public Member Functions

- static char **symbol** ()

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

- include/catch2/catch_amalgamated.hpp

5.194 Catch::ratio_string< std::pico > Struct Reference

Static Public Member Functions

- static char **symbol** ()

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

- include/catch2/catch_amalgamated.hpp

5.195 Catch::RedirectedStdErr Class Reference

Public Member Functions

- auto **str** () const -> std::string

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

- include/catch2/catch_amalgamated.hpp

5.196 Catch::RedirectedStdOut Class Reference

Public Member Functions

- auto **str** () const -> std::string

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

- include/catch2/catch_amalgamated.hpp

5.197 Catch::RedirectedStream Class Reference

Public Member Functions

- **RedirectedStream** (std::ostream &originalStream, std::ostream &redirectionStream)

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

- include/catch2/catch_amalgamated.hpp

5.198 Catch::RedirectedStreams Class Reference

Public Member Functions

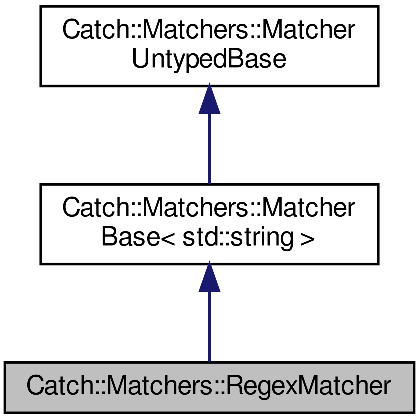
- **RedirectedStreams** (RedirectedStreams const &)=delete
- RedirectedStreams & **operator=** (RedirectedStreams const &)=delete
- **RedirectedStreams** (RedirectedStreams &&)=delete
- RedirectedStreams & **operator=** (RedirectedStreams &&)=delete
- **RedirectedStreams** (std::string &redirectedCout, std::string &redirectedCerr)

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

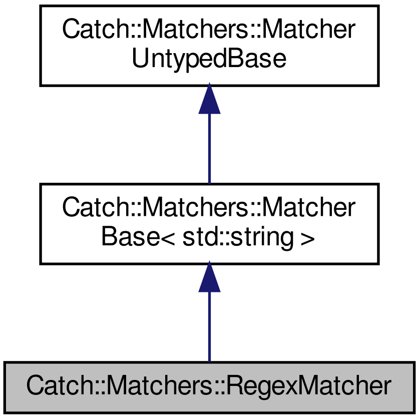
- include/catch2/catch_amalgamated.hpp

5.199 Catch::Matchers::RegexMatcher Class Reference

Inheritance diagram for Catch::Matchers::RegexMatcher:


Catch::Matchers::Matcher UntypedBase
Catch::Matchers::Matcher Base< std::string >
Catch::Matchers::RegexMatcher

Collaboration diagram for Catch::Matchers::RegexMatcher:


Catch::Matchers::Matcher UntypedBase
Catch::Matchers::Matcher Base< std::string >
Catch::Matchers::RegexMatcher

Public Member Functions

- **RegexMatcher** (std::string regex, CaseSensitive caseSensitivity)
- bool **match** (std::string const &matchee) const override
- std::string **describe** () const override

Additional Inherited Members

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

- include/catch2/catch_amalgamated.hpp

5.200 Catch::RegistrarForTagAliases Struct Reference

Public Member Functions

- **RegistrarForTagAliases** (char const ∗alias, char const ∗tag, SourceLineInfo const &lineInfo)

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

- include/catch2/catch_amalgamated.hpp

5.201 Catch::Benchmark::Detail::repeater< Fun > Struct Template Reference

Public Member Functions

- void **operator()** (int k) const

Public Attributes

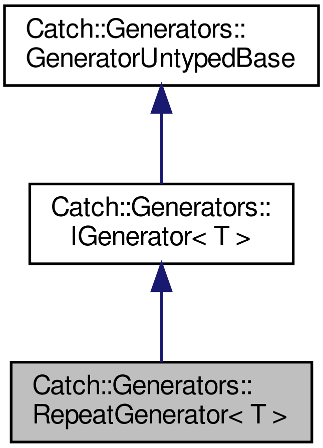
- Fun **fun**

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

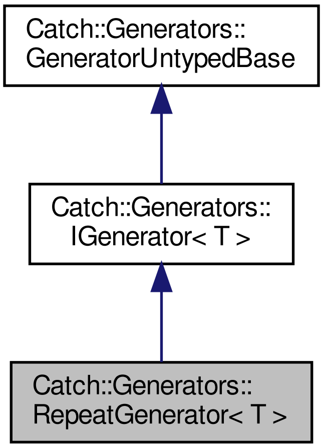
- include/catch2/catch_amalgamated.hpp

5.202 Catch::Generators::RepeatGenerator< T > Class Template Reference

Inheritance diagram for Catch::Generators::RepeatGenerator< T >:



Collaboration diagram for Catch::Generators::RepeatGenerator< T >:



Public Member Functions

- **RepeatGenerator** (size_t repeats, GeneratorWrapper< T > &&generator)
- T const & **get** () const override
- bool next () override

Additional Inherited Members

5.202.1 Member Function Documentation

5.202.1.1 next()

```
template<typename T >
bool Catch::Generators::RepeatGenerator< T >::next ( )  [inline], [override], [virtual]
```

Attempts to move the generator to the next element

Returns true iff the move succeeded (and a valid element can be retrieved).

Implements Catch::Generators::GeneratorUntypedBase.

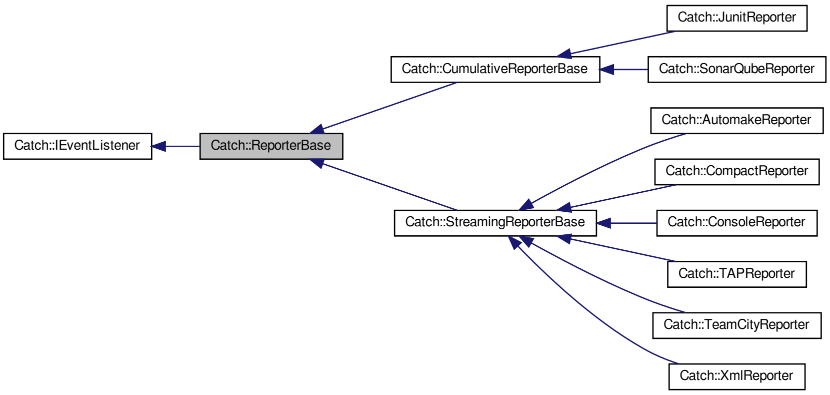
The documentation for this class was generated from the following file:

- include/catch2/catch_amalgamated.hpp

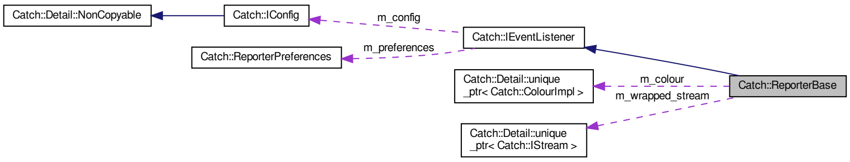
5.203 Catch::ReporterBase Class Reference

```
#include <catch_amalgamated.hpp>
```

Inheritance diagram for Catch::ReporterBase:



Collaboration diagram for Catch::ReporterBase:


Catch::Detail::NonCopyable
Catch::IConfig
m_config
Catch::IEventListener
Catch::ReporterPreferences
m_preferences
Catch::Detail::unique _ptr< Catch::ColourImpl >
m_colour
m_wrapped_stream
Catch::ReporterBase
Catch::Detail::unique _ptr< Catch::IStream >

Public Member Functions

- **ReporterBase** (ReporterConfig &&config)
- void listReporters (std::vector< ReporterDescription > const &descriptions) override
- void listListeners (std::vector< ListenerDescription > const &descriptions) override
- void listTests (std::vector< TestCaseHandle > const &tests) override
- void listTags (std::vector< TagInfo > const &tags) override

Protected Attributes

- Detail::unique_ptr< IStream > m_wrapped_stream

  The stream wrapper as passed to us by outside code.
- std::ostream & m_stream
- Detail::unique_ptr< ColourImpl > m_colour

  Colour implementation this reporter was configured for.
- std::map< std::string, std::string > m_customOptions

  The custom reporter options user passed down to the reporter.

5.203.1 Detailed Description

This is the base class for all reporters.

If are writing a reporter, you must derive from this type, or one of the helper reporter bases that are derived from this type.

ReporterBase centralizes handling of various common tasks in reporters, like storing the right stream for the reporters to write to, and providing the default implementation of the different listing events.

5.203.2 Member Function Documentation

5.203.2.1 listListeners()

```
void Catch::ReporterBase::listListeners (
            std::vector< ListenerDescription > const & descriptions )  [override], [virtual]
```

Provides a simple default listing of listeners

Looks similarly to listing of reporters, but with listener type instead of reporter name.

Implements Catch::IEventListener.

Reimplemented in Catch::XmlReporter.

5.203.2.2 listReporters()

```
void Catch::ReporterBase::listReporters (
            std::vector< ReporterDescription > const & descriptions )  [override], [virtual]
```

Provides a simple default listing of reporters.

Should look roughly like the reporter listing in v2 and earlier versions of Catch2.

Implements Catch::IEventListener.

Reimplemented in Catch::XmlReporter.

5.203.2.3 listTags()

```
void Catch::ReporterBase::listTags (
            std::vector< TagInfo > const & tags )  [override], [virtual]
```

Provides a simple default listing of tags.

Should look roughly like the tag listing in v2 and earlier versions of Catch2.

Implements Catch::IEventListener.

Reimplemented in Catch::XmlReporter.

5.203.2.4 listTests()

```
void Catch::ReporterBase::listTests (
            std::vector< TestCaseHandle > const & tests )  [override], [virtual]
```

Provides a simple default listing of tests.

Should look roughly like the test listing in v2 and earlier versions of Catch2. Especially supports low-verbosity listing that mimics the old `--list-test-names-only` output.

Implements Catch::IEventListener.

Reimplemented in Catch::XmlReporter.

5.203.3 Member Data Documentation

5.203.3.1 m_stream

```
std::ostream& Catch::ReporterBase::m_stream [protected]
```

Cached output stream from `m_wrapped_stream` to reduce number of indirect calls needed to write output.

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

- include/catch2/catch_amalgamated.hpp

5.204 Catch::ReporterConfig Struct Reference

Public Member Functions

- **ReporterConfig** (IConfig const ∗_fullConfig, Detail::unique_ptr< IStream > _stream, ColourMode colour↩ Mode, std::map< std::string, std::string > customOptions)
- **ReporterConfig** (ReporterConfig &&)=default
- ReporterConfig & **operator=** (ReporterConfig &&)=default
- Detail::unique_ptr< IStream > **takeStream** () &&
- IConfig const ∗ **fullConfig** () const
- ColourMode **colourMode** () const
- std::map< std::string, std::string > const & **customOptions** () const

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

- include/catch2/catch_amalgamated.hpp

5.205 Catch::ReporterDescription Struct Reference

Public Attributes

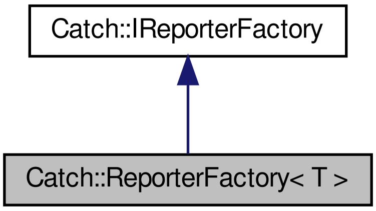
- std::string **name**
- std::string **description**

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

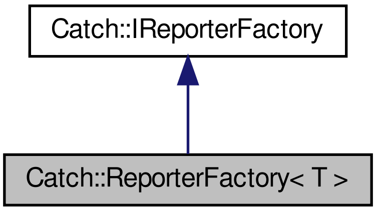
- include/catch2/catch_amalgamated.hpp

5.206 Catch::ReporterFactory< T > Class Template Reference

Inheritance diagram for Catch::ReporterFactory< T >:



Collaboration diagram for Catch::ReporterFactory< T >:



Additional Inherited Members

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

- include/catch2/catch_amalgamated.hpp

5.207 Catch::ReporterPreferences Struct Reference

```
#include <catch_amalgamated.hpp>
```

Public Attributes

- bool shouldRedirectStdOut = false
- bool shouldReportAllAssertions = false

5.207.1 Detailed Description

By setting up its preferences, a reporter can modify Catch2's behaviour in some regards, e.g. it can request Catch2 to capture writes to stdout/stderr during test execution, and pass them to the reporter.

5.207.2 Member Data Documentation

5.207.2.1 shouldRedirectStdOut

```
bool Catch::ReporterPreferences::shouldRedirectStdOut = false
```

Catch2 should redirect writes to stdout and pass them to the reporter

5.207.2.2 shouldReportAllAssertions

```
bool Catch::ReporterPreferences::shouldReportAllAssertions = false
```

Catch2 should call `Reporter::assertionEnded` even for passing assertions

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

- include/catch2/catch_amalgamated.hpp

5.208 Catch::ReporterRegistrar< T > Class Template Reference

Public Member Functions

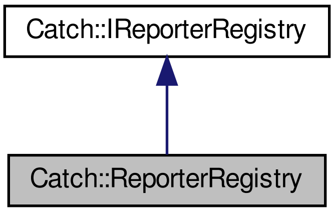
- **ReporterRegistrar** (std::string const &name)

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

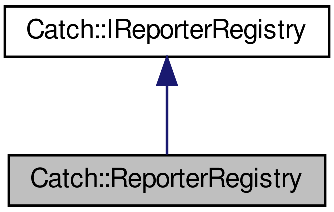
- include/catch2/catch_amalgamated.hpp

5.209 Catch::ReporterRegistry Class Reference

Inheritance diagram for Catch::ReporterRegistry:



Collaboration diagram for Catch::ReporterRegistry:



Public Member Functions

- IEventListenerPtr **create** (std::string const &name, ReporterConfig &&config) const override
- void **registerReporter** (std::string const &name, IReporterFactoryPtr factory)
- void **registerListener** (Detail::unique_ptr< EventListenerFactory > factory)
- FactoryMap const & **getFactories** () const override
- Listeners const & **getListeners** () const override

Additional Inherited Members

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

- include/catch2/catch_amalgamated.hpp

5.210 Catch::ReporterSpec Class Reference

```
#include <catch_amalgamated.hpp>
```

Public Member Functions

- **ReporterSpec** (std::string name, Optional< std::string > outputFileName, Optional< ColourMode > colourMode, std::map< std::string, std::string > customOptions)
- std::string const & **name** () const
- Optional< std::string > const & **outputFile** () const
- Optional< ColourMode > const & **colourMode** () const
- std::map< std::string, std::string > const & **customOptions** () const

Friends

- bool **operator==** (ReporterSpec const &lhs, ReporterSpec const &rhs)
- bool **operator!=** (ReporterSpec const &lhs, ReporterSpec const &rhs)

5.210.1 Detailed Description

Structured reporter spec that a reporter can be created from

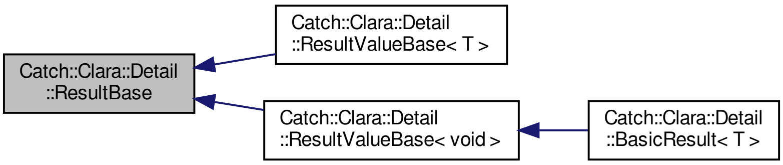
Parsing has been validated, but semantics have not. This means e.g. that the colour mode is known to Catch2, but it might not be compiled into the binary, and the output filename might not be openable.

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

- include/catch2/catch_amalgamated.hpp

5.211 Catch::Clara::Detail::ResultBase Class Reference

Inheritance diagram for Catch::Clara::Detail::ResultBase:


Catch::Clara::Detail ::ResultBase
Catch::Clara::Detail ::ResultValueBase< T >
Catch::Clara::Detail ::ResultValueBase< void >
Catch::Clara::Detail ::BasicResult< T >

Protected Member Functions

- **ResultBase** (ResultType type)
- **ResultBase** (ResultBase const &)=default
- ResultBase & **operator=** (ResultBase const &)=default
- **ResultBase** (ResultBase &&)=default
- ResultBase & **operator=** (ResultBase &&)=default
- virtual void **enforceOk** () const =0

Protected Attributes

- ResultType **m_type**

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

- include/catch2/catch_amalgamated.hpp

5.212 Catch::ResultDisposition Struct Reference

Public Types

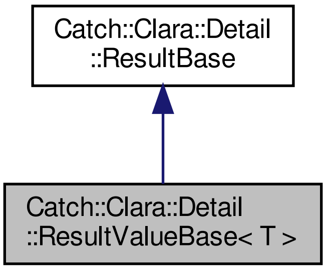
- enum **Flags** { **Normal** = 0x01 , **ContinueOnFailure** = 0x02 , **FalseTest** = 0x04 , **SuppressFail** = 0x08 }

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

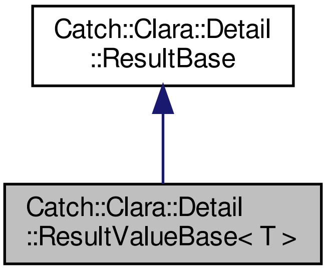
- include/catch2/catch_amalgamated.hpp

5.213 Catch::Clara::Detail::ResultValueBase< T > Class Template Reference

Inheritance diagram for Catch::Clara::Detail::ResultValueBase< T >:



Collaboration diagram for Catch::Clara::Detail::ResultValueBase< T >:


Catch::Clara::Detail ::ResultBase
Catch::Clara::Detail ::ResultValueBase< T >

Public Member Functions

- auto **value** () const -> T const &

Protected Member Functions

- **ResultValueBase** (ResultType type)
- **ResultValueBase** (ResultValueBase const &other)
- **ResultValueBase** (ResultType, T const &value)
- auto **operator=** (ResultValueBase const &other) -> ResultValueBase &

Protected Attributes

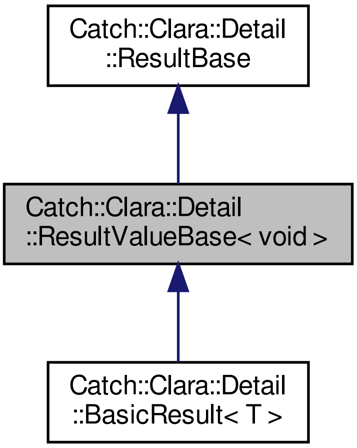
- union {
    T **m_value**
  };

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

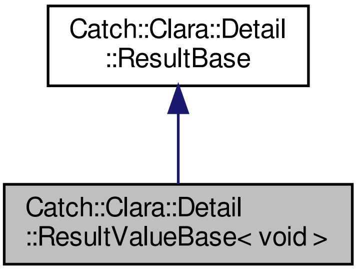
- include/catch2/catch_amalgamated.hpp

5.214 Catch::Clara::Detail::ResultValueBase< void > Class Reference

Inheritance diagram for Catch::Clara::Detail::ResultValueBase< void >:


Catch::Clara::Detail ::ResultBase
Catch::Clara::Detail ::ResultValueBase< void >
Catch::Clara::Detail ::BasicResult< T >

Collaboration diagram for Catch::Clara::Detail::ResultValueBase< void >:


Catch::Clara::Detail ::ResultBase
Catch::Clara::Detail ::ResultValueBase< void >

Protected Member Functions

- **ResultBase** (ResultType type)
- **ResultBase** (ResultBase const &)=default
- **ResultBase** (ResultBase &&)=default

Additional Inherited Members

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

- include/catch2/catch_amalgamated.hpp

5.215 Catch::ResultWas Struct Reference

Public Types

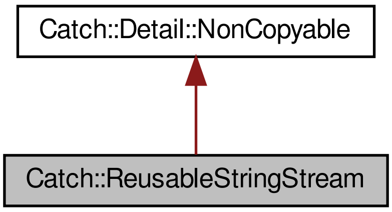
- enum **OfType** {
Unknown = -1 , **Ok** = 0 , **Info** = 1 , **Warning** = 2 ,
FailureBit = 0x10 , **ExpressionFailed** = FailureBit | 1 , **ExplicitFailure** = FailureBit | 2 , **Exception** = 0x100 | FailureBit ,
ThrewException = Exception | 1 , **DidntThrowException** = Exception | 2 , **FatalErrorCondition** = 0x200 | FailureBit }

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

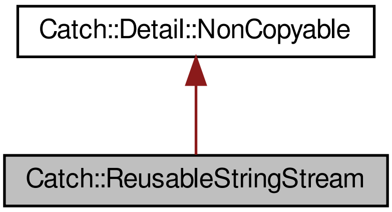
- include/catch2/catch_amalgamated.hpp

5.216 Catch::ReusableStringStream Class Reference

Inheritance diagram for Catch::ReusableStringStream:



Collaboration diagram for Catch::ReusableStringStream:



Public Member Functions

- std::string str () const

  Returns the serialized state.
- void str (std::string const &str)

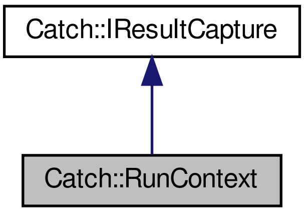
  Sets internal state to `str`
- template<typename T >
  auto **operator<<** (T const &value) -> ReusableStringStream &
- auto **get** () -> std::ostream &

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

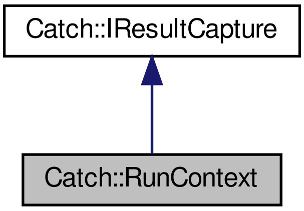
- include/catch2/catch_amalgamated.hpp

5.217 Catch::RunContext Class Reference

Inheritance diagram for Catch::RunContext:



Collaboration diagram for Catch::RunContext:



Public Member Functions

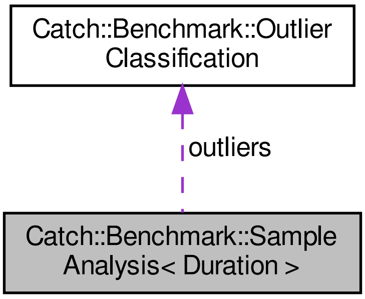
- **RunContext** (RunContext const &)=delete
- RunContext & **operator=** (RunContext const &)=delete
- **RunContext** (IConfig const ∗_config, IEventListenerPtr &&reporter)
- Totals **runTest** (TestCaseHandle const &testCase)
- void **handleExpr** (AssertionInfo const &info, ITransientExpression const &expr, AssertionReaction &reaction) override
- void **handleMessage** (AssertionInfo const &info, ResultWas::OfType resultType, StringRef message, AssertionReaction &reaction) override
- void **handleUnexpectedExceptionNotThrown** (AssertionInfo const &info, AssertionReaction &reaction) override
- void **handleUnexpectedInflightException** (AssertionInfo const &info, std::string const &message, AssertionReaction &reaction) override
- void **handleIncomplete** (AssertionInfo const &info) override
- void **handleNonExpr** (AssertionInfo const &info, ResultWas::OfType resultType, AssertionReaction &reaction) override
- bool **sectionStarted** (SectionInfo const &sectionInfo, Counts &assertions) override
- void **sectionEnded** (SectionEndInfo const &endInfo) override
- void **sectionEndedEarly** (SectionEndInfo const &endInfo) override
- auto **acquireGeneratorTracker** (StringRef generatorName, SourceLineInfo const &lineInfo) -> IGeneratorTracker &override
- void **benchmarkPreparing** (StringRef name) override
- void **benchmarkStarting** (BenchmarkInfo const &info) override
- void **benchmarkEnded** (BenchmarkStats<> const &stats) override
- void **benchmarkFailed** (StringRef error) override
- void **pushScopedMessage** (MessageInfo const &message) override
- void **popScopedMessage** (MessageInfo const &message) override
- void **emplaceUnscopedMessage** (MessageBuilder const &builder) override
- std::string **getCurrentTestName** () const override
- const AssertionResult ∗ **getLastResult** () const override
- void **exceptionEarlyReported** () override
- void **handleFatalErrorCondition** (StringRef message) override
- bool **lastAssertionPassed** () override
- void **assertionPassed** () override
- bool **aborting** () const

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

- include/catch2/catch_amalgamated.hpp

5.218 Catch::Benchmark::SampleAnalysis< Duration > Struct Template Reference

Collaboration diagram for Catch::Benchmark::SampleAnalysis< Duration >:


Catch::Benchmark::Outlier Classification
outliers
Catch::Benchmark::Sample Analysis< Duration >

Public Member Functions

- template<typename Duration2 >
  operator SampleAnalysis< **Duration2** > () const

Public Attributes

- std::vector< Duration > **samples**
- Estimate< Duration > **mean**
- Estimate< Duration > **standard_deviation**
- OutlierClassification **outliers**
- double **outlier_variance**

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

- include/catch2/catch_amalgamated.hpp

5.219 Catch::XmlWriter::ScopedElement Class Reference

Public Member Functions

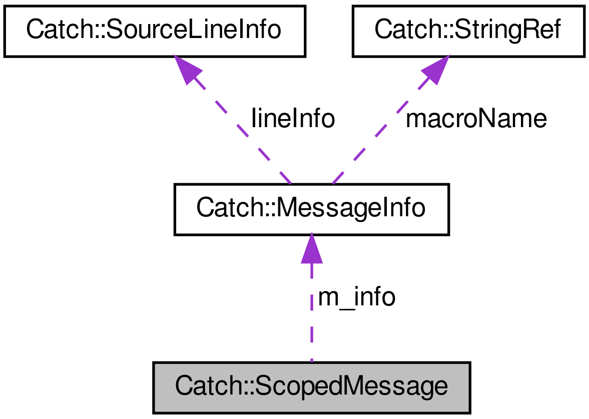
- **ScopedElement** (XmlWriter ∗writer, XmlFormatting fmt)
- **ScopedElement** (ScopedElement &&other) noexcept
- ScopedElement & **operator=** (ScopedElement &&other) noexcept
- ScopedElement & **writeText** (StringRef text, XmlFormatting fmt=XmlFormatting::Newline|XmlFormatting::↩ Indent)
- ScopedElement & **writeAttribute** (StringRef name, StringRef attribute)
- template<typename T , typename = typename std::enable_if_t< !std::is_convertible<T, StringRef>::value>>
  ScopedElement & **writeAttribute** (StringRef name, T const &attribute)

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

- include/catch2/catch_amalgamated.hpp

5.220 Catch::ScopedMessage Class Reference

Collaboration diagram for Catch::ScopedMessage:



Public Member Functions

- **ScopedMessage** (MessageBuilder const &builder)
- **ScopedMessage** (ScopedMessage &duplicate)=delete
- **ScopedMessage** (ScopedMessage &&old) noexcept

Public Attributes

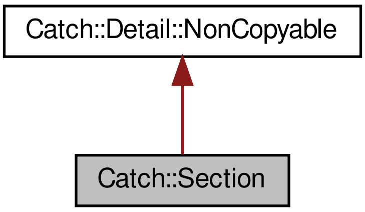
- MessageInfo **m_info**
- bool **m_moved** = false

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

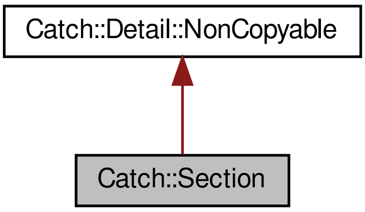
- include/catch2/catch_amalgamated.hpp

5.221 Catch::Section Class Reference

Inheritance diagram for Catch::Section:



Collaboration diagram for Catch::Section:



Public Member Functions

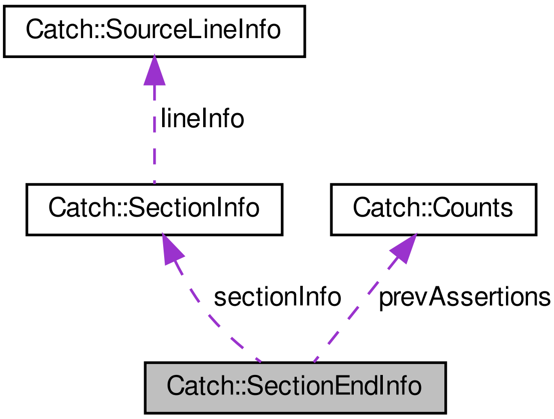
- **Section** (SectionInfo &&info)
- **operator bool** () const

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

- include/catch2/catch_amalgamated.hpp

5.222 Catch::SectionEndInfo Struct Reference

Collaboration diagram for Catch::SectionEndInfo:



Public Attributes

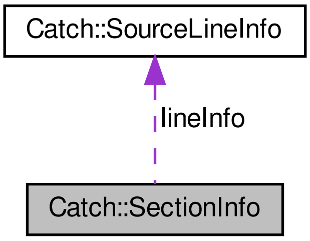
- SectionInfo **sectionInfo**
- Counts **prevAssertions**
- double **durationInSeconds**

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

- include/catch2/catch_amalgamated.hpp

5.223 Catch::SectionInfo Struct Reference

Collaboration diagram for Catch::SectionInfo:



Public Member Functions

- **SectionInfo** (SourceLineInfo const &_lineInfo, std::string _name, const char ∗const =nullptr)

Public Attributes

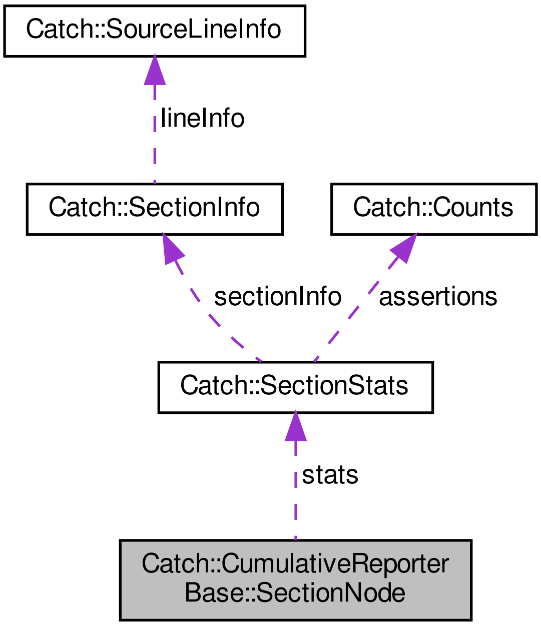
- std::string **name**
- SourceLineInfo **lineInfo**

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

- include/catch2/catch_amalgamated.hpp

5.224 Catch::CumulativeReporterBase::SectionNode Struct Reference

Collaboration diagram for Catch::CumulativeReporterBase::SectionNode:



Public Member Functions

- **SectionNode** (SectionStats const &_stats)
- bool **operator==** (SectionNode const &other) const
- bool **hasAnyAssertions** () const

Public Attributes

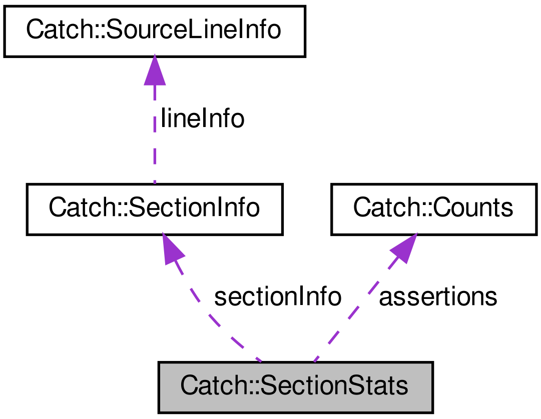
- SectionStats **stats**
- std::vector< Detail::unique_ptr< SectionNode > > **childSections**
- std::vector< Detail::AssertionOrBenchmarkResult > **assertionsAndBenchmarks**
- std::string **stdOut**
- std::string **stdErr**

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

- include/catch2/catch_amalgamated.hpp

5.225 Catch::SectionStats Struct Reference

Collaboration diagram for Catch::SectionStats:



Public Member Functions

- **SectionStats** (SectionInfo const &_sectionInfo, Counts const &_assertions, double _durationInSeconds, bool _missingAssertions)

Public Attributes

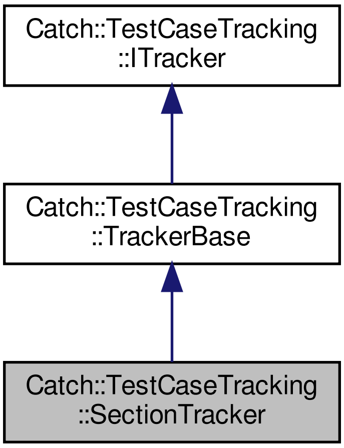
- SectionInfo **sectionInfo**
- Counts **assertions**
- double **durationInSeconds**
- bool **missingAssertions**

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

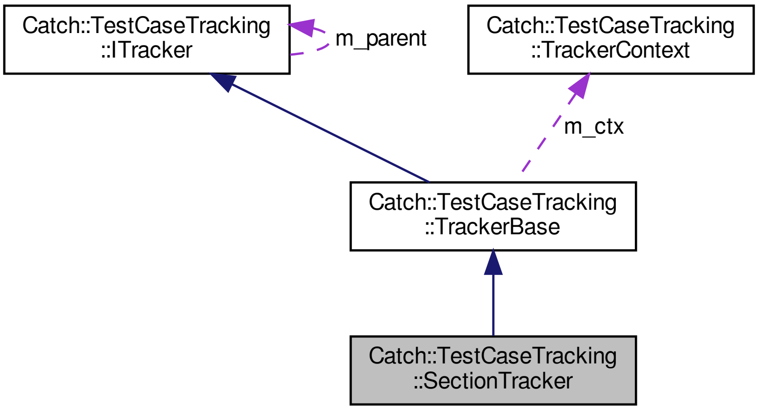
- include/catch2/catch_amalgamated.hpp

5.226 Catch::TestCaseTracking::SectionTracker Class Reference

Inheritance diagram for Catch::TestCaseTracking::SectionTracker:


Catch::TestCaseTracking ::ITracker
Catch::TestCaseTracking ::TrackerBase
Catch::TestCaseTracking ::SectionTracker

Collaboration diagram for Catch::TestCaseTracking::SectionTracker:


Catch::TestCaseTracking ::ITracker
m_parent
Catch::TestCaseTracking ::TrackerContext
m_ctx
Catch::TestCaseTracking ::TrackerBase
Catch::TestCaseTracking ::SectionTracker

Public Member Functions

- **SectionTracker** (NameAndLocation const &nameAndLocation, TrackerContext &ctx, ITracker ∗parent)
- bool isSectionTracker () const override
- bool isComplete () const override

    Returns true if tracker run to completion (successfully or not)

- void **tryOpen** ()
- void **addInitialFilters** (std::vector< std::string > const &filters)
- void **addNextFilters** (std::vector< StringRef > const &filters)
- std::vector< StringRef > const & getFilters () const

    Returns filters active in this tracker.
- StringRef trimmedName () const

    Returns whitespace-trimmed name of the tracked section.

Static Public Member Functions

- static SectionTracker & **acquire** (TrackerContext &ctx, NameAndLocation const &nameAndLocation)

Additional Inherited Members

5.226.1 Member Function Documentation

5.226.1.1 isSectionTracker()

```
bool Catch::TestCaseTracking::SectionTracker::isSectionTracker ( ) const  [override], [virtual]
```

Returns true if the instance is a section tracker

Subclasses should override to true if they are, replaces RTTI for internal debug checks.

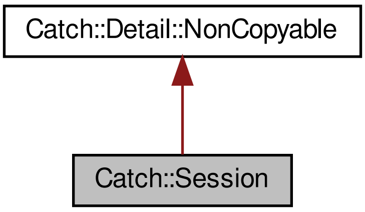
Reimplemented from Catch::TestCaseTracking::ITracker.

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

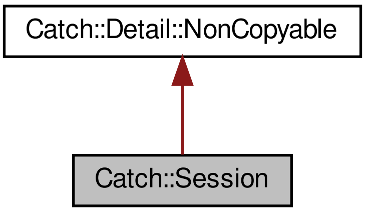
- include/catch2/catch_amalgamated.hpp

5.227 Catch::Session Class Reference

Inheritance diagram for Catch::Session:



Collaboration diagram for Catch::Session:



Public Member Functions

- void **showHelp** () const
- void **libIdentify** ()
- int **applyCommandLine** (int argc, char const ∗const ∗argv)
- void **useConfigData** (ConfigData const &configData)
- template<typename CharT >
  int **run** (int argc, CharT const ∗const argv[ ])
- int **run** ()
- Clara::Parser const & **cli** () const
- void **cli** (Clara::Parser const &newParser)
- ConfigData & **configData** ()
- Config & **config** ()

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

- include/catch2/catch_amalgamated.hpp

5.228 Catch::SimplePcg32 Class Reference

Public Types

- using **result_type** = std::uint32_t

Public Member Functions

- **SimplePcg32** (result_type seed_)
- void **seed** (result_type seed_)
- void **discard** (uint64_t skip)
- result_type **operator()** ()

Static Public Member Functions

- static constexpr result_type() **min** ()
- static constexpr result_type() **max** ()

Friends

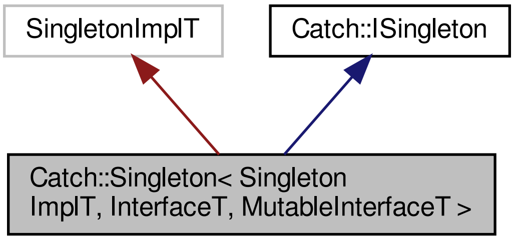
- bool **operator==** (SimplePcg32 const &lhs, SimplePcg32 const &rhs)
- bool **operator!=** (SimplePcg32 const &lhs, SimplePcg32 const &rhs)

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

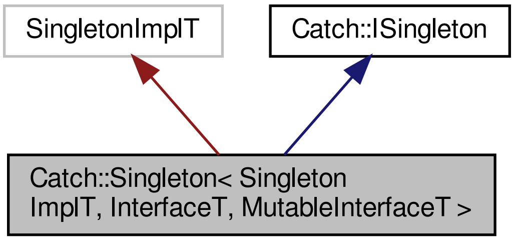
- include/catch2/catch_amalgamated.hpp

5.229 Catch::Singleton< SingletonImplT, InterfaceT, MutableInterfaceT > Class Template Reference

Inheritance diagram for Catch::Singleton< SingletonImplT, InterfaceT, MutableInterfaceT >:


SingletonImplT
Catch::ISingleton
Catch::Singleton< Singleton ImplT, InterfaceT, MutableInterfaceT >

Collaboration diagram for Catch::Singleton< SingletonImplT, InterfaceT, MutableInterfaceT >:


SingletonImplT
Catch::ISingleton
Catch::Singleton< Singleton ImplT, InterfaceT, MutableInterfaceT >

Static Public Member Functions

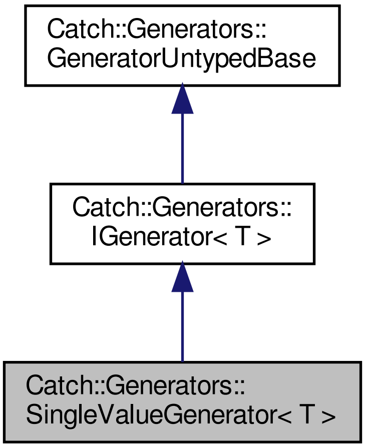
- static auto **get** () -> InterfaceT const &
- static auto **getMutable** () -> MutableInterfaceT &

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

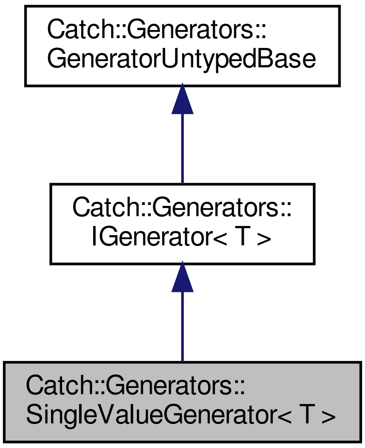
- include/catch2/catch_amalgamated.hpp

5.230 Catch::Generators::SingleValueGenerator< T > Class Template Reference

Inheritance diagram for Catch::Generators::SingleValueGenerator< T >:



Collaboration diagram for Catch::Generators::SingleValueGenerator< T >:



Public Member Functions

- **SingleValueGenerator** (T const &value)
- **SingleValueGenerator** (T &&value)
- T const & **get** () const override
- bool next () override

Additional Inherited Members

5.230.1 Member Function Documentation

5.230.1.1 next()

```
template<typename T >
bool Catch::Generators::SingleValueGenerator< T >::next ( )  [inline], [override], [virtual]
```

Attempts to move the generator to the next element

Returns true iff the move succeeded (and a valid element can be retrieved).

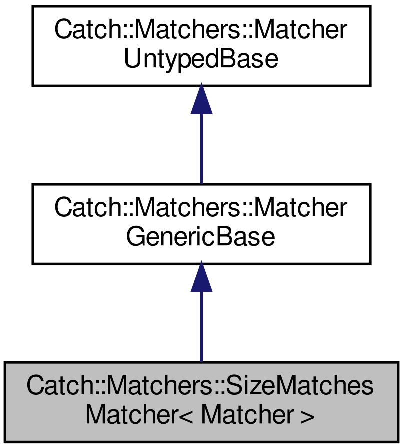
Implements Catch::Generators::GeneratorUntypedBase.

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

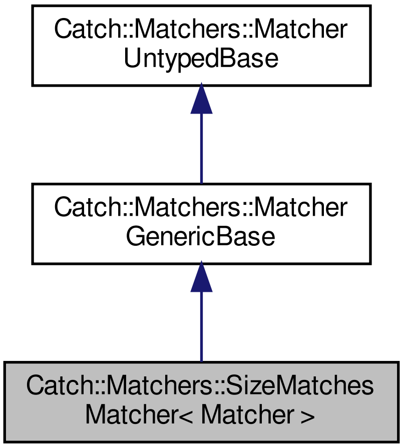
- include/catch2/catch_amalgamated.hpp

5.231 Catch::Matchers::SizeMatchesMatcher< Matcher > Class Template Reference

Inheritance diagram for Catch::Matchers::SizeMatchesMatcher< Matcher >:


Catch::Matchers::MatcherUntypedBase
Catch::Matchers::MatcherGenericBase
Catch::Matchers::SizeMatchesMatcher< Matcher >

Collaboration diagram for Catch::Matchers::SizeMatchesMatcher< Matcher >:


Catch::Matchers::MatcherUntypedBase
Catch::Matchers::MatcherGenericBase
Catch::Matchers::SizeMatchesMatcher< Matcher >

Public Member Functions

- **SizeMatchesMatcher** (Matcher m)
- template<typename RangeLike >
  bool **match** (RangeLike &&rng) const
- std::string **describe** () const override

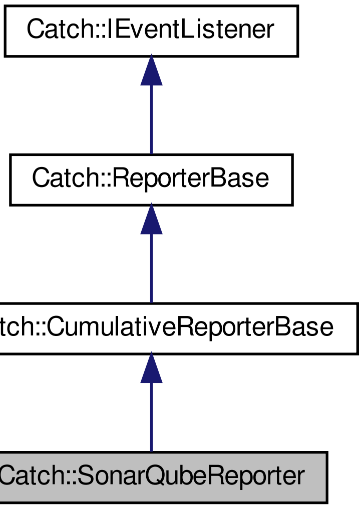
Additional Inherited Members

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

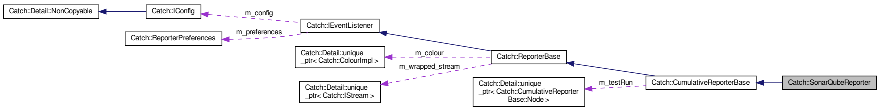
- include/catch2/catch_amalgamated.hpp

5.232 Catch::SonarQubeReporter Class Reference

Inheritance diagram for Catch::SonarQubeReporter:



Collaboration diagram for Catch::SonarQubeReporter:


Catch::Detail::NonCopyable
Catch::IConfig
m_config
Catch::IEventListener
Catch::ReporterPreferences
m_preferences
Catch::Detail::unique _ptr< Catch::ColourImpl >
m_colour
Catch::ReporterBase
m_wrapped_stream
Catch::Detail::unique _ptr< Catch::IStream >
Catch::Detail::unique _ptr< Catch::CumulativeReporter Base::Node >
m_testRun
Catch::CumulativeReporterBase
Catch::SonarQubeReporter

Public Member Functions

- **SonarQubeReporter** (ReporterConfig &&config)
- void testRunStarting (TestRunInfo const &testRunInfo) override
- void testRunEndedCumulative () override

    Customization point: called after last test finishes (testRunEnded has been handled)
- void **writeRun** (TestRunNode const &groupNode)
- void **writeTestFile** (std::string const &filename, std::vector< TestCaseNode const ∗ > const &testCaseNodes)
- void **writeTestCase** (TestCaseNode const &testCaseNode)
- void **writeSection** (std::string const &rootName, SectionNode const &sectionNode, bool okToFail)
- void **writeAssertions** (SectionNode const &sectionNode, bool okToFail)
- void **writeAssertion** (AssertionStats const &stats, bool okToFail)

Static Public Member Functions

- static std::string **getDescription** ()

Additional Inherited Members

5.232.1 Member Function Documentation

5.232.1.1 testRunStarting()

```
void Catch::SonarQubeReporter::testRunStarting (
            TestRunInfo const & testRunInfo )  [override], [virtual]
```

Called once in a testing run before tests are started

Not called if tests won't be run (e.g. only listing will happen)

Reimplemented from Catch::CumulativeReporterBase.

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

- include/catch2/catch_amalgamated.hpp

5.233 Catch::SourceLineInfo Struct Reference

Public Member Functions

- constexpr **SourceLineInfo** (char const ∗_file, std::size_t _line) noexcept
- bool **operator==** (SourceLineInfo const &other) const noexcept
- bool **operator<** (SourceLineInfo const &other) const noexcept

Public Attributes

- char const ∗ **file**
- std::size_t **line**

Friends

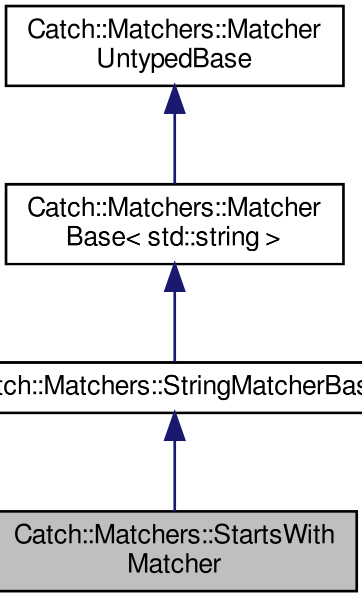
- std::ostream & **operator<<** (std::ostream &os, SourceLineInfo const &info)

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

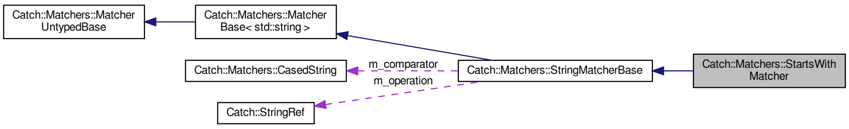
- include/catch2/catch_amalgamated.hpp

5.234 Catch::Matchers::StartsWithMatcher Class Reference

Inheritance diagram for Catch::Matchers::StartsWithMatcher:


Catch::Matchers::Matcher UntypedBase
Catch::Matchers::Matcher Base< std::string >
Catch::Matchers::StringMatcherBase
Catch::Matchers::StartsWith Matcher

Collaboration diagram for Catch::Matchers::StartsWithMatcher:


Catch::Matchers::Matcher UntypedBase
Catch::Matchers::Matcher Base< std::string >
Catch::Matchers::CasedString
m_comparator
m_operation
Catch::Matchers::StringMatcherBase
Catch::Matchers::StartsWith Matcher
Catch::StringRef

Public Member Functions

- **StartsWithMatcher** (CasedString const &comparator)
- bool **match** (std::string const &source) const override

Additional Inherited Members

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

- include/catch2/catch_amalgamated.hpp

5.235 Catch::StartupExceptionRegistry Class Reference

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

- include/catch2/catch_amalgamated.hpp

5.236 Catch::StreamEndStop Struct Reference

Public Member Functions

- StringRef **operator+** () const

Friends

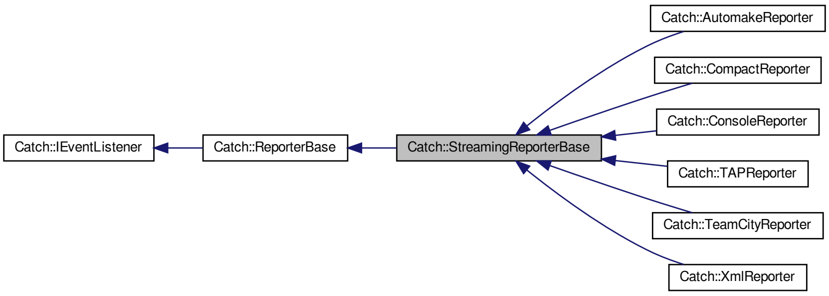
- template<typename T >
  T const & **operator+** (T const &value, StreamEndStop)

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

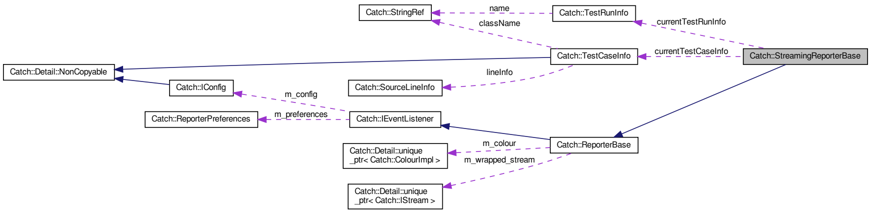
- include/catch2/catch_amalgamated.hpp

5.237 Catch::StreamingReporterBase Class Reference

Inheritance diagram for Catch::StreamingReporterBase:



Collaboration diagram for Catch::StreamingReporterBase:



Public Member Functions

- void benchmarkPreparing (StringRef) override

  Called when user-code is being probed before the actual benchmark runs.
- void benchmarkStarting (BenchmarkInfo const &) override

  Called after probe but before the user-code is being benchmarked.
- void benchmarkEnded (BenchmarkStats<> const &) override

  Called with the benchmark results if benchmark successfully finishes.
- void benchmarkFailed (StringRef) override

  Called if running the benchmarks fails for any reason.
- void fatalErrorEncountered (StringRef) override

  Called if a fatal error (signal/structured exception) occured.
- void noMatchingTestCases (StringRef) override

  Called when no test cases match provided test spec.
- void reportInvalidTestSpec (StringRef) override

  Called for all invalid test specs from the cli.
- void testRunStarting (TestRunInfo const &_testRunInfo) override
- void testCaseStarting (TestCaseInfo const &_testInfo) override

  Called once for each TEST_CASE, no matter how many times it is entered.
- void testCasePartialStarting (TestCaseInfo const &, uint64_t) override

  Called every time a TEST_CASE is entered, including repeats (due to sections)
- void sectionStarting (SectionInfo const &_sectionInfo) override

  Called when a `SECTION` is being entered. Not called for skipped sections.
- void assertionStarting (AssertionInfo const &) override

  Called before assertion success/failure is evaluated.
- void assertionEnded (AssertionStats const &) override

  Called after assertion was fully evaluated.
- void sectionEnded (SectionStats const &) override

  Called after a `SECTION` has finished running.
- void testCasePartialEnded (TestCaseStats const &, uint64_t) override

  Called every time a TEST_CASE is entered, including repeats (due to sections)
- void testCaseEnded (TestCaseStats const &) override

  Called once for each TEST_CASE, no matter how many times it is entered.
- void testRunEnded (TestRunStats const &) override
- void skipTest (TestCaseInfo const &) override

  Called with test cases that are skipped due to the test run aborting.
- **ReporterBase** (ReporterConfig &&config)

Protected Attributes

- TestRunInfo **currentTestRunInfo** { "test run has not started yet"_sr }
- TestCaseInfo const ∗ **currentTestCaseInfo** = nullptr
- std::vector< SectionInfo > m_sectionStack

  Stack of all active sections in the current test case.

5.237.1 Member Function Documentation

5.237.1.1 testRunEnded()

```
void Catch::StreamingReporterBase::testRunEnded (
            TestRunStats const & testRunStats )  [override], [virtual]
```

Called once after all tests in a testing run are finished

Not called if tests weren't run (e.g. only listings happened)

Implements Catch::IEventListener.

Reimplemented in Catch::XmlReporter, Catch::TeamCityReporter, Catch::TAPReporter, Catch::ConsoleReporter, and Catch::CompactReporter.

5.237.1.2 testRunStarting()

```
void Catch::StreamingReporterBase::testRunStarting (
            TestRunInfo const & testRunInfo )  [override], [virtual]
```

Called once in a testing run before tests are started

Not called if tests won't be run (e.g. only listing will happen)

Implements Catch::IEventListener.

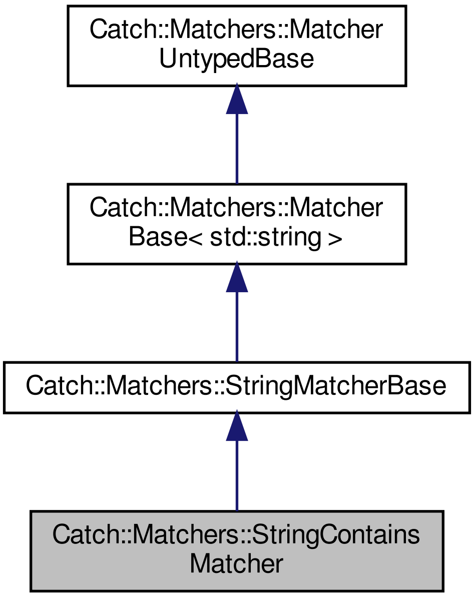
Reimplemented in Catch::XmlReporter, Catch::TAPReporter, Catch::TeamCityReporter, Catch::ConsoleReporter, and Catch::CompactReporter.

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

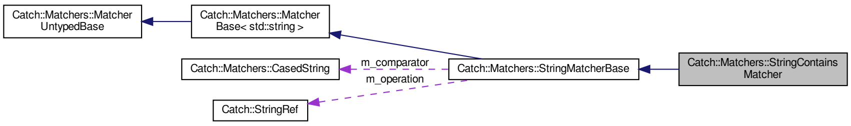
- include/catch2/catch_amalgamated.hpp

5.238 Catch::Matchers::StringContainsMatcher Class Reference

Inheritance diagram for Catch::Matchers::StringContainsMatcher:


Catch::Matchers::Matcher UntypedBase
Catch::Matchers::Matcher Base< std::string >
Catch::Matchers::StringMatcherBase
Catch::Matchers::StringContains Matcher

Collaboration diagram for Catch::Matchers::StringContainsMatcher:


Catch::Matchers::Matcher UntypedBase
Catch::Matchers::Matcher Base< std::string >
Catch::Matchers::CasedString
m_comparator
m_operation
Catch::Matchers::StringMatcherBase
Catch::Matchers::StringContains Matcher
Catch::StringRef

Public Member Functions

- **StringContainsMatcher** (CasedString const &comparator)
- bool **match** (std::string const &source) const override

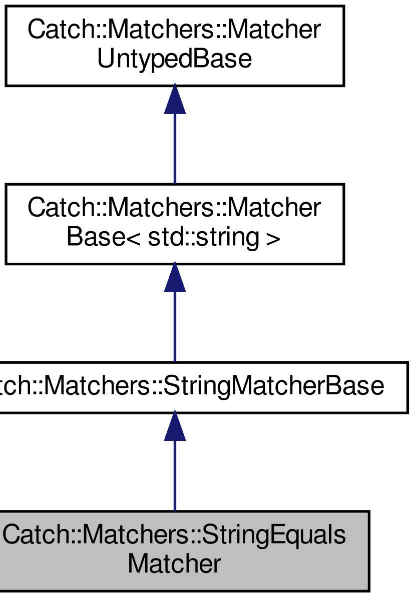
Additional Inherited Members

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

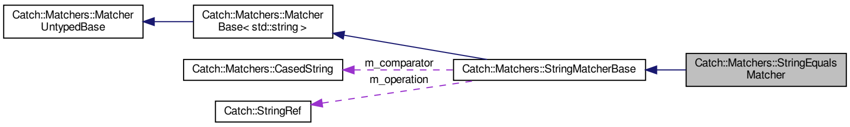
- include/catch2/catch_amalgamated.hpp

5.239 Catch::Matchers::StringEqualsMatcher Class Reference

Inheritance diagram for Catch::Matchers::StringEqualsMatcher:


Catch::Matchers::Matcher UntypedBase
Catch::Matchers::Matcher Base< std::string >
Catch::Matchers::StringMatcherBase
Catch::Matchers::StringEquals Matcher

Collaboration diagram for Catch::Matchers::StringEqualsMatcher:


Catch::Matchers::Matcher UntypedBase
Catch::Matchers::Matcher Base< std::string >
Catch::Matchers::CasedString
m_comparator
m_operation
Catch::Matchers::StringMatcherBase
Catch::Matchers::StringEquals Matcher
Catch::StringRef

Public Member Functions

- **StringEqualsMatcher** (CasedString const &comparator)
- bool **match** (std::string const &source) const override

Additional Inherited Members

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

- include/catch2/catch_amalgamated.hpp

5.240 Catch::StringMaker< T, typename > Struct Template Reference

Static Public Member Functions

- template<typename Fake = T>
  static std::enable_if_t<::Catch::Detail::IsStreamInsertable< Fake >::value, std::string > **convert** (const Fake &value)
- template<typename Fake = T>
  static std::enable_if_t<!::Catch::Detail::IsStreamInsertable< Fake >::value, std::string > **convert** (const Fake &value)

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

- include/catch2/catch_amalgamated.hpp

5.241 Catch::StringMaker< bool > Struct Reference

Static Public Member Functions

- static std::string **convert** (bool b)

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

- include/catch2/catch_amalgamated.hpp

5.242 Catch::StringMaker< Catch::Approx > Struct Reference

Static Public Member Functions

- static std::string **convert** (Catch::Approx const &value)

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

- include/catch2/catch_amalgamated.hpp

5.243 Catch::StringMaker< char * > Struct Reference

Static Public Member Functions

- static std::string **convert** (char *str)

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

- include/catch2/catch_amalgamated.hpp

5.244 Catch::StringMaker< char > Struct Reference

Static Public Member Functions

- static std::string **convert** (char c)

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

- include/catch2/catch_amalgamated.hpp

5.245 Catch::StringMaker< char const * > Struct Reference

Static Public Member Functions

- static std::string **convert** (char const *str)

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

- include/catch2/catch_amalgamated.hpp

5.246 Catch::StringMaker< char[SZ]> Struct Template Reference

Static Public Member Functions

- static std::string **convert** (char const *str)

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

- include/catch2/catch_amalgamated.hpp

5.247 Catch::StringMaker< double > Struct Reference

Static Public Member Functions

- static std::string **convert** (double value)

Static Public Attributes

- static int **precision**

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

- include/catch2/catch_amalgamated.hpp

5.248 Catch::StringMaker< float > Struct Reference

Static Public Member Functions

- static std::string **convert** (float value)

Static Public Attributes

- static int **precision**

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

- include/catch2/catch_amalgamated.hpp

5.249 Catch::StringMaker< int > Struct Reference

Static Public Member Functions

- static std::string **convert** (int value)

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

- include/catch2/catch_amalgamated.hpp

5.250 Catch::StringMaker< long > Struct Reference

Static Public Member Functions

- static std::string **convert** (long value)

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

- include/catch2/catch_amalgamated.hpp

5.251 Catch::StringMaker< long long > Struct Reference

Static Public Member Functions

- static std::string **convert** (long long value)

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

- include/catch2/catch_amalgamated.hpp

5.252 Catch::StringMaker< R C::∗ > Struct Template Reference

Static Public Member Functions

- static std::string **convert** (R C::∗p)

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

- include/catch2/catch_amalgamated.hpp

5.253 Catch::StringMaker< R, std::enable_if_t< is_range< R >::value &&!::Catch::Detail::IsStreamInsertable< R >::value > > Struct Template Reference

Static Public Member Functions

- static std::string **convert** (R const &range)

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

- include/catch2/catch_amalgamated.hpp

5.254 Catch::StringMaker< signed char > Struct Reference

Static Public Member Functions

- static std::string **convert** (signed char c)

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

- include/catch2/catch_amalgamated.hpp

5.255 Catch::StringMaker< signed char[SZ]> Struct Template Reference

Static Public Member Functions

- static std::string **convert** (signed char const ∗str)

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

- include/catch2/catch_amalgamated.hpp

5.256 Catch::StringMaker< std::chrono::duration< Value, Ratio > > Struct Template Reference

Static Public Member Functions

- static std::string **convert** (std::chrono::duration< Value, Ratio > const &duration)

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

- include/catch2/catch_amalgamated.hpp

5.257 Catch::StringMaker< std::chrono::duration< Value, std::ratio< 1 > > > Struct Template Reference

Static Public Member Functions

- static std::string **convert** (std::chrono::duration< Value, std::ratio< 1 >> const &duration)

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

- include/catch2/catch_amalgamated.hpp

5.258 Catch::StringMaker< std::chrono::duration< Value, std::ratio< 3600 > > > Struct Template Reference

Static Public Member Functions

- static std::string **convert** (std::chrono::duration< Value, std::ratio< 3600 >> const &duration)

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

- include/catch2/catch_amalgamated.hpp

5.259 Catch::StringMaker< std::chrono::duration< Value, std::ratio< 60 > > > Struct Template Reference

Static Public Member Functions

- static std::string **convert** (std::chrono::duration< Value, std::ratio< 60 >> const &duration)

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

- include/catch2/catch_amalgamated.hpp

5.260 Catch::StringMaker< std::chrono::time_point< Clock, Duration > > Struct Template Reference

Static Public Member Functions

- static std::string **convert** (std::chrono::time_point< Clock, Duration > const &time_point)

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

- include/catch2/catch_amalgamated.hpp

5.261 Catch::StringMaker< std::chrono::time_point< std::chrono::system_clock, Duration > > Struct Template Reference

Static Public Member Functions

- static std::string **convert** (std::chrono::time_point< std::chrono::system_clock, Duration > const &time_point)

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

- include/catch2/catch_amalgamated.hpp

5.262 Catch::StringMaker< std::nullptr_t > Struct Reference

Static Public Member Functions

- static std::string **convert** (std::nullptr_t)

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

- include/catch2/catch_amalgamated.hpp

5.263 Catch::StringMaker< std::string > Struct Reference

Static Public Member Functions

- static std::string **convert** (const std::string &str)

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

- include/catch2/catch_amalgamated.hpp

5.264 Catch::StringMaker< std::wstring > Struct Reference

Static Public Member Functions

- static std::string **convert** (const std::wstring &wstr)

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

- include/catch2/catch_amalgamated.hpp

5.265 Catch::StringMaker< T * > Struct Template Reference

Static Public Member Functions

- template<typename U >
  static std::string **convert** (U *p)

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

- include/catch2/catch_amalgamated.hpp

5.266 Catch::StringMaker< T[SZ]> Struct Template Reference

Static Public Member Functions

- static std::string **convert** (T const(&arr)[SZ])

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

- include/catch2/catch_amalgamated.hpp

5.267 Catch::StringMaker< unsigned char > Struct Reference

Static Public Member Functions

- static std::string **convert** (unsigned char c)

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

- include/catch2/catch_amalgamated.hpp

5.268 Catch::StringMaker< unsigned char[SZ]> Struct Template Reference

Static Public Member Functions

- static std::string **convert** (unsigned char const ∗str)

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

- include/catch2/catch_amalgamated.hpp

5.269 Catch::StringMaker< unsigned int > Struct Reference

Static Public Member Functions

- static std::string **convert** (unsigned int value)

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

- include/catch2/catch_amalgamated.hpp

5.270 Catch::StringMaker< unsigned long > Struct Reference

Static Public Member Functions

- static std::string **convert** (unsigned long value)

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

- include/catch2/catch_amalgamated.hpp

5.271 Catch::StringMaker< unsigned long long > Struct Reference

Static Public Member Functions

- static std::string **convert** (unsigned long long value)

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

- include/catch2/catch_amalgamated.hpp

5.272 Catch::StringMaker< wchar_t ∗ > Struct Reference

Static Public Member Functions

- static std::string **convert** (wchar_t ∗str)

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

- include/catch2/catch_amalgamated.hpp

5.273 Catch::StringMaker< wchar_t const ∗ > Struct Reference

Static Public Member Functions

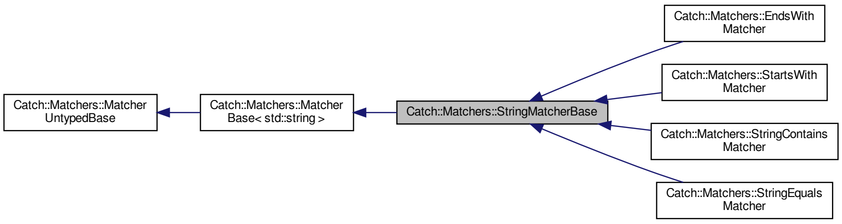
- static std::string **convert** (wchar_t const ∗str)

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

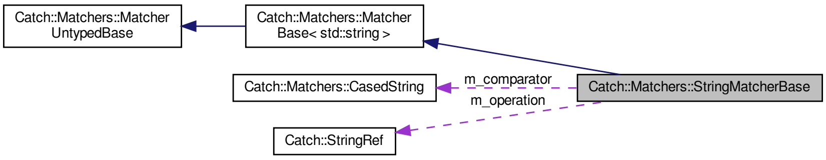
- include/catch2/catch_amalgamated.hpp

5.274 Catch::Matchers::StringMatcherBase Class Reference

Inheritance diagram for Catch::Matchers::StringMatcherBase:


Catch::Matchers::Matcher UntypedBase
Catch::Matchers::Matcher Base< std::string >
Catch::Matchers::StringMatcherBase
Catch::Matchers::EndsWith Matcher
Catch::Matchers::StartsWith Matcher
Catch::Matchers::StringContains Matcher
Catch::Matchers::StringEquals Matcher

Collaboration diagram for Catch::Matchers::StringMatcherBase:


Catch::Matchers::Matcher UntypedBase
Catch::Matchers::Matcher Base< std::string >
Catch::Matchers::CasedString
m_comparator
Catch::Matchers::StringMatcherBase
m_operation
Catch::StringRef

Public Member Functions

- **StringMatcherBase** (StringRef operation, CasedString const &comparator)
- std::string **describe** () const override

Protected Attributes

- CasedString **m_comparator**
- StringRef **m_operation**

Additional Inherited Members

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

- include/catch2/catch_amalgamated.hpp

5.275 Catch::StringRef Class Reference

```
#include <catch_amalgamated.hpp>
```

Public Types

- using **size_type** = std::size_t
- using **const_iterator** = const char ∗

Public Member Functions

- **StringRef** (char const ∗rawChars) noexcept
- constexpr **StringRef** (char const ∗rawChars, size_type size) noexcept
- **StringRef** (std::string const &stdString) noexcept
- **operator std::string** () const
- auto **operator==** (StringRef other) const noexcept -> bool
- auto **operator!=** (StringRef other) const noexcept -> bool
- constexpr auto **operator[ ]** (size_type index) const noexcept -> char
- bool **operator**< (StringRef rhs) const noexcept
- constexpr auto **empty** () const noexcept -> bool
- constexpr auto **size** () const noexcept -> size_type
- constexpr StringRef **substr** (size_type start, size_type length) const noexcept
- constexpr char const ∗ **data** () const noexcept
- constexpr const_iterator **begin** () const
- constexpr const_iterator **end** () const
- int compare (StringRef rhs) const

Friends

- std::string & **operator+=** (std::string &lhs, StringRef sr)
- std::ostream & **operator**<< (std::ostream &os, StringRef sr)
- std::string **operator+** (StringRef lhs, StringRef rhs)

5.275.1 Detailed Description

A non-owning string class (similar to the forthcoming std::string_view) Note that, because a StringRef may be a substring of another string, it may not be null terminated.

5.275.2 Member Function Documentation

5.275.2.1 compare()

```
int Catch::StringRef::compare (
            StringRef rhs ) const
```

Provides a three-way comparison with rhs

Returns negative number if lhs < rhs, 0 if lhs == rhs, and a positive number if lhs > rhs

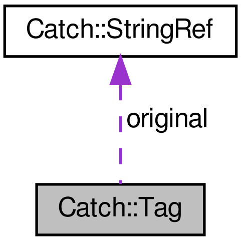
The documentation for this class was generated from the following file:

- include/catch2/catch_amalgamated.hpp

5.276 Catch::Tag Struct Reference

```
#include <catch_amalgamated.hpp>
```

Collaboration diagram for Catch::Tag:



Public Member Functions

- constexpr **Tag** (StringRef original_)

Public Attributes

- StringRef **original**

Friends

- bool **operator<** (Tag const &lhs, Tag const &rhs)
- bool **operator==** (Tag const &lhs, Tag const &rhs)

5.276.1 Detailed Description

A **view** of a tag string that provides case insensitive comparisons

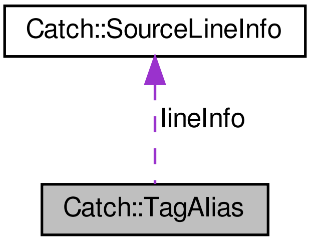
Note that in Catch2 internals, the square brackets around tags are not a part of tag's representation, so e.g. "[cool-tag]" is represented as "cool-tag" internally.

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

- include/catch2/catch_amalgamated.hpp

5.277 Catch::TagAlias Struct Reference

Collaboration diagram for Catch::TagAlias:



Public Member Functions

- **TagAlias** (std::string const &_tag, SourceLineInfo _lineInfo)

Public Attributes

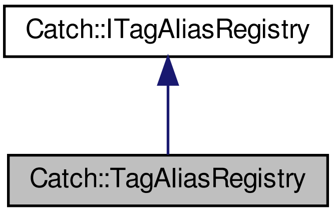
- std::string **tag**
- SourceLineInfo **lineInfo**

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

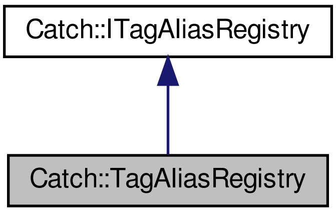
- include/catch2/catch_amalgamated.hpp

5.278 Catch::TagAliasRegistry Class Reference

Inheritance diagram for Catch::TagAliasRegistry:



Collaboration diagram for Catch::TagAliasRegistry:



Public Member Functions

- TagAlias const ∗ **find** (std::string const &alias) const override
- std::string **expandAliases** (std::string const &unexpandedTestSpec) const override
- void **add** (std::string const &alias, std::string const &tag, SourceLineInfo const &lineInfo)

Additional Inherited Members

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

- include/catch2/catch_amalgamated.hpp

5.279 Catch::TagInfo Struct Reference

Public Member Functions

- void **add** (StringRef spelling)
- std::string **all** () const

Public Attributes

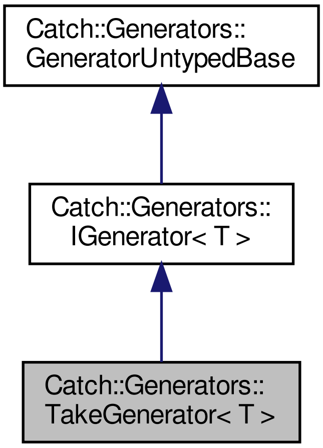
- std::set< StringRef > **spellings**
- std::size_t **count** = 0

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

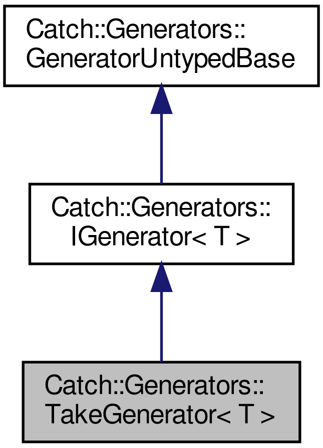
- include/catch2/catch_amalgamated.hpp

5.280 Catch::Generators::TakeGenerator< T > Class Template Reference

Inheritance diagram for Catch::Generators::TakeGenerator< T >:



Collaboration diagram for Catch::Generators::TakeGenerator< T >:



Public Member Functions

- **TakeGenerator** (size_t target, GeneratorWrapper< T > &&generator)
- T const & **get** () const override
- bool next () override

Additional Inherited Members

5.280.1 Member Function Documentation

5.280.1.1 next()

```
template<typename T >
bool Catch::Generators::TakeGenerator< T >::next ( )  [inline], [override], [virtual]
```

Attempts to move the generator to the next element

Returns true iff the move succeeded (and a valid element can be retrieved).

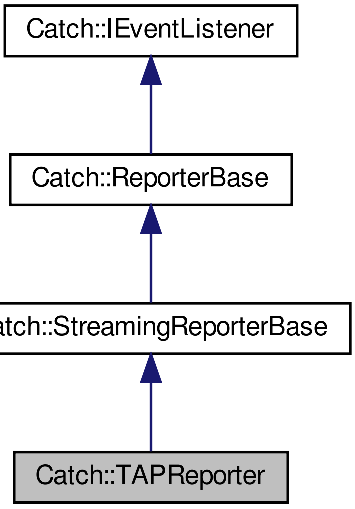
Implements Catch::Generators::GeneratorUntypedBase.

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

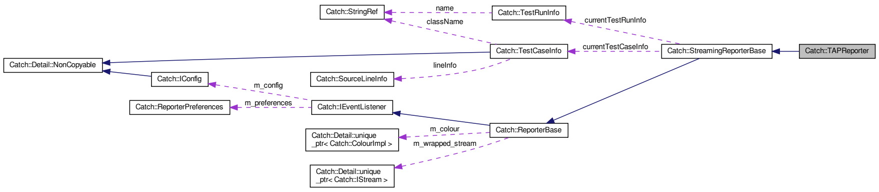
- include/catch2/catch_amalgamated.hpp

5.281 Catch::TAPReporter Class Reference

Inheritance diagram for Catch::TAPReporter:



Collaboration diagram for Catch::TAPReporter:



Public Member Functions

- **TAPReporter** (ReporterConfig &&config)
- void testRunStarting (TestRunInfo const &testInfo) override
- void noMatchingTestCases (StringRef unmatchedSpec) override

    Called when no test cases match provided test spec.
- void assertionEnded (AssertionStats const &_assertionStats) override

    Called after assertion was fully evaluated.
- void testRunEnded (TestRunStats const &_testRunStats) override

Static Public Member Functions

- static std::string **getDescription** ()

Additional Inherited Members

5.281.1 Member Function Documentation

5.281.1.1 testRunEnded()

```
void Catch::TAPReporter::testRunEnded (
            TestRunStats const & testRunStats )  [override], [virtual]
```

Called once after all tests in a testing run are finished

Not called if tests weren't run (e.g. only listings happened)

Reimplemented from Catch::StreamingReporterBase.

5.281.1.2 testRunStarting()

```
void Catch::TAPReporter::testRunStarting (
            TestRunInfo const & testRunInfo )  [override], [virtual]
```

Called once in a testing run before tests are started

Not called if tests won't be run (e.g. only listing will happen)

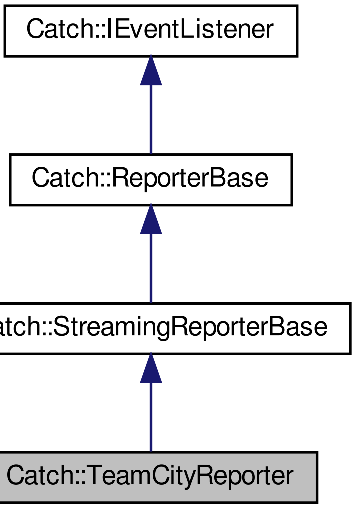
Reimplemented from Catch::StreamingReporterBase.

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

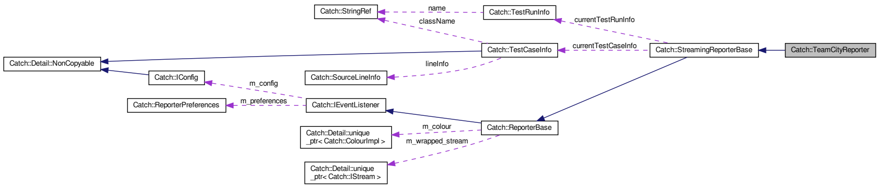
- include/catch2/catch_amalgamated.hpp

5.282 Catch::TeamCityReporter Class Reference

Inheritance diagram for Catch::TeamCityReporter:



Collaboration diagram for Catch::TeamCityReporter:



Public Member Functions

- **TeamCityReporter** (ReporterConfig &&_config)
- void testRunStarting (TestRunInfo const &groupInfo) override
- void testRunEnded (TestRunStats const &testGroupStats) override
- void assertionEnded (AssertionStats const &assertionStats) override

  Called after assertion was fully evaluated.
- void sectionStarting (SectionInfo const &sectionInfo) override

  Called when a `SECTION` is being entered. Not called for skipped sections.
- void testCaseStarting (TestCaseInfo const &testInfo) override

  Called once for each TEST_CASE, no matter how many times it is entered.
- void testCaseEnded (TestCaseStats const &testCaseStats) override

  Called once for each TEST_CASE, no matter how many times it is entered.

Static Public Member Functions

- static std::string **getDescription** ()

Additional Inherited Members

5.282.1 Member Function Documentation

5.282.1.1 testRunEnded()

```
void Catch::TeamCityReporter::testRunEnded (
            TestRunStats const & testRunStats )  [override], [virtual]
```

Called once after all tests in a testing run are finished

Not called if tests weren't run (e.g. only listings happened)

Reimplemented from Catch::StreamingReporterBase.

5.282.1.2 testRunStarting()

```
void Catch::TeamCityReporter::testRunStarting (
            TestRunInfo const & testRunInfo )  [override], [virtual]
```

Called once in a testing run before tests are started

Not called if tests won't be run (e.g. only listing will happen)

Reimplemented from Catch::StreamingReporterBase.

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

- include/catch2/catch_amalgamated.hpp

5.283 Catch::TestCaseHandle Class Reference

```
#include <catch_amalgamated.hpp>
```

Public Member Functions

- **TestCaseHandle** (TestCaseInfo ∗info, ITestInvoker ∗invoker)
- void **invoke** () const
- TestCaseInfo const & **getTestCaseInfo** () const

5.283.1 Detailed Description

Wrapper over the test case information and the test case invoker

Does not own either, and is specifically made to be cheap to copy around.

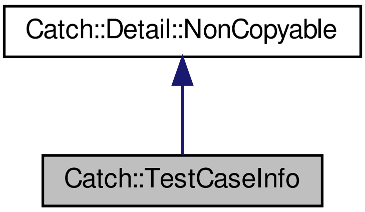
The documentation for this class was generated from the following file:

- include/catch2/catch_amalgamated.hpp

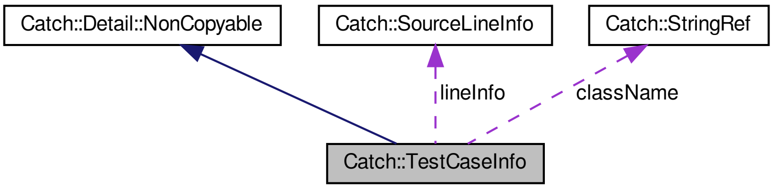
5.284 Catch::TestCaseInfo Struct Reference

```
#include <catch_amalgamated.hpp>
```

Inheritance diagram for Catch::TestCaseInfo:



Collaboration diagram for Catch::TestCaseInfo:



Public Member Functions

- **TestCaseInfo** (StringRef _className, NameAndTags const &_tags, SourceLineInfo const &_lineInfo)
- bool **isHidden** () const
- bool **throws** () const
- bool **okToFail** () const
- bool **expectedToFail** () const
- void **addFilenameTag** ()
- std::string **tagsAsString** () const

Public Attributes

- std::string **name**
- StringRef **className**
- std::vector< Tag > **tags**
- SourceLineInfo **lineInfo**
- TestCaseProperties **properties** = TestCaseProperties::None

Friends

- bool operator< (TestCaseInfo const &lhs, TestCaseInfo const &rhs)

  Orders by name, classname and tags.

5.284.1 Detailed Description

Various metadata about the test case.

A test case is uniquely identified by its (class)name and tags combination, with source location being ignored, and other properties being determined from tags.

Tags are kept sorted.

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

- include/catch2/catch_amalgamated.hpp

5.285 Catch::TestCaseInfoHasher Class Reference

Public Types

- using **hash_t** = std::uint64_t

Public Member Functions

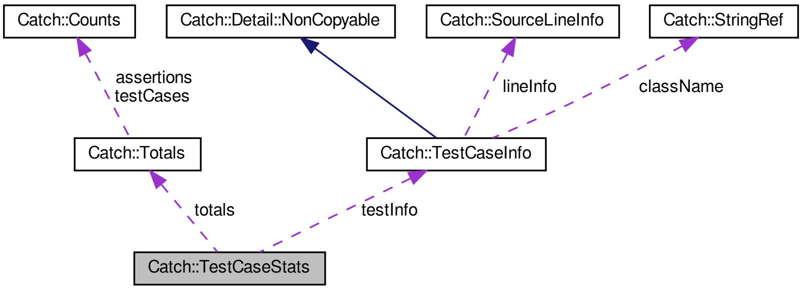
- **TestCaseInfoHasher** (hash_t seed)
- uint32_t **operator()** (TestCaseInfo const &t) const

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

- include/catch2/catch_amalgamated.hpp

5.286 Catch::TestCaseStats Struct Reference

Collaboration diagram for Catch::TestCaseStats:



Public Member Functions

- **TestCaseStats** (TestCaseInfo const &_testInfo, Totals const &_totals, std::string const &_stdOut, std::string const &_stdErr, bool _aborting)

Public Attributes

- TestCaseInfo const ∗ **testInfo**
- Totals **totals**
- std::string **stdOut**
- std::string **stdErr**
- bool **aborting**

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

- include/catch2/catch_amalgamated.hpp

5.287 Catch::TestFailureException Struct Reference

Used to signal that an assertion macro failed.

```
#include <catch_amalgamated.hpp>
```

5.287.1 Detailed Description

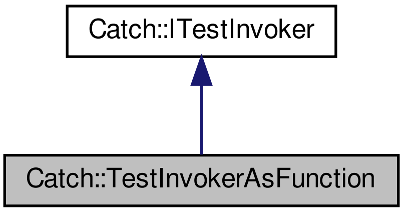
Used to signal that an assertion macro failed.

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

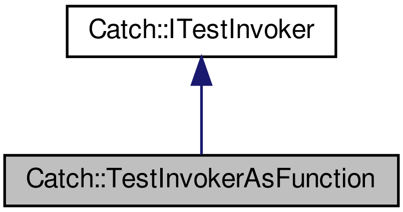
- include/catch2/catch_amalgamated.hpp

5.288 Catch::TestInvokerAsFunction Class Reference

Inheritance diagram for Catch::TestInvokerAsFunction:



Collaboration diagram for Catch::TestInvokerAsFunction:



Public Member Functions

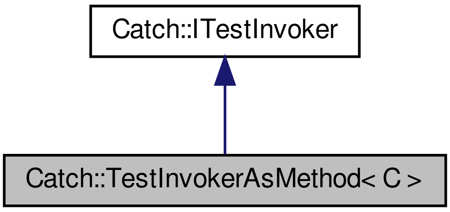
- **TestInvokerAsFunction** (TestType testAsFunction) noexcept
- void **invoke** () const override

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

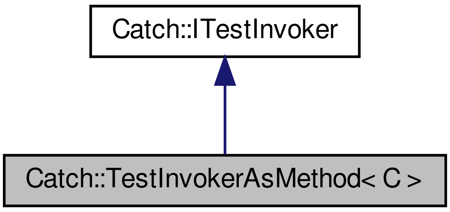
- include/catch2/catch_amalgamated.hpp

5.289 Catch::TestInvokerAsMethod< C > Class Template Reference

Inheritance diagram for Catch::TestInvokerAsMethod< C >:



Collaboration diagram for Catch::TestInvokerAsMethod< C >:



Public Member Functions

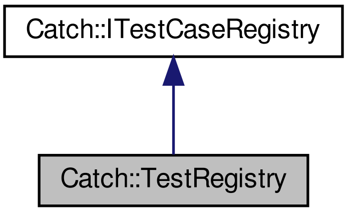
- **TestInvokerAsMethod** (void(C::∗testAsMethod)()) noexcept
- void **invoke** () const override

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

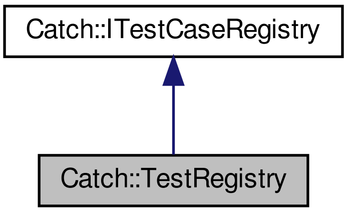
- include/catch2/catch_amalgamated.hpp

5.290 Catch::TestRegistry Class Reference

Inheritance diagram for Catch::TestRegistry:



Collaboration diagram for Catch::TestRegistry:



Public Member Functions

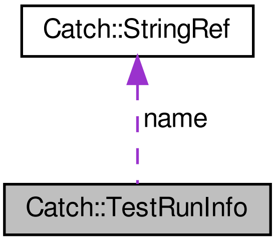
- void **registerTest** (Detail::unique_ptr< TestCaseInfo > testInfo, Detail::unique_ptr< ITestInvoker > testInvoker)
- std::vector< TestCaseInfo ∗ > const & **getAllInfos** () const override
- std::vector< TestCaseHandle > const & **getAllTests** () const override
- std::vector< TestCaseHandle > const & **getAllTestsSorted** (IConfig const &config) const override

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

- include/catch2/catch_amalgamated.hpp

5.291 Catch::TestRunInfo Struct Reference

Collaboration diagram for Catch::TestRunInfo:



Public Member Functions

- constexpr **TestRunInfo** (StringRef _name)

Public Attributes

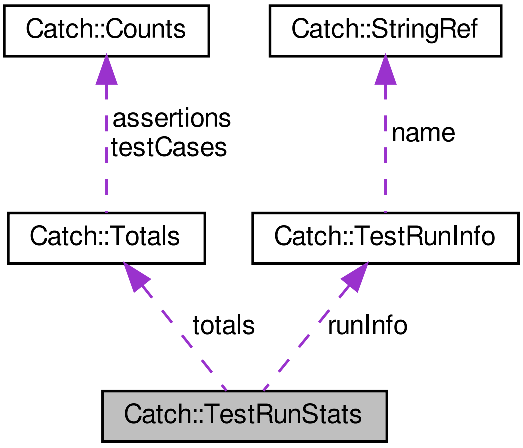
- StringRef **name**

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

- include/catch2/catch_amalgamated.hpp

5.292 Catch::TestRunStats Struct Reference

Collaboration diagram for Catch::TestRunStats:



Public Member Functions

- **TestRunStats** (TestRunInfo const &_runInfo, Totals const &_totals, bool _aborting)

Public Attributes

- TestRunInfo **runInfo**
- Totals **totals**
- bool **aborting**

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

- include/catch2/catch_amalgamated.hpp

5.293 Catch::TestSpec Class Reference

Classes

- struct FilterMatch

Public Types

- using **Matches** = std::vector< FilterMatch >
- using **vectorStrings** = std::vector< std::string >

Public Member Functions

- bool **hasFilters** () const
- bool **matches** (TestCaseInfo const &testCase) const
- Matches **matchesByFilter** (std::vector< TestCaseHandle > const &testCases, IConfig const &config) const
- const vectorStrings & **getInvalidSpecs** () const

Friends

- class **TestSpecParser**

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

- include/catch2/catch_amalgamated.hpp

5.294 Catch::TestSpecParser Class Reference

Public Member Functions

- **TestSpecParser** (ITagAliasRegistry const &tagAliases)
- TestSpecParser & **parse** (std::string const &arg)
- TestSpec **testSpec** ()

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

- include/catch2/catch_amalgamated.hpp

5.295 Catch::Timer Class Reference

Public Member Functions

- void **start** ()
- auto **getElapsedNanoseconds** () const -> uint64_t
- auto **getElapsedMicroseconds** () const -> uint64_t
- auto **getElapsedMilliseconds** () const -> unsigned int
- auto **getElapsedSeconds** () const -> double

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

- include/catch2/catch_amalgamated.hpp

5.296 Catch::Benchmark::Timing< Duration, Result > Struct Template Reference

Public Attributes

- Duration **elapsed**
- Result **result**
- int **iterations**

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

- include/catch2/catch_amalgamated.hpp

5.297 Catch::Clara::Detail::Token Struct Reference

Public Attributes

- TokenType **type**
- std::string **token**

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

- include/catch2/catch_amalgamated.hpp

5.298 Catch::Clara::Detail::TokenStream Class Reference

Public Member Functions

- **TokenStream** (Args const &args)
- **TokenStream** (Iterator it, Iterator itEnd)
- **operator bool** () const
- size_t **count** () const
- Token **operator∗** () const
- Token const ∗ **operator->** () const
- TokenStream & **operator++** ()

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

- include/catch2/catch_amalgamated.hpp

5.299 Tool< TSeq > Class Template Reference

Tools for defending the agent against the virus.

```
#include <tool-bones.hpp>
```

Public Member Functions

- **Tool** (std::string name="unknown tool")
- void **set_sequence** (TSeq d)
- void **set_sequence_unique** (TSeq d)
- void **set_sequence** (std::shared_ptr< TSeq > d)
- std::shared_ptr< TSeq > **get_sequence** ()
- TSeq & **get_sequence_unique** ()
- void **set_name** (std::string name)
- std::string **get_name** () const
- Agent< TSeq > ∗ **get_agent** ()
- int **get_id** () const
- void **set_id** (int id)
- void **set_date** (int d)
- int **get_date** () const
- void **set_status** (epiworld_fast_int init, epiworld_fast_int post)
- void **set_queue** (epiworld_fast_int init, epiworld_fast_int post)
- void **get_status** (epiworld_fast_int ∗init, epiworld_fast_int ∗post)
- void **get_queue** (epiworld_fast_int ∗init, epiworld_fast_int ∗post)

Get and set the tool functions

Parameters

v	*The virus over which to operate*
fun	*the function to be used*

Returns

epiworld_double

- epiworld_double **get_susceptibility_reduction** (VirusPtr< TSeq > v)
- epiworld_double **get_transmission_reduction** (VirusPtr< TSeq > v)
- epiworld_double **get_recovery_enhancer** (VirusPtr< TSeq > v)
- epiworld_double **get_death_reduction** (VirusPtr< TSeq > v)
- void **set_susceptibility_reduction_fun** (ToolFun< TSeq > fun)
- void **set_transmission_reduction_fun** (ToolFun< TSeq > fun)
- void **set_recovery_enhancer_fun** (ToolFun< TSeq > fun)
- void **set_death_reduction_fun** (ToolFun< TSeq > fun)
- void **set_susceptibility_reduction** (epiworld_double ∗prob)
- void **set_transmission_reduction** (epiworld_double ∗prob)
- void **set_recovery_enhancer** (epiworld_double ∗prob)
- void **set_death_reduction** (epiworld_double ∗prob)
- void **set_susceptibility_reduction** (epiworld_double prob)
- void **set_transmission_reduction** (epiworld_double prob)
- void **set_recovery_enhancer** (epiworld_double prob)
- void **set_death_reduction** (epiworld_double prob)

Friends

- class **Agent**< **TSeq** >
- class **Model**< **TSeq** >
- void **default_add_virus** (Action< TSeq > &a, Model< TSeq > ∗m)
- void **default_add_tool** (Action< TSeq > &a, Model< TSeq > ∗m)
- void **default_rm_virus** (Action< TSeq > &a, Model< TSeq > ∗m)
- void **default_rm_tool** (Action< TSeq > &a, Model< TSeq > ∗m)

5.299.1 Detailed Description

template<typename TSeq = int>
class Tool< TSeq >

Tools for defending the agent against the virus.

Template Parameters

TSeq	Type of sequence

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

- include/epiworld/agent-bones.hpp
- include/epiworld/tool-bones.hpp
- include/epiworld/tool-meat.hpp

5.300 Tools< TSeq > Class Template Reference

Set of tools (useful for building iterators)

`#include <tools-bones.hpp>`

Public Member Functions

- **Tools** (Agent< TSeq > &p)
- std::vector< ToolPtr< TSeq > >::iterator **begin** ()
- std::vector< ToolPtr< TSeq > >::iterator **end** ()
- ToolPtr< TSeq > & **operator()** (size_t i)
- ToolPtr< TSeq > & **operator[ ]** (size_t i)
- size_t **size** () const noexcept

Friends

- class **Tool**< **TSeq** >
- class **Agent**< **TSeq** >

5.300.1 Detailed Description

template<typename TSeq>
class Tools< TSeq >

Set of tools (useful for building iterators)

Template Parameters

TSeq	

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

- include/epiworld/agent-bones.hpp
- include/epiworld/tools-bones.hpp

5.301 Tools_const< TSeq > Class Template Reference

Set of Tools (const) (useful for iterators)

```
#include <tools-bones.hpp>
```

Public Member Functions

- **Tools_const** (const Agent< TSeq > &p)
- std::vector< ToolPtr< TSeq > >::const_iterator **begin** ()
- std::vector< ToolPtr< TSeq > >::const_iterator **end** ()
- const ToolPtr< TSeq > & **operator()** (size_t i)
- const ToolPtr< TSeq > & **operator[ ]** (size_t i)
- size_t **size** () const noexcept

Friends

- class **Tool**< **TSeq** >
- class **Agent**< **TSeq** >

5.301.1 Detailed Description

template<typename TSeq>
class Tools_const< TSeq >

Set of Tools (const) (useful for iterators)

Template Parameters

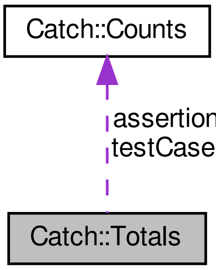
TSeq	

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

- include/epiworld/agent-bones.hpp
- include/epiworld/tools-bones.hpp

5.302 Catch::Totals Struct Reference

Collaboration diagram for Catch::Totals:



Public Member Functions

- Totals **operator-** (Totals const &other) const
- Totals & **operator+=** (Totals const &other)
- Totals **delta** (Totals const &prevTotals) const

Public Attributes

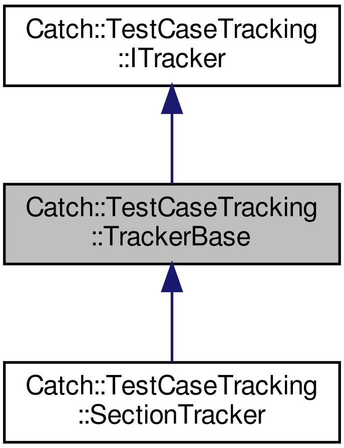
- Counts **assertions**
- Counts **testCases**

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

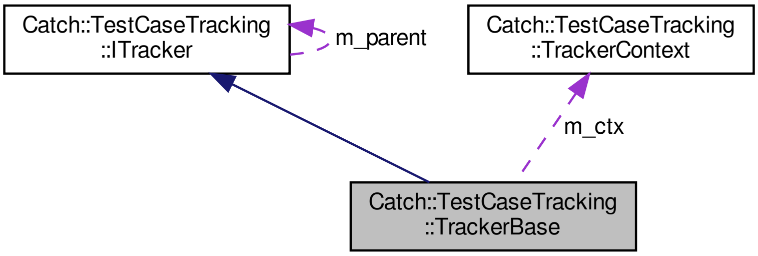
- include/catch2/catch_amalgamated.hpp

5.303 Catch::TestCaseTracking::TrackerBase Class Reference

Inheritance diagram for Catch::TestCaseTracking::TrackerBase:



Collaboration diagram for Catch::TestCaseTracking::TrackerBase:



Public Member Functions

- **TrackerBase** (NameAndLocation const &nameAndLocation, TrackerContext &ctx, ITracker ∗parent)
- bool isComplete () const override

  Returns true if tracker run to completion (successfully or not)
- void **open** ()
- void **close** () override
- void **fail** () override

Protected Attributes

- TrackerContext & **m_ctx**

Additional Inherited Members

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

- include/catch2/catch_amalgamated.hpp

5.304 Catch::TestCaseTracking::TrackerContext Class Reference

Public Member Functions

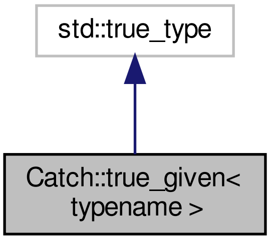
- ITracker & **startRun** ()
- void **endRun** ()
- void **startCycle** ()
- void **completeCycle** ()
- bool **completedCycle** () const
- ITracker & **currentTracker** ()
- void **setCurrentTracker** (ITracker ∗tracker)

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

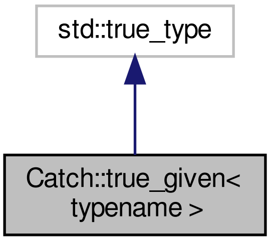
- include/catch2/catch_amalgamated.hpp

5.305 Catch::true_given< typename > Struct Template Reference

Inheritance diagram for Catch::true_given< typename >:



Collaboration diagram for Catch::true_given< typename >:



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

- include/catch2/catch_amalgamated.hpp

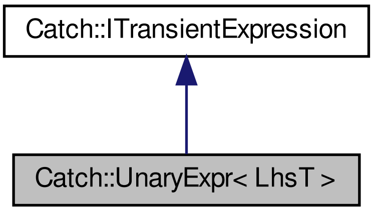
5.306 Catch::Benchmark::Detail::CompleteType< void >::type Struct Reference

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

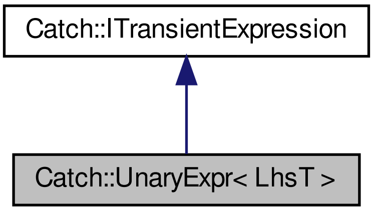
- include/catch2/catch_amalgamated.hpp

5.307 Catch::UnaryExpr< LhsT > Class Template Reference

Inheritance diagram for Catch::UnaryExpr< LhsT >:



Collaboration diagram for Catch::UnaryExpr< LhsT >:



Public Member Functions

- **UnaryExpr** (LhsT lhs)

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

- include/catch2/catch_amalgamated.hpp

5.308 Catch::Clara::Detail::UnaryLambdaTraits< L > Struct Template Reference

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

- include/catch2/catch_amalgamated.hpp

5.309 Catch::Clara::Detail::UnaryLambdaTraits< ReturnT(ClassT::*)(Args...) const > Struct Template Reference

Static Public Attributes

- static const bool **isValid** = false

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

- include/catch2/catch_amalgamated.hpp

5.310 Catch::Clara::Detail::UnaryLambdaTraits< ReturnT(ClassT::*)(ArgT) const > Struct Template Reference

Public Types

- using **ArgType** = std::remove_const_t< std::remove_reference_t< ArgT > >
- using **ReturnType** = ReturnT

Static Public Attributes

- static const bool **isValid** = true

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

- include/catch2/catch_amalgamated.hpp

5.311 Catch::Detail::unique_ptr< T > Class Template Reference

```
#include <catch_amalgamated.hpp>
```

Public Member Functions

- constexpr **unique_ptr** (std::nullptr_t=nullptr)
- constexpr **unique_ptr** (T *ptr)
- template<typename U , typename = std::enable_if_t<std::is_base_of<T, U>::value>>
  unique_ptr (unique_ptr< U > &&from)
- template<typename U , typename = std::enable_if_t<std::is_base_of<T, U>::value>>
  unique_ptr & **operator=** (unique_ptr< U > &&from)
- **unique_ptr** (unique_ptr const &)=delete
- unique_ptr & **operator=** (unique_ptr const &)=delete
- **unique_ptr** (unique_ptr &&rhs) noexcept
- unique_ptr & **operator=** (unique_ptr &&rhs) noexcept
- T & **operator*** ()
- T const & **operator*** () const
- T * **operator->** () noexcept
- T const * **operator->** () const noexcept
- T * **get** ()
- T const * **get** () const
- void **reset** (T *ptr=nullptr)
- T * **release** ()
- **operator bool** () const

Friends

- void **swap** (unique_ptr &lhs, unique_ptr &rhs)

5.311.1 Detailed Description

template<typename T>
class Catch::Detail::unique_ptr< T >

A reimplementation of `std::unique_ptr` for improved compilation performance

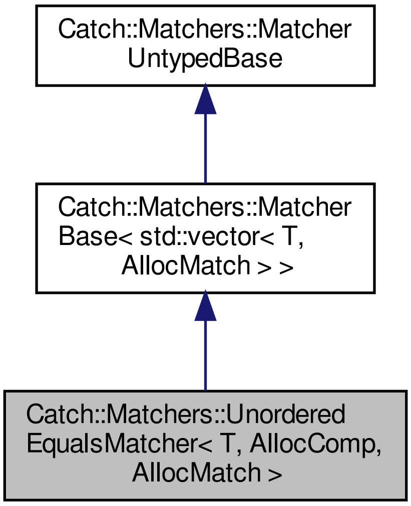
Does not support arrays nor custom deleters.

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

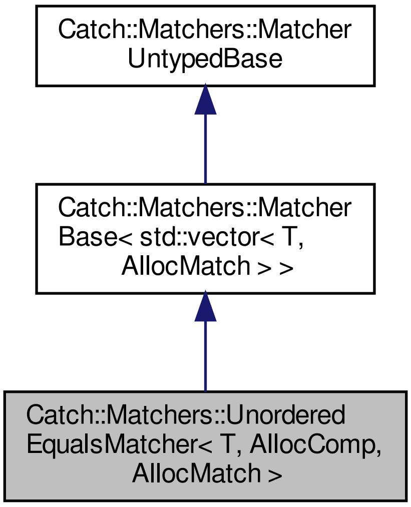
- include/catch2/catch_amalgamated.hpp

5.312 Catch::Matchers::UnorderedEqualsMatcher< T, AllocComp, AllocMatch > Class Template Reference

Inheritance diagram for Catch::Matchers::UnorderedEqualsMatcher< T, AllocComp, AllocMatch >:


Catch::Matchers::Matcher UntypedBase
Catch::Matchers::Matcher Base< std::vector< T, AllocMatch > >
Catch::Matchers::Unordered EqualsMatcher< T, AllocComp, AllocMatch >

Collaboration diagram for Catch::Matchers::UnorderedEqualsMatcher< T, AllocComp, AllocMatch >:


Catch::Matchers::Matcher UntypedBase
Catch::Matchers::Matcher Base< std::vector< T, AllocMatch > >
Catch::Matchers::Unordered EqualsMatcher< T, AllocComp, AllocMatch >

Public Member Functions

- **UnorderedEqualsMatcher** (std::vector< T, AllocComp > const &target)
- bool **match** (std::vector< T, AllocMatch > const &vec) const override
- std::string **describe** () const override

Additional Inherited Members

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

- include/catch2/catch_amalgamated.hpp

5.313 UserData< TSeq > Class Template Reference

Personalized data by the user.

```
#include <userdata-bones.hpp>
```

Public Member Functions

- **UserData** (Model< TSeq > &m)
- UserData (std::vector< std::string > names)

  Construct a new User Data object.
- std::vector< std::string > & **get_names** ()
- std::vector< int > & **get_dates** ()
- std::vector< epiworld_double > & **get_data** ()
- void **get_all** (std::vector< std::string > *names=nullptr, std::vector< int > *date=nullptr, std::vector< epiworld_double > *data=nullptr)
- unsigned int **nrow** () const
- unsigned int **ncol** () const
- void **write** (std::string fn)
- void **print** () const

Append data

Parameters

x	*A vector of length* `ncol()` *(if vector), otherwise a* `epiworld_double`*.*
j	*Index of the data point, from 0 to* `ncol() - 1`*.*

- void **add** (std::vector< epiworld_double > x)
- void **add** (unsigned int j, epiworld_double x)

Access data

Parameters

i	*Row (0 through ndays - 1.)*
j	*Column (0 through* `ncols()`*).*

Returns

epiworld_double&

- epiworld_double & **operator()** (unsigned int i, unsigned int j)
- epiworld_double & **operator()** (unsigned int i, std::string name)

Friends

- class **Model**< **TSeq** >
- class **DataBase**< **TSeq** >

5.313.1 Detailed Description

template<typename TSeq>
class UserData< TSeq >

Personalized data by the user.

Template Parameters

TSeq	

5.313.2 Constructor & Destructor Documentation

5.313.2.1 UserData()

```
template<typename TSeq >
UserData< TSeq >::UserData (
            std::vector< std::string > names )  [inline]
```

Construct a new User Data object.

Parameters

names	A vector of names. The length of the vector sets the number of columns to record.

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

- include/epiworld/database-bones.hpp
- include/epiworld/userdata-bones.hpp
- include/epiworld/userdata-meat.hpp

5.314 vecHasher< T > Struct Template Reference

Vector hasher.

```
#include <misc.hpp>
```

Public Member Functions

- std::size_t **operator()** (std::vector< T > const &dat) const noexcept

5.314.1 Detailed Description

template<typename T>
struct vecHasher< T >

Vector hasher.

Template Parameters

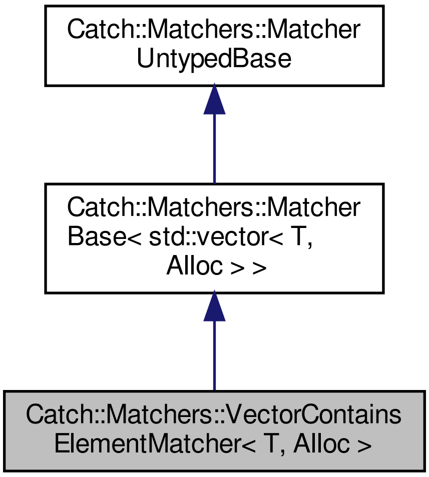
T	

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

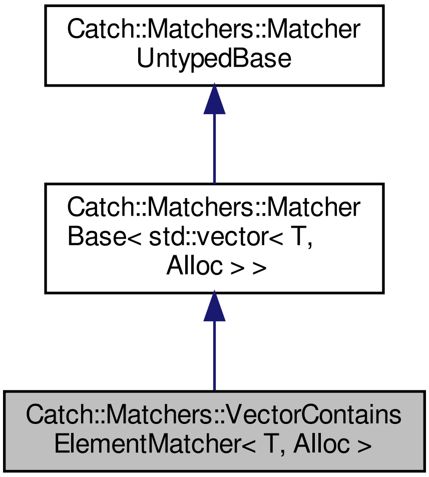
- include/epiworld/misc.hpp

5.315 Catch::Matchers::VectorContainsElementMatcher< T, Alloc > Class Template Reference

Inheritance diagram for Catch::Matchers::VectorContainsElementMatcher< T, Alloc >:


Catch::Matchers::Matcher UntypedBase
Catch::Matchers::Matcher Base< std::vector< T, Alloc > >
Catch::Matchers::VectorContains ElementMatcher< T, Alloc >

Collaboration diagram for Catch::Matchers::VectorContainsElementMatcher< T, Alloc >:


Catch::Matchers::Matcher UntypedBase
Catch::Matchers::Matcher Base< std::vector< T, Alloc > >
Catch::Matchers::VectorContains ElementMatcher< T, Alloc >

Public Member Functions

- **VectorContainsElementMatcher** (T const &comparator)
- bool **match** (std::vector< T, Alloc > const &v) const override
- std::string **describe** () const override

Additional Inherited Members

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

- include/catch2/catch_amalgamated.hpp

5.316 Catch::Version Struct Reference

Public Member Functions

- **Version** (Version const &)=delete
- Version & **operator=** (Version const &)=delete
- **Version** (unsigned int _majorVersion, unsigned int _minorVersion, unsigned int _patchNumber, char const ∗const _branchName, unsigned int _buildNumber)

Public Attributes

- unsigned int const **majorVersion**
- unsigned int const **minorVersion**
- unsigned int const **patchNumber**
- char const ∗const **branchName**
- unsigned int const **buildNumber**

Friends

- std::ostream & **operator**<< (std::ostream &os, Version const &version)

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

- include/catch2/catch_amalgamated.hpp

5.317 Virus< TSeq > Class Template Reference

Virus.

```
#include <virus-bones.hpp>
```

Public Member Functions

- **Virus** (std::string name="unknown virus")
- void **mutate** ()
- void **set_mutation** (MutFun< TSeq > fun)
- const TSeq ∗ **get_sequence** ()
- void **set_sequence** (TSeq sequence)
- Agent< TSeq > ∗ **get_agent** ()
- void **set_agent** (Agent< TSeq > ∗p, epiworld_fast_uint idx)
- Model< TSeq > ∗ **get_model** ()
- void **set_date** (int d)
- int **get_date** () const
- void **set_id** (int idx)
- int **get_id** () const
- void **set_name** (std::string name)
- std::string **get_name** () const
- std::vector< epiworld_double > & **get_data** ()

Get and set the tool functions

Parameters

v	*The virus over which to operate*
fun	*the function to be used*

Returns

epiworld_double

- epiworld_double **get_prob_infecting** ()
- epiworld_double **get_prob_recovery** ()
- epiworld_double **get_prob_death** ()
- void **post_recovery** ()
- void **set_post_recovery** (PostRecoveryFun< TSeq > fun)
- void **set_post_immunity** (epiworld_double prob)
- void **set_post_immunity** (epiworld_double ∗prob)
- void **set_prob_infecting_fun** (VirusFun< TSeq > fun)

- void **set_prob_recovery_fun** (VirusFun< TSeq > fun)
- void **set_prob_death_fun** (VirusFun< TSeq > fun)
- void **set_prob_infecting** (epiworld_double *prob)
- void **set_prob_recovery** (epiworld_double *prob)
- void **set_prob_death** (epiworld_double *prob)
- void **set_prob_infecting** (epiworld_double prob)
- void **set_prob_recovery** (epiworld_double prob)
- void **set_prob_death** (epiworld_double prob)

Get and set the status and queue

After applied, viruses can change the status and affect the queue of agents. These function sets the default values, which are retrieved when adding or removing a virus does not specify a change in status or in queue.

Parameters

init	*After the virus/tool is added to the agent.*
end	*After the virus/tool is removed.*
removed	*After the agent (Agent) is removed.*

- void **set_status** (epiworld_fast_int init, epiworld_fast_int end, epiworld_fast_int removed=-99)
- void **set_queue** (epiworld_fast_int init, epiworld_fast_int end, epiworld_fast_int removed=-99)
- void **get_status** (epiworld_fast_int *init, epiworld_fast_int *end, epiworld_fast_int *removed=-99)
- void **get_queue** (epiworld_fast_int *init, epiworld_fast_int *end, epiworld_fast_int *removed=-99)

Friends

- class **Agent**< **TSeq** >
- class **Model**< **TSeq** >
- class **DataBase**< **TSeq** >
- void **default_add_virus** (Action< TSeq > &a, Model< TSeq > *m)
- void **default_add_tool** (Action< TSeq > &a, Model< TSeq > *m)
- void **default_rm_virus** (Action< TSeq > &a, Model< TSeq > *m)
- void **default_rm_tool** (Action< TSeq > &a, Model< TSeq > *m)

5.317.1 Detailed Description

template<typename TSeq = int>
class Virus< TSeq >

Virus.

Template Parameters

TSeq	

Raw transmisibility of a virus should be a function of its genetic sequence. Nonetheless, transmisibility can be reduced as a result of having one or more tools to fight the virus. Because of this, transmisibility should be a function of the agent.

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

- include/epiworld/agent-bones.hpp
- include/epiworld/virus-bones.hpp
- include/epiworld/virus-meat.hpp

5.318 Viruses< TSeq > Class Template Reference

Set of viruses (useful for building iterators)

```
#include <viruses-bones.hpp>
```

Public Member Functions

- **Viruses** (Agent< TSeq > &p)
- std::vector< VIRUSPTR >::iterator **begin** ()
- std::vector< VIRUSPTR >::iterator **end** ()
- VIRUSPTR & **operator()** (size_t i)
- VIRUSPTR & **operator[ ]** (size_t i)
- size_t **size** () const noexcept

Friends

- class **Virus**< **TSeq** >
- class **Agent**< **TSeq** >

5.318.1 Detailed Description

template<typename TSeq>
class Viruses< TSeq >

Set of viruses (useful for building iterators)

Template Parameters

TSeq	

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

- include/epiworld/agent-bones.hpp
- include/epiworld/viruses-bones.hpp

5.319 Viruses_const< TSeq > Class Template Reference

Set of Viruses (const) (useful for iterators)

```
#include <viruses-bones.hpp>
```

Public Member Functions

- **Viruses_const** (const Agent< TSeq > &p)
- std::vector< VIRUSPTR >::const_iterator **begin** ()
- std::vector< VIRUSPTR >::const_iterator **end** ()
- const VIRUSPTR & **operator()** (size_t i)
- const VIRUSPTR & **operator[ ]** (size_t i)
- size_t **size** () const noexcept

Friends

- class **Virus**< **TSeq** >
- class **Agent**< **TSeq** >

5.319.1 Detailed Description

template<typename TSeq>
class Viruses_const< TSeq >

Set of Viruses (const) (useful for iterators)

Template Parameters

TSeq	

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

- include/epiworld/agent-bones.hpp
- include/epiworld/viruses-bones.hpp

5.320 Catch::WaitForKeypress Struct Reference

Public Types

- enum **When** { **Never** , **BeforeStart** = 1 , **BeforeExit** = 2 , **BeforeStartAndExit** = BeforeStart | BeforeExit }

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

- include/catch2/catch_amalgamated.hpp

5.321 Catch::WarnAbout Struct Reference

Public Types

- enum What { **Nothing** = 0x00 , NoAssertions = 0x01 , UnmatchedTestSpec = 0x02 }

5.321.1 Member Enumeration Documentation

5.321.1.1 What

```
enum Catch::WarnAbout::What
```

Enumerator

NoAssertions	A test case or leaf section did not run any assertions.
UnmatchedTestSpec	A command line test spec matched no test cases.

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

- include/catch2/catch_amalgamated.hpp

5.322 Catch::WildcardPattern Class Reference

Public Member Functions

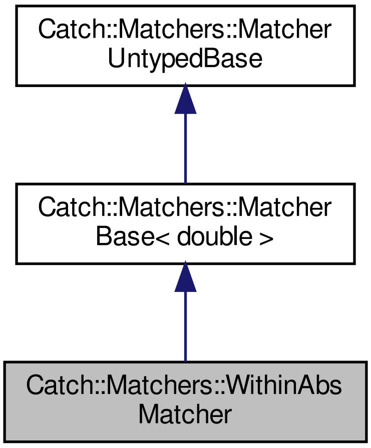
- **WildcardPattern** (std::string const &pattern, CaseSensitive caseSensitivity)
- bool **matches** (std::string const &str) const

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

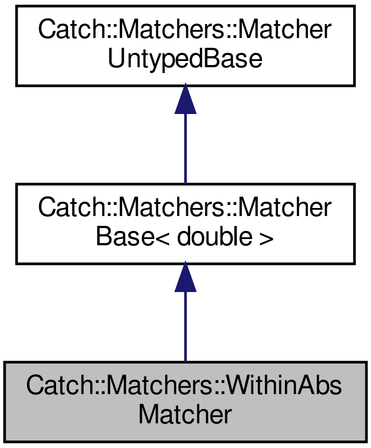
- include/catch2/catch_amalgamated.hpp

5.323 Catch::Matchers::WithinAbsMatcher Class Reference

Inheritance diagram for Catch::Matchers::WithinAbsMatcher:



Collaboration diagram for Catch::Matchers::WithinAbsMatcher:


Catch::Matchers::Matcher UntypedBase
Catch::Matchers::Matcher Base< double >
Catch::Matchers::WithinAbs Matcher

Public Member Functions

- **WithinAbsMatcher** (double target, double margin)
- bool **match** (double const &matchee) const override
- std::string **describe** () const override

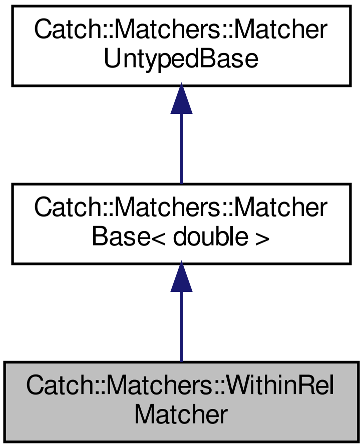
Additional Inherited Members

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

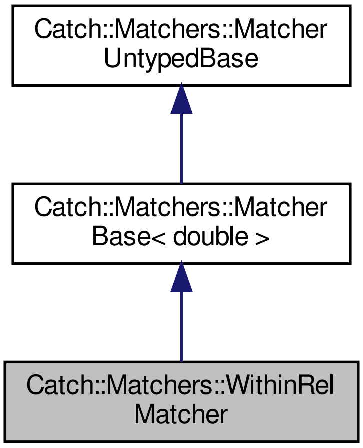
- include/catch2/catch_amalgamated.hpp

5.324 Catch::Matchers::WithinRelMatcher Class Reference

Inheritance diagram for Catch::Matchers::WithinRelMatcher:


Catch::Matchers::Matcher UntypedBase
Catch::Matchers::Matcher Base< double >
Catch::Matchers::WithinRel Matcher

Collaboration diagram for Catch::Matchers::WithinRelMatcher:


Catch::Matchers::Matcher UntypedBase
Catch::Matchers::Matcher Base< double >
Catch::Matchers::WithinRel Matcher

Public Member Functions

- **WithinRelMatcher** (double target, double epsilon)
- bool **match** (double const &matchee) const override
- std::string **describe** () const override

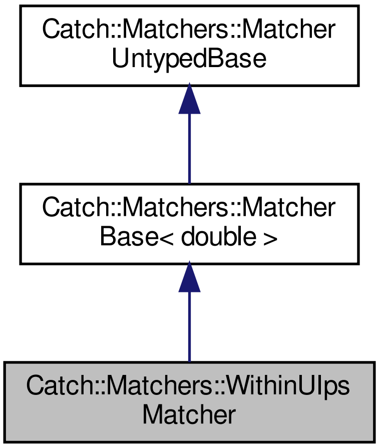
Additional Inherited Members

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

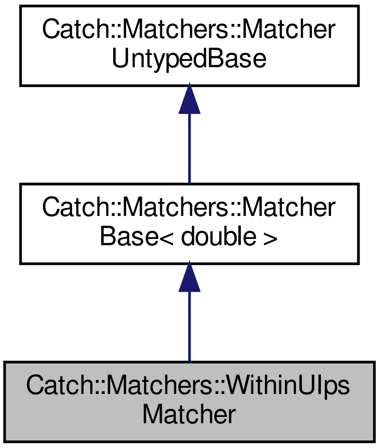
- include/catch2/catch_amalgamated.hpp

5.325 Catch::Matchers::WithinUlpsMatcher Class Reference

Inheritance diagram for Catch::Matchers::WithinUlpsMatcher:


Catch::Matchers::Matcher UntypedBase
Catch::Matchers::Matcher Base< double >
Catch::Matchers::WithinUlps Matcher

Collaboration diagram for Catch::Matchers::WithinUlpsMatcher:


Catch::Matchers::Matcher UntypedBase
Catch::Matchers::Matcher Base< double >
Catch::Matchers::WithinUlps Matcher

Public Member Functions

- **WithinUlpsMatcher** (double target, uint64_t ulps, Detail::FloatingPointKind baseType)
- bool **match** (double const &matchee) const override
- std::string **describe** () const override

Additional Inherited Members

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

- include/catch2/catch_amalgamated.hpp

5.326 Catch::XmlEncode Class Reference

```
#include <catch_amalgamated.hpp>
```

Public Types

- enum **ForWhat** { **ForTextNodes** , **ForAttributes** }

Public Member Functions

- **XmlEncode** (StringRef str, ForWhat forWhat=ForTextNodes)
- void **encodeTo** (std::ostream &os) const

Friends

- std::ostream & **operator**<< (std::ostream &os, XmlEncode const &xmlEncode)

5.326.1 Detailed Description

Helper for XML-encoding text (escaping angle brackets, quotes, etc)

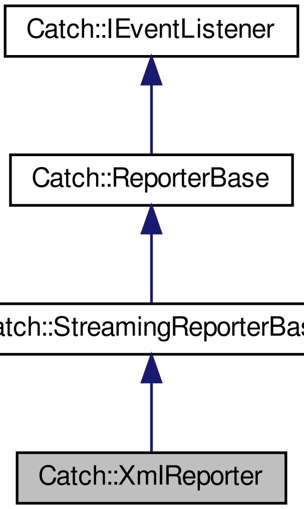
Note: doesn't take ownership of passed strings, and thus the encoded string must outlive the encoding instance.

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

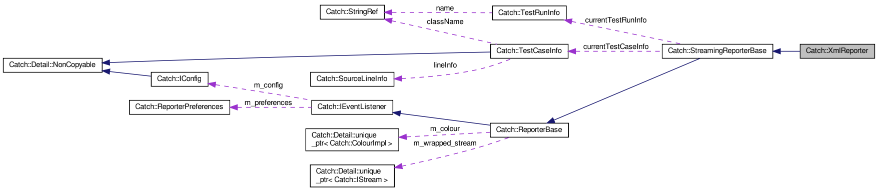
- include/catch2/catch_amalgamated.hpp

5.327 Catch::XmlReporter Class Reference

Inheritance diagram for Catch::XmlReporter:



Collaboration diagram for Catch::XmlReporter:



Public Member Functions

- **XmlReporter** (ReporterConfig &&_config)
- virtual std::string **getStylesheetRef** () const
- void **writeSourceInfo** (SourceLineInfo const &sourceInfo)
- void testRunStarting (TestRunInfo const &testInfo) override
- void testCaseStarting (TestCaseInfo const &testInfo) override

  Called once for each TEST_CASE, no matter how many times it is entered.
- void sectionStarting (SectionInfo const &sectionInfo) override

  Called when a `SECTION` is being entered. Not called for skipped sections.
- void assertionStarting (AssertionInfo const &) override

  Called before assertion success/failure is evaluated.
- void assertionEnded (AssertionStats const &assertionStats) override

  Called after assertion was fully evaluated.

- void sectionEnded (SectionStats const &sectionStats) override

    Called after a `SECTION` *has finished running.*
- void testCaseEnded (TestCaseStats const &testCaseStats) override

    Called once for each TEST_CASE, no matter how many times it is entered.
- void testRunEnded (TestRunStats const &testRunStats) override
- void benchmarkPreparing (StringRef name) override

    Called when user-code is being probed before the actual benchmark runs.
- void benchmarkStarting (BenchmarkInfo const &) override

    Called after probe but before the user-code is being benchmarked.
- void benchmarkEnded (BenchmarkStats<> const &) override

    Called with the benchmark results if benchmark successfully finishes.
- void benchmarkFailed (StringRef error) override

    Called if running the benchmarks fails for any reason.
- void listReporters (std::vector< ReporterDescription > const &descriptions) override
- void listListeners (std::vector< ListenerDescription > const &descriptions) override
- void listTests (std::vector< TestCaseHandle > const &tests) override
- void listTags (std::vector< TagInfo > const &tags) override

Static Public Member Functions

- static std::string **getDescription** ()

Additional Inherited Members

5.327.1 Member Function Documentation

5.327.1.1 listListeners()

```
void Catch::XmlReporter::listListeners (
            std::vector< ListenerDescription > const & descriptions )  [override], [virtual]
```

Provides a simple default listing of listeners

Looks similarly to listing of reporters, but with listener type instead of reporter name.

Reimplemented from Catch::ReporterBase.

5.327.1.2 listReporters()

```
void Catch::XmlReporter::listReporters (
            std::vector< ReporterDescription > const & descriptions )  [override], [virtual]
```

Provides a simple default listing of reporters.

Should look roughly like the reporter listing in v2 and earlier versions of Catch2.

Reimplemented from Catch::ReporterBase.

5.327.1.3 listTags()

```
void Catch::XmlReporter::listTags (
            std::vector< TagInfo > const & tags )  [override], [virtual]
```

Provides a simple default listing of tags.

Should look roughly like the tag listing in v2 and earlier versions of Catch2.

Reimplemented from Catch::ReporterBase.

5.327.1.4 listTests()

```
void Catch::XmlReporter::listTests (
            std::vector< TestCaseHandle > const & tests )  [override], [virtual]
```

Provides a simple default listing of tests.

Should look roughly like the test listing in v2 and earlier versions of Catch2. Especially supports low-verbosity listing that mimics the old `--list-test-names-only` output.

Reimplemented from Catch::ReporterBase.

5.327.1.5 testRunEnded()

```
void Catch::XmlReporter::testRunEnded (
            TestRunStats const & testRunStats )  [override], [virtual]
```

Called once after all tests in a testing run are finished

Not called if tests weren't run (e.g. only listings happened)

Reimplemented from Catch::StreamingReporterBase.

5.327.1.6 testRunStarting()

```
void Catch::XmlReporter::testRunStarting (
            TestRunInfo const & testRunInfo )  [override], [virtual]
```

Called once in a testing run before tests are started

Not called if tests won't be run (e.g. only listing will happen)

Reimplemented from Catch::StreamingReporterBase.

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

- include/catch2/catch_amalgamated.hpp

5.328 Catch::XmlWriter Class Reference

Classes

- class ScopedElement

Public Member Functions

- **XmlWriter** (std::ostream &os)
- **XmlWriter** (XmlWriter const &)=delete
- XmlWriter & **operator=** (XmlWriter const &)=delete
- XmlWriter & **startElement** (std::string const &name, XmlFormatting fmt=XmlFormatting::Newline|XmlFormatting::Indent)
- ScopedElement **scopedElement** (std::string const &name, XmlFormatting fmt=XmlFormatting::Newline|XmlFormatting::Indent)
- XmlWriter & **endElement** (XmlFormatting fmt=XmlFormatting::Newline|XmlFormatting::Indent)
- XmlWriter & writeAttribute (StringRef name, StringRef attribute)

  The attribute content is XML-encoded.
- XmlWriter & writeAttribute (StringRef name, bool attribute)

  Writes the attribute as "true/false".
- XmlWriter & writeAttribute (StringRef name, char const ∗attribute)

  The attribute content is XML-encoded.
- template<typename T , typename = typename std::enable_if_t< !std::is_convertible<T, StringRef>::value>>
  XmlWriter & writeAttribute (StringRef name, T const &attribute)
- XmlWriter & writeText (StringRef text, XmlFormatting fmt=XmlFormatting::Newline|XmlFormatting::Indent)

  Writes escaped `text` in a element.
- XmlWriter & writeComment (StringRef text, XmlFormatting fmt=XmlFormatting::Newline|XmlFormatting::Indent)

  Writes XML comment as "<!-- text -->".
- void **writeStylesheetRef** (StringRef url)
- void **ensureTagClosed** ()

5.328.1 Member Function Documentation

5.328.1.1 writeAttribute()

```
template<typename T , typename = typename std::enable_if_t< !std::is_convertible<T, StringRef>::value>>
XmlWriter& Catch::XmlWriter::writeAttribute (
            StringRef name,
            T const & attribute )  [inline]
```

The attribute value must provide op<<(ostream&, T). The resulting serialization is XML-encoded

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

- include/catch2/catch_amalgamated.hpp

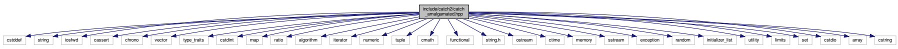
Chapter 6

File Documentation

6.1 include/catch2/catch_amalgamated.hpp File Reference

```
#include <cstddef>
#include <string>
#include <iosfwd>
#include <cassert>
#include <chrono>
#include <vector>
#include <type_traits>
#include <cstdint>
#include <map>
#include <ratio>
#include <algorithm>
#include <iterator>
#include <numeric>
#include <tuple>
#include <cmath>
#include <functional>
#include <string.h>
#include <ostream>
#include <ctime>
#include <memory>
#include <sstream>
#include <exception>
#include <random>
#include <initializer_list>
#include <utility>
#include <limits>
#include <set>
#include <cstdio>
#include <array>
#include <cstring>
```

Include dependency graph for catch_amalgamated.hpp:



Classes

- class Catch::Detail::NonCopyable

    Deriving classes become noncopyable and nonmovable.
- class Catch::StringRef
- struct Catch::WarnAbout
- struct Catch::WaitForKeypress
- class Catch::IConfig
- class Catch::IContext
- class Catch::IMutableContext
- struct Catch::SourceLineInfo
- struct Catch::Counts
- struct Catch::Totals
- struct Catch::SectionInfo
- struct Catch::SectionEndInfo
- struct Catch::ResultWas
- struct Catch::ResultDisposition
- struct Catch::AssertionInfo
- class Catch::LazyExpression
- struct Catch::AssertionResultData
- class Catch::AssertionResult
- class Catch::IResultCapture
- struct Catch::MessageInfo
- class Catch::Detail::unique_ptr< T >
- struct Catch::Benchmark::Estimate< Duration >
- struct Catch::Benchmark::OutlierClassification
- struct Catch::ReporterConfig
- struct Catch::TestRunInfo
- struct Catch::AssertionStats
- struct Catch::SectionStats
- struct Catch::TestCaseStats
- struct Catch::TestRunStats
- struct Catch::BenchmarkInfo
- struct Catch::BenchmarkStats< Duration >
- struct Catch::ReporterPreferences
- class Catch::IEventListener
- struct Catch::Benchmark::now< Clock >
- struct Catch::TestFailureException

    Used to signal that an assertion macro failed.
- struct Catch::always_false< T >
- struct Catch::true_given< typename >
- struct Catch::is_callable_tester
- struct Catch::is_callable< Fun(Args...)>
- class Catch::IRegistryHub
- class Catch::IMutableRegistryHub
- struct Catch::Benchmark::Detail::CompleteType< T >
- struct Catch::Benchmark::Detail::CompleteType< void >
- struct Catch::Benchmark::Detail::CompleteType< void >::type
- struct Catch::Benchmark::Detail::CompleteInvoker< Result >
- struct Catch::Benchmark::Detail::CompleteInvoker< void >
- struct Catch::Benchmark::Detail::ChronometerConcept
- struct Catch::Benchmark::Detail::ChronometerModel< Clock >
- struct Catch::Benchmark::Chronometer
- struct Catch::Benchmark::EnvironmentEstimate< Duration >

- struct Catch::Benchmark::Environment< Clock >
- struct Catch::Benchmark::Detail::is_related< T, U >
- struct Catch::Benchmark::Detail::BenchmarkFunction
- struct Catch::Benchmark::Detail::repeater< Fun >
- struct Catch::Benchmark::Timing< Duration, Result >
- struct Catch::Benchmark::ExecutionPlan< Duration >
- struct Catch::Benchmark::Detail::bootstrap_analysis
- struct Catch::Benchmark::SampleAnalysis< Duration >
- struct Catch::Benchmark::Benchmark
- struct Catch::Benchmark::Detail::ObjectStorage< T, Destruct >
- class Catch::ReusableStringStream
- struct Catch::Detail::make_void<... >
- struct Catch::Detail::EnumInfo
- class Catch::IMutableEnumValuesRegistry
- struct Catch_global_namespace_dummy
- class Catch::Detail::IsStreamInsertable< T >
- struct Catch::StringMaker< T, typename >
- struct Catch::StringMaker< std::string >
- struct Catch::StringMaker< char const ∗ >
- struct Catch::StringMaker< char ∗ >
- struct Catch::StringMaker< std::wstring >
- struct Catch::StringMaker< wchar_t const ∗ >
- struct Catch::StringMaker< wchar_t ∗ >
- struct Catch::StringMaker< char[SZ]>
- struct Catch::StringMaker< signed char[SZ]>
- struct Catch::StringMaker< unsigned char[SZ]>
- struct Catch::StringMaker< int >
- struct Catch::StringMaker< long >
- struct Catch::StringMaker< long long >
- struct Catch::StringMaker< unsigned int >
- struct Catch::StringMaker< unsigned long >
- struct Catch::StringMaker< unsigned long long >
- struct Catch::StringMaker< bool >
- struct Catch::StringMaker< char >
- struct Catch::StringMaker< signed char >
- struct Catch::StringMaker< unsigned char >
- struct Catch::StringMaker< std::nullptr_t >
- struct Catch::StringMaker< float >
- struct Catch::StringMaker< double >
- struct Catch::StringMaker< T ∗ >
- struct Catch::StringMaker< R C::∗ >
- struct Catch::Detail::is_range_impl< T, typename >
- struct Catch::Detail::is_range_impl< T, void_t< decltype(begin(std::declval< T >()))> >
- struct Catch::is_range< T >
- struct Catch::StringMaker< R, std::enable_if_t< is_range< R >::value &&!::Catch::Detail::IsStreamInsertable< R >::value >
- struct Catch::StringMaker< T[SZ]>
- struct Catch::ratio_string< Ratio >
- struct Catch::ratio_string< std::atto >
- struct Catch::ratio_string< std::femto >
- struct Catch::ratio_string< std::pico >
- struct Catch::ratio_string< std::nano >
- struct Catch::ratio_string< std::micro >
- struct Catch::ratio_string< std::milli >
- struct Catch::StringMaker< std::chrono::duration< Value, Ratio > >
- struct Catch::StringMaker< std::chrono::duration< Value, std::ratio< 1 > > >

- struct Catch::StringMaker< std::chrono::duration< Value, std::ratio< 60 > > >
- struct Catch::StringMaker< std::chrono::duration< Value, std::ratio< 3600 > > >
- struct Catch::StringMaker< std::chrono::time_point< Clock, Duration > >
- struct Catch::StringMaker< std::chrono::time_point< std::chrono::system_clock, Duration > >
- class Catch::Approx
- struct Catch::StringMaker< Catch::Approx >
- class Catch::WildcardPattern
- class Catch::TestSpec
- struct Catch::TestSpec::FilterMatch
- class Catch::Optional< T >
- struct Catch::Colour
- class Catch::ColourImpl
- class Catch::ColourImpl::ColourGuard
- class Catch::ReporterSpec
- struct Catch::ProcessedReporterSpec
- struct Catch::ConfigData
- class Catch::Config
- struct Catch::StreamEndStop
- struct Catch::MessageStream
- struct Catch::MessageBuilder
- class Catch::ScopedMessage
- class Catch::Capturer
- struct Catch::Clara::accept_many_t
- struct Catch::Clara::Detail::fake_arg
- struct Catch::Clara::Detail::is_unary_function< F, typename >
- struct Catch::Clara::Detail::is_unary_function< F, Catch::Detail::void_t< decltype(std::declval< F >()(fake_arg())) > >
- struct Catch::Clara::Detail::UnaryLambdaTraits< L >
- struct Catch::Clara::Detail::UnaryLambdaTraits< ReturnT(ClassT::∗)(Args...) const >
- struct Catch::Clara::Detail::UnaryLambdaTraits< ReturnT(ClassT::∗)(ArgT) const >
- struct Catch::Clara::Detail::Token
- class Catch::Clara::Detail::TokenStream
- class Catch::Clara::Detail::ResultBase
- class Catch::Clara::Detail::ResultValueBase< T >
- class Catch::Clara::Detail::ResultValueBase< void >
- class Catch::Clara::Detail::BasicResult< T >
- class Catch::Clara::Detail::ParseState
- struct Catch::Clara::Detail::HelpColumns
- struct Catch::Clara::Detail::BoundRef
- struct Catch::Clara::Detail::BoundValueRefBase
- struct Catch::Clara::Detail::BoundFlagRefBase
- struct Catch::Clara::Detail::BoundValueRef< T >
- struct Catch::Clara::Detail::BoundValueRef< std::vector< T > >
- struct Catch::Clara::Detail::BoundFlagRef
- struct Catch::Clara::Detail::LambdaInvoker< ReturnType >
- struct Catch::Clara::Detail::LambdaInvoker< void >
- struct Catch::Clara::Detail::BoundLambda< L >
- struct Catch::Clara::Detail::BoundManyLambda< L >
- struct Catch::Clara::Detail::BoundFlagLambda< L >
- class Catch::Clara::Detail::ParserBase
- class Catch::Clara::Detail::ComposableParserImpl< DerivedT >
- class Catch::Clara::Detail::ParserRefImpl< DerivedT >
- class Catch::Clara::Arg
- class Catch::Clara::Opt
- class Catch::Clara::ExeName
- class Catch::Clara::Parser

- class Catch::Clara::Args
- struct Catch::Clara::Help
- class Catch::Session
- struct Catch::TagAlias
- struct Catch::RegistrarForTagAliases
- class Catch::ITransientExpression
- class Catch::BinaryExpr< LhsT, RhsT >
- class Catch::UnaryExpr< LhsT >
- class Catch::ExprLhs< LhsT >
- struct Catch::Decomposer
- struct Catch::AssertionReaction
- class Catch::AssertionHandler
- class Catch::Timer
- class Catch::Section
- class Catch::ITestInvoker
- class Catch::ITestCaseRegistry
- class Catch::TestInvokerAsMethod< C >
- struct Catch::NameAndTags
- struct Catch::AutoReg
- struct Catch::Tag
- struct Catch::TestCaseInfo
- class Catch::TestCaseHandle
- class Catch::IExceptionTranslator
- class Catch::IExceptionTranslatorRegistry
- class Catch::ExceptionTranslatorRegistrar
- struct Catch::Version
- class Catch::GeneratorException
- class Catch::Generators::GeneratorUntypedBase
- class Catch::IGeneratorTracker
- class Catch::Generators::IGenerator< T >
- class Catch::Generators::GeneratorWrapper< T >
- class Catch::Generators::SingleValueGenerator< T >
- class Catch::Generators::FixedValuesGenerator< T >
- class Catch::Generators::Generators< T >
- struct Catch::Generators::as< T >
- class Catch::Generators::TakeGenerator< T >
- class Catch::Generators::FilterGenerator< T, Predicate >
- class Catch::Generators::RepeatGenerator< T >
- class Catch::Generators::MapGenerator< T, U, Func >
- class Catch::Generators::ChunkGenerator< T >
- class Catch::SimplePcg32
- class Catch::Generators::RandomFloatingGenerator< Float >
- class Catch::Generators::RandomIntegerGenerator< Integer >
- class Catch::Generators::RangeGenerator< T >
- class Catch::Generators::IteratorGenerator< T >
- class Catch::IReporterFactory
- class Catch::EventListenerFactory
- struct Catch::Detail::CaseInsensitiveLess

  Provides case-insensitive $op<$ semantics when called.
- struct Catch::Detail::CaseInsensitiveEqualTo

  Provides case-insensitive $op==$ semantics when called.
- class Catch::IReporterRegistry
- class Catch::ITagAliasRegistry
- class Catch::Detail::EnumValuesRegistry

- class Catch::ErrnoGuard
- class Catch::ExceptionTranslatorRegistry
- class Catch::FatalConditionHandler
- class Catch::FatalConditionHandlerGuard

  Simple RAII guard for (dis)engaging the FatalConditionHandler.
- class Catch::IStream
- struct Catch::LeakDetector
- struct Catch::ReporterDescription
- struct Catch::ListenerDescription
- struct Catch::TagInfo
- class Catch::RedirectedStream
- class Catch::RedirectedStdOut
- class Catch::RedirectedStdErr
- class Catch::RedirectedStreams
- class Catch::ReporterRegistry
- struct Catch::TestCaseTracking::NameAndLocation
- class Catch::TestCaseTracking::ITracker
- class Catch::TestCaseTracking::TrackerContext
- class Catch::TestCaseTracking::TrackerBase
- class Catch::TestCaseTracking::SectionTracker
- class Catch::RunContext
- struct Catch::ISingleton
- class Catch::Singleton< SingletonImplT, InterfaceT, MutableInterfaceT >
- class Catch::StartupExceptionRegistry
- class Catch::pluralise
- class Catch::TagAliasRegistry
- class Catch::TestCaseInfoHasher
- class Catch::TestRegistry
- class Catch::TestInvokerAsFunction
- class Catch::TestSpecParser
- class Catch::TextFlow::Column
- class Catch::TextFlow::Column::const_iterator
- class Catch::TextFlow::Columns
- class Catch::TextFlow::Columns::iterator
- class Catch::XmlEncode
- class Catch::XmlWriter
- class Catch::XmlWriter::ScopedElement
- class Catch::MatchExpr< ArgT, MatcherT >
- class Catch::Matchers::MatcherUntypedBase
- class Catch::Matchers::MatcherBase< T >
- class Catch::Matchers::Detail::MatchAllOf< ArgT >
- class Catch::Matchers::Detail::MatchAnyOf< ArgT >
- class Catch::Matchers::Detail::MatchNotOf< ArgT >
- class Catch::Matchers::MatcherGenericBase
- struct Catch::Matchers::Detail::conjunction< Cond >
- struct Catch::Matchers::Detail::conjunction< Cond, Rest... >
- class Catch::Matchers::Detail::MatchAllOfGeneric< MatcherTs >
- class Catch::Matchers::Detail::MatchAnyOfGeneric< MatcherTs >
- class Catch::Matchers::Detail::MatchNotOfGeneric< MatcherT >
- class Catch::Matchers::IsEmptyMatcher
- class Catch::Matchers::HasSizeMatcher
- class Catch::Matchers::SizeMatchesMatcher< Matcher >
- class Catch::Matchers::ContainsElementMatcher< T, Equality >

  Matcher for checking that an element in range is equal to specific element.

- class Catch::Matchers::ContainsMatcherMatcher< Matcher >

    Meta-matcher for checking that an element in a range matches a specific matcher.
- class Catch::Matchers::ExceptionMessageMatcher
- class Catch::Matchers::WithinAbsMatcher
- class Catch::Matchers::WithinUlpsMatcher
- class Catch::Matchers::WithinRelMatcher
- class Catch::Matchers::PredicateMatcher< T, Predicate >
- class Catch::Matchers::AllMatchMatcher< Matcher >
- class Catch::Matchers::NoneMatchMatcher< Matcher >
- class Catch::Matchers::AnyMatchMatcher< Matcher >
- struct Catch::Matchers::CasedString
- class Catch::Matchers::StringMatcherBase
- class Catch::Matchers::StringEqualsMatcher
- class Catch::Matchers::StringContainsMatcher
- class Catch::Matchers::StartsWithMatcher
- class Catch::Matchers::EndsWithMatcher
- class Catch::Matchers::RegexMatcher
- class Catch::Matchers::VectorContainsElementMatcher< T, Alloc >
- class Catch::Matchers::ContainsMatcher< T, AllocComp, AllocMatch >
- class Catch::Matchers::EqualsMatcher< T, AllocComp, AllocMatch >
- class Catch::Matchers::ApproxMatcher< T, AllocComp, AllocMatch >
- class Catch::Matchers::UnorderedEqualsMatcher< T, AllocComp, AllocMatch >
- class Catch::ReporterBase
- class Catch::StreamingReporterBase
- class Catch::AutomakeReporter
- class Catch::CompactReporter
- class Catch::ConsoleReporter
- class Catch::Detail::AssertionOrBenchmarkResult

    Represents either an assertion or a benchmark result to be handled by cumulative reporter later.
- class Catch::CumulativeReporterBase
- struct Catch::CumulativeReporterBase::Node< T, ChildNodeT >
- struct Catch::CumulativeReporterBase::SectionNode
- class Catch::EventListenerBase
- struct Catch::lineOfChars
- class Catch::JunitReporter
- class Catch::MultiReporter
- struct Catch::Detail::has_description< T, typename >
- struct Catch::Detail::has_description< T, void_t< decltype(T::getDescription())> >
- class Catch::ReporterFactory< T >
- class Catch::ReporterRegistrar< T >
- class Catch::ListenerRegistrar< T >
- class Catch::SonarQubeReporter
- class Catch::TAPReporter
- class Catch::TeamCityReporter
- class Catch::XmlReporter

Macros

- #define **CATCH_ALL_HPP_INCLUDED**
- #define **CATCH_BENCHMARK_ALL_HPP_INCLUDED**
- #define **CATCH_BENCHMARK_HPP_INCLUDED**
- #define **CATCH_INTERFACES_CONFIG_HPP_INCLUDED**
- #define **CATCH_NONCOPYABLE_HPP_INCLUDED**
- #define **CATCH_STRINGREF_HPP_INCLUDED**
- #define **CATCH_COMPILER_CAPABILITIES_HPP_INCLUDED**
- #define **CATCH_PLATFORM_HPP_INCLUDED**
- #define **CATCH_INTERNAL_CONFIG_POSIX_SIGNALS**
- #define **CATCH_INTERNAL_CONFIG_GLOBAL_NEXTAFTER**
- #define **CATCH_CONFIG_POSIX_SIGNALS**
- #define **CATCH_CONFIG_CPP11_TO_STRING**
- #define **CATCH_CONFIG_DISABLE_EXCEPTIONS**
- #define **CATCH_CONFIG_GLOBAL_NEXTAFTER**
- #define **CATCH_INTERNAL_START_WARNINGS_SUPPRESSION**
- #define **CATCH_INTERNAL_STOP_WARNINGS_SUPPRESSION**
- #define **CATCH_INTERNAL_SUPPRESS_PARENTHESES_WARNINGS**
- #define **CATCH_INTERNAL_SUPPRESS_GLOBALS_WARNINGS**
- #define **CATCH_INTERNAL_SUPPRESS_UNUSED_VARIABLE_WARNINGS**
- #define **CATCH_INTERNAL_SUPPRESS_ZERO_VARIADIC_WARNINGS**
- #define **CATCH_INTERNAL_IGNORE_BUT_WARN**(...)
- #define **CATCH_INTERNAL_SUPPRESS_UNUSED_TEMPLATE_WARNINGS**
- #define **CATCH_TRY** if ((true))
- #define **CATCH_CATCH_ALL** if ((false))
- #define **CATCH_CATCH_ANON**(type) if ((false))
- #define **CATCH_CONTEXT_HPP_INCLUDED**
- #define **CATCH_INTERFACES_REPORTER_HPP_INCLUDED**
- #define **CATCH_SECTION_INFO_HPP_INCLUDED**
- #define **CATCH_MOVE_AND_FORWARD_HPP_INCLUDED**
- #define CATCH_MOVE(...) static_cast<std::remove_reference_t<decltype(__VA_ARGS__)>&&>(__VA_ARGS__)

  Replacement for std::move with better compile time performance.
- #define CATCH_FORWARD(...) static_cast<decltype(__VA_ARGS__)&&>(__VA_ARGS__)

  Replacement for std::forward with better compile time performance.
- #define **CATCH_SOURCE_LINE_INFO_HPP_INCLUDED**
- #define **CATCH_INTERNAL_LINEINFO** ::Catch::SourceLineInfo(__FILE__, static_cast<std::size_t>(__LINE__))
- #define **CATCH_TOTALS_HPP_INCLUDED**
- #define **CATCH_ASSERTION_RESULT_HPP_INCLUDED**
- #define **CATCH_ASSERTION_INFO_HPP_INCLUDED**
- #define **CATCH_RESULT_TYPE_HPP_INCLUDED**
- #define **CATCH_LAZY_EXPR_HPP_INCLUDED**
- #define **CATCH_MESSAGE_INFO_HPP_INCLUDED**
- #define **CATCH_INTERFACES_CAPTURE_HPP_INCLUDED**
- #define **CATCH_UNIQUE_PTR_HPP_INCLUDED**
- #define **CATCH_ESTIMATE_HPP_INCLUDED**
- #define **CATCH_OUTLIER_CLASSIFICATION_HPP_INCLUDED**
- #define **CATCH_UNIQUE_NAME_HPP_INCLUDED**
- #define **CATCH_CONFIG_COUNTER_HPP_INCLUDED**
- #define **CATCH_INTERNAL_CONFIG_COUNTER**
- #define **CATCH_CONFIG_COUNTER**
- #define **INTERNAL_CATCH_UNIQUE_NAME_LINE2**(name, line) name##line

- #define **INTERNAL_CATCH_UNIQUE_NAME_LINE**(name, line) INTERNAL_CATCH_UNIQUE_NAME_LINE2(name, line)
- #define **INTERNAL_CATCH_UNIQUE_NAME**(name) INTERNAL_CATCH_UNIQUE_NAME_LINE(name, __COUNTER__)
- #define **CATCH_CHRONOMETER_HPP_INCLUDED**
- #define **CATCH_CLOCK_HPP_INCLUDED**
- #define **CATCH_OPTIMIZER_HPP_INCLUDED**
- #define **CATCH_COMPLETE_INVOKE_HPP_INCLUDED**
- #define **CATCH_TEST_FAILURE_EXCEPTION_HPP_INCLUDED**
- #define **CATCH_META_HPP_INCLUDED**
- #define **CATCH_INTERFACES_REGISTRY_HUB_HPP_INCLUDED**
- #define **CATCH_ENVIRONMENT_HPP_INCLUDED**
- #define **CATCH_EXECUTION_PLAN_HPP_INCLUDED**
- #define **CATCH_BENCHMARK_FUNCTION_HPP_INCLUDED**
- #define **CATCH_REPEAT_HPP_INCLUDED**
- #define **CATCH_RUN_FOR_AT_LEAST_HPP_INCLUDED**
- #define **CATCH_MEASURE_HPP_INCLUDED**
- #define **CATCH_TIMING_HPP_INCLUDED**
- #define **CATCH_ESTIMATE_CLOCK_HPP_INCLUDED**
- #define **CATCH_STATS_HPP_INCLUDED**
- #define **CATCH_ANALYSE_HPP_INCLUDED**
- #define **CATCH_SAMPLE_ANALYSIS_HPP_INCLUDED**
- #define **INTERNAL_CATCH_GET_1_ARG**(arg1, arg2, ...) arg1
- #define **INTERNAL_CATCH_GET_2_ARG**(arg1, arg2, ...) arg2
- #define **INTERNAL_CATCH_BENCHMARK**(BenchmarkName, name, benchmarkIndex)
- #define **INTERNAL_CATCH_BENCHMARK_ADVANCED**(BenchmarkName, name)
- #define **BENCHMARK**(...) INTERNAL_CATCH_BENCHMARK(INTERNAL_CATCH_UNIQUE_NAME(CATCH2_INTERNAL_BENCHMARK_), INTERNAL_CATCH_GET_1_ARG(__VA_ARGS__„), INTERNAL_CATCH_GET_2_ARG(__VA_ARGS__„))
- #define **BENCHMARK_ADVANCED**(name) INTERNAL_CATCH_BENCHMARK_ADVANCED(INTERNAL_CATCH_UNIQUE_NAME(CATCH2_INTERNAL_BENCHMARK_), name)
- #define **CATCH_CONSTRUCTOR_HPP_INCLUDED**
- #define **CATCH_APPROX_HPP_INCLUDED**
- #define **CATCH_TOSTRING_HPP_INCLUDED**
- #define **CATCH_CONFIG_WCHAR_HPP_INCLUDED**
- #define **CATCH_CONFIG_WCHAR**
- #define **CATCH_REUSABLE_STRING_STREAM_HPP_INCLUDED**
- #define **CATCH_VOID_TYPE_HPP_INCLUDED**
- #define **CATCH_INTERFACES_ENUM_VALUES_REGISTRY_HPP_INCLUDED**
- #define **INTERNAL_CATCH_REGISTER_ENUM**(enumName, ...)
- #define **CATCH_REGISTER_ENUM**(enumName, ...) INTERNAL_CATCH_REGISTER_ENUM(enumName, __VA_ARGS__)
- #define **CATCH_CONFIG_HPP_INCLUDED**
- #define **CATCH_TEST_SPEC_HPP_INCLUDED**
- #define **CATCH_WILDCARD_PATTERN_HPP_INCLUDED**
- #define **CATCH_CASE_SENSITIVE_HPP_INCLUDED**
- #define **CATCH_OPTIONAL_HPP_INCLUDED**
- #define **CATCH_RANDOM_SEED_GENERATION_HPP_INCLUDED**
- #define **CATCH_REPORTER_SPEC_PARSER_HPP_INCLUDED**
- #define **CATCH_CONSOLE_COLOUR_HPP_INCLUDED**
- #define **CATCH_MESSAGE_HPP_INCLUDED**
- #define **CATCH_STREAM_END_STOP_HPP_INCLUDED**
- #define **INTERNAL_CATCH_MSG**(macroName, messageType, resultDisposition, ...)
- #define **INTERNAL_CATCH_CAPTURE**(varName, macroName, ...)

- #define **INTERNAL_CATCH_INFO**(macroName, log) Catch::ScopedMessage INTERNAL_CATCH↩ _UNIQUE_NAME(scopedMessage)(Catch::MessageBuilder(macroName##_catch_sr, CATCH_↩ INTERNAL_LINEINFO, Catch::ResultWas::Info) << log)
- #define **INTERNAL_CATCH_UNSCOPED_INFO**(macroName, log) Catch::getResultCapture().emplace↩ UnscopedMessage(Catch::MessageBuilder(macroName##_catch_sr, CATCH_INTERNAL_LINEINFO, Catch::ResultWas::Info) << log)
- #define **INFO**(msg) INTERNAL_CATCH_INFO("INFO", msg)
- #define **UNSCOPED_INFO**(msg) INTERNAL_CATCH_UNSCOPED_INFO("UNSCOPED_INFO", msg)
- #define **WARN**(msg) INTERNAL_CATCH_MSG("WARN", Catch::ResultWas::Warning, Catch::Result↩ Disposition::ContinueOnFailure, msg)
- #define **CAPTURE**(...) INTERNAL_CATCH_CAPTURE(INTERNAL_CATCH_UNIQUE_NAME(capturer), "CAPTURE", __VA_ARGS__)
- #define **CATCH_SESSION_HPP_INCLUDED**
- #define **CATCH_COMMANDLINE_HPP_INCLUDED**
- #define **CATCH_CLARA_HPP_INCLUDED**
- #define **CATCH_TAG_ALIAS_HPP_INCLUDED**
- #define **CATCH_TAG_ALIAS_AUTOREGISTRAR_HPP_INCLUDED**
- #define **CATCH_REGISTER_TAG_ALIAS**(alias, spec)
- #define **CATCH_TEMPLATE_TEST_MACROS_HPP_INCLUDED**
- #define **CATCH_TEST_MACROS_HPP_INCLUDED**
- #define **CATCH_TEST_MACRO_IMPL_HPP_INCLUDED**
- #define **CATCH_ASSERTION_HANDLER_HPP_INCLUDED**
- #define **CATCH_DECOMPOSER_HPP_INCLUDED**
- #define **CATCH_INTERNAL_DEFINE_EXPRESSION_OPERATOR**(op)
- #define **CATCH_INTERNAL_STRINGIFY**(...) #__VA_ARGS__
- #define **INTERNAL_CATCH_TRY**
- #define **INTERNAL_CATCH_CATCH**(capturer)
- #define **INTERNAL_CATCH_REACT**(handler) handler.complete();
- #define **INTERNAL_CATCH_TEST**(macroName, resultDisposition, ...)
- #define **INTERNAL_CATCH_IF**(macroName, resultDisposition, ...)
- #define **INTERNAL_CATCH_ELSE**(macroName, resultDisposition, ...)
- #define **INTERNAL_CATCH_NO_THROW**(macroName, resultDisposition, ...)
- #define **INTERNAL_CATCH_THROWS**(macroName, resultDisposition, ...)
- #define **INTERNAL_CATCH_THROWS_AS**(macroName, exceptionType, resultDisposition, expr)
- #define **INTERNAL_CATCH_THROWS_STR_MATCHES**(macroName, resultDisposition, matcher, ...)
- #define **CATCH_SECTION_HPP_INCLUDED**
- #define **CATCH_TIMER_HPP_INCLUDED**
- #define **INTERNAL_CATCH_SECTION**(...)
- #define **INTERNAL_CATCH_DYNAMIC_SECTION**(...)
- #define **CATCH_TEST_REGISTRY_HPP_INCLUDED**
- #define **CATCH_INTERFACES_TESTCASE_HPP_INCLUDED**
- #define **CATCH_PREPROCESSOR_REMOVE_PARENS_HPP_INCLUDED**
- #define **INTERNAL_CATCH_EXPAND1**(param) INTERNAL_CATCH_EXPAND2(param)
- #define **INTERNAL_CATCH_EXPAND2**(...) INTERNAL_CATCH_NO##__VA_ARGS__
- #define **INTERNAL_CATCH_DEF**(...) INTERNAL_CATCH_DEF __VA_ARGS__
- #define **INTERNAL_CATCH_NOINTERNAL_CATCH_DEF**
- #define **INTERNAL_CATCH_REMOVE_PARENS**(...) INTERNAL_CATCH_EXPAND1(INTERNAL_↩ CATCH_DEF __VA_ARGS__)
- #define **INTERNAL_CATCH_TESTCASE2**(TestName, ...)
- #define **INTERNAL_CATCH_TESTCASE**(...) INTERNAL_CATCH_TESTCASE2(INTERNAL_CATCH_↩ UNIQUE_NAME(CATCH2_INTERNAL_TEST_), __VA_ARGS__)
- #define **INTERNAL_CATCH_METHOD_AS_TEST_CASE**(QualifiedMethod, ...)
- #define **INTERNAL_CATCH_TEST_CASE_METHOD2**(TestName, ClassName, ...)
- #define **INTERNAL_CATCH_TEST_CASE_METHOD**(ClassName, ...) INTERNAL_CATCH_TEST_↩ CASE_METHOD2(INTERNAL_CATCH_UNIQUE_NAME(CATCH2_INTERNAL_TEST_), ClassName, ↩ __VA_ARGS__)

- #define **INTERNAL_CATCH_REGISTER_TESTCASE**(Function, ...)
- #define **REQUIRE**(...) INTERNAL_CATCH_TEST("REQUIRE", Catch::ResultDisposition::Normal, __VA_ARGS__)
- #define **REQUIRE_FALSE**(...) INTERNAL_CATCH_TEST("REQUIRE_FALSE", Catch::ResultDisposition::Normal | Catch::ResultDisposition::FalseTest, __VA_ARGS__)
- #define **REQUIRE_THROWS**(...) INTERNAL_CATCH_THROWS("REQUIRE_THROWS", Catch::ResultDisposition::Normal, __VA_ARGS__)
- #define **REQUIRE_THROWS_AS**(expr, exceptionType) INTERNAL_CATCH_THROWS_AS("REQUIRE_THROWS_AS", exceptionType, Catch::ResultDisposition::Normal, expr)
- #define **REQUIRE_NOTHROW**(...) INTERNAL_CATCH_NO_THROW("REQUIRE_NOTHROW", Catch::ResultDisposition::Normal, __VA_ARGS__)
- #define **CHECK**(...) INTERNAL_CATCH_TEST("CHECK", Catch::ResultDisposition::ContinueOnFailure, __VA_ARGS__)
- #define **CHECK_FALSE**(...) INTERNAL_CATCH_TEST("CHECK_FALSE", Catch::ResultDisposition::ContinueOnFailure | Catch::ResultDisposition::FalseTest, __VA_ARGS__)
- #define **CHECKED_IF**(...) INTERNAL_CATCH_IF("CHECKED_IF", Catch::ResultDisposition::ContinueOnFailure | Catch::ResultDisposition::SuppressFail, __VA_ARGS__)
- #define **CHECKED_ELSE**(...) INTERNAL_CATCH_ELSE("CHECKED_ELSE", Catch::ResultDisposition::ContinueOnFailure | Catch::ResultDisposition::SuppressFail, __VA_ARGS__)
- #define **CHECK_NOFAIL**(...) INTERNAL_CATCH_TEST("CHECK_NOFAIL", Catch::ResultDisposition::ContinueOnFailure | Catch::ResultDisposition::SuppressFail, __VA_ARGS__)
- #define **CHECK_THROWS**(...) INTERNAL_CATCH_THROWS("CHECK_THROWS", Catch::ResultDisposition::ContinueOnFailure, __VA_ARGS__)
- #define **CHECK_THROWS_AS**(expr, exceptionType) INTERNAL_CATCH_THROWS_AS("CHECK_THROWS_AS", exceptionType, Catch::ResultDisposition::ContinueOnFailure, expr)
- #define **CHECK_NOTHROW**(...) INTERNAL_CATCH_NO_THROW("CHECK_NOTHROW", Catch::ResultDisposition::ContinueOnFailure, __VA_ARGS__)
- #define **TEST_CASE**(...) INTERNAL_CATCH_TESTCASE(__VA_ARGS__)
- #define **TEST_CASE_METHOD**(className, ...) INTERNAL_CATCH_TEST_CASE_METHOD(className, __VA_ARGS__)
- #define **METHOD_AS_TEST_CASE**(method, ...) INTERNAL_CATCH_METHOD_AS_TEST_CASE(method, __VA_ARGS__)
- #define **REGISTER_TEST_CASE**(Function, ...) INTERNAL_CATCH_REGISTER_TESTCASE(Function, __VA_ARGS__)
- #define **SECTION**(...) INTERNAL_CATCH_SECTION(__VA_ARGS__)
- #define **DYNAMIC_SECTION**(...) INTERNAL_CATCH_DYNAMIC_SECTION(__VA_ARGS__)
- #define **FAIL**(...) INTERNAL_CATCH_MSG("FAIL", Catch::ResultWas::ExplicitFailure, Catch::ResultDisposition::Normal, __VA_ARGS__)
- #define **FAIL_CHECK**(...) INTERNAL_CATCH_MSG("FAIL_CHECK", Catch::ResultWas::ExplicitFailure, Catch::ResultDisposition::ContinueOnFailure, __VA_ARGS__)
- #define **SUCCEED**(...) INTERNAL_CATCH_MSG("SUCCEED", Catch::ResultWas::Ok, Catch::ResultDisposition::ContinueOnFailure, __VA_ARGS__)
- #define **STATIC_REQUIRE**(...) static_assert(__VA_ARGS__, #__VA_ARGS__); SUCCEED(#__VA_ARGS__)
- #define **STATIC_REQUIRE_FALSE**(...) static_assert(!(__VA_ARGS__), "!(" #__VA_ARGS__ ")"); SUCCEED("!(" #__VA_ARGS__ ")")
- #define **STATIC_CHECK**(...) static_assert(__VA_ARGS__, #__VA_ARGS__); SUCCEED(#__VA_ARGS__)
- #define **STATIC_CHECK_FALSE**(...) static_assert(!(__VA_ARGS__), "!(" #__VA_ARGS__ ")"); SUCCEED("!(" #__VA_ARGS__ ")")
- #define **SCENARIO**(...) TEST_CASE("Scenario: " __VA_ARGS__)
- #define **SCENARIO_METHOD**(className, ...) INTERNAL_CATCH_TEST_CASE_METHOD(className, "Scenario: " __VA_ARGS__)
- #define **GIVEN**(desc) INTERNAL_CATCH_DYNAMIC_SECTION(" Given: " << desc)
- #define **AND_GIVEN**(desc) INTERNAL_CATCH_DYNAMIC_SECTION("And given: " << desc)
- #define **WHEN**(desc) INTERNAL_CATCH_DYNAMIC_SECTION(" When: " << desc)

- #define **AND_WHEN**(desc) INTERNAL_CATCH_DYNAMIC_SECTION(" And when: " << desc)
- #define **THEN**(desc) INTERNAL_CATCH_DYNAMIC_SECTION(" Then: " << desc)
- #define **AND_THEN**(desc) INTERNAL_CATCH_DYNAMIC_SECTION(" And: " << desc)
- #define **CATCH_TEMPLATE_TEST_REGISTRY_HPP_INCLUDED**
- #define **CATCH_PREPROCESSOR_HPP_INCLUDED**
- #define **CATCH_RECURSION_LEVEL0**(...) __VA_ARGS__
- #define **CATCH_RECURSION_LEVEL1**(...) CATCH_RECURSION_LEVEL0(CATCH_RECURSION_LEVEL0(CATCH_RECURSION_LEVEL0(__VA_ARGS__)))
- #define **CATCH_RECURSION_LEVEL2**(...) CATCH_RECURSION_LEVEL1(CATCH_RECURSION_LEVEL1(CATCH_RECURSION_LEVEL1(__VA_ARGS__)))
- #define **CATCH_RECURSION_LEVEL3**(...) CATCH_RECURSION_LEVEL2(CATCH_RECURSION_LEVEL2(CATCH_RECURSION_LEVEL2(__VA_ARGS__)))
- #define **CATCH_RECURSION_LEVEL4**(...) CATCH_RECURSION_LEVEL3(CATCH_RECURSION_LEVEL3(CATCH_RECURSION_LEVEL3(__VA_ARGS__)))
- #define **CATCH_RECURSION_LEVEL5**(...) CATCH_RECURSION_LEVEL4(CATCH_RECURSION_LEVEL4(CATCH_RECURSION_LEVEL4(__VA_ARGS__)))
- #define **CATCH_RECURSE**(...) CATCH_RECURSION_LEVEL5(__VA_ARGS__)
- #define **CATCH_REC_END**(...)
- #define **CATCH_REC_OUT**
- #define **CATCH_EMPTY**()
- #define **CATCH_DEFER**(id) id CATCH_EMPTY()
- #define **CATCH_REC_GET_END2**() 0, CATCH_REC_END
- #define **CATCH_REC_GET_END1**(...) CATCH_REC_GET_END2
- #define **CATCH_REC_GET_END**(...) CATCH_REC_GET_END1
- #define **CATCH_REC_NEXT0**(test, next, ...) next CATCH_REC_OUT
- #define **CATCH_REC_NEXT1**(test, next) CATCH_DEFER (CATCH_REC_NEXT0) (test, next, 0)
- #define **CATCH_REC_NEXT**(test, next) CATCH_REC_NEXT1(CATCH_REC_GET_END test, next)
- #define **CATCH_REC_LIST0**(f, x, peek, ...) , f(x) CATCH_DEFER (CATCH_REC_NEXT(peek, CATCH_REC_LIST1)) (f, peek, __VA_ARGS__)
- #define **CATCH_REC_LIST1**(f, x, peek, ...) , f(x) CATCH_DEFER (CATCH_REC_NEXT(peek, CATCH_REC_LIST0)) (f, peek, __VA_ARGS__)
- #define **CATCH_REC_LIST2**(f, x, peek, ...) f(x) CATCH_DEFER (CATCH_REC_NEXT(peek, CATCH_REC_LIST1)) (f, peek, __VA_ARGS__)
- #define **CATCH_REC_LIST0_UD**(f, userdata, x, peek, ...) , f(userdata, x) CATCH_DEFER (CATCH_REC_NEXT(peek, CATCH_REC_LIST1_UD)) (f, userdata, peek, __VA_ARGS__)
- #define **CATCH_REC_LIST1_UD**(f, userdata, x, peek, ...) , f(userdata, x) CATCH_DEFER (CATCH_REC_NEXT(peek, CATCH_REC_LIST0_UD)) (f, userdata, peek, __VA_ARGS__)
- #define **CATCH_REC_LIST2_UD**(f, userdata, x, peek, ...) f(userdata, x) CATCH_DEFER (CATCH_REC_NEXT(peek, CATCH_REC_LIST1_UD)) (f, userdata, peek, __VA_ARGS__)
- #define **CATCH_REC_LIST_UD**(f, userdata, ...) CATCH_RECURSE(CATCH_REC_LIST2_UD(f, userdata, __VA_ARGS__, ()()(), ()()(), ()()(), 0))
- #define **CATCH_REC_LIST**(f, ...) CATCH_RECURSE(CATCH_REC_LIST2(f, __VA_ARGS__, ()()(), ()()(), ()()(), 0))
- #define **INTERNAL_CATCH_STRINGIZE**(...) INTERNAL_CATCH_STRINGIZE2(__VA_ARGS__)
- #define **INTERNAL_CATCH_STRINGIZE2**(...) #__VA_ARGS__
- #define **INTERNAL_CATCH_STRINGIZE_WITHOUT_PARENS**(param) INTERNAL_CATCH_STRINGIZE(INTERNAL_CATCH_REMOVE_PARENS(param))
- #define **INTERNAL_CATCH_MAKE_NAMESPACE2**(...) ns_##__VA_ARGS__
- #define **INTERNAL_CATCH_MAKE_NAMESPACE**(name) INTERNAL_CATCH_MAKE_NAMESPACE2(name)
- #define **INTERNAL_CATCH_MAKE_TYPE_LIST2**(...) decltype(get_wrapper<INTERNAL_CATCH_REMOVE_PARENS_GEN(__VA_ARGS__)>())
- #define **INTERNAL_CATCH_MAKE_TYPE_LIST**(...) INTERNAL_CATCH_MAKE_TYPE_LIST2(INTERNAL_CATCH_REMOVE_PARENS(__VA_ARGS__))
- #define **INTERNAL_CATCH_MAKE_TYPE_LISTS_FROM_TYPES**(...) CATCH_REC_LIST(INTERNAL_CATCH_MAKE_TYPE_LIST,__VA_ARGS__)

- #define **INTERNAL_CATCH_REMOVE_PARENS_1_ARG**(_0) INTERNAL_CATCH_REMOVE_PARENS(↩ _0)
- #define **INTERNAL_CATCH_REMOVE_PARENS_2_ARG**(_0, _1) INTERNAL_CATCH_REMOVE_↩ PARENS(_0), INTERNAL_CATCH_REMOVE_PARENS_1_ARG(_1)
- #define **INTERNAL_CATCH_REMOVE_PARENS_3_ARG**(_0, _1, _2) INTERNAL_CATCH_REMOVE_↩ PARENS(_0), INTERNAL_CATCH_REMOVE_PARENS_2_ARG(_1, _2)
- #define **INTERNAL_CATCH_REMOVE_PARENS_4_ARG**(_0, _1, _2, _3) INTERNAL_CATCH_REMOVE↩ _PARENS(_0), INTERNAL_CATCH_REMOVE_PARENS_3_ARG(_1, _2, _3)
- #define **INTERNAL_CATCH_REMOVE_PARENS_5_ARG**(_0, _1, _2, _3, _4) INTERNAL_CATCH_↩ REMOVE_PARENS(_0), INTERNAL_CATCH_REMOVE_PARENS_4_ARG(_1, _2, _3, _4)
- #define **INTERNAL_CATCH_REMOVE_PARENS_6_ARG**(_0, _1, _2, _3, _4, _5) INTERNAL_CATCH_↩ REMOVE_PARENS(_0), INTERNAL_CATCH_REMOVE_PARENS_5_ARG(_1, _2, _3, _4, _5)
- #define **INTERNAL_CATCH_REMOVE_PARENS_7_ARG**(_0, _1, _2, _3, _4, _5, _6) INTERNAL_CATCH↩ _REMOVE_PARENS(_0), INTERNAL_CATCH_REMOVE_PARENS_6_ARG(_1, _2, _3, _4, _5, _6)
- #define **INTERNAL_CATCH_REMOVE_PARENS_8_ARG**(_0, _1, _2, _3, _4, _5, _6, _7) INTERNAL_↩ CATCH_REMOVE_PARENS(_0), INTERNAL_CATCH_REMOVE_PARENS_7_ARG(_1, _2, _3, _4, _5, _6, _7)
- #define **INTERNAL_CATCH_REMOVE_PARENS_9_ARG**(_0, _1, _2, _3, _4, _5, _6, _7, _8) INTERNAL↩ _CATCH_REMOVE_PARENS(_0), INTERNAL_CATCH_REMOVE_PARENS_8_ARG(_1, _2, _3, _4, _5, _6, _7, _8)
- #define **INTERNAL_CATCH_REMOVE_PARENS_10_ARG**(_0, _1, _2, _3, _4, _5, _6, _7, _8, _↩ 9) INTERNAL_CATCH_REMOVE_PARENS(_0), INTERNAL_CATCH_REMOVE_PARENS_9_ARG(_1, _↩ 2, _3, _4, _5, _6, _7, _8, _9)
- #define **INTERNAL_CATCH_REMOVE_PARENS_11_ARG**(_0, _1, _2, _3, _4, _5, _6, _7, _8, _9, _↩ 10) INTERNAL_CATCH_REMOVE_PARENS(_0), INTERNAL_CATCH_REMOVE_PARENS_10_ARG(_1, ↩ _2, _3, _4, _5, _6, _7, _8, _9, _10)
- #define **INTERNAL_CATCH_VA_NARGS_IMPL**(_0, _1, _2, _3, _4, _5, _6, _7, _8, _9, _10, N, ...) N
- #define **INTERNAL_CATCH_TYPE_GEN**
- #define **INTERNAL_CATCH_NTTP_1**(signature, ...)
- #define **INTERNAL_CATCH_DECLARE_SIG_TEST0**(TestName)
- #define **INTERNAL_CATCH_DECLARE_SIG_TEST1**(TestName, signature)
- #define **INTERNAL_CATCH_DECLARE_SIG_TEST_X**(TestName, signature, ...)
- #define **INTERNAL_CATCH_DEFINE_SIG_TEST0**(TestName)
- #define **INTERNAL_CATCH_DEFINE_SIG_TEST1**(TestName, signature)
- #define **INTERNAL_CATCH_DEFINE_SIG_TEST_X**(TestName, signature, ...)
- #define **INTERNAL_CATCH_NTTP_REGISTER0**(TestFunc, signature)
- #define **INTERNAL_CATCH_NTTP_REGISTER**(TestFunc, signature, ...)
- #define **INTERNAL_CATCH_NTTP_REGISTER_METHOD0**(TestName, signature, ...)
- #define **INTERNAL_CATCH_NTTP_REGISTER_METHOD**(TestName, signature, ...)
- #define **INTERNAL_CATCH_DECLARE_SIG_TEST_METHOD0**(TestName, ClassName)
- #define **INTERNAL_CATCH_DECLARE_SIG_TEST_METHOD1**(TestName, ClassName, signature)
- #define **INTERNAL_CATCH_DECLARE_SIG_TEST_METHOD_X**(TestName, ClassName, signature, ...)
- #define **INTERNAL_CATCH_DEFINE_SIG_TEST_METHOD0**(TestName)
- #define **INTERNAL_CATCH_DEFINE_SIG_TEST_METHOD1**(TestName, signature)
- #define **INTERNAL_CATCH_DEFINE_SIG_TEST_METHOD_X**(TestName, signature, ...)
- #define **INTERNAL_CATCH_NTTP_0**
- #define **INTERNAL_CATCH_NTTP_GEN**(...) INTERNAL_CATCH_VA_NARGS_IMPL(__VA_ARGS↩ __, INTERNAL_CATCH_NTTP_1(__VA_ARGS__), INTERNAL_CATCH_NTTP_1(__VA_ARGS__), INTERNAL_CATCH_NTTP_1(__VA_ARGS__), INTERNAL_CATCH_NTTP_1(__VA_ARGS__), INTERNAL↩ _CATCH_NTTP_1(__VA_ARGS__), INTERNAL_CATCH_NTTP_1(__VA_ARGS__), INTERNAL_CATCH↩ _NTTP_1(__VA_ARGS__), INTERNAL_CATCH_NTTP_1(__VA_ARGS__), INTERNAL_CATCH_NTTP_1(__VA_ARGS__),INTERNAL_CATCH_NTTP_1(__VA_ARGS__), INTERNAL_CATCH_NTTP_0)

- #define **INTERNAL_CATCH_DEFINE_SIG_TEST_METHOD**(TestName, ...) INTERNAL_CATCH_VA_NARGS_IMPL("dummy", __VA_ARGS__, INTERNAL_CATCH_DEFINE_SIG_TEST_METHOD_X,INTERNAL_CATCH_DEFINE_SIG_TEST_METHOD_X, INTERNAL_CATCH_DEFINE_SIG_TEST_METHOD_X, INTERNAL_CATCH_DEFINE_SIG_TEST_METHOD_X, INTERNAL_CATCH_DEFINE_SIG_TEST_METHOD_X, INTERNAL_CATCH_DEFINE_SIG_TEST_METHOD_X,INTERNAL_CATCH_DEFINE_SIG_TEST_METHOD_X,INTERNAL_CATCH_DEFINE_SIG_TEST_METHOD_X, INTERNAL_CATCH_DEFINE_SIG_TEST_METHOD1, INTERNAL_CATCH_DEFINE_SIG_TEST_METHOD0)(TestName, __VA_ARGS__)
- #define **INTERNAL_CATCH_DECLARE_SIG_TEST_METHOD**(TestName, ClassName, ...) INTERNAL_CATCH_VA_NARGS_IMPL("dummy", __VA_ARGS__, INTERNAL_CATCH_DECLARE_SIG_TEST_METHOD_X,INTERNAL_CATCH_DECLARE_SIG_TEST_METHOD_X, INTERNAL_CATCH_DECLARE_SIG_TEST_METHOD_X, INTERNAL_CATCH_DECLARE_SIG_TEST_METHOD_X, INTERNAL_CATCH_DECLARE_SIG_TEST_METHOD_X, INTERNAL_CATCH_DECLARE_SIG_TEST_METHOD_X,INTERNAL_CATCH_DECLARE_SIG_TEST_METHOD_X,INTERNAL_CATCH_DECLARE_SIG_TEST_METHOD_X, INTERNAL_CATCH_DECLARE_SIG_TEST_METHOD1, INTERNAL_CATCH_DECLARE_SIG_TEST_METHOD0)(TestName, ClassName, __VA_ARGS__)
- #define **INTERNAL_CATCH_NTTP_REG_METHOD_GEN**(TestName, ...) INTERNAL_CATCH_VA_NARGS_IMPL("dummy", __VA_ARGS__, INTERNAL_CATCH_NTTP_REGISTER_METHOD, INTERNAL_CATCH_NTTP_REGISTER_METHOD, INTERNAL_CATCH_NTTP_REGISTER_METHOD, INTERNAL_CATCH_NTTP_REGISTER_METHOD, INTERNAL_CATCH_NTTP_REGISTER_METHOD, INTERNAL_CATCH_NTTP_REGISTER_METHOD, INTERNAL_CATCH_NTTP_REGISTER_METHOD, INTERNAL_CATCH_NTTP_REGISTER_METHOD, INTERNAL_CATCH_NTTP_REGISTER_METHOD, INTERNAL_CATCH_NTTP_REGISTER_METHOD0, INTERNAL_CATCH_NTTP_REGISTER_METHOD0)(TestName, __VA_ARGS__)
- #define **INTERNAL_CATCH_NTTP_REG_GEN**(TestFunc, ...) INTERNAL_CATCH_VA_NARGS_IMPL("dummy", __VA_ARGS__, INTERNAL_CATCH_NTTP_REGISTER, INTERNAL_CATCH_NTTP_REGISTER, INTERNAL_CATCH_NTTP_REGISTER, INTERNAL_CATCH_NTTP_REGISTER, INTERNAL_CATCH_NTTP_REGISTER, INTERNAL_CATCH_NTTP_REGISTER, INTERNAL_CATCH_NTTP_REGISTER, INTERNAL_CATCH_NTTP_REGISTER, INTERNAL_CATCH_NTTP_REGISTER, INTERNAL_CATCH_NTTP_REGISTER0, INTERNAL_CATCH_NTTP_REGISTER0)(TestFunc, __VA_ARGS__)
- #define **INTERNAL_CATCH_DEFINE_SIG_TEST**(TestName, ...) INTERNAL_CATCH_VA_NARGS_IMPL("dummy", __VA_ARGS__, INTERNAL_CATCH_DEFINE_SIG_TEST_X, INTERNAL_CATCH_DEFINE_SIG_TEST_X, INTERNAL_CATCH_DEFINE_SIG_TEST_X, INTERNAL_CATCH_DEFINE_SIG_TEST_X, INTERNAL_CATCH_DEFINE_SIG_TEST_X, INTERNAL_CATCH_DEFINE_SIG_TEST_X, INTERNAL_CATCH_DEFINE_SIG_TEST_X, INTERNAL_CATCH_DEFINE_SIG_TEST_X,INTERNAL_CATCH_DEFINE_SIG_TEST_X,INTERNAL_CATCH_DEFINE_SIG_TEST1, INTERNAL_CATCH_DEFINE_SIG_TEST0)(TestName, __VA_ARGS__)
- #define **INTERNAL_CATCH_DECLARE_SIG_TEST**(TestName, ...) INTERNAL_CATCH_VA_NARGS_IMPL("dummy", __VA_ARGS__, INTERNAL_CATCH_DECLARE_SIG_TEST_X,INTERNAL_CATCH_DECLARE_SIG_TEST_X, INTERNAL_CATCH_DECLARE_SIG_TEST_X, INTERNAL_CATCH_DECLARE_SIG_TEST_X, INTERNAL_CATCH_DECLARE_SIG_TEST_X, INTERNAL_CATCH_DECLARE_SIG_TEST_X, INTERNAL_CATCH_DEFINE_SIG_TEST_X,INTERNAL_CATCH_DECLARE_SIG_TEST_X,INTERNAL_CATCH_DECLARE_SIG_TEST_X, INTERNAL_CATCH_DECLARE_SIG_TEST1, INTERNAL_CATCH_DECLARE_SIG_TEST0)(TestName, __VA_ARGS__)
- #define **INTERNAL_CATCH_REMOVE_PARENS_GEN**(...) INTERNAL_CATCH_VA_NARGS_IMPL(__VA_ARGS__, INTERNAL_CATCH_REMOVE_PARENS_11_ARG,INTERNAL_CATCH_REMOVE_PARENS_10_ARG,INTERNAL_CATCH_REMOVE_PARENS_9_ARG,INTERNAL_CATCH_REMOVE_PARENS_8_ARG,INTERNAL_CATCH_REMOVE_PARENS_7_ARG,INTERNAL_CATCH_REMOVE_PARENS_6_ARG,INTERNAL_CATCH_REMOVE_PARENS_5_ARG,INTERNAL_CATCH_REMOVE_PARENS_4_ARG,INTERNAL_CATCH_REMOVE_PARENS_3_ARG,INTERNAL_CATCH_REMOVE_PARENS_2_ARG,INTERNAL_CATCH_REMOVE_PARENS_1_ARG)(__VA_ARGS__)
- #define **INTERNAL_CATCH_TEMPLATE_TEST_CASE_2**(TestName, TestFunc, Name, Tags, Signature, ...)
- #define **INTERNAL_CATCH_TEMPLATE_TEST_CASE**(Name, Tags, ...) INTERNAL_CATCH_TEMPLATE_TEST_CASE_2(INTERNAL_CATCH_UNIQUE_NAME(CATCH2_INTERNAL_TEMPLATE_TEST_), INTERNAL_CATCH_UNIQUE_NAME(CATCH2_INTERNAL_TEMPLATE_TEST_), Name, Tags, typename TestType, __VA_ARGS__)

- #define **INTERNAL_CATCH_TEMPLATE_TEST_CASE_SIG**(Name, Tags, Signature, ...) INTERNAL_CATCH_TEMPLATE_TEST_CASE_2(INTERNAL_CATCH_UNIQUE_NAME(CATCH2_INTERNAL_TEMPLATE_TEST_), INTERNAL_CATCH_UNIQUE_NAME(CATCH2_INTERNAL_TEMPLATE_TEST_), Name, Tags, Signature, __VA_ARGS__)
- #define **INTERNAL_CATCH_TEMPLATE_PRODUCT_TEST_CASE2**(TestName, TestFuncName, Name, Tags, Signature, TmplTypes, TypesList)
- #define **INTERNAL_CATCH_TEMPLATE_PRODUCT_TEST_CASE**(Name, Tags, ...) INTERNAL_CATCH_TEMPLATE_PRODUCT_TEST_CASE2(INTERNAL_CATCH_UNIQUE_NAME(CATCH2_INTERNAL_TEMPLATE_TEST_), INTERNAL_CATCH_UNIQUE_NAME(CATCH2_INTERNAL_TEMPLATE_TEST_), Name, Tags, typename T,__VA_ARGS__)
- #define **INTERNAL_CATCH_TEMPLATE_PRODUCT_TEST_CASE_SIG**(Name, Tags, Signature, ...) INTERNAL_CATCH_TEMPLATE_PRODUCT_TEST_CASE2(INTERNAL_CATCH_UNIQUE_NAME(CATCH2_INTERNAL_TEMPLATE_TEST_), INTERNAL_CATCH_UNIQUE_NAME(CATCH2_INTERNAL_TEMPLATE_TEST_), Name, Tags, Signature, __VA_ARGS__)
- #define **INTERNAL_CATCH_TEMPLATE_LIST_TEST_CASE_2**(TestName, TestFunc, Name, Tags, TmplList)
- #define **INTERNAL_CATCH_TEMPLATE_LIST_TEST_CASE**(Name, Tags, TmplList) INTERNAL_CATCH_TEMPLATE_LIST_TEST_CASE_2(INTERNAL_CATCH_UNIQUE_NAME(CATCH2_INTERNAL_TEMPLATE_TEST_), INTERNAL_CATCH_UNIQUE_NAME(CATCH2_INTERNAL_TEMPLATE_TEST_), Name, Tags, TmplList)
- #define **INTERNAL_CATCH_TEMPLATE_TEST_CASE_METHOD_2**(TestNameClass, TestName, ClassName, Name, Tags, Signature, ...)
- #define **INTERNAL_CATCH_TEMPLATE_TEST_CASE_METHOD**(ClassName, Name, Tags, ...) INTERNAL_CATCH_TEMPLATE_TEST_CASE_METHOD_2(INTERNAL_CATCH_UNIQUE_NAME(CATCH2_INTERNAL_TEMPLATE_TEST_CLASS_), INTERNAL_CATCH_UNIQUE_NAME(CATCH2_INTERNAL_TEMPLATE_TEST_) , ClassName, Name, Tags, typename T, __VA_ARGS__)
- #define **INTERNAL_CATCH_TEMPLATE_TEST_CASE_METHOD_SIG**(ClassName, Name, Tags, Signature, ...) INTERNAL_CATCH_TEMPLATE_TEST_CASE_METHOD_2(INTERNAL_CATCH_UNIQUE_NAME(CATCH2_INTERNAL_TEMPLATE_TEST_CLASS_), INTERNAL_CATCH_UNIQUE_NAME(CATCH2_INTERNAL_TEMPLATE_TEST_) , ClassName, Name, Tags, Signature, __VA_ARGS__)
- #define **INTERNAL_CATCH_TEMPLATE_PRODUCT_TEST_CASE_METHOD_2**(TestNameClass, TestName, ClassName, Name, Tags, Signature, TmplTypes, TypesList)
- #define **INTERNAL_CATCH_TEMPLATE_PRODUCT_TEST_CASE_METHOD**(ClassName, Name, Tags, ...) INTERNAL_CATCH_TEMPLATE_PRODUCT_TEST_CASE_METHOD_2(INTERNAL_CATCH_UNIQUE_NAME(CATCH2_INTERNAL_TEMPLATE_TEST_), INTERNAL_CATCH_UNIQUE_NAME(CATCH2_INTERNAL_TEMPLATE_TEST_), ClassName, Name, Tags, typename T, __VA_ARGS__)
- #define **INTERNAL_CATCH_TEMPLATE_PRODUCT_TEST_CASE_METHOD_SIG**(ClassName, Name, Tags, Signature, ...) INTERNAL_CATCH_TEMPLATE_PRODUCT_TEST_CASE_METHOD_2(INTERNAL_CATCH_UNIQUE_NAME(CATCH2_INTERNAL_TEMPLATE_TEST_), INTERNAL_CATCH_UNIQUE_NAME(CATCH2_INTERNAL_TEMPLATE_TEST_), ClassName, Name, Tags, Signature, __VA_ARGS__)
- #define **INTERNAL_CATCH_TEMPLATE_LIST_TEST_CASE_METHOD_2**(TestNameClass, TestName, ClassName, Name, Tags, TmplList)
- #define **INTERNAL_CATCH_TEMPLATE_LIST_TEST_CASE_METHOD**(ClassName, Name, Tags, TmplList) INTERNAL_CATCH_TEMPLATE_LIST_TEST_CASE_METHOD_2(INTERNAL_CATCH_UNIQUE_NAME(CATCH2_INTERNAL_TEMPLATE_TEST_), INTERNAL_CATCH_UNIQUE_NAME(CATCH2_INTERNAL_TEMPLATE_TEST_), ClassName, Name, Tags, TmplList)
- #define **TEMPLATE_TEST_CASE**(...) INTERNAL_CATCH_TEMPLATE_TEST_CASE(__VA_ARGS__)
- #define **TEMPLATE_TEST_CASE_SIG**(...) INTERNAL_CATCH_TEMPLATE_TEST_CASE_SIG(__VA_ARGS__)
- #define **TEMPLATE_TEST_CASE_METHOD**(className, ...) INTERNAL_CATCH_TEMPLATE_TEST_CASE_METHOD(className, __VA_ARGS__)
- #define **TEMPLATE_TEST_CASE_METHOD_SIG**(className, ...) INTERNAL_CATCH_TEMPLATE_TEST_CASE_METHOD_SIG(className, __VA_ARGS__)
- #define **TEMPLATE_PRODUCT_TEST_CASE**(...) INTERNAL_CATCH_TEMPLATE_PRODUCT_TEST_CASE(__VA_ARGS__)

- #define **TEMPLATE_PRODUCT_TEST_CASE_SIG**(...) INTERNAL_CATCH_TEMPLATE_PRODUCT_TEST_CASE_SIG(__VA_ARGS__)
- #define **TEMPLATE_PRODUCT_TEST_CASE_METHOD**(className, ...) INTERNAL_CATCH_TEMPLATE_PRODUCT_TEST_CASE_METHOD(className, __VA_ARGS__)
- #define **TEMPLATE_PRODUCT_TEST_CASE_METHOD_SIG**(className, ...) INTERNAL_CATCH_TEMPLATE_PRODUCT_TEST_CASE_METHOD_SIG(className, __VA_ARGS__)
- #define **TEMPLATE_LIST_TEST_CASE**(...) INTERNAL_CATCH_TEMPLATE_LIST_TEST_CASE(__VA_ARGS__)
- #define **TEMPLATE_LIST_TEST_CASE_METHOD**(className, ...) INTERNAL_CATCH_TEMPLATE_LIST_TEST_CASE_METHOD(className, __VA_ARGS__)
- #define **CATCH_TEST_CASE_INFO_HPP_INCLUDED**
- #define **CATCH_TRANSLATE_EXCEPTION_HPP_INCLUDED**
- #define **CATCH_INTERFACES_EXCEPTION_HPP_INCLUDED**
- #define **INTERNAL_CATCH_TRANSLATE_EXCEPTION2**(translatorName, signature)
- #define **INTERNAL_CATCH_TRANSLATE_EXCEPTION**(signature) INTERNAL_CATCH_TRANSLATE_EXCEPTION2(INTERNAL_CATCH_UNIQUE_NAME(catch_internal_ExceptionTranslator), signature)
- #define **CATCH_TRANSLATE_EXCEPTION**(signature) INTERNAL_CATCH_TRANSLATE_EXCEPTION(signature)
- #define **CATCH_VERSION_HPP_INCLUDED**
- #define **CATCH_VERSION_MACROS_HPP_INCLUDED**
- #define **CATCH_VERSION_MAJOR** 3
- #define **CATCH_VERSION_MINOR** 0
- #define **CATCH_VERSION_PATCH** 1
- #define **CATCH_GENERATORS_ALL_HPP_INCLUDED**
- #define **CATCH_GENERATOR_EXCEPTION_HPP_INCLUDED**
- #define **CATCH_GENERATORS_HPP_INCLUDED**
- #define **CATCH_INTERFACES_GENERATORTRACKER_HPP_INCLUDED**
- #define **GENERATE**(...)
- #define **GENERATE_COPY**(...)
- #define **GENERATE_REF**(...)
- #define **CATCH_GENERATORS_ADAPTERS_HPP_INCLUDED**
- #define **CATCH_GENERATORS_RANDOM_HPP_INCLUDED**
- #define **CATCH_RANDOM_NUMBER_GENERATOR_HPP_INCLUDED**
- #define **CATCH_GENERATORS_RANGE_HPP_INCLUDED**
- #define **CATCH_INTERFACES_ALL_HPP_INCLUDED**
- #define **CATCH_INTERFACES_REPORTER_FACTORY_HPP_INCLUDED**
- #define **CATCH_INTERFACES_REPORTER_REGISTRY_HPP_INCLUDED**
- #define **CATCH_CASE_INSENSITIVE_COMPARISONS_HPP_INCLUDED**
- #define **CATCH_INTERFACES_TAG_ALIAS_REGISTRY_HPP_INCLUDED**
- #define **CATCH_CONFIG_ANDROID_LOGWRITE_HPP_INCLUDED**
- #define **CATCH_CONFIG_UNCAUGHT_EXCEPTIONS_HPP_INCLUDED**
- #define **CATCH_CONSOLE_WIDTH_HPP_INCLUDED**
- #define **CATCH_CONFIG_CONSOLE_WIDTH** 80
- #define **CATCH_CONTAINER_NONMEMBERS_HPP_INCLUDED**
- #define **CATCH_CONFIG_POLYFILL_NONMEMBER_CONTAINER_ACCESS**
- #define **CATCH_DEBUG_CONSOLE_HPP_INCLUDED**
- #define **CATCH_DEBUGGER_HPP_INCLUDED**
- #define **CATCH_BREAK_INTO_DEBUGGER**() []{}()
- #define **CATCH_ENFORCE_HPP_INCLUDED**
- #define **CATCH_MAKE_MSG**(...) (Catch::ReusableStringStream() << __VA_ARGS__).str()
- #define **CATCH_INTERNAL_ERROR**(...) Catch::throw_logic_error(CATCH_MAKE_MSG(CATCH_INTERNAL_LINEINFO << ": Internal Catch2 error: " << __VA_ARGS__))
- #define **CATCH_ERROR**(...) Catch::throw_domain_error(CATCH_MAKE_MSG(__VA_ARGS__))
- #define **CATCH_RUNTIME_ERROR**(...) Catch::throw_runtime_error(CATCH_MAKE_MSG(__VA_ARGS__))

- #define **CATCH_ENFORCE**(condition, ...) do{ if(!(condition)) CATCH_ERROR(__VA_ARGS__); } while(false)
- #define **CATCH_ENUM_VALUES_REGISTRY_HPP_INCLUDED**
- #define **CATCH_ERRNO_GUARD_HPP_INCLUDED**
- #define **CATCH_EXCEPTION_TRANSLATOR_REGISTRY_HPP_INCLUDED**
- #define **CATCH_FATAL_CONDITION_HANDLER_HPP_INCLUDED**
- #define **CATCH_FLOATING_POINT_HELPERS_HPP_INCLUDED**
- #define **CATCH_POLYFILLS_HPP_INCLUDED**
- #define **CATCH_ISTREAM_HPP_INCLUDED**
- #define **CATCH_LEAK_DETECTOR_HPP_INCLUDED**
- #define **CATCH_LIST_HPP_INCLUDED**
- #define **CATCH_OUTPUT_REDIRECT_HPP_INCLUDED**
- #define **CATCH_REPORTER_REGISTRY_HPP_INCLUDED**
- #define **CATCH_RUN_CONTEXT_HPP_INCLUDED**
- #define **CATCH_TEST_CASE_TRACKER_HPP_INCLUDED**
- #define **CATCH_SHARDING_HPP_INCLUDED**
- #define **CATCH_SINGLETONS_HPP_INCLUDED**
- #define **CATCH_STARTUP_EXCEPTION_REGISTRY_HPP_INCLUDED**
- #define **CATCH_STDSTREAMS_HPP_INCLUDED**
- #define **CATCH_STRING_MANIP_HPP_INCLUDED**
- #define **CATCH_TAG_ALIAS_REGISTRY_HPP_INCLUDED**
- #define **CATCH_TEST_CASE_INFO_HASHER_HPP_INCLUDED**
- #define **CATCH_TEST_CASE_REGISTRY_IMPL_HPP_INCLUDED**
- #define **CATCH_TEST_SPEC_PARSER_HPP_INCLUDED**
- #define **CATCH_TEXTFLOW_HPP_INCLUDED**
- #define **CATCH_TO_STRING_HPP_INCLUDED**
- #define **CATCH_UNCAUGHT_EXCEPTIONS_HPP_INCLUDED**
- #define **CATCH_WINDOWS_H_PROXY_HPP_INCLUDED**
- #define **CATCH_XMLWRITER_HPP_INCLUDED**
- #define **CATCH_MATCHERS_ALL_HPP_INCLUDED**
- #define **CATCH_MATCHERS_HPP_INCLUDED**
- #define **CATCH_MATCHERS_IMPL_HPP_INCLUDED**
- #define **INTERNAL_CHECK_THAT**(macroName, matcher, resultDisposition, arg)
- #define **INTERNAL_CATCH_THROWS_MATCHES**(macroName, exceptionType, resultDisposition, matcher, ...)
- #define **REQUIRE_THROWS_WITH**(expr, matcher) INTERNAL_CATCH_THROWS_STR_MATCHES("REQUIRE_THROWS_WITH", Catch::ResultDisposition::Normal, matcher, expr)
- #define **REQUIRE_THROWS_MATCHES**(expr, exceptionType, matcher) INTERNAL_CATCH_THROWS_↩ MATCHES("REQUIRE_THROWS_MATCHES", exceptionType, Catch::ResultDisposition::Normal, matcher, expr)
- #define **CHECK_THROWS_WITH**(expr, matcher) INTERNAL_CATCH_THROWS_STR_MATCHES("CHECK_THROWS_WITH", Catch::ResultDisposition::ContinueOnFailure, matcher, expr)
- #define **CHECK_THROWS_MATCHES**(expr, exceptionType, matcher) INTERNAL_CATCH_THROWS_↩ MATCHES("CHECK_THROWS_MATCHES", exceptionType, Catch::ResultDisposition::ContinueOnFailure, matcher, expr)
- #define **CHECK_THAT**(arg, matcher) INTERNAL_CHECK_THAT("CHECK_THAT", matcher, Catch::↩ ResultDisposition::ContinueOnFailure, arg)
- #define **REQUIRE_THAT**(arg, matcher) INTERNAL_CHECK_THAT("REQUIRE_THAT", matcher, Catch::↩ ResultDisposition::Normal, arg)
- #define **CATCH_MATCHERS_CONTAINER_PROPERTIES_HPP_INCLUDED**
- #define **CATCH_MATCHERS_TEMPLATED_HPP_INCLUDED**
- #define **CATCH_MATCHERS_CONTAINS_HPP_INCLUDED**
- #define **CATCH_MATCHERS_EXCEPTION_HPP_INCLUDED**
- #define **CATCH_MATCHERS_FLOATING_POINT_HPP_INCLUDED**
- #define **CATCH_MATCHERS_PREDICATE_HPP_INCLUDED**

- #define **CATCH_MATCHERS_QUANTIFIERS_HPP_INCLUDED**
- #define **CATCH_MATCHERS_STRING_HPP_INCLUDED**
- #define **CATCH_MATCHERS_VECTOR_HPP_INCLUDED**
- #define **CATCH_REPORTERS_ALL_HPP_INCLUDED**
- #define **CATCH_REPORTER_AUTOMAKE_HPP_INCLUDED**
- #define **CATCH_REPORTER_STREAMING_BASE_HPP_INCLUDED**
- #define **CATCH_REPORTER_COMMON_BASE_HPP_INCLUDED**
- #define **CATCH_REPORTER_COMPACT_HPP_INCLUDED**
- #define **CATCH_REPORTER_CONSOLE_HPP_INCLUDED**
- #define **CATCH_REPORTER_CUMULATIVE_BASE_HPP_INCLUDED**
- #define **CATCH_REPORTER_EVENT_LISTENER_HPP_INCLUDED**
- #define **CATCH_REPORTER_HELPERS_HPP_INCLUDED**
- #define **CATCH_REPORTER_JUNIT_HPP_INCLUDED**
- #define **CATCH_REPORTER_MULTI_HPP_INCLUDED**
- #define **CATCH_REPORTER_REGISTRARS_HPP_INCLUDED**
- #define **CATCH_REGISTER_REPORTER**(name, reporterType)
- #define **CATCH_REGISTER_LISTENER**(listenerType)
- #define **CATCH_REPORTER_SONARQUBE_HPP_INCLUDED**
- #define **CATCH_REPORTER_TAP_HPP_INCLUDED**
- #define **CATCH_REPORTER_TEAMCITY_HPP_INCLUDED**
- #define **CATCH_REPORTER_XML_HPP_INCLUDED**

Typedefs

- using **Catch::IEventListenerPtr** = Detail::unique_ptr< IEventListener >
- template<typename Clock >
  using **Catch::Benchmark::ClockDuration** = typename Clock::duration
- template<typename Clock >
  using **Catch::Benchmark::FloatDuration** = std::chrono::duration< double, typename Clock::period >
- template<typename Clock >
  using **Catch::Benchmark::TimePoint** = typename Clock::time_point
- using **Catch::Benchmark::default_clock** = std::chrono::steady_clock
- using **Catch::Benchmark::fp_seconds** = std::chrono::duration< double, std::ratio< 1 > >
- template<typename Func , typename... U>
  using **Catch::FunctionReturnType** = std::remove_reference_t< std::remove_cv_t< std::result_of_t< Func(U...)> >>
- using **Catch::IReporterFactoryPtr** = Detail::unique_ptr< IReporterFactory >
- template<typename T >
  using **Catch::Benchmark::Detail::CompleteType_t** = typename CompleteType< T >::type
- template<typename Clock , typename Func , typename... Args>
  using **Catch::Benchmark::TimingOf** = Timing< ClockDuration< Clock >, Detail::CompleteType_t< FunctionReturnType< Func, Args... > >>
- template<typename Clock , typename Fun >
  using **Catch::Benchmark::Detail::run_for_at_least_argument_t** = std::conditional_t< is_callable< Fun(Chronometer)>::value, Chronometer, int >
- using **Catch::Benchmark::Detail::sample** = std::vector< double >
- template<typename T >
  using **Catch::Benchmark::storage_for** = Detail::ObjectStorage< T, true >
- template<typename T >
  using **Catch::Benchmark::destructable_object** = Detail::ObjectStorage< T, false >
- template<typename... Ts>
  using **Catch::Detail::void_t** = typename make_void< Ts... >::type
- using **Catch::Clara::Detail::Result** = BasicResult< void >
- using **Catch::Clara::Detail::ParserResult** = BasicResult< ParseResultType >

- using **Catch::Clara::Detail::InternalParseResult** = BasicResult< ParseState >
- using **Catch::exceptionTranslateFunction** = std::string(∗)()
- using **Catch::ExceptionTranslators** = std::vector< Detail::unique_ptr< IExceptionTranslator const > >
- using **Catch::Generators::GeneratorBasePtr** = Catch::Detail::unique_ptr< GeneratorUntypedBase >
- template<typename T >
  using **Catch::Generators::GeneratorPtr** = Catch::Detail::unique_ptr< IGenerator< T > >
- using **Catch::TestCaseTracking::ITrackerPtr** = Catch::Detail::unique_ptr< ITracker >
- using **Catch::StringMatcher** = Matchers::MatcherBase< std::string >
- template<typename T >
  using **Catch::Matchers::Detail::is_generic_matcher** = std::is_base_of< Catch::Matchers::MatcherGenericBase, std::remove_cv_t< std::remove_reference_t< T > > >
- template<typename... Ts>
  using **Catch::Matchers::Detail::are_generic_matchers** = conjunction< is_generic_matcher< Ts >... >
- template<typename T >
  using **Catch::Matchers::Detail::is_matcher** = std::is_base_of< Catch::Matchers::MatcherUntypedBase, std::remove_cv_t< std::remove_reference_t< T > > >

Enumerations

- enum class **Verbosity** { **Quiet** = 0 , **Normal** , **High** }
- enum class **ShowDurations** { **DefaultForReporter** , **Always** , **Never** }
- enum class **TestRunOrder** { **Declared** , **LexicographicallySorted** , **Randomized** }
- enum class Catch::ColourMode : std::uint8_t { PlatformDefault , ANSI , Win32 , None }
- enum class **CaseSensitive** { **Yes** , **No** }
- enum class Catch::GenerateFrom { **Time** , **RandomDevice** , Default }
- enum class **ParseResultType** { **Matched** , **NoMatch** , **ShortCircuitAll** , **ShortCircuitSame** }
- enum class **TokenType** { **Option** , **Argument** }
- enum class Catch::Clara::Detail::ResultType { Ok , LogicError , RuntimeError }

  Denotes type of a parsing result.
- enum class **Optionality** { **Optional** , **Required** }
- enum class **TestCaseProperties** : uint8_t {
  None = 0 , **IsHidden** = 1 << 1 , **ShouldFail** = 1 << 2 , **MayFail** = 1 << 3 ,
  Throws = 1 << 4 , **NonPortable** = 1 << 5 , **Benchmark** = 1 << 6 }
- enum class **XmlFormatting** { **None** = 0x00 , **Indent** = 0x01 , **Newline** = 0x02 }

Functions

- constexpr auto **Catch::operator""_sr** (char const ∗rawChars, std::size_t size) noexcept -> StringRef
- constexpr auto **operator""_catch_sr** (char const ∗rawChars, std::size_t size) noexcept -> Catch::StringRef
- IMutableContext & **Catch::getCurrentMutableContext** ()
- IContext & **Catch::getCurrentContext** ()
- void **Catch::cleanUpContext** ()
- SimplePcg32 & **Catch::sharedRng** ()
- bool **Catch::isOk** (ResultWas::OfType resultType)
- bool **Catch::isJustInfo** (int flags)
- ResultDisposition::Flags **Catch::operator|** (ResultDisposition::Flags lhs, ResultDisposition::Flags rhs)
- bool **Catch::shouldContinueOnFailure** (int flags)
- bool **Catch::isFalseTest** (int flags)
- bool **Catch::shouldSuppressFailure** (int flags)
- IResultCapture & **Catch::getResultCapture** ()
- template<typename T , typename... Args>
  unique_ptr< T > **Catch::Detail::make_unique** (Args &&... args)

- template<typename T >
  void **Catch::Benchmark::deoptimize_value** (T &&x)
- template<typename Fn , typename... Args>
  auto **Catch::Benchmark::invoke_deoptimized** (Fn &&fn, Args &&... args) -> std::enable_if_t<!std::is_↩
  same< void, decltype(fn(args...))>::value >
- IRegistryHub const & **Catch::getRegistryHub** ()
- IMutableRegistryHub & **Catch::getMutableRegistryHub** ()
- void **Catch::cleanUp** ()
- std::string **Catch::translateActiveException** ()
- template<typename Fun , typename... Args>
  CompleteType_t< FunctionReturnType< Fun, Args... > > **Catch::Benchmark::Detail::complete_invoke** (Fun &&fun, Args &&... args)
- template<typename Fun >
  Detail::CompleteType_t< FunctionReturnType< Fun > > **Catch::Benchmark::user_code** (Fun &&fun)
- template<typename Fun >
  repeater< std::decay_t< Fun > > **Catch::Benchmark::Detail::repeat** (Fun &&fun)
- template<typename Clock , typename Fun , typename... Args>
  TimingOf< Clock, Fun, Args... > **Catch::Benchmark::Detail::measure** (Fun &&fun, Args &&... args)
- template<typename Clock , typename Fun >
  TimingOf< Clock, Fun, int > **Catch::Benchmark::Detail::measure_one** (Fun &&fun, int iters, std::false_↩
  type)
- template<typename Clock , typename Fun >
  TimingOf< Clock, Fun, Chronometer > **Catch::Benchmark::Detail::measure_one** (Fun &&fun, int iters, std::true_type)
- void **Catch::Benchmark::Detail::throw_optimized_away_error** ()
- template<typename Clock , typename Fun >
  TimingOf< Clock, Fun, run_for_at_least_argument_t< Clock, Fun > > **Catch::Benchmark::Detail::run_↩
  for_at_least** (ClockDuration< Clock > how_long, const int initial_iterations, Fun &&fun)
- bool **Catch::Benchmark::Detail::directCompare** (double lhs, double rhs)
- double **Catch::Benchmark::Detail::weighted_average_quantile** (int k, int q, std::vector< double >↩
  ::iterator first, std::vector< double >::iterator last)
- template<typename Iterator >
  OutlierClassification **Catch::Benchmark::Detail::classify_outliers** (Iterator first, Iterator last)
- template<typename Iterator >
  double **Catch::Benchmark::Detail::mean** (Iterator first, Iterator last)
- template<typename Estimator , typename Iterator >
  sample **Catch::Benchmark::Detail::jackknife** (Estimator &&estimator, Iterator first, Iterator last)
- double **Catch::Benchmark::Detail::normal_cdf** (double x)
- double **Catch::Benchmark::Detail::erfc_inv** (double x)
- double **Catch::Benchmark::Detail::normal_quantile** (double p)
- template<typename Iterator , typename Estimator >
  Estimate< double > **Catch::Benchmark::Detail::bootstrap** (double confidence_level, Iterator first, Iterator last, sample const &resample, Estimator &&estimator)
- double **Catch::Benchmark::Detail::outlier_variance** (Estimate< double > mean, Estimate< double > stddev, int n)
- bootstrap_analysis **Catch::Benchmark::Detail::analyse_samples** (double confidence_level, unsigned int n_resamples, std::vector< double >::iterator first, std::vector< double >::iterator last)
- template<typename Clock >
  std::vector< double > **Catch::Benchmark::Detail::resolution** (int k)
- template<typename Clock >
  int **Catch::Benchmark::Detail::warmup** ()
- template<typename Clock >
  EnvironmentEstimate< FloatDuration< Clock > > **Catch::Benchmark::Detail::estimate_clock_↩
  resolution** (int iterations)
- template<typename Clock >
  EnvironmentEstimate< FloatDuration< Clock > > **Catch::Benchmark::Detail::estimate_clock_cost** (FloatDuration< Clock > resolution)

- template<typename Clock >
  Environment< FloatDuration< Clock > > **Catch::Benchmark::Detail::measure_environment** ()
- template<typename Duration , typename Iterator >
  SampleAnalysis< Duration > **Catch::Benchmark::Detail::analyse** (const IConfig &cfg, Environment< Duration >, Iterator first, Iterator last)
- std::ostream & **operator**<< (std::ostream &, Catch_global_namespace_dummy)
- std::string Catch::Detail::convertIntoString (StringRef string, bool escapeInvisibles)

  Encases `string in quotes, and optionally escapes invisibles.
- std::string Catch::Detail::convertIntoString (StringRef string)
- std::string **Catch::Detail::rawMemoryToString** (const void *object, std::size_t size)
- template<typename T >
  std::string **Catch::Detail::rawMemoryToString** (const T &object)
- template<typename E >
  std::string **Catch::Detail::convertUnknownEnumToString** (E e)
- template<typename T >
  std::enable_if_t< !std::is_enum< T >::value &&!std::is_base_of< std::exception, T >::value, std::string > **Catch::Detail::convertUnstreamable** (T const &)
- template<typename T >
  std::enable_if_t< !std::is_enum< T >::value &&std::is_base_of< std::exception, T >::value, std::string > **Catch::Detail::convertUnstreamable** (T const &ex)
- template<typename T >
  std::enable_if_t< std::is_enum< T >::value, std::string > **Catch::Detail::convertUnstreamable** (T const &value)
- template<typename T >
  std::string **Catch::Detail::stringify** (const T &e)
- template<typename InputIterator , typename Sentinel = InputIterator>
  std::string **Catch::Detail::rangeToString** (InputIterator first, Sentinel last)
- template<typename Range >
  std::string **Catch::rangeToString** (Range const &range)
- template<typename Allocator >
  std::string **Catch::rangeToString** (std::vector< bool, Allocator > const &v)
- Approx **Catch::literals::operator""_a** (long double val)
- Approx **Catch::literals::operator""_a** (unsigned long long val)
- std::uint32_t **Catch::generateRandomSeed** (GenerateFrom from)
- Detail::unique_ptr< ColourImpl > Catch::makeColourImpl (ColourMode colourSelection, IStream *stream)

  Provides ColourImpl based on global config and target compilation platform.
- bool Catch::isColourImplAvailable (ColourMode colourSelection)

  Checks if specific colour impl has been compiled into the binary.
- std::vector< std::string > Catch::Detail::splitReporterSpec (StringRef reporterSpec)

  Splits the reporter spec into reporter name and kv-pair options.
- Optional< ColourMode > **Catch::Detail::stringToColourMode** (StringRef colourMode)
- Optional< ReporterSpec > Catch::parseReporterSpec (StringRef reporterSpec)
- template<typename T >
  ParserResult **Catch::Clara::Detail::convertInto** (std::string const &source, T &target)
- ParserResult **Catch::Clara::Detail::convertInto** (std::string const &source, std::string &target)
- ParserResult **Catch::Clara::Detail::convertInto** (std::string const &source, bool &target)
- template<typename ArgType , typename L >
  auto **Catch::Clara::Detail::invokeLambda** (L const &lambda, std::string const &arg) -> ParserResult
- Clara::Parser **Catch::makeCommandLineParser** (ConfigData &config)
- void **Catch::formatReconstructedExpression** (std::ostream &os, std::string const &lhs, StringRef op, std::string const &rhs)
- template<typename LhsT , typename RhsT >
  auto **Catch::compareEqual** (LhsT const &lhs, RhsT const &rhs) -> bool
- template<typename T >
  auto **Catch::compareEqual** (T *const &lhs, int rhs) -> bool

- template<typename T >
  auto **Catch::compareEqual** (T ∗const &lhs, long rhs) -> bool
- template<typename T >
  auto **Catch::compareEqual** (int lhs, T ∗const &rhs) -> bool
- template<typename T >
  auto **Catch::compareEqual** (long lhs, T ∗const &rhs) -> bool
- template<typename LhsT , typename RhsT >
  auto **Catch::compareNotEqual** (LhsT const &lhs, RhsT &&rhs) -> bool
- template<typename T >
  auto **Catch::compareNotEqual** (T ∗const &lhs, int rhs) -> bool
- template<typename T >
  auto **Catch::compareNotEqual** (T ∗const &lhs, long rhs) -> bool
- template<typename T >
  auto **Catch::compareNotEqual** (int lhs, T ∗const &rhs) -> bool
- template<typename T >
  auto **Catch::compareNotEqual** (long lhs, T ∗const &rhs) -> bool
- void **Catch::handleExceptionMatchExpr** (AssertionHandler &handler, std::string const &str, StringRef matcherString)
- bool **Catch::isThrowSafe** (TestCaseHandle const &testCase, IConfig const &config)
- bool **Catch::matchTest** (TestCaseHandle const &testCase, TestSpec const &testSpec, IConfig const &config)
- std::vector< TestCaseHandle > **Catch::filterTests** (std::vector< TestCaseHandle > const &testCases, TestSpec const &testSpec, IConfig const &config)
- std::vector< TestCaseHandle > const & **Catch::getAllTestCasesSorted** (IConfig const &config)
- Detail::unique_ptr< ITestInvoker > **Catch::makeTestInvoker** (void(∗testAsFunction)())
- template<typename C >
  Detail::unique_ptr< ITestInvoker > **Catch::makeTestInvoker** (void(C::∗testAsMethod)())
- Detail::unique_ptr< TestCaseInfo > **Catch::makeTestCaseInfo** (StringRef className, NameAndTags const &nameAndTags, SourceLineInfo const &lineInfo)
- Version const & **Catch::libraryVersion** ()
- void Catch::Generators::Detail::throw_generator_exception (char const ∗msg)

  Throws GeneratorException with the provided message.
- template<typename T , typename DecayedT = std::decay_t<T>>
  GeneratorWrapper< DecayedT > **Catch::Generators::value** (T &&value)
- template<typename T >
  GeneratorWrapper< T > **Catch::Generators::values** (std::initializer_list< T > values)
- template<typename... Ts>
  GeneratorWrapper< std::tuple< std::decay_t< Ts >... > > **Catch::Generators::table** (std::initializer_list< std::tuple< std::decay_t< Ts >... >> tuples)
- template<typename T , typename... Gs>
  auto **Catch::Generators::makeGenerators** (GeneratorWrapper< T > &&generator, Gs &&... more↩ Generators) -> Generators< T >
- template<typename T >
  auto **Catch::Generators::makeGenerators** (GeneratorWrapper< T > &&generator) -> Generators< T >
- template<typename T , typename... Gs>
  auto **Catch::Generators::makeGenerators** (T &&val, Gs &&... moreGenerators) -> Generators< std↩ ::decay_t< T >>
- template<typename T , typename U , typename... Gs>
  auto **Catch::Generators::makeGenerators** (as< T >, U &&val, Gs &&... moreGenerators) -> Generators< T >
- auto **Catch::Generators::acquireGeneratorTracker** (StringRef generatorName, SourceLineInfo const &lineInfo) -> IGeneratorTracker &
- template<typename L >
  auto **Catch::Generators::generate** (StringRef generatorName, SourceLineInfo const &lineInfo, L const &generatorExpression) -> decltype(std::declval< decltype(generatorExpression())>().get())

- template<typename T >
  GeneratorWrapper< T > **Catch::Generators::take** (size_t target, GeneratorWrapper< T > &&generator)
- template<typename T , typename Predicate >
  GeneratorWrapper< T > **Catch::Generators::filter** (Predicate &&pred, GeneratorWrapper< T > &&generator)
- template<typename T >
  GeneratorWrapper< T > **Catch::Generators::repeat** (size_t repeats, GeneratorWrapper< T > &&generator)
- template<typename Func , typename U , typename T = FunctionReturnType<Func, U>>
  GeneratorWrapper< T > **Catch::Generators::map** (Func &&function, GeneratorWrapper< U > &&generator)
- template<typename T >
  GeneratorWrapper< std::vector< T > > **Catch::Generators::chunk** (size_t size, GeneratorWrapper< T > &&generator)
- std::uint32_t **Catch::Generators::Detail::getSeed** ()
- template<typename T >
  std::enable_if_t< std::is_integral< T >::value &&!std::is_same< T, bool >::value, GeneratorWrapper< T > > **Catch::Generators::random** (T a, T b)
- template<typename T >
  std::enable_if_t< std::is_floating_point< T >::value, GeneratorWrapper< T > > **Catch::Generators↩ ::random** (T a, T b)
- template<typename T >
  GeneratorWrapper< T > **Catch::Generators::range** (T const &start, T const &end, T const &step)
- template<typename T >
  GeneratorWrapper< T > **Catch::Generators::range** (T const &start, T const &end)
- template<typename InputIterator , typename InputSentinel , typename ResultType = typename std::iterator_traits<InputIterator>↩ ::value_type>
  GeneratorWrapper< ResultType > **Catch::Generators::from_range** (InputIterator from, InputSentinel to)
- template<typename Container , typename ResultType = typename Container::value_type>
  GeneratorWrapper< ResultType > **Catch::Generators::from_range** (Container const &cnt)
- template<typename Container >
  constexpr auto **Catch::Detail::empty** (Container const &cont) -> decltype(cont.empty())
- template<typename T , std::size_t N>
  constexpr bool **Catch::Detail::empty** (const T(&)[N]) noexcept
- template<typename T >
  constexpr bool **Catch::Detail::empty** (std::initializer_list< T > list) noexcept
- template<typename Container >
  constexpr auto **Catch::Detail::size** (Container const &cont) -> decltype(cont.size())
- template<typename T , std::size_t N>
  constexpr std::size_t **Catch::Detail::size** (const T(&)[N]) noexcept
- void **Catch::writeToDebugConsole** (std::string const &text)
- bool **Catch::isDebuggerActive** ()
- void **Catch::throw_exception** (std::exception const &e)
- void **Catch::throw_logic_error** (std::string const &msg)
- void **Catch::throw_domain_error** (std::string const &msg)
- void **Catch::throw_runtime_error** (std::string const &msg)
- Catch::Detail::unique_ptr< EnumInfo > **Catch::Detail::makeEnumInfo** (StringRef enumName, StringRef allValueNames, std::vector< int > const &values)
- std::vector< StringRef > **Catch::Detail::parseEnums** (StringRef enums)
- bool **Catch::isnan** (float f)
- bool **Catch::isnan** (double d)
- uint32_t **Catch::Detail::convertToBits** (float f)
- uint64_t **Catch::Detail::convertToBits** (double d)
- template<typename FP >
  uint64_t Catch::ulpDistance (FP lhs, FP rhs)
- auto Catch::makeStream (std::string const &filename) -> Detail::unique_ptr< IStream >

- bool **Catch::list** (IEventListener &reporter, Config const &config)
- void **Catch::seedRng** (IConfig const &config)
- unsigned int **Catch::rngSeed** ()
- template<typename Container >
  Container **Catch::createShard** (Container const &container, std::size_t const shardCount, std::size_t const shardIndex)
- void **Catch::addSingleton** (ISingleton ∗singleton)
- void **Catch::cleanupSingletons** ()
- std::ostream & **Catch::cout** ()
- std::ostream & **Catch::cerr** ()
- std::ostream & **Catch::clog** ()
- bool **Catch::startsWith** (std::string const &s, std::string const &prefix)
- bool **Catch::startsWith** (StringRef s, char prefix)
- bool **Catch::endsWith** (std::string const &s, std::string const &suffix)
- bool **Catch::endsWith** (std::string const &s, char suffix)
- bool **Catch::contains** (std::string const &s, std::string const &infix)
- void **Catch::toLowerInPlace** (std::string &s)
- std::string **Catch::toLower** (std::string const &s)
- char **Catch::toLower** (char c)
- std::string Catch::trim (std::string const &str)

  Returns a new string without whitespace at the start/end.
- StringRef Catch::trim (StringRef ref)

  Returns a substring of the original ref without whitespace. Beware lifetimes!
- std::vector< StringRef > **Catch::splitStringRef** (StringRef str, char delimiter)
- bool **Catch::replaceInPlace** (std::string &str, std::string const &replaceThis, std::string const &withThis)
- std::vector< TestCaseHandle > **Catch::sortTests** (IConfig const &config, std::vector< TestCaseHandle > const &unsortedTestCases)
- void **Catch::enforceNoDuplicateTestCases** (std::vector< TestCaseHandle > const &functions)
- TestSpec **Catch::parseTestSpec** (std::string const &arg)
- Column Catch::TextFlow::Spacer (size_t spaceWidth)

  Creates a column that serves as an empty space of specific width.
- template<typename T >
  std::string **Catch::to_string** (T const &t)
- bool **Catch::uncaught_exceptions** ()
- XmlFormatting **Catch::operator|** (XmlFormatting lhs, XmlFormatting rhs)
- XmlFormatting **Catch::operator&** (XmlFormatting lhs, XmlFormatting rhs)
- void **Catch::handleExceptionMatchExpr** (AssertionHandler &handler, StringMatcher const &matcher, StringRef matcherString)
- template<typename ArgT , typename MatcherT >
  auto **Catch::makeMatchExpr** (ArgT &&arg, MatcherT const &matcher, StringRef matcherString) -> MatchExpr< ArgT, MatcherT >
- template<typename ArgT >
  MatchAllOf< ArgT > Catch::Matchers::Detail::operator&& (MatchAllOf< ArgT > const &lhs, MatcherBase< ArgT > const &rhs)=delete
- template<typename ArgT >
  MatchAllOf< ArgT > Catch::Matchers::Detail::operator&& (MatcherBase< ArgT > const &lhs, MatchAllOf< ArgT > const &rhs)=delete
- template<typename ArgT >
  MatchAnyOf< ArgT > Catch::Matchers::Detail::operator|| (MatchAnyOf< ArgT > const &lhs, MatcherBase< ArgT > const &rhs)=delete
- template<typename ArgT >
  MatchAnyOf< ArgT > Catch::Matchers::Detail::operator|| (MatcherBase< ArgT > const &lhs, MatchAnyOf< ArgT > const &rhs)=delete
- template<typename T >
  Detail::MatchAllOf< T > **Catch::Matchers::operator&&** (MatcherBase< T > const &lhs, MatcherBase< T > const &rhs)

- template<typename T >
  Detail::MatchAnyOf< T > **Catch::Matchers::operator||** (MatcherBase< T > const &lhs, MatcherBase< T > const &rhs)
- template<typename T >
  Detail::MatchNotOf< T > **Catch::Matchers::operator!** (MatcherBase< T > const &matcher)
- template<std::size_t N, std::size_t M>
  std::array< void const ∗, N+M > **Catch::Matchers::Detail::array_cat** (std::array< void const ∗, N > &&lhs, std::array< void const ∗, M > &&rhs)
- template<std::size_t N>
  std::array< void const ∗, N+1 > **Catch::Matchers::Detail::array_cat** (std::array< void const ∗, N > &&lhs, void const ∗rhs)
- template<std::size_t N>
  std::array< void const ∗, N+1 > **Catch::Matchers::Detail::array_cat** (void const ∗lhs, std::array< void const ∗, N > &&rhs)
- template<std::size_t N, typename Arg >
  bool **Catch::Matchers::Detail::match_all_of** (Arg &&, std::array< void const ∗, N > const &, std::index_sequence<>)
- template<typename T , typename... MatcherTs, std::size_t N, typename Arg , std::size_t Idx, std::size_t... Indices>
  bool **Catch::Matchers::Detail::match_all_of** (Arg &&arg, std::array< void const ∗, N > const &matchers, std::index_sequence< Idx, Indices... >)
- template<std::size_t N, typename Arg >
  bool **Catch::Matchers::Detail::match_any_of** (Arg &&, std::array< void const ∗, N > const &, std::index_sequence<>)
- template<typename T , typename... MatcherTs, std::size_t N, typename Arg , std::size_t Idx, std::size_t... Indices>
  bool **Catch::Matchers::Detail::match_any_of** (Arg &&arg, std::array< void const ∗, N > const &matchers, std::index_sequence< Idx, Indices... >)
- std::string **Catch::Matchers::Detail::describe_multi_matcher** (StringRef combine, std::string const ∗descriptions_begin, std::string const ∗descriptions_end)
- template<typename... MatcherTs, std::size_t... Idx>
  std::string **Catch::Matchers::Detail::describe_multi_matcher** (StringRef combine, std::array< void const ∗, sizeof...(MatcherTs)> const &matchers, std::index_sequence< Idx... >)
- template<typename MatcherLHS , typename MatcherRHS >
  std::enable_if_t< Detail::are_generic_matchers< MatcherLHS, MatcherRHS >::value, Detail::MatchAllOfGeneric< MatcherLHS, MatcherRHS > > **Catch::Matchers::operator&&** (MatcherLHS const &lhs, MatcherRHS const &rhs)
- template<typename MatcherLHS , typename MatcherRHS >
  std::enable_if_t< Detail::are_generic_matchers< MatcherLHS, MatcherRHS >::value, Detail::MatchAnyOfGeneric< MatcherLHS, MatcherRHS > > **Catch::Matchers::operator||** (MatcherLHS const &lhs, MatcherRHS const &rhs)
- template<typename MatcherT >
  std::enable_if_t< Detail::is_generic_matcher< MatcherT >::value, Detail::MatchNotOfGeneric< MatcherT > > Catch::Matchers::operator! (MatcherT const &matcher)

  Wrap provided generic matcher in generic negator.
- template<typename MatcherLHS , typename ArgRHS >
  std::enable_if_t< Detail::is_generic_matcher< MatcherLHS >::value, Detail::MatchAllOfGeneric< MatcherLHS, MatcherBase< ArgRHS > > > **Catch::Matchers::operator&&** (MatcherLHS const &lhs, MatcherBase< ArgRHS > const &rhs)
- template<typename ArgLHS , typename MatcherRHS >
  std::enable_if_t< Detail::is_generic_matcher< MatcherRHS >::value, Detail::MatchAllOfGeneric< MatcherBase< ArgLHS >, MatcherRHS > > **Catch::Matchers::operator&&** (MatcherBase< ArgLHS > const &lhs, MatcherRHS const &rhs)
- template<typename MatcherLHS , typename ArgRHS >
  std::enable_if_t< Detail::is_generic_matcher< MatcherLHS >::value, Detail::MatchAnyOfGeneric< MatcherLHS, MatcherBase< ArgRHS > > > **Catch::Matchers::operator||** (MatcherLHS const &lhs, MatcherBase< ArgRHS > const &rhs)

- template<typename ArgLHS , typename MatcherRHS >
  std::enable_if_t< Detail::is_generic_matcher< MatcherRHS >::value, Detail::MatchAnyOfGeneric< MatcherBase< ArgLHS >, MatcherRHS > > **Catch::Matchers::operator**|| (MatcherBase< ArgLHS > const &lhs, MatcherRHS const &rhs)
- IsEmptyMatcher Catch::Matchers::IsEmpty ()

  Creates a matcher that accepts empty ranges/containers.
- HasSizeMatcher Catch::Matchers::SizeIs (std::size_t sz)

  Creates a matcher that accepts ranges/containers with specific size.
- template<typename Matcher >
  std::enable_if_t< Detail::is_matcher< Matcher >::value, SizeMatchesMatcher< Matcher > > **Catch::Matchers::SizeIs** (Matcher &&m)
- template<typename T >
  std::enable_if_t<!Detail::is_matcher< T >::value, ContainsElementMatcher< T, std::equal_to<> > > Catch::Matchers::Contains (T &&elem)
- template<typename Matcher >
  std::enable_if_t< Detail::is_matcher< Matcher >::value, ContainsMatcherMatcher< Matcher > > Catch::Matchers::Contains (Matcher &&matcher)

  Creates a matcher that checks whether a range contains element matching a matcher.
- template<typename T , typename Equality >
  ContainsElementMatcher< T, Equality > Catch::Matchers::Contains (T &&elem, Equality &&eq)
- ExceptionMessageMatcher Catch::Matchers::Message (std::string const &message)

  Creates a matcher that checks whether a std derived exception has the provided message.
- WithinUlpsMatcher Catch::Matchers::WithinULP (double target, uint64_t maxUlpDiff)

  Creates a matcher that accepts doubles within certain ULP range of target.
- WithinUlpsMatcher Catch::Matchers::WithinULP (float target, uint64_t maxUlpDiff)

  Creates a matcher that accepts floats within certain ULP range of target.
- WithinAbsMatcher Catch::Matchers::WithinAbs (double target, double margin)

  Creates a matcher that accepts numbers within certain range of target.
- WithinRelMatcher Catch::Matchers::WithinRel (double target, double eps)

  Creates a matcher that accepts doubles within certain relative range of target.
- WithinRelMatcher Catch::Matchers::WithinRel (double target)

  *Creates a matcher that accepts doubles within 100*DBL_EPS relative range of target.*
- WithinRelMatcher Catch::Matchers::WithinRel (float target, float eps)

  Creates a matcher that accepts doubles within certain relative range of target.
- WithinRelMatcher Catch::Matchers::WithinRel (float target)

  *Creates a matcher that accepts floats within 100*FLT_EPS relative range of target.*
- std::string **Catch::Matchers::Detail::finalizeDescription** (const std::string &desc)
- template<typename T , typename Pred >
  PredicateMatcher< T, Pred > Catch::Matchers::Predicate (Pred &&predicate, std::string const &description="")
- template<typename Matcher >
  AllMatchMatcher< Matcher > **Catch::Matchers::AllMatch** (Matcher &&matcher)
- template<typename Matcher >
  NoneMatchMatcher< Matcher > **Catch::Matchers::NoneMatch** (Matcher &&matcher)
- template<typename Matcher >
  AnyMatchMatcher< Matcher > **Catch::Matchers::AnyMatch** (Matcher &&matcher)
- StringEqualsMatcher Catch::Matchers::Equals (std::string const &str, CaseSensitive caseSensitivity=CaseSensitive::Yes)

  Creates matcher that accepts strings that are exactly equal to `str`
- StringContainsMatcher Catch::Matchers::ContainsSubstring (std::string const &str, CaseSensitive caseSensitivity=CaseSensitive::Yes)

  Creates matcher that accepts strings that contain `str`
- EndsWithMatcher Catch::Matchers::EndsWith (std::string const &str, CaseSensitive caseSensitivity=CaseSensitive::Yes)

Creates matcher that accepts strings that end with `str`

- StartsWithMatcher Catch::Matchers::StartsWith (std::string const &str, CaseSensitive caseSensitivity=Case←Sensitive::Yes)

  Creates matcher that accepts strings that start with `str`
- RegexMatcher Catch::Matchers::Matches (std::string const &regex, CaseSensitive caseSensitivity=Case←Sensitive::Yes)

  Creates matcher that accepts strings matching `regex`
- template<typename T , typename AllocComp = std::allocator<T>, typename AllocMatch = AllocComp>
  ContainsMatcher< T, AllocComp, AllocMatch > Catch::Matchers::Contains (std::vector< T, AllocComp > const &comparator)

  Creates a matcher that matches vectors that contain all elements in `comparator`
- template<typename T , typename Alloc = std::allocator<T>>
  VectorContainsElementMatcher< T, Alloc > Catch::Matchers::VectorContains (T const &comparator)

  Creates a matcher that matches vectors that contain `comparator` as an element.
- template<typename T , typename AllocComp = std::allocator<T>, typename AllocMatch = AllocComp>
  EqualsMatcher< T, AllocComp, AllocMatch > Catch::Matchers::Equals (std::vector< T, AllocComp > const &comparator)

  Creates a matcher that matches vectors that are exactly equal to `comparator`
- template<typename T , typename AllocComp = std::allocator<T>, typename AllocMatch = AllocComp>
  ApproxMatcher< T, AllocComp, AllocMatch > Catch::Matchers::Approx (std::vector< T, AllocComp > const &comparator)

  Creates a matcher that matches vectors that `comparator` as an element.
- template<typename T , typename AllocComp = std::allocator<T>, typename AllocMatch = AllocComp>
  UnorderedEqualsMatcher< T, AllocComp, AllocMatch > Catch::Matchers::UnorderedEquals (std::vector< T, AllocComp > const &target)

  Creates a matcher that matches vectors that is equal to `target` modulo permutation.
- std::string **Catch::getFormattedDuration** (double duration)
- bool Catch::shouldShowDuration (IConfig const &config, double duration)

  Should the reporter show duration of test given current configuration?
- std::string **Catch::serializeFilters** (std::vector< std::string > const &filters)
- void Catch::defaultListReporters (std::ostream &out, std::vector< ReporterDescription > const &descriptions, Verbosity verbosity)
- void Catch::defaultListListeners (std::ostream &out, std::vector< ListenerDescription > const &descriptions)
- void Catch::defaultListTags (std::ostream &out, std::vector< TagInfo > const &tags, bool isFiltered)
- void Catch::defaultListTests (std::ostream &out, ColourImpl ∗streamColour, std::vector< TestCaseHandle > const &tests, bool isFiltered, Verbosity verbosity)
- void Catch::Detail::registerReporterImpl (std::string const &name, IReporterFactoryPtr reporterPtr)

Variables

- const auto **Catch::Benchmark::Detail::warmup_iterations** = 10000
- const auto **Catch::Benchmark::Detail::warmup_time** = std::chrono::milliseconds(100)
- const auto **Catch::Benchmark::Detail::minimum_ticks** = 1000
- const auto **Catch::Benchmark::Detail::warmup_seed** = 10000
- const auto **Catch::Benchmark::Detail::clock_resolution_estimation_time** = std::chrono::milliseconds(500)
- const auto **Catch::Benchmark::Detail::clock_cost_estimation_time_limit** = std::chrono::seconds(1)
- const auto **Catch::Benchmark::Detail::clock_cost_estimation_tick_limit** = 100000
- const auto **Catch::Benchmark::Detail::clock_cost_estimation_time** = std::chrono::milliseconds(10)
- const auto **Catch::Benchmark::Detail::clock_cost_estimation_iterations** = 10000
- constexpr StringRef **Catch::Detail::unprintableString** = "{?}"_sr
- constexpr accept_many_t **Catch::Clara::accept_many** {}

6.1.1 Detailed Description

This is a convenience header for Catch2. It includes **all** of Catch2 headers.

Generally the Catch2 users should use specific includes they need, but this header can be used instead for ease-of-experimentation, or just plain convenience, at the cost of (significantly) increased compilation times.

When a new header is added to either the top level folder, or to the corresponding internal subfolder, it should be added here. Headers added to the various subparts (e.g. matchers, generators, etc...), should go their respective catch-all headers.

This is a convenience header for Catch2's benchmarking. It includes **all** of Catch2 headers related to benchmarking.

Generally the Catch2 users should use specific includes they need, but this header can be used instead for ease-of-experimentation, or just plain convenience, at the cost of (significantly) increased compilation times.

When a new header is added to either the `benchmark` folder, or to the corresponding internal (detail) subfolder, it should be added here.

Wrapper for the CONFIG configuration option

When generating internal unique names, there are two options. Either we mix in the current line number, or mix in an incrementing number. We prefer the latter, using `__COUNTER__`, but users might want to use the former.

Wrapper for the WCHAR configuration option

We want to support platforms that do not provide `wchar_t`, so we sometimes have to disable providing wchar_t overloads through Catch2, e.g. the StringMaker specialization for `std::wstring`.

This is a convenience header for Catch2's Generator support. It includes **all** of Catch2 headers related to generators.

Generally the Catch2 users should use specific includes they need, but this header can be used instead for ease-of-experimentation, or just plain convenience, at the cost of (significantly) increased compilation times.

When a new header is added to either the `generators` folder, or to the corresponding internal subfolder, it should be added here.

This is a convenience header for Catch2's interfaces. It includes **all** of Catch2 headers related to interfaces.

Generally the Catch2 users should use specific includes they need, but this header can be used instead for ease-of-experimentation, or just plain convenience, at the cost of somewhat increased compilation times.

When a new header is added to either the `interfaces` folder, or to the corresponding internal subfolder, it should be added here.

Wrapper for ANDROID_LOGWRITE configuration option

We want to default to enabling it when compiled for android, but users of the library should also be able to disable it if they want to.

Wrapper for UNCAUGHT_EXCEPTIONS configuration option

For some functionality, Catch2 requires to know whether there is an active exception. Because `std::uncaught_exception` is deprecated in C++17, we want to use `std::uncaught_exceptions` if possible.

This is a convenience header for Catch2's Matcher support. It includes **all** of Catch2 headers related to matchers.

Generally the Catch2 users should use specific includes they need, but this header can be used instead for ease-of-experimentation, or just plain convenience, at the cost of increased compilation times.

When a new header is added to either the `matchers` folder, or to the corresponding internal subfolder, it should be added here.

This is a convenience header for Catch2's Reporter support. It includes **all** of Catch2 headers related to reporters, including all reporters.

Generally the Catch2 users should use specific includes they need, but this header can be used instead for ease-of-experimentation, or just plain convenience, at the cost of (significantly) increased compilation times.

When a new header (reporter) is added to either the `reporter` folder, or to the corresponding internal subfolder, it should be added here.

6.1.2 Macro Definition Documentation

6.1.2.1 CATCH_INTERNAL_DEFINE_EXPRESSION_OPERATOR

```
#define CATCH_INTERNAL_DEFINE_EXPRESSION_OPERATOR(
                op )
```

Value:

```
template<typename RhsT, std::enable_if_t<!std::is_arithmetic<std::remove_reference_t<RhsT»::value,
int> = 0> \
friend auto operator op ( ExprLhs && lhs, RhsT && rhs ) -> BinaryExpr<LhsT, RhsT const&> { \
    return { static_cast<bool>(lhs.m_lhs op rhs), lhs.m_lhs, #op##_sr, rhs }; \
} \
template<typename RhsT, std::enable_if_t<std::is_arithmetic<RhsT>::value, int> = 0> \
friend auto operator op ( ExprLhs && lhs, RhsT rhs ) -> BinaryExpr<LhsT, RhsT> { \
    return { static_cast<bool>(lhs.m_lhs op rhs), lhs.m_lhs, #op##_sr, rhs }; \
}
```

6.1.2.2 CATCH_REGISTER_LISTENER

```
#define CATCH_REGISTER_LISTENER(
                listenerType )
```

Value:

```
CATCH_INTERNAL_START_WARNINGS_SUPPRESSION                              \
CATCH_INTERNAL_SUPPRESS_GLOBALS_WARNINGS                               \
namespace {                                                            \
    Catch::ListenerRegistrar<listenerType> INTERNAL_CATCH_UNIQUE_NAME( \
        catch_internal_RegistrarFor )( #listenerType );                \
}                                                                      \
CATCH_INTERNAL_STOP_WARNINGS_SUPPRESSION
```

6.1.2.3 CATCH_REGISTER_REPORTER

```
#define CATCH_REGISTER_REPORTER(
                name,
                reporterType )
```

Value:

```
CATCH_INTERNAL_START_WARNINGS_SUPPRESSION                              \
CATCH_INTERNAL_SUPPRESS_GLOBALS_WARNINGS                               \
namespace {                                                            \
    Catch::ReporterRegistrar<reporterType> INTERNAL_CATCH_UNIQUE_NAME( \
        catch_internal_RegistrarFor )( name );                         \
}                                                                      \
CATCH_INTERNAL_STOP_WARNINGS_SUPPRESSION
```

6.1.2.4 CATCH_REGISTER_TAG_ALIAS

```
#define CATCH_REGISTER_TAG_ALIAS(
              alias,
              spec )
```

Value:

```
    CATCH_INTERNAL_START_WARNINGS_SUPPRESSION \
    CATCH_INTERNAL_SUPPRESS_GLOBALS_WARNINGS \
    namespace{ Catch::RegistrarForTagAliases INTERNAL_CATCH_UNIQUE_NAME( AutoRegisterTagAlias )( alias,
       spec, CATCH_INTERNAL_LINEINFO ); } \
    CATCH_INTERNAL_STOP_WARNINGS_SUPPRESSION
```

6.1.2.5 GENERATE

```
#define GENERATE(
              ... )
```

Value:

```
    Catch::Generators::generate( INTERNAL_CATCH_STRINGIZE(INTERNAL_CATCH_UNIQUE_NAME(generator)), \
                                 CATCH_INTERNAL_LINEINFO, \
                                 [ ]{ using namespace Catch::Generators; return makeGenerators( __VA_ARGS__
       ); } )
```

6.1.2.6 GENERATE_COPY

```
#define GENERATE_COPY(
              ... )
```

Value:

```
    Catch::Generators::generate( INTERNAL_CATCH_STRINGIZE(INTERNAL_CATCH_UNIQUE_NAME(generator)), \
                                 CATCH_INTERNAL_LINEINFO, \
                                 [=]{ using namespace Catch::Generators; return makeGenerators( __VA_ARGS__
       ); } )
```

6.1.2.7 GENERATE_REF

```
#define GENERATE_REF(
              ... )
```

Value:

```
    Catch::Generators::generate( INTERNAL_CATCH_STRINGIZE(INTERNAL_CATCH_UNIQUE_NAME(generator)), \
                                 CATCH_INTERNAL_LINEINFO, \
                                 [&]{ using namespace Catch::Generators; return makeGenerators( __VA_ARGS__
       ); } )
```

6.1.2.8 INTERNAL_CATCH_BENCHMARK

```
#define INTERNAL_CATCH_BENCHMARK(
            BenchmarkName,
            name,
            benchmarkIndex )
```

Value:

```
if( Catch::Benchmark::Benchmark BenchmarkName{name} ) \
    BenchmarkName = [&](int benchmarkIndex)
```

6.1.2.9 INTERNAL_CATCH_BENCHMARK_ADVANCED

```
#define INTERNAL_CATCH_BENCHMARK_ADVANCED(
            BenchmarkName,
            name )
```

Value:

```
if( Catch::Benchmark::Benchmark BenchmarkName{name} ) \
    BenchmarkName = [&]
```

6.1.2.10 INTERNAL_CATCH_CAPTURE

```
#define INTERNAL_CATCH_CAPTURE(
            varName,
            macroName,
            ... )
```

Value:

```
Catch::Capturer varName( macroName, CATCH_INTERNAL_LINEINFO, Catch::ResultWas::Info, #__VA_ARGS__ ); \
varName.captureValues( 0, __VA_ARGS__ )
```

6.1.2.11 INTERNAL_CATCH_DECLARE_SIG_TEST1

```
#define INTERNAL_CATCH_DECLARE_SIG_TEST1(
            TestName,
            signature )
```

Value:

```
template<INTERNAL_CATCH_REMOVE_PARENS(signature)>\
static void TestName()
```

6.1.2.12 INTERNAL_CATCH_DECLARE_SIG_TEST_METHOD1

```
#define INTERNAL_CATCH_DECLARE_SIG_TEST_METHOD1(
            TestName,
            ClassName,
            signature )
```

Value:

```
    template<typename TestType> \
    struct TestName : INTERNAL_CATCH_REMOVE_PARENS(ClassName)<TestType> { \
        void test();\
    }
```

6.1.2.13 INTERNAL_CATCH_DECLARE_SIG_TEST_METHOD_X

```
#define INTERNAL_CATCH_DECLARE_SIG_TEST_METHOD_X(
            TestName,
            ClassName,
            signature,
            ... )
```

Value:

```
    template<INTERNAL_CATCH_REMOVE_PARENS(signature)> \
    struct TestName : INTERNAL_CATCH_REMOVE_PARENS(ClassName)<__VA_ARGS__> { \
        void test();\
    }
```

6.1.2.14 INTERNAL_CATCH_DECLARE_SIG_TEST_X

```
#define INTERNAL_CATCH_DECLARE_SIG_TEST_X(
            TestName,
            signature,
            ... )
```

Value:

```
    template<INTERNAL_CATCH_REMOVE_PARENS(signature)>\
    static void TestName()
```

6.1.2.15 INTERNAL_CATCH_DEFINE_SIG_TEST1

```
#define INTERNAL_CATCH_DEFINE_SIG_TEST1(
            TestName,
            signature )
```

Value:

```
    template<INTERNAL_CATCH_REMOVE_PARENS(signature)>\
    static void TestName()
```

6.1.2.16 INTERNAL_CATCH_DEFINE_SIG_TEST_METHOD1

```
#define INTERNAL_CATCH_DEFINE_SIG_TEST_METHOD1(
            TestName,
            signature )
```

Value:

```
template<typename TestType> \
void INTERNAL_CATCH_MAKE_NAMESPACE(TestName)::TestName<TestType>::test()
```

6.1.2.17 INTERNAL_CATCH_DEFINE_SIG_TEST_METHOD_X

```
#define INTERNAL_CATCH_DEFINE_SIG_TEST_METHOD_X(
            TestName,
            signature,
            ... )
```

Value:

```
template<INTERNAL_CATCH_REMOVE_PARENS(signature)> \
void INTERNAL_CATCH_MAKE_NAMESPACE(TestName)::TestName<__VA_ARGS__>::test()
```

6.1.2.18 INTERNAL_CATCH_DEFINE_SIG_TEST_X

```
#define INTERNAL_CATCH_DEFINE_SIG_TEST_X(
            TestName,
            signature,
            ... )
```

Value:

```
template<INTERNAL_CATCH_REMOVE_PARENS(signature)>\
static void TestName()
```

6.1.2.19 INTERNAL_CATCH_DYNAMIC_SECTION

```
#define INTERNAL_CATCH_DYNAMIC_SECTION(
            ... )
```

Value:

```
CATCH_INTERNAL_START_WARNINGS_SUPPRESSION \
CATCH_INTERNAL_SUPPRESS_UNUSED_VARIABLE_WARNINGS \
if( Catch::Section const& INTERNAL_CATCH_UNIQUE_NAME( catch_internal_Section ) = Catch::SectionInfo(
   CATCH_INTERNAL_LINEINFO, (Catch::ReusableStringStream() « __VA_ARGS__).str() ) ) \
CATCH_INTERNAL_STOP_WARNINGS_SUPPRESSION
```

6.1.2.20 INTERNAL_CATCH_ELSE

```
#define INTERNAL_CATCH_ELSE(
            macroName,
            resultDisposition,
            ... )
```

Value:

```
INTERNAL_CATCH_TEST( macroName, resultDisposition, __VA_ARGS__ ); \
if( !Catch::getResultCapture().lastAssertionPassed() )
```

6.1.2.21 INTERNAL_CATCH_IF

```
#define INTERNAL_CATCH_IF(
            macroName,
            resultDisposition,
            ... )
```

Value:

```
INTERNAL_CATCH_TEST( macroName, resultDisposition, __VA_ARGS__ ); \
if( Catch::getResultCapture().lastAssertionPassed() )
```

6.1.2.22 INTERNAL_CATCH_METHOD_AS_TEST_CASE

```
#define INTERNAL_CATCH_METHOD_AS_TEST_CASE(
            QualifiedMethod,
            ... )
```

Value:

```
    CATCH_INTERNAL_START_WARNINGS_SUPPRESSION \
    CATCH_INTERNAL_SUPPRESS_GLOBALS_WARNINGS \
    namespace{ Catch::AutoReg INTERNAL_CATCH_UNIQUE_NAME( autoRegistrar )( Catch::makeTestInvoker(
   &QualifiedMethod ), CATCH_INTERNAL_LINEINFO, "&" #QualifiedMethod, Catch::NameAndTags{ __VA_ARGS__ }
   ); } /* NOLINT */ \
    CATCH_INTERNAL_STOP_WARNINGS_SUPPRESSION
```

6.1.2.23 INTERNAL_CATCH_MSG

```
#define INTERNAL_CATCH_MSG(
            macroName,
            messageType,
            resultDisposition,
            ... )
```

Value:

```
do { \
    Catch::AssertionHandler catchAssertionHandler( macroName##_catch_sr, CATCH_INTERNAL_LINEINFO,
   Catch::StringRef(), resultDisposition ); \
    catchAssertionHandler.handleMessage( messageType, ( Catch::MessageStream() « __VA_ARGS__ +
   ::Catch::StreamEndStop() ).m_stream.str() ); \
    INTERNAL_CATCH_REACT( catchAssertionHandler ) \
} while( false )
```

6.1.2.24 INTERNAL_CATCH_NO_THROW

```
#define INTERNAL_CATCH_NO_THROW(
                macroName,
                resultDisposition,
                ... )
```

Value:

```
do { \
    Catch::AssertionHandler catchAssertionHandler( macroName##_catch_sr, CATCH_INTERNAL_LINEINFO,
   CATCH_INTERNAL_STRINGIFY(__VA_ARGS__), resultDisposition ); \
    try { \
        static_cast<void>(__VA_ARGS__); \
        catchAssertionHandler.handleExceptionNotThrownAsExpected(); \
    } \
    catch( ... ) { \
        catchAssertionHandler.handleUnexpectedInflightException(); \
    } \
    INTERNAL_CATCH_REACT( catchAssertionHandler ) \
} while( false )
```

6.1.2.25 INTERNAL_CATCH_NTTP_1

```
#define INTERNAL_CATCH_NTTP_1(
                signature,
                ... )
```

Value:

```
template<INTERNAL_CATCH_REMOVE_PARENS(signature)> struct Nttp{};\
template<INTERNAL_CATCH_REMOVE_PARENS(signature)>\
constexpr auto get_wrapper() noexcept -> Nttp<__VA_ARGS__> { return {}; } \
template<template<INTERNAL_CATCH_REMOVE_PARENS(signature)> class...> struct NttpTemplateTypeList{};\
template<template<INTERNAL_CATCH_REMOVE_PARENS(signature)> class...Cs>\
constexpr auto get_wrapper() noexcept -> NttpTemplateTypeList<Cs...> { return {}; } \
\
template< template<INTERNAL_CATCH_REMOVE_PARENS(signature)> class Container,
   template<INTERNAL_CATCH_REMOVE_PARENS(signature)> class List,
   INTERNAL_CATCH_REMOVE_PARENS(signature)>\
struct rewrap<NttpTemplateTypeList<Container>, List<__VA_ARGS__» { using type =
   TypeList<Container<__VA_ARGS__»; };\
template< template<INTERNAL_CATCH_REMOVE_PARENS(signature)> class Container,
   template<INTERNAL_CATCH_REMOVE_PARENS(signature)> class List,
   INTERNAL_CATCH_REMOVE_PARENS(signature), typename...Elements>\
struct rewrap<NttpTemplateTypeList<Container>, List<__VA_ARGS__>, Elements...> { using type = typename
   append<TypeList<Container<__VA_ARGS__», typename rewrap<NttpTemplateTypeList<Container>,
   Elements...>::type>::type; };\
template<template <typename...> class Final, template<INTERNAL_CATCH_REMOVE_PARENS(signature)>
   class...Containers, typename...Types>\
struct create<Final, NttpTemplateTypeList<Containers...>, TypeList<Types...» { using type = typename
   append<Final<>, typename rewrap<NttpTemplateTypeList<Containers>, Types...>::type...>::type; };
```

6.1.2.26 INTERNAL_CATCH_NTTP_REGISTER

```
#define INTERNAL_CATCH_NTTP_REGISTER(
                TestFunc,
                signature,
                ... )
```

Value:

```
template<INTERNAL_CATCH_REMOVE_PARENS(signature)>\
void reg_test(Nttp<__VA_ARGS__>, Catch::NameAndTags nameAndTags)\
{\
    Catch::AutoReg( Catch::makeTestInvoker(&TestFunc<__VA_ARGS__>), CATCH_INTERNAL_LINEINFO,
   Catch::StringRef(), nameAndTags);\
}
```

6.1.2.27 INTERNAL_CATCH_NTTP_REGISTER0

```
#define INTERNAL_CATCH_NTTP_REGISTER0(
                TestFunc,
                signature )
```

Value:

```
    template<typename Type>\
    void reg_test(TypeList<Type>, Catch::NameAndTags nameAndTags)\
    {\
        Catch::AutoReg( Catch::makeTestInvoker(&TestFunc<Type>), CATCH_INTERNAL_LINEINFO,
       Catch::StringRef(), nameAndTags);\
    }
```

6.1.2.28 INTERNAL_CATCH_NTTP_REGISTER_METHOD

```
#define INTERNAL_CATCH_NTTP_REGISTER_METHOD(
                TestName,
                signature,
                ... )
```

Value:

```
    template<INTERNAL_CATCH_REMOVE_PARENS(signature)>\
    void reg_test(Nttp<__VA_ARGS__>, Catch::StringRef className, Catch::NameAndTags nameAndTags)\
    {\
        Catch::AutoReg( Catch::makeTestInvoker(&TestName<__VA_ARGS__>::test), CATCH_INTERNAL_LINEINFO,
       className, nameAndTags);\
    }
```

6.1.2.29 INTERNAL_CATCH_NTTP_REGISTER_METHOD0

```
#define INTERNAL_CATCH_NTTP_REGISTER_METHOD0(
                TestName,
                signature,
                ... )
```

Value:

```
    template<typename Type>\
    void reg_test(TypeList<Type>, Catch::StringRef className, Catch::NameAndTags nameAndTags)\
    {\
        Catch::AutoReg( Catch::makeTestInvoker(&TestName<Type>::test), CATCH_INTERNAL_LINEINFO, className,
       nameAndTags);\
    }
```

6.1.2.30 INTERNAL_CATCH_REGISTER_ENUM

```
#define INTERNAL_CATCH_REGISTER_ENUM(
                enumName,
                ... )
```

Value:

```
namespace Catch { \
    template<> struct StringMaker<enumName> { \
        static std::string convert( enumName value ) { \
            static const auto& enumInfo =
       ::Catch::getMutableRegistryHub().getMutableEnumValuesRegistry().registerEnum( #enumName,
       #__VA_ARGS__, { __VA_ARGS__ } ); \
            return static_cast<std::string>(enumInfo.lookup( static_cast<int>( value ) )); \
        } \
    }; \
}
```

6.1.2.31 INTERNAL_CATCH_REGISTER_TESTCASE

```
#define INTERNAL_CATCH_REGISTER_TESTCASE(
                Function,
                ... )
```

Value:

```
 do { \
     CATCH_INTERNAL_START_WARNINGS_SUPPRESSION \
     CATCH_INTERNAL_SUPPRESS_GLOBALS_WARNINGS \
     Catch::AutoReg INTERNAL_CATCH_UNIQUE_NAME( autoRegistrar )( Catch::makeTestInvoker( Function ),
CATCH_INTERNAL_LINEINFO, Catch::StringRef(), Catch::NameAndTags{ __VA_ARGS__ } ); /* NOLINT */ \
     CATCH_INTERNAL_STOP_WARNINGS_SUPPRESSION \
 } while(false)
```

6.1.2.32 INTERNAL_CATCH_SECTION

```
#define INTERNAL_CATCH_SECTION(
                ... )
```

Value:

```
CATCH_INTERNAL_START_WARNINGS_SUPPRESSION \
CATCH_INTERNAL_SUPPRESS_UNUSED_VARIABLE_WARNINGS \
if( Catch::Section const& INTERNAL_CATCH_UNIQUE_NAME( catch_internal_Section ) = Catch::SectionInfo(
   CATCH_INTERNAL_LINEINFO, __VA_ARGS__ ) ) \
CATCH_INTERNAL_STOP_WARNINGS_SUPPRESSION
```

6.1.2.33 INTERNAL_CATCH_TEMPLATE_LIST_TEST_CASE_2

```
#define INTERNAL_CATCH_TEMPLATE_LIST_TEST_CASE_2(
                TestName,
                TestFunc,
                Name,
                Tags,
                TmplList )
```

Value:

```
 CATCH_INTERNAL_START_WARNINGS_SUPPRESSION \
 CATCH_INTERNAL_SUPPRESS_GLOBALS_WARNINGS \
 CATCH_INTERNAL_SUPPRESS_UNUSED_TEMPLATE_WARNINGS \
 CATCH_INTERNAL_SUPPRESS_UNUSED_VARIABLE_WARNINGS \
 template<typename TestType> static void TestFunc();       \
 namespace {\
 namespace INTERNAL_CATCH_MAKE_NAMESPACE(TestName){\
 INTERNAL_CATCH_TYPE_GEN\
 template<typename... Types>                               \
 struct TestName {                                         \
     void reg_tests() {                                          \
         size_t index = 0;                                    \
         using expander = size_t[];                           \
         (void)expander{(Catch::AutoReg( Catch::makeTestInvoker( &TestFunc<Types> ),
CATCH_INTERNAL_LINEINFO, Catch::StringRef(), Catch::NameAndTags{ Name " - " +
std::string(INTERNAL_CATCH_STRINGIZE(TmplList)) + " - " + std::to_string(index), Tags } ),
index++)... };/* NOLINT */\
     }                                                     \
 };\
 static int INTERNAL_CATCH_UNIQUE_NAME( globalRegistrar ) = [](){ \
         using TestInit = typename convert<TestName, TmplList>::type; \
         TestInit t;                                           \
         t.reg_tests();                                        \
         return 0;                                             \
     }();                                                      \
 }}\
 CATCH_INTERNAL_STOP_WARNINGS_SUPPRESSION                       \
 template<typename TestType>                                   \
 static void TestFunc()
```

6.1.2.34 INTERNAL_CATCH_TEMPLATE_LIST_TEST_CASE_METHOD_2

```
#define INTERNAL_CATCH_TEMPLATE_LIST_TEST_CASE_METHOD_2(
                TestNameClass,
                TestName,
                ClassName,
                Name,
                Tags,
                TmplList )
```

Value:

```
 CATCH_INTERNAL_START_WARNINGS_SUPPRESSION \
 CATCH_INTERNAL_SUPPRESS_GLOBALS_WARNINGS \
 CATCH_INTERNAL_SUPPRESS_UNUSED_TEMPLATE_WARNINGS \
 CATCH_INTERNAL_SUPPRESS_UNUSED_VARIABLE_WARNINGS \
 template<typename TestType> \
 struct TestName : INTERNAL_CATCH_REMOVE_PARENS(ClassName <TestType>) { \
     void test();\
 };\
 namespace {\
 namespace INTERNAL_CATCH_MAKE_NAMESPACE(TestName){ \
     INTERNAL_CATCH_TYPE_GEN\
     template<typename...Types>\
     struct TestNameClass{\
         void reg_tests(){\
             size_t index = 0;\
             using expander = size_t[];\
             (void)expander{(Catch::AutoReg( Catch::makeTestInvoker( &TestName<Types>::test ),
CATCH_INTERNAL_LINEINFO, #ClassName, Catch::NameAndTags{ Name " - " +
std::string(INTERNAL_CATCH_STRINGIZE(TmplList)) + " - " + std::to_string(index), Tags } ),
index++)... };/* NOLINT */ \
         }\
     };\
     static int INTERNAL_CATCH_UNIQUE_NAME( globalRegistrar ) = [](){\
         using TestInit = typename convert<TestNameClass, TmplList>::type;\
         TestInit t;\
         t.reg_tests();\
         return 0;\
     }(); \
 }}\
 CATCH_INTERNAL_STOP_WARNINGS_SUPPRESSION \
 template<typename TestType> \
 void TestName<TestType>::test()
```

6.1.2.35 INTERNAL_CATCH_TEMPLATE_TEST_CASE_2

```
#define INTERNAL_CATCH_TEMPLATE_TEST_CASE_2(
                TestName,
                TestFunc,
                Name,
                Tags,
                Signature,
                ... )
```

Value:

```
 CATCH_INTERNAL_START_WARNINGS_SUPPRESSION \
 CATCH_INTERNAL_SUPPRESS_GLOBALS_WARNINGS \
 CATCH_INTERNAL_SUPPRESS_ZERO_VARIADIC_WARNINGS \
 CATCH_INTERNAL_SUPPRESS_UNUSED_TEMPLATE_WARNINGS \
 CATCH_INTERNAL_SUPPRESS_UNUSED_VARIABLE_WARNINGS \
 INTERNAL_CATCH_DECLARE_SIG_TEST(TestFunc, INTERNAL_CATCH_REMOVE_PARENS(Signature));\
 namespace {\
 namespace INTERNAL_CATCH_MAKE_NAMESPACE(TestName){\
     INTERNAL_CATCH_TYPE_GEN\
     INTERNAL_CATCH_NTTP_GEN(INTERNAL_CATCH_REMOVE_PARENS(Signature))\
     INTERNAL_CATCH_NTTP_REG_GEN(TestFunc,INTERNAL_CATCH_REMOVE_PARENS(Signature))\
     template<typename...Types> \
     struct TestName{\
         TestName(){\
             size_t index = 0;                                    \
             constexpr char const* tmpl_types[] =
{CATCH_REC_LIST(INTERNAL_CATCH_STRINGIZE_WITHOUT_PARENS, __VA_ARGS__)};\
             using expander = size_t[];\
             (void)expander{(reg_test(Types{}, Catch::NameAndTags{ Name " - " +
std::string(tmpl_types[index]), Tags } ), index++)... };/* NOLINT */ \
         }\
     };\
     static int INTERNAL_CATCH_UNIQUE_NAME( globalRegistrar ) = [](){\
     TestName<INTERNAL_CATCH_MAKE_TYPE_LISTS_FROM_TYPES(__VA_ARGS__)>();\
     return 0;\
 }();\
 }\
 }\
 CATCH_INTERNAL_STOP_WARNINGS_SUPPRESSION \
 INTERNAL_CATCH_DEFINE_SIG_TEST(TestFunc,INTERNAL_CATCH_REMOVE_PARENS(Signature))
```

6.1.2.36 INTERNAL_CATCH_TEMPLATE_TEST_CASE_METHOD_2

```
#define INTERNAL_CATCH_TEMPLATE_TEST_CASE_METHOD_2(
                TestNameClass,
                TestName,
                ClassName,
                Name,
                Tags,
                Signature,
                ...  )
```

Value:

```
 CATCH_INTERNAL_START_WARNINGS_SUPPRESSION \
 CATCH_INTERNAL_SUPPRESS_GLOBALS_WARNINGS \
 CATCH_INTERNAL_SUPPRESS_ZERO_VARIADIC_WARNINGS \
 CATCH_INTERNAL_SUPPRESS_UNUSED_TEMPLATE_WARNINGS \
 CATCH_INTERNAL_SUPPRESS_UNUSED_VARIABLE_WARNINGS \
 namespace {\
 namespace INTERNAL_CATCH_MAKE_NAMESPACE(TestName){ \
     INTERNAL_CATCH_TYPE_GEN\
     INTERNAL_CATCH_NTTP_GEN(INTERNAL_CATCH_REMOVE_PARENS(Signature))\
     INTERNAL_CATCH_DECLARE_SIG_TEST_METHOD(TestName, ClassName,
INTERNAL_CATCH_REMOVE_PARENS(Signature));\
     INTERNAL_CATCH_NTTP_REG_METHOD_GEN(TestName, INTERNAL_CATCH_REMOVE_PARENS(Signature))\
     template<typename...Types> \
     struct TestNameClass{\
         TestNameClass(){\
             size_t index = 0;                                    \
             constexpr char const* tmpl_types[] =
{CATCH_REC_LIST(INTERNAL_CATCH_STRINGIZE_WITHOUT_PARENS, __VA_ARGS__)};\
             using expander = size_t[];\
             (void)expander{(reg_test(Types{}, #ClassName, Catch::NameAndTags{ Name " - " +
std::string(tmpl_types[index]), Tags } ), index++)... };/* NOLINT */ \
         }\
     };\
     static int INTERNAL_CATCH_UNIQUE_NAME( globalRegistrar ) = [](){\
         TestNameClass<INTERNAL_CATCH_MAKE_TYPE_LISTS_FROM_TYPES(__VA_ARGS__)>();\
         return 0;\
 }();\
 }\
 }\
 CATCH_INTERNAL_STOP_WARNINGS_SUPPRESSION \
 INTERNAL_CATCH_DEFINE_SIG_TEST_METHOD(TestName, INTERNAL_CATCH_REMOVE_PARENS(Signature))
```

6.1.2.37 INTERNAL_CATCH_TEST

```
#define INTERNAL_CATCH_TEST(
                macroName,
                resultDisposition,
                ...  )
```

Value:

```
    do { /* NOLINT(bugprone-infinite-loop) */ \
        /* The expression should not be evaluated, but warnings should hopefully be checked */ \
        CATCH_INTERNAL_IGNORE_BUT_WARN(__VA_ARGS__); \
        Catch::AssertionHandler catchAssertionHandler( macroName##_catch_sr, CATCH_INTERNAL_LINEINFO,
       CATCH_INTERNAL_STRINGIFY(__VA_ARGS__), resultDisposition ); \
        INTERNAL_CATCH_TRY { \
            CATCH_INTERNAL_START_WARNINGS_SUPPRESSION \
            CATCH_INTERNAL_SUPPRESS_PARENTHESES_WARNINGS \
            catchAssertionHandler.handleExpr( Catch::Decomposer() <= __VA_ARGS__ ); \
            CATCH_INTERNAL_STOP_WARNINGS_SUPPRESSION \
        } INTERNAL_CATCH_CATCH( catchAssertionHandler ) \
        INTERNAL_CATCH_REACT( catchAssertionHandler ) \
    } while( (void)0, (false) && static_cast<const bool&>( !!(__VA_ARGS__) ) )
```

6.1.2.38 INTERNAL_CATCH_TEST_CASE_METHOD2

```
#define INTERNAL_CATCH_TEST_CASE_METHOD2(
                TestName,
                ClassName,
                ... )
```

Value:

```
        CATCH_INTERNAL_START_WARNINGS_SUPPRESSION \
        CATCH_INTERNAL_SUPPRESS_GLOBALS_WARNINGS \
        namespace{ \
            struct TestName : INTERNAL_CATCH_REMOVE_PARENS(ClassName) { \
                void test(); \
            }; \
            Catch::AutoReg INTERNAL_CATCH_UNIQUE_NAME( autoRegistrar ) ( Catch::makeTestInvoker(
       &TestName::test ), CATCH_INTERNAL_LINEINFO, #ClassName, Catch::NameAndTags{ __VA_ARGS__ } ); /*
       NOLINT */ \
        } \
        CATCH_INTERNAL_STOP_WARNINGS_SUPPRESSION \
        void TestName::test()
```

6.1.2.39 INTERNAL_CATCH_TESTCASE2

```
#define INTERNAL_CATCH_TESTCASE2(
                TestName,
                ... )
```

Value:

```
        static void TestName(); \
        CATCH_INTERNAL_START_WARNINGS_SUPPRESSION \
        CATCH_INTERNAL_SUPPRESS_GLOBALS_WARNINGS \
        namespace{ Catch::AutoReg INTERNAL_CATCH_UNIQUE_NAME( autoRegistrar )( Catch::makeTestInvoker(
       &TestName ), CATCH_INTERNAL_LINEINFO, Catch::StringRef(), Catch::NameAndTags{ __VA_ARGS__ } ); } /*
       NOLINT */ \
        CATCH_INTERNAL_STOP_WARNINGS_SUPPRESSION \
        static void TestName()
```

6.1.2.40 INTERNAL_CATCH_THROWS

```
#define INTERNAL_CATCH_THROWS(
                macroName,
                resultDisposition,
                ... )
```

Value:

```
    do { \
        Catch::AssertionHandler catchAssertionHandler( macroName##_catch_sr, CATCH_INTERNAL_LINEINFO,
       CATCH_INTERNAL_STRINGIFY(__VA_ARGS__), resultDisposition); \
        if( catchAssertionHandler.allowThrows() ) \
            try { \
                static_cast<void>(__VA_ARGS__); \
                catchAssertionHandler.handleUnexpectedExceptionNotThrown(); \
            } \
            catch( ... ) { \
                catchAssertionHandler.handleExceptionThrownAsExpected(); \
            } \
        else \
            catchAssertionHandler.handleThrowingCallSkipped(); \
        INTERNAL_CATCH_REACT( catchAssertionHandler ) \
    } while( false )
```

6.1.2.41 INTERNAL_CATCH_THROWS_AS

```
#define INTERNAL_CATCH_THROWS_AS(
                macroName,
                exceptionType,
                resultDisposition,
                expr )
```

Value:

```
    do { \
        Catch::AssertionHandler catchAssertionHandler( macroName##_catch_sr, CATCH_INTERNAL_LINEINFO,
       CATCH_INTERNAL_STRINGIFY(expr) ", " CATCH_INTERNAL_STRINGIFY(exceptionType), resultDisposition ); \
        if( catchAssertionHandler.allowThrows() ) \
            try { \
                static_cast<void>(expr); \
                catchAssertionHandler.handleUnexpectedExceptionNotThrown(); \
            } \
            catch( exceptionType const& ) { \
                catchAssertionHandler.handleExceptionThrownAsExpected(); \
            } \
            catch( ... ) { \
                catchAssertionHandler.handleUnexpectedInflightException(); \
            } \
        else \
            catchAssertionHandler.handleThrowingCallSkipped(); \
        INTERNAL_CATCH_REACT( catchAssertionHandler ) \
    } while( false )
```

6.1.2.42 INTERNAL_CATCH_THROWS_MATCHES

```
#define INTERNAL_CATCH_THROWS_MATCHES(
                macroName,
                exceptionType,
                resultDisposition,
                matcher,
                ... )
```

Value:

```
do { \
    Catch::AssertionHandler catchAssertionHandler( macroName##_catch_sr, CATCH_INTERNAL_LINEINFO,
   CATCH_INTERNAL_STRINGIFY(__VA_ARGS__) ", " CATCH_INTERNAL_STRINGIFY(exceptionType) ", "
   CATCH_INTERNAL_STRINGIFY(matcher), resultDisposition ); \
    if( catchAssertionHandler.allowThrows() ) \
        try { \
            static_cast<void>(__VA_ARGS__ ); \
            catchAssertionHandler.handleUnexpectedExceptionNotThrown(); \
        } \
        catch( exceptionType const& ex ) { \
            catchAssertionHandler.handleExpr( Catch::makeMatchExpr( ex, matcher, #matcher##_catch_sr )
   ); \
        } \
        catch( ... ) { \
            catchAssertionHandler.handleUnexpectedInflightException(); \
        } \
    else \
        catchAssertionHandler.handleThrowingCallSkipped(); \
    INTERNAL_CATCH_REACT( catchAssertionHandler ) \
} while( false )
```

6.1.2.43 INTERNAL_CATCH_THROWS_STR_MATCHES

```
#define INTERNAL_CATCH_THROWS_STR_MATCHES(
                macroName,
                resultDisposition,
                matcher,
                ...  )
```

Value:

```
do { \
    Catch::AssertionHandler catchAssertionHandler( macroName##_catch_sr, CATCH_INTERNAL_LINEINFO,
   CATCH_INTERNAL_STRINGIFY(__VA_ARGS__) ", " CATCH_INTERNAL_STRINGIFY(matcher), resultDisposition ); \
    if( catchAssertionHandler.allowThrows() ) \
        try { \
            static_cast<void>(__VA_ARGS__); \
            catchAssertionHandler.handleUnexpectedExceptionNotThrown(); \
        } \
        catch( ... ) { \
            Catch::handleExceptionMatchExpr( catchAssertionHandler, matcher, #matcher##_catch_sr ); \
        } \
    else \
        catchAssertionHandler.handleThrowingCallSkipped(); \
    INTERNAL_CATCH_REACT( catchAssertionHandler ) \
} while( false )
```

6.1.2.44 INTERNAL_CATCH_TRANSLATE_EXCEPTION2

```
#define INTERNAL_CATCH_TRANSLATE_EXCEPTION2(
                translatorName,
                signature )
```

Value:

```
static std::string translatorName( signature ); \
CATCH_INTERNAL_START_WARNINGS_SUPPRESSION \
CATCH_INTERNAL_SUPPRESS_GLOBALS_WARNINGS \
namespace{ Catch::ExceptionTranslatorRegistrar INTERNAL_CATCH_UNIQUE_NAME(
   catch_internal_ExceptionRegistrar )( &translatorName ); } \
CATCH_INTERNAL_STOP_WARNINGS_SUPPRESSION \
static std::string translatorName( signature )
```

6.1.2.45 INTERNAL_CHECK_THAT

```
#define INTERNAL_CHECK_THAT(
                macroName,
                matcher,
                resultDisposition,
                arg )
```

Value:

```
    do { \
        Catch::AssertionHandler catchAssertionHandler( macroName##_catch_sr, CATCH_INTERNAL_LINEINFO,
       CATCH_INTERNAL_STRINGIFY(arg) ", " CATCH_INTERNAL_STRINGIFY(matcher), resultDisposition ); \
        INTERNAL_CATCH_TRY { \
            catchAssertionHandler.handleExpr( Catch::makeMatchExpr( arg, matcher, #matcher##_catch_sr ) ); \
        } INTERNAL_CATCH_CATCH( catchAssertionHandler ) \
        INTERNAL_CATCH_REACT( catchAssertionHandler ) \
    } while( false )
```

6.1.3 Enumeration Type Documentation

6.1.3.1 ColourMode

`enum Catch::ColourMode : std::uint8_t [strong]`

Enumerator

PlatformDefault	Let Catch2 pick implementation based on platform detection.
ANSI	Use ANSI colour code escapes.
Win32	Use Win32 console colour API.
None	Don't use any colour.

6.1.3.2 GenerateFrom

`enum Catch::GenerateFrom [strong]`

Enumerator

Default	Currently equivalent to RandomDevice, but can change at any point.

6.1.3.3 ResultType

`enum Catch::Clara::Detail::ResultType [strong]`

Denotes type of a parsing result.

Enumerator

Ok	No errors.
LogicError	Error in user-specified arguments for construction
RuntimeError	Error in parsing inputs.

6.1.4 Function Documentation

6.1.4.1 Contains() [1/2]

```
template<typename T >
std::enable_if_t<!Detail::is_matcher<T>::value, ContainsElementMatcher<T, std::equal_to<> >
> Catch::Matchers::Contains (
            T && elem )
```

Creates a matcher that checks whether a range contains a specific element.

Uses `std::equal_to` to do the comparison

6.1.4.2 Contains() [2/2]

```
template<typename T , typename Equality >
ContainsElementMatcher<T, Equality> Catch::Matchers::Contains (
            T && elem,
            Equality && eq )
```

Creates a matcher that checks whether a range contains a specific element.

Uses `eq` to do the comparisons

6.1.4.3 convertIntoString()

```
std::string Catch::Detail::convertIntoString (
            StringRef string )
```

Encases `string` in quotes, and escapes invisibles if user requested it via CLI

6.1.4.4 defaultListListeners()

```
void Catch::defaultListListeners (
            std::ostream & out,
            std::vector< ListenerDescription > const & descriptions )
```

Lists listeners descriptions to the provided stream in user-friendly format

6.1.4.5 defaultListReporters()

```
void Catch::defaultListReporters (
             std::ostream & out,
             std::vector< ReporterDescription > const & descriptions,
             Verbosity verbosity )
```

Lists reporter descriptions to the provided stream in user-friendly format

Used as the default listing implementation by the first party reporter bases. The output should be backwards compatible with the output of Catch2 v2 binaries.

6.1.4.6 defaultListTags()

```
void Catch::defaultListTags (
             std::ostream & out,
             std::vector< TagInfo > const & tags,
             bool isFiltered )
```

Lists tag information to the provided stream in user-friendly format

Used as the default listing implementation by the first party reporter bases. The output should be backwards compatible with the output of Catch2 v2 binaries.

6.1.4.7 defaultListTests()

```
void Catch::defaultListTests (
             std::ostream & out,
             ColourImpl * streamColour,
             std::vector< TestCaseHandle > const & tests,
             bool isFiltered,
             Verbosity verbosity )
```

Lists test case information to the provided stream in user-friendly format

Used as the default listing implementation by the first party reporter bases. The output is backwards compatible with the output of Catch2 v2 binaries, and also supports the format specific to the old `--list-test-names-only` option, for people who used it in integrations.

6.1.4.8 makeStream()

```
auto Catch::makeStream (
             std::string const & filename ) -> Detail::unique_ptr< IStream >
```

Creates a stream wrapper that writes to specific file.

Also recognizes 4 special filenames

- `-` for stdout
- `stdout` for stdout
- `stderr` for stderr
- `debug` for platform specific debugging output

Exceptions

if	passed an unrecognized %-prefixed stream

6.1.4.9 operator&&() [1/2]

```
template<typename ArgT >
MatchAllOf<ArgT> Catch::Matchers::Detail::operator&& (
             MatchAllOf< ArgT > const & lhs,
             MatcherBase< ArgT > const & rhs )  [delete]
```

lvalue overload is intentionally deleted, users should not be trying to compose stored composition matchers

6.1.4.10 operator&&() [2/2]

```
template<typename ArgT >
MatchAllOf<ArgT> Catch::Matchers::Detail::operator&& (
             MatcherBase< ArgT > const & lhs,
             MatchAllOf< ArgT > const & rhs )  [delete]
```

lvalue overload is intentionally deleted, users should not be trying to compose stored composition matchers

6.1.4.11 operator"|"|() [1/2]

```
template<typename ArgT >
MatchAnyOf<ArgT> Catch::Matchers::Detail::operator|| (
             MatchAnyOf< ArgT > const & lhs,
             MatcherBase< ArgT > const & rhs )  [delete]
```

lvalue overload is intentionally deleted, users should not be trying to compose stored composition matchers

6.1.4.12 operator"|"|() [2/2]

```
template<typename ArgT >
MatchAnyOf<ArgT> Catch::Matchers::Detail::operator|| (
             MatcherBase< ArgT > const & lhs,
             MatchAnyOf< ArgT > const & rhs )  [delete]
```

lvalue overload is intentionally deleted, users should not be trying to compose stored composition matchers

6.1.4.13 parseReporterSpec()

```
Optional<ReporterSpec> Catch::parseReporterSpec (
             StringRef reporterSpec )
```

Parses provided reporter spec string into

Returns empty optional on errors, e.g.

- field that is not first and not a key+value pair
- duplicated keys in kv pair
- unknown catch reporter option
- empty key/value in an custom kv pair
- ...

6.1.4.14 Predicate()

```
template<typename T , typename Pred >
PredicateMatcher<T, Pred> Catch::Matchers::Predicate (
             Pred && predicate,
             std::string const & description = "" )
```

Creates a matcher that calls delegates `match` to the provided predicate.

The user has to explicitly specify the argument type to the matcher

6.1.4.15 registerReporterImpl()

```
void Catch::Detail::registerReporterImpl (
             std::string const & name,
             IReporterFactoryPtr reporterPtr )
```

Indirection for reporter registration, so that the error handling is independent on the reporter's concrete type

6.1.4.16 ulpDistance()

```
template<typename FP >
uint64_t Catch::ulpDistance (
             FP lhs,
             FP rhs )
```

Calculates the ULP distance between two floating point numbers

The ULP distance of two floating point numbers is the count of valid floating point numbers representable between them.

There are some exceptions between how this function counts the distance, and the interpretation of the standard as implemented. by e.g. `nextafter`. For this function it always holds that:

- `(x == y) => ulpDistance(x, y) == 0` (so `ulpDistance(-0, 0) == 0`)
- `ulpDistance(maxFinite, INF) == 1`
- `ulpDistance(x, -x) == 2 * ulpDistance(x, 0)`

Precondition

`!isnan( lhs )`

`!isnan( rhs )`

floating point numbers are represented in IEEE-754 format

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