

Writing Regexprs 2021-22 / Regex Executor

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Chapter 1

Namespace Index

1.1 Namespace List

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Chapter 2

Hierarchical Index

2.1 Class Hierarchy

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

wr22::regex_executor::algorithms::backtracking::instruction::AddStep	21
step::Adt	
wr22::regex_executor::algorithms::backtracking::Step	85
wr22::regex_executor::algorithms::backtracking::AlternativesDecision	21
wr22::regex_executor::algorithms::backtracking::step::Backtrack	23
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wr22::regex_executor::Capture	25
wr22::regex_executor::Captures	26
wr22::regex_executor::algorithms::backtracking::DecisionApplicator< T >	27
wr22::regex_executor::algorithms::backtracking::DecisionApplicator< AlternativesDecision >	27
wr22::regex_executor::algorithms::backtracking::DecisionApplicator< QuantifierDecision< Quantifier > >	29
wr22::regex_executor::algorithms::backtracking::DecisionRef	30
wr22::regex_executor::algorithms::backtracking::DecisionSnapshot	31
wr22::regex_executor::algorithms::backtracking::step::End	31
wr22::regex_executor::algorithms::backtracking::step::EndGroup	32
wr22::regex_executor::algorithms::backtracking::failure_reasons::EndOfInput	33
wr22::regex_executor::algorithms::backtracking::ErrorHook	34
std::exception	
wr22::regex_executor::algorithms::backtracking::MatchFailure	61
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wr22::regex_executor::algorithms::backtracking::instruction::ExpectEnd	39
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wr22::regex_executor::algorithms::backtracking::step::End::Failure	40
wr22::regex_executor::algorithms::backtracking::step::FinishAlternatives::Failure	40
wr22::regex_executor::algorithms::backtracking::step::FinishQuantifier::Failure	41
wr22::regex_executor::algorithms::backtracking::step::MatchCharClass::Failure	42
wr22::regex_executor::algorithms::backtracking::step::MatchLiteral::Failure	43
wr22::regex_executor::algorithms::backtracking::step::MatchWildcard::Failure	43
wr22::regex_executor::algorithms::backtracking::FailureReason< Reasons >	45
wr22::regex_executor::algorithms::backtracking::FailureReason< wr22::regex_executor::algorithms::↵ ::backtracking::failure_reasons::EndOfInput >	45

wr22::regex_executor::algorithms::backtracking::FailureReason< wr22::regex_executor::algorithms::backtracking::failure_reasons::ExcludedChar, wr22::regex_executor::algorithms::backtracking::failure_reasons::EndOfInput >	45
wr22::regex_executor::algorithms::backtracking::FailureReason< wr22::regex_executor::algorithms::backtracking::failure_reasons::OptionsExhausted >	45
wr22::regex_executor::algorithms::backtracking::FailureReason< wr22::regex_executor::algorithms::backtracking::failure_reasons::OtherChar, wr22::regex_executor::algorithms::backtracking::failure_reasons::EndOfInput >	45
wr22::regex_executor::algorithms::backtracking::step::FinishAlternatives	46
wr22::regex_executor::algorithms::backtracking::step::FinishQuantifier	48
wr22::regex_executor::algorithms::backtracking::Interpreter	49
wr22::regex_executor::algorithms::backtracking::InterpreterState	55
wr22::regex_executor::algorithms::backtracking::InterpreterStateMiniSnapshot	56
wr22::regex_executor::algorithms::backtracking::InterpreterStateSnapshot	57
wr22::regex_executor::MapPrinter< K, V >	58
wr22::regex_executor::algorithms::backtracking::step::MatchAlternatives	59
wr22::regex_executor::algorithms::backtracking::step::MatchCharClass	60
wr22::regex_executor::algorithms::backtracking::step::MatchLiteral	62
wr22::regex_executor::algorithms::backtracking::step::MatchQuantifier	63
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wr22::regex_executor::algorithms::backtracking::step::MatchWildcard	65
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wr22::regex_executor::algorithms::backtracking::failure_reasons::OtherChar	67
wr22::regex_executor::algorithms::backtracking::PartExecutor	68
wr22::regex_executor::algorithms::backtracking::QuantifierDecision< PartT >	69
wr22::regex_executor::algorithms::backtracking::QuantifierExecutor< Derived, Quantifier >	71
wr22::regex_executor::algorithms::backtracking::SpecificPartExecutor< regex_parser::regex::part::Optional >	80
wr22::regex_executor::algorithms::backtracking::SpecificPartExecutor< regex_parser::regex::part::Plus >	81
wr22::regex_executor::algorithms::backtracking::SpecificPartExecutor< regex_parser::regex::part::Star >	83
wr22::regex_executor::Regex	73
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wr22::regex_executor::utils::SpannedRef< Quantifier >	75
wr22::regex_executor::utils::SpannedRef< regex_parser::regex::Part >	75
wr22::regex_executor::utils::SpannedRef< regex_parser::regex::part::Alternatives >	75
wr22::regex_executor::utils::SpannedRef< regex_parser::regex::part::CharacterClass >	75
wr22::regex_executor::utils::SpannedRef< regex_parser::regex::part::Group >	75
wr22::regex_executor::utils::SpannedRef< regex_parser::regex::part::Literal >	75
wr22::regex_executor::utils::SpannedRef< regex_parser::regex::part::Sequence >	75
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wr22::regex_executor::algorithms::backtracking::SpecificPartExecutor< regex_parser::regex::part::Alternatives >	76
wr22::regex_executor::algorithms::backtracking::SpecificPartExecutor< regex_parser::regex::part::CharacterClass >	77
wr22::regex_executor::algorithms::backtracking::SpecificPartExecutor< regex_parser::regex::part::Empty >	78
wr22::regex_executor::algorithms::backtracking::SpecificPartExecutor< regex_parser::regex::part::Group >	79
wr22::regex_executor::algorithms::backtracking::SpecificPartExecutor< regex_parser::regex::part::Literal >	80
wr22::regex_executor::algorithms::backtracking::SpecificPartExecutor< regex_parser::regex::part::Sequence >	82
wr22::regex_executor::algorithms::backtracking::SpecificPartExecutor< regex_parser::regex::part::Wildcard >	84
wr22::regex_executor::algorithms::backtracking::QuantifierExecutor< Derived, Quantifier >::StopImmediatelyTag	85
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wr22::regex_executor::algorithms::backtracking::step::MatchLiteral::Success	89
wr22::regex_executor::algorithms::backtracking::step::MatchWildcard::Success	89

Chapter 3

Class Index

3.1 Class List

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

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wr22::regex_executor::algorithms::backtracking::AlternativesDecision	21
wr22::regex_executor::algorithms::backtracking::step::Backtrack	23
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wr22::regex_executor::algorithms::backtracking::DecisionApplicator< AlternativesDecision >	27
wr22::regex_executor::algorithms::backtracking::DecisionApplicator< QuantifierDecision< Quantifier > >	29
wr22::regex_executor::algorithms::backtracking::DecisionRef	30
wr22::regex_executor::algorithms::backtracking::DecisionSnapshot	31
wr22::regex_executor::algorithms::backtracking::step::End	31
wr22::regex_executor::algorithms::backtracking::step::EndGroup	32
wr22::regex_executor::algorithms::backtracking::failure_reasons::EndOfInput	33
wr22::regex_executor::algorithms::backtracking::ErrorHook	34
wr22::regex_executor::algorithms::backtracking::failure_reasons::ExcludedChar	36
wr22::regex_executor::algorithms::backtracking::instruction::Execute	37
wr22::regex_executor::algorithms::backtracking::Executor	37
wr22::regex_executor::Executor	38
wr22::regex_executor::algorithms::backtracking::instruction::ExpectEnd	39
wr22::regex_executor::algorithms::backtracking::step::End::Failure	40
wr22::regex_executor::algorithms::backtracking::step::FinishAlternatives::Failure	40
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wr22::regex_executor::algorithms::backtracking::step::MatchCharClass::Failure	42
wr22::regex_executor::algorithms::backtracking::step::MatchLiteral::Failure	43
wr22::regex_executor::algorithms::backtracking::step::MatchWildcard::Failure	43
wr22::regex_executor::algorithms::backtracking::detail::step::FailureBase	44
wr22::regex_executor::algorithms::backtracking::FailureReason< Reasons >	45
wr22::regex_executor::algorithms::backtracking::step::FinishAlternatives	46
wr22::regex_executor::algorithms::backtracking::step::FinishQuantifier	48
wr22::regex_executor::algorithms::backtracking::Interpreter	49
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wr22::regex_executor::algorithms::backtracking::MatchFailure	61
wr22::regex_executor::algorithms::backtracking::step::MatchLiteral	62
wr22::regex_executor::algorithms::backtracking::step::MatchQuantifier	63
wr22::regex_executor::algorithms::backtracking::MatchResult	65
wr22::regex_executor::algorithms::backtracking::step::MatchWildcard	65
wr22::regex_executor::algorithms::backtracking::failure_reasons::OptionsExhausted	67
wr22::regex_executor::algorithms::backtracking::failure_reasons::OtherChar	67
wr22::regex_executor::algorithms::backtracking::PartExecutor	68
wr22::regex_executor::algorithms::backtracking::QuantifierDecision< PartT >	69
wr22::regex_executor::algorithms::backtracking::QuantifierExecutor< Derived, Quantifier >	71
wr22::regex_executor::Regex	73
wr22::regex_executor::algorithms::backtracking::instruction::Run	73
wr22::regex_executor::utils::SpannedRef< T >	75
wr22::regex_executor::algorithms::backtracking::SpecificPartExecutor< T >	76
wr22::regex_executor::algorithms::backtracking::SpecificPartExecutor< regex_parser::regex::part::Alternatives >	76
wr22::regex_executor::algorithms::backtracking::SpecificPartExecutor< regex_parser::regex::part::CharacterClass >	77
wr22::regex_executor::algorithms::backtracking::SpecificPartExecutor< regex_parser::regex::part::Empty >	78
wr22::regex_executor::algorithms::backtracking::SpecificPartExecutor< regex_parser::regex::part::Group >	79
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Chapter 4

File Index

4.1 File List

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include/wr22/regex_executor/algorithms/backtracking/decision.hpp	93
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include/wr22/regex_executor/algorithms/backtracking/decision_ref.hpp	96
include/wr22/regex_executor/algorithms/backtracking/decision_snapshot.hpp	97
include/wr22/regex_executor/algorithms/backtracking/error_hook.hpp	97
include/wr22/regex_executor/algorithms/backtracking/executor.hpp	98
include/wr22/regex_executor/algorithms/backtracking/failure_reason.hpp	100
include/wr22/regex_executor/algorithms/backtracking/instruction.hpp	101
include/wr22/regex_executor/algorithms/backtracking/interpreter.hpp	103
include/wr22/regex_executor/algorithms/backtracking/interpreter_state.hpp	105
include/wr22/regex_executor/algorithms/backtracking/match_failure.hpp	106
include/wr22/regex_executor/algorithms/backtracking/match_result.hpp	106
include/wr22/regex_executor/algorithms/backtracking/part_executor.hpp	107
include/wr22/regex_executor/algorithms/backtracking/specific_part_executor.hpp	108
include/wr22/regex_executor/algorithms/backtracking/step.hpp	111
include/wr22/regex_executor/utils/spanned_ref.hpp	117
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src/executor.cpp	118
src/regex.cpp	122
src/algorithms/backtracking/decision.cpp	118
src/algorithms/backtracking/executor.cpp	118
src/algorithms/backtracking/instruction.cpp	118
src/algorithms/backtracking/interpreter.cpp	119
src/algorithms/backtracking/match_failure.cpp	119
src/algorithms/backtracking/match_result.cpp	119
src/algorithms/backtracking/part_executor.cpp	120
src/algorithms/backtracking/specific_part_executor.cpp	120
src/algorithms/backtracking/step.cpp	121
src/utils/spanned_ref.cpp	123

Chapter 5

Namespace Documentation

5.1 wr22 Namespace Reference

Namespaces

- namespace [regex_executor](#)

5.2 wr22::regex_executor Namespace Reference

Namespaces

- namespace [algorithms](#)
- namespace [utils](#)

Classes

- struct [Capture](#)
- struct [Captures](#)
- class [Executor](#)
- struct [MapPrinter](#)
- class [Regex](#)

Enumerations

- enum class [QuantifierType](#) { [Optional](#) , [Star](#) , [Plus](#) }

Functions

- template<typename K , typename V >
std::ostream & [operator<<](#) (std::ostream &out, [MapPrinter](#)< K, V > printer)
- void [to_json](#) (nlohmann::json &j, [Capture](#) capture)
- std::ostream & [operator<<](#) (std::ostream &out, [Capture](#) capture)
- void [to_json](#) (nlohmann::json &j, const [Captures](#) &captures)
- std::ostream & [operator<<](#) (std::ostream &out, const [Captures](#) &captures)

5.2.1 Enumeration Type Documentation

5.2.1.1 QuantifierType

```
enum class wr22::regex_executor::QuantifierType [strong]
```

Enumerator

Optional	
Star	
Plus	

5.2.2 Function Documentation

5.2.2.1 operator<<() [1/3]

```
std::ostream & wr22::regex_executor::operator<< (
    std::ostream & out,
    Capture capture )
```

5.2.2.2 operator<<() [2/3]

```
std::ostream & wr22::regex_executor::operator<< (
    std::ostream & out,
    const Captures & captures )
```

5.2.2.3 operator<<() [3/3]

```
template<typename K , typename V >
std::ostream & wr22::regex_executor::operator<< (
    std::ostream & out,
    MapPrinter< K, V > printer )
```

5.2.2.4 to_json() [1/2]

```
void wr22::regex_executor::to_json (
    nlohmann::json & j,
    Capture capture )
```

5.2.2.5 to_json() [2/2]

```
void wr22::regex_executor::to_json (
    nlohmann::json & j,
    const Captures & captures )
```

5.3 wr22::regex_executor::algorithms Namespace Reference

Namespaces

- namespace [backtracking](#)

5.4 wr22::regex_executor::algorithms::backtracking Namespace Reference

Namespaces

- namespace [detail](#)
- namespace [failure_reasons](#)
- namespace [instruction](#)
- namespace [step](#)

Classes

- struct [AlternativesDecision](#)
- struct [DecisionApplicator](#)
- struct [DecisionApplicator< AlternativesDecision >](#)
- struct [DecisionApplicator< QuantifierDecision< Quantifier > >](#)
- struct [DecisionRef](#)
- struct [DecisionSnapshot](#)
- struct [ErrorHook](#)
- class [Executor](#)
- struct [FailureReason](#)
- class [Interpreter](#)
- struct [InterpreterState](#)
- struct [InterpreterStateMiniSnapshot](#)
- struct [InterpreterStateSnapshot](#)
- struct [MatchFailure](#)
- struct [MatchResult](#)

- class [PartExecutor](#)
- struct [QuantifierDecision](#)
- class [QuantifierExecutor](#)
- class [SpecificPartExecutor](#)
- class [SpecificPartExecutor](#)< [regex_parser::regex::part::Alternatives](#) >
- class [SpecificPartExecutor](#)< [regex_parser::regex::part::CharacterClass](#) >
- class [SpecificPartExecutor](#)< [regex_parser::regex::part::Empty](#) >
- class [SpecificPartExecutor](#)< [regex_parser::regex::part::Group](#) >
- class [SpecificPartExecutor](#)< [regex_parser::regex::part::Literal](#) >
- class [SpecificPartExecutor](#)< [regex_parser::regex::part::Optional](#) >
- class [SpecificPartExecutor](#)< [regex_parser::regex::part::Plus](#) >
- class [SpecificPartExecutor](#)< [regex_parser::regex::part::Sequence](#) >
- class [SpecificPartExecutor](#)< [regex_parser::regex::part::Star](#) >
- class [SpecificPartExecutor](#)< [regex_parser::regex::part::Wildcard](#) >
- struct [Step](#)

Typedefs

- `template<typename Quantifier >`
`using QuantifierExecutorBase = QuantifierExecutor< SpecificPartExecutor< Quantifier >, Quantifier >`
- `using Decision = wr22::utils::Adt< AlternativesDecision, QuantifierDecision< regex_parser::regex::part::Star >, QuantifierDecision< regex_parser::regex::part::Plus >, QuantifierDecision< regex_parser::regex::part::Optional > >`
- `using Instruction = instruction::Adt`

Functions

- `void to_json (nlohmann::json &j, const MatchResult &result)`
- `void to_json (nlohmann::json &j, const Step &step)`
- `template<typename... Reasons>`
`void to_json (nlohmann::json &j, const FailureReason< Reasons... > &failure_reason)`

5.4.1 Typedef Documentation

5.4.1.1 Decision

```
using wr22::regex_executor::algorithms::backtracking::Decision = typedef wr22::utils::Adt<
AlternativesDecision, QuantifierDecision<regex\_parser::regex::part::Star>, QuantifierDecision<regex\_
\_parser::regex::part::Plus>, QuantifierDecision<regex\_parser::regex::part::Optional> >
```

5.4.1.2 Instruction

```
using wr22::regex_executor::algorithms::backtracking::Instruction = typedef instruction::Adt
```

5.4.1.3 QuantifierExecutorBase

```
template<typename Quantifier >
using wr22::regex_executor::algorithms::backtracking::QuantifierExecutorBase = typedef QuantifierExecutor<Spec,
Quantifier>
```

5.4.2 Function Documentation

5.4.2.1 to_json() [1/3]

```
template<typename... Reasons>
void wr22::regex_executor::algorithms::backtracking::to_json (
    nlohmann::json & j,
    const FailureReason< Reasons... > & failure_reason )
```

5.4.2.2 to_json() [2/3]

```
void wr22::regex_executor::algorithms::backtracking::to_json (
    nlohmann::json & j,
    const MatchResult & result )
```

5.4.2.3 to_json() [3/3]

```
void wr22::regex_executor::algorithms::backtracking::to_json (
    nlohmann::json & j,
    const Step & step )
```

5.5 wr22::regex_executor::algorithms::backtracking::detail Namespace Reference

Namespaces

- namespace [step](#)

5.6 wr22::regex_executor::algorithms::backtracking::detail::step Namespace Reference

Classes

- struct [FailureBase](#)
- struct [SuccessBase](#)

5.7 wr22::regex_executor::algorithms::backtracking::failure_reasons Namespace Reference

Classes

- struct [EndOfInput](#)
- struct [ExcludedChar](#)
- struct [OptionsExhausted](#)
- struct [OtherChar](#)

5.8 wr22::regex_executor::algorithms::backtracking::instruction Namespace Reference

Classes

- struct [AddStep](#)
- struct [Execute](#)
- struct [ExpectEnd](#)
- struct [Run](#)

Typedefs

- using [Adt](#) = wr22::utils::Adt< [Execute](#), [AddStep](#), [Run](#), [ExpectEnd](#) >

5.8.1 Typedef Documentation

5.8.1.1 Adt

```
using wr22::regex_executor::algorithms::backtracking::instruction::Adt = typedef wr22::utils::Adt<Execute, AddStep, Run, ExpectEnd>
```

5.9 wr22::regex_executor::algorithms::backtracking::step Namespace Reference

Classes

- struct [Backtrack](#)
- struct [BeginGroup](#)
- struct [End](#)
- struct [EndGroup](#)
- struct [FinishAlternatives](#)
- struct [FinishQuantifier](#)
- struct [MatchAlternatives](#)
- struct [MatchCharClass](#)
- struct [MatchLiteral](#)
- struct [MatchQuantifier](#)
- struct [MatchWildcard](#)

Typedefs

- using `Adt` = wr22::utils::Adt< [MatchQuantifier](#), [FinishQuantifier](#), [MatchCharClass](#), [MatchLiteral](#), [MatchWildcard](#), [BeginGroup](#), [EndGroup](#), [MatchAlternatives](#), [FinishAlternatives](#), [Backtrack](#), [End](#) >

Functions

- void [to_json](#) (nlohmann::json &j, const [MatchQuantifier](#) &step)
- void [to_json](#) (nlohmann::json &j, const [FinishQuantifier](#) &step)
- void [to_json](#) (nlohmann::json &j, const [MatchCharClass](#) &step)
- void [to_json](#) (nlohmann::json &j, const [MatchWildcard](#) &step)
- void [to_json](#) (nlohmann::json &j, const [BeginGroup](#) &step)
- void [to_json](#) (nlohmann::json &j, const [EndGroup](#) &step)
- void [to_json](#) (nlohmann::json &j, const [MatchLiteral](#) &step)
- void [to_json](#) (nlohmann::json &j, const [MatchAlternatives](#) &step)
- void [to_json](#) (nlohmann::json &j, const [FinishAlternatives](#) &step)
- void [to_json](#) (nlohmann::json &j, const [Backtrack](#) &step)
- void [to_json](#) (nlohmann::json &j, const [End](#) &step)

5.9.1 Typedef Documentation

5.9.1.1 Adt

```
using wr22::regex_executor::algorithms::backtracking::step::Adt = typedef wr22::utils::Adt<
MatchQuantifier, FinishQuantifier, MatchCharClass, MatchLiteral, MatchWildcard, BeginGroup,
EndGroup, MatchAlternatives, FinishAlternatives, Backtrack, End>
```

5.9.2 Function Documentation

5.9.2.1 to_json() [1/11]

```
void wr22::regex_executor::algorithms::backtracking::step::to_json (
    nlohmann::json & j,
    const Backtrack & step )
```

5.9.2.2 to_json() [2/11]

```
void wr22::regex_executor::algorithms::backtracking::step::to_json (
    nlohmann::json & j,
    const BeginGroup & step )
```

5.9.2.3 to_json() [3/11]

```
void wr22::regex_executor::algorithms::backtracking::step::to_json (
    nlohmann::json & j,
    const End & step )
```

5.9.2.4 to_json() [4/11]

```
void wr22::regex_executor::algorithms::backtracking::step::to_json (
    nlohmann::json & j,
    const EndGroup & step )
```

5.9.2.5 to_json() [5/11]

```
void wr22::regex_executor::algorithms::backtracking::step::to_json (
    nlohmann::json & j,
    const FinishAlternatives & step )
```

5.9.2.6 to_json() [6/11]

```
void wr22::regex_executor::algorithms::backtracking::step::to_json (
    nlohmann::json & j,
    const FinishQuantifier & step )
```

5.9.2.7 to_json() [7/11]

```
void wr22::regex_executor::algorithms::backtracking::step::to_json (
    nlohmann::json & j,
    const MatchAlternatives & step )
```

5.9.2.8 to_json() [8/11]

```
void wr22::regex_executor::algorithms::backtracking::step::to_json (
    nlohmann::json & j,
    const MatchCharClass & step )
```

5.9.2.9 to_json() [9/11]

```
void wr22::regex_executor::algorithms::backtracking::step::to_json (
    nlohmann::json & j,
    const MatchLiteral & step )
```

5.9.2.10 to_json() [10/11]

```
void wr22::regex_executor::algorithms::backtracking::step::to_json (
    nlohmann::json & j,
    const MatchQuantifier & step )
```

5.9.2.11 to_json() [11/11]

```
void wr22::regex_executor::algorithms::backtracking::step::to_json (
    nlohmann::json & j,
    const MatchWildcard & step )
```

5.10 wr22::regex_executor::utils Namespace Reference

Classes

- class [SpannedRef](#)

Chapter 6

Class Documentation

6.1 `wr22::regex_executor::algorithms::backtracking::instruction::AddStep` Struct Reference ↩

```
#include <instruction.hpp>
```

Public Attributes

- [Step](#) `step`

6.1.1 Member Data Documentation

6.1.1.1 `step`

[Step](#) `wr22::regex_executor::algorithms::backtracking::instruction::AddStep::step`

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

- `include/wr22/regex_executor/algorithms/backtracking/instruction.hpp`

6.2 `wr22::regex_executor::algorithms::backtracking::Alternatives` Decision Struct Reference ↩

```
#include <decision.hpp>
```

Public Types

- using [PartType](#) = `regex_parser::regex::part::Alternatives`

Public Member Functions

- `std::optional< AlternativesDecision > reconsider (Interpreter &interpreter, InterpreterStateSnapshot snapshot) const`

Public Attributes

- `std::reference_wrapper< const PartType > part_ref`
- `std::optional< size_t > initial_string_pos`
- `size_t decision_index = 0`

6.2.1 Member Typedef Documentation

6.2.1.1 PartType

```
using wr22::regex_executor::algorithms::backtracking::AlternativesDecision::PartType = regex↵
_parser::regex::part::Alternatives
```

6.2.2 Member Function Documentation

6.2.2.1 reconsider()

```
std::optional< AlternativesDecision > wr22::regex_executor::algorithms::backtracking::Alternatives↵
Decision::reconsider (
    Interpreter & interpreter,
    InterpreterStateSnapshot snapshot ) const
```

6.2.3 Member Data Documentation

6.2.3.1 decision_index

```
size_t wr22::regex_executor::algorithms::backtracking::AlternativesDecision::decision_index =
0
```

6.2.3.2 initial_string_pos

```
std::optional<size_t> wr22::regex_executor::algorithms::backtracking::AlternativesDecision←  
::initial_string_pos
```

6.2.3.3 part_ref

```
std::reference_wrapper<const PartType> wr22::regex_executor::algorithms::backtracking::↔  
AlternativesDecision::part_ref
```

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

- include/wr22/regex_executor/algorithms/backtracking/[decision.hpp](#)
- src/algorithms/backtracking/[decision.cpp](#)

6.3 wr22::regex_executor::algorithms::backtracking::step::Backtrack Struct Reference

```
#include <step.hpp>
```

Public Member Functions

- constexpr const char * [type_code](#) () const
- bool [operator==](#) (const [Backtrack](#) &other) const =default

Public Attributes

- size_t [string_pos](#)
- size_t [continue_after_step](#)

6.3.1 Member Function Documentation

6.3.1.1 operator==()

```
bool wr22::regex_executor::algorithms::backtracking::step::Backtrack::operator== (
    const Backtrack & other ) const [default]
```

6.3.1.2 type_code()

```
constexpr const char * wr22::regex_executor::algorithms::backtracking::step::Backtrack::type_code ( ) const [inline], [constexpr]
```

6.3.2 Member Data Documentation

6.3.2.1 continue_after_step

```
size_t wr22::regex_executor::algorithms::backtracking::step::Backtrack::continue_after_step
```

6.3.2.2 string_pos

```
size_t wr22::regex_executor::algorithms::backtracking::step::Backtrack::string_pos
```

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

- include/wr22/regex_executor/algorithms/backtracking/[step.hpp](#)

6.4 wr22::regex_executor::algorithms::backtracking::step::BeginGroup Struct Reference

```
#include <step.hpp>
```

Public Member Functions

- constexpr const char * [type_code](#) () const
- bool [operator==](#) (const [BeginGroup](#) &other) const =default

Public Attributes

- regex_parser::span::Span [regex_span](#)
- size_t [string_pos](#)

6.4.1 Member Function Documentation

6.4.1.1 operator==()

```
bool wr22::regex_executor::algorithms::backtracking::step::BeginGroup::operator== (
    const BeginGroup & other ) const [default]
```

6.4.1.2 type_code()

```
constexpr const char * wr22::regex_executor::algorithms::backtracking::step::BeginGroup::type↵
_code ( ) const [inline], [constexpr]
```

6.4.2 Member Data Documentation

6.4.2.1 regex_span

```
regex_parser::span::Span wr22::regex_executor::algorithms::backtracking::step::BeginGroup↵
::regex_span
```

6.4.2.2 string_pos

```
size_t wr22::regex_executor::algorithms::backtracking::step::BeginGroup::string_pos
```

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

- include/wr22/regex_executor/algorithms/backtracking/[step.hpp](#)

6.5 wr22::regex_executor::Capture Struct Reference

```
#include <capture.hpp>
```

Public Member Functions

- constexpr bool [operator==](#) (const [Capture](#) &other) const =default

Public Attributes

- regex_parser::span::Span [string_span](#)

6.5.1 Member Function Documentation

6.5.1.1 operator==()

```
constexpr bool wr22::regex_executor::Capture::operator== (
    const Capture & other ) const [constexpr], [default]
```

6.5.2 Member Data Documentation

6.5.2.1 string_span

```
regex_parser::span::Span wr22::regex_executor::Capture::string_span
```

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

- [include/wr22/regex_executor/capture.hpp](#)

6.6 wr22::regex_executor::Captures Struct Reference

```
#include <capture.hpp>
```

Public Member Functions

- bool [operator==](#) (const [Captures](#) &other) const =default

Public Attributes

- [Capture whole](#)
- std::unordered_map< size_t, [Capture](#) > [indexed](#)
- std::unordered_map< std::string_view, [Capture](#) > [named](#)

6.6.1 Member Function Documentation

6.6.1.1 operator==()

```
bool wr22::regex_executor::Captures::operator== (
    const Captures & other ) const [default]
```

6.6.2 Member Data Documentation

6.6.2.1 indexed

```
std::unordered_map<size_t, Capture> wr22::regex_executor::Captures::indexed
```

6.6.2.2 named

```
std::unordered_map<std::string_view, Capture> wr22::regex_executor::Captures::named
```

6.6.2.3 whole

```
Capture wr22::regex_executor::Captures::whole
```

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

- include/wr22/regex_executor/capture.hpp

6.7 wr22::regex_executor::algorithms::backtracking::DecisionApplicator< T > Struct Template Reference

```
#include <decision_applicator.hpp>
```

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

- include/wr22/regex_executor/algorithms/backtracking/decision_applicator.hpp

6.8 wr22::regex_executor::algorithms::backtracking::DecisionApplicator< AlternativesDecision > Struct Reference

```
#include <decision_applicator.hpp>
```

Public Types

- using [PartType](#) = regex_parser::regex::part::Alternatives
- using [ExecutorType](#) = [SpecificPartExecutor](#)< [PartType](#) >

Static Public Member Functions

- static [ExecutorType](#) [construct_executor](#) ([utils::SpannedRef](#)< [PartType](#) > *part_ref*, [utils::SpannedRef](#)< [regex_parser::regex::Part](#) > *part_var_ref*, [AlternativesDecision](#) *decision*)
- static void [finalize_exhausted](#) ([AlternativesDecision](#) *decision*, [utils::SpannedRef](#)< [PartType](#) > *part_ref*, [Interpreter](#) &*interpreter*)

6.8.1 Member Typedef Documentation

6.8.1.1 ExecutorType

```
using wr22::regex_executor::algorithms::backtracking::DecisionApplicator< AlternativesDecision
>::ExecutorType = SpecificPartExecutor<PartType>
```

6.8.1.2 PartType

```
using wr22::regex_executor::algorithms::backtracking::DecisionApplicator< AlternativesDecision
>::PartType = regex_parser::regex::part::Alternatives
```

6.8.2 Member Function Documentation

6.8.2.1 construct_executor()

```
static ExecutorType wr22::regex_executor::algorithms::backtracking::DecisionApplicator< AlternativesDecision
>::construct_executor (
    utils::SpannedRef< PartType > part_ref,
    utils::SpannedRef< regex_parser::regex::Part > part_var_ref,
    AlternativesDecision decision ) [inline], [static]
```

6.8.2.2 finalize_exhausted()

```
static void wr22::regex_executor::algorithms::backtracking::DecisionApplicator< AlternativesDecision
>::finalize_exhausted (
    AlternativesDecision decision,
    utils::SpannedRef< PartType > part_ref,
    Interpreter & interpreter ) [inline], [static]
```

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

- [include/wr22/regex_executor/algorithms/backtracking/decision_applicator.hpp](#)

6.9 wr22::regex_executor::algorithms::backtracking::DecisionApplicator< QuantifierDecision< Quantifier > > Struct Template Reference

```
#include <decision_applicator.hpp>
```

Public Types

- using [PartType](#) = Quantifier
- using [ExecutorType](#) = [SpecificPartExecutor](#)< [PartType](#) >

Static Public Member Functions

- static [ExecutorType](#) [construct_executor](#) ([utils::SpannedRef](#)< [PartType](#) > part_ref, [utils::SpannedRef](#)< [regex_parser::regex::Part](#) > part_var_ref, [QuantifierDecision](#)< [PartType](#) > decision)
- static void [finalize_exhausted](#) ([QuantifierDecision](#)< Quantifier > decision, [utils::SpannedRef](#)< [PartType](#) > part_ref, [Interpreter](#) &interpreter)

6.9.1 Member Typedef Documentation

6.9.1.1 ExecutorType

```
template<typename Quantifier >  
using wr22::regex_executor::algorithms::backtracking::DecisionApplicator< QuantifierDecision<  
Quantifier > >::ExecutorType = SpecificPartExecutor<PartType>
```

6.9.1.2 PartType

```
template<typename Quantifier >  
using wr22::regex_executor::algorithms::backtracking::DecisionApplicator< QuantifierDecision<  
Quantifier > >::PartType = Quantifier
```

6.9.2 Member Function Documentation

6.9.2.1 construct_executor()

```
template<typename Quantifier >
static ExecutorType wr22::regex_executor::algorithms::backtracking::DecisionApplicator< QuantifierDecision<
Quantifier > >::construct_executor (
    utils::SpannedRef< PartType > part_ref,
    utils::SpannedRef< regex_parser::regex::Part > part_var_ref,
    QuantifierDecision< PartType > decision ) [inline], [static]
```

6.9.2.2 finalize_exhausted()

```
template<typename Quantifier >
static void wr22::regex_executor::algorithms::backtracking::DecisionApplicator< QuantifierDecision<
Quantifier > >::finalize_exhausted (
    QuantifierDecision< Quantifier > decision,
    utils::SpannedRef< PartType > part_ref,
    Interpreter & interpreter ) [inline], [static]
```

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

- [include/wr22/regex_executor/algorithms/backtracking/decision_applicator.hpp](#)

6.10 wr22::regex_executor::algorithms::backtracking::DecisionRef Struct Reference

```
#include <decision_ref.hpp>
```

Public Attributes

- `size_t` [index](#)

6.10.1 Member Data Documentation

6.10.1.1 index

```
size_t wr22::regex_executor::algorithms::backtracking::DecisionRef::index
```

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

- [include/wr22/regex_executor/algorithms/backtracking/decision_ref.hpp](#)

6.11 wr22::regex_executor::algorithms::backtracking::DecisionSnapshot Struct Reference

```
#include <decision_snapshot.hpp>
```

Public Attributes

- [InterpreterStateSnapshot snapshot](#)
- [Decision decision](#)

6.11.1 Member Data Documentation

6.11.1.1 decision

[Decision](#) wr22::regex_executor::algorithms::backtracking::DecisionSnapshot::decision

6.11.1.2 snapshot

[InterpreterStateSnapshot](#) wr22::regex_executor::algorithms::backtracking::DecisionSnapshot::snapshot↔

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

- include/wr22/regex_executor/algorithms/backtracking/[decision_snapshot.hpp](#)

6.12 wr22::regex_executor::algorithms::backtracking::step::End Struct Reference

```
#include <step.hpp>
```

Classes

- struct [Failure](#)
- struct [Success](#)

Public Member Functions

- constexpr const char * [type_code](#) () const
- bool [operator==](#) (const [End](#) &other) const =default

Public Attributes

- `size_t` [string_pos](#)
- `wr22::utils::Adt< Success, Failure >` [result](#)

6.12.1 Member Function Documentation

6.12.1.1 `operator==()`

```
bool wr22::regex_executor::algorithms::backtracking::step::End::operator== (
    const End & other ) const [default]
```

6.12.1.2 `type_code()`

```
constexpr const char * wr22::regex_executor::algorithms::backtracking::step::End::type_code (
) const [inline], [constexpr]
```

6.12.2 Member Data Documentation

6.12.2.1 `result`

```
wr22::utils::Adt<Success, Failure> wr22::regex_executor::algorithms::backtracking::step::End↔
::result
```

6.12.2.2 `string_pos`

```
size_t wr22::regex_executor::algorithms::backtracking::step::End::string_pos
```

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

- `include/wr22/regex_executor/algorithms/backtracking/step.hpp`

6.13 `wr22::regex_executor::algorithms::backtracking::step::End` Group Struct Reference

```
#include <step.hpp>
```


Public Member Functions

- constexpr const char * [type_code](#) () const
- bool [operator==](#) (const [EndGroup](#) &other) const =default

Public Attributes

- size_t [string_pos](#)

6.13.1 Member Function Documentation

6.13.1.1 operator==()

```
bool wr22::regex_executor::algorithms::backtracking::step::EndGroup::operator== (
    const EndGroup & other ) const [default]
```

6.13.1.2 type_code()

```
constexpr const char * wr22::regex_executor::algorithms::backtracking::step::EndGroup::type_↵
code ( ) const [inline], [constexpr]
```

6.13.2 Member Data Documentation

6.13.2.1 string_pos

```
size_t wr22::regex_executor::algorithms::backtracking::step::EndGroup::string_pos
```

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

- include/wr22/regex_executor/algorithms/backtracking/[step.hpp](#)

6.14 wr22::regex_executor::algorithms::backtracking::failure_reasons↵ ::EndOfInput Struct Reference

```
#include <failure_reason.hpp>
```

Public Member Functions

- bool `operator==` (const `EndOfInput` &other) const =default

Static Public Member Functions

- static constexpr const char * `code` ()

6.14.1 Member Function Documentation

6.14.1.1 `code()`

```
static constexpr const char * wr22::regex_executor::algorithms::backtracking::failure_reasons↵
::EndOfInput::code ( ) [inline], [static], [constexpr]
```

6.14.1.2 `operator==()`

```
bool wr22::regex_executor::algorithms::backtracking::failure_reasons::EndOfInput::operator== (
    const EndOfInput & other ) const [default]
```

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

- include/wr22/regex_executor/algorithms/backtracking/[failure_reason.hpp](#)

6.15 wr22::regex_executor::algorithms::backtracking::ErrorHook Struct Reference

```
#include <error_hook.hpp>
```

Public Types

- using `Context` = wr22::utils::Adt< std::monostate, [DecisionRef](#) >
- using `Fn` = void(*)(const `Context` &context, [Interpreter](#) &interpreter)

Public Member Functions

- void `operator()` ([Interpreter](#) &interpreter) const

Public Attributes

- [Context](#) ctx
- [Fn](#) fn

6.15.1 Member Typedef Documentation

6.15.1.1 Context

```
using wr22::regex_executor::algorithms::backtracking::ErrorHook::Context = wr22::utils::↔  
Adt<std::monostate, DecisionRef>
```

6.15.1.2 Fn

```
using wr22::regex_executor::algorithms::backtracking::ErrorHook::Fn = void (*) (const Context&  
context, Interpreter& interpreter)
```

6.15.2 Member Function Documentation

6.15.2.1 operator()()

```
void wr22::regex_executor::algorithms::backtracking::ErrorHook::operator() (  
    Interpreter & interpreter ) const [inline]
```

6.15.3 Member Data Documentation

6.15.3.1 ctx

```
Context wr22::regex_executor::algorithms::backtracking::ErrorHook::ctx
```

6.15.3.2 fn

```
Fn wr22::regex_executor::algorithms::backtracking::ErrorHook::fn
```

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

- include/wr22/regex_executor/algorithms/backtracking/error_hook.hpp

6.16 wr22::regex_executor::algorithms::backtracking::failure_reasons↵ ::ExcludedChar Struct Reference

```
#include <failure_reason.hpp>
```

Public Member Functions

- bool [operator==](#) (const [ExcludedChar](#) &other) const =default

Static Public Member Functions

- static constexpr const char * [code](#) ()

6.16.1 Member Function Documentation

6.16.1.1 code()

```
static constexpr const char * wr22::regex_executor::algorithms::backtracking::failure_reasons↵  
::ExcludedChar::code ( ) [inline], [static], [constexpr]
```

6.16.1.2 operator==()

```
bool wr22::regex_executor::algorithms::backtracking::failure_reasons::ExcludedChar::operator==  
(  
    const ExcludedChar & other ) const [default]
```

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

- include/wr22/regex_executor/algorithms/backtracking/failure_reason.hpp

6.17 wr22::regex_executor::algorithms::backtracking::instruction↵ ::Execute Struct Reference

```
#include <instruction.hpp>
```

Public Attributes

- [utils::SpannedRef](#)< regex_parser::regex::Part > [part](#)
- std::optional< [Decision](#) > [forced_decision](#)

6.17.1 Member Data Documentation

6.17.1.1 forced_decision

```
std::optional<Decision> wr22::regex_executor::algorithms::backtracking::instruction::Execute↵  
::forced_decision
```

6.17.1.2 part

```
utils::SpannedRef<regex_parser::regex::Part> wr22::regex_executor::algorithms::backtracking↵  
::instruction::Execute::part
```

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

- include/wr22/regex_executor/algorithms/backtracking/[instruction.hpp](#)

6.18 wr22::regex_executor::algorithms::backtracking::Executor Class Reference

```
#include <executor.hpp>
```

Public Member Functions

- [Executor](#) (const [Regex](#) ®ex_ref)
- const [Regex](#) & [regex_ref](#) () const
- [MatchResult](#) [execute](#) (const std::u32string_view &string) const

6.18.1 Constructor & Destructor Documentation

6.18.1.1 Executor()

```
wr22::regex_executor::algorithms::backtracking::Executor::Executor (
    const Regex & regex_ref ) [explicit]
```

6.18.2 Member Function Documentation

6.18.2.1 execute()

```
MatchResult wr22::regex_executor::algorithms::backtracking::Executor::execute (
    const std::u32string_view & string ) const
```

6.18.2.2 regex_ref()

```
const Regex & wr22::regex_executor::algorithms::backtracking::Executor::regex_ref ( ) const
```

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

- include/wr22/regex_executor/algorithms/backtracking/[executor.hpp](#)
- src/algorithms/backtracking/[executor.cpp](#)

6.19 wr22::regex_executor::Executor Class Reference

```
#include <executor.hpp>
```

Public Types

- using [BacktrackingResult](#) = [algorithms::backtracking::MatchResult](#)

Public Member Functions

- [Executor](#) (const [Regex](#) &[regex_ref](#))
- const [Regex](#) & [regex_ref](#) () const
- [BacktrackingResult](#) [execute](#) (const std::u32string_view &string)

6.19.1 Member Typedef Documentation

6.19.1.1 BacktrackingResult

```
using wr22::regex_executor::Executor::BacktrackingResult = algorithms::backtracking::MatchResult
```

6.19.2 Constructor & Destructor Documentation

6.19.2.1 Executor()

```
wr22::regex_executor::Executor::Executor (
    const Regex & regex_ref ) [explicit]
```

6.19.3 Member Function Documentation

6.19.3.1 execute()

```
Executor::BacktrackingResult wr22::regex_executor::Executor::execute (
    const std::u32string_view & string )
```

6.19.3.2 regex_ref()

```
const Regex & wr22::regex_executor::Executor::regex_ref ( ) const
```

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

- include/wr22/regex_executor/[executor.hpp](#)
- src/[executor.cpp](#)

6.20 wr22::regex_executor::algorithms::backtracking::instruction::ExpectEnd Struct Reference

```
#include <instruction.hpp>
```

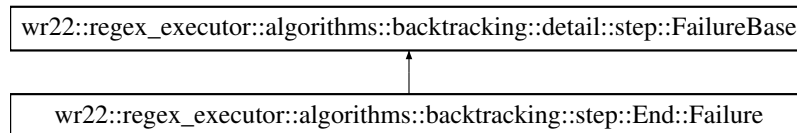
The documentation for this struct was generated from the following file:

- include/wr22/regex_executor/algorithms/backtracking/[instruction.hpp](#)

6.21 wr22::regex_executor::algorithms::backtracking::step::End::Failure Struct Reference

```
#include <step.hpp>
```

Inheritance diagram for wr22::regex_executor::algorithms::backtracking::step::End::Failure:



Additional Inherited Members

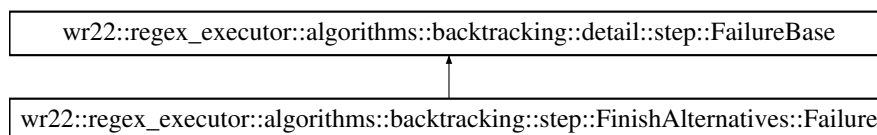
The documentation for this struct was generated from the following file:

- [include/wr22/regex_executor/algorithms/backtracking/step.hpp](#)

6.22 wr22::regex_executor::algorithms::backtracking::step::Finish↵ Alternatives::Failure Struct Reference

```
#include <step.hpp>
```

Inheritance diagram for wr22::regex_executor::algorithms::backtracking::step::FinishAlternatives::Failure:



Public Attributes

- `size_t` [string_pos](#)
- `FailureReason`< [failure_reasons::OptionsExhausted](#) > [failure_reason](#)

Additional Inherited Members

6.22.1 Member Data Documentation

6.22.1.1 failure_reason

```
FailureReason<failure_reasons::OptionsExhausted> wr22::regex_executor::algorithms::backtracking↵
::step::FinishAlternatives::Failure::failure_reason
```

6.22.1.2 string_pos

```
size_t wr22::regex_executor::algorithms::backtracking::step::FinishAlternatives::Failure↵
::string_pos
```

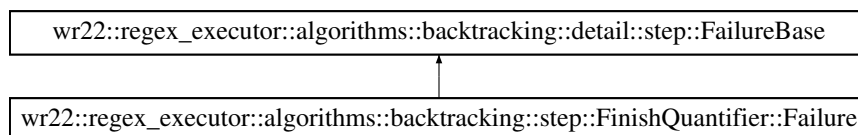
The documentation for this struct was generated from the following file:

- [include/wr22/regex_executor/algorithms/backtracking/step.hpp](#)

6.23 wr22::regex_executor::algorithms::backtracking::step::Finish↵ Quantifier::Failure Struct Reference

```
#include <step.hpp>
```

Inheritance diagram for wr22::regex_executor::algorithms::backtracking::step::FinishQuantifier::Failure:



Public Attributes

- `size_t` [string_pos](#)
- [FailureReason](#)< [failure_reasons::OptionsExhausted](#) > [failure_reason](#)

Additional Inherited Members

6.23.1 Member Data Documentation

6.23.1.1 failure_reason

```
FailureReason<failure_reasons::OptionsExhausted> wr22::regex_executor::algorithms::backtracking↵
::step::FinishQuantifier::Failure::failure_reason
```

6.23.1.2 string_pos

```
size_t wr22::regex_executor::algorithms::backtracking::step::FinishQuantifier::Failure::string↵
_pos
```

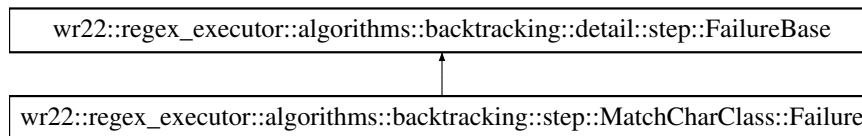
The documentation for this struct was generated from the following file:

- include/wr22/regex_executor/algorithms/backtracking/[step.hpp](#)

6.24 wr22::regex_executor::algorithms::backtracking::step::MatchChar↵ Class::Failure Struct Reference

```
#include <step.hpp>
```

Inheritance diagram for wr22::regex_executor::algorithms::backtracking::step::MatchCharClass::Failure:



Public Attributes

- size_t [string_pos](#)
- FailureReason< [failure_reasons::ExcludedChar](#), [failure_reasons::EndOfInput](#) > [failure_reason](#)

Additional Inherited Members

6.24.1 Member Data Documentation

6.24.1.1 failure_reason

```
FailureReason<failure_reasons::ExcludedChar, failure_reasons::EndOfInput> wr22::regex_executor↵
::algorithms::backtracking::step::MatchCharClass::Failure::failure_reason
```

6.24.1.2 string_pos

```
size_t wr22::regex_executor::algorithms::backtracking::step::MatchCharClass::Failure::string↵
_pos
```

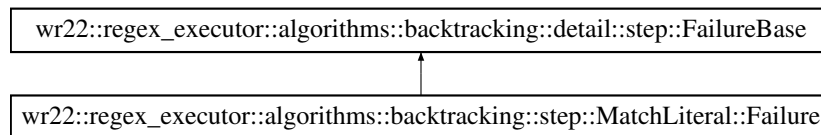
The documentation for this struct was generated from the following file:

- include/wr22/regex_executor/algorithms/backtracking/[step.hpp](#)

6.25 wr22::regex_executor::algorithms::backtracking::step::MatchLiteral::Failure Struct Reference

```
#include <step.hpp>
```

Inheritance diagram for wr22::regex_executor::algorithms::backtracking::step::MatchLiteral::Failure:



Public Attributes

- size_t [string_pos](#)
- FailureReason< [failure_reasons::OtherChar](#), [failure_reasons::EndOfInput](#) > [failure_reason](#)

Additional Inherited Members

6.25.1 Member Data Documentation

6.25.1.1 failure_reason

```
FailureReason<failure_reasons::OtherChar, failure_reasons::EndOfInput> wr22::regex_executor::algorithms::backtracking::step::MatchLiteral::Failure::failure_reason
```

6.25.1.2 string_pos

```
size_t wr22::regex_executor::algorithms::backtracking::step::MatchLiteral::Failure::string_pos
```

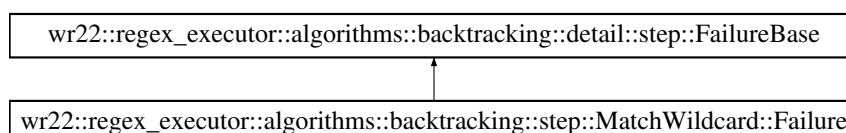
The documentation for this struct was generated from the following file:

- [include/wr22/regex_executor/algorithms/backtracking/step.hpp](#)

6.26 wr22::regex_executor::algorithms::backtracking::step::MatchWildcard::Failure Struct Reference

```
#include <step.hpp>
```

Inheritance diagram for wr22::regex_executor::algorithms::backtracking::step::MatchWildcard::Failure:



Public Attributes

- `size_t string_pos`
- `FailureReason< failure_reasons::EndOfInput > failure_reason`

Additional Inherited Members

6.26.1 Member Data Documentation

6.26.1.1 failure_reason

`FailureReason<failure_reasons::EndOfInput> wr22::regex_executor::algorithms::backtracking↔
::step::MatchWildcard::Failure::failure_reason`

6.26.1.2 string_pos

`size_t wr22::regex_executor::algorithms::backtracking::step::MatchWildcard::Failure::string_↔
pos`

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

- `include/wr22/regex_executor/algorithms/backtracking/step.hpp`

6.27 wr22::regex_executor::algorithms::backtracking::detail::step↔ ::FailureBase Struct Reference

```
#include <step.hpp>
```

Inheritance diagram for `wr22::regex_executor::algorithms::backtracking::detail::step::FailureBase`:



Public Member Functions

- `bool operator== (const FailureBase &other) const =default`

Static Public Attributes

- `static constexpr bool success = false`

6.27.1 Member Function Documentation

6.27.1.1 operator==()

```
bool wr22::regex_executor::algorithms::backtracking::detail::step::FailureBase::operator==(
    const FailureBase & other ) const [default]
```

6.27.2 Member Data Documentation

6.27.2.1 success

```
constexpr bool wr22::regex_executor::algorithms::backtracking::detail::step::FailureBase←
::success = false [static], [constexpr]
```

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

- include/wr22/regex_executor/algorithms/backtracking/step.hpp

6.28 wr22::regex_executor::algorithms::backtracking::FailureReason< Reasons > Struct Template Reference

```
#include <failure_reason.hpp>
```

Public Types

- using [Adt](#) = wr22::utils::Adt< Reasons... >

Public Member Functions

- template<typename Reason >
[FailureReason](#) (Reason [reason](#))
- bool [operator==](#) (const [FailureReason](#)< Reasons... > &other) const =default

Public Attributes

- [Adt reason](#)

6.28.1 Member Typedef Documentation

6.28.1.1 Adt

```
template<typename... Reasons>
using wr22::regex_executor::algorithms::backtracking::FailureReason< Reasons >::Adt = wr22↵
::utils::Adt<Reasons...>
```

6.28.2 Constructor & Destructor Documentation

6.28.2.1 FailureReason()

```
template<typename... Reasons>
template<typename Reason >
wr22::regex_executor::algorithms::backtracking::FailureReason< Reasons >::FailureReason (
    Reason reason ) [inline]
```

6.28.3 Member Function Documentation

6.28.3.1 operator==()

```
template<typename... Reasons>
bool wr22::regex_executor::algorithms::backtracking::FailureReason< Reasons >::operator== (
    const FailureReason< Reasons... > & other ) const [default]
```

6.28.4 Member Data Documentation

6.28.4.1 reason

```
template<typename... Reasons>
Adt wr22::regex_executor::algorithms::backtracking::FailureReason< Reasons >::reason
```

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

- include/wr22/regex_executor/algorithms/backtracking/failure_reason.hpp

6.29 wr22::regex_executor::algorithms::backtracking::step::Finish↵ Alternatives Struct Reference

```
#include <step.hpp>
```

Classes

- struct [Failure](#)
- struct [Success](#)

Public Member Functions

- constexpr const char * [type_code](#) () const
- bool [operator==](#) (const [FinishAlternatives](#) &other) const =default

Public Attributes

- regex_parser::span::Span [regex_span](#)
- wr22::utils::Adt< [Success](#), [Failure](#) > [result](#)

6.29.1 Member Function Documentation

6.29.1.1 operator==()

```
bool wr22::regex_executor::algorithms::backtracking::step::FinishAlternatives::operator== (
    const FinishAlternatives & other ) const [default]
```

6.29.1.2 type_code()

```
constexpr const char * wr22::regex_executor::algorithms::backtracking::step::FinishAlternatives↵
::type_code ( ) const [inline], [constexpr]
```

6.29.2 Member Data Documentation

6.29.2.1 regex_span

```
regex_parser::span::Span wr22::regex_executor::algorithms::backtracking::step::FinishAlternatives↵
::regex_span
```

6.29.2.2 result

```
wr22::utils::Adt<Success, Failure> wr22::regex_executor::algorithms::backtracking::step::↵
FinishAlternatives::result
```

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

- include/wr22/regex_executor/algorithms/backtracking/step.hpp

6.30 wr22::regex_executor::algorithms::backtracking::step::Finish↵ Quantifier Struct Reference

```
#include <step.hpp>
```

Classes

- struct [Failure](#)
- struct [Success](#)

Public Member Functions

- const char * [type_code](#) () const
- bool [operator==](#) (const [FinishQuantifier](#) &other) const =default

Public Attributes

- [QuantifierType](#) [quantifier_type](#)
- regex_parser::span::Span [regex_span](#)
- wr22::utils::Adt< [Success](#), [Failure](#) > [result](#)

6.30.1 Member Function Documentation

6.30.1.1 operator==()

```
bool wr22::regex_executor::algorithms::backtracking::step::FinishQuantifier::operator== (
    const FinishQuantifier & other ) const [default]
```

6.30.1.2 type_code()

```
const char * wr22::regex_executor::algorithms::backtracking::step::FinishQuantifier::type_code
( ) const
```


6.30.2 Member Data Documentation

6.30.2.1 quantifier_type

`QuantifierType` wr22::regex_executor::algorithms::backtracking::step::FinishQuantifier::quantifier↔
_type

6.30.2.2 regex_span

`regex_parser::span::Span` wr22::regex_executor::algorithms::backtracking::step::FinishQuantifier↔
::regex_span

6.30.2.3 result

`wr22::utils::Adt<Success, Failure>` wr22::regex_executor::algorithms::backtracking::step::↔
FinishQuantifier::result

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

- include/wr22/regex_executor/algorithms/backtracking/[step.hpp](#)
- src/algorithms/backtracking/[step.cpp](#)

6.31 wr22::regex_executor::algorithms::backtracking::Interpreter Class Reference

```
#include <interpreter.hpp>
```

Public Member Functions

- [Interpreter](#) (const [Regex](#) ®ex, const std::u32string_view &string_ref)
- std::optional< char32_t > [current_char](#) () const
- void [advance](#) ()
- [DecisionRef](#) [add_decision](#) ([Decision](#) decision, [utils::SpannedRef](#)< regex_parser::regex::Part > decision_↵
making_part)
- const [DecisionSnapshot](#) & [decision_snapshot_at](#) ([DecisionRef](#) ref) const
- [DecisionSnapshot](#) & [decision_snapshot_at](#) ([DecisionRef](#) ref)
- std::optional< [DecisionRef](#) > [last_decision_ref](#) () const
- void [restore_from_snapshot](#) ([InterpreterStateSnapshot](#) snapshot)
- void [push_mini_snapshot](#) ()
- void [pop_mini_snapshot](#) ()
- std::optional< std::reference_wrapper< const [InterpreterStateMiniSnapshot](#) > > [last_mini_snapshot](#) ()
const
- void [add_instruction](#) ([Instruction](#) instruction)
- void [add_step](#) ([Step](#) step)
- void [push_error_hook](#) ([ErrorHook](#) hook)
- void [pop_error_hook](#) ()
- const [ErrorHook](#) & [last_error_hook](#) () const
- [ErrorHook](#) & [last_error_hook](#) ()
- void [push_counter](#) (size_t initial)
- void [pop_counter](#) ()
- size_t & [counter_at_offset](#) (size_t offset)
- size_t [counter_at_offset](#) (size_t offset) const
- size_t [cursor](#) () const
- bool [finished](#) () const
- void [run_instruction](#) ()
- void [finalize](#) ()
- void [finalize_error](#) ()
- void [add_indexed_capture](#) ([Capture](#) capture)
- void [add_named_capture](#) (std::string_view name, [Capture](#) capture)
- std::vector< [Step](#) > [into_steps](#) () &&
- const [InterpreterState](#) & [current_state](#) () const
- [InterpreterState](#) & [current_state](#) ()

6.31.1 Constructor & Destructor Documentation

6.31.1.1 Interpreter()

```
wr22::regex_executor::algorithms::backtracking::Interpreter::Interpreter (
    const Regex & regex,
    const std::u32string_view & string_ref )
```

6.31.2 Member Function Documentation

6.31.2.1 add_decision()

```
DecisionRef wr22::regex_executor::algorithms::backtracking::Interpreter::add_decision (
    Decision decision,
    utils::SpannedRef< regex_parser::regex::Part > decision_making_part )
```

6.31.2.2 add_indexed_capture()

```
void wr22::regex_executor::algorithms::backtracking::Interpreter::add_indexed_capture (
    Capture capture )
```

6.31.2.3 add_instruction()

```
void wr22::regex_executor::algorithms::backtracking::Interpreter::add_instruction (
    Instruction instruction )
```

6.31.2.4 add_named_capture()

```
void wr22::regex_executor::algorithms::backtracking::Interpreter::add_named_capture (
    std::string_view name,
    Capture capture )
```

6.31.2.5 add_step()

```
void wr22::regex_executor::algorithms::backtracking::Interpreter::add_step (
    Step step )
```

6.31.2.6 advance()

```
void wr22::regex_executor::algorithms::backtracking::Interpreter::advance ( )
```

6.31.2.7 counter_at_offset() [1/2]

```
size_t & wr22::regex_executor::algorithms::backtracking::Interpreter::counter_at_offset (
    size_t offset )
```

6.31.2.8 counter_at_offset() [2/2]

```
size_t wr22::regex_executor::algorithms::backtracking::Interpreter::counter_at_offset (
    size_t offset ) const
```

6.31.2.9 current_char()

```
std::optional< char32_t > wr22::regex_executor::algorithms::backtracking::Interpreter::current↵
_char ( ) const
```

6.31.2.10 current_state() [1/2]

```
InterpreterState & wr22::regex_executor::algorithms::backtracking::Interpreter::current_state
( )
```

6.31.2.11 current_state() [2/2]

```
const InterpreterState & wr22::regex_executor::algorithms::backtracking::Interpreter::current↵
_state ( ) const
```

6.31.2.12 cursor()

```
size_t wr22::regex_executor::algorithms::backtracking::Interpreter::cursor ( ) const
```

6.31.2.13 decision_snapshot_at() [1/2]

```
DecisionSnapshot & wr22::regex_executor::algorithms::backtracking::Interpreter::decision↵
snapshot_at (
    DecisionRef ref )
```

6.31.2.14 decision_snapshot_at() [2/2]

```
const DecisionSnapshot & wr22::regex_executor::algorithms::backtracking::Interpreter::decision↵
_snapshot_at (
    DecisionRef ref ) const
```

6.31.2.15 finalize()

```
void wr22::regex_executor::algorithms::backtracking::Interpreter::finalize ( )
```

6.31.2.16 finalize_error()

```
void wr22::regex_executor::algorithms::backtracking::Interpreter::finalize_error ( )
```

6.31.2.17 finished()

```
bool wr22::regex_executor::algorithms::backtracking::Interpreter::finished ( ) const
```

6.31.2.18 into_steps()

```
std::vector< Step > wr22::regex_executor::algorithms::backtracking::Interpreter::into_steps (
) &&
```

6.31.2.19 last_decision_ref()

```
std::optional< DecisionRef > wr22::regex_executor::algorithms::backtracking::Interpreter↵
::last_decision_ref ( ) const
```

6.31.2.20 last_error_hook() [1/2]

```
ErrorHook & wr22::regex_executor::algorithms::backtracking::Interpreter::last_error_hook ( )
```

6.31.2.21 last_error_hook() [2/2]

```
const ErrorHook & wr22::regex_executor::algorithms::backtracking::Interpreter::last_error_hook
( ) const
```

6.31.2.22 last_mini_snapshot()

```
std::optional< std::reference_wrapper< const InterpreterStateMiniSnapshot > > wr22::regex_executor::algorithms::backtracking::Interpreter::last_mini_snapshot ( ) const
```

6.31.2.23 pop_counter()

```
void wr22::regex_executor::algorithms::backtracking::Interpreter::pop_counter ( )
```

6.31.2.24 pop_error_hook()

```
void wr22::regex_executor::algorithms::backtracking::Interpreter::pop_error_hook ( )
```

6.31.2.25 pop_mini_snapshot()

```
void wr22::regex_executor::algorithms::backtracking::Interpreter::pop_mini_snapshot ( )
```

6.31.2.26 push_counter()

```
void wr22::regex_executor::algorithms::backtracking::Interpreter::push_counter (
    size_t initial )
```

6.31.2.27 push_error_hook()

```
void wr22::regex_executor::algorithms::backtracking::Interpreter::push_error_hook (
    ErrorHandler hook )
```

6.31.2.28 push_mini_snapshot()

```
void wr22::regex_executor::algorithms::backtracking::Interpreter::push_mini_snapshot ( )
```

6.31.2.29 restore_from_snapshot()

```
void wr22::regex_executor::algorithms::backtracking::Interpreter::restore_from_snapshot (
    InterpreterStateSnapshot snapshot )
```

6.31.2.30 run_instruction()

```
void wr22::regex_executor::algorithms::backtracking::Interpreter::run_instruction ( )
```

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

- include/wr22/regex_executor/algorithms/backtracking/interpreter.hpp
- src/algorithms/backtracking/interpreter.cpp

6.32 wr22::regex_executor::algorithms::backtracking::InterpreterState Struct Reference

```
#include <interpreter_state.hpp>
```

Public Attributes

- size_t [cursor](#) = 0
- std::vector< [Instruction](#) > [instructions](#)
- std::stack< [ErrorHook](#) > [error_hooks](#)
- std::vector< size_t > [counters](#)
- [Captures](#) [captures](#)
- size_t [capture_counter](#) = 1

6.32.1 Member Data Documentation

6.32.1.1 capture_counter

```
size_t wr22::regex_executor::algorithms::backtracking::InterpreterState::capture_counter = 1
```

6.32.1.2 captures

```
Captures wr22::regex_executor::algorithms::backtracking::InterpreterState::captures
```

6.32.1.3 counters

```
std::vector<size_t> wr22::regex_executor::algorithms::backtracking::InterpreterState::counters
```

6.32.1.4 cursor

```
size_t wr22::regex_executor::algorithms::backtracking::InterpreterState::cursor = 0
```

6.32.1.5 error_hooks

```
std::stack<ErrorHook> wr22::regex_executor::algorithms::backtracking::InterpreterState::error↵_hooks
```

6.32.1.6 instructions

```
std::vector<Instruction> wr22::regex_executor::algorithms::backtracking::InterpreterState↵::instructions
```

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

- include/wr22/regex_executor/algorithms/backtracking/[interpreter_state.hpp](#)

6.33 wr22::regex_executor::algorithms::backtracking::InterpreterState↵ MiniSnapshot Struct Reference

```
#include <interpreter_state.hpp>
```

Public Attributes

- size_t [cursor](#)
- size_t [before_step](#)

6.33.1 Member Data Documentation

6.33.1.1 before_step

```
size_t wr22::regex_executor::algorithms::backtracking::InterpreterStateMiniSnapshot::before_↵
step
```

6.33.1.2 cursor

```
size_t wr22::regex_executor::algorithms::backtracking::InterpreterStateMiniSnapshot::cursor
```

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

- include/wr22/regex_executor/algorithms/backtracking/[interpreter_state.hpp](#)

6.34 wr22::regex_executor::algorithms::backtracking::InterpreterStateSnapshot Struct Reference

```
#include <interpreter_state.hpp>
```

Public Attributes

- [InterpreterState](#) state
- [utils::SpannedRef](#)< regex_parser::regex::Part > [decision_making_part](#)
- size_t [before_step](#)

6.34.1 Member Data Documentation

6.34.1.1 before_step

```
size_t wr22::regex_executor::algorithms::backtracking::InterpreterStateSnapshot::before_step
```

6.34.1.2 decision_making_part

```
utils::SpannedRef<regex_parser::regex::Part> wr22::regex_executor::algorithms::backtracking_↵
::InterpreterStateSnapshot::decision_making_part
```

6.34.1.3 state

```
InterpreterState wr22::regex_executor::algorithms::backtracking::InterpreterStateSnapshot↔
::state
```

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

- [include/wr22/regex_executor/algorithms/backtracking/interpreter_state.hpp](#)

6.35 wr22::regex_executor::MapPrinter< K, V > Struct Template Reference

Public Member Functions

- [MapPrinter](#) (const std::unordered_map< K, V > &[map](#))

Public Attributes

- const std::unordered_map< K, V > & [map](#)

6.35.1 Constructor & Destructor Documentation

6.35.1.1 MapPrinter()

```
template<typename K , typename V >
wr22::regex_executor::MapPrinter< K, V >::MapPrinter (
    const std::unordered_map< K, V > & map ) [inline]
```

6.35.2 Member Data Documentation

6.35.2.1 map

```
template<typename K , typename V >
const std::unordered_map<K, V>& wr22::regex_executor::MapPrinter< K, V >::map
```

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

- [src/captures.cpp](#)

6.36 wr22::regex_executor::algorithms::backtracking::step::MatchAlternatives Struct Reference

```
#include <step.hpp>
```

Public Member Functions

- constexpr const char * [type_code](#) () const
- bool [operator==](#) (const [MatchAlternatives](#) &other) const =default

Public Attributes

- [regex_parser::span::Span](#) [regex_span](#)
- [size_t](#) [string_pos](#)

6.36.1 Member Function Documentation

6.36.1.1 operator==()

```
bool wr22::regex_executor::algorithms::backtracking::step::MatchAlternatives::operator== (
    const MatchAlternatives & other ) const [default]
```

6.36.1.2 type_code()

```
constexpr const char * wr22::regex_executor::algorithms::backtracking::step::MatchAlternatives↵
::type_code ( ) const [inline], [constexpr]
```

6.36.2 Member Data Documentation

6.36.2.1 regex_span

```
regex\_parser::span::Span wr22::regex_executor::algorithms::backtracking::step::MatchAlternatives↵
::regex_span
```

6.36.2.2 string_pos

```
size_t wr22::regex_executor::algorithms::backtracking::step::MatchAlternatives::string_pos
```

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

- include/wr22/regex_executor/algorithms/backtracking/step.hpp

6.37 wr22::regex_executor::algorithms::backtracking::step::MatchChar↵ Class Struct Reference

```
#include <step.hpp>
```

Classes

- struct [Failure](#)
- struct [Success](#)

Public Member Functions

- constexpr const char * [type_code](#) () const
- bool [operator==](#) (const [MatchCharClass](#) &other) const =default

Public Attributes

- regex_parser::span::Span [regex_span](#)
- wr22::utils::Adt< [Success](#), [Failure](#) > [result](#)

6.37.1 Member Function Documentation

6.37.1.1 operator==()

```
bool wr22::regex_executor::algorithms::backtracking::step::MatchCharClass::operator== (
    const MatchCharClass & other ) const [default]
```

6.37.1.2 type_code()

```
constexpr const char * wr22::regex_executor::algorithms::backtracking::step::MatchCharClass↵
::type_code ( ) const [inline], [constexpr]
```

6.37.2 Member Data Documentation

6.37.2.1 regex_span

```
regex_parser::span::Span wr22::regex_executor::algorithms::backtracking::step::MatchChar↔
Class::regex_span
```

6.37.2.2 result

```
wr22::utils::Adt<Success, Failure> wr22::regex_executor::algorithms::backtracking::step::↔
MatchCharClass::result
```

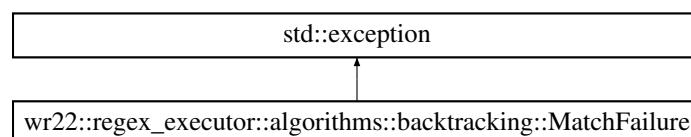
The documentation for this struct was generated from the following file:

- include/wr22/regex_executor/algorithms/backtracking/[step.hpp](#)

6.38 wr22::regex_executor::algorithms::backtracking::MatchFailure Struct Reference

```
#include <match_failure.hpp>
```

Inheritance diagram for wr22::regex_executor::algorithms::backtracking::MatchFailure:



Public Member Functions

- const char * [what](#) () const noexcept override

6.38.1 Member Function Documentation

6.38.1.1 what()

```
const char * wr22::regex_executor::algorithms::backtracking::MatchFailure::what ( ) const
[override], [noexcept]
```

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

- include/wr22/regex_executor/algorithms/backtracking/[match_failure.hpp](#)
- src/algorithms/backtracking/[match_failure.cpp](#)

6.39 wr22::regex_executor::algorithms::backtracking::step::MatchLiteral Struct Reference

```
#include <step.hpp>
```

Classes

- struct [Failure](#)
- struct [Success](#)

Public Member Functions

- constexpr const char * [type_code](#) () const
- bool [operator==](#) (const [MatchLiteral](#) &other) const =default

Public Attributes

- regex_parser::span::Span [regex_span](#)
- char32_t [literal](#)
- wr22::utils::Adt< [Success](#), [Failure](#) > [result](#)

6.39.1 Member Function Documentation

6.39.1.1 operator==()

```
bool wr22::regex_executor::algorithms::backtracking::step::MatchLiteral::operator== (
    const MatchLiteral & other ) const [default]
```

6.39.1.2 type_code()

```
constexpr const char * wr22::regex_executor::algorithms::backtracking::step::MatchLiteral↵
::type_code ( ) const [inline], [constexpr]
```

6.39.2 Member Data Documentation

6.39.2.1 literal

```
char32_t wr22::regex_executor::algorithms::backtracking::step::MatchLiteral::literal
```

6.39.2.2 regex_span

```
regex_parser::span::Span wr22::regex_executor::algorithms::backtracking::step::MatchLiteral↵
::regex_span
```

6.39.2.3 result

```
wr22::utils::Adt<Success, Failure> wr22::regex_executor::algorithms::backtracking::step::↵
MatchLiteral::result
```

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

- include/wr22/regex_executor/algorithms/backtracking/step.hpp

6.40 wr22::regex_executor::algorithms::backtracking::step::Match↵ Quantifier Struct Reference

```
#include <step.hpp>
```

Public Member Functions

- const char * [type_code](#) () const
- bool [operator==](#) (const [MatchQuantifier](#) &other) const =default

Public Attributes

- `regex_parser::span::Span` [regex_span](#)
- `size_t` [string_pos](#)
- `QuantifierType` [quantifier_type](#)

6.40.1 Member Function Documentation

6.40.1.1 `operator==()`

```
bool wr22::regex_executor::algorithms::backtracking::step::MatchQuantifier::operator== (
    const MatchQuantifier & other ) const [default]
```

6.40.1.2 `type_code()`

```
const char * wr22::regex_executor::algorithms::backtracking::step::MatchQuantifier::type_code
( ) const
```

6.40.2 Member Data Documentation

6.40.2.1 `quantifier_type`

```
QuantifierType wr22::regex_executor::algorithms::backtracking::step::MatchQuantifier::quantifier↔
_type
```

6.40.2.2 `regex_span`

```
regex_parser::span::Span wr22::regex_executor::algorithms::backtracking::step::MatchQuantifier↔
::regex_span
```

6.40.2.3 `string_pos`

```
size_t wr22::regex_executor::algorithms::backtracking::step::MatchQuantifier::string_pos
```

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

- `include/wr22/regex_executor/algorithms/backtracking/`[step.hpp](#)
- `src/algorithms/backtracking/`[step.cpp](#)

6.41 wr22::regex_executor::algorithms::backtracking::MatchResult Struct Reference

```
#include <match_result.hpp>
```

Public Attributes

- bool [matched](#)
- std::optional< [Captures](#) > [captures](#)
- std::vector< [Step](#) > [steps](#)

6.41.1 Member Data Documentation

6.41.1.1 captures

```
std::optional<Captures> wr22::regex_executor::algorithms::backtracking::MatchResult::captures
```

6.41.1.2 matched

```
bool wr22::regex_executor::algorithms::backtracking::MatchResult::matched
```

6.41.1.3 steps

```
std::vector<Step> wr22::regex_executor::algorithms::backtracking::MatchResult::steps
```

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

- include/wr22/regex_executor/algorithms/backtracking/[match_result.hpp](#)

6.42 wr22::regex_executor::algorithms::backtracking::step::MatchWildcard Struct Reference

```
#include <step.hpp>
```

Classes

- struct [Failure](#)
- struct [Success](#)

Public Member Functions

- constexpr const char * [type_code](#) () const
- bool [operator==](#) (const [MatchWildcard](#) &other) const =default

Public Attributes

- [regex_parser::span::Span](#) [regex_span](#)
- [wr22::utils::Adt](#)< [Success](#), [Failure](#) > [result](#)

6.42.1 Member Function Documentation

6.42.1.1 [operator==\(\)](#)

```
bool wr22::regex_executor::algorithms::backtracking::step::MatchWildcard::operator== (
    const MatchWildcard & other ) const [default]
```

6.42.1.2 [type_code\(\)](#)

```
constexpr const char * wr22::regex_executor::algorithms::backtracking::step::MatchWildcard↵
::type_code ( ) const [inline], [constexpr]
```

6.42.2 Member Data Documentation

6.42.2.1 [regex_span](#)

```
regex_parser::span::Span wr22::regex_executor::algorithms::backtracking::step::MatchWildcard↵
::regex_span
```

6.42.2.2 [result](#)

```
wr22::utils::Adt<Success, Failure> wr22::regex_executor::algorithms::backtracking::step::↵
MatchWildcard::result
```

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

- [include/wr22/regex_executor/algorithms/backtracking/step.hpp](#)

6.43 wr22::regex_executor::algorithms::backtracking::failure_reasons::OptionsExhausted Struct Reference

```
#include <failure_reason.hpp>
```

Public Member Functions

- bool `operator==` (const `OptionsExhausted` &other) const =default

Static Public Member Functions

- static constexpr const char * `code` ()

6.43.1 Member Function Documentation

6.43.1.1 `code()`

```
static constexpr const char * wr22::regex_executor::algorithms::backtracking::failure_reasons↵  
::OptionsExhausted::code ( ) [inline], [static], [constexpr]
```

6.43.1.2 `operator==()`

```
bool wr22::regex_executor::algorithms::backtracking::failure_reasons::OptionsExhausted::operator==  
(  
    const OptionsExhausted & other ) const [default]
```

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

- include/wr22/regex_executor/algorithms/backtracking/failure_reason.hpp

6.44 wr22::regex_executor::algorithms::backtracking::failure_reasons::OtherChar Struct Reference

```
#include <failure_reason.hpp>
```

Public Member Functions

- bool `operator==` (const `OtherChar` &other) const =default

Static Public Member Functions

- static constexpr const char * [code](#) ()

6.44.1 Member Function Documentation

6.44.1.1 [code\(\)](#)

```
static constexpr const char * wr22::regex_executor::algorithms::backtracking::failure_reasons↵
::OtherChar::code ( ) [inline], [static], [constexpr]
```

6.44.1.2 [operator==\(\)](#)

```
bool wr22::regex_executor::algorithms::backtracking::failure_reasons::OtherChar::operator== (
    const OtherChar & other ) const [default]
```

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

- include/wr22/regex_executor/algorithms/backtracking/[failure_reason.hpp](#)

6.45 wr22::regex_executor::algorithms::backtracking::PartExecutor Class Reference

```
#include <part_executor.hpp>
```

Public Member Functions

- [PartExecutor](#) ([utils::SpannedRef](#)< regex_parser::regex::Part > part_ref)
- bool [execute](#) ([Interpreter](#) &interpreter) const

6.45.1 Constructor & Destructor Documentation

6.45.1.1 [PartExecutor\(\)](#)

```
wr22::regex_executor::algorithms::backtracking::PartExecutor::PartExecutor (
    utils::SpannedRef< regex_parser::regex::Part > part_ref ) [explicit]
```

6.45.2 Member Function Documentation

6.45.2.1 execute()

```
bool wr22::regex_executor::algorithms::backtracking::PartExecutor::execute (
    Interpreter & interpreter ) const
```

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

- include/wr22/regex_executor/algorithms/backtracking/part_executor.hpp
- src/algorithms/backtracking/part_executor.cpp

6.46 wr22::regex_executor::algorithms::backtracking::QuantifierDecision< PartT > Struct Template Reference

```
#include <decision.hpp>
```

Public Types

- using [PartType](#) = PartT

Public Member Functions

- std::optional< [QuantifierDecision](#)< PartT > > [reconsider](#) (Interpreter &interpreter, InterpreterStateSnapshot snapshot) const

Public Attributes

- bool [stop_here](#) = false
- bool [can_go_back](#) = false
- bool [is_first](#) = false

6.46.1 Member Typedef Documentation

6.46.1.1 PartType

```
template<typename PartT >
using wr22::regex_executor::algorithms::backtracking::QuantifierDecision< PartT >::PartType =
PartT
```

6.46.2 Member Function Documentation

6.46.2.1 reconsider()

```
template<typename PartT >
template std::optional< QuantifierDecision< part::Optional > > wr22::regex_executor::algorithms::backtracking::
PartT >::reconsider (
    Interpreter & interpreter,
    InterpreterStateSnapshot snapshot ) const
```

6.46.3 Member Data Documentation

6.46.3.1 can_go_back

```
template<typename PartT >
bool wr22::regex_executor::algorithms::backtracking::QuantifierDecision< PartT >::can_go_back
= false
```

6.46.3.2 is_first

```
template<typename PartT >
bool wr22::regex_executor::algorithms::backtracking::QuantifierDecision< PartT >::is_first =
false
```

6.46.3.3 stop_here

```
template<typename PartT >
bool wr22::regex_executor::algorithms::backtracking::QuantifierDecision< PartT >::stop_here =
false
```

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

- include/wr22/regex_executor/algorithms/backtracking/[decision.hpp](#)
- src/algorithms/backtracking/[decision.cpp](#)

6.47 wr22::regex_executor::algorithms::backtracking::QuantifierExecutor< Derived, Quantifier > Class Template Reference

```
#include <specific_part_executor.hpp>
```

Inheritance diagram for wr22::regex_executor::algorithms::backtracking::QuantifierExecutor< Derived, Quantifier >:



Classes

- struct [StopImmediatelyTag](#)

Public Member Functions

- [QuantifierExecutor](#) ([utils::SpannedRef](#)< Quantifier > part_ref, [utils::SpannedRef](#)< regex_parser::regex::Part > part_var_ref)
- [QuantifierExecutor](#) ([utils::SpannedRef](#)< Quantifier > part_ref, [utils::SpannedRef](#)< regex_parser::regex::Part > part_var_ref, [StopImmediatelyTag](#) tag)
- bool [execute](#) ([Interpreter](#) &interpreter)

Static Public Member Functions

- static size_t [min_repetitions](#) ()
- static std::optional< size_t > [max_repetitions](#) ()
- static [QuantifierType](#) [quantifier_type](#) ()

6.47.1 Constructor & Destructor Documentation

6.47.1.1 QuantifierExecutor() [1/2]

```
template<typename Derived , typename Quantifier >
wr22::regex_executor::algorithms::backtracking::QuantifierExecutor< Derived, Quantifier >::QuantifierExecutor (
    utils::SpannedRef< Quantifier > part_ref,
    utils::SpannedRef< regex_parser::regex::Part > part_var_ref ) [explicit]
```

6.47.1.2 QuantifierExecutor() [2/2]

```
template<typename Derived , typename Quantifier >
wr22::regex_executor::algorithms::backtracking::QuantifierExecutor< Derived, Quantifier >::↔
QuantifierExecutor (
    utils::SpannedRef< Quantifier > part_ref,
    utils::SpannedRef< regex_parser::regex::Part > part_var_ref,
    StopImmediatelyTag tag ) [explicit]
```

6.47.2 Member Function Documentation

6.47.2.1 execute()

```
template<typename Derived , typename Quantifier >
bool wr22::regex_executor::algorithms::backtracking::QuantifierExecutor< Derived, Quantifier
>::execute (
    Interpreter & interpreter )
```

6.47.2.2 max_repetitions()

```
template<typename Derived , typename Quantifier >
std::optional< size_t > wr22::regex_executor::algorithms::backtracking::QuantifierExecutor<
Derived, Quantifier >::max_repetitions [static]
```

6.47.2.3 min_repetitions()

```
template<typename Derived , typename Quantifier >
size_t wr22::regex_executor::algorithms::backtracking::QuantifierExecutor< Derived, Quantifier
>::min_repetitions [static]
```

6.47.2.4 quantifier_type()

```
template<typename Derived , typename Quantifier >
QuantifierType wr22::regex_executor::algorithms::backtracking::QuantifierExecutor< Derived,
Quantifier >::quantifier_type [static]
```

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

- include/wr22/regex_executor/algorithms/backtracking/specific_part_executor.hpp
- src/algorithms/backtracking/specific_part_executor.cpp

6.48 wr22::regex_executor::Regex Class Reference

```
#include <regex.hpp>
```

Public Member Functions

- [Regex](#) (regex_parser::regex::SpannedPart [root_part](#))
- const regex_parser::regex::SpannedPart & [root_part](#) () const

6.48.1 Constructor & Destructor Documentation

6.48.1.1 Regex()

```
wr22::regex_executor::Regex::Regex (
    regex_parser::regex::SpannedPart root_part ) [explicit]
```

6.48.2 Member Function Documentation

6.48.2.1 root_part()

```
const regex_parser::regex::SpannedPart & wr22::regex_executor::Regex::root_part ( ) const
```

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

- include/wr22/regex_executor/[regex.hpp](#)
- src/[regex.cpp](#)

6.49 wr22::regex_executor::algorithms::backtracking::instruction::Run Struct Reference

```
#include <instruction.hpp>
```

Public Types

- using [Context](#) = wr22::utils::Adt< std::monostate, size_t, std::pair< size_t, [utils::SpannedRef](#)< regex_parser::regex::part::Group > >, [DecisionRef](#), std::pair< [utils::SpannedRef](#)< regex_parser::regex::part::Star >, [utils::SpannedRef](#)< regex_parser::regex::Part > >, std::pair< [utils::SpannedRef](#)< regex_parser::regex::part::Plus >, [utils::SpannedRef](#)< regex_parser::regex::Part > >, std::pair< [utils::SpannedRef](#)< regex_parser::regex::part::Optional >, [utils::SpannedRef](#)< regex_parser::regex::Part > >, [Step](#) >
- using [Fn](#) = bool(*) (const [Context](#) &ctx, [Interpreter](#) &interpreter)

Public Member Functions

- bool [operator\(\)](#) ([Interpreter](#) &interpreter) const

Public Attributes

- [Context](#) ctx
- [Fn](#) fn

6.49.1 Member Typedef Documentation

6.49.1.1 Context

```
using wr22::regex_executor::algorithms::backtracking::instruction::Run::Context = wr22::utils::Adt<
std::monostate, size_t, std::pair<size_t, utils::SpannedRef<regex_parser::regex::part::Group> >,
DecisionRef, std::pair< utils::SpannedRef<regex_parser::regex::part::Star>,
utils::SpannedRef<regex_parser::regex::Part> >, std::pair< utils::SpannedRef<regex_parser::regex::part::Plus>,
utils::SpannedRef<regex_parser::regex::Part> >, std::pair< utils::SpannedRef<regex_parser::regex::part::Optional>,
utils::SpannedRef<regex_parser::regex::Part> >, Step>
```

6.49.1.2 Fn

```
using wr22::regex_executor::algorithms::backtracking::instruction::Run::Fn = bool (*)(const
Context& ctx, Interpreter& interpreter)
```

6.49.2 Member Function Documentation

6.49.2.1 operator>()

```
bool wr22::regex_executor::algorithms::backtracking::instruction::Run::operator() (
Interpreter & interpreter ) const
```

6.49.3 Member Data Documentation

6.49.3.1 ctx

`Context` wr22::regex_executor::algorithms::backtracking::instruction::Run::ctx

6.49.3.2 fn

`Fn` wr22::regex_executor::algorithms::backtracking::instruction::Run::fn

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

- include/wr22/regex_executor/algorithms/backtracking/instruction.hpp
- src/algorithms/backtracking/instruction.cpp

6.50 wr22::regex_executor::utils::SpannedRef< T > Class Template Reference

```
#include <spanned_ref.hpp>
```

Public Member Functions

- `SpannedRef` (const T &item, regex_parser::span::Span span)
- const T & item () const
- regex_parser::span::Span span () const

6.50.1 Constructor & Destructor Documentation

6.50.1.1 SpannedRef()

```
template<typename T >
wr22::regex_executor::utils::SpannedRef< T >::SpannedRef (
    const T & item,
    regex_parser::span::Span span ) [inline]
```

6.50.2 Member Function Documentation

6.50.2.1 item()

```
template<typename T >
const T & wr22::regex_executor::utils::SpannedRef< T >::item ( ) const [inline]
```

6.50.2.2 span()

```
template<typename T >
regex_parser::span::Span wr22::regex_executor::utils::SpannedRef< T >::span ( ) const [inline]
```

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

- [include/wr22/regex_executor/utils/spanned_ref.hpp](#)

6.51 wr22::regex_executor::algorithms::backtracking::SpecificPart↵ Executor< T > Class Template Reference

```
#include <specific_part_executor.hpp>
```

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

- [include/wr22/regex_executor/algorithms/backtracking/specific_part_executor.hpp](#)

6.52 wr22::regex_executor::algorithms::backtracking::SpecificPart↵ Executor< regex_parser::regex::part::Alternatives > Class Reference

```
#include <specific_part_executor.hpp>
```

Public Member Functions

- [SpecificPartExecutor](#) ([utils::SpannedRef](#)< [regex_parser::regex::part::Alternatives](#) > part_ref, [utils::SpannedRef](#)< [regex_parser::regex::Part](#) > part_var_ref)
- [SpecificPartExecutor](#) ([utils::SpannedRef](#)< [regex_parser::regex::part::Alternatives](#) > part_ref, [utils::SpannedRef](#)< [regex_parser::regex::Part](#) > part_var_ref, [AlternativesDecision](#) decision)
- bool [execute](#) ([Interpreter](#) &interpreter)

6.52.1 Constructor & Destructor Documentation

6.52.1.1 SpecificPartExecutor() [1/2]

```
wr22::regex_executor::algorithms::backtracking::SpecificPartExecutor< regex_parser::regex↵
::part::Alternatives >::SpecificPartExecutor (
    utils::SpannedRef< regex_parser::regex::part::Alternatives > part_ref,
    utils::SpannedRef< regex_parser::regex::Part > part_var_ref ) [explicit]
```

6.52.1.2 SpecificPartExecutor() [2/2]

```
wr22::regex_executor::algorithms::backtracking::SpecificPartExecutor< regex_parser::regex↵
::part::Alternatives >::SpecificPartExecutor (
    utils::SpannedRef< regex_parser::regex::part::Alternatives > part_ref,
    utils::SpannedRef< regex_parser::regex::Part > part_var_ref,
    AlternativesDecision decision ) [explicit]
```

6.52.2 Member Function Documentation

6.52.2.1 execute()

```
bool wr22::regex_executor::algorithms::backtracking::SpecificPartExecutor< regex_parser↵
::regex::part::Alternatives >::execute (
    Interpreter & interpreter )
```

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

- include/wr22/regex_executor/algorithms/backtracking/specific_part_executor.hpp

6.53 wr22::regex_executor::algorithms::backtracking::SpecificPart↵ Executor< regex_parser::regex::part::CharacterClass > Class Reference

```
#include <specific_part_executor.hpp>
```

Public Member Functions

- [SpecificPartExecutor](#) (utils::SpannedRef< regex_parser::regex::part::CharacterClass > part_ref)
- bool [execute](#) (Interpreter &interpreter) const

6.53.1 Constructor & Destructor Documentation

6.53.1.1 SpecificPartExecutor()

```
wr22::regex_executor::algorithms::backtracking::SpecificPartExecutor< regex_parser::regex↵
::part::CharacterClass >::SpecificPartExecutor (
    utils::SpannedRef< regex_parser::regex::part::CharacterClass > part_ref ) [explicit]
```

6.53.2 Member Function Documentation

6.53.2.1 execute()

```
bool wr22::regex_executor::algorithms::backtracking::SpecificPartExecutor< regex_parser↵
::regex::part::CharacterClass >::execute (
    Interpreter & interpreter ) const
```

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

- [include/wr22/regex_executor/algorithms/backtracking/specific_part_executor.hpp](#)

6.54 wr22::regex_executor::algorithms::backtracking::SpecificPart↵ Executor< regex_parser::regex::part::Empty > Class Reference

```
#include <specific_part_executor.hpp>
```

Public Member Functions

- [SpecificPartExecutor](#) (utils::SpannedRef< regex_parser::regex::part::Empty > part_ref)
- bool [execute](#) (Interpreter &interpreter) const

6.54.1 Constructor & Destructor Documentation

6.54.1.1 SpecificPartExecutor()

```
wr22::regex_executor::algorithms::backtracking::SpecificPartExecutor< regex_parser::regex↵
::part::Empty >::SpecificPartExecutor (
    utils::SpannedRef< regex_parser::regex::part::Empty > part_ref ) [explicit]
```

6.54.2 Member Function Documentation

6.54.2.1 execute()

```
bool wr22::regex_executor::algorithms::backtracking::SpecificPartExecutor< regex_parser↵
::regex::part::Empty >::execute (
    Interpreter & interpreter ) const
```

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

- include/wr22/regex_executor/algorithms/backtracking/specific_part_executor.hpp

6.55 wr22::regex_executor::algorithms::backtracking::SpecificPart↵ Executor< regex_parser::regex::part::Group > Class Reference

```
#include <specific_part_executor.hpp>
```

Public Member Functions

- [SpecificPartExecutor](#) (utils::SpannedRef< regex_parser::regex::part::Group > part_ref)
- bool [execute](#) (Interpreter &interpreter) const

6.55.1 Constructor & Destructor Documentation

6.55.1.1 SpecificPartExecutor()

```
wr22::regex_executor::algorithms::backtracking::SpecificPartExecutor< regex_parser::regex↵
::part::Group >::SpecificPartExecutor (
    utils::SpannedRef< regex_parser::regex::part::Group > part_ref ) [explicit]
```

6.55.2 Member Function Documentation

6.55.2.1 execute()

```
bool wr22::regex_executor::algorithms::backtracking::SpecificPartExecutor< regex_parser↵
::regex::part::Group >::execute (
    Interpreter & interpreter ) const
```

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

- include/wr22/regex_executor/algorithms/backtracking/specific_part_executor.hpp

6.56 wr22::regex_executor::algorithms::backtracking::SpecificPart↵ Executor< regex_parser::regex::part::Literal > Class Reference

```
#include <specific_part_executor.hpp>
```

Public Member Functions

- [SpecificPartExecutor](#) ([utils::SpannedRef](#)< regex_parser::regex::part::Literal > part_ref)
- bool [execute](#) ([Interpreter](#) &interpreter) const

6.56.1 Constructor & Destructor Documentation

6.56.1.1 SpecificPartExecutor()

```
wr22::regex_executor::algorithms::backtracking::SpecificPartExecutor< regex_parser::regex↵  
::part::Literal >::SpecificPartExecutor (   
    utils::SpannedRef< regex_parser::regex::part::Literal > part_ref ) [explicit]
```

6.56.2 Member Function Documentation

6.56.2.1 execute()

```
bool wr22::regex_executor::algorithms::backtracking::SpecificPartExecutor< regex_parser↵  
::regex::part::Literal >::execute (   
    Interpreter & interpreter ) const
```

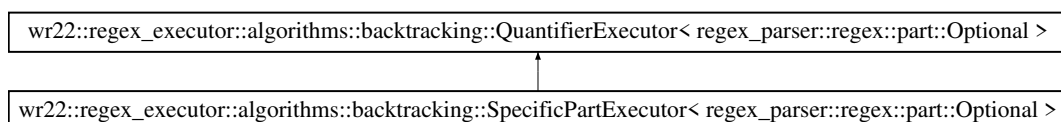
The documentation for this class was generated from the following file:

- include/wr22/regex_executor/algorithms/backtracking/[specific_part_executor.hpp](#)

6.57 wr22::regex_executor::algorithms::backtracking::SpecificPart↵ Executor< regex_parser::regex::part::Optional > Class Reference

```
#include <specific_part_executor.hpp>
```

Inheritance diagram for wr22::regex_executor::algorithms::backtracking::SpecificPartExecutor< regex_parser↵
::regex::part::Optional >:



Static Public Member Functions

- static [QuantifierType impl_quantifier_type](#) ()
- static [size_t impl_min_repetitions](#) ()
- static [std::optional< size_t > impl_max_repetitions](#) ()

Additional Inherited Members

6.57.1 Member Function Documentation

6.57.1.1 impl_max_repetitions()

```
static std::optional< size_t > wr22::regex_executor::algorithms::backtracking::SpecificPartExecutor<  
regex_parser::regex::part::Optional >::impl_max_repetitions ( ) [static]
```

6.57.1.2 impl_min_repetitions()

```
static size_t wr22::regex_executor::algorithms::backtracking::SpecificPartExecutor< regex_↵  
parser::regex::part::Optional >::impl_min_repetitions ( ) [static]
```

6.57.1.3 impl_quantifier_type()

```
static QuantifierType wr22::regex_executor::algorithms::backtracking::SpecificPartExecutor<  
regex_parser::regex::part::Optional >::impl_quantifier_type ( ) [static]
```

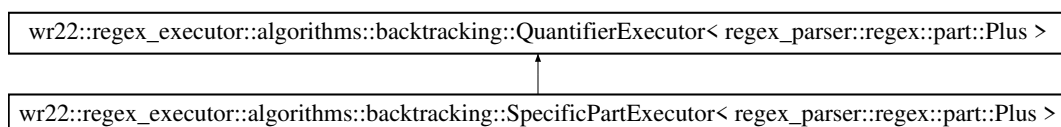
The documentation for this class was generated from the following file:

- include/wr22/regex_executor/algorithms/backtracking/[specific_part_executor.hpp](#)

6.58 wr22::regex_executor::algorithms::backtracking::SpecificPart↵ Executor< regex_parser::regex::part::Plus > Class Reference

```
#include <specific_part_executor.hpp>
```

Inheritance diagram for wr22::regex_executor::algorithms::backtracking::SpecificPartExecutor< regex_parser↵
::regex::part::Plus >:



Static Public Member Functions

- static [QuantifierType](#) [impl_quantifier_type](#) ()
- static [size_t](#) [impl_min_repetitions](#) ()
- static [std::optional< size_t >](#) [impl_max_repetitions](#) ()

Additional Inherited Members

6.58.1 Member Function Documentation

6.58.1.1 [impl_max_repetitions\(\)](#)

```
static std::optional< size\_t > wr22::regex\_executor::algorithms::backtracking::SpecificPartExecutor<  
regex\_parser::regex::part::Plus >::impl\_max\_repetitions ( ) [static]
```

6.58.1.2 [impl_min_repetitions\(\)](#)

```
static size\_t wr22::regex\_executor::algorithms::backtracking::SpecificPartExecutor< regex\_↵  
parser::regex::part::Plus >::impl\_min\_repetitions ( ) [static]
```

6.58.1.3 [impl_quantifier_type\(\)](#)

```
static QuantifierType wr22::regex\_executor::algorithms::backtracking::SpecificPartExecutor<  
regex\_parser::regex::part::Plus >::impl\_quantifier\_type ( ) [static]
```

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

- [include/wr22/regex_executor/algorithms/backtracking/specific_part_executor.hpp](#)

6.59 [wr22::regex_executor::algorithms::backtracking::SpecificPart↵](#) [Executor< regex_parser::regex::part::Sequence >](#) Class Reference

```
#include <specific_part_executor.hpp>
```

Public Member Functions

- [SpecificPartExecutor](#) ([utils::SpannedRef< regex_parser::regex::part::Sequence >](#) part_ref)
- bool [execute](#) ([Interpreter](#) &interpreter) const

6.59.1 Constructor & Destructor Documentation

6.59.1.1 SpecificPartExecutor()

```
wr22::regex_executor::algorithms::backtracking::SpecificPartExecutor< regex_parser::regex↵
::part::Sequence >::SpecificPartExecutor (
    utils::SpannedRef< regex_parser::regex::part::Sequence > part_ref ) [explicit]
```

6.59.2 Member Function Documentation

6.59.2.1 execute()

```
bool wr22::regex_executor::algorithms::backtracking::SpecificPartExecutor< regex_parser↵
::regex::part::Sequence >::execute (
    Interpreter & interpreter ) const
```

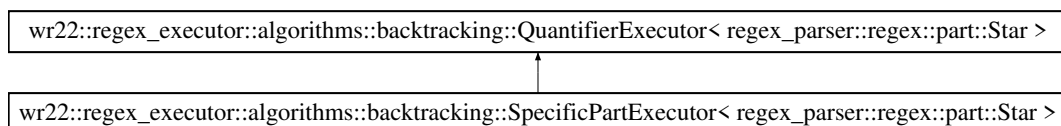
The documentation for this class was generated from the following file:

- include/wr22/regex_executor/algorithms/backtracking/specific_part_executor.hpp

6.60 wr22::regex_executor::algorithms::backtracking::SpecificPart↵ Executor< regex_parser::regex::part::Star > Class Reference

```
#include <specific_part_executor.hpp>
```

Inheritance diagram for wr22::regex_executor::algorithms::backtracking::SpecificPartExecutor< regex_parser↵
::regex::part::Star >:



Static Public Member Functions

- static QuantifierType impl_quantifier_type ()
- static size_t impl_min_repetitions ()
- static std::optional< size_t > impl_max_repetitions ()

Additional Inherited Members

6.60.1 Member Function Documentation

6.60.1.1 impl_max_repetitions()

```
static std::optional< size_t > wr22::regex_executor::algorithms::backtracking::SpecificPartExecutor<
regex_parser::regex::part::Star >::impl_max_repetitions ( ) [static]
```

6.60.1.2 impl_min_repetitions()

```
static size_t wr22::regex_executor::algorithms::backtracking::SpecificPartExecutor< regex_↵
parser::regex::part::Star >::impl_min_repetitions ( ) [static]
```

6.60.1.3 impl_quantifier_type()

```
static QuantifierType wr22::regex_executor::algorithms::backtracking::SpecificPartExecutor<
regex_parser::regex::part::Star >::impl_quantifier_type ( ) [static]
```

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

- [include/wr22/regex_executor/algorithms/backtracking/specific_part_executor.hpp](#)

6.61 wr22::regex_executor::algorithms::backtracking::SpecificPart↵ Executor< regex_parser::regex::part::Wildcard > Class Reference

```
#include <specific_part_executor.hpp>
```

Public Member Functions

- [SpecificPartExecutor](#) (utils::SpannedRef< regex_parser::regex::part::Wildcard > part_ref)
- bool [execute](#) (Interpreter &interpreter) const

6.61.1 Constructor & Destructor Documentation

6.61.1.1 SpecificPartExecutor()

```
wr22::regex_executor::algorithms::backtracking::SpecificPartExecutor< regex_parser::regex↵
::part::Wildcard >::SpecificPartExecutor (
    utils::SpannedRef< regex_parser::regex::part::Wildcard > part_ref ) [explicit]
```

6.61.2 Member Function Documentation

6.61.2.1 execute()

```
bool wr22::regex_executor::algorithms::backtracking::SpecificPartExecutor< regex_parser↵
::regex::part::Wildcard >::execute (
    Interpreter & interpreter ) const
```

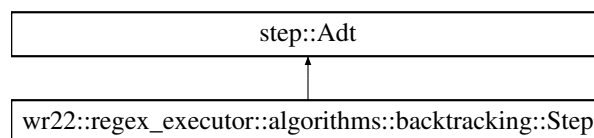
The documentation for this class was generated from the following file:

- include/wr22/regex_executor/algorithms/backtracking/specific_part_executor.hpp

6.62 wr22::regex_executor::algorithms::backtracking::Step Struct Reference

```
#include <step.hpp>
```

Inheritance diagram for wr22::regex_executor::algorithms::backtracking::Step:



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

- include/wr22/regex_executor/algorithms/backtracking/step.hpp

6.63 wr22::regex_executor::algorithms::backtracking::Quantifier↵ Executor< Derived, Quantifier >::StopImmediatelyTag Struct Reference

```
#include <specific_part_executor.hpp>
```

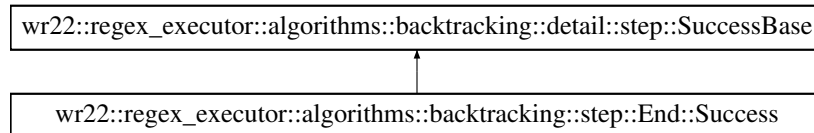
The documentation for this struct was generated from the following file:

- include/wr22/regex_executor/algorithms/backtracking/specific_part_executor.hpp

6.64 wr22::regex_executor::algorithms::backtracking::step::End↵ ::Success Struct Reference

```
#include <step.hpp>
```

Inheritance diagram for wr22::regex_executor::algorithms::backtracking::step::End::Success:



Additional Inherited Members

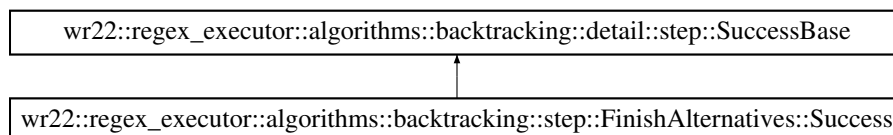
The documentation for this struct was generated from the following file:

- include/wr22/regex_executor/algorithms/backtracking/[step.hpp](#)

6.65 wr22::regex_executor::algorithms::backtracking::step::Finish↵ Alternatives::Success Struct Reference

```
#include <step.hpp>
```

Inheritance diagram for wr22::regex_executor::algorithms::backtracking::step::FinishAlternatives::Success:



Public Attributes

- regex_parser::span::Span [string_span](#)
- size_t [alternative_chosen](#)

Additional Inherited Members

6.65.1 Member Data Documentation

6.65.1.1 alternative_chosen

```
size_t wr22::regex_executor::algorithms::backtracking::step::FinishAlternatives::Success←
::alternative_chosen
```

6.65.1.2 string_span

```
regex_parser::span::Span wr22::regex_executor::algorithms::backtracking::step::FinishAlternatives←
::Success::string_span
```

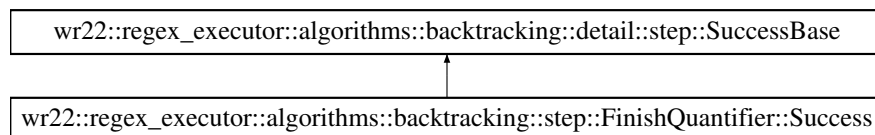
The documentation for this struct was generated from the following file:

- include/wr22/regex_executor/algorithms/backtracking/step.hpp

6.66 wr22::regex_executor::algorithms::backtracking::step::FinishQuantifier::Success Struct Reference

```
#include <step.hpp>
```

Inheritance diagram for wr22::regex_executor::algorithms::backtracking::step::FinishQuantifier::Success:



Public Attributes

- regex_parser::span::Span [string_span](#)
- size_t [num_repetitions](#)

Additional Inherited Members

6.66.1 Member Data Documentation

6.66.1.1 num_repetitions

```
size_t wr22::regex_executor::algorithms::backtracking::step::FinishQuantifier::Success::num←
repetitions
```

6.66.1.2 string_span

```
regex_parser::span::Span wr22::regex_executor::algorithms::backtracking::step::FinishQuantifier↔
::Success::string_span
```

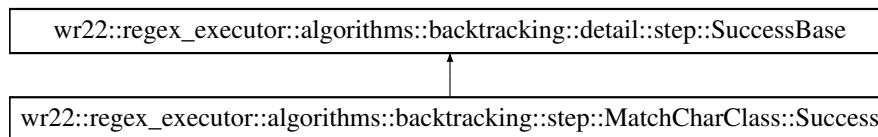
The documentation for this struct was generated from the following file:

- include/wr22/regex_executor/algorithms/backtracking/[step.hpp](#)

6.67 wr22::regex_executor::algorithms::backtracking::step::MatchChar↔ Class::Success Struct Reference

```
#include <step.hpp>
```

Inheritance diagram for wr22::regex_executor::algorithms::backtracking::step::MatchCharClass::Success:



Public Attributes

- regex_parser::span::Span [string_span](#)

Additional Inherited Members

6.67.1 Member Data Documentation

6.67.1.1 string_span

```
regex_parser::span::Span wr22::regex_executor::algorithms::backtracking::step::MatchChar↔
Class::Success::string_span
```

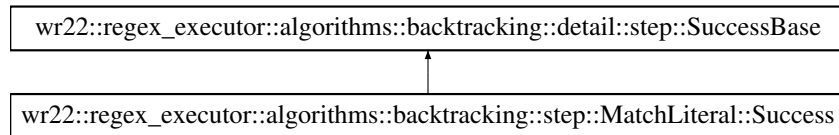
The documentation for this struct was generated from the following file:

- include/wr22/regex_executor/algorithms/backtracking/[step.hpp](#)

6.68 wr22::regex_executor::algorithms::backtracking::step::MatchLiteral::Success Struct Reference

```
#include <step.hpp>
```

Inheritance diagram for wr22::regex_executor::algorithms::backtracking::step::MatchLiteral::Success:



Public Attributes

- regex_parser::span::Span [string_span](#)

Additional Inherited Members

6.68.1 Member Data Documentation

6.68.1.1 string_span

```
regex_parser::span::Span wr22::regex_executor::algorithms::backtracking::step::MatchLiteral::Success::string_span
```

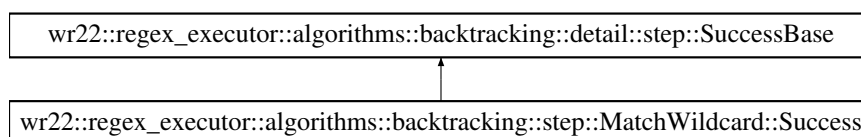
The documentation for this struct was generated from the following file:

- include/wr22/regex_executor/algorithms/backtracking/[step.hpp](#)

6.69 wr22::regex_executor::algorithms::backtracking::step::MatchWildcard::Success Struct Reference

```
#include <step.hpp>
```

Inheritance diagram for wr22::regex_executor::algorithms::backtracking::step::MatchWildcard::Success:



Public Attributes

- `regex_parser::span::Span` [string_span](#)

Additional Inherited Members

6.69.1 Member Data Documentation

6.69.1.1 string_span

```
regex_parser::span::Span wr22::regex_executor::algorithms::backtracking::step::MatchWildcard↵
::Success::string_span
```

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

- `include/wr22/regex_executor/algorithms/backtracking/step.hpp`

6.70 wr22::regex_executor::algorithms::backtracking::detail::step↵ ::SuccessBase Struct Reference

```
#include <step.hpp>
```

Inheritance diagram for `wr22::regex_executor::algorithms::backtracking::detail::step::SuccessBase`:



Public Member Functions

- `bool` [operator==](#) (const [SuccessBase](#) &other) const =default

Static Public Attributes

- static constexpr `bool` [success](#) = true

6.70.1 Member Function Documentation

6.70.1.1 operator==()

```
bool wr22::regex_executor::algorithms::backtracking::detail::step::SuccessBase::operator== (
    const SuccessBase & other ) const [default]
```

6.70.2 Member Data Documentation

6.70.2.1 success

```
constexpr bool wr22::regex_executor::algorithms::backtracking::detail::step::SuccessBase↵  
::success = true [static], [constexpr]
```

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

- include/wr22/regex_executor/algorithms/backtracking/[step.hpp](#)

Chapter 7

File Documentation

7.1 `include/wr22/regex_executor/algorithms/backtracking/decision.hpp` File Reference

```
#include <wr22/regex_parser/regex/part.hpp>
#include <functional>
#include <optional>
```

Classes

- struct [wr22::regex_executor::algorithms::backtracking::AlternativesDecision](#)
- struct [wr22::regex_executor::algorithms::backtracking::QuantifierDecision< PartT >](#)

Namespaces

- namespace [wr22](#)
- namespace [wr22::regex_executor](#)
- namespace [wr22::regex_executor::algorithms](#)
- namespace [wr22::regex_executor::algorithms::backtracking](#)

Typedefs

- using [wr22::regex_executor::algorithms::backtracking::Decision](#) = wr22::utils::Adt< AlternativesDecision, QuantifierDecision< regex_parser::regex::part::Star >, QuantifierDecision< regex_parser::regex::part::Plus >, QuantifierDecision< regex_parser::regex::part::Optional > >

7.2 decision.hpp

[Go to the documentation of this file.](#)

```

1 #pragma once
2
3 // wr22
4 // #include <wr22/regex_executor/algorithms/backtracking/interpreter_state.hpp>
5 #include <wr22/regex_parser/regex/part.hpp>
6
7 // stl
8 #include <functional>
9 #include <optional>
10
11 namespace wr22::regex_executor::algorithms::backtracking {
12
13 struct Interpreter;
14 struct InterpreterStateSnapshot;
15
16 struct AlternativesDecision {
17     using PartType = regex_parser::regex::part::Alternatives;
18
19     // SAFETY: comes from borrowed 'regex', safe to keep as long
20     // as the 'Executor' is alive, provided its safety assumptions
21     // are met.
22     std::reference_wrapper<const PartType> part_ref;
23     std::optional<size_t> initial_string_pos;
24     size_t decision_index = 0;
25
26     std::optional<AlternativesDecision> reconsider(
27         Interpreter& interpreter,
28         InterpreterStateSnapshot snapshot) const;
29 };
30
31 template <typename PartT>
32 struct QuantifierDecision {
33     using PartType = PartT;
34
35     bool stop_here = false;
36     bool can_go_back = false;
37     bool is_first = false;
38     std::optional<QuantifierDecision<PartT>> reconsider(
39         Interpreter& interpreter,
40         InterpreterStateSnapshot snapshot) const;
41 };
42
43 using Decision = wr22::utils::Adt<
44     AlternativesDecision,
45     QuantifierDecision<regex_parser::regex::part::Star>,
46     QuantifierDecision<regex_parser::regex::part::Plus>,
47     QuantifierDecision<regex_parser::regex::part::Optional>>;
48
49 } // namespace wr22::regex_executor::algorithms::backtracking

```

7.3 include/wr22/regex_executor/algorithms/backtracking/decision_↵ applicator.hpp File Reference

```

#include <wr22/regex_executor/algorithms/backtracking/decision.hpp>
#include <wr22/regex_executor/algorithms/backtracking/failure_reason.hpp>
#include <wr22/regex_executor/algorithms/backtracking/interpreter.hpp>
#include <wr22/regex_executor/algorithms/backtracking/specific_part_executor.↵
hpp>
#include <wr22/regex_executor/algorithms/backtracking/step.hpp>
#include <wr22/regex_executor/utils/spanned_ref.hpp>
#include <wr22/regex_parser/regex/part.hpp>
#include <algorithm>
#include <type_traits>

```

Classes

- struct `wr22::regex_executor::algorithms::backtracking::DecisionApplicator< T >`
- struct `wr22::regex_executor::algorithms::backtracking::DecisionApplicator< AlternativesDecision >`
- struct `wr22::regex_executor::algorithms::backtracking::DecisionApplicator< QuantifierDecision< Quantifier > >`

Namespaces

- namespace `wr22`
- namespace `wr22::regex_executor`
- namespace `wr22::regex_executor::algorithms`
- namespace `wr22::regex_executor::algorithms::backtracking`

7.4 decision_applicator.hpp

[Go to the documentation of this file.](#)

```

1 #pragma once
2
3 // wr22
4 #include <wr22/regex_executor/algorithms/backtracking/decision.hpp>
5 #include <wr22/regex_executor/algorithms/backtracking/failure_reason.hpp>
6 #include <wr22/regex_executor/algorithms/backtracking/interpreter.hpp>
7 #include <wr22/regex_executor/algorithms/backtracking/specific_part_executor.hpp>
8 #include <wr22/regex_executor/algorithms/backtracking/step.hpp>
9 #include <wr22/regex_executor/utils/spanned_ref.hpp>
10 #include <wr22/regex_parser/regex/part.hpp>
11
12 // stl
13 #include <algorithm>
14 #include <type_traits>
15
16 namespace wr22::regex_executor::algorithms::backtracking {
17
18 template <typename T>
19 struct DecisionApplicator {};
20
21 template <>
22 struct DecisionApplicator<AlternativesDecision> {
23     using PartType = regex_parser::regex::part::Alternatives;
24     using ExecutorType = SpecificPartExecutor<PartType>;
25
26     static ExecutorType construct_executor(
27         utils::SpannedRef<PartType> part_ref,
28         utils::SpannedRef<regex_parser::regex::part> part_var_ref,
29         AlternativesDecision decision) {
30         return ExecutorType(part_ref, part_var_ref, std::move(decision));
31     }
32
33     static void finalize_exhausted(
34         [[maybe_unused]] AlternativesDecision decision,
35         utils::SpannedRef<PartType> part_ref,
36         Interpreter& interpreter) {
37         interpreter.add_step(step::FinishAlternatives{
38             .regex_span = part_ref.span(),
39             .result =
40                 step::FinishAlternatives::Failure{
41                     .string_pos = interpreter.cursor(),
42                     .failure_reason = failure_reasons::OptionsExhausted{},
43                 },
44         });
45     }
46 };
47
48 template <typename Quantifier>
49 // Formatting disabled because clang-format fails terribly with requires-clauses.
50 // clang-format off
51 requires
52     std::is_same_v<Quantifier, regex_parser::regex::part::Star>
53     || std::is_same_v<Quantifier, regex_parser::regex::part::Plus>
54     || std::is_same_v<Quantifier, regex_parser::regex::part::Optional>
55 // clang-format on
56 struct DecisionApplicator<QuantifierDecision<Quantifier>> {
57     using PartType = Quantifier;

```

```

58     using ExecutorType = SpecificPartExecutor<PartType>;
59
60     static ExecutorType construct_executor(
61         utils::SpannedRef<PartType> part_ref,
62         utils::SpannedRef<regex_parser::regex::Part> part_var_ref,
63         [[maybe_unused]] QuantifierDecision<PartType> decision) {
64         return ExecutorType(part_ref, part_var_ref, typename ExecutorType::StopImmediatelyTag{});
65     }
66
67     static void finalize_exhausted(
68         QuantifierDecision<Quantifier> decision,
69         utils::SpannedRef<PartType> part_ref,
70         Interpreter& interpreter) {
71         if (decision.is_first) {
72             interpreter.add_step(step::FinishQuantifier{
73                 .quantifier_type = ExecutorType::quantifier_type(),
74                 .regex_span = part_ref.span(),
75                 .result =
76                     step::FinishQuantifier::Failure{
77                         .string_pos = interpreter.cursor(),
78                         .failure_reason = failure_reasons::OptionsExhausted{},
79                     },
80             });
81         }
82     }
83 };
84
85 } // namespace wr22::regex_executor::algorithms::backtracking

```

7.5 include/wr22/regex_executor/algorithms/backtracking/decision_ref.hpp File Reference

```
#include <cstdint>
```

Classes

- struct [wr22::regex_executor::algorithms::backtracking::DecisionRef](#)

Namespaces

- namespace [wr22](#)
- namespace [wr22::regex_executor](#)
- namespace [wr22::regex_executor::algorithms](#)
- namespace [wr22::regex_executor::algorithms::backtracking](#)

7.6 decision_ref.hpp

[Go to the documentation of this file.](#)

```

1 #pragma once
2
3 // stl
4 #include <cstdint>
5
6 namespace wr22::regex_executor::algorithms::backtracking {
7
8     struct DecisionRef {
9         size_t index;
10    };
11
12 } // namespace wr22::regex_executor::algorithms::backtracking

```


7.7 include/wr22/regex_executor/algorithms/backtracking/decision_snapshot.hpp File Reference

```
#include <wr22/regex_executor/algorithms/backtracking/decision.hpp>
#include <wr22/regex_executor/algorithms/backtracking/interpreter_state.↵
hpp>
```

Classes

- struct [wr22::regex_executor::algorithms::backtracking::DecisionSnapshot](#)

Namespaces

- namespace [wr22](#)
- namespace [wr22::regex_executor](#)
- namespace [wr22::regex_executor::algorithms](#)
- namespace [wr22::regex_executor::algorithms::backtracking](#)

7.8 decision_snapshot.hpp

[Go to the documentation of this file.](#)

```
1 #pragma once
2
3 // wr22
4 #include <wr22/regex_executor/algorithms/backtracking/decision.hpp>
5 #include <wr22/regex_executor/algorithms/backtracking/interpreter_state.hpp>
6
7 namespace wr22::regex_executor::algorithms::backtracking {
8
9     struct DecisionSnapshot {
10         InterpreterStateSnapshot snapshot;
11         Decision decision;
12     };
13
14 } // namespace wr22::regex_executor::algorithms::backtracking
```

7.9 include/wr22/regex_executor/algorithms/backtracking/error_hook.hpp File Reference

```
#include <wr22/regex_executor/algorithms/backtracking/decision_ref.hpp>
#include <wr22/utils/adt.hpp>
```

Classes

- struct [wr22::regex_executor::algorithms::backtracking::ErrorHook](#)

Namespaces

- namespace [wr22](#)
- namespace [wr22::regex_executor](#)
- namespace [wr22::regex_executor::algorithms](#)
- namespace [wr22::regex_executor::algorithms::backtracking](#)

7.10 error_hook.hpp

[Go to the documentation of this file.](#)

```

1 #pragma once
2
3 // wr22
4 #include <wr22/regex_executor/algorithms/backtracking/decision_ref.hpp>
5 #include <wr22/utils/adt.hpp>
6
7 namespace wr22::regex_executor::algorithms::backtracking {
8     struct Interpreter;
9
10    struct ErrorHandler {
11        using Context = wr22::utils::Adt<std::monostate, DecisionRef>;
12        using Fn = void (*)(const Context& context, Interpreter& interpreter);
13        Context ctx;
14        Fn fn;
15
16        void operator()(Interpreter& interpreter) const {
17            fn(ctx, interpreter);
18        }
19    };
20 } // namespace wr22::regex_executor::algorithms::backtracking

```

7.11 include/wr22/regex_executor/algorithms/backtracking/executor.hpp

File Reference

```

#include <wr22/regex_executor/algorithms/backtracking/match_result.hpp>
#include <wr22/regex_executor/regex.hpp>
#include <functional>
#include <string_view>

```

Classes

- class [wr22::regex_executor::algorithms::backtracking::Executor](#)

Namespaces

- namespace [wr22](#)
- namespace [wr22::regex_executor](#)
- namespace [wr22::regex_executor::algorithms](#)
- namespace [wr22::regex_executor::algorithms::backtracking](#)

7.12 executor.hpp

[Go to the documentation of this file.](#)

```

1 #pragma once
2
3 // wr22
4 #include <wr22/regex_executor/algorithms/backtracking/match_result.hpp>
5 #include <wr22/regex_executor/regex.hpp>
6
7 // stl
8 #include <functional>
9 #include <string_view>
10
11 namespace wr22::regex_executor::algorithms::backtracking {
12
13 class Executor {
14 public:
15     explicit Executor(const Regex& regex_ref);
16
17     const Regex& regex_ref() const;
18     MatchResult execute(const std::u32string_view& string) const;
19
20 private:
21     std::reference_wrapper<const Regex> m_regex_ref;
22 };
23
24 } // namespace wr22::regex_executor::algorithms::backtracking

```

7.13 include/wr22/regex_executor/executor.hpp File Reference

```

#include "wr22/regex_executor/algorithms/backtracking/match_result.hpp"
#include <string_view>
#include <wr22/regex_executor/regex.hpp>
#include <wr22/regex_executor/algorithms/backtracking/executor.hpp>
#include <functional>

```

Classes

- class [wr22::regex_executor::Executor](#)

Namespaces

- namespace [wr22](#)
- namespace [wr22::regex_executor](#)

7.14 executor.hpp

[Go to the documentation of this file.](#)

```

1 #pragma once
2
3 // wr22
4 #include "wr22/regex_executor/algorithms/backtracking/match_result.hpp"
5 #include <string_view>
6 #include <wr22/regex_executor/regex.hpp>
7 #include <wr22/regex_executor/algorithms/backtracking/executor.hpp>
8
9 // stl
10 #include <functional>
11
12 namespace wr22::regex_executor {
13

```

```

14 class Executor {
15 public:
16     using BacktrackingResult = algorithms::backtracking::MatchResult;
17
18     explicit Executor(const Regex& regex_ref);
19
20     const Regex& regex_ref() const;
21     BacktrackingResult execute(const std::u32string_view& string);
22
23 private:
24     using BacktrackingExecutor = algorithms::backtracking::Executor;
25
26     BacktrackingExecutor m_executor;
27 };
28
29 }

```

7.15 include/wr22/regex_executor/algorithms/backtracking/failure_reason.hpp File Reference

```

#include <type_traits>
#include <wr22/utils/adt.hpp>
#include <nlohmann/json.hpp>

```

Classes

- struct [wr22::regex_executor::algorithms::backtracking::failure_reasons::EndOfInput](#)
- struct [wr22::regex_executor::algorithms::backtracking::failure_reasons::ExcludedChar](#)
- struct [wr22::regex_executor::algorithms::backtracking::failure_reasons::OtherChar](#)
- struct [wr22::regex_executor::algorithms::backtracking::failure_reasons::OptionsExhausted](#)
- struct [wr22::regex_executor::algorithms::backtracking::FailureReason< Reasons >](#)

Namespaces

- namespace [wr22](#)
- namespace [wr22::regex_executor](#)
- namespace [wr22::regex_executor::algorithms](#)
- namespace [wr22::regex_executor::algorithms::backtracking](#)
- namespace [wr22::regex_executor::algorithms::backtracking::failure_reasons](#)

Functions

- template<typename... Reasons>
void [wr22::regex_executor::algorithms::backtracking::to_json](#) (nlohmann::json &j, const FailureReason< Reasons... > &failure_reason)

7.16 failure_reason.hpp

[Go to the documentation of this file.](#)

```

1 #pragma once
2
3 // stl
4 #include <type_traits>
5
6 // wr22
7 #include <wr22/utils/adt.hpp>
8
9 // nlohmann
10 #include <nlohmann/json.hpp>
11
12 namespace wr22::regex_executor::algorithms::backtracking {
13
14 namespace failure_reasons {
15     struct EndOfInput {
16         static constexpr const char* code() {
17             return "end_of_input";
18         }
19
20         bool operator==(const EndOfInput& other) const = default;
21     };
22
23     struct ExcludedChar {
24         static constexpr const char* code() {
25             return "excluded_char";
26         }
27
28         bool operator==(const ExcludedChar& other) const = default;
29     };
30
31     struct OtherChar {
32         static constexpr const char* code() {
33             return "other_char";
34         }
35
36         bool operator==(const OtherChar& other) const = default;
37     };
38
39     struct OptionsExhausted {
40         static constexpr const char* code() {
41             return "options_exhausted";
42         }
43
44         bool operator==(const OptionsExhausted& other) const = default;
45     };
46 } // namespace failure_reasons
47
48 template <typename... Reasons>
49 struct FailureReason {
50     using Adt = wr22::utils::Adt<Reasons...>;
51
52     template <typename Reason>
53     FailureReason(Reason reason)
54         : reason(std::move(reason)) {}
55
56     Adt reason;
57
58     bool operator==(const FailureReason<Reasons...>& other) const = default;
59 };
60
61 template <typename... Reasons>
62 void to_json(nlohmann::json& j, const FailureReason<Reasons...>& failure_reason) {
63     j = nlohmann::json::object();
64     failure_reason.reason.visit([&j](const auto& reason) { j["code"] = reason.code(); });
65 }
66
67 } // namespace wr22::regex_executor::algorithms::backtracking

```

7.17 include/wr22/regex_↵ executor/algorithms/backtracking/instruction.hpp File Reference

```

#include <wr22/regex_executor/algorithms/backtracking/decision.hpp>
#include <wr22/regex_executor/algorithms/backtracking/decision_ref.hpp>
#include <wr22/regex_executor/algorithms/backtracking/step.hpp>

```

```
#include <wr22/regex_executor/utils/spanned_ref.hpp>
#include <wr22/regex_parser/regex/part.hpp>
#include <wr22/regex_parser/span/span.hpp>
#include <wr22/utils/adt.hpp>
#include <optional>
```

Classes

- struct [wr22::regex_executor::algorithms::backtracking::instruction::Execute](#)
- struct [wr22::regex_executor::algorithms::backtracking::instruction::AddStep](#)
- struct [wr22::regex_executor::algorithms::backtracking::instruction::Run](#)
- struct [wr22::regex_executor::algorithms::backtracking::instruction::ExpectEnd](#)

Namespaces

- namespace [wr22](#)
- namespace [wr22::regex_executor](#)
- namespace [wr22::regex_executor::algorithms](#)
- namespace [wr22::regex_executor::algorithms::backtracking](#)
- namespace [wr22::regex_executor::algorithms::backtracking::instruction](#)

Typedefs

- using [wr22::regex_executor::algorithms::backtracking::instruction::Adt](#) = [wr22::utils::Adt](#)< [Execute](#), [AddStep](#), [Run](#), [ExpectEnd](#) >
- using [wr22::regex_executor::algorithms::backtracking::Instruction](#) = [instruction::Adt](#)

7.18 instruction.hpp

[Go to the documentation of this file.](#)

```
1 #pragma once
2
3 // wr22
4 #include <wr22/regex_executor/algorithms/backtracking/decision.hpp>
5 #include <wr22/regex_executor/algorithms/backtracking/decision_ref.hpp>
6 #include <wr22/regex_executor/algorithms/backtracking/step.hpp>
7 #include <wr22/regex_executor/utils/spanned_ref.hpp>
8 #include <wr22/regex_parser/regex/part.hpp>
9 #include <wr22/regex_parser/span/span.hpp>
10 #include <wr22/utils/adt.hpp>
11
12 // stl
13 #include <optional>
14
15 namespace wr22::regex_executor::algorithms::backtracking {
16
17 struct Interpreter;
18
19 namespace instruction {
20     struct Execute {
21         utils::SpannedRef<regex_parser::regex::Part> part;
22         std::optional<Decision> forced_decision;
23     };
24
25     struct AddStep {
26         Step step;
27     };
28
29     struct Run {
30         using Context = wr22::utils::Adt<
```

```

31         std::monostate,
32         size_t,
33         std::pair<size_t, utils::SpannedRef<regex_parser::regex::part::Group>,
34         DecisionRef,
35         std::pair<
36             utils::SpannedRef<regex_parser::regex::part::Star>,
37             utils::SpannedRef<regex_parser::regex::Part>>,
38         std::pair<
39             utils::SpannedRef<regex_parser::regex::part::Plus>,
40             utils::SpannedRef<regex_parser::regex::Part>>,
41         std::pair<
42             utils::SpannedRef<regex_parser::regex::part::Optional>,
43             utils::SpannedRef<regex_parser::regex::Part>>,
44         Step>;
45     using Fn = bool (*)(const Context& ctx, Interpreter& interpreter);
46     Context ctx;
47     Fn fn;
48
49     bool operator()(Interpreter& interpreter) const;
50 };
51
52 struct ExpectEnd {};
53
54 using Adt = wr22::utils::Adt<Execute, AddStep, Run, ExpectEnd>;
55 }; // namespace instruction
56
57 using Instruction = instruction::Adt;
58 } // namespace wr22::regex_executor::algorithms::backtracking

```

7.19 include/wr22/regex_executor/algorithms/backtracking/interpreter.hpp File Reference

```

#include <wr22/regex_executor/algorithms/backtracking/decision_ref.hpp>
#include <wr22/regex_executor/algorithms/backtracking/decision_snapshot.↵
hpp>
#include <wr22/regex_executor/algorithms/backtracking/instruction.hpp>
#include <wr22/regex_executor/algorithms/backtracking/interpreter_state.↵
hpp>
#include <wr22/regex_executor/algorithms/backtracking/step.hpp>
#include <wr22/regex_executor/regex.hpp>
#include <wr22/regex_parser/regex/part.hpp>
#include <functional>
#include <stack>
#include <string_view>
#include <vector>

```

Classes

- class [wr22::regex_executor::algorithms::backtracking::Interpreter](#)

Namespaces

- namespace [wr22](#)
- namespace [wr22::regex_executor](#)
- namespace [wr22::regex_executor::algorithms](#)
- namespace [wr22::regex_executor::algorithms::backtracking](#)

7.20 interpreter.hpp

[Go to the documentation of this file.](#)

```

1 #pragma once
2
3 // wr22
4 #include <wr22/regex_executor/algorithms/backtracking/decision_ref.hpp>
5 #include <wr22/regex_executor/algorithms/backtracking/decision_snapshot.hpp>
6 #include <wr22/regex_executor/algorithms/backtracking/instruction.hpp>
7 #include <wr22/regex_executor/algorithms/backtracking/interpreter_state.hpp>
8 #include <wr22/regex_executor/algorithms/backtracking/step.hpp>
9 #include <wr22/regex_executor/regex.hpp>
10 #include <wr22/regex_parser/regex/part.hpp>
11
12 // stl
13 #include <functional>
14 #include <stack>
15 #include <string_view>
16 #include <vector>
17
18 namespace wr22::regex_executor::algorithms::backtracking {
19
20 class Interpreter {
21 public:
22     Interpreter(const Regex& regex, const std::u32string_view& string_ref);
23
24     std::optional<char32_t> current_char() const;
25     void advance();
26
27     DecisionRef add_decision(
28         Decision decision,
29         utils::SpannedRef<regex_parser::regex::Part> decision_making_part);
30     const DecisionSnapshot& decision_snapshot_at(DecisionRef ref) const;
31     DecisionSnapshot& decision_snapshot_at(DecisionRef ref);
32     std::optional<DecisionRef> last_decision_ref() const;
33     void restore_from_snapshot(InterpreterStateSnapshot snapshot);
34
35     void push_mini_snapshot();
36     void pop_mini_snapshot();
37     std::optional<std::reference_wrapper<const InterpreterStateMiniSnapshot> last_mini_snapshot()
38         const;
39
40     void add_instruction(Instruction instruction);
41     void add_step(Step step);
42
43     void push_error_hook(ErrorHook hook);
44     void pop_error_hook();
45     const ErrorHook& last_error_hook() const;
46     ErrorHook& last_error_hook();
47
48     void push_counter(size_t initial);
49     void pop_counter();
50     size_t& counter_at_offset(size_t offset);
51     size_t counter_at_offset(size_t offset) const;
52
53     size_t cursor() const;
54     bool finished() const;
55
56     void run_instruction();
57     void finalize();
58     void finalize_error();
59
60     void add_indexed_capture(Capture capture);
61     void add_named_capture(std::string_view name, Capture capture);
62
63     std::vector<Step> into_steps() &&;
64
65     const InterpreterState& current_state() const;
66     InterpreterState& current_state();
67
68 private:
69     size_t parse_counter_offset(size_t offset) const;
70
71     std::u32string_view m_string_ref;
72     InterpreterState m_current_state;
73     std::vector<DecisionSnapshot> m_decision_snapshots;
74     std::stack<InterpreterStateMiniSnapshot> m_mini_snapshots;
75     std::vector<Step> m_steps;
76 };
77
78 } // namespace wr22::regex_executor::algorithms::backtracking

```


7.21 include/wr22/regex_executor/algorithms/backtracking/interpreter_state.hpp File Reference

```
#include <wr22/regex_executor/algorithms/backtracking/error_hook.hpp>
#include <wr22/regex_executor/algorithms/backtracking/instruction.hpp>
#include <wr22/regex_executor/capture.hpp>
#include <stack>
#include <vector>
```

Classes

- struct [wr22::regex_executor::algorithms::backtracking::InterpreterState](#)
- struct [wr22::regex_executor::algorithms::backtracking::InterpreterStateSnapshot](#)
- struct [wr22::regex_executor::algorithms::backtracking::InterpreterStateMiniSnapshot](#)

Namespaces

- namespace [wr22](#)
- namespace [wr22::regex_executor](#)
- namespace [wr22::regex_executor::algorithms](#)
- namespace [wr22::regex_executor::algorithms::backtracking](#)

7.22 interpreter_state.hpp

[Go to the documentation of this file.](#)

```
1 #pragma once
2
3 // wr22
4 #include <wr22/regex_executor/algorithms/backtracking/error_hook.hpp>
5 #include <wr22/regex_executor/algorithms/backtracking/instruction.hpp>
6 #include <wr22/regex_executor/capture.hpp>
7
8 // stl
9 #include <stack>
10 #include <vector>
11
12 namespace wr22::regex_executor::algorithms::backtracking {
13
14 struct InterpreterState {
15     size_t cursor = 0;
16     std::vector<Instruction> instructions;
17     std::stack<ErrorHook> error_hooks;
18     std::vector<size_t> counters;
19     Captures captures;
20     size_t capture_counter = 1;
21 };
22
23 struct InterpreterStateSnapshot {
24     InterpreterState state;
25     utils::SpannedRef<regex_parser::regex::Part> decision_making_part;
26     size_t before_step;
27 };
28
29 struct InterpreterStateMiniSnapshot {
30     size_t cursor;
31     size_t before_step;
32 };
33
34 } // namespace wr22::regex_executor::algorithms::backtracking
```

7.23 include/wr22/regex_executor/algorithms/backtracking/match_↵ failure.hpp File Reference

```
#include <exception>
#include <fmt/compile.h>
#include <fmt/core.h>
```

Classes

- struct [wr22::regex_executor::algorithms::backtracking::MatchFailure](#)

Namespaces

- namespace [wr22](#)
- namespace [wr22::regex_executor](#)
- namespace [wr22::regex_executor::algorithms](#)
- namespace [wr22::regex_executor::algorithms::backtracking](#)

7.24 match_failure.hpp

[Go to the documentation of this file.](#)

```
1 #pragma once
2
3 // stl
4 #include <exception>
5
6 // fmt
7 #include <fmt/compile.h>
8 #include <fmt/core.h>
9
10 namespace wr22::regex_executor::algorithms::backtracking {
11
12     struct MatchFailure : public std::exception {
13         const char* what() const noexcept override;
14     };
15
16 } // namespace wr22::regex_executor::algorithms::backtracking
```

7.25 include/wr22/regex_executor/algorithms/backtracking/match_↵ result.hpp File Reference

```
#include <wr22/regex_executor/algorithms/backtracking/step.hpp>
#include <wr22/regex_executor/capture.hpp>
#include <vector>
#include <optional>
#include <nlohmann/json_fwd.hpp>
```

Classes

- struct [wr22::regex_executor::algorithms::backtracking::MatchResult](#)

Namespaces

- namespace [wr22](#)
- namespace [wr22::regex_executor](#)
- namespace [wr22::regex_executor::algorithms](#)
- namespace [wr22::regex_executor::algorithms::backtracking](#)

Functions

- void [wr22::regex_executor::algorithms::backtracking::to_json](#) (nlohmann::json &j, const MatchResult &result)

7.26 match_result.hpp

[Go to the documentation of this file.](#)

```
1 #pragma once
2
3 // wr22
4 #include <wr22/regex_executor/algorithms/backtracking/step.hpp>
5 #include <wr22/regex_executor/capture.hpp>
6
7 // stl
8 #include <vector>
9 #include <optional>
10
11 // nlohmann
12 #include <nlohmann/json_fwd.hpp>
13
14 namespace wr22::regex_executor::algorithms::backtracking {
15
16 struct MatchResult {
17     bool matched;
18     std::optional<Captures> captures;
19     std::vector<Step> steps;
20 };
21
22 void to_json(nlohmann::json& j, const MatchResult& result);
23
24 } // namespace wr22::regex_executor::algorithms::backtracking
```

7.27 include/wr22/regex_executor/algorithms/backtracking/part_↵ executor.hpp File Reference

```
#include <wr22/regex_executor/utils/spanned_ref.hpp>
#include <wr22/regex_parser/regex/part.hpp>
```

Classes

- class [wr22::regex_executor::algorithms::backtracking::PartExecutor](#)

Namespaces

- namespace [wr22](#)
- namespace [wr22::regex_executor](#)
- namespace [wr22::regex_executor::algorithms](#)
- namespace [wr22::regex_executor::algorithms::backtracking](#)

7.28 part_executor.hpp

[Go to the documentation of this file.](#)

```
1 #pragma once
2
3 // wr22
4 #include <wr22/regex_executor/utils/spanned_ref.hpp>
5 #include <wr22/regex_parser/regex/part.hpp>
6
7 namespace wr22::regex_executor::algorithms::backtracking {
8
9 struct Interpreter;
10
11 class PartExecutor {
12 public:
13     explicit PartExecutor(utils::SpannedRef<regex_parser::regex::Part> part_ref);
14     bool execute(Interpreter& interpreter) const;
15
16 private:
17     utils::SpannedRef<regex_parser::regex::Part> m_part_ref;
18 };
19
20 } // namespace wr22::regex_executor::algorithms::backtracking
```

7.29 include/wr22/regex_executor/algorithms/backtracking/specific_↵ part_executor.hpp File Reference

```
#include "wr22/regex_executor/quantifier_type.hpp"
#include <wr22/regex_executor/algorithms/backtracking/decision.hpp>
#include <wr22/regex_executor/algorithms/backtracking/interpreter.hpp>
#include <wr22/regex_executor/algorithms/backtracking/part_executor.hpp>
#include <wr22/regex_executor/utils/spanned_ref.hpp>
#include <wr22/regex_parser/regex/part.hpp>
```

Classes

- class [wr22::regex_executor::algorithms::backtracking::SpecificPartExecutor< T >](#)
- class [wr22::regex_executor::algorithms::backtracking::SpecificPartExecutor< regex_parser::regex::part::Empty >](#)
- class [wr22::regex_executor::algorithms::backtracking::SpecificPartExecutor< regex_parser::regex::part::Literal >](#)
- class [wr22::regex_executor::algorithms::backtracking::SpecificPartExecutor< regex_parser::regex::part::Wildcard >](#)
- class [wr22::regex_executor::algorithms::backtracking::SpecificPartExecutor< regex_parser::regex::part::Sequence >](#)
- class [wr22::regex_executor::algorithms::backtracking::SpecificPartExecutor< regex_parser::regex::part::Group >](#)
- class [wr22::regex_executor::algorithms::backtracking::SpecificPartExecutor< regex_parser::regex::part::Alternatives >](#)
- class [wr22::regex_executor::algorithms::backtracking::SpecificPartExecutor< regex_parser::regex::part::CharacterClass >](#)
- class [wr22::regex_executor::algorithms::backtracking::QuantifierExecutor< Derived, Quantifier >](#)
- struct [wr22::regex_executor::algorithms::backtracking::QuantifierExecutor< Derived, Quantifier >::StopImmediatelyTag](#)
- class [wr22::regex_executor::algorithms::backtracking::SpecificPartExecutor< regex_parser::regex::part::Star >](#)
- class [wr22::regex_executor::algorithms::backtracking::SpecificPartExecutor< regex_parser::regex::part::Plus >](#)
- class [wr22::regex_executor::algorithms::backtracking::SpecificPartExecutor< regex_parser::regex::part::Optional >](#)

Namespaces

- namespace [wr22](#)
- namespace [wr22::regex_executor](#)
- namespace [wr22::regex_executor::algorithms](#)
- namespace [wr22::regex_executor::algorithms::backtracking](#)

7.30 specific_part_executor.hpp

[Go to the documentation of this file.](#)

```

1 #pragma once
2
3 // wr22
4 #include "wr22/regex_executor/quantifier_type.hpp"
5 #include <wr22/regex_executor/algorithms/backtracking/decision.hpp>
6 #include <wr22/regex_executor/algorithms/backtracking/interpreter.hpp>
7 #include <wr22/regex_executor/algorithms/backtracking/part_executor.hpp>
8 #include <wr22/regex_executor/utils/spanned_ref.hpp>
9 #include <wr22/regex_parser/regex/part.hpp>
10
11 namespace wr22::regex_executor::algorithms::backtracking {
12
13 template <typename T>
14 class SpecificPartExecutor {};
15
16 template <>
17 class SpecificPartExecutor<regex_parser::regex::part::Empty> {
18 public:
19     explicit SpecificPartExecutor(
20         [[maybe_unused]] utils::SpannedRef<regex_parser::regex::part::Empty> part_ref);
21     bool execute([[maybe_unused]] Interpreter& interpreter) const;
22 };
23
24 template <>
25 class SpecificPartExecutor<regex_parser::regex::part::Literal> {
26 public:
27     explicit SpecificPartExecutor(utils::SpannedRef<regex_parser::regex::part::Literal> part_ref);
28     bool execute(Interpreter& interpreter) const;
29
30 private:
31     utils::SpannedRef<regex_parser::regex::part::Literal> m_part_ref;
32 };
33
34 template <>
35 class SpecificPartExecutor<regex_parser::regex::part::Wildcard> {
36 public:
37     explicit SpecificPartExecutor(utils::SpannedRef<regex_parser::regex::part::Wildcard> part_ref);
38     bool execute(Interpreter& interpreter) const;
39
40 private:
41     utils::SpannedRef<regex_parser::regex::part::Wildcard> m_part_ref;
42 };
43
44 template <>
45 class SpecificPartExecutor<regex_parser::regex::part::Sequence> {
46 public:
47     explicit SpecificPartExecutor(utils::SpannedRef<regex_parser::regex::part::Sequence> part_ref);
48     bool execute(Interpreter& interpreter) const;
49
50 private:
51     utils::SpannedRef<regex_parser::regex::part::Sequence> m_part_ref;
52 };
53
54 template <>
55 class SpecificPartExecutor<regex_parser::regex::part::Group> {
56 public:
57     explicit SpecificPartExecutor(utils::SpannedRef<regex_parser::regex::part::Group> part_ref);
58     bool execute(Interpreter& interpreter) const;
59
60 private:
61     utils::SpannedRef<regex_parser::regex::part::Group> m_part_ref;
62 };
63
64 template <>
65 class SpecificPartExecutor<regex_parser::regex::part::Alternatives> {
66 public:
67     explicit SpecificPartExecutor(
68         utils::SpannedRef<regex_parser::regex::part::Alternatives> part_ref,
69         utils::SpannedRef<regex_parser::regex::Part> part_var_ref);
70     explicit SpecificPartExecutor(
71         utils::SpannedRef<regex_parser::regex::part::Alternatives> part_ref,
72         utils::SpannedRef<regex_parser::regex::Part> part_var_ref,
73         AlternativesDecision decision);
74     bool execute(Interpreter& interpreter);
75
76 private:
77     utils::SpannedRef<regex_parser::regex::part::Alternatives> m_part_ref;
78     utils::SpannedRef<regex_parser::regex::Part> m_part_var_ref;
79     AlternativesDecision m_decision;
80 };
81
82 template <>

```

```

83 class SpecificPartExecutor<regex_parser::regex::part::CharacterClass> {
84 public:
85     explicit SpecificPartExecutor(
86         utils::SpannedRef<regex_parser::regex::part::CharacterClass> part_ref);
87     bool execute(Interpreter& interpreter) const;
88
89 private:
90     utils::SpannedRef<regex_parser::regex::part::CharacterClass> m_part_ref;
91 };
92
93 template <typename Derived, typename Quantifier>
94 class QuantifierExecutor {
95 public:
96     struct StopImmediatelyTag {};
97
98     explicit QuantifierExecutor(
99         utils::SpannedRef<Quantifier> part_ref,
100         utils::SpannedRef<regex_parser::regex::Part> part_var_ref);
101     explicit QuantifierExecutor(
102         utils::SpannedRef<Quantifier> part_ref,
103         utils::SpannedRef<regex_parser::regex::Part> part_var_ref,
104         StopImmediatelyTag tag);
105     bool execute(Interpreter& interpreter);
106
107     static size_t min_repetitions();
108     static std::optional<size_t> max_repetitions();
109     static QuantifierType quantifier_type();
110
111 private:
112     static bool num_repetitions_ok(size_t num_repetitions);
113
114     static bool greedy_walk_run_func(const instruction::Run::Context& ctx, Interpreter& interpreter);
115     static bool finalize_run_func(const instruction::Run::Context& ctx, Interpreter& interpreter);
116
117     utils::SpannedRef<Quantifier> m_part_ref;
118     utils::SpannedRef<regex_parser::regex::Part> m_part_var_ref;
119     bool m_stop_immediately;
120 };
121
122 template <typename Quantifier>
123 using QuantifierExecutorBase = QuantifierExecutor<SpecificPartExecutor<Quantifier>, Quantifier>;
124
125 template <>
126 class SpecificPartExecutor<regex_parser::regex::part::Star> :
127     public QuantifierExecutorBase<regex_parser::regex::part::Star> {
128 public:
129     using QuantifierExecutorBase<regex_parser::regex::part::Star>::QuantifierExecutor;
130
131     static QuantifierType impl_quantifier_type();
132     static size_t impl_min_repetitions();
133     static std::optional<size_t> impl_max_repetitions();
134 };
135
136 template <>
137 class SpecificPartExecutor<regex_parser::regex::part::Plus> :
138     public QuantifierExecutorBase<regex_parser::regex::part::Plus> {
139 public:
140     using QuantifierExecutorBase<regex_parser::regex::part::Plus>::QuantifierExecutor;
141
142     static QuantifierType impl_quantifier_type();
143     static size_t impl_min_repetitions();
144     static std::optional<size_t> impl_max_repetitions();
145 };
146
147 template <>
148 class SpecificPartExecutor<regex_parser::regex::part::Optional> :
149     public QuantifierExecutorBase<regex_parser::regex::part::Optional> {
150 public:
151     using QuantifierExecutorBase<regex_parser::regex::part::Optional>::QuantifierExecutor;
152
153     static QuantifierType impl_quantifier_type();
154     static size_t impl_min_repetitions();
155     static std::optional<size_t> impl_max_repetitions();
156 };
157
158 } // namespace wr22::regex_executor::algorithms::backtracking

```

7.31 include/wr22/regex_executor/algorithms/backtracking/step.hpp File Reference

```
#include <wr22/regex_executor/algorithms/backtracking/failure_reason.hpp>
#include <wr22/regex_executor/quantifier_type.hpp>
#include <wr22/regex_parser/span/span.hpp>
#include <wr22/utils/adts.hpp>
#include <string>
#include <variant>
#include <nlohmann/json.hpp>
```

Classes

- struct [wr22::regex_executor::algorithms::backtracking::detail::step::SuccessBase](#)
- struct [wr22::regex_executor::algorithms::backtracking::detail::step::FailureBase](#)
- struct [wr22::regex_executor::algorithms::backtracking::step::MatchQuantifier](#)
- struct [wr22::regex_executor::algorithms::backtracking::step::FinishQuantifier](#)
- struct [wr22::regex_executor::algorithms::backtracking::step::FinishQuantifier::Success](#)
- struct [wr22::regex_executor::algorithms::backtracking::step::FinishQuantifier::Failure](#)
- struct [wr22::regex_executor::algorithms::backtracking::step::MatchCharClass](#)
- struct [wr22::regex_executor::algorithms::backtracking::step::MatchCharClass::Success](#)
- struct [wr22::regex_executor::algorithms::backtracking::step::MatchCharClass::Failure](#)
- struct [wr22::regex_executor::algorithms::backtracking::step::MatchWildcard](#)
- struct [wr22::regex_executor::algorithms::backtracking::step::MatchWildcard::Success](#)
- struct [wr22::regex_executor::algorithms::backtracking::step::MatchWildcard::Failure](#)
- struct [wr22::regex_executor::algorithms::backtracking::step::BeginGroup](#)
- struct [wr22::regex_executor::algorithms::backtracking::step::EndGroup](#)
- struct [wr22::regex_executor::algorithms::backtracking::step::MatchLiteral](#)
- struct [wr22::regex_executor::algorithms::backtracking::step::MatchLiteral::Success](#)
- struct [wr22::regex_executor::algorithms::backtracking::step::MatchLiteral::Failure](#)
- struct [wr22::regex_executor::algorithms::backtracking::step::MatchAlternatives](#)
- struct [wr22::regex_executor::algorithms::backtracking::step::FinishAlternatives](#)
- struct [wr22::regex_executor::algorithms::backtracking::step::FinishAlternatives::Success](#)
- struct [wr22::regex_executor::algorithms::backtracking::step::FinishAlternatives::Failure](#)
- struct [wr22::regex_executor::algorithms::backtracking::step::Backtrack](#)
- struct [wr22::regex_executor::algorithms::backtracking::step::End](#)
- struct [wr22::regex_executor::algorithms::backtracking::step::End::Success](#)
- struct [wr22::regex_executor::algorithms::backtracking::step::End::Failure](#)
- struct [wr22::regex_executor::algorithms::backtracking::Step](#)

Namespaces

- namespace [wr22](#)
- namespace [wr22::regex_executor](#)
- namespace [wr22::regex_executor::algorithms](#)
- namespace [wr22::regex_executor::algorithms::backtracking](#)
- namespace [wr22::regex_executor::algorithms::backtracking::detail](#)
- namespace [wr22::regex_executor::algorithms::backtracking::detail::step](#)
- namespace [wr22::regex_executor::algorithms::backtracking::step](#)

Typedefs

- using `wr22::regex_executor::algorithms::backtracking::step::Adt` = `wr22::utils::Adt< MatchQuantifier, FinishQuantifier, MatchCharClass, MatchLiteral, MatchWildcard, BeginGroup, EndGroup, MatchAlternatives, FinishAlternatives, Backtrack, End >`

Functions

- void `wr22::regex_executor::algorithms::backtracking::step::to_json` (`nlohmann::json &j`, `const MatchQuantifier &step`)
- void `wr22::regex_executor::algorithms::backtracking::step::to_json` (`nlohmann::json &j`, `const FinishQuantifier &step`)
- void `wr22::regex_executor::algorithms::backtracking::step::to_json` (`nlohmann::json &j`, `const MatchCharClass &step`)
- void `wr22::regex_executor::algorithms::backtracking::step::to_json` (`nlohmann::json &j`, `const MatchWildcard &step`)
- void `wr22::regex_executor::algorithms::backtracking::step::to_json` (`nlohmann::json &j`, `const BeginGroup &step`)
- void `wr22::regex_executor::algorithms::backtracking::step::to_json` (`nlohmann::json &j`, `const EndGroup &step`)
- void `wr22::regex_executor::algorithms::backtracking::step::to_json` (`nlohmann::json &j`, `const MatchLiteral &step`)
- void `wr22::regex_executor::algorithms::backtracking::step::to_json` (`nlohmann::json &j`, `const MatchAlternatives &step`)
- void `wr22::regex_executor::algorithms::backtracking::step::to_json` (`nlohmann::json &j`, `const FinishAlternatives &step`)
- void `wr22::regex_executor::algorithms::backtracking::step::to_json` (`nlohmann::json &j`, `const Backtrack &step`)
- void `wr22::regex_executor::algorithms::backtracking::step::to_json` (`nlohmann::json &j`, `const End &step`)
- void `wr22::regex_executor::algorithms::backtracking::to_json` (`nlohmann::json &j`, `const Step &step`)

7.32 step.hpp

[Go to the documentation of this file.](#)

```
1 #pragma once
2
3 // wr22
4 #include <wr22/regex_executor/algorithms/backtracking/failure_reason.hpp>
5 #include <wr22/regex_executor/quantifier_type.hpp>
6 #include <wr22/regex_parser/span/span.hpp>
7 #include <wr22/utils/adt.hpp>
8
9 // stl
10 #include <string>
11 #include <variant>
12
13 // nlohmann
14 #include <nlohmann/json.hpp>
15
16 namespace wr22::regex_executor::algorithms::backtracking {
17
18 // TODO: maybe move to a separate file.
19
20 namespace detail::step {
21     struct SuccessBase {
22         static constexpr bool success = true;
23         bool operator==(const SuccessBase& other) const = default;
24     };
25
26     struct FailureBase {
27         static constexpr bool success = false;
28         bool operator==(const FailureBase& other) const = default;
29     };
30 }
```



```

31 } // namespace detail::step
32
33 namespace step {
34     struct MatchQuantifier {
35         regex_parser::span::Span regex_span;
36         size_t string_pos;
37         QuantifierType quantifier_type;
38
39         const char* type_code() const;
40         bool operator==(const MatchQuantifier& other) const = default;
41     };
42     void to_json(nlohmann::json& j, const MatchQuantifier& step);
43
44     struct FinishQuantifier {
45         QuantifierType quantifier_type;
46         regex_parser::span::Span regex_span;
47         struct Success : public detail::step::SuccessBase {
48             regex_parser::span::Span string_span;
49             size_t num_repetitions;
50         };
51         struct Failure : public detail::step::FailureBase {
52             size_t string_pos;
53             FailureReason<failure_reasons::OptionsExhausted> failure_reason;
54         };
55         wr22::utils::Adt<Success, Failure> result;
56
57         const char* type_code() const;
58         bool operator==(const FinishQuantifier& other) const = default;
59     };
60     void to_json(nlohmann::json& j, const FinishQuantifier& step);
61
62     struct MatchCharClass {
63         regex_parser::span::Span regex_span;
64         struct Success : public detail::step::SuccessBase {
65             regex_parser::span::Span string_span;
66         };
67         struct Failure : public detail::step::FailureBase {
68             size_t string_pos;
69             FailureReason<failure_reasons::ExcludedChar, failure_reasons::EndOfInput>
70                 failure_reason;
71         };
72         wr22::utils::Adt<Success, Failure> result;
73
74         constexpr const char* type_code() const {
75             return "match_char_class";
76         }
77         bool operator==(const MatchCharClass& other) const = default;
78     };
79     void to_json(nlohmann::json& j, const MatchCharClass& step);
80
81     struct MatchWildcard {
82         regex_parser::span::Span regex_span;
83         struct Success : public detail::step::SuccessBase {
84             regex_parser::span::Span string_span;
85         };
86         struct Failure : public detail::step::FailureBase {
87             size_t string_pos;
88             FailureReason<failure_reasons::EndOfInput> failure_reason;
89         };
90         wr22::utils::Adt<Success, Failure> result;
91
92         constexpr const char* type_code() const {
93             return "match_wildcard";
94         }
95         bool operator==(const MatchWildcard& other) const = default;
96     };
97     void to_json(nlohmann::json& j, const MatchWildcard& step);
98
99     struct BeginGroup {
100         // TODO: captures.
101         regex_parser::span::Span regex_span;
102         size_t string_pos;
103
104         constexpr const char* type_code() const {
105             return "begin_group";
106         }
107         bool operator==(const BeginGroup& other) const = default;
108     };
109     void to_json(nlohmann::json& j, const BeginGroup& step);
110
111     struct EndGroup {
112         size_t string_pos;
113         constexpr const char* type_code() const {
114             return "end_group";
115         }
116         bool operator==(const EndGroup& other) const = default;
117     };

```

```

118 void to_json(nlohmann::json& j, const EndGroup& step);
119
120 struct MatchLiteral {
121     regex_parser::span::Span regex_span;
122     char32_t literal;
123     struct Success : public detail::step::SuccessBase {
124         regex_parser::span::Span string_span;
125     };
126     struct Failure : public detail::step::FailureBase {
127         size_t string_pos;
128         FailureReason<failure_reasons::OtherChar, failure_reasons::EndOfInput> failure_reason;
129     };
130     wr22::utils::Adt<Success, Failure> result;
131
132     constexpr const char* type_code() const {
133         return "match_literal";
134     }
135     bool operator==(const MatchLiteral& other) const = default;
136 };
137 void to_json(nlohmann::json& j, const MatchLiteral& step);
138
139 struct MatchAlternatives {
140     regex_parser::span::Span regex_span;
141     size_t string_pos;
142
143     constexpr const char* type_code() const {
144         return "match_alternatives";
145     }
146     bool operator==(const MatchAlternatives& other) const = default;
147 };
148 void to_json(nlohmann::json& j, const MatchAlternatives& step);
149
150 struct FinishAlternatives {
151     regex_parser::span::Span regex_span;
152     struct Success : public detail::step::SuccessBase {
153         regex_parser::span::Span string_span;
154         size_t alternative_chosen;
155     };
156     struct Failure : public detail::step::FailureBase {
157         size_t string_pos;
158         FailureReason<failure_reasons::OptionsExhausted> failure_reason;
159     };
160     wr22::utils::Adt<Success, Failure> result;
161
162     constexpr const char* type_code() const {
163         return "finish_alternatives";
164     }
165     bool operator==(const FinishAlternatives& other) const = default;
166 };
167 void to_json(nlohmann::json& j, const FinishAlternatives& step);
168
169 struct Backtrack {
170     size_t string_pos;
171     size_t continue_after_step;
172
173     constexpr const char* type_code() const {
174         return "backtrack";
175     }
176     bool operator==(const Backtrack& other) const = default;
177 };
178 void to_json(nlohmann::json& j, const Backtrack& step);
179
180 struct End {
181     size_t string_pos;
182     struct Success : public detail::step::SuccessBase {};
183     struct Failure : public detail::step::FailureBase {};
184     wr22::utils::Adt<Success, Failure> result;
185
186     constexpr const char* type_code() const {
187         return "end";
188     }
189     bool operator==(const End& other) const = default;
190 };
191 void to_json(nlohmann::json& j, const End& step);
192
193 using Adt = wr22::utils::Adt<
194     MatchQuantifier,
195     FinishQuantifier,
196     MatchCharClass,
197     MatchLiteral,
198     MatchWildcard,
199     BeginGroup,
200     EndGroup,
201     MatchAlternatives,
202     FinishAlternatives,
203     Backtrack,
204     End>;

```

```

205 } // namespace step
206
207 struct Step : public step::Adt {
208     using step::Adt::Adt;
209 };
210 void to_json(nlohmann::json& j, const Step& step);
211
212 } // namespace wr22::regex_executor::algorithms::backtracking

```

7.33 include/wr22/regex_executor/capture.hpp File Reference

```

#include <wr22/regex_parser/span/span.hpp>
#include <iosfwd>
#include <string_view>
#include <unordered_map>
#include <nlohmann/json_fwd.hpp>

```

Classes

- struct [wr22::regex_executor::Capture](#)
- struct [wr22::regex_executor::Captures](#)

Namespaces

- namespace [wr22](#)
- namespace [wr22::regex_executor](#)

Functions

- void [wr22::regex_executor::to_json](#) (nlohmann::json &j, Capture capture)
- std::ostream & [wr22::regex_executor::operator<<](#) (std::ostream &out, Capture capture)
- void [wr22::regex_executor::to_json](#) (nlohmann::json &j, const Captures &captures)
- std::ostream & [wr22::regex_executor::operator<<](#) (std::ostream &out, const Captures &captures)

7.34 capture.hpp

[Go to the documentation of this file.](#)

```

1 #pragma once
2
3 // wr22
4 #include <wr22/regex_parser/span/span.hpp>
5
6 // stl
7 #include <iosfwd>
8 #include <string_view>
9 #include <unordered_map>
10
11 // nlohmann
12 #include <nlohmann/json_fwd.hpp>
13
14 namespace wr22::regex_executor {
15
16 struct Capture {
17     regex_parser::span::Span string_span;
18     constexpr bool operator==(const Capture& other) const = default;
19 };
20 void to_json(nlohmann::json& j, Capture capture);

```

```

21 std::ostream& operator<<(std::ostream& out, Capture capture);
22
23 struct Captures {
24     Capture whole;
25     std::unordered_map<size_t, Capture> indexed;
26     std::unordered_map<std::string_view, Capture> named;
27     bool operator==(const Captures& other) const = default;
28 };
29 void to_json(nlohmann::json& j, const Captures& captures);
30 std::ostream& operator<<(std::ostream& out, const Captures& captures);
31
32 } // namespace wr22::regex_executor

```

7.35 include/wr22/regex_executor/quantifier_type.hpp File Reference

Namespaces

- namespace [wr22](#)
- namespace [wr22::regex_executor](#)

Enumerations

- enum class [wr22::regex_executor::QuantifierType](#) { [wr22::regex_executor::Optional](#), [wr22::regex_executor::Star](#), [wr22::regex_executor::Plus](#) }

7.36 quantifier_type.hpp

[Go to the documentation of this file.](#)

```

1 #pragma once
2
3 namespace wr22::regex_executor {
4
5 enum class QuantifierType {
6     Optional,
7     Star,
8     Plus,
9 };
10
11 } // namespace wr22::regex_executor

```

7.37 include/wr22/regex_executor/regex.hpp File Reference

```
#include <wr22/regex_parser/regex/part.hpp>
```

Classes

- class [wr22::regex_executor::Regex](#)

Namespaces

- namespace [wr22](#)
- namespace [wr22::regex_executor](#)

7.38 regex.hpp

[Go to the documentation of this file.](#)

```
1 #pragma once
2
3 // wr22
4 #include <wr22/regex_parser/regex/part.hpp>
5
6 namespace wr22::regex_executor {
7
8 class Regex {
9 public:
10     explicit Regex(regex_parser::regex::SpannedPart root_part);
11
12     const regex_parser::regex::SpannedPart& root_part() const;
13
14 private:
15     regex_parser::regex::SpannedPart m_root_part;
16 };
17
18 }
```

7.39 include/wr22/regex_executor/utils/spanned_ref.hpp File Reference

```
#include <wr22/regex_parser/span/span.hpp>
#include <functional>
```

Classes

- class [wr22::regex_executor::utils::SpannedRef< T >](#)

Namespaces

- namespace [wr22](#)
- namespace [wr22::regex_executor](#)
- namespace [wr22::regex_executor::utils](#)

7.40 spanned_ref.hpp

[Go to the documentation of this file.](#)

```
1 #pragma once
2
3 // wr22
4 #include <wr22/regex_parser/span/span.hpp>
5
6 // stl
7 #include <functional>
8
9 namespace wr22::regex_executor::utils {
10
11 template <typename T>
12 class SpannedRef {
13 public:
14     SpannedRef(const T& item, regex_parser::span::Span span) : m_item(item), m_span(span) {}
15
16     const T& item() const {
17         return m_item.get();
18     }
19
20     regex_parser::span::Span span() const {
21         return m_span;
22     }
23
24 private:
25     std::reference_wrapper<const T> m_item;
26     regex_parser::span::Span m_span;
27 };
28
29 } // namespace wr22::regex_executor::utils
```

7.41 src/algorithms/backtracking/decision.cpp File Reference

```
#include <wr22/regex_executor/algorithms/backtracking/decision.hpp>
#include <wr22/regex_executor/algorithms/backtracking/interpreter.hpp>
#include <wr22/regex_parser/regex/part.hpp>
```

Namespaces

- namespace [wr22](#)
- namespace [wr22::regex_executor](#)
- namespace [wr22::regex_executor::algorithms](#)
- namespace [wr22::regex_executor::algorithms::backtracking](#)

7.42 src/algorithms/backtracking/executor.cpp File Reference

```
#include <wr22/regex_executor/algorithms/backtracking/executor.hpp>
#include <wr22/regex_executor/algorithms/backtracking/instruction.hpp>
#include <wr22/regex_executor/algorithms/backtracking/interpreter.hpp>
#include <wr22/regex_executor/algorithms/backtracking/match_failure.hpp>
```

Namespaces

- namespace [wr22](#)
- namespace [wr22::regex_executor](#)
- namespace [wr22::regex_executor::algorithms](#)
- namespace [wr22::regex_executor::algorithms::backtracking](#)

7.43 src/executor.cpp File Reference

```
#include <wr22/regex_executor/executor.hpp>
```

Namespaces

- namespace [wr22](#)
- namespace [wr22::regex_executor](#)

7.44 src/algorithms/backtracking/instruction.cpp File Reference

```
#include <wr22/regex_executor/algorithms/backtracking/instruction.hpp>
#include <wr22/regex_executor/algorithms/backtracking/interpreter.hpp>
```

Namespaces

- namespace [wr22](#)
- namespace [wr22::regex_executor](#)
- namespace [wr22::regex_executor::algorithms](#)
- namespace [wr22::regex_executor::algorithms::backtracking](#)

7.45 src/algorithms/backtracking/interpreter.cpp File Reference

```
#include <wr22/regex_executor/algorithms/backtracking/decision_applicator.↵  
hpp>  
#include <wr22/regex_executor/algorithms/backtracking/instruction.hpp>  
#include <wr22/regex_executor/algorithms/backtracking/interpreter.hpp>  
#include <wr22/regex_executor/algorithms/backtracking/match_failure.hpp>  
#include <wr22/regex_executor/algorithms/backtracking/part_executor.hpp>  
#include <wr22/regex_executor/algorithms/backtracking/step.hpp>  
#include <wr22/regex_executor/utils/spanned_ref.hpp>  
#include <wr22/regex_parser/regex/part.hpp>  
#include <wr22/unicode/conversion.hpp>  
#include <fmt/compile.h>  
#include <fmt/core.h>
```

Namespaces

- namespace [wr22](#)
- namespace [wr22::regex_executor](#)
- namespace [wr22::regex_executor::algorithms](#)
- namespace [wr22::regex_executor::algorithms::backtracking](#)

7.46 src/algorithms/backtracking/match_failure.cpp File Reference

```
#include <wr22/regex_executor/algorithms/backtracking/match_failure.hpp>
```

Namespaces

- namespace [wr22](#)
- namespace [wr22::regex_executor](#)
- namespace [wr22::regex_executor::algorithms](#)
- namespace [wr22::regex_executor::algorithms::backtracking](#)

7.47 src/algorithms/backtracking/match_result.cpp File Reference

```
#include <wr22/regex_executor/algorithms/backtracking/match_result.hpp>  
#include <nlohmann/json.hpp>
```

Namespaces

- namespace [wr22](#)
- namespace [wr22::regex_executor](#)
- namespace [wr22::regex_executor::algorithms](#)
- namespace [wr22::regex_executor::algorithms::backtracking](#)

Functions

- void [wr22::regex_executor::algorithms::backtracking::to_json](#) (nlohmann::json &j, const MatchResult &result)

7.48 src/algorithms/backtracking/part_executor.cpp File Reference

```
#include <wr22/regex_executor/algorithms/backtracking/decision.hpp>
#include <wr22/regex_executor/algorithms/backtracking/interpreter.hpp>
#include <wr22/regex_executor/algorithms/backtracking/part_executor.hpp>
#include <wr22/regex_executor/algorithms/backtracking/specific_part_executor.↵
hpp>
#include <wr22/regex_executor/utils/spanned_ref.hpp>
#include <wr22/regex_parser/regex/part.hpp>
#include <type_traits>
```

Namespaces

- namespace [wr22](#)
- namespace [wr22::regex_executor](#)
- namespace [wr22::regex_executor::algorithms](#)
- namespace [wr22::regex_executor::algorithms::backtracking](#)

7.49 src/algorithms/backtracking/specific_part_executor.cpp File Reference

```
#include <wr22/regex_executor/algorithms/backtracking/instruction.hpp>
#include <wr22/regex_executor/algorithms/backtracking/specific_part_executor.↵
hpp>
#include <wr22/regex_executor/algorithms/backtracking/step.hpp>
#include <wr22/regex_executor/utils/spanned_ref.hpp>
#include <wr22/regex_parser/regex/capture.hpp>
```

Namespaces

- namespace [wr22](#)
- namespace [wr22::regex_executor](#)
- namespace [wr22::regex_executor::algorithms](#)
- namespace [wr22::regex_executor::algorithms::backtracking](#)

Typedefs

- `template<typename Quantifier >`
`using wr22::regex_executor::algorithms::backtracking::QuantifierExecutorBase = QuantifierExecutor<`
`SpecificPartExecutor< Quantifier >, Quantifier >`

7.50 src/algorithms/backtracking/step.cpp File Reference

```
#include <wr22/regex_executor/algorithms/backtracking/step.hpp>
#include <wr22/unicode/conversion.hpp>
```

Namespaces

- namespace `wr22`
- namespace `wr22::regex_executor`
- namespace `wr22::regex_executor::algorithms`
- namespace `wr22::regex_executor::algorithms::backtracking`
- namespace `wr22::regex_executor::algorithms::backtracking::step`

Macros

- `#define FIELD_TO_JSON(j, value, field) j[#field] = value.field`

Functions

- void `wr22::regex_executor::algorithms::backtracking::step::to_json` (nlohmann::json &j, const MatchQuantifier &step)
- void `wr22::regex_executor::algorithms::backtracking::step::to_json` (nlohmann::json &j, const FinishQuantifier &step)
- void `wr22::regex_executor::algorithms::backtracking::step::to_json` (nlohmann::json &j, const MatchChar↵ Class &step)
- void `wr22::regex_executor::algorithms::backtracking::step::to_json` (nlohmann::json &j, const MatchWildcard &step)
- void `wr22::regex_executor::algorithms::backtracking::step::to_json` (nlohmann::json &j, const BeginGroup &step)
- void `wr22::regex_executor::algorithms::backtracking::step::to_json` (nlohmann::json &j, const EndGroup &step)
- void `wr22::regex_executor::algorithms::backtracking::step::to_json` (nlohmann::json &j, const MatchLiteral &step)
- void `wr22::regex_executor::algorithms::backtracking::step::to_json` (nlohmann::json &j, const Match↵ Alternatives &step)
- void `wr22::regex_executor::algorithms::backtracking::step::to_json` (nlohmann::json &j, const Finish↵ Alternatives &step)
- void `wr22::regex_executor::algorithms::backtracking::step::to_json` (nlohmann::json &j, const Backtrack &step)
- void `wr22::regex_executor::algorithms::backtracking::step::to_json` (nlohmann::json &j, const End &step)
- void `wr22::regex_executor::algorithms::backtracking::to_json` (nlohmann::json &j, const Step &step)

7.50.1 Macro Definition Documentation

7.50.1.1 FIELD_TO_JSON

```
#define FIELD_TO_JSON(  
    j,  
    value,  
    field ) j[#field] = value.field
```

7.51 src/captures.cpp File Reference

```
#include <wr22/regex_executor/capture.hpp>  
#include <nlohmann/json.hpp>  
#include <ostream>  
#include <unordered_map>  
#include <fmt/compile.h>  
#include <fmt/core.h>  
#include <fmt/ostream.h>
```

Classes

- struct [wr22::regex_executor::MapPrinter< K, V >](#)

Namespaces

- namespace [wr22](#)
- namespace [wr22::regex_executor](#)

Functions

- template<typename K , typename V >
std::ostream & [wr22::regex_executor::operator<<](#) (std::ostream &out, MapPrinter< K, V > printer)
- void [wr22::regex_executor::to_json](#) (nlohmann::json &j, Capture capture)
- std::ostream & [wr22::regex_executor::operator<<](#) (std::ostream &out, Capture capture)
- void [wr22::regex_executor::to_json](#) (nlohmann::json &j, const Captures &captures)
- std::ostream & [wr22::regex_executor::operator<<](#) (std::ostream &out, const Captures &captures)

7.52 src/regex.cpp File Reference

```
#include <wr22/regex_executor/regex.hpp>
```

Namespaces

- namespace [wr22](#)
- namespace [wr22::regex_executor](#)

7.53 src/utls/spanned_ref.cpp File Reference

```
#include <wr22/regex_executor/utls/spanned_ref.hpp>
```


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