Writing Regexps 2021-22 / Regex Explainer

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Chapter 1

Namespace Index

1.1 Namespace List

Here is a list of all namespaces with brief descriptions:

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wr22::regex_explainer 7
wr22::regex_explainer::explanation 7
wr22::regex_explainer::hints 11

Chapter 2

Class Index

2.1 Class List

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

wr22::regex_explainer::explanation::Explanation 13
wr22::regex_explainer::explanation::Hint 14

Chapter 3

File Index

3.1 File List

Here is a list of all files with brief descriptions:

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include/wr22/regex_explainer/explanation/explanation_folder.hpp 18
include/wr22/regex_explainer/explanation/sample_folder.hpp 19
include/wr22/regex_explainer/explanation/upgrade_sample.hpp 21
include/wr22/regex_explainer/hints/hint.hpp 21
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src/explanation/explanation.cpp 23
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src/explanation/sample_folder.cpp 24
src/explanation/upgrade_sample.cpp 25
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Chapter 4

Namespace Documentation

4.1 wr22 Namespace Reference

Namespaces

- namespace regex_explainer

4.2 wr22::regex_explainer Namespace Reference

Namespaces

- namespace explanation
- namespace hints

4.3 wr22::regex_explainer::explanation Namespace Reference

Classes

- class Explanation
- class Hint

Typedefs

- typedef wr22::utils::Adt< std::string, std::u32string, uint32_t > type_of_sentence

Functions

- std::vector< Explanation > get_full_explanation (const SpannedPart &spanned_part, size_t depth=0)

  The function returns the vector processed information about each node of the syntax tree.
- void to_json (nlohmann::json &j, const Explanation &explanation)
- std::string get_sample (const Empty &vertex)

  The function returns a sample for the AST node depending on its type.
- std::vector< std::string > get_sample (const Literal &vertex)

  The function describes which literal matched and what index it has in the ASCII table.
- std::string get_sample (const Alternatives &vertex)

  The function lists all alternatives that needed to be mached and describes each one in detail.
- std::string get_sample (const Sequence &vertex)

  The function lists all items of the sequence list and match there explanation one after another.
- std::vector< std::string > get_sample (const Group &vertex)

  TO DO.
- std::string get_sample (const Optional &vertex)

  Next three functions return the explanation of some quantifier.
- std::string get_sample (const Plus &vertex)
- std::string get_sample (const Star &vertex)
- std::string get_sample (const Wildcard &vertex)

  The function returns the explanation for some regex basic that is always the same and does not require any modifications depending on the situation.
- std::vector< std::string > get_sample (const CharacterClass &vertex)

  The function lists the symbols from the certain set that need to be matched.
- std::string upgrade_sample (const std::string &symbol, const std::string &sample)
- void to_json (nlohmann::json &j, const Hint &hint)

4.3.1 Typedef Documentation

4.3.1.1 type_of_sentence

```
typedef wr22::utils::Adt<std::string, std::u32string, uint32_t> wr22::regex_explainer::explanation::type_of_s
```

4.3.2 Function Documentation

4.3.2.1 get_full_explanation()

```
std::vector< Explanation > wr22::regex_explainer::explanation::get_full_explanation (
            const SpannedPart & spanned_part,
            size_t depth = 0 )
```

The function returns the vector processed information about each node of the syntax tree.

Thus, a complete description of the work of the written regular expression is created.

Returns

a vector of pairs there the first element is some explanation / part of explanation and the second is the depth of it.

4.3.2.2 get_sample() [1/10]

```
std::string wr22::regex_explainer::explanation::get_sample (
            const Alternatives & vertex )
```

The function lists all alternatives that needed to be mached and describes each one in detail.

4.3.2.3 get_sample() [2/10]

```
std::vector< std::string > wr22::regex_explainer::explanation::get_sample (
            const CharacterClass & vertex )
```

The function lists the symbols from the certain set that need to be matched.

The function is case sensitive.

4.3.2.4 get_sample() [3/10]

```
std::string wr22::regex_explainer::explanation::get_sample (
            const Empty & vertex )
```

The function returns a sample for the AST node depending on its type.

This is functions that returns the sample for the node from AST as the std::string_view.

If the sample consists of one part, then simply returns std::string. If the sample consists of several parts, then a vector of patterns with type std::string is returned, which should then make up a whole sentence / paragraph.

The function is overloaded and returns a different pattern of type "std::string_view" depending on the type of the argument it takes.

The function for type "Empty" is always default because it does not have any meaningful information.

4.3.2.5 get_sample() [4/10]

```
std::vector< std::string > wr22::regex_explainer::explanation::get_sample (
            const Group & vertex )
```

TO DO.

he function says that it is group and describes it in detail.

4.3.2.6 get_sample() [5/10]

```
std::vector< std::string > wr22::regex_explainer::explanation::get_sample (
            const Literal & vertex )
```

The function describes which literal matched and what index it has in the ASCII table.

The function is case sensitive.

4.3.2.7 get_sample() [6/10]

```
std::string wr22::regex_explainer::explanation::get_sample (
            const Optional & vertex )
```

Next three functions return the explanation of some quantifier.

They are always the same and do not require any modifications depending on the situation.

4.3.2.8 get_sample() [7/10]

```
std::string wr22::regex_explainer::explanation::get_sample (
            const Plus & vertex )
```

4.3.2.9 get_sample() [8/10]

```
std::string wr22::regex_explainer::explanation::get_sample (
            const Sequence & vertex )
```

The function lists all items of the sequence list and match there explanation one after another.

There is no information about the type of this vertex.

4.3.2.10 get_sample() [9/10]

```
std::string wr22::regex_explainer::explanation::get_sample (
            const Star & vertex )
```

4.3.2.11 get_sample() [10/10]

```
std::string wr22::regex_explainer::explanation::get_sample (
            const Wildcard & vertex )
```

The function returns the explanation for some regex basic that is always the same and does not require any modifications depending on the situation.

4.3.2.12 to_json() [1/2]

```
void wr22::regex_explainer::explanation::to_json (
            nlohmann::json & j,
            const Explanation & explanation )
```

4.3.2.13 to_json() [2/2]

```
void wr22::regex_explainer::explanation::to_json (
             nlohmann::json & j,
             const Hint & hint )
```

4.3.2.14 upgrade_sample()

```
std::string wr22::regex_explainer::explanation::upgrade_sample (
             const std::string & symbol,
             const std::string & sample )
```

4.4 wr22::regex_explainer::hints Namespace Reference

Functions

- Hint get_hint (const ParseError &error)

  If any exception was thrown, then there is an error in the regular expression.
- Hint get_hint (const UnexpectedEnd &error)
- Hint get_hint (const ExpectedEnd &error)
- Hint get_hint (const UnexpectedChar &error)
- Hint get_hint (const InvalidRange &error)

4.4.1 Function Documentation

4.4.1.1 get_hint() [1/5]

```
Hint wr22::regex_explainer::hints::get_hint (
             const ExpectedEnd & error )
```

4.4.1.2 get_hint() [2/5]

```
Hint wr22::regex_explainer::hints::get_hint (
             const InvalidRange & error )
```

4.4.1.3 get_hint() [3/5]

```
Hint wr22::regex_explainer::hints::get_hint (
            const ParseError & error )
```

If any exception was thrown, then there is an error in the regular expression.

If the error is related to syntax, then this function returns a hint on how to fix it. In case of other errors, the function returns information about where the failure occurred.

4.4.1.4 get_hint() [4/5]

```
Hint wr22::regex_explainer::hints::get_hint (
            const UnexpectedChar & error )
```

4.4.1.5 get_hint() [5/5]

```
Hint wr22::regex_explainer::hints::get_hint (
            const UnexpectedEnd & error )
```

Chapter 5

Class Documentation

5.1 wr22::regex_explainer::explanation::Explanation Class Reference

```
#include <explanation_folder.hpp>
```

Public Member Functions

- Explanation ()
- Explanation (type_of_sentence explanation_, size_t depth_, bool bold_=false)
- type_of_sentence get_explanation () const
- size_t get_depth () const
- bool is_bold () const

5.1.1 Constructor & Destructor Documentation

5.1.1.1 Explanation() [1/2]

```
wr22::regex_explainer::explanation::Explanation::Explanation ( )
```

5.1.1.2 Explanation() [2/2]

```
wr22::regex_explainer::explanation::Explanation::Explanation (
            type_of_sentence explanation_,
            size_t depth_,
            bool bold_ = false )
```

5.1.2 Member Function Documentation

5.1.2.1 get_depth()

```
size_t wr22::regex_explainer::explanation::Explanation::get_depth ( ) const
```

5.1.2.2 get_explanation()

```
type_of_sentence wr22::regex_explainer::explanation::Explanation::get_explanation ( ) const
```

5.1.2.3 is_bold()

```
bool wr22::regex_explainer::explanation::Explanation::is_bold ( ) const
```

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

- include/wr22/regex_explainer/explanation/explanation_folder.hpp
- src/explanation/explanation_folder.cpp

5.2 wr22::regex_explainer::explanation::Hint Class Reference

```
#include <hint_folder.hpp>
```

Public Member Functions

- Hint ()
- Hint (std::string hint_, std::string additional_info_="")
- std::string get_hint () const
- std::string get_additional_information () const

Static Public Attributes

- static constexpr const char ∗ main_sentence

5.2.1 Constructor & Destructor Documentation

5.2.1.1 Hint() [1/2]

```
wr22::regex_explainer::explanation::Hint::Hint ( )
```

5.2.1.2 Hint() [2/2]

```
wr22::regex_explainer::explanation::Hint::Hint (
             std::string hint_,
             std::string additional_info_ = "" )
```

5.2.2 Member Function Documentation

5.2.2.1 get_additional_information()

```
std::string wr22::regex_explainer::explanation::Hint::get_additional_information ( ) const
```

5.2.2.2 get_hint()

```
std::string wr22::regex_explainer::explanation::Hint::get_hint ( ) const
```

5.2.3 Member Data Documentation

5.2.3.1 main_sentence

```
constexpr const char* wr22::regex_explainer::explanation::Hint::main_sentence  [static], [constexpr]
```

Initial value:

```
=
       "Your pattern contains one or more errors, please see the explanation section above"
```

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

- include/wr22/regex_explainer/hints/hint_folder.hpp
- src/hints/hint_folder.cpp

Chapter 6

File Documentation

6.1 include/wr22/regex_explainer/explanation/explanation.hpp File Reference

```
#include "wr22/regex_parser/regex/part.hpp"
#include "wr22/regex_parser/span/span.hpp"
#include "wr22/regex_explainer/explanation/explanation_folder.hpp"
#include "wr22/regex_explainer/explanation/sample_folder.hpp"
#include "wr22/regex_explainer/explanation/upgrade_sample.hpp"
#include <string_view>
```

Namespaces

- namespace wr22
- namespace wr22::regex_explainer
- namespace wr22::regex_explainer::explanation

Functions

- std::vector< Explanation > wr22::regex_explainer::explanation::get_full_explanation (const SpannedPart &spanned_part, size_t depth=0)

  The function returns the vector processed information about each node of the syntax tree.

6.2 explanation.hpp

Go to the documentation of this file.

```
#pragma once

// wr22
#include "wr22/regex_parser/regex/part.hpp"
#include "wr22/regex_parser/span/span.hpp"
#include "wr22/regex_explainer/explanation/explanation_folder.hpp"
#include "wr22/regex_explainer/explanation/sample_folder.hpp"
#include "wr22/regex_explainer/explanation/upgrade_sample.hpp"

// STL
#include <string_view>
```

```

namespace wr22::regex_explainer::explanation {

    using regex_parser::regex::SpannedPart;


    std::vector<Explanation>
    get_full_explanation(const SpannedPart &spanned_part, size_t depth = 0);

}  // namespace wr22::regex_explainer::explanation
```

6.3 include/wr22/regex_explainer/explanation/explanation_folder.hpp File Reference

```
#include "wr22/regex_explainer/explanation/explanation_folder.hpp"
#include "wr22/utils/adt.hpp"
#include <nlohmann/json_fwd.hpp>
#include <string>
#include <variant>
#include <nlohmann/json.hpp>
```

Classes

- class wr22::regex_explainer::explanation::Explanation

Namespaces

- namespace wr22
- namespace wr22::regex_explainer
- namespace wr22::regex_explainer::explanation

Typedefs

- typedef wr22::utils::Adt< std::string, std::u32string, uint32_t > wr22::regex_explainer::explanation::type_of_sentence

Functions

- void wr22::regex_explainer::explanation::to_json (nlohmann::json &j, const Explanation &explanation)

6.4 explanation_folder.hpp

Go to the documentation of this file.

```
#pragma once

// wr22
#include "wr22/regex_explainer/explanation/explanation_folder.hpp"
#include "wr22/utils/adt.hpp"

// STL
#include <nlohmann/json_fwd.hpp>
#include <string>

// variant
#include <variant>

// nlohmann
#include <nlohmann/json.hpp>

namespace wr22::regex_explainer::explanation {

typedef wr22::utils::Adt<std::string, std::u32string, uint32_t> type_of_sentence;

class Explanation {
public:
    Explanation();
    Explanation(type_of_sentence explanation_, size_t depth_, bool bold_ = false);

    type_of_sentence get_explanation() const;
    [[nodiscard]] size_t get_depth() const;
    [[nodiscard]] bool is_bold() const;

private:
    type_of_sentence explanation;
    size_t depth;
    bool bold;
};

void to_json(nlohmann::json& j, const Explanation& explanation);

}  // namespace wr22::regex_explainer::explanation
```

6.5 include/wr22/regex_explainer/explanation/sample_folder.hpp File Reference

```
#include "wr22/regex_explainer/explanation/explanation_folder.hpp"
#include "wr22/regex_parser/regex/part.hpp"
#include "wr22/regex_parser/span/span.hpp"
#include <string_view>
```

Namespaces

- namespace wr22
- namespace wr22::regex_explainer
- namespace wr22::regex_explainer::explanation

Functions

- std::string wr22::regex_explainer::explanation::get_sample (const Empty &vertex)

  The function returns a sample for the AST node depending on its type.
- std::vector< std::string > wr22::regex_explainer::explanation::get_sample (const Literal &vertex)

  The function describes which literal matched and what index it has in the ASCII table.

- std::string wr22::regex_explainer::explanation::get_sample (const Alternatives &vertex)

  The function lists all alternatives that needed to be mached and describes each one in detail.
- std::string wr22::regex_explainer::explanation::get_sample (const Sequence &vertex)

  The function lists all items of the sequence list and match there explanation one after another.
- std::vector< std::string > wr22::regex_explainer::explanation::get_sample (const Group &vertex)

  TO DO.
- std::string wr22::regex_explainer::explanation::get_sample (const Optional &vertex)

  Next three functions return the explanation of some quantifier.
- std::string wr22::regex_explainer::explanation::get_sample (const Plus &vertex)
- std::string wr22::regex_explainer::explanation::get_sample (const Star &vertex)
- std::string wr22::regex_explainer::explanation::get_sample (const Wildcard &vertex)

  The function returns the explanation for some regex basic that is always the same and does not require any modifications depending on the situation.
- std::vector< std::string > wr22::regex_explainer::explanation::get_sample (const CharacterClass &vertex)

  The function lists the symbols from the certain set that need to be matched.

6.6 sample_folder.hpp

Go to the documentation of this file.

```
#pragma once

// wr22
#include "wr22/regex_explainer/explanation/explanation_folder.hpp"
#include "wr22/regex_parser/regex/part.hpp"
#include "wr22/regex_parser/span/span.hpp"

// STL
#include <string_view>

namespace wr22::regex_explainer::explanation {

    using regex_parser::regex::part::Empty;
    using regex_parser::regex::part::Literal;
    using regex_parser::regex::part::Alternatives;
    using regex_parser::regex::part::Sequence;
    using regex_parser::regex::part::Group;
    using regex_parser::regex::part::Optional;
    using regex_parser::regex::part::Plus;
    using regex_parser::regex::part::Star;
    using regex_parser::regex::part::Wildcard;
    using regex_parser::regex::part::CharacterClass;

    std::string get_sample(const Empty &vertex);

    std::vector<std::string> get_sample(const Literal &vertex);

    std::string get_sample(const Alternatives &vertex);

    std::string get_sample(const Sequence &vertex);

    std::vector<std::string> get_sample(const Group &vertex);

    std::string get_sample(const Optional &vertex);

    std::string get_sample(const Plus &vertex);

    std::string get_sample(const Star &vertex);

    std::string get_sample(const Wildcard &vertex);

    std::vector<std::string> get_sample(const CharacterClass &vertex);

}  // namespace wr22::regex_explainer::explanation
```

6.7 include/wr22/regex_explainer/explanation/upgrade_sample.hpp File Reference

```
#include "wr22/regex_explainer/explanation/sample_folder.hpp"
#include <string_view>
```

Namespaces

- namespace wr22
- namespace wr22::regex_explainer
- namespace wr22::regex_explainer::explanation

Functions

- std::string wr22::regex_explainer::explanation::upgrade_sample (const std::string &symbol, const std::string &sample)

6.8 upgrade_sample.hpp

Go to the documentation of this file.

```
#pragma once

#include "wr22/regex_explainer/explanation/sample_folder.hpp"

// STL
#include <string_view>

namespace wr22::regex_explainer::explanation {

std::string upgrade_sample(const std::string& symbol, const std::string& sample);

}  // namespace wr22::regex_explainer::explanation
```

6.9 include/wr22/regex_explainer/hints/hint.hpp File Reference

```
#include "wr22/regex_explainer/hints/hint_folder.hpp"
#include "wr22/regex_parser/parser/errors.hpp"
#include "wr22/unicode/conversion.hpp"
#include <vector>
```

Namespaces

- namespace wr22
- namespace wr22::regex_explainer
- namespace wr22::regex_explainer::hints

Functions

- Hint wr22::regex_explainer::hints::get_hint (const ParseError &error)

  If any exception was thrown, then there is an error in the regular expression.
- Hint wr22::regex_explainer::hints::get_hint (const UnexpectedEnd &error)
- Hint wr22::regex_explainer::hints::get_hint (const ExpectedEnd &error)
- Hint wr22::regex_explainer::hints::get_hint (const UnexpectedChar &error)
- Hint wr22::regex_explainer::hints::get_hint (const InvalidRange &error)

6.10 hint.hpp

Go to the documentation of this file.

```
#pragma once

// wr22
#include "wr22/regex_explainer/hints/hint_folder.hpp"
#include "wr22/regex_parser/parser/errors.hpp"
#include "wr22/unicode/conversion.hpp"

// vector
#include <vector>

namespace wr22::regex_explainer::hints {

    using explanation::Hint;
    using regex_parser::parser::errors::ParseError;
    using regex_parser::parser::errors::UnexpectedEnd;
    using regex_parser::parser::errors::ExpectedEnd;
    using regex_parser::parser::errors::UnexpectedChar;
    using regex_parser::parser::errors::InvalidRange;

    Hint get_hint(const ParseError &error);

    Hint get_hint(const UnexpectedEnd &error);

    Hint get_hint(const ExpectedEnd &error);

    Hint get_hint(const UnexpectedChar &error);

    Hint get_hint(const InvalidRange &error);

}  // namespace wr22::regex_explainer::hints



```

6.11 include/wr22/regex_explainer/hints/hint_folder.hpp File Reference

```
#include <string>
#include <string_view>
#include <utility>
#include <nlohmann/json.hpp>
```

Classes

- class wr22::regex_explainer::explanation::Hint

Namespaces

- namespace wr22
- namespace wr22::regex_explainer
- namespace wr22::regex_explainer::explanation

Functions

- void wr22::regex_explainer::explanation::to_json (nlohmann::json &j, const Hint &hint)

6.12 hint_folder.hpp

Go to the documentation of this file.

```
#pragma once

// STL
#include <string>
#include <string_view>
#include <utility>

// nlohmann
#include <nlohmann/json.hpp>

namespace wr22::regex_explainer::explanation {

class Hint {
public:
    Hint();
    Hint(std::string hint_, std::string additional_info_ = "");

    std::string get_hint() const;
    std::string get_additional_information() const;

    static constexpr const char* main_sentence =
        "Your pattern contains one or more errors, please see the explanation section above";

private:
    std::string hint;
    std::string additional_info;
};

void to_json(nlohmann::json& j, const Hint& hint);

}  // namespace wr22::regex_explainer::explanation
```

6.13 src/explanation/explanation.cpp File Reference

```
#include "wr22/regex_explainer/explanation/explanation.hpp"
#include "wr22/unicode/conversion.hpp"
#include <string_view>
#include <vector>
#include <variant>
```

Namespaces

- namespace wr22
- namespace wr22::regex_explainer
- namespace wr22::regex_explainer::explanation

Functions

- std::vector< Explanation > wr22::regex_explainer::explanation::get_full_explanation (const SpannedPart &spanned_part, size_t depth=0)

  The function returns the vector processed information about each node of the syntax tree.

6.14 src/explanation/explanation_folder.cpp File Reference

```
#include <wr22/regex_explainer/explanation/explanation_folder.hpp>
#include <wr22/unicode/conversion.hpp>
```

Namespaces

- namespace wr22
- namespace wr22::regex_explainer
- namespace wr22::regex_explainer::explanation

Functions

- void wr22::regex_explainer::explanation::to_json (nlohmann::json &j, const Explanation &explanation)

6.15 src/explanation/sample_folder.cpp File Reference

```
#include "wr22/regex_explainer/explanation/sample_folder.hpp"
#include <string_view>
```

Namespaces

- namespace wr22
- namespace wr22::regex_explainer
- namespace wr22::regex_explainer::explanation

Functions

- std::string wr22::regex_explainer::explanation::get_sample (const Empty &vertex)

  The function returns a sample for the AST node depending on its type.
- std::vector< std::string > wr22::regex_explainer::explanation::get_sample (const Literal &vertex)

  The function describes which literal matched and what index it has in the ASCII table.
- std::string wr22::regex_explainer::explanation::get_sample (const Alternatives &vertex)

  The function lists all alternatives that needed to be mached and describes each one in detail.
- std::string wr22::regex_explainer::explanation::get_sample (const Sequence &vertex)

  The function lists all items of the sequence list and match there explanation one after another.
- std::vector< std::string > wr22::regex_explainer::explanation::get_sample (const Group &vertex)

  TO DO.
- std::string wr22::regex_explainer::explanation::get_sample (const Optional &vertex)

  Next three functions return the explanation of some quantifier.
- std::string wr22::regex_explainer::explanation::get_sample (const Plus &vertex)
- std::string wr22::regex_explainer::explanation::get_sample (const Star &vertex)
- std::string wr22::regex_explainer::explanation::get_sample (const Wildcard &vertex)

  The function returns the explanation for some regex basic that is always the same and does not require any modifications depending on the situation.
- std::vector< std::string > wr22::regex_explainer::explanation::get_sample (const CharacterClass &vertex)

  The function lists the symbols from the certain set that need to be matched.

6.16 src/explanation/upgrade_sample.cpp File Reference

```
#include "wr22/regex_explainer/explanation/upgrade_sample.hpp"
```

Namespaces

- namespace wr22
- namespace wr22::regex_explainer
- namespace wr22::regex_explainer::explanation

Functions

- std::string wr22::regex_explainer::explanation::upgrade_sample (const std::string &symbol, const std::string &sample)

6.17 src/hints/hint.cpp File Reference

```
#include "wr22/regex_explainer/hints/hint.hpp"
#include <string>
```

Namespaces

- namespace wr22
- namespace wr22::regex_explainer
- namespace wr22::regex_explainer::hints

Functions

- Hint wr22::regex_explainer::hints::get_hint (const ParseError &error)

  If any exception was thrown, then there is an error in the regular expression.
- Hint wr22::regex_explainer::hints::get_hint (const UnexpectedEnd &error)
- Hint wr22::regex_explainer::hints::get_hint (const ExpectedEnd &error)
- Hint wr22::regex_explainer::hints::get_hint (const UnexpectedChar &error)
- Hint wr22::regex_explainer::hints::get_hint (const InvalidRange &error)

6.18 src/hints/hint_folder.cpp File Reference

```
#include <wr22/regex_explainer/hints/hint_folder.hpp>
```

Namespaces

- namespace wr22
- namespace wr22::regex_explainer
- namespace wr22::regex_explainer::explanation

Functions

- void wr22::regex_explainer::explanation::to_json (nlohmann::json &j, const Hint &hint)

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