Git Ref:	master
Date:	2020-02-25
Revises:	master
Reply at:	https://github.com/johelegp/jegp/issues

JEGP Library

Contents

1 Scope [scope]

1 This document describes the contents of the *JEGP library*.

2 References [refs]

1 The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document.

(1.1) — ISO/IEC 14882:2020, *Programming Languages — C++*

2 ISO/IEC 14882 is herein called the *C++ Standard*.

3 Introduction [intro]

3.1 General [intro.general]

1 The library specification subsumes the C++ Standard's [library], assumingly amended to the context of this library. [*Example*:

(1.1) — Per C++ Standard's [namespace.future], `::jegp2` is reserved.

(1.2) — Per C++ Standard's [contents]#3, a name `x` means `::jegp::x`.

— *end example*] The following subclauses describe additions to it.

Table 1: Library categories [tab:library.categories]

Clause	Category
Clause 4	General utilities library

3.2 Library-wide requirements [requirements]

3.2.1 Library contents [contents]

1 Whenever a name is qualified with `X::`, `::X::` is meant. [*Example*: When `std::Y` is mentioned, `::std::Y` is meant. — *end example*]

3.2.2 Reserved names [reserved.names]

1 The JEGP library reserves macro names starting with `JEGP_`.

4 General utilities library [utilities]

4.1 General [utilities.general]

1 This clause describes generally useful utilities. These utilities are summarized in Table 2.

Table 2: General utilities library summary [tab:utilities.summary]

	Subclause	Header
4.2	Utility components	`<jegp/utility.hpp>`

4.2 Utility components [utility]

4.2.1 Header `<jegp/utility.hpp>` synopsis [utility.syn]

1 The header `<jegp/utility.hpp>` contains some basic constructs.

```
namespace jegp
{
template <class T>
inline constexpr std::size_t bitsof{sizeof(T) * CHAR_BIT};

// 4.2.2, underlying
template <class Enum>
constexpr std::underlying_type_t<Enum> underlying(Enum e) noexcept;

// 4.2.3, static_downcast
template <class DerivedRef, class Base>
constexpr DerivedRef static_downcast(Base&& b) noexcept;

// 4.2.4, hash_combine
template <class... Args>
constexpr std::size_t hash_combine(const Args&... args) noexcept(see below);

} // namespace jegp
```

4.2.2 `underlying` [utility.underlying]

```
template <class Enum>
constexpr std::underlying_type_t<Enum> underlying(Enum e) noexcept;
```

1 *Constraints:* `std::is_enum_v<Enum>` is `true`.

2 *Returns:* `static_cast<std::underlying_type_t<Enum>>(e)`.

4.2.3 `static_downcast` [static.downcast]

1 A `static_cast` that performs a downcast.

```
template <class DerivedRef, class Base>
constexpr DerivedRef static_downcast(Base&& b) noexcept;
```

2 *Constraints:*

(2.1) — `std::is_reference_v<DerivedRef>` is `true`.

(2.2) — `std::is_same_v<std::remove_cvref_t<DerivedRef>, std::remove_cvref_t<Base>>` is `false`.

(2.3) — `std::derived_from<std::remove_reference_t<DerivedRef>, std::remove_reference_t<Base>>` is `true`.

(2.4) — `static_cast<DerivedRef>(std::forward<Base>(b))` is well-formed.

3 *Preconditions:* `b` is a base class subobject of an object of type `std::remove_cvref_t<DerivedRef>`.

4 *Returns:* `static_cast<DerivedRef>(std::forward<Base>(b))`.

4.2.4 `hash_combine` [**hash.combine**]

1 Insipred by `Boost.ContainerHash`. Useful in the specializations of `std::hash` whose `Key`'s salient parts consist of two or more objects.

```
template <class... Args>
constexpr std::size_t hash_combine(const Args&... args) noexcept(see below);
```

2 *Constraints:*

(2.1) — `sizeof...(Args)` ≥ 2 and

(2.2) — `std::hash<T>` is enabled (C++ Standard's [unord.hash]) for all `T` in `Args`.

3 *Effects:* Equivalent to:

```
std::size_t seed{0};
return (..., (seed ^= std::hash<Args>{}(args) + (seed << 6) + (seed >> 2)));
```

4 *Remarks:* The expression inside `noexcept` is equivalent to `noexcept((..., std::hash<Args>(args)))`.

Cross references

This annex lists each clause or subclause label and the corresponding clause or subclause number and page number, in alphabetical order by label.

Index

Index of library headers

The bold page number for each entry refers to the page where the synopsis of the header is shown.

Index of library names