

G++ 2.91.57, cygnus\cygwin-b20\include\g++\stl_iterator.h 完整列表

```
/*
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 */

/* NOTE: This is an internal header file, included by other STL headers.
 * You should not attempt to use it directly.
 */

#ifndef __SGI_STL_INTERNAL_ITERATOR_H
#define __SGI_STL_INTERNAL_ITERATOR_H

__STL_BEGIN_NAMESPACE

struct input_iterator_tag {};
struct output_iterator_tag {};
struct forward_iterator_tag : public input_iterator_tag {};
struct bidirectional_iterator_tag : public forward_iterator_tag {};
struct random_access_iterator_tag : public bidirectional_iterator_tag {};

template <class T, class Distance> struct input_iterator {
    typedef input_iterator_tag iterator_category;
    typedef T value_type;
    typedef Distance difference_type;
    typedef T* pointer;
    typedef T& reference;
};
```

```
};

struct output_iterator {
    typedef output_iterator_tag iterator_category;
    typedef void value_type;
    typedef void difference_type;
    typedef void pointer;
    typedef void reference;
};

template <class T, class Distance> struct forward_iterator {
    typedef forward_iterator_tag iterator_category;
    typedef T value_type;
    typedef Distance difference_type;
    typedef T* pointer;
    typedef T& reference;
};

template <class T, class Distance> struct bidirectional_iterator {
    typedef bidirectional_iterator_tag iterator_category;
    typedef T value_type;
    typedef Distance difference_type;
    typedef T* pointer;
    typedef T& reference;
};

template <class T, class Distance> struct random_access_iterator {
    typedef random_access_iterator_tag iterator_category;
    typedef T value_type;
    typedef Distance difference_type;
    typedef T* pointer;
    typedef T& reference;
};

#ifdef __STL_USE_NAMESPACES
template <class Category, class T, class Distance = ptrdiff_t,
        class Pointer = T*, class Reference = T>
struct iterator {
    typedef Category iterator_category;
    typedef T value_type;
    typedef Distance difference_type;
    typedef Pointer pointer;
    typedef Reference reference;
};
#endif /* __STL_USE_NAMESPACES */

#ifdef __STL_CLASS_PARTIAL_SPECIALIZATION
```

```
template <class Iterator>
struct iterator_traits {
    typedef typename Iterator::iterator_category iterator_category;
    typedef typename Iterator::value_type        value_type;
    typedef typename Iterator::difference_type    difference_type;
    typedef typename Iterator::pointer           pointer;
    typedef typename Iterator::reference          reference;
};

template <class T>
struct iterator_traits<T*> {
    typedef random_access_iterator_tag iterator_category;
    typedef T                          value_type;
    typedef ptrdiff_t                  difference_type;
    typedef T*                         pointer;
    typedef T&                         reference;
};

template <class T>
struct iterator_traits<const T*> {
    typedef random_access_iterator_tag iterator_category;
    typedef T                          value_type;
    typedef ptrdiff_t                  difference_type;
    typedef const T*                   pointer;
    typedef const T&                   reference;
};

template <class Iterator>
inline typename iterator_traits<Iterator>::iterator_category
iterator_category(const Iterator&) {
    typedef typename iterator_traits<Iterator>::iterator_category category;
    return category();
}

template <class Iterator>
inline typename iterator_traits<Iterator>::difference_type*
distance_type(const Iterator&) {
    return static_cast<typename iterator_traits<Iterator>::difference_type*>(0);
}

template <class Iterator>
inline typename iterator_traits<Iterator>::value_type*
value_type(const Iterator&) {
    return static_cast<typename iterator_traits<Iterator>::value_type*>(0);
}

#else /* __STL_CLASS_PARTIAL_SPECIALIZATION */

template <class T, class Distance>
```

```
inline input_iterator_tag
iterator_category(const input_iterator<T, Distance>&) {
    return input_iterator_tag();
}

inline output_iterator_tag iterator_category(const output_iterator&) {
    return output_iterator_tag();
}

template <class T, class Distance>
inline forward_iterator_tag
iterator_category(const forward_iterator<T, Distance>&) {
    return forward_iterator_tag();
}

template <class T, class Distance>
inline bidirectional_iterator_tag
iterator_category(const bidirectional_iterator<T, Distance>&) {
    return bidirectional_iterator_tag();
}

template <class T, class Distance>
inline random_access_iterator_tag
iterator_category(const random_access_iterator<T, Distance>&) {
    return random_access_iterator_tag();
}

template <class T>
inline random_access_iterator_tag iterator_category(const T*) {
    return random_access_iterator_tag();
}

template <class T, class Distance>
inline T* value_type(const input_iterator<T, Distance>&) {
    return (T*)(0);
}

template <class T, class Distance>
inline T* value_type(const forward_iterator<T, Distance>&) {
    return (T*)(0);
}

template <class T, class Distance>
inline T* value_type(const bidirectional_iterator<T, Distance>&) {
    return (T*)(0);
}

template <class T, class Distance>
inline T* value_type(const random_access_iterator<T, Distance>&) {
```

```
    return (T*)(0);
}

template <class T>
inline T* value_type(const T*) { return (T*)(0); }

template <class T, class Distance>
inline Distance* distance_type(const input_iterator<T, Distance>&) {
    return (Distance*)(0);
}

template <class T, class Distance>
inline Distance* distance_type(const forward_iterator<T, Distance>&) {
    return (Distance*)(0);
}

template <class T, class Distance>
inline Distance*
distance_type(const bidirectional_iterator<T, Distance>&) {
    return (Distance*)(0);
}

template <class T, class Distance>
inline Distance*
distance_type(const random_access_iterator<T, Distance>&) {
    return (Distance*)(0);
}

template <class T>
inline ptrdiff_t* distance_type(const T*) { return (ptrdiff_t*)(0); }

#endif /* __STL_CLASS_PARTIAL_SPECIALIZATION */

template <class InputIterator, class Distance>
inline void __distance(InputIterator first, InputIterator last, Distance& n,
                      input_iterator_tag) {
    while (first != last) { ++first; ++n; }
}

template <class RandomAccessIterator, class Distance>
inline void __distance(RandomAccessIterator first, RandomAccessIterator last,
                      Distance& n, random_access_iterator_tag) {
    n += last - first;
}

template <class InputIterator, class Distance>
inline void distance(InputIterator first, InputIterator last, Distance& n) {
    __distance(first, last, n, iterator_category(first));
}
```

```

#ifdef __STL_CLASS_PARTIAL_SPECIALIZATION

template <class InputIterator>
inline iterator_traits<InputIterator>::difference_type
__distance(InputIterator first, InputIterator last, input_iterator_tag) {
    iterator_traits<InputIterator>::difference_type n = 0;
    while (first != last) {
        ++first; ++n;
    }
    return n;
}

template <class RandomAccessIterator>
inline iterator_traits<RandomAccessIterator>::difference_type
__distance(RandomAccessIterator first, RandomAccessIterator last,
           random_access_iterator_tag) {
    return last - first;
}

template <class InputIterator>
inline iterator_traits<InputIterator>::difference_type
distance(InputIterator first, InputIterator last) {
    typedef typename iterator_traits<InputIterator>::iterator_category category;
    return __distance(first, last, category());
}

#endif /* __STL_CLASS_PARTIAL_SPECIALIZATION */

template <class InputIterator, class Distance>
inline void __advance(InputIterator& i, Distance n, input_iterator_tag) {
    while (n-- > 0) ++i;
}

#ifdef __sgi && !defined(__GNUC__) && (_MIPS_SIM != _MIPS_SIM_ABI32)
#pragma set woff 1183
#endif

template <class BidirectionalIterator, class Distance>
inline void __advance(BidirectionalIterator& i, Distance n,
                     bidirectional_iterator_tag) {
    if (n >= 0)
        while (n-- > 0) ++i;
    else
        while (n++ < 0) --i;
}

#ifdef __sgi && !defined(__GNUC__) && (_MIPS_SIM != _MIPS_SIM_ABI32)
#pragma reset woff 1183

```

```
#endif

template <class RandomAccessIterator, class Distance>
inline void __advance(RandomAccessIterator& i, Distance n,
                     random_access_iterator_tag) {
    i += n;
}

template <class InputIterator, class Distance>
inline void advance(InputIterator& i, Distance n) {
    __advance(i, n, iterator_category(i));
}

template <class Container>
class back_insert_iterator {
protected:
    Container* container;
public:
    typedef output_iterator_tag iterator_category;
    typedef void value_type;
    typedef void difference_type;
    typedef void pointer;
    typedef void reference;

    explicit back_insert_iterator(Container& x) : container(&x) {}
    back_insert_iterator<Container>&
    operator=(const typename Container::value_type& value) {
        container->push_back(value);
        return *this;
    }
    back_insert_iterator<Container>& operator*() { return *this; }
    back_insert_iterator<Container>& operator++() { return *this; }
    back_insert_iterator<Container>& operator++(int) { return *this; }
};

#ifndef __STL_CLASS_PARTIAL_SPECIALIZATION

template <class Container>
inline output_iterator_tag
iterator_category(const back_insert_iterator<Container>&)
{
    return output_iterator_tag();
}

#endif /* __STL_CLASS_PARTIAL_SPECIALIZATION */

template <class Container>
inline back_insert_iterator<Container> back_inserter(Container& x) {
    return back_insert_iterator<Container>(x);
}
```

```

}

template <class Container>
class front_insert_iterator {
protected:
    Container* container;
public:
    typedef output_iterator_tag iterator_category;
    typedef void                value_type;
    typedef void                difference_type;
    typedef void                pointer;
    typedef void                reference;

    explicit front_insert_iterator(Container& x) : container(&x) {}
    front_insert_iterator<Container>&
    operator=(const typename Container::value_type& value) {
        container->push_front(value);
        return *this;
    }
    front_insert_iterator<Container>& operator*() { return *this; }
    front_insert_iterator<Container>& operator++() { return *this; }
    front_insert_iterator<Container>& operator++(int) { return *this; }
};

#ifndef __STL_CLASS_PARTIAL_SPECIALIZATION

template <class Container>
inline output_iterator_tag
iterator_category(const front_insert_iterator<Container>&)
{
    return output_iterator_tag();
}

#endif /* __STL_CLASS_PARTIAL_SPECIALIZATION */

template <class Container>
inline front_insert_iterator<Container> front_inserter(Container& x) {
    return front_insert_iterator<Container>(x);
}

template <class Container>
class insert_iterator {
protected:
    Container* container;
    typename Container::iterator iter;
public:
    typedef output_iterator_tag iterator_category;
    typedef void                value_type;
    typedef void                difference_type;

```

```

typedef void                pointer;
typedef void                reference;

insert_iterator(Container& x, typename Container::iterator i)
    : container(&x), iter(i) {}
insert_iterator<Container>&
operator=(const typename Container::value_type& value) {
    iter = container->insert(iter, value);
    ++iter;
    return *this;
}
insert_iterator<Container>& operator*() { return *this; }
insert_iterator<Container>& operator++() { return *this; }
insert_iterator<Container>& operator++(int) { return *this; }
};

#ifndef __STL_CLASS_PARTIAL_SPECIALIZATION

template <class Container>
inline output_iterator_tag
iterator_category(const insert_iterator<Container>&)
{
    return output_iterator_tag();
}

#endif /* __STL_CLASS_PARTIAL_SPECIALIZATION */

template <class Container, class Iterator>
inline insert_iterator<Container> inserter(Container& x, Iterator i) {
    typedef typename Container::iterator iter;
    return insert_iterator<Container>(x, iter(i));
}

#ifndef __STL_LIMITED_DEFAULT_TEMPLATES
template <class BidirectionalIterator, class T, class Reference = T&,
         class Distance = ptrdiff_t>
#else
template <class BidirectionalIterator, class T, class Reference,
         class Distance>
#endif
class reverse_bidirectional_iterator {
    typedef reverse_bidirectional_iterator<BidirectionalIterator, T, Reference,
                                         Distance> self;
protected:
    BidirectionalIterator current;
public:
    typedef bidirectional_iterator_tag iterator_category;
    typedef T                        value_type;
    typedef Distance                difference_type;

```

```

typedef T*                pointer;
typedef Reference          reference;

reverse_bidirectional_iterator() {}
explicit reverse_bidirectional_iterator(BidirectionalIterator x)
    : current(x) {}
BidirectionalIterator base() const { return current; }
Reference operator*() const {
    BidirectionalIterator tmp = current;
    return *--tmp;
}
#ifdef __SGI_STL_NO_ARROW_OPERATOR
    pointer operator->() const { return &(operator*()); }
#endif /* __SGI_STL_NO_ARROW_OPERATOR */
self& operator++() {
    --current;
    return *this;
}
self operator++(int) {
    self tmp = *this;
    --current;
    return tmp;
}
self& operator--() {
    ++current;
    return *this;
}
self operator--(int) {
    self tmp = *this;
    ++current;
    return tmp;
}
};

#ifdef __STL_CLASS_PARTIAL_SPECIALIZATION

template <class BidirectionalIterator, class T, class Reference,
          class Distance>
inline bidirectional_iterator_tag
iterator_category(const reverse_bidirectional_iterator<BidirectionalIterator,
                                                         T,
                                                         Reference, Distance>&) {
    return bidirectional_iterator_tag();
}

template <class BidirectionalIterator, class T, class Reference,
          class Distance>
inline T*
value_type(const reverse_bidirectional_iterator<BidirectionalIterator, T,

```

```

                                Reference, Distance>&) {
    return (T*) 0;
}

template <class BidirectionalIterator, class T, class Reference,
          class Distance>
inline Distance*
distance_type(const reverse_bidirectional_iterator<BidirectionalIterator, T,
                                                  Reference, Distance>&) {
    return (Distance*) 0;
}

#endif /* __STL_CLASS_PARTIAL_SPECIALIZATION */

template <class BidirectionalIterator, class T, class Reference,
          class Distance>
inline bool operator==(
    const reverse_bidirectional_iterator<BidirectionalIterator, T, Reference,
                                         Distance>& x,
    const reverse_bidirectional_iterator<BidirectionalIterator, T, Reference,
                                         Distance>& y) {
    return x.base() == y.base();
}

#ifdef __STL_CLASS_PARTIAL_SPECIALIZATION

// This is the new version of reverse_iterator, as defined in the
// draft C++ standard. It relies on the iterator_traits template,
// which in turn relies on partial specialization. The class
// reverse_bidirectional_iterator is no longer part of the draft
// standard, but it is retained for backward compatibility.

template <class Iterator>
class reverse_iterator
{
protected:
    Iterator current;
public:
    typedef typename iterator_traits<Iterator>::iterator_category
        iterator_category;
    typedef typename iterator_traits<Iterator>::value_type
        value_type;
    typedef typename iterator_traits<Iterator>::difference_type
        difference_type;
    typedef typename iterator_traits<Iterator>::pointer
        pointer;
    typedef typename iterator_traits<Iterator>::reference
        reference;

```

```

typedef Iterator iterator_type;
typedef reverse_iterator<Iterator> self;

public:
    reverse_iterator() {}
    explicit reverse_iterator(iterator_type x) : current(x) {}

    reverse_iterator(const self& x) : current(x.current) {}
#ifdef __STL_MEMBER_TEMPLATES
    template <class Iter>
    reverse_iterator(const reverse_iterator<Iter>& x) : current(x.current) {}
#endif /* __STL_MEMBER_TEMPLATES */

    iterator_type base() const { return current; }
    reference operator*() const {
        Iterator tmp = current;
        return *--tmp;
    }
#ifdef __SGI_STL_NO_ARROW_OPERATOR
    pointer operator->() const { return &(operator*()); }
#endif /* __SGI_STL_NO_ARROW_OPERATOR */

    self& operator++() {
        --current;
        return *this;
    }
    self operator++(int) {
        self tmp = *this;
        --current;
        return tmp;
    }
    self& operator--() {
        ++current;
        return *this;
    }
    self operator--(int) {
        self tmp = *this;
        ++current;
        return tmp;
    }

    self operator+(difference_type n) const {
        return self(current - n);
    }
    self& operator+=(difference_type n) {
        current -= n;
        return *this;
    }
    self operator-(difference_type n) const {

```

```

        return self(current + n);
    }
    self& operator+=(difference_type n) {
        current += n;
        return *this;
    }
    reference operator[](difference_type n) const { return *(*this + n); }
};

template <class Iterator>
inline bool operator==(const reverse_iterator<Iterator>& x,
                      const reverse_iterator<Iterator>& y) {
    return x.base() == y.base();
}

template <class Iterator>
inline bool operator<(const reverse_iterator<Iterator>& x,
                    const reverse_iterator<Iterator>& y) {
    return y.base() < x.base();
}

template <class Iterator>
inline typename reverse_iterator<Iterator>::difference_type
operator-(const reverse_iterator<Iterator>& x,
          const reverse_iterator<Iterator>& y) {
    return y.base() - x.base();
}

template <class Iterator>
inline reverse_iterator<Iterator>
operator+(reverse_iterator<Iterator>::difference_type n,
          const reverse_iterator<Iterator>& x) {
    return reverse_iterator<Iterator>(x.base() - n);
}

#else /* __STL_CLASS_PARTIAL_SPECIALIZATION */

// This is the old version of reverse_iterator, as found in the original
// HP STL. It does not use partial specialization.

#ifndef __STL_LIMITED_DEFAULT_TEMPLATES
template <class RandomAccessIterator, class T, class Reference = T&,
          class Distance = ptrdiff_t>
#else
template <class RandomAccessIterator, class T, class Reference,
          class Distance>
#endif
class reverse_iterator {
    typedef reverse_iterator<RandomAccessIterator, T, Reference, Distance>

```

```

        self;
protected:
    RandomAccessIterator current;
public:
    typedef random_access_iterator_tag iterator_category;
    typedef T value_type;
    typedef Distance difference_type;
    typedef T* pointer;
    typedef Reference reference;

    reverse_iterator() {}
    explicit reverse_iterator(RandomAccessIterator x) : current(x) {}
    RandomAccessIterator base() const { return current; }
    Reference operator*() const { return *(current - 1); }
#ifdef __SGI_STL_NO_ARROW_OPERATOR
    pointer operator->() const { return &(operator*()); }
#endif /* __SGI_STL_NO_ARROW_OPERATOR */
    self& operator++() {
        --current;
        return *this;
    }
    self operator++(int) {
        self tmp = *this;
        --current;
        return tmp;
    }
    self& operator--() {
        ++current;
        return *this;
    }
    self operator--(int) {
        self tmp = *this;
        ++current;
        return tmp;
    }
    self operator+(Distance n) const {
        return self(current - n);
    }
    self& operator+=(Distance n) {
        current -= n;
        return *this;
    }
    self operator-(Distance n) const {
        return self(current + n);
    }
    self& operator-=(Distance n) {
        current += n;
        return *this;
    }
}

```

```
    Reference operator[](Distance n) const { return *(*this + n); }
};

template <class RandomAccessIterator, class T, class Reference, class Distance>
inline random_access_iterator_tag
iterator_category(const reverse_iterator<RandomAccessIterator, T,
                                     Reference, Distance>&) {
    return random_access_iterator_tag();
}

template <class RandomAccessIterator, class T, class Reference, class Distance>
inline T* value_type(const reverse_iterator<RandomAccessIterator, T,
                                     Reference, Distance>&) {
    return (T*) 0;
}

template <class RandomAccessIterator, class T, class Reference, class Distance>
inline Distance* distance_type(const reverse_iterator<RandomAccessIterator, T,
                                     Reference, Distance>&) {
    return (Distance*) 0;
}

template <class RandomAccessIterator, class T, class Reference, class Distance>
inline bool operator==(const reverse_iterator<RandomAccessIterator, T,
                                     Reference, Distance>& x,
                      const reverse_iterator<RandomAccessIterator, T,
                                     Reference, Distance>& y) {
    return x.base() == y.base();
}

template <class RandomAccessIterator, class T, class Reference, class Distance>
inline bool operator<(const reverse_iterator<RandomAccessIterator, T,
                                     Reference, Distance>& x,
                    const reverse_iterator<RandomAccessIterator, T,
                                     Reference, Distance>& y) {
    return y.base() < x.base();
}

template <class RandomAccessIterator, class T, class Reference, class Distance>
inline Distance operator-(const reverse_iterator<RandomAccessIterator, T,
                                     Reference, Distance>& x,
                        const reverse_iterator<RandomAccessIterator, T,
                                     Reference, Distance>& y) {
    return y.base() - x.base();
}

template <class RandomAccessIter, class T, class Ref, class Dist>
inline reverse_iterator<RandomAccessIter, T, Ref, Dist>
```

```

operator+(Dist n, const reverse_iterator<RandomAccessIter, T, Ref, Dist>& x) {
    return reverse_iterator<RandomAccessIter, T, Ref, Dist>(x.base() - n);
}

#endif /* __STL_CLASS_PARTIAL_SPECIALIZATION */

template <class T, class Distance = ptrdiff_t>
class istream_iterator {
    friend bool
        operator== __STL_NULL_TMPL_ARGS (const istream_iterator<T, Distance>& x,
                                           const istream_iterator<T, Distance>& y);

protected:
    istream* stream;
    T value;
    bool end_marker;
    void read() {
        end_marker = (*stream) ? true : false;
        if (end_marker) *stream >> value;
        end_marker = (*stream) ? true : false;
    }

public:
    typedef input_iterator_tag iterator_category;
    typedef T value_type;
    typedef Distance difference_type;
    typedef const T* pointer;
    typedef const T& reference;

    istream_iterator() : stream(&cin), end_marker(false) {}
    istream_iterator(istream& s) : stream(&s) { read(); }
    reference operator*() const { return value; }
#ifdef __SGI_STL_NO_ARROW_OPERATOR
    pointer operator->() const { return &(operator*()); }
#endif /* __SGI_STL_NO_ARROW_OPERATOR */
    istream_iterator<T, Distance>& operator++() {
        read();
        return *this;
    }
    istream_iterator<T, Distance> operator++(int) {
        istream_iterator<T, Distance> tmp = *this;
        read();
        return tmp;
    }
};

#ifdef __STL_CLASS_PARTIAL_SPECIALIZATION

template <class T, class Distance>
inline input_iterator_tag
iterator_category(const istream_iterator<T, Distance>&) {

```



```
    return input_iterator_tag();
}

template <class T, class Distance>
inline T* value_type(const istream_iterator<T, Distance>&) { return (T*) 0; }

template <class T, class Distance>
inline Distance* distance_type(const istream_iterator<T, Distance>&) {
    return (Distance*) 0;
}

#endif /* __STL_CLASS_PARTIAL_SPECIALIZATION */

template <class T, class Distance>
inline bool operator==(const istream_iterator<T, Distance>& x,
                      const istream_iterator<T, Distance>& y) {
    return x.stream == y.stream && x.end_marker == y.end_marker ||
           x.end_marker == false && y.end_marker == false;
}

template <class T>
class ostream_iterator {
protected:
    ostream* stream;
    const char* string;
public:
    typedef output_iterator_tag iterator_category;
    typedef void value_type;
    typedef void difference_type;
    typedef void pointer;
    typedef void reference;

    ostream_iterator(ostream& s) : stream(&s), string(0) {}
    ostream_iterator(ostream& s, const char* c) : stream(&s), string(c) {}
    ostream_iterator<T>& operator=(const T& value) {
        *stream << value;
        if (string) *stream << string;
        return *this;
    }
    ostream_iterator<T>& operator*() { return *this; }
    ostream_iterator<T>& operator++() { return *this; }
    ostream_iterator<T>& operator++(int) { return *this; }
};

#ifndef __STL_CLASS_PARTIAL_SPECIALIZATION

template <class T>
inline output_iterator_tag
iterator_category(const ostream_iterator<T>&) {
```

```
    return output_iterator_tag();  
}  
  
#endif /* __STL_CLASS_PARTIAL_SPECIALIZATION */  
  
__STL_END_NAMESPACE  
  
#endif /* __SGI_STL_INTERNAL_ITERATOR_H */  
  
// Local Variables:  
// mode:C++  
// End:
```