

**Keep Your Friends
under Control**

```
namespace Animals {  
    class Badger {  
        int size = 42;  
  
        friend void badgerSize(Badger const &badger);  
};  
  
void badgerSize(Badger const &badger) {  
    std::cout << "This badger is: " << badger.size << "\n";  
}  
}
```

```
Animals::Badger b;  
badgerSize(b);
```

```
namespace Animals {  
  
    class Badger {  
        int size = 42;  
  
        friend void badgerSize(Badger const &badger);  
};  
  
    void badgerSize(Badger const &badger) {  
        std::cout << "This badger is: " << badger.size << "\n";  
    }  
}
```

```
Animals::Badger b;  
badgerSize(b);
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```
namespace Animals {  
    class Badger {  
        int size = 42;  
  
        friend void badgerSize(Badger const &badger);  
};  
  
void badgerSize(Badger const &badger) {  
    std::cout << "This badger is: " << badger.size << "\n";  
}  
}
```

```
Animals::Badger b;  
Animals::badgerSize(b);
```

```
namespace Animals {
```

```
    class Badger {  
        int size = 42;
```

```
        friend void badgerSize(Badger const &badger) {  
            std::cout << "This badger is: " << badger.size << "\n";  
        }
```

```
    };
```

```
}
```

```
namespace Animals {  
    class Badger {  
        int size = 42;  
  
        friend void badgerSize(Badger const &badger) {  
            std::cout << "This badger is: " << badger.size << "\n";  
        }  
    };  
}
```

```
Animals::Badger b;  
Animals::badgerSize(b);
```

error: no type named 'badgerSize' in namespace 'Animals'

```
namespace Animals {  
    class Badger {  
        int size = 42;  
  
        friend void badgerSize(Badger const &badger) {  
            std::cout << "This badger is: " << badger.size << "\n";  
        }  
    };  
}
```

```
Animals::Badger b;  
badgerSize(b);
```

```
namespace Animals {  
    class Badger {  
        int size = 42;  
  
        friend void unreachable() {  
            std::cout << "I see dead code\n";  
        }  
    };  
}
```

```
Animals::Badger b;  
unreachable();  
Animals::unreachable();
```

error: use of undeclared identifier 'unreachable'

error: no member named 'unreachable' in namespace 'Animals'



wait...





so what?

```
class Badger {  
    int size = 42;
```

```
    friend std::ostream& operator <<  
        (std::ostream& os, Badger const& badger) {  
        return os << "This badger is: " << badger.size;  
    }
```

```
};
```

```
Animals::Badger b;  
std::cout << b << "\n";
```

```
class Badger {  
    int size = 42;  
  
    friend std::ostream& operator <<  
        (std::ostream& os, Badger const& badger) {  
        return os << "This badger is: " << badger.size;  
    }  
};
```

```
class Fox {};
```

```
friend std::ostream& operator <<
    (std::ostream& os, Badger const& badger);

class Badger {
    int size = 42;

    friend std::ostream& operator <<
        (std::ostream& os, Badger const& badger) {
        return os << "This badger is: " << badger.size;
        }
};

class Fox {};
```

```
friend std::ostream& operator <<
    (std::ostream& os, Badger const& badger);

class Badger {
    int size = 42;

    friend std::ostream& operator <<
        (std::ostream& os, Badger const& badger) {
        return os << "This badger is: " << badger.size;
    }
};

class Fox {};
```

```
Animals::Fox f;
std::cout << f << "\n";
```



```
/Development/Scratch/dawnTest/main.cpp:64:15: error: invalid operands to binary expression ('std::__1::ostream' (aka 'basic_ostream<char>') and 'Animals::Fox')
std::cout << f;
^~~~~~ ^ ~
Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:218:20: note: candidate function not viable: no known conversion from 'Animals::Fox' to 'const void **' for 1st argument; take the address of the argument with &
basic_ostream& operator<<(const void* _p);
^
Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/type_traits:4903:3: note: candidate function not viable: no known conversion from 'std::__1::ostream' (aka 'basic_ostream<char>') to 'std::byte' for 1st argument
operator<<(byte __lhs, Integer __shift) noexcept
^
Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:194:20: note: candidate function not viable: no known conversion from 'Animals::Fox' to 'std::__1::basic_ostream<char>' (&*)(std::__1::basic_ostream<char> &) for 1st argument
basic_ostream& operator<<(basic_ostream& (*__pf)(basic_ostream&))
^
Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:198:20: note: candidate function not viable: no known conversion from 'Animals::Fox' to 'basic_ios<std::__1::basic_ostream<char, std::__1::char_traits<char>>;char_type, std::__1::basic_ostream<char, std::__1::char_traits<char>>;traits_type>' (&*)(std::__1::basic_ostream<char, std::__1::char_traits<char>>;char_type, std::__1::basic_ostream<char, std::__1::char_traits<char>>;traits_type> &)(aka 'basic_ios<char, std::__1::char_traits<char>> &') for 1st argument
basic_ostream& operator<<(basic_ios<char_type, traits_type&
^
Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:203:20: note: candidate function not viable: no known conversion from 'Animals::Fox' to 'std::__1::ios_base &*)(std::__1::ios_base &)' for 1st argument
basic_ostream& operator<<([ios_base& (*__pf)(ios_base&))
^
Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:206:20: note: candidate function not viable: no known conversion from 'Animals::Fox' to 'bool' for 1st argument
basic_ostream& operator<<(bool __n);
^
Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:207:20: note: candidate function not viable: no known conversion from 'Animals::Fox' to 'short' for 1st argument
basic_ostream& operator<<(short __n);
^
Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:208:20: note: candidate function not viable: no known conversion from 'Animals::Fox' to 'unsigned short' for 1st argument
basic_ostream& operator<<(unsigned short __n);
^
Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:209:20: note: candidate function not viable: no known conversion from 'Animals::Fox' to 'int' for 1st argument
basic_ostream& operator<<(int __n);
^
Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:210:20: note: candidate function not viable: no known conversion from 'Animals::Fox' to 'unsigned int' for 1st argument
basic_ostream& operator<<(unsigned int __n);
^
Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:211:20: note: candidate function not viable: no known conversion from 'Animals::Fox' to 'long' for 1st argument
basic_ostream& operator<<(long __n);
^
Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:212:20: note: candidate function not viable: no known conversion from 'Animals::Fox' to 'unsigned long' for 1st argument
basic_ostream& operator<<(unsigned long __n);
^
Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:213:20: note: candidate function not viable: no known conversion from 'Animals::Fox' to 'long long' for 1st argument
basic_ostream& operator<<(long long __n);
^
Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:214:20: note: candidate function not viable: no known conversion from 'Animals::Fox' to 'unsigned long long' for 1st argument
basic_ostream& operator<<(unsigned long long __n);
^
Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:215:20: note: candidate function not viable: no known conversion from 'Animals::Fox' to 'float' for 1st argument
basic_ostream& operator<<(float __f);
^
Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:216:20: note: candidate function not viable: no known conversion from 'Animals::Fox' to 'double' for 1st argument
basic_ostream& operator<<(double __f);
^
Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:217:20: note: candidate function not viable: no known conversion from 'Animals::Fox' to 'long double' for 1st argument
basic_ostream& operator<<(long double __f);
^
Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:219:20: note: candidate function not viable: no known conversion from 'Animals::Fox' to 'basic_streambuf<std::__1::basic_ostream<char, std::__1::char_traits<char>>;char_type, std::__1::basic_ostream<char, std::__1::char_traits<char>>;traits_type>' (aka 'basic_streambuf<char, std::__1::char_traits<char>>' *) for 1st argument
basic_ostream& operator<<(basic_streambuf<char_type, traits_type* __sb);
^
Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:755:1: note: candidate function not viable: no known conversion from 'Animals::Fox' to 'char' for 2nd argument
operator<<(basic_ostream< CharT, Traits>& __os, char __cn)
^
Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:788:1: note: candidate function not viable: no known conversion from 'Animals::Fox' to 'char' for 2nd argument
operator<<(basic_ostream<char, Traits>& __os, char __c)
^
Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:795:1: note: candidate function not viable: no known conversion from 'Animals::Fox' to 'signed char' for 2nd argument
operator<<(basic_ostream<char, Traits>& __os, signed char __c)
^
Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:802:1: note: candidate function not viable: no known conversion from 'Animals::Fox' to 'unsigned char' for 2nd argument
operator<<(basic_ostream<char, Traits>& __os, unsigned char __c)
^
Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:816:1: note: candidate function not viable: no known conversion from 'Animals::Fox' to 'const char **' for 2nd argument
operator<<(basic_ostream< CharT, Traits>& __os, const char* __strn)
^
Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:862:1: note: candidate function not viable: no known conversion from 'Animals::Fox' to 'const char **' for 2nd argument
operator<<(basic_ostream<char, Traits>& __os, const char* __str)
^
Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:869:1: note: candidate function not viable: no known conversion from 'Animals::Fox' to 'const signed char **' for 2nd argument
operator<<(basic_ostream<char, Traits>& __os, const signed char* __str)
^
Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:877:1: note: candidate function not viable: no known conversion from 'Animals::Fox' to 'const unsigned char **' for 2nd argument
operator<<(basic_ostream<char, Traits>& __os, const unsigned char* __str)
^
Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:1061:1: note: candidate function not viable: no known conversion from 'Animals::Fox' to 'const std::__1::error_code' for 2nd argument
operator<<(basic_ostream< CharT, Traits>& __os, const error_code& __ec)
^
/Development/Scratch/dawnTest/main.cpp:45:30: note: candidate function not viable: no known conversion from 'Animals::Fox' to 'const Animals::Badger' for 2nd argument
friend std::ostream& operator << ( std::ostream& os, Badger const& badger ) {
^
Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:748:1: note: candidate template ignored: deduced conflicting types for parameter 'CharT' ('char' vs. 'Animals::Fox')
operator<<(basic_ostream< CharT, Traits>& __os, CharT __c)
^
Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:809:1: note: candidate template ignored: could not match 'const CharT **' against 'Animals::Fox'
operator<<(basic_ostream< CharT, Traits>& __os, const CharT* __str)
^
Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:1044:1: note: candidate template ignored: could not match 'basic_string<type-parameter-0-0, type-parameter-0-1, type-parameter-0-2>' against 'Animals::Fox'
operator<<(basic_ostream< CharT, Traits>& __os,
^
Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:1069:1: note: candidate template ignored: could not match 'shared_ptr<type-parameter-0-2>' against 'Animals::Fox'
operator<<(basic_ostream< CharT, Traits>& __os, shared_ptr< Yp> const& __p)
^
Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:1090:1: note: candidate template ignored: could not match 'bitset<Size>' against 'Animals::Fox'
operator<<(basic_ostream< CharT, Traits>& __os, const bitset< Size>& __x)
^
Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:1034:1: note: candidate template ignored: requirement 'is_lvalue_reference<basic_ostream<char>> &;value' was not satisfied [with _Stream = std::__1::basic_ostream<char> &, _Tp = Animals::Fox]
operator<<({ Stream&& __os, const Tp& __x)
^
Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:1052:1: note: candidate template ignored: could not match 'basic_string_view<type-parameter-0-0, type-parameter-0-1>' against 'Animals::Fox'
operator<<(basic_ostream< CharT, Traits>& __os,
^
Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:1082:1: note: candidate template ignored: could not match 'unique_ptr<type-parameter-0-2, type-parameter-0-3>' against 'Animals::Fox'
operator<<(basic_ostream< CharT, Traits>& __os, unique_ptr< Yp, Dp> const& __p)
^
```

const unsigned char * __str for 2nd argument

operator<<(basic_ostream<char, _Traits>& __os, const unsigned char* __str)

^

/Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++

+/v1/ostream:1061:1: note: candidate function not viable: no known conversion from 'Animals::Fox'

to 'const std::__1::error_code' for 2nd argument

operator<<(basic_ostream<_CharT, _Traits>& __os, const error_code& __ec)

^

/Development/Scratch/dawnTest/main.cpp:45:30: note: candidate function not viable: no known conversion from 'Animals::Fox' to 'const Animals::Badger' for 2nd argument

friend std::ostream& operator << (std::ostream& os, Badger const& badger) {

^

/Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++

+/v1/ostream:748:1: note: candidate template ignored: deduced conflicting types for parameter

'_CharT' ('char' vs. 'Animals::Fox')

operator<<(basic_ostream<_CharT, _Traits>& __os, _CharT __c)

^

/Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++

+/v1/ostream:809:1: note: candidate template ignored: could not match 'const _CharT *' against

'Animals::Fox'

operator<<(basic_ostream<_CharT, _Traits>& __os, const _CharT* __str)

^

/Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++

```
friend std::ostream& operator <<
    (std::ostream& os, Badger const& badger);

class Badger {
    int size = 42;

    friend std::ostream& operator <<
        (std::ostream& os, Badger const& badger) {
        return os << "This badger is: " << badger.size;
    }
};
```

```
class Fox {};
```

```
Animals::Fox f;
std::cout << f << "\n";
```

```
class Badger {
    int size = 42;

    friend std::ostream& operator <<
        (std::ostream& os, Badger const& badger) {
        return os << "This badger is: " << badger.size;
    }
};
```

```
class Fox {};
```

```
Animals::Fox f;
std::cout << f << "\n";
```

const unsigned char * __str for 2nd argument

operator<<(basic_ostream<char, _Traits>& __os, const unsigned char* __str)

^

/Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++

+v1/ostream:1061:1: note: candidate function not viable: no known conversion from 'Animals::Fox'

to 'const std::__1::error_code' for 2nd argument

operator<<(basic_ostream<_CharT, _Traits>& __os, const error_code& __ec)

^

/Development/Scratch/dawnTest/main.cpp:45:30: note: candidate function not viable: no known conversion from 'Animals::Fox' to 'const Animals::Badger' for 2nd argument

friend std::ostream& operator << (std::ostream& os, Badger const& badger) {

^

/Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++

+v1/ostream:748:1: note: candidate template ignored: deduced conflicting types for parameter

'_CharT' ('char' vs. 'Animals::Fox')

operator<<(basic_ostream<_CharT, _Traits>& __os, _CharT __c)

^

/Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++

+v1/ostream:809:1: note: candidate template ignored: could not match 'const _CharT *' against

'Animals::Fox'

operator<<(basic_ostream<_CharT, _Traits>& __os, const _CharT* __str)

^

/Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++

/Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:877:1: note: candidate function not viable: no known conversion from 'Animals::Fox' to 'const unsigned char *' for 2nd argument

```
operator<<(basic_ostream<char, _Traits>& __os, const unsigned char* __str)
```

^

/Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:1061:1: note: candidate function not viable: no known conversion from 'Animals::Fox' to 'const std::__1::error_code' for 2nd argument

```
operator<<(basic_ostream<_CharT, _Traits>& __os, const error_code& __ec)
```

^

/Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:748:1: note: candidate template ignored: deduced conflicting types for parameter '_CharT' ('char' vs. 'Animals::Fox')

```
operator<<(basic_ostream<_CharT, _Traits>& __os, _CharT __c)
```

^

/Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:809:1: note: candidate template ignored: could not match 'const _CharT *' against 'Animals::Fox'

```
operator<<(basic_ostream<_CharT, _Traits>& __os, const _CharT* __str)
```

^

/Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:1044:1: note: candidate template ignored: could not match 'basic_string<type-parameter 0, 0, type-parameter 0, 1, type-parameter 0, 2>' against 'Animals::Fox'

```
/Development/Scratch/dawnTest/main.cpp:64:15: error: invalid operands to binary expression ('std::__1::ostream' (aka 'basic_ostream<char>') and 'Animals::Fox')
    std::cout << f;
    ~~~~~^ ~
/Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:218:20: note: candidate function not viable: no known conversion from 'Animals::Fox' to 'const void*' for 1st argument; take the address of the argument with &
    basic_ostream& operator<<(const void* __p);
    ^
/Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/type_traits:4903:3: note: candidate function not viable: no known conversion from 'std::__1::ostream' (aka 'basic_ostream<char>') to 'std::byte' for 1st argument
operator<<(byte __lhs, _Integer __shift) noexcept
^
/Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:194:20: note: candidate function not viable: no known conversion from 'Animals::Fox' to 'std::__1::basic_ostream<char> &(*)[std::__1::basic_ostream<char> &]' for 1st argument
    basic_ostream& operator<<(basic_ostream& (* __pf)(basic_ostream&))
    ^
/Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:198:20: note: candidate function not viable: no known conversion from 'Animals::Fox' to 'basic_ios<std::__1::basic_ostream<char, std::__1::char_traits<char>>;char_type, std::__1::basic_ostream<char, std::__1::char_traits<char>>;traits_type> &(*)[basic_ios<std::__1::basic_ostream<char, std::__1::char_traits<char>>;char_type, std::__1::basic_ostream<char, std::__1::char_traits<char>>;traits_type> &]' (aka 'basic_ios<char, std::__1::char_traits<char>> &(*)[basic_ios<char, std::__1::char_traits<char>> &]' for 1st argument
    basic_ostream& operator<<(basic_ios<char_traits<char>> > &)) for 1st argument
    ^
/Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:203:20: note: candidate function not viable: no known conversion from 'Animals::Fox' to 'std::__1::ios_base &(*)[std::__1::ios_base &]' for 1st argument
    basic_ostream& operator<<(ios_base& (* __pf)(ios_base&))
    ^
/Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:206:20: note: candidate function not viable: no known conversion from 'Animals::Fox' to 'bool' for 1st argument
    basic_ostream& operator<<(bool __n);
    ^
/Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:207:20: note: candidate function not viable: no known conversion from 'Animals::Fox' to 'short' for 1st argument
    basic_ostream& operator<<(short __n);
    ^
/Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:208:20: note: candidate function not viable: no known conversion from 'Animals::Fox' to 'unsigned short' for 1st argument
    basic_ostream& operator<<(unsigned short __n);
    ^
/Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:209:20: note: candidate function not viable: no known conversion from 'Animals::Fox' to 'int' for 1st argument
    basic_ostream& operator<<(int __n);
    ^
/Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:210:20: note: candidate function not viable: no known conversion from 'Animals::Fox' to 'unsigned int' for 1st argument
    basic_ostream& operator<<(unsigned int __n);
    ^
/Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:211:20: note: candidate function not viable: no known conversion from 'Animals::Fox' to 'long' for 1st argument
    basic_ostream& operator<<(long __n);
    ^
/Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:212:20: note: candidate function not viable: no known conversion from 'Animals::Fox' to 'unsigned long' for 1st argument
    basic_ostream& operator<<(unsigned long __n);
    ^
/Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:213:20: note: candidate function not viable: no known conversion from 'Animals::Fox' to 'long long' for 1st argument
    basic_ostream& operator<<(long long __n);
    ^
/Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:214:20: note: candidate function not viable: no known conversion from 'Animals::Fox' to 'unsigned long long' for 1st argument
    basic_ostream& operator<<(unsigned long long __n);
    ^
/Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:215:20: note: candidate function not viable: no known conversion from 'Animals::Fox' to 'float' for 1st argument
    basic_ostream& operator<<(float __f);
    ^
/Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:216:20: note: candidate function not viable: no known conversion from 'Animals::Fox' to 'double' for 1st argument
    basic_ostream& operator<<(double __f);
    ^
/Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:217:20: note: candidate function not viable: no known conversion from 'Animals::Fox' to 'long double' for 1st argument
    basic_ostream& operator<<(long double __f);
    ^
/Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:219:20: note: candidate function not viable: no known conversion from 'Animals::Fox' to 'basic_streambuf<std::__1::basic_ostream<char, std::__1::char_traits<char>>;char_type, std::__1::basic_ostream<char, std::__1::char_traits<char>>;traits_type>*' (aka 'basic_streambuf<char, std::__1::char_traits<char>> >') for 1st argument
    basic_ostream& operator<<(basic_streambuf<char_type, traits_type>* __sb);
    ^
/Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:755:1: note: candidate function not viable: no known conversion from 'Animals::Fox' to 'char' for 2nd argument
operator<<(basic_ostream< _CharT, _Traits>& __os, char __cn)
^
/Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:788:1: note: candidate function not viable: no known conversion from 'Animals::Fox' to 'char' for 2nd argument
operator<<(basic_ostream<char, _Traits>& __os, char __c)
^
/Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:795:1: note: candidate function not viable: no known conversion from 'Animals::Fox' to 'signed char' for 2nd argument
operator<<(basic_ostream<char, _Traits>& __os, signed char __c)
^
/Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:802:1: note: candidate function not viable: no known conversion from 'Animals::Fox' to 'unsigned char' for 2nd argument
operator<<(basic_ostream<char, _Traits>& __os, unsigned char __c)
^
/Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:816:1: note: candidate function not viable: no known conversion from 'Animals::Fox' to 'const char*' for 2nd argument
operator<<(basic_ostream< _CharT, _Traits>& __os, const char* __strn)
^
/Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:862:1: note: candidate function not viable: no known conversion from 'Animals::Fox' to 'const char*' for 2nd argument
operator<<(basic_ostream<char, _Traits>& __os, const char* __str)
^
/Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:869:1: note: candidate function not viable: no known conversion from 'Animals::Fox' to 'const signed char*' for 2nd argument
operator<<(basic_ostream<char, _Traits>& __os, const signed char* __str)
^
/Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:877:1: note: candidate function not viable: no known conversion from 'Animals::Fox' to 'const unsigned char*' for 2nd argument
operator<<(basic_ostream<char, _Traits>& __os, const unsigned char* __str)
^
/Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:1061:1: note: candidate function not viable: no known conversion from 'Animals::Fox' to 'const std::__1::error_code' for 2nd argument
operator<<(basic_ostream< _CharT, _Traits>& __os, const error_code& __ec)
^
/Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:748:1: note: candidate template ignored: deduced conflicting types for parameter '_CharT' ('char' vs. 'Animals::Fox')
operator<<(basic_ostream< _CharT, _Traits>& __os, _CharT __c)
^
/Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:809:1: note: candidate template ignored: could not match 'const _CharT*' against 'Animals::Fox'
operator<<(basic_ostream< _CharT, _Traits>& __os, const _CharT* __str)
^
/Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:1044:1: note: candidate template ignored: could not match 'basic_string<type-parameter-0-0, type-parameter-0-1, type-parameter-0-2>' against 'Animals::Fox'
operator<<(basic_ostream< _CharT, _Traits>& __os,
^
/Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:1069:1: note: candidate template ignored: could not match 'shared_ptr<type-parameter-0-2>' against 'Animals::Fox'
operator<<(basic_ostream< _CharT, _Traits>& __os, shared_ptr< _Yp> const& __p)
^
/Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:1090:1: note: candidate template ignored: could not match 'bitset< _Size>' against 'Animals::Fox'
operator<<(basic_ostream< _CharT, _Traits>& __os, const bitset< _Size>& __x)
^
/Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:1034:1: note: candidate template ignored: requirement 'is_lvalue_reference<basic_ostream<char>> &>;value' was not satisfied [with _Stream = std::__1::basic_ostream<char> &, _Tp = Animals::Fox]
operator<<(_Stream&& __os, const _Tp& __x)
^
/Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:1052:1: note: candidate template ignored: could not match 'basic_string_view<type-parameter-0-0, type-parameter-0-1>' against 'Animals::Fox'
operator<<(basic_ostream< _CharT, _Traits>& __os,
^
/Applications/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/include/c++/v1/ostream:1082:1: note: candidate template ignored: could not match 'unique_ptr<type-parameter-0-2, type-parameter-0-3>' against 'Animals::Fox'
operator<<(basic_ostream< _CharT, _Traits>& __os, unique_ptr< _Yp, _Dp> const& __p)
^
```

Recommendations for Specifying “Hidden Friends”

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Audience: Authors/reviewers of standard library wording
Reply to: Walter E. Brown <webrown.cpp@gmail.com>
Daniel Sunderland <dsunder@sandia.gov>

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Abstract

This paper proposes wording to be used by proposal authors who wish to specify a non-member function as a *hidden friend*.

Everything is made of one hidden stuff.
— RALPH WALDO EMERSON

Good merchandise, even hidden, soon finds buyers.
— PLAUTUS

DXXXR0

Nodecl(bool) - The Independence of Declaration

Draft Proposal, 2019-04-01

This version:

<https://atomgalaxy.github.io/isocpp-nodecl-bool/isocpp-nodecl-bool.html>

Authors:

- Gašper Ažman <gasper.azman@gmail.com>
- Timur Doumler <papers@timur.audio>
- Christopher DiBella <cjdb.ns@gmail.com>
- Phil Nash <isocpp@philnash.me>

Audience:

EWG

2019-04-01

**[https://github.com/atomgalaxy/
isocpp-nodecl-bool](https://github.com/atomgalaxy/isocpp-nodecl-bool)**