

CSE 333

Mini-lecture 13 - revisiting references

Hal Perkins

Department of Computer Science & Engineering

University of Washington



∃ confusion about references

When should they be used?

as arguments?

as return values?

When can using them cause trouble?

Let's go through examples

I'll show you some code, you tell me whether:

we must use a reference

it's OK and encouraged to use a reference

it's OK but discouraged to use a reference

we must NOT use a reference

see `arg1.cc`

arg1.cc

we must use a reference

it's OK and encouraged to use a reference

(c) it's OK but discouraged to use a reference

we must NOT use a reference

For simple primitive types (int, float, etc.), passing in a const reference results in a correct program, but the performance benefit is questionable.

see `arg2.cc`

arg2.cc

we must use a reference

(b) it's OK and encouraged to use a reference

it's OK but discouraged to use a reference

we must NOT use a reference

For complex types (structs, object instances), passing in a const reference results in a correct program and likely gives you some performance benefits.

pop quiz: why not pass in a pointer instead?

see ret1.cc

ret1.cc

we must use a reference

it's OK and encouraged to use a reference

it's OK but discouraged to use a reference

(d) we must NOT use a reference

Never return a reference to a local (stack allocated) variable; it's the same error as returning a pointer to one.

see Complex1.h

Complex1.h

(a) we must use a reference

it's OK and encouraged to use a reference

it's OK but discouraged to use a reference

we must NOT use a reference

A copy constructor must have a reference parameter (that identifies it as a copy ctr). `const` could be omitted but is almost always used. It is correct, safe, and efficient.

see `Complex2.h`

Complex2.h

we must use a reference

it's OK and encouraged to use a reference

it's OK but discouraged to use a reference

(d) we must NOT use a reference

Because we don't want to return <a reference to *this>, but instead <a copy of a local variable>, we cannot use a reference in this case.

pop quiz: does chaining work if we correct the code?

see `Complex3.h`

Complex3.h

(a) we must use a reference

it's OK and encouraged to use a reference

it's OK but discouraged to use a reference

we must NOT use a reference

We must use a reference so chaining works correctly. It is also more efficient to use a reference.

pop quiz: why does chaining break if we don't use a reference? give an example of chained code that breaks.

see `Complex4.h`

Complex4.h

(a) we must use a reference

it's OK and encouraged to use a reference

it's OK but discouraged to use a reference

we must NOT use a reference

This is the same case as the plain assignment operator;
we must return a reference so that chaining works.

see `Complex5.h`

Complex5.h

(a) we must use a reference

it's OK and encouraged to use a reference

it's OK but discouraged to use a reference

we must NOT use a reference

This is the same case as the assignment operator; we must return a reference so that chaining works. More so, copying `std::cout` doesn't make sense (and is prevented)!

See you on Friday!