

# 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 Monday!