CSE 333
Mini-lecture 13 - revisiting references

Hal Perkins
Department of Computer Science & Engineering
University of Washington
Administrivia

Midterm on Friday
- Review in sections tomorrow
- Is there demand/need for a last-minute Q&A Thursday afternoon?

Next exercise and hw4 out by end of week
- exercise due Monday before class
- hw4 due two weeks from tomorrow
∃ 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:

(a) we must use a reference
(b) it’s OK and encouraged to use a reference
(c) it’s OK but discouraged to use a reference
(d) 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.

(a) we must use a reference
(b) it’s OK and encouraged to use a reference
(c) it’s OK but discouraged to use a reference
(d) we must NOT use a reference
see arg2.cc
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?

(a) we must use a reference

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

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

(d) we must NOT use a reference
see ret1.cc
ret1.cc

(a) we must use a reference
(b) it’s OK and encouraged to use a reference
(c) 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
A copy constructor must have a reference parameter (that identifies it as a copy constructor). const is optional but is good practice. It is correct, safe, and efficient.
see Complex2.h
Complex2.h

(a) we must use a reference
(b) it’s OK and encouraged to use a reference
(c) 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
(b) it’s OK and encouraged to use a reference
(c) it’s OK but discouraged to use a reference
(d) 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
(b) it’s OK and encouraged to use a reference
(c) it’s OK but discouraged to use a reference
(d) 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
(b) it’s OK and encouraged to use a reference
(c) it’s OK but discouraged to use a reference
(d) 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::cin doesn’t make sense (and is prevented)!
See you on Friday!