Inheritance (and Subtyping)

11-19-2001

Opening Discussion

- What did we talk about last class?
- Assignment #6 is due on Wednesday. Do you have any questions about it?
- We have talked a fair bit about types in C++, both the native types (int, double, etc.) and user defined types (classes and structs). Can you think of ways that we use "typing" that don't fit this simple mold?

Types with Pointers

- One of the most acute problems you are likely to encounter when writing assignment 6 is understanding the pointer syntax. The real key to this is understanding the types of different pointer expressions.
- Let's look quickly at some example declarations and expressions.

Subtype Relationships

▌ While you might not realize it, you have a multitude of subtype relationships stored in your head that you use each and every day.

   ▌ Bike wheels and wagon wheels are subtypes of wheels.

   ▌ SUVs and sedans are subtypes of automobiles.

   ▌ Trinity is a subtype of small liberal arts university which is a subtype of university.

Subtyping in Programs

▌ In programming, we have to formalize this notion of a subtype.

▌ If B is a subtype of A then any place you use an A you could use a B.

▌ This idea is standard across many programming languages and can be applied to all types of different things (including functions). We are only going to deal with it in the context of classes.

Subtyping in C++ - Inheritance

▌ C++ provides a way for you to state that a given class is a subtype of another class. This mechanism is called inheritance. When a class inherits from another class it gets all of the methods and members of the superclass.

▌ Taking full advantage of this we will get into later.

Using Subtyping

❚ For now we will consider a simple example use of subtyping. We have already seen one of these in class. Remember that by definition a subtype can be used any place a supertype would normally appear. So any time you have a pointer or reference to a type it could actually link to any subtype.

❚ We have seen this in parameter passing, but it also matters for data structures.

Minute Essay

❚ Do you understand the concept of a subtype. Is it at least reasonably clear how you declare them in code? Don't worry too much if not. You won't have to program with them for the last assignment (though you can).

❚ Wednesday I will be leaving right after class. You can turn in your assignments in my box in the CS office.