Inheritance and Subtyping

1-19-2011

Opening Discussion

- Minute Essay Comments
  - Switching editors. “:w” in your Eclipse files.
  - Autoformatting and being “helpful”.
  - The purpose of packages.
- Solutions to the IcP.

Special Methods

- apply
  - If you have an apply method, it will be called when you use an object in a function like syntax.
  - This is how you index into collections.
  - c(i) is the same as c.apply(i)
- update
  - Takes two arguments and gives you assignment into an index.
  - c(i)=o is the same as c.update(i,o)

More Special Methods

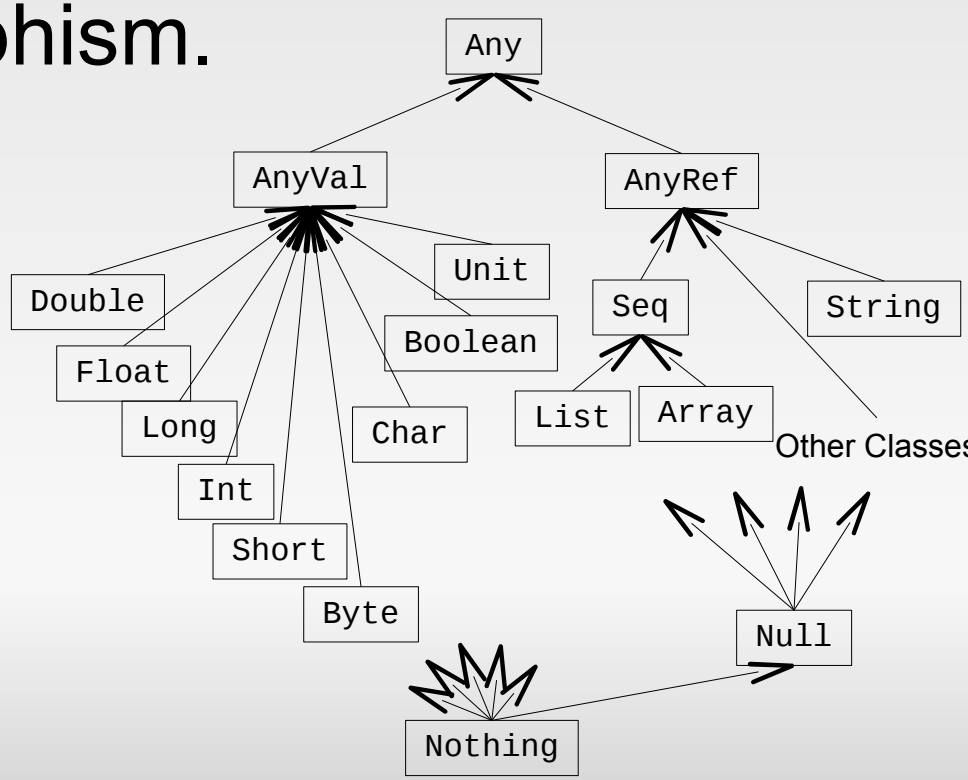
- Symbolic Operators
  - You can use symbolic method names.
  - If they take only one argument you can use them as operators.
- Property Assignment
  - A method name that ends in _= and takes a single argument is interpreted and creating an assignment to a member.
  - Public vars actually compile to a private var and an accessor method with an assignment method.

Polymorphism

- Literally this means many shapes.
- In programming it means many types.
- The code we wrote in the first semester was generally monomorphic. It worked for one type.
- Polymorphic code is much more powerful. You write it once and it works for lots of types.
- A lot of this semester and the benefit of OO is about abstraction and polymorphism.
- Universal polymorphism mean code can work with an infinite number of types.

Subtyping

- If type B is a subtype of type A, then anyplace in the code that requires type A, you can provide an object of type B.
- This gives us a form of Universal polymorphism called inclusion polymorphism.



Inheritance

- The way we get inheritance in Scala (and most class based OOPLs) is through inheritance.
- If B inherits from A it becomes a subtype of A.
- B also gets all the members (data and functions) of A. This is effectively why it is a subtype. Anything you could do to A you can do to B because B got it all from A.
- You can only inherit from one class and you do so with the extends keyword.
  - class B extends A { ... }

Overriding

- Part of the real power of inheritance comes from the fact that you can override methods.
- An overridden declaration is one in the subclass with the same name and type as the superclass. Methods need to match arguments as well.
- You must label overriding members with the keyword override. We did this for paint last semester.
- toString is a good method to override.

Minute Essay

- Questions?
- If you use a local copy of the book, remember to pull it down occasionally so you get updates.