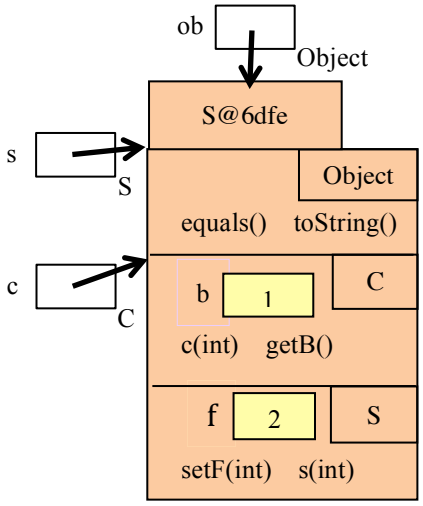
Compile-time reference rule

Consider the object drawn to the right. It's an object of class S, which is declared as a subclass of class C. Three different variables contain a pointer to this object: s, c, and ob. They were declared like this:




```
Object ob;
C c;
S s;
```

They point at the same object, but because of how the variables were declared, each looks at the object differently:

Variable ob views it as an Object.

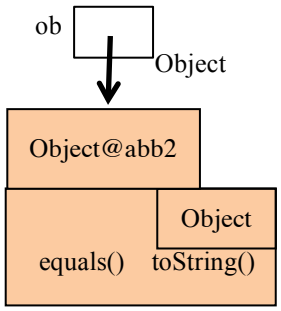
Variable c views it as a C.

Variable s views it as an S.

Now note that execution of the assignment

```
ob= new Object();
```

will change variable ob to point to an object of class Object, as shown to the right. Consider a call ob.c(5). With ob pointing at this object of class Object, there is no method to call!



The Java developers wanted to ensure that such a situation could never happen at runtime. They wanted to ensure that a call like ob.c(5) would compile only if it was *guaranteed* that method c is *always* available at runtime. To ensure this property, they imposed this reference rule:

Compile-time reference rule. For a variable p declared as

```
P p;
```

The variable reference p.v (or method call p.m(…)) is syntactically correct and can be compiled only if v (or method m) is declared in P or is inherited by P.

Examples

ob.equals(…) and ob.toString() are syntactically correct.

ob.b, ob.c(5), ob.getB(), ob.f, ob.setF(5) and ob.s(int) are syntactically incorrect and will not compile.

c.equals(…), c.toString(),c.b, c.c(5), and c.getB() are syntactically correct.

c.f, c.setF(5), and c.s(int) are syntactically incorrect and will not compile.

s.equals(…), s.toString(), s.b, s.c(5), s.getB(), s.f, s.setF(5), and s.s(int) are syntactically correct.

Please remember that this reference rule is a syntactic rule, to be checked at compile-time, and the program will not compile if some variable or method reference violates this rule.