10.6 Allowed Assignments Between Superclass and Subclass Variables

Now that you've seen a complete application that processes diverse subclass objects *polymorphically*, we summarize what you can and cannot do with superclass and subclass objects and variables. Although a subclass object also *is a* superclass object, the two classes are nevertheless different. As discussed previously, subclass objects can be treated as objects of their superclass. But because the subclass can have additional subclass-only members, assigning a superclass reference to a subclass variable is not allowed without an *explicit cast*—such an assignment would leave the subclass members undefined for the superclass object.

We've discussed three proper ways to assign superclass and subclass references to variables of superclass and subclass types:

1. Assigning a superclass reference to a superclass variable is straightforward.
2. Assigning a subclass reference to a subclass variable is straightforward.
3. Assigning a subclass reference to a superclass variable is safe, because the subclass object *is an* object of its superclass. However, the superclass variable can be used to refer *only* to superclass members. If this code refers to subclass-only members through the superclass variable, the compiler reports errors.