8.3 Controlling Access to Members

The access modifiers `public` and `private` control access to a class's variables and methods. In Chapter 9, we'll introduce the additional access modifier `protected`. The primary purpose of `public` methods is to present to the class's clients a view of the services the class provides (i.e., the class's `public` interface). Clients need not be concerned with how the class accomplishes its tasks. For this reason, the class's `private` variables and `private` methods (i.e., its *implementation details*) are *not* accessible to its clients.

Figure 8.3 demonstrates that `private` class members are *not* accessible outside the class. Lines 7–9 attempt to access the `private` instance variables `hour`, `minute` and `second` of the `Time1` object `time`. When this program is compiled, the compiler generates error messages that these `private` members are not accessible. This program assumes that the `Time1` class from Fig. 8.1 is used.

```
      1   // Fig. 8.3: MemberAccessTest.java
2   // Private members of class Time1 are not access
       3   public class MemberAccessTest {
 4      public static void main(String[] args) {
5          Time1 time = new Time1(); // create and in
                          6
7          time.hour = 7; // error: hour has private
```

```
 8          time.minute = 15; // error: minute has pri
 9          time.second = 30; // error: second has pri
10       }
11    }
```

```
MemberAccessTest.java:7: error: hour has private acce
     time.hour = 7; // error: hour has private access
                  ^
MemberAccessTest.java:8: error: minute has private ac
     time.minute = 15; // error: minute has private a
                  ^
MemberAccessTest.java:9: error: second has private ac
     time.second = 30; // error: second has private a
                  ^
3 errors
```

Fig. 8.3

Private members of class `Time1` are not accessible.

Common Programming Error 8.1

An attempt by a method that's not a member of a class to access a `private` *member of that class generates a compilation error.*