

# 21

*Classes and Packages*

## Self-review Questions

21.1 In the class `Blah`:

```
class Blah {  
    public String hello = "hello" ;  
    public final String world = "world" ;  
    protected int count = 0 ;  
    private float length = 2.345f ;  
    long size = 123432L ;  
}
```

Why is the `length` variable completely redundant?

The field `length` is private and is not used in the public or protected interface. This means the field cannot ever be accessed. If there were methods then we would need check whether the field was used in the methods, but as there are only field defined in this class and private fields are useless.

21.2 Why are the cast expressions necessary in the first two calls of `max` in the `Methods2` program?

21.3 What happens if the following calls had existed in `Methods2`?

```
maxObject.max ( 3.0 , 5 ) ;  
maxObject.max ( 3 , 3L ) ;  
maxObject.max ( 3.4f , 5.0 ) ;
```

21.4 In program `Class2` each `max` method is identical except for the type name used. Is it possible to write a single `max` method that will work for any of the integral types? If it is possible, would you use the single method?

21.5 Explain why the statement `s2.f ( )` in `StaticMethods2` is legal.

21.6 Work through the execution of program `MemberClass2` as a pencil and paper exercise to determine how it works. What does the program display?

21.7 What does the `MemberClass3` program display?

## Programming Exercises

- 21.1** Write a class to represent complex numbers, where the real and imaginary parts are represented by double values. Provide at least two constructors for creating complex number objects and implement the basic operations of addition and subtraction.