A class (or class definition, or class declaration) is a blueprint that describes the contents of each object of the class. To the right is a definition of class C. Use it as a first model for any class that you write. We explain its pieces.

Keyword **public** is an access modifier. It indicates that all parts of a program can access class C. The first brace { and last brace } delimit the body of the class. The body contains two declarations:

- A declaration of variable b. It is called a field of the class. Access modifier **private** indicates that this field can be accessed or referenced only from within objects of this class, not from outside the class.
- A declaration of function getB. It is **public**, so it can be referenced or called from outside the class. It returns an int value. Its body, delimited by { and }, contains the statement return b;.

The order of the declarations in a class doesn’t matter at all, but, the convention is to place the field declarations first, then constructors, then getter methods, then setter methods, and then others. This is a guideline, not a requirement.

Above, we said that the class is a blueprint that describes the contents of each object of the class. To the right we draw an object of the class, based on this blueprint. It looks like a manila folder. The tab at the top contains the name of, or a pointer to, the object itself. The tab contains (1) the name of the class, (2) @, and (3) an integer written in hexadecimal. When we draw an object, we put any integer we want after @ to distinguish it from other objects. When a computer creates the object during program execution, it puts the address in memory of the object, written in hexadecimal.

We put a small box with the class name in the upper right. The class definition contains a declaration of field b. Therefore, variable b is in the object; here, it happens to contain the value 1.

The class definition contains a declaration of method getB. Therefore, method getB is in the object. We write only the method signature “getB()”, but actually the whole method is there, and instead of getB() we might write:

getB() {...} or getB() { return b; }

Thus, every object of class C contains all the fields and methods that are declared in class C.

Note: Generally, a public class C that you write is placed in a file C.java and stored on your hard drive.

**Subclasses and superclasses**

To the right is a declaration of another class S. It is different from the declaration of C in that it has an extends clause,

extends C

Thus, an object of class S contains not only declared te fields and methods but also all the fields and methods of class C. Here is some terminology:

- S is a subclass of C.
- C is a superclass of S.
- Subclass S inherits all fields and methods of superclass C.

We draw an object of class S to the right. Now there are two partitions, a partition for the components (fields and methods) declared in class C and a partition for the components declared in class S. The partition for S appears under the partition for C since S is the subclass and C is the superclass.

The declaration of a subclass is a great way to use previously written code. With just the introduction of “extends C”, we get to use all that C has to offer. This is a major feature of object-oriented programming.
Class definition / declaration

Class Object, the superest class of them all

Java has a predeclared class Object, in package java.lang. Any class that does not explicitly extend another class automatically extends class Object. Since class C declared on the previous page does not explicitly extend another class, it automatically extends Object.

Therefore, the objects of class C and S on the previous page should be drawn as shown below. Note that object S@2 has three partitions: the top one for superclass Object, the middle one for its subclass C, and the lower one for C’s subclass S.

However, to reduce clutter, when there is no reason to draw attention to class Object, we may omit its partition. Object has no superclass above it, so we call it the superest class of them all.

Class Object declares about 11 methods. The objects below show the two you will learn about first: equals() and toString(). They are discussed elsewhere.