9 Functions

If you have a procedure with ten parameters, you probably missed some.

We saw in Chapter 2 that a function is simply a series of statements that have been grouped together and given a name. Although the term "function" comes from mathematics, C functions don't always resemble math functions. In C, a function doesn't necessarily have arguments, nor does it necessarily compute a value. (In some programming languages, a "function" returns a value, whereas a "procedure" doesn't. C lacks this distinction.)

Functions are the building blocks of C programs. Each function is essentially a small program, with its own declarations and statements. Using functions, we can divide a program into small pieces that are easier for us—and others—to understand and modify. Functions can take some of the tedium out of programming by allowing us to avoid duplicating code that's used more than once. Moreover, functions are reusable: we can take a function that was originally part of one program and use it in others.

Our programs so far have consisted of just the `main` function. In this chapter, we'll see how to write functions other than `main`, and we'll learn more about `main` itself. Section 9.1 shows how to define and call functions. Section 9.2 then discusses function declarations and how they differ from function definitions. Next, Section 9.3 examines how arguments are passed to functions. The remainder of the chapter covers the `return` statement (Section 9.4), the related issue of program termination (Section 9.5), and recursion (Section 9.6).

9.1 Defining and Calling Functions

Before we go over the formal rules for defining a function, let's look at three simple programs that define functions.