26 Miscellaneous Library Functions

It is the user who should parametrize procedures, not their creators.

—Alan Perlis

<stdarg.h>, <stdlib.h>, and <time.h>—the only C89 headers that weren't covered in previous chapters—are unlike any others in the standard library. The <stdarg.h> header (Section 26.1) makes it possible to write functions with a variable number of arguments. <stdlib.h> (Section 26.2) is an assortment of functions that don't fit into one of the other headers. The <time.h> header (Section 26.3) allows programs to work with dates and times.

26.1 The <stdarg.h> Header: Variable Arguments

```
type va_arg(va_list ap, type);
void va_copy(va_list dest, va_list src);
void va_end(va_list ap);
void va_start(va_list ap, parmN);
```

Functions such as printf and scanf have an unusual property: they allow any number of arguments. The ability to handle a variable number of arguments isn't limited to library functions, as it turns out. The <stdarg.h> header provides the tools we'll need to write our own functions with variable-length argument lists. <stdarg.h> declares one type (va_list) and defines several macros. In C89, there are three macros, named va_start, va_arg, and va_end, which can be thought of as functions with the prototypes shown above. C99 adds a function-like macro named va_copy.

C99