Chapter 2

Introduction to the C++ Language

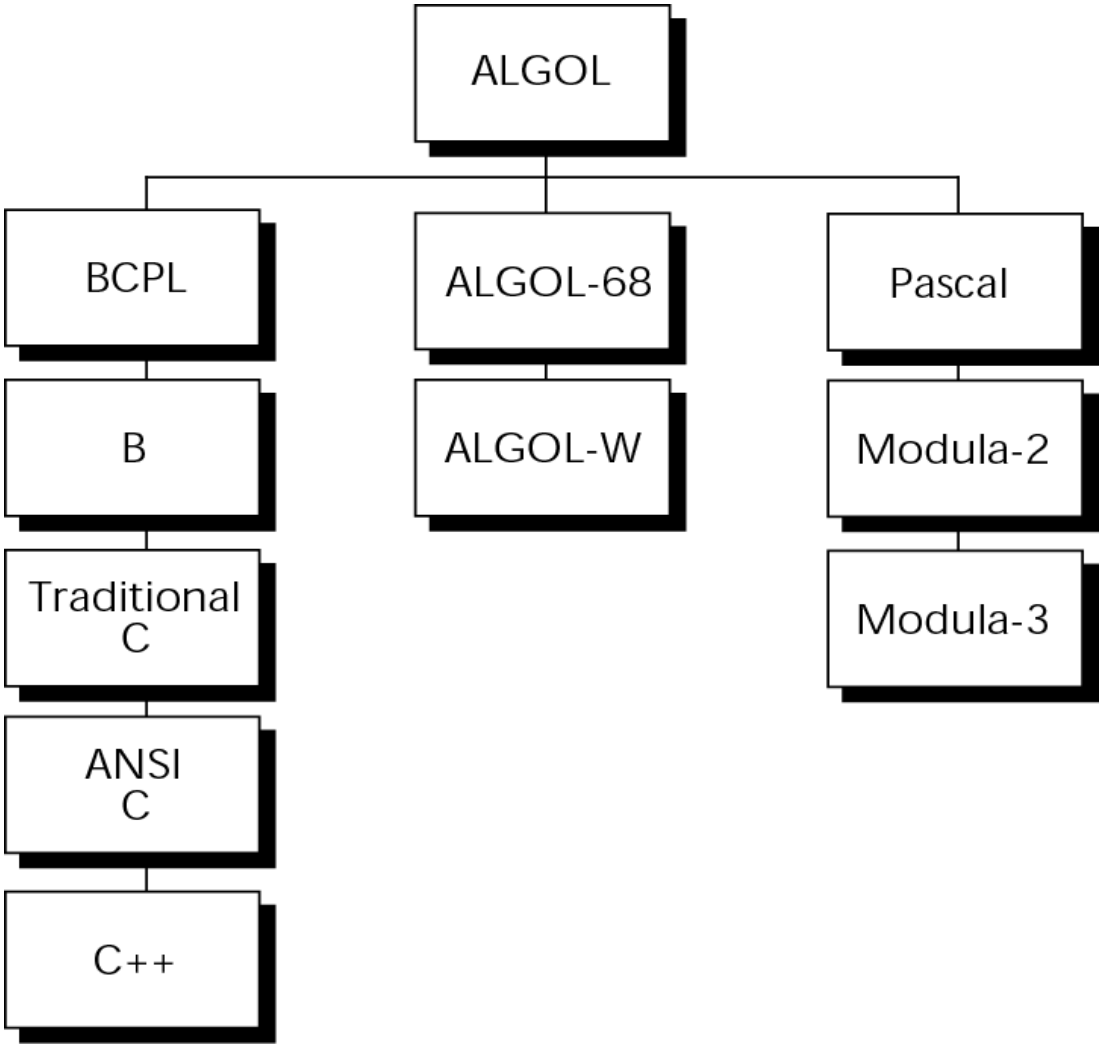
OBJECTIVES

After studying this chapter you will be able to:

- **Identify the basic components of a C++ function.**
- **Identify and use the standard C++ data types.**
- **Identify and use the four kinds of C++ constants.**
- **Differentiate between literal, as defined, and memory constants.**
- **Define and use variables.**
- **Read data from the keyboard and output data to the console.**
- **Add comments to a program as a form of inline documentation.**
- **Create "intelligent" names to make programs easier to read and understand.**

BACKGROUND

Figure 2-1 Taxonomy of the C++ language



C++ PROGRAMS

Figure 2-2 Structure of a C++ program

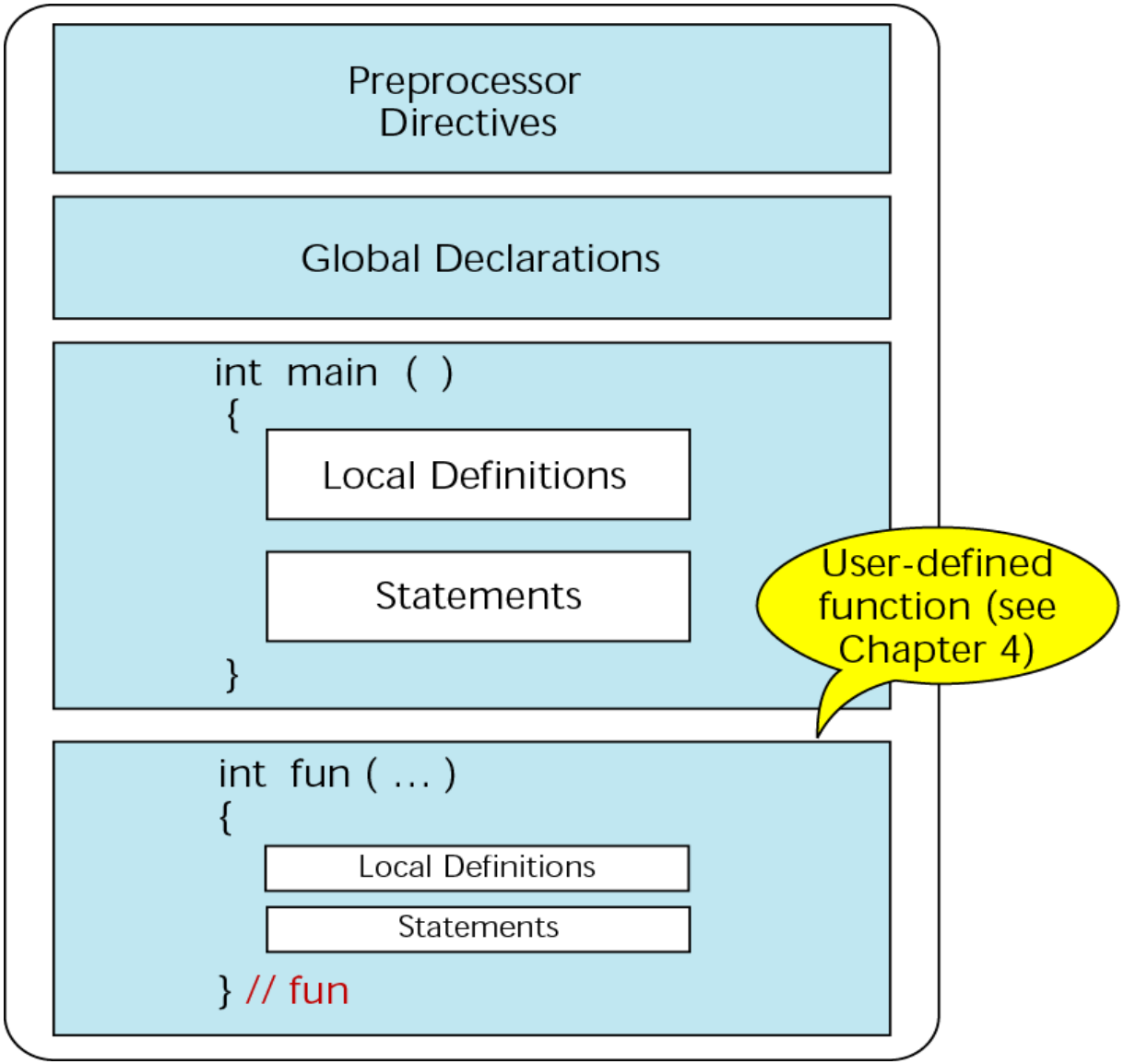


Figure 2-3 The greeting program

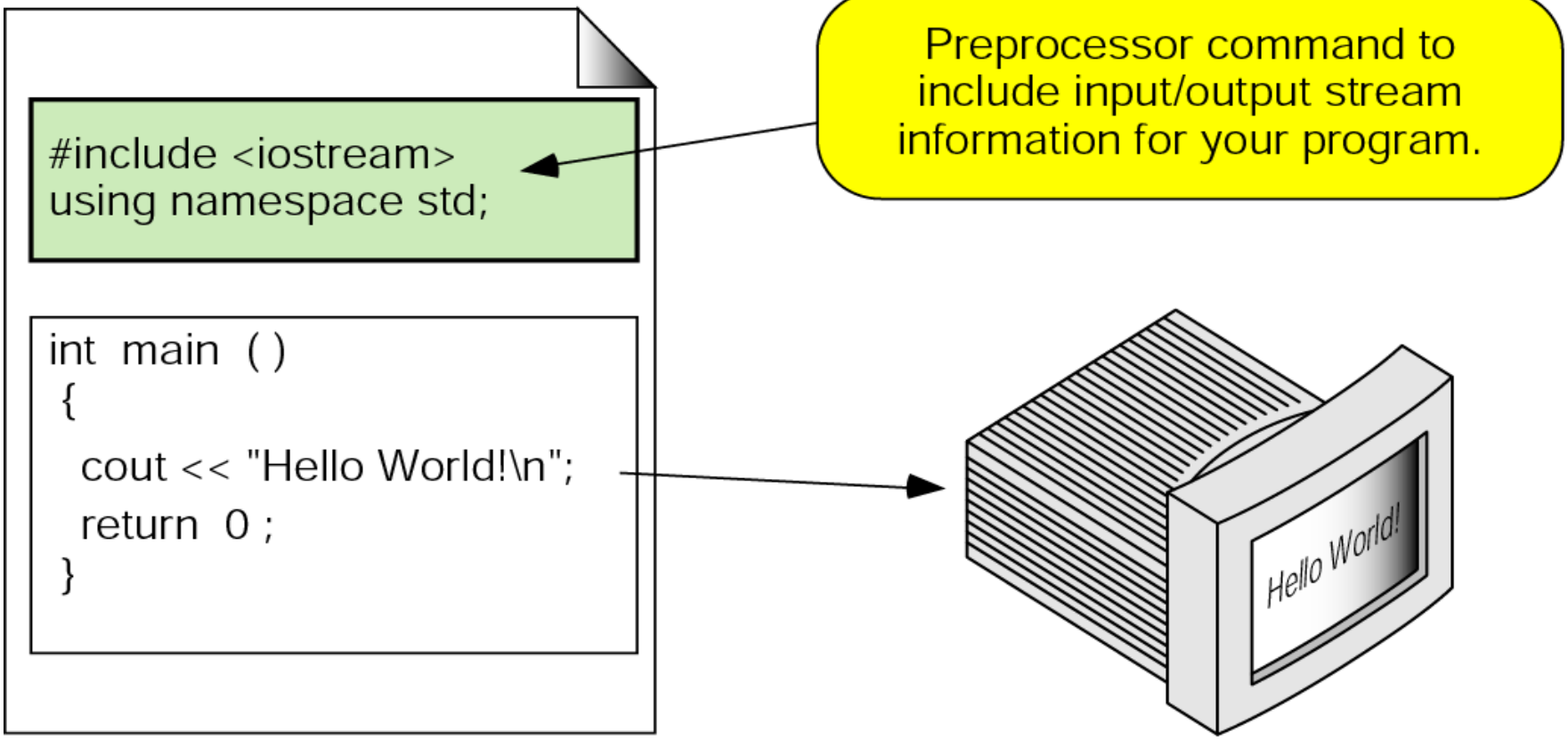
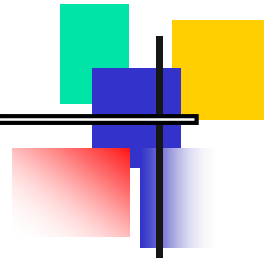


Figure 2-4 Examples of comments

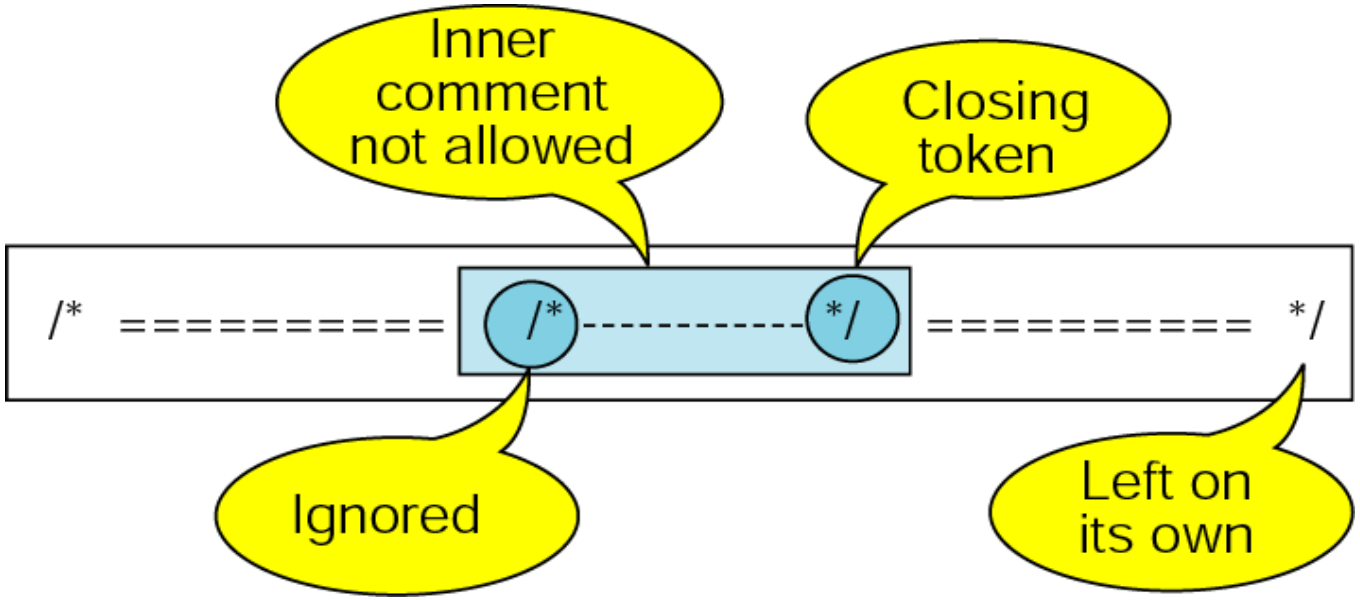


```
// This is a single line comment.

/* This is a comment that
   covers two lines.                    */

/*
** It is a very common style to put the opening token
** on a line by itself, followed by the documentation
** and then the closing token on a separate line. Some
** programmers also like to put asterisks at the beginning
** of each line to clearly mark the comment.
*/
```

Figure 2-5 Nested block comments are invalid



IDENTIFIERS

DATA TYPES

Figure 2-6 Standard data types

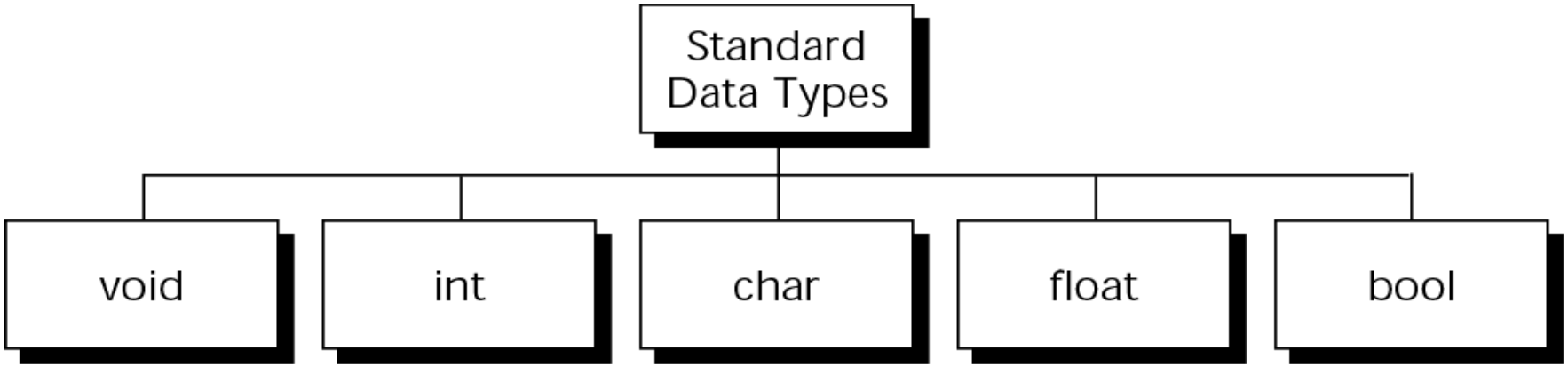
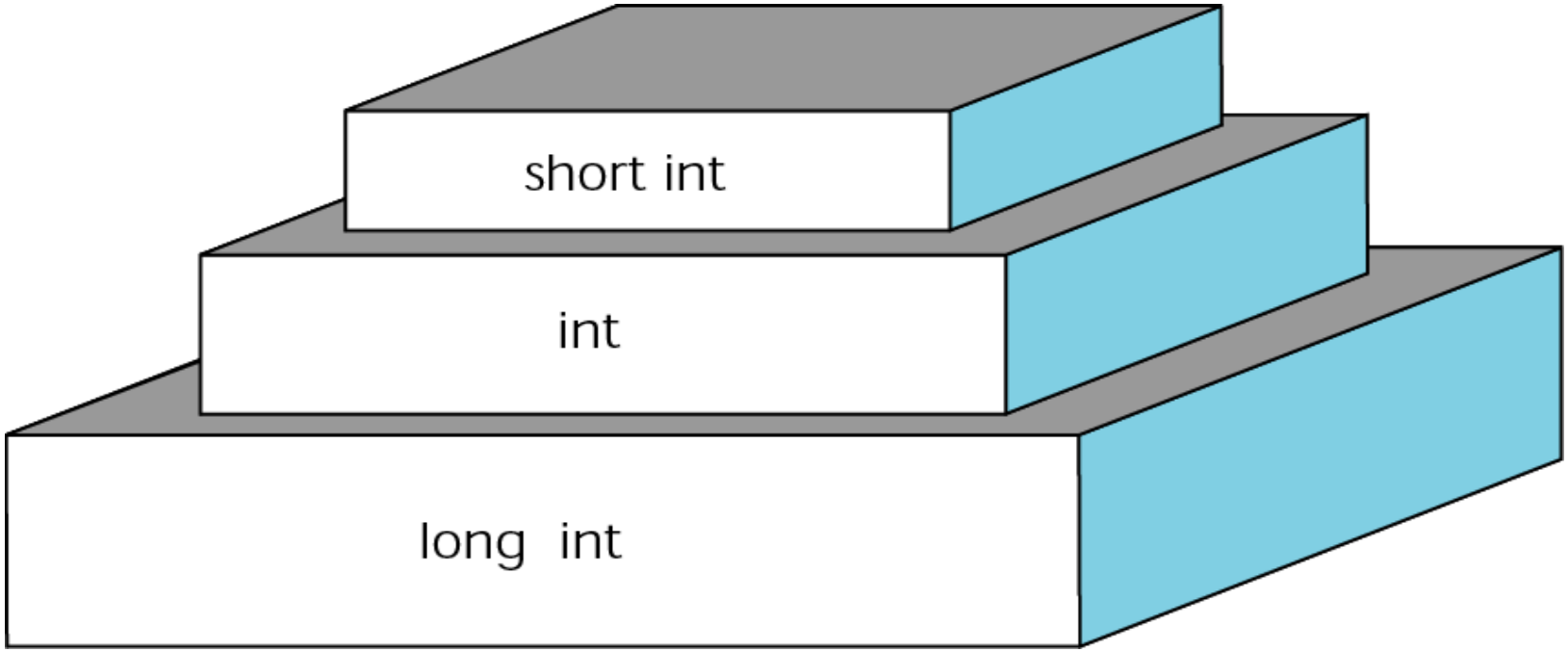


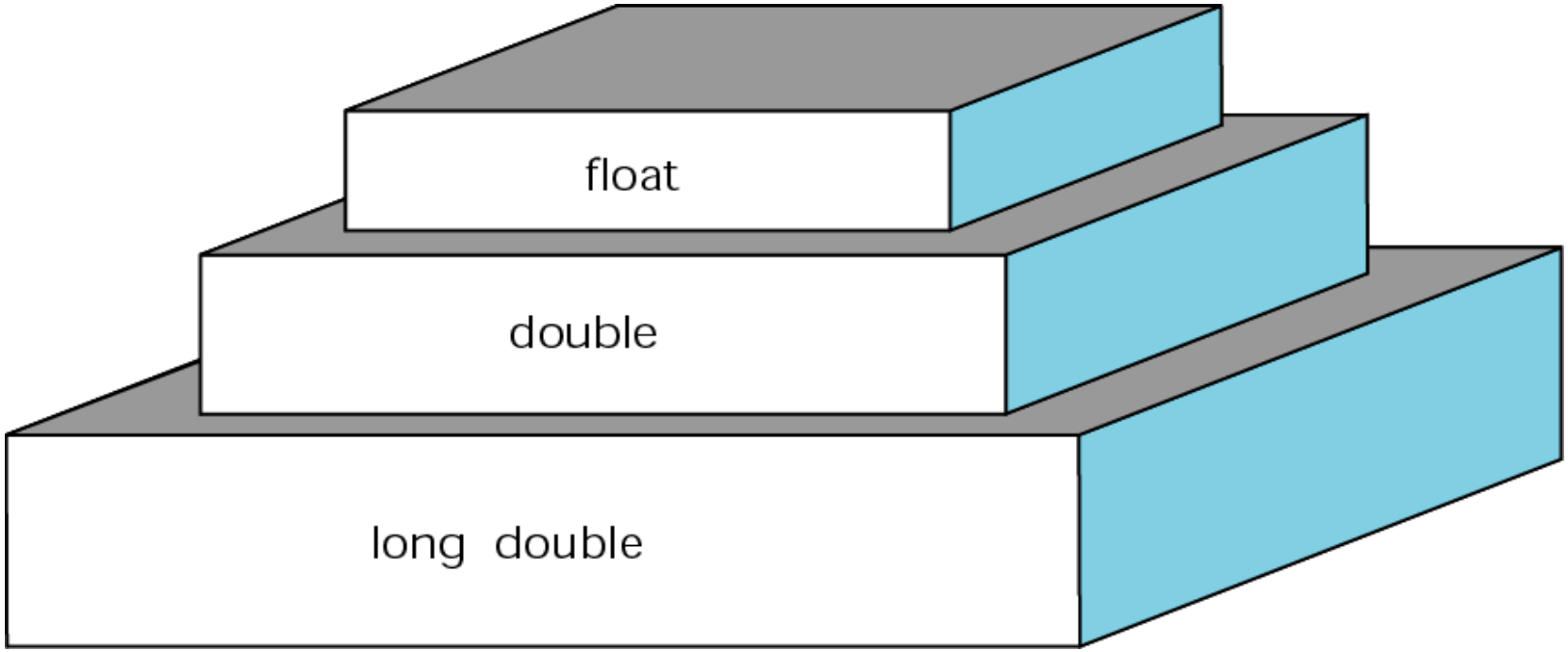
Figure 2-7 Integer types



Note:

A character in C++ can be interpreted as a small integer (between 0 and 255). For this reason, C++ often treats a character like an integer.

Figure 2-8 Floating-point types

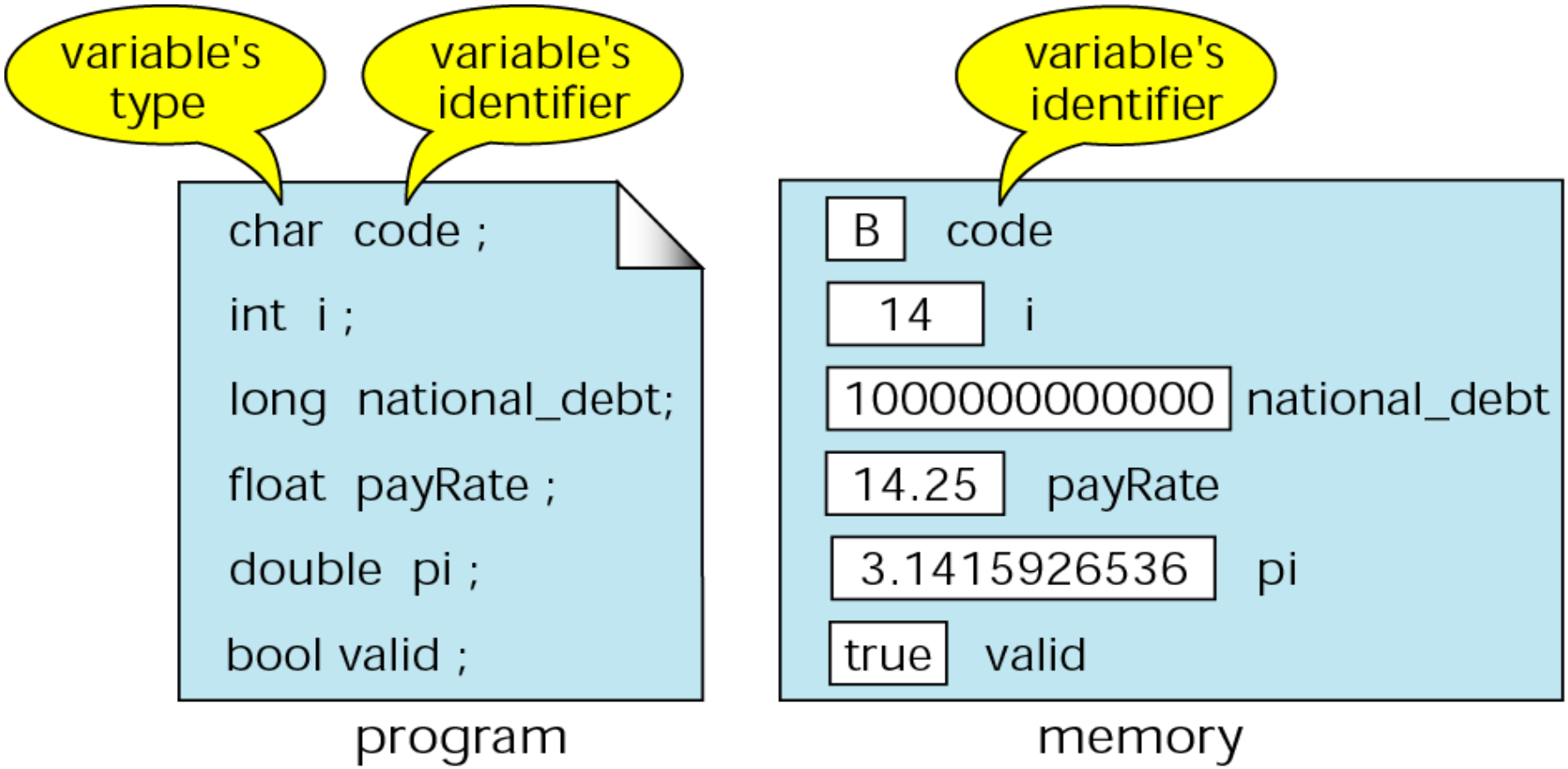


Note:

In C++ the Boolean constants are true and false. Additionally, following traditional standards, any nonzero number is considered true, and zero is considered false.

Variables

Figure 2-9 Variables in memory



Note:

When a variable is defined, it is not initialized. The programmer must initialize any variable requiring prescribed data when the function starts.

CONSTANTS

Note:

A character constant is enclosed in single quotes.

Note:

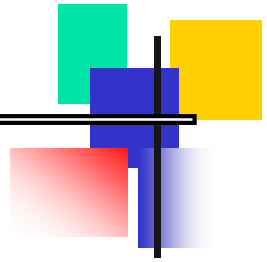
Use single quotes for character constants.

Use double quotes for string constants.

Note:

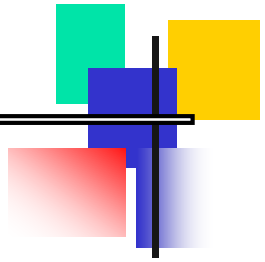
The only bool types constants are true, printed as 1, and false, printed as 0.

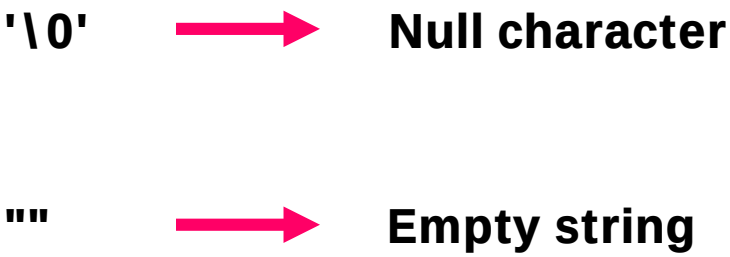
Figure 2-10 Some strings



```
""                                  // A null string
"h"
"Hello World!\n"
"HOW ARE YOU?"
"Good Morning!"
"'Good' Morning!"                   // 'Good' Morning
"\"Good\" Morning!"                 // "Good" Morning
```

Figure 2-11 Null characters and null strings





CODING CONSTANTS

Reading and Writing Data

Note:

Keyboards and monitors handle data only as a sequence of characters.

Note:

The standard streams are created automatically and connected to appropriate devices when a program starts.

Figure 2-12 Standard streams

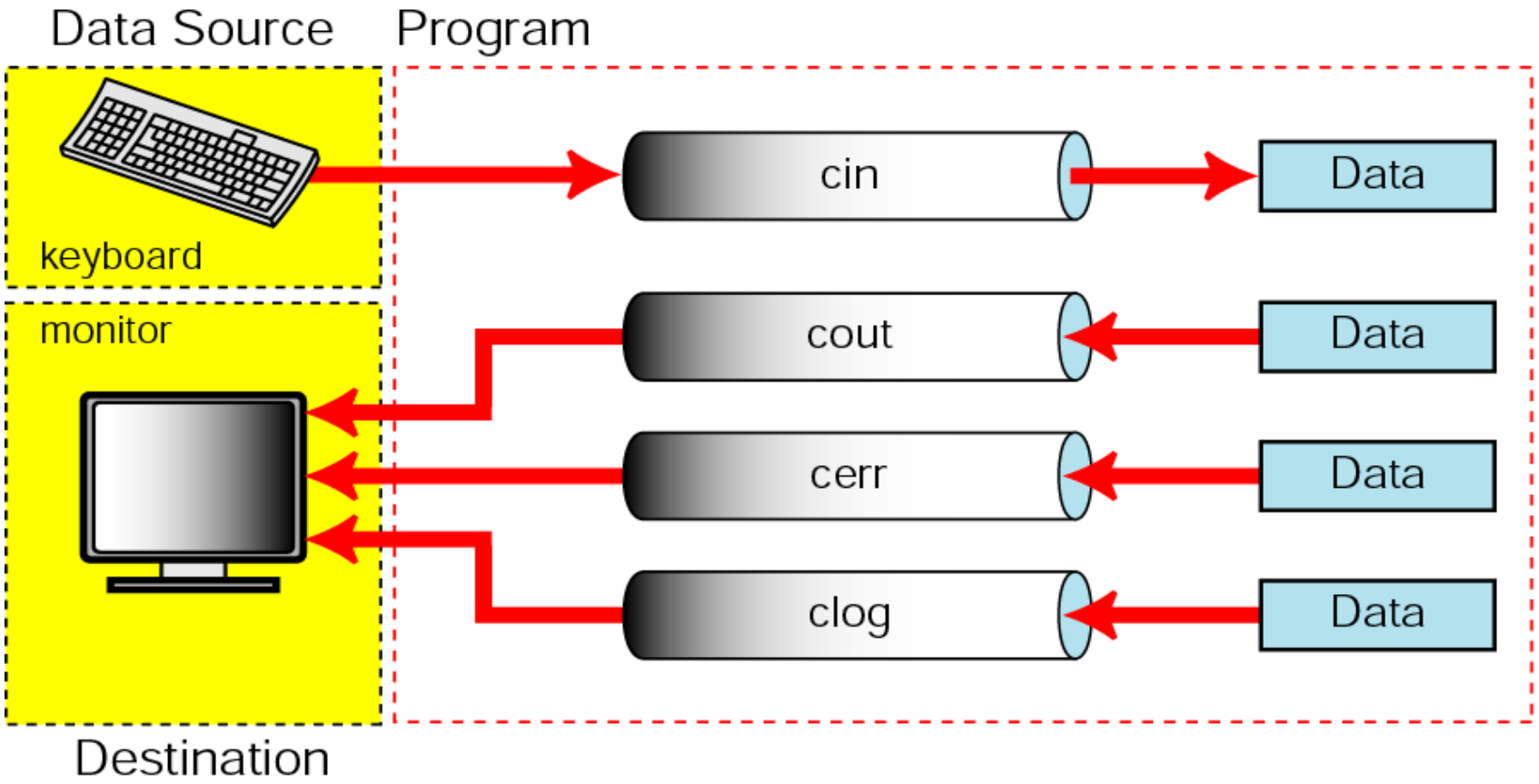
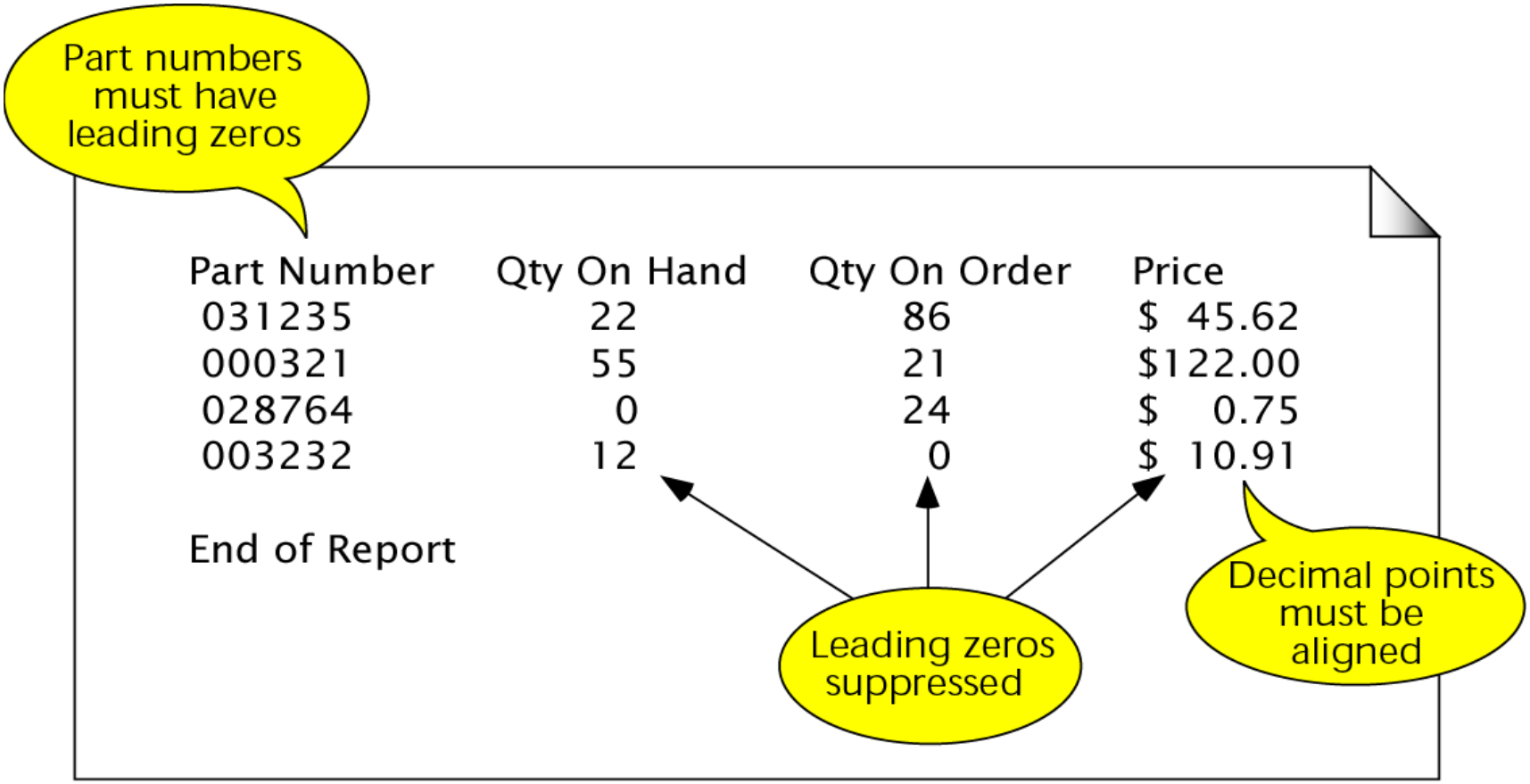


Figure 2-13 Output specifications for inventory report



PROGRAMMING EXAMPLES

SOFTWARE ENGINEERING AND PROGRAMMING STYLE

Note:

Programming Standard

No variables are to be placed in the global area of a program.