Q: Is it legal for a function £1 to call a function £2, which then calls £1?

A: Yes. This is just an indirect form of recursion in which one call of £1 leads to another. (But make sure that either £1 or £2 eventually terminates!)

Exercises

Section 9.1

1. The following function, which computes the area of a triangle, contains two errors. Locate the errors and show how to fix them. (*Hint:* There are no errors in the formula.)

   ```
   double triangle_area(double base, height)
   double product;
   {
     product = base * height;
     return product / 2;
   }
   ```

⓪ 2. Write a function check(x, y, n) that returns 1 if both x and y fall between 0 and $n - 1$, inclusive. The function should return 0 otherwise. Assume that x, y, and n are all of type int.

3. Write a function gcd(m, n) that calculates the greatest common divisor of the integers m and n. (Programming Project 2 in Chapter 6 describes Euclid's algorithm for computing the GCD.)

⓪ 4. Write a function day_of_year(month, day, year) that returns the day of the year (an integer between 1 and 366) specified by the three arguments.

5. Write a function num_digits(n) that returns the number of digits in n (a positive integer). *Hint:* To determine the number of digits in a number n, divide it by 10 repeatedly. When n reaches 0, the number of divisions indicates how many digits n originally had.

⓪ 6. Write a function digit(n, k) that returns the kth digit (from the right) in n (a positive integer). For example, digit(829, 1) returns 9, digit(829, 2) returns 2, and digit(829, 3) returns 8. If k is greater than the number of digits in n, have the function return 0.

7. Suppose that the function £ has the following definition:

   ```
   int f(int a, int b) { ... }
   ```

   Which of the following statements are legal? (Assume that i has type int and x has type double.)

   (a) i = f(83, 12);
   (b) x = f(83, 12);
   (c) i = f(3.15, 9.28);
   (d) x = f(3.15, 9.28);
   (e) f(83, 12);

Section 9.2

⓪ 8. Which of the following would be valid prototypes for a function that returns nothing and has one double parameter?

   (a) void f(double x);