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Chapter 5

Pages 233 – 237

R5.1, 2, 4, 5, 7, 8, 9, 12 (parts e, f, g), 17, 20

Chapter 5 Written Homework

R5.1 What is the difference between an argument and a return value? How many arguments can a function have? How many return values?

There can be multiple arguments for a function, but a function can only return one value. How to differentiate return values and arguments are that arguments are the values you input into the function, whereas the return value is what the function returns to you.

R5.2 In which sequence are the lines of the program cube.cpp on page 198 executed, starting with the first line of main?

1. 18
2. 10-14 (cube_volume(2))
3. 19
4. 10-14 (cube_volume(10))
5. 20 (prints out result1)
6. 21 (prints out result2)

R5.4 True or false?

a. A function has exactly one return statement.
   False
b. A function has at least one return statement.
   False
c. A function has at most one return value.
   True
d. A function with return value void never has a return statement.
   True
e. When executing a return statement, the function exits immediately.
   True
f. A function with return value void must print a result.
   False
g. A function without arguments always returns the same value.
   True

R5.5 Consider these functions:

```
double f(double x) { return g(x) + sqrt(h(x)); }
double g(double x) { return 4 * h(x); }
double h(double x) { return x * x + k(x) - 1; }
double k(double x) { return 2 * (x + 1); }
```

Without actually compiling and running a program, determine the results of the following function calls:

a. double x1 = f(2);
   x1 = 39
b. double x2 = g(h(2));
   x2 = 400
c. double x3 = k(g(2) + h(2));
   x3 = 92
d. double x4 = f(0) + f(1) + f(2);
   x4 = 62
e. double x5 = f(-1) + g(-1) + h(-1) + k(-1);
   x5 = 0

R5.7 Design a function that prints a floating-point number as a currency value (with a $ sign and two decimal digits).

a. Indicate how the programs ch02/volume2.cpp and ch04/invtable.cpp should change to use your function.
   The value of volume2 would not change, as the precision is already set. There will just be a $ added at the beginning. Invtable would just be changed to have a $ at the beginning,as it already has set precision.
b. What change is required if the programs should show a different currency, such as euro?
   There would be no change required, as euros will also be counted with two decimal points, except the fact that they count for different values of money.

R5.8 For each of the variables in the following program, indicate the scope. Then determine what the program prints, without actually running the program.

Scopes:

- a: entire program
- b: entire program
- c: int f(), int g()
- n: int f(), int g()
- i: main()

Program prints 3

R5.9 We have seen three kinds of variables in C++: global variables, parameter variables, and local variables. Classify the variables of Exercise R5.8 according to these categories.

- Global variables: a, b
- Parameter variables: c
- Local variables: n, i

R5.12 Perform a walkthrough of the int_name function with the following arguments:

e. 324, three hundred twenty four

f. 0, only works for numbers greater than 0

g. -2, only works for numbers greater than 0

R5.17 Consider the following function that is intended to swap the values of two integers:

```
void false_swap2(int a, int b)
{
    int temp = a;
    a = b;
    b = temp;
}
int main()
{
    int x = 3;
    int y = 4;
    false_swap2(x, y);
    cout << x << " " << y << endl;
    return 0;
}
```

Why doesn't the function swap the contents of x and y? How can you rewrite the function to work correctly?

This function doesn't work due to the fact that there is nothing returned due to the false_swap2 function, and that the values that are swapped are not returned to x and y.

R5.20 Give pseudocode for a recursive function that sorts all letters in a string. For example, the string "goodbye" would be sorted into "bdegooy".

If string length is equal to 0 return string

Else return function(substring starting from 1 plus 0)