

Homework

Exercise 1

The hexadecimal digits are the ordinary, base-10 digits '0' through '9' plus the letters 'A' through 'F'. In the hexadecimal system, these digits represent the values 0 through 15, respectively. A hexadecimal integer is a sequence of hexadecimal digits, such as 34A7, FF8, 174204, or FADE.

Write first a static function named `hexValue` that finds and returns the hexadecimal value of a given character. The character is a parameter to the function. You should count lower case letters 'a' through 'f' as having the same value as the corresponding upper case letters. If the parameter is not one of the legal hexadecimal digits, return -1 as the value of the function.

Write then a static function `convHexDec` that converts `str`, a string containing a hexadecimal integer, into a base-10 integer. Of course, if `str` contains any characters that are not hexadecimal digits the conversion is not possible.

Finally, write a program that reads a string from the user. If all the characters in the string are hexadecimal digits, print out the corresponding base-10 value. If not, print out an error message.

Exercise 2

Write a static function that simulates rolling a pair of dice until the total on the dice comes up to be a given number. The number that you are rolling for is a parameter to the function. The number of times you have to roll the dice is the return value of the function. You can assume that the parameter is one of the possible totals: 2, 3, ..., 12.

Use your function in a program that computes and prints the number of rolls it takes to get 2 as the total showing on the dice.

Exercise 3

This exercise builds on the previous exercise. Every time you roll the dice repeatedly, trying to get a given total, the number of rolls it takes can be different. The question naturally arises, what's the average number of rolls? Write a function that performs the experiment of rolling to get a given total 10000 times. The desired total is a parameter to the subroutine. The average number of rolls is the return value. Each individual experiment should be done by calling the function you wrote for exercise 4.3. Now, write a main program that will call your function once for each of the possible totals (2, 3, ..., 12). It should make a table of the results, something like:

Total On Dice	Average Number of Rolls
2	35.8382
3	18.0607
.	.
.	.