Source File: `~/2336/01/lab01.(C|CPP|cpp|c++|cc|cxx|cp)`
Input: Standard Input
Output: Standard Output
Value: 2

The purpose of this assignment is to refamiliarize you with the Unix C++ programming environment and the method to be utilized when submitting an assignment for grading.

Multiplying the digits of an integer and continuing the process gives the surprising result that the sequence of products always arrives at a single-digit number. For example, 715 → 35 → 15 → 5, 88 → 64 → 24 → 8, 27 → 14 → 4, etc. The number of products necessary to reach the single-digit is called the ***persistence*** number of that integer. Thus, 715 and 88 have persistence 3, while 27 has persistence 2.

Write a program that will read an unknown number of `unsigned int`s from the standard input device (input can terminate when the end-of-data marker is encountered). For each input number, determine its persistence. In addition to printing the original number and its persistence, also print the intermediate products. The output should be formatted as shown below. The output should be directed to the standard output device.

A sample execution sequence is in Figure 1. To use the `Makefile` as distributed in class, add a target of `lab01` to `targets1srcfile`.

```
1  newuser@csunix ~> mkdir 2336
2  newuser@csunix ~> cd 2336
3  newuser@csunix ~/2336> cp /usr/local/2336/src/getlab.ksh .
4  newuser@csunix ~/2336> ./getlab.ksh 01
5    * Checking to see if a folder exists for Lab 01. . .No
6    * Creating a folder for Lab 01
7    * Checking to see if Lab 01 has sample input and output files. . .Yes
8    * Copying input and output files for Lab 01
9      from folder /usr/local/2336/data/01 to folder ./01
10   * Checking to see if /usr/local/2336/src/lab01main.C exists. . .No
11   * Checking to see if /usr/local/2336/include/lab01.h exists. . .No
12   * Copying file /usr/local/2336/src/Makefile to folder ./01
13   * Adding a target of lab01 to targets1srcfile
14   * Touching file ./01/lab01.cpp
15   * Edit file ./01/lab01.cpp in Notepad++
16 newuser@csunix ~/2336> cd 01
17 newuser@csunix ~/2336/01> ls
18 01.dat     01.out     Makefile   lab01.cpp
19 newuser@csunix ~/2336/01> make lab01
20 g++ -g -Wall -std=c++11 -c lab01.cpp -I/usr/local/2336/include -I.
21 g++ -o lab01 lab01.o -L/usr/local/2336/lib -lm -lbits
```

Figure 1. Commands to Compile, Link, & Run Lab 01 (Part 1 of 2)

```
newuser@csunix ~/2336/01> cat 01.dat
715
88
27
100
2147483647
2147483648
999
1234
12345
123456
1234567
12345678
123456789
1234567890
newuser@csunix ~/2336/01> cat 01.dat | ./lab01
Your Name - CS 2336 - Lab 01

715 -> 35 -> 15 -> 5 persistence = 3
88 -> 64 -> 24 -> 8 persistence = 3
27 -> 14 -> 4 persistence = 2
100 -> 0 persistence = 1
2147483647 -> 903168 -> 0 persistence = 2
2147483648 -> 1032192 -> 0 persistence = 2
999 -> 729 -> 126 -> 12 -> 2 persistence = 4
1234 -> 24 -> 8 persistence = 2
12345 -> 120 -> 0 persistence = 2
123456 -> 720 -> 0 persistence = 2
1234567 -> 5040 -> 0 persistence = 2
12345678 -> 40320 -> 0 persistence = 2
123456789 -> 362880 -> 0 persistence = 2
1234567890 -> 0 persistence = 1
newuser@csunix ~/2336/01> cat 01.dat | ./lab01 > my.out
newuser@csunix ~/2336/01> diff 01.out my.out
newuser@csunix ~/2336/01>
```

Figure 1. Commands to Compile, Link, & Run Lab 01 (Part 2 of 2)