



B-MAT-150

107transfer

Polytechnical Polynomials



Transfer

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binary name: : 107transfer

repository name: : 107transfer

repository rights: : ramassage-tek

language: : C, C++, perl 5, python 3.4, ruby 2.1, php 5.6, bash 4

group size: : 1-2

compilation (when necessary): : via Makefile, including re, clean and fclean rules



- Your repository shall contain the totality of your source files, but no useless file (binary, test files, obj files,...).
- All the bonus files (including a specific Makefile) shall be in a directory named *bonus*.
- Error messages have to be written on the error output, and the program should then exit with the 84 error code (0 if there is no error).

A laboratory is studying new electronic components to be integrated into its last generation chipset. Those components are entirely characterized by their transfer function, which determines frequency response ; this function computes a frequency into another frequency. The transfer functions of these components are defined by rational functions.

To perform the tests, the laboratory is used to using a quite complex software. Well, they used to : the software was so badly benchmarked, they decided to have a new one developed, and guess what, you are in charge of the optimization of the function computations.



You have to manage several components in cascade. In such a case, the transfer function of the set of components is the product of the transfer functions of each component.

A transfer function is here defined by two strings (one for the numerator, one for the denominator), composed by the polynomial coefficients split by the '*' sign.

For instance, "1*4*2*6*0*8" stands for $8x^5 + 6x^3 + 2x^2 + 4x + 1$.

Your program has to print the frequency responses of the component for the values from 0 to 1, by 0.001 steps.



Considering the context, too slow programs will be considered non functional. You'd better use a fast algorithm...



Terminal

```
~/B-MAT-150> ./107transfer -h
USAGE
    ./107transfer [num den]*

DESCRIPTION
    num    polynomial numerator defined by its coefficients
    den    polynomial denominator defined by its coefficients
```



Your program output has to be strictly identical to the one below.

Terminal

```
~/B-MAT-150> ./107transfer "0*1*2*3*4" "1" > file
~/B-MAT-150> head -n 12 file
0 -> 0.000000
0.001 -> 0.00100
0.002 -> 0.00201
0.003 -> 0.00302
0.004 -> 0.00403
0.005 -> 0.00505
0.006 -> 0.00607
0.007 -> 0.00710
0.008 -> 0.00813
0.009 -> 0.00916
0.01 -> 0.01020
0.011 -> 0.01125
~/B-MAT-150> tail file
0.991 -> 9.73282
0.992 -> 9.76223
0.993 -> 9.79171
0.994 -> 9.82126
0.995 -> 9.85087
0.996 -> 9.88056
0.997 -> 9.91031
0.998 -> 9.94014
0.999 -> 9.97003
1 -> 10.00000
```

Terminal

```
~/B-MAT-150> ./107transfer "0*0*9" "1*3*5" "2*4*6" "8*8*8" > file
~/B-MAT-150> head file
0 -> 0.000000
0.001 -> 0.000000
0.002 -> 0.000001
0.003 -> 0.000002
0.004 -> 0.000004
0.005 -> 0.000006
0.006 -> 0.000008
0.007 -> 0.000011
0.008 -> 0.000014
0.009 -> 0.000018
```