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VFMUL - Very Fast Multiplication

#simple-math ([/problems/tag/simple-math](#)) #big-numbers ([/problems/tag/big-numbers](#))
#karatsuba ([/problems/tag/karatsuba](#))

Multiply the given numbers.

Input

n [the number of multiplications ≤ 101]

$I1$ $I2$ [numbers to multiply (at most 300000 decimal digits each)]

Text grouped in [] does not appear in the input file.

Output

The results of multiplications.

Example

```
Input:
5
4 2
123 43
324 342
0 12
9999 12345

Output:
8
5289
110808
0
123437655
```

Warning: large Input/Output data, be careful with certain languages

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tarun_28 (/users/tarun_28): 2019-12-09 13:46:27

Got to know after 2 WA:

=>PyPy is faster than cpython.

=>Don't even think of using BigInteger class in JAVA



sagar_june97p (/users/sagar_june97p): 2019-01-10 08:04:02

My first FFT problem.



mindrolin (/users/mindrolin): 2018-11-25 13:56:09

If you use Python (both 2 and 3), choose PyPy interpreter if you don't want to get TLE



phoemur (/users/phoemur): 2018-10-14 04:21:49

In C++, even boost/multiprecision/cpp_int will TLE...

I solved using Fast Fourier Transform Convolution...

But mine is still inefficient with 0.50s runtime.

@rds_98 I don't know if it is OK to put the link here.
Just Google it...

Last edit: 2018-10-14 04:51:14



aneesh_k_14 (/users/aneesh_k_14): 2018-08-20 18:54:01

take pi = 3.14159265358979323846



rds_98 (/users/rds_98): 2018-07-28 14:36:30

Can someone Please put his/her solution to Github?



Charlie Yu (/users/charlie_yu): 2018-06-07 18:57:04

When you get AC easily with 10 lines of code in Python 3 but can't even past MUL with carefully tailored C++ code you wrote for 5 hours



aditya_rev (/users/aditya_rev): 2018-05-06 19:28:20

My 100th, and solved it with PYPY. Not happy at all:"(



mahilewets (/users/mahilewets): 2017-08-25 20:08:31

Use PyPy if you are Python

My Python 3.5 TLE code AC just after changing PyPy interpreter



bnzhaxx (/users/bnzhaxx): 2017-04-24 23:31:01

And BigInteger is slow slow slow slow slow...



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Added by: Darek Dereniowski
(/users/deren)
Date: 2004-11-27
Time limit: 3s
Source limit: 50000B
Memory limit: 1536MB
Cluster: Cube (Intel G860) (/clusters/)
Languages: All except: NODEJS PERL6
Resource: PAL

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