Largest exponential

Problem 99 (http://projecteuler.net/problem=99)

Comparing two numbers written in index form like 2^{11} and 3^7 is not difficult, as any calculator would confirm that $2^{11} = 2048 < 3^7 = 2187$.

However, confirming that $632382^{518061} > 519432^{525806}$ would be much more difficult, as both numbers contain over three million digits.

Using base_exp.txt (p099_base_exp.txt) (right click and 'Save Link/Target As...'), a 22K text file containing one thousand lines with a base/exponent pair on each line, determine which line number has the greatest numerical value.

NOTE: The first two lines in the file represent the numbers in the example given above.

Solution

In [1]:
```
from math import log

with open("p099_base_exp.txt","r") as f:
    data = [(int(x), int(y)) for x, y in [l.split(',') for

base, exponent, line = 1, 0, 0

for n, (a, b) in enumerate(data):
    if b * log(a) > exponent * log(base):
        line = n
        base = a
        exponent = b

print(line + 1)
```

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709
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