



AMERICAN COMPUTER SCIENCE LEAGUE

2019-2020

Contest #1

Senior Division - Number Transformation

PROBLEM: Given a positive integer (call it N) and a position in that integer (call it P) transform N . To transform N , find the P^{th} digit of N from the right:

- Replace each of the digits to the left by the sum of that digit and the P^{th} digit.
- Replace each of the digits to the right by the absolute value of the difference between it and the P^{th} digit.
- Replace the P^{th} digit by the number of different prime factors of N . Note that 1 is not a prime number, and it has no prime factors. A prime number has exactly one prime factor (namely, itself).

Example 1: $N=102438$, $P=3$. There are 4 different prime factors of N (2, 3, 7, 271). The transformed value N is $(1+4)(0+4)(2+4)(4)(|3-4|)(|8-4|) \Rightarrow 5\ 4\ 6\ 4\ 1\ 4 \Rightarrow 546414$

Example 2: $N=4329$, $P=1$. There are 3 different prime factors of N (3, 13, 37). The transformed value of N is $(4+9)(3+9)(2+9)(3) \Rightarrow 13\ 12\ 11\ 3 \Rightarrow 1312113$

INPUT: There will be 5 sets of data. Each set contains two positive integers: N and P . N will be less than 10^{15} , and P will be valid.

OUTPUT: The transformed value of each input set. The printed number may not have any spaces between the digits.

SAMPLE INPUT: (<http://www.datafiles.acsl.org/2020/contest1/sr-sample-input.txt>)

```
102438 3
4329 1
6710 2
16807 1
60098065452 7
```

SAMPLE OUTPUT:

1. 546414
2. 1312113
3. 7841
4. 8131571
5. 1488173823436



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TEST DATA

TEST INPUT:

43287 3
72431685 1
246897531573 12
96783 5
16058314729 3

TEST OUTPUT:

1. 65365
2. 12798611133
3. 424675311351
4. 23216
5. 8137121510811152