

## C. Capture Valerian

time limit per test: 2 seconds  
memory limit per test: 256 megabytes  
input: standard input  
output: standard output

It's now 260 AD. Shapur, being extremely smart, became the King of Persia. He is now called Shapur, His majesty King of kings of Iran and Aniran.

Recently the Romans declared war on Persia. They dreamed to occupy Armenia. In the recent war, the Romans were badly defeated. Now their senior army general, Philip is captured by Shapur and Shapur is now going to capture Valerian, the Roman emperor.

Being defeated, the cowardly Valerian hid in a room at the top of one of his castles. To capture him, Shapur has to open many doors. Fortunately Valerian was too scared to make impenetrable locks for the doors.

Each door has 4 parts. The first part is an integer number  $a$ . The second part is either an integer number  $b$  or some really odd sign which looks like R. The third one is an integer  $c$  and the fourth part is empty! As if it was laid for writing something. Being extremely gifted, after opening the first few doors, Shapur found out the secret behind the locks.

$c$  is an integer written in base  $a$ , to open the door we should write it in base  $b$ . The only bad news is that this R is some sort of special numbering system that is used only in Roman empire, so opening the doors is not just a piece of cake!

Here's an explanation of this really weird number system that even doesn't have zero:

Roman numerals are based on seven symbols: a stroke (identified with the letter I) for a unit, a chevron (identified with the letter V) for a five, a cross-stroke (identified with the letter X) for a ten, a C (identified as an abbreviation of Centum) for a hundred, etc.:

- I=1
- V=5
- X=10
- L=50
- C=100
- D=500
- M=1000

Symbols are iterated to produce multiples of the decimal (1, 10, 100, 1, 000) values, with V, L, D substituted for a multiple of five, and the iteration continuing: I 1, II 2, III 3, V 5, VI 6, VII 7, etc., and the same for other bases: X 10, XX 20, XXX 30, L 50, LXXX 80; CC 200, DCC 700, etc. At the fourth and ninth iteration, a subtractive principle must be employed, with the base placed before the higher base: IV 4, IX 9, XL 40, XC 90, CD 400, CM 900.

Also in bases greater than 10 we use A for 10, B for 11, etc.

Help Shapur capture Valerian and bring peace back to Persia, especially Armenia.

### Input

The first line contains two integers  $a$  and  $b$  ( $2 \leq a, b \leq 25$ ). Only  $b$  may be replaced by an R which indicates Roman numbering system.

The next line contains a single non-negative integer  $c$  in base  $a$  which may contain leading zeros but its length doesn't exceed  $10^3$ .

It is guaranteed that if we have Roman numerals included the number would be less than or equal to  $3000_{10}$  and it won't be 0. In any other case the number won't be greater than  $10^{15}_{10}$ .

Output

Write a single line that contains integer  $c$  in base  $b$ . You must omit leading zeros.

Examples

input
10 2 1
output
1

input
16 R 5
output
V

input
5 R 4
output
IV

input
2 2 1111001
output
1111001

input
12 13 A
output
A

Note

You can find more information about roman numerals here: [http://en.wikipedia.org/wiki/Roman\\_numerals](http://en.wikipedia.org/wiki/Roman_numerals)