

## 6014 Homework

Now it is time for your math homework. A Tornado operation  $T(n)$  is defined as follows:

$$T(n) = \begin{cases} a & \text{,where } n = 0 \\ [T(n-1) + X_n]^{Y_n} & \forall n \in \mathbb{Z}^+ \end{cases}$$

$a$  is a given constant, and  $\mathbb{Z}^+$  is the set of positive integers.  $X_n$  and  $Y_n$  are positive integers chosen such that  $X_n \leq X_{n+1}$  and  $Y_n \leq Y_{n+1}$ , for all positive  $n$ . Also,  $\min X \leq X_n \leq \max X$  and  $\min Y \leq Y_n \leq \max Y$ , for all positive  $n$ .

For example if  $a = 1$ ,  $X_1 = 2$ ,  $X_2 = 4$ , and  $Y_1 = Y_2 = 3$ , then:

$$T(2) = [T(1) + X_2]^{Y_2} = [(T(1) + X_1)^{Y_1} + X_2]^{Y_2} = [(1 + 2)^3 + 4]^3 = 29,791.$$

Given  $a$ ,  $\min X$ ,  $\max X$ ,  $\min Y$ ,  $\max Y$  and two positive integers  $P$  and  $C$ , your homework is to find the minimum value of  $n$  such that  $T(n) + C$  is divisible by  $10^P$ , by choosing appropriate values for  $X_1, \dots, X_n$  and  $Y_1, \dots, Y_n$ .

### Input

Your program will be tested on one or more test cases. The first line of the input will contain a single integer  $T$ , the number of test cases ( $1 \leq T \leq 200$ ). Next  $T$  lines contain the test cases, each on a single line.

Each of those lines will contain 7 integers,  $a$ ,  $\min X$ ,  $\max X$ ,  $\min Y$ ,  $\max Y$ ,  $P$  and  $C$ , separated by single spaces, given in this order ( $1 \leq \min X, \max X, \min Y, \max Y \leq 100$ ,  $1 \leq P \leq 3$ ,  $1 \leq a, C \leq 1,000,000$ ).

### Output

For each test case, output, on a single line, a single integer representing the minimum value for  $n$  such that  $T(n) + C$  is divisible by  $10^P$ . If there is no such value, output '-1' instead.

### Sample Input

```
4
4 1 1 1 2 1 5
4 1 100 1 100 1 6
3 1 1 2 2 2 11
1 2 2 1 1 3 2
```

### Sample Output

```
1
0
2
-1
```