## Prime Face

### Problem Description

Accept a number N up to 5 digits long in the positional numeral system formed by symbols 0, 1, ... 9, A, ..., Z. Also, accept another symbol S other than zero. Separate N and S with a space. Considering N to be represented in the least base possible between 2 and 36, identify the smallest prime number greater than or equal to N that contains at least one occurrence of S in it in base S + 1. (Refer example section for a better understanding). Prime number should be identified with respect to Base 10 i.e. a regular prime number.

### Constraints

1. Length of N <= 5

2. Max Base = 36

3. Face values for symbols:  
Symbol => Value in base 10  
0 => 0  
1 => 1  
2 => 2  
….  
9 => 9  
A => 10  
B => 11   
….  
Z => 35

### Input Format

One line containing two integers, N and S separated with space.

### Output

Print the smallest prime number greater than or equal to N that contains at least one occurrence of S in it, in base S + 1.

### Test Case

### Explanation

Example 1

Input

10 B

Output

B

Explanation

The least possible base for N is 2 and its value in that base is 2. We want the smallest prime number in base 12 (1 more than the face value of B, 11) that contains symbol B and is greater than or equal to 2. The first few numbers in ascending order in base 12 containing face value B are B (value 11), 1B (value 1 \* 12 + 11 = 23), 2B (value 2 \* 12 + 11 = 35): of these the smallest number that is prime is 11, which is greater than N. Hence, the output is B.

Example 2

Input

ZZ Z

Output

11Z

Explanation

The least possible base for N is 36 and its value in that base is 35 \* 36 ^1 + 35 = 1295. The first few numbers in ascending order in base 36 (1 more than the face value of Z, 35) containing face value Z and greater than N are 10Z (1 \* 36^2 + 0\*36^1 + 35 = 1331, non-prime), 11Z (1 \* 36^2 + 1 \* 36^1 + 35 = 1367, a prime). Hence, the output is 11Z.

## Lazy Student

### Problem Description

There is a test of Algorithms. Teacher provides a question bank consisting of N questions and guarantees all the questions in the test will be from this question bank. Due to lack of time and his laziness, Codu could only practice M questions. There are T questions in a question paper selected randomly. Passing criteria is solving at least 1 of the T problems. Codu can't solve the question he didn't practice. What is the probability that Codu will pass the test?

### Constraints

0 < T <= 10000

0 < N, T <= 1000

0 <= M <= 1000

M,T <= N

### Input Format

First line contains single integer T denoting the number of test cases.

First line of each test case contains 3 integers separated by space denoting N, T, and M.

### Output

For each test case, print a single integer.

If probability is p/q where p & q are co-prime, print (p\*mulInv(q)) modulo 1000000007, where mulInv(x) is multiplicative inverse of x under modulo 1000000007.

### Test Case

### Explanation

Example 1

Input

1

4 2 1

Output

500000004

Explanation

The probability is ½. So output is 500000004.

## Death Battle

### Problem Description

In a crossover fantasy universe, Houin Kyoma is up in a battle against a powerful monster Nomu that can kill him in a single blow. However being a brilliant scientist Kyoma found a way to pause time for exactly M seconds. Each second, Kyoma attacks Nomu with certain power, which will reduce his health points by that exact power. Initially Nomu has H Health Points. Nomu dies when his Health Points reach 0. Normally Kyoma performs Normal Attack with power A. Besides from Kyoma’s brilliance, luck plays a major role in events of this universe. Kyoma’s Luck L is defined as probability of performing a super attack. A super attack increases power of Normal Attack by C. Given this information calculate and print the probability that Kyoma kills Nomu and survives. If Kyoma dies print “RIP”.

### Constraints

0 < T <= 50

1 <= A, H, C, L1, L2 <= 1000

1 <= M <= 20.

L1<=L2

### Input Format

First line is integer T denoting number of test cases.

Each test case consist of single line with space separated numbers A H L1 L2 M C. Where luck L is defined as L1/L2. Other numbers are, as described above.

### Output

Print probability that Kyoma kills Nomu in form P1/P2 where P1<=P2 and gcd(P1,P2)=1. If impossible, print “RIP” without quotes.

### Test Case

### Explanation

Example 1

Input

2

10 33 7 10 3 2

10 999 7 10 3 2

Output

98/125

RIP

## Marathon Winner

### Problem Description

Race is generally organized by distance but this race will be organized by time.

In order to predict the winner we will check every 2 seconds.

Let’s say total race time is 7 seconds we will check for (7-1) seconds.

For 7 sec : We will check who is leading at 2 sec, 4 sec and 6 sec.

Participant who is leading more number of times is winner from prediction perspective.

Now our task is to predict a winner in this marathon.

Note:

1)At particular time let say at 4th second, top two (top N, in general) participants are at same distance, then in this case both are leading we will increase count for both (all N).

2)And after calculating at all time slices, if number of times someone is leading, is same for two or more participants, then one who come first in input sequence will be the winner.

Ex: If participant 2 and 3 are both leading with same number, participant 2 will be the winner.

### Constraints

1 <= T <= 100

1 <= N <= 100

### Input Format

First line contains a single integer N denoting the number of participants

Second line contains a single integer T denoting the total time in seconds of this Marathon.

Next N lines (for each participant) are as follows :

We have T+1 integers separated by space.

First T integers are as follow:

ith integer denotes the number of steps taken by the participant at the ith second.

T+1st integer denotes the Distance (in meters) of each step.

### Output

Index of Marathon winner, where index starts with 1.

### Test Case

### Explanation

Example 1

Input

3

8

2 2 4 3 5 2 6 2 3

3 5 7 4 3 9 3 2 2

1 2 4 2 7 5 3 2 4

Output

2

Explanation

3 (No. of candidate)

8 (Total time of Sprint (In seconds))

2 2 4 3 5 2 6 2 3 ( data for 1st candidate. First 8 integers denote number of steps per second and last integer denotes distance covered in each step i.e. 3).

3 5 7 4 3 9 3 2 2 (similarly, 2nd candidate’s data).

1 2 4 2 7 5 3 2 4 (similarly, 3rd candidate’s data).

At time 2: Here 2nd marathoner is leading

12 (2\*3+2\*3)

16 (3\*2+5\*2)

12 (1\*4+2\*4)

At time 4 :Here also 2nd marathoner is leading

33 ( 2\*3+2\*3 +4\*3+3\*3)

38

36

At time 6 :Here 3rd marathoner is leading

57

62

84

Output:

2

Since, 2nd marathoner is leading more number of times, so 2 is the winner.