Minimum steps

Harsh has an integer A. He doesn't like this integer but he likes integer B. So he wishes to change it. He can perform following operations on A

1. Divide A by any integer X
2. Multiply A by any integer Y

Find the minimum number of steps required to change A to B

Optional:

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Input Format

First line of the input contains T, the number of test cases

For each test case, there will be two integers in each line A and B

Constraints

$1 \leq T \leq 10^4$

$1 \leq A, B \leq 10^9$

Output Format

For each test case print a single integer denoting the answer denoting the answer

Sample Input 0

```
3
4 6
2 6
15 10
```

Sample Output 0

```
2
1
2
```

Explanation 0

In test 1: First divide 4 by 2 and then multiply by 3

In test 2: First multiply 2 by 3

In test 3: First multiply 15 by 2 and then divide by 3

Contest ends in 11 minutes

Submissions: 1437
Max Score: 150
Difficulty: Easy

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Python 3

```
for i in range(int(input())):
    a,b = map(int,input().split())
    if((a*3) == b):
        print(1)
    elif((a//2)*3 == b):
        print(2)
    elif((a*2)//3 == b):
        print(2)
```

Line: 1 Col: 1

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Colony Unification

There are N independent colonies who knew nothing about each other. But as the time moved on different colonies discovered each other and decided to merge other.

Let's say there are two colonies A and B, after discovering each other they become AB. From now on, whenever we talk about A or B it means AB only, in other words don't overthink about the name situation. It only means the larger colony into which a colony is merged into.

There are M instances when people from two colonies meet each other and join each other as well. Ofcourse, if they are from same colony they don't join any further.

You have to tell the number of colonies after each instance.

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Input Format

First line contains two integers N and M Next M lines contains two integers A and B, initial number of colonies of the two people who meet.

Constraints

$1 \leq N, M \leq 10^5$

$1 \leq A, B \leq N$

Output Format

For each instance, print the answer on a seperate line

Sample Input 0

```
5 4
1 2
1 3
2 3
2 4
```

Sample Output 0

```
4
3
```

```
3
2
```

Explanation 0

Initial state = $1, 2, 3, 4, 5$

After Instance 1 = $(1, 2), 3, 4, 5$

After Instance 2 = $(1, 2, 3), 4, 5$

After Instance 3 = $(1, 2, 3), 4, 5$

After Instance 4 = $(1, 2, 3, 4), 5$

Contest ends in an hour

Submissions: 747
Max Score: 200
Difficulty: Easy

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1

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2-D binary

You are given a $N \times N$ boolean matrix in which elements are initially set to $false$. You will be given Q queries.

There are 3 types of queries

Type 1: Print the sum of all elements of the matrix

Type 2: i, j : Invert the bit at position i, j

Type 3: i : Invert all the bits in row i

Optional:

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Input Format

First Line Contains 2 integers, N, Q

Next Q lines contains t, denoting the type of queries.

If query is of type 2, it will be followed by 2 more integers, i, j

If query is of type 3, it will be followed by 1 more integer, i

Constraints

$1 \leq N \leq 10^4$

$1 \leq Q \leq 10^6$

$1 \leq i, j \leq N$

Output Format

For each query of type 1, print the respective answer on a new line

Sample Input 0

```
3 5
1
2 2 3
3 1
2 3 3
1
```

Sample Output 0

```
0
5
```

Explanation 0

Initially

$$A = \begin{pmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{pmatrix}$$

After Query 2:

$$A = \begin{pmatrix} 0 & 0 & 0 \\ 0 & 0 & 1 \\ 0 & 0 & 0 \end{pmatrix}$$

After Query 3:

$$A = \begin{pmatrix} 1 & 1 & 1 \\ 0 & 0 & 1 \\ 0 & 0 & 0 \end{pmatrix}$$

After Query 4:

$$A = \begin{pmatrix} 1 & 1 & 1 \\ 0 & 0 & 1 \\ 0 & 0 & 1 \end{pmatrix}$$

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Oreo

Question is simple. You have an array A of size N, I will ask Q queries. You have to answer them.

About queries: You will given an integer X, you have to tell the probability of selecting an index i in the array such that

$$A_i | X = X$$

$$| = OR$$

Since probability is in $\frac{P}{Q}$ form, print the answer as $P \times Q^{-1}$ modulo 998244353, where Q^{-1} is Q modulo inverse 998244353

Tip for those who don't know how to calculate modulo inverse

Since the question is not about testing modular mathematics, I will tell how how to calculate Q^{-1} modulo M

If M is prime then $Q^{-1} \ mod \ M = Q^{M-2} \ mod \ M$

And 998244353 is a prime number

Optional:

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Input Format

First line will contain N and Q

Next line will contain N integers of the array

Next Q lines will contain a single integer X

Constraints

$1 \leq N, Q, A_i, X \leq 10^6$

Output Format

For each query, print on seperate line, the answer to that query

Sample Input 0

```
5 3
1 2 3 4 5
```

```
3
4
5
```

Sample Output 0

```
798595483
598946612
798595483
```

Explanation 0

1. $x = 3$, there are 3 indices $\{1, 2, 3\}$ for which $A_i | x = x$, thus probability of choosing one of those indices is $\frac{3}{5}\ mod\ M = 798595483$
2. $x = 4$, there is only 1 index $\{4\}$ for which $A_i | x = x$, thus probability of choosing one of those indices is $\frac{1}{5}\ mod\ M = 598946612$
3. $x = 5$, there are 3 indices $\{1, 4, 5\}$ for which $A_i | x = x$, thus probability of choosing one of those indices is $\frac{3}{5}\ mod\ M = 798595483$