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Wrestling Match

Time Limit: 2000/1000 MS (Java/Others) Memory Limit: 65536/65536 K (Java/Others)
Total Submission(s): 711 Accepted Submission(s): 184

Problem Description

Nowadays, at least one wrestling match is held every year in our country. There are a lot of people in the game is "good player", the rest is "bad player". Now, Xiao Ming is referee of the wrestling match and he has a list of the matches in his hand. At the same time, he knows some people are good players, some are bad players. He believes that every game is a battle between the good and the bad player. Now he wants to know whether all the people can be divided into "good player" and "bad player".

Input

Input contains multiple sets of data. For each set of data, there are four numbers in the first line: N ($1 \leq N \leq 1000$), M ($1 \leq M \leq 10000$), X , Y ($X+Y \leq N$), in order to show the number of players (numbered 1 to N), the number of matches, the number of known "good players" and the number of known "bad players". In the next M lines, each line has two numbers a , b ($a \neq b$), said there is a game between a and b . The next line has X different numbers. Each number is known as a "good player" number. The last line contains Y different numbers. Each number represents a known "bad player" number. Data guarantees there will not be a player number is a good player and also a bad player.

Output

If all the people can be divided into "good players" and "bad players", output "YES", otherwise output "NO".

Sample Input

```
5 4 0 0
1 3
1 4
3 5
4 5
5 4 1 0
1 3
1 4
3 5
4 5
2
```

Sample Output

```
NO
YES
```

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Regular Number

Time Limit: 2000/1000 MS (Java/Others) Memory Limit: 65536/65536 K (Java/Others)
Total Submission(s): 72 Accepted Submission(s): 4

Problem Description

Using regular expression to define a numeric string is a very common thing. Generally, use the shape as follows:

$(0|9|7)(5|6)(2)(4|5)$

Above regular expression matches 4 digits: The first is one of 0, 9 and 7. The second is one of 5 and 6. The third is 2. And the fourth is one of 4 and 5. The above regular expression can be successfully matched to 0525, but it cannot be matched to 9634.

Now, giving you a regular expression like the above formula, and a long string of numbers, please find out all the substrings of this long string that can be matched to the regular expression.

Input

It contains a set of test data. The first line is a positive integer N ($1 \leq N \leq 1000$), on behalf of the regular representation of the N bit string. In the next N lines, the first integer of the i -th line is a_i ($1 \leq a_i \leq 10$), representing that the i -th position of regular expression has a_i numbers to be selected. Next there are a_i numeric characters. In the last line, there is a numeric string. The length of the string is not more than $5 * 10^6$.

Output

Output all substrings that can be matched by the regular expression. Each substring occupies one line

Sample Input

```
4
3 0 9 7
2 5 7
2 2 5
2 4 5
09755420524
```

Sample Output

```
9755
7554
0524
```

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Game of Taking Stones

Time Limit: 2000/1000 MS (Java/Others) Memory Limit: 65536/65536 K (Java/Others)
Total Submission(s): 542 Accepted Submission(s): 80

Problem Description

Two people face two piles of stones and make a game. They take turns to take stones. As game rules, there are two different methods of taking stones: One scheme is that you can take any number of stones in any one pile while the alternative is to take the same amount of stones at the same time in two piles. In the end, the first person taking all the stones is winner. Now, giving the initial number of two stones, can you win this game if you are the first to take stones and both sides have taken the best strategy?

Input

Input contains multiple sets of test data. Each test data occupies one line, containing two non-negative integers a and b , representing the number of two stones. a and b are not more than 10^{100} .

Output

For each test data, output answer on one line. 1 means you are the winner, otherwise output 0.

Sample Input

```
2 1
8 4
4 7
```

Sample Output

```
0
1
0
```

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A Simple Math Problem

Time Limit: 2000/1000 MS (Java/Others) Memory Limit: 65536/65536 K (Java/Others)
Total Submission(s): 729 Accepted Submission(s): 177

Problem Description

Given two positive integers a and b, find suitable X and Y to meet the conditions:

$$X+Y=a$$

$$\text{Least Common Multiple}(X, Y) = b$$

Input

Input includes multiple sets of test data. Each test data occupies one line, including two positive integers a ($1 \leq a \leq 2 \times 10^4$), b ($1 \leq b \leq 10^9$), and their meanings are shown in the description. Contains most of the 12W test cases.

Output

For each set of input data, output a line of two integers, representing X, Y. If you cannot find such X and Y, output one line of "No Solution" (without quotation).

Sample Input

```
6 8
798 10780
```

Sample Output

```
No Solution
308 490
```

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An interesting game

Time Limit: 2000/1000 MS (Java/Others) Memory Limit: 65536/65536 K (Java/Others)
 Total Submission(s): 120 Accepted Submission(s): 20

Problem Description

Let's play a game. We add numbers $1, 2, \dots, n$ in increasing order from 1 and put them into some sets.

When we add i , we must create a new set, and put i into it. And meanwhile we have to bring $[i - \text{lowbit}(i) + 1, i - 1]$ from their original sets, and put them into the new set, too. When we put one integer into a set, it costs us one unit physical strength. But bringing integer from old set does not cost any physical strength.

After we add $1, 2, \dots, n$, we have q queries now. There are two different kinds of query:

1 L R: query the cost of strength after we add all of $[L, R]$ ($1 \leq L \leq R \leq n$)

2 x: query the units of strength we cost for putting x ($1 \leq x \leq n$) into some sets.

Input

There are several cases, process till end of the input.

For each case, the first line contains two integers n and q . Then q lines follow. Each line contains one query. The form of query has been shown above. $n \leq 10^4$, $q \leq 10^5$

Output

For each query, please output one line containing your answer for this query

Sample Input

```
10 2
1 8 9
2 6
```

Sample Output

```
9
2
```

Hint

$\text{lowbit}(i) = i \& (-i)$. It means the size of the lowest nonzero bits in binary of i . For example, $610 = 1102$, $\text{lowbit}(6) = 102 = 210$

When we add 8, we should bring $[1, 7]$ and 8 into new set.

When we add 9, we should bring $[9, 8]$ (empty) and 9 into new set.

So the first answer is $8 + 1 = 9$.

When we add 6 and 8, we should put 6 into new sets.

So the second answer is 2.

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Detachment

Time Limit: 4000/2000 MS (Java/Others) Memory Limit: 65536/65536 K (Java/Others)
Total Submission(s): 346 Accepted Submission(s): 97

Problem Description

In a highly developed alien society, the habitats are almost infinite dimensional space.

In the history of this planet, there is an old puzzle.

You have a line segment with x units' length representing one dimension. The line segment can be split into a number of small line segments: a_1, a_2, \dots ($x = a_1 + a_2 + \dots$) assigned to different dimensions. And then, the multidimensional space has been established. Now there are two requirements for this space:

1. Two different small line segments cannot be equal ($a_i \neq a_j$ when $i \neq j$).

2. Make this multidimensional space size s as large as possible ($s = a_1 * a_2 * \dots$). Note that it allows to keep one dimension. That's to say, the number of a_i can be only one.

Now can you solve this question and find the maximum size of the space? (For the final number is too large, your answer will be modulo 10^9+7)

Input

The first line is an integer T , meaning the number of test cases.

Then T lines follow. Each line contains one integer x .

$1 \leq T \leq 10^6, 1 \leq x \leq 10^9$

Output

Maximum s you can get modulo 10^9+7 . Note that we want to be greatest product before modulo 10^9+7 .

Sample Input

1
4

Sample Output

4

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Garden of Eden

Time Limit: 10000/5000 MS (Java/Others) Memory Limit: 131072/131072 K (Java/Others)
Total Submission(s): 201 Accepted Submission(s): 17

Problem Description

When God made the first man, he put him on a beautiful garden, the Garden of Eden. Here Adam lived with all animals. God gave Adam eternal life. But Adam was lonely in the garden, so God made Eve. When Adam was asleep one night, God took a rib from him and made Eve beside him. God said to them, "here in the Garden, you can do everything, but you cannot eat apples from the tree of knowledge."

One day, Satan came to the garden. He changed into a snake and went to live in the tree of knowledge. When Eve came near the tree someday, the snake called her. He gave her an apple and persuaded her to eat it. Eve took a bite, and then she took the apple to Adam. And Adam ate it, too. Finally, they were driven out by God and began a hard journey of life.

The above is the story we are familiar with. But we imagine that Satan love knowledge more than doing bad things. In Garden of Eden, the tree of knowledge has n apples, and there are k varieties of apples on the tree. Satan wants to eat all kinds of apple to gets all kinds of knowledge. So he chooses a starting point in the tree, and starts walking along the edges of tree, and finally stops at a point in the tree (starting point and end point may be same). The same point can only be passed once. He wants to know how many different kinds of schemes he can choose to eat all kinds of apple. Two schemes are different when their starting points are different or ending points are different.

Input

There are several cases. Process till end of input.

For each case, the first line contains two integers n and k , denoting the number of apples on the tree and number of kinds of apple on the tree respectively.

The second line contains n integers meaning the type of the i -th apple. Types are represented by integers between 1 and k .

Each of the following $n-1$ lines contains two integers u and v , meaning there is one edge between u and v . $1 \leq n \leq 50000$, $1 \leq k \leq 10$

Output

For each case output your answer on a single line.

Sample Input

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

Sample Output

```
6
```

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To begin or not to begin

Time Limit: 2000/1000 MS (Java/Others) Memory Limit: 65536/65536 K (Java/Others)
Total Submission(s): 428 Accepted Submission(s): 267

Problem Description

A box contains black balls and a single red ball. Alice and Bob draw balls from this box without replacement, alternating after each draws until the red ball is drawn. The game is won by the player who happens to draw the single red ball. Bob is a gentleman and offers Alice the choice of whether she wants to start or not. Alice has a hunch that she might be better off if she starts; after all, she might succeed in the first draw. On the other hand, if her first draw yields a black ball, then Bob's chances to draw the red ball in his first draw are increased, because then one black ball is already removed from the box. How should Alice decide in order to maximize her probability of winning? Help Alice with decision.

Input

Multiple test cases (number of test cases ≤ 50), process till end of input.
For each case, a positive integer k ($1 \leq k \leq 10^5$) is given on a single line.

Output

For each case, output:
1, if the player who starts drawing has an advantage
2, if the player who starts drawing has a disadvantage
0, if Alice's and Bob's chances are equal, no matter who starts drawing
on a single line.

Sample Input

1
2

Sample Output

0
1

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Convex

Time Limit: 2000/1000 MS (Java/Others) Memory Limit: 65536/65536 K (Java/Others)
Total Submission(s): 369 Accepted Submission(s): 262

Problem Description

We have a special convex that all points have the same distance to origin point.

As you know we can get N segments after linking the origin point and the points on the convex. We can also get N angles between each pair of the neighbor segments. Now give you the data about the angle, please calculate the area of the convex

Input

There are multiple test cases.

The first line contains two integer N and D indicating the number of the points and their distance to origin. ($3 \leq N \leq 10$, $1 \leq D \leq 10$)

The next lines contain N integers indicating the angles. The sum of the N numbers is always 360.

Output

For each test case output one float numbers indicating the area of the convex. The printed values should have 3 digits after the decimal point.

Sample Input

```
4 1
90 90 90 90
6 1
60 60 60 60 60 60
```

Sample Output

```
2.000
2.598
```

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Find Small A

Time Limit: 2000/1000 MS (Java/Others) Memory Limit: 65536/65536 K (Java/Others)
Total Submission(s): 766 Accepted Submission(s): 250

Problem Description

As is known to all, the ASCII of character 'a' is 97. Now, find out how many character 'a' in a group of given numbers. Please note that the numbers here are given by 32 bits' integers in the computer. That means, 1 digit represents 4 characters (one character is represented by 8 bits' binary digits).

Input

The input contains a set of test data. The first number is one positive integer N ($1 \leq N \leq 100$), and then N positive integers a_i ($1 \leq a_i \leq 2^{32} - 1$) follow.

Output

Output one line, including an integer representing the number of 'a' in the group of given numbers.

Sample Input

```
3
97 24929 100
```

Sample Output

```
3
```

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Guess the number

Time Limit: 2000/1000 MS (Java/Others) Memory Limit: 160000/160000 K (Java/Others)
Total Submission(s): 26 Accepted Submission(s): 3

Problem Description

AOA just met a problem when he attended an interview, as shown below:

A and B two people play guessing games. A thinks of a number x between a and b randomly in his mind, and he lets B to guess this number. A will say too small if B's guess is less than x and A will say yes if B's guess is just x . Once B's guess is bigger than x , A won't speak any more. After that, A just nods his head if B's guess is just x , otherwise shakes his head. The problem is that how many kinds of best guess strategies to make the least number of guesses in the worst situation?

Input

Input contains multiple sets of test data and each of them occupies one line, including two integers a, b ($1 \leq a \leq b \leq 5 * 10^6$), on behalf of range of the number. Input to the end of the file.

Output

For each set of input, output one line containing two integers. The first one represents the least number of times of guessing in the worst situation. The second one represents the number of best guess method modulo 100000073.

Sample Input

1 5

Sample Output

3 3

Hint

B can guess the number in A's mind up to 3 times in the worst case.
The first method, B can guess in the order of (2,4,5)
The second method, B can guess in the order of (3,4,5)
The third method, B can guess in the order of (3,5)
Each method is up to three times.

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