TLE 12.0 Level 1 - Contest 1

A. Dice Game

1 s., 256 MB

Priyansh and Priyam are engaged in a game where each player writes an integer from 1 to 6 on a piece of paper. Subsequently, a six-sided dice is thrown, and the player whose written number is closer to the number on the dice wins the round. If both players have the same difference, the round ends in a draw.

Priyansh writes the number a, and Priyam writes the number b. Now, Ayush wants to determine the number of possible outcomes when the dice is thrown, considering all possible scenarios: Priyansh wins, the game ends in a draw, or Priyam wins.

Input
The single line contains two integers a and b ($1 \leq a, b \leq 6$) — the numbers written by Priyansh and Priyam, respectively.

Output
Print three integers representing the number of outcomes where Priyansh wins, the game ends in a draw, and Priyam wins, respectively.

input
2 5
output
3 0 3

input
2 4
output
2 1 3

The dice is a standard six-sided cube with each side containing a number from 1 to 6, where all numbers are distinct.

In this game, if number a is closer to the number x than number b, it means that $|a - x| < |b - x|$.

For example 1,

- If the dice shows 1:

  - Priyansh's difference from the dice: $(|2 - 1| = 1)$
  - Priyam's difference from the dice: $(|5 - 1| = 4)$
  - Priyansh wins because 1 is closer to 2 than 5.

- If the dice shows 2:

  - Priyansh's difference from the dice: $(|2 - 2| = 0)$
  - Priyam's difference from the dice: $(|5 - 2| = 3)$
  - Priyansh wins because 2 is exactly his number.

- If the dice shows 3:

  - Priyansh's difference from the dice: $(|2 - 3| = 1)$
  - Priyam's difference from the dice: $(|5 - 3| = 2)$
  - Priyansh wins because 3 is closer to 2 than 5.

- In the same way the result when the dice shows 4, 5, or 6 can be calculated.

B. Harmonic Resonance Value

2 s., 256 MB

Tushar is a young scientist working on a secret project in the futuristic city of Neo Zenith. He's developing a revolutionary energy synchronizer that requires two power crystals to function. The synchronizer works based on a special property called the Harmonic Resonance Value (HRV) of the two crystals.

The HRV of two crystals with energy levels x and y is defined as the smallest energy level that is a multiple of both x and y. For example, $HRV(13, 37) = 481$ and $HRV(9, 6) = 18$.

For each experiment, Tushar is given a range of acceptable energy levels, from l to r. He needs to find two crystals with energy levels x and y that satisfy these conditions:

1. Both crystal energy levels are within the given range: $l \leq x < y \leq r$

2. The HRV of the two crystals is also within the range:
$l \leq HRV(x, y) \leq r$

Can you help Tushar determine if it's possible to find such crystals for each experiment, and if so, what their energy levels should be?

Input
The first line contains one integer t ($1 \leq t \leq 10000$) — the number of experiments Tushar wants to conduct.

For each experiment: One line containing two integers l and r ($1 \leq l < r \leq 10^9$) — the lower and upper limits of the acceptable energy range.

Output
For each experiment, print two integers:

- If it's impossible to find two crystals meeting all the conditions, print two integers equal to -1;
- Otherwise, print the energy levels x and y of the two crystals (if there are multiple valid answers, you may print any of them).

input
4
1 1337
13 69
2 4
88 89
output
6 7
14 21
2 4
-1 -1

C. Puzzleland

1 s., 256 MB

Priyansh and Dhruvil are best friends who love solving puzzles. They've recently discovered a new puzzle book called "The Mystic Challenges of Puzzleland" which contains n challenging puzzles. Both friends are excited to complete all the puzzles in the book.

However, Priyansh and Dhruvil have different strengths when it comes to puzzle-solving. Priyansh can solve certain types of puzzles, while Dhruvil excels at others. They decide to team up and combine their skills to try and solve all the puzzles in the book.

Given the information about which puzzles each friend can solve, can you determine if Priyansh and Dhruvil will be able to complete the entire puzzle book by working together?

Input
The first line contains a single integer n ($1 \leq n \leq 100$), representing the total number of puzzles in the book.

The second line starts with an integer p ($0 \leq p \leq n$), followed by p distinct integers $a_1, a_2, \ldots, a_p$ ($1 \leq a_i \leq n$). These integers represent the puzzle numbers that Priyansh can solve.

The third line follows the same format for Dhruvil: it starts with an integer q ($0 \leq q \leq n$), followed by q distinct integers representing the puzzle numbers Dhruvil can solve.

Note: Puzzles are numbered from 1 to n.

Output
If Priyansh and Dhruvil can solve all the puzzles together, print "I become the guy.". If it's impossible for them to solve all puzzles, print "Oh, my keyboard!" (without the quotes).

input
4 3 1 2 3 2 2 4
output
I become the guy.

input
4 3 1 2 3 2 2 3
output
Oh, my keyboard!

In the first sample, Priyansh can solve puzzles $[1, 2, 3]$, and Dhruvil can solve puzzles $[2, 4]$, so together they can solve all the puzzles in the book.

In the second sample, neither Priyansh nor Dhruvil can solve puzzle number 4, so they can't complete the entire book.

D. Avoid Change

1 s., 256 MB

Tushar urgently needs a tool! He visits a shop and finds an appropriate tool priced at k credits. Fortunately, the shop has an unlimited supply of such tools.

In his pocket, Tushar carries an unlimited number of "10-credit coins" and exactly one coin worth r credits ($1 \leq r \leq 9$).

What is the minimum number of tools Tushar needs to buy so that he can pay for the purchase without any change? Although he can pay for 10 tools without any change using only "10-credit coins", perhaps he can buy fewer tools and pay without any change. Note that Tushar must buy at least one tool.

Input

The single line of input contains two integers k and r ($1 \leq k \leq 1000$, $1 \leq r \leq 9$) — the price of one tool and the denomination of the coin in Tushar's pocket that is different from "10-credit coins".

Assume that he has an unlimited number of coins in the denomination of 10, ensuring that Tushar has enough money to buy any number of tools.

Output
Print the required minimum number of tools Tushar needs to buy so that he can pay for them without any change.

input
117 3
output
9

input
237 7
output
1

input
15 2
output
2

In the first example, Tushar can buy 9 tools and pay $9 \times 117 = 1053$ credits. He can pay this sum using certain number of 10-credit coins and one 3-credit coin. Tushar cannot buy fewer tools without any change.

In the second example, it is sufficient for Tushar to buy one tool.

In the third example, Tushar should buy two tools and pay $2 \times 15 = 30$ credits. It is obvious that he can pay this sum without any change.

E. 3D model

0.25 s., 256 MB

Priyansh is a new intern at Mixed Dimensions, and he's learning the basics about 3D models. Hasan gave him an easy task on his first day, he has to count the number of boundary edges in a 3D mesh.

A boundary edge in a 3D mesh is an edge that is a part of only one triangle. Priyansh got so confused, and asked Hasan to simplify the problem. Hasan decided to give him only two triangles. But he still can't figure it out. Given the names of the vertices that make up the two triangles, can you help Priyansh find the number of boundary edges in the two triangles?

Input
The input consists of two lines, each line describes one triangle, and contains 3 distinct integers from 1 to 6 which represent the names of the vertices of each triangle. It is guaranteed that the two triangles are different by at least one vertex.
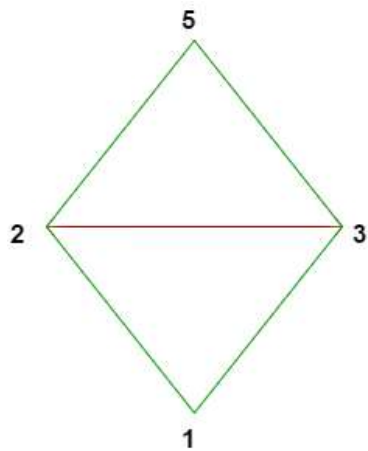
Output
Print one integer, the number of boundary edges in the two given triangles.

input
3 5 2 3 1 2

output

4

input

6 1 4
5 2 3

output

6

The first sample results in the following 2 triangles with 4 boundary edges (in green):

F. Username

2 s., 256 MB

Dhruvil is creating a new social media platform for Bangalore's tech community. To ensure unique usernames, he's devised a system that combines parts of a user's first and last name.

The rules for generating usernames are as follows:

1. Take a prefix of the first name (can be the entire name).

2. Immediately follow it with a prefix of the last name (can be the entire name).

3. Both prefixes must contain at least one character.

4. The resulting username should be as short as possible while following alphabetical order.

For example, if a user's name is "abhay kumar", valid usernames could be "ak", "abk", "abhk", "abhkumar", etc. The system should choose the alphabetically earliest option.

As a reminder:

- A prefix is a substring starting from the beginning of a word. For "rocket", valid prefixes are "r", "ro", "roc", "rock", "rocke", and "rocket".

- Alphabetical order means: A string a is alphabetically earlier than a string b, if a is a prefix of b, or a and b coincide up to some position, and then a has a letter that is alphabetically earlier than the corresponding letter in b: "a" and "ab" are alphabetically earlier than "ac" but "b" and "ba" are alphabetically later than "ac".

Help Dhruvil create a function that generates the correct username for new users.

Input

The input consists of a single line containing two space-separated strings: the first and last names. Each name contains only lowercase English letters and is between 1 and 10 characters long.

Output

Output a single string - the alphabetically earliest possible username formed from these names. The output should also be in lowercase.

input

harry potter

output

hap

input

tom riddle

output

tomr

G. Trio Prime Sum

2 s., 64 MB

Priyansh is a young mathematician who loves to explore number patterns. He recently learned about prime numbers and became fascinated by them. Inspired by famous mathematical conjectures, Priyansh decided to create his own number theory challenge called the "Trio Prime Sum."

The Trio Prime Sum challenge works like this:

- Take any prime number.

- Try to express it as the sum of three integers: two consecutive prime numbers and 1. (Remember, two primes are considered consecutive if there are no other prime numbers between them.)

- For example, $19 = 7 + 11 + 1$, or $13 = 5 + 7 + 1$.

Priyansh wonders how many prime numbers in a given range can be expressed this way. He challenges his friend Dhruvil to verify if at least k prime numbers from 2 to n (inclusive) can be expressed as the sum of two consecutive primes plus 1.

Can you help Dhruvil solve Priyansh's challenge?

Input

The input consists of a single line containing two integers n and k ($2 \leq n \leq 1000, 0 \leq k \leq 1000$).

- n represents the upper limit of the range of numbers to consider (from 2 to n, inclusive).

- k represents the minimum number of primes that should satisfy the Trio Prime Sum property.

Output

Output YES if at least k prime numbers from 2 to n (inclusive) can be expressed as the sum of two consecutive primes plus 1. Output NO otherwise.

input

27 2

output

YES

input

45 7

output
NO

In the first example, the answer is YES because at least two numbers can be expressed in the required form (for instance, 13 and 19).

In the second example, the answer is NO because it's not possible to find 7 prime numbers from 2 to 45 that satisfy the Trio Prime Sum property.

H. Skyline with lights

2 s., 256 MB

Priyansh is passionate about architecture, and he's designing a unique skyline for a futuristic city called Neo Zenith. He wants to create a series of n skyscrapers, where the i-th skyscraper is currently a_i units tall. To make the skyline more harmonious, he plans to add uniform extra special floors above the buildings as follows:

- Choose an integer $h \geq 1$ — the *special floor height*. Add special floors up to height h on both ends of the skyline.
- Then, extend special floors from each skyscraper up to height h, unless the skyscraper is already taller than h; in that case, no special floors are added to this skyscraper.

For example, with skyscrapers of heights $a = [3, 1, 2, 4, 6, 2, 5]$ and a special floor height of $h = 4$, Priyansh will need a total of $w = 8$ units of special flooring, as illustrated.
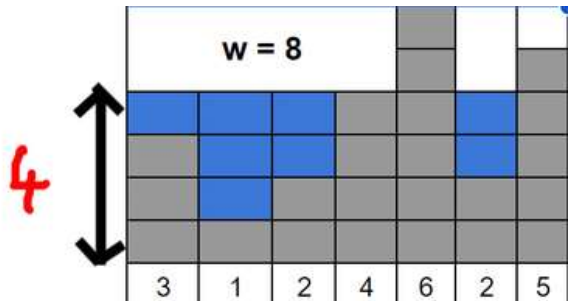
Priyansh has a limited supply of special flooring material that can cover at most x units. He wants to create the tallest possible uniform special floor addition. What is the maximum value of h he can choose? (Each tower with height smaller than h must be extended to height h)

Input
The first line contains a single integer t ($1 \leq t \leq 10^4$) — the number of test cases.

For each test case:

The first line contains two positive integers n and x ($1 \leq n \leq 2 \cdot 10^5$; $1 \leq x \leq 10^9$) — the number of skyscrapers and the maximum amount of special flooring available.

The second line contains n space-separated integers a_i ($1 \leq a_i \leq 10^9$) — the heights of the skyscrapers.

The sum of n across all test cases doesn't exceed $2 \cdot 10^5$.

Output
For each test case, output a single positive integer h ($h \geq 1$) — the maximum special floor height achievable using at most x units of special flooring.

It is guaranteed that under these constraints, such a value of h always exists.

input
5
7 9
3 1 2 4 6 2 5
3 10
1 1 1
4 1
1 4 3 4
6 1984
2 6 5 9 1 8
1 1000000000
1

output
4
4
2
335
1000000001

In the first test case, as shown in the image, with $h = 4$ we need 8 units of special flooring, but if h is increased to 5 we need 13 units, exceeding the available $x = 9$. Thus, $h = 4$ is optimal.

For the second test case, we can set $h = 4$ and add 3 units of special flooring to each skyscraper, using a total of 9 units. This is proven to be optimal. In the third test case, setting $h = 2$ uses all available special flooring, making it the optimal choice.

I. Color Trail

1 s., 64 MB

Priyam loves to play video games on his mobile phone. He's particularly fond of a new game called "Color Trail" where players have to memorize sequences of colors as they appear on the screen.

One day, while playing "Color Trail", Priyam got distracted once. He managed to remember two separate sequences of colors before and after distraction. Now he's curious if these sequences could have appeared in the game, either in the original order or in reverse.

In "Color Trail", colors are represented by lowercase letters. The same letter always represents the same color, and different letters represent different colors.

Priyam's friend Abhay, who's good at puzzles, wants to help. Given the full sequence of colors in the game and the two sequences Priyam remembers, can you help Abhay determine if Priyam's recollection matches the game?

Input
The input contains three lines:

The first line contains a non-empty string of lowercase Latin letters, length not exceeding 10^5, representing the full sequence of colors in the game.

The second line contains a non-empty string of lowercase Latin letters, length not exceeding 100, representing the first sequence Priyam remembers.

The third line contains a non-empty string of lowercase Latin letters, length not exceeding 100, representing the second sequence Priyam remembers.

Each of Priyam's remembered sequences is in chronological order.

Output
Output one of these four words:

- "forward" if Priyam's sequences could only match the game's original order

- "backward" if Priyam's sequences could only match the game's reverse order

- "both" if Priyam's sequences could match either the original or reverse order

- "fantasy" if Priyam's sequences couldn't possibly match the game

input
atob a b
output
forward

input
aaacaaa aca aa
output
both

input
aab b aa
output
backward

input
3 3 3 8 3 14 3
output
1 1 1 4 2 2 2 6 6

In "Color Trail", each color appears only once as the game progresses, so the same color can't be seen twice in a row. The first and last colors of the full sequence are not included in Priyam's recollections.

J. Recycling Centers

1 s., 256 MB

In the bustling city of Numeropolis, Mayor Abhay has initiated a citywide recycling program. Each day, the city collects n recyclable items that need to be distributed among k recycling centers and $k = 3$ for this question. To ensure efficient processing, Mayor Abhay has established the following guidelines:

- Each recycling center must receive at least one item.
- The total number of items distributed among the 3 recycling centers (a_1, a_2, a_3) must equal n i.e. $a_1 + a_2 + a_3 = n$.
- To prevent overload, the least common multiple (LCM) of the number of items each center receives must not exceed $\frac{n}{2}$, i.e. $lcm(a_1, a_2, a_3) <= \frac{n}{2}$.

As the city's logistics expert, your task is to determine a valid distribution of items to the recycling centers that meets these criteria.

Input
The first line contains a single integer t $(1 \le t \le 10^4)$ — the number of days for which you need to plan the distribution. For each day, there is one line containing two integers n and k $(3 \le n \le 10^9, k = 3)$ — the total number of recyclable items and the number of recycling centers, respectively.

Output
For each day, output k positive integers $a_1, a_2, \ldots, a_k$, representing the number of items each recycling center should receive. These numbers must satisfy all the given conditions.