DIU Take-Off Programming Contest Fall 2022 Slot D

Daffodil International University

https://toph.co/c/diu-take-off-fall-2022-slot-d

Toph

Schedule

The contest will run for **3h0m0s**.

Authors

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Rules

This contest is formatted as per the official rules of ICPC Regional Programming Contests.

You can use C GCC 5.3, C++11 GCC 7.4, C++14 GCC 8.3, C++17 GCC 9.2, C++20 GCC 12.1, and C11 GCC 9.2 in this contest.

Be fair, be honest. Plagiarism will result in disqualification. Judges' decisions will be final.

Notes

There are 8 challenges in this contest.

Please make sure this booklet contains all of the pages.

If you find any discrepencies between the printed copy and the problem statements in Toph Arena, please rely on the later.

A. Flying Horse

Have you ever thought of riding a **“Flying Horse”**?

It was the 19th century, a time of great change in England. A girl named Ada was born, who dreamed of making a steam-powered flying horse.

Sometimes her mother, Lady Anne Isabella Milbank, took her to see the new exciting factories. They inspired her to dream up her new ideas like flying horses.

At the age of 16, she started going to fancy parties full of fascinating people. There she met Charles Babbage, an inventor of machines that would compute the trickiest math problems. Charles needed help from Ada in programming his machine. With her incredible math skills and imagination, she was able to come up with that program. Ada foresaw a world where such a machine could one day make words, pictures, and music. She envisioned the computer we use today and is now known as the **world's first Computer Programmer**.

Now your task is to use your skills, start your **“Competitive Programming”** journey to print this sentence **“Ada Lovelace, The Enchantress of Numbers!”.**

Can you write a program to print **“Ada Lovelace, The Enchantress of Numbers!”**(without quotations)? Let’s make your task easier. Here is the C program to write **“Hello World”**. Good Luck!!!🫡

```
#include <stdio.h>

int main() {
    printf("Hello World\n");
    return 0;
}
```

Input

There is no input for this problem.

Output

Output the line mentioned in the statement to print.

Notes: Be careful about the newline(‘\n’) at the end.

B. Hatred

Human psychology is amusing. We like to love. We want to embrace everything that we love. May it be a person or a thing. But most of the time we remember the thing we hate the most. Now you might be wondering how, right? Well the thing is what we hate the most we check on it every time we get free time. Like what is the status of that thing or that person. Is that thing or person doing great? If they're doing great, why are they doing great? Why hasn't that thing is not vanished yet? Etc etc.

Now the problem setter has a bag that has a lock. And to open the lock it demands a passcode. One day the setter was thinking about what number he should give as a passcode so he remembers it correctly. So, he thought of giving something that he hates. Nowadays he hates the number 6. Why, though? Reason is pretty simple. Because from this semester his college ruled the semester to be 6 months long and he's suffering from exhaustion. That's why he hates the number 6. So he decided to set the passcode as six sixes. That means the passcode is 666666. Now you've something of yours in the setter's bag. Your task is to open the bag with the correct passcode.

Input

There will be only one number.

$$\mathbf{0 \leq number \leq 10^8}$$

Output

If you cracked the passcode correctly then the bag will show **"Agh! It opened"** without quotations. If not then the bag will show **"Aww! You failed to open"** without quotations.

Samples

Input	Output
66666	Aww! You failed to open

Input	Output
666666	Agh! It opened

Don’t forget to add newline at the end of the line.

C. Clumsy Scoreboard

Onuron loves watching cricket and considers himself a huge cricket fan of the Bangladesh cricket team. He went to watch a match between Bangladesh vs India which was a knockout match, so winning is important for both teams to qualify for the final.

In that match, India won the toss and elected to bat first and they scored X runs. In reply, Bangladesh is batting second and their current score is Y runs. When Onuron looked at the scoreboard he noticed that the target shown on the big screen was wrong and he thought that might cause problems for the Bangladesh team in order to reach their target. He then rushed to the technical support team. The technical lead of the team knows you as a well-known famous programmer and mathematician, and he asks for your help to fix the issue. For sake of the Bangladesh team, you agreed to help them with your programming and mathematical prowess.

So, now your task is to calculate the **minimum** number of runs required by the Bangladesh team to win the match.

Input

In the first line, there will be two integers $0 \leq Y \leq X \leq 2000$ separated by spaces. X denotes runs scored by India and Y indicates the current score of Bangladesh.

Output

You have to output the minimum number of runs needed for Bangladesh to win the match.

Samples

Input	Output
312 186	127

Input	Output
345 275	71

Be careful about the newline('\n') at the end.

D. G.O.A.T

Two of the greatest football players $CR10$ and $LM7$ are playing for the top two European Clubs, for their club they're already club legends based on their achievement. They've already won everything for their club career, both of them have impressive stats, they have similar records at international level and very similar trophy hauls for their respective country. When it comes to league titles for their club $LM7$ won 10 times, $CR10$ won 7 times, but unlike $LM7$, he can claim to have won league in three different countries. $CR10$ has an edge over $LM7$ in the Champions League, $CR10$ won the UEFA Champions League five times and all-time leading goal scorer in the Champions League, something that increases his claim to the GOAT crown in the eyes of some. On the other hand, $LM7$ won the UCL four times, but when it comes to assists, $LM7$ is much superior to $CR10$ and that contrast has become increasingly stark as their respective roles evolve.

The FIFA World Cup Qatar 2022 final has been held today, both of them played the final with their respective country, but **CR10 have won the FIFA World Cup 2022** with his country. So who really is the greatest of all time? Never mind who you prefer, as we all know, there is no other player in their era who can score more goals than two of them. FIFA hired you to find out who will be the **Golden Boot Award** Winner this World Cup. So your job is to find out who will be the winner, FIFA has given some rules to determine the winner.

- The player with the most goals scored in that competition will be the winner.
- If two players ended with the same number of goals, the player with the most assists wins the Golden Boot.
- If players are still tied, the winner of the World Cup wins the award.

Input

The only line of input will contain four integers $1 <= A, B, C, D <= 100$. A, B indicating the goals and assists of CR10 and C, D indicating LM7's goals and assists respectively.

Output

You have to output a single line, **"GOAT CR10"** (without quotes) if $CR10$ wins the Golden Boot, or **"GOAT LM7"** (without quotes) otherwise.

Samples

Input	Output
16 7 15 8	GOAT CR10

Input	Output
17 9 17 19	GOAT LM7

E. Chocolate

Jarin is a chocoholic. She loves chocolate more than anything. But she lives in a strange country. The government of that country doesn't like people who are addicted to chocolate. For that reason, the government made a strange rule. That is, no one can buy more than X chocolates from a shop. Such a weird rule isn't it? I mean, who does that? Jarin is intelligent and wants to buy as many chocolates as possible. So, she visits all the shops in that country and buys as much chocolate as possible.

Suppose there are 3 shops and each of them has $1, 2, 2$ chocolates consecutively and the maximum amount of chocolates Jarin can buy is 2. So the maximum number of chocolates she can buy will be $1 + 2 + 2 = 5$.

There are N shops in that country and each of them contain Y chocolates. Can you write a program to find out the maximum numbers of chocolates Jarin can buy?

Input

First line of input will contain two integers N, X indicating the number of shops and the maximum number of chocolate she can buy from a store.

Second line of input will contain N numbers. Each of the numbers Y will indicate the number of chocolates available in the store.

$\mathbf{1 \leq N \leq 10^5}$

$\mathbf{1 \leq X \leq 10^3}$

$\mathbf{1 \leq Y \leq 10^8}$

Output

You have to output exactly one integer, the maximum number of chocolates she can buy.

Samples

Input	Output
5 3 1 2 3 4 5	12

Input	Output
3 2 1 2 2	5

Input	Output
7 8 7 7 7 7 7 7 7	49

F. Meet in the Middle

Once there lived 4 friends A, B, C, and D in ***P_Land***. They bought a rectangular piece of land to build their house. They decide that they will build 4 houses on 4 corners of the land. They will live in separate houses and make sideroads in a such way that there are four roads between A to B, B to C, C to D and D to A respectively. You can go both direction by using these roads. For example you can go from A to B as well as from B to A.

Now, you are given the coordinates of 4 houses of peoples A, B, C, D, and two friends' names who want to meet each other. You need to calculate the minimum distance they need to cross to meet each other.

Input

The first line will be the coordinates of 4 corners according to $(x_1, y_1), (x_2, y_2), (x_3, y_3), and (x_4, y_4)$. And the second line will take the name of the two friends P_1 and P_2.

$1 \leq x_1, y_1, x_2, y_2, x_3, y_3, x_4, y_4 \leq 10^5$

$A \leq P_1, P_2 \leq D$

Output

Print the minimum distance P_1 and P_2 need to cross to meet each other. Your answer will be considered correct if its error doesn't exceed 10^{-4}.

Samples

Input	Output
0 0 1 0 1 1 0 1 A B	1.00000000000000000

Input	Output
0 0 1 0 1 1 0 1 A D	1.000000000000000

Input	Output
0 0 1 0 1 1 0 1 A C	2.0000000000

G. Doppelgänger

Kurt and Cobain are twin brothers, and both of them look alike. They look pretty similar that people can not differentiate between them. Even close friends of theirs can't recognize them without seeing or talking closely, who is Kurt and who is Cobain. They also wear similar clothes wherever they go together. But when it comes to the string they have a different choice, **Kurt likes only characters** and **Cobain likes only digits**. These twins are close friends of yours, they've given you a string S and a number K, the string which can contains digits $(0-9)$, lowercase $(a-z)$ and uppercase $(A-Z)$ letters of the Latin alphabet.

Kurt wants to remove all the digits from the string S and form a new string X which will only consist of Latin letters. On the other hand, Cobain wants to remove all the letters and form an integer Y from the string S**.** For the sake of friendship, They asked your favors, to split the string. During the splitting, you can not change the order of any letters or digits. After splitting the string, you will get a new string $X$and an integer Y. Now you have to check whether the integer $Y$is divisible by Kor not. If $X$is divisible by K print the integer Y without any leading zero. Otherwise print the string X.

Input

The first line of input contains two integers $N(1 \leq N \leq 100)$and $K(1 \leq K \leq 10^9)$

The second line of input contains a string S. String S is consists of N characters where each of them can be digit, lowercase and uppercase Latin letters.

It is guaranteed that extracted integer Y from the string S is always less than 10^9.

Output

In the output line print the integer Y, if Y is divisible by K. Otherwise, print the string X.

Samples

Input	Output
9 7 D7i0uAc7m	707

Input	Output
In the first sample input, we have the following: After splitting numbers and characters from the string S=”D7i0uAc7m” we found X=”DiuAcm” and Y=707. Here, 707 is divisible by 7 so, answer is 707.	

Input	Output
`8 10` `dra4g9on`	`dragon`
In the second sample input we have: After splitting numbers and characters from the string S=”dra4g9on” we found X=”dragon” and Y=49. Here, 49 is not divisible by 10 so, answer is dragon.	

H. Average Player

Our friend Oindrila is playing a game. In this game she can form her own army with the help of available troops. There are N troops and each of them have some health points and attack power. The health point of a troop is X and attack power of a troop is equal to the number of divisors of health point of that troop. She can take any number of troops, maybe no troops at all, but she can't take similar troops more than once.

Suppose Oindrila has an army of $N = 3$ troops and the health points are$\{14, 15, 16\}$ then the attack values will be $\{4, 4, 5\}$.So, Oindrila can from team whose attack power will be $\{4, 4, 5\}, \{4, 4\}, \{4, 5\}, \{4, 5\}, \{4\}, \{4\}, \{5\}, \{\}$one of these combination.

As we see there are 2^N possible unique army combinations. From these combinations she will form the team whose team average attack power is maximum. Suppose a team has attack power $\{1, 2, 3\}$so the average attack power of that team will be$(1 + 2 + 3)/3 = 2$. Can you find out which will be the maximum average attack power over all possible army combinations?

Input

The first line will be a single integer $T(\mathbf{1 \leq T \leq 10})$ indicating the number of test cases.The following lines contain the description of each test case.

The first line of each test case contains an integer $N(\mathbf{1 \leq N \leq 10^4})$i - the number of troops.

The second line contains the N integers each of them indicate the health point of each troop $X(\mathbf{1 \leq X \leq 10^9})$.

Output

You have to output Tlines in format "$Case\ X$: Y"(without quotes) where X is the number of test cases starting from 1 and Y is the result of the test case exactly four digits after decimal. Check out the samples for clarification.

Samples

Input	Output
2 5 240 840 11540 285285 3437005 3 38115 393129 765567	Case 1: 64.0000 Case 2: 36.0000