

Problem A. Al-Quds

Input file: standard input
Output file: standard output
Balloon Color: Green

Al-Quds is a city in the Southern Levant, on a plateau in the Judaeen Mountains between the Mediterranean and the Dead Sea. It is one of the oldest cities in the world and is considered holy to the three major Abrahamic religions—Judaism, Christianity, and Islam. Throughout its long history, Al-Quds has been destroyed at least twice, besieged 23 times, captured and recaptured 44 times, and attacked 52 times. The first fixed name for the city of Al-Quds is "Ursalem," which appears in the Egyptian Amarna letters and means the foundations of Salem. Salem is the name of the Canaanite god, the protector of the city, and it was said that the city of peace.

Yahya is a playful boy who wants to playfully throw paper balls at his classmates. However, each classmate has a reaction time to dodge the ball.

There are n classmates in Yahya's classroom, the i -th classmate has A_i reaction time, and D_i is the distance between Yahya and the i -th classmate.

If Yahya throws the paper ball at a speed v , determine how many classmates he can successfully hit with the ball. A classmate will avoid the ball if their reaction time is **strictly less** than the time it takes for Yahya's ball to reach them.

Input

The first line contains two integers n and v ($1 \leq n \leq 10^5, 1 \leq v \leq 10^9$) — the number of classmates and Yahya's paper ball speed, respectively.

The second line contains an array A of n integers ($1 \leq A_i \leq 10^9$) — The i -th classmate reaction time.

The third line contains an array D of n integers ($1 \leq D_i \leq 10^9$) — the distance between Yahya and the i -th classmate.

Output

Output a single integer — the number of classmates Yahya can hit with the paper balls.

Example

standard input	standard output
5 10 1 2 3 4 5 9 5 6 4 7	5

Note

In the Example, Yahya can hit all 5 classmates because their reaction times are greater than the time it takes for Yahya's paper ball to reach them.

classmate number	classmate distance	Yahya time to hit	classmate reaction time
1	9	0.9 s	1
2	5	0.5 s	2
3	6	0.6 s	3
4	4	0.4 s	4
5	7	0.7 s	5

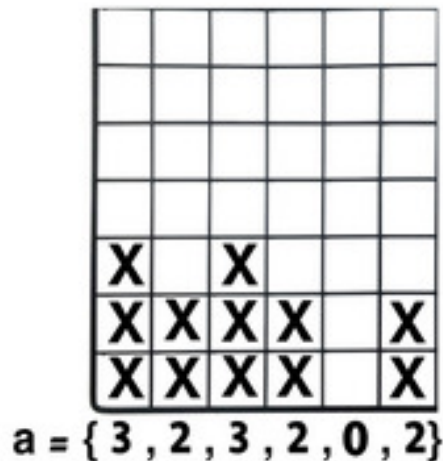
Problem B. Bir Seb'a

Input file: standard input
Output file: standard output
Balloon Color: Bronze

Bir Seb'a is the largest city in the Negeb desert of southern Palestine. Often referred to as the "Capital of the Negeb" it is the centre of the fourth-most populous metropolitan area in Palestine. The population of the town was completely changed in 1948–49. Bir Seb'a, as it was then known, had been almost entirely Muslim, and was designated to be part of the Arab state in the 1947 UN Partition Plan.

Yahya is a smart student. Every time he goes to the Physics Dinosaur, he wonders how much money the teacher makes in one lesson. The teacher's hall is a grid with n columns and infinite rows. Each cell is a place for one student, except for a_i first chairs in the i -th column that are broken chairs.

Yahya attended the physics lessons for q days. The only information he knows is that on the i -th day, the first q_i rows were occupied. If the teacher takes 50 EGP from each student, for each day, print how much money he made.



For example, if $a = \{3, 2, 3, 2, 0, 2\}$, if only the first row is occupied, the teacher earns 50 EGP because there is only one unbroken chair that can be used in the first row. However, if the first 2 rows were occupied, the teacher earns 100 EGP because there are two unbroken chairs.

Input

The first line contains two integers n and q ($1 \leq n \leq 10^6$, $1 \leq q \leq 10^5$) — the number of columns in the teacher's hall and the number of days Yahya attended the physics lessons, respectively.

The second line contains n space-separated integers a_1, a_2, \dots, a_n ($0 \leq a_i \leq 10^9$) — the number of broken chairs in the i -th column.

Followed by q lines, each line contains only one integer q_i ($1 \leq q_i \leq 10^9$) — the number of occupied rows on the i -th day.

Output

Print q lines, each line contains only one integer, how much the teacher earned on the i -th day.

Examples

standard input	standard output
6 3 3 2 3 2 0 2 1 3 10	50 300 2400
5 1 1 1 1 1 1 2	250

Problem C. Caesarea

Input file: standard input
Output file: standard output
Balloon Color: Rose

Caesarea Maritima, Caesarea Palaestinae or Caesarea Stratonis, was an ancient and medieval port city on the coast of the Eastern Mediterranean, and later a small fishing village. It was the capital of Roman Judaea, Syria Palaestina and Palaestina Prima, successively, for a period of c.650 years, and a major intellectual hub of the Mediterranean, from the time of Herod I until the Muslim conquest of the Levant. The town is considered an archaeological tourist site, as it contains the remains of a Roman city, walls, a port, a racetrack, a temple, Crusader walls, a sloping fortification base, a rectangular Roman building, foundations and architectural pieces, carved rocks and canals.

You are given an $n \times m$ grid, where each cell in the grid can contain '#', '.' or a digit from '1' to '9'.

Starting from the top-left cell (1,1), your task is to determine the minimum number of cells, regardless of their type, you need to pass through to arrive at the last cell (n, m) and stop there. don't count the last cell in your answer.

Here's how each character affects movement:

- '.': Represents an empty cell, from which you can only move one cell forward.
- '#': Represents an obstacle that decreases your position by 2 without passing through the previous cell if encountered.
- Digits from '1' to '9' represent boosters that Increase your position by the digit's value. You can choose to use the booster or skip it. However, you cannot use a booster if it would move you out of the grid

When you reach the end of a row, you wrap around to the beginning of the next row. The movement stops once you reach the end of the last row.

It's guaranteed that no '#' will get you out of the grid and no '#' at end point (n, m).

Input

The first line contains two integers n and m ($1 \leq n, m \leq 10^3$), representing the dimensions of the grid.

The following n lines contain m characters each, representing the grid.

Each character in the grid can be '#', '.' or a digit from '1' to '9'.

Output

Print the minimum number of cells you need to pass through to arrive at the last cell (n, m) or print -1 if it's impossible to arrive there.

Example

standard input	standard output
3 4 ..2# 233. 2#..	7

Problem D. Dura

Input file: standard input
Output file: standard output
Balloon Color: Purple

Dura is a Palestinian city located eleven kilometers southwest of Hebron, in the southern West Bank, in the Hebron Governorate of the State of Palestine. According to the Palestinian Central Bureau of Statistics, the town had a population of 39,336 in 2017. The current mayor is Ahmad Salhoub. Dura is identified with the ancient town of Adoraim, a city of Judah that, according to the Bible, was fortified by Rehoboam. The town is also mentioned in other ancient texts such as the Amarna Letters, the Anastasi Papyrus, and the Zenon Papyri. During the Hellenistic period, the town, then also known as Adora.

Let $a = [a_1, a_2, \dots, a_n]$ denote an array of size n .

Let's define $f(x, y) = 2(x \mid y) - (x + y)$ where \mid represents the bitwise OR operation.

You are required to process the following types of queries:

1. **Range Sum Query:** Given indices l and r , compute the sum of the array elements in the segment $[l, r]$
2. **Range Update Query:** Given indices l, r , and an integer b , for each $i (l \leq i \leq r)$ assign $a_i := f(a_i, b)$.

Input

The first line contains integer $n (1 \leq n \leq 10^5)$ — the size of the array.

The second line contains n space-separated integers $a_1, a_2, \dots, a_n (0 \leq a_i \leq 10^9)$ — the original array.

The third line contains an integer $q (1 \leq q \leq 10^5)$ — the number of queries, followed by q lines.

The beginning of each of the next q lines contains an integer $type (1 \leq type \leq 2)$

- If $type = 1$, two integers $l, r (1 \leq l \leq r \leq n)$ will follow separated by whitespaces.
- If $type = 2$, three integers $l, r, b (1 \leq l \leq r \leq n, 0 \leq b \leq 10^9)$ will follow separated by whitespaces.

Output

For each query of type 1 (**Range Sum Query**) print in a single line the sum of numbers within the given segment. Print the answers to the queries in the order in which the queries go in the input.

Examples

standard input	standard output
5 4 10 3 13 7 8 1 2 4 2 1 3 3 1 2 4 1 3 3 2 2 5 5 1 1 5 2 1 2 10 1 2 3	26 22 0 34 11
10 26 6 27 28 28 19 14 8 0 24 3 2 7 8 16 1 4 7 2 6 9 10	105

Problem E. Ein es-Sultan

Input file: standard input
Output file: standard output
Balloon Color: Red

Ein es-Sultan is a natural spring in Jericho, at the site of ancient Jericho, which has been identified with the tell (archaeological mound) known as Tell es-Sultan. It is known by Jews and Christians as the Spring of Elisha/Elisha's Spring, based on a biblical story about Prophet Elisha. In 2010, the spring saw the end of a year-long rehabilitation programme. By 2000 a protective building which helps avoid contamination of the water had been erected over the spring, and by 2010 the rehabilitation included the old facilities, the preservation of archaeological remains, and landscaping works at the site for tourism purposes.

You are standing at the fourth vertex of a complete graph with four vertices. You want to count the number of paths that have a length of at most n and end at the starting vertex.

Complete graph: is a graph that every pair of node have an edge between them.

As the result can be very large, you should print the answer modulo $10^9 + 7$

Input

The only line contains one integer n ($1 \leq n \leq 10^{16}$) — the maximum length of a path.

Output

Print integer c — the number of paths.

Examples

standard input	standard output
4	30
14	1793613
1	0

Problem F. Falujah

Input file: standard input
Output file: standard output
Balloon Color: Blue

Al-Falujah is a Palestinian village located between Hebron and Gaza, 30 km away from them, and 100 m above sea level. It is bordered by the Fallujah Valley. It was called Zuraig Al-Khandaq and later changed to the name Al-Falujah, attributed to one of the masters of the Sufi order known as Sidi Ahmed Al-Faluji because he acquired this title because he came from the current "Iraqi" town of Fallujah. The village was an important commercial center frequented by merchants and citizens from neighboring villages such as Barkosia, Baalin, Samil, Zeta and others. There was a large, old mosque in Al-Falujah, with three corridors, domes, and a courtyard, in which Sheikh Al-Faluji was buried. It also contained shrines and shrines of saints and mujahideen from the period of the Crusades.

Yahya is a serial killer, and he is not good at programming, so he asks his friend Adnan to help him with his problem.

Adnan loves Yahya, so he will try his best to help him, but he is not good too. Can you help Yahya with his problem?

Yahya has an array A of size N and an integer X ($2^0 \leq X \leq 2^{32} - 1$).

You are allowed to perform one type of operation on it (zero or more times):

- Select j in the range ($0 \leq j \leq 31$) and i in the range ($1 \leq i \leq N$) and make $A_i = A_i \mid 2^j$ where \mid represents the bitwise OR.

Yahya wants to make XOR of all elements in the array at least X .

Can you find what is the minimum number of operations you need to make XOR of all elements in the array at least X ?

If you can't make it at least X , then print -1 .

Input

The first line of the input contains 2 integers N and X ($1 \leq N \leq 2 \cdot 10^5$, $2^0 \leq X \leq 2^{32} - 1$).

The second line of the input contains N integer numbers A_1, A_2, \dots, A_n ($2^0 \leq A_i \leq 2^{31}$) the elements of the array.

Output

If there is no such answer, print -1 (without quotes); otherwise, print the minimum number of operations you need.

Examples

standard input	standard output
5 20 1 3 8 2 6	1
5 10 1 3 8 2 6	0

Problem G. Gaza

Input file: standard input
Output file: standard output
Balloon Color: Orange

The Gaza Strip or simply Gaza, is a polity and the smaller of the two Palestinian territories (the other being the West Bank). On the eastern coast of the Mediterranean Sea, Gaza is bordered by Egypt on the southwest and Palestine on the east and north. The Gaza Strip is 41 kilometres (25 miles) long, from 6 to 12 km (3.7 to 7.5 mi) wide, and has a total area of 365 km² (141 sq mi). With around 2 million Palestinians on approximately 365 km² (141 sq mi) of land, Gaza has one of the world's highest population densities.

Given an array a of n elements, and q queries. Each query is in one of the following formats:

- 1 i X ($1 \leq i \leq |a|$), ($0 \leq X \leq 10^9$): to change element at index i to the **last bit** of $(a_i \text{ Xor } X)$, i.e. $1 \& (a_i \oplus x)$.
- 2 l r ($1 \leq l \leq r \leq |a|$): to calculate decimal representation from l (Most Significant Bit) to r (Least Significant Bit) in the array if possible.

You have to print the output for all queries of the second type if possible, otherwise, print “*Impossible*” without quotations.

If the answer is too huge, output the result $\text{mod } 10^9 + 9$.

Input

The first line contains a positive integer n ($1 \leq n \leq 10^5$), the number of elements in the array.

The second line contains n values, and the i^{th} element a_i in the array a . ($0 \leq a_i \leq 10^9$)

The third line contains a positive integer q ($1 \leq q \leq 5 \times 10^5$), the number of queries. Followed by q lines containing the queries, one per line. Each query is given in the format described in the problem statement. It is guaranteed that there is at least one query of the second type.

Output

For each second query type, output the decimal representation, or “*Impossible*” if not possible, in a separate line.

Example

standard input	standard output
5	Impossible
1 2 3 8 6	6
8	Impossible
1 2 5	27
2 1 3	
1 3 5	
2 1 3	
2 1 5	
1 4 5	
1 5 9	
2 1 5	

Note

It's only eligible to apply this operation on the array's elements of values 0s or 1s.

For the first example, we have our array: $[1, 2, 3, 8, 6]$.

After the first query, it will be $[1, \underline{1}, 3, 8, 6]$ as $2 \oplus 5 = 7 = (111)_2$, so the last bit 1 will replace element 2.

After the second query, we can't get the decimal representation because of the element 3.

After the third query, it will be $[1, 1, \underline{0}, 8, 6]$ as $3 \oplus 5 = 6 = (110)_2$, so the last bit 0 will replace element 3.

After the fourth query, the output will be $6 = (110)_2$.

...

After applying all queries of the first type, the array will be $[1, 1, 0, 1, 1]$.

Problem H. Haifa

Input file: standard input
Output file: standard output
Balloon Color: Yellow

The city of Haifa is one of the largest and most important historical cities in Palestine. It is located today on the eastern coast of the Mediterranean Sea, and is about 158 km away from Al-Quds to the northwest. Its population is about 284,560 people (until mid-2023 AD) in addition to 300,000 living in the residential suburbs around the city, making it the third largest city in the country. The city is located at latitude 32.49 north and longitude 35 east. It is the meeting point of the Mediterranean Sea with both the plain and Mount Carmel. This made it an obligatory crossing point, as the width of the coastal plain is less than 200 metres, and it rises above sea level at a rate of 450 metres. Its location also made it one of the most important seaports, and made it a gateway to the region across the Mediterranean.

Given an array a of n numbers, you have to rearrange it to have at least k mountains or report that no such rearrangement of the array a exists.

we define a mountain as any i ($1 < i < n$) such that $a[i - 1] < a[i] > a[i + 1]$

A rearrangement means changing the order of the numbers inside the array but not the numbers themselves for example $a = [1, 2, 3, 1, 5]$ then a valid rearrangement is $[1, 1, 2, 5, 3]$ but not $[1, 2, 3, 4, 5]$ as 4 does not appear in the original array

Input

The first line of input contains T ($1 \leq T \leq 10^5$) the number of test cases.

Each test case is represented by 2 lines where:

The first line contains n, k ($1 \leq n \leq 10^5$), ($0 \leq k \leq 10^5$) the number of elements of array a and the required number of mountains.

The next line contains n integers a_1, a_2, \dots, a_n $0 \leq a_i \leq 10^9$ the numbers in the array a

The sum of n over all test cases will not exceed 10^5

Output

For each test case print n numbers: the new rearrangement of the array a such that it contains at least k mountains. **If there are multiple valid rearrangements print any of them. Or print -1 if there is no valid rearrangement.**

Note: You do not have to maximize the number of mountains.

Example

standard input	standard output
3	-1
3 1	1 4 2 5 3
1 1 1	2 1 2 1 1
5 2	
1 2 3 4 5	
5 1	
1 1 2 2 1	

Problem I. Ibrahimi Mosque

Input file: standard input
Output file: standard output
Balloon Color: Pink

The Sanctuary of Abraham , is a series of caves situated 30 kilometres (19 mi) south of Al-Quds in the heart of the Old City of Hebron in the West Bank. According to the Abrahamic religions, the cave and adjoining field were purchased by Abraham as a burial plot, although most historians believe the Abraham-Isaac-Jacob narrative to be primarily mythological. The site is considered a holy place in Judaism, Christianity, and Islam. According to Genesis Abraham's wife Sarah dies in Kiryat Arba near Hebron in the land of Canaan at the age of 127, being the only woman in the Bible whose exact age is given, while Abraham is tending to business elsewhere.

As we know, the set is a list of elements that doesn't allow duplicates. Also, we know that the intersection \cap between two sets is the elements which are common in both of them, and the union \cup between two sets is all the elements in both of them without duplicates. For example,

$S_1 = a, b, c$ and $S_2 = b, c, d$ then $S_1 \cap S_2 = b, c$, $S_1 \cup S_2 = a, b, c, d$

Now, let S_1 be a set of all subsequences of string x and let S_2 be a set of all substrings of string x .

Folka has an integer k and wants to find a non-empty string x such that:

- x contains only English lowercase alphabetical letters.
- x is the smallest positive length. If there are multiple answers, print the smallest lexicographically.
- The characters in x are sorted in non-decreasing order.
- $|S_1 \cup S_2| - |S_1 \cap S_2| = k$.

$|S|$ = the number of elements in the set S .

A subsequence of a string is a string which can be obtained by removing several (possibly zero) characters from the original string. A substring of a string is a contiguous subsequence of that string.

Input

The first line contains a single integer T ($1 \leq T \leq 500$) — the number of testcases.

For each testcase, a single line contains a single integer k ($1 \leq k \leq 5000$).

Output

For each testcase, print the string x .

Example

standard input	standard output
3	a
1	abc
2	abcde
17	

Note

For the first testcase, string $x = a$

Subsequences S_1 are :

1. "
2. 'a'

Substring S_2 are :

1. 'a'

$$|S_1 \cup S_2| - |S_1 \cap S_2| = 2 - 1 = 1 = k$$

For the second testcase, string $x = abc$

Subsequences S_1 are :

1. "
2. 'a'
3. 'ab'
4. 'abc'
5. 'ac'
6. 'b'
7. 'bc'
8. 'c'

Substring S_2 are :

1. 'a'
2. 'ab'
3. 'abc'
4. 'b'
5. 'bc'
6. 'c'

$$|S_1 \cup S_2| - |S_1 \cap S_2| = 8 - 6 = 2 = k$$

Problem J. Jenin

Input file: standard input
Output file: standard output
Balloon Color: Silver

Jenin is a Palestinian city, the center of Jenin Governorate and its largest city, located in the northern West Bank of the Palestinian Authority. Historically, it is considered one of the triangle cities in northern Palestine, and is 75 kilometers north of Jerusalem. Jenin overlooks the Jordan Valley to the east, and Marj Bin Amer to the north. Despite its small population compared to other Palestinian cities, it has an economic weight much greater than its population size. The city has a population of 39,000 people, while the governorate has about 256,000 people. The area of the city of Jenin alone reaches 21,000 dunams, making it the fifth largest Palestinian city in the West Bank after the cities of Hebron, Nablus, Tulkarm, and Yatta.

You are given a coordinate system with the x and y axes ranging from -10^6 to 10^6 .

There are n rectangles, numbered from 1 to n . Each rectangle is defined by its lower-left corner (x_1, y_1) and upper-right corner (x_2, y_2) . Rectangles can overlap.

Your task is to find the maximum number of rectangles that overlap at any point.

Input

The first line contains an integer n ($1 \leq n \leq 1000$) — the number of rectangles.

The following n lines contain four integers x_1, y_1, x_2, y_2 ($-10^6 \leq x_1 \leq x_2 \leq 10^6$) and ($-10^6 \leq y_1 \leq y_2 \leq 10^6$) — representing the coordinates of the lower-left and upper-right corners of the i_{th} rectangle.

It is guaranteed that each rectangle's area is at least 1 square unit, and the sum of the areas of all rectangles does not exceed 2×10^6 square units.

Output

Print the maximum number of rectangles that overlap at any point.

Example

standard input	standard output
4 1 0 3 3 2 1 5 6 2 2 4 4 6 -1 7 0	3

Problem K. Khan Yunis

Input file: standard input
Output file: standard output
Balloon Color: Light Blue

Khan Yunis is a Palestinian city, and the center of Khan Yunis Governorate. It is located in the southern part of the Gaza Strip, and is 100 km away from Al-Quds to the southwest. It is bordered to the south by the city of Rafah and to the north by the city of Deir al-Balah. It is the center of a coastal governorate overlooking the Mediterranean Sea to the west and the Negev Desert to the east. Khan Yunis is considered the second largest city in the Gaza Strip in terms of population and area after Gaza City, with a population today of more than 451,000 people, which represents 16 percent of the population of the Gaza Strip. Its area is 54 square kilometers, making it one of the most densely populated Palestinian cities.

You are given an array a of length n . Your task is to find the total sum of the scores of all subsequences s of the array a . The score of a subsequence s is defined as the sum of the absolute differences between consecutive elements of the subsequence.

More formally, the score of a subsequence s can be expressed as $\sum_{i=2}^k |s_i - s_{i-1}|$, where k is the length of the subsequence s and $|s_i - s_{i-1}|$ represents the absolute difference between consecutive elements s_i and s_{i-1} of the subsequence.

Your goal is to calculate the total sum of the scores for all possible subsequences of the array a .

Input

The first line contains a single integer n ($1 \leq n \leq 10^5$), the length of the array.

The second line contains n integers a_1, a_2, \dots, a_n ($-10^9 \leq a_i \leq 10^9$), the elements of the array.

Output

Output a single integer, the sum of scores of all subsequences of the given array modulo $10^9 + 7$.

Examples

standard input	standard output
3 2 7 5	17
1 5	0

Note

If the length of a subsequence s is less than 2, the score is considered to be 0.

Problem L. Lifta

Input file: standard input
Output file: standard output
Balloon Color: Gold

The village was founded by the Canaanites. It was called Naftuh, which means conquest in the Canaanite language. "Nafto" during the period of Byzantine rule, and during the period of the Crusader occupation, it was called "Klepsta," while the Arabic name since the Islamic conquest is "Lifta". Lifta is located on lands of the city of Al-Quds on an area of 8,743 dunams. The center of Lifta is approximately 2 kilometers away from the center of the Holy City, and Lifta shares lands and real estate with many surrounding villages. Lifta shares borders with more than six villages. Lifta is declared as a national nature reserve. It has been referred to as the "Palestinian Pompeii". In 2011, plans were announced to demolish the village and build a luxury development consisting of 212 luxury housing units and a hotel.

You are given a tree consisting of n nodes, each node uniquely numbered from 1 to n . Additionally, there are m paths between pairs of nodes in the tree, where each path is associated with a positive integer value p . Furthermore, q queries are provided, each query represented by two integers x and y .

Your task is to process these queries efficiently. For each query (x, y) , find all paths passing through both nodes x and y , and calculate the bitwise XOR (\oplus) of their associated values.

Input

The input consists of multiple test cases. The first line of the input contains an integer T ($1 \leq T \leq 10^5$), the number of test cases.

Each test case starts with a line containing three integers n , m , and q ($1 \leq n, m, q \leq 10^5$) – the number of nodes in the tree, the number of paths, and the number of queries, respectively.

The next $n - 1$ lines describe the tree structure. Each of these lines contains two integers u and v ($1 \leq u, v \leq n, u \neq v$) denoting an edge between nodes u and v .

The following m lines describe the paths. Each path description consists of three integers a , b , and p ($1 \leq a, b \leq n, 1 \leq p \leq 10^9$) denoting a path between nodes a and b with a value of p .

The next q lines represent the queries. Each query consists of two integers x and y ($1 \leq x, y \leq n$).

The sum of n , m , and q over all test cases doesn't exceed 10^5 .

Output

For each test case, output the results of the queries. For each query, output a single integer representing the XOR of all values of the paths that pass through nodes x and y .

Example

standard input	standard output
2	3 2 3
6 3 3	25 10 0 11 13
1 2	
1 3	
2 4	
2 5	
3 6	
1 2 1	
2 3 2	
4 5 3	
1 2	
1 3	
4 5	
5 5 5	
1 3	
2 3	
2 5	
3 4	
4 3 1	
4 5 7	
2 5 19	
5 1 13	
1 1 14	
5 5	
3 2	
1 4	
3 3	
3 1	

Note

In the given example, there are two test cases:

- For the first test case, the queries are:
 - 1, 2: The paths passing through nodes 1 and 2 are (1-2) with value 1 and (2-3) with value 2. The XOR of these values is 3.
 - 1, 3: The paths passing through nodes 1 and 3 are (2-3) with value 2. The XOR of these values is 2.
 - 4, 5: The paths passing through nodes 4 and 5 are (4-5) with value 3. The XOR of these values is 3.

Problem M. Megiddo

Input file: standard input
Output file: standard output
Balloon Color: Black

Tel Megiddo called in Arabic Tell el-Mutesellim, 'Mound of the Governor', is the site of the ancient city of Megiddo, the remains of which form a tell (archaeological mound), situated in northern Plastine near Kibbutz Megiddo, about 30 kilometres (19 mi) south-east of Haifa, at the western edge of the Jezreel Valley. Megiddo is known for its historical, geographical, and theological importance, especially under its Greek name Armageddon. During the Bronze Age, Megiddo was an important Canaanite city-state.

Given exactly three integers, find the median. The median is the middle value in an ordered list of numbers.

Input

One line contains three unique integers a , b , and c ($1 \leq a, b, c \leq 100$).

Output

Print the median of the three numbers.

Examples

standard input	standard output
1 2 3	2
3 2 5	3