Fahim Hates Juice

Fahim doesn't like juice, but his sister Ira likes it so much, especially mixed-fruit juice. So Fahim will make a few glasses of it for her.

A mango and an orange are need to make a glass of mixed-fruit juice. Fahim has M mangoes and O oranges. What is the maximum number of glasses of mixed-fruit juice he can make?

Input

- line 1: M O

Output

- line 1: Maximum number of glasses of mixed-fruit juice Fahim can make

Constraints

- $1 \leq M, O \leq 10^9$

Subtasks

Subtask	Score	Additional constraints
1	10	$M = 1$
2	15	$M \leq 3$ and $O = 2$
3	30	$M, O \leq 200000$
4	45	No additional constraints

Examples

Example 1

```
3 5
```

The correct output is:

```
3
```

Example 2

```
4 4
```

The correct output is:

```
4
```

Sleepy Joe

Sleepy Joe is playing with a light bulb. The bulb is initially on. For the next X minutes, he will do one of the following:

- Toggle the light bulb (If it's on, turn it off. If it's off, turn it on). It takes 1 minute to do that.
- Sleep for next L minutes (light bulb will be unaffected). Note that he must wake up before or on Xth minute. Otherwise, he won't sleep.

However, Joe has a rule: he must do something each minute. That is, he must toggle the bulb, or must be in sleep each minute. Determine if it is possible to have the light bulb on after X minutes despite following the rules. If possible, output two integers M and N describing one possible scenario, where M is the number of times he toggles the bulb, and N is the number of times he goes to sleep (each time for L minutes). Otherwise, output `-1 -1`.

Input

Each test contains multiple test cases. **The first line of the input contains the number of test cases T.** Then for each of the T test cases, input is given in the following format:

- line 1: L X

Output

For each of test cases, if it is possible to have the light bulb on after X minutes, output in the following format:

- line 1: M N

Otherwise, output in the following format:

- line 1: -1 -1

If there are multiple correct solutions print any of them.

Constraints

- $1 \leq T \leq 10^5$
- $1 \leq L \leq 10^9$

- $1 \leq X \leq 10^9$

Subtasks

Subtask	Score	Additional constraints
1	10	$L = 1$
2	16	X is even
3	20	L is even
4	30	$L = 5$
5	24	No additional constraints.

Examples

Example 1

```
3
4 10
4 5
5 15
```

One possible output is:

```
2 2
-1 -1
0 3
```

In the 1st case, one possible way is to sleep twice taking $2 \times 4 = 8$ minutes, and then toggle the bulb twice taking rest of the 2 minutes. The first toggle turns the bulb off, and the second toggle turns it on again.

In the 2nd case, it is impossible to have the light bulb on after 5 minutes while doing something every minute.

In the 3rd case, one possible way is to sleep 3 times covering the entire $3 \times 5 = 15$ minutes.

Neighbor's Wi-Fi

Farhan is going to participate in an online programming competition. He has been preparing for it since last year, and he can't miss the competition in any way. However, last night, someone cut his broadband cable. So, Farhan will now break into his neighbor's Wi-Fi to get internet access. To figure out the password, he has to solve the following puzzle.

Farhan has discovered two arrays of n integers, A and B. He can do the following operation any number of times:

- Pick three integers l, r and x, such that $1 \leq l \leq x \leq r \leq n$.
- Assign $A[i] = A[x]$ for all $l \leq i \leq r$.

To crack the password, Farhan needs to find a way to transform A to B. And now, he has asked for your help. He will give you n, A, B. You have to say if there's a way, and if yes, also say how to do so with at most $n \cdot 5$ operations.

Input

Each test contains multiple test cases. **The first line of the input contains the number of test cases T.** Then for each of the T test cases, input is given in the following format:

- line 1: n
- line 2: $A[1]\ A[2] \cdots A[n]$
- line 3: $B[1]\ B[2] \cdots B[n]$

Output

For each of test cases, if it is possible to transform A to B using any number of the operation, and you'll output the sequence of operations to achieve it, output in the following format:

- line 1: `YES` K; K is the number of operation needed to transform A to B
- line $1 + i$ ($1 \leq i \leq K$): $L[i]\ R[i]\ X[i]$; values of l, r and x for the ith operation

If it is possible, but you won't output the sequence of operations, output the following:

- line 1: `YES` -1

If it is not possible to transform, output the following:

- line 1: `NO`

Constraints

Let N be the sum of n over all test cases.

- $1 \le T \le 2 \cdot 10^5$
- $1 \le n \le N \le 2 \cdot 10^5$
- $1 \le A[i], B[i] \le 10^9$ for all $1 \le i \le n$

Subtasks

Subtask	Score	Additional constraints
1	10	$n = 2$ and $T \le 500$
2	15	$B[i] = B[i+1]$ for all $1 \le i < n$
3	15	There's at most one $1 \le i < n$ such that $B[i] \ne B[i+1]$
4	25	$n \le N \le 2000$
5	35	No additional constraints

Scoring

- If you choose not to print the sequence of operations for any test case but provide the correct answer, you will receive 60% of the subtask's score.
- If you choose to print the sequence, but it is incorrect, you will receive 0 points for that subtask.
- Otherwise, you will receive full score for the subtask.

Examples

Example 1

```
2
2
23 42
23 42
4
69 96 143 10
96 69 10 10
```

The partially correct output is:

```
YES -1
NO
```

The correct output is:

```
YES 0
NO
```

Note that other valid sequences of operations can exist.

Example 2

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

The partially correct output is:

```
YES -1
```

A correct output is:

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

Note that other valid sequences of operations can exist.

Archaeologist Pepe

Pepe, the curious archaeologist, has discovered an ancient numeric inscription left by a lost civilization. The inscription consists of an array A of N numbers, believed to hold a hidden meaning.

Ancient writings indicate that the civilization measured the **stability** of any subarray $A[l \dots r]$ (i.e., values from index l to r inclusive) using the following formula:

$f(l, r) = (r - l + 1) \times$ (minimum element in $A[l \dots r]$ + second minimum element in $A[l \dots r]$)

Pepe's goal is to find the **maximum possible stability value** among **all subarrays of length at least 2** (subarrays where $1 \leq l < r \leq N$).

Input

The input consists of multiple test cases. The first line contains the integer T, the number of test cases. Then for each of the test cases, input is given in the following format:

- line 1: N
- line 2: $A[1]$ $A[2]$ $\dots$ $A[N]$

Output

For each test case, output a single line containing the **maximum stability** over all valid subarrays (subarrays of length ≥ 2).

Constraints

Let S_N be the sum of all N values over all test cases in a single input file.

- $2 \leq N \leq S_n \leq 2 \cdot 10^5$
- $1 \leq A[i] \leq 10^9$ (for all $1 \leq i \leq N$)

Subtasks

Subtask	Score	Additional constraints
1	5	$N = 2$
2	9	A contains at most 2 distinct values
3	11	$S_N \leq 500$
4	15	$S_N \leq 2000$
5	15	$1 \leq A[i] \leq 50$
6	15	$A[i]$ is generated randomly (for all $1 \leq i \leq N$)
7	30	No additional constraints.

Examples

Sample Input

```
3
3
1 2 3
5
10 5 1 3 2
3
5 10 5
```

The correct output is:

```
10
30
30
```

For the 1st test case,

- $f(1, 2) = (2 - 1 + 1) \cdot (1 + 2) = 6$
- $f(2, 3) = (3 - 2 + 1) \cdot (2 + 3) = 10$
- $f(1, 3) = (3 - 1 + 1) \cdot (1 + 2) = 9$

So, the maximum value is 10.

Painter's Treasure

While exploring the school library, Kek has found a rather unusual painting. At first glance, the painting seemed pretty simple. But after a careful and thorough inspection, Kek found a reference to a valuable treasure in the painting. To locate the treasure, he has to solve a riddle.

Kek's school has N classrooms. Each classroom has a blackboard and a light bulb. Initially, all the blackboards have the number 0 written on it, and all the light bulbs are off. The classrooms are connected by $N-1$ doors. The ith door is between the $U[i]$th and the $V[i]$th classroom. Doors are in such a way that any classroom can be reached from any other classroom.

Now, back to the riddle. The riddle has Q instructions in order. Instructions are of the following two types:

1. Start from Ath classroom and go to Bth classroom. For each classroom on the path, add X to the blackboard's number if the light bulb is off, or subtract X from the blackboard's number if the light bulb is on, write down the number on the blackboard — overwriting the previous number; and toggle the light bulb.
2. Go to the Vth classroom and note down the number written on the blackboard.

To find the treasure, Kek needs answers for each instruction of the second type. Kek is weak in counting, so he needs your help.

Input

- line 1: $N\ Q$
- line $1+i$ ($1 \le i \le N-1$): $U[i]\ V[i]$
- line $N+i$ ($1 \le i \le Q$): The ith instruction, represented as either of the following:
  - $1\ A\ B\ X$
  - $2\ V$

Output

For each instruction of the second type, output the number written on the blackboard in a separate line.

Constraints

- $2 \leq N \leq 10^5$
- $1 \leq Q \leq 10^5$
- $1 \leq U[i], V[i] \leq N$ and $U[i] \neq V[i]$
- $1 \leq A, B \leq N$ and $A \neq B$
- $-10^9 \leq X \leq 10^9$
- $1 \leq V \leq N$
- There is at least one instruction of the second type.

Subtasks

Subtask	Score	Additional constraints
1	7	$N = 2$ and $Q \leq 3$
2	10	There exists a classroom with doors to every other classroom
3	18	$N, Q \leq 2000$ and $-10^6 \leq X \leq 10^6$
4	26	No classroom has more than two doors
5	39	No additional constraints.

Examples

Example 1

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

The correct output is:

```
3
1
2
```