ACM-ICPC Indonesia National Contest 2016

Problem D

Arithmetic Sequence

Time Limit: 4 seconds

A sequence of integers (x_1, x_2, ..., x_m) is an arithmetic sequence if the difference between any two consecutive elements are the same. In other words, $x_i - x_{i+1} = x_j - x_{j+1}$ for any $1 \le i \le j < m$. By definition, any sequence with less than three integers is also an arithmetic sequence.

Given a sequence of integers a_1, a_2, ..., a_n and Q queries, where each query is one of the following:

i. `1 p q` : change the value of a_p into q.

ii. `2 s t` : output whether (a_s, a_{s+1}, ..., a_t) is an arithmetic sequence.

For each query of the first type (i), the change is reflected in the original sequence and may affect any future queries. For each query of the second type (ii), you should ouput "YES" or "NO" whether it satisfies the query.

For example, let there be a sequence $a_{1..5}$ = (2, 4, 8, 14, 20) and 5 queries:

- `2 3 5` : is $a_{3..5}$ = (8, 14, 20) an arithmetic sequence? output: YES.
- `2 1 3` : is $a_{1..3}$ = (2, 4, 8) an arithmetic sequence? output: NO.
- `1 3 6` : change a_3 into 6, so the sequence becomes $a_{1..5}$ = (2, 4, 6, 14, 20)
- `2 1 3` : is $a_{1..3}$ = (2, 4, 6) an arithmetic sequence? output: YES.
- `2 3 5` : is $a_{3..5}$ = (6, 14, 20) an arithmetic sequence? output: NO.

Input

The first line of input contains an integer T (T ≤ 10) denoting the number of cases. Each case begins with two integers N and Q (1 ≤ N, Q ≤ 50,000) denoting the number of integers in the sequence and the number of queries, respectively. The next line contains N integers a_1, a_2, ..., a_N (1 ≤ a_i ≤

1,000,000,000) each separated by a single space, representing the given sequence. The next Q lines represent the queries, where each line is one of the following:

i. `1 p q` (1 ≤ p ≤ N; 1 ≤ q ≤ 1,000,000,000).

ii. `2 s t` (1 ≤ s ≤ t ≤ N).

Output

For each case, output in a line "`Case #X:`" where `X` is the case number, starts from 1. For each query of the second type (ii), output "YES" or "NO" (without quotes) in a single line whether the query is satisfied.

Sample Input	Output for Sample Input
2 5 5 2 4 8 14 20 2 3 5 2 1 3 1 3 6 2 1 3 2 3 5 10 4 1 2 3 4 5 6 7 8 9 10 2 1 10 1 4 6 2 4 5 2 3 5	Case #1: YES NO YES NO Case #2: YES YES NO

Explanation for 2nd sample case

The original sequence $a_{1..10}$ = (1, 2, 3, 4, 5, 6, 7, 8, 9, 10); and there are 4 queries:

- `2 1 10` : is $a_{1..10}$ = (1, 2, 3, 4, 5, 6, 7, 8, 9, 10) an arithmetic sequence? output: YES.
- `1 4 6` : change a_4 into 6, so the sequence becomes $a_{1..10}$ = (1, 2, 3, 6, 5, 6, 7, 8, 9, 10).
- `2 4 5` : is $a_{4..5}$ = (6, 5) an arithmetic sequence? output: YES.
- `2 3 5` : is $a_{3..5}$ = (3, 6, 5) an arithmetic sequence? output: NO.