Prefix Suffix Max

You are given an array a of n integers: $a[1], a[2], \ldots, a[n]$. Your task is to process q operations of the following two types.

- $0 \;\; l \;\; r$:
  - Compute the prefix max array p of size $r - l + 1$, where
$$p[i] = \max(a[l], a[l+1], \ldots, a[l+i-1]) \quad \text{for } 1 \le i \le r - l + 1.$$
  - Compute the suffix max array s of size $r - l + 1$, where
$$s[i] = \max(a[l+i-1], a[l+i], \ldots, a[r]) \quad \text{for } 1 \le i \le r - l + 1.$$
  - Compute z, the dot product of p and s, that is,
$$z = \sum_{i=1}^{r-l+1} p[i] \cdot s[i].$$
  - Print z modulo $998\ 244\ 353$, that is, if q and r are uniquely determined integers such that
$$z = q \cdot 998\ 244\ 353 + r \quad \text{and} \quad 0 \le r < 998\ 244\ 353,$$
print r.
- $1 \;\; l \;\; r \;\; x$:
  - Add x to each of the elements $a[l], a[l+1], \ldots, a[r]$.

Input

Read the input from the standard input in the following format:

- line 1: $\;n \;\; q$
- line 2: $\;a[1] \;\; a[2] \;\; \ldots \;\; a[n]$
- line $2 + i$ ($1 \le i \le q$): this line describes operation i and follows one of the following formats:
  - $0 \;\; l \;\; r$
  - $1 \;\; l \;\; r \;\; x$

Output

Let k be the number of operations of the first type. Write the output to the standard output in the following format:

- line i ($1 \leq i \leq k$): the answer to the i-th occurrence of the first type of operations.

Constraints

- $1 \leq n, q \leq 100\ 000$
- $1 \leq l \leq r \leq n$
- $-100\ 000\ 000 \leq a[i] \leq 100\ 000\ 000$ (for all $1 \leq i \leq n$)
- $-100\ 000\ 000 \leq x \leq 100\ 000\ 000$

Subtasks

1. (4 points) $n, q \leq 1000$
2. (6 points) $a[i] \leq a[i+1]$ (for all $1 \leq i < n$), and all operations are of the first type.
3. (8 points) $1 \leq a[i] \leq 2$ (for all $1 \leq i \leq n$), and all operations are of the first type.
4. (13 points) $1 \leq a[i] \leq 500$ (for all $1 \leq i \leq n$), and all operations are of the first type.
5. (25 points) All operations are of the first type.
6. (44 points) No further constraints.

Examples

Example 1

```
5 3
1 2 5 3 4
0 1 5
1 1 2 4
0 1 5
```

The correct output is:

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80
144
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For the first operation, $p = [1, 2, 5, 5, 5]$ and $s = [5, 5, 5, 4, 4]$. So, $z = 1 \cdot 5 + 2 \cdot 5 + 5 \cdot 5 + 5 \cdot 4 + 5 \cdot 4 = 80$.

After the second operation, $a = [5, 6, 5, 3, 4]$.

For the third operation, $p = [5, 6, 6, 6, 6]$ and $s = [6, 6, 5, 4, 4]$. So, $z = 5 \cdot 6 + 6 \cdot 6 + 6 \cdot 5 + 6 \cdot 4 + 6 \cdot 4 = 144$.